CHESAPEAKE
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Independent environmental news for the Chesapeake region

Celebrating 30 YEARS

Raking up Bay grasses in a bid to restore them

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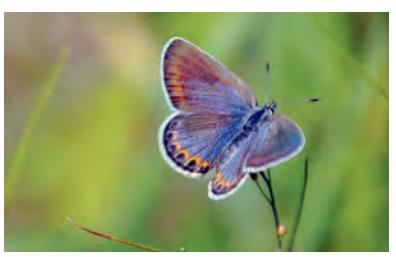
INSECT DECLINE



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LOCAL LEADERSHIP

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THE MOUTH OF THE BAY

Paddle at the southern tip of VA's Eastern Shore PAGE 28

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James Berry, public works director for Chesapeake Beach, MD, holds oysters retrieved from a reef that town residents have been restoring. The oyster tissue was sent to an independent lab to be tested for PFAS contamination.
See article on page 12.
(Courtesy of Chesapeake Beach, MD)

CORRECTION

In the July-August issue, the article about water quality testing in Virginia should have stated that the bacterial levels are evaluated over a 90-day time period, not a 9-day time period. We apologize for the error.

ON THE COVER

Mark Lewandowski (left) and Mike Naylor of the Maryland Department of Natural Resources harvest horned pondweed from the Wye River to collect seeds for spring restoration projects. (Dave Harp)

Bottom photos, left to right: Jill Utrup/U.S. Fish and Wildlife Service; Courtesy of Lancaster Clean Water Partners; Dave Harp

EDITOR'S NOTE

Invite, respect local input

I'm from Pennsylvania. I grew up in the Potomac River watershed around the east branch of Antietam Creek. That's pretty far upstream from the Chesapeake Bay, so it may come as no surprise that, for most folks in that area, the health of the Bay is generally not a high priority.

About 25 years ago, when I first started doing Bay-related work, I attended meetings in Annapolis packed with people passionate about clean water and healthy ecosystems. Even then, they were asking how they could get people upstream in Pennsylvania to care more about a clean Bay. My answer, unspoken at the time, was that they might use the word "Bay" a little less often. What's good for the streams is good for the Bay. And Pennsylvanians care about their streams.

Ad Crable's article, *PA hands over lead for Bay cleanup plans to counties,* brought those moments to mind. That's because Pennsylvania's latest strategy for achieving its share of Bay goals emphasizes local leadership. One outcome, Ad writes, is that conservation efforts are touted as a way to improve local streams rather than the far-off Bay.

Investing in local knowledge, and respecting local perspectives, really matters. As a county official once said to me, "People who *live* in a place *know* things." And, I would add, they have the power to change things. In this issue, for example, you'll read about a Virginia community that helped put the brakes on a power plant.

Regional leaders have long said that the health of the Bay's 64,000-square-mile watershed depends greatly on what people do, or don't do, at the community level. That's no small thing. Average people must sacrifice a lot of precious time and energy to engage with local projects and policies. Sometimes their input is welcomed. Sometimes it's not.

Regardless of our backgrounds or political leanings, I believe that pretty much everyone cares about where they live. The more our civil structures support meaningful engagement with local residents, the more we all have to gain. And the more that community residents find even a small amount of time to ask questions, speak up, share ideas and volunteer, the better our solutions will be.

— Lara Lutz

BY THE numbers

193,574
The number of shad passed over the Conowingo Dam fish lift in 2001

0
The number of shad passed over Conowingo Dam in 2020 and 2021

29
In inches, the maximum length of a hellbender, the largest salamander in North America, which requires clean water to survive. It is Pennsylvania's state amphibian.

70.5
In billions, the number of gallons of fresh water that flow into the Bay in an average day

58
Percent of Bay watershed covered by forests

80
Percent of forests privately owned, most in tracts of less than 25 acres

62.07
Average global temperature in July, which was 1.67 degrees higher than normal, making it the warmest July on record

The saga of American shad: fading from the Bay region

American shad once supported the most valuable commercial fishery in the Chesapeake Bay region. In colonial times, spring spawning runs of shad and other herring were so great that people referred to rivers as "running silver" in the spring and densely packed fish were crushed by wagons crossing streams. The construction of dams, which prevented shad from reaching their historic spawning grounds, along with overfishing, pollution and other habitat degradation, have left the shad population at record lows. Commercial fishing for shad has been banned in the Bay for decades. (Photo / Dave Harp)

Some facts about American shad

- Their Latin species name, *sapidissima*, means most savory or most delicious.
- They spend most of their lives in the ocean but typically return to native rivers to spawn around age 5.
- Females broadcast 30,000–600,000 eggs into the water over several days.
- Fertilized eggs are carried by river currents and hatch within 7–10 days.
- An American shad may swim more than 12,000 miles during its lifetime.
- Adult shad can reach lengths of 20–24 inches, but 30-inch fish have been reported.
- Although many shad die after spawning, many others survive and spawn again in future years.
- Most juvenile shad migrate to near-shore coastal areas by fall, though some will remain in rivers and estuaries for up to a year before reaching the ocean.

LOOKING BACK

Celebrating 30 YEARS AT WORK FOR YOU

30 years ago

Criteria for Bay critters

In a landmark document, the Bay Program identified in detail for the first time the water quality conditions and other habitat factors that 31 important Bay species need to survive and proliferate. ■

— Bay Journal, September 1991

20 years ago

Strong shad runs reported

Shad returned to the Susquehanna in record numbers. Strong runs were reported in Virginia and Maryland, too, marking what seemed to be a continued turnaround for a troubled species. ■

— Bay Journal, September 2001

10 years ago

Poultry power! Plants turning chicken litter into fuel, fertilizer

Officials in Maryland and Virginia were taking a hard look at turning poultry litter into fuel, both to enhance water quality and to help make the region energy-independent. ■

— Bay Journal, September 2011

ABOUT US

The *Chesapeake Bay Journal* is published by Bay Journal Media, an independent nonprofit news organization dedicated to producing journalism that informs the public about environmental issues in the Chesapeake Bay watershed. The *Bay Journal* is available in print and by email and is distributed free of charge, reaching approximately 100,000 readers each month. The print edition is published 10 times a year, and bundles are available for distribution at offices, libraries, schools, etc. Material may be reproduced, with permission and attribution.

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A hatchling loggerhead sea turtle makes its way to the ocean off Hilton Head Island in South Carolina. (Ad Crable)

What we did on our summer vacation

The *Bay Journal* staff spent their summer vacations traveling to far-flung parts of the country, some returning with stories to tell.

My family ventured out west to Colorado and Wyoming. I'd visited western states many times and lived there for a while, but I hadn't returned in 20 years. What was striking is how evident the impacts of climate change, which really wasn't much of a discussion topic back then, have become.

Mountains once clearly seen in the distance were obscured by smoke drifting in from wildfires in Oregon. We shuffled plans to escape the "heat dome" sweltering some areas. And the campground where we initially headed closed the week before we arrived after being inundated by a deadly flood, caused by a deluge of rain running off areas left barren by wildfires last summer. It was far from what I expected (and remembered), and which it may never be like again.

Ad Crable spent a week in South Carolina's Lowcountry on Hilton Head Island. In the subtropical beaches along the Atlantic Ocean, he serendipitously stumbled upon hatchling loggerhead sea turtles emerging from the sand at dusk during high tide and making an energetic, if meandering, journey to the ocean. Once reaching the surface, they use the downward slope of the beach and the shine of moonlight and stars on the water to find their way home.

He said the spectacle reminded him of the miracles all around us, wherever we are on this Earth.

And **Jeremy Cox** ate a lionfish in Florida. Go ahead and Google it, he said. It is one exotic-looking fish. It turns out that this popular aquarium species is wreaking havoc across ocean ecosystems. So, in Florida and elsewhere, authorities are encouraging chefs and restaurant patrons to eat them. It's a good thing he didn't do an internet search before eating one, he said, because he probably would have stopped cold, likely at the "venomous" part. But when prepared correctly, he reported, lionfish sports a light, delectable white meat.

"I'm not a picky eater, but I'm also not terribly adventurous," he says. "My dining experience in the Sunshine State gives me courage to continue eating invasive species. Look out, snakeheads! I'm coming for you!"

— Karl Blankenship

Senate set to vote on funding for reconstruction of Bay islands

The U.S. Senate Appropriations Committee has signed off on $37.5 million in spending that could launch the reconstruction of James and Barren islands in the Chesapeake Bay.

The Aug. 4 approval sets up a vote before the full Senate. The legislation will then undergo negotiations between the House and Senate to merge their differing versions of the measure, which is part of the $53 billion Energy and Water Development Appropriations bill.

The current House bill does not include the James and Barren funding.

The $1.9 billion undertaking, called the Mid-Chesapeake Bay Island Ecosystem Restoration, will rebuild two eroding islands off the coast of Dorchester County, MD. In all, it will create more than 2,100 acres of new land.

The fill will be dredged from the shipping channels for the Port of Baltimore, keeping the lanes open for cargo traffic.

The funding would cover the first year of planned construction. Critically, this moves the effort past the "new start" phase, where projects can languish for years, said Sen. Ben Cardin of Maryland.

Clump by clump, Maryland's Barren Island is washing into Tar Bay and the Honga River. (Dave Harp)

"The project will build the resiliency of Dorchester County communities, provide new habitats for a variety of fish and wildlife, support commerce at the port and enhance safety for boats and ships navigating the Bay," Cardin said. "Having worked for years to make this vision a reality, I am heartened to announce that we are finally taking decisive steps toward giving the Mid-Bay Island Project what it needs to move forward in earnest." ■

PA group wants $1.3 billion in state funds returned for conservation use

After two Pennsylvania Supreme Court victories, an emboldened environmental group is asking a court to force the state to return $1.3 billion in oil and natural gas revenue that the group says should have been spent to support natural resources but was instead used to plug holes in the state budget.

The Pennsylvania Environmental Defense Foundation didn't waste much time after the state's highest court ruled in July that money derived from the lucrative practice of hydraulic fracturing under state forests must be used to conserve and maintain public natural resources under the state's Environmental Rights Amendment.

Less than a week later, the foundation asked the Pennsylvania Commonwealth Court to have the money generated by natural gas leases, royalties, bonus and rental payments from 2009–20 returned to the state Department of Conservation and Natural Resources.

That includes $383 million taken from the DCNR's Oil and Gas Lease Fund to balance the state budget, $800 million used to pay for the agency's operating expenses so general taxpayer funds weren't used, and $200 million used to pay counties throughout the state for the economic and environmental impacts of fracking.

In a separate case before the Supreme Court, the foundation is seeking clarification on whether operating expenses for the DCNR is a valid use of the money. The group maintains it is not.

See **BRIEFS**, *page 6*

briefs

From page 5

The court's latest decision gave more clarity to its blockbuster 2017 ruling that Pennsylvania's Environmental Rights Amendment compels the state to protect public lands, including state forests, for future generations.

John Childe, the foundation's attorney who has fought the diversion of funds for 12 years, said the group's ultimate goal is to protect the state's 1.6 million acres of state forests where Marcellus Shale gas has been found. He hopes that enforcing limits on the use of the revenue will reduce the pressure to lease state forestland for fracking. "We're not trying to chase the money here. We're trying to stop them from destroying the forests," he said. ■

Full length of Chesapeake Country byway gets national designation

The Chesapeake Country All-American Road is now part of America's Byways, a collection of 150 distinct and diverse roads designated by the U.S. Secretary of Transportation.

The Chesapeake Country route runs more than 400 miles through Maryland from Chesapeake City to Crisfield on country roads along the edge of the Chesapeake Bay. The designation as one of America's Byways is expected to expand tourism and economic development opportunities along the route.

Previously, only part of the Chesapeake Country route, from Kent County to Queen Anne's County, was considered a national scenic byway. ■

Robert Orth honored for research on Bay's underwater grass beds

Robert J. Orth, a leader in underwater grass research in the Chesapeake Bay region, was recently recognized with the prestigious Odum Award for Lifetime Achievement in Estuarine Sciences by the Coastal and Estuarine Research Federation. The award recognizes scientists who made important contributions to the understanding of estuaries and coastal ecosystems.

Among other achievements, Orth helped to launch the annual Baywide underwater grass survey, which assesses how the critical resource is faring.

Orth, who recently retired from the Virginia Institute of Marine Science, was a co-recipient of the award, along with Kenneth L. Heck, Jr., a marine scientist with the University of South Alabama who also works with underwater grasses.

Orth and Heck started their work in the Chesapeake Bay as students in the 1970s and went on to estuarine research careers, often collaborating during later decades.

CERF noted that the nomination letter for Orth and Heck stated that "both candidates have shaped our understanding of seagrasses and marine ecology — through a series of foundational papers, edited volumes and synthetic reviews. Moreover, their science has had a lasting societal impact through their long and successful track record of integration with management and policy."

Scientist Robert J. Orth examines an eelgrass bed in 2006. Orth was recently recognized with the Odum Award for Lifetime Achievement in Estuarine Sciences. (Dave Harp)

Combined, Orth and Heck have authored nearly 500 publications and co-authored 56. Their reviews and syntheses have brought attention to the vulnerabilities of underwater grass beds to human stressors and climate change, highlighted their global decline and raised awareness of the need for restoration efforts for seagrasses in the conservation world.

Orth's seagrass work helped to define the water quality conditions needed for grass recovery in the Chesapeake, a driving factor for today's nutrient and sediment reduction efforts. He also documented how climate change has impacted eelgrass, one of the Bay's most important grass species, and developed techniques for restoring it. ■

briefs

Virginia special session secures more funds for clean water

Virginia lawmakers in a special session in August funneled significant portions of federal funds from the American Rescue Plan Act toward projects that will help curb pollution in the Chesapeake Bay. Virginia received roughly $4.3 billion from the act.

State lawmakers approved spending $100 million on continued improvements to wastewater treatment facilities. In addition, $125 million will go toward curtailing raw sewage overflows from combined sewer systems in Alexandria, Richmond and Lynchburg. The cities have been building costly storage solutions to reduce overflows into the Potomac and James rivers and have regularly asked the state for funding to reduce the impact on ratepayers.

Another $75 million will go toward repairing, upgrading and improving septic and sewer systems that leak pollution into streams in other parts of the state. Some of that funding will be available as grants to homeowners at or below federal poverty guidelines.

Infrastructure improvements have helped Virginia toward achieving its Bay cleanup goals since 2010. The state plans to get most of its remaining pollution reductions from farm operations — an effort advocates say will require an even larger infusion of funds.

Through separate funding mechanisms, Virginia legislators also approved an expansion of a key agricultural cost-share program. Farmers will be able to receive state cost-share money to pay for not only permanent but also temporary, portable fencing that keeps livestock out of waterways. Portable fencing is often used by farmers who practice rotational grazing, which has other benefits for water quality. The program will pay farmers $250 for each charger to run electrical fencing and 30 cents per linear foot of portable fencing.

Virginia's soil and water conservation districts called the measure "a huge step forward in supporting practical and inexpensive options for protecting the water" on farms. Maryland this year increased its cost-share rate for fencing from 87% to 100% to help achieve agriculture pollution reduction goals, but its program does not cover portable fencing. ■

Kennedy Center settles alleged water quality violations

The John F. Kennedy Center for the Performing Arts in Washington, DC, has settled alleged Clean Water Act violations at its facility, the U.S. Environmental Protection Agency announced in August.

The Kennedy Center has a Clean Water Act permit regulating discharges of condenser cooling water from its air conditioning system into the Potomac River, which flows into the Chesapeake Bay.

The settlement addresses alleged violations of temperature and pH discharge limits required under the permit. The EPA also cited the Kennedy Center for failing to submit timely monitoring reports and failing to submit pH influent data. The agreement also addresses alleged violations identified by the District of Columbia's Department of Energy and Environment during an inspection of the facility.

The John F. Kennedy Center for the Performing Arts, shown here from the Potomac River, has settled alleged violations of the Clean Water Act at its facility. (Tom/CC BY 3.0)

The Kennedy Center has certified that it is now in compliance with permit requirements. As part of the settlement, the center must also submit a compliance implementation plan.

This agreement is part of an EPA initiative to reduce significant violations of National Pollutant Discharge Elimination System permits.

According to the EPA, there are approximately 46,000 facilities with NPDES permits nationwide. Approximately 20% had major violations of their permits in fiscal year 2018, reduced to approximately 16% by the end of fiscal year 2020. Violations range from exceeding effluent limits, which poses risks to human health and the environment, to failure to submit reports, which can mask serious pollution problems. ■

U.N. report paints dire climate picture for planet's future

Continued trends ensure Chesapeake Bay will be significantly altered

By Karl Blankenship

Climate change is clearly observable in every region of the planet, and the window is closing for nations to take actions that would stem the most severe future impacts, a global climate assessment concluded in August.

The report, compiled by more than 230 scientists who assessed more than 14,000 studies, cautioned that world leaders are rapidly running out of time to limit global warming to 1.5 degrees Celsius from pre-industrial levels.

Many of the changes now observed are unprecedented in thousands, if not hundreds of thousands, of years of climate records, said the latest report from the Intergovernmental Panel on Climate Change, which was created by the United Nations in 1988 and is considered an authority on global climate issues.

Even with quick action, the panel warned, that changes already set in motion — such as sea level rise — are irreversible over hundreds to thousands of years because it takes so long to counter alterations already taking place in the oceans that cover three-quarters of the planet.

Still, the report said that strong and sustained actions to curb emissions of carbon dioxide and other greenhouse gases would limit impacts of climate change, but it could take 20–30 years to see global temperatures stabilize.

> *In all likelihood, the Bay in coming decades will be unlike the Bay of the past.*

"This report is a reality check," said Valérie Masson-Delmotte, co-chair of the IPCC Working Group that released the report. "We now have a much clearer picture of the past, present and future climate, which is essential for understanding where we are headed, what can be done and how we can prepare."

The Chesapeake Bay has seen rising water levels and temperatures for decades, and the report says continued rises in sea levels and temperatures are virtually certain for most of North America, including the East Coast.

This means, in all likelihood, that the Bay in coming decades will be unlike the Bay of the past. It will be both higher and warmer than it has been since it was created after the last ice age 10,000 years ago.

Water levels around the Bay have already risen by about a foot during the last century. That's one of the fastest paces in the nation because the Bay is experiencing the dual effects of rising water and subsiding land.

NASA, using modeling data produced for the report, launched a website predicting future sea level change in different places around the globe. It shows that sea levels near Norfolk could rise between 2 and 5 feet by the end of the century and between a foot and a foot-and-a-half by 2050.

Temperature rises will cause their own problems. Bay water temperatures have risen about 1 degree Celsius in the last 25 years. That has contributed to the loss of eelgrass in the Lower Bay — a critically important underwater habitat that scientists expect to largely disappear from the Bay in coming decades. Scientists also say the rising water temperatures have increased the prevalence of harmful algae blooms.

The Bay's watershed has about 10% more precipitation on average than it did a century ago, and a 2017 federal climate report said more of that rain was coming during intense storms. The IPCC expects those trends to continue and will lead to an increased frequency of river flooding. It also expects hurricanes along the East Coast to become more severe.

The Chesapeake Executive Council, which includes the administrator of the U.S. Environmental Protection Agency, governors of watershed states, the mayor of the District of Columbia and the chair of the Chesapeake Bay Commission, which represents state legislatures, is expected to adopt a directive later this year affirming that climate change is affecting the Bay and its watershed and that urgent action is warranted. ■

New regulations credited for decrease in striped bass harvest

Report calls numbers a sign of hope for fish's recovery

By Jeremy Cox

Striped bass catches were down along the Atlantic Coast last year, an early sign that tough regulations imposed across 15 states are helping the species recover from years of overfishing.

A new report from the Atlantic States Marine Fisheries Commission estimates that in 2020 nearly 5.1 million striped bass were "removed," a figure that includes commercial and recreational catches as well as those that likely died after being caught and released.

In 2019, the Atlantic States commission, which manages estuary and near-shore fisheries from Maine to Florida, mandated that each state cut its commercial quotas by 18% compared with 2017 levels, and it limited recreational fisherman to taking home one fish per day.

Commercial and recreational fishermen significantly surpassed the 18% target, reducing removals by a total of 28% in 2020, compared with 2017, according to an annual status update unveiled at the commission's Aug. 3 meeting.

The report shows that the recreational sector last year accounted for 88% of total removals, with more than 1.7 million fish harvested and another 2.8 million assumed to have died after being released. The commercial sector removed a total of nearly 600,000 fish.

The new figures provide a glimmer of hope that the harvest limits are working, said Allison Colden, a Maryland fisheries scientist with the nonprofit Chesapeake Bay Foundation. But the news shouldn't lead to any relaxation in those standards, she added.

"We were pleased to see the reductions that folks have been taking over the past two years did take us to the target level," Colden said. "[But] I think now is not the time to loosen up. We know we have a long road ahead of us."

The new catch information is expected to play an important role in discussions leading up to the commission's first large-scale overhaul of its striped bass management plan in nearly 20 years. During its first public input phase earlier this year, the agency received more than 3,000 comments on how the species should be overseen.

A striped bass is removed from a gill net in the Choptank River. (Dave Harp / 2014)

The Chesapeake Bay was by far the epicenter of both harvests, accounting for more than 84% of all striped bass caught by the commercial sector and 46% of all landings in the recreational sector.

But the new limits were only part of the striped bass story in 2020. COVID-19 restrictions almost certainly dampened the 2020 harvest as well, experts say. One of the most affected segments was Maryland's recreational trophy season in May, which saw a nearly 50% reduction in catches, according to the new assessment.

The pandemic also disrupted some of the information-gathering from the states for the report, forcing scientists to fill in those gaps with information from 2018 and 2019. Colden said that issue was less of a concern in Maryland and Virginia because the holes in the data were much smaller there.

The Atlantic states commission is under increasing pressure to head off the threat of overfishing to striped bass. The New England-based nonprofit Stripers Forever recently called on the commission to enact a 10-year harvest moratorium to give the species time to boost its numbers.

A similar moratorium that began in Maryland in 1985 is widely credited with helping the fish gain a "fully recovered" designation a decade later. ■

The good, the bad and the not so lovely: views of the Bay cleanup from 2001–2010

By Karl Blankenship

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

In the summer issue of the *Bay Journal*, I reviewed lessons about the Chesapeake Bay restoration gleaned from our first decade of reporting. From 1991–2000, our articles reveal that the region was busy defining major challenges. From 2001–2010, we explored how difficult it would be to grapple with them. But there were bright spots: Science informed debates over a nonnative oyster, and management action pulled blue crabs back from a worrisome decline. The Bay gained a water trail, and a big dam got blown up. Here are some of the high and low points, as viewed through *Bay Journal* headlines.

The Chesapeake 2000 Agreement *included a goal to reduce the rate of "harmful" sprawl in the Bay region by 30%. (Dave Harp)*

A dubious debate

One goal in the state-federal *Chesapeake 2000 Agreement* was to reduce the rate of "harmful" sprawl by 30%. But, as we chronicled in many articles, the Bay Program couldn't agree how to define sprawl or measure it. By the November 2002 issue, the debate had reached this conclusion: *Bay Program to count all sprawl as 'harmful' in setting goal*. But they were still trying to determine how much of it was taking place.

To invite a foreign oyster, or not

From September 2001: *Dream come true or nightmare? Foreign oysters raise hopes for some, worries for others.* The story highlighted research at the Virginia Institute of Marine Science with *Crassostrea ariakensis*, an oyster species from China that is resistant to the diseases plaguing native oysters. Debate over whether to introduce the nonnative species to the Bay raged most of the decade and was featured in dozens of our articles. Ultimately, the idea was rejected: *Introduction of Asian oyster too risky for Bay* (May 2009). But research conducted in conjunction with the effort proved to be a boost for aquaculture efforts with native oysters.

A reservoir that would not die

The battle over Newport News' proposal to build a massive reservoir two counties away festered the entire decade. The project would have flooded more than 400 wetland acres, fragmented forests with pipelines and put a water intake in the middle of shad spawning ground. Permits were rejected repeatedly, only to have those decisions succumb to political pressure. The headlines tell the story: *Corps reverses decision on reservoir* (November 2002). The Virginia Marine Resources Commission denied a permit because of concerns over shad impacts. Then: *Commission reverses decision on Mattaponi intake permit* (September 2004). At the federal level, the U.S. Fish and Wildlife Service raised concerns. Then: *USF&WS drops objection to Newport News reservoir project* (October 2005). Finally, in 2009, a federal court ruled against the permit, calling it "arbitrary and capricious."

A new park for the Bay

Bay advocates have long sought a Chesapeake Bay national park. They got part of the way there with the creation of the Captain John Smith Chesapeake National Historic Trail, a water trail that retraced the explorer's journeys in 1607–08: *Congress creates water trail marking Smith's Bay journey* (January 2007).

Blue crab action

Many articles highlighted concerns about the blue crab population. Finally, the governors agreed to act: *VA, MD slash female blue crab harvest 34%* (May 2008). Results came quickly: *Winter blue crab survey shows dramatic population increase* (May 2009). The ongoing effort to protect female spawners has been credited with helping the population stabilize at a higher level.

Estimating the tab

Many blamed the regional failure to meet Bay restoration goals set for 2000 on inadequate funding. So they tried to put a price tag on the cleanup. The Chesapeake Bay Foundation was first: *$850 million a year needed to fix the Bay, according to CBF* (May 2001). Then: *Maryland tab for Bay goals put at $7 billion* January–February 2002). Virginia was soon out with estimates, too, though just for pollution reduction efforts, which it put between $1.7 and $2.7 billion: *VA comes up with cost for cleanup; now it must come up with money* (March 2002). By that December, the Chesapeake Bay Commission had a say: *Analysis puts Bay cleanup tab at $19 billion*.

Discharge permits

The biggest impact on Bay water quality was not the total maximum daily load established in 2010. It was this less-noticed action that we highlighted in March 2005: *New discharge permits in watershed to require nutrient limits.* The EPA and Bay states would now set enforceable nutrient limits on the more than 350 major dischargers in the watershed. That produced the region's greatest nutrient reductions, and rapidly: *Wastewater plants close to reaching 2010 objectives* (February 2008).

Criteria for a clean Bay

It's wonky, but identifying the amount of dissolved oxygen needed by the Bay's aquatic life and the amount of light needed by underwater plants was critical to quantifying the nutrient reductions needed to achieve clean water goals. From July-August 2001: *Bay Program unveils draft criteria for a clean Bay.* The criteria, adopted by states by the middle of the decade, were a major scientific achievement and the backbone of today's pollution control efforts.

Taming dams

Helping fish move upstream of dams has long been a regional goal. But the best solution is to have no dam at all. Dam removal became a priority, with the most dramatic example being the demolition of Embrey Dam on Virginia's Rappahannock River: *Embrey Dam removal opens 100s of miles of river to fish* (April 2004). Many more were removed, albeit less dramatically: *Chesapeake Bay region leads nation in dam removals* (November 2005).

Road to the TMDL

The *Chesapeake 2000 Agreement* aimed to clean up the Bay by 2010, but our articles documented that the region was far off track: *A long way to go & not much time to get there* (January 2006). And, two years later: *Not nearly on pace to meet goals* January 2007). Even the EPA acknowledged it: *EPA report indicates 2010 cleanup deadline will not be met* (April 2006). We then covered the development of the more enforceable TMDL, whose release was announced in our last issue of the decade: *EPA, in announcing new TMDL, says it will finally clean up the Chesapeake Bay* (January–February 2011). ■

VA county fends off natural gas plant, but battles continue

Larger power station, new pipeline proposed for beleaguered area

By Whitney Pipkin

A company planning to bring one of two natural gas-fired power plants to Charles City County, VA, said this summer it is abandoning the project. It's a partial victory for residents who have been opposing the C4GT power plants and other new natural gas infrastructure in the rural county for years.

But a larger power plant, the Chickahominy Power Station, also fueled by natural gas, is still in the works for the county. Developers of that power plant, which has already garnered key permits from the state, say the county along the James River southeast of Richmond is ideally located between growing Northern Virginia and Hampton Roads, two corners of the state where "electricity demand is expected to increase with the many data centers planned and under construction in the region."

But the county's 7,000 residents — 46% of whom are Black and 7% Native American — have largely opposed the pair of projects, along with the expansion of a landfill, citing environmental justice concerns.

"These power plants and industries are not going to help anyone in our majority-minority rural area," said Wanda Roberts, co-director of the group Concerned Citizens of Charles City County, or C5. "The character of our rural county is up for grabs right now."

Virginia residents Wanda Roberts (left) and Cynthia Robinson, co-directors of Concerned Citizens of Charles City County, or C5, celebrate the cancellation of a natural gas-fired power plant they've opposed for years. (Dave Harp)

Common thread

Advocates for clean water have increasingly been fighting new natural gas infrastructure (not just the pipelines, but also compressor stations, which repressurize the gas to keep it moving) in communities they say are already overburdened with environmental impacts. Though the sprawling Atlantic Coast Pipeline — opposed all the way to the U.S. Supreme Court — was canceled last year, the Mountain Valley Pipeline is still under way in Virginia and seeking permits for additional infrastructure.

A new air pollution permit application for the Lambert compressor station in Pittsylvania County, intended to pump gas for the Mountain Valley Pipeline, is seen as a test of the state's commitment to environmental justice because of its potential to impact local air quality.

Before the Atlantic Coast Pipeline was canceled, a federal judge had ruled in early 2020 that the Virginia Air Pollution Control Board failed to properly weigh environmental justice concerns in issuing an air permit for one of its compressor stations in Buckingham County. The board is now being asked to decide on a similar permit for the Pittsylvania compressor station, slated for review in September.

"It's an interesting place to be in," said Taylor Lilley, environmental justice staff attorney for the Chesapeake Bay Foundation. "At the same time the Virginia [general] assembly has put out the Clean Economy Act and the Environmental Justice Act, we are seeing an increase in these projects and an increase in discourse about the role of these projects in Virginia's energy portfolio and the way the state should address these projects as a whole."

Virginia's Clean Economy Act, passed in 2020, requires energy companies to produce electricity entirely from nuclear and renewable sources by 2050. Companies will have to retire electric generating units that emit carbon, such as those fueled by burning natural gas.

Still, that gives new natural gas infrastructure, which emits less carbon than coal-fired power plants, a few decades to run. But there is debate over whether there is currently enough demand to justify what are often privately funded natural gas projects.

The C4GT's downfall

The C4GT power plant had been on shaky regulatory and financial ground for months leading up to NOVI Energy's decision in July to cancel the project. The State Corporation Commission in December rejected a proposal by Virginia Natural Gas to expand its pipeline infrastructure largely to supply the new power plant, questioning the demand for the project.

Opponents celebrated the SCC's decision as a major setback for the company just as its construction permit was set to expire. But, on the day it would have elapsed, NOVI Energy poured concrete and set up fencing to meet their permit's requirements that would allow construction to begin. But that work slowed and stopped in the early months of 2021. In March, gas supplier Virginia Natural Gas sued NOVI Energy for breaking the terms of a financial agreement between the two companies. The Charles City County Board of Supervisors voted in April to essentially take back the 88 acres of land that had been given to NOVI for the C4GT plant.

"Everyone was holding their breath and realizing how poorly managed this project was and how detrimental this project would be for the county," Lilley said.

A reporter for the *Richmond Times-Dispatch* was the first to hear that NOVI Energy was pulling the plug on the power station, and he relayed the news to the members of C5.

"We are thrilled that the C4GT power plant will not be built here," Roberts said a few weeks later. "We feel like our community won."

Around the same time, though, some residents received notice that the Chickahominy Power Station was taking another step forward. A company called Chickahominy Pipeline sent letters to property owners saying it plans to build a gas pipeline through Charles City and surrounding counties. Though pipeline details and the identity of its backers are still unclear, residents have begun their research, buoyed by the recent victory.

Lawyers from the Chesapeake Bay Foundation and Southern Environmental Law Center have asked the air board to reopen its decision to grant a permit to the 1,650-megawatt Chickahominy Power Station. They argued in a March letter that the state's environmental justice analysis for the power station found many of the same defects as the Buckingham permit that was overturned by the Fourth Circuit Court of Appeals.

Still, Lilley said, having the C4GT project canceled "shows that tireless public engagement works."

"But when you're dealing with a community that's continuously selected for these projects," he said, "you don't get much of a rest." ■

‘Forever chemicals’ from Navy lab flowing into Chesapeake

PFAS found in nearby streams, wells, fish, oysters

By Timothy B. Wheeler

David Harris grew up on a farm next door to the Naval Research Laboratory-Chesapeake Bay Detachment. He recalls camping with his scout troop on the 168-acre base overlooking the Bay, and drinking water from the small stream that flows from the Navy property onto his family’s farm.

Until recently, much of what went on at the facility just south of Chesapeake Beach, MD, was a mystery to Harris. But at times in his youth, he said, “big plumes of black smoke” rose over the facility. His mother told him their crops sometimes got a dusting of sooty ash.

Now 50 years old and still living next door, Harris worries about the health risks he and his family may have been exposed to from their military neighbor.

The Navy disclosed recently that it has found high levels of so-called “forever chemicals” in soil, groundwater and streams — not only on the base but beyond its fence line, including in the stream that flows through the Harris farm. Per– and polyfluoroalkyl substances, or PFAS, also have been detected in a few off-base wells, including one that Harris and his family drank from for years.

“I am just freaking out a little bit, having grown up my entire life by the base and now raising my family here on the farm,” he said during a virtual meeting in May at which the Navy disclosed its findings.

It may be hard to picture, but the seemingly quiet lab campus, with its mix of aging Quonset huts and modern radar domes, has some of the worst PFAS contamination of any military installation in the country. It’s earned a mention in the “Filthy Fifty Act,” a bill introduced this summer in the U.S. Senate that would set testing and cleanup deadlines for the most PFAS-contaminated defense sites in the country.

PFAS are a group of more than 9,000 highly persistent chemicals, many of them toxic, which have been in wide use since the 1940s. They are found in everyday consumer products such as nonstick cookware, pizza boxes and stain repellants. Their use in fire-fighting foams, though, has resulted in widespread PFAS contamination around airports and military bases nationwide.

Nationwide, PFAS have been detected at more than 300 military sites, including at least 10 in the Bay watershed, according to a report by the nonprofit Environmental Working Group.

“The Bay really stands out,” said Scott Faber, the group’s senior vice president of government affairs. “There’s no other resource, not the Great Lakes, not the Gulf of Mexico or any other resource, where the Department of Defense has such a significant presence and where there’s been testing done that creates cause for concern.”

Engineering technician Stanley Karwoski extinguishes a fire during a test at the U.S. Naval Research Laboratory near Chesapeake Beach, MD. The test was part of an effort to compare the firefighting performance of foams that don’t contain PFAS and those that do. (U.S. Navy/Jonathan Sunderman)

The Naval Research Laboratory - Chesapeake Bay Detachment in Calvert County, MD, is used to test methods and materials for radar, radio, optical systems and fire control. Fire suppression tests have been conducted there since 1968, often using firefighting foam containing PFAS. (Timothy B. Wheeler)

Fire testing legacy

Since 1968, fire suppression tests have been conducted at the Chesapeake lab, one of several field sites for the Naval Research Laboratory, which is headquartered in the District of Columbia.

The Navy says its firefighting tests in Calvert County are now done under controlled conditions, some indoors. But for roughly two decades, the service acknowledges, those tests were conducted on a concrete pad outdoors, and the PFAS-laden foam was allowed to run off and soak into the ground or drain into an unlined pond nearby.

In 2017, the Navy found 234,000 parts per trillion of perfluorooctane sulfonate, or PFOS, and 14,900 parts per trillion of perfluorooctanoic acid, or PFOA, in shallow groundwater on the base.

Of the many PFAS compounds in use, the U.S. Environmental Protection Agency has issued health advisories for only those two, recommending that drinking water contain no more than 70 parts per trillion of either or both. But a growing number of states, including Pennsylvania and New York, have already acted or begun to set their own drinking-water limits, often lower than the EPA’s guideline and for more compounds.

The health effects of all PFAS aren’t clear, but studies have found that two of the most widely used and studied compounds, PFOS and PFOA, can cause reproductive, developmental, liver, kidney and immunological effects in laboratory animals. Both chemicals have also caused tumors in animals.

The Navy initially didn’t plan to look for PFAS off-base because it hadn’t detected any in the Piney Point aquifer, which county records indicate was the source for drinking water wells in the community around the base.

“We had to plead and beg,” David Harris said, to get the Navy to test the shallow well on the family farm. It’s only used for agricultural purposes now, he explained, but it was the family’s household drinking water supply when he was growing up. “I know I was on that well for 18 years,” he said.

In 2018, the Navy tested 42 private wells outside its fence line. Last year it reported

that PFAS turned up in four, including the Harris farm well, though levels of PFOA and PFOS did not exceed the EPA's guideline.

On the base, the Navy reported that shallow monitoring wells in the fire suppression testing area detected up to a 175,000 parts per trillion combination of PFOS, PFOA and one other compound.

Soil sampled around the old burn pad detected nearly 4,700,000 parts per trillion. Samples from deeper underground yielded even higher levels, in one spot nearly 8,000,000 parts per trillion. Those data suggested that the PFAS had seeped down into the ground, said Ryan Mayer, the Navy's remedial project manager.

Most troubling to Harris and others was the contamination of surface water in streams at the site that flow into the Bay. PFAS levels in a stream flowing from the facility's north side measured nearly 5,500 parts per trillion. Levels in the stream flowing southeast off the Navy property onto the Harris farm were lower, about 220 parts per trillion. But farther downstream, where that unnamed creek re-enters Navy property by its wastewater treatment plant outfall, the PFAS levels jumped to nearly 1,400 parts per trillion.

Fish contamination concerns

"We have all this PFAS flowing into the Bay," Harris said. "That's a huge concern," he added, or ought to be, for anybody eating oysters, crabs or fish caught nearby.

Stream flows from a pipe emerging past the fence line of the Naval Research Laboratory in Calvert County, MD, onto private property. The Navy detected PFAS in the water upstream and also downstream after it flows back onto lab property before emptying into the Bay. (Timothy B. Wheeler)

It certainly struck a nerve in Chesapeake Beach, a resort town of around 6,000 residents just north of the lab.

"We have a very large charter boat business here in town," said Larry Jaworski, a member of the town council, who sits on the Navy lab's restoration advisory board. Residents have been voluntarily raising oysters in town for several years, he noted, to restore a large reef offshore in the Bay.

Prompted by the Navy disclosure, officials had the town's well-based water supply tested, which detected no PFAS. They checked swimming waters at the Bayfront park on the south side of town, which found low levels.

Finally, in July, the town's public works director went out and collected oysters from the reef local residents had been restoring. He also hooked some fish just offshore from the Navy lab.

An independent lab found 1,000 parts per trillion of three PFAS compounds in one oyster and a slightly lower amount in a second. It found 2,450 parts per trillion in striped bass and 9,470 parts per trillion in white perch caught just beyond the end of the Navy lab's pier.

Jaworski said he found the results "a little bit alarming," but also noted that it's hard to know what to make of them because there are no federal standards for what is safe to consume in fish or other foods.

MDE spokesman Jay Apperson said the agency doesn't know enough about how the samples were collected, but it deems the PFAS levels found in Chesapeake Beach oysters to be below the "risk-based consumption screening criteria" it developed last year.

It also said the PFAS levels in the fish pose little risk, assuming that adults don't make a meal of such fish more than 48 times a year and that children — the most sensitive to long-term exposure to contaminants — eat the fish no more than 28 times a year.

In the wake of high PFAS levels found in groundwater at Naval Air Station Patuxent in St. Mary's County, an independent lab analysis last year found higher levels in an oyster, blue crab and striped bass caught there. The MDE analyzed oysters from the same waters but turned up "no levels of concern," the agency reported.

Environmentalists say the lack of federal standards for PFAS in water or food leaves the public uncertain and vulnerable. They also fault the Department of Defense for not acting more promptly to deal with PFAS contamination at its bases.

"It's important to answer a very simple question," said the Environmental Working Group's Faber. "Which bases are contaminated that may be contaminating our crabs, oysters and seafood, [and] when does DOD plan to clean it up?"

James Berry, public works director for Chesapeake Beach, MD, and Emily Grace, who works at the town's wastewater treatment plant, fillet fish caught offshore of the Naval Research Laboratory before sending them to an independent lab to be tested for PFAS contamination. (Courtesy of Chesapeake Beach, MD)

The Navy expects to file a final report soon with the MDE on its site investigation at the Bayfront research lab. Next up is a more extensive remedial investigation, which will assess the risks to human health and the environment as well as evaluate what can be done.

David Harris said he's frustrated that studies only seem to lead to more studies.

"I know it's almost impossible or very difficult for the government to try and clean water that's in the wells or in the ground," he said. "But when it's coming out of these streams, and they have the high numbers like they do, shouldn't they be responsible for damming it, filtering it and then passing it back again? ... They should be doing something to remove it."

Denise Keehner, assistant MDE secretary overseeing the state's PFAS response, said the Department of Defense has "drawn a pretty firm line" in its commitment to focus first on dealing with any drinking water contamination that exceeds the EPA's health advisory levels.

But she said state regulators have been pressing the Pentagon in recent months "to do more sooner."

Kaley Laleker, head of the MDE's Land and Materials Administration, said the Navy has been urged to look into the viability of treating the contamination in the streams themselves, or possibly preventing PFAS-laden groundwater from reaching them. Another option, she suggested, might be "targeted soil removals."

Robin Harris, David's wife, has a more pressing personal concern. She said she's asked if her husband or his mother, who lives with them, should have their blood tested for PFAS because they may have been exposed to it for years.

"People didn't even have an answer how to even go about it," she said. "But I think it would be better [to do it] sooner than later." ■

Biologists use trucks to help shad reach spawning ground

MD, DE resumed hatcheries, no fish were stocked in PA, VA

By Karl Blankenship

The long-running effort to get American shad back to their historic spawning grounds this year enlisted a tool that had been abandoned two decades ago: trucks.

With operation of the multi-million dollar fish lifts halted at Conowingo Dam, biologists resorted to capturing shad below the dam and trucking them upstream before releasing the fish back into the Susquehanna River to continue their spawning migration.

By the time the trucks stopped running on June 5, they hauled more than 6,300 shad upstream. That's a fraction of the number that swam upriver during historic shad runs, but it's the most to have gotten past the first three dams on the river in more than a decade.

And it wouldn't have happened without the trucks. Fish lifts at the 94-foot-high dam have not operated for two years because of concerns that invasive species such as northern snakeheads and blue catfish were moving upstream through the fish lifts, too.

"From a shad perspective, we feel like in the short term it is best to get as many to the spawning grounds as we can," said Sheila Eyler, who coordinates fish restoration efforts on the Susquehanna for the U.S. Fish and Wildlife Service.

American shad definitely needed the helping hand.

Shad are an anadromous species, which means they spawn in freshwater but spend most of their lives in the ocean before they return to their native rivers to spawn. Their migrations once numbered in the tens, even hundreds, of millions. But overfishing, dams, water pollution and other problems have devastated the population.

Shad were the Bay's most valuable fishery as recently as the 1950s, estimated numbers have plummeted along most of the East Coast and most Bay tributaries. Major efforts in recent decades have tried to boost populations, either by getting more fish past dams to spawning grounds or releasing hatchery-raised fish into rivers.

Those efforts have been hampered by the poor performance of fish passages and by reduced funding for hatcheries. As recently as 2000, roughly 36 million hatchery-reared shad were stocked in as many as nine rivers around the Bay, but that number has plummeted as hatchery operations have been cut back.

American shad, shown here at a Conowingo fish lift in 2013, were once the Bay's most valuable species, but their populations are approaching record lows in many rivers today. (Dave Harp)

Last year, no shad were stocked as hatcheries were closed by COVID-19. This year, stocking efforts resumed in Delaware and Maryland, where a combined total of about 2.5 million small shad were stocked in the Nanticoke, Choptank and Patapsco rivers.

But Pennsylvania's Van Dyke Hatchery, which stocks the Susquehanna, did not produce any shad for a second year because it was unable to obtain eggs.

Josh Tryninewski, who oversees the hatchery for the Pennsylvania Fish & Boat Commission, is hoping new contracts and funding will be in place next year to collect eggs on the Potomac River for the hatchery.

Fish passages on the Susquehanna have failed to get significant numbers of shad upstream to reproduce on their own despite tens of millions of dollars spent by utilities since 1990 to build giant fish lifts that scoop shad out of the water and hoist them over Conowingo and two upstream hydroelectric dams. A fishway was built at a smaller fourth dam to allow fish to swim by.

Trucks had been hauling shad upstream, sometimes tens of thousands in a year, until 2000 when all of the passages were completed. But because the passages never operated as well as anticipated, the number of fish moved upstream declined.

In a new operating license, Exelon Corp., which owns Conowingo, committed to spend millions of dollars to improve fish lifts at the dam. Biologists hope those improvements, coupled with upgrades at passages at the other dams, will eventually help get more shad to spawning grounds.

In the meantime, Exelon has committed to trucking up to 100,000 shad a year upstream. But Eyler said it will take several years to reach that number because infrastructure at the dam needed to catch shad and move them to trucks must be upgraded.

State and agency officials, she said, wanted to get started this year so that people could be trained to move larger numbers in future years.

Meanwhile, biologists are hoping the trucked fish released near Columbia, PA, this spring produce young of their own to make up for this year's lost hatchery production.

Many of the Chesapeake's rivers depend heavily on stocking to maintain shad populations. On the James River, Patrick McGrath, a VIMS biologist who works on its annual shad survey, said their data suggest that the strength of the spawning run is closely tied to the number of hatchery fish released five or six years earlier.

VIMS' annual shad index for the James this year showed the worst numbers since it began in 1998. The state stopped stocking shad in the river in 2018, and McGrath expects the figures to get worse in the next few years, when hatchery-reared fish begin making up less of the spawning run.

"What dismal numbers we see are still propped up by the hatchery," he said. "In the next two or three years, it's unfortunate, but we should see further declines."

The nearby York River had its second-worst shad run this year, according to the index.

On the Nanticoke, Johnny Moore, a fisheries biologist with the Delaware Department of Natural Resources and Environmental Control, said shad seem to be increasing. Hatchery fish continue to account for a about a third of the shad surveyed. Which, he said, is the goal.

"We just want to supplement the actual wild population," Moore said. "I don't want to get to the point where our system is depending on our hatchery."

Chuck Stence, a fisheries biologist with the Maryland Department of Natural Resources, said recent surveys show that the Patuxent River, where the state stopped stocking shad a decade ago, continues to have shad. The numbers increased this year, he said, and surveys suggest hatcheries are helping populations rebuild on the Choptank and Patapsco rivers, where stocking continues.

But two rivers are doing well without any stocking. The VIMS data show that the Rappahannock River population seems to be rebounding. That could be the result of the removal of Embrey Dam in 2004, which reopened the river to migrating fish, McGrath said.

"The Rappahannock makes me feel good after I fish on the James," McGrath said.

And, the Potomac River Fisheries Commission reported continued strong shad runs on that river this spring, which has maintained the most robust population in the Bay region. ■

Wegmans distribution center faces fresh opposition in VA

New factors include air quality concerns and historic designation for Brown Grove

By Whitney Pipkin

Opponents of a sprawling Wegmans distribution center slated for Hanover County, VA, say new developments underline their concerns about the project, which recently gained a key federal permit.

Plans for the $175 million distribution center to serve the growing grocery brand's East Coast stores were announced in late 2019. The complex would be built on a 217-acre property that, while near a regional airport, has been forested and relatively untouched for decades.

The surrounding area is also home to a community founded by freedmen and freedwomen after the Civil War. And Brown Grove, with about 200 homes on rural, wooded lots already has a landfill and a concrete plant, raising environmental justice concerns about another industrial-scale facility.

"In the past, we have been the community of least resistance," said Renada Harris, who grew up in Brown Grove and is a member of the Brown Grove Preservation Group that formed over concerns about the project. "But now, we're learning to fight back."

Despite growing public opposition, the county, state and federal government have granted the project almost all of the permits needed to begin construction. But new air pollution concerns associated with backup generators, along with a new historic designation for the surrounding community, could complicate those approvals.

On June 17, the state issued a historic designation to the entire Brown Grove community after recognizing the Brown Grove Baptist Church as historic in February. The most recent nod gives more defined boundary lines to the community and includes two historic churches, grave sites and the remains of the 1927 Brown Grove School.

The original environmental justice screenings for the project were based on a census tract that includes a larger, more economically and racially diverse area than Brown Grove alone. Advocates say outlining this specific community could have made a difference at the outset but it may be too late to have an impact now.

On the same day in June, the U.S. Army Corps of Engineers granted Wegmans a permit to impact nearly 15 acres of wetlands, clearing what appeared to be the project's last permitting hurdle.

The permit also details in a memo how developers should handle several archaeological resources located at the site, including remnants of the school, a 1700s dwelling and the potential findings of human remains from unmarked graves.

At a property owned by her grandparents in Brown Grove, Harris recently walked with her relatives Diane Smith Drake and Alonzo Dendy to a plot with a few dozen graves marked by headstones. The family members explained how they almost all descended from an early resident of Brown Grove named Caroline Morris, pointing out a back corner of the plot where the Morris name first appears on headstones.

"All these graves here are mothers and daughters and fathers buried together," Harris said. Then, gesturing to a Morris headstone that stands on its own near the edge, "We suspect that there are more graves back there."

On another property that abuts the Wegmans land, Chris French, environmental justice chair for the Hanover County NAACP, pointed out soils with characteristics that he said are signatures of wetland soils. He and others have asserted throughout the process that the corps did not properly tally the amount of wetlands that will be impacted by the construction.

French also contested technical aspects of the corps' decision to issue the wetlands permit, which happened at the same time that the corps released the results of a federal study to determine whether the project would have a significant environmental impact. That environmental assessment is required by the National Environmental Policy Act and is intended to inform the permitting process.

"With them releasing it simultaneously, there's a significant question as to whether they followed adequate protocols according to law," said French, adding that "all legal options" are being considered.

"In the past, we have been the community of least resistance," said Renada Harris, who grew up in Brown Grove, VA. She is a member of the Brown Grove Preservation Group, which formed over concerns about a Wegmans distribution center proposed for the property behind her. Two industrial facilities are already located in the community. (Dave Harp)

A Wegmans spokesperson has yet to respond to an email requesting comment.

The Hanover County NAACP is among the groups suing the State Water Control Board over its decision to approve permits for the project, which would impact more acres of wetlands than originally anticipated.

And the project's final site plan approved in July raised new concerns about previously undisclosed aspects of the project that could contribute to air pollution.

The final site plan, approved by Hanover County in July, made room for three to five emergency diesel generators that had not been included in the original concept plan. The generators, which emit pollutants when running, require an air pollution permit from the state.

French said these generators were news to him when a colleague spotted them on the approved plans in July. He said they should have been considered as part of the federal environmental review process.

"Something as large as five tractor-trailer-size emergency generators … is a substantial deviation from the concept plan," French said.

County officials wrote in an update to their website on July 16 that, while "neither the compactor nor the generators were shown on the conceptual plan approved by the Board of Supervisors," such "ancillary equipment … [is] not typically shown on a conceptual plan at the time of zoning. Those details are usually included in the site plan."

The update also said that Wegmans only plans to use three generators during the initial phase of development and no more than one additional generator at full buildout.

Hanover County wrote on its website that staff had already required modifications to an earlier site plan that would have placed the generators along Sliding Hill Road to move them to a "location more central to the project." The generators also would need to fall under noise ordinances and be limited to running for maintenance purposes during evening and overnight hours, the county stated.

David Paylor, director of the Virginia Department of Environmental Quality, which would issue the air permit, wrote in an email to French on July 13 that his department had not yet seen an air permit application from Wegmans for the project's generators. The permitting process would address concerns about how often the generators would run, emitting pollutants that could impact human health and the environment.

"Members of Brown Grove will be the most impacted," French said. So far, he said, "no one has bothered to look at the real impacts." ■

Mike Norman of Anne Arundel Community College and Mark Lewandowski of the Maryland Department of Natural Resources harvest horned pondweed from the Wye River for re-seeding elsewhere in the spring. (Dave Harp)

Raking up Bay grass beds in a bid to restore them

Grant helps partnership ramp up seed harvesting on MD's Eastern Shore

By Timothy B. Wheeler

Restoring the Chesapeake Bay's depleted underwater meadows is a painstaking process, requiring lots of elbow grease, savvy and patience. Paradoxically, it begins by pulling up a little of what's left of the critical aquatic habitat.

Standing knee-deep in the Wye River on Maryland's Eastern Shore, Elle Bassett and a handful of helpers raked clumps of wispy green grass from the water one warm June day. They piled the vegetation, known as horned pondweed, in orange plastic baskets for transport by boat to shore.

"This one is easier than others to harvest," noted Bassett, the Miles-Wye Riverkeeper. Some species of Bay grass are more firmly rooted in the bottom, she explained, and have to be collected one handful at a time.

For the last four years, Bassett and other staff and volunteers with the nonprofit group ShoreRivers have been working with experts from the Maryland Department of Natural Resources and Anne Arundel Community College learning how to restore Bay grasses.

"We're doing what I would call a 'technology transfer'" said Mike Naylor, a DNR biologist specializing in the Bay grass restoration effort who was on hand to help.

Now, with a $75,000 grant from the Chesapeake Bay Trust, ShoreRivers has ramped up its efforts, with a focus on mid and upper Eastern Shore waters. Their aim: to double the state's overall restoration capacity.

A lot is at stake. Bay grasses, also known as submerged aquatic vegetation, or SAV, are a vital component of the Chesapeake ecosystem. They provide food and shelter for waterfowl, turtles, fish, blue crabs and other creatures. They also consume some of the excess nutrients that foul the water, clearing it up and infusing it with fish– and shellfish-sustaining oxygen. For those reasons, the grass beds are closely monitored as an indicator of the Bay's health.

Like the rest of the Bay, the grasses need all the help they can get. Historical photos show that they once covered at least 185,000 acres of the bottom of the Chesapeake and its tributaries, and probably much more. But by 1984, with the Bay suffocating from nutrient and sediment pollution, the coverage had dwindled to just 38,227 acres.

Bay grasses are so important to the estuary's health that federal, state and local agencies and nonprofit groups have been trying for decades to restore them, with mixed results.

Rebound, then regression

A few years ago, it looked like the Bay's grasses were rebounding quite well on their own. By 2018, aerial surveys spotted underwater vegetation growing across more than 100,000 acres of Bay and river bottom, well on their way to achieving the restoration effort's goal of having 130,000 acres by 2025.

Water quality has proven to be a major factor, both in the past decline of the Bay's aquatic plants and in the recovery seen so far. Like upland vegetation, underwater grasses need sunlight to grow. But sediment or nutrient-fed algae blooms cloud the water, which stunts or even kills the plants.

"It really only required a modest improvement in water quality for SAV to improve," noted Brooke Landry, a DNR biologist and chair of the federal-state Chesapeake Bay Program's SAV workgroup.

But 2018 and 2019 brought heavy and persistent rains, which clouded the water and altered its salinity — another critical factor for sustaining certain species of underwater vegetation. The Bay's grasses shrank by 33% in 2019 and by another 7% in 2020, the surveys found.

Now, manual grass restoration efforts, which seemed almost superfluous just a few years ago, have taken on renewed importance.

"I think every little bit does help," Landry said.

For a while, in the 1990s and early 2000s, comparatively more money and effort were put into replanting lost aquatic grasses. There were some notable successes, such as the restoration of eelgrass beds in

the seaside bays of Virginia.

In Maryland, biologists at Anne Arundel Community College figured out how to raise Bay grasses from seeds collected from the wild. They set up an aquatic plant nursery capable of producing batches of underwater vegetation.

Around 2000, the Chesapeake Bay Foundation and the DNR teamed up to get students in more than 300 Maryland schools to grow aquatic vegetation in their classrooms and then take it out to plant on the Bay's bottom.

Those broad-scale efforts succeeded in replacing some missing grass beds in places such as the Severn and Magothy rivers in Anne Arundel County. But they were "expensive, time-consuming and laborious," Naylor said. The results also proved to be spotty overall, and funding dried up.

Out of necessity, the effort shifted to a lower gear.

"Instead of doing huge projects, we've been concentrating on small-scale restoration efforts of an acre or less," Landry said. They've also chosen to skip the logistical challenges of raising aquatic plants in nurseries or classrooms and instead sow the seeds directly on the bottom.

The aim, she said, is to plant about 20 acres a year, roughly evenly divided between Maryland and Virginia.

"We started working with waterfront homeowners," she explained, "planting little, tiny half-acre projects, just placing seeds offshore." Those have worked, she said, in places like the upper Chester River.

"The hard part is collecting and processing seeds," Landry added. Care must be taken to find grass beds lush enough that they can afford to give up some seeds and still sustain themselves. Collectors limit their harvests to no more than a third of those beds.

Miles-Wye Riverkeeper Elle Bassett displays a clump of horned pondweed collected for its seeds. (Dave Harp)

Focus on the Shore

The aerial SAV surveys conducted by the Virginia Institute of Marine Science help to identify candidate sites for seed collection, but ground-truthing is still vital.

The patch of horned pondweed harvested in June had never been spotted from the air, noted Bassett, the Miles-Wye Riverkeeper. It was instead discovered by a ShoreRivers volunteer who routinely scouts local waters to check on grass beds.

Shore Rivers, a coalition of four Eastern Shore riverkeeper organizations, is focusingis its efforts on restoring grasses in the four Bay tributaries in the mid and upper Shore. Of the rivers in those regions, only the Sassafras has a healthy stock of underwater vegetation, which has at times met and even exceeded the acreage goals set by the federal-state Bay Program. It's lost ground lately, though, like much of the rest of the Bay.

Grass coverage in the other rivers — the Chester, Miles-Wye and Choptank — is well below acreage targets considered sufficient for ecosystem health.

Complicating restoration efforts: Each river has a different type or mix of underwater vegetation — horned pondweed, widgeon grass, redhead and wild celery — each with its own characteristics and optimal growing conditions.

"SAV is almost as elusive as crabs in determining their patterns," said Annie Richards, the Chester Riverkeeper.

The grasses harvested by ShoreRivers staff and volunteers are taken to Chestertown, where the group has forged a partnership with Washington College to process and store the seeds for replanting the next spring. They've built a "turbulator," a sort of Rube Goldberg contraption on the grounds of the college's new Semans-Griswold Environmental Hall. It is based on a prototype built by Anne Arundel Community College.

In the turbulator's big, water-filled fiberglass tank, ShoreRivers staff and volunteers dump in batches of Bay grass to give them hot tub-like baths. Shopvacs churn the water, beginning the process of separating the tiny grass seeds from their stalks. The seeds and some plant matter sink to the bottom, where they're drawn out by draining the tank.

Staff and volunteers must meticulously cull the seeds from plant debris by hand.

Chester Riverkeeper Annie Richards (left), ShoreRivers volunteer coordinator Amy Narimatsu and volunteer Carole Trippe feed clumps of harvested redhead grass into the "turbulator," which begins the process of separating seeds from stalks. (Dave Harp)

They first sift them through a series of wooden trays lined with successively finer screens, much as miners pan for gold. Finally, they pore over them, trying to spy and winnow out seeds that don't look like they're ripe enough to germinate successfully later.

"Every seed counts," said Amy Narimatsu, the group's volunteer coordinator.

Once that laborious process is complete, the seeds are stored in jars and refrigerated to keep them viable until the next spring, when they'll be taken out for planting. To prevent them from being carried away by the current and ending up in the wrong place, the seeds are embedded in clumps of playground sand, which pull them to the bottom and give them a fighting chance to sprout and take root in the intended spot.

The harvesting, processing and storage all follow a tried-and-true script worked out by experts at Anne Arundel Community College. But one important challenge remains: getting the grasses to grow again where they vanished years ago.

"You can collect all the seed you want, and we are really good at keeping it and storing it properly," said Mike Norman, lab manager at Anne Arundel Community College's environmental center. "But we really have to work on getting it out in the field in successful projects."

Learning where to plant

With decades of VIMS surveys as a guide, Norman said they to try to target areas for seeding where they know grasses grew in the past.

There have been some successful plantings of redhead and widgeon grass, Norman said, but the Johnny Appleseed method of restoration is still a learning process, with misses as well as hits.

"We've been collecting seeds for a long time," he said. "We have been broadcasting seeds for a much shorter time — the past three years."

Bassett said Bay grass restoration offers ShoreRivers a way to engage more volunteers in hands-on work that directly benefits the Bay. She said she's looking forward to enlisting Washington College students in the ranks.

"For us, as riverkeeper organizations, our main mission is protecting and restoring our waterways," she said. "So we feel very much that SAV restoration is key to improving water quality."

The DNR's Naylor said he hopes the ShoreRivers undertaking can be replicated by other riverkeeper and watershed groups around the Bay. But it'll take more funding, he noted.

While the acreage they're able to restore may be small compared to what's needed, Naylor said it also helps to engage and educate the public about the value of aquatic plants, which were once routinely eradicated because boaters complained about the grasses fouling their propellors.

"We can get people involved, to care about it," he said, "so they appreciate SAV and don't look at it as a pain in the butt." ■

Native wild plant preserves established in PA

State designates 35 secret sanctuaries to protect rare plants, more to follow

By Ad Crable

Bluehearts, slender dayflower, northern hound's tongue, tall bentgrass, bearberry Manzanita, creeping sedge, small white lady's slipper, Leiberg's panic-grass: All of them are gone. Those plants once decorated the Pennsylvania landscape, but no longer.

To protect and provide ideal growing conditions for the remainder of Pennsylvania's native plant species, the state Department of Conservation and Natural Resources has established 35 wild plant sanctuaries.

To guard against poaching, the agency isn't revealing the locations, except to say they are all in state forests, in patches ranging from five to 700 acres. The preserves contain many of the state's rarest and most threatened plants.

The DCNR means business. Approximately 30 more sanctuaries are expected to come under state protection by early next year. The agency also worked with landowners to create nearly two dozen preserves on private property where vulnerable plants have been found. And it is helping the Pennsylvania Game Commission to take similar measures on 1.5 million acres of game lands.

These moves seek to ensure that native plants are protected and managed for their importance to wildlife, pollinators, insects and biodiversity in general — as well as for their sheer beauty and to protect what some people say is their right to be a part of the natural world.

"Designation of sanctuaries assists DCNR in carrying out its mission to conserve native wild plants and ensures the protection of some of the most botanically diverse sites in the commonwealth," said DCNR Secretary Cindy Adams Dunn.

The sanctuaries are found on rocky slopes, rich forest hollows, glacial bogs, river islands, mucky peatlands, tidal mud flats and perpetually scoured floodplains along streams.

When the Pennsylvania Division of Forestry was formed in 1895, the mission was centered on woods and trees. But now plants of all kinds, from wildflowers to meadow grasses to centuries-old trees, are getting their due.

Of the 2,100 species of native plants found in Pennsylvania, about 350 are now considered rare, threatened or endangered. Some species, such as the three-seeded mercury, blue-ridge false foxglove and pink tickseed, have not been found in the state in many years, leading some to believe they are extirpated.

The DCNR is required to search for and monitor native wild plants. It enlists botanists, academics and volunteers to help with monitoring and research projects.

These runners of box huckleberry on the floor of a Pennsylvania forest are attached to a base plant estimated to be 1,300 years old. (Jaci Braund/PA Natural Heritage Program)

Blue lupine grows in a native wild plant sanctuary in Pennsylvania. (PA Dept. of Conservation and Natural Resources)

Why make such an effort to protect Pennsylvania's native plants? "Nothing exists in nature in a vacuum," said Rebecca Bowen, chief of the DCNR's conservation science and ecological resources division. "The birds and animals and trees all work depending on each other."

Also, after passage of the state's Wild Resource Conservation Act in 1982, the state Department of Environmental Resources — DCNR's predecessor — was tasked with finding and protecting threatened plants in the state, as well as augmenting populations of wild plants.

Legislators who passed the act noted that plants need to be protected "for the benefit of all," even if they aren't a resource that is eaten or harvested for other purposes.

Bowen said that the creation of plant sanctuaries shows the DCNR is "taking that charge seriously." Although, she noted, the agency has been managing many sites as plant sanctuaries as far back as the 1980s and it is only now declaring them as such.

The exact nature of protection varies according to the plants' needs and vulnerabilities. Plants such as glade spurge, white monkshood and mountain pimpernel have wire cages placed over them to keep deer from munching them to oblivion. In some cases, timbering activities and trails are banned to minimize disturbances.

Trees might be removed to bring needed sunlight to a particular species, and some areas are mowed regularly to keep competing vegetation in check. Controlled burns are prescribed for plant communities that have evolved to need occasional fire.

Invasive, non-native plants are a constant and growing threat. They can out-compete native species, alter habitats and disrupt the life cycles of native insects that depend on or support plant communities. Endangered northeastern bulrush, a type of sedge grass, is one such vulnerable species, and the state has deployed crews to clear detrimental invasive plants in and around the vernal ponds where bullrush grows.

The 1982 conservation act also called on the agency to encourage private sanctuaries wherever a rare or threatened plant might benefit from it — and the state makes professional help available to participants.

The call-to-arms, said Bowen, aims to stop more of the wild things that spring from the ground from disappearing, even species that most people will never see. "It's been shown to be important to people that there are wild things and wild places out there, whether they are seen or not," she said. "It makes people feel good that we're protecting these species that might otherwise go extinct." ■

If you have property in Pennsylvania that might be eligible for wild plant sanctuary designation, you can find an application at dcnr.pa.gov. Click on the Conservation tab, and then choose Wild Plants. From there, select Wild Plant Sanctuaries, where you'll find an application.

Chesapeake's famous manatee reappears in Florida

Tested by starvation and alligators, Chessie's tale of survival continues

By Jeremy Cox

Florida wildlife officials on Feb. 5 rescued an 1,100-pound male manatee in Florida after he was spotted swimming sideways, a signal of distress. Suffering from malnutrition and severe pneumonia, he was taken to SeaWorld Orlando for rehabilitation.

A record number of manatees have perished in Florida this year in what experts are calling an unprecedented die-off. Marine scientists say most of the 890 deaths, as tabulated through July 30, are linked to a massive decline in seagrass on the state's east coast that has robbed the gentle mammals of their primary food source.

But in this case, rescuers soon realized they had just saved an icon. A decade after his last confirmed sighting anywhere, Chessie the manatee — famous for his northerly treks to the Chesapeake Bay — was still alive.

The distinctive scars on his back betrayed his identity as the manatee that stunned the scientific world in 1994 with his first foray into the Chesapeake, for which he was named. At the time, he was the first documented manatee to be spotted in Maryland.

Chessie, a manatee, is scanned for a passive integrated transponder tag. PIT tags, commonly referred to as microchips, are about the size of a rice grain and are widely used by veterinarians to help identify lost pets and return them to their owners. (Florida Fish and Wildlife Conservation Commission)

His renown was heightened by two more confirmed sightings in the Bay in 2001 and 2011.

Was this to be the end of Chessie's far-wandering ways? Not quite. In fact, not long after his release into the wild in May 2021, the manatee, who is believed to be at least 35 years old, showed he has quite a bit of life left in him.

"He very quickly made tracks north," said Monica Ross, a senior research scientist at the Clearwater Marine Aquarium, which had attached a satellite tag to the manatee to track his whereabouts. The public could also follow his movements on a website operated by the aquarium.

"To me, Chessie is the rock star of manatees," Ross added. Before his inaugural Chesapeake appearance, "most people had no idea that manatees went farther north. As researchers, we did. But he was the first one to get a track farther north and to get a track on the way back."

Typically, manatees are found in the warm waters of Florida and the Caribbean Sea. When water temperatures drop below 62 degrees, they start showing signs of cold stress, a potentially fatal condition.

But during the summer, some manatees venture northward. Ross' long-running tracking study, for example, has counted at least 14 individuals that show up each year off the coast of Charleston, SC.

"Manatees are exploratory animals," Ross said. "If they find a habitat they like, they will come back to it."

Over the past two decades, manatees have been occasional summertime visitors in the Bay. But Chessie was the first.

After he was spotted the first time in the Maryland portion of the Bay, officials grew worried he wouldn't make it back to Florida in time to beat the winter weather. So, after a brief stay at the National Aquarium in Baltimore, they booked him a flight home aboard a military transport plane.

Curious whether he would try the trip again, researchers outfitted Chessie with telemetry gear upon his release. Sure enough, he was back to his old tricks in 1995. This time, he journeyed as far north as Rhode Island, marking the first time a manatee had been confirmed north of the Chesapeake Bay.

Staff with the Florida Fish and Wildlife Conservation Commission use a grease marker to highlight a scar pattern on Chessie, a manatee known for his forays into the Chesapeake Bay. The agency photographs scar patterns to help track individual manatees over time and examine life history traits of the population. (Florida Fish and Wildlife Conservation Commission)

Chessie's exploits transformed him into a media darling and the subject of at least two children's books. But after the sightings in 2001 in Virginia and 2011 in Maryland, all was radio silence.

Between then and Chessie's reemergence this year, much had changed for the species.

In 2017, the U.S. Fish and Wildlife Service downlisted the manatee from endangered to threatened. But wildlife biologists and others remained concerned about a rising death toll from boat collisions. Then, last winter, manatees began dying by the hundreds. The suspected cause: a vast loss of seagrass due to polluted waters off Florida's coast.

More than 10% of the state's population of manatees, as calculated by the federal Fish and Wildlife agency, is believed to have been wiped out during the "unusual mortality event." The deaths and rescues have slackened in recent months as warmer temperatures have allowed the lumbering creatures to travel more widely to munch seagrass beds elsewhere, according to the Florida Fish and Wildlife Conservation Commission.

But Ross and others worry that this winter will bring another widespread die-off.

"Seagrass is not going to grow back for years," she said. "This is going to be a long-standing issue. Manatees are the canary in the coal mine. They're letting us know how bad it is out there."

Ross said that the crisis demonstrates the urgency of her work tracking manatee habitat usage outside Florida. She hoped Chessie's long-haul habits would provide a vital datapoint. But nature had other plans.

Chessie, now tipping the scales at 1,500 pounds, was released May 12 just north of West Palm Beach, FL. By May 23, he had trekked to the mouth of the St. Johns River near Jacksonville, about 300 miles up the coast. Over the next month, the satellite tracker showed him swimming several miles up the river as well as farther north along the coast to within a few hundred yards of the Florida-Georgia state line.

But after the tag sent up a signal near Blount Island in the St. Johns on June 27, there were no more pings. The tag was connected to a float ring that towed behind the large, gray animal. Because the signal was lost in the early evening near a shoreline, Ross said she is "100% convinced" the tag was bitten by an alligator.

"It's something in the water column and they're looking for food, so they will bite our tags," she said.

Where and when Chessie will pop up again is anyone's guess now. Ross urged anyone who spots a belt-wearing manatee to report the sighting to their state's wildlife agency.

It might lead to a new chapter in Chessie's story. ■

Experts warn of troubling decline in insect populations

Pesticide use, loss of habitat taking a toll

By Whitney Pipkin

We hear that pollinators are in dire straits while harmful, invasive insects seem to be proliferating. But how are all the other bugs doing?

In recent years, scientists have begun sounding the alarm on a suspected "insect apocalypse." Research initially out of Europe suggests that arthropods — a category of invertebrates that includes insects — are suffering steep declines globally in both diversity and abundance.

Half of the one million animal species that scientists predict will face extinction in the coming decades are insects, according to a 2020 paper in the journal *Biological Conservation*. Granted, there are a lot of insects to begin with — an estimated 5.5 million species globally.

Some researchers suggest the dips may be only cyclical or regional, but most say there's no time to waste in reversing troubling trends. And, while local population data is not easy to come by, they say that many of the trends playing out globally are likely occurring in the Chesapeake Bay region.

"We know that different places are experiencing different environmental stressors, different climates, different local management," said Daniel Gruner, an associate professor of entomology at the University of Maryland. "But we can, from these global studies, identify some major threats that are probably pretty universal."

Many of the factors working against environmental health in general — habitat loss, urbanization and the broad use of pesticides — have an outsized impact on insects. In many ways, insect health is a proxy for that of the overall ecosystem.

Insects recycle nutrients, keep pests in balance and disperse seeds. Pollinators and soil-improving insects also make irreplaceable contributions to agriculture.

"Insects are really good indicators of environmental quality," said Alejandro Del-Pozo, an assistant professor at the Virginia Tech University Department of Entomology. "If we want to look at the streams and creeks and understand if there is something specific going on ... look at the insects."

But tracking insect populations can be tricky, and the trends vary widely depending on the region and species. It can also be hard to find population data collected using methods similar enough to allow for comparisons across time.

Researchers on the entomology team at Virginia Tech University study the presence of pollinators in an experimental plot planted with native flowers. From left to right are Shannon Bradley, Devin Calpo and Julie Brindley. (Alejandro Del-Pozo)

Still, the 2020 paper said that between 5% and 10% of insect species have been lost over the last two centuries and the rate of loss is accelerating. A 2021 paper published by the National Academy of Sciences estimated that annual declines in insect abundance are hovering around 1-2%.

Why the decline?

Several environmental factors could be putting insects in peril. The fragmentation and destruction of habitat can sharply reduce certain populations and lead to co-extinctions — the disappearance not only of a single species but also of one or more that depended on it. Climate change and an influx of invasive species are also thought to play major roles.

And pollution, especially the use of broad-spectrum pesticides, is considered a major culprit. A study published this spring in *Science* magazine found that the chemical makeup of modern pesticides, though applied in decreasing amounts since the 1960s, has substantially increased in toxicity, particularly for insects and aquatic invertebrates. Those pesticides also harm soil invertebrates such as earthworms, beetles and ground-nesting bees, another study found.

Bonnie Raindrop, program director at the Maryland Pesticide Education Network for the Pesticides and the Chesapeake Bay Project, said she talks a lot about the impact of these chemicals on honeybees and other pollinators.

"But it's important to connect the dots so that people understand [that] what's happening to honeybees is happening to every other insect," she said. "Losing the insect world would have devastating effects for all of us."

Losers and winners

In the Bay region, some bugs are faring worse than others. The number of native ladybird beetles, for example — including New York's state insect, the nine-spotted ladybug — has greatly declined over the past 30 years.

Meanwhile, populations of nonnative species like the multicolored Asian lady beetle have thrived. These so-called Halloween ladybugs were introduced in North America to consume plant pests. Now, they compete with native ladybugs for food and are known to invade homes in droves in October to overwinter.

Large silk moths, such as the bright-green luna moth, are also much harder to find, one study found. Scientists think this is likely because of another nonnative species: a deadly parasitic fly introduced over a century ago to control gypsy moth caterpillars, but which is now "controlling" hundreds of other moth species.

"I've seen only a few over the years," Gruner said of large moths in the *Saturniidae* family, such as the red-brown cecropia and yellow-brown imperial. "In the past, we introduced [species to combat unwanted pests] without a lot of testing to see if they would also consume native insects."

Many arthropods play a specific role in a specific ecosystem. That makes them less resilient in the face of change.

Maryland's state insect, the Baltimore checkerspot butterfly, is one of those specialist insects. Its caterpillars feed almost exclusively on white turtlehead, a wetland plant with large white blooms. But the turtlehead has become rarer as invasive plants, development and sea level rise have transformed many wetland habitats. Maryland now considers the checkerspot to be an imperiled species.

Tyler Rippel, a doctoral candidate at Georgetown University, has been studying how a loss of specific habitats in coastal environments can interrupt the delicate dance of insects in those ecosystems. Many are impacted when a single type of seagrass, for example, takes over a once-diverse wetland.

"People don't really track this in coastal ecosystems, unless they're studying fish, oysters or mollusks or some sort of agriculturally important species," Rippel said. "Not many people care about those insects, so we wanted to point out how they are influencing the environment." ■

How can we help insects?

1. Convert lawns into diverse natural habitats.
2. Grow native plants.
3. Reduce use of pesticides and herbicides.
4. Limit use of exterior lighting.
5. Reduce runoff from soap, de-icers and driveway sealants.
6. Counter negative perceptions of insects.
7. Become an advocate for insect conservation.
8. Support insect-friendly policies at the local level.

Source: "Eight simple actions that individuals can take to save insects from global declines" from the Proceedings of the National Academy of Sciences, 2021.

Capital Beltway widening project gets green light — for now

Split board approves $54 million design contract over fiscal, environmental and climate objections

By Timothy B. Wheeler

After hitting a temporary roadblock, the Hogan administration's hotly disputed "traffic relief plan" for widening congested highways in Maryland's portion of the DC metropolitan area is back on track, at least for now.

In a 2-to-1 vote, the Maryland Board of Public Works on Aug. 11 approved a $54 million "predevelopment" contract for designing the widening of Maryland's western portion of the Capital Beltway and Interstate 270, a major feeder highway, all the way north to Interstate 70 in Frederick. The project also would involve replacing the American Legion Bridge over the Potomac River to Virginia.

The Maryland board's vote, which came after nearly four hours of back-and-forth testimony and debate, capped the project's recent rebound from apparent oblivion. In mid-June, a regional transportation planning board, comprising county and city leaders from Maryland, Virginia and the District of Columbia, had voted to remove it from the region's long-term transportation plan, effectively killing it. But the board reversed itself weeks later in July after intense lobbying by Gov. Larry Hogan and project supporters.

The plan, first unveiled by Hogan in 2017, originally encompassed adding high-occupancy, variable-toll lanes to the entire Maryland portion of the Capital Beltway plus I-270. But in May, state transportation leaders scaled it back to focus on the bridge, which is a major traffic bottleneck, and the highways to the west and north of the District.

After the vote by the Board of Public Works, Hogan's office issued a press release calling it "a win for families, commuters and small businesses" that would begin to solve the "soul crushing, worst-in-the-nation traffic that people have failed to address for 50 years."

The project has the backing of the region's business leaders and some local officials. State transportation officials say that adding two toll lanes each way would relieve congestion, while the revenues raised by the variable tolls would pay for the construction at no cost to taxpayers.

But other local officials, community leaders and many environmentalists came out strongly against the widening project.

Jeanne Braha, executive director of Rock Creek Conservancy, and Kyle Hart of the National Parks Conservation Association visit a stretch of Interstate 495 that runs close to Rock Creek. "It's not in great shape," Braha said of the creek, "but it's not going to get better building a highway up to it." (Dave Harp)

The Capital Beltway is well known for problems with traffic congestion. (Dave Harp)

They argued it would harm local waterways, harm disadvantaged communities, benefit affluent commuters at the expense of poorer ones, add to climate-warming air pollution and encroach on parkland and cultural and historic sites.

Opponents of the project urged the board — made up of Hogan, state Comptroller Peter Franchot and state Treasurer Nancy Kopp — to hold off on the predevelopment contract. They contended the "public-private partnership" forged to manage the project had not undergone a proper financial review, leaving the state's fiscal health at risk if the private development group defaults or tolls fail to cover costs.

Critics also argued that a decision should wait until the completion of the final environmental impact statement due this fall. And they insisted that the real answer to the region's traffic woes must involve getting people out of cars and onto transit.

Kopp agreed with opponents, who have cited evidence that widening highways doesn't provide lasting relief from traffic congestion. Moreover, she said, she was struck by the dire warnings in the latest United Nations report on climate change, which had been released just two days earlier.

"That makes it clear what a crisis climate change is, bordering between climate crisis and catastrophe," she said. "We have to change the way we do things. I think we can't just look at [pouring] more concrete and more aggregate."

But Franchot sided with project supporters, giving Hogan the needed vote to approve the contract.

The comptroller, who has declared his candidacy for governor in 2022, ticked off a list of steps state transportation officials had taken to address concerns, particularly pledges to let unionized contractors compete for work and to commit funding toward upgrading transit in the area. Despite sharing the concerns about climate change, Franchot said something needs to be done now to relieve traffic backups.

"Kicking the can down a highly congested road is not an option," he said.

Josh Tulkin, director of the Maryland Sierra Club, called the board's action "unconscionable," especially in the wake of the United Nations report.

"Climate change must be central to all of our transportation and infrastructure planning," he said in a statement after the vote. "On that mark our leaders failed us today."

The project still faces a rocky path forward. A losing bidder for the predevelopment contract has filed a protest. And the environmental impact statement could force further changes to the project.

Tulkin also said he's hoping the Biden administration will make good on its stated commitments to addressing climate change and environmental justice by withholding the federal approval the project still needs before it can begin construction. ■

Conservation opportunity: A new focus on leased farmland

Advocates stepping up outreach efforts to landowners, tenants

By Ad Crable

Rental farmers and landowners: Bob and Kathy Leaman, left, own farmland in Lancaster County, PA, but are not farmers. They have leased their land to Bob Shearer and his son, Mike, at far right, to make sure the land is farmed using conservation practices. (Ad Crable)

Bob and Kathy Leaman, a couple from Lancaster County, PA, wanted a private place to build their dream home. They ended up buying an 88-acre Amish farm dating back to the Civil War.

Both were adamant about keeping the land in farming. And they wanted the land to be productive without polluting the environment. "We wanted someone who really respected the land and alternated crops and who wasn't all about ruining the land for profit," Kathy said.

They signed a lease with Bob Shearer, who leases 320 acres of farmland in two counties. He practices no-till and contour farming, both of which reduce erosion and promote healthy soil. And, he reduces nutrient-laden runoff by using winter cover crops and planting vegetative strips along streams — "because it's the right thing to do," he said.

Unfortunately, this conservation-oriented pairing is not the norm across the United States. For a variety of reasons, pollution-prevention practices are less common on leased farmland than on owner-operated farms.

To address the shortcoming, two efforts are under way to encourage farm owners and tenant farmers in the Chesapeake Bay region to place more conservation practices on leased farmland, an understudied and critical demographic in "save the Bay" efforts.

The website LandownerHelp.com is a joint project of the Pennsylvania Soil Heath Coalition, Stroud Water Research Center and other organizations — and focuses on encouraging landowners to embrace and support best management practices on their client farms.

Meanwhile, a coalition of organizations, including the American Farmland Trust, The Nature Conservancy and the *Farm Journal's* Trust In Food partnership is working to provide information and resources to both landowners and tenant farmers.

That's a lot of farmland

This is a big deal, advocates say, because an estimated 42% of the nation's farmland is leased — a majority of it by owners who do not farm the land themselves and may not know about the importance of soil conservation and nutrient management.

In Bay watershed states, the rates of leased farmland are even higher. In Virginia, fully half of active agricultural land is leased. Forty-six percent is leased in Pennsylvania, 43% in Maryland and 37% in New York.

Those percentages are growing as economic conditions, chiefly falling commodity prices, make it more difficult for farmers to buy land. Leasing is an affordable alternative. Also, as small farm owner-operators retire or take jobs off the farm, or are forced out of business by vanishing profit margins, more farmland becomes available for lease.

Much of that land ends up in the hands of people with no background or family tradition in farming. In many cases, the owners may not be aware of the need for erosion control or nutrient management practices and therefore are much less inclined to encourage them, particularly if there are significant costs attached.

Or it may be as simple as a landowner not liking the look of cover crops, preferring "clean" dirt fields free of unkempt-looking vegetation. Speaking at a recent webinar about conservation practices on leased farmland, Pennsylvania farmer and soil health advocate Steve Groff described a landowner who preferred dirt fields because "he just liked plowing."

On the other side of the lease arrangement, a tenant farmer may be reluctant to invest in best management practices without a long-term lease or without knowing who the next owner of the land will be.

Furthermore, asking a landowner to share the costs of regenerative farming runs the risk of souring the relationship, perhaps to the point that the landowner revokes the lease and looks for a less "troublesome" farmer to work the land. And the more informal the lease agreement, the more likely that could happen.

There have been cases, observers say, when a tenant farmer has invested in soil health and slowly built up crop yields, only to have the owner lease the land to someone else for a higher price because of the increased productivity.

Tackling the problem

To date, efforts to promote conservation practices and soil health have been overwhelmingly aimed at the farmers who own their land. But bringing more conservation practices to the vast acreage of leased farmland has the potential to significantly reduce nutrient pollution and soil loss at a time when most Bay states are struggling to meet the agricultural portion of their 2025 Bay cleanup goals.

LandownerHelp.com, which was launched in June, aims to help farmland owners forge better relationships with tenant farmers and give them incentives for using soil health and water-quality practices.

"We recognize in the Chesapeake Bay region that, if we are to fully achieve this goal, we need to adopt these [soil health] practices on as many acres as we can. The change has clearly been these rented acres," said Lisa Blazure, soil health coordinator for Pennsylvania's Stroud Water Research Center, one of the partner organizations behind the website. She is also active with the Pennsylvania Soil Health Coalition, another partner in the effort, along with the University of Maryland Agriculture Law Education Initiative and the Northeast Sustainable Agriculture Research and Education Program.

"Rent confidently, for the good of the soil, for the good of your land," reads the banner on the website's landing page. "Handshakes are good. Deeper

understandings are better," reads a second banner, which introduces a three-point action plan for landowners: learning about soil conservation (soil health 101), learning how to talk to farmers (a conversation guide) and learning how to write a lease (a link to the University of Maryland's Ag Leasing Guide).

Many farmland leases are arranged with merely a handshake or scribblings on a piece of paper. That's a significant part of the problem, said Sarah Everhart of the University of Maryland's agricultural law initiative.

"There can be a lot of generational trust," Everhart said, "but we've seen time and time again that if there's not a written lease giving the farmer assurance they will be here for at least a few years, there really is going to be a reduced likelihood that rental farmers will do conservation practices."

Everhart and others note that it may take several years for improvements in soil health to pay for themselves in better yields and lower production costs, so farmers who aren't confident that they'll be working the land for years to come aren't inclined to invest time, effort and money in best management practices. And, too often, farmers and landowners simply don't talk to each other about such matters.

Shared risks, shared rewards

A different approach is being launched by another coalition, including The Nature Conservancy and American Farmland Trust. The goal of this as-yet-unnamed initiative is to work both sides of the street, educating farmers and landowners alike on the long-term benefits of conservation practices, how to share the rewards and risks, and where to find resources and financial aid.

"At least to The Nature Conservancy, our best avenue to increasing those [soil health] practices is in supporting the farmers to do that. It's not the best approach just to try to force landowners to do something on their land," said Amy Jacobs, the conservancy's agriculture program director for Maryland and the DC area.

In addition to the conservancy, partners include the *Farm Journal's* Trust In Food project, which claims to be one of the country's largest public-private partnerships dedicated to conservation practices in agriculture. The conversation guides available at trustinfood.com are designed to empower farmers to talk to landowners.

American Farmland Trust is another partner, whose two-year survey of non-operator landowners found, among other things, that a weak farm economy and a feeling of overly restrictive government programs are the two largest roadblocks to more conservation on leased farmland.

"There's been a limited amount of engagement with nonfarming landowners and a real potential to change the conversation with written leases to facilitate that shared risk and reward," said Gabrielle Roesch-McNally of American Farmland Trust.

A stream crossing on leased farmland in Pennsylvania helps cows and equipment pass through without causing erosion. (Ad Crable)

A large amount of farmland in the Chesapeake Bay region is leased, but pollution prevention practices are less common on leased farmland than on owner-operated farms. (Dave Harp)

The trust conducted a two-year study of agricultural landowners in 13 states, including Pennsylvania and Virginia, to learn how nonfarming landowners feel about their land.

In Virginia, the survey found, 64% of lease agreements were purely verbal — not the long-term written agreements that groups say are needed to encourage soil health practices. But most landowners said they were willing to make changes in the lease and were interested in learning more about soil health and conservation.

In Pennsylvania, 79% of the owners of leased farmland had helped their parents farm. Just as in Virginia, 64% of the respondents said they had informal verbal agreements with tenant farmers — though many have rented to the same farmer for about 10 years, which is seen as a good sign.

Also part of the effort is the Harry R. Hughes Center for Agro-Ecology, which is preparing an agricultural leasing guide and has recorded workshops and webinars on its website to give farmers and landowners tools to overcome the challenges of adopting conservation practices on leased land.

The University of Maryland's agriculture law initiative is involved in both projects and offers related workshops throughout Maryland.

"There's a lot of potential there, but there's been an information gap," said Roesch-McNally. "I see it as a need to educate both [landowners and tenants] to see a win-win there." ■

Interested in conservation practices on leased farmland?

- Guidance for landowners can be found at LandownerHelp.com.
- Guidance for tenant farmers can be found at trustinfood.com, or visit nature.org and search for "Ensure Your Farmland's Sustainability."
- For lease-writing advice and templates, visit farmland.org, click on "Visit Farmland Information Center" and look under the "Info For" tab. You can also visit agnr.umd.edu and search for "Agricultural Conservation Leasing" or umaglaw.org and search for "Farm Leasing."

Bay restoration would get boost from infrastructure bill

U.S. Senate approves $238 million funding increase, House action uncertain

By Timothy B. Wheeler

The struggling Chesapeake Bay restoration effort stands to get a hefty infusion of funding from the ambitious $1.2 trillion infrastructure bill passed in August by the U.S. Senate.

Its fate rests, though, with how — or whether — a divided Congress works out its differences over a larger $3.5 trillion measure supporting social programs and climate action.

The Infrastructure Investment and Jobs Act, which passed Aug. 10 in a vote of 69–30, calls for providing $238 million over the next five years to the U.S. Environmental Protection Agency's Chesapeake Bay Program, which coordinates the state-federal restoration effort.

The Bay restoration effort is among $21 billion in environmental remediation projects that would be funded under the bill. The 2,702-page measure also includes money for physical infrastructure, such as highways, bridges, transit and rail, airports and ports, power and water systems, waterways, broadband access and electric vehicle charging stations.

Two federal programs that provide loans to states for upgrading sewage and stormwater facilities and for enhancing drinking water systems would each get an additional $14.7 billion over the next five years. (Dave Harp)

Hammered out by a bipartisan group of senators, the infrastructure bill is much smaller than the $2.6 trillion plan that President Joe Biden originally proposed in March. Many Republicans had criticized that plan because it included funding for things not traditionally deemed infrastructure, such as workforce training and care for the elderly and disabled.

Those are now to be included in a separate $3.5 trillion legislative package that Democrats are working on. On a narrow, party-line vote Aug. 11, the Senate approved a budget resolution setting the stage for bills to spell out the details of how that larger pot of money would be spent. Those have already sparked debate, particularly in the House, where some moderate Democrats have warned they can't support that much spending, while progressives have insisted they won't support the bipartisan infrastructure bill unless the larger one passes, too.

The infrastructure bill increases spending on environmental remediation even more than what Biden had proposed. It would provide funds for cleaning up abandoned mine land and Superfund sites, as well as improving the resiliency of degraded ecosystems, such as the Great Lakes, Puget Sound and the Gulf of Mexico.

The Chesapeake restoration effort also could get additional help from the bill's funding for water and wastewater infrastructure nationally. Two EPA programs that provide loans to states for upgrading sewage and stormwater treatment facilities and for enhancing drinking water systems would each get an additional $14.7 billion over the next five years. That would more than double the current annual level of funding for such projects.

The Chesapeake Bay Program received $87.5 million for fiscal year 2021; Biden has proposed increasing that by $3 million for fiscal year 2022, which starts Oct. 1. The House has already approved that level of funding. The infrastructure measure, if it becomes law, would boost that by roughly 50%, providing an additional $47.6 million a year.

"As we work to modernize our infrastructure and tackle climate change, it's crucial that we're investing in protecting our watersheds," said Sen. Chris Van Hollen, D-MD, a member of the Senate Appropriations Committee. "That's why we fought to include funding for the Chesapeake Bay Program in the bipartisan infrastructure deal."

An infrastructure funding bill moving its way through Congress could infuse money into the Chesapeake Bay restoration effort. If the bill becomes law, it would boost the annual Chesapeake Bay Program budget by roughly 50%. (Timothy B. Wheeler)

The bill's text doesn't say how the EPA is to use the additional money. The Bay Program typically funds research and helps assess cleanup progress, but nearly two-thirds of its money goes to states, local governments and nonprofit groups for on-the-ground projects.

Even without such details spelled out in the bill, Bay advocates hailed the proposed increase. Kristin Reilly, director of the Choose Clean Water Coalition, called it "a shot in the arm" for the states and federal government, which could help them get closer to putting all needed pollution reduction practices in place by their 2025 deadline.

"While currently there is ambiguity on the exact allocation of this funding, we are heartened to see the restoration of our waterways is recognized as a national priority," Reilly said in a statement.

With just four years to go to meet the deadline of the "pollution diet" that the EPA set for the Bay in 2010, advocates and state and local officials have been urging Congress to boost funding for the restoration effort, which remains far short of many of its goals.

At least one-third of the outcomes pledged in the 2014 *Chesapeake Bay Watershed Agreement* are lagging badly or in limbo. An internal Bay Program review found that seven, including the key goal of meeting nutrient and sediment pollution reduction targets, are unlikely to be met by the 2025 deadline.

In May, governors of the six Bay watershed states, the mayor of the District of Columbia and the chair of the Chesapeake Bay Commission, a tri-state legislative advisory body, wrote Congress seeking an additional billion dollars for the effort. They didn't specify how the extra money could be spent.

The Choose Clean Water Coalition, representing dozens of environmental and community groups across the six-state watershed, also wrote congressional leaders that month asking in part for a $132 million boost in Bay Program funding. It proposed distributing the increased funding in grants to states and local governments to support their restoration efforts. ■

PA hands over lead for Bay cleanup plans to counties

Strategy seeks success from local knowledge, partnerships

By Ad Crable

Members of Donegal Trout Unlimited and other volunteers plant a riparian buffer along a stream in Lancaster County, PA. The state is giving counties the responsibility to plan and implement projects to reduce soil and nutrients that flow into the Chesapeake Bay. (Lancaster Clean Water Partners)

In a major shift in strategy as the Chesapeake region nears its 2025 Bay cleanup deadline, Pennsylvania has switched to an approach that gives the reins and money to counties as they try to reduce large amounts of pollution from agriculture and stormwater runoff.

Counties are in the best position to make a difference at the local level, rather than an agency in the state capital, said the state Department of Environmental Protection, which has long overseen the cleanup. The agency wants to give counties a shot at forging solutions, figuring that they know the relevant stakeholders and can best track on-ground projects for accurate progress reports and pollution reduction credits.

The bottom-up cleanup plan is at the core of Pennsylvania's latest watershed implementation plan, a federally mandated road map for meeting its share of the Bay cleanup commitments.

The new county battle plan began in 2018 with a pilot test by four southeastern Pennsylvania counties, which together send the lion's share of nutrients into the Susquehanna River and Bay. Four more counties were added, and this year, with a few tweaks to the process, 26 other counties agreed to plan and oversee the cleanup work themselves. County conservation districts are major players.

The agreements by counties usher in a late and dramatic new effort to achieve Pennsylvania's cleanup goals, an effort that is lagging far behind that of other states in the Bay watershed.

"It's a sea change," said Deb Klenotic, a spokeswoman for the DEP, of the county-wide action plans, or CAPs, now in various stages of deployment.

"Real commitment to improve water quality has taken root," said DEP Secretary Robert McDonnell.

At the heart of the new direction is the concept that people working at the community level are a source of strength. The idea behind the CAPs is that counties know best who to work with and where conservation practices, such as streamside buffers, manure storage, soil health, urban tree canopies and stormwater management projects, can be most cost-effective. That insight should help draw state financial support, which favors quick-turnaround projects that can be done in 12–18 months. Counties would also monitor streams to check for improvements in water quality.

"It's a big difference. Stakeholders like conservation districts and watershed alliances had been used to implement projects, not brought to the table to make decisions," said Jill Whitcomb, who heads Pennsylvania's Chesapeake Bay Program for the DEP.

"I think that creates a whole new level of buy-in by engaging people from the very start."

For its part, the DEP has streamlined its permit process and amped up technical assistance, and it now meets regularly with local officials.

The Lancaster County effort has enlisted nearly 40 partners, including watershed groups, ag consultants, a farmland trust, a local chapter of Trout Unlimited, local foundations and many municipalities.

Besides those official partners, more than 150 other state, federal and non-government organizations have gotten involved in the county, which is tasked with removing 11 million pounds of nitrogen and 500,000 pounds of phosphorus from streams, mainly originating from agriculture.

"There is no question that it is working and scaling things up and increasing the awareness of these goals and the collective effort needed to meet it," said Allyson Gibson, director of Lancaster Clean Water Partners, the coalition that formed to lead the effort.

Projects have been both large and small. The congregation of a Mennonite church in Lancaster County repaved its parking lot with porous asphalt. In Cumberland County, officials started a cover crop incentive program and partly paid rental fees for no-till drills.

Another difference in the county-based approach is that conservation efforts are touted as a way to improve local streams rather than simply focusing on the distant Chesapeake Bay.

Cleaning up local streams will lessen flood risks, improve fishing and swimming, and enhance quality of life, DEP and county officials say. The slogan for the CAP program is "Healthy Waters, Healthy Communities."

That focus on local waters has resonated in Luzerne County, where residents are smarting from fee increases, driven in part by the Bay restoration effort, to control stormwater runoff.

"People do sometimes have a hard time understanding how these regulatory changes affect them or why they should affect us, way up in the [Bay] watershed," said Josh Longmore, director of the Luzerne County Conservation District.

The opportunities for local minds to brainstorm have given birth to new partnerships. The centerpiece of Lancaster County's CAP focuses on intensively treating 21 stream segments that can be quickly upgraded to healthy status.

This "rapid delisting" concept came from the Chesapeake Conservancy, an Annapolis-based nonprofit. So far, the Lancaster Clean Water Partners have garnered $8.4 million in grants for the effort.

Because of the newness of the program and delays in projects stemming from COVID-19, it is too early to assess the success of the CAP program from stream-monitoring data.

Plus, funding on the scale needed to help Pennsylvania come anywhere close to meeting its pollution reduction goals by 2025 remains a huge uncertainty. The state's latest Bay cleanup plan identified an annual funding gap of more than $300 million a year.

But state and county officials are convinced they have hit on a better way and are confident the local approach will accelerate efforts to restore both local waters and the Bay, though not totally by 2025.

"This program is not going away," Whitcomb said. ■

Fish passage gets star billing in retrofit of centuries-old VA dam

Decision to repower private dam bucks demolition trend

By Jeremy Cox

The Jefferson Mill dam was built in 1820 near Charlottesville, VA. Private owners of the site plan to convert the old mill building into a residence and repower the dam to produce energy for the home, while installing a fish passage ramp that will help move migrating fish upstream. (Courtesy of Natel Energy)

Across the Chesapeake Bay watershed, dams are being demolished to restore fish habitat and remove potential threats to the safety of swimmers. But the private owner of a dam near Charlottesville, VA, is receiving mostly praise for doing the opposite.

The Jefferson Mill dam appears destined to remain where it has stood for more than 200 years on the Hardware River, about 15 miles upstream from where it joins the James River, a major Bay tributary. Let It Go LLC, the dam's owner, plans to transform the historic mill building into a private residence and modernize the dam's hydroelectric system to power the home.

What has drawn positive reception from local officials and environmentalists is the extent to which the company proposes to refit the dam to improve fish passage. Currently, the dam obstructs all upstream migration.

The renovation will add a peg-lined ramp for American eels and sea lampreys to wriggle their way past the dam and continue upstream. Meanwhile, the company is sacrificing energy capacity to install a turbine that is safer for the creatures that get sucked into it.

"I think they're making it better than the existing dam," said Bill Fritz, development process manager for Albemarle County. At a public meeting earlier this summer, the veteran official called it "by far the most extensive and complete application in the 30-plus years I've worked for the county."

Albemarle's Planning Commission and Board of Supervisors have each signed off on the changes. State and federal permission is pending.

Who is behind Let It Go LLC? It isn't exactly clear. But clues suggest a possible famous connection.

According to the company's registration with the State Corporation Commission, its headquarters shares the same address as Blenheim Vineyards, a winery just outside Charlottesville owned by musician Dave Matthews and his family. Property records for the dam site and surrounding parcels also owned by Let It Go list the contact person as Aaron Van Duyne III, Matthews' longtime business manager.

Context also points in Matthews' direction. The two-time Grammy winner and perennial top concert draw has deep roots in Charlottesville. It's where he founded the Dave Matthews Band and where his main charity, the Bama Works Fund, is based.

And Matthews is no stranger to environmental causes. Over the years, his band has planted trees to offset the carbon emissions of touring, committing to 1 million for its 2021 tour alone. In 2019, the United Nations' environmental arm designated the group as a goodwill ambassador, citing its composting, recycling and carbon-removal efforts while on tour.

But no one publicly connected with the land or the project would comment on the owner's identity for this report.

Under the 2014 *Chesapeake Bay Watershed Agreement*, the region's six states and the District of Columbia set a goal of reopening at least 1,000 miles of streams and rivers to migratory fish by 2025. Having surpassed that goal in 2016, the entities involved have adjusted it to adding 132 miles every two years.

After some initial success, the number of added stream miles has been trending downward. Experts attribute the decline to a dwindling supply of what they call low-hanging fruit: publicly owned dams that are relatively easy to remove. Most of what remains are private dams whose owners are disinclined to have them taken down.

Jessica Penrod, project manager with Natel Energy, the California-based hydropower developer handling the Jefferson Mill project, said that removing the dam would be of little help to migrating fish because there are several more dams blocking their passage downstream, including on the James. Dam removal is the gold standard, but constructing a fish passage — a lift, ladder, ramp or some other type of upstream egress — is considered an acceptable alternative by Bay restoration advocates.

The Jefferson Mill dam is no Hoover Dam. Built in 1820 by one of Thomas Jefferson's relatives and named after the former president, the masonry dam rises 9 feet from the bottom of the river and spans its 140-foot width. The mill adjacent to the dam ground wheat into flour, powered by a water wheel and later by three small turbines. It went out of business in 1945, but the four-story building is one of the few survivors of its kind in the region from that era.

"This dam's actually totally amazing," said Joseph Head, a civil engineer with Natel. "These guys that built this dam did it by hand 200 years ago with just rock and mortar, and it's still there. If we're messing with this dam, we have a standard to meet here."

No changes are planned for the dam itself. The project will divert water into a renovated "water room," where the new turbine will be housed. The facility will produce about 20 kilowatts of electricity for the mill-turned-home, with any excess energy sent to the power grid. The other major addition will be the fish passage, consisting of a 2-foot-wide, 25-foot-long ramp along the riverbank.

At the direction of state and federal wildlife agencies, Natel's Penrod said, the company will monitor the site for at least a year before building the ramp, so it can be placed where eels and lampreys tend to go when they encounter the dam. Monitoring will be required afterward to make sure it's working. If it's not, Natel and the property's owners may have to tweak it.

Karen Firehock, a planning commission member and the founder of a nonprofit that promotes green infrastructure, said she would prefer no dam to be there at all, historic or not. But she nevertheless joined the other commissioners in recommending approval of the project, saying the fish passage and renewable energy aspect represented a "net benefit." ■

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

A

Leafy bits

Leaves are a tree's food factory. Here is a list of parts that keep them functioning. Can you match these parts to their job and place on the diagram? Answers are on page 40.

Apex	Midrib
Bud	Petiole
Lamina	Secondary veins
Leaf margin	Stoma

A. I am the tip of the leaf that is farthest from where it is attached to the stem. My shape ranges from sharply pointed to rounded, depending on the plant. While I have no specific function that is common in all leaves, I do serve a purpose in some. If I'm sharp and pointed, I deter herbivores by making it uncomfortable for them to eat the leaf. If I'm curved, in wet climates I help to drain water off a leaf more quickly.

B. I am the central, supporting ridge running down the center of the leaf. I provide the strength that keeps a leaf facing the sun and upright during strong winds. I also help to transport nutrients produced in the leaf during photosynthesis to other parts of the plant.

C. I am not as thick as the midrib I emerge from, and I extend to other parts of the leaf. I am one of the many tubes that help the midrib support the leaf and transport nutrition.

D. I am the thin flat membrane that covers the leaf, and I am sometimes referred to as the blade. I am the surface in which photosynthesis occurs.

E. I am the edge of the leaf. I can be lobed, simple, smooth or toothed. Most often, I am the part that helps an observer identify a plant.

F. I am the tiny stalk that attaches the leaf to the stem. Because of me, the leaf is able to twist so that it faces the sun. I am not found on all leaves: These leaves are called sessile.

G. I am the part of the plant where a new leaf starts to form, usually in early spring.

H. I am one of the many pores in the leaf's surface that regulates the intake or release of water (transpiration) by opening or closing as needed. I also help the leaf control the carbon dioxide needed for the plant to create food. When there is too much water or carbon dioxide, I close; when there is too little, I open up.

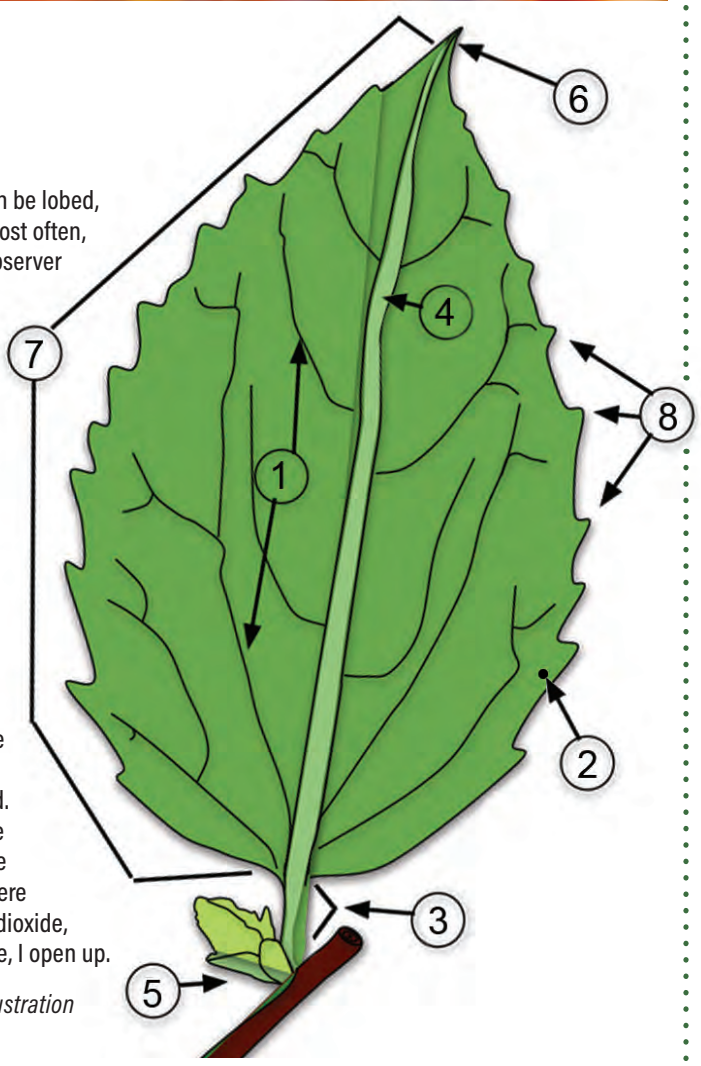


Diagram credit: (Adapted from illustration by Jessekar0524 / CC BY-SA 4.0)

Icon: The leaf bud of a Yoshino cherry tree (Prunus x yedoenis) growing alongside the Potomac Basin in DC emerges in the spring. (Michele Danoff)

A. Beech tree leaves (and bark) are used to make a coppery reddish brown dye. (Michele Danoff)

B

B. Sassafras leaves grow in three shapes: unlobed, bibbed (mitten-shaped) and tri-lobed. This is called heterophylly. (Francois Andre Michaux, author; Augustus Lucas Hillhouse, translator; iii, illustrator; eee, engraver / Public domain)

Can you be-leaf this?

Cold weather compromises the ability of leaves on deciduous trees to create food through photosynthesis. Their thin cells, which are filled with water, would easily burst when it freezes, turning the leaves into dead weight no longer able to produce food. This unproductive excess surface area would catch more wind during winter and could lead to broken limbs. Leaves would also burden the tree by collecting snow and ice.

Plus, come autumn, many leaves are already injured by insects and disease.

To reduce these liabilities, the tree starts to grow a layer of cells between the leaf and the point at which it is attached to the branch. Eventually, this "wall" severs the leaf from the tree. The process is called abscission.

Shape show-offs! The term for when a tree grows more than one leaf shape on the same plant is heterophylly.

The old soft shoe: Do the insoles of your shoes wear out? Our ancestors inserted the soft, fuzzy leaf of the mullein plant into their footwear. It not only served as a cushion that reduced blisters, but medicinal properties in the leaf are said to prevent infection. Caveat: Some people are highly allergic to mullein.

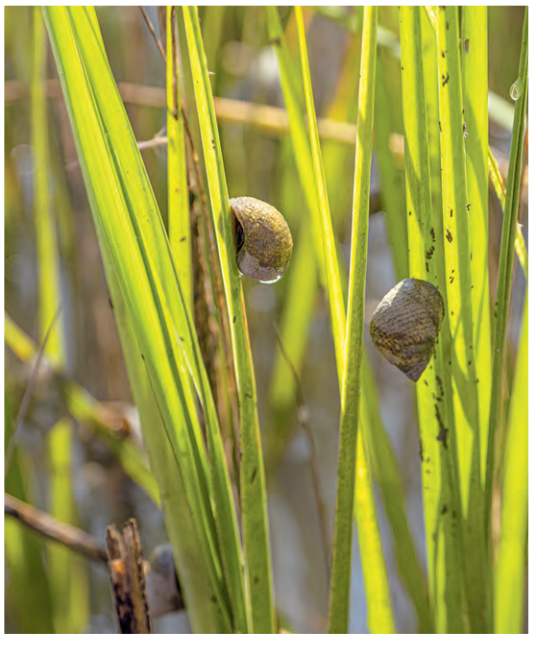
Are you a foliage foodie? Animals that love to lunch on leaves are called folivores.

Malicious mulch: Don't add black walnut leaves to your mulch or compost pile. They contain juglone, a chemical that is toxic to other plants.

Re-leaf for what ails you: One superstition holds that if you catch a falling leaf on the first day of autumn, it protects you from getting sick that winter.

Paddle at Bay's mouth highlights nature in flux

By Jeremy Cox



Top photo: Jeff Squire of Falls Church, VA, and his son Wade paddle inside the Eastern Shore of Virginia National Wildlife Refuge.

Bottom photos: Periwinkle snails graze on Spartina alterniflora*.*

(Photos / Dave Harp)

This is where it all ends. At Wise Point, VA, the mainland of the Delmarva Peninsula culminates in a final exertion of sand and loblollies, concluding its 170-mile journey down the East Coast. There are no more cornfields, which seemed like they would go on forever. No more sporadic little towns, steeped in history: Accomac, Wachapreague, Nassawadox.

But it is also the beginning of something else. This is where the Chesapeake Bay sloshes together with saltwater, eventually giving way to the Atlantic Ocean in all of its briny splendor.

All of this makes for a fascinating place to paddle, as Emma Karlok well knows.

She is the general manager and an environmental educator with SouthEast Expeditions, an outdoors outfitter and tour company based in the nearby town of Cape Charles. From April through the beginning of October, she can often be found leading groups on paddle excursions here, departing from the Wise Point canoe and kayak launch inside the Eastern Shore of Virginia National Wildlife Refuge.

"I just want to tell a wide array of people from all different places about this one place here," said Karlok, a 2019 graduate of the University of North Carolina-Chapel Hill with a bachelor's degree in environmental studies.

I piggybacked onto a kayak outing of hers in mid-August that was just long enough to sate my appetite for nature but not so long that I would be overtaken by it — specifically, by the oppressive heat wave gripping much of the country at the time.

Our companions included an older couple from New Jersey and a mother and father with two young boys from the DC suburb of Falls Church, VA. Karlok would also be getting an assist from a local guide, John "Elijah" Turner.

With an incoming tide adding strain to our strokes, we set off a little after 9:30 a.m. into a narrow creek flanked on both sides by *Spartina alterniflora*, the ubiquitous saltmarsh grass found along much of the Chesapeake's shoreline. Embarking at high tide is a must, Karlok explained, because there wouldn't be enough water here at low tide to float a kayak.

Our little waterway was barely wide enough for two kayaks to pass one another. It zigged and zagged. Sometimes, it would come to a fork, and

the right decision would have to be made.

An interesting feature during this early part of the paddle: When members of our motley crew maneuvered around a sharp bend ahead of the others, they didn't disappear behind it. The marsh was too short for that. Instead, they transformed into disembodied heads gliding above the tips of the green grass blades. Wearing an oversized straw hat with rainbow trim, Karlok's appearance above the grassline provided an odd but conspicuous guide to her trailing fleet.

When novice paddlers book a trip, Karlok said she typically directs them to the Wise Point tour.

"This one is so great for beginner paddlers," she said. "You're just winding through the marsh in a real controlled environment and the water is shallow, so the risk is real low. Plus, there are so many natural features that are really easy to highlight."

Karlok paused at regular intervals to give short talks on the evolving landscape. Keeping in mind that her audience included a 5-year-old, she generally kept her comments down to earth. A sampling: "This whole area is part of a big wildlife habitat that we want to keep preserved."

The barrier islands and coastal mainland along the Eastern Shore of Virginia's Atlantic-facing flank constitute one of the longest stretches of undeveloped shoreline on the U.S. East Coast. Land held in conservation by The Nature Conservancy, as well as the state and federal governments, shields about 60 miles of coastline from the concrete between Wise Point and Wallops Island.

Each spring, the low-lying islands become the temporary home for more than 100,000 shorebirds on the Atlantic Flyway. Some stay to breed, including the federally endangered piping plover, the state-endangered Wilson's plover and the state-threatened gull-billed tern. As our party of paddlers rounded one of the creek's hairpin turns, Karlok pointed to a mass of sticks near the top of a pine tree about a quarter mile away: a bald eagle nest.

Beneath our hulls lay another treasure: blue crabs. After spawning in the mouth of the Bay, young crabs spend much of their early life sheltered in nearby shallow tidal creeks like the one we were paddling, Karlok said.

"If we don't have these areas, we don't have blue crabs," she added.

Finally, the endless marsh did, in fact, end, and we were greeted by the open water of a constructed boat channel. We pointed our bows to the west and stuck close to the right shoreline to avoid as much of the current's strength as possible.

In the distance loomed the northernmost leg of the Chesapeake Bay Bridge-Tunnel, the Fisherman Inlet Bridge. But we crossed the channel before we could reach it, landing near the western terminus of Raccoon Island. On the far side lies a house that adventure-seekers can rent by the weekend or the week during part of the year. But our side was devoid of such amenities, consisting instead mostly of bleached sand, fossilized oyster shells and circular divots dug by ghost crabs.

And raccoons? "That's more of a nighttime tour kind of thing," Turner said with the start of a grin. "I've never seen one, but a lot of other people say they have."

Karlok drew the group's attention to a clump of driftwood and long-dead shrubs on the island's edge. These islands play an important role in protecting the peninsula's communities from coastal storms and erosion, she said. To a certain extent, it is natural for such islands to lose ground to the sea on one side and add it to the other. But rising seas, she explained, are endangering their future.

"When we look, we can see how far the island used to go out [into the ocean]," Karlok said. "It's a natural process for the island to change, but it's happening at a much faster rate because of sea level rise."

It was similar to the message I had heard several months earlier when representatives from The Nature Conservancy took me on a boat trip in some of the same waters. (Until the beginning of this season, Karlok was an outreach and education assistant for the conservancy, so that may have had something to do with it.) On that earlier trip, the sights and sounds of nature took a backseat to the outboard motor and me fumbling with technology as I tried to capture content for my *Bay Journal* podcast.

While that excursion was productive, this one was much more satisfying to my nature-loving heart. Experiencing a landscape by a motorized boat is like driving through a city on the interstate — yes, it's convenient, and you get the general idea of the place, but you miss the finer details.

With noon quickly approaching, the return paddle was a sweaty slog. The less said about it, the better. In all, we had notched a little more than 2 miles on the water, which felt like enough amid the enveloping heat.

Karlok and Turner dragged their charges safely ashore and made their farewells. They barely had time to wolf down a breakfast bar before it was time for their second tour of the day. ■

Top photo: Paddlers approach the northernmost leg of the Chesapeake Bay Bridge-Tunnel, the Fisherman Inlet Bridge.

Bottom photo: The heads of paddlers appear just above the tall marsh grasses.

(Photos / Dave Harp)

PADDLING WISE POINT

WHERE

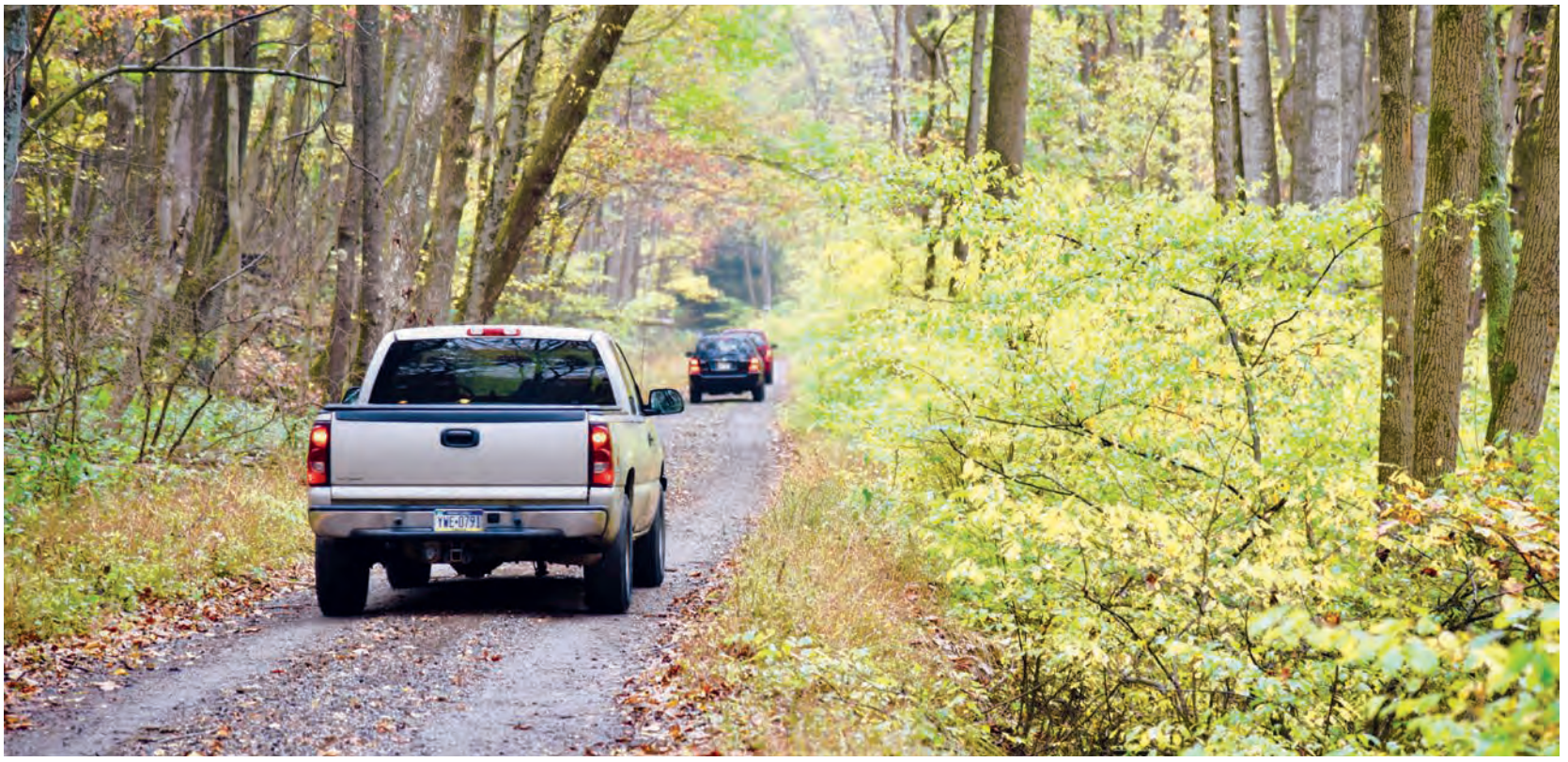
The kayak launch is inside the Eastern Shore of Virginia National Wildlife Refuge, 32205 Seaside Road, Cape Charles. Take Ramp Road until about 200 yards before the boat ramp.

GUIDED TOURS

Available from SouthEast Expeditions. Visit southeastexpeditions.com.

ACCESS NOTE

Fisherman Island, designated as a national wildlife refuge, is closed to public access to protect wildlife. The island is just south of Raccoon Island and traversed by the Chesapeake Bay Bridge-Tunnel.



Once a year, take the road not traveled – and discover ghosts of PA's past

By Ad Crable

On a single day each fall, Pennsylvania's second-largest roadless area becomes bumper to bumper with vehicles.

It's an odd sight, with up to 2,000 cars and trucks backed up like rush hour as they crawl along a 19th-century railroad bed wedged between two mountains and 44,000 acres of forests located a mere 10 miles north of Harrisburg.

The motorists are taking advantage of the one day a year that the Pennsylvania Game Commission suspends the no-motorized-vehicles rule and opens the gates to Stony Creek Valley. The public rushes into the narrow path between the mountains and drives one-way, for free, in a flat, straight line for 17 miles.

They gawk at an overload of changing leaves and admire Stony Creek, state-designated as "wild and scenic." They also wander through the remains of five ghost coal towns and a resort from the 1800s that once promised summer coolness and salubrious spring waters.

This year's tour takes place 9 a.m. to 3 p.m. Sunday, Oct. 17.

There are plenty of side trails to explore, including a section of the Appalachian Trail that follows an old stagecoach road. Others feature a fire tower and gin-clear Stony Creek. You'll also find left-behind oddities of the coal mining and timbering past, such as a mysterious stone tower, an abandoned and now tree-imprisoned shovel that dug strip mines, and a deteriorating caboose, once repurposed as a hunting cabin. Any other time of the year you would have to walk or bike or ski for miles to see these curiosities.

On the 2019 road tour, a cool, rainy Sunday that seemed to accentuate the valley's isolation and wildness, Ken Davidson and his son, Stephen, could be found probing the bottomlands along Stony Creek, pondering who might have lived in the buildings now marked only by stone foundations. It's all that is left of Rausch Gap, a shanty town from the 1850s that was home to 1,000 English and Irish immigrants, including children, who toiled in the mines.

"This is like stepping back in history," marveled the elder Davidson. The two had just come from a visit to the nearby Rausch Gap cemetery,

Photo: Vehicles wind along a 17-mile route through Pennsylvania's Stony Creek Valley. The rail-trail is open to vehicles only one day a year, for a fall foliage driving tour. (Ad Crable)

Illustration: This engraving from the 1800s shows the Cold Spring Park resort in Stony Creek Valley. Only stone foundations remain. (Courtesy of StonyValley.com)

where only three of the remaining tombstones have inscriptions. As many as 100 people may be buried there.

The inscriptions are all from 1854, noting the remains of a 1-year-old girl, a 52-year-old English worker who apparently died after a long affliction and Andrew Allen, a 30-year-old English immigrant who was killed in a mining accident. His epitaph reads: "Here lies beneath this humble sod, the noble work of nature's God. A heart once warm with gratitude, with strength and courage was endured."

This was Ken Davidson's third tour here. "The allure for me is, here is a chance to get back in nature so near where you live and take it all in, the trees and the leaves and color, and the walking through the woods and the old foundations," he said, standing in the rain. "You wonder how people lived, and what their life was like. How did they educate their kids? What did they do when a guy had appendicitis and it was acute? Well, they buried him probably."

A windstorm a few days earlier had left a fresh carpet of mostly yellow leaves on the old railroad bed, providing a mirror of the colorful cloak of leaves on the trees above. The rain encouraged a few leaves to let go, and they drifted to the ground in lazy freefalls.

This forbidding valley pinched between Second Mountain and Stony Mountain was first occupied by Native Americans. It is said that Sand Spring, which does indeed bubble up through sand, was a favorite camping spot. The spring is visible on the driving tour, on the right, midway between Rausch Gap and Gold Mine.

Later, Moravian missionaries arrived and tried to ease tensions between settlers and Native Americans. One of the missionaries, from a mountaintop overlooking the valleys and steep ridges in 1742, proclaimed it St. Anthony's

Wilderness. Today, it is better known as Stony Creek Valley, named after the clear stream that runs over sand and rounded rocks.

That wilderness was split asunder with the discovery of coal in the mountains. What would later become the Schuylkill & Susquehanna Railroad was built along Stony Creek from 1849 to 1854. English and Irish immigrants were hired to do the back-breaking and life-threatening work in the mines.

The valley quickly grew to a population of 5,000. After the coal seams were depleted around 1890, lumbering took over, and the industry clear-cut the vast forests that grew so thick that they nearly cloaked the valley in daytime darkness. This resource, too, was eventually exhausted.

Cold Spring, a summer resort built around the attractions of shade and invigorating springs, was a successful venture that helped the railroad run a passenger service from about 1850 to 1900. Sleuths can still find the remains of a bath house, tavern, bowling alley, two hotels and other buildings. A farm on the property supplied fresh milk, eggs, poultry, fruit, bacon and wine. There also was a large lake from the damming of Stony Creek.

The advent of the automobile enabled those escaping the summer heat to find other places, like beaches, farther away. When both hotels were burned to the ground by a fire in 1900, the resort was closed.

For a while, water from the cold springs was bottled for sale as far away as Philadelphia. The Lancaster YMCA purchased the grounds in about 1920 for a youth retreat. That venture ended when the military, training for World War II just over the mountain, fired some wayward shells that lodged in trees behind the camp.

With everything abandoned, the railroad stopped running, and vandals and time have removed the railroad stations that once delivered workers and vacationers. The Game Commission purchased 44,000 acres in the valley in 1945 as part of State Game Lands 211 and made the area roadless — but open to hunters, anglers, hikers and anyone willing to walk or bicycle their way into the woods.

The annual road tour used to go east to west, but there were so many fender benders from drivers squinting into the sun that it now goes in the opposite direction.

The tour is often crowded. Participants should expect to travel the 17 miles no faster than 5 or 10 miles per hour — about the same speed as trains hauling coal. With the brilliant foliage around you and a carpet of leaves on the cinder roadbed, it would be a sin to go any faster.

Bears, rattlesnakes, deer, turkeys, bobcats, beavers and other wildlife are viewing possibilities. You can pull over to the side at any time and meander along the stream or hike the slopes.

There are no restrooms or food sales along the route, and likely no mobile phone service. But there are helpful, informed Game Commission personnel at each end and at the ghost towns and other major stops. At Cold Spring, the resort and mining ghost town, a group dedicated to the history and preservation of the site often gives free tours. Pets are permitted.

The entrance gate at Ellendale, site of an old iron forge, will open at 9 a.m. on Oct. 17 and close at 3 p.m. You have to exit the gate at the ghost town of Gold Mine no later than 4 p.m. The Ellendale gate is located east of the town of Dauphin, north of Harrisburg. Set your GPS for Ellendale Forge, Dauphin, PA.

For a website devoted to the history of Stony Creek Valley and exploring its trails and ruins, visit stonyvalley.com. ■

IF YOU GO

Here are a few more worthy stops in Stony Creek Valley.

- **The ghost towns** of Rausch Gap, Yellow Springs, Cold Spring, Rattling Run and Gold Mine.
- **Stony Mountain Fire Tower,** a vigorous hike to reach but with breathtaking views. Climb at your own risk. You can reach the tower via a steep 1-mile climb on the Water Tank Trail.
- **Evening Branch Beaver Swamp,** a huge wetlands created by beaver dams. The contrast of dead gray trees rising from the dark water with flaming foliage in the background is striking.
- **Yellow Springs Incline Plane,** built in 1908 to haul trees down to the railroad. This steep incline was built entirely of rocks and once stretched for more than 2 miles.
- **Devil's Race Course,** an expansive boulder field where the headwaters of Rattling Run gurgle under the rocks.
- **Yellow Springs Stone Tower,** a mysterious edifice atop Stony Mountain, believed to have provided ventilation for an adjacent steam engine that hauled coal cars up and down the mountain. Reach it via the blue-blazed Stone Tower Trail.

Top photo: Little remains of a bath house at the Cold Spring Resort. Jesuit priests who briefly owned the land complained that it was too cold for bathing. (Ad Crable)

Bottom photo: Tombstones mark the graves of immigrants who lived in a shanty town for those toiling in the remote coal mines of Stony Creek Valley in the 1800s. (Ad Crable)

Four fledgling barn swallows survey their world at St. Brigid's Farm near Kennedyville, MD. (Dave Harp)

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A deer peers out of a field of wheat near Carlisle in Cumberland County, PA. (Dave Harp)

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Rockville, MD

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Vincent G. Carter
Temple Hills, MD

John A. DePalma
North Bethesda, MD

Paul Drohan
Aberdeen, MD

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David Hafer
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Owego, NY

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Gloucester, VA

Chris Kellner
Bel Air, MD

L. Scott Kilmon
Royal Oak, MD

Sister Betty Koehn
Timonium, MD

Alan Krueger
Beverly, WV

John Martinkosky
Riner, VA

Nancy Mason
Silver Spring, MD

Peter Mirones
Tampa, FL

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EPA picking up the pace of Chesapeake Bay restoration

By Diana Esher

The U.S. Environmental Protection Agency serves a vital role as we coordinate the efforts of federal, state and local partners to protect and restore the Chesapeake Bay and the rivers and streams that flow into it from six states and the District of Columbia.

We take that responsibility seriously. Along with our partners, we're working to accelerate the pace of restoration and close the gap in reaching the goals of the 2014 *Chesapeake Bay Watershed Agreement*.

When EPA Administrator Michael Regan addressed Bay watershed leaders in June, he pledged that this is a new day at the EPA. President Biden's budget, for example, proposes a record amount of EPA financial support for programs and actions to clean up the land and waters that impact the Bay's health.

The president's proposed budget for fiscal year 2022 would deliver $90.5 million for the Bay Program — a $3 million increase over current funding. The bulk of the funding is provided to our state partners to further their progress in improving local waters and the Bay.

In addition to providing needed technical assistance, the EPA is tracking and reporting progress and coordinating partnership efforts through the Bay Program Office.

We've also been evaluating cleanup plans from the watershed states and the District of Columbia, and we're looking forward to reviewing a revised plan to be submitted by Pennsylvania by the end of this year to meet its 2025 targets.

We're committed to this mission, and we're committed to building on the strong, productive relationships with our state, local and tribal partners — who know their communities better than the federal government ever could.

The EPA will continue to adapt to the needs of our partners to support the 2025 restoration goals and fulfill our shared vision of protecting the Chesapeake Bay for generations to come, along with the people and the economies that rely on its bounty and vitality.

The effort to restore the Chesapeake Bay, seen here at Maryland's Bay crossing, has been a long and challenging task at the local, state and federal levels. (Will Parson/Chesapeake Bay Program)

We know that the health of the Bay and the welfare of the 18 million people who live in the watershed go hand in hand.

We also know that the Chesapeake is a critical economic driver for watershed states, providing abundant tourism and recreational opportunities, sustaining fisheries and creating jobs. The Bay watershed is essential to the region's way of life and it continues to deserve and receive priority status at the EPA.

The Biden administration has placed an emphasis on scientific integrity and the need to rely on science to tell us, among other things, where we are and how far we need to go in our restoration efforts. That is certainly true at the Bay Program, where cutting-edge science is a hallmark of our partnership.

The EPA and broader Bay Program partnership are also in sync on two overarching issues — climate change and environmental justice — and we're taking action to advance them.

The Bay Program's Executive Council, which includes the EPA administrator, governors of the watershed states and other representatives, is working toward a climate directive that would confirm and reinforce a science-based understanding that climate change is significantly affecting the Chesapeake and its watershed, and that urgent attention is warranted.

The action would complement a history of the involvement of the Bay Program in climate change considerations. For instance, the Bay Program has established goals for protecting and conserving lands since the signing of the *Chesapeake 2000 Agreement,* putting the partnership within reach of Biden's "30 by 30" executive order, with its goal of conserving 30% of the land in the watershed by 2030. That would not only advance our restoration efforts but also make the region more climate resilient.

Meanwhile, a Climate Resiliency Workgroup is focused on the specific climate-related outcomes in the 2014 *Chesapeake Bay Watershed Agreement,* as Bay Program partners implement management practices — from stormwater to agriculture — designed to counter increased rainfall volumes and intensities that are expected in the future for all counties in the Bay watershed.

The partnership has also embraced a Diversity, Equity, Inclusion and Justice Strategy Implementation Plan that seeks to build relationships with underrepresented communities and will help ensure that everyone in the watershed shares in the environmental and economic benefits of the cleanup work.

We've come a long way in our restoration efforts, but we still have much to do. We look forward to continued collaboration with our partners as we work to pick up the pace of our efforts and realize the promise of a clean Chesapeake Bay. ■

Diana Esher is the acting regional administrator for the U.S. EPA's Region 3, which includes virtually all of the Bay watershed. She has held several leadership positions since joining the EPA in 1984, including assistant regional administrator, director of the Air Protection Division, deputy director of the Environmental Services Division and, for nearly a decade starting in 1999, deputy director of the Chesapeake Bay Program Office, also serving as acting director of the office.

SHARE YOUR THOUGHTS

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

Celebrate autumn with these new ways to enjoy the water

By Rachel Felver

Chesapeake anglers and paddlers rejoice! In 2020, the Chesapeake Bay Program and its partners added 12 access points where the public can connect to the water. With these additions, the region has met 69% of the goal in the *Chesapeake Bay Watershed Agreement* to add 300 new public access sites by 2025. Here's a look at the new offerings:

- **Gravelly Point (VA):** This area along the Potomac River is known as one of the best places near Washington, DC, to watch planes take off and land at Reagan National Airport. Now, it is also an area for paddlers to find parking and launch their watercraft.
- **Leonardtown Wharf Park (MD):** A floating dock has been added to serve transient boat traffic. After docking, glance around the park and imagine what it might have looked like in July 1814, when British troops attacked the town during the War of 1812 to distract attention from a plan to seize the nation's capital.
- **Mariner Point Park (MD):** Paddlers have a new launch area along Taylor Creek, a tributary of the Gunpowder River in Joppatowne. This park is located near a railroad line where, in 1864, Confederate troops seized two trains heading north. They captured supplies, set a train on fire, cut telegraph lines and partially destroyed the railroad trestle over the river.
- **Meems Bottom Covered Bridge (VA):** This covered bridge, which crosses the Shenandoah River, has stood witness to some of the most significant events in Virginia's history. The original bridge was burnt down by Stonewall Jackson's troops in 1862 during the Civil War, and its replacement was washed away by floodwaters during the Great Virginia Flood of 1870. The current bridge — the fourth — was built in 1978 after vandals burned down its third iteration. It was added to the National Register of Historic Places in 1975. There is a small parking lot to access the river for kayaking, tubing and canoeing.
- **Old Dover Bridge (MD):** The "old" Dover Bridge, near Tanyard, is one of the last three swing bridges in Maryland. Built in 1932, it was decommissioned in 2018 and is open for recreational use only. The center portion of the bridge will remain permanently open for boats to pass through and the spans will be used as public fishing areas. A small parking lot and shoreline fishing area are available.

Paddlers launch into McIntosh Run from Leonardtown Wharf Park in Leonardtown, MD. (Ethan Weston/Chesapeake Bay Program)

Fishermen gather at Mariner Point Park in Joppatowne, MD, in preparation for a largemouth bass fishing tournament that raises funds for a bass stocking program. (Ethan Weston/Chesapeake Bay Program)

- **Phelps Mill Canoe Access (PA):** For years, residents of Jersey Shore, PA, would sneak onto private property to access Pine Creek. When the property went up for sale two years ago, the Northcentral Pennsylvania Conservancy raised enough money, with the help of the town, to purchase the property and turn it over to the Pennsylvania Bureau of Forestry. The tract provides a parking lot and launch site for paddlers.
- **Red Bank Road (VA):** This site near Edinburg includes parking and an informal launch area to access the Shenandoah River for paddling and tubing.
- **Riverside Park (VA):** Residents of Farmville typically frequent Riverside Park for annual events and wine festivals. Now, paddlers can launch onto the Appomattox River here as well.
- **Rose's Mill Park (MD):** Located on the site of the former Rose Mill, the half-acre park near Hagerstown includes a launch site for paddlers to access Antietam Creek, a tributary of the Potomac River. While paddling, be sure to check out the restored, three-span stone arch bridge constructed from local limestone that was built in 1839. The park is also the access point for the Antietam Creek Water Trail.
- **Saxis Wildlife Management Area (VA):** This site has added a soft launch area alongside the existing boat ramp at the end of Hammock Road, giving paddlers a third option in which to access the water in this pristine, protected marshland. Visitors to Buxom can find waterfowl hunting opportunities, primitive camping, boat ramps and excellent birding. The National Audubon Society has designated the area an Important Bird Area.
- **Seneca Landing Special Park (MD):** This special place in Poolesville has added an ADA-accessible floating boat launch for paddlers. After coming off the Potomac River, check out the nearby Seneca Store, continuously operating since 1901.
- **Wilck's Lake Park (VA):** This scenic park in Farmville has long provided ample space for children to play and families to picnic. With the opening of a soft launch area, paddlers can more easily access the Farmville Blueway Paddle Trail, which runs 4 miles down the Appomattox River.

To find water access sites in the Bay region, visit chesapeakebay.net/action/visit. ■

Rachel Felver is the Chesapeake Bay Program communications director at the Alliance for the Chesapeake Bay.

‘God’s engineers’: How beavers can help repair an ecosystem

By Tom Horton

A beaver works on the branches of a beech tree that it felled near Thurmont, MD. (Dave Harp)

Faithful readers know that I have become a beaver believer. For most of the time that the Chesapeake Bay has existed, beavers by the millions inhabited every nook and cranny of the six-state watershed (and most of North America).

By damming, digging and ponding, the rodents controlled the continent’s hydrology and shaped the landscape in ways that delivered profoundly cleaner, clearer water to streams and rivers and estuaries. Their work also created rich habitats for a host of other denizens of the air and swamps. So a forthcoming *Bay Journal* film, *Water’s Way: Thinking Like A Watershed,* will explore the idea that more beavers — virtually trapped out by the 1750s — could significantly and cost-effectively boost Bay restoration.

But humans have made their mark in the region since the beavers’ heyday, growing from an estimated 165,000 Native Americans to some 18 million moderns. That obviously precludes re-beavering to the max.

Still, there is immense potential. Beavers are adapting to even highly developed locales; we have filmed wonderful wetland complexes they have built in the pavement-clad heart of Baltimore’s White Marsh-Middle River urbanization. And they are relentless bundles of instinct and compulsion, constantly expanding their projects up and down every stream, always exploring around the next bend, and the next, and the next (kind of like humans).

So what ecologists term “carrying capacity” — physical habitat — for beavers abounds. The real question is “cultural carrying capacity”: the willingness of landowners and governments to accommodate a critter who chews trees and plugs drainageways and floods landscapes for a living.

The *Bay Journal* film I’m working on with Dave Harp and Sandy Cannon-Brown aims to expand that cultural carrying capacity, to show why we must champion and emulate beavers and to show that there are relatively simple, cheap ways for humans and beavers to coexist. (If you can’t wait for the film, search the web for “Beaver Institute for beaver conflict resolution.”)

But the journalist in me cautions the believer in me against overselling beavers or portraying them as quick and easy solutions to the Bay’s health. Beavers don’t give a damn about restoration goals or coexistence with humans. They are too busy being beavers.

Being our salvation doesn’t mean being our buddies.

When beavers move in, their flooding and chewing can initially degrade forests, creating a more open, sunny complex of braided stream channels and weedy vegetation — which to many people looks messy.

More ecologically sophisticated folks than I (The Nature Conservancy) relocated beavers that were ruining nesting trees for great blue herons. Later, the herons moved anyway, for reasons known only to herons.

The beavers that Ken Staver, an ag research scientist and farmer, initially welcomed on his farm undermined a dirt roadway, causing a hauler to flip over and spill several tons of corn into the water. Ken still likes beavers, but now more guardedly and with some trapping to keep them in check.

Allie Tyler, with a large property near Easton, has made a game of it in retirement, letting his beavers plug a pond outlet every night, then during the day removing it with his backhoe.

He showed us a massive pile he has made of mud and sticks, estimated at several tons, representing the work of a couple beavers for just a few months. “No doubt who’s gonna win in the long run,” Tyler said.

One of our main filming areas is a several-acre beaver complex behind Boordy Vineyards in northern Maryland, where the landowners have used a simple pond-leveling device to keep flooding in check while allowing enough depth for the beavers to feel safe.

But beavers have kids (kits), and kids mature and seek to build their own ponds, moving upstream and downstream, encountering other landowners and land uses. To date, that has resulted in more trapping and removal than acceptance.

Outdoorsman and naturalist Kai Hagen, an at-large member of the Frederick County Council in Maryland, is as big a beaver believer as you’ll ever find and has welcomed generations of the creatures on his acreage in the county’s Catoctin Mountains. He has happily spent years building fences out of fallen forest limbs around trees to a height (about 4 feet) that beaver-proofs them. But, he acknowledges, “There are limits.”

Biologists who work for state and federal governments with cold water species of fish like brook trout are highly skeptical of re-beavering. They worry that the ponds slow the flow and let water warm too much for trout, already beleaguered by other environmental problems. Beaver dams may also block fish migration.

There’s a lot of evidence with salmon and beavers in the West that such fears may be largely misplaced, but no such research has been done in the eastern U.S.

At one of our filming sites in Harford County, MD, neighbors were horrified at the look of a restored stream where beavers have moved in and prospered. Then their kids began playing in the pond and catching bass, and folks mostly got used to the shaggier look of the beaver landscape.

Similarly, some farmers have become aware of the superb duck hunting where beavers move in, and they see potential in their own acreage for sport and income from waterfowlers.

Sometimes I have been surprised at the tolerance for beavers. I was stopped by a farmer as I snooped around his creek looking for evidence of beavers. He had a bolt action rifle lying on the front seat of his pickup.

When I told him what I was doing, he chuckled, “Oh, yeah, they’re in here. Some people say get rid of ’em, but you’ll never do it ... those animals are God’s own engineers.” ■

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.

BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Citizen Science: Butterfly census

Friend of the Earth, an initiative of the World Sustainability Organization, has launched a *Global Butterflies Census* to raise awareness about butterflies and moths, their biodiversity; collect population data; better understand their behavior. To participate: When you 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 and file the info on the census' interactive map, database. Data will be used to design conservation measures to save these insects from extinction. Info: friendoftheearth.org.

Citizen Science: Creek Critters

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

PENNSYLVANIA

Middle Susquehanna River

Get involved with the Middle Susquehanna Riverkeeper Association. Contact Riverkeeper John Zaktansky at 570-768-6300, midsusriver@gmail.com.

- *HERYN (Helping Engage our River's Youth with Nature):* Assist with youth outdoor activities.
- *Susquehanna Stewards:* Deliver programs, info to people in your region, help to develop new initiatives. Info: middlesusquehannariverkeeper.org.
- *Water Reporter App:* Track the health of Middle Susquehanna watershed's fish species by sharing photos, info about catches via an app. Reports, interactive map available at middlesusquehannariverkeeper.org.

VIRGINIA

Cleanup support & supplies

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

Goose Creek Association

The Goose Creek Association in Middleburg needs volunteers for stream monitoring & restoration, educational outreach & events, zoning & preservation, river cleanups. It also offers projects and internships for high school & college students. Info: Holly Geary at 540-687-3073, info@goosecreek.org, goosecreek.org/volunteer.

Citizen Science: Ghosts of the coast

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

Check out cleanup supplies

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

Become a water quality monitor

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

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

VA Master Naturalists

VA Master Naturalists is a corps of volunteers who help to manage, protect natural areas through plant & animal surveys; monitor streams; rehabilitate trails; teach in nature centers. Training covers ecology, geology, soils, native flora & fauna, habitat management. Info: virginiamasternaturalist.org.

Chemical water monitoring teams

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

MARYLAND

Monarch tagging, workshop

Chesapeake Wildlife Heritage's annual *Magnificent Monarchs* workshop takes place 10 a.m. Sept. 25 at Barnstable Hill Farm in Chester. Learn about these butterflies while helping to tag them. The workshop is free, space is limited. All participants must be fully vaccinated. CWH reserves the right to cancel the workshop if staff feel that conditions are not safe. To register: apupke@cheswildlife.org, 410-822-5100.

Delmarva Woodland Stewards

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

Legacy Institute for the Environment

The Chesapeake Bay Environmental Center in Grasonville is accepting applications for the *Legacy Institute for the Environment.* Maryland residents interested in learning more about the environment and desiring to volunteer at the CBEC are invited to apply. Participants attend educational sessions and participate in site visits guided by expert scientists, environmental educators, professional consultants. The institute runs 10 a.m.–3 p.m. Wednesdays Sept. 22 through Oct. 27. The fee is $150 plus 20 hours volunteering at CBEC. Apply online at bayrestoration.org/LIFE. Info: Anne & Dave Brunson at volunteercoordinator@bayrestoration.org.

See **BULLETIN**, *page 40*

WORKDAY WISDOM

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

Submission Guidelines

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.
October issue: September 11
November issue: October 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.

BULLETIN BOARD

BULLETIN *from page 39*

Annapolis Maritime Museum
The Annapolis Maritime Museum & Park is seeking volunteers. Info: Ryan Linthicum at museum@amaritime.org.

Severn River Association
Join the Severn River Association's Water Quality Monitoring team. Volunteers help out on a three-hour cruise Wednesday, Thursday or Friday mornings through the first week in November. SRA provides training. Participants become certified water quality monitors using Chesapeake Monitoring Cooperative protocols. Data collected is shared with scientific, regulatory, academic communities via CMC's Chesapeake Data Explore sharing platform. Info: Info@severnriver.org. Put "WQ Team" in message box.

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

Mount Harmon Plantation
Help with manor house student tours, colonial crafts, hearth cooking, guided nature walks, the herb garden at Mount Harmon Plantation in Earleville. Special event needs include house tours, admission/ticket sales, gift shop, auction & raffle fundraisers. Training provided. Docents are asked to commit to eight service hours per month during tour season: 10 a.m.–3 p.m. Thursdays to Sundays, May to October. Info: 410-275-8819, info@mountharmon.org.

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

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

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

Ruth Swann Park
Help the Maryland Native Plant Society, Sierra Club and Chapman Forest Foundation remove invasive plants 10 a.m.–4 p.m. the second Saturday in September, October and November 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 a.m.; return at 5 p.m. Carpool contact: 301-277-7111.

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

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

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

Patuxent Research Refuge
Volunteer in the Wildlife Images Bookstore & Nature Shop inside the National Wildlife Visitor Center, on the South Tract of the U.S. Fish and Wildlife Service's Patuxent Research Refuge in Laurel. Help for a few hours or all day 11 a.m.–4 p.m. Wednesday through Saturday. Open/close the shop, help customers, restock, run the register. A future webstore may need volunteers. Training provided. Info: wibookstore@friendsofpatuxent.org.

CONFERENCES/CLASSES

WATERSHEDWIDE

Chesapeake Watershed Forum
The 16th annual *Chesapeake Watershed Forum, The Future is Now: Getting to (and Moving Beyond) 2025* takes place Nov. 3–5. Registration for the virtual forum includes online workshops, sessions, plenary speaker presentations, participation in virtual and in-person networking activities, in-person field trips and access to session recordings and content after the event. Info: contact Jenny McGarvey at jmcgarvey@allianceforthebay.org.

VIRGINIA

Fall in the Piedmont virtual forum
Learn about the state's regions and seasonal changes at the *2021 Virginia Association for Environmental Education* virtual mini-conference, *Fall in the Piedmont* 12 a.m.–11:59 p.m. Oct. 23. There is enough space to offer up to nine, 50-minute sessions. The conference includes professional development, learning, collaboration, and environmental education efforts and resources in Virginia, beyond. For pricing details, registration (required) packet, scholarship opportunities, visit vaee.wildapricot.org. Click on "events" in the menu. Info: April Harper at events@virginiaee.org, 804-916-9302.

EVENTS / PROGRAMS

VIRGINIA

Family Festival
The Goose Creek Association's Fall Family Festival takes place 12–4 p.m. Sept. 19 at the Historic Aldie Mill in Aldie, VA. The free events features a local artists' art show & sale, wildlife & environmental exhibits, children's games, pumpkins, vendors, food, music. Info: Holly Geary at 540-687-3073.

MARYLAND

Horn Point Lab celebration
The University of Maryland Center for Environmental Science Horn Point Laboratory's *Eighth Annual Chesapeake Champion Celebration* fundraiser takes place 5–7 p.m. Sept. 30 at the Tidewater Inn in Easton. Beverly and Richard Tilghman, steadfast supporters of HPL's graduate students, will also be honored for their support and advice for a variety of Eastern Shore environmental groups as well as their stewardship of Wye House: installing living shorelines and conservation easements to protect the land and wildlife. The celebration features locally sourced foods, beverages, demonstrations by HPL graduate students. The event's fundraising goal of $100,000 would provide stipends for two graduate students. Tickets: $100. Sponsorship opportunities available. Info: umces.edu/hpl or Carin Starr at cstarr@umces.edu, 410-221-8408.

Woodend Nature Sanctuary
The grand opening of the Audubon Naturalist Society's restored habitat at Woodend Nature Sanctuary in Chevy Chase takes place 10 a.m.–5 p.m. Oct. 6. The free event includes tours, scavenger hunt for all ages, native plant sale, giveaways. New trails are accessible to wheelchairs, strollers, walkers, canes. Look for wildlife at upgraded stream, pond, butterfly-friendly meadow. See the newly installed native trees, shrubs plants. Learn how the restored stream decreases pollution entering Rock Creek, the Bay. Info: anshome.org/grand-opening, Lisa Goodnight at lglisagoodnight@gmail.com, 301-523-5394.

Ladew Topiary Gardens
Join ecologist John Canoles 9:30–11:30 a.m. Oct. 12 for *Fall Nature Exploration*, a leisurely nature walk at Ladew Topiary Gardens in Monkton. Participants, ages 13+, should wear hiking gear; the 1-mile trail can be muddy. Registration

CHESAPEAKE CHALLENGE

ANSWERS TO Leafy Bits

on page 27

A. Apex, 6 B. Midrib, 4 C. Secondary veins, 1 D. Lamina, 7 E. Leaf margin, 8

F. Petiole, 3 G. Bud, 5 H. Stoma, 2

required. $20 fee includes admission to the gardens. Info: 410-557-9466, ladewgardens.com, information@ladewgardens.com.

St. Marys RiverFest

Celebrate the St. Mary's River at *RiverFest* 11 a.m.–4 p.m. Sept. 25 at Historic St. Mary's City. Activities at this free event include live music, boat rides, kayaking, seining, oyster tonging, face painting, balloon art, exhibits, craft vendors, the St. Maries Citty Militia, food. Info: www.SMRWA.org.

Fall foliage cruise, dinner

St. Clement's Island Museum in Colton's Point is offering a *Fall Foliage Tour* 2–6 p.m. Oct. 10. Guided cruise on the St. Clement's Island Water Taxi, includes cocktail reception at the museum, dinner at waterside Morris Point Restaurant, narrated tour around St. Clement's Island. Tickets: $55. Info: 301-769-2222, Facebook.com/SCIMuseum.

Dee of St. Mary's public cruises

Take a two-hour sail aboard the Calvert Marine Museum's historic skipjack, *Dee of St. Mary's*, which is used in the museum's Chesapeake Bay Field Lab education programs. Guests will have an opportunity to help raise, lower the sail. Weather-dependent cruises run through October. Full schedule, fees: calvertmarinemuseum.com or contact Melissa McCormick at Melissa.Mccormick@calvertcountymd.gov.

MD Park Quest 2021

The Department of Natural Resources' *Maryland Park Quest 2021* for families runs through Oct. 31. More than 25 state parks are offering outdoor activities that feature the state's cultural, historical, natural resources on public lands, parks. This year's theme, *Spread Your Wings to Explore Maryland's State Parks*, highlights the state's birds. Adjustments related to the COVID-19 pandemic include:

- Ranger-led activities have been turned into do-it-yourself programs. Web search "MD park service" to download, print worksheets.
- Passport or registration is no longer required.

Participants/teams completing at least 12 activities before Oct. 31 and the Quest form by Nov. 1 are eligible to win prizes (proof of completion via photos required). Drawings take place Nov. 2. Winners will be notified by email. Prizes range from stickers and bandanas to an Annual State Park & Trail Passport. Participants will need to pay day-use service charges at certain parks. (A list of service charges is found at: dnr.maryland.gov/Publiclands/Pages) There are no additional fees to participate; all materials are available online. Downloading a copy of the Maryland Bird List at mdbirds.org/wp-content/uploads/md-bird-list.pdf or a Checklist to Maryland Birds mdbirds.org/wp-content/uploads/MOS-MD-Field-Checklist-Oct-2019.pdf will help with many of the quests. Bring binoculars, if possible, to see more birds. Info: Ranger Melissa Boyle Acuti (Monday-Friday) at melissa.boyle@maryland.gov.

Chesapeake Bay Maritime Museum

Programs offered by the Chesapeake Bay Maritime Museum in St. Michaels, MD:

- *Trap Pond State Park (DE) Overnight Paddle-Camping Trip:* 10 a.m. Sept. 25. Beginner, intermediate kayakers. Paddle through one of the largest surviving, northernmost natural stands of bald cypress on the East Coast. Explore the park's trails for just the day or share in a family-style meal, camp. Overnight fee: $85/w/kayak rental ($65/bring your own kayak). Day trip only fee: $65 w/kayak rental ($45/bring your own kayak). Info: cbmm.org/paddleovernight.
- *Maryland Dove - A Symposium on Memory & Meaning Series:* Talks cover transition from current vessel built in the 1970s to a modern reproduction based upon decades of research. Fee: $7.50/session. (Discount is offered to anyone who registers for these and two later sessions, which will also be recorded and shared with registrants who are unable to participate live. To register, visit cbmm.org/dovesymposium. The schedule is:
  - *Researching Dove Tales:* 3 p.m. Sept. 29. Shipwright James B. Richardson was coaxed out of retirement to build the 1970s vessel. CBMM's associate curator of collections, Jenifer Dolde, offers an oral history with shipwrights who worked alongside "Mr. Jim."
  - *Tall Ships:* 2 p.m. Oct. 6. Captains Will Gates (Historic St. Mary's City), Eric Speth (Jamestown-Yorktown Foundation) and Lauren Morgens & Sharon Dounce (Kalmar Nyckel Foundation) share their experiences blending modern and historic expertise as ship's masters aboard replica and reproduction 17th-century vessels.
  - *Interpreting MD History on Both Sides of the Atlantic:* 10:30 a.m. Oct. 13. Kiplin Hall & Gardens Director James Etherington and Maryland Heritage Scholar Henry Miller discuss perspectives on interpreting the legacies of the Calverts.
- *STEAM Team:* 10 a.m.–12 p.m. ages 4–6, and 1–3 p.m. ages 7–9. Oct. 2 *Oyster Exploration*; Oct. 9 *Digging Geology*; Oct. 16 *Engineering Agents*; Oct. 23 *Who, What, Where & Weather*. Take part in hands-on exploration incorporating science, technology, engineering, math with the arts. Fee: $15 (discount available for those registering for all four sessions). Need-based scholarships available. Online preregistration required. Info: cbmm.org/steamteam.
- *Winnie Estelle Cruises:* 45-minute cruises scheduled 12:30 p.m., 1:30 p.m. and 2:30 p.m. Fridays, Saturdays & Sundays through October. Bring binoculars, cameras. Boarding passes, in addition to CBMM admission, are $10/ages 18+; $3/ages 6–17; free/ages 5 & younger. Purchase them at the Welcome Center upon arrival. All cruises are weather-dependent, subject to availability. *Note: Facial coverings required for guests on cruises. To read CBMM's COVID-19 policies, visit welcome.cbmm.org. To schedule a private charters, visit cbmm.org/cruises.*

African American schoolhouse

The Drayden (MD) African American Schoolhouse has scheduled open houses 11 a.m.–2 p.m. Oct. 2. Drayden, a one-room African American schoolhouses, played a major educational role in St. Mary's County. Learn about its students up until the mid-20th century. Staff, volunteers offer tours, answer questions. Info: 301-994-1471, Facebook.com/DraydenSchool.

VIRTUAL EXPERIENCES

Tour Maryland parks

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

RESOURCES

WATERSHEDWIDE

Middle Susquehanna River podcasts

The Middle Susquehanna River Association's has added two new episodes to its podcast library. In *Wild Trout Man*, Middle Susquehanna Riverkeeper Association Board Vice President Dr. Joseph Simons III talks about his efforts to educate others about the importance of conservation and fly fishing for wild trout. In *Moshannon Creek*, Eric Skrivseth and Eric Rosengrant of the Moshannon Creek Watershed Association discuss their efforts to curb abandoned mine drainage before it enters the West Branch of the Susquehanna River. Web search: "Middle Susquehanna River podcasts" for these episodes and others featuring outdoor specialists in the river's watershed.

Farm tool, equipment sharing forum

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

Chesapeake Network

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

MARYLAND

DNR educational resources

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

Free streamside buffers

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

Fishing report

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

Million Acre Challenge

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

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

The stream game is best played with many players

By Ryan Davis

I often find myself playing what I call the "stream game" while looking at digital maps. It's a simple game involving aerial imagery and reconnaissance for future streamside, or "riparian," tree plantings. I start at the property I'm working on, which has a "naked" stream but one that, if I have my way, soon will be lined with a wide buffer of young trees. Then I follow the stream through the landscape — and get increasingly upset about how few trees are along it and how little forest cover there is in general.

It's admittedly a pretty bad game. It lacks objectives, it's impossible to win or lose, and it makes me feel terrible about the condition of our landscape. The presence or absence of a riparian forest around a stream is a strong determinant of its health. Those naked streams have unstable banks, less protection from runoff and little food for aquatic invertebrates. Plus, they likely get too hot in the summer to harbor many fish. I don't think many people *try* to harm streams or aquatic life, but by choosing to farm or mow land that should be a riparian forest, that's precisely what they're doing — on property after property, click after click on the map.

To me, one of the hardest parts of being a restoration professional is knowing this painful truth: We live in a landscape that is often denuded of nature. We got here not because of a few distant bad actors, but because of millions of uninformed decisions made by millions of individuals over hundreds of years. Restoring a creek takes decades of successful education and conservation efforts in the entire watershed. It isn't enough for one farmer to adopt soil health practices and plant a riparian forest buffer; their neighbors need to do so as well if we want the stream to teem with life.

This work is slow and difficult. There is still so much left to do, and it can be hard to feel optimistic while playing the stream game — though every so often it can make my day. Last winter, I was clicking around the map, feeling dejected, until I came across what was clearly a young riparian forest buffer. The trees were in a tidy grid to facilitate maintenance mowing, and I could see the shadows of some of the trees' young crowns! It took me a second longer to realize, with even more delight, that as the Pennsylvania forest program manager at the Alliance for the Chesapeake Bay, I had coordinated the planting of that buffer.

It's easy to feel hopeless when most of what you see is ecological destruction, especially in the lonely glow of a computer monitor. Thinking back, the stream game started as a way to explore new buffer planting opportunities, not as a reminder of how much work there is to do. And as I saw that young forest growing, I recalled that progress is not just possible, but a cinch if you have enough people power.

Those 800 trees were planted by volunteers in April 2019. Staff from the township met me at sunup that morning (and brought coffee!). While I placed the trees for planting, they distributed stakes and shelters and set up the volunteer registration station. When the volunteers arrived, joyful chaos ensued. The first wave was made up of the Lititz Run Watershed Alliance, the Donegal Chapter of Trout Unlimited and other individuals from the community. A few hours later, a large group of Franklin & Marshall College students arrived. Then the college's volleyball team showed up to help — followed, unexpectedly, by another sports team and a fraternity. I finished planting around noon with the frat brothers, a little dazed about the 150 volunteers who came to help. That is something to be hopeful about!

In the two years since the planting, the township has diligently taken care of their trees. If it wasn't for their hard work mowing and spraying, I may not have even noticed the site. Without maintenance, it would look identical to a hayfield from the aerial. The planting also owes its success so far to one volunteer in particular: a "Riparian Ranger" who asked not to be named here but has spent countless hours tending to the trees. The Riparian Rangers, a volunteer corps created by the Alliance for the Chesapeake Bay, was formed to care for and monitor forest planting sites to ensure they grow to mature forests. Planting trees is quick, fun and gets lots of attention. Tending to them is long, arduous and unglamorous work, but we have scores of volunteers who choose to spend their free time helping — under the blazing sun and up to their knees in stinging nettle — because they care. That is also something to be hopeful about!

Young native black locusts thrive among the 800 trees planted by volunteers in 2019 along a stream at Dean Saylor Park, outside of Lititz, PA. (Ryan Davis)

The amount of forest cover, erosion and nutrient runoff in the upland parts of the watershed also play a critical role in its health. Sure, we need landowners who own riparian land to get on board with conservation, but we also need our communities to understand and engage with our efforts, or else we can't be upset that millions of people are making millions of uninformed decisions.

Agricultural land provides a tremendous opportunity to implement cost-efficient conservation practices that directly improve stream quality, but this work cannot solely be the responsibility of the farming community. Farmers need help, and our communities can provide that support, whether it entails planting trees, tending to them or simply donating to conservation organizations. Environmental health is a public health issue, after all. The more people we have in the movement, the more powerful it will be.

I believe we must be clear about how much work is left to do in restoring the Chesapeake Bay watershed. We need to remember that things have substantially improved over the past 50 years, and that they continue to do so with every tree planted, every conservation practice embraced and every resident engaged or informed.

Keep your eye on those naked streams, but don't forget to tell your neighbors, friends and family — and anyone else who will listen — that streams need trees. Don't forget to invite them to a tree planting this fall. We're all in this together, and we need each other to make progress. ■

Ryan Davis is manager of the Pennsylvania Forests Projects for the Alliance for the Chesapeake Bay.

Drab eastern phoebes are flashy when catching insects

By Mike Burke

The summer heat continued to be oppressive. Thankfully, one person offered her house for our little meeting. I was briefing a group of fellow residents on a new sustainability plan for our retirement community. The lively conversation ranged from energy-saving LEDs to expanded composting and even electric vehicles and charging stations.

We were about to wrap up, when a bird just outside the big sunroom window caught my eye. It perched on a shepherd's hook, tail pumping rhythmically, before sallying forth to snatch an unseen insect in midair. I interrupted myself to point out the bird.

I could tell that some were unimpressed. It had no flashy colors or distinguishing marks like eye rings or wing bars. In truth, it wasn't much to look at, but I was still fascinated. Birders are like that: A bird doesn't have to be visually arresting to be interesting.

After breeding, the phoeble molts, and its off-white undersides give way to a yellow wash. (Dan Pancamo, CC BY-SA 2.0)

For the nonbirders in the room, I identified it as an eastern phoebe *(Sayornis phoebe)*. A few minutes later, after my impromptu monologue on the behavior and diet of the phoebe, I returned my attention to the sustainability plan. We finished 10 minutes later.

Eastern phoebes are common here in central Maryland every summer. They belong to the large avian family of flycatchers. There are two other phoebes found in North America, the black and the Say's — both are found exclusively out west, making identification of the rather plain-looking eastern bird a bit easier for those of us in the Chesapeake Bay watershed. The three phoebes are joined by another 33 native flycatcher species on our continent. And that number pales in comparison with the 400 or so flycatcher species in the Americas combined. They constitute one of the largest and most diverse families in the avian world.

The phoebe we saw had a dark, almost black, head. The nape, back, wings and tail were a softer gray. The bird had a white throat and incomplete neck ring. The undersides were a dingy white. After breeding, the bird molts, and those off-white undersides give way to a yellow wash. Fresh wing feathers have a thin white leading edge, giving the phoebe's folded wings a faintly striped appearance. The sexes look alike. Juveniles have faint orange wing bars that gradually fade away.

The hot sun had brought out summer's insects in force. The phoebe was busy, catching them as they flew by and then zipping back to the hook. Equipped with a slightly flattened black bill and terrific agility, phoebes are expert insect catchers. They eat moths and butterflies, cicadas, wasps and other winged insects. Sometimes they eat spiders, often by hovering near a branch and gleaning the arachnids there. In cold weather, when insects are scarce, phoebes turn to seeds or small fruits.

On the perch, eastern phoebes will typically flick their tails up and down and constantly turn their heads to scan for their next meal. That pumping tail is perhaps the best field identifier for birders.

These birds are short– to intermediate-migrants. During the winter they live in Mexico and along our Gulf Coast. Some

The Eastern phoebe is one of three species in the Sayornis *genus of the flycatcher family and the only one commonly seen in the eastern U.S., especially in summer months. (C. L. Ricketson, CC BY 2.0)*

reside year-round in an area that stretches from the Delmarva Peninsula over to West Virginia and down into Georgia. Come breeding season, phoebes that winter in the deep South or Mexico head north, often as early as March. They fan out, covering the Mississippi River watershed, central and northwest Canada, and points east to the Atlantic, including the entire Chesapeake watershed.

Phoebes live in woodlands, parks and many suburban neighborhoods. You can identify them by that flicking tail and their voice, a quick, raspy, whistled "shree-dip, shree-brr." Usually it is translated eponymously as "Phoe-bee." It is similar to the softly lisped "fee-bee" of the black-capped chickadee.

Eastern phoebes build their mud and grass cup nests in natural crevices and under overhangs. They are one of the few species that seem to have benefited from man-made changes in the landscape. The tens of thousands of bridges that stretch across the continent provide the ledges and weather protection that phoebes seek for their nests. Gradually, the species seems to be expanding their range west and north. Phoebes often return to the same breeding territory and sometimes even reuse the same nest. Only females construct the nests.

Because they are primarily eastern-America, short-distance migrants, phoebes are likely to withstand the climate changes under way and accelerating. Phoebes are not coastal birds, so they will be protected from rising sea levels. As the planet warms, the birds are expected to move farther north, where many already breed. And unlike many western birds that are imperiled from record-setting droughts and attendant wildfires, eastern phoebes are not likely to suffer from the warmer but wetter weather predicted for the mid-Atlantic, New England and southeastern Canada.

As I made my way home, mentally I ran through the elements of our sustainability plan. It called for renewable electricity, planting native trees and bushes, adopting a more carbon-friendly diet, eliminating plastic bags and bottles, and rethinking transportation options. It was ambitious. But I couldn't help worrying: Would it be enough, and would it happen fast enough?

The eastern phoebe is well-prepared for the future. Will we be? ■

Mike Burke, an amateur naturalist, lives in Mitchellville, MD.

When leaves leave: Autumn reveals trees' true colors

By Kathy Reshetiloff

Tree leaves have an abundance of chlorophyll in spring and summer, which masks their other colors. In the fall, chlorophyll breaks down, revealing the fiery colors created by other pigments in the leaves. (Michele Danoff)

Autumn always seems to sneak up. Slowly, the heat and humidity of summer is replaced with cooler, drier days. Here and there, autumn colors peek out of the green landscape. Then, before you know it, nature's festival of color is in full swing. And just as quickly, it seems, the brilliant fall hues are replaced by dismal browns, and leaves carpet our lawns and gardens.

Actually, this leaf-shedding process, known as abscission, begins before the colors appear. As summer's heat fades, the cells where the leaf stem is attached to the tree toughen and begin to form a protective waterproof scar. The cells in the leaf stem swell, weaken and degenerate. This interferes with the flow of moisture and nutrients into the leaf, reducing the production of chlorophyll, which gives leaves their green color.

The leaf is the food factory for the tree.

A possumhaw viburnum in the fall offers the striking contrast of scarlet leaves with the plant's blue or blue-purple berries. (Dave Harp)

Chlorophyll in a leaf uses the sun's energy to convert carbon dioxide and water into sugar, which is food for the tree. As the days shorten, there is less sunlight to manufacture food. Nutrients and minerals are withdrawn from leaves and transported to the permanent parts of trees: trunks, stems and roots. Chlorophyll breaks down.

But leaves contain other pigments that give them their fiery fall colors. These colors are hidden in the spring and summer by the abundance of chlorophyll. Leaves reveal their autumn colors as chlorophyll breaks down and other pigments are unmasked.

The pigment called xanthophyll gives leaves a yellow color, and carotene produces yellow-orange. Leaves continue to produce sugar during the day, but colder night temperatures prevent trees from withdrawing the food from the leaves. Sunny days and cool nights can produce anthocyanin, a sugar-related pigment that turns leaves fiery red. Other chemicals and breakdown products give us bronze, purple and crimson hues.

The leaves of birches, beeches and tulip poplars turn golden. Sassafras leaves take on an orange tone. One of the more colorful trees, the sugar maple, may assume a yellow, orange, or red color — or any combination of these hues. The biochemistry that determines which of those colors it will be is not well understood, except that anthocyanin is abundant in red leaves and colder weather plays a role.

The red maple and staghorn sumac are two of the more vibrant red trees. Vines such as Virginia creeper and poison ivy also turn crimson. Oaks turn yellow, orange or bronze, or blends thereof. Leaves stay on oaks the longest and it is often their dry leaves that you hear rustling in the breeze. Some oak species, as well as beeches and hornbeams, hold on to all or some of their dead leaves throughout winter in a phenomenon known as marcescence. There is no widely accepted theory as to why this happens, though some suggest it may be the tree's way of capturing moisture by trapping snow or a strategy of waiting until spring to "fertilize" the ground below with decomposing leaves.

The final step of the abscission process is when a tree sheds its leaves. Gradually, the bond between the leaf and the branch weakens. The tiny veins that carried sap to the leaves all summer are sealed off. Wind and gravity finish the job, sending the leaves to the ground, where decomposition begins in earnest and turns them various shades of brown.

Dry, brown decaying leaves may not be beautiful, but they are valuable. Instead of bagging leaves, consider composting them and using the compost to enrich your garden soil. It's an ecological and economical way to dispose of them and generally less labor intensive than raking and bagging.

Or you can simply mow the leaf-covered grass with a mulching mower, which chops the leaves into smaller pieces that decompose faster. Mulched leaves can be left on lawns to enhance the soil.

You can also spread whole leaves around vegetable gardens and flowerbeds or at the bases of bushes and trees. These leaves will form an insulating barrier around plants, reducing moisture loss and damage from severe winter weather. By putting whole and composted leaves on gardens and leaving mulched leaves on lawns, you reduce the need to fertilize. This cuts down on the amount of nutrients that run off the land into streams, rivers and, ultimately, the Chesapeake Bay.

Of course, leaves are good for other things too. Nothing beats jumping into a big pile of them on a crisp autumn day!

For information on leaf management and backyard composting, contact your state or local cooperative extension service. ■

Kathy Reshetiloff is with the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office in Annapolis.