CHESAPEAKE
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New state plans reveal tough path to 2025 cleanup goals

≈ PA plan admits it falls short of goal; NY hints it may not follow theirs; ag and stormwater runoff bedevil almost all jurisdictions.

By Karl Blankenship

In April, states submitted yet another round of roadmaps outlining how they intend to reach Chesapeake Bay cleanup goals by 2025. But, 36 years after the region committed to cleaning up the nation's largest estuary, the latest draft plans still won't get them over the finish line.

That's largely because of Pennsylvania, which submitted a draft plan to the U.S. Environmental Protection Agency that falls far short of its cleanup goal. New York submitted a plan, but suggested it did not intend to fully implement it.

Other states drafted plans that meet their goals on paper. But in many cases, they require a nearly unprecedented increase in the amount of on-the-ground actions that reduce polluted runoff from farms and developed lands.

The EPA is reviewing the drafts to determine whether they meet pollution goals for each state and whether states have adequate funding, staffing and programs to implement them.

The agency has the ability to take action against states that fall behind on their goals, and pressure is mounting for Pennsylvania to face consequences if it continues to come up short.

The region has been working to clean up the Bay since 1983 and set its first voluntary cleanup goal in 1987. It then repeatedly established and fell short of goals to control nitrogen and phosphorus, two nutrients that spur algae blooms in the Bay.

The blooms block sunlight, killing underwater grass beds — one of the Bay's most important habitats for juvenile crabs, fish and waterfowl. When the algae die, they draw oxygen from the water, leading to oxygen-starved dead zones that put large areas of the Bay off-limits for everything from fish to bottom-dwelling worms.

After earlier goals were missed, the EPA imposed a regulatory plan, called the Chesapeake Bay Total Maximum Daily Load or "pollution diet," in 2010. It established enforceable limits on the amount of nutrients entering the Bay

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This is the view of the Susquehanna taken from above Highpoint Scenic Vista near Wrightsville, PA, in the Susquehanna National Heritage Area. (Susquehanna Heritage)

New National Heritage Area to highlight Susquehanna

≈ Designation likely to attract more visitors to York and Lancaster counties' natural, historical and cultural features.

By Ad Crable

The majestic Lower Susquehanna River, its vistas, wooded hills, sculpted potholes — in the river rocks, not roads — and its place in shaping U.S. history will get more attention now that it has earned a seat among the nation's other 54 national heritage areas.

The Susquehanna National Heritage Area was recently created by Congress and President Donald Trump, after 11 sometimes frustrating years in the making. It includes 53 miles of the river at its widest and deepest point and all of Lancaster and York counties to the Maryland line.

"The Susquehanna is so significant to American history, and it is such a special place. I think it deserves it," said Mark Platts, president of Susquehanna Heritage, a nonprofit coalition of partners from both counties that pushed for the designation and will guide its moving forward.

"It was part of our vision to be a national destination," he said. "The heritage area is seen as a vehicle to do that. We would like to see a combination of more recreation and interpretation."

That means more programs and experiences for visitors and the area's residents alike.

The designation brings the heritage area under the umbrella of the National Park Service and its familiar brown logo. Local officials hope the increased recognition and visibility will mold the two counties into a

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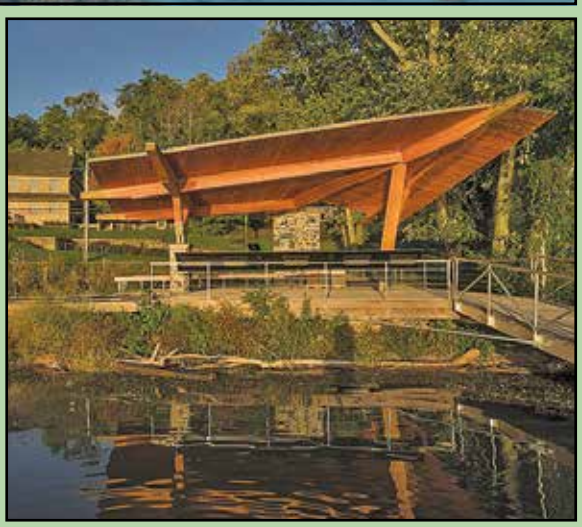

A kayak launch at the Zimmerman Center for Heritage provides access to the Susquehanna River as part of the Captain John Smith Chesapeake National Historic Trail. (Dave Harp)

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Editor's Note

Can we WIP Chesapeake into shape? Only time will tell

It was a momentary lapse. I recently called someone and asked about a "tributary strategy."

"What?" they wondered.

It's a term that's not been actively used in Bay circles for many years. Tributary strategies were the original Bay cleanup plans — making the foundational connection that cleaning up the Bay means cleaning up the rivers that flow into it. They were first written by states in 1992, with a couple of iterations over the next decade.

The strategies laid out what states had to do to meet the Bay nutrient reduction goals as they were written at the time, the first of which was set in 1987. Obviously, they were not totally effective, as we are still talking about meeting Bay water quality goals. Today, though, our strategies are called "watershed implementation plans." These documents are not only more specific than their predecessors, but potentially more enforceable under the Bay's Total Maximum Daily Load, established by the U.S. Environmental Protection Agency in 2010.

In the coming months, we'll get an idea about whether the WIPs are indeed more effective. The drafts released April 12 were supposed to be something of the endgame — the plans that would show how the remaining nutrient reduction gap would be closed between now and 2025, thereby restoring healthy conditions throughout the Chesapeake.

Frankly, it's not encouraging. Pennsylvania's plan doesn't add up, and its task is beyond daunting. New York, which has made relatively little progress, has declared that it will keep doing the same things, even if it doesn't get to the goal.

For many of the other states, meeting goals would require the implementation of runoff control practices on farms at rates far greater than have been seen in the past, and they require continued over-performance by wastewater treatment plants to cover likely shortfalls from the stormwater sector.

The EPA is reviewing plans to determine if they are feasible and adequately show how remaining gaps should be filled. If not, it could potentially set the stage for future agency action. The public is encouraged to review the plans as well.

WIPs were supposed to make the Bay cleanup efforts "real" in a way the tributary strategies never did. Soon, we'll find out if that's the case.

Stream *'An Island out of Time'*

The latest film sponsored by *Bay Journal, "An Island out of Time,"* premiered to on Maryland Public Television in April.

The half-hour documentary, produced by the filmmaking team of Sandy Cannon-Brown, Dave Harp and Tom Horton, tells the story of a seafood-harvesting family on Smith Island, MD, their vanishing heritage and culture — and the difficult decisions made by their children to break with that tradition. Based on Horton's 1996 book, the film is an elegy for a place beset with erosion, dwindling population and vanishing economic opportunities.

Feedback has been overwhelmingly positive. If you haven't seen it yet, you can watch it on our website. Visit bayjournal.com and click on "Films."

— Karl Blankenship

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Clockwise from left:

Canvasback decoys in a pile with other duck carvings recall a time when this waterfowl was the object of market hunters. See article on page 10. (Ad Crable)

Cyclists follow the Pennsylvania Dutch route in the Farm to Fork Fondo, intended to raise awareness about farmland conservation. See article on page 26 (Courtesy of Wrenegade Sports)

Some call the eastern salamander a devil dog, mud devil, snot otter or Old Lasagna Sides. Pennsylvania has named the creature its state amphibian. See article on page 20. (Dave Harp)

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Going native? Let experts help you find the best plants for your needs

By Abbi Huntzinger

There are few things more exciting than a garden awakening in spring with a buzz of activity. In May, many of us in the Chesapeake region are patiently waiting for serviceberry, milkweed, phlox and other plants to bloom and lure pollinators and other wildlife to our native gardens.

Some of us are planning how to expand our native gardens to extend their seasonal interest, attract more wildlife, and/or reduce lawns and other high-maintenance landscapes.

In recent years, many great resources have been developed to help identify native plants species that match our needs based on location, soils, sun exposure and bloom time. These include:

- *Chesapeake Bay Native Plant Center:* nativeplantcenter.net
- *National Wildlife Federation's Garden for Wildlife Native Plant Finder Tool:* nwf.org/NativePlantFinde
- *Lady Bird Johnson Wildflower Center Find Plants:* wildflower.org/plants
- *Audubon Native Plants Database:* audubon.org/native-plants
- *U.S. Natural Resource Conservation Service PLANTS Database:* plants.usda.gov

Once you identify the right plant for the right place, where can you find these species? Sourcing quality native plants that function the way you want them to has not always been easy. Thanks to increasing demand in both the landscape design and consumer sectors, though, growers and vendors have been steadily increasing native plant offerings. Asking local nurseries to stock more native species can help them plan for this increasing demand. Leslie Cario, Principal at Chesapeake Horticultural Services, LLC, suggests that designers and consumers engage in informed discussions with plant vendors to ensure plant selection matches desired native garden goals.

Monarch butterflies feed on a groundsel tree on Poplar Island in Talbot County, MD, in 2016. (Will Parson / Chesapeake Bay Program)

Here are smart questions to ask vendors:

- What percentage of your plant offerings consists of native plants?
- How would you describe the native range of these plants? (native to the United States, this region, local ecotype, unsure)
- Are the native plants you provide primarily straight species, cultivars or both?
- How are the plants cultivated? (grown from seed you've purchased, grown from seed you collected, purchased from another grower, propagated from cuttings of another plant, propagated from tissue culture, unsure)
- What is your policy on using pesticides/fertilizers/other chemicals?
- What is looking good/what's available in my time frame?

While there are no right or wrong answers to the questions above, it is important to understand the answers in the context of your own native garden goals. If your garden is more ornamental in nature and not adjacent to wild populations of plants, then it may make sense to include native species cultivars that are propagated from the cuttings of another plant because these plants may be more attractive in form and bloom. If you are working on a garden that is less about aesthetics and more about ecosystem restoration, then it may make sense to find the straight species of the native plant. Regardless of your native garden goals, being more informed when sourcing native plants will help you meet your goals.

If you are asking a plant vendor questions about native plants that they cannot answer, you may want to seek another vendor. Many native plant information sources, including some of the resources listed above, include lists of select native plant vendors. These lists are not all-inclusive, and there is the possibility that your favorite local plant vendor can supply you with the right native plant — sometimes all you have to do is ask!

Jeffrey Popp, senior program manager at the Chesapeake Bay Trust, suggests that by expressing the importance of and growing demand for native plants in the Chesapeake region, you have the opportunity to prompt the increased availability of native plants from that vendor.

And if you are feeling brave, sharing with the vendor the negative impacts of supplying invasive plants can prompt a reduced availability of these plants. You may be asking which plants are considered invasive. That is another topic for another day. But if you need a good reference, *Plant Invaders of Mid-Atlantic Natural Areas* is really helpful.

Beyond traditional plant vendors, the Chesapeake Bay region is fortunate to be home to many community and nonprofit organizations who offer native plant sales throughout the year. A calendar of native plant sales and related events is found on the Choose Natives website, choosenatives.org/native-plant-sales/2019-native-plant-sales-events, or through your local native plant society. While many of the organizations listed on this site have high standards for sourcing the native plants they are selling, it never hurts to ask the questions that will help you meet your own native garden goals.

If you find you need additional information in your native plant sourcing quest, there is a growing community of professionals who can help. The Chesapeake Bay Landscape Professional certification program trains and certifies regional sustainable landscape professionals, many of whom are native plant specialists. The program's coordinator, Beth Ginter, encourages those seeking native plant sourcing assistance to visit the program's website, which includes a searchable directory where you can locate certified professionals in your area.

Enjoy the buzz as your garden awakens this spring! And when it comes to sourcing native plants, know that you play a vital role in shaping an informed and growing native plant movement in our region!

Abbi Huntzinger is the Maryland restoration program manager at the Alliance for the Chesapeake Bay.

What is a Native Plant Cultivar?

Shortened from "cultivated variety," cultivar refers to a plant that has been altered by humans to display certain desired characteristics such as leaf color, bloom color, bloom size, and more. In the native plant world, a native plant cultivar is the result of altering the genetics of the original native plant variety found in the wild.

For many native plant enthusiasts, the notion of using native cultivars can cause trepidation. A recent study led by Mt. Cuba and the University of Delaware found that over a two-year period little difference exists in the abundance and diversity of insect herbivores on cultivars versus straight species of native plants.

A significant decrease in insect herbivore activity was observed in cultivars where leaf color was changed from green to red, blue or purple. The study suggests that cultivars that retain their green leaf color can play a role in restoring and/or sustaining insect-driven food webs.*

Additional studies are examining the impact that changes in flower shape, bloom time, and other physical characteristics of cultivars have on wildlife. Changes in these characteristics could have negative impacts for pollinators such as reduced access to pollen and nectar.

**Baisden, Emily C., et al. "Do Cultivars of Native Plants Support Insect Herbivores?" HortTechnology, vol. 28, no. 5, Oct. 2018, pp. 596-606., doi:10.21273/horttech03957-18.*

Fears over potential fishing regs hold up sanctuary designation for Mallows Bay

≈ NOAA trying to assure Hogan that it would only protect shipwrecks not regulate fishing.

By Timothy B. Wheeler

It's been four and a half years since the state of Maryland asked the federal government to make Mallows Bay a national marine sanctuary to safeguard the final resting place of a "ghost fleet" of World War I–era ships as well as some even older relics.

Despite having broad support, the effort to protect this historic ship graveyard on the Potomac River south of Washington, D.C. has been stalled for a year as Gov. Larry Hogan seeks extra assurance that the state's watermen won't lose their ability to crab, oyster and fish in what would become federally protected waters.

The National Oceanic and Atmospheric Administration, which oversees marine sanctuaries, has repeatedly said that the agency is only interested in protecting the maritime artifacts in Mallows Bay and won't meddle with fishing there. But lawyers for NOAA and Hogan have been unable to reach agreement so far. Advocates say they're frustrated by the delay.

"This has been held up by the governor for a year now," said Charlie Stek, chairman of a coalition of groups pursuing the marine sanctuary designation. "It's ridiculous. There's such a tiny minority of people who've raised concerns here," he added, asserting that "all their concerns have been addressed."

Submerged remains of century-old wooden vessels in Mallows Bay are most visible at low tide. (Dave Harp)

Not so, countered Robert T. Brown, president of the Maryland Watermen's Association. While recreational anglers, kayakers, conservationists, local officials and many others are enthusiastic about making Mallows Bay a sanctuary, Brown said he has yet to see an ironclad guarantee from NOAA that it will never invoke its legal authority to regulate or restrict commercial fishing in the proposed sanctuary.

"We want to maintain our livelihood," he said. Though Mallows Bay itself is too cluttered with wreckage for most commercial fishing gear, the river above and below it yields sizeable catches of blue catfish, as well as blue crabs, striped bass and even some oysters.

Often described as the largest ship graveyard in the Western Hemisphere, the small bay on the Maryland shore of the Potomac holds the sunken remains of nearly 200 known vessels dating to the Civil War, though some artifacts found there go back 12,000 years. It's best known as the watery crypt for more than 100 wooden steamships built to support the U.S. engagement in World War I.

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MALLOWS FROM PAGE

Finished too late to be used, they were deemed obsolete, towed to Mallows for salvage, and subsequently burned to the waterline.

The site was put on the National Register of Historic Places in 2015, not long after the state formally asked NOAA to make 18 square miles of the Potomac encompassing Mallows Bay a marine sanctuary. The nomination had widespread backing early on, including from sport and commercial fishing advisory groups. Many have extolled its historic and scenic qualities, others have called it a birdwatcher's paradise and suggested it has the potential to be a prime magnet for outdoor recreation and tourism.

After an extensive review, NOAA announced in early 2017 that it was prepared to go forward but said its "preferred alternative" for the new sanctuary would cover 52 square miles of the river, almost three times larger than the state's original request.

That drew enthusiastic support from most people and groups who weighed in during public meetings and the written comment period. But watermen in Maryland and Virginia rose up in vocal opposition, saying they'd been taken aback by how large the proposed protected area had grown. Noting that fishing is limited or prohibited in many other marine sanctuaries, they said they feared federal interference with their ability to earn a living on that stretch of water.

NOAA has repeatedly stressed that the sanctuary designation is intended exclusively to protect shipwrecks and artifacts, and fishing can continue as it does now. Paul "Sammy" Orlando, NOAA's liaison for the proposed sanctuary, said that pledge was written into a memorandum of understanding that's been drawn up since 2017 in talks between the federal agency, the state and Charles County, MD, where the sanctuary is located. NOAA also agreed to go along with the state's original proposal for an 18-square-mile area, which leaves out a few wrecks that the larger designation would have protected.

In early 2018, Orlando said, federal officials thought an agreement had been reached and were prepared to finalize the designation once the governor and Congress had an opportunity to review it, as the law requires.

Then, in March 2018, the governor's chief counsel, Robert Scholz, got involved, Orlando said. The NOAA liaison said the agency's initial communications with Scholz involved familiarizing him with the federal marine sanctuaries law and what was planned in Mallows Bay.

"We've been doing that back and forth with him," Orlando said, "and to a large degree a lot of what he's asking for falls into the category of assurances on top of reassurances."

A pair of ospreys made their nest on the remains of a ship in Mallows Bay. (Dave Harp)

Orlando said the memorandum of understanding outlining the plan for the sanctuary makes clear that it is solely for the protection of historic wrecks and artifacts, and that NOAA intends to leave all management of fisheries and other natural resources in the area to Maryland's Department of Natural Resources and to the bistate Potomac River Fisheries Commission.

Mallow's Bay holds the sunken remains of nearly 200 known vessels. (Dave Harp)

But Brown and other watermen point out that NOAA has authority under federal law to limit fishing in marine sanctuaries. And while the agency says it won't exercise that authority in Mallows Bay, they fear that could change in the future, because sanctuary management plans get reviewed and renewed every five years.

Scholz referred questions to the governor's communications office. Michael Ricci, Hogan's communications director, declined to discuss the "back and forth," as he put it. He said the Hogan administration "strongly supports the designation, and our counsel is working closely with NOAA on the final details."

Pressed to explain the state's position, Ricci added: "The governor's office is seeking protections for the state from potential federal overreach in Mallows Bay, including opt-out clauses."

Advocates for Mallows Bay say the governor's lawyer has pressed NOAA to give the state the right to revoke the marine sanctuary status up to 15 years after its designation.

NOAA agreed two decades ago to include an opt-out clause in its designation of another marine sanctuary, Thunder Bay on the Michigan shore of Lake Huron. Like Mallows Bay, it was designated solely for the purpose of protecting a cluster of shipwrecks that had occurred there. But it faced significant opposition from commercial fishermen, charter boat captains and scuba divers fearful that NOAA would not keep its word and interfere with them; one town even voted against the sanctuary proposal in a referendum.

In the case of Thunder Bay, NOAA granted the state a chance to pull out when the sanctuary management plan came up for review after its first five years. By that time, concerns had eased, and some outspoken opponents have since become vocal supporters.

Advocates say they think Mallows Bay is different because it enjoys broader support. Even so, they say they're willing to go along with the precedent NOAA set and offer a five-year opt-out in this case. But they object to extending that to 10 or 15 years.

"Overall, I think it's a bad precedent for land and water conservation efforts," said Kristen Sarri, president and CEO of the National Marine Sanctuary Foundation, a nonprofit advocacy group. "It doesn't show the state is willing to invest in the site. If that's the situation, it's hard for others to want to invest."

Some investments have already been made, and activities begun to promote Mallows Bay as a sanctuary.

Last year, for instance, Sarri's foundation gave the state a $62,500 grant to place a buoy in Mallows to do continuous water quality monitoring there. Charles County has a park on the shoreline and has offered guided kayak tours of the wrecks, as have other organizations.

On behalf of her organization and more than a dozen others, Sarri wrote Hogan, NOAA and some of Maryland's congressional delegation in March calling for Mallows Bay's designation without further delay.

"It's well past in our minds the time for a decision," Sarri said in an interview. "A lot of this lies with the governor's office because this is a community-driven process, so NOAA has to be and is being respectful of what the state wants to do. The groups that want to see this designation are wondering why the state is not taking action."

But Brown, the watermen's association president, said he remains opposed to the proposed sanctuary as it stands now.

Joel Dunn, president and CEO of the Chesapeake Conservancy, has also been an ardent advocate for the sanctuary. His group, in partnership with others, produced a downloadable paddler's guide to the wrecks and wildlife in the area. It's also posted a map of three paddling itineraries online along with a series of virtual reality tours of the site.

Dunn said he sees the sanctuary proposal as "a huge opportunity for the state of Maryland to celebrate its Chesapeake culture and wildlife." He added that he believes it would be "a huge tourism draw" and generate visitor spending for Charles County and other neighboring localities.

"I want to encourage them to keep working on it," he said of the lawyers for NOAA and the governor. "And I think it's just such an enormous opportunity, it would be a shame to miss out."

Pipeline proposal may undermine Delmarva forestry industry, critics say

≈ If MD's only biomass energy plant shuts down, landowners may have to switch land to less-environmentally beneficial uses.

BY JEREMY COX

James Culp cuts some small pines to thin out a stand of pines on his tree farm near Powellville, MD. The thinning allows more light and nutrients to reach the remaining trees to augment their growth. (Dave Harp)

A proposal to shut down a Maryland prison's wood-fueled boiler is generating worries about the economic future of private forests that help keep the Chesapeake Bay clean.

State officials are seeking to extend natural gas service to the Eastern Correctional Institution south of Princess Anne, replacing a more than 30-year-old woodchip-burning system as the prison's source of heat and electricity.

About one-third of the pulpwood produced on the Eastern Shore finds its way to the prison, home to the state's only biomass energy plant. If it goes offline, forestry leaders fear it would undercut an industry that is already shrinking in the region and possibly force some landowners to switch their acreage to other uses, such as planting crops or building homes.

"Without markets for these products, it makes these lands more prone to development pressure," said Beth Hill, executive director of the Maryland Forests Association.

The prison's proposed conversion is setting off alarm bells among environmentalists, too. The loss of forested land could further erode water quality in the nation's largest estuary, while six states and the federal government scramble to meet a 2025 cleanup deadline, they said.

"Forests on the landscape are the best for water quality, hands down," said Craig Highfield, head of the Alliance for the Chesapeake Bay's forestry program. "In essence, these private foresters are doing a public good."

Trees and shrubs filter up to 65 percent of nitrogen and 45 percent of phosphorus from stormwater as it runs toward streams and the Chesapeake Bay, where it can spawn harmful algal blooms, studies show. Their roots also stabilize stream banks, preventing the leaching of sediment that can impede the growth of aquatic grass.

But the amount of forested land has plummeted in the Bay watershed from 95 percent of land cover in the 1600s to 55 percent today. And nearly 80 percent of what remains is in private hands. During the 1990s and early 2000s, mid-Atlantic forests were lost to development at a rate of 100 acres per day, according to the U.S. Forest Service.

Forests are considered so important they were written into the 2014 Chesapeake Bay Watershed Agreement between the U.S. Environmental Protection Agency and the watershed's states. The agreement reaffirmed an earlier goal of restoring 900 miles of stream-adjacent forests per year.

The Eastern Correctional Institution, commonly called by its acronym ECI, houses about 2,840 inmates in a medium-security complex and 560 others in a minimum-security annex. It receives all of its heating and about 85 percent of its electricity from a boiler that consumes about 50,000 tons of wood chips per year, according to state estimates.

The facility's unusual energy arrangement is the result of a mixture of politics and economic development, said Bill Miles, the lobbyist for the Association for Forest Industries. In the early 1980s, when backers of ECI's construction were trying to win support among state lawmakers, Miles was the chief of staff on the Maryland Senate's Budget and Taxation Committee. He recalled that the installation of a wood-based boiler was dangled as a potential economic windfall for Somerset County, historically one of the state's poorest counties.

"The idea was to take a resource that's abundant and available and convert it into energy for that prison down there," Miles said.

Today, the aging system is operating below its advertised efficiency and requires fuel oil for starting up and "support," according to state records. "It's a dinosaur, but it's still functioning," Miles said.

As officials move toward a possible new energy source for the state-owned prison, economic gain is once again a driving theme.

Somerset is one of three counties in Maryland where there are no natural gas distribution lines. Local boosters hope that the move opens the door to future natural gas expansion to the town's industrial park, which has struggled to lure employers, in part because of its lack of pipeline access.

"Companies coming in ask, 'What do you have to offer?'" said Dennis Williams, a town commissioner and member of the Somerset County Economic Development Commission. "Everyone wants to have the natural gas."

Last August, the Maryland Environmental Service, a self-supporting state agency, began asking natural gas suppliers to submit construction bids on a pipeline to ECI and the University of Maryland Eastern Shore, which is in Princess Anne, Somerset's county seat. The gas would have to be flowing by 2022, according to bid documents.

Craig Renner, an MES spokesman, said he couldn't comment on the proposal while the bidding process is ongoing. Bill Robinson, a spokesman for the university, supplied a brief statement, saying the parties are "evaluating the best path forward in providing natural gas to the lower Eastern Shore."

The MES is now in talks with the project's lone bidder: Chesapeake Utilities. The publicly traded corporation, based in Dover, DE, is the parent company of Eastern Shore Natural Gas, which operates a nearly 500-mile network of pipelines in southeastern Pennsylvania, Delaware and Maryland's Eastern Shore.

Last September, the company filed an application with the Federal Energy Regulatory Commission seeking approval for a $37 million project that would create four pipeline segments totaling nearly 20 miles. One of those segments, if green-lighted by FERC and other regulators, would extend a pipeline for more than 6 miles south from Salisbury in Wicomico County to a point just below Somerset's northern boundary.

A Chesapeake Utilities representative offered few details about the ECI proposal in an email to the *Bay Journal*, but he clarified that additional piping would be needed to carry the gas from the proposed pipeline's terminus near the county line to the college and ECI. "Our goal is to continue to find ways to provide the underserved areas on the (Delmarva) Peninsula with low-cost, environmentally beneficial energy solutions," Justin Mulcahey wrote.

On its own, the prison's switch to natural gas, if it happens, is unlikely to doom the Eastern Shore's forestry industry, experts say. But it would take another swipe at a business facing a death by a thousand cuts.

"It is important income for [owners of] private forests in the area," said Sally Claggett, Chesapeake Bay Pro-

BOILER CONTINUES ON PAGE 9

Boiler from page 8

gram Coordinator for the U.S. Forest Service. "It's just like farmers. They need a place to sell, and it's always a challenge to find a market, especially since the mills keep closing."

During the 2000s, about half of the state's sawmills closed amid the global economic downturn. One sawmill in Linkwood, about 50 miles northwest of the prison, was set to go up for auction in April.

The Maryland Forests Association and the Association of Forest Industries said the loss of the wood market at ECI would cost 50 jobs regionally and $7 million in economic activity.

They also claim that forest management would suffer.

Joe Hinson is a consultant for Eastern Shore Forest Products, the Salisbury-based timber company under contract to supply ECI with its pulpwood. The wood sent to ECI is usually harvested during a practice called "thinning," when loggers remove brush as well as young or damaged trees from a forest. Thinning, he said, makes forests less susceptible to devastating fires and sets the stage for more-valuable trees to receive more sunlight and nutrients, speeding their growth.

Without the ECI market, many Delmarva landowners will no longer have a financial incentive to thin their woodland, Hinson said.

Forestry leaders worry that shuttering Eastern Correctional Institution's wood-based energy system could lead to more clear-cutting like this in Talbot County. (Dave Harp)

"Basically, the state is spending taxpayer money to entice a gas company to build a pipeline to ECI that destroys local jobs and is detrimental to both forest management and the ability of landowners to maintain their land as productive forest," he added.

Forest industry supporters also question the move's timing, pointing to a law requiring 25 percent of the state's electricity to come from renewable sources by 2020. Maryland lawmakers passed a bill in the closing hours of their spring session this year that increases that standard to 50 percent by 2030. The measure requires Gov. Larry Hogan's signature to become law. Wood products like those used for the ECI energy plant are designated as "Tier I" renewable sources under the state's energy credit system.

If the state is determined to replace the old ECI boiler, it should build at least one new wood-fueled system elsewhere to keep the market alive, Miles said.

James and Linda Culp own hundreds of acres of timberland on the lower Eastern Shore. Nearly a decade ago, loggers slashed away about 3,500 tons of hardwood from a forest they own near Pocomoke City in Worcester County. Its destination: ECI's energy plant.

What was once a stand "as thick as dog hairs" is now a healthy forest where trees have room to breathe, James said. To him, maintaining the wood chip boiler is a win for renewable energy and to the Eastern Shore's landscape.

"I'm not against natural gas, but natural gas is not a renewable resource," he said. "Trees are a renewable resource."

Recent large rafts of canvasbacks a feast for birders' eyes, not gourmets' tables

≈ Sightings of popular waterfowl stir memories of days when market hunting and decoy carving ruled the Upper Bay.

By Ad Crable

One male stands out in a raft of canvasbacks on the Choptank River in 2016. (Dave Harp)

On a cold morning last February, Bob Schutsky looked out the dining room window of his home along the Susquehanna River in southern Lancaster County, PA, and spied a raft of tightly packed ducks that made his heart race.

Four days before, 36 miles south at the head of the Chesapeake Bay, Rick Bouchelle glanced outside the Upper Bay Museum in North East, MD, and stared in disbelief at a floating flock of ducks.

"They were so thick in there you could walk on them. There were thousands," the president of the museum recalled, still with a tinge of excitement.

Both men were thrilled to the bone because they recognized the waterfowl immediately as canvasbacks.

For Schutsky, a well-known ornithologist, it was a notable birdwatching sighting. For the next month, he posted daily updates of the canvasback numbers on a statewide website. As the ranks hanging out in the middle of the river swelled to 515, birders came from far and wide to see a species of waterfowl that once dominated the Susquehanna but had been mostly gone for generations.

For Bouchelle, seeing so many of the handsome diving ducks with their distinctive sloping, rusty red heads was like seeing a ghost, and strong memories of the past welled inside him.

Canvasbacks are birds of lore on the Chesapeake Bay. For almost a century, the Bay was the wintering grounds for at least half of all canvasbacks in North America — about 250,000. Hunting for the large and tasty ducks helped define the Bay's identity, creating a distinctive culture and representing a big chunk of the economy for towns at the water's edge.

Hunters in a sinkbox wait low in the water for ducks in this photo taken on the Susquehanna Flats in 1950. (Upper Bay Museum)

No part of the Bay was more synonymous with canvasbacks as the Upper Bay and most specifically the Susquehanna Flats. Plant-boosting nutrients and topsoil flushed into the shallow, 25,000-acre flats from the Susquehanna River and created ideal growing conditions for underwater grasses, including wild celery and widgeon grasses — the caviar for migratory ducks. Today, an overload of nutrients and sediment has become a problem rather than a boon, creating algae blooms and smothering grasses. Curbing them is at the core of the Bay restoration effort.

From approximately the Civil War until about 1950, the Upper Bay offered the finest canvasback hunting in the world. Business magnates and celebrities such as Annie Oakley and President Grover Cleveland flocked to area towns and hunting lodges for autumn hunts guaranteed to bring action and gunning without limits.

Some of the largest lodges, including one owned by banker John Pierpont Morgan, were located on what is now the Army's Aberdeen Proving Ground.

It's no coincidence that both the Upper Bay Museum and nearby Havre de Grace Decoy Museum sport canvasbacks on their logos.

And, Maryland Del. Mary Ann Lisanti, a Havre de Grace resident, is trying to get the canvasback designated as Maryland's state waterfowl.

Her first attempt failed but she vowed to continue her quest. "Some things in life take time, and this is no exception," she said. "I will continue to advocate for preserving our rich cultural history while looking to the future to find innovative ways to link our waterfront communities together."

Decoy carvers, who fashioned and painted lifelike representations of canvasbacks, were in great demand. Men from Upper Bay towns such as Havre de Grace, North East, Elkton and Charlestown began hand-chopping, carving and painting wooden decoys to meet hunters' demands.

They didn't know it at the time, but the period would make legends of blue-collar decoy carvers on the flats: James Pierce, Harry Jobes, Bob McGaw, Paul Gibson, Charles Joiner and many others, especially R. Madison Mitchell, a funeral home director from Havre de Grace whose decoys now fetch more than $10,000.

Havre de Grace still bills itself as the "decoy capital of the world."

The wild celery that used to abound in the flats gave canvasbacks a distinctive savory taste. With the invention of refrigerated railroad cars in 1870, the ducks became the preferred wild game delicacy on the East Coast.

In novelist Edith Wharton's Pulitzer Prize-winning *The Age of Innocence*, about the bluebloods of New York City in the Gilded Age (1870s–1900s), the protagonists are served canvasbacks and Maryland terrapins, along with fine wines.

Market hunters killed canvasbacks by the hundreds in the morning, and by evening, diners in the finest restaurants in Baltimore, Philadelphia, New York and Boston could feast on the delicacy.

"They were loaded in wooden nail kegs and shipped to restaurants. They weren't even dressing them out. You were just shooting them and piling 'em up," Bouchelle said.

The demand for canvasbacks soon spawned a market for weapons that could take the migrating waterfowl in ever-increasing numbers.

Perhaps the ultimate example was the punt gun, a crudely fashioned shotgun approaching the effectiveness of a small cannon. The guns, filling most of the length of low-profile skiffs, were simple guns made from steel pipes and folded into a wood block. They had to be anchored to the skiff to protect shooters from the recoil.

A single blast from their wide shot pattern was capable of taking out 30 ducks or more. One account claimed 54 ducks were killed from a single discharge.

Market hunters would take ducks by any means necessary. Thus, much hunting occurred at night when the ducks were at rest on the water, floating in tight flocks and were, literally, sitting ducks. The boats that sneaked up on them were painted grey to blend in with the reflected moonlight.

Sinkboxes were another effective hunting device. They resembled floating coffins with wings that unfolded when the rigs were moved into place.

Flat-bottomed iron decoys were placed on the attached wooden platforms to sink the vessel to water level, and hunters would lie hidden in the coffin-like space. Lighter, flat-bottom wooden decoys were scattered on canvas wings and 300 to 700 wooden decoys were strategically scattered around the sinkbox

DUCKS CONTINUES ON PAGE 11

Ducks on Display

Two private museums capture the rich history of hunting canvasbacks and other ducks on the Upper Chesapeake Bay and Susquehanna Flats.

Upper Bay Museum

Devoted to preserving the area's culture of the hunters and watermen, the museum is located in an old shad and herring-processing facility on the North East River that operated from 1880–1973. The floor of the museum used to be knee-deep in fish. Today you will find displays of hunting, boating and fishing tools. Visitors can trace the long history of the waterfowl hunter through various gunning rigs and an extensive display of original working decoys. The museum includes one of the country's best collections of marine engines.

Location: 219 W. Walnut St., North East, MD; 410-287-2675, upperbaymuseum.org.

Hours: 12–4 p.m. Fridays, Saturdays and Sundays, Memorial Day through Labor Day. The museum is closed from the Decoy Show (mid-October) until Memorial Day weekend. Groups may call to arrange for a tour when the museum is not open.

Admission: Free. Donations welcome.

Upcoming events: Upper Shore Decoy Show, Oct. 19., North East Fire Hall, 210 Mauldin Ave.

Havre de Grace Decoy Museum

Located on the banks of the historic Susquehanna Flats, the museum houses one of the finest collections of working and decorative decoys from the area's famed carvers. The building once housed the swimming pool for the adjacent Hotel Bayou, a lavish structure built in 1921 mainly to accommodate visiting waterfowl hunters.

Location: 215 Giles St., Havre de Grace, MD; 410-939-3739, decoymuseum.com.

Hours: 10:30 a.m.-4:30 p.m. Monday through Saturday and 12–4 p.m. Sundays, year-round. Closed New Year's Day, Easter, Thanksgiving, Christmas, and the day the city of Havre de Grace holds its 4th of July Parade & Fireworks, which may or may not be the 4th of July.

Admission: $6 / adults; $5 / ages 60+

Ducks from page 10

in the water.

When a flock of canvasbacks approached, hunters would jump up and shoot.

Sinkboxes and live decoys were outlawed by the federal government in 1935.

Less elaborate were "sneak" or "bushwhack" boats. A single 10-foot oar protruding from the stern of the boat allowed a sculler to silently propel the boat toward a flock of ducks that had landed in the decoy spread, while two other hunters hunkered down, ready for action.

Market hunting ended abruptly with the passage of the Migratory Bird Treaty Act in 1918. Alarmed at the declines of many bird species because of commercial hunting for consumption and feathers for women's hats, Congress passed legislation that for the first time placed kill limits on migratory birds.

A lifelike mannequin of decoy carver Robert Litzenberg is found at the Havre de Grace Decoy Museum. (Ad Crable)

Even without a commercial market, hunters were still keenly interested in the Upper Bay's canvasbacks.

One method that became popular after the ban on sinkboxes was "body boot hunting." Hunters would don one-piece surplus World War I diving suits and wade into the Flats amid their spreads of decoys. The hunters would stand behind a cutout silhouette of a Canada goose stuck in the mud with a pole. The back of the cutout included a shelf for ammo.

The end of an era came abruptly with an August 1950 storm that ripped up submerged grasses that had grown on the Flats for centuries. Without their preferred food, most of the canvasbacks went elsewhere. Hurricane Agnes in 1972 was the final nail in the coffin, smothering the remaining grasses in an underwater wave of sediment.

Were the large flocks of canvasbacks seen by Bouchelle and Schutsky last winter an anomaly or signs of something more?

A display of old, mostly canvasback, decoys at the Upper Bay Museum attests to the popularity of the duck among hunters the late 1800s and early 1900s. (Ad Crable)

Each winter since 1955, the Maryland Department of Natural Resources has conducted a survey of the various duck species spending the season on the Chesapeake Bay.

This winter, 46,000 canvasbacks were sighted, actually down from 60,000 the previous year. But Josh Homyack, the agency's waterfowl project manager, cautions against reading too much into the numbers, especially for last winter, when high water flows impeded counts and dispersed flocks.

"A lot of people saw them scattered around the Bay this year and thought populations would be high and were disappointed [that the survey's results] were not," Homyack said. Still, he added, "Most hunters had really good duck hunting on the Bay this year, particularly scaup and canvasbacks."

That's enough to spark a dream in Kerri Kneisley, executive director of the Havre de Grace Decoy Museum, who also saw one of those large flocks.

"Gosh, I wish we would see that like we used to."

Piscataway Park to share complex past of its peoples, landscape

≈ 'Viewshed' coming out of Mount Vernon's shadow to shed light on its own history.

By Whitney Pipkin

Among the heavily wooded acres of Piscataway Park, on Maryland's shore of the Potomac River, is a popular collection of cattle, sheep, hogs and plants — their breeds and varieties far more common on local farms during the 1700s than today. They are the living dressing on a recreated colonial farm — a farmhouse and tobacco barn and costumed interpreters — established there in 1958.

But the colonial era story highlighted in the park's 5,000 acres is only one layer in the long, complex history of the land and its people.

That's why the Accokeek Foundation, the nonprofit group that runs the farm, wants to do more.

"We want to listen to the rhythm of the land and the river and listen to the various stories of the land," said Gene Roberts, one of the nonprofit's board members, during a conversation the foundation hosted on March 31.

The discussion about the "complicated story" of conservation was one of three this spring aimed at incorporating a diversity of perspectives into the site's interpretation.

The series, explained Shemika Berry, Accokeek's interpretation coordinator, "is designed to honor the voices of those who were here on this land before us, and those who still live here."

The Piscataway people inhabited the riverside area for thousands of years before the English explorer John Smith encountered them in the early 1600s. Their communities suffered violence and disruption as colonists came to control the landscape. Farms and plantations grew, depending greatly on the work of enslaved people, and changed over time.

This is the view across the Potomac River from Piscataway Park, a national park near Accokeek, MD. The park was originally preserved to protect the tree-lined views of Mount Vernon across the river, but interpreters are looking to unearth more about the people who have used this land over the centuries. (Whitney Pipkin)

That took place before, in the 1700s, George Washington lived in the Mount Vernon mansion directly across the river. It happened before the land at Piscataway Park was preserved from development in the 1950s to protect the tree-lined view from that estate. But those colonial and conservation stories have formed the dominant narrative of this land for many of its more recent years.

Shemika Berry, Accokeek's interpretation coordinator, portrays Cate Sharper, a fictitious enslaved woman, whose son was sold to another plantation. Visitors to her garden, planted with heirloom varieties, get a glimpse into African American foodways and how "the dignity of labor [helped enslaved people] transcend unthinkable exploitation and hardship." (Courtesy of Accokeek Foundation))

To only tell one slice of that history, said Accokeek Foundation president and CEO Laura Ford, is to miss an opportunity. But to do justice to each of the land's past and present inhabitants — without taking visitors through a disorienting time warp — can be challenging, too.

"This landscape tells us a story of generations of change," she said. Yes, Piscataway was the first national park set aside to preserve a historic vista, "but that's only part of it. It also preserved the heart of the traditional homeland of the Piscataway people. It preserved a landscape that carries the stories of first contact [with European settlers] and colonization and the story of the evolution of agriculture against the backdrop of slavery, emancipation, Jim Crow, the Civil Rights movement and the American Indian movement."

Ford said conversations like the ones they are hosting help provide information for future interpretations of the property, allowing caretakers to expand their perspective.

"It's what's driving our interpretive planning process, and that's what's going to get us to a place where we're telling a different story," she said, "a more authentic story of this landscape."

Piscataway Park also includes the remains of former Piscataway Chief Turkey Tayac, whose burial at the national park site in 1979 required a permit from Congress, according to a *Washington Post* article.

Chris Newman, a farmer, software engineer and member of the Choptico Band of Piscataway Indians, opened up the March discussion by saying the decision to pursue a community dialogue was a brave one. Land conservation, he said, can be "a fraught issue for indigenous people."

"It can be tempting to stand up and say, 'That land was stolen, and that, and that,' " he said. "But that doesn't help a lot when it comes to a sensitive and nuanced discussion. Conservation means different things to different people. Where we are now is a place where we are finally starting to appreciate those perspectives."

Many of the people in the room were residents of the Moyaone Reserve, a nearby residential community named after a historic Piscataway village site in the area. The community, made up of mostly 5-acre wooded lots and built around conservation values, is actually included within the boundaries of Piscataway Park, which is one of the few national parks with such an arrangement. Before the park was created, the community's early residents worked to protect the land from industrial development, explained Wilton Corkern, an adviser to the Accokeek Foundation who served as its president for 22 years.

"Beginning in the 1950s and '60s, a small group of women and men, right here in Accokeek, changed the way Americans would think about land conservation for the next two generations and protected this from private development," Corkern said, gesturing to some families in the room whose parents were a part of that early movement.

The conservation covenants they put in place to maintain a wooded community also protected the tree-canopy shoreline view from Mount Vernon. When the community became part of the national park, those covenants turned into federally held easements that require property owners to get National Park Service permission before felling large trees.

Many of the conservation-minded residents of the Moyaone Reserve remain active in efforts to protect the land and its surroundings from what they consider intrusive development. Last year, they worked with the Mount Vernon Ladies Association to convince Dominion Energy that an adjacent Charles County property was not the right place for the utility's

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planned natural gas compressor station.

But the concept of conservation can be as complicated as this landscape, and the foundation wanted the conversation series to point that out.

Newman explained that some modern approaches to conservation — which entail removing all people from the landscape so it can be protected from their urge to develop it — run afoul of the way indigenous people managed the landscape by cultivating it.

"These landscapes did not just happen by themselves. We were an integrative part of it," he said. "These places are anthropogenic by nature. They were influenced by native people, by their hands, by fire, by wildlife that we directed into certain places, by cultivars that we encouraged to grow in certain places."

Newman takes a similar approach today as he and his family manage a handful of historic lands as farmers and "permaculture developers," working to produce food in concert with the surrounding ecosystems. To that end, they graze animals and plant perennials on 150 acres split between historic Stratford Hall in Montross, VA, and James Madison's Montpelier near Orange, VA. He's also working on projects with the Accokeek Foundation.

At these historic places and others, protecting colonial history was the impetus for preserving a landscape that modern caretakers realize might have a lot more stories to tell.

A historic photo shows Piscataway Chief Turkey Tayac with some of the founders of Piscataway Park when the historic site was preserved. Today's interpreters want to incorporate more layers of the land's history into their presentations today. (Whitney Pipkin)

Julia King, an archaeologist and author of the book, *Archaeology, Narrative, and the Politics of the Past: The View from Southern Maryland*, pointed out how often this property is defined by its role as the viewshed of Mount Vernon.

"This landscape is in the gaze of Mount Vernon. This landscape is to be consumed by people at Mount Vernon who may never even come here and realize that it has history," King said during the event. "So my question is: Is there a way we can turn that gaze around?"

Newman said that narrow view only encourages visitors at both sites to see the land as it relates to the colonial story — at the expense of other narratives.

"Accokeek is, for me, about this place and just this place," he said.

Roberts, the board member, said that the different narratives and time periods don't necessarily have to be competition or in concert.

"I think Accokeek has an opportunity to identify a number of those layers that it will interpret. And those layers are not necessarily going to agree with each other," he said.

Accokeek already is working to move beyond the colonial narrative. Visitors who come to the colonial farm learn how the Bolton family — the fictitious residents of the farm — preserves food for a Maryland winter, and they can also talk to Cate Sharper, a fictitious enslaved woman interpreted by Berry, whose son was sold to another farm. They can visit her garden, planted with heirloom varieties, to get a glimpse into African American foodways and how "the dignity of labor [helped enslaved people] transcend unthinkable exploitation and hardship."

"As the interpretation coordinator, it is my job to make sure we're telling the stories of the people of this area respectfully and compassionately," Berry said. "With the interpreters we have now and will have, we will be the faces and voices [to provide] that framework."

Hampton Roads wastewater-to-aquifer recharge project showing results

≈ Success of SWIFT, the first to test technique in a non-arid region, is attracting attention of other jurisdictions.

By Sarah Vogelsong

One year after the highly anticipated SWIFT project came online in Virginia, its trickle of activity continues to swell.

The Sustainable Water Initiative for Tomorrow is an innovative solution to two problems that plague the Hampton Roads region: the need to cut down on pollution that flows into local waterways and the shrinking of the Potomac aquifer, the main source of water for eastern portions of the state.

In April 2018, instead of simply discharging the treated wastewater back into the rivers, the Hampton Roads Sanitation District began giving it an even greater level of treatment and then injecting it 2,000 feet into the ground to help recharge the aquifer's increasingly dwindling stores.

A similar approach to aquifer recharge has been adopted elsewhere — particularly in the arid regions of the Middle East and Santa Clara Valley of California — but the proposal to adopt it on a large scale in a "wet weather" area of the East Coast was new.

Now, one year into the experiment, SWIFT is pumping an average of 1 million gallons of drinking-quality water back into the aquifer every day from the SWIFT Research Center, located at the Nansemond Treatment Plant in Suffolk.

That quantity is only a fraction of the 100 million gallons per day that the sanitation district plans to inject back into the aquifer once the project is fully built. But even in these early stages, the U.S. Geological Survey has found that SWIFT is having results.

"[We] saw a signal of expansion of the aquifer by a third of a millimeter over the course of two months," said Kurt McCoy, a hydrologist at the USGS Virginia Water Science Center, which has been monitoring and analyzing SWIFT since its inception. "It is showing that the SWIFT activities do have an impact on the aquifer."

A third of a millimeter may not seem like much, but "these things add up over time," McCoy said.

That's particularly true in the low-lying area of Hampton Roads, where sinking land and rising waters are closely connected. Recent projections show that sea level in the area has been rising 4–5 mm per year. Historically, about half of that has been caused by the overpumping of water from the Potomac aquifer. Overuse has caused the pressure of the water within the aquifer to decline and the land to sink as the sediments that hold the water are compacted. In the Hampton Roads region, that compaction has occurred at an estimated rate of 1.5–3.7 mm per year.

This is the SWIFT Research Center at the Hampton Roads Sanitation District's Nansemond Treatment Plant at the ribbon cutting for the facility on May 18, 2018. (Courtesy of SWIFT)

Within that context, McCoy pointed out, the aquifer's expansion by a third of a millimeter within only two months' time is significant.

"It was a bit unexpected for those of us that aren't geologists," said sanitation district manager Ted Henifin.

So far, SWIFT has pumped a total of about 90 million gallons of highly treated wastewater back into the aquifer.

Much of the Research Center's focus has been on refining its processes. Among other tweaks, the site had to be taken offline for a period over the winter because of issues involving the unexpected corrosion of steel tanks.

Eventually, SWIFT will operate out of four or five facilities throughout the district, each of which will return water to the aquifer through multiple recharge wells.

Initial plans called for the first new facility, which would have had a recharge capacity of about 8 million gallons a day, to be constructed at the Williamsburg Treatment Plant near historic Carter's Grove. In April, though, the James City County Board of Supervisors denied the district's request to acquire the land on the grounds that the project doesn't meet state criteria allowing utilities to acquire land in an agricultural and forestal district.

Consequently, while Henifin said that the sanitation district "hope[s] to be able to resolve our land issues in Williamsburg in the coming years," that expansion has been moved "to the end of our list" of facilities to develop.

"We started out with the toughest one, and we didn't exactly hit a home run there," he said.

The next expansions are slated to occur at the James River Treatment Plant in Newport News, followed by the York River Treatment Plant in Seaford, the Virginia Initiative Plant in Norfolk and finally the Nansemond Treatment Plant, where the Research Center is also located.

Henifin said that the district has already acquired or finalized deals to acquire the land needed for those expansions.

Despite the Williamsburg setback, cash-strapped municipalities within the district have greeted SWIFT with open arms because it offers a way to sidestep expensive stormwater repairs that would otherwise be needed immediately to meet pollution reduction goals for the Bay cleanup. Henifin said that all 11 localities in the area with municipal separate storm sewer system (MS4) permits have struck agreements with the district to use credits from the SWIFT project to meet their nutrient reduction obligations.

Such agreements, known as nutrient trading, allow a polluter that achieves reductions beyond the threshold set for it by the state to sell or transfer "credits" for those reductions to other polluters. Those other polluters can then put the credits toward their own reduction quota.

The result is that even if each source of pollution does not achieve its own reduction target, the region can still meet its overall goal.

In its agreement with the sanitation district, the city of Hampton justified its decision to use pollution reduction credits from SWIFT by arguing that the city will "conserve scarce state and local resources for other important water quality projects."

But while municipalities may be relying on SWIFT for reductions, the state has adopted a wait-and-see approach to including the project as a best management practice in its latest watershed implementation plan for meeting 2025 Bay cleanup goals, released as a draft in April.

"Until it's proven, we weren't going to require it in the WIP," said Allan Brockenbrough of Virginia's Department of Environmental Quality. Nevertheless, he said, "The WIP counts on significant nutrient reductions from those facilities, and they may achieve those reductions from the SWIFT project."

Other localities are taking notice of SWIFT's promise. Henifin said that several representatives of other cities or counties had visited the site to see if they could implement a similar system at home.

"We're interested to see how effective it is, and we do see it potentially as one part of an integrated strategy both to meet our water supply goals down the road and our nutrient management goals down the road," said Christopher Phipps, the director of public works for Anne Arundel County, MD.

Anne Arundel does not face a problem with land subsidence, and its water supply is more stable than that of Hampton Roads. But a portion of the county also draws water from the Potomac aquifer, and the county as a whole is subject to the same goal of reducing the flow of pollution to the Bay.

"We're not under duress, especially on the water supply side, but we do think it could have some potential for longer-term and regional strategies," Phipps said.

On May 10, the Chesapeake Environmental Protection Association, a nonprofit group, will hold a forum to explore whether the SWIFT model is "feasible and worthy of further consideration" in Anne Arundel and Southern Maryland.

To Phipps, the idea of using treated wastewater to recharge aquifers is part of a broader — and growing — shift among the public toward recycle-and-reuse strategies.

"We call it wastewater, but is it?" he asked. "Should it be wasted, or should it be used?"

VA closes striped bass trophy season as ASMFC weighs action

≈ Assessment showing species is overfished led to action.

By Karl Blankenship

Virginia and two New England states are urging other East Coast fishery managers to move quickly to curb striped bass catches in the wake of a new assessment that found the prized species was being overfished.

The Virginia Marine Resources Commission voted unanimously April 23 to shut down the state's spring striped bass trophy season, which targets the largest fish in the population.

The action comes in the wake of a new stock assessment that found striped bass along the East Coast, also known as rockfish, were in worse shape than previously thought and had been overfished for several years.

"Virginia has always been a conservation leader, and this is a time to step up. The recent stock assessment shows that early action is needed to slow the decline and restore this fishery to sustainable levels," said Steven Bowman, head of the commission.

In an April 17 letter sent to James Gilmore, chair of the Atlantic States Marine Fisheries Commission — which manages striped bass along the coast — environmental officials from Virginia, Massachusetts and Connecticut said "we cannot afford to continue unsustainable levels of fishing" as the commission mulls its response to the assessment. "Scientific evidence and what fishermen in our states are seeing on the water tell us that bold action to protect striped bass is long overdue," they wrote. "Rebuilding striped bass stocks and sustaining them at target levels of abundance is incredibly important to fisheries in our states. We urge the Commission to implement measures that will reduce striped bass harvests to sustainable levels as quickly as possible."

Recreational catches of striped bass are down in Virginia in recent years. (Dave Harp)

They called for the ASMFC to commit to adopt new measures by its October meeting, while urging states to act sooner on their own. States that take early action, they said, should get credit for those efforts when new conservation measures are established by the commission.

In Virginia, the closing of the state's spring trophy season affects fishing from May 1 through June 15 and targets fish at least 36 inches long. In the state's Potomac River tributaries, the season is from April 29 through May 15, with a minimum size of 35 inches. Along the Atlantic coast, the season runs May 1 through May 15, with a 36-minimum length. From May 16 though June 15, anglers will be able to keep two striped bass measuring 20-28 inches.

The large fish are popular for anglers, but are also important to the health of the overall population because they produce a disproportionately large number of eggs. Although striped bass spend most of their lives migrating along the coast, most are spawned in the Bay's tributaries.

"The state of our striped bass fishery is shameful, especially considering that it was fully rebuilt just a few years ago," said Matthew Strickler, Virginia secretary of natural resources. "We need immediate action to reduce striped bass harvests to sustainable levels to ensure we have better fishing in future seasons."

Striped bass were heavily overfished in the 1970s and 1980s, sending the population to record low levels and ultimately leading to a fishing moratorium in the Bay and along the coast in the late 1980s.

The population rebuilt and reached new peaks by the early 2000s, but has been declining since 2010, at least in part because a number of dry springs in the Chesapeake region led to a series of years with lower than average reproduction.

In recommending emergency action, the VMRC staff noted that the recreational catch of striped bass in Virginia has declined from 368,000 fish in 2010 to less than 52,000 last year. Angler reports of catching trophy-size fish have also been low in recent years, they said.

The Maryland Department of Natural Resources is going ahead with that state's trophy season for striped bass as is the Potomac River Fisheries Commission, a bi-state panel which regulates fishing in the mainstem of the river. The season in both cases runs April 20 through May 15, with a minimum catchable size of 35 inches. In a press release announcing the spring trophy season, the Maryland DNR said it intends to work through the management process set up by the Atlantic States commission and expects to have a "more long-term picture" of the fishery after the commission's April 30 meeting.

Staff writer Jeremy Cox contributed to this report.

Chesapeake Challenge

Answers to
Where in Heaven are You?
on page 38.

1. Wetland
2. Wetland, Meadow
3. Wetland, Meadow
4. Rocky patch 5. Wetland
6. Woods 7. Wetland, Wet woods
8. Woods

Bay Buddies

Answers to
Flower Part-ners!
on page 38.

1. a**N**th**E**r 2. filame**NT** 3.**O**va**R**y
4. pet**A**ls 5. pisti**L** 6. sep**A**l
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Answer: Mountain laurel

Mountain laurel (Arx Fortis CC BY-SA 3.0)

Livestock fencing needs to pick up pace in Shenandoah Valley

≈ Report finds just 20% of area farms have such fences while obstacles to installation persist.

By Whitney Pipkin

Arlene and Glenn Reid decided to take measures on their 40 acres of pasture after attending a meeting about the urgency of keeping cows out of local creeks. "We said, 'We can do our little part here,'" Glenn Reid said. (Whitney Pipkin)

Time seems to slow down in the Shenandoah Valley, where the pastoral act of raising livestock for a living appears as unchanged by the years as the emerald-green hills on either side of Interstate 81. But almost a decade has passed since Virginia first set a goal to have farmers build fences along nearly every Chesapeake Bay-bound stream that livestock could otherwise access in the state.

As much as animals like to wade in and drink from the streams that cut across countless pastures here, their hooves and feces wreak havoc on local and regional water quality. For two decades, federal and state governments have provided varying levels of funding to reimburse farmers who install fences and alternative watering sources.

Such practices are among the most cost-effective ways for Chesapeake Bay states to reduce pollution heading into local streams and, eventually, the Bay. But cost and cultural preference are still formidable obstacles. A report released by the Environmental Integrity Project in April found that in the state's two largest farming counties, both of which are in the Shenandoah Valley, just 20% of farms had fenced their animals away from streams as of 2017.

The results suggest the state is far away from its goal, which "seeks the exclusion of livestock from all perennial streams in the Bay watershed." Its new Bay cleanup plan, released as a draft in April, seeks to dramatically ramp up support for initiatives aimed at getting livestock out of streams across the state.

The EIP report, though, is critical of those efforts because they fall short of making fencing the required method of exclusion. While the plan calls for a dramatic increase in fencing, it also includes a broader suite of actions such as providing "off stream watering" to cows, which gives the animals an alternative water source but does not guarantee they will stay out of streams.

EIP spokesman Tom Pelton faulted the plan for being vague, saying the state should stick to stream fencing rather than allow other measures to be considered similarly effective.

The plan also calls for legislation to require the exclusion of livestock from streams and provide a date by which farms must provide exclusion measures. Pelton raised concerns that the plan itself did not clearly require fencing nor establish a compliance date.

"We're saying Virginia should require fencing. If that is politically implausible, we say 'why not create a system of tax incentives for farms that are fencing?'" said Pelton, who also thinks Virginia should continue to share farmers' costs as much as possible. "Virginia should say, 'We're going to pay for this, but you've gotta do it.'"

But fencing streams has long been controversial for some farmers because it not only denies cattle easy access to water, but also requires long-term maintenance. Maryland requires farmers to exclude cattle from streams in the state, though — in lieu of a strict fencing requirement — the measure also gives landowners wiggle room to install alternative watering troughs and vegetated buffers to discourage livestock from wading.

Russ Baxter, deputy director at the Virginia Department of Conservation and Recreation, said each new draft of the state's cleanup plan is informed by the latest available data. Given the magnitude of stream mileage in the state, he said it was not practical to hold Virginia to the goal established years ago that focused solely on the amount of fencing.

"What I would say is that we are absolutely committed to excluding livestock from streams — and have spent millions of dollars to do that," he said. "Our desire is to exclude animals from all perennial streams. The question is: How do you get that done? What will that cost, and what is the ability of farmers to do that?"

The amount of money farmers can receive from state or federal coffers for stream fencing and the practices that go with it — such as alternative watering troughs and forested streamside buffers — has varied from year to year. When the state told farmers that they could receive up to 100% reimbursement for the cost of stream exclusions if they signed up by mid-2015, officials found themselves with a backlog of hundreds of interested landowners. They've been chipping away at that list ever since, as staff and funding becomes available.

Virginia legislators approved a budget this year that allocates nearly $90 million over the next two fiscal years toward agricultural cost-share programs, an amount one advocate deemed an "unprecedented level of investment."

In the Shenandoah

There is no better place in Virginia to see how such programs play out on the ground, where obstacles persist even when funding is available, than in the Shenandoah Valley. Cattle outnumber people in Rockingham and Augusta counties, according to the 2017 Census of Agriculture released last month, making the region a focal point of state efforts.

Arlene and Glenn Reid learned about the urgency of keeping cows out of the creeks running through their 40 acres of pasture at a meeting about their local Linville Creek. The tributary to the Shenandoah River is impaired by high concentrations of fecal coliform bacteria, and a 2017 plan for improving its water quality found that only a small fraction of the creek had been fenced off from the cattle that dot the surrounding hills.

"We said, 'We can do our little part here,'" Glenn Reid said from his front porch in Broadway, VA, from which he can see almost the entire farm on the cascading hill below.

After that creek meeting, the couple invited staff from the Harrisonburg office of the USDA Natural Resources Conservation Service to visit and write up a management plan. The plan incorporated several practices to improve water quality — stream fencing, cross-farm fencing to create more paddocks, alternative water troughs and water crossings, to name a few — while making their farm more

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productive. They made the changes over a few months in 2017.

"For years, it was one big pasture and the cows would roam around wherever they wanted. It worked, but it wasn't as productive as we wanted it to be," Glenn Reid said.

Now, the Reids, who are in their early 60s with four children in college, can manage the cattle more easily on their own alongside a bustling greenhouse-based business.

"Before, trying to round up three or four cows was a job," said Arlene Reid. But, with the rotational grazing methods that came with the plan, systematically moving cows through the paddocks to promote better forage, "these cows can't wait for me to open the gate so they can get to the new pasture."

Cows visit Whiskey Creek in Augusta County, VA. Cows' hooves and feces can wreak havoc on a stream's water quality. (Shenandoah Riverkeeper)

Obstacles

Still, the Reids understand why their neighbors aren't all eager to install fencing and the other practices that often accompany it.

While various programs have reimbursed the couple for most of their costs, the upfront price was about $35,000. Finding local contractors to drive in fence posts or bury pipes for watering troughs was easier said than done, with many booked up with projects for months into the future.

Many in the Reids' community are Mennonite farmers who have reservations about receiving government funding. Other experts estimate that as much as half of the pastures in parts of the Shenandoah are rented by the farmers who maintain cattle on them.

"Without a long-term lease, a farmer is going to be reluctant to spend thousands on a long-term stream exclusion project," said Matt Kowalski, a watershed restoration scientist with the Chesapeake Bay Foundation who works in the Shenandoah Valley.

The alphabet soup of programs that can help defray costs can be overwhelming for farmers, but the Reids said the local NRCS office helped walk them through the process. Bobby Whitescarver, a livestock farmer and champion for stream exclusion in Augusta County, said many of those programs are being tweaked, albeit slowly, to respond to what landowners need on the ground.

Certain types of fencing that qualify for state funds, for example, might not stand up to frequent flooding near the mainstem of the Shenandoah River, and a farmer who relied on state funding might not have help to rebuild it. The state's draft cleanup plan calls for more flexibility in grant programs, which might make them more appealing and adaptive to certain farms. Some private granters are stepping into the gap for farmers who have exceeded their contract periods and want to continue maintaining fences.

Buff Showalter, a livestock farmer in Rockingham County who fenced off his streams years ago, said he feels that the low-hanging fruit — farms whose owners or landscape make them relatively easy places to fence livestock away from streams — has already been picked. At his farm, the main waterways are located near the back, where thick riparian buffers protect them.

"Some farms are more expensive and complicated to fence out, especially if people are philosophically opposed to the idea," he said, a nod to farmers who are skittish about government programs or who simply prefer the traditional look of a stream unencumbered by trees and fences.

Way forward

The EIP report suggests a few ways to overcome these obstacles, though some of them skew toward using laws to require fencing rather than sticking with the state's incentive-based approach. If legislators can't compel farmers to install livestock fencing, the report says, the state should consider adding tax-based incentives that would reward farmers who help improve water quality while reducing tax breaks for those who don't.

Pelton said part of what drove the EIP report is that Virginia seemed unable to definitively track progress toward the stream-fencing goals officials had set earlier. Baxter and others at the DCR said they knew how many miles of stream fencing the state had helped to fund, but that those estimates did not include fencing installed by farmers without government funding.

To arrive at a more holistic number, the EIP combed through 2017 Google Earth images of farms in Augusta County, which were taken between January and October of that year, looking for evidence of pastures with fenced-off streams. Pelton said a team of analysts spent several months last year poring over the images, comparing them with county tax maps to determine farm boundaries.

"When a farm doesn't have a fence, you can easily see the brown, muddy banks and the areas where the cow goes right into the river," he said, noting aerial images included in the report as examples.

The report also synthesized similar data from a survey the Shenandoah Riverkeeper conducted in 2016 of farms in Rockingham County that concluded that just 20 percent of farms with livestock in that county fence them away from waterways.

Evaluating farm practices from aerial images has its shortcomings, which the report acknowledged. EIP analysts used "common sense" definitions of streams and farms that in some cases do not match the definitions the state uses to measure progress, so the data is difficult to compare. Also, tallying the number of farms with fences is not directly comparable to the number of linear feet of streams with fences because one large farm could contain several miles of streams while another has very few, for example.

But several sources said they would agree, based on what they see in these counties, with an estimate that 20–30% of farms have fenced livestock from streams so far.

"It's a hard pill to swallow, but I think it's pretty truthful," Whitescarver said. But, he added, "Twenty years ago, nobody was thinking about fencing cattle out of the streams. You could flip the coin and say, 'Wow. Starting from zero, we're doing pretty good.'"

MD bans plastic foam containers, VA passes plan for coal ash

Both states also addressed fishing, farming and energy issues during recent legislative sessions.

BY TIMOTHY B. WHEELER

The third time's the charm, it seems. After balking twice before, Maryland lawmakers this year adopted the nation's first statewide ban on polystyrene foam food and drink containers.

And in Virginia, after two years of debate and study, legislators agreed on a plan for dealing with coal ash impoundments that threaten to contaminate groundwater and Bay tributaries.

The Maryland General Assembly session in Annapolis, which concluded on April 8, gave environmental advocates more cause to cheer after discouraging results the previous year. The 90-day session saw debates on a slew of environmental issues, including oysters, clean energy, forest conservation and environmental rights.

"We were pleasantly surprised by how much we got done," said Karla Raettig, executive director of the Maryland League of Conservation Voters.

Advocates in Virginia had a more modest list to celebrate after lawmakers finished in Richmond on Feb. 23. Legislators there weighed funding increases for Bay restoration efforts, as well as bills dealing with fisheries management, offshore drilling and climate.

Legislation in both states dealing with oysters and aquaculture are covered in a separate article (see *MD, VA legislatures tackle oyster issues with mixed reactions*, page 19). Here is a rundown of other notable bills that passed — and some that didn't.

For the second year, Virginia lawmakers did not bring state fishing regulations for menhaden in line with limits ordered by the Atlantic States Marine Fisheries Commission. (Dave Harp)

Maryland

Foam ban: Lawmakers approved a ban on polystyrene foam food containers after advocates pointed out that two of Maryland's largest counties, Prince George's and Montgomery, had already enacted local bans, and others are scheduled to take effect in the coming year.

Foam food and drink containers make up 10–40% of the litter collected in stream cleanups, according to the nonprofit Trash Free Maryland. Beyond that, they argue, the foam poses threats to wildlife and human health, as it picks up contaminants and breaks down into tiny particles that can be easily ingested.

"The health of the Chesapeake Bay, our waterways, our neighborhoods and our children's futures depends on our willingness to do the hard work of cleaning the mess that we inherited and created," said Del. Brooke Lierman (D-Baltimore city), lead sponsor of the House version of the bill.

Clean energy: The Clean Energy Jobs Act passed in the final hour of the session, but only as the result of a compromise that left some environmentalists bitter.

The act requires Maryland to get 50% of its energy from renewable sources by 2030 and to come up with a plan for reaching 100% by 2040. But to win passage, lawmakers agreed to maintain a loophole in the existing law that classifies trash incineration as clean energy, enabling it to earn state subsidies.

That upset some activists, who argued that incinerators are significant sources of air pollution and that, particularly in Baltimore, poor and predominantly minority neighborhoods are recipients of those harmful emissions.

Supporters of the bill said they tried to close the incineration loophole, but couldn't muster the votes needed to pass it because of warnings that jobs could be lost if incinerators in Baltimore city and Montgomery County were forced to shut down by losing the subsidies.

Supporters also say that the benefits outweigh the downsides, and the share of clean-energy credits going to incineration will shrink as more solar and wind projects come online.

The fate of both the foam ban and clean energy bills rests now with Gov. Larry Hogan, who must decide whether to sign or veto them, or let them become law without his signature.

Environmental rights: A bid to give Marylanders a constitutional right to a clean environment failed for the second year. Inspired by similar amendments in Pennsylvania and other states, advocates argued that residents should be able to challenge in court those state and local governmental actions they contend are harmful to the environment.

"Shouldn't people at least be able to get in the door to challenge things that seem dangerous to all of us?" asked Del. Stephen Lafferty (D-Baltimore County), the bill's sponsor.

Despite being a priority of the environmental community, the measure worried some lawmakers that it could flood the courts with lawsuits. Lafferty said he withdrew the bill at the urging of legislative leaders but plans to reintroduce it next year.

Forest conservation: Amid continuing debate over whether Maryland's forests need greater protection from development, lawmakers took a couple of small steps. They agreed to study the issue in the coming year, and they acted to make localities better account for fees that developers pay in lieu of replacing woodlands that get bulldozed.

Agriculture: Lawmakers passed legislation intended to enhance the tracking of poultry manure, a potentially significant source of nutrient pollution on the Eastern Shore, and tightened the permitting of large-scale poultry operations. They also tightened restrictions passed two years ago on the use of antimicrobial drugs in healthy farm animals.

Cownose rays: With a ban on killing cownose rays in bowfishing contests set to expire this summer, lawmakers voted overwhelmingly to extend the prohibition until state regulators complete a plan for managing the species.

Solar siting: An emergency

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Maryland has enacted a ban on polystyrene foam food containers. According to Trash Free Maryland, foam food and drink containers make up 10–40% of the litter collected during stream cleanups. (Dave Harp)

MD, VA legislatures tackle oyster issues with mixed reactions

≈ In Annapolis, lawmakers had to overcome Hogan veto, opposition from watermen.

By Timothy B. Wheeler

Oysters got attention from lawmakers this year in both Maryland and Virginia, but the issue sparked bitter debates in Annapolis.

Maryland lawmakers overcame Gov. Larry Hogan's veto to forbid future commercial harvests from five oyster sanctuaries undergoing restoration. They also passed another bill that at least temporarily bars opening any of the state's 46 other sanctuaries to harvest. Watermen are urging Hogan to veto it as well.

In Richmond, there was less at stake and more harmony — which may stem from the fact that the Old Dominion's wild oyster harvests have been increasing, while Maryland's have been slipping. Virginia lawmakers approved Gov. Ralph Northam's budget request for $4 million for oyster reef repletion and restoration, one-third more than this year. They also agreed to some of the recommendations of a gubernatorial task force seeking to ease conflicts over aquaculture leases.

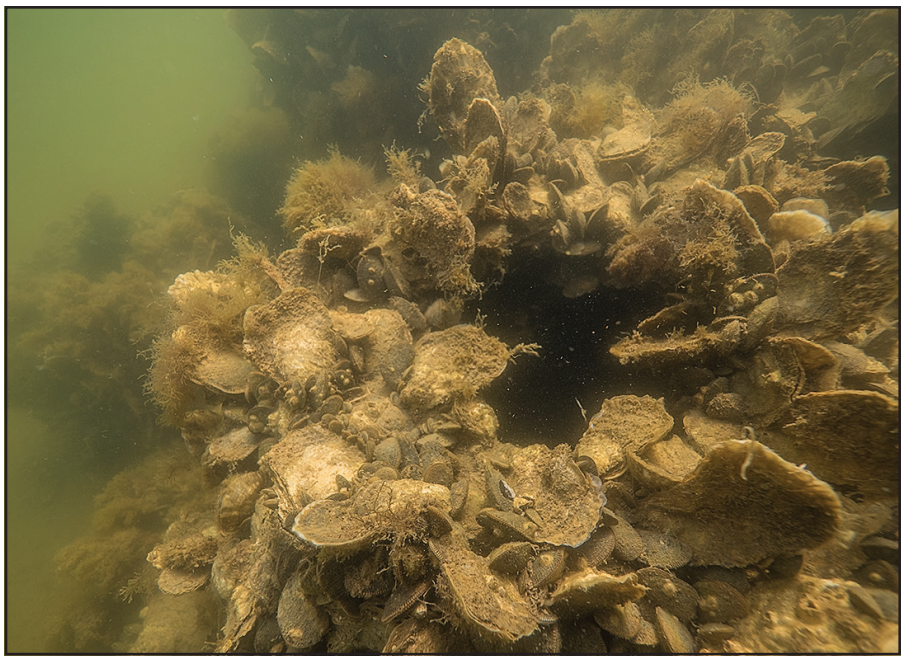
The two oyster bills passed by Maryland's General Assembly are the latest in a tug of war with the Hogan administration over management of the keystone Chesapeake Bay species.

Hogan campaigned in 2014 with a pledge to end what he called his predecessor's "assault" on watermen. In early 2017, at the urging of watermen worried about declining harvests, his Department of Natural Resources floated a plan to open portions of some sanctuaries for commercial harvest.

The General Assembly reacted by blocking that move until the DNR produced a scientific assessment of the oyster stock. The study, completed last year, found that the state's population of market-size oysters had declined by half since 1999 and more than half of the areas where commercial harvest is allowed were being overfished.

Those findings prompted the DNR to begin drawing up a new management plan for oysters, which officials said they hoped to have in place before the next commercial oyster season begins on Oct. 1.

But environmentalists, worried that the DNR was still intent on opening sanctuaries, appealed to lawmakers to set some parameters for future management. One bill proposed stronger protection for sanctuaries in the five Bay tributaries that the state has selected for large-scale oyster restoration projects.



Oysters grow in a sanctuary in the St. Mary's River, one of five major oyster restoration projects taking place in Maryland. (Dave Harp)

As part of the Chesapeake Bay Watershed Agreement, Maryland pledged nearly five years ago to restore oyster populations in five Bay tributaries by 2025. Work is essentially complete in Harris Creek and in various stages of construction or planning in the other four: the Tred Avon, Little Choptank, St. Mary's and Manokin rivers.

The proposed bill barred any changes to the five sanctuaries without approval from the General Assembly, removing direct control from the DNR. Watermen opposed it, contending that the restoration projects — and sanctuaries in general — aren't helping to restore the oyster population. They have pressed the state to let them harvest oysters from portions of some sanctuaries on a rotational basis, a management method used in Virginia.

In March, in votes that generally broke along party lines, the Democrat-controlled Maryland House and Senate approved the bill. Hogan vetoed the measure, calling it bad for watermen and the Bay. He accused the legislature of undermining his administration's efforts to forge a consensus over stewardship of the state's oyster population.

Unswayed, the House easily overrode Hogan's veto, while the Senate did so by a narrow margin.

The same back-and-forth may await the oyster management bill that the Assembly also passed in its final days. The bill requires the DNR to reorganize its Oyster Advisory Commission, then work with it and the University of Maryland Center for Environmental Science to develop "consensus recommendations" for maintaining a sustainable harvest and rebuilding the depleted oyster population, estimated to be 1–2% of historic levels.

Supporters say the measure requires the DNR to follow a more inclusive process for developing management strategies that environmentalists and watermen alike can support. But DNR officials view it as potentially disruptive, saying it could prolong their development of the plan and limit their options.

That's a concern for watermen, who got a sobering preview in mid-April of new harvest limits the DNR may impose on existing public fishery areas. DNR officials told the Oyster Advisory Commission they were considering shortening the six-month season, cutting the number of harvest days per week, reducing the maximum daily catch, or alternately opening and closing areas to limit harvest pressure.

Robert T. Brown, president of the Maryland Watermen's Association, contended that the curbs would hurt his members, may not be effective and might actually increase harvest pressure in some areas. He said the "one thing that could save our industry" would be for the DNR to let watermen try rotational harvests in the sanctuaries not affected by the bill passed over Hogan's veto.

But after the meeting, Jeannie Haddaway-Riccio, the new DNR secretary, said that the oyster management bill would prevent the DNR from letting watermen experiment with any of the other sanctuaries.

Anne Arundel County Sen. Sarah Elfreth, a lead sponsor of the bill, emphasized that the restriction would be temporary. No sanctuary acreage could be opened to harvest, she said, until the DNR has reconstituted its advisory commission and worked to get new management recommendations from them — a process she estimated could take up to two years.

Elfreth said she offered to amend her bill to let watermen start working as early as this year on rebuilding oyster habitat in up to four sanctuaries, to see if they could support rotational harvest in a few years. But the offer wasn't taken, she said.

Hogan has until late May to sign, veto or let the management bill become law without his signature. If he vetoes it, the General Assembly could vote on an override when it meets in January, unless there's a special session earlier.

Other controversial oyster bills in Maryland failed to progress, including three that sought to prohibit the dredging of old oyster shells from Man 'o War Shoal, a large reef near the mouth of the Patapsco River. They died in committee.

The DNR has proposed dredging 5 million bushels from the shoal to rebuild oyster reefs in public fishery areas and sanctuaries, as well as to supply oyster farmers with shells. But sport fishermen, environmentalists and even some watermen oppose the project, which they contend could impact finfish and degrade one of the state's last large reefs. The U.S. Army Corps of Engineers has given the project conditional approval, but the Maryland Board of Public Works has not yet issued a decision.

Also dying in committee was legislation sponsored by a pair of St. Mary's County lawmakers that would have given waterfront property owners the right to preempt the issuance of a state lease to raise oysters in cages or floats in the water off their shoreline.

The DNR has sole authority over whether to lease bottom or the water column for aquaculture. But in response to complaints from waterfront property owners, the Southern Maryland county last year imposed a six-month moratorium on using county docks to work new water-column leases.

Aquaculture legislation fared better in Virginia, where lawmakers approved a measure intended to mediate disputes over navigational dredging through the many leased areas in the Lynnhaven River in Virginia Beach. They also passed a bill that gives the Virginia Marine Resources Commission more leeway in preventing parties from acquiring leases that they have no intention to use for raising oysters.

Eastern hellbender gets new nickname: Pennsylvania state amphibian

≈ North America's largest amphibian is also a poster child for clear, clean water.

By Ad Crable

The imperiled eastern hellbender, a creature most people consider ugly and few Pennsylvanians have ever seen, became the state's official amphibian April 23, with the stroke of a pen from Gov. Tom Wolf.

It was a crisscrossed journey — the nomination of another salamander briefly challenged the designation — but the persistence of a high school environmental group and a few other loyal fans of North America's largest salamander succeeded in the end.

A fully aquatic salamander with slimy, wrinkled skin, the hellbender can grow up to 2 feet long and goes by an unflattering array of nicknames such as devil dog, mud devil, snot otter and Old Lasagna Sides.

It is not aesthetically pleasing or universally cherished like other Pennsylvania official emblems, such as ruffed grouse, brook trout, Pennsylvania firefly, white-tailed deer or mountain laurel. The new state amphibian is actually one of the least-known creatures in the state.

But supporters say it serves as a symbol for something valued both by Pennsylvania citizens and those downstream near the Chesapeake Bay: clean, clear water.

Hellbenders survive only in clean, well-oxygenated and fast-flowing streams. They also need streams with plenty of boulders to hide under and snatch prey, which consists almost entirely of crayfish with an occasional minnow or trout egg that they find more by smell than clumsy sight.

"Yes, it's an ugly creature that serves a beautiful purpose," state Sen. Gene Yaw said on the floor of the capitol in Harrisburg in February when he appealed to fellow legislators to recognize hellbenders.

Eastern hellbenders, which live up to 50 years, have been around for tens of thousands of years. (Dave Harp)

"It's an excellent natural indicator of good water quality. It exemplifies what is good about Pennsylvania's waterways."

Yaw decided to push for state status after being approached by Anna Pauletta, of Mechanicsburg, PA, then a high school student and president of the Chesapeake Bay Foundation's Student Leadership Council in Pennsylvania.

"It's not the most attractive, but it's something that's very important to the food and balance of our waterways. It's an indicator species," Pauletta said. "It's such a universal need. Everybody relies on clean water."

Peter Petokas, a biology professor at Lycoming College in Pennsylvania who keeps tabs on hellbenders and fights to save them, adds, "They are kind of a canary in the coal mine."

Eastern hellbenders, which live up to 50 years, have been around for tens of thousands of years and are the largest amphibians in the world aside from a 4-foot-long species in Asia, which is their closest relative.

They are secretive, live most of their lives under a single boulder or two, and only come out at night to feed. Few people have ever seen them, though anglers fishing with bait occasionally are startled to find one at the end of their lines.

Eastern hellbenders once inhabited rivers and tributaries up and down the Appalachians, from New York to Georgia. But they have disappeared from most of their range in recent decades because of pollution, sedimentation, illegal collection, acid mine drainage, dams and more recently, a fungus.

In Pennsylvania, Petokas and his students have found viable populations remaining in only four mountain tributaries of the Susquehanna.

Countering the eastern hellbenders' rise to recognition in Pennsylvania, the U.S. Department of the Interior in April declined to list the species as threatened under the Endangered Species Act after eight years of consideration. The Center for Biological Diversity characterized the decision as "a big shove toward extinction."

But there are some encouraging signs on the conservation front. Last August, 100 adult hellbenders raised in captivity at the Bronx Zoo — from eggs collected by Petokas in Pennsylvania and New York — were released into a tributary of the Susquehanna in southern New York. The Wildlife Conservation Society paid for the project which is working on a second batch for release.

And a new high-tech tool called Environmental DNA uses water samples collected from streams to identify the presence of different species. The data is identifying hellbenders in some new streams, according to Brandon Ruhe, president of the Pennsylvania-based Mid-Atlantic Center for Herpetology and Conservation.

Ruhe says the group is also getting promising reports from anglers who accidentally hook hellbenders, some in streams where hellbenders had not been documented.

"I think maybe we should take a deep breath. Maybe they are doing a little better than we thought," Ruhe said.

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bill aimed at steering solar energy development away from farmland and forests passed the Senate but died in the House. Sen. Paul Pinsky (D-Prince George's County) had proposed a broad-based commission to write siting guidelines amid the uproar over plans to clear 240 forested acres in Southern Maryland for a solar facility to serve Georgetown University. A House committee plans a summer study of the issue.

Virginia

≈ **Coal Ash:** Unlined ponds holding the toxic residue from coal-fired power plants threaten to contaminate groundwater and pollute waterways in the Bay watershed. Dominion Energy had wanted to cap the ash in place at its plants, but legislators agreed on a plan to recycle at least 25 percent of the ash and move the rest to modern, lined landfills.

≈ **Agriculture:** The General Assembly increased funding to help farmers control runoff from fields and pastures, putting $89.7 million into an agricultural cost-share program that will help to pay to exclude livestock from streams and install other conservation practices. The budget included $25 million for upgrading Alexandria's combined sewer and stormwater system, which routinely overflows into the Potomac River.

≈ **Menhaden:** For the second year, lawmakers did not bring state fishing regulations for this important forage fish in line with limits ordered by the Atlantic States Marine Fisheries Commission. The commission has said it won't penalize the state as long as the Virginia-based Omega Protein menhaden fleet does not exceed the Bay catch cap of 51,000 metric tons.

≈ **Offshore Drilling:** Legislation that would have limited exploration and drilling for oil and gas in state waters failed. Environmental advocates worry that an offshore oil spill or well blowout could affect the Bay as well as the Atlantic shoreline.

≈ **Climate:** Legislators inserted language in the budget to prevent the state from joining the Regional Greenhouse Gas Initiative, a nine-state compact that's working to reduce climate-altering carbon pollution by requiring fossil-fuel power plants to buy and trade emission allowances. Gov. Ralph Northam tried to remove the language, but the Assembly refused to go along. In mid-April, the state Air Pollution Control Board approved a plan to regulate carbon emissions from power plants that would let it join the regional compact. But it's not clear what the state could do as long as that budget language remains in effect. Advocates are urging the governor to veto it, which he must do by May 3 or it takes effect.

Highlights of the Watershed Implementation Plans

In 2010, the U.S. Environmental Protection Agency established a cleanup plan for the Chesapeake Bay known as the Total Maximum Daily Load or "pollution diet." It established the maximum about of nitrogen and phosphorus "loads" that could reach the Chesapeake Bay each year while allowing it to maintain water quality safe for aquatic life. Specific goals were assigned to each state and major river in the watershed. The Baywide goals, slightly refined in 2018, are:

Nitrogen
- 2009 Load: 270.9 million pounds
- 2017 Load: 249.78 million pounds
- **2025 Target: 201.41 million pounds**

Phosphorus
- 2009 Load: 17.07 million pounds
- 2017 Load: 14.84 million pounds
- **2025 Target: 14.17 million pounds**

States have been working since 2010 to achieve those goals. On April 12, they released draft plans showing how they plan to achieve remaining nutrient reductions by the 2025 deadline. Drawing straight comparisons between the drafts is difficult, as each presents information and data in slightly different ways, and not all provide cost estimates.

Highlights of those "watershed implementation plans," as well as the nutrient reduction progress and goals for each state, are summarized here.

Controlling stormwater runoff continues to be a challenge for several of the Bay jurisdictions. (Dave Harp)

Virginia

Nitrogen
- 2009 Load: 68.1 million pounds
- 2017 Load: 58.15 million pounds
- **2025 Target: 55.72 million pounds**
- ***Draft WIP: 48.67 million pounds****

Phosphorus
- 2009 Load: 6.99 million pounds
- 2017 Load: 6.12 million pounds
- **2025 Target: 6.19 million pounds**
- ***Draft WIP: 5.14 million pounds****

The Virginia plan divides its goals among its major river basins: the Rappahannock, York and James basins, as well as the state's portion of the Potomac River watershed and Eastern Shore.

The plan cautions that the goals are "ambitious and will require significant effort, sustained funding and increased technical capacity." It also expects that more public funding and new laws will be needed. And, it anticipates that surplus nutrient reductions from wastewater treatment plants will be needed to cover potential nutrient reduction shortfalls in its stormwater and agriculture sectors.

The job will be particularly difficult in its portions of the Potomac basin and Eastern Shore, which have the greatest impact on Bay water quality. For instance, the Potomac basin would need to have nutrient management plans implemented on three times as many crop acres by 2025 as have been done since 2010, and plant three times as many acres of cover crops. Streamside grass buffers with livestock fencing would have to increase by 14-fold. The Eastern Shore would require similar ramp-ups.

To help cover likely shortfalls in those basins, the plan is counting on over-performance in other basins, particularly the James River, where a number of wastewater treatment plants are slated for upgrades.

In some cases, the plan calls for backup from the state legislature if progress falls short. For instance, the plan aims for nutrient management plans on 85% of all cropland and says the state would pursue legislation making it a requirement for all operations larger than 50 acres that apply fertilizer, manure or sewage sludge. The requirement would only be triggered if the state is not on a trajectory to meet the 85% goal by 2025.

Likewise, the plan sets a goal of excluding livestock from all streams in the state and says the state will pursue legislation to require it, though it did not establish a time frame for doing so.

The WIP also calls for establishing a workgroup to explore whether the state's Chesapeake Bay Preservation Act, which gives local governments more regulatory authority to protect water quality, should be extended to areas west of Interstate 95.

**Meeting cleanup goals requires significant nutrient reductions from the James River to offset shortfalls elsewhere. Because much of the water from the James goes out the mouth of the Bay toward the ocean, only a portion of its nutrients impact Bay water quality. Therefore, it takes significantly more reductions from the James to achieve the same water quality impact as those from other tributaries. Because of its reliance on James River reductions, Virginia's statewide nitrogen reductions far surpass the state goal set in the TMDL in order to have the same benefit to the Bay.*

Maryland

Nitrogen
- 2009 Load: 57.51 million pounds
- 2017 Load: 54.22 million pounds
- **2025 Target: 45.78 million pounds**
- ***Draft WIP: 45 million pounds***

Phosphorus
- 2009 Load: 4.05 million pounds
- 2017 Load: 3.66 million pounds
- **2025 Target: 3.68 million pounds**
- ***Draft WIP: 3.28 million pounds***

Maryland's plan outlines activities that would lead to success but says Bay restoration will "test the collective will across seven watershed jurisdictions" to see if they can "live in harmony with the region's natural resources."

The majority of the state's nitrogen reductions will come from continuing improvements from wastewater treatment plants, where discharges are projected to decrease by 4.7 million pounds a year as the last large treatment plants in the state are upgraded with nutrient control technology.

That will be closely matched by agriculture, which is expected to deliver a 4.4 million pound annual reduction. Under the plan, the state needs to increase its rate of nitrogen reductions from agriculture threefold — from 2010 through 2017, it achieved 1.4 million pounds of nitrogen reductions from farmland.

Controlling stormwater continues to be a challenge. Current permits for its nine largest jurisdictions call for a treating runoff from the equivalent of 20% of the previously untreated impervious surfaces, but jurisdictions have struggled to meet that goal. The WIP suggests that in the next 5-year permit cycle, an average reduction rate of 2% per year — half the current objective — may be more realistic.

It also said counties will be able to meet a portion of their stormwater requirements though water quality trading as "over performance in the wastewater sector more than offsets anticipated growth in the urban sector."

The plan's preliminary estimates say that full implementation will cost the state $273 million a year, with the largest costs incurred by wastewater, followed by stormwater. It estimates that local governments will incur an additional $1.6 billion in costs through 2025, mainly to implement stormwater programs.

Pennsylvania

Nitrogen
- 2009 Load: 112.71 million pounds
- 2017 Load: 107.31 million pounds
- **2025 Target: 73.17 million pounds**
- ***Draft WIP: 84.74 million pounds***

Phosphorus
- 2009 Load: 4.46 million pounds
- 2017 Load: 3.8 million pounds
- **2025 Target: 3.04 million pounds**
- ***Draft WIP: 2.98 million pounds***

Pennsylvania's draft states that it "is committed to having all practices and controls in place by 2025" and says that its plan provides "reasonable assurance" that those reductions will be achieved. The submitted plan would achieve the goal for phosphorus, but not for nitrogen. The state would fall short by about one third of its goal, or 11 million pounds, and the plan does not clearly show how that gap would be closed.

The WIP says it hopes to shore up part of the shortfall by identifying nutrient control practices that have been installed, but not previously counted toward cleanup goals. The state has also launched an intensive effort to work with local officials and organizations to develop county-level plans, which is a more aggressive effort to engage local governments than has been undertaken in other states. The plan says that when that process is complete, counties may identify additional nutrient reduction opportunities. But the first two counties

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from each state and major river, and it requires all actions needed for meeting those goals to be in place by 2025.

States wrote plans and have been implementing them with varying amounts of success. They have met phosphorus goals ahead of schedule, but efforts to control nitrogen — long the bigger challenge — are far off track. The new "watershed implementation plans" being completed this year are supposed to show how states will complete the job on schedule.

States submitted their drafts to the EPA April 12, and they are available for public comment through June 7. The plans are to be finalized by Aug. 9.

An Amish farmer lays down commercial fertilizer in Lancaster County, PA. The state has more farms — 33,000 — than other states in the region, and most are small, making both oversight and outreach a struggle. (Ad Crable)

More effort & more costs

For some, writing the latest plan was easy. West Virginia and the District of Columbia have already met their goals, though both have committed to do more in coming years.

Other plans detail how states would meet the 2025 goals but require significantly more effort and funding to reduce nutrient-laden runoff from farmland — the largest source of nutrients — as well as stormwater from urban and suburban roads.

Maryland counts on doing three times as much to control nutrients from its farms between now and 2025 than it has accomplished since 2010. Delaware calls for planting cover crops on "every eligible acre," and Virginia calls for a huge acceleration of its various programs aimed at keeping livestock out of streams.

Some states included cost estimates for their plans; others did not. But the plans show that full implementation would cost hundreds of millions of dollars a year.

The biggest problems lie on the Susquehanna River, which supplies half of the freshwater — and nearly half of the nitrogen — to the Bay.

New York, which lies hundreds of miles upstream and has long been a reluctant participant in the Bay restoration effort, has made little progress since the pollution diet went into effect. Rather than accelerating its work, the state's new plan commits to maintaining "a consistent level of implementation" on its farmland, which is by far its largest source of nutrients, saying such efforts are "realistic." It is counting on significant farmland losses in its portion of the watershed, with an associated reduction in fertilizer applications, to help meet its goal.

New York submitted an alternate plan that would achieve the Bay goals, but said it lacks the funding and staffing to implement it.

PA still far behind

The larger shortfall, by far, is in Pennsylvania. Nutrient reduction has lagged there for years, and the Keystone State now needs to accomplish three quarters of the remaining reductions needed in the entire Bay watershed. Pennsylvania does not touch the Chesapeake, but nearly half of the state drains into the Susquehanna, while a small portion goes into the Potomac River, the Bay's second largest tributary.

Under the pollution diet, the state needs to slash annual nitrogen discharges to the Bay by 39.5 million pounds a year, but through the end of 2017 — the most recent figures publicly available — the state had reduced its load by just 5.4 million pounds, according to the state-federal Bay Program.

Although its draft plan says the state "is committed to having all practices and controls in place by 2025" to meet the Bay goals, the submitted document only shows how it would achieve two-thirds of its needed reduction, leaving a gap of more than 11 million pounds. That's nearly a quarter of the nitrogen reductions needed for the entire Bay watershed from now through 2025. (The state would achieve its phosphorus goal, though.)

Even with that shortfall, the plan would require Pennsylvania to increase funding for pollution reduction efforts by $257 million a year — more than doubling what the state currently spends.

Because Pennsylvania is so far behind in its Bay commitments, the EPA last year singled it out for increased oversight and asked for more evidence to demonstrate that it will have the programs, funding and policies needed to implement its plan. The agency also said it expected "technical details," including a list of all nutrient control actions Pennsylvania needs to meet its goals. The draft failed to do that and provides little detail about how the state would cover the shortfall.

In its warning last year, the EPA said that if Pennsylvania did not submit a satisfactory plan, it could face a variety of consequences. Those could include forcing wastewater treatment plants to make further costly upgrades, bringing more animal feedlots under the federal regulatory umbrella, redirecting how EPA grant funds are spent or other actions.

An agency spokesman declined to comment on Pennsylvania's plan, saying that the agency was reviewing drafts from all of the states and would release its assessments in early June.

EPA urged to act

Environmental groups and representatives from other jurisdictions have called on the agency to apply more pressure on Pennsylvania. Maryland's draft plan emphasized that meeting Bay goals "will require full commitment from upstream states, like Pennsylvania and New York" and upon the EPA "holding all jurisdictions accountable."

Deborah Klenotic, a spokeswoman for the Pennsylvania Department of Environmental Protection, acknowledged that the plan only outlined actions that achieved two-thirds of the nitrogen goal but said the state "will meet its obligations through additional measures."

"A key focus … is increased tracking of nitrogen reductions from sources not yet documented," she said.

The plan said many conservation measures that farmers and others implemented on their own — without public funding — have not been accounted for in meeting Bay goals. It calls for increased efforts to track those actions, as well as other measures for which it says the state has not received full credit.

Harry Campbell, Pennsylvania executive director of the Chesapeake Bay Foundation, expressed disappointment in Pennsylvania's plan. "We've got to fix it and fund it," he said.

Campbell praised the state's effort to involve counties, farmers and other stakeholders in the plan's development, saying "the process got a lot of interest, energy and even enthusiasm" and that the state would have been further along if such an outreach effort had begun years ago.

But, he added, "the bottom line is it's got to add up."

Securing funding from the state's General Assembly has long been a challenge. According to the plan, the state and counties in the Bay watershed currently spend about $229 million a year on restoration efforts. But that spending needs to be ramped up to $485 million a year.

The shortfalls identified in the report are not new. A Pennsylvania "reboot" strategy released three years ago intending to jump-start the state's Bay obligations also identified severe staffing shortages and a funding shortfall.

Campbell said that the new plan, and the potential for EPA action, could finally spur the state's lawmakers to provide more resources for the job. "This is sort of a stark reminder, and maybe even a wake-up call, as to the need," he said.

Keystone State's tough task

Pennsylvania has always faced a more difficult challenge in reducing nutrient pollution than most other states in the watershed.

Maryland and Virginia have made recent progress by upgrading wastewater treatment plants, but only about a tenth of Pennsylvania's nitrogen comes

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to complete plans, Lancaster and York, fell short of their nutrient reduction goals.

Only about a tenth of the nitrogen from the state comes from wastewater, and most of its plants have been upgraded with nutrient control technologies. That means most of the remaining reductions will have to come from agriculture and stormwater, sectors in which all states have been struggling to reduce pollution.

Noting that the shortfalls could trigger action by the EPA, the plan stresses the urgency of demonstrating progress. For instance, it says, local governments can take necessary administrative steps toward creating stormwater fees even if they cannot be levied immediately. They can also create voluntary programs to reduce lawn fertilizer, subsidize rain barrels and promote reforestation, the plan suggests.

Delaware

Nitrogen
2009 Load: 7.25 million pounds
2017 Load: 6.46 million pounds
2025 Target: 4.55 million pounds
Draft WIP: 4.46 million pounds

Phosphorus
2009 Load: 139,723 pounds
2017 Load: 118,069 pounds
2025 Target: 108,000 pounds
Draft WIP: 81,000 pounds

Delaware's plan would achieve its nutrient reduction goals by 2025. The state's nutrients overwhelmingly come from agriculture instead of stormwater runoff from developed areas or wastewater. Its largest town in the Bay watershed, Seaford, has fewer than 8,000 people. Delaware has several small wastewater dischargers but is counting on agriculture to overachieve and offset potential increases from wastewater treatment plants. Most states are approaching it the other way around, looking for reductions from wastewater to cover shortfalls in agriculture.

Recent rates of agricultural nutrient reductions would not achieve the state's goal, so the plan calls for a sharp increase in activity. That includes planting "every eligible acre" of cropland with a nutrient-absorbing cover crop in the fall, which would triple cover crop implementation by 2025. Among other actions, the state is counting on ramped up levels of enhanced nutrient management to further reduce fertilizer applications. At the same time, it backs away from earlier goals for planting streamside buffers, citing lack of landowner interest.

The District of Columbia has already surpassed its nutrient reduction goals for 2025, thanks in large part to upgrades at its Blue Plains Advanced Wastewater Treatment Plant. (Dave Harp)

District of Columbia

Nitrogen
2009 Load: 2.76 million pounds
2017 Load: 1.54 million pounds
2025 Target: 2.42 million pounds
Draft WIP: 2.42 million pounds

Phosphorus
2009 Load: 72,272 pounds
2017 Load: 76,178 pounds
2025 Target: 130,065 pounds
Draft WIP: 129,037 pounds

The District of Columbia has already surpassed its nutrient reduction goals for 2025, thanks in large part to upgrades at its Blue Plains Advanced Wastewater Treatment Plant, by far the largest treatment plant in the Bay watershed and perhaps the world. It handles the wastewater from the district, as well as its densely populated suburbs in Virginia and Maryland. But the wastewater figures included in the district's plan only cover the portion of the Blue Plains flow stemming from the district.

Nonetheless, the district plans to continue implementing stormwater control actions because of benefits to local communities, such as improving stream health and reducing flood risks.

Actual nitrogen loads from the district could be less than stated in its plan, because the WIP sets the nitrogen discharge for Blue Plains at its design capacity. In fact, the plan notes, the plant is operating under that capacity, and is expected to do so at least through 2030.

West Virginia

Nitrogen
2009 Load: 8.06 million pounds
2017 Load: 7.77 million pounds
2025 Target: 8.22 million pounds
Draft WIP: 7.51 million pounds

Phosphorus
2009 Load: 624,124 pounds
2017 Load: 429,053 pounds
2025 Target: 431,952 pounds
Draft WIP: 383,000 pounds

West Virginia has already reached and slightly exceeded its 2025 goals because of reductions from wastewater treatment plant upgrades, agriculture and stormwater runoff, as well as changes in the way that the state-federal Bay Program developed its nutrient reduction goals. But the state's plan says that it is committed to continue implementing runoff control practices at its recent rate because of benefits to local waterways, which will result in additional nutrient reductions.

New York

Nitrogen
2009 Load: 14.51 million pounds
2017 Load: 14.32 million pounds
2025 Target: 11.53 million pounds
Draft WIP: N/A

Phosphorus
2009 Load: 737,271 pounds
2017 Load: 632,372 pounds
2025 Target: 587,326 pounds
Draft WIP: N/A

New York has not been working at the pace needed to meet its nitrogen goals by 2025. The plan does not accelerate improvements for its agricultural sector — the state's largest source of nutrients — saying the state is "committed to executing a consistent level of implementation." It characterizes the decision to maintain the current level of effort as "practical and reasonable considering current available funding, technical staff, time and cooperation for implementation."

The state is counting on "negative growth" in its agricultural sector, anticipating that the loss of farms — and the related nutrients — will help meet its goal. But figures presented in the plan make it unclear whether those changes would be sufficient to close its gap.

The plan anticipates small reductions in wastewater pollution as some upgrades are finalized, while expecting to slash nitrogen runoff from urban areas — an area where others have struggled — by 600,000 pounds a year, or more than a quarter of its urban runoff.

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from that sector.

Most of its nutrients come from agriculture and stormwater runoff — sectors that all of the states have struggled to control.

It has more farms — 33,000 — than other states in the region, and most are small, making both oversight and outreach a struggle. Likewise, much of the stormwater pollution comes from small rural communities. Three-fourths of Pennsylvania's developed lands are outside areas covered by state and federal stormwater permits, meaning there is little effective regulatory control.

"Compared to the other states in the watershed, the scale of the nonpoint source challenges in Pennsylvania is one of the most significant factors that has impacted past progress and will impact future success," the state's draft plan says.

Despite its shortfall, the state's draft plan acknowledges the urgency to begin demonstrating cleanup progress or face potential EPA action. It implores local governments and others to "demonstrate progress," such adopting policies or ordinances, even if on-the-ground action is not immediately possible.

The plan also emphasizes that not only the Bay, but the state's own rivers, streams and public drinking water supplies are at risk and would benefit from the cleanup actions.

If the state doesn't ramp up its efforts, some — including Maryland lawmakers — have suggested forcing action through lawsuits. In the draft plan, Pennsylvania tacitly acknowledges that patience among others involved in the Bay restoration effort is wearing thin and that it "could face opposition from other states and environmental organizations" if it does not do more.

Links to the plans, and instructions for commenting, can be found at the EPA's Chesapeake Bay Total Maximum Daily Load website. Visit epa.gov/chesapeake-bay-tmdl and click on "Read the Draft WIPs."

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national destination where visitors can take in natural, historical and cultural features — some already well known, some not so much.

The National Park Service already has been a partner on several river-related projects in the area, helping to fund a map and guide in 2003 for the Susquehanna River Water Trail and improving the Zimmerman Center for Heritage in 2006 so that the riverfront site could become a visitor center and passport station for the Captain John Smith Chesapeake National Historic Trail. A ranger stationed there offers family programs.

Platts thinks the park service's presence has increased attention on the area and helped to nail down the Congressional support that led to creation of the national heritage area.

A national heritage area is different from a national park in that a heritage area is not federal property. "We don't manage what heritage areas do," noted Peter Samuel of the Park Service's regional office in Philadelphia. Rather, the communities do.

Though the new heritage area will develop and promote opportunities throughout the two counties separated by the Susquehanna, a river will be the umbilical cord that ties everything together.

Native Americans used the area along the river and its tributaries for at least 11,000 years before European settlers arrived as part of William Penn's experiment in religious freedom.

Depressions in boulders, sculpted by Ice Age currents and swirling debris, known as potholes, lie in the Conewago Falls section of the Susquehanna River. (Ad Crable)

The Susquehannocks, later called Conestogas, were the largest tribe in the area, but there also were Mohawk, Seneca, Shawnee and Nanticoke, Ganawese and Delawares — some seeking refuge in the area with permission from Penn.

John Smith, during his exploration of the Chesapeake Bay and some of its rivers, only made it a few miles up the Susquehanna in 1608. But he met with members of the Susquehannock tribe from present-day Lancaster County and was impressed by the athletic and tall tribesmen whom he described as "giants." As settlers continued to enter the area, Native Americans were driven away. The last known to be in the area were murdered in 1763.

Over time, the Susquehanna made the area a national nexus of early commerce with its canals, railroads, shad runs, rafts of timber and iron furnaces. The river town of Columbia in Lancaster County, in fact, wielded such economic might that the town failed to become the nation's capital by just a single vote in Congress in 1790.

The river also was a natural barrier that figured prominently in two wars.

During the Revolutionary War, the Continental Congress fled Philadelphia, crossed the Susquehanna and met in York for nine pivotal months. The Articles of Confederation were written there and George Washington survived an effort to remove him as commander-in-chief.

In the Civil War, Confederate Gen. Robert E. Lee's plan to invade Pennsylvania was thwarted when Union forces burned the covered bridge across the river at Columbia. Lee's forces retreated, resulting in the epic Battle of Gettysburg.

Socially, the river tested early settlers' mettle, Platts said.

For a time, the river was a gateway to the untamed West. "Those risk takers crossed the river. To this day, the cultures of people in Lancaster and York counties are different," Platts said.

Preservation of the wooded hillsides

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that cloak both sides of the river's gorge has been a longstanding effort. For example, the Lancaster County Conservancy, aided by the state, has acquired more than 1,800 acres of former utility-owned woods along the river over the last decade. The ongoing state-private effort to preserve woodlands on both shores is called the Susquehanna Riverlands.

Surprisingly, the corridor retains a large amount of its natural character, even though the stretch contains a nuclear facility, two hydroelectric dams, a pumped storage reservoir, power plant and incinerator.

The segment between the Maryland line to just south of Harrisburg has a wide range of natural features, from overlooks that peer down into the gorge, the jutting Chickies Rock with its sweeping vista — a regional magnet for rock climbers — and the water-sculpted potholes at Conewago Falls.

Two outfitters, one on each side of the river, supply paddlers. Two hiking and bicycling trails, one in the old bed and mule paths of the Pennsylvania Canal, parallel the Susquehanna near the river's edge and include great views.

The dams create quiet water, while above them the river flows free and swift. The two different environments attract a variety of freshwater game fish popular with anglers.

Though the river will be front and center, the heritage area development will include attractions throughout the two counties that shaped the area's history and culture. Among them will be destinations revolving around the Underground Railroad, Plain Sects, agricultural bounty, President James Buchanan, abolitionist Thaddeus Stevens, Native American history and others.

Quaint old river towns such as Columbia, Wrightsville and Marietta, each undergoing revitalization efforts, are expected to benefit from the national designation as they seek to become tourist destinations. One of them may host an envisioned Museum of the Susquehanna.

"It's going to be a big help to be able to use that as an advertising piece and say, 'Come to the area and see our antique shops, see our history and come along and see the river,' " said Columbia's mayor, Leo Lutz.

Partners in the heritage area will get busy on a management plan over the next couple of years. They are already planning a big launch over Memorial Day weekend with pontoon tour boats on weekends to take visitors between the Zimmerman Center for Heritage on the York County side of the river to Columbia and its Columbia Crossing River Trails Center to the east. The two facilities will be hubs for visitors to the heritage area.

A guide will be on board and passengers will learn about the Native Americans who lived along the river and Smith's historic visit. They will also see and learn about river features, such as a natural rock ledge and the unnatural remains of an old dam that was built to tow canal boats across the river below what was the world's longest covered bridge.

If successful, the tour boat trips could be expanded to take bikes and kayaks between the two shores. Land-water shuttles are another possibility in the future.

Set your sights on these Susquehanna sites

Thinking about checking out the Susquehanna National Heritage Area in Lancaster and York counties, PA? Here are some of the recreational, historical and cultural attractions:

≈ *Agricultural & Industrial Museum:* Exhibits highlight 300 years of transportation, agriculture and the development of manufacturing and industry. 217 W. Princess St., York. *yorkhistorycenter.org*

≈ *Captain John Smith Chesapeake National Historic Trail:* Fifty-three miles of this water trail with land-based sites flow through the heritage area on the Susquehanna. *nps.gov/cajo*

≈ *Christiana Underground Railroad Center & Underground Railroad Museum:* Learn about the 1851 "Christiana Resistance," when local residents violently protected a fugitive slave from Maryland from a posse. 11 Green St., Christiana. *zerchershotel.com*

≈ *Columbia Crossing River Trails Center:* This Gateway visitor education center is also the trailhead for the Northwest Lancaster County River Trail. 41 Walnut St., Columbia. *susquehannaheritage.org*

≈ *Ephrata Cloister:* Explore the site of a celibate, disciplined religious experiment that started in 1732. 632 W. Market St., Ephrata. *ephratacloister.org*

≈ *Highpoint Scenic Vista:* Take in sweeping views of the Susquehanna and hilltop meadows. 1199 Hilt Road, Wrightsville. *yorkcountypa.gov/parks-recreation*

≈ *Lancaster County Central Market:* Shop at the nation's oldest municipally operated market. 23 N. Market St., Lancaster. *centralmarketlancaster.com*

≈ *Landis Valley Village & Farm Museum:* Learn about Pennsylvania's German farming heritage and equipment circa 1740–1940, 2451. Kissel Hill Road, Lancaster. *landisvalleymuseum.org*

≈ *Pennsylvania Railroad Museum:* See more than 100 locomotives, historical displays, giant model train display and interactive exhibits. 300 Gap Road, Ronks. *rrmuseumpa.org*

≈ *Safe Harbor petroglyphs:* Shank's Mare Outfitters will lead paddling tours to the site on July 27, Aug. 17 and Sept. 21 at 2092 Long Level Road, Wrightsville. *shanksmare.com* / Chiques Rock Outfitters is another local paddling outfitter. 41 Walnut St., Columbia. *chiquesrockoutfitters.com*

≈ *Wheatland:* Visit the home of former President James Buchanan. 1120 Marietta Ave., Lancaster. *lancasterhistory.org*

≈ *William C. Goodridge Freedom Center & Underground Railroad Museum:* Exhibits tell the story of the African American businessman and abolitionist in his former home. 123 E. Philadelphia St., York. *goodridgefreedomcenter.org*

≈ *York Colonial Complex:* Four historic buildings showcase York's considerable role during the Revolutionary War, including a reconstructed courthouse where the Continental Congress wrote the Articles of Confederation. 205 W. Market St., York. *yorkhistorycenter.org*

≈ *Zimmerman Center for Heritage:* This visitor center for the heritage area is also a visitor station and National Park Service passport site for the Capt. John Smith Chesapeake National Historic Trail. It includes a paddle launch and short hiking trail. 1706 Long Level Road, Wrightsville. *susquehannaheritage.org*

The creation of the new Susquehanna National Heritage Area is expected to boost recreational activities on the Susquehanna River. (Shank's Mare Outfitters)

Trails

≈ *Conestoga Trail:* A rugged 14-mile section of the trail goes through ravines and ridges on the Lancaster County side of the Susquehanna. *susquehannagreenway.org*

≈ *Enola Low Grade Rail Trail:* This 28-mile route on a former freight railroad, features about 5 miles along the Susquehanna, including the Turkey Hill Trail to a scenic vista, 2459 River Road, Washington Boro. *manortownship.net*

≈ *Mason-Dixon Trail:* A section of the 193-mile trail follows the Susquehanna in the River Hills of York County. *kta-hike.org*

≈ *Northwest Lancaster County River Trail: W*alk or bicycle a 14-mile trail along the river connecting the towns of Columbia, Marietta, Bainbridge and Falmouth. *nwrt.info*

≈ *York County Heritage Rail Trail:* Walk, bicycle or travel by horseback on a 21-mile trail from the Maryland line to York. *yorkcountypa.gov*

Native American Sites

≈ *Blue Rock Heritage Center:* The center features Native American artifacts from one the most heavily populated villages of Susquehannocks. 2251 River Road, Washington Boro. *susquehannariverlands.com*

≈ *Conestoga Historical Society:* View Native American artifacts found in the area. 51 Kendig Road, Conestoga. *susquehannariverlands.com*

≈ *Hans Herr House & Museum:* Visit a life-size reproduced longhouse used by local Native American tribes. *hansherr.org*

≈ *Indian Steps Museum:* This is perhaps the first public museum in the United States for Native American culture. Its local artifacts date back to 10,000 B.C. 205 Indian Steps Road, Airville. *indiansteps.org*

≈ *Native Lands County Park:* This 180-acre preserve of woods and meadows on the hills above the Susquehanna River includes the site of a Susquehannock settlement. 1664 Long Level Road, Wrightsville. *yorkcountypa.gov*

Pedal up! Food, farms await on farm-to-fork bike rides

Cyclists travel the countryside of Lancaster County, PA, during the Pennsylvania Dutch Farm to Fork Fondo. The bike tour is one of several that take place each year at a variety of locations to raise awareness about farmland conservation. (Courtesy of Wrenegade Sports)

By Kimbra Cutlip

To bicycle through farmland in Lancaster County, PA, is to inhale the air of a bygone era. It's a feeling that cannot be experienced from the seat of a car, even with the windows down.

It's not just the horse-drawn buggies that pass you when you're on a bike. However you travel, you will see backyard clotheslines hung with rows of black pants and long dresses. You'll see men in suspenders guiding wooden plows behind teams of horses. You'll see mile-long vistas of rolling fields cut through here and there with open road, and you'll likely notice the absence of overhead powerlines.

But only by bike can you experience the kind of stillness that swallows sound and makes it feel as if time has stopped. It was a windless 94-degree day in June when I rode in the 2018 Pennsylvania Dutch Farm to Fork Fondo: an organized bicycle ride featuring farm-fresh treats at rest stops on local farms. A Fondo is a festive cycling event in which riders choose from different course lengths ranging from a 10-mile "ramble," to a full 75- to 100-mile "gran" fondo.

Most riders I spoke with had opted for the 25– or 50-mile routes because of the brutal heat, but I was committed to the full 80-mile course. Over long stretches of road I was aware of the absence of sound: no distant cars or planes, no crickets, birds or cicadas. But when I stopped for a moment of shade beneath a tree, the silence was so absolute it had a presence of its own, like the blue sky and stifling heat. It was a silence I had only experienced in the desert far from human development. I was having a moment — one that exemplified how different Lancaster County is from the mixed suburban farmland in southern Anne Arundel County, MD, where I usually ride.

I think that's exactly what former pro cyclist Tyler Wren had in mind when he conceived of the Farm-to-Fork Fondo bicycle series. The night before, at a meet-the-farmer dinner, he explained his mission to raise awareness for farmland conservation. "We in the cycling community get to experience these iconic landscapes that are disappearing to development, and we have a unique responsibility to preserve them," he said. "I want these events to make that connection."

True to the fondo format, there are prizes for those who want to race, but the emphasis at Wren's events is on celebrating the ride at all levels and inspiring support for local farmers.

Nearly 500 riders particiated in last year's Pennsylvania Dutch fondom, which started and ended at a picturesque stone farmhouse, built in the 1700s, on Wyebrook Farm in Honey Brook.

At mile 12, we rolled into our first rest stop, Wanner's Pride-n-Joy Farm in Narvon. Volunteers from a local charity kept the aid station stocked with sunscreen and offered to spritz us with cool water. Along with energy drinks and protein bars, the refueling tent had samples of orange quinoa pudding, made with milk from the farm, topped with strawberries and toasted almonds.

I knew it would set me back timewise, but I asked farmer Alfred Wanner to show me the digester that converts manure into methane for powering the farm. It was basically a big black tank. But I also got to pet a newborn calf and see what an operation with 750 head of cattle looks like.

A little more than eight miles down the road, we stopped at Lapp Valley Farm, a Mennonite dairy and ice creamery in New Holland. Another team of volunteers cheered us in wildly, eager to earn their share of a $4,000 cash prize to be distributed based on rider votes for the most supportive teams. It's part of Wren's strategy to support the broader community at a time when agricultural regions are facing intense pressure from development, an aging population of farmers, fluctuating food prices and rising costs.

Our third rest stop, at Cherry Crest Adventure Farm in Ranks, revealed how some farmers have turned to diversification for economic sustainability. In addition to raising beef cows, broiler chickens and crops, Cherry Crest has embraced "agri-tainment" with a 15-acre theme park that includes a corn maize, petting zoo and

Appetizers served at a meet-the-farmer dinner are just one of the many opportunities to sample local fare during the cycling event. (Courtesy of Wrenegade Sports)

farm-themed games.

When I rolled in, only a handful of other riders lingered over the apple cider donuts and corn on the cob. My delays had cost me, and so had the combination of heat, exertion and rich food. The previous night's dinner was a rustic gourmet affair with mushroom crepes, pork roast, Dutch potato salad and peach chutney. Adding ice cream at the last stop had been a mistake. Others didn't appear distressed by it, but my stomach was in knots. I hoped more peddling would shake it out.

Above: A volunteer offers watermelon to cyclists at a rest stop during a Farm to Fork Fondo in Pennsylvania. Right: Cyclists makes their way uphill through the rolling Pennsylvania landscape. (Photos courtesy of Wrenegade Sports)

Over the next 14 miles the course dipped deep into the expansive cornfields of Plain Sect farmer territory south of Strasburg. Families in black buggies passed by wearing dark clothing from ankle to neck in near 100-degree heat. The route crisscrossed Little Beaver Creek and its tributaries, where cattle cooled themselves in the water.

Giving cattle free access to streams creates nutrient and sediment pollution when manure and loosened soil merge with local waterways. Here, fuzzy brown growth floated in the muddy slurry as it traveled languidly toward Pequea Creek, one of Pennsylvania's most polluted. In the county as a whole, approximately 40 percent of streams are impaired.

But well managed farmland is generally considered better for water quality than development, and these farms offer important opportunities for improvement. Plain Sect communities have been reluctant to adopt some environmental practices, such as planting streamside trees and fencing cattle from streams, especially through government-sponsored programs. But some have found ways to participate in conservation programs, and more are starting to do so.

The next rest stop offered the boost of optimism I needed, if not the energy. Though, I couldn't touch the lamb sliders, goat cheese or vegan watermelon gazpacho at Linden Dale Farm, I did speak with farmers Abe and Melissa Mellinger. After showing me the goat milking parlor, Abe described the buffer of trees he and his father (who are not Plain Sect) planted to absorb runoff along their stretch of Pequea Creek.

"It's amazing," he said, "how resilient it is. Even though it's just this small section of the creek, there are fish, crayfish and things that weren't there when I was a kid." That Abe looked to be a bit younger than 30 suggested restoration can have rapid impacts.

When I left Abe, I found that I'd fallen to the very back of the pack. The next stop, Riehl's Family Farm, was seven miles away in Leola, and I was almost there when I veered for the shady tree. I was overheated, and my stomach had shut down. With 27 miles of sweltering pavement left to peddle, I knew I was finished.

I made it to Riehl's but wheeled right past the freshly made potato chips, whoopie pies and root beer, and called the support vehicle for a ride. I would miss the next two farms with their cheese and veggie empanadas and the Amish buns with lavender herbed butter and honey, but other riders would later tell me they were fantastic.

Back at Wyebrook, I walked my bike to the finisher's tent to get my bag of swag. It didn't matter that the after-party was nearly over, or that I hadn't crossed the finish line on two wheels. The voice on the loudspeaker called my race number, a woman draped a cold wet cloth on my neck and I bowed to receive a lanyard with a commemorative wooden spatula like a gold medal. It was the most festive bike event I'd ever participated in. I think I'd rather see all that rich farm food at the after-party instead of the rest stops, but I'm ready to tackle it again.

Cyclists gather at the starting line for the Pennsylvania Dutch Farm to Fork Fondo. (Courtesy of Wrenegade Sports)

2019 Farm to Fork Fondos

There are eight Farm-to-Fork Fondos scheduled in 2019 from Maine to Virginia. Two are in the Chesapeake watershed:

- The Pennsylvania Dutch route on Aug. 24
- The Shenandoah route on Sept. 15

Registration fees vary depending on the cyclists' age and length of the route. For information and registration, visit farmforkfondo.com.

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A box turtle ambles across a moss-covered log in a Nassawango Creek wetland near Salisbury, MD. (Dave Harp)

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A growth on a tree trunk looks remarkably like a turtle's head in a Nassawango Creek wetland owned by the Nature Conservancy near Salisbury, MD. (Dave Harp)

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Forum

Commentary • Letters • Perspectives

Harry Hughes, one of the best political allies the Chesapeake ever had

When problems with the Chesapeake Bay were starting to become obvious, Maryland Gov. Harry Hughes stepped forward and acted, when many others would have been far more cautious. Many of his admirers refer to him as the "father of Bay restoration" for his willingness to act, which he always did with grace. We asked several people who had worked closely with Hughes over the years to offer some of their memories about working with him.

"Harry Hughes usually considered the political implications of a given decision, but I never saw these sway the direction of his choices. They were always framed by his sense of achieving the greatest progressive good for the citizens of Maryland."
— Bill Eichbaum
(Dave Harp)

John Griffin

Environmental aide to Gov. Hughes, now a program manager for Chesapeake Conservation Partnership

Governor Hughes entered the 1984 Maryland General Assembly session with a comprehensive package of legislative and budgetary initiatives as the state's response to the documented declines in the Chesapeake. His proposal, painstakingly developed over the course of 1983 in consultation with many, many stakeholder groups, had in December of that year received thunderous acclaim at the Chesapeake Bay Summit in Virginia.

Knowing that parts of his proposals would be controversial, Hughes hosted a series of dinners for each member of the General Assembly — serving oysters and rockfish. He arranged for a special guest, scientist and author William Warner, to attend each dinner and personally inscribe a copy of his Pulitzer Prize-winning book, *Beautiful Swimmers*, for each guest. Warner and Hughes spoke to each group of legislators about the historic moment they were in and the need to approve the proposals.

Warner refused to receive an honorarium for the cost of each trip from his home in DC or the valuable gift of his time and wisdom. Both these great Americans were motivated solely by a cause greater than themselves, the restoration of the Chesapeake Bay. Two Great Gentlemen of the Greatest Generation.

Bernie Fowler

Former chairman of the Calvert County Board and former Maryland state senator

After Gov. Huges was elected, I asked him to meet with the Calvert County commissioners and the Chesapeake Biological Lab folks to see the degraded state of the Patuxent River. When he came down, on Dec. 12, 1979, it was just like I had known him forever. He really turned out to be one of the best political allies I ever had.

He really got charged up. We took a tour down the river that started up at Benedict and went to Solomons, where we stopped for dinner that evening. I gave a talk with data and statistics and I mentioned that Thanksgiving had just come but said, "Christmas is just around the corner, governor. You could do Southern Maryland a great big favor. People would honor you the rest of your life if you would play Santa Claus this Christmas and help us clean this Patuxent River up." And when he got up to respond, he started off by saying, "Ho ho ho.'"

At the time, the feds were saying nitrogen was not a problem. They were arguing that only phosphorus needed to be addressed. That was disturbing because that meant the federal government would not pay a dime for the nitrogen removal. But Hughes was so convinced that the Chesapeake Biological Lab scientists and our group were right that he pledged that day to pay for taking the nitrogen out of the largest sewage treatment plant on the Patuxent River. He was really interested in using the river as a laboratory for the Bay.

Verna Harrison

Former aide to Gov. Hughes, now a consultant specializing in organizational development and resource protection

Looking up from his black reading glasses, he asked, "so what do we do?" — in response to receiving the most recent report on the decline of striped bass, previously a vital link in the Bay's ecosystem chain, a mainstay of commercial and recreational pursuit and source of income from tourism and other industries across the state.

He wanted to know in detail about the immediate impact on the watermen and their communities. He wanted to know about the longer-term consequences, for them and the Bay's health, of not acting. He wanted to discuss the strategy to win the political fight in the Maryland General Assembly and within the Atlantic States Marine Fisheries Commission, which included states up and down the Atlantic Coast. He wanted to hear about a strategy to provide meaningful employment for watermen while the moratorium was in place.

What he didn't ask, or want to know, was the impact on his polling. I never heard him inject that type of question in any of the tough public policy issues we dealt with — from increasing the gas tax, to installing the first fishing license with fees to help provide funding for his comprehensive Chesapeake Bay restoration program.

Bill Eichbaum

Member of the Hughes administration, vice president emeritus and senior fellow with the World Wildlife Fund

Over a period of 20 years, I was fortunate to serve in senior environmental positions in the state governments of Pennsylvania, Maryland and Massachusetts and in the federal Department of the Interior. For eight of those years, I served in Hughes' administration. Two features stand out about his leadership.

One, he created a collaborative environment in which his senior staff and officials joined together to seek the most productive policy choices for the benefit of the public. The landmark efforts to begin the Chesapeake's restoration were one of many results of this approach.

Second, as I recall, Hughes had a press conference almost every week. These were wide-ranging but often touched on environmental issues.

Over the years, he made decisions about and prepared for public discussions on a wide range of issues from the environment to mental health to the criminal justice system. Throughout that time, Hughes usually considered the political implications of a given decision, but I never saw these sway the direction of his choices. They were always framed by his sense of achieving the greatest progressive good for the citizens of Maryland.

William C. Baker

President of Chesapeake Bay Foundation

I have been fortunate to have known and worked with Hughes throughout my 40-plus years at the foundation.

HUGHES CONTINUES ON PAGE 33

Forum

Commentary • Letters • Perspectives

When it came to the Bay, Hughes was more than up to the challenge

By Tom Horton

"Harry Hughes Horton." Sounds good, don't ya think? A missed opportunity that I'll explain in a bit.

I always had a soft spot for Harry R. Hughes, Maryland's governor from 1979 to 1987, who died March 13 at age 92. We both grew up in rural Caroline county, born a generation apart (1926 and 1945).

Caroline, the only Eastern Shore county lacking Bay shoreline and ignored by major highways, didn't change that much between Hughes' time and mine. I would joke to Harry that he came from the "privileged" part, around Denton, which in our day had the county's only stoplight. My hometown, Federalsburg, made do with a yellow flasher.

"Champion of Clean Government and a Clean Bay" — the *Baltimore Sun* put that perfect headline on Hughes' obituary. A reputation for integrity did help fuel his stunning upset victory in the Democratic primary election of 1978. He had resigned as secretary of transportation a year earlier to protest unethical bidding processes.

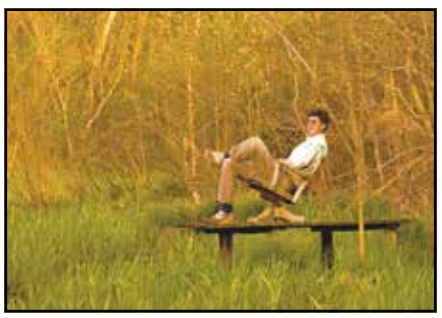
But no one, including Harry Hughes, foresaw the environmentalism that would become a major part of his legacy, and not just while he governed. I have long privately compared him with former President Jimmy Carter — both men showing unstinting, lifelong commitments to public service.

A few years after leaving office, Hughes joined the board of the Eastern Shore Land Conservancy, significantly raising the profile of that "little podunk group," to use the words of current ESLC president Rob Etgen. "[He gave us] the heft we needed," Etgen said. Having Hughes onboard opened doors for the group, which is now a force for environmental leadership on the Shore, where it has conserved around 65,000 acres of land.

Nearly a million more acres have been protected statewide under Maryland's Rural Legacy Program, which came to be under Hughes' post-gubernatorial leadership. In 1995, in consultation with then Gov. Parris Glendening and farming and natural resources officials, he hatched the plan that would become Rural Legacy.

"He was always there for you, and he had a sense for those 'pivot points,' including his own first election, where things were on the cusp of change, where moving decisively could get big results," Etgen said.

Former Maryland Gov. Harry Hughes walks along his property in Denton, in Caroline County on Maryland's Eastern Shore in 2006. (Dave Harp)



Chesapeake Born

An example. In 1997 Hughes agreed to chair a commission taking on a political hot potato — the mysterious outbreaks of pfiesteria, a toxic algae that threatened the Bay's seafood, tourism and recreation industries.

The upshot revealed a shocking lack of progress by Maryland agriculture in meeting its Bay cleanup obligations and led to recent legislation that will sharply limit the runoff of manure into Maryland waterways.

"My admiration for him only grew after he left office," said John Griffin, who worked on the governor's staff, then as deputy secretary and secretary of Maryland's Department of Natural Resources.

Hughes would follow the science and act on it, letting the chips fall where they might, said Griffin and others who worked with Chesapeake Bay restoration efforts.

"He would listen intently to the evidence, ask questions, then say, 'we need to do something … Maryland should lead on this,'" Griffin said.

Issue after issue: a moratorium on catching rockfish that outraged some of Hughes' closest allies on his native Eastern Shore, but led to the species' robust recovery; a ban on phosphate detergents that was controversial enough for the *Baltimore Sun* to dispatch me to interview people in laundromats in phosphate-ban states like Wisconsin.

Also taking leadership in the historic 1983 federal-state partnership that ushered in the ongoing watershedwide effort to restore the Bay's health; and before that, deciding to clean up the Patuxent River, which Maryland environmental officials had earlier fought in court, denying emerging science that the river was in peril.

And creating the Hughes Center for Agro-Ecology, a novel organization that straddles the often-difficult divide between farming and environmental protection. When he was elected back in 1978, none of the above was on anyone's radar screen.

Though he was athletic — he is in the Eastern Shore Baseball Hall of Fame — Hughes was no typical, outdoor Eastern Shore guy. He was appreciative of his rural roots, but rather urbane and more at home in a suit than in camo.

I remember him as a young lawyer who did some work for my Dad's poultry company, being dragged down to our cabin on the Honga River for duck hunting expeditions. I was just a kid, but it was apparent he'd rather have been anywhere else.

But as the facts came in during the 1970s and '80s on the troubling environmental declines throughout the Bay. Harry Hughes was more than equal to the challenge, becoming forever associated with championing the Chesapeake.

In September of 1978, I was assigned to cover his upset victory in the Democratic primary, which in those days was tantamount to winning the governorship.

A phone call from my wife cut that assignment short. She was giving birth — six weeks early. Racing to the hospital, we mulled our list of baby names. Tyler, we decided, if it was a boy. It was, and Tyler, now 40, is doing good.

But I often told Harry, if we'd realized just how good he was going to be, the name, hands down, would have been Harry Hughes Horton.

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

Reopen CREP: Help a farmer and you help the Chesapeake

By Beth McGee

A narrow forested buffer separates this farm field in Maryland from a creek that flows into the Choptank River. (Dave Harp)

In the most recent *Bay Barometer* report released by the Chesapeake Bay Program, one metric tracking progress toward a healthy Bay stands out: With a goal to plant forested buffers along 900 miles of streams each year, the Bay states in 2017 planted just 56 miles. It was the lowest annual planting total in 22 years.

Forested streamside buffers remain one of the most cost-effective ways to cut pollution from agricultural lands, trapping soil, manure and fertilizers before they can flow downstream to the Bay. The woeful lag in planting spells big trouble for the states as they design their final plans to meet federally mandated pollution reductions in the Bay by 2025.

That's why it is imperative for the U.S. Department of Agriculture to reopen a key program that helps Bay farmers put forested buffers in the ground.

The Conservation Reserve Enhancement Program, or CREP, pays farmers in the watershed an annual rent over a contract period of 10–15 years for land where they agree to plant protective barriers of native trees along streams. It also provides incentive payments and defrays the cost of designing and installing the buffers, as well as related practices like stream fencing and water systems.

On the farm, the buffers help stabilize stream banks; provide shade and cool the water for native fish; create habitat for wildlife; and enhance the aesthetic value of the landscape. Downstream in the Bay, the pollution reductions from buffers help to restore underwater grasses, reduce harmful algal blooms and shrink oxygen-deprived dead zones.

But CREP, the primary program for planting forested buffers in the watershed, stopped accepting new applications from farmers last September after the expiration of the 2014 Farm Bill. Despite the passage of a new bill reauthorizing the program, the USDA indicates it will likely not accept new enrollments until this fall. Put plainly, farmers willing to protect local streams from pollution can't.

Additionally, approximately 34,000 acres of farmland in the Bay watershed currently enrolled in CREP and its parent program, the Conservation Reserve Program, are set to expire this year. When contracts expire, farmers no longer receive rental payments and are not obligated to keep their buffers. The closure of CREP means farmers with expiring contracts who want to continue their commitments may choose not to do so, putting those buffers at risk.

The delay couldn't come at a worse time. Fewer miles of buffers means a heavier lift for states as they design their final watershed implementation plans, the steps that will make the final push to the 2025 deadline for meeting Bay restoration requirements. Last year's midpoint assessment of how much progress states are making toward those goals noted that the planting of forested buffers needs to accelerate — not scale back.

There are three reasons to be optimistic about closing the gap.

First, many farmers in the watershed are willing and excited to plant forested buffers. In Pennsylvania, Chesapeake Bay Foundation restoration specialists report getting weekly calls from producers who are interested in planting buffers and signing up for CREP. Farmers who have worked with the CBF and state and federal partners to plant buffers in the past say they are eager to do more, noting the benefits buffers provide for native wildlife and flood management.

Second, a legislative effort led by Sen. Bob Casey (D-PA) incorporated substantial improvements to CREP in the new Farm Bill. The new measures ensure farmers have adequate financial support to maintain buffers and protect their investments. The bill also ensures farmers are fairly compensated for expenses associated with buffers, such as installing fencing along streams and providing alternative water sources for livestock.

Finally, the CBF and its partners last year launched the Keystone 10 Million Trees Partnership to focus a diverse array of resources on forests and streamside buffers. The partnership is committed to planting 10 million new trees in priority landscapes in Pennsylvania by the end of 2025. Aerial surveys show 1.4 million acres of streamside land across the Bay watershed that could be converted from crops, pasture, or turf into forested buffers, according to the Bay Program.

But all of this momentum is at risk unless CREP reopens soon.

The biggest blow could be to farmers' willingness to plant forested buffers in the future. Planning and ultimately planting a buffer can take months of effort — from designing the buffer alongside technical specialists to submitting paperwork, ordering trees and putting shovels in the dirt. Repeated interruptions of the CREP program undermine this significant investment of time and effort and hinder farmers' ability to plan for the future. As a result, many farmers who want to enroll in CREP are understandably frustrated.

As Roger Rohrer, a farmer in Lancaster County, PA, said, "It's a problem when we have people raising their hands and we can't move on."

We must support farmers who want to do the right thing for their communities and the Bay. The best way to do that is to reopen CREP as soon as possible. Farmers, and the Bay, can't afford to wait.

Beth McGee is director of science and agricultural policy at the Chesapeake Bay Foundation.

Let Us Know

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Forum

Commentary • Letters • Perspectives

Rolling back Clean Water rules would devastate the Potomac, Bay

By Nancy Stoner

For nearly 50 years, the Clean Water Act's definition of which water bodies across the country are protected from pollution enabled states and local communities to safeguard our nation's rivers, streams, wetlands and other waterways.

The value of clean water was broadly appreciated and understood. President George W. Bush implemented his father's vision of no net loss of wetlands. President Obama's Environmental Protection Agency sought to clarify and simplify the definition of "Waters of the United States" in 2015 to protect invaluable sources of drinking water and critical wildlife habitat.

But now, in the blink of an eye, President Trump's EPA threatens to undo all of the progress we've made cleaning up and protecting our nation's treasured waters.

The EPA is proposing to drastically limit the scope of the Clean Water Act and gut existing clean water protections at the behest of polluting industries that profit from weak regulation. The new rule would remove the federal protection of at least 40% of the country's rivers, streams and freshwater wetlands, undermining the protection that provided greatly improved water quality in many of our waterways.

The Potomac River's vast improvement in water quality, wildlife habitat and recreational opportunities has largely been driven by implementation of the Clean Water Act, one of our nation's most effective environmental statutes.

The new rule purports to create "clarity, predictability and consistency" in defining "waters of the United States." Instead, it simply defines away nearly

Tubers and kayakers enjoy a day on the Potomac River near its confluence with the Shenandoah River at Harpers Ferry, WV. One of objectives of the Clean Water Act was to make U.S. waters safe for recreational activities. (Dave Harp)

half of the waters of our country from protection, taking away the public's right to clean water. We have come too far to undo decades of critical protections that cleaned our rivers and streams and stopped pollution.

The Clean Water Act is designed to ensure that Americans could go anywhere in the country and be confident that they could drink the tap water, eat the fish they caught and go swimming. While we have not yet realized that goal, we are making great progress, and the Clean Water Act is responsible for much of it.

The new rule would take away Americans' right to clean water protections and replace them with the right of polluters to destroy or degrade 40% of the country's streams, lakes and wetlands.

No scientific basis supports the Trump EPA's rule. It would eliminate express protection for waters flowing through multiple states and strip protection from ephemeral streams — those that exist from rainfall or snowmelt and form the headwaters of watersheds. In the West, 80–90% of streams are ephemeral. Closer to home, 60 percent of Virginia streams would lose their shield, especially headwater streams in the Shenandoah and Upper Potomac regions of the Potomac's 14,000-square-mile watershed, which are integral to providing habitat for trout and other popular species, not to mention clean drinking water for almost 6 million people downstream. Miney Branch on the Upper Potomac and Quail Run in the Shenandoah River watershed are merely two examples of thousands of streams in our watershed that would be more vulnerable than ever to pollution.

The rule would also eliminate federal protection for most wetlands. In Virginia, for example, we estimate that up to 80 percent of freshwater wetlands could lose federal protection.

Wetlands are the kidneys of the stream system, absorbing one million gallons of water for every acre. They serve as natural pollution filters, buffers for flooding and critical habitat for migratory waterfowl and other birds. When wetlands are lost, the public suffers from increased flooding, loss of habitat and more pollution — as well as pay to install more-expensive and less-effective engineered infrastructure to try to replace the wetlands functions that have been lost.

The Clean Water Act has played a seminal role in setting us back on the path to clean, healthy rivers, streams and wetlands that provide drinking water, wildlife habitat and recreational opportunities for millions of Americans.

The days when the Cuyahoga River burned, the Potomac was called a "national disgrace" and the Chesapeake Bay's perpetual decline was mourned are over, yet President Trump's EPA wants to dismantle the protections enabling such great progress.

Our waterways belong to all of us, not to polluters. We need to stand up and defeat this rollback of clean water protections.

Nancy Stoner is president of the Potomac Riverkeeper Network.

Hughes from page 30

While there were many memorable moments, September 1982 stands out in my mind. Virginia Gov. Chuck Robb came to Annapolis to campaign for Hughes' second term. They began the day with a press conference at the State House, where they launched a Maryland/Virginia partnership to "save Chesapeake Bay." Both governors used that exact term, saying that if Hughes was re-elected to a second term, the two of them would work together to "Save the Bay."

That may seem routine today, but it was a groundbreaking moment. The partnership formed that day has had an incalculable benefit for the Bay. On behalf of the Chesapeake Bay Foundation, we are grateful for Harry Hughes' leadership and dedication to saving the Bay.

Ann Swanson

Executive director of Chesapeake Bay Commission

I met Hughes for the first time in 1984, shortly after the signing of the first Chesapeake Bay Agreement and thought he was the consummate blue-eyed, Bay gentleman. He seemed to have a heart-felt sense of the Bay, a calm and an almost genetic attachment to Maryland and its Bay. When combined with his political savvy and polished demeanor, Hughes was a credible leader able to persuade liberals and conservatives alike that the Chesapeake was well worth restoring. Hughes worked his magic repeatedly — it was so easy to follow him. Assisted by his able staff, he created the Critical Areas program; sediment and erosion control laws; rockfish moratoriums; the phosphate detergent ban; and so much more. In each case, these actions were not about party, but instead about the resource, the culture and the community. Hughes was smart. He was humble. He was environmentally aware. He was the leader that all of us needed to jump-start this program and guarantee its longevity over time. His slogan, "Together we will," remains the mantra of the Chesapeake Bay Program to this day.

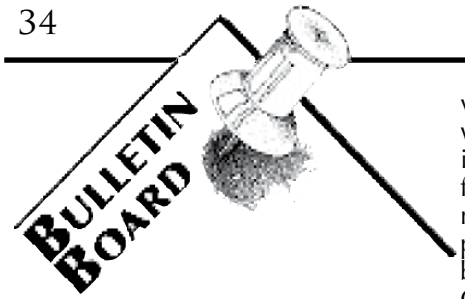
Donald Boesch

Former president of Maryland Center for Environmental Science

In 1997 Gov. Parris Glendening appointed Hughes to chair a commission to recommend steps that could be taken to deal with outbreaks of toxic algal blooms that had commanded much public attention.

I remember meeting with Governor Hughes in the back offices of the General Assembly after a particularly confusing commission meeting. He challenged to me to provide actionable scientific advice, even with the uncertainties that existed: "You scientists need to tell us what you know, not just what you don't know."

Within two weeks I pulled together a group of scientific experts — among whom there was much skepticism and disagreement — who finally agreed to the "Cambridge Consensus" that nutrient pollution was contributing to harmful algal blooms and that more effective controls of agricultural sources were required. The commission's report, based on this scientific advice, led to the enactment of Maryland's historic Nutrient Management Law in the next legislative session.



VOLUNTEER OPPORTUNITIES

MD Volunteer Angler Survey

The Maryland Department of Natural Resources is asking anglers to help track scientific data by using the mobile-friendly *Volunteer Angler Survey.* Anglers of all ages can become citizen scientists by recording basic information from their catch such as species, location and size directly to the survey on their smartphone. Biologists use this data to develop, plan and implement management strategies. The artificial reef initiative, blue crab, freshwater fisheries, muskie, shad and striped bass programs have upgraded to mobile-friendly methods. Participants are eligible to win quarterly prizes. Info: dnr.maryland.gov/Fisheries/Pages/survey/index.aspx.

Severn River Association

The Severn River Association in Annapolis is recruiting volunteers to join their team of citizen scientists monitoring water quality on the Severn River and its creeks. The weekly tours take place Wednesday and Thursday mornings, and last roughly four hours. The season lasts from May to October. Volunteers can sign up for as many tours as they'd like. Info: TAGuay@severnriver.org, 443-569-3556, info@severnriver.org

Thomas Point Shoal Lighthouse

The National Historic Landmark, Thomas Point Shoal Lighthouse, restored by the U.S. Lighthouse Society, which operates tours in partnership with the Annapolis Maritime Museum, needs volunteers. Info: volunteer@amaritime.org.

Irvine Nature Center

Irvine Nature Center in Owings Mills, MD, needs *Weekend Weed Warriors*, ages 14 & older, to remove oriental bittersweet and multiflora rose May 11 & 25 and June 1, 15 & 29. Training and tools are provided. Wear sturdy shoes that can get wet/muddy and bring water and nonrefrigerated snacks or a lunch. Meet at the main entrance. Info, including hours: 443-738-9230, fertigb@explorenature.org.

Volunteer at CBEC

The Chesapeake Bay Environmental Center in Grasonville, MD, has a variety of volunteer openings for those who only want to drop in a few times a month to assist with a project or event, or help out on a more regular basis. Openings include: helping with educational programs, such as *School's Out* or *Summer Camp*; early childhood *Creepy Crawler* programs; guided kayak trips or hikes; staffing the visitor center's front desk; maintaining trails; working on landscape projects, landscaping, mowing and the Pollinator Garden; feeding or handling captive birds of prey; maintaining birds' living quarters; and participating in CBEC's team of wood duck box monitoring or other wildlife initiatives. Other opportunities include participating in fundraising events and behind-the-scenes operations, including 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 complimentary 1-year family membership to CBEC. Info: volunteercoordinator@bayrestoration.org.

Watershed Stewards Academy

Learn how to become a *Harford County Master Watershed Steward* at an information session 6–7 p.m. May 14 at the McFaul Activities Center in Bel Air, MD. Stewards become leaders in their community, helping to improve the health and function of local streams and the Bay. There is no registration for this free event. Info: bit.ly/WatershedStewards, 410-638-3217 x244, wsa@harfordcountymd.gov.

Cromwell Valley Park

Cromwell Valley Park in Parkville, MD, needs volunteers for:

- *Habitat Restoration Team / Weed Warrior Days:* 2–4 p.m. May 4, 8, 11, & 15 and 10 a.m.–12 p.m. June 8, 19, 22 & 26. All ages (12 & younger w/adult). Remove invasive species, install native ones, maintain habitat. Service hours available. Meet at Sherwood House parking lot. Registration required. Info: ltmitchell4@comcast.net.
- *Drop in Gardening:* 9 a.m.–12 p.m. May 18. Meet at Children's Garden. Individuals/Families ages 13+ Gloves, tools, water provided. Bring a hat, sunscreen. No registration. Info: cromwellvalleypark.org, info@cromwellvalleypark.org, 410-887-2503. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

York County (PA) Parks

Upcoming volunteer opportunities in York County, PA, parks include:

- *Cleaning of the Rail Trail Train Stations:* 5 p.m. May 14. (*Hanover Junction)* & May 21 (*New Freedom*). Bring your favorite supplies to clean walls, floors, windows. Pizza, subs, drinks provided. No registration.
- *Intro to iNaturalist:* 1–2:30 p.m. May 18. Nixon Park, Jacobus. Using citizen science tools such as *iNaturalist*, people can contribute data to scientific research. Half-indoor, half on-the-trails program shows how to be part of a worldwide collaboration. Preregistration required: 717-428-1961.
- *Reptile Week Volunteer Orientations:* 2–4 p.m. June 8; 6–8 p.m. June 11; 10 a.m.–12 p.m. June 17. Nixon Park, Jacobus. Those interested in volunteering during *Reptile Week* must attend one of three orientation dates to practice handling reptiles, learn reptile basics, practice engaging an audience with reptile questions. Sign up for one or more four-hour volunteer shifts during *Reptile Week* (June 29–July 7). New and returning volunteers are encouraged to attend. Volunteers must be 15 or older to volunteer without an adult helper. Preregistration required: 717-428-1961.
- *Stop the Spread!* 2:30–4 p.m. June 9. Nixon Park, Jacobus. Get an update on gypsy moths in York County, the emerging spotted lantern fly threat. Learn how to control these species' impact on your community. No registration.

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 May, June and July at Little Paint Branch Park in Beltsville. Learn about native plants. Sign in for a safety orientation. Gloves, tools are provided. Info: Marc.Imlay@pgparks.com, 301-442-5657.

Anita Leight Estuary Center

Anita C. Leight Estuary Center in Abingdon, MD, needs volunteers for its *Invasinators Workday* 10 a.m.–12 p.m. May 19. Help to remove invasive species and install native plants. Learn why nonnative invasive plants threaten ecosystems, how to identify problem plants, removal and restoration strategies. Wear sturdy shoes, long sleeves, work gloves for field work, weather permitting. Ages 12 & younger must be accompanied by an adult. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

WORKDAY WISDOM

Make sure that when you participate in cleanup or invasive plant removal workdays to protect the Chesapeake Bay watershed and its resources that you also protect yourself. Organizers of almost every workday strongly urge their volunteers to wear long pants, long-sleeved shirts, socks and closed-toe shoes (hiking or waterproof). This helps to minimize skin exposure to poison ivy and ticks, which might be found at the site. Light-colored clothing also makes it easier to spot ticks. Hats are strongly recommended. Although some events provide work gloves, not all do; ask when registering. Events near water require closed-toe shoes and clothing that can get wet or muddy. **Always bring water.** Sunscreen and an insect repellent designed to repel both deer ticks and mosquitoes help.

Lastly, most organizers ask that volunteers register ahead of time. Knowing how many people are going to show up ensures that they will have enough tools and supervisors. They can also give directions to the site or offer any suggestions for apparel or gear not mentioned here.

Adopt-a-Stream program

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 stewardship. To learn more, adopt a stream or get a proposed site, visit waterquality@pwswcd.org. Groups can register their events at trashnetwork.fergusonfoundation.org.

Magruder Woods

Help Friends of Magruder Woods 9 a.m. to 1 p.m. the third Saturday in May, June and July remove invasive plants in the forested swamp in Hyattsville, MD. Meet at farthest end of parking lot. Info: Marc.Imlay@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 that perform help to manage and protect natural areas through activities such as plant and animal surveys, stream monitoring, trail rehabilitation, and teaching in nature centers. Basic training teaches new volunteers to become *Master Naturalists*. Topics covered include ecology, geology, soils, native flora and fauna and habitat management. Info: virginiamasternaturalist.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. Preregistration is required. Info: 410-414-3400, acltweb.org, landmanager@acltweb.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 May, June and July remove invasive plants at Ruth Swann Park in Bryans Road. Meet at Ruth Swann Park-Potomac Branch Library parking lot. Bring lunch. Info: ialm@erols.com, 301-283-0808, (301-442-5657 day of event). Carpoolers meet at the Sierra Club MD Chapter office at 9 a.m. and return at 5 p.m. Carpool contact: 301-277-7111.

Creek Critters app

Audubon Naturalist's *Creek Critters App* empowers people to check their local streams' health through finding and identifying small organisms that live in freshwater streams, then generating health reports based on what they find. The free app can be downloaded from the App Store and Google Play. Info:

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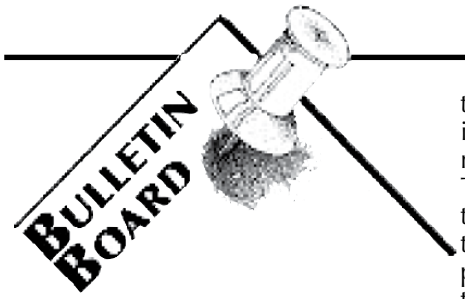

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anshome.org/creek-critters. To learn about partnerships or host a Creek Critters event: cleanstreams@anshome.org.

Floatable monitoring program

The Prince William Soil & Water Conservation District in Manassas, VA, needs volunteers to help assess and trace trash in streams as part of 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@pwswcd.org.

Eden Mill Nature Centerr

Eden Mill Nature Center in Pylesville, MD, invites volunteers, ages 5 & older, to help on its *Plant Invaders Workday*, 9:30 a.m. May 25. Participants will learn about native and invasive plants, then remove invasive plants. Preregister 24 hours in advance. Info: edenmillnaturecenter@gmail.com.

Stansbury Park cleanup

Clean Bread and Cheese invites volunteers of all ages and abilities to help clean up Stansbury Park in Dundalk, MD, 9 a.m. to 2 p.m. May 18. Trash bags, gloves, snacks, water and lunch are provided. A limited number of tools are available; volunteers are asked to bring their own, if possible. Service learning hours and community service hours are available. Register at the park's pavilion. Info: 410-285-1202, info@BreadandCheeseCreek.org.

Merrimac Master Naturalist

Merrimac Farm Master Naturalists / Prince William County Chapter are accepting applications for the Basic Training Course starting in August 2019. Virginia Master Naturalists are trained and certified volunteers, ages 18 & older (14 & older w/ parents), who participate in education and outreach in schools; stewardship of forests, parks and waterways; and citizen science ranging from bioblitzes to water quality monitoring. An information meeting is scheduled 7–8:30 p.m. May 22 in Manassas, VA. Register by May 21. Fee of $200 includes training and membership. Info: merrimacfarmmn@gmail.com.

Resources

MD DNR Grants Gateway

The Maryland Department of Natural Resources has announced that $24.75 million in funding is available for local governments and nonprofit organizations seeking to restore local waterways, increase climate resilience or develop the next generation of environmental stewards. To streamline the grant application process, the DNR has created a *Grants Gateway* that provides a single entry point for prospective grantees, and assures access to funding for innovative local projects. In addition to ease of use for applicants, *Grants Gateway* provides the DNR with an integrated grant-management system to monitor sources, manage data and ensure grants are consistent with strategic priorities. Grants are made possible with funding through the State of Maryland, National Oceanic and Atmospheric Administration and U.S. Environmental Protection Agency's Chesapeake Bay Program. Info: dnr.maryland.gov/ccs/Pages/funding/grants-gateway.aspx.

Rain barrels for sale

Friends of the Occoquan are selling 55-gallon food-grade rain barrels for $60. Each barrel comes with the hardware to complete the barrel; tools, hoses and downspout are not included. Assembly is required. Rain barrels help to decrease runoff — which contains pesticides, sediments and bacteria — before it enters the watershed. The captured rain can be used to water lawns, gardens or indoor plants as well as wash cars. Barrels also reduce erosion and control moisture levels around a home's foundation. For info on FOTO's rain barrel workshops or to host one: foto@friendsofthеoccoquan.org, friendsofthеoccoquan.org/rainbarrelsworkshops/aboutrainbarrels.

Wetlands Work website

The Chesapeake Bay Program has launched Wetlands Work (wetlandswork.org). The site, developed by the Wetlands Workgroup, connects agricultural landowners with people and programs that can support wetland development and restoration on their land.

Turf / lawn programs

For information on the Prince William Soil & Water Conservation District's *12 Steps to a Greener Lawn / Building Environmental Sustainable Turf BEST Lawns* programs, low-cost, research-based programs for lawn education, contact: 703792-4037, bestlawns@pwcgov.org.

Watershed education capsules

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

VA water monitoring test kits

The Virginia Department of Environmental Quality is distributing a limited number of water monitoring kits to test for dissolved oxygen, pH, turbidity and temperature. These kits are free to schools and organizations that do not have this equipment. The DEQ asks that participants use these kits as part of the EarthEcho Water Challenge (worldwatermonitoringday.org). Groups with their own monitoring equipment can also participate. Request a kit at charles.torbeck@deq.virginia.gov. Provide an address, the number of monitoring locations and the number of people from the organization or school expected to participate in the EarthEcho Water Challenge. This information helps to determine how many kits a group needs.

PRAD accepting grant proposals

Patuxent River Appreciation Day, Inc. is accepting proposals for its 2019 grant cycle. Nonprofit organizations that provide educational programs about the Patuxent River or conduct research activities or enhancements in and around the Patuxent River or Patuxent River Basin are eligible to apply for grants of up to $1,000. To request an application: Melissa.McCormick@calvertcountymd.gov. The deadline for applications to be received (or postmarked if sent via USPS) is May 31, 2019.

Severn River video library

The Severn River Association invites the public to view videos of its *John Wright Speaker Series* presentations to learn about activities and challenges on the Severn River. The videos are available at severnriver.org/category/speaker-series

Stormwater management

Prince William (VA) County Businesses and nonprofits interested in landscaping and turf management, stormwater pond management, wildlife concerns, recommendations for maintaining landscapes, protecting water quality and pollution prevention can call the county at 703-792-6285 to schedule a free site visit.

Bay Backpack

Provided by the Chesapeake Bay Program's Education Workgroup, the *Bay Backpack* is an online resource for educators with information about funding opportunities, field studies, curriculum guides and lesson plans related to the Chesapeake. Info: baybackpack.com.

5 MD libraries offer fishing gear

The Maryland Department of Natural Resources' Aquatic Resources Education Program is providing rods and reels, tackle and fishing books geared toward children to the Eastport-Annapolis Neck Community Library and Mountain Road Community Library in Anne Arundel County; Westminster Branch Library in Carroll County; Brunswick Branch Library in Frederick County; and Joppa Branch Library in Harford County. The goal is to foster the next generation of anglers by cultivating a passion for outdoor recreation and an appreciation of nature. The libraries, which are close to public fishing areas, have partnered with local fishing clubs to ensure inventory levels and maintenance of the equipment.

Forums / Workshops

Stormwater & litter forum

Managers of Phase I and Phase II MS4 permits and stormwater professionals are invited to the *Second Virginia Stormwater & Litter Workshop*, 9 a.m. to 4 p.m. May 28 in Woodbridge, VA. The workshop will address urban trash pollution and strategies used to intercept trash before it becomes part of stormwater runoff and is conveyed to and through the sewer system via storm drains. It will include case studies, an overview of available technologies, networking, and discussions about funding, behavioral change and legislation. The registration fee of $20 includes lunch, morning coffee, snacks and afternoon break. Preregistration info: goo.gl/forms/UHdhgRYmCGcMTeIG3. Agenda updates: registerkm@longwood.edu.

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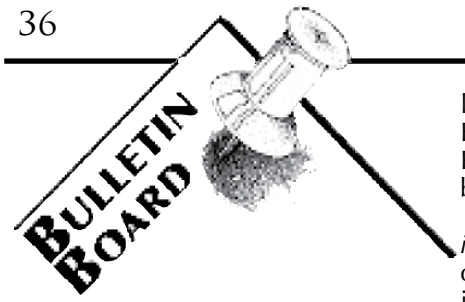
New Submission Guidelines

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.
- **June issue: May 11**
- **July/August issue: June 11**



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Events / Programs

Maryland *Park Quest*

The Maryland Department of Natural Resources invites the public to register for *Park Quest*, a family-based outdoor adventure program in state parks. This year's theme is *Off the Beaten Path - Arts, Activities & Adventures in Maryland State Parks*. One thousand qualifying teams will get an opportunity to complete outdoor excursions at at least 20 different sites from May 1 through Oct. 31. Teams must include at least one member who is 16 or younger and at least one adult, with a maximum of 10 participants per team. The cost to participate is $10 per team, which is provided with a *Park Quest* passport booklet. Registration is first-come, first-served and is open until 1,000 team slots are filled. Families who miss the registration process can participate by accessing *Park Quest* worksheets on the Maryland Park Service website. Info: dnr.maryland.gov/parkquest/Pages/Home.aspx.

Thomas Point Shoal Lighthouse

The Annapolis Maritime Museum is offering tours of the Thomas Point Shoal Lighthouse 9–11 a.m. & 12–2 p.m. June 8 & 15 and July 6, 13 & 27. The tour include 30-minute boat rides to and from the lighthouse, with opportunities to photograph it from every angle, and a one-hour interior tour, where visitors, who must be 12 & older, learn about the light's history, the life of a keeper and the role of the U.S. Coast Guard. Tours require some physical exertion. Tickets are $80 and help to fund the lighthouse's restoration. Info: amaritime.org, uslhs.org.

Merrimac Farm bird walk

The Prince William Conservation Alliance invites the public to a bird walk 8 a.m. May 31 on Merrimac Farm in Nokesville, VA. Preregistration required: alliance@pwconserve.org, 703-499-4954.

Kayaking at CBEC

The Chesapeake Bay Environmental Center in Grasonville, MD, is offering kayak tours and classes to increase the appreciation, knowledge and stewardship of the Chesapeake ecosystem:

Guided Kayak Tours: 5:30–7:30 p.m. May 16 & June 6. Beginner to intermediate kayakers. Look for wildlife while exploring Marshy Creek with a self-provided snack break at the halfway point. Instruction on equipment, paddling/safety techniques, loading & unloading vessels included. Fee of $20 includes kayaks, equipment. Preregistration required: bayrestoration.org/guided-kayak-tours.

ACA Level 1 – Introduction to Kayaking: 10 a.m.–5 p.m. May 19, June 2 or July 7. Beginner to intermediate kayakers interested in traditional decked kayaks, inflatables, and sit-on-tops (spray skirts not used in this course). Classes include two hours of dry land instruction and three hours of on-water instruction on calm, flat water with certified ACA Kayak Instructors at a 5 to 1 ratio. Course includes pre-paddling preparation; equipment overview; stroke development; maneuvers; self-rescue; rules of the water. This is a skills-based course with an optional assessment that provides the participant with an opportunity to receive documentation of having achieved a certain level of paddling ability. Cost: $80, plus a kayak and equipment rental fee of $20. Those seeking the optional Assessment pay an additional $15 and will need to acquire an ACA membership prior to class. Preregistration required. Info: bayrestoration.org/kayaking.

South River 5-mile swim

This year's *South River Open Water Swim Benefit,* is set for 8 a.m. May 26, at Sylvan Shores in Riva, MD. The noncompetitive event offers swimmers, paddlers and kayakers an opportunity to start their season while helping to fund the efforts of the South Riverkeeper in protecting, preserving and restoring the South River. The fee to enter is $200. Preregistration, volunteer, sponsor, advertising info: info@crossingcurrentsaquatics.com, swimthesouthriver.com.

Chesapeake Bay Maritime Museum

Upcoming events at the Chesapeake Bay Maritime Museum in St. Michaels, MD, include:

On Land & On Sea - A Century of Women in the Rosenfeld Collection: May 17 through March 1, 2020. Exhibition of photos taken by Morris and Stanley Rosenfeld showcases roles of women in maritime industries and beyond, revealing the social, historical context of women over the better part of the 20th century. The exhibition also features photographs of women from museum's collection.

Create Decorative Rope Fenders: 10 a.m.–4 p.m. May 25. $75 fee includes basic tools, materials. Preregistration required. Info: cbmm.org/ropefenders, cbmm.org/shipyardprograms.

Maritime Day: 10 a.m.–4 p.m. June 1. Celebrate the traditions kept alive in CBMM working Shipyard, the construction of a new Maryland Dove. The annual Blessing of the Fleet, prayers for a safe and bountiful boating season and for mariners whose lives were lost at sea will take place at 10 a.m. Shipwrights will demonstrate maritime skills throughout the day, including steam-bending mast hoops, shaping a dugout canoe, blacksmithing, splicing. Construction on Maryland Dove, a reproduction of the 17th-century trading ship that accompanied the first European settlers to what is now Maryland, kicks off in the afternoon. Help make trunnels, or large wooden nails, to be used during its construction. Festivities also include boat rides, and local food and drink. Admittance, which includes general admission, is $15/adults; $12/ ages 65+, college students w/ID & retired military; $6/ ages 6–17; free/ active military, ages 5 & younger. Info: cbmm.org.

Open Boatshop: 5:30–8:30 p.m. May 23, June 20, July 25 & Aug. 22. Experienced and novice woodworkers, ages 16+ (unless accompanied by an adult) can work on a small woodworking project of their own, or bring ideas for a future project to receive guidance from an experienced shipwright and woodworker, as well as assistance with CBMM's machinery and tools for the execution of their small-scale project. Fee $35. Preregistration required: cbmm.org/shipyardprograms.

Mount Harmon Plantation

Mount Harmon Plantation in Earleville, MD, invites nature lovers to a guided *Native Tree Walk with Mount Harmon Tour* 1–2:30 p.m. May 19. The fee is $10. Preregistration is required. Info: info@mountharmon.org

Boating safety classes

U.S. Coast Guard Auxiliary Flotilla 25-08 is offering *Boating Safety* classes 7:30 a.m.–5 p.m. May 18, June 15 and July 20 at the Washington Farm United Methodist Church in Alexandria, VA. Learn about boat handling and regulations, nautical "rules of the road," trailering and required gear. Virginia, Maryland and the District of Columbia have varying requirements for boaters before they may legally operate certain motorized vessels on their respective waterways. Each jurisdiction has some requirement for a safe boating class. Preregistration is required. Info: jdburt@verizon.net, 703-307-6482. The auxiliary's website, wow.uscgaux.info/content.php?unit=B-DEPT, also features boating safety tools, materials.

Cromwell Valley Park

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

Bird Walks: 8–10 a.m. Saturdays through May 25. Meet at Willow Grove Farm gravel parking lot.

Full Flower Moon Night Hike & Campfire: 8–9:30 p.m. May 17. Ages 5+ Take a moonlit stroll, gather around a fire for s'mores. Fee: $5.

Boy Scout Day: 1–3 p.m. May 18. Lion, Tiger & Wolf Cubs. Meet some of Maryland's amazing animals, go outside to explore their habitat. Participants receive a Cromwell Valley Park patch. Fee: $5.

Beaver Valley: 1–3 p.m. May 25. Ages 8+ Learn how these animals shape the landscape, hike to see beaver-cut trees. Free.

Frog Roundup: 11 a.m.–12:30 p.m. May 26. Ages 8+ Hike to Marble Springs. Nets, capture containers provided to help identify, then release, what is caught. Wear waterproof shoes, boots. Free.

Forest Animals & Their Tracks: 1–2:30 p.m. June 1. All ages. Animals' distinctive marks reveal who they are. Make a plaster cast of a track. Fee: $5.

Visit our Nature Center Day! Drop in program. 11 a.m.–3 p.m. June 2. All ages. Exhibits, animal visits, iced tea. Free. No registration.

Lady Bug Fun: 1–2:30 p.m. June 8. Ages 4–10 w/adult. The lady bug is an important beetle. Learn about local species, search for one, make a craft. Fee: $4.

Let's Get Wet! 1–2:30 p.m. June 9. All ages. Explore Minebank Run. Wear shoes that can get wet. Free.

Programs take place at the Willow Grove Nature Center unless noted otherwise. Ages 12 & younger must be accompanied by an adult. Except where noted, preregistration is required for all programs. Info: info@cromwellvalleypark.org, cromwellvalleypark.org, 410-887-2503. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

Oregon Ridge Nature Center

Upcoming programs at the Oregon Ridge Nature Center in Cockeysville, MD, include:

Nature Book Club / Sea Change - A Message of the Oceans: 7–8 p.m. May 13. Author Sylvia Earle makes it clear that how we treat oceans now will determine the future health of the Earth – and of humans. Free. Preregistration appreciated.

Shoots & Letters: 10–11 a.m. May 16 (*Turtles*); May 23 (*Forests*); May 30 (*Flowers*). Ages 3+ Outdoor activities. Fee: $2/child. No registration.

All About Birds: 10 a.m.–12 p.m. May 18. All ages. Learn about bird adaptations, go on a bird hike. Fee: $3.

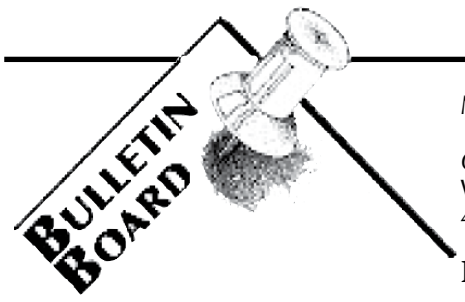
Senior Stroll: 10:30 a.m. May 18. Adults. Walk on the Marble Quarry Loop, a paved, 0.3-mile interpretive trail. Stay for a guided reflection activity. Free.

Full Moon Family Camp Out: 6 p.m. May 18 through 9 a.m. May 19. All ages. Bring a tent (limited number available for rent at $10), camping gear, bag dinner. Take a night hike. S'mores, light breakfast provided. Fee: $10.

ORNC Council Speaker Series / You Can't Get Blood from a Stone, But You Can Get Money from It - the Northampton Iron Furnace: 7–8:30 p.m. May 20. Adults. Bill Curtis, a National Park ranger, will discuss the history of the furnace, its workers as well as ways Americans have exploited, changed natural resources: stone, minerals, wood, water. He will touch on transportation history. Free, donations appreciated. No registration.

Amphibian Walk: 2–3 p.m. May

Bulletin continues on page 37



Bulletin from page 36

21. Ages 10+ Visit the wetlands, listen for calling frogs, toads. Learn about the *FrogWatchUSA* monitoring effort. Free.

≋ *Pollination Power:* 1–3 p.m. May 25 & 26. Ages 4+ Learn how plants are pollinated, visit the gardens to look for pollinators. Fee: $3.

Ages 16 & younger must be accompanied by an adult. Except where noted, preregistration is required for programs and payment must be made within five business days of registration All programs take place rain or shine. Programs are designed for individuals and families, not groups. To arrange a program for a group, contact the park office. Info: 410-887-1815, info@OregonRidgeNatureCenter.org. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTD/Deaf), giving as much notice as possible.

MD youth fishing rodeos

The MD DNR Fishing & Boating Services and partners in local communities are running free *Youth Fishing Rodeos* for ages 3–15. Participants learn basic angling skills; develop an understanding of the environment and natural resources; and have an experience that fosters interest in conservation and fishing. The DNR helps raise and supply thousands of hybrid sunfish, channel catfish and rainbow trout for this year's fishing rodeos with support from the U.S. Fish and Wildlife Service and Sport Fish Restoration Program. Because of space limitations, would-be attendees must call the contact at each venue to register. Upcoming rodeos include:

≋ *Gwynn Brook /Baltimore County:* 8 a.m. May 18. Info: Mark Kurth / Northwest Fishing Club, 410-382-3107.

≋ *Patterson Park /Baltimore City:* 10 a.m. June 1. Info: Bob Wall / Parks & Rec, 410-245-0854.

≋ *Hillcrest Park Lake / Baltimore County:* 7 a.m. June 8. Info: Jodie Blackford / Baltimore Highlands Rec Council, 410-887-6994.

≋ *Calvert Cliffs Pond / Calvert County:* 8 a.m. June 1. Info: Diane Holloway/ Calvert County Parks and Rec, 410-586-1101.

≋ *Silver Run/ Carroll County:* 8 a.m. May 18. Info: Lois Szymanski Silver / Run Union Mills Lions Club. 443-519-8124.

≋ *Roberts Mill Pond / Carroll County:* 8 a.m. May 18. Info: Bob Mitchell / City of Taneytown, 410-751-1100.

≋ *Krimgold Park Pond / Carroll County:* 8 a.m. May 19. Info: Loren Lustig / Carroll County Parks & Rec, 410-386-3705.

≋ *St. Mary's River / St. Mary's County:* 8:30 a.m. May 12. Info: Will James / St. Mary's River State Park, 301-872-5688.

≋ *Tributary of Wicomico / Wicomico County:* 7 a.m. June 1. Info: Allen Swiger / Wicomico County Parks and Rec, 410-548-4900.

Patuxent Research Refuge

Upcoming programs at the Patuxent Research Refuge's North Tract and National Wildlife Visitor Center [C] in Laurel, MD, include:

≋ *Bird Walk:* 8–10 a.m. May 8 & 22 [C] Ages 16+ Search for spring migrants in various habitats. Bring binoculars.

≋ *Owl & Kestrel:* 12:15–12:45 p.m. May. 11, 18 & 25 [C] All ages. Meet two of North America's smallest birds of prey: the American kestrel and eastern screech owl. No registration.

≋ *Tiny Tots:* 10:30–11:15 a.m. May 12 & 13. [C] Ages 16–48 months w/participating parent. Interactive songs, stories, activities teach about the refuge.

≋ *Nature Tots / Spring has Sprung:* 10:30–11:30 a.m. May 14. [C] Ages 3–4. Learn to identify plants in the refuge.

≋ *North Tract Bicycle Ride:* 1–3:30 p.m. May 26. Ages 10+ Learn the importance of reducing one's footprint, leaving no trace on 12-mile guided ride. Discover local wildlife, plants, historical sites. Bring bike, energy bar/snack, water bottle, helmet. Ride is weather-dependent.

≋ *Treetop Rock Jam Session with Stina the Nature Troubadour:* 1–2 p.m. May 18 [C] Participants of all ages can bring a hand drum, guitar or any acoustic instrument to play along with musical nature games.

≋ *Raptors Reign:* 1–3 p.m. May 25 [C] All ages. Join licensed falconer Rodney Stotts, for discussions and up-close encounters with birds of prey.

≋ *Kids Fishing Day:* 1st session 8:30–11 a.m.; 2nd session 8:50–11:20 a.m.; 3rd session 9:10–11:40 a.m.; 4th session 9:30 a.m.–12 p.m.; 5th session 9:50 a.m.–12:20 p.m. June 1. Ages 3–15 w/adult. Catch & release only. Call 301-497-5887 to register: leave a name; a good contact phone number; ages & names of children; preferred session. If that session is filled your reservation will be moved to the next available time slot. Do not register for other families.

All programs are free; donations are appreciated. Except where noted, programs are designed for individuals/families and require preregistration. Contact: 301-497-5887. For disability-related accommodations, notify the refuge, giving as much notice as possible. Info: fws.gov/refuge/Patuxent, fws.gov/refuge/Patuxent/visit/PublicPrograms.html.

MARC Farm Sprouts

The Maryland Agricultural Resource Center invites children, ages 5 & younger and their parents to its *Farms Sprouts* programs, *Cows/Milk* on May 17 and *Tractors* on June 7 at the Baltimore County Agriculture Center in Cockeysville. Classes features movement, stories and arts & crafts. Participants must choose between two sessions: 9:45–10:45 a.m. or 11:30 a.m. to 12:30 p.m. The fee for children ages 9 months and older is $8 per workshop. Parents are free. (If financial constraints prevent someone from attending, contact MARC to see if arrangements can be made.) Preregistration is required; no walk-ins. Info: info@marylandagriculture.org.

Anita Leight Estuary Center

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

≋ *Mother's Day Tea Party Pontoon:* 2:30–4 p.m. May 12 Ages 2+ Fee: $12.

≋ *Birding By Boat:* 9–10:30 a.m. May 18. Ages 8+ Search for marsh birds along Otter Point Creek. Fee: $10.

≋ *Critter Dinner Time:* 1:30 p.m. May 18. All ages. Learn about turtles, fish, snakes while watching them eat. Free. No registration.

≋ *Kayak Cruising on the Creek:* 10 a.m.–12:30 p.m. May 23. Adults. Explore nooks, crannies of Otter Point Creek, upper Bush River. Fee: $12.

≋ *Children's Garden Club:* 10:30–11:30 a.m. May 25. Ages 5–8 w/adult. Cook, create, explore while discovering a garden's connection to the wild world. Fee: $5/child.

≋ *Spring Kayak Scavenger Hunt:* 1–3:30 p.m. May 25. Ages 8+ Search for animals, plants, landmarks. First boat to find everything on the list wins. Fee: $12.

≋ *Meet a Critter:* 1:30 p.m. May 26. All ages. Meet a live animal up close, learn what makes it special. Free. No registration.

≋ *Press-a-Posie:* 3–4:30 p.m. May 26. Ages 5+ Collect flowers to dry in a microwave press, then use in a craft. Fee: $5.

Ages 12 & younger must be accompanied by an adult for all programs. Events meet at the center and require preregistration unless otherwise noted. Payment is due at time of registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Eden Mill Nature Center

Upcoming programs at Eden Mill Nature Center in Pylesville, MD, include:

≋ *Critter Dinner Time:* 1–2 p.m. May 4 & 18. Ages 5+ Learn about, help feed some of the center's animals.

≋ *Nature Storybook Art for Homeschoolers:* 12:30–2:30 p.m. May 15, 22 & 29. Ages 5–12, parents do not attend. Learn about books, illustrators, art techniques such as drawing, painting, collage, crafting/constructing. Fee: $44 for the month.

≋ *Child & Adult Paint Afternoon / Butterfly:* 3–5 p.m. May 17. Ages 5–10 w/adult. Child & adult each complete a 14"x 18" acrylic painting on canvas. Instruction provided during event. Fee: $50 per pair.

≋ *Preschool Nature Series:* 10–11:15 a.m. May 21 (*Lovely Ladybugs*); May 28 (*Plant Power*). Ages 2–5 w/adult. Nature games, story, craft, hike. Fee: $10 per session.

≋ *Sunrise/Sunset Canoe Trips:* 5:45–8:15 p.m. Tuesdays & Thursdays in June, September & October through Oct. 13 and 9–11:30 a.m. Saturdays in July & August. 5:45–8:15 p.m. Thursdays, in July & August. Fee of $8 includes all equipment.

Preregistration is required for all programs and closes 24 hours in advance of each program. Weekend program registration closes at noon on the prior Friday. Info: 410-836-3050, edenmill.org, edenmillnaturecenter@gmail.com.

York County (PA) Parks

Upcoming events at York County (PA) Parks include:

≋ *Spring Plant Fest:* 8:30 a.m.–2 p.m. May 11 at 112 Pleasant Acres Road. Native plant sale sponsored by Penn State Extension & MAEscapes includes wildflowers, ferns, shrubs, trees. Attend talks on making one's space more butterfly-friendly. Info: 717-840-7408, extension.psu.edu/plants/gardening/maescapes.

≋ *Build a Rain Barrel:* 2:30–4 p.m. May 19. Nixon Park, Jacobus. Ages 12+ Add to a home spout to conserve water, save money, help the environment. All materials provided. Fee $30 per barrel. Preregistration required: 717-428-1961.

≋ *Family Scavenger Hunt:* Drop-in 12–4 p.m. May 26. Nixon Park, Jacobus. Pick up a self-guided scavenger hunt challenge packet. Explore trails, museum to complete pages. Go to nature center before closing to pick up a small reward.

≋ *Statewide Free Fishing Day:* May 26. Kain & Spring Valley parks, York. No license needed to fish this day. All other regulations apply.

≋ *Summer Reading Program & Go York! Kick-off:* 10 a.m.–12 p.m. June 1. Nixon Park, Jacobus. County libraries are kicking off *SummerQuest: A Universe of Stories*. Bring your library card to pick up a program packet. Pack a picnic lunch. Early registration begins online May 19. Info: yorklibraries.org.

≋ *Sharks & Shells Drop-In:* 2–4 p.m. June 2. Nixon Park, Jacobus. Ages 5+ Learn about treasures one might find on the beach. Examine shells, animal artifacts. Learn the truth about Atlantic Coast sharks.

≋ *Creature Features:* 9:30–10 a.m. & 11–11:30 a.m. June 6, 13, & 20. Nixon Park, Jacobus. Ages 5+ Each session, props, photos, artifacts feature a different creature, its natural history, behavior.

≋ *Sunset Scramble Bicycle Rides:* 6:30 p.m. May 7 (*Hanover Junction Train Station*); May 14 (*Railroad, PA, Parking Lot)*; May 21 *(New Freedom Train Station)*; May 28 (*Rudy Park near Rail Trail entrance)*; June 4 (*Brillhart Station)*; June 11 (*Glatfelter Station*). Meet at designated parking lot for 13–15 mile round trip on the Heritage Rail Trail. The group determines the pace. Each rider must have a light, water, helmets. Snack money is optional.

≋ *Moonlight Bicycle Ride:* 8:30 p.m. May 18. Meet at the Heritage Rail Trail's Seven Valleys parking lot. Ride about 9 miles north. Bring bicycle, light, helmet.

Unless noted otherwise, programs are free and do not require registration. Info: 717-428-1961.

Where in Heaven are you?

A petal paradise awaits those who wander in the Chesapeake watershed. Here are some of the wildflowers you might encounter, as well as their descriptions. This puzzle wants to know where you are. Woods? Wetlands? Meadows? Rocky patches? Or more than one of these habitats? Answers are on page 15.

1. The arrow arum gets its name from the arrow-shaped leaf that surrounds its spadix, the long thick spike that bears its tiny white blossoms. It grows in large colonies and blooms from May to July. A favorite of black and wood ducks, it is sometimes called duck corn. American Indians pounded its roots into flour and ate its green fruits like peas.

2. Dense blazing star's clumps of pinkish-purple or white flowers cover 1–2 feet of a thick spike that can grow up to 5 feet tall. Its 1-inch feathery flowers bloom from July through September, starting with the flowers at the top of the spike. Songbirds, butterflies and honeybees visit this plant.

3. The cardinal flower has small, bright red, tubular flowers consisting of two lips and three lobes with white-tipped stamens that unite to form a tube. Although it attracts bees, butterflies and hummingbirds, it is mostly pollinated by the latter, which are more successful in navigating the tube than the others. The flowers bloom on stalks that can grow 2–4 feet tall from July through September.

4. The prickly pear cactus is the only widespread native cactus east of the Mississippi. Its 3-inch bright yellow flowers (sometimes with a red center) open only in bright sunlight from June to August. Its flat, oval stems are thick and fleshy pads with short spines that grow in clumps up to 3-feet wide and 1-foot tall.

5. Rose mallow has showy 6– to 8-inch hibiscus-like white or pink flowers with a burgundy or deep pink center and yellow stamens. The plant, which can grow up to 7 feet tall, blooms from late June to the first frost.

6. Smooth Solomon's seal's half-inch greenish yellow, pendant-shaped flowers hang in pairs from the axils of its 2– to 4-inch leaves on an arching stem. It blooms from May to July. Scars on its rhizome (horizontal underground stem) are said to resemble the seal of King Solomon of ancient Israel.

7. Spicebush has been called "the forsythia of the wild" because its 0.125-inch pale yellow flowers bloom in dense clusters from March to April, before its leaves unfurl. Its leaves and twigs have been used to make tea. Its berrylike red fruit, when dried, has been used as spice.

8. Wild ginger does not have petals. Instead, its three pointed sepals form a 1.5-inch wide brownish red to greenish brown cup at the junction of two petioles. It may take some effort to find wild ginger, because it is often buried in leaf litter under its hairy, heart-shaped 5– to 6-inch leaves. Look for it from April to May.

— Kathleen A. Gaskell

Prickly Pear Cactus

Cardinal Flower

Rose Mallow

Spicebush

Wild Ginger

Dense Blazing Star

Smooth Solomon's Seal

Arrow Arum

Prickly Pear Cactus, Arrow Arum, Cardinal Flower (Dave Harp) // Rose Mallow (Fritzflohrreynolds / CC BY-SA 3.0) // Spicebush (Ryan Hager / USFWS) // Wild Ginger (Peter Pearsal / USFWS) // Dense Blazing Star (Brett Billings / USFWS) Smooth Solomon's Seal (Kristine Paulus / CC BY-2.0)

Bay Buddies Flower Part-ners!

Flowers are not just pretty faces for plants. They have an important job: Pollinating potential seeds to produce next year's plants. Some plants are able to do this by themselves, with a little help from the wind, while others need to attract pollinators (and that's when having a pretty face or nice scent is important).

Here are the scrambled names of flower parts, along with their roles in producing seeds. Unscramble the words and put them in the spaces. Some of the letters will have a number below them. Place the letter in the space above the matching number in the blanks at the end of the puzzle. When you are finished, the blanks will spell out one of the watershed's showiest blooms.

Answers are on page 15.

1. N H E A R T __ __ __ __ __ __
   4 13

   This is the tip at the end of the male flower part. It produces the pollen.

2. F L A M E T I N __ __ __ __ __ __ __ __ __
   8 5

   This is the male part's thin tubelike stalk, which ends with a pollen-producing tip.

3. R Y V O A __ __ __ __ __
   2 12

   This is the bottom of the female part that produces and contains potential seeds before they are pollinated. Once the seeds are pollinated, they will develop into a fruit.

4. P L A T E S __ __ __ __ __ __
   10

   These parts surround the rest of the flower. Their role in most flowers is to attract pollinators.

5. L I P I S T __ __ __ __ __ __
   14

   This is the female part of the flower. It consists of the tip that collects the pollen and the part that produces the seeds. It is usually in the center of the flower and is the tallest part of the flower.

6. P A L E S __ __ __ __ __
   6

   This is the green leaflike structure that protects the flower when it is a bud. Later, it supports the flower after it has bloomed.

7. E N M A S T __ __ __ __ __ __
   1

   This is the male part of the flower. It consists of a stalk and a tip. There may be more than one of these on a flower.

8. A M G I S T __ __ __ __ __ __
   7

   This is the top of the female part that traps pollen, usually through a sticky substance, hairs or flaps.

9. L E S T Y __ __ __ __ __
   9

   This is the name of the stalk between the pollen-collecting and seed-producing parts of the flower's female structure.

10. U S O L V E __ __ __ __ __ __
    3/11

    These will develop into seeds if they are pollinated.

__ __ __ __ __ __ __ __ __ __ __ __ __ __
1 2 3 4 5 6 7 8 9 10 11 12 13 14

— Kathleen A. Gaskell

Cape May warbler has its own part to play in spring's avian orchestra

By Mike Burke

I stood on the boardwalk and turned to the early morning sun. I felt the warmth on my face and closed my eyes. The dawn chorus of birds enveloped me.

As I listened intently, I could make out several familiar songs. There was a hermit thrush nearby, singing its fluted notes. To my left an indigo bunting whistled its complex tune. Somewhere behind me came the rattling voice of a downy woodpecker. There were warbles and chirps and slurred cheeps.

Above me and quite close by, I could hear a softer *tsee*, repeated four to five times. With eyes now wide open, I tilted my head toward the lisped notes. There it was, with a heavily streaked yellow breast and a tell-tale chestnut face patch. This tiny songster was a Cape May warbler (*Setophaga trigina*).

For centuries, humans have celebrated the arrival of spring with its extraordinary and all-pervasive renewal of life. Flowers blossom, trees leaf out, fawns are born, and most delightful of all, birds sing. A few common species like cardinals and wrens sing all year long, but for most avian species, song is restricted to the breeding season. To hear it in its full glory, listen at dawn when male birds fill the air with their lively tunes.

It was the first week of May. We had arrived at the Kenilworth Aquatic Gardens a little before 7 a.m., and a kind ranger let us in a bit early. The National Park Service property is an oasis in Washington, DC. Bordering the Anacostia River and directly opposite the National Arboretum, the park has a tidal river, marshes and a host of trees surrounding the ponds. Its rich and varied habitats make it an ideal spot for birding.

To see the park's lovely aquatic plants and their bountiful blooms of water lilies and lotus flowers, come in midsummer. But to enjoy its soundscape, come in late April or early May, and be sure to come when it opens.

The Cape May warbler doesn't have the loveliest voice in the forest, but its notes seemed to perfectly complement its companions. The dawn chorus of mixed species that morning would rival any symphony orchestra in richness, complexity and pure musicality.

The Cape May warbler (male shown here) is the only warbler with a semi-tubular tongue, which it uses to access hummingbird feeders, the nectar from flowers and the juices of fruit such as grapes. (U.S. Fish and Wildlife Service)

The Cape May was just passing through on his way to his breeding grounds in the coniferous boreal forests of Canada and the northernmost tier of the United States, from Michigan to Maine. We see these warblers in the Chesapeake region just briefly each year. During the spring migration they come through in early May. In the fall, they will fly through the watershed in September.

Cape May warblers preferentially nest in spruce trees. These birds are canopy specialists, living atop the trees where they build their nests, raise their young, and find most of their food. Their reproductive success largely mirrors the boom-or-bust cycles of the spruce bud worm, a widespread pest that Cape Mays consume in vast numbers. Most warblers lay two to three eggs each year, but the Cape May will brood six or more during years with abundant bud worms.

These warblers also eat invertebrates like spiders and insects. Unique among warblers, the Cape May has a semi-tubular tongue, which it uses to access hummingbird feeders, the nectar from flowers and the juices of fruit such as grapes.

As the days shorten in September, Cape May warblers return to their winter grounds in the Caribbean. (The bird gets its name from the location where it was first identified.)

The male Cape May is a brightly colored chap. His yellow breast and sides are heavily streaked with black. The black continues down through its white belly before yielding to its all-white vent. He has a brilliant yellow neck ring that starts with a bold throat patch and narrows as it reaches the back of the neck. A bright chestnut "ear" patch is eye-catching. He has a dark cap and a thin black line runs through the eye. A slightly down-curved bill sets it apart from all other warblers. With a greenish mantle and a fat white wing bar, the Cape May's color palette is complete.

In contrast to the male's complex color pattern, the female Cape May is much duller. Indistinct streaking and faint hints of yellow make the female a much tougher field ID. During the fall migration the male, too, has lost its most distinctive coloration. Even worse, he doesn't sing in the fall.

After feasting my eyes on the male, I again closed my eyes. From near and far the bird songs continued. I stopped struggling to identify species by ear and just listened. For a few moments at least, the world drifted away as I was transported by the avian music. I wanted to soak it in and make sure that I would remember this moment.

When the cacophony of modern life seems overwhelming, this memory of exuberant bird song will be the perfect antidote.

Mike Burke, an amateur naturalist, lives in Cheverly, MD.

Naturalist from page 40

pebbles or down. Birds: many shorebirds, such as terns, plovers, killdeers, American oystercatchers.

≋ *Platform:* Sticks and twigs make up these bulky, relatively flat nests, although some have a shallow depression. Some birds may use the same nest year after year and continue to add material. Birds: ospreys, bald eagles, great blue herons and other wading birds.

If you come across an occupied nest, do not disturb the bird, eggs or hatchlings. Under the Migratory Bird Treaty Act, it is illegal to take possess, import, export, transport, sell, purchase, barter or offer for sale, purchase or barter any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid federal permit.

The Cornell Lab of Ornithology runs a citizen science project called NestWatch (nestwatch.org) that provides information on how to monitor a nest safely and report observations. You can also find bird house plans that are designed for specific bird species in your region at nestwatch.org/learn/all-about-birdhouses/right-bird-right-house.

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office in Annapolis.

These yellow warbler eggs are in a cup nest. The Cape May warbler, featured in the on the Wing *column, above, also builds a cup nest. (Jerry Schoen / CC BY-NC 2.0)*

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Rock-a-bye-birdie: Bird nests may vary, but each is home tweet home

BY KATHY RESHETILOFF

A few weeks ago, I took advantage of the lovely spring weather to begin sprucing up my yard, neglected during months of cold and rain. Not many of my trees or shrubs had leafed out yet. Passing by my Virginia sweetspire bush, I noticed an empty nest, a leftover from a robin last year. It was an ordinary nest, cup-shaped and made of woven grasses.

As I moved around the yard, a small bird, an eastern phoebe, caught my attention as it flew back and forth from the nearby woods to a spot under my deck. A quick look confirmed that the bird was building a nest on a support beam. Unlike the robin's, this nest was being created with tiny, carefully placed, pieces of moss and mud.

Birds are a diverse group of animals, differing in size, color, song, food preferences and habitat. Their nests are just as distinct, some simple and plain, others engineering marvels. Some nests are lined with plant fibers, feathers and other materials to cushion the eggs even as an adult moves around the nest. But they all serve the same purpose: to protect eggs and growing hatchlings.

Birds also choose the location of their nests to provide shelter from wind, rain and sun. And, because eggs and chicks are vulnerable to hungry predators, some birds choose a location that will hide or camouflage the nest with leaves, grass, moss and bark.

Clockwise, from top: A female Baltimore oriole guards her pendulum nest. An osprey pair may return to the same platform nest every year. The red-headed woodpecker feeds its young in a hollow cavity nest. (Oriole: Ben Long Hair / CC BY-NC 2.0) (Osprey: Randy Loftus / U.S. Fish and Wildlife Service) (Red-headed woodpecker: Joe Kosack /Pennsylvania Game Commission)

Basic Shapes & Inhabitants

≋ *Cup:* This nest , the one most people are familiar with, differs in size, dimensions and depth, depending on the bird. These may be placed between or on branches, on ledges or even on the ground. Birds: robins, hummingbirds, yellow warblers and many perching birds.

≋ *Pendant:* These elaborately woven nests, with side entrances, dangle from branches, providing protection from predators. Birds: Baltimore orioles.

≋ *Sphere:* Almost completely enclosed, these round nests with a side entrance are well camouflaged. These nests are often on the ground or in low areas susceptible to predators. Birds: marsh wrens, winter wrens, ovenbirds.

≋ *Cavity:* These nesters either hollow out their homes (or use abandoned nest holes hollowed out by other species) as well as natural holes in trees and poles. Some also use bird boxes. Birds: Eastern bluebirds, house sparrows, most woodpeckers.

≋ *Scrape:* You might not even notice these shallow depressions. Some have a little nesting material, such as plants,

Common terns lay their eggs in a scrape, a shallow depression on the ground with only a bit of nesting material. (Peter C. McGowan / U.S. Fish and Wildlife Service)

The marsh wren's sphere nest has a side entrance and is built close to the ground. (Chelsi Burns / U.S. Fish and Wildlife Service)

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