

CHESAPEAKE

BAY JOURNAL

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Volume 33 Number 5

Independent environmental news for the Chesapeake region

Outrigger canoes make waves in the Chesapeake

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LOST URBAN STREAMS



Should we bring buried streams back to the surface? **PAGE 20**

UNDERWATER GRASSES



Warmer water triggers change in dominant species **PAGE 15**

NEW LEADERSHIP



An interview with MD's secretary of the environment **PAGE 28**

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Researchers in Pennsylvania have been conducting an extensive study about deer and their interactions with the forest ecosystem. Read the article on page 12. (Lara Lutz)

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ON THE COVER

A crew paddles an outrigger canoe in Maryland's Kent Island Narrows. The outrigger or "ama" gives the vessel stability that its narrow main hull wouldn't otherwise have. (Dave Harp)

Bottom photos: Left by Dave Harp, center by Will Parson/Chesapeake Bay Program, right by Dave Harp.

CORRECTION

An item in the June Chesapeake Challenge incorrectly stated how a woodpecker's brain is cushioned against repeated blows when the bird pecks. It is the hyoid bone that wraps around the brain and neck. The bird's tongue is attached to the end of this structure.

EDITOR'S NOTE



Loose threads in big knots

I'm struck by several articles in this month's issue for the same reason: the fortitude and creativity of people who are tackling our region's tough environmental problems. In some ways, the projects described in these articles are small, targeted efforts aimed at finding solutions to daunting situations. The scale, you could say, is somewhat out of whack.

For example, stream restoration experts are working to bring buried streams in urban areas back to the surface. But momentum for such projects is slow, and the amount of subsumed stream miles is stunning: 70% of the original stream network in DC and 66% in Baltimore. (See the article by Jeremy Cox on page 20.)

In Pennsylvania, the U.S. Environmental Protection Agency is working with the Farm Bureau and Lancaster County Conservation District on a collaborative process for farm assessments, checking for existing and needed practices to reduce water pollution. In a county with 5,100 farms, they made spring site visits to four. But as Karl Blankenship writes, those small steps could mark a sea change in terms of approach. (See page 18.)

Painstaking work is also underway in Pennsylvania to relieve stream systems of the polluted sediment built up behind small, historic dams — and to use it for revitalizing abandoned mine land. The state has an enormous amount of land damaged and contaminated by mining, but this project could demonstrate a helpful strategy for benefitting streams, degraded soil and the Chesapeake Bay. (See the article by Ad Crable on page 24.)

Despite the scale and complexity of our problems, the people and organizations involved with projects like these bring optimism and determination to the table. They take a look at big, tangled situations, then find some loose threads that might, eventually, help unravel the knots. I hope you find inspiration in their work and their stories.

—Lara Lutz



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BY THE numbers

250

Acres that make up the typical home range of a white-tailed deer

30-40

Miles per hour, the typical sprinting speed of a white-tailed deer

100,000

Estimated global population of ospreys

16,000-20,000

Estimated number of osprey that breed in the Bay region

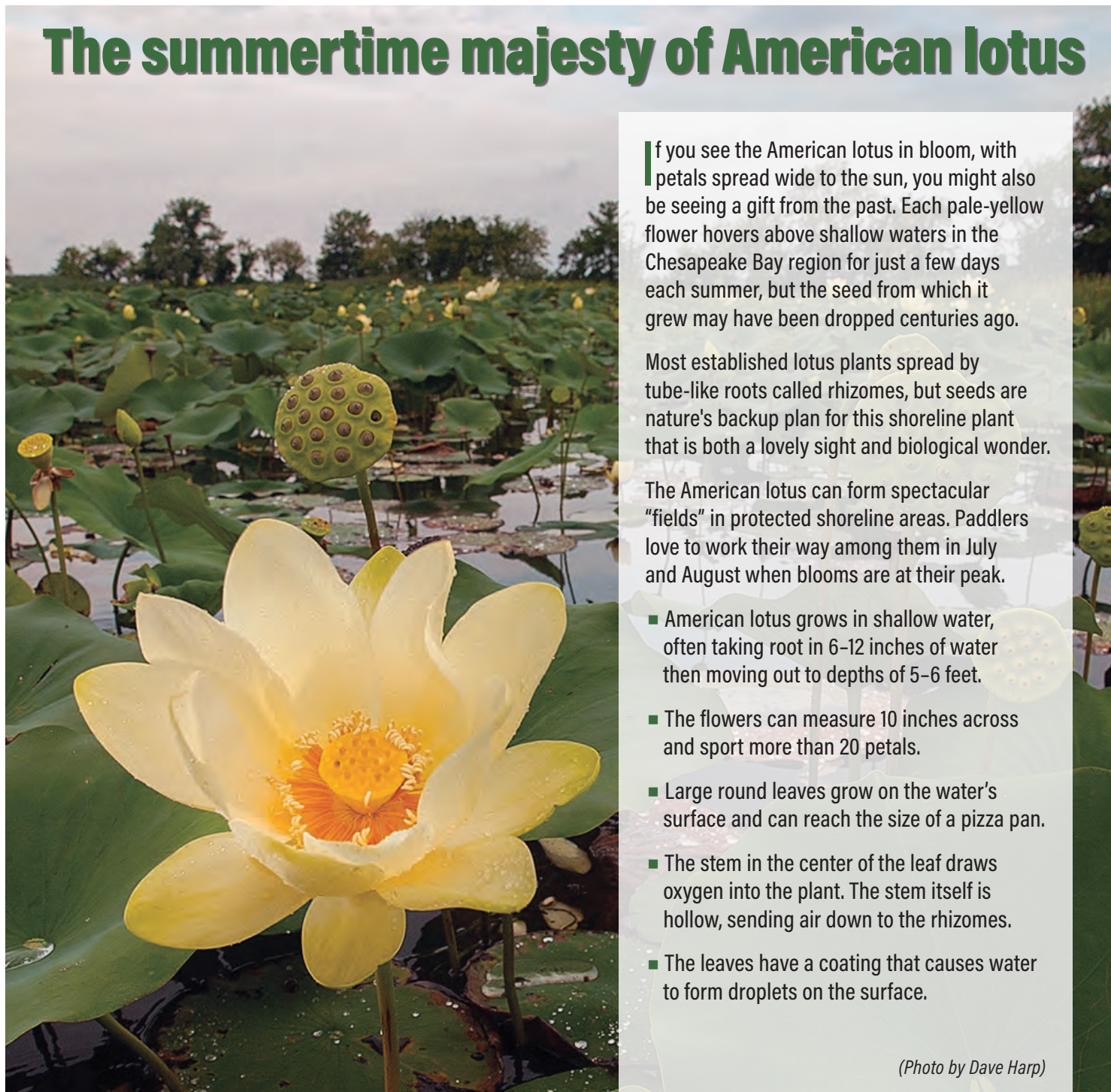
85,000

Acres of wetlands to be created or reestablished under the 2025 Chesapeake Bay Program goal, along with the enhancement of 150,000 additional acres of degraded wetlands

9,103

Acres of wetlands that were created, rehabilitated or reestablished on agricultural lands between 2010-17

The summertime majesty of American lotus



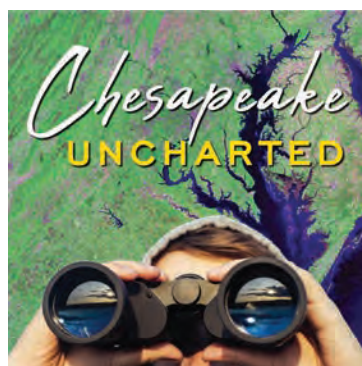
If you see the American lotus in bloom, with petals spread wide to the sun, you might also be seeing a gift from the past. Each pale-yellow flower hovers above shallow waters in the Chesapeake Bay region for just a few days each summer, but the seed from which it grew may have been dropped centuries ago.

Most established lotus plants spread by tube-like roots called rhizomes, but seeds are nature's backup plan for this shoreline plant that is both a lovely sight and biological wonder.

The American lotus can form spectacular "fields" in protected shoreline areas. Paddlers love to work their way among them in July and August when blooms are at their peak.

- American lotus grows in shallow water, often taking root in 6-12 inches of water then moving out to depths of 5-6 feet.
- The flowers can measure 10 inches across and sport more than 20 petals.
- Large round leaves grow on the water's surface and can reach the size of a pizza pan.
- The stem in the center of the leaf draws oxygen into the plant. The stem itself is hollow, sending air down to the rhizomes.
- The leaves have a coating that causes water to form droplets on the surface.

(Photo by Dave Harp)



bayjournal.com/podcast

LOOKING BACK

30 years ago

MD, VA to restrict crab harvests

Maryland and Virginia took steps to protect the crab population after the previous summer's commercial catch hit a four-year low. ■

— *Bay Journal*, July-August 1993

20 years ago

MD aims to put nonnative oysters in the Bay

Maryland announced that it would seek approval to release Asian oysters directly into the Bay because the native species was at an all-time low. ■

— *Bay Journal*, July-August 2003

10 years ago

Concerns for water contact

Monitoring programs found dangerous levels of bacteria in the Bay and many of its rivers. ■

— *Bay Journal*, July-August 2013

ABOUT US

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BAY JOURNAL NOTEBOOK



Bay Journal staff writer Ad Crable won an award from the Pennsylvania NewsMedia Association for his article about the Thousand Steps trail, shown here last fall. (Ad Crable)

Talking about awards, ag and Agnes

Editor-at-large **Karl Blankenship** primarily spends his time communicating through a keyboard, but recently he has been doing an unusual amount of talking about the first two installments of our series, *Ag & the Bay: Sowing a Conversation*. Karl was the “lunch and learn” speaker for the Million Acre Challenge, a collaborative project that works to advance soil health and regenerative agriculture in the Chesapeake region. He was also one of the speakers for an agriculture-themed discussion on a Potomac River boat trip that was part of the Sustainable Agriculture & Food System Funders meeting in Washington, DC. And Don Rush of Delmarva Public Radio conducted an extensive interview with him.

Meanwhile, we released the final episode of our *Chesapeake Uncharted* podcast, Season 2. The six-episode season, produced by staff writer **Jeremy Cox**, marks the 50th anniversary of Tropical Storm Agnes. Episodes follow the effects and aftermath of the massive 1972 storm, highlighting floods in Pennsylvania, the ways the storm altered the Bay and helped spur restoration efforts, and its impact on national responses to natural disasters. You can find the podcast at bayjournal.com or through your favorite podcast service. We hope you enjoy Season 2 we look forward to bringing you a third.

We also have a few more staff awards to announce, this time from the Pennsylvania NewsMedia Association. In our division, **Ad Crable** won first place for feature writing for *Rare butterflies find refuge thanks to explosions at PA training base* and second place in the same category for *Relive history the hard way: Pennsylvania's Thousand Steps trail*. **Jeremy** won first place in the podcast category for his Killer Storm Agnes series. And **Karl** won first place for enterprise reporting for *Chesapeake Bay & the case of the missing chickens*.

As summer hits full stride, members of our staff have been planning vacations in Iceland, Germany, England, Oregon, Colorado, Florida and Michigan. We hope our readers have an enjoyable summer as well!

— K. Blankenship

Smallest 'dead zone' on record predicted for Bay

The Chesapeake Bay's annual "dead zone" is expected to be the smallest ever recorded this summer.

Scientists with the Chesapeake Bay Program, University of Maryland Center for Environmental Science, University of Michigan and U.S. Geologic Survey forecast that the area of oxygen-starved water will be one-third smaller than its historic average. The tracking began in 1985.

Dead zones are naturally occurring, but they are worsened by excess nutrients washing off farms and urban landscapes across the watershed. Nutrients, primarily from fertilizer, sewage and pet waste, trigger algae blooms. When the blooms die off, they consume oxygen, resulting in a large area of water where no marine life can live.

Also, a warming climate is raising water temperatures in the Bay, which aids the formation of dead zones, scientists say.

A dearth of rainfall from last fall through the spring may be offsetting that trend, as well as reducing the amount of nutrient pollution in the Bay and its rivers. River flows were 20% lower than average from November 2022 to May 2023, the scientists found.

"Less water moving through the watershed means less nitrogen was carried by the tributaries to the Bay," said John Wolf, acting coordinator for the USGS Chesapeake Bay research program. The researchers estimated that nitrogen loads were 42% lower than average from January through May at nine locations that represent a vast majority of the Bay's freshwater inputs.

As is typical, this year's dead zone began forming in mid-May as the water warmed. Last year's dead zone also was smaller than average, measuring 0.65 cubic miles or the equivalent of about 1 million Olympic swimming pools. — *J. Cox*

VA air board votes for state to withdraw from RGGI

A state regulatory board in June voted to withdraw Virginia from a regional agreement aimed at reducing emissions by trading carbon credits across state lines.

Virginia joined 10 other states in the Regional Greenhouse Gas Initiative, or RGGI, after the General Assembly passed a law in 2020, signed by a Democratic governor, that enabled the state's mem-

bership. Pennsylvania's governor has since initiated the process to have his state join RGGI as well.

Virginia's Republican Gov. Glenn Youngkin ran on a campaign promise to withdraw the state from the agreement, which he said amounts to "a regressive tax" on residents.

Environmental groups have contended that the Virginia State Air Pollution Control Board, a seven-member body appointed by the governor, does not have the authority to repeal a law set into motion by the General Assembly.

The Chesapeake Bay Foundation noted in a press release that funds generated for Virginia by the RGGI program make certain flooding resilience and energy efficiency programs possible for state residents, and that the emissions reductions are a net benefit to everyone.

"Participation in RGGI is more important than ever as climate change adds new challenges to Chesapeake Bay restoration," the foundation's Virginia policy and grassroots adviser, Jay Ford, wrote in a statement.

The Virginia board's proposal will go through an executive review process by Youngkin before being published in the Virginia Register. — *W. Pipkin*

Update: Groups sue over weapons testing in Potomac

The Potomac Riverkeeper Network and Natural Resources Defense Council have sued the U.S. Navy, accusing it of violating the Clean Water Act by firing munitions and releasing chemicals into the Potomac River near Dahlgren, VA, without a discharge permit. The groups filed suit June 21 in the U.S. District Court in Baltimore.

The Naval Surface Warfare Center, Dahlgren Division has used the Potomac for more than a century as a proving ground to test small arms, large-caliber guns, explosives, lasers, propellants and targeting systems. The 51 nautical mile stretch of the river used for those purposes constitutes the nation's largest over-water firing range, the lawsuit says.

A 2013 environmental impact statement prepared by the Navy said it annually fires about 4,700 large-caliber projectiles from Dahlgren and sets off more than 200 explosions in the river. It said it releases substances over the water 70 times a year on average to simulate chemical or biological attacks.

The lawsuit came almost five months after the groups wrote to the Navy, threatening to sue over

See **BRIEFS**, page 6



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briefs

From page 5

the lack of a discharge permit and accusing it of violating the federal Endangered Species Act by not considering the impacts of its weapons testing on endangered Atlantic sturgeon.

Boaters and watermen have been upset since the beginning of the year after learning the Navy proposed to expand the “danger zone” in the river. Their initial concerns about repeated closures of the area increased after learning more about the volume and kinds of material the Navy had deposited in the river. Oyster farmers and watermen worried that the shellfish they raise or harvest could be affected. — *T. Wheeler*

VA state parks launch paddling rewards program

Virginia State Parks announced a new program for paddlers, the Wandering Waters Paddle Quest, in June.

Thirty-one state parks offer the self-paced challenge, which connects people to Virginia landscapes through streams, lakes, rivers and bays and rewards them for time spent on the water.

Visitors can explore the waterways through a mixture of ranger-guided programs and independent adventures using park rental

equipment or personal gear, including canoes, kayaks, standup paddle boards or paddle boats.

To earn rewards, visitors must create an account on the State Park Adventures system (dcr.virginia.gov/state-parks/contest) and log each paddle. Prizes are given in increments and include a sticker, patch, mesh gear bag and cellphone dry bag. Those who complete the challenge by paddling at all 31 parks also receive a Virginia State Parks certificate. — *L. Lutz*

Amid oyster bounty, MD eyes harvest limits

Last season, Maryland watermen hauled in their biggest harvest in 36 years — 623,000 bushels. After an “exceptional” crop of juvenile oysters spawned in 2020 and better than average reproduction since then, the state’s annual reef survey last fall found the third greatest abundance of bivalves in the last three decades.

Yet state fisheries regulators say they see potential trouble on the horizon, including a sizable increase in harvest effort and overfishing in areas of the Bay and its tributaries that harbor the most oysters. As a result, the Department of Natural Resources might impose new harvest restrictions in the second half of the upcoming season, which begins Oct. 1 and normally lasts until March 31.

Although DNR plans no changes in harvest rules for the first three months of the season, it informed its Oyster Advisory Commission June 6 that changes were possible in January. Depending on what its reef survey finds this fall, DNR said it may close the season a month early — either statewide or in those areas with the heaviest harvest pressure — to boats using the most efficient gear. Or, alternatively, it may leave the season length unchanged but reduce the daily permitted catch for that gear the last three months by roughly 20%.

DNR was seeking industry input and public comment on its options by June 20, with plans to publish its final decision in a public notice in July.

More online at bayjournal.com

— *T. Wheeler*

Update: Wilderness Crossing challenged in court

The American Battlefield Trust filed suit on May 24 against the Board of Supervisors in Orange County, VA, over its approval of a “mega-development” on largely forested land adjacent to the Wilderness National Battlefield Park.

The filing in Orange County Circuit Court contends that the county made “substantive” procedural flaws while approving the largest mixed-use development project in the rural locality’s history.

The Friends of Wilderness Battlefield, Inc., and Central Virginia Battlefields Trust, Inc., as well as a few residents, joined the nonprofit in the lawsuit.

The Board of Supervisors voted 4-1 in late April to approve the project, rezoning a heavily forested property measuring about four square miles — part of the Germanna-Wilderness Area — to allow a mix of residential, commercial and light industrial development interspersed with parks and open spaces. Known as Wilderness Crossing, the development is intended to occur in phases over the next 40 years.

“To approve a project of this scale and magnitude without conducting analysis of the impacts to the hundreds of surrounding acres of protected historic landscape is unacceptable,” said American Battlefield Trust President David Duncan, “as was the county’s complete lack of response to repeated requests by the preservation community and the National Park Service to meet and discuss our concerns.”

The Piedmont Environmental Council opposed plans to develop the property because of suspected gold mine contamination in the soil.

In the months before the project was approved, the developer greatly expanded the amount of land within the project’s footprint that could be used for data center development. — *W. Pipkin*



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Chesapeake earns another C in latest Bay health assessment

Ups and downs equate to little change in overall conditions

By Jeremy Cox

As the deadline looms for the Chesapeake Bay's 2025 cleanup goals, the annual progress report from the University of Maryland shows that the estuary's overall health is neither declining nor improving by significant margins.

That can be interpreted as a win of sorts, given the challenges that the Bay faces from a growing population, intensifying farming practices and climate change. But it falls short of the progress that the multi-state and federal partnership had in mind when it launched the current iteration of the cleanup plan a decade ago.

In its 2022 report card, released June 6, the University of Maryland Center for Environmental Science issued a score of 51 points out of 100 for the overall health of the Bay and its tributaries — good for a

“C” on the center’s scale. That was a one-point gain from 2021, but it marked the third consecutive year of improvement.

This year’s progress was driven by better water clarity, an increase in underwater grasses and a decrease in pollution from the nutrients nitrogen and phosphorus, according to the report. The region as a whole also saw lower levels of *chlorophyll a*, a measure of harmful algae blooms. Meanwhile, levels of dissolved oxygen and benthic communities (bottom-dwelling creatures) were down.

“While the trajectory of improvements, particularly concerning nutrients in the Bay, is in the right direction, we need to pick up the pace of restoration so that we can hit our nutrient reduction targets in the future and ensure our resilience to climate change,” UMCES President Peter Goodwin said.

Around the Bay, nine of the 17 regions saw increases in their scores. The biggest decline — from a 50 to a 36 — took place in the Choptank River on Maryland’s Eastern Shore. The upper Bay experienced the greatest improvement, jumping from a 49 to a 58.

For the first time, researchers wove into the grade a measure of environmental justice, which included indicators for social vulnerability, environmental burden and health vulnerability. The scale suggests that the greatest disparities can be found in urban and rural regions with lesser impacts in suburban areas.

Overall, the report card showed that the Chesapeake’s health has changed little since the assessment’s debut in 1986. Then, the Bay scored a 48, three points lower than in 2022. Last year’s score, though, was tied for sixth best in the record.

This year marks the 40th anniversary of the Chesapeake Bay restoration effort. The program — a collaboration of federal agencies, the Bay’s watershed states and the District of Columbia — faces a self-imposed 2025 deadline for a range of Bay cleanup goals. Restoration leaders, though, have already acknowledged that the region will fall short on many of them, including the core goal to reduce nutrient pollution. Talks are already underway about how to shape the effort beyond 2025.

The UMCES report card mirrored other

recent Bay assessments. The Chesapeake Bay Foundation, a nonprofit environmental group, rated the Bay’s health at a D-plus in its 2022 analysis. That was unchanged from 2020.

Following the release of the UMCES report, the Bay Foundation called on officials to increase funding to address pollution and climate change in the region. Much of those reductions will need to come from the agricultural sector, said the organization’s president, Hilary Harp Falk.

“While it is critical that the U.S. Department of Agriculture increase conservation funding and technical assistance, a recent study from the Bay Program’s Scientific and Technical Advisory Committee has reinforced [the point] that more funding alone will not be enough,” she said in a statement. “We can still leave clean water and a healthy environment to the next generation, but only if Bay leaders listen to the science, target efforts more strategically and begin paying for the outcomes that matter most to local communities and the Bay downstream.” ■




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Around Bay shorelines, that sinking feeling is real

Virginia Tech analysis looked at combined effects of land subsidence and rising water

By Jeremy Cox

Some of the lands around the Chesapeake Bay are sinking at a rate of up to a quarter of an inch per year, raising the stakes for cities, towns and natural areas at risk from sea level rise, according to a new study.

The Virginia Tech analysis, published in March in the *Journal of Geophysical Research*, is not the first paper to posit that much of the region's land is declining in elevation. That fact has been established for decades.

What's new, the researchers say, is that the projections within the study paint the most accurate picture yet of what they call "vertical land motion" or subsidence. Such measurements are critical, they add, because sinking coastal areas will face a wetter future than those that are stable or rising.

"The ground goes down, sea level comes up and flood waters go much farther inland than either change would produce by itself," said Sonam Futi Sherpa, a doctoral student in the Department of Geosciences and lead author of the study, in a statement.

She and her colleagues hope that the new information is a call to action. Many of the region's climate-resilience plans either don't consider subsidence or use outdated estimates, they said.

"There are many estimates and models for sea level rise, but they all fall short because they don't take into account land elevation changes," said Manoochehr Shirzaei, a radar remote sensing professor who also participated in the study. "The flooding hazards maps of the Chesapeake Bay area need to be updated with the measurements of land elevation changes and updated projections of sea level rise."

The triggers behind the sinking vary, depending on the area. After the last Ice Age more than 10,000 years ago, much of the Mid-Atlantic has been sinking as the Earth's crust slowly adjusts to the retreat of the glaciers. In some places, heavy groundwater withdrawals are a significant factor. Erosion can play a role as well.

The Virginia Tech study used satellite data gleaned from 2007 to 2020 to create a

"seamless map" of changes in land elevation around the Bay's shoreline. The technology enabled the team to estimate year-to-year changes as small as a millimeter.

The study found that the ground around most of the Bay's perimeter is sinking annually by less than 2 millimeters, about the

*"The ground goes down,
sea level comes up and flood
waters go much farther inland
than either change would
produce by itself."*

— Sonam Futi Sherpa, Virginia Tech

width of a strand of spaghetti. But other places are sinking two or three times as fast.

One of those hot spots is the Hampton Roads region, home to Norfolk and Virginia Beach. There, groundwater pumping and erosion have exacerbated the phenomenon,

leading to subsidence rates of 3–4 millimeters per year, the study suggests.

Meanwhile, the region's sea level is rising 2.5 millimeters per year, compounding the problem, Shirzaei said.

Under a high greenhouse gas emission scenario, the study estimates that by 2100, a combination of sea level rise and sinking land will risk flooding up to 370 square miles of land that is currently dry. But even if emissions are minimized, low-lying areas such as Virginia's Tangier Island and Maryland's Smith Island stand to drown by the century's end.

"Many of these coastal lands are effectively at zero elevation to the sea," Shirzaei said. "So, even a drop of a few centimeters is a huge amount of land getting flooded."

Bad weather is likely to make a bad situation worse. If a storm with a surge as powerful as the one produced by 2003's Hurricane Isabel were to strike the area again in 2100, the inundated area would expand to nearly 700 square miles, the study estimated. ■

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Brown Grove gets national historic nod, support in court

VA community fighting for recognition in environmental justice land use challenge

By Whitney Pipkin

A rural historic district in Hanover County, VA, has found a place on the National Register of Historic Places — even as residents continue to battle a grocery distribution center being built in its midst.

The Brown Grove Rural Historic District was designated a National Historic Landmark in April, following state recognition as the only rural historic district in Virginia in 2022. Built by formerly enslaved people during the Reconstruction Era, Brown Grove was an agricultural community built largely around a Baptist church and family ties.

“The construction of Interstate 95 in the 1950s and 1960s through the Brown Grove community resulted in the two halves of today’s discontinuous district... [following a] pattern of locating large public infrastructure projects in minority communities,” stated a press release from Hanbury Preservation Consulting, which prepared the nomination for national historic recognition in collaboration with the William and

Mary Center for Archaeological Research.

These historic recognitions have come about, in part, because of the community’s strong sense of shared history — and in opposition to a large commercial project. A 1.7-million-square-foot Wegmans Food Market distribution center is now nearing completion after months of construction on a 200-plus-acre property across the street from Brown Grove Baptist Church.

The Wegman’s project has continued to move forward under county approvals despite recent legal setbacks at the Virginia Supreme Court. That court ruled in February that residents who had sued the county should have had legal standing in a decision to rezone the nearby land to allow the distribution center, sending the case back to lower courts. And, in May, the Virginia Supreme Court also denied a request by Wegmans, supported by some in the development industry, to reconsider its decision.

Attorneys representing residents in and near Brown Grove said the court’s decision has “significant implications for commun-

ities and the environment in court.”

One legal brief said it “creates a new class of plaintiffs” — neighboring landowners who can show that a new development causes them “particularized harm.”

But, for Brown Grove residents, it’s not yet clear whether the legal wins will have any ability to stop a project that’s so far along. The case has been sent back to Hanover County Circuit Court for a judge to decide whether the county zoning board’s procedures invited sufficient public debate during a decision-making process that was at least partly hampered by COVID restrictions.

Members of the Brown Grove community have also asked the U.S. Environmental Protection Agency to make an environmental justice case study of their ongoing concerns about the impacts of concentrated industry on residents. But their progress on that front has come to a standstill.

Brown Grove is a relatively small area that includes about 200 homes on rural, wooded lots. It also includes a landfill, a concrete plant, an airport, a truck stop and



Renada Harris discusses development concerns in Brown Grove, VA. (Dave Harp)

a defunct gas station that some suspect wasn’t properly closed.

“It’s unfortunate that we’ve had to get recognized on a state level and then on a national level for Hanover [County] to finally recognize that our Black community has been there for 150-plus years,” said Renada Harris of the Brown Grove Preservation Group. “I’m glad that, now, we have that recognition.” ■

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Supreme Court wetlands ruling 'serious setback' for Bay

State laws offer some protection but enforcement, permitting process could be vulnerable

By Timothy B. Wheeler

With a recent U.S. Supreme Court decision sharply curtailing federal oversight of streams and wetlands, environmental groups working to restore the Chesapeake Bay say they're worried about gaps in state laws and enforcement practices that now leave those waters vulnerable to unrestricted development and pollution.

In a May 25 ruling the nine justices unanimously agreed that the U.S. Environmental Protection Agency overstepped its authority in declaring part of an Idaho couple's home site wetlands and demanding that they get a permit to fill it.

But the court's majority went further in *Sackett v. EPA* and, with a 5-4 vote, drastically redefined which streams and wetlands are protected under the Clean Water Act. In doing so, it sought to settle decades of debate by removing federal regulation of activities affecting isolated wetlands and tiny streams that flow with water only after heavy rains.

"I'm not aware of anyone who predicted this," said Peggy Sanner, Virginia executive director of the Chesapeake Bay Foundation. She called it a "serious setback" for environmental protection efforts in general, as well as for the Bay restoration effort.

Wetlands and those periodically dry stream beds help keep water-fouling nutrients and sediment from reaching the Bay while also providing critical habitat and soaking up floodwaters.

Farmers, developers and other business organizations, welcomed the ruling. The Virginia Farm Bureau's blog called it "a major victory for farmers and property rights," while the chair of the National Association of Home Builders dubbed it a win against "federal overreach" and for "common-sense regulations and housing affordability."

Passed in 1972, the Clean Water Act gave the federal government jurisdiction over "navigable waters" and set up a permitting program to regulate discharges of dredged or fill material into "waters of the United States," including wetlands.

A legal and political dispute has flared on and off since then about how far upstream that authority applies. Congress amended the Clean Water Act in 1977 to specify that it also covered wetlands "adjacent" to navigable waters, but that hasn't quelled the controversy. The Supreme Court has weighed in repeatedly since the 1980s, with



Steve Moyer visits the ephemeral headwaters of Snakeden Branch near Reston, VA, in 2020. (Dave Harp)

shifting and conflicting opinions.

In 2015, the Obama administration sought to clarify what's regulated with a rule that protected isolated wetlands and "ephemeral" streams with a "significant nexus" to navigable waters.

That drew fierce backlash from farmers, developers and energy companies. The Trump administration repealed it and proposed a much narrower rule that applied federal regulations only in cases where surface water contributes to the wetland or waterway in question. States and environmental groups sued.

A court threw out the Trump rule, and the Biden administration has been working on another, more expansive version.

Environmental lawyers say the Sackett ruling appears to restrict federal jurisdiction even more than the Trump regulation. The EPA and U.S. Army Corps of Engineers, the two agencies that regulate activities affecting wetlands and waterways, had estimated that the Trump regulation would have stripped federal protection from more than half of the nation's wetlands and roughly one-fifth of its streams.

Bob Dreher, legal director for the Potomac Riverkeeper Network, estimated that the recent court decision removes protection from as much as 65% of wetlands nationwide and more than 80% of the streams.

In the Bay watershed, the impact is somewhat muted. Five of the six states and the District of Columbia provide at least

some protection under their own laws for wetlands and streams now removed from federal jurisdiction. Delaware is the only outlier, one of 24 states nationwide that rely entirely on the Clean Water Act for safeguarding their waters, according to the Environmental Law Institute.

Maryland, Pennsylvania and Virginia each have comprehensive state laws that provide protection from disturbance for their wetlands and all waters, even groundwater, noted the Bay Foundation's Sanner.

West Virginia law also contains a broad definition of "waters of the state" but, according to the law institute's James McElfish, the state has not always required permits for activities in wetlands and streams that fall outside the federal interpretation.

New York last year strengthened its protec-

tions for freshwater wetlands, but the state only requires permits for activities affecting wetlands larger than 7.4 acres, unless they're deemed to be of "unusual importance."

David Reed, executive director of the Chesapeake Legal Alliance, foresees trouble, even in states with strong legal protections on the books. State and federal agencies have jointly reviewed applications for permits to disturb a wetland or stream. Now, with the federal role shrinking, he said, there won't be a backstop for state regulators facing intense pressure to look the other way.

"It will push them inevitably toward laxer enforcement," Reed said of the states. "It will be this insidious direction toward less and less protection."

Another major concern is that most states do not offer their citizens the same right to go to court to enforce their laws as the Clean Water Act does. The federal provision for "citizen suits" has allowed environmental groups to go after polluters in federal court and often prod state regulators to act when they haven't before, Reed said.

Environmentalists say the Supreme Court decision also puts a cloud over the section of the Clean Water Act that establishes federal and, by extension, state authority to regulate discharges of stormwater and other pollutants into dry stream beds or isolated wetlands.

Activists say the Supreme Court's ruling means they're going to have to press for stronger state laws and for staffing and budget increases for regulatory agencies to enforce them.

"If we're going to have hope for states to be a little of a backfill here, we're going to have to help states get up to speed," said Betsy Nicholas, the Potomac Riverkeeper Network's vice president of programs. ■



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New Southern MD heritage area aims to be inclusive

National designation will help highlight Native, Black histories in the Chesapeake landscape

By Jeremy Cox

In Southern Maryland, Native peoples fought to keep their traditions alive dating back to the earliest days of European colonization. It's the location of the first Roman Catholic Mass in the English-speaking colonies. And it's where the first person of African descent served in a legislative body in America.

Now, it's where those feats, among others, are commemorated as part of a new federal designation. The region — a joining-together of Calvert, Charles, St. Mary's and southern Prince George's counties — has been formally declared a National Heritage Area.

Congress passed the measure creating the heritage area Dec. 22, 2022, and President Biden signed it into law Jan. 5, 2023. With its creation, there are now 62 national heritage areas nationwide.

The program is aimed at sites where “historic, cultural, and natural resources combine to form cohesive, nationally important landscapes,” according to a National Park Service website.

There are NHAs in the Chesapeake Bay region, for example, that draw attention to the Susquehanna River in Pennsylvania, the Civil War battlefields of Virginia's Shenandoah Valley and the Appalachian forests of Maryland and West Virginia.

The new law set aside \$10 million over 10 years to support the Southern Maryland region. Supporters say that the designation and funding will help expand educational and historical programming in the region, boosting tourism and economic growth.

“It says this region is important to the nation for these reasons and to come visit it,” said Lucille Walker, executive director of the new national heritage area. Since 2015, Walker has overseen the state-designated heritage area that overlaps much of the federally recognized landscape. Having both at her disposal, she added, “ups your game at every level.”

She and other advocates frequently cite a National Park Service statistic showing that National Heritage Areas lead to an average of \$5.50 in economic activity for every \$1 of federal investment.

The annual \$1 million in federal spending for the new heritage area represents a windfall. The state heritage area program has an annual operating budget of about \$6 million, which it must divide among



Maryland Gov. Wes Moore, center, joins local tribal leaders in celebrating the creation of the Southern Maryland National Heritage Area during an event on May 25 at Piscataway Park in Accokeek. (Sophia Handel/The Hatcher Group)

13 designated areas. Each year, Walker's organization, known as Destination Southern Maryland, receives \$100,000 in state operating funds.

Individual state grants of up to \$500,000 are made available for building projects and educational programs, though competition is fierce.

Acquiring the new federal designation was not a foregone conclusion, especially at a time when federal lawmakers are increasingly cautious about committing to new spending. After marshaling local support, Walker and her allies got a required feasibility study completed. Then, they got members of Congress on board, enlisting the help of Sens. Ben Cardin and Chris Van Hollen and Rep. Steny Hoyer, all of Maryland.

As with other NHAs, the designation confers no new restrictions on property owners within its boundaries. Participation in the program, operated by the National Park Service, is voluntary.

The entire process took about two years, a quick turnaround by national heritage standards, Walker said. It has taken some sites up to 20 years to gain recognition.

Maryland Gov. Wes Moore headlined a May 25 gathering celebrating the

establishment of the new heritage area. “This designation raises the profile of the region and brings great economic, environmental and cultural benefits,” he said. “National Heritage Areas connect communities, promote awareness and foster interest in our rich natural resources and diverse heritage.”

The event, hosted at Piscataway Park in Accokeek, featured a blend of entertainment as varied as the region itself. It included performances by the Piscataway Indian Nation drums, Spring Ridge Rhythm Club and “colonial singers” David and Ginger Hildebrand.

Onlookers could also look out onto the water toward the region's past with a visit from the *Maryland Dove*, a re-created 17th century historic ship that is typically docked in St. Mary's County.

The historical timeline highlighted by the designation stretches back thousands of years and into the present day. Representatives of the two, state-recognized tribes in the area, the Piscataway Indian Nation and Piscataway Conoy Tribe, say they hope it will help spread their stories to new audiences and remind people that they're still here.

“You can't speak of Maryland without

speaking of its first peoples,” said Chairman Francis Gray of the Piscataway Conoy Tribe, an early advocate for the federal move. “It has always been a non-Native person speaking about non-Native ways. This starts to give the opportunity for Native peoples to speak about our ways, to speak with authority.”

African American history also will be at the forefront, Walker said. The region is home to Historic Sotterley, the only Tidewater plantation open to the public in Maryland. Gwen Bankins, a descendant of a family once enslaved at Sotterley and a board member of the nonprofit that operates the site, said she looks forward to sharing the full story of America through her Southern Maryland lens.

“I see helping people deal with a very painful part of history. History is pretty, but it's also painful. We have to talk about the mistakes and the parts people don't want to talk about. We can't leave any part of the story out because it's America's story,” she said.

Walker said that now that the heritage area has been formed, she and others are creating a steering committee to author the area's management plan. ■

Study dishes up surprises about deer behavior, forest impacts

Decade-long research efforts in PA continue to reveal new insights

By Ad Crable

Who knew that deer salivate about 2 gallons a day or that a fawn has 272–342 spots on its coat?

Or that a doe may choose to give birth to fawns near a road so that fewer bears, coyotes and bobcats are around? Or that a deer may consume more than 100 different plant species a year?

After a decade of following and studying 1,200 live-trapped deer, fitting them with ear tags and GPS radio collars to track their movements, Pennsylvania researchers are getting an unprecedented look into the behavior of one of North America's most widespread mammals and their imprint on the landscape.

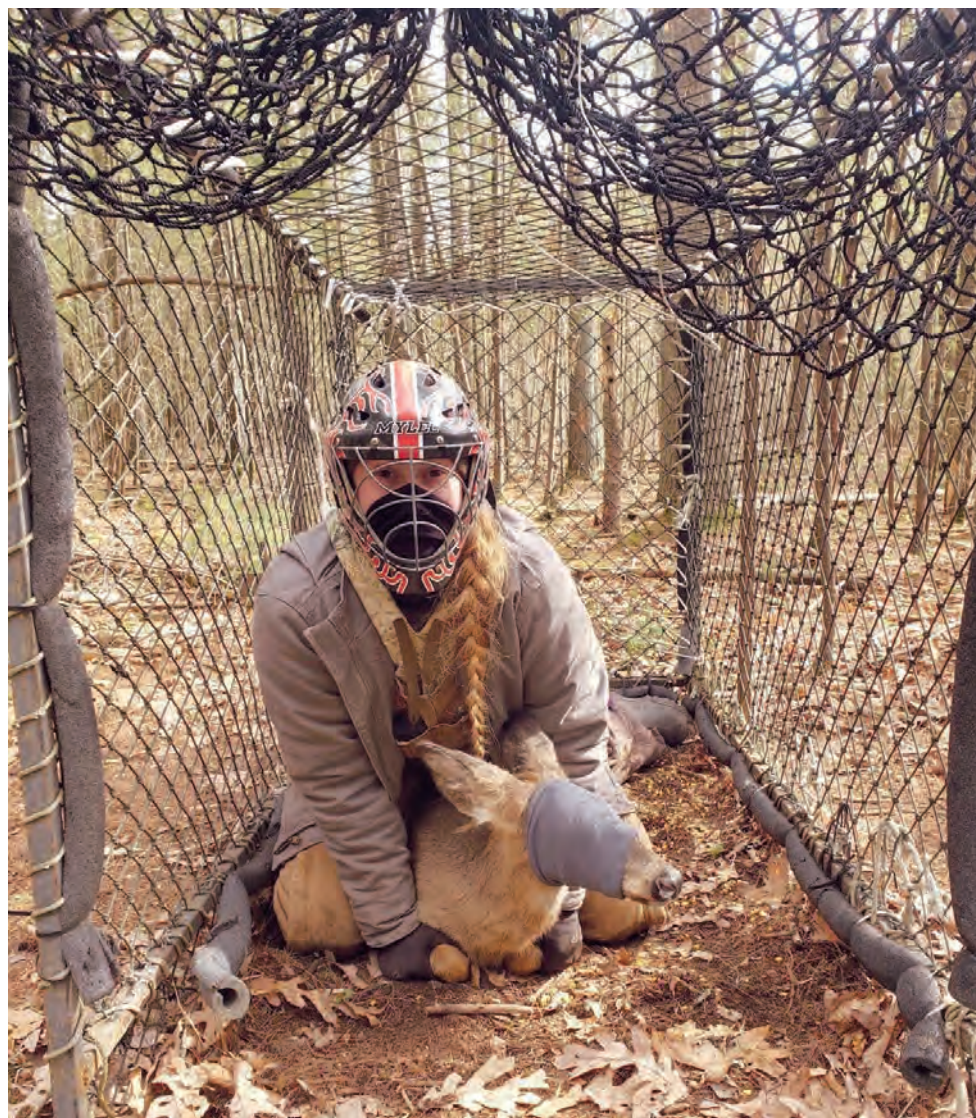
In 2013, the sweeping Deer-Forest Study was launched and funded by the Pennsylvania Game Commission, Pennsylvania Bureau of Forestry, U.S. Geological Survey and Penn State — each with an interest in what happens between deer, soil and plants in 2.2 million acres of state forests, 1.5 million acres of state game lands and millions more acres of private land across the state.

The study, which won't be wrapped up until 2026, could shape how land managers ensure healthy forests in an age of climate change and invasive plants.

It offers new nuances to be considered by game managers in determining how many deer are being killed by hunters because hunting is the primary means for controlling deer populations. And it helps the Game Commission with the difficult decision about how many deer should be culled each year for the herd to remain in balance with available habitat.

"This study is unique," said Duane Diefenbach, leader of Penn State's Pennsylvania Cooperative Fish and Wildlife Research Unit. "Looking at all these different factors at the scale we are looking at, and the interaction over a long time, is really a first."

One aim of the year-round study is to learn how vegetation responds to changes in deer densities and various tweaking to forests by managers. It's commonly known that unchecked deer can browse the forest floor so heavily that trees and desirable plants never get a chance to regenerate.



Wearing a masked hockey helmet for protection, a Deer-Forest Study researcher gets ready to tag and collar a deer in a Pennsylvania state forest. (Deer-Forest Study)

But the study is showing that what happens in a forest and the best ways to ensure its future growth is much more complex and involves a dance of wildlife, plants and soil.

In some cases, deer may be overly blamed for problems in the understory. A team of about 20 people scrutinized approximately 170 species of herbs, shrubs and trees on 200 fenced and unfenced plots in three state forests with a mix of unfragmented forests, and other plots with a mix of forest and farmland.

They found that the absence of a native plant does not always indicate overbrowsing by deer. For example, the researchers found that Indian cucumber-root, an important native species and delicacy for deer, did not grow in areas where the soil was acidic and high in manganese.

This is important because the Pennsylvania Game Commission uses a browsing index

to determine how many deer can sustainably live in a section of forest and how many need to be removed by hunters. Indian cucumber-root is one of the species monitored and, at least in some cases, its disappearance may be blamed falsely on deer.

In a related finding, researchers found that field technicians had trouble consistently scoring how deer browsing affects understory vegetation. That subjective measurement is part of the deer impact index used by state forest managers. Generally, plants that deer like to browse are sampled for abundance and regrowth. The study is investigating if there is a more reliable way to accurately determine the effect of deer on vegetation.

The study is also highlighting the importance of sunlight filtering through treetops to understory vegetation. Again, deer may be excessively blamed for lack of regrowth in the forest.

Still, Diefenbach cautioned, "that doesn't mean we can have more deer. A healthy deer population relies on a healthy forest."

In addition to impacts from deer, forest plots are showing that controlled burns help to regenerate trees and many plants. Also, tree-cutting and herbicide treatments for invasive plants help a forest maintain itself. One preliminary finding is that spraying invasive nonnative plants does indeed help tree seedlings rebound.

Deer insights

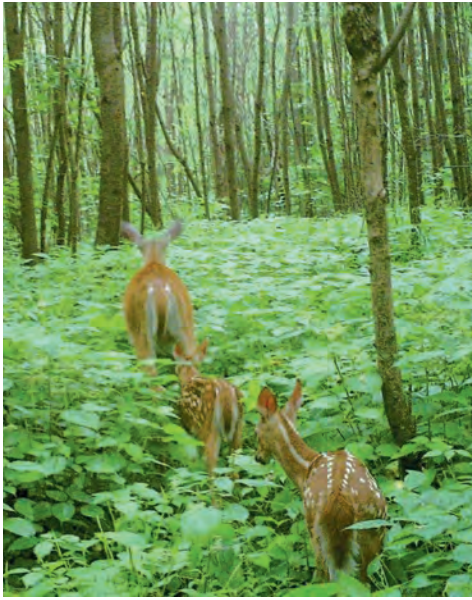
Discussions of soil and forest interactions aside, the most interest shown in the study by far has been from wildlife lovers and deer hunters who are gaining new and surprising insights into the behavior of white-tailed deer.

To gain an intimate look into the lives and times of deer, researchers have live-captured more than 1,000, from fawns to geriatric bucks, in four areas of the state.

Attracted by a bait of shelled corn, deer are lured into cages or netted in 60-by-40 foot traps triggered by a nearby technician. Most captured deer are fitted with GPS radio collars so their movements can be tracked remotely around the clock. Researchers analyze DNA in deer pellets to track those that were captured but not fitted with radio collars.



A doe is fitted with a GPS collar to track her movements. (Deer-Forest Study)



A doe and her fawns roam a Pennsylvania state forest. A study found that fawns spend most of their time hiding in the woods and only interact with their mothers several times a day for nursing. (Deer-Forest Study)

GPS collars have enabled researchers to plot deer locations more than 1 million times over the last 10 years. Their movements are related in the conversational field diaries that researchers share online (deer.psu.edu/category/the-deer-forest-blog). The often-humorous dispatches have attracted more than 2 million views as they shed light on deer behavior.

One female was captured in 2003 as a fawn. While many deer are shot by hunters — most bucks will not survive to age 3 — the doe was recovered in 2015 after being killed at nearly 14 years of age during muzzle-loader deer season.

Some females have small transmitters placed in their birth canals. When they give birth, the device is expelled and activated, revealing the newborn's location. Technicians rush to the birthing bed to capture the immobile fawn nearby.

The fawn's collar communicates with the doe's collar, enabling researchers to study doe-fawn interactions, learn which kind of terrain a doe selects to have her fawns and assess fawn survival rates.

It turns out that mother does are pretty hands-off. They only approach their fawns two or three times a day to nurse and hang around about 300 feet away. The rest of the time, the fawns are lying camouflaged on the forest floor.

Too often, this leads some people to conclude the fawn has been abandoned. Not so. And if you approach the fawn and leave your scent, it may attract predators. Also, it takes several days for fawns to imprint on their mothers. Until then, a fawn



Researchers tag a fawn in a Pennsylvania forest. (Deer-Forest Study)

may imprint on almost any moving thing, including humans.

There also have been surprises to conventional assumptions long held by hunters.

For example, hunters generally believe that deer are most active first thing in the morning, and therefore they head out well before dawn, assuming few deer are moving at lunchtime.

But deer movements tracked in the study showed that most spent the early hours bedded down, finally beginning to wander around at about 10 a.m. The peak movement for bucks took place 12–1 p.m. They rested in the afternoon before moving again from 4 p.m. to dusk.

“How often is life fair? Umm, never. So, rifle hunters rejoice. You too can spend an extra hour or two in that nice, cozy, warm bed,” confided one of the study's bloggers.

The study is providing answers on another question: Do human activities affect deer survival?

Deer typically avoid hanging out near roads, though they do have to cross them between territories. Yet sometimes a doe may seek out a roadside area to serve as a “human shield” when she gives birth, deterring predators that could threaten her or her young.

But that safety may be nullified by increased chances of being hit by a vehicle.

A three-year side study into fawn survival yielded surprising revelations. Between 28% and 43% will not live to 6 months of age. The study found that in about two-thirds of the cases, predators such as black bears, coyotes, bobcats, and dogs killed the fawns.

High stress levels may play a big part in fawn mortality. Necropsies sometimes reveal the presence of the stress hormone

cortisol in deceased fawns. Cortisol can help a fawn flee danger with a quick burst of energy but, when produced over a long time, it can be harmful to health.

The exact cause of elevated stress hormones in fawns is not known, but it does not appear to be related to the number of nearby predators. Poor rearing from their mom is one hypothesis.

Other causes of fawn mortality are starvation, failure to nurse, infections, parasites and collisions with vehicles.

Buck on the run

No deer tracking was followed more closely by the public than that of Buck 8917. In his second year of life, the male was

captured in 2013 and fitted with a GPS collar and ear tags. During the next rifle hunting season, his movements were plotted every 20 minutes, with 2,570 movements in all during 2013. He eluded hunters into a second deer season.

The buck's behavior is typical of males. During most of the year, he moved pretty much in a core area of 1 square mile. He frequently bedded on a ridgetop where he could see and smell approaching danger and leap over the ridge to escape.

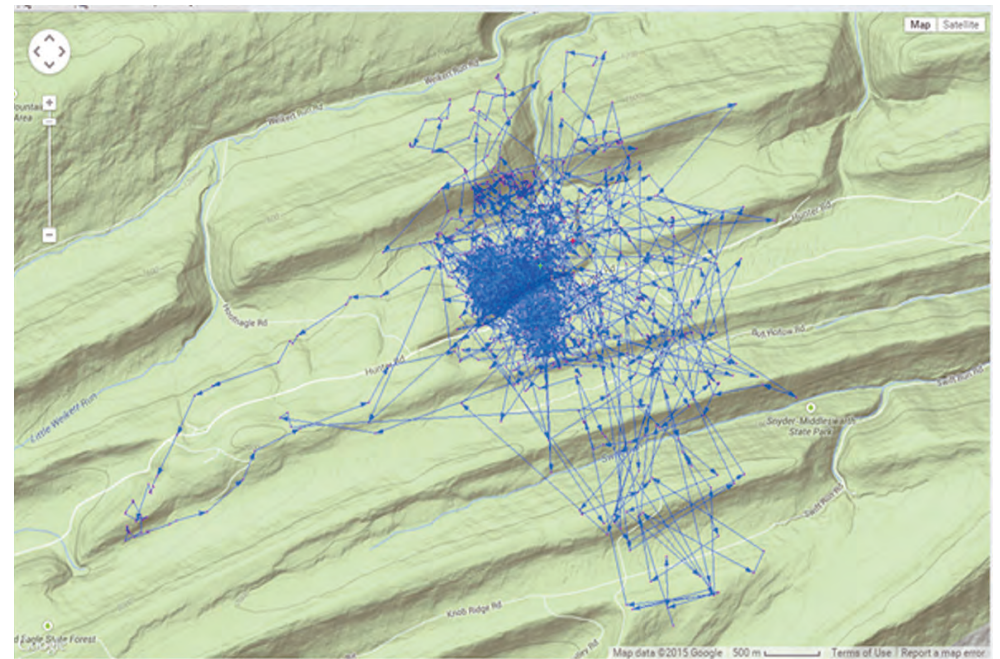
But during the rut, when bucks search far and wide for receptive mates, Buck 8917 wandered widely almost nonstop. In one 12-hour period, he covered a 5-mile route and more than a mile in elevation change.

Wily number 8917 survived three hunting seasons before dying in January 2015. When his collar sent an email to researchers saying that he had not moved in eight hours, they went looking for him and found his carcass. Unfortunately, coyotes beat the team to the spot, and we will never know the cause of death.

Do bucks that spar by locking antlers for supremacy ever cause injuries? The study found that in at least one case, yes.

A mortality signal from a 4.5-year-old buck in 2015 sent field technicians out to recover his body. A lab necropsy revealed multiple lacerations and puncture wounds on the buck, including one near the heart. The buck died from loss of blood from a fight. ■

Researchers have published more than 700 entries on the Deer-Forest Blog to share information about their work. Read them at deer.psu.edu/category/the-deer-forest-blog.



The movements of a buck were mapped over the course of a year with the aid of a radio collar and GPS technology. (Deer-Forest Study)

Bay grasses expanded 12% in 2022 but remain far from goal

Cooler temperatures account for increased acreage in lower Bay

By Karl Blankenship

The Chesapeake Bay's underwater meadows continued to expand in 2022, aided in part by cooler temperatures that prompted a resurgence of heat-sensitive beds in parts of the lower Bay.

It was the second straight year underwater grass beds expanded after losing 42% of their acreage following a protracted period of heavy rain in late 2018 and early 2019 that left the Bay awash in water-clouding sediment and algae blooms.

"It was a good year," said Chris Patrick, director of the submerged aquatic vegetation monitoring and restoration program at the Virginia Institute of Marine Science, who oversees the annual aerial survey.

Overall, the grasses edged up 12% to 76,383 acres last year, after a 7% increase in 2021.

Underwater grass beds generally expanded in mid- and high-salinity areas of the Bay, he noted, with more mixed results in lower salinity and freshwater areas.

Bay grasses, also known as submerged aquatic vegetation or SAV, provide important habitat for juvenile blue crabs and fish, as well as food for waterfowl. The plants also provide a host of other services, pumping oxygen into the water while their roots help stabilize sediment and their leaves buffer wave action.

But they require clear water to get the sunlight needed to survive. When sediment, driven off the land by rain, and nutrient-fueled algae blooms cloud the water, the beds can die off.

Because underwater grasses are so important, Bay cleanup goals are aimed in part at creating conditions that allow them to thrive. Their annual abundance is a closely watched indicator of how the Chesapeake is doing.

Last year's coverage was nearly double the 38,958 acres observed in the first annual survey in 1984. But it was well below the restoration goal of 185,000 acres set by the state-federal Bay Program and the high of 108,077 acres observed in 2018 before the heavy rains hit.

Generally, grasses in recent decades have been recovering in freshwater and



A scientist holds several species of underwater grasses from the Susquehanna Flats near Havre de Grace, MD. (Matt Rath/Chesapeake Bay Program)

low-salinity areas of the upper Bay and the upper reaches of its tidal tributaries. In many of those areas, they are even near their restoration goals.

Nowhere is that comeback more dramatic than in the Susquehanna flats, located near the mouth of the Chesapeake's largest tributary, which was nearly void of grasses when the survey began but now has the largest bed in the Bay. Last year, it had roughly 10,500 acres, up a couple of hundred acres from the year before.

But in the mid- and high-salinity areas of the middle and lower portions of the Chesapeake — where more than 80% of potential SAV habitat is found — the story is different. Unlike low-salinity areas that support many types of grass, areas with higher salinity have only two main species: eelgrass and widgeon grass.

Eelgrass, which is sensitive to heat, has seen sharp reductions as temperatures have warmed, while widgeon grass has become more abundant. But widgeon grass fluctuates widely from year to year. As a result, there has been no strong trend in those areas over the last two decades.

The 2022 survey showed that:

- SAV in the tidal freshwater areas at the head of the Bay and in the uppermost tidal reaches of most tributaries held mostly steady, with 19,179 acres in 2021

and 19,185 acres mapped last year. That is 93% of the restoration goal for that area.

- The slightly salty "oligohaline" waters, which occupy a relatively small portion of the upper Bay and tidal tributaries, showed a decrease from 8,384 acres to 7,145 acres, a loss of about 15%. That is 69% of the restoration goal for that area. Almost all of the loss was concentrated in a small area between the Gunpowder and Middle rivers on Maryland's upper Western Shore, where scientists suspect a localized event led to the decline.
- The moderately salty "mesohaline" waters — the Bay's largest area of potential underwater grass habitat, stretching from near Baltimore south to the Rappahannock River and Tangier Island in Virginia, including large sections of most tidal rivers — saw an increase from 24,091 acres to 30,932 acres, or 28%. Still, that is just 26% of the restoration goal for that area.
- The very salty "polyhaline" water in the lower Bay — from the mouth of the Rappahannock and Tangier Island south, including the lower York and James rivers — had an increase from 16,371 acres to 19,200 acres, or about 17%. That is 57% of the restoration goal for that area. The rebound in the salty and very salty

areas, from Baltimore south, was driven both by the expansion of widgeon grass and a reversal in the long-term decline of eelgrass, scientists said.

"The last couple of years have not seen that intense heat," said Brooke Landry, a biologist with the Maryland Department of Natural Resources and chair of the Bay Program's SAV Workgroup. "And so, it makes sense that eelgrass is going pretty well."

Patrick attributed at least part of the comeback to a faraway cause: A La Nina climate pattern that has existed in the Pacific Ocean the last couple of years contributed to cooler temperatures in this region.

That, in turn, led to an expansion of eelgrass. Eelgrass, once the Bay's dominant underwater grass species, is not tolerant of warm temperatures and has been in decline in the Chesapeake for the last quarter century.

The good news could be short-lived, though. An El Nino, which has the opposite effect of a La Nina, is forming in the Pacific, and Patrick said he is concerned that could produce hotter temperatures next year.

"As we're in this La Nina period, it's going to be cool," Patrick said. "That's good for eelgrass. When we switch to El Nino, it's likely to get a lot hotter, potentially the hottest summers we've ever seen, and that can't be good for eelgrass." ■

Study crowns widgeon grass as Bay's new top SAV species

Widgeon grass helps make up for lost eelgrass but has boom and bust cycles

By Karl Blankenship

The Chesapeake Bay has a new seagrass champion, but it's not necessarily good news for the Bay.

The Bay supports roughly 24 underwater grass species but, for decades, eelgrass dominated. The tall, deeply rooted plants formed vast meadows that accounted for two-fifths of the Bay's total underwater grass acreage as recently as the late 1990s.

But the Chesapeake is near the southern edge of its range, and eelgrass has since suffered a series of heat-related die-offs. By 2019, it accounted for just 19% of the Bay's grass coverage, according to a new study. And a different grass reigns instead.

The paper, published in the *Proceedings of the National Academy of Sciences*, confirms what scientists have long suspected: Widgeon grass is now the dominant species of submerged aquatic vegetation, or SAV, in the Bay, accounting for up to 43% of the total acreage in recent years.

"Widgeon grass has been hanging around forever," said Marc Hensel, a post-doctoral research associate at the Virginia Institute of Marine Science, and the study's lead author. "But it's always been in the fringes, literally, because it lives in shallow water."

A mix of factors has moved the fringe actor to center stage.

Gradually warming water has caused eelgrass to retreat from more than half of the area it occupied in 1991. Meanwhile, efforts to reduce nutrient pollution in the Bay brought clearer water — at least in some years — that allowed widgeon grass, which requires especially clear water, to expand.

The ability of the more heat-tolerant widgeon grass to move into areas vacated by eelgrass is good news because scientists had long been worried that nothing would replace eelgrass in mid- and high salinity parts of the Chesapeake. Those areas contain — by far — the greatest amount of potential SAV habitat, but they are off limits to most of the Bay's other grasses, which need low-salinity or freshwater areas.

Widgeon grass is often an unreliable replacement, though, because of its wild year-to-year fluctuations.

It produces large amounts of seeds that can persist in the sediment for years. When conditions are right, vast beds suddenly spring forth.

But it is equally vulnerable to poor water



Widgeon grass, left, has replaced eelgrass, right, as the dominant underwater grass in the Chesapeake Bay. Scientists worry that its thin, less dense blades may not provide the same habitat quality for crabs and fish. (Virginia Institute of Marine Science)

quality. The study found that in years with high spring flows — which flush large amounts of sediment and nutrients into the Bay — widgeon grass beds can "totally collapse." The sediment clouds the water, and the nutrients spur algae blooms, blocking the sunlight the plants need to survive.

The tall blades of eelgrass can better withstand such conditions because they extend close to the water surface, avoiding the worst of the murky conditions. Widgeon grass does not reach its full height until mid-summer, and the short springtime plants are more vulnerable to cloudy conditions.

Widgeon grass has long been known to have boom and bust cycles, but the full magnitude of those changes was previously unknown.

An annual aerial survey conducted since 1984 measures the overall SAV acreage, but it is not able to differentiate among species. Each year, though, scientists spot check survey results, during which time they identify what species are present. Using that and other information, scientists in the new study were able to construct a model showing how eelgrass and widgeon grass

abundance has changed.

While the amount of underwater grasses has always varied from year to year, the model shows how the rise of widgeon grass has exaggerated those swings. Half of the years between 1999 and 2019 had increases or decreases in Baywide acreage of more than 20%, largely driven by widgeon grass. Such large variations were rare in earlier years.

In 2019 alone, half of the widgeon grass acreage was lost, the study reported.

"The booms and busts, the peaks and valleys, from a Baywide perspective, appear to be widgeon grass peaks and widgeon grass valleys," Hensel said.

Even when widgeon grass fills some of the same areas previously dominated by eelgrass, biologists worry that it may not provide the same benefits.

It is not only shorter, but its blades are thinner than those of eelgrass so they may not provide the same shelter for juvenile blue crabs, spot or black sea bass seeking refuge from predators. Unlike eelgrass, which persists much of the year, it provides habitat for only a few months.

Further, the scientists reported, widgeon

grass lacks the extensive root system of eelgrass, which makes it more vulnerable to wave action and other physical disturbances.

More work is underway to provide a fuller look at the ecological implications of a Bay dominated by widgeon grass, said Chris Patrick, director of the SAV monitoring and restoration program at VIMS and a co-author of the study.

"It becomes more of an issue for the Chesapeake when widgeon grass stops being a supporting player and starts being the main event in terms of seagrass," Patrick said, "because then we have to contend with these swings and how that's driving increases and decreases in service provisioning from year to year."

Scientists are also looking at the implications that the demise of eelgrass and rise of widgeon grass may have for reaching the region's 185,000-acre SAV goal. That goal was based in part on the expectation of returning eelgrass to areas where beds existed at some point during the last century. It's unclear whether widgeon grass, which generally needs more light and doesn't survive in deeper areas, can occupy all of the areas vacated by eelgrass.

"Widgeon grass really wasn't an important player in those discussions," Patrick said.

"It's been largely ignored by seagrass biologists in the Bay community until very recently. It's a different species. It's got different light needs and it's got different tolerances for stressors."

Patrick said the fact that widgeon grass was a largely ignored species until recently provides a case study of how climate change can alter systems in unpredictable ways — and how the Chesapeake of the future will be different from the Bay of the past.

In fact, the study underestimates the extent of the change, Patrick said. It only examines periods since 1991 for which data was available, but eelgrass is known to have covered a much greater area in the past.

"We've actually lost more ground than this paper really fully alludes to because we didn't have an aerial survey, and we didn't have the ground observation data," Patrick said.

The good news is that, given unusually low river flows into the Bay this spring, the conditions are right for widgeon grass to thrive this summer, biologists say.

But how long those beds persist is anyone's guess. ■

MD investigating 'forever chemicals' near industrial plant

Company is monitoring groundwater, offering bottled water to some Cecil County residents

By Timothy B. Wheeler

Norma Calabro has lived on a woody 10-acre tract north of Elkton, MD, since 1987, and until recently she thought it was sylvan splendor.

Earlier this year, though, she got a flyer in her mailbox inviting her to a meeting at a neighborhood school. There, she learned about a lawsuit alleging wells in the vicinity are contaminated with toxic chemicals from a plant owned by W. L. Gore & Associates, a multinational company best known for making Gore-Tex, a breathable waterproof fabric used in outerwear.

Calabro had her well tested and found out that the water contained PFAS, or per- and polyfluoroalkyl substances, commonly called "forever chemicals."

"I moved here thinking it was bucolic and clean," Calabro said. She's seen frogs swimming in the water in her springhouse and assumed that meant it was pure, because amphibians are sensitive to chemicals. Now, she's agonizing about what she can do to get rid of the contaminants and wondering if they could have had anything to do with her husband's death from bladder cancer 21 years ago.

She said she's also joining the lawsuit filed against Gore, which is based in Newark, DE, and has several manufacturing facilities in Cecil County. Its Cherry Hill plant is about a mile from Calabro's property.

Calabro said her water test detected four PFAS compounds, including three that the U.S. Environmental Protection Agency proposed earlier this year to limit in community drinking water systems. At least one of those compounds, perfluorooctanoic acid or PFOA, was once used by Gore.

A company spokesperson said Gore used PFOA to aid in the processing of another synthetic compound it uses in tapes and membranes. In response to growing concerns about PFOA, the company announced in 2014 that it had stopped using it and switched to "more environmentally friendly alternatives."

Studies have linked long-term exposure to PFOA and some other PFAS compounds with serious health problems, including cancer and reproductive and immune system damage. They are known to persist in groundwater for years, even decades, and some can accumulate in fish, animals and people.



Norma Calabro of Elkton, MD, learned that her residential well, which is located in this springhouse, is contaminated with PFAS or "forever chemicals." (Dave Harp)

"Gore knew of the environmental risks and health hazards associated with PFAS," said Chase Brockstedt, a lawyer with one of the firms that has filed a pair of PFAS-related lawsuits against Gore. "They had a duty to take all reasonable measures to control PFAS pollution." Instead, he contended, the company "put profits ahead of the health, safety and wellness of the area's citizens, as well as the environment."

None of the levels measured in Calabro's water exceeded the EPA's proposed safe drinking water limits. But the lawsuit filed in February alleges that well tests at three other nearby households detected PFOA at concentrations well above the proposed limit of 4 parts per trillion. Two wells across from the Gore facility on MD Route 213 had about 600 and 700 parts per trillion, respectively, according to the suit. The third, a little more than 2 miles away, had 10 ppt. Tests of a small creek across the road from the Gore plant also detected 770 ppt of PFOA, according to the lawsuit.

Prompted by such findings, the Maryland Department of the Environment has

launched an investigation. MDE has tested 50 private wells within a mile of the Gore facility, said spokesman Jay Apperson, who called it a "known source" of PFAS. The well test results were "highly variable," Apperson said, but 80% of them had PFAS levels above one or more of the EPA-proposed regulatory limits for community drinking water systems.

"As a committed member of this community, Gore has taken proactive and comprehensive steps to gain a deeper understanding of the situation," a company spokesperson said in a statement. "We understand and appreciate the trust the community has placed in us, and we will continue to work collaboratively with the Maryland Department of the Environment as we move forward."

The Elkton community is among the latest of dozens across the Chesapeake Bay watershed to learn that its public water systems or private wells have been contaminated with PFAS. The chemicals have been found in the drinking water or groundwater of nearly 2,800 communities

nationwide, according to the Environmental Working Group. Many of those, especially in the Bay region, are near military bases, airports or firefighting facilities where PFAS-laden firefighting foam was deployed or stored.

MDE also has tried to identify and check for issues around industrial users of PFAS, including Gore's plants in Cecil County. In 2019, a state contractor sampled sediment and water in Little Elk Creek, which flows past the Cherry Hill plant. No PFAS were detected in the sediment and "very low" levels were found in the water, which an MDE spokesperson said "did not reveal any obvious relationship to the W. L. Gore site."

MDE also planned to sample groundwater around the Cherry Hill plant, the spokesperson said, but gave up because at the time it could not get enough property owners to permit groundwater monitoring wells on their land.

Now, as part of the state-ordered investigation, Gore is drilling monitoring wells on its 20-acre Cherry Hill site, according to Apperson. The company also is sampling private wells around its facility in Fair Hill, a few miles north of the Cherry Hill plant. MDE has not received any results of that sampling, he added.

Residents across the road from the Cherry Hill plant whom Gore contacted about well testing have been offered free bottled water, a company spokesperson said, and Gore has offered to pay to connect "a limited number" of households directly across the street to a private water utility in the area. MDE's Apperson said the state agency also recommended that residents consider installing home filtration systems if they continue to use wells with PFAS in them.

Calabro said she's unsure what to do. She's gotten estimates for installing home water treatment systems that range from \$4,000 to \$10,000, and she said she's not clear just how effective they'd be.

"Some people have gone to getting bottled water," she said, but she objects to the plastic waste involved. And the idea of having to import water "grates on me."

"Now I feel like I'm being pushed, pressured into buying my water from a water company," she added. "I'm not that confident their water is any better." ■

Debate resumes on Conowingo Dam pollution problems

Federal court decision leads MD to reconsider 2018 cleanup order to Constellation Energy

By Timothy B. Wheeler

The long-running and litigious debate over Conowingo Dam's impact on the Chesapeake Bay has resumed, with all sides still entrenched, at least for now.

Six months after a federal appeals court vacated Constellation Energy Corp.'s license to generate hydropower at the dam on the lower Susquehanna River, the Maryland Department of the Environment has called a parley with representatives of the company and the environmental groups that successfully challenged the license. The initial meeting of the parties took place June 21.

At issue is what the state will require of Constellation to reduce nutrient and sediment pollution flowing downriver through the dam to the Bay. In a letter inviting lawyers for the other two parties to meet, MDE officials said they were going to resume reconsideration of a tough water quality certificate, or permit, for the dam that it had issued in 2018, triggering a legal donnybrook in which both the company and environmental groups filed lawsuits.

"We're not sure how this is going to go for all of us," said Betsy Nicholas, a consultant to Waterkeepers Chesapeake, a coalition of 17 riverkeepers around the Bay watershed which, along with the Lower Susquehanna Riverkeeper, had sued. MDE has never dealt with a situation like this before, she said.

Completed in 1928, the 94-foot-high dam straddles the Susquehanna about 10 miles upriver from the Bay. Until about a decade ago, it captured a portion of the nutrients and sediments washing down the river.

Now, its 14-mile reservoir is mostly filled, and those pollutants from farm runoff, municipal wastewater and storm-water flow through Conowingo and into the Chesapeake, where they contribute to algae blooms and other water quality woes. Storms or heavy rains also flush a surge of pollution, trash and debris from behind the dam into the Bay.

Five years ago, after years of studies, MDE had ordered the company, as a condition to keep operating the dam, to either deal with that untrapped pollution or pay the state \$172 million a year to have it done. The federal Clean Water Act effectively gives states veto power over federal licenses or permits for facilities, like the dam, that may affect states' waters.



The 94-foot high Conowingo Dam straddles the Susquehanna River about 10 miles upriver from the Chesapeake Bay. (Dave Harp)

But Constellation, then a part of Exelon Corp., sued MDE in response, contending that Maryland was placing an "unfair burden" on the company to address pollution its dam did not generate.

In 2019, MDE and the company reached an out-of-court settlement, under which it agreed to provide more than \$200 million to rebuild eel, mussel and migratory fish populations in the river. It also offered to help address nutrient and sediment pollution flowing into the Bay, though much less than what the state had initially required. In turn, the state waived its right to impose its previous conditions on the dam's operating license.

Environmental groups and others objected to the deal. But the Federal Energy Regulatory Commission, which regulates hydropower facilities, issued a new license for Conowingo with no other conditions. The waterkeepers groups then sued, and in December 2022, the U.S. Court of Appeals for the District of Columbia ruled that the commission should not have accepted the deal and vacated Constellation's license to run the dam. The court said Maryland could either stick with its original certification or toss it and have the company apply for a new one.

After first engaging in private talks with

Constellation, MDE wrote the company and environmental groups on June 1, inviting them to present any new or previously overlooked information they believe is relevant to assessing the dam's impact on water quality downriver and in the Bay.

MDE is also inviting public feedback on the issue, with Aug. 1 set as the deadline for all comments and new information.

"Ensuring a revitalized Chesapeake Bay for the benefit of all Marylanders is a top priority," said MDE Secretary Serena McIlwain in a statement issued by the department. "As we move ahead with the reconsideration of the 2018 Water Quality Certification, we will be transparent, we will welcome input and we will work collegially with all parties for a healthier and more vibrant Bay."

Environmentalists want MDE to stick to its original requirements.

"We're hoping that they see at the end of the day that they made the correct choices in 2018," said Lower Susquehanna Riverkeeper Ted Evgeniadis. MDE "provided a water quality certificate that was adequate to protect water quality," he said, "and we hope they uphold that ... without any changes."

A Constellation spokesman indicated the company wants MDE to honor the later deal they negotiated.

"While we believe another round of comments is an unnecessary step," spokesman Bill Gibbons said in an email, "Constellation will participate in the re-opened reconsideration process to support the long-term future of the state's largest source of renewable energy and to demonstrate that our settlement agreement with Maryland offers the best possible outcome for the state and the Bay."

Gibbons urged MDE to "come to a speedy conclusion" so the company could carry out the cleanup measures it agreed to in the deal, which it values at \$700 million. Meanwhile, Constellation continues to generate power under a temporary extension of its expired license.

But MDE's review may just be the opening round in another legal bout that could take several more years to conclude. Nicholas, the waterkeepers consultant, said if MDE sticks by its earlier requirements or substantially reduces them, one side or the other is sure to demand a "contested case hearing." That is a trial-like process at which all sides can present evidence and testimony and cross-examine witnesses.

And if anyone disagrees with the outcome of that hearing, they can then file a lawsuit in state court, with appeals possible all the way to Maryland's Supreme Court.

Nicholas and Evgeniadis say that while they want to see MDE uphold the water quality goals it originally set, they hope an acceptable compromise can be negotiated among all parties, one that deals with the pollution while perhaps adjusting Constellation's financial burden.

One possible framework for a new deal is a plan Bay watershed states developed in 2021 for dealing with the pollution impacts of the dam. It calls for reducing the annual downriver flow of nitrogen by 6 million pounds and phosphorus by 260,000 pounds. The estimated price tag: \$53 million, only part of which the states have pledged so far to cover.

Alison Prost, the Chesapeake Bay Foundation's vice president for environmental protection and restoration, said she believes Constellation has a role to play in addressing that pollution.

"I don't believe they should take up the entire burden, Prost said. But, she added, "this is an opportunity to bring them into the fold." ■



EPA launches more-collaborative assessments of PA farms

Learning from past missteps, agency hopes to 'flip the script'

By Karl Blankenship

In a Pennsylvania county with 5,100 farms, the U.S. Environmental Protection Agency visited four this spring to assess any potential for water quality problems locally or for the Chesapeake Bay.

That may seem like a drop in the bucket. Nonetheless, work in Lancaster County constitutes something of a sea change in the agency's approach to addressing farm runoff.

While pledging to ramp up such oversight, the EPA is also working closely with the county conservation district, Farm Bureau and others to encourage farmers to adopt runoff control measures on their land.

"We think it's a good concept, but we want to really kick the tires and figure out what works," said Adam Ortiz, administrator of the EPA's Mid-Atlantic region, which covers most of the Bay watershed. He described the first farm assessments as "sort of a first testing phase."

More are likely. Last year, Ortiz said the agency would increase water-related compliance and inspection efforts in Pennsylvania because the state is far behind in its Bay cleanup efforts.

Photo: Pennsylvania has more than 38,000 farms in the Chesapeake Bay watershed. That is the most of any Bay state, including Maryland and Virginia. (Dave Harp)

And the EPA recently committed to making such farm assessments under the terms of a proposed settlement for a suit brought against it by environmental groups and other states that want the agency to pressure Pennsylvania to do more for the Bay cleanup.

Most states in the Chesapeake region will miss their 2025 goals for reducing nutrient pollution, which is the main cause of the Bay's water quality woes. The majority of it comes from excess manure and fertilizer on farmland. Pennsylvania is furthest behind, primarily because it has more farms in the Bay watershed than any other state — more than 38,000.

It's unlikely any state will meet its agricultural nutrient reduction goal anytime soon, which has proven far more difficult than once thought. Many believe it could take decades.

Those sentiments were echoed in a recent report from the Scientific and Technical Advisory Committee to the state-federal Chesapeake Bay Program. The report also cautioned that existing programs were insufficient to reach the goals.

But Ortiz said he hoped the new multi-pronged Pennsylvania Conservation Assessment Initiative, which combines increased federal oversight, greater outreach and record amounts of funding to help farmers put conservation practices on the ground, will help change the trajectory.

"Really, the key we have to unlock is widespread adoption of conservation practices on small- and medium-size farms," Ortiz said. "I think that this conservation assessment is a step in that direction."

Tough cleanup goals

Under a 2010 cleanup plan, formally known as the Bay's total maximum daily load, the EPA assigned all six states in the Chesapeake watershed, along with the District of Columbia, specific goals for reducing nitrogen and phosphorus, the two nutrients largely responsible for the Bay's poor water quality.

The hope was to have all necessary actions in place by 2025 to meet those goals.

Under the TMDL, Pennsylvania needed to reduce the amount of nitrogen it annually sends to the Bay from 113.2 million pounds to 73.5 million. That's a decrease of 39.7 million pounds and a greater reduction than any other state.

Through 2021, Pennsylvania had cut 8.7 million pounds, with just 2.1 million pounds credited to farms, according to computer models. About 93% of its remaining reductions needs to come from agriculture.

Most other Bay states have not fared much better in reining in agricultural runoff. In general, most of their nutrient reductions have come from upgrading wastewater treatment plants, and most of that work is complete. Fewer than 10% of Pennsylvania's nutrients come from wastewater treatment plants, and those have mostly been upgraded.

Reductions on farms hinge on the use of best management practices or BMPs. Those include things such as planting streamside buffers, adopting no-till farming, planting nutrient-absorbing cover crops, building manure storage facilities, and more than 100 other actions defined by the Bay Program.

Some BMPs, such as no-till, have been widely adopted because they reduce costs to farmers. But many provide little economic benefit, and others can cost money by reducing productivity or taking land out of production.

Government cost-share programs help fund BMPs, but they typically require investments from farmers. States have struggled to get the level of implementation necessary to meet goals, particularly on small- and medium-size operations that often operate on thin margins.

"Farmers are busy, especially small- and medium-size farms," Ortiz said. "They don't always have the capacity to take advantage of these conservation programs." The EPA's new mix of farm assessments and outreach aims to ensure farmers "have the support and guidance to help get practices on the ground that make a difference."

From leader to lagger

Pennsylvania was an early leader in nutrient control efforts. In 1993, it enacted the region's first law requiring its largest farms to have nutrient management plans to guide fertilizer and manure applications.

But that and other farm-related regulations were often unenforced. "For decades, basically, we just sort of ignored that they were there," said Matt Ehrhart, former executive director of the Chesapeake Bay Foundation's Pennsylvania Office and now director of watershed restoration with the Stroud Water Research Center. "So there was sort of a cultural lack of expectation of performance."

Budget cuts forced the state's Department of Environmental Protection to slash inspec-



Adam Ortiz (left), administrator of the EPA's mid-Atlantic region, joined a variety of conservation partners for an informational tour of Spring Meadow Farm in Peach Bottom, PA, on March 23, 2022. (Will Parson/Chesapeake Bay Program)

tion and enforcement staff. And while half of the state drains into the Chesapeake, most of its population lives elsewhere, with political power based outside of the Bay watershed in Pittsburgh and Philadelphia. The Bay was never a priority. "From a policy standpoint, that was a challenge nobody really had the horsepower to overcome," Ehrhart said.

Geography further complicates the picture. Most of Pennsylvania's portion of the Bay watershed is drained by the Susquehanna River. It's the Bay's largest tributary, and it's located near the head of the Bay, giving it a much larger impact on the oxygen-starved "dead zone" that plagues the upper Chesapeake each summer.

Pennsylvania, therefore, poses the perfect storm of problems. It contributes the most nutrients, which pound-for-pound have a greater impact on the dead zone than most other areas. The state doesn't border the Bay, and political power is concentrated outside its watershed. Its nutrients predominantly come from agriculture, a source that all Bay states struggle to control.

And in Lancaster County, the most intensive agricultural county in the Bay watershed, Plain Sect farmers — Amish and some Mennonites — run half of the operations. They are often reluctant to participate in government farm programs.

While Pennsylvania's job is hard, its outsized importance to Bay health, coupled with the state's lack of progress, has fueled frustration among others.

In 2020, the Chesapeake Bay Foundation, the states of Maryland, Virginia and Delaware, the District of Columbia and others filed suit against the EPA for not taking more aggressive action to force Pennsylvania to do more.

As part of a proposed settlement announced April 20, the EPA committed to increased oversight of discharge permits, stormwater runoff and farms. While the EPA had already pledged to do much of that, the agreement requires it to provide more public accountability about its actions.

"This settlement is about EPA having responsibility to take action to ensure that Pennsylvania ... does its part to reduce the pollution flowing into the Bay," said Maryland Attorney General Anthony Brown in a news conference announcing the proposed agreement.

Changing the narrative

The state's problems were apparent as far back as 2009 when the EPA made a series of unannounced inspections on mostly Amish farms in Lancaster County's Watson Run watershed.

Of 24 small farms inspected, 85% did not have the required erosion and sediment plans and manure management plans. The inspections revealed other problems as well.

But the tactics gave the agency a black eye in the farming community and garnered negative press. The inspections even made the *New York Times*, which quoted one farmer as saying — with an element of exaggeration — "they came in here with their guns ablazing and really tried to hammer some people hard."

When the EPA imposed the TMDL the following year, relations with the farm community — which would bear the greatest brunt of the nutrient reduction effort — were further strained.

In its comments on the TMDL, the Pennsylvania Farm Bureau charged the EPA with acting in an "authoritarian manner"



Plain Sect farmers gather for a demonstration on a farm in Lancaster County, PA, to learn about stream restoration opportunities. (Lancaster Clean Water Partners)

and had made little effort to engage farmers. It unsuccessfully sued the EPA.

Now, though, the EPA and Farm Bureau see opportunities to work together.

They successfully partnered to get the state General Assembly to establish an Agriculture Conservation Assistance Program, which provides \$154 million over four years to help farmers statewide implement runoff control practices.

The funding, from unspent state COVID relief money, is the first significant funding by the state for agricultural cost-share programs.

The Farm Bureau also helped spread the word about the recent assessments. While the organization has long had concerns about regulations, it has recently stressed the importance of complying with water quality rules and the need to address "bad actors" whose lack of attention to environmental quality harms all farmers."

The EPA is also increasing outreach through a variety of informal networks, including Amish leadership. "It requires a lot of different strategies," Ortiz said.

With its new approach, Chris Thompson, director of the Lancaster County Conservation District, said the EPA seems to have learned from its missteps.

Now, Thompson said, agency inspectors are still looking for problems but putting more emphasis on helping to solve them.

"It's not been, 'we're going to penalize you for not doing it,'" Thompson said. "It's 'let's work together to get it fixed.' That's definitely a different message."

The four spring inspections were on Plain Sect farms. Instead of showing up without

warning, the EPA notified farmers in advance. Conservation district staff arrived early to explain to the farmer what the inspection is about, Thompson said, and to act as a "translator" between the EPA and the farmer.

EPA officials checked to see if the farmers had state-required conservation plans and were implementing them. They also collected water samples from adjacent streams.

District staff informed the farmers of programs and funding sources that could help resolve problems.

"We're proving that we can get it done," Thompson said. "It's going to just take time."

Other action possible

Ultimately, if the EPA isn't convinced that significant progress is likely, it could take further action. The EPA's Clean Water Act authority over farms is generally limited to large, concentrated animal feeding operations or CAFOs. But the agency can bring smaller animal operations under its regulatory oversight if it deems they are leading to water quality impairments.

That's something some environmental organizations say would prod more progress. The Annapolis-based Chesapeake Legal Alliance said that such actions "could constitute important backstop action of the sort that the EPA should have employed many years ago" and "should most certainly be exercising going forward."

Ortiz said that authority "is a tool that we have." But he added that designating a smaller farm as a CAFO is "a complicated and long-term process."

But, he said, "if we can work with a farmer to voluntarily adopt conservation practices and we can ensure that farm is compliant, that's a quicker path to the same destination, which is conservation practices on the ground."

The EPA is expected to complete a report summarizing what it learned from the four assessments later this summer.

Still, no one is under any illusion that Pennsylvania's goal will be achieved in the foreseeable future. No plan exists that would fully achieve its goal, and it is unclear whether that could be done without closing large numbers of farms.

The state also has an estimated \$325 million annual funding shortfall in what is needed to meet nutrient reduction goals from agriculture and other sources, much more than what's currently available.

Ortiz, though, said the ramped-up oversight, funding and engagement could help "flip the script" in Pennsylvania and accelerate progress.

But, he added, "this stuff is tough." ■

Shining 'daylight' on the Chesapeake Bay's lost streams

Bringing buried waterways to the surface has potential to reduce nutrient pollution downstream

By Jeremy Cox

Hiking recently through one of the last large, wooded tracts inside Washington, DC, Josh Burch halted at a jarring sight: a concrete culvert herding a steady cascade of water into a narrow creek.

Engineers probably entombed the unnamed waterway in a pipe several decades ago, Burch suspects, when the property was sculpted into a golf course. But with the course long shuttered and converted into a public park, he said, the pipe no longer makes sense.

"The stream is right here," said Burch, an environmental protection specialist with the District's Department of Energy and Environment. "All we have to do is set it free."

The district's plan at Fort Dupont Park, an oasis of green just east of the Anacostia River, involves exhuming the buried stream and bringing it back to the surface. Planners hope that unearthing the creek will improve the natural filtration of pollutants within its drainage area, reduce flooding and create badly needed habitat for aquatic creatures.

Across the Chesapeake Bay watershed, untold miles of headwater streams have disappeared from sight. In most cases, developers and urban planners in the 1800s and the first half of the 1900s forced their flows underground. Where lands were once laced with marsh-fringed waterways, they now conceal an underground network of pipes.

Most stream restoration experts say that "daylighting" a waterway like the one proposed in DC is the near-ideal remedy for bringing a buried stream back to life. But a series of constraints, ranging from conflicting regulations to fears of public backlash, have frustrated efforts to put it into practice beyond a handful of sites in the Chesapeake watershed.

"There's a part of me that wants to say every stream that is piped should be daylighted," said Adam Nabors, project manager with Environmental Quality Resources LLC in Millersville, MD, and president of the Maryland Stream Restoration Association. But "there are compromises we make and that planners make regarding the value of natural resources versus the needs of the community."

Converting dry land back into streams and marshes often would be highly disruptive to the urban landscape, said Joe Arrowsmith, deputy director of water



Josh Burch, an environmental protection specialist with the District of Columbia's Department of Energy and Environment, inspects a section of pipe that carries a buried stream through Fort Dupont Park, just east of the Anacostia River. The stream is slated to be "daylighted," or brought to the surface, to restore its ecosystem functions to the landscape. (Dave Harp)

resources engineering for Straughan Environmental, based in Columbia, MD.

"It's not as easy as breaking the pipe, spilling it out and seeing what happens," Arrowsmith said. "We have to make sure we're not impacting people's lives and property."



This large pipe carries a portion of Foundry Branch through the District of Columbia. (Straughan Environmental)

The creation of pollution highways

Humans have been burying streams around the world for thousands of years, Arrowsmith said. Such projects were critical for creating enough dry land for large populations to crowd together in large cities.

Before they were paved over, small streams were natural pollution fighters, experts say. Their marshy shorelines and meandering courses helped slow the rush of stormwater, trapping much of the nutrient and sediment pollution before it could flow into downstream water bodies.

And the Chesapeake Bay was almost certainly cleaner for it, they say.

By design, the pipes moved stormwater faster than it normally would have traveled at the surface. By accident, the pollution within that water moved faster as well, often straight into the Bay and its web of major rivers.

Excess sediment smothers oyster reefs and keeps sunlight from reaching underwater grass meadows. Nutrients, meanwhile, cause algae blooms to flare, sometimes triggering fish kills. When the algae die, it triggers a chemical reaction that soaks up most of the water's dissolved oxygen. Nearly all life flees or expires, inspiring the phenomenon's ghastly name: "dead zones."

Then came another problem. Beginning in the late 1800s, Arrowsmith said, many burgeoning cities around the Bay — and elsewhere in the United States — were forced to reckon with an escalating public health crisis: the human and animal waste piling up in their streets and gutters. Waterborne diseases were running rampant.

So, local authorities turned to their fledgling subterranean drainage systems. The stormwater flowing through those pipes, they reasoned, could be harnessed to carry sewage away from where people lived. Simply pair the sewage pipes with the stormwater pipes and — *voilà!* — goodbye waste problem.

The pipes greatly reduced human suffering. But downstream from the pipes, streams and rivers became open sewers. The tsunami of urban pollution contributed to the Chesapeake Bay's ecological tailspin.

"It seems so obvious now that these resources are precious, but we had different challenges then," Arrowsmith said. "We were worried about the health of people, and we didn't have the information that we do now."

But related problems persist. Many cities in the Bay region continue to employ underground systems that carry both sewage and stormwater in one piping system. Heavy rains can overwhelm the system and cause it to overflow, discharging raw sewage into nearby waters. DC, Baltimore, Harrisburg,

Richmond and other cities continue to pour millions of dollars into efforts to control combined sewer overflows.

A solution emerges

Amid such headaches, some localities have tried to reverse course. The first documented “daylighting” project was performed on California’s Napa Creek in the 1970s, said Luna Khirfan, a researcher at the University of Waterloo in Canada who has examined the history of the practice.

Adoption remained slow over the next few decades. But it began to catch on in the 2000s after a handful of large-scale projects gained public attention, most notably (in part, because of its eye-popping \$384 million price tag) the 2005 restoration of the Cheonggyecheon stream in Seoul, South Korea.

Some of the most prominent examples in the Bay watershed include a 1,500-foot section of Broad Branch in 2014 in DC, a 250-foot pipe at Ray’s Meadow Local Park in 2019 in Chevy Chase, MD, and about 800 feet of pipe at the Eisenhower Golf Course in 2021 in Crownsville, MD.

Despite a regionwide mandate to reduce stormwater pollution to help clean up the Chesapeake Bay, daylighting has remained mostly on the sidelines, according to interviews with several stream restoration contractors and experts.

One reason is that the projects are inherently “messier” than other stream restoration efforts, said Erik Michelsen, head of the watershed restoration program in Anne Arundel County, MD. After all, it involves re-wetting dry land, posing an at-least theoretical risk to flooding neighboring properties at some point.

But daylighting faces a thornier problem, he said. Each Bay state administers stormwater permits, which require that most urbanized cities and counties take steps toward reducing pollutants, such as nutrients and sediment. But the scoring system used to determine a project’s worth, at least when it comes to meeting Bay pollution reduction goals, is stacked against daylighting, Michelsen said.

The reasoning? A stream with eroding banks is clearly fouling downstream waters with silt, so fixing that stream gets more pollution reduction credit. But an existing metal or concrete pipe has no such obvious problems, as far as the current system is concerned.

“Daylighting projects tend to be less generously credited than dealing with a site that is actively eroding,” Michelsen said. “If a [daylighting] project is going to cost just as much as a [streambank] stabilization



This painting by DeLancey Gill depicts the headwaters of James Creek with the U.S. Capitol in the background. By 1815, the upper creek became part of a canal, which was then covered or filled. Its lower reach was also subsumed by a canal then buried in 1916–17. (Smithsonian American Art Museum)

project but is worth half the amount of credits, that may be a driving force that determines whether a project moves forward.”

The Chesapeake Bay Program’s Urban Stormwater Workgroup, a panel of experts that helps set the parameters for the permitting process in the region, does not give daylighting projects pollution reduction credits toward meeting Bay goals, said David Wood, executive director of the nonprofit Chesapeake Stormwater Network and the workgroup’s coordinator.

The main hurdle is that the practice is still so new that there remains scant scientific evidence to back up the environmental benefits of releasing a stream from its pipes and returning it to a more natural channel, Wood said. More research also needs to be done to nail down where the sediment originates in storm sewer lines, which could help build the case against piped systems and help encourage daylighting.

Science is beginning to catch up. For example, a 2015 study led by the U.S. Environmental Protection Agency compared the nutrient-filtering capabilities of piped streams and their open-air counterparts in a total of six waterways in Baltimore and Cincinnati. It showed that nitrogen, the major form of nutrients plaguing the Bay, traveled an average of 18 times farther inside pipes than in open streams, raising the likelihood of pollution escaping into waters like the Chesapeake.

“It’s the source of many of our water-quality issues,” said Sujay Kaushal, a University of Maryland hydrologist and one of the study’s authors. “Stream burial is probably the most severe in terms of stream degradation because you’re putting it underground and you’re also putting it in a channel.”



A broken pipe rests at the lower end of a buried stream in DC’s Fort Dupont Park. (Dave Harp)

The lack of daylight inside pipes blocks the growth of algae. In open environments, the tiny organisms help remove nitrogen while in its nitrate form, Kaushal said. The channelization disconnects the stream from its historic floodplain, where slower flows and interactions with organic material would further serve to halt nitrogen.

A capital effort

Buried streams are more than a historical curiosity. They can be a hazard, too.

DC officials learned that lesson the hard way a few years ago after an aging stormwater pipe collapsed in the Northwest section of the city, unearthing a sinkhole on private property. An investigation showed that the pipe was actually carrying the remnants of a stream that had been filled in during the neighborhood’s construction, Burch said.

The incident drove the government to undertake an ambitious project to map the extent of its underground waterway

network. It wouldn’t be easy. In most cases, private developers had interred the waterways in the days before stormwater permits would have left a paper trail for researchers to follow. Officials decided early on that it would be too expensive to dispatch inspectors to physically survey every corner of the nearly 70-square-mile jurisdiction.

In early 2020, the District hired Arrowsmith and his firm for the project. The effort relied largely on historic maps that depicted where the waterways had once been and modern records showing the current extent of the city’s underground pipe network. Newspaper accounts and old images, ranging from oil paintings to black-and-white photographs, helped fill in the details.

The analysis found that about 70% of the original stream network has vanished from sight. The findings mirrored what Kaushal and another colleague reported in a 2008 paper about Baltimore. There, the burial rate was 66%.

DC’s landscape was never the same, Burch said. Most streams were either filled in or corralled into pipes; others simply dried up from the lack of rain infiltration onto lands now slathered with hard, impenetrable surfaces, such as rooftops and asphalt.

The earliest map used in the project, drawn in 1792, portrays a DC very different from that of today, Arrowsmith said. At that time, when the city’s development was still in its infancy, the landscape was what he called “a mosaic of marsh and upland forest.”

The poster child for Washington’s lost rivers may be Tiber Creek, said David Ramos, a graphic design professor at DC’s American University who collaborated on the mapping project.

The Tiber, originally known as Goose Creek, was once formidable enough to show up on maps. It was the second-largest stream in the district after Rock Creek, measuring 200 yards in width at its intersection with the Potomac River near where the Washington Monument stands.

A public works scheme in the early 1800s lassoed the creek into a straight canal, freeing up dry land for the National Mall but also creating a fetid, exposed sewer. Eventually, the city’s post-Civil War urbanization forced virtually its entire length into underground pipes. Today, there’s little evidence that Tiber Creek ever existed, Ramos said.

A subtle dip in the terrain, an unusual arrangement of manhole covers – these are the few reminders of the Tiber’s former course, he pointed out.

STREAMS, continued on page 22



Josh Burch of the District of Columbia's Department of Energy and Environment stands atop the bank of a deeply incised section of a stream in Fort Dupont Park. Most of the stream is diverted into an underground pipe, but plans are underway to unearth the stream and restore its ecosystem. (Dave Harp)

STREAMS, continued from page 21

“There’s really nothing concrete to see except the highest reach of the stream. It’s an exercise of suspending your disbelief for a moment and looking for tiny little clues,” he said.

The districtwide search for lost streams culminated in 2021 with the debut of an interactive online map. Burch said that he hopes it offers residents and property owners a window into the past to help shed light on present-day stormwater issues.

The mapping effort also might pave the way toward a future with more visible streams. As part of the project, the expert team recommended locations where long-lost waterways could be daylighted. Four were selected for initial designing: a 900-foot storm pipe beneath the Langston Golf Course, a 1,300-foot storm sewer under Anacostia Park, 360 feet of an outfall pipe at Glover Archbold Park, and a stretch of the former Tiber Creek near its headwaters on the Old Soldiers’ Home property.

Burch said that, for now, there are no plans to carry those daylighting proposals any further. The design work was only intended to demonstrate the realm of possibility.

Grappling with loss

The Fort Dupont Park project could provide a roadmap for future daylighting efforts across the city, Burch said.

The proposal faces fewer financial and regulatory hurdles because nearly all of the land involved is already owned by the

public, he said. Fort Dupont is part of the National Park Service’s lands around the capital. Reintroducing water at ground level won’t imperil any buildings or public infrastructure.

The project will dig up a roughly 450-foot-long section of stormwater pipe. That excavation will require felling a relatively small number of trees, Burch noted. But much of that portion of the forest canopy remains open from its days as a golf fairway. Plus, many of the trees that have sprouted along the pipe’s path are invasives that should be removed anyway, he added.

Work is expected to begin in early 2024, Burch said. It is part of a larger project that aims to restore about 18,000 linear feet of small waterways in the park, including Fort Dupont Creek. The effort is one of the centerpieces of the District’s Anacostia River Watershed Implementation Plan.

During Burch’s visit to the shade-dappled site in early June, the weather had been abnormally dry. Clear water flowed out of the culvert.

But nature has a long memory. Heavy rainfall still manages to collect along the fissure in the terrain above the pipe’s length, Burch said.

“Water consistently does one thing,” he said, trudging his way through waist-high brush. “It flows downhill.”

Daylighting projects can have a host of localized benefits, Kaushal said. But the urban headwaters around the Bay lost to burial are likely too widespread for such efforts to make much of a dent in improving the Chesapeake’s water quality, he added.

“They’re so ubiquitous that you don’t think about them,” he said during an interview on his cellphone. “I’m walking Rock Creek right now with my dog. They’re just everywhere.” ■



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Eat more blue catfish, MD says, unless they're contaminated

State updating fish consumption advisories for invasive species

By Timothy B. Wheeler

Maryland wants people to eat more blue catfish to keep the invasive species from gobbling up the Chesapeake Bay's prized blue crabs and striped bass.

But there's just one catch: Blue catfish are predators, and they can pick up toxic contaminants from their prey. So, a regular diet of tainted fish could increase a person's long-term health risks.

The Maryland Department of the Environment recommends that people avoid eating any blue catfish caught recreationally in the Anacostia River near the District of Columbia. They have been found to harbor unsafe levels of polychlorinated biphenyls, or PCBs, a group of once widely used chemicals that has been banned since 1979 because of their toxicity.

For the same reason, MDE recommends limiting meals of blue catfish caught in the Potomac River from the District of Columbia line all the way downriver to the Bay, and from the Middle River near Baltimore. Since bigger blue catfish tend to pick up more contaminants, MDE suggests not eating any lunkers longer than 30 inches from the Potomac.

Because children 6 years old and younger are more vulnerable than adults to contaminants, MDE also urges limiting their meals of blue catfish from those rivers, as well as from the Choptank, Nanticoke, Patuxent and Wicomico.

There are similar consumption advisories for recreationally caught blue catfish in some Virginia rivers, and the District of Columbia urges limiting consumption of any fish, not just blue catfish, caught in its portions of the Anacostia and Potomac.

While meant to protect public health, such varied warnings can seem confusing, and they complicate Maryland's decade-long efforts to promote the harvest and consumption of invasive fish.

Native to the Mississippi River, blue catfish were introduced in a few Virginia rivers in the 1970s but have since spread throughout the Bay watershed. In some rivers, they have become the dominant fish, raising concerns about their impact on crabs and other commercially valuable native fish.



Biologist Joe Love (left) and Eastern regional freshwater fisheries manager Bret Coakley, both with the Maryland Department of Natural Resources, handle a large blue catfish caught by electro fishing in Marshyhope Creek. (Dave Harp)

In March, Maryland Gov. Wes Moore asked for federal assistance to cope with what he characterized as a fisheries disaster in the state tied to the proliferation of blue catfish and other invasive fish.

To support the state's campaign to boost

public appetites for blue catfish, MDE is undertaking another round of testing this year for contaminants in the fish to update and broaden its advice.

With help from the Maryland Department of Natural Resources, MDE plans to

analyze 20 fresh blue catfish samples from tidal and nontidal waters of the Chester, Nanticoke, Patuxent and Susquehanna rivers, according to spokesman Jay Apperson. MDE is also taking a fresh look at contaminants in two other invasive species, flathead catfish and Northern snakeheads.

In big blue catfish collected earlier this year by DNR, the department is looking for PCBs and mercury, the two contaminants responsible for most fish consumption advisories throughout the Bay watershed. The results of that analysis will be used to update advisories and possibly provide new ones for additional waterways, Apperson said.

Because PCBs tend to accumulate in fatty tissue, MDE recommends removing the dark meat while filleting blue catfish prior to cooking. Studies indicate that can reduce the contaminants consumed by up to 80%, the agency said.

MDE also has analyzed some blue catfish caught earlier for the contaminants known as PFAS, or per- and polyfluoroalkyl substances, sometimes called "forever chemicals."

The agency issued a consumption advisory in 2021 for a few species of freshwater fish from Piscataway Creek in Prince George's County where PFAS contamination had been detected. But Apperson said MDE officials have made no decision at this time to issue new or amended advisories for blue catfish as a result of PFAS. ■



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Dammed-up soil could help heal abandoned mine land

PA project aims to restore streams, reduce pollution by removing and reusing trapped sediment

By Ad Crable

Fertile sediment bottled up behind old mill dams in Pennsylvania is a relentless source of nutrient and sediment pollution in local waterways that flow toward the Chesapeake Bay. But it could become a prime ingredient in restoring another scourge in the state: abandoned mine land.

Documented as a sediment and nutrient pollution problem for the Bay about 15 years ago, legacy sediment is topsoil that ran off the land long ago from farm fields and logging areas throughout the Bay region and piled up behind mill dams, many of which date back to colonial times.

As the dams have been torn down or abandoned, the now-elevated streams seek their original course, cutting through the soft earth that buried them and sending the soil and attached nutrients into the water. Also, the gantlet of mill ponds buried and altered healthy stream channels that once were a braid of connected streams with floodplains buffering nearby land from rising water.

In Pennsylvania, the 126-square-mile Chiques Creek watershed is one of the largest sediment and nutrient polluters in Lancaster County, itself one of the Bay's top sources of such pollutants with one of the highest concentrations of easily erodible legacy sediment. More than 400 old mill dams have been mapped in Lancaster County alone.

Primarily surrounded by farmland and urban development with scant forest cover, the Chiques watershed has 48 dam sites that have been identified through satellite imagery.

All but nine of the dams are gone, resulting in slow but persistent pollution from the easily erodible soil in the former mill ponds. About 70 million pounds of sediment from banks up to 8 feet high erode each year, washing toward the Susquehanna River and on to the Bay, according to the Susquehanna River Basin Commission.

Sediment makes the water murky, smothering fish habitat and blocking sunlight for underwater grasses. It also carries nutrients, which contribute to harmful algae blooms and the Bay's oxygen-starved "dead zone."

Partners in the Chiques Creek Legacy Sediment Removal Project would like to turn that problem into a solution. If the project secures enough funding, as much as 283,000 cubic yards of legacy sediment stranded on streamside terraces would be dug



The remains of a mill pond on Chiques Creek in Lancaster County, PA, have filled over time with water and vegetation. Shown at the site are Joe Sweeney (rear) of the Water Science Institute, Matt Koffroth of the Lancaster County Conservation District and Heather Smeltz of the Natural Resources Conservation Service. (Ad Crable)

up at 10 sites. The nutrient-rich soil would be trucked or taken by train to spread on abandoned mine land, where vegetation struggles to grow in acidic conditions. If applied to a depth of 6 inches, there would be enough legacy sediment to treat about 350 acres of mine land.

With an estimated price tag of about \$10 million, the project is being assembled by the U.S. Department of Agriculture's Natural Resources Conservation Service, the nonprofit Water Science Institute, and the Lancaster County commissioners and soil conservation district. NRCS has already provided \$800,000 from its small watershed improvement program to study the idea's potential.

"I personally feel we will never solve the nitrogen and phosphorus and sediment

problem unless we address some of these legacy sediments," said Denise Coleman, the NRCS state conservationist in Pennsylvania. "A lot of the farmers today are doing all the right things as a farming community, but we still have huge amounts of sediment loading.... We're testing this [approach] because we have this problem all up and down the Mid-Atlantic and the Chesapeake Bay."

The proposed project could cut the annual 70-million-pound sediment loading in half. In addition, the watershed, with its 200 miles of streams, has long been flood prone. Restoring floodplains and long-buried wetlands could reduce flood threats considerably, according to the Water Science Institute.

Habitat in and along the streams could benefit, too. Cooler water often results after

legacy sediment is removed, improving fish habitat. And scientists have found that, in many cases, long-buried native seeds sprout again. "If done correctly, these things bounce back with new growth like Chia Pets, with benefits for wildlife habitat," said Joe Sweeney, executive director of the Water Science Institute.

The partners have spent two years documenting the problem and planning creative solutions. The full-scale project would evaluate the impacts for the creek, its tributaries and the mine land. Officials say the costs of transporting the soil to mine sites would be weighed against the environmental benefits to determine if the strategy makes economic sense.

By far, transportation costs are the biggest barrier. "If we can find someone who wants that legacy sediment, it really lowers that cost and it's not just a waste product," Sweeney said.

Project leaders are encouraged by the increased funding available in the NRCS small watershed improvement program. Plus, there is huge pot of money coming to Pennsylvania for abandoned mine land cleanup under the federal Infrastructure Investment and Jobs Act. The legislation authorized \$6.4 billion for such purposes in Pennsylvania, Maryland, Virginia and West Virginia.

"We are very, very, very interested in supporting dredge or legacy sediments to mine lands," said John Dawes, executive director of the Foundation for Pennsylvania Watersheds, a group that works on improving mine lands and treating acid mine drainage.

"There are 119,000 acres of scarred mine lands in the Pennsylvania portion of the Bay watershed. They're like moonscapes. They produce acid mine drainage every time it rains, and they kill 2,000 miles of streams.

"The highest and best use of those lands would be reforestation. But I'm an agriculturist. So to put that back into grazing land or usable farmland would be just fantastic also," he said.

Coleman of the NRCS said that although reclaiming abandoned mine land would be a priority, project managers would consider other uses of the sediment, such as repairing industrial brownfields, improving fertility of farm fields, capping landfills or selling it as a soil additive, possibly with biochar added to increase carbon sequestration. With a high content in silica, the material might even be used for making cement. ■



Water flows over an old mill dam on Chiques Creek in Lancaster County, PA. (Ad Crable)

Researchers peg food shortage for Mobjack Bay osprey woes

Decline in hatchling rate could be linked to menhaden

By Whitney Pipkin

On busy city bridges and along shorelines throughout the Chesapeake Bay region, osprey appear to be fish-feasting, breeding and thriving all summer. But researchers that track dense concentrations of the iconic raptors in Virginia's Mobjack Bay say the birds' nests in that location are beginning to tell a different story.

In "the good days" a few years ago, each of the 83 active osprey nests monitored in Mobjack Bay might have had one hatched egg by late spring, said Michael Academia, a researcher with the Center for Conservation Biology at the College of William & Mary in Virginia. But recently, the nests have produced a total of just 10–15 hatchlings per year. And, during a check this June, there appeared to be only three young ospreys in all of the nests combined.

"Something's not adding up," he said.

In a paper published in the *Frontiers of Marine Science* in April, Academia contends that the cause of these dips in nest numbers is a shortage of food — namely, Atlantic menhaden. The center has been tracking the health of local osprey populations since the 1970s and sees "an inextricable link" between the birds and the nutrient-rich fish that travel in schools near the water's surface in the ocean and estuaries.

A study in the mid-1980s first identified that menhaden often make up nearly 75% of an osprey's diet. A 2009 study showed that is still the case the closer the ospreys are to the mouth of the Chesapeake, while upper Bay birds tend to have a more varied diet.

Mobjack Bay is located directly off the lower Chesapeake, near the area where Chesapeake menhaden harvesting is most active.

Besides feeding predators like osprey, menhaden are the focus of one of the largest commercial fisheries on the Atlantic Coast. The health of that fishery is measured and managed as a coastwide population, making it difficult to determine how local or Chesapeake populations of the fish may be faring.

The Bay is also home to the world's largest breeding population of ospreys. Many of them migrate into the area in early March to breed before heading south in mid-August for the winter.

For Academia, who grew up as the son of



For Michael Academia, who grew up as the son of a commercial fisherman in Hawaii, ospreys "are the proverbial canary in the coal mine" for menhaden abundance. (Bryan Watts)

a commercial fisherman in Hawaii, ospreys "are the proverbial canary in the coal mine" for menhaden abundance.

"We were taught before technology to look at birds to locate fish," he said. "If the birds are doing OK, then there's a lot of fish."

Because he lacked abundance data for menhaden in Mobjack Bay, Academia and Bryan Watts, director of the center, conducted an experiment in 2021 and published the results this year.

They divided breeding pairs of ospreys into two groups, supplementing the diets of one group with additional menhaden to see whether there was a relationship between

more food and more hatchlings surviving. A nest was considered a success if it had one survivor (female osprey typically lay three eggs in late spring).

Among the nests that received food supplementation, 81% succeeded, compared with 33% in the control group. The supplemented nests had an average productivity rate of 1.13 young per active nest, close to the 1.15 rate that's needed to offset mortality in the osprey population and make it self-sustaining.

The control group's fertility rate of .47 young per active nest was lower than the fertility rate for ospreys in the 1960s, when



Michael Academia, a researcher with the Center for Conservation Biology at the College of William & Mary, says "asymmetric" broods in which one subordinate bird weighs about 50% less than the dominant bird in the nest result from varying levels of food availability. (Bryan Watts)

the widespread use of the pesticide DDT pushed populations of ospreys, eagles and other birds to the brink. A 1972 ban on DDT helped Chesapeake ospreys recover from an estimated low of 1,450 breeding pairs. The breeding pairs recovered to about 3,500 by the mid-1990s. Watts has estimated that as many as 12,000 pairs today consider the Chesapeake region home.

The Atlantic States Marine Fisheries Commission is responsible for managing the Atlantic menhaden population along the East Coast, assessing populations and setting catch limits. In 2022, the governing body found harvests to be abundant and approved a 20% increase of the previous catch quota. A longstanding cap on harvests in the Chesapeake remained unchanged, at 51,000 metric tons, but conservationists and sport anglers still worry about the impact of large-scale menhaden fishing near the mouth of the Bay on local populations.

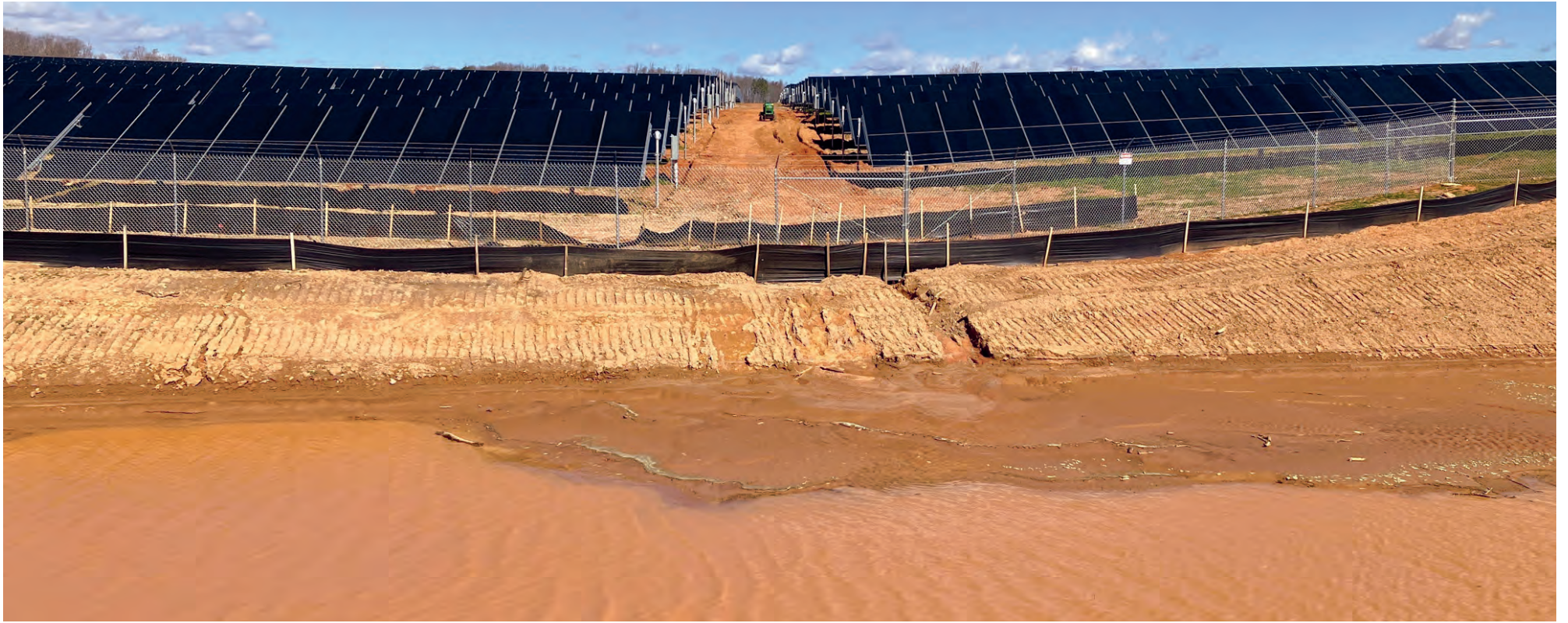
Academia's paper argues that the health of osprey should be considered an ecological reference point for menhaden and that the harvest quotas should account for the impact on osprey fertility rates. The paper figures into a lawsuit filed by a recreational fishing group challenging Virginia's management of menhaden.

In a case filed May 10 in Richmond Circuit Court, the Southern Maryland Recreational Fishing Organization contends that the Virginia Marine Resources Commission, in approving an increased catch for the Omega Protein fishing fleet, failed its legal obligation to protect the menhaden population from overfishing and to take into consideration the subsequent impacts on species that depend on them for food, including Atlantic striped bass and osprey.

"We just want some responsible regulation here," said David Reed, an attorney with the Chesapeake Legal Alliance, which filed the suit on behalf of the fishing group. "You've got to put some aside for the ecosystem."

A VMRC spokesperson declined to comment on the litigation, as did Ben Landry, vice president for Omega Protein's fishing fleet. But Landry did note that scientific assessments of the coastwide stock of Atlantic menhaden found that they are not overfished. He dismissed as "unfounded" contentions by anglers and some scientists that there is a localized depletion in menhaden in the Bay because of Omega's large-scale harvesting there. ■

Timothy B. Wheeler contributed reporting to this article.



Bay experts focus on solar power's stormwater footprint

States grapple to come up with consistent regulations for inconsistent circumstances



Native flowers surround solar panels in Westmoreland County, VA. The project is part of Virginia's voluntary Pollinator-Smart Program. (Virginia Department of Conservation & Recreation)

Top photo: Silt fencing and other measures failed to stabilize bare soils left during the construction phase of a solar project in west-central Virginia that was found out of compliance with state regulations in May. (Virginia Department of Environmental Quality)

By Whitney Pipkin

Rain dripping off solar panels can produce a unique type of runoff — one the scientific community is playing catch-up to quantify as the solar industry rapidly expands its footprint in the Chesapeake Bay watershed.

Industry analysts predict that the nation's solar market will triple over the next five years as it takes advantage of federal incentives. And data from the U.S. Department of Energy indicates that the U.S. will need to devote about 5 million acres of land to solar panels to meet renewable energy goals over the next 25 years.

Similar math is playing out in most of the Bay states as they work to meet their own renewable goals. Virginia has led the charge in rapid growth over the past five years, more than doubling the state's footprint of solar arrays in that time, according to an analysis by the Chesapeake Conservancy.

The director of the Virginia's Department of Environmental Quality, Mike Rolband, estimates that 317,000–687,000 acres of land will be converted to solar energy to produce 30–65 gigawatts of power by 2045. The variation depends on how many acres it takes to produce each gigawatt and the other sources of renewable energy that make up the state's portfolio.

"We are talking about one of the largest land use changes ever in Virginia in a short period of time," Rolband said during an April presentation to experts from both the stormwater and solar fields.

He made the comments during a workshop held by the Scientific and Technical Advisory Committee of the Chesapeake Bay Program, the state-federal partnership that leads the Bay restoration effort. The committee was discussing one of the region's pressing issues: Could Bay states' rush to increase solar energy get in the way of meeting water quality goals?

The crux of the problem, from a regulatory standpoint, lies with whether solar fields should be considered pervious or impervious land cover. Pervious areas allow water to soak into the ground. Impervious areas, like roads, rooftops and parking lots, do not. Polluted runoff from those hard surfaces causes problems for waterways across the Bay region — making them subject to regulation.

Utility-scale solar fields, also called "solar farms," have both pervious and impervious elements: often enormous acreage covered by the panels and a range of soil conditions and groundcover below them.

Many states consider solar fields pervious, which cuts regulatory red tape. Also, the volume and velocity of runoff from the panels falls somewhere between that caused by farmland and parking lots, depending on the type of groundcover under the panels. That makes solar facilities difficult to regulate under existing models.

But the sheer scale of the industry — and rapid rate of growth — has renewed the urgency to determine more precisely the relationship between solar panels and stormwater.

If calculating how much water runs off a solar panel sounds simple, it's not. Similar to the dynamics on farmland, there are innumerable — and controversial — variables that can change the way rain runs off of panels and soaks into the ground (or doesn't). Virginia DEQ formed an advisory panel in 2022 to determine, in response to legislation that required it, the stormwater impacts and appropriate mitigation options for replacing "prime" agricultural and forested land with solar panels.

"The workgroup developed 41 proposals but was unable to reach consensus," Rolband said of the effort. "How do you balance the legitimate concerns of local governments and the companies?"

His department will have to attempt an answer to that question soon. Although the stakeholders couldn't come to an agreement, legislation still requires DEQ to finalize new regulations for solar stormwater by the end of 2024.

Existing studies

The research community isn't starting from scratch on the topic.

"There is a whole lot of science around stormwater regulation," said Brian Ross, vice president of renewable energy for the Great Plains Institute for Sustainable Development, a Minnesota-based firm researching ways to improve renewable energy. Just "not for the kind of land use that is a 'solar farm.'"

Researchers from Pennsylvania State University released a review in April 2022 of the existing science and legal frameworks for managing stormwater on solar farms. At the time, 12 states had solar-specific guidance for construction and post-construction stormwater management, said Lauren McPhillips, an assistant professor at Penn State who oversaw the research. The rest did not.

"Some states don't treat solar farms as impervious surface, but quite a few are moving toward trying to consider [solar panels] as 'disconnected' impervious surface," McPhillips said at the Scientific and Technical Advisory Committee meeting in April.

Maryland and Pennsylvania have policies that either consider the panels pervious, under most conditions, or exempt them from being considered impervious for the purpose of stormwater management. Virginia had a similar approach — until Rolband announced in March 2022 that solar projects in the state would be subject to stronger post-development stormwater regulations. Initially, the policy was "effective immediately," but strong industry pushback caused the department to extend the timeline for research and implementation.

Rolband said in April that Virginia DEQ recently gave a \$3.4 million grant to state universities to spend six years "actually measuring" how stormwater runs off solar panels at a variety of sites in the state. Dominion Power has also helped fund the research, he said.

"We want to get some science in here and then obviously use that to calibrate the models," Rolband said.

Bay restoration organizations are also studying the broader impact of solar installations on land use in the region. Most notably, the nonprofit Chesapeake Conservancy recently applied its artificial intelligence technology to predict where solar facilities might be in the future based on where it has been growing in recent years.

Michael Evans, a senior data scientist with the conservancy's Conservation Innovation Center, said an analysis of trends from 2017 to 2021 showed that the majority of land being converted to solar uses was cropland and pasture. That's a trend some agriculture advocates have found troubling, but Evans found it "encouraging, from a biodiversity, ecosystem-services" perspective.

"By and large, the solar growth we've seen so far has been avoiding natural landscapes and going for croplands," he said. "Not only was agriculture being converted to solar, but there is evidence that the least suitable agricultural lands [for crops] are being converted first."

Evans said one possible reason is that the farmers and solar companies are looking for similar sites: land that is relatively flat, gets good sunlight and is near transportation networks.

Still, solar's future footprint could be difficult to predict. David Murray, director of solar policy at American Clean Power, said the selection of solar sites is based on a complex combination of variables. At the top of that list is access to



Sheep feed from a mix of plants growing at the Nittany 1 solar array in central Pennsylvania. The plants were selected to support the sheep's nutritional needs and attract pollinating insects. (Lightsource BP)

high-voltage transmission lines and the cost of connecting to the existing grid. After that is finding locations that avoid sensitive habitats and where landowners and local zoning laws are open to solar projects.

"Honestly, Congress can do all they want to incentivize clean energy. But, at the end of the day, whether solar is going to be successful is up to every county and town in the country," Murray said. "A number of times, a developer will get a report back that says it's infeasible economically."

Inconsistent practices

But, as with active farmland, not all acres of solar panels are managed equally. While the industry and regulators have a suite of best practices that can reduce stormwater runoff from solar panels, they can be costly and are not deployed consistently.

Andrew Foley, a water program specialist with Pennsylvania's Department of Environmental Protection, said his agency is trying to catch up to the solar developers with regulations that keep their operations, which are largely permitted at the county level, from contributing excess runoff.

"The biggest issue is consistency," he said.

Even when regulations are in place, compliance on sites under construction can be a problem. Virginia's DEQ regulates the largest solar facilities while counties tend to oversee others. Of the 77 that DEQ was overseeing in April, Rolband said nearly 70% of them had "significant issues" complying with stormwater regulations. About 30% of the violations were awaiting or had received consent orders — agreements that dictate how a site must get back into compliance.

"What we're seeing on the ground is huge problems, due mostly to lack of any vegetation," Rolband said.

At solar installations where heavy machinery is used to grade the landscape, soil compaction is the biggest problem. And it's not easy to fix afterwards, because the compaction makes it difficult to grow plants that keep soil in place longterm. One study found that a landscape compacted by solar installations remained so, in some cases 10 years after the panels were removed and the land was replanted. Many solar farms are installed under 25- or 30-year leases with an understanding that the land could be used for agriculture again once it expires.



The Remington Solar Power Facility on 125 acres in Fauquier County, VA, was developed as a public-private partnership between the state and Microsoft. (Meg Cole)

"If you drive a piece of equipment over the soil, it's compacted. Then you need to restore the soil," said Stewart Comstock, chief of the program review division of the Maryland Department of the Environment's stormwater program.

The solar industry knows about these issues and points to pioneering projects that plant native meadows and deep-rooted grasses before solar panels are installed or use sheep instead of machinery to manage grass growth. Changing the way things are done can be difficult, especially in periods of rapid development. But a recent slowdown in solar approvals, along with regulatory changes on the horizon, could set the stage for new practices.

"Unlike a lot of other industries I've worked in where you can do remediation afterward, [with solar] we really need to put all of that at the beginning," said Virginia Brown, director of ecosystem services for solar developer Lightsource BP, during the Scientific and Technical Advisory Committee workshop. "The timeline of construction is very tight, but ... we always have to think about vegetation."

Peter Claggett, a U.S. Geological Survey geographer who coordinates the Bay Program's Land Use Workgroup, said his biggest takeaway from the workshop was that, when it comes to managing stormwater on solar farms, site preparation and revegetation may be more important than how the panels are arranged.

The Chesapeake Conservancy has shared its solar land use data with the Bay Program to help inform land use cover data for future computer modeling. ■

McIlwain takes reins of hobbled MD environmental agency



Serena McIlwain, secretary of the Maryland Department of the Environment, discusses the Chesapeake Bay and other topics during a Bay Journal interview in June. (Dave Harp)

New secretary emphasizes climate, equity, ag solutions

By Jeremy Cox

When Serena McIlwain was appointed to lead the Maryland Department of the Environment earlier this year, she took charge of an agency at a crossroads.

Under Republican Larry Hogan's governorship, which ended after eight years because of term limits, the department made several important strides toward restoring the Chesapeake Bay. But it was hobbled by a shrinking workforce and bruised by legal fights with environmental groups seeking better enforcement of pollution controls.

The new governor, Democrat Wes Moore, reached across the continent to hire McIlwain. She had served for four years as under-secretary of California's Environmental Protection Agency. That was after a short stint at the U.S. Environmental Protection Agency in Washington, DC, as director of the Office of Continuous Improvement during the Trump administration.

The veteran bureaucrat has worked in various roles across much of the federal government going back to 2003.

During an interview with the *Bay Journal*, McIlwain was quick to dispel any notion that she is merely a hired gun. She was born and raised in the Chesapeake Bay region, and she still considers it her home.

Below are excerpts from the interview, which took place in mid-June at MDE headquarters in Baltimore. It has been edited for length and clarity.

Question: You've moved across the country a couple of times now. Why did you want to come back to Maryland for this position?

Answer: I wanted to come home. And the more important reason is when I met with the new governor, Gov. Wes Moore, we talked about climate change. We talked about some of the issues in Maryland, and when we spoke, I saw the passion he had and the support that he would have for me and MDE, I was ready to pack up right then and there and leave my job and come here.

Q: What's your favorite image when you think of the Chesapeake Bay?

A: My favorite image is really just the water. I love water. Water is my middle name. Not literally. But yeah, it's just the image of the water and seeing the boats and people out there enjoying themselves.

Q: The University of Maryland Center for Environmental Science Bay recently gave the Bay ecosystem a C grade. Despite 40 years of effort, the big lift in aquatic health seems to elude us. Why haven't we been able to overcome this?

A: It's called climate change. Things keep changing. Every time we come up with goals that we think are suitable for restoring the Chesapeake Bay, more things are happening.

And it's just hard. We're relying on other states that contribute [pollutants] to the Chesapeake Bay. We don't really control that. We rely on the EPA to control those other states. It's a constant battle challenge, but we're making progress nonetheless.

Q: The biggest pollution reductions for the Bay need to come from the agricultural sector. That's not news to anybody. But, so far, efforts such as cost sharing and best management practices haven't been nearly effective enough. What can be done to get at this problem?

A: There's a lot of nonpoint sources of pollution. I will tell you, as new secretary, I'm working very closely with the new [Department of Agriculture] Secretary Kevin Atticks on trying to really look at ways that we can do things differently in the agricultural area.

It's agriculture. We need it. But at the same time, you cannot pollute the environment. It's a constant thing that we try to deal with and work with.

Q: The Chesapeake Bay program from the beginning has largely been based on reducing nutrients to reduce the size of the "dead zones" in the deep channel. With the 2025 deadline approaching to put actions in place, is it worth rethinking what those goals should be?

A: I think we're at a good moment where we can start to reimagine how we're going to restore the Bay. There was a recent report out [the *Comprehensive Evaluation of System Response* report], and it has a lot of recommendations in there as well. In that report, they're talking about ways to start thinking differently.

I know there's a lot of hype about, "Oh, we're not going to meet the 2025 TMDL [total maximum daily load]." I will tell you, that might be true. But Maryland — we're on target to meeting it. We're doing our part.

Q: Your agency is working on releasing an implementation strategy for the Climate Solutions Now Act, which calls for 60% reductions in greenhouse gas emissions by 2031. How do you see the state reaching this goal?

A: It hasn't been released yet. But I do have an idea of what it's going to take. And it is going to take a lot of coordination and partnership with state agencies. I will tell you this: It is possible to meet the 60% goal by 2031. We can do it, but it's going to be a real heavy lift.

That includes continuing the efforts that we have now with zero-emission vehicles and building more infrastructure [to support EVs].

Q: What about the gas stoves?

A: Yes, the gas stoves loved by chefs and cooks at home. But it is part of the solution that we need to be able to convert appliances to electric. It's better for pollution, and it will definitely help us meet our climate goals. We plan to really look into changing appliances and making them cleaner.

Q: When you look at any environmental justice screening tool — University of Maryland's, for example — you see different places light up in the DC suburbs and Baltimore, but also in rural places like Hagerstown and the Eastern Shore. What can this administration do over four or eight years to get wins when it comes to environmental justice?

A: I will be looking at everything that we do from an equity lens. And that's from permits, to regulations, everything.

Q: The Climate, Labor and Environmental Equity Act did not pass this last legislative session. It would add more teeth to the idea of equity and permitting. Is that something you would support going forward?

A: I absolutely need it. I supported it. I want it badly. If it's never passed, are we still going to move forward? I am. That bill was really important to me, and I hope to see it continue on [in next spring's session].



MDE Secretary Serena McIlwain, seated beside Maryland Gov. Wes Moore, speaks during a climate roundtable on April 3. (Executive Office of the Governor)

Q: What other justice-related goals do you have in mind?

A: I have started listening sessions throughout Maryland. I started with Curtis Bay. And it was really enlightening for me. We're starting to listen more. And it's no longer rhetoric, as far as I'm concerned. So, I'm listening to their needs. We're coming back here, and I'm keeping it at the forefront of all that we do.

Q: What was so enlightening about the Curtis Bay listening session?

[Editor's note: Curtis Bay is a majority Black community in Baltimore that neighbors several industrial sites.]

A: They brought up issues like, we have to continue to get our tires changed on our cars because of all the trucks going through. We [at MDE] don't regulate the streets. But that was a concern to them. And it was a concern to us.

They talked about the coal that's in those trains that are right there, and I was able to go and see the dust. They were talking about how they can't keep their windows open. That really resonated with me. I felt helpless because I can't do anything about that coal. And that did not make me feel good.

So, what I told them was, "It's not my area, but I will partner with whoever I need to, to bring awareness to this issue." That means talking to federal Department

of Transportation, speaking with Maryland Department of Transportation, and I already have it scheduled to meet with them.

Q: This administration's first state budget includes funding for 43 new positions at about \$3.7 million to help clear the backlog of stormwater discharge permits that have expired but been allowed to continue standing. Why did this administration want to address that right out of the gate?

A: The public is really concerned about it. We need to make sure that everyone is in compliance. We need to do our jobs. I get reports weekly. I've made it clear that it's a priority.

Q: It very much echoes another situation that involves your department. MDE and the Department of Health share oversight of septic permitting, where another backlog is occurring, particularly for the Eastern Shore. What can you tell folks who are saying, "Why can't I get my darn permit?"

A: We are working with the Health Department. We're going to be looking at making sure that the people who need the permits are getting five-star customer service. People are waiting for responses. That's unacceptable. Period. So we're going to correct it, we're going to clean it up.



MDE Secretary Serena McIlwain (center) meets with residents during a South Baltimore listening session. (Maryland Department of the Environment)

Q: Can you provide an update on the Conowingo Dam license negotiations with its owner, Constellation Energy, in the wake of the federal court ruling last year that nullified the 2018 agreement for its operating license? Do you see significant changes to those provisions in that settlement?

A: As part of the court decision, we are required to start the reconsideration process again. We're going to reconsider whatever [Constellation's representatives] bring forward. Once that process is over, then we will make a decision on what we need to do with the water quality certification.

We're going to be and we have been very transparent. We're letting the public be a part of it. We're just trying to do the right thing by Marylanders.

Q: Under the 2018 agreement, Exelon (the dam's owner at the time) was on the line to pay \$200 million to address water quality concerns, and \$700 million if you count in-kind projects. Do you see that amount changing much going forward?

A: I'm not sure about how much more money we will get, if any, because now we have to start all over. There are a lot of court cases and different things that have happened over the years. Because this case was drawn out too long, we're not in a position as we could have been to be more forceful with the enforcement, or the amount. We've got court cases [released

since 2018] saying we can't do this and we can't do that, in terms of asking for more money when it comes to fines.

[As for the original settlement payout], I think people on the outside thought, "That's nothing. You could have gotten billions." Honestly, there was a chance that we could have gotten zero. When I did start, I asked what happened with Conowingo Dam, what happened with the settlement. When I looked at everything, I understood why we decided to settle for \$200 million. That was good for what we knew and what was in front of us.

Q: A timely question: Our region was literally choking on smoke caused by Canadian wildfires widely attributed to climate change. You lived in and worked in California, where wildfire fires have sadly become part of life. What was your takeaway from this latest experience?

A: My mind went to California. I thought, "Oh, communication." When I was in California, we were very good at communicating to the public where we are and what does this mean. We didn't really have that system in place here.

As we were getting through it [here], I saw misinformation. [Misinformation was spreading that said] it was getting worse. We were looking at the data, and it was going down. So, I made a decision that, "Hey, we need to get out there and get the message out correctly." ■

Chesapeake region loses longtime Bay scientist, Beth McGee

Senior scientist at Bay Foundation helped convey complex issues to policymakers

By Karl Blankenship

Beth McGee, a longtime senior scientist with the Chesapeake Bay Foundation, whose work is reflected in some of the most widely used reports detailing the Bay's health and value, died June 4 after a long battle with cancer. She was 61.

"The Chesapeake Bay lost a giant," said Alison Prost, CBF vice president for Environmental Protection and Restoration.

"Few have contributed as much to the science and policy of Bay restoration as Dr. Beth McGee," Prost said. "Her love and connection to the watershed and the Bay drove her. And her intellect never let her settle for the status quo. When Beth talked, the Bay restoration community listened and acted on her advice."

Many people in the general public are familiar with her two decades of work at CBF, even if they do not recognize her name. She oversaw production of the organization's *State of the Bay* reports, one of the most widely cited assessments of the Chesapeake's well-being.

McGee was also a lead author of a 2014 study that established a value on the natural benefits of the Bay (\$107 billion a year) and how those would grow (by another \$22.5 billion annually) if cleanup goals were met. Those figures are still widely used today.

The breadth of McGee's work over the years encompassed everything from agriculture, fish health and nutrient trading to the Conowingo Dam, toxic contaminants and much more.

"Beth was able to become an expert on this or that aspect of science, whether it was economics or agricultural restoration tools," said Roy Hoagland, a retired CBF vice president who worked with McGee for years. "She had a mind that was able to understand, grasp and articulate practically any subject matter."

Prior to 2010, when the region was crafting its latest cleanup plan — the Chesapeake Bay Total Maximum Daily Load, which limits the amount of nutrients states can send to the Bay — McGee was instrumental in developing approaches that would provide better accountability.

"She wanted to make it actually mean something," Hoagland said. "That was consistent with her being a really smart, thoughtful, creative, passionate advocate."

McGee was a fixture at meetings of the state-federal Chesapeake Bay Program, and



Bay scientist Beth McGee, shown here in 2020, was admired for her expertise as well as her ability to explain complex issues and connect them to potential policy solutions. (Dave Harp)

colleagues there cited her ability to synthesize complex scientific issues and suggest how they could inform restoration policies.

"She did not lead with that advocacy side. She was an advocate, absolutely. But she was an advocate that had a strong, strong scientific foundation," said Rich Batiuk, the retired associate director for science with the U.S. Environmental Protection Agency's Bay Program Office. "I found myself, probably 99% of the time, ending up agreeing with her, even when I started that conversation thinking, 'Let me see if I can turn about her around.' It was usually Beth who ended up turning me around and having me understand the science implications."

McGee was frequently asked to make presentations to the Chesapeake Bay Commission, a panel of Bay state legislators.

"Beth was, for many of us, our 'go-to' person," said Ann Swanson, who recently retired as the commission's executive director.

"She was a gifted conservation policymaker with a strong science background. She was most interested in getting it right, with little need for fanfare or credit. Her wit provided well-timed humor, and all of us will remember her laugh. So many of us relied on her. So many of us will now miss her."

Kim Coble, who hired McGee at CBF in 2003, recognized early that the scientist had a gift for communicating and tapped her to help persuade lawmakers on key legislation.

"It was fun to see somebody with her scientific skills, intellect and personality lobby," recalled Coble, who is now executive director of the Maryland League of Conservation Voters. "As you can imagine, she was very effective at it. I don't think she really enjoyed it, but she was very good at it."

McGee often took the lead in creating forums to advance knowledge of Bay issues that were not always front-and-center in the public eye. When fish diseases were turning up across the Bay watershed, she led efforts to organize a workshop that brought together biologists from across the region, many of whom had never met.

She was particularly proud of the development of a nitrogen footprint calculator on CBF's website (cbf.org/bayfootprint), which helps individuals estimate their contributions to the Bay's nutrient problems and learn how they could be reduced. A link to the

calculator was in her email signature line. In more recent years, her title expanded to encompass "agricultural policy" as she took a greater role in addressing the largest source of nutrient pollution to the Bay.

The work included addressing state and federal policies, identifying ways to better target funding and programs, trying to accurately assess nutrient contributions from the growing number of chickens in the watershed and, most recently, crafting approaches to address both climate change and nutrient runoff on the region's farms.

That's an evolution even McGee didn't envision. "If you had asked me 10 years ago whether I would have agricultural policy in my title, I would have said you were crazy," she told an interviewer from the Peal Center for Baltimore History and Architecture in 2020. "I'm actually an aquatic toxicologist by training."

Indeed, prior to joining CBF in 2003, she worked on chemical contaminant issues with the U.S. Fish and Wildlife Service office in Annapolis. Previously, she worked with the Maryland Department of the Environment, EPA and the University of Maryland Wye Research Center.

McGee had a bachelor's degree in biology from the University of Virginia, a master's degree in ecology from the University of Delaware, and a Ph.D. in environmental science from the University of Maryland.

She was an outdoor enthusiast, kayaking the Bay, hiking the region's trails and taking long bicycling trips both here and abroad, often organizing trips for friends and colleagues. In 2011, she and another CBF staffer made a 1,200-mile bike trip that roughly followed the perimeter of the Bay watershed.

She once said, "Find your passion, make it your job, and you'll never work another day in your life!" In her Chesapeake work, McGee found her passion, continuing to push for solutions to complex problems years after her cancer diagnosis. Indeed, no matter how difficult the issue, McGee always described herself as an "eternal optimist."

"Not only was Beth incredibly smart, thoughtful and passionate in her work for clean water, she was also known for her kindness, affability and warmth," said Mariah Davis, acting director of the Choose Clean Water Coalition. "We will miss Beth and hope to honor her legacy by leaving clean rivers and streams for future generations." ■

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell



Don't be-leaf everything you hear about poison ivy

Technically, it's not the poison ivy causing all your misery. It's you. Or your immune system, to be more precise. Urushiol, the oily substance on all parts of the poison ivy plant, dead or alive — roots, stem, leaves, flowers and berries — tricks your body into attacking itself through a process called "cell-mediated immune response." When urushiol gets on your skin, it binds to protein in the cell membranes and cuts off their ability to communicate with the rest of your body. This causes your immune system to view these cells as foreign invaders that must be destroyed. The itching, the burning, the rash: They are all part of the body's battle against itself.

Don't be myth-taken about these claims.

"It's contagious." You can't catch poison ivy from someone else just by being near them. That said, a tiny bit of urushiol goes a long way. If you touch someone before they have thoroughly washed it off, or things they have touched or have been touched by the plant — clothing, garden tools, doorknobs, pets — you can get a reaction.

"Touching a poison ivy rash will cause it to spread." Nope. The rash/blister/pus is your body's immune response and does not contain urushiol. On the other hand, touching or scratching a rash or blister — especially if you break the skin — can make the affected area more vulnerable to infection, which could slow healing.

"Eating poison ivy will give you immunity." Don't. Just don't! Instead of immunity, you'll develop a rash or blisters in your mouth and throat.

"It spreads through the bloodstream." Not true. It can take 12–48 hours for the rash to develop. Not all areas of the body may respond at the same time, and you may have been re-exposed to the urushiol still present on clothing or other items.

"I didn't get a reaction. I'm immune!" Not necessarily. While 10–15% of people are immune, others (like your author) will eventually succumb after years or decades of apparent immunity. Why take chances?

Title image: Poison ivy (Michele Danoff)

A "If there are three, leave it be" is worth remembering. The color, texture and edges of poison ivy leaves vary widely, but they always have three fanned-out leaflets, and the stalk of the center leaflet is noticeably longer than that of the other two. (Dave Harp)

B A long-sleeve shirt might have prevented this moderate case of poison ivy. (Michael Maloney/Shutterstock)

C Long pants and socks might have prevented this moderate case of poison ivy. (J. Mattia/Shutterstock)

D Open shoes and poison ivy are a recipe for disaster. Cover up as best you can, and wash exposed shoes, clothing and tools with hot water. (Mark van Dam/Shutterstock)

Itching for relief?

Here's how to deal with "urushiol," poison ivy's irritating oil.

Dress for success: If you plan to hike or garden where poison ivy is present, cover up your skin: Wear closed shoes, socks, long pants, long sleeves and gloves.

Come clean! Your skin absorbs urushiol within minutes. Wash the area with a grease-cutting soap — the dish soap Dawn is highly recommended — to break down the oil. Use lukewarm water; hot water opens pores, allowing urushiol to penetrate more deeply. Scrub under your fingernails.

Don't be wishy-washy: Use hot water when cleaning clothing, shoes or any items that touched your affected skin or the ivy itself — doorknobs, handles, faucets, hiking sticks. Urushiol on unwashed garden tools was found to still be potent five years after the initial contact.

No sink on the trail? Carry alcohol wipes if hiking in areas where poison ivy might be present. Immediately wipe down any exposed area.

Itching & swelling & rash, oh my! If, despite all precautions, you lost in a game of tag with poison ivy, expect the reaction to last two to three weeks, depending on your sensitivity and the amount of urushiol that gets on your skin.

Easing the itch: Poison ivy's rash is not caused by histamines, so taking an oral antihistamine can only help control the itch; it won't speed the healing. A cold compress might help. Aloe vera, used in tandem with other treatments, can fight inflammation and may prevent bacterial infections.

Get over it: Calamine lotion, which will help to dry out the reaction without drying out the skin, speeds healing in most mild or moderate cases. Resist the urge to scratch, which can cause the rash or blister to get infected. More severe cases may require a prescription for a steroid cream.

When to see a doctor: If the rash is widespread or close to your eyes, seek medical care. If you inhaled smoke from burning poison ivy (never burn the plant, because it volatilizes the urushiol into the air) and have difficulty breathing, or if you faint, have nausea, a fever or swollen lymph nodes, call 911 or go to the hospital right away.

Enough about us humans: Look for September's *Chesapeake Challenge*, when we'll look at the poison ivy plant itself, as well as its interactions with other animals.



Let birdsong drown out city noise at Leopold's Preserve

By Whitney Pipkin

We'd walked nearly two miles and through a handful of habitats, spotting red-winged blackbirds, tree swallows, egrets and evidence of active beavers by the time we saw the first house in the distance.

By then, it was easy to forget that the Northern Virginia land we were exploring — a 380-acre area called Leopold's Preserve — was initially protected as part of a housing development. With seven miles of wide trails winding through meadows, various forest types and wetlands, the preserve an hour west of the nation's capital feels more like a well-maintained state park than a privately funded project.

And that's intentional.

When the push for housing in the DC metro area made its way to this swath of relatively undisturbed land in northern Prince William County, VA, in the mid-2000s, developer Scott Plein decided to take a different approach. Rather than allowing this section of the county's Rural Crescent to be turned into a few dozen

homes on large lots, he got county approval to cluster 155 single family and 256 townhomes on about 100 acres next to an existing development.

The developer then protected the surrounding acreage through a conservation easement with the Northern Virginia Conservation Trust and opened it to the public as Leopold's Preserve. The property is named after Aldo Leopold, author of *A Sand County Almanac*, who is considered the father of wildlife management in the United States.

Marie Pinto, communications and administrative manager of the White House Farm Foundation, a nonprofit that manages the preserve, said the land could have easily become "10-acre lots with septic systems, long driveways and people managing their yards however they felt like."

"But now," she said while walking the grounds, "we have so many different types of habitats here for people to see."

Online maps work just fine for bringing visitors to the entrance off Thoroughfare Road in the town of Broad Run. The parking lot on the east



side of the road has the site's only port-a-potty. The smaller west parking lot offers accessible parking. Also on the west side, a wheelchair-accessible and stroller-friendly paved trail winds carefully down a slope to the preserve's pièce de résistance: a spacious observation deck offering views of the wetlands below.

Bring binoculars and zoom lenses for closeups of red-winged blackbirds flitting and trilling among the waving cattails below — and, occasionally, rarer sightings. Leopold's is listed as a birding hotspot by a website that, using eBird data, has tallied 192 species at the preserve. Audubon Society of Northern Virginia regularly hosts guided tours at the preserve.

Top photo: Members of the group NextGen Birders, sponsored by the Audubon Society of Northern Virginia, gather for a photo near an old farmhouse at Leopold's Preserve in 2022. (NextGen Birders for Conservation)

Inset photo: A shimmering tree swallow visits one of the nest boxes at Leopold's Preserve. The site is listed as a birding hot spot, with 192 species tallied there so far, according to one website. (Marie Pinto)



A pack of Cub Scouts visited Leopold's Preserve on Earth Day this year to plant 100 pawpaw seeds donated by a local landowner — and to take a hike. The property offers seven miles of wide trails winding through meadows, various forest types and wetlands. (Marie Pinto)

Last spring, a group of trumpeter swans made a temporary home in the wetlands, drawing birders from across the region. This April, a black swan, probably an escapee from a private collection, briefly found its way to Leopold's waters.

Other sightings are more reliable. With the condominiums for purple martins, single-family nest boxes for bluebirds in the meadows and above-water abodes for the chestnut-and-green wood ducks in the wetlands, even the birds have housing options. The preserve posted a series of baby bird photos to its social media pages this spring, challenging followers to spot the difference between nests of wood ducks, chickadees, bluebirds and red-winged blackbirds.

Pinto gets a particular kick out of watching the wood duck box for duckling departures in the spring.

"As you can see, the nests are very high up from the water," she said. "They'll just push the babies out when they fledge and that's it. They can't fly well enough to go back in."

The observation deck also features the first of 35 interpretive signs throughout the trail system that detail the natural and historic features of the landscape. Visitors can read about the Battle of Thoroughfare Gap that was fought here during the Civil War or learn that one of the first public schools for African American children in the county, eventually called the North Fork School, operated until 1936 near the site of today's parking lots. It's one of two African American schools that once existed on the property.

Across Thoroughfare Road from the wetlands, visitors will find a large map of Leopold's Preserve. Pinto suggests pulling one up on a phone or printing it out beforehand as well; many of



A wood frog rests its hind legs floating in one of the property's water features, many of them managed by an active group of beavers. (Marie Pinto)

the loops overlap and it can be easy to get disoriented. (When in doubt, look for the interpretive signs, which are also shown on the map.)

The preserve map also offers a tree walk with QR-codes that link to signs along the trail pointing out 18 significant or interesting tree species. These include a large white oak near the parking lots, a grove of pawpaw trees near the Warbler Loop, and a group of eastern red cedars, among others. The walk is a good way to get acquainted with native tree species.

Most of the wildlife habitats unfold near the larger parking lot, starting with a trail that begins at the lot's back corner. The gravel path gives way to a mown one that loops around a meadow. The paths are extra wide here, which is the way park manager Nick Davis likes them, Pinto said. Visitors can easily walk side-by-side, even along heavily forested areas of the trail.

Davis works with other groups and volunteers to periodically mow, mulch or burn sections

of the property to beat back invasive plants. Any habitats that look like they're still "under construction" probably are.

Maintenance efforts by the White House Farm Foundation are funded by the Plein Family Charitable Trust, which Scott Plein says is "one of the ways I like giving back."

"I wanted to put my money where my mouth is," he said. "People say, 'There's plenty of open space on a 10-acre lot.' But that's not open space, and it's not for the public, not to mention the cost of services to each lot."

Plein notes that Leopold's Preserve has active partnerships with other environmental organizations. The Bull Run Mountains Conservancy leads programs for homeschoolers, and birding and naturalist groups lead guided hikes at the preserve. A researcher from the Smithsonian Institution is studying sawflies on one area of the property, and experts from the U.S. Department of Agriculture have helped with invasive species management plans.

The property's water features, though, are primarily managed by beavers. A good-size pond next to the meadow has been losing water recently because the beavers stopped maintaining the dam they'd built in the North Fork of Broad Run, which forms a border of the property.

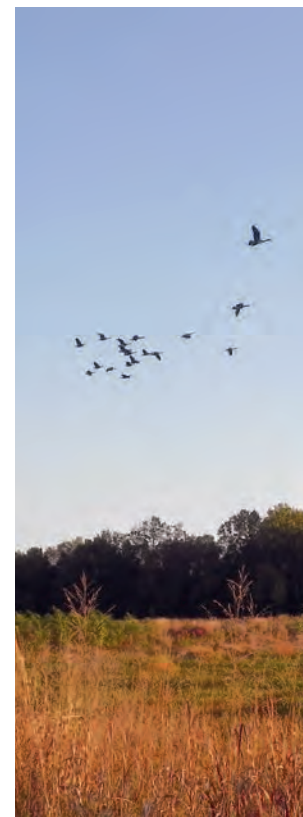
On some sections of the trail, interpretive signs seem to anticipate the visitor's questions. Heading south on Leopold's Loop into a forested area that was once farmland, a half-dozen dead trees line the edge of an otherwise healthy-looking stand. "Dead wood good?" the sign asks, and then answers: "Standing dead trees ... play a vital role in the life cycle of many organisms and provide useful habitat for more than 1,000 species of wildlife."

The trail leads to an old wooden farmhouse, now protected by a fence. Property managers don't know the exact age or story of the house, which was probably inhabited by the same farmers that left an old cattle pen standing along another section of the trail. An interpretive sign tells the story of Alfred Brent, an African American who built a homestead and ran a laundry business on the property.

In addition to remembering the property's past, today's managers are also trying to reimagine its future. Volunteers on Earth Day this year helped plant a smattering of small trees — pawpaws, sweet gums, oaks and others — in a field they are turning into a savannah habitat, where trees and shrubs dot an otherwise flat, grassy area.

In the middle of a wooded area along Warbler Way sits another uncommon habitat, also protected by a fence, called an upland depression swamp, a shallow, seasonally flooded basin of wetland oaks and shrubs. Pinto said someone reported finding an American hazelnut plant growing there, an unusual find.

It sounds like there's a home for everything at Leopold's. ■



IF YOU GO

Leopold's Preserve is at 16290 Thoroughfare Road, Broad Run, VA.

Access is for hiking only (no bicycles) from dawn to dusk. Leashed pets are welcome.

For information, including a trail map and upcoming programs, visit leopoldspreserve.com.

Consider wearing tick-preventative clothing, hats and shoes for grass and dirt trails. Bring plenty of drinking water.

The observation deck over the wetlands is wheelchair accessible from Parking Lot West, where there are also accessible parking spaces.

Photo: Canada geese fly over wetlands at Leopold's Preserve. (Marie Pinto)



Hawaiian outrigger canoes make waves in the Chesapeake

By Jeremy Cox

Skipjacks, deadrises, log canoes, tall ships, bugeyes — the Chesapeake Bay has no shortage of iconic boats. But if a core group of devotees has anything to do with it, a vessel closely associated with the South Pacific could be next.

The outrigger canoe is practically synonymous with Polynesian and Hawaiian cultures. Many Americans of a certain age, though, likely received their notions about outriggers from the closing credits of the original version of the TV crime drama *Hawaii Five-O*, which showed a sequence of muscly men vigorously paddling through waves.

That depiction — of brute strength and more than a whiff of masculinity — continues to loom over the sport of outrigger racing in the popular imagination. But the brand practiced by Maryland's Kent Island Outrigger Canoe Club tends, by intention, toward inclusivity and working in harmony.

"People of all ages and abilities can do this," said Bill Key, 72, a longtime member. "You can't screw it up. We're thrilled to have you out here no matter what."

To that end, during routine club practices, members are often found welcoming newcomers who want to try their hands at the ancient sport. This spring, they hosted a series of outings explicitly geared toward coaxing novices onto the water, with the hope of boosting membership.

So, there I was on a Sunday morning in April, standing with a strange-looking paddle in my hands and absolutely no idea what I was getting myself into.

The first thing you notice about an outrigger canoe is how long and narrow it is. Single and tandem versions are available. But, like the one in the *Hawaii Five-O* outro, the craft I boarded could comfortably seat six adults. Most outriggers in this class measure more than 40 feet from stern to bow, roughly the length of a school bus, but the main hull might be a mere 16 inches across.



Jessica Kennedy of the Kent Island Outrigger Canoe Club demonstrates the proper technique with a traditional paddle. (Dave Harp)

Photo above: Suzanne Martin, foreground, Pat MacNabb and Doug Klepfer paddle an outrigger canoe in Kent Island Narrows in Maryland during a new paddler welcome event hosted by the Kent Island Outrigger Canoe Club. (Dave Harp)



A six-person outrigger crew concentrates on synchronizing their strokes during a demonstration paddle in Kent Island Narrows. (Dave Harp)

This is where the “outrigger” part comes into play. Two arms (*iakos* in Hawaiian) project from one side of the canoe. These connect to a float (the “outrigger” or, in Hawaiian, the *ama*). Without these second hulls, the vessels would be highly unstable in the open seas.

Now, let’s turn to the paddle. The shaft isn’t straight like a traditional canoe oar or kayak paddle; it’s slightly bowed, and the blade is angled back a bit to compensate for the bend. At the opposite end of the paddle is a T-shaped handle. Your palm wraps around it, kind of like a bicycle handlebar. Your lower hand should be gripping the shaft just above the blade. It feels more like digging into the water than sweeping through it.

The setting for the club’s practices is the Kent Island Yacht Club, situated on a narrow peninsula bordering the channel through Kent Island Narrows. Here, you’re practically in the shadow of the U.S. 50/301 bridge. The high-arching structure looks impressive until you remember it is only a prelude to the more famous Chesapeake Bay Bridge found 6 miles west.

The scenery can be summed up as Outer Banks lite. Wooden piers frame gleaming-white fiberglass fishing boats. The ramshackle tiki bars in the distance compete to outdo each other’s color schemes. But the splashes of salt marshes and pine-dominated woods serve as reminders that nature hasn’t been completely crowded out yet.

The outrigger club here traces its history back 25 years, when John Fulton, who had recently returned to Maryland after a few years living in Hawaii, raised enough money to purchase a communal outrigger canoe.

“It’s the state sport of Hawaii,” he said. “Just about everybody does it.”

The sport has long since migrated to the mainland United States, but its presence on the East Coast remains limited. The nationwide parent organization for outrigger canoe racing chapters

lists 70 clubs operating in the three continental states that border the Pacific Ocean. The East Coast boasts a mere 17 clubs.

The Kent Island club, the only outrigger group with a Maryland address, counts about three dozen active members. They compete in races up and down the East Coast and host their own event over Labor Day weekend, a 35-mile relay race in which paddlers circumnavigate Kent Island.

From what I could gather, outrigger canoe racing tends to attract experienced standup paddleboarders or kayakers looking for a team environment.

“This is a great way [to] get out on the water with people who become your friends,” said longtime member Nancy Wallace. “I think I knew one person when I first started. It becomes a family.”

In this way, the sport embraces another Hawaiian cultural export: the concept of *ohana*. For a definition, let’s turn to the 2002 Disney movie *Lilo & Stitch*. In it, viewers are told, “*Ohana* means family. Family means nobody gets left behind — or forgotten.”

At the April practice session, at least a dozen or more of us were new to outrigger canoeing. The club regulars were cheerful and generous with advice. They made sure no one felt left behind.

Jessica Kennedy, a converted standup paddleboarder, instructed the first timers on the paddling technique. What matters most, she said, is staying in sync with other paddlers. When the paddles slice into the water at the same time, the canoe glides across through the waves with the greatest efficiency. There’s a beat to it that you can keep in perfect time — or miss.

“If you fall behind,” Kennedy explained, “just get in on the next one. It’s no big deal.”

I was in one of the first groups to go out on the water. We were a mixture of regulars and newcomers. I’m a fairly proficient kayaker, but this was like learning a new dance. My entire concentration was wrapped up in performing the individual steps — keeping my hands vertically

in line with one another, leaning forward as I started the stroke, “burying the blade” in the water, rotating through my core.

We would do several strokes on one side. Then, someone would call out “Hut!” and our crew would answer with a “Ho!” This was the signal to switch our paddles to the other side and begin anew.

Invariably, I would miss the first “hit” on the new side. I made it my goal to do it right just once before the canoe returned to shore. But it never happened. I was too slow making the transition.

I didn’t notice how fast we were going until I looked around and saw how far we had gotten from our starting point. We were flying across the water. The pace was anything but leisurely. Tiring quickly, I whipped out my notebook at one point and caught up on some notes while others picked up the slack.

Neil Macindoe, a 15-year outrigger veteran, was in the front seat of our canoe. As such, it was his job to set the pace. To hear him describe it, there’s something mystical about every paddle meeting the water at the same time.

“You can feel the boat come alive when we’re all in sync,” he said.

This didn’t happen much while I was in the canoe. (My fault, probably.) But I felt it once or twice. It was as if we were a 12-armed creature, with one brain and one heart.

Some of the other people, regardless of their experience level, described the feeling of working together as something akin to “meditation.” I can see that. You can’t afford to think of anything except the movements of your body and those of the people around you.

Who’s to say what the next trend will be in water sports? In this post-COVID world, I think many of us are trying to reestablish connections with our fellow human beings. An outrigger canoe could be one great way to bring us together again. ■



About the Kent Island Outrigger Canoe Club

The club is based at the Kent Island Yacht Club, 117 Yacht Club Drive in Chester, MD.

- Practices are at 6 p.m. Tuesdays and Thursdays and 9 a.m. Sundays.
- Nonmembers are always welcome.
- Check for weather-related cancellations and other information on the group’s Facebook page.

Other clubs in the Bay region include the National Capital Area Women’s Paddling Association and Washington Canoe Club, both in the District of Columbia.

There’s also the Mid-Atlantic Paddlers Association in Virginia’s Hampton Roads.

A complete list of East Coast clubs can be found under the “About” tab on the East Coast Outrigger Racing Association website: ecora.org.

Photo: An outrigger canoe is inscribed with the Hawaiian expression meaning “family of the sea.” (Dave Harp)



After the wheat harvest in June, bales await pickup on a field near Ingleside, MD. (Dave Harp)

Hay there! We'd like to thank you for your generosity

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Horseshoe crabs, a species estimated to be at least 300 million years old, spawn on sandy shorelines in the Chesapeake Bay region during spring high tides of the new and full moons. (Dave Harp)

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Raymond Dueser Charlottesville, VA	Harry Habecker Swatara, PA	Pamela Kellett Pasadena, MD	James and Carol Meholic Royal Oak, MD	Perrie Prouty Rockville, MD	Alex Schubel Hagerstown, MD	Louis Uccellini Columbia, MD
Diane Dunlap Ellicott City, MD	Christopher Haga Frederick, MD	Susan Klingensmith Baltimore, MD	Phillip Merkle Bethesda, MD	Karen Randall Hughesville, MD	Gustave Schultheiss Asheville, NC	John Ulaky Pequea, PA
Mr. & Mrs. Thomas Emory Chase City, VA	Doug and Kim Hagen Kitty Hawk, NC	John Kraft Baltimore, MD	Chris & Olivia Merryman Whiteford, MD	Marty Reeve Libertytown, MD	Sea Tow Lower Chesapeake Seaford, VA	Vincent Vaise Linthicum Heights, MD
Donna Engle Westminster, MD	Charles Haslup Annapolis, MD	Mr. & Mrs. Chris Kunkel Midlothian, VA	Lindy Millman Charlestown, MD	Cindy & John Reeves Rockingham, VA	James Sheffield Midlothian, VA	Doug Valente Greenwich, NJ
Charles Ewers Bivalve, MD	Earle Hatton Delmar, MD	Wade Lamb New Bern, NC	James Morin Severna Park, MD	Derek Rhymes Annapolis, MD	Larry & Meg Sherertz Hayes, VA	Ginny Vroblecky Annapolis, MD
Diane Ewing Bonita Springs, FL	Gerry Hawkins Arlington, VA	Christian Larrimore Pylesville, MD	Frederick Morris Gainesville, FL	Carl Richards Crofton, MD	Jere Shimp Ephrata, PA	Buren Walker Mechanicsville, VA
Ralph & Susan Faust Adelphi, MD	Anne Hays Annapolis, MD	Harvey Lee Littlestown, PA	Lew Morrison Churchville, VA	Vernon Richardson Alexandria, VA	Rick Siegman Essex, MD	Steven Wall Farmville, VA
Cheryl & Wayne Fisher Milton, DE	Joette Henry Akron, PA	Keith Lefler Sharpsburg, MD	Stephen Moss Rockville, MD	John Roach Baltimore, MD	Eric Smith Red Lion, PA	Loretta & Chris Wanman Annandale, VA
Ellen Fisher Baltimore, MD	Elaine Herr Manheim, PA	Geary & Stefanie Lehr East Berlin, PA	Patricia Mulvey Palo Alto, CA	Dr. Beverly Roane Dutton, VA	Larry & Louise Smith Williamsburg, VA	Henry & Sandra Ward Baltimore, MD
Edith Foley Chestertown, MD	Samuel Heywood Mount Jackson, VA	Blaine Leidy Glen Arm, MD	James Muscatello Annapolis, MD	Joyce Robinson Glen Burnie, MD	Barbara Smith Parkville, MD	Warwick Yacht & Country Club Newport News, VA
Arreather Forbers Redford, MI	Carol Hickey Lebanon, PA	Carol Lenzi Richmond, VA	H. Norwood Baltimore, MD	Jonathan Rogers Lutherville, MD	Francis Smith Severna Park, MD	Bruna Watts Washington, DC
Charles Forbe Lutherville, MD	Eddie Hill Pikesville, MD	Richard Leonard Stevensville, MD	Nancy Novak Baltimore, MD	Kathryn Rothrock Berlin, MD	Jim Spontak Etters, PA	C. Waybright Roanoke, VA
Thomas Ford Forest Hill, MD	Brenda Hollweger Solomons, MD	Richard Lewis Emporium, PA	Dennis Obermayer Fairfax, VA	Edward Rucker Charlottesville, VA	Jean Startt Easton, MD	Anna & Ed Wilkinson Dundalk, MD
Louis Forster Bonita Springs, FL	Robert Hottinger Bergton, VA	J. Lewis Vestal, NY	Arnold Oliver Millersburg, OH	Kathy Rumberger Norfolk, VA	Jann Steele Richmond, VA	Ernie Willoughby Solomons, MD
Glynn Frank Ames, IA	Charles Howes Dunkirk, MD	Nathalie Lombard Baltimore, MD	Dale. Orwig Jarrettsville, MD	Casimir Ruszala Nottingham, MD	Karen & Robert Stickel White Stone, VA	Pamela & James Wroten Arlington, VA
Dennis Fronheiser Elkton, MD	Alexander Hubner Wappingers Falls, NY	Ronald Louzon Woodstock, MD	James Payne Jr. Manassas, VA	David Sanford Silver Spring, MD	Ruth and Robert Stober New Oxford, PA	Jane Zanger Annapolis, MD
James Garrett Silver Spring, MD	Eddie Hyle Zionville, NC	William Lower Biglerville, PA	Rodney Payseure Bethel Park, PA		Korlan Strayer Dallastown, PA	

How the Flats bounced back and other Bay mysteries



CHESAPEAKE BORN

By Tom Horton

“We know more about how the environment declines than about how it comes back.”

I don't remember which scientist told me that, but the notion stuck — a story of the Chesapeake Bay, a story of the Earth. For all of our lives, more to lament, to study what went wrong, than to celebrate, to learn what went right.

Which brings me to the glorious, mysterious regreening of the Susquehanna Flats, the great, shallow delta of sediment deposited where the river that delivers half of the Bay's freshwater flows into the upper Chesapeake around Havre de Grace, MD.

The Flats historically were iconic for lush, underwater growth of aquatic grasses and the hordes of migratory waterfowl that fed there: “flocks that darken the air,” read an 1883 account from Havre de Grace, “and the noise of their wings can be heard five miles or more on the water.”

Into the early decades of the 20th century, the Baltimore *Sun* covered opening day of waterfowling on the Flats like they do now for the Orioles' opening day.

By the 1960s, though, pollution coming downstream — nutrients from sewage and farming — was stressing the grasses, cutting off vital sunlight as the water grew murkier with algae. Nutrient-enriched “epiphytes” slimed the grasses.

A thunderous, raging nail in the coffin for the Flats was driven home in June 1972 by unprecedented floods from Tropical Storm Agnes. Agnes dumped half a century or more of normal sediment loads from the Susquehanna in a single, smothering week.

The storm's scouring of sediment from upstream was so extreme that, after it



After 1972's Tropical Storm Agnes all but wiped out underwater grasses in the Susquehanna Flats, reducing them to an estimated six acres' worth. But they very, very gradually recovered. By the time this photo was taken in 2010, the grass beds covered 14,000 acres, or nearly 22 square miles. (Dave Harp)

passed, one could see through crystalline water an estimated 60 feet down into the deep channels of the river. That account came from a Havre de Grace marina operator in his small plane.

On the Flats, the grass beds that were always reckoned in square miles were relegated to an estimated six acres — about a hundredth of a square mile.

The next few decades would see attempts at revival: Baywide programs to reduce nutrient pollution and the transplanting of grasses from other places.

By 2002, the grasses seemed to be creeping back a little. Then in 2005, a miraculous shift. And by 2010, a dazzling flora of more than a dozen native grasses again populated an astounding 14,000 acres, some 20 square miles.

Another massive storm, Lee, second only to Agnes, in 2011 knocked the grasses back to about 6,000 acres. But the system held, rebounding to 10,000 acres and expanding, according to Cassie Gurbisz, a professor of environmental studies at St. Mary's College who studied the Flats in her Ph.D. work.

After snorkeling in the middle of the huge grass beds, she described a world of “almost tropical clear water,” where it was

hard to even measure nitrogen, the Bay's most ubiquitous form of nutrient pollution.

So what happened to cause this massive success amid an overall Bay restoration effort that still gets a grade of D-plus from the Chesapeake Bay Foundation?

There's no tidy answer, Gurbisz said. “It is just not a neat story.”

Nature likely helped itself, with low to normal rainfall in the years before the big leap in 2005 (less rain off the land meant less nutrients to foul the water). But it's clearly about more than just that, Gurbisz and other experts say.

For example, co-occurring with lovely grass jungles have been big mats of grayish, slimy, possibly toxic algae up to 3 feet thick. They don't seem to be outcompeting the native grasses as much as co-existing.

“We call [the Flats] a recovery, but what is recovery? Is it just the reverse of degradation, or something else?” Gurbisz asked.

(I recall that when Pennsylvania made early progress in sewage cleanup on the Susquehanna, one of the first “benefits” was big hatches of biting black flies.)

Another wrinkle in the “recovery”: It's not just happening on the Flats, but in the upper, freshwater portions of many Bay rivers.

Unlike the widgeon grass and eelgrass that dominate brackish and salty Bay waters, freshwater grasses form canopies that can take advantage of scant light in murky waters. Widgeon grass by nature is a “here today, gone tomorrow and back again” species. Eelgrass, on the southern limits of its range, appears threatened by a warming Chesapeake.

There may also have been a “nursery effect” in the Flats comeback. As grasses revived modestly, they began to create a microclimate favorable to more grasses, and so on. Similarly, a lot of the grass that hung on after Agnes was nonnative, invasive Eurasian milfoil. This may have provided a nursery effect to help native species restart. That phenomenon was seen years ago on the upper Potomac River, courtesy of another invader, hydrilla.

Stan Kollar, retired ecologist from Harford Community College, says even after the Agnes blast, small “refugia” of healthy native grasses remained in coves of the Susquehanna and nearby rivers. These, along with the early grass transplants he and his students did, may have — ever so slowly, over decades — begun to restore the Flats.

Other comeback explanations include increased freshwater releases from the giant Conowingo Dam upstream, which benefit spawning fish and maybe the grasses, too. Also in recent decades, more nutrient-rich sediments have been “passing through,” as the bottom of the reservoir behind the dam filled with dirt from upriver.

“There was some work showing more fertilizer could jump-start aquatic grasses ... the story's surely more complex than less nutrients, better grasses,” said Maryland state biologist Mike Naylor.

It's surely worth more research into this glad, improbable comeback. There's little reason to expect comebacks to look like declines in reverse or to happen on impatient human timelines. ■

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

We need more realistic goals to improve the Bay

By Scott Phillips

Efforts to restore the Chesapeake Bay have been underway for close to four decades. Improvements have been made to the Chesapeake Bay and its watershed, but many restoration goals have not been met. We are doing a disservice to the public with promises that the Chesapeake Bay can be “cleaned up.”

Giving the impression that the entire Bay can be cleaned up is not unlike saying cancer can be eradicated everywhere, in all of its forms. Both statements are inspirational but not realistic. Similar to the battle against cancer, we can make progress toward improving portions of the Bay and its watershed through greater prevention and improved treatments, but we won't heal the whole ecosystem.

The Chesapeake Bay restoration partnership, which includes a wide network of federal and state agencies, academic institutions and local governments and organizations, was established in 1983. About every 10 years they agree on goals and actions for restoring the Bay and its watershed.

The most recent Chesapeake Bay agreement was signed in 2014 with 10 goals and 31 outcomes. The goals range from addressing fisheries, habitat and water quality to community engagement, education and climate resiliency. Many outcomes are coming due in 2025, but the outlook for meeting them is mixed. According to the Chesapeake Bay Program: Two outcomes have been completed, 11 outcomes are “on course” to reach their target, 11 are off course and the rest are uncertain.

According to the Bay Program's Chesapeake Progress website, most of the outcomes currently on course are related to goals for land conservation, public access and sustainable fisheries. There has been progress toward conserving 2 million additional acres of land from the 7.8 million acres that were protected in 2010. The outcome to add 300 new public access sites by 2025 is nearly 80% complete. The construction of oyster reefs has exceeded the target for adding them in 10 Bay tributaries.

But many outcomes for the remaining goals are off course or uncertain —



Kayakers explore the Eastern Shore of Virginia National Wildlife Refuge in Northhampton County, VA. (Caitlin Finnerty/Chesapeake Bay Program)

especially water quality. Reducing nutrient pollution in the Bay is off course despite 40 years of being the top priority of the states and federal government. Water quality conditions in the Bay are still lagging, with only about one-third of the tidal waters meeting conditions necessary for healthy fish, crabs and underwater grasses.

Recent articles in the *Bay Journal* discuss the challenges of reducing nutrients from agriculture, the largest source in the watershed. A new report from the scientific community says that existing programs designed to curb urban and farm runoff are unlikely to attain their nutrient reduction goals, even with increased funding. New ways are needed to address these issues in the future.

As a new Chesapeake watershed agreement is being considered for beyond 2025, there is an opportunity for the organizations involved in the partnership to consider more realistic goals for the future — and increased public input and involvement are critical for success. Some considerations for the next agreement include:

Focus more on benefits to people. Several goals in the current agreement focus on people (public access, environmental literacy and stewardship), but more

emphasis is needed. Goals should expand to include direct benefits to people and their communities, such as protecting drinking water, making fish safer to eat and having places to recreate.

Conserve what we cherish. We need to protect lands important to people, fish and wildlife needs before they are lost to development or the impacts of climate change. Conservation is like preventative medicine — protecting land is less costly than restoring degraded areas.

Have more realistic goals. We need to stop giving the impression that water quality and habitats for fish and wildlife can be restored to conditions found in the Bay 400 years ago, but we can strive for improvements. For example, we should avoid unrealistic language for goals such as “restoring water quality for the entire Bay” or “eliminating the impacts of toxic contaminants,” because such language creates false expectations.

The monitoring data show only slight improvement in water quality conditions for the entire Bay after 40 years of nutrient reduction efforts. So, let's set more achievable goals focused on improving portions of the Bay that are most important for fish, waterfowl and recreation. A recent report by the

Bay Program's Scientific and Technical Advisory Committee suggests focusing restoration on the Bay's shallow waters, which are the most critical for living resources.

Have more locally focused actions. Over the years, the Chesapeake partnership has focused primarily on reducing nutrients to improve water quality in the Bay. But it lacked a strategic approach for how these efforts can provide additional benefits to other goals and local communities.

For example, actions to reduce nutrients to the Bay will also improve local streams and increase habitat for freshwater fisheries, thereby increasing their value and enjoyment for surrounding communities. If the public becomes more aware of local benefits, more targeted improvements can be made one lawn, one farm and one community at a time.

A new Chesapeake agreement having more realistic, locally focused goals is needed in the future. Having goals that more directly benefit the public will increase their involvement and result in more sustainable progress. ■

Scott Phillips recently retired from the U.S Geological Survey after a career of working on environmental issues, including with the Chesapeake Bay partnership.

In the Bay, summertime striped bass fishing is in hot water

By Dave Secor & Marty Gary

Chesapeake Bay anglers are facing a stark future — a future in which summertime fishing for striped bass, once a hallmark of Bay fishing, may become an ever-distant memory.

A century ago, fishing for striped bass was centered on meals for the table. Then sportfishing boomed in the 1950s, '60s and '70s, with increased incomes, leisure and boat ownership. The public embraced the enthusiasm of Bill Burton, famed angler and Baltimore *Sun* reporter, for a day on the water.

And with virtually no regulatory limits, they reeled in millions of skillet-size striped bass on halcyon summer days.

But summers were much cooler then. Now, the Maryland Department of Natural Resources posts striped bass heat advisories, warning against taking the fish when air temperatures exceed 90 degrees F — which in 2022 accounted for one-third of the summer. By 2050, climate predictions tell us, the majority of summer days will exceed this threshold.

Most large striped bass, those 30 inches and longer, prefer to spend the summers in cooler waters offshore of New England. But the younger, smaller fish don't generally join them; they stay in the Bay, where they endure ever longer and more extreme heatwaves.

The sunbaked summer water of the Chesapeake permeates muscle and viscera, and doubles heart rates in the fish. This athletic species adjusts, but increased respiration just keeps pace. Until fall cooling, the unrelenting heat drains the fish's capacity to swim, find food, resist disease and recover from stress.

Increased summer heat exacerbates the stresses of fishing and disease. An undersize fish caught on a pleasant June day and dutifully released with the greatest of care — non-offset circle hook, minimum time out of water, dehooking tool, wetted hands and net — will still lose some of its protective slime, allowing a point of attack by the infectious mycobacteria.

High rates of fishing mean that this same fish may be caught repeatedly. When that fish is caught again in July, red infection



Striped bass are feeling the stress of warmer water in the Chesapeake Bay. (Dave Harp)

sores will likely be visible on its flank — and, undersize or not, the unsavory fish is destined to head back into the water.

On board, while the fish are being dehooked, exposure to the hot July air may itself do them in. The fish that do survive being caught and released are now voracious, compelled to recoup physiological losses. Searching for easy meals, they are much more susceptible to being caught yet again. And anglers, with ever-improving sonar, find their targets concentrated in pockets of slightly cooler and better oxygenated waters.

The combination of heat, disease and fishing pressure is a losing battle for resident rockfish. A 2018 Virginia Institute of Marine Science study in the Rappahannock River reported that the combination of these stresses caused nine of 10 fish to perish during the summer.

Regrettably, the only way out of this

summertime heat trap is to take striped bass fishing out of the equation.

Fishery managers are heading off the heat with increased restrictions. Summer fisheries (June 15–Oct. 15) have been closed for some time in Virginia. Beginning in 2020, the Potomac River Fisheries Commission closed the season for nearly six weeks (July 6–Aug. 20).

Maryland's Department of Natural Resources was less aggressive, closing it only for the last half of July — though it does ask recreational anglers to reduce fishing pressure on the hottest days. In its Striped Bass Fishing Advisory Forecasts, DNR recommends leaving striped bass in the water when air temperatures exceed 90 degrees F, and not fishing at all in temperatures 95 degrees or higher.

Overlaying summer regulations, managers are struggling with other measures to address overfishing, such as narrowing legal

size windows. The Atlantic States Marine Fisheries Commission in early May issued emergency orders for states to reduce the maximum size for keepers to 31 inches.

But make no mistake, as opposed to climate-based restrictions, such measures come and go, and size restrictions do nothing to minimize the damages of catch-and-release during summer months. Climate-based regulations are likely here to stay. Sadly, we forecast a Chesapeake Bay that may no longer support a summer striped bass fishery.

In the meantime, anglers can do their part by voluntarily observing a summer sabbatical for striped bass and shifting their efforts to blue catfish, a most-destructive invasive species that seemingly thrives in the Bay's warming waters. ■

Dave Secor is a fisheries and environmental scientist at the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory. Marty Gary is executive secretary of the Potomac River Fisheries Commission and chair of the Atlantic States Marine Fisheries Commission's striped bass management board.

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake Bay region. Letters to the editor should be 300 words or less. Submit your letter online at bayjournal.com by following a link in the Opinion section, or use the contact information below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length.

Contact T.F. Sayles at tsayles@bayjournal.com, 410-746-0519 or at P.O. Box 300, Mayo, MD, 21106. Please include your phone number and/or email address.



BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Project Clean Stream

The Alliance for the Chesapeake Bay, through its *Project Clean Stream*, provides supplies for stream cleanups anywhere in the watershed. To volunteer, register an event, report a site needing a cleanup: Lauren Sauder at lsauder@allianceforthebay.org.

Citizen Science: Creek Critters

Use Nature Forward's *Creek Critters* app to check the health of local streams by identifying small organisms living in them and reporting your findings. Download the free app from the Apple App Store or Google Play. Info: natureforward.org/creek-critters.

Potomac River watershed cleanups

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

Citizen science: butterfly census

Friend of the Earth's *Global Butterflies Census* raises awareness about butterflies & moths, their biodiversity. Collect data to participate: See a butterfly or moth? Take a close picture without disturbing it, then send it by WhatsApp message to Friend of the Earth along with your position's coordinates. The organization will reply with the species' name, file the information on the census' interactive map, database. Info: friendoftheearth.org. Click on "Projects."

PENNSYLVANIA

State park, forest projects

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

PA Parks & Forests Foundation

The Pennsylvania Parks and Forests Foundation, a Department of Conservation and Natural Resources partner, helps citizens become involved in parks and forests. Volunteers learn about park or forest needs, then join or start a friends group. Info: parksandforests.org.

Middle Susquehanna steward

The Penn State Extension's Master Watershed Steward program is expanding across the northern counties of the Middle Susquehanna watershed to include Elk, Potter, Cameron, McKean, Bradford, Susquehanna, Sullivan, Wyoming, Jefferson, Forest, Clearfield, Clarion, Centre, Clinton, Tioga and Lycoming counties. Help preserve clean water resources. Web search: "middle Susquehanna watershed steward."

VIRGINIA

Prince William Bandalong

Help to empty trash out of *Bandalong*, Prince William County's trash trap on Neabsco Creek, every Friday. Participants also collect data. Info: Tim Hughes at thughes@pwcgov.org.

Reedville Fishermen's Museum

The Reedville Fishermen's Museum needs volunteers for docents and in the gift shop, boat shop, research collections/library. Info: office@rfmuseum.org, rfmuseum.org.

Goose Creek Association

The Goose Creek Association in Middleburg needs volunteers for stream monitoring & restoration, educational outreach, events, zoning & preservation projects, river cleanups. Info: Holly Geary at 540-687-3073, info@goosecreek.org, goosecreek.org/volunteer.

Check out cleanup supplies

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

Virginia Living Museum

Virginia Living Museum in Newport News needs volunteers ages 11+ (11-14 w/adult) to work alongside staff. Some positions have age requirements. Adults must complete background check (\$12.50). Financial aid applications available. Info: volunteer@thevlm.org.

Chemical water monitoring teams

Help the Prince William Soil and Water Conservation District and Department of Environmental Quality by joining a *Chemical Water Quality Monitoring Team*. Training provided. Monitoring sites are accessible. Info: Veronica Tangiri at waterquality@pwsxcd.org or waterquality@pwsxcd.org, pwsxcd.org.

Pond cleanup programs

Join a Prince William Soil & Water Conservation District's *One-Time Pond Cleanup* in the fall or spring. The district needs kayaks to support this effort. Volunteers are also needed to take on longer-term commitments. Info: waterquality@pwsxcd.org.

Virginia Master Naturalists

Virginia Master Naturalists is a corps of volunteers who help manage and protect natural areas through plant & animal surveys, monitor streams, rehabilitate trails, teach in nature centers. Training covers ecology, geology, soils, native flora & fauna, habitat management. Info: virginiamasternaturalist.org.

MARYLAND

Anita C. Leight Estuary Center

Meet 9-11 am July 9 & Aug. 20 at the Anita C. Leight Estuary Center in Abingdon for an *Invasinators Workday*. Ages 14+ (12 & younger w/adult). Remove invasive plants, install native species. Wear sturdy shoes, long sleeves, work gloves. Weather permitting. Registration recommended. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Delmarva Woodland Stewards

Maryland property owners on the Delmarva Peninsula who are interested in changing their forest management practices to increase species diversity, eliminate invasives, improve forest health are encouraged to sign up for the *Delmarva Woodland Stewards* program. Web search: "Delmarva Woodland Stewards."

Severn River Association

Volunteer at the Severn River Association. Visit severnriver.org/get-involved, then fill out the "volunteer interest" form.

Annapolis Maritime Museum

The Annapolis Maritime Museum & Park needs volunteers. Info: Ryan Linthicum at museum@amaritime.org.

Patapsco Valley State Park

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

Oyster growers sought

The *Marylanders Grow Oysters* program is looking for waterfront communities or property owners to grow oysters. Participants must own an existing pier or wharf with at least 4 feet of water at low tide with enough salinity to support oyster survival in one of the selected creeks, coves, inlets. They will provide maintenance for up to four cages of oysters for up to 12 months. Once oysters are about an inch in size, they will be planted on local sanctuaries to filter water; enrich aquatic ecosystems; provide habitat for fish, crabs. There is no cost to participate. Web search "Marylanders Grow Oysters."

National Wildlife Refuge at Patuxent

Volunteer in Wildlife Images Bookstore & Nature Shop with Friends of Patuxent Research Refuge, near Laurel, for a few hours a week or all day, 10 am-4 pm Saturdays; 11 am-4 pm Tuesdays-Fridays. Help customers, run the register. Training provided. Info: Visit the shop in the National Wildlife Visitor Center and ask for Ann; email wibookstore@friendsofpatuxent.org.



SUBMISSIONS

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

DEADLINES

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

FORMAT

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

CONTENT

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

CONTACT

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

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BULLETIN BOARD

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Ruth Swann Park

Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 am–4 pm the second Saturday in July, August and September at Ruth Swann Memorial 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 Sierra Club Maryland Chapter office at 9 am; return at 5 pm. Carpool contact: 301-277-7111.

Invasive Species Tool Kit

The Lower Shore Land Trust is offering a free, online *Invasive Species Tool Kit* to identify, remove weeds on your land. Residents can also report invasive clusters in their neighborhood, parks, public lands. Info: lowershorelandtrust.org/resources.

Chesapeake Bay Environmental Center

Volunteer at the Chesapeake Bay Environmental Center in Grasonville a few times a month or more often. Volunteering more than 100 hours per year earns a free one-year family membership. Info: volunteercoordinator@bayrestoration.org.

Maryland State Parks

Search for volunteer opportunities in state parks at ec.samaritan.com/custom/1528. Click on "Opportunity Search" in volunteer menu on left side of page.

FORUMS/CONFERENCES

Future Harvest conference RFP

Future Harvest is accepting workshop proposals for its 25th annual winter conference, *Nourish & Flourish: From the Ground Up*, set for Jan. 18–20 at The Hotel at UMD in College Park, MD. Workshop themes include: beginner farmer; crop production; soil health/regenerative; business & marketing; environment, community & policy; and grassfed meat & dairy. Session proposals are due Aug. 1. Speakers will be notified by Oct. 1. This RFP is designed to solicit proposals for 60-minute workshops during the main conference (Friday and Saturday). Those with ideas for farmer-to-farmer chats or pre-conference workshops (usually half- or full-day intensives) should email conference@futureharvest.org before Sept. 1. To submit a proposal: <https://futureharvest.org/2024-conference>. Info: Manager Gabi Salazar at conference@futureharvest.org.

Agriculture in the watershed abstracts

The Center for Watershed Protection is accepting abstracts for its 2023 agriculture & watershed symposium, *The Nexus Between Agriculture and Healthy Watersheds*, set for Oct. 18–19 in Fulton, MD. Topics at the in-person meeting include: agricultural best management practices for pollutant reductions; innovative practices; climate resilience; stakeholder engagement; regulatory compliance; and project implementation tools including funding resources. Submissions due by Aug 4. Web search "cwp 2023 abstracts."

EVENTS/PROGRAMS

WATERSHEDWIDE

Taste of the Chesapeake

The Alliance for the Chesapeake Bay's largest annual fundraiser, *Taste of the Chesapeake*, takes place in three locations: 6–8 pm Aug. 31 at the River's Edge at Long Level in Pennsylvania; Sept. 7 at the Blue Atlas Restaurant & Market in Virginia; and Sept. 21 at the Annapolis Maritime Museum in Maryland. The Taste, a celebration of the Bay watershed, offers live music, local food, awards and silent auctions. Tickets are \$85. Contact: allianceforthebay.org/thetaste or Mason Hendrick at mhendrick@allianceforthebay.org.

Youth Fishing Derby

Kent Island Fishermen and the Kent Island Estates Community Association invite youths from throughout the region, ages 3–16, to its free 17th *Annual Youth Fishing Derby* 8 am to 1 pm Aug. 19 at the Romancoke Pier on Kent Island. Three age groups, 3–5, 6–10 & 11–16, will compete for a trophy for the largest, smallest and most unique fish as well as the most fish caught in their age group. Only one trophy per child, who must be present to win. All participants must be accompanied by an adult. Bring rods; bait provided. Wristbands required for fishing and lunch. Registration begins at 8 am; fishing takes place 9–11 am and refreshments and awards will be presented 11:30 am–1 pm. Info: wotwater@atlanticbb.net.

PENNSYLVANIA

York County Parks

Events at York County parks are free and require registration except where noted. Info: NixonCountyPark@YorkCountyPA.gov or 717-428-1961. When registering, include number of participants, names, children's ages, phone number.

■ *Creature Corner Drop-ins*: 10 am–3 pm July 13 (*Frogs*); July 20 (*Turtles*); July 27 (*Nocturnal Animals*); Aug. 3 (*Birds of Prey*); Aug. 10 (*Moths & Butterflies*.) Nixon Park, near Jacobus. Display will include trivia, touchable objects, expert to talk to. No registration.

■ *Streamside with a Master Watershed Steward*: 2–3 pm July 16 at Nixon Park near Jacobus; July 30 at Wallace-Cross Mill Historic Site in Felton; Aug. 13 Spring Valley Park in Springfield Township. Hike to a creek to learn what aquatic life is present and how to protect streams. Bring a towel. Participants MUST wear closed-toe shoes, boots that can get wet.

■ *Nothing & Black Light Caterpillar Searches*: 8–10 pm July 28 at Rocky Ridge Park (meet at Pheasant Pavilion) or Aug. 1 & Sept. 1 at Nixon Park near Jacobus (meet at Nature Center). Stay as long as you'd like to see what insects are attracted to bright lights. If bringing a flashlight, it MUST be a high-powered BLACKLIGHT flashlight. A few of these lights will be available to borrow.

■ *Native PA Wildlife Presentation*: 2–3 pm Aug. 6. Nixon Park near Jacobus. Live animal program. Bring a blanket or camp chair. \$2. No registration.

■ *Caterpillars*: Drop-in 1:30–4:30 pm Aug. 19. Nixon Park near Jacobus. Meet live caterpillars, learn about their habitats. No registration.

■ *Nature Walk/Colors of Nature*: 2–3 pm Aug. 20. Nixon Park, near Jacobus. No registration.

MARYLAND

Horn Point summer talks

The University of Maryland's Horn Point Laboratory invites the public to free summer talks 5:30–6:30 pm at the High Spot restaurant in Cambridge. Space is limited. Register: <https://www.usmf.org/horn-point-laboratory-summer-talks>. Info: Carin Starr at cstarr@umces.edu or 410-221-8408. Talks include:

■ *A Virtual Tour of the UMCES Horn Point Oyster Hatchery*: July 18. Stephanie Alexander will discuss how the lab's oyster hatchery produces larvae, seed and spat on shell for restoration, private aquaculture, public fishery activities.

■ *From Plankton to Plastics — the Chesapeake Under a Microscope*: July 25. Jamie Pierson will introduce the audience to local waterways' tiniest creatures. Learn how they are connected to our everyday lives.

■ *Environmental Remote Sensing — How Scientists Use Satellites to Monitor the Earth*: Aug. 1. Greg Sils explores the theory, opportunities, challenges of monitoring environmental change from earth-observing satellites.

Anita C. Leight Estuary Center

Meet at Anita C. Leight Estuary Center in Abingdon, except where noted, for these events. Ages 12 & younger w/adult. Registration required for all programs; payment due at registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

■ *July Jewels Wildflower Canoe*: 9–11:30 am July 15. Ages 8+ Search creek banks, marsh for blossoms. \$15. Registration required.

■ *Critter Dinner Time*: 10:30–11:30 am July 15, 29 and Aug. 26 as well as 1:30–2:30 Aug. 5. All ages. Learn about turtles, fish, snakes while watching them eat. Free. Register by Friday before.

■ *Wonderful Worms*: 1–2 pm July 15. Ages 6+ Explore a working worm farm, go outside to find worms to feed center's animals, make gummy worms. \$12/family. Register by July 12.

■ *Summertime Seining*: 1–2 pm July 16 and 12:30–1:30 pm Aug. 13. Ages 5+ Use a 100-foot seine net to capture creatures swimming along the shoreline. Feet will get wet. \$10/family. Register at least 48 hours prior.

■ *Dragonfly Days Kayak*: 10 am–12:30 pm July 22. Ages 8+ Look for, learn about native dragonflies, their nymphs. Binoculars, dip nets, identification keys provided. \$15. Register by July 21.

■ *Meet a Critter*: 1:30 p.m. July 23 or Aug. 6 & 20. All ages. Learn about an animal up close. Free. Register at least 48 hours prior.

■ *Bonfire for Bats*: 8–9 pm July 29. Meet at Pontoon Pier. Ages 8+ Learn about bats flying overhead while roasting s'mores. \$10/family. Register by July 26.

■ *Mini Sailboat Regatta*: 1:30–2:30 pm July 30. Ages 8+ Design your own sailboat to race in a shoreline regatta. \$10/family. Register by July 26.

■ *Creek Life Discovery Hike*: 10:30–11:30 am Aug. 5. Ages 6+ Learn to ID tiny creatures in creeks, what they reveal about a waterway's health. \$10/family Register by Aug. 4.

■ *Flight of the Monarchs*: 2:30–3:30 pm Aug. 5. Ages 8+ Learn about this butterfly's lifecycle, including how it migrates 2,500 miles. Look for live monarchs in the gardens. \$12/family. Register by Aug. 2.

■ *Wildflower Wonders Canoe*: 12–2:30 pm Aug. 6. Ages 8+ Glide through marsh at high tide to look for wildflowers. \$15.

■ *Bosely Beaver Kayak*: 8:30–11 am Aug. 12. Ages 8+ Search for beavers, signs of their handiwork. Learn why they are so important. \$15. Register by Aug. 11.

■ *Food Web Float Canoe*: 8–10:30 am Aug. 13. Ages 8+ Discover who eats whom (or what) in & above the estuary. \$15

■ *Wetland Wanderers Kayak*: 9:30 am–12 pm Aug. 19. Ages 8+ Paddle Otter Point Creek's water trails. \$15.

■ *Butterflies of the Marsh Canoe*: 10 am–12:30 pm Aug. 20. Ages 8+ Search for butterflies amid Otter Point Creek's wildflowers. \$15.

■ *Ponds & Polliwogs*: 1:30–2:30 pm Aug. 27. Ages 4+ Use dip net in ponds, puddles to see what swims in them. \$10/family. Register by Aug. 25.

■ *Blue Supermoon Kayak*: 6:30–9 pm Aug. 30. Ages 8+ Watch the year's largest full moon of the year rise, look for what it reveals. \$15. Register by Aug. 29.



BULLETIN BOARD

Horn Point tours

The University of Maryland's Horn Point Laboratory in Cambridge is offering free walking tours through September:

- **Aquaculture Research & Ecology Laboratory:** 10–11 am Tuesdays through Labor Day. Ages 10 & older. Meet in lab's lobby for tour of the Atlantic Coast's largest hatchery. Learn Bay facts and about Horn Point's research; citizens' roles as stewards; physical oceanography of the Bay; submerged aquatic vegetation; the Bay ecosystem; oyster restoration. Park under the solar structure. Special tours can be arranged. Info: 410-221-8383 or hpl tours@umces.edu.
- **Oyster Culture Facility:** 30–60 minutes, weekdays through September. Ages preschool & older. See oysters spawn, oyster larvae, working production facility. Info: Stephanie Alexander at tobash@hpl.umces.edu or 410-221-8310.

Win cash for snakeheads

The Maryland Department of Natural Resources and U.S. Fish and Wildlife Service are continuing a northern snakehead tagging program to spur the removal of this invasive fish. Up to 500 snakeheads will be tagged in the Gunpowder River, upper Chesapeake Bay tributaries, and Mattawoman and Nanjemoy creeks of the Potomac River. Harvest a yellow-tagged snakehead to receive \$10, or \$200 for a blue tag. Report the tag number to the phone number on the tag, then email a picture of the harvested, tagged snakehead to DNR. Only harvested snakeheads (those removed from the water & not returned) with a tag number reported by the end of 2024 qualify for rewards. Info: web search "DNR snakehead incentive."

MD Junior Ranger program

The Maryland Junior Ranger Program for children, ages 3–14, includes hiking, games, crafts. Participants can earn three achievement awards: basic, advanced & expert. After reaching the expert level, they can earn patches in self-guided levels: naturalist, explorer, conservationist, guide. To earn Junior Ranger status, children must attend all sessions. Check with park for availability. Info: Melissa Boyle Acuti at Melissa.boyle@maryland.gov. To download the Junior Rangers Adventure Guide, web search "MD jr rangers 2023 guide." Upcoming Sessions:

- **Harriet Tubman Underground Railroad State Park:** 10 am–3 pm Tuesday–Sunday. Ages 5+ Info: michaelg.fray@maryland.gov.
- **Seneca Creek State Park:** 9 am–12 pm July 17–21. Ages 11–14. Info: dylan.wagner@maryland.gov.
- **Seneca Creek State Park:** 9 am–12 pm July 31–Aug. 4. Ages 7–10. Info: dylan.wagner@maryland.gov.
- **Janes Island State Park:** 9 am–12 pm Aug. 2–4. Ages 7–13. Info: Mark.Herring@maryland.gov.
- **Martinak State Park:** July 24–28. 6 pm for ages 4–6 and 7 pm for ages 7–11.

Free museum passes at libraries

In a partnership with the Annapolis Maritime Museum, each of the 16 branches of the Anne Arundel County Public Library have added family admission passes to their *Library of Things* catalog. The passes, good for the general admission for up to four people during regular museum public hours, can be checked out for free with a library card for seven days and can be picked up or returned at any Anne Arundel County public library.

Cruise St. Michaels Harbor

Chesapeake Bay Maritime Museum in St. Michael's is offering drop-in cruises aboard its floating fleet Fridays–Sundays & select Mondays. These 45-minute *Harbor Highlights Tours* explore St. Michaels Harbor, its history. Fee: \$25. Cruises dependent on marine conditions. Web search "CBMM cruises."

DNR photo contest

The Maryland Department of Natural Resources is accepting entries for its annual photo contest through 5 pm Aug. 1. It's open to resident or out-of-state novice & professional photographers. Entries may include wildlife, flora, recreation or landscapes from any year as long as photos were taken in Maryland. Contestants may submit three entries for \$10. Additional entries (no limit) are \$3 each. First, second, third place awarded for each season. A grand prize will be awarded to one of the first place winners. Winning entries will be featured in *Maryland Natural Resource* magazine, DNR's 2024 calendar. Best overall photo receives \$500, a one-year Maryland State Park and Trail Passport, magazine subscription, five calendars. First, second, third place winners also receive prizes. Vote for a fan favorite on facebook.com/MarylandDNR, and the winner will be printed in the calendar and magazine. Info: Web search "DNR photo contest."

Fishing report

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

Free museum admission for military

St. Mary's County Museum Division, through the *Blue Stars Museum Program*, is offering free admission to St. Clement's Island (does not include water taxi) and Piney Point Lighthouse museums for actively serving members of the armed forces and up to five family members until Sept. 4. The military ID holder can be either an active-duty service member, their spouse or other dependent family members with the appropriate ID card (Geneva Convention common access card, DD Form 1173 ID card or a DD Form 1173-1 ID card).

The active-duty member does not have to be present for family members to use the program. Info: 301-769-2222.

Patuxent Research Refuge

Patuxent Research Refuge's National Wildlife Visitor Center on South Tract [S], and the refuge's North Tract [N], both in Laurel, offer free public programs. Preregistration required, except where noted. Note special accommodation needs when registering. Registration: 301-497-5887. Info: 301-497-5772; <https://fws.gov/refuge/patuxent-research/events>. List: timothy_parker@fws.gov.

- **Kids' Discovery Center - July/Nocturnal Animals & August/Rotting Trees:** 9 am–12 pm (35-minute time slots, on hour) Tuesdays–Saturdays. Ages 3–10 w/adult. Crafts, puzzles, games, nature exploration; free booklet. Large-group special arrangements possible. Registration strongly recommended: 301-497-5760.
- **Monarch Magic Center:** 9 am–4:30 pm Tuesdays–Saturdays. All ages. Daily sign-ups (in-person only) at Info Desk. Help release adult butterflies at noon if they're ready to fly; call to check. See all monarch butterfly life stages live. No registration.
- **Easy Butterfly-Habitat Gardens:** 2–3:30 pm July 8 & Aug. 12 [S]. All ages. Plant/take home free native species for a mini wildlife refuge.
- **Photo-Adventure Scavenger Hunt:** Drop in 9:30 am–1 pm July 22 & Aug. 12 [N]. Ages 10+ Use clues to hunt for sculptured stones, mystery objects, plants, animals; learn about refuge's history/features. Requires driving 1–2 miles, then walking short distances near trails. Bring camera/cell phone. No registration.
- **North Tract Bicycle Trek:** 10 am–12:30 pm July 22 & Aug. 19 [N]. Ages 10+ See wildlife, plants, historical sites on 12-mile guided ride. Weather-dependent. Rough road may be unsuitable for narrow tires. Bring bike, snack, water bottle, helmet.
- **Pollinators in a Pot:** 2–3:30 pm July 22 & Aug. 5 [S]. All ages. Create a wildlife home in limited patio, deck space. Take home plants for pollinators.
- **Junior Wildlife Ranger:** 10–11:30 am Aug. 12 [S]. Ages 6–10. Explore nature-related activities with a ranger, complete booklet, earn a JWR badge.
- **BARK Ranger Training:** 2–3:30 pm Aug. 12 [S]. All ages (participating youths w/adult). Upon completion, your dog can monitor trails as a certified B.A.R.K. Ranger.
- **Family-Fun/Welcome Wildlife to Your Yard:** Drop in 10 am–1 pm Aug. 25–26 [S]. All ages. Activities, crafts. Learn how to build a mini habitat. No registration.
- **Evening Wildlife Hike at Cash Lake:** 5:45–7:45 pm Aug. 26 [S]. Ages 12+ Look for wildlife; learn about habitats/refuge management during leisurely hike around Cash Lake. Bug spray, binoculars recommended.

Outdoor museum adventures

St. Mary's County Museums invites visitors of all ages to outdoor activities that encourage them explore nature and the outdoors through curiosity and play. Events take place 12–2 pm. Price is included with museum admission. Registration is encouraged to ensure there are enough materials for participants. Play is rain or shine. If there are weather safety concerns, call ahead.

- **Piney Point Lighthouse Museum/Beach Combing:** Aug. 12. Admission \$7; \$3.50/students, senior citizens, military personnel. Info: (301) 994-1471 or Facebook.com/1836Light.
- **St. Clement's Island Museum/Hibernate, Migrate or Adapt:** Sept. 9. \$3; \$1.50/ages 6–18; free/ages 5 & younger. Info: 301-769-2222, Facebook.com/SCIMuseum.

Drayden school open houses

The St. Mary's County Museum Division, in partnership with the Unified Committee for Afro-American Contributions, are offering free open houses at the Drayden African American Schoolhouse in Drayden, 11 am–2 pm Aug. 5, Sept. 2 and Oct. 7. Volunteers will share stories about schoolhouse's history & importance to education in St. Mary's County, how African American students learned in this school up until the mid-20th century. Special programs for school, bus, tour groups can be arranged as well as individuals who would like to visit outside open house hours. Info: 301-994-1471, facebook.com/DraydenSchool.

African-American driving tour guide

Beach to Bay Heritage Area's *African-American Driving Tour* brochure: *StoryWays, A Journey of Faith & Freedom on Maryland's Eastern Shore*, is available. The self-guided tour of 29 sites highlights places and people that have made a significant impact to the region. Email info@beachesbayswaterways.org to receive a free copy.

RESOURCES

NOAA interpretive buoys

The National Oceanic and Atmospheric Administration's Chesapeake Bay *Interpretive Buoy System* offers real-time weather and environmental conditions, info about Capt. John Smith's voyages in the 1600s. Buoys are located at Annapolis, Gooses Reef, Potomac, Stingray Point, York Spit, Jamestown and First Landing. Visit buoybay.noaa.gov/about/about-system-to-download-app.

Hats off to watershed champs and Flanigan award winners



By John Montgomery

The Alliance for the Chesapeake Bay presents the Watershed Champion and Fran Flanigan awards as special recognition for leadership and dedication to cleaner rivers and streams of the Chesapeake Bay. This year's awardees have thoughtfully considered how to push the boundaries between science, the environment and art, demonstrating exemplary stewardship and profound impacts on the Bay.

Fran Flanigan Award: Penny Gross

Penny Gross is a 27-year veteran of the Fairfax County Board of Supervisors in Virginia. First elected in 1995 to represent the county's Mason District, she's been a longtime advocate of expanded public transportation, affordable housing and diversity.

When she announced her decision not to run for reelection in 2022, Board Chair Jeff McKay praised Gross for her leadership and lasting legacy. The board is extremely grateful, McKay said, for the legacy Gross built for others and the leadership attributes and respect she brought to the table.

Gross, who says she looks forward to continuing to serve the county, also writes a weekly column in the *Falls Church News Press* and hosts the monthly television show, *Mason Matters*. She is a founding member of Friends of Mason District Park.

Her work has been extraordinarily impactful, for her district and beyond, and the Alliance is proud to honor Gross with the Fran Flanigan Award.

VA Watershed Champions: Tim Harper and Matt Lively

With experience in finance, found-object kinetic sculpture, multimedia installations, public art and graphic design, Tim Harper has a keen interest in multidisciplinary projects that occupy the space between science and art. His work has been shown throughout the Mid-Atlantic, and he has taught kinetic sculpture to children and adults.

Matt Lively, a recipient of the 2012 Theresa Pollak Award for Excellence in the Arts, is a painter, sculptor, film producer and muralist who has contributed to collections around the world. Matt has taught at Virginia Commonwealth University in Richmond, the University of Richmond, the city's Visual Art Center and the Virginia Museum of Fine Arts Studio School.

Matt and Tim began collaborating in early 2013 and quickly found that their strengths as artists were complementary. Their combined installation work includes a rainwater harvesting system sculpture at Richmond's Binford Middle School, designed in collaboration with students from the school and the Alliance for the Chesapeake Bay; an illuminated mural for Dominion Energy, highlighting the company's renewable energy assets; a sculpture project for the city's Fulton commercial district; and a forthcoming installation for Bon Secours Health Care that celebrates the historical significance of their West-hampton property in Richmond.

PA Watershed Champion: Jodi Sulpizio

Jodi Sulpizio is a natural resources educator for Penn State Extension in York County and coordinates its Master Watershed Steward Program and Spongy Moth Program. She teaches residents about stormwater best practices, drinking water safety and watershed management. As the master watershed steward coordinator, Sulpizio supervises more than 80 volunteers who are educating residents about water resources and implementing best management projects. Formerly, she was a naturalist for York County Parks and Manheim Township Parks.

Sulpizio is passionate about empowering both citizens and volunteers to protect our natural resources. She is now training York County's eighth class of Master Watershed Stewards. Since 2016, stewards in the county have volunteered more than 20,000 hours and have taught watershed basics to more than 34,000 people. Together, they have planned and completed many successful projects.

Sulpizio particularly enjoys planting streamside buffers and rain gardens and educating youth. She also coordinates York's annual "Street 2 Creek" storm drain art project and looks forward to continued endeavors to help make streams and rivers cleaner for both local communities and the Chesapeake Bay.



Tim Harper and Matt Lively, who received the Watershed Champion award from the Alliance for the Chesapeake Bay, created this combination art installation and rainwater collection system at Binford Middle School in Richmond, VA. (Tim Harper)

MD Watershed Champion: Jodi Rose

Jodi Rose, executive director of Interfaith Partners for the Chesapeake, graduated from the University of Illinois with a degree in biochemistry and worked in the environmental consulting field for 15 years, managing soil and groundwater remediation projects and later running her own consulting firm. As a volunteer in her Catholic parish, she spearheaded several environmental and social justice programs that engaged fellow parishioners to live out their faith in action.

It was during this time that Rose decided to shift into nonprofits to work at the intersection of faith and the environment. She became the executive director of IPC in 2013 and has grown the IPC staff from one to 10 employees, increased its revenue tenfold and expanded the organization's network to encompass hundreds of congregations.

DC Watershed Champion: Julie Lawson

Julie Patton Lawson is a talented connector and communicator, coalition builder, entrepreneurial advocate, marketing professional and project manager. She is a respected leader in engaging diverse

communities in the restoration of the Bay. Lawson has developed multiple local, state and national coalitions to advocate for cutting-edge legislation and programs to protect neighborhoods and waterways.

She currently serves as the coordinator for education and workforce development strategy for the DC Department of Energy and Environment, with a focus on supporting environmental education and opportunities at Anacostia High School and the University of the District of Columbia. Previously, Lawson served in the cabinet of Mayor Muriel Bowser as the director of the Mayor's Office of the Clean City. She was also the founding executive director of the nonprofit Trash Free Maryland.

Lawson also chairs the Citizens Advisory Committee to the Chesapeake Bay Program. Serving on several boards and committees informing education policy, she is passionate about restoring the Anacostia River so that it can be a full recreational, economical and natural resource for all Washingtonians to enjoy. ■

John Montgomery is communications and social media coordinator for the Alliance for the Chesapeake Bay.

Beyond bird feeders, think native plants and their insects



By Alonso Abugattas

Many of us enjoy feeding birds. It's a good way to get close to them and may help some survive during severe weather.

But feeders alone will not help birds raise their young. That requires insects. According to University of Delaware Professor Douglas Tallamy, a noted wildlife ecologist and author of *Bringing Nature Home—How You Can Sustain Wildlife with Native Plants*, 96% of our land birds feed insects to their young, with caterpillars being the most necessary. The vast majority of these insects need *native* plants to thrive and proliferate.

Even birds that are known to eat seeds, such as Carolina chickadees, cannot thrive without feeding insects to their young. It takes about 9,120 caterpillars to raise a brood of three young chickadees. A study conducted in the Washington, DC, area and published in 2013 in *Proceedings of the National Academy of Sciences* put the magic number for native flora at 70%. That is, for there to be enough insects to support a population of Carolina chickadees, 70% of the plant biomass in their habitat must be native.

No matter how much bird seed is available, without enough insect protein, young birds will not survive, according to Tallamy. In fact, if the native plant biomass is under that threshold, many chickadees won't even breed — or if they do, the nests will have 1.5 fewer eggs, 1.2 fewer young will fledge and those that do fledge will be smaller and less viable adults.

When it comes to supporting wildlife, the grand champion native tree is the mighty, ever-nourishing oak — with more than 600 species of animals and insects relying *solely* on oaks to survive.

In addition to providing shelter and nesting locations, oaks support about 60 bird species and 40 mammal species with their acorns.

Just as important, oaks are home to more than 500 caterpillar species. Add to that another 600 or so other insect species — from gall-making insects and wood-boring



Yellowneck caterpillars feed on oak leaves. Native oaks are host to more than 500 species of caterpillars. (Shane Harris/public domain)

beetles to treehoppers and leafhoppers. It is indeed a keystone plant! Compare that to nonnative trees like ginkgoes (0 caterpillars), zelkovas (0 caterpillars) or the ubiquitous crape myrtle, which supports only three caterpillar species.

Another extremely valuable native tree is the black cherry, aka wild cherry — which, in addition to providing fruit to many birds and mammals, hosts more than 400 caterpillar species. Eastern red cedars are home to 42 caterpillar species and produce fruit that feeds scores of bird species, including cedar waxwings.

But that's just the beginning of a long list of trees, shrubs and even garden bed perennials that support birds and other wildlife. Here are a few that might be appropriate for your yard or garden. (The numbers of caterpillar species given here and elsewhere come from Tallamy's data.)

Serviceberries (*Amelanchier* species), beautiful springtime shrubs with white flowers loved by pollinators, provide a ton of nutrition for wildlife. Their fruit is eaten by more than 40 bird species, and even more birds feed on the 120-plus caterpillars that use these shrubs as host plants. Mammals also eat the fruit; more than 24 species are known to include them in their diets. (This doesn't count people, who enjoy planting this as edible landscaping.)

Dogwoods (*Cornus* species) are another favorite with a ton of wildlife value. The



A cedar waxwing eats a berry from an eastern red cedar, photographed in southeastern Pennsylvania. (Stan Lupo/CC BY-NC-ND 2.0)

berries (botanically called drupes) are eaten by about 100 bird species, including tanagers, woodpeckers and catbirds. Native dogwoods, including the smaller shrub varieties, host more than 100 caterpillar species. Sixteen mammal species are also known to eat the fruit of some dogwood varieties.

Another great wildlife shrub is **elderberry** (*Sambucus* species). More than 120 bird species are known to feed on the berries — from catbirds, thrashers and finches to waxwings, warblers and woodpeckers. The latter love to eat the pupae of *Osmia* and *Ceratina* bees, which nest in cavities in the plants' stems. Elderberries also attract 42 caterpillar species.

Plus, more than a dozen mammal species are known to eat their fruits. This includes humans — though the prevailing advice is to not eat them raw, as this can cause nausea and other unpleasantities.

There are many native shrub options, but what if you need smaller plants? Many native plants with tube-shaped red flowers attract hummingbirds. Favorites include **cardinal flowers** (which host four caterpillar species), **coral honeysuckle** (37 caterpillars),



A Carolina chickadee brings a caterpillar to its nest, hidden in a dead tree trunk in Ellicott City, MD. (Will Parson/Chesapeake Bay Program)

trumpet creeper (seven caterpillars), **wild columbine** (12 caterpillars) and **scarlet bee balm** (seven caterpillars).

Nectar feeders for hummingbirds are only partially helpful — because a hummingbird's diet needs to be 80% insects, according to Tallamy, especially when they're feeding their young.

For a nice fall bloomer, consider the various **goldenrod** (*Solidago*) species — not just beautiful but very adaptable, with close to 40 species in the region covering a range of growing conditions. Their abundant seeds feed many bird species, and the plant is host to 115 caterpillar species and dozens of other insects. If you're worried about an allergic reaction to goldenrod, don't. You're thinking of goldenrod's distant cousin, ragweed — same family (*Asteraceae*) but a wholly different genus.

There are many, many more plants I could mention here, but the main thing to bear in mind is that next link in the food chain. When choosing plants for the sake of birds, yes, think seeds and berries. But also think beyond that: Consider planting native flora that brings insects to the table. ■

Alonso Abugattas, a storyteller and blogger known as the Capital Naturalist on social media, is natural resources manager for Arlington County (VA) Parks and Recreation. He is filling in this month for regular On the Wing columnist Mike Burke.

Intervention brings brown pelican back from the brink



By Kathy Reshetiloff

I was in North Carolina the first time I saw a brown pelican (*Pelecanus occidentalis*) and was immediately taken by this odd bird. Brown pelicans may look gawky on land, but when they take to the skies, they fly with elegance.

There are several subspecies of brown pelican, and the eastern or Atlantic variety (*P. occidentalis occidentalis*) is the smallest and considerably smaller than its continental cousin, the American white pelican. The eastern brown is nevertheless a sizable bird, weighing 8–10 pounds and measuring up to 54 inches long, with a wingspan of 6–7 feet. It has a chestnut and white neck, a white head, pale yellow crown, brown back, grayish bill and pouch, and black legs and feet.

This bird can remain in flight for hours at a time using slow, powerful wing beats. While flying, it draws its head in between its shoulders, stretches out its broad webbed feet and flies in perfect silence. It's also a strong swimmer. Young pelicans — before they can even fly — have been clocked swimming at 3 miles per hour.

Pelicans are primarily fish eaters and require up to 4 pounds of fish a day. They have extremely keen eyesight and can see a single fish from 70 feet above the water. Once they spot a meal, they abruptly fold their wings and drop from the air, diving straight as an arrow into the water, sometimes submerging completely before surfacing with a mouthful of fish.

Suspended from the lower half of a pelican's long, straight bill is a pouch that is used as a dipnet. The pouch holds the pelican's catch until the water, as much as 3 gallons, is squeezed out. The pouch also serves as a cooling mechanism, as well as a feeding trough for young pelicans.

These are social and gregarious birds. Males and females, juveniles and adults, congregate in large flocks for much of the year, nesting in colonies mostly on small



Ungainly physique notwithstanding, the bird is a graceful flier and expert swimmer. (Cindy Elder/CC BY 2.0)

coastal islands — which offer protection from predators and flooding.

Newly hatched pelicans, like many young birds, are blind, featherless and completely dependent upon their parents. They soon develop a soft, silky down, followed by feathers. The average age at first flight is 75 days.

Young are fed with great care, with partially digested fish that the adult disgorges on demand. For the youngest chicks, the parent drops mashed fish into the youngster's extended throats. Later they feed them whole fish, and finally the parent merely places the fish on the edge of the nest.

Although more common to the southeast, brown pelicans have been nesting in the lower part of the Chesapeake Bay since 1987. More recently, they have moved

northward into the mid Bay, on islands near the Virginia-Maryland border.

Brown pelicans have few natural enemies. Their biggest threat has been people. In the late 1800s and early 1900s, pelicans were hunted for their feathers. After World War I, pelicans were hunted because it was thought that they were depleting commercial fisheries. And, as with other large fish-eating birds, use of the pesticide DDT in the 1940s and '50s decimated the pelican population by compromising the strength of their eggshells.

Several efforts curbed the decline of brown pelicans. Early on, passage of the Migratory Bird Treaty Act in 1918 gave protection to pelicans and other birds from feather collectors. Studies proving



Brown pelicans have few natural enemies. (Dave Hensley/CC BY-NC-ND 2.0)



This brown pelican was photographed in Key West, FL. Although more common to the southeast, they have been nesting in the lower part of the Chesapeake Bay since 1987. (Will Pollard/CC BY-ND 2.0)

the pelicans were not harming commercial fisheries also helped to stop illegal hunting.

In 1970, the brown pelican was listed as an endangered species, affording it more protection, and in 1972 the use of DDT was banned in the United States.

Together, these actions have helped to bring brown pelicans back from the brink. By 1985, their numbers on the Atlantic and Gulf coasts had rebounded to the point that they could be removed from the endangered species list in that part of their range. By 2009, they had recovered throughout the rest of their range.

Although the species is doing well on the Atlantic Coast, threats remain. The disturbance of nesting colonies, birds caught on fishhooks or entangled in monofilament line, and oil or chemical spills still pose a threat to this wonderful bird.

Yet these potential threats are situations we can prevent — by protecting known colonies during nesting, disposing fishing gear properly and enforcing laws that reduce the possibility of spills in our waters. ■

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office in Annapolis.