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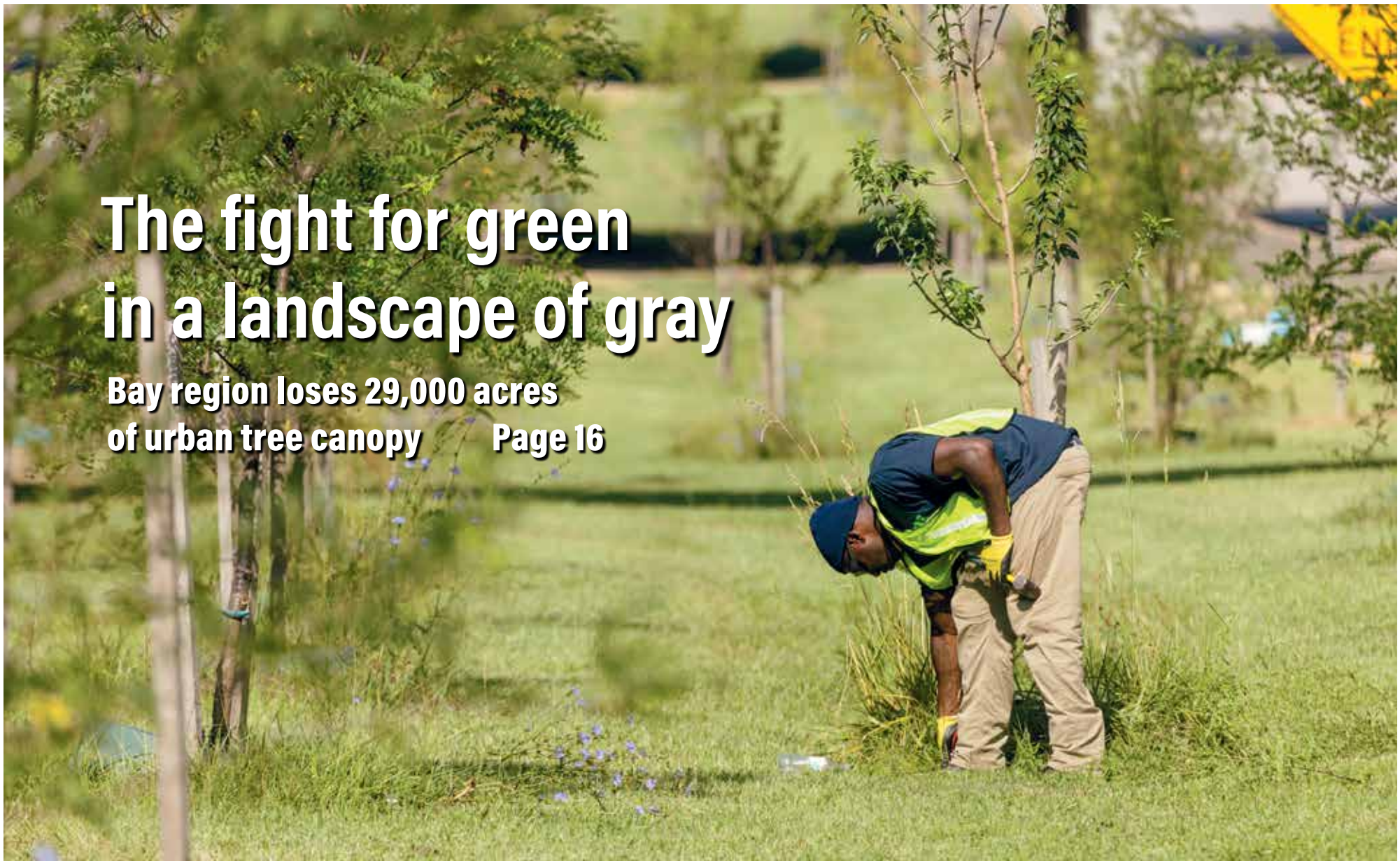

The fight for green in a landscape of gray

Bay region loses 29,000 acres of urban tree canopy Page 16

CHECKERED SCULPIN

A fish still finds refuge in cool headwater streams PAGE 19

AMERICAN MARTENS

Can wildlife managers bring martens back to PA? PAGE 11

OUTDOOR EDUCATION

Hampton City Schools win national award PAGE 23

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This community solar project was created by members of the Cedar Ridge Community Church in Montgomery County, MD. What is "community solar" and does it work? Read the article on page 20. (Dave Harp)

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EDITOR'S NOTE

It's a long road: stewardship progress and setbacks

In one my mother's oldest photo albums, held to the paper pages with tiny corner tabs, are black-and-white photos of my grandfather, Al Seibel. He's outdoors, grinning, with a group of skinny young men all wearing work clothes. The photos are labeled "CCC camp."

In the 1930s, when those photos were taken, CCC stood for Civilian Conservation Corps. That national program is long gone, but a new CCC is at work in the Bay region: the Chesapeake Conservation Corps. In this issue, you can learn about both. See *Tough times led to lasting legacies* on page 26 and *Conservation Corps delivers results — and expands* on page 12. The meaningful work that these groups have provided for parks and natural resources in the Bay watershed is inspiring.

You might need that inspiration after reading about the loss of urban tree canopy on page 16. The goal set by the state-federal Chesapeake Bay Program is to add 2,400 acres of canopy, regionwide, to our most developed places by 2025. Instead, we have already lost 29,000. Many residents, nonprofit groups and people in government are fighting to stem the loss, but — clearly — the critical mass needed to bring more green into gray landscapes is lacking.

Along with the CCCs, though, you will find other examples of people making a difference for the environment and their local communities. Among them: the empowering benefits of "community solar," the reintroduction of martens and the award-winning environmental education program run by Hampton City Schools.

Shifting to more sustainable living is an intergenerational task. There will be both setbacks and celebrations. I'm reminded of this when I see the grin on my grandfather's face, knowing that his love of the outdoors was passed on to me and the work he did with the CCC impacted parks that people still visit. Everyone working as stewards today is giving a gift to the next generation.

On another note: We've received hundreds of reader surveys, and they are still coming in! Thanks so much for your input. We are recording and analyzing the results, and I'll share them with you soon.

— Lara Lutz

ON THE COVER

A staff member from the Baltimore Tree Trust performs maintenance on trees planted in a median along Route 40 in 2019. (Will Parson/ Chesapeake Bay Program)

Bottom photos: Left by Jeremy Cox, center by Allison Gregor and right courtesy of Hampton City Schools.

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BY THE numbers

30%
Percentage of pollutants in U.S. waterways resulting from stormwater runoff

312,000
Ounces of water needed to dilute one ounce of household bleach in order for the water to be safe for fish

193 million
Gallons of used oil that households in the U.S. dump improperly each year

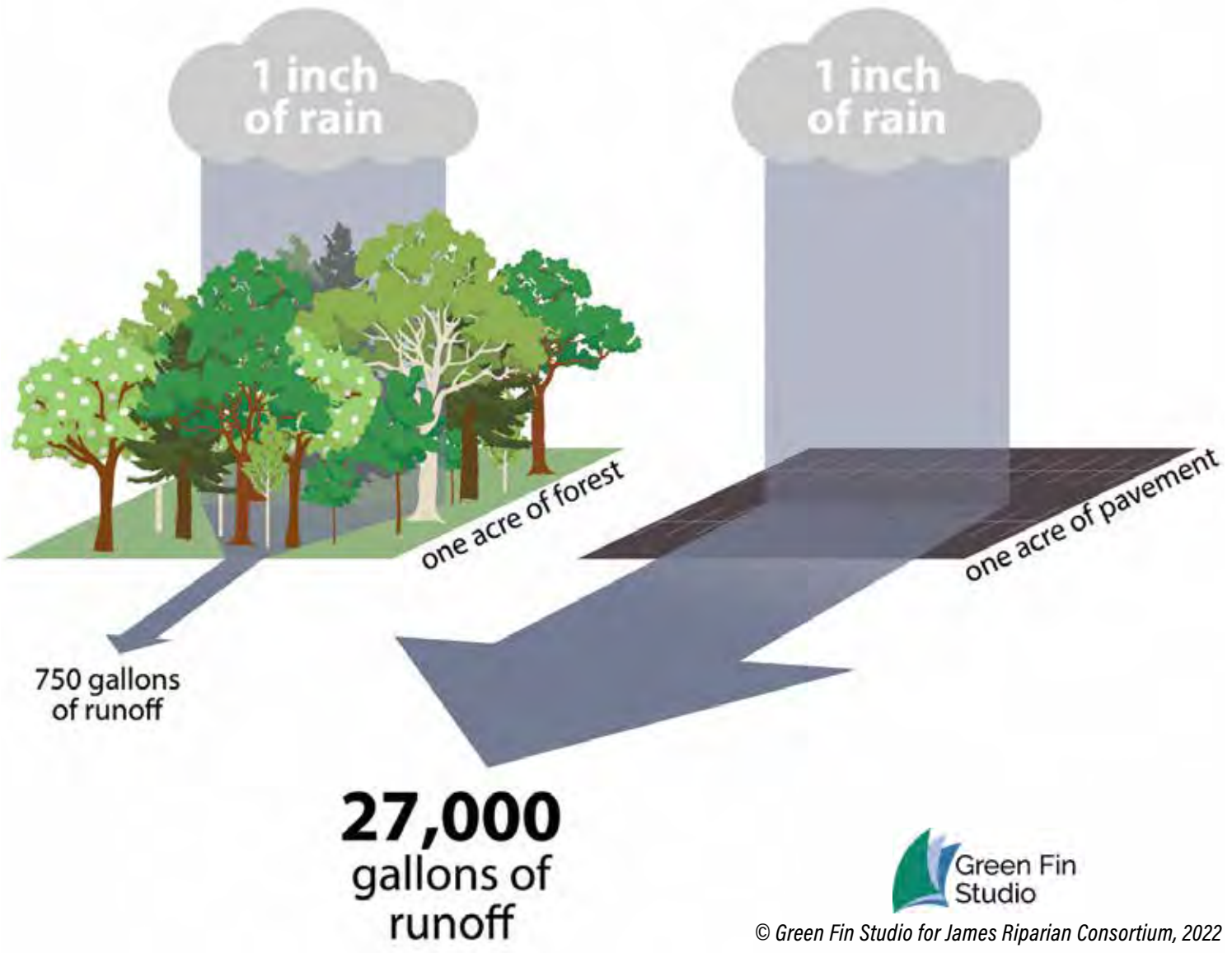
22,000
Students who participated in a Bay watershed education program supported by NOAA's B-WET grant program in 2020–21

276
The number of teeth typically in the mouth of the prehistoric megalodon shark

40,000
Number of teeth that the megalodon shark is thought to have produced in its lifetime

Forests: Nature's sponge for cleaner water

Trees provide many environmental benefits for humans and wildlife. One is to help keep polluted stormwater runoff out of our waterways. Their leaves, branches and roots slow the rush of rainfall and melting snow. Especially in forests, this allows water to soak into the earth, where it can recharge groundwater and carry nutrients to growing plants. According to the Chesapeake Bay Program, streamside forests can sometimes reduce the amount of nutrient pollution entering waterways by as much as 30–90%.



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LOOKING BACK

30 years ago

'Phantom' microbe kills fish

A previously unknown algae was blamed for massive fish kills along the East Coast and in the Chesapeake Bay. ■

— *Bay Journal,* Oct. 1992

20 years ago

Migratory population of Canada geese still rebounding

The region's migratory Canada geese population continued to rebound from an all-time low in 1995. The Bay is their most important wintering area on the East Coast. ■

— *Bay Journal,* Oct. 2002

10 years ago

High-voltage line put on hold

Groups cheered a decision to suspend planning for the Mid-Atlantic Power Pathway, a high-voltage transmission line that would have cut across the floor of the Bay, impacted several rivers and changed rural viewsheds on the Eastern Shore. ■

— *Bay Journal,* Oct. 2012

ABOUT US

The *Chesapeake Bay Journal* is published by Bay Journal Media, an independent nonprofit news organization dedicated to environmental reporting in the Chesapeake Bay region. *Bay Journal* reporting reaches well over 250,000 people each month through news articles, columns, films and the *Chesapeake Uncharted* podcast.

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Tropical Storm Agnes, the subject of a new season of the Chesapeake Uncharted podcast, delivered a heavy blow to Wilkes Barre, PA, when it lingered over the Susquehanna River in June 1972. (Courtesy of Wilkes University)

A new season of Chesapeake Uncharted

We're excited to announce that a new season of the *Bay Journal* podcast, *Chesapeake Uncharted*, will launch on Friday, Oct. 28. Season 2, *Killer Storm Agnes*, will revisit the devastation caused by the remnants of the 1972 hurricane that hit the Bay region and hovered over the Susquehanna River. Join host **Jeremy Cox** as he travels around the watershed asking, how did the deluge impact communities, the river and aquatic life in the Bay? How long did the impacts last? And have lessons from Agnes helped communities prepare for a similar storm in the future?

You can download *Chesapeake Uncharted* from your favorite podcast streaming service or listen to it on our website, at bayjournal.com/podcasts. We want to extend a special thanks to our sponsor, Green Fin Studio.

In September, the Scientific and Technical Advisory Committee of the state-federal Chesapeake Bay Program drew on the expertise of editor-at-large **Karl Blankenship**. The committee included Karl on a panel discussion about the filling of the reservoir behind Conowingo Dam and the resulting problem of additional nutrient pollution washing toward the Bay. Karl presented a retrospective on the long-developing problem and an overview of evolving public policy.

To prepare their report on urban tree canopy, reporters **Tim Wheeler** and **Jeremy Cox** spent a lot of time consulting with Bay Program participants from the U.S. Geological Survey and U.S. Forest Service. Staff from those agencies shared an extensive amount of data about canopy coverage in the region, which Tim and Jeremy then analyzed and combined with more data from the U.S. Census. "We wanted to figure out the attributes of the communities that were affected," Jeremy said, "to unpack the demographics and trends."

We also responded to a surprising call from the West Coast, where some clean water advocates would like to start a newspaper for the Columbia River modeled after the *Bay Journal*. To help, **Karl Blankenship** consulted with a team of river advocates in the non-profit and academic sectors who are seeking more in-depth, objective coverage for the Columbia basin.

— Lara Lutz

NEWS briefs

LOCAL
REGIONAL
NATIONAL

UPDATE: Fones Cliffs property up for bankruptcy sale

Plans to develop a strip of forested cliffs along Virginia's Rappahannock River may not come to fruition, a bankruptcy sale notice confirms.

The 1,000-acre property on an ecologically and historically valuable stretch of Fones Cliffs in Richmond County will be auctioned off during an online sale on Nov. 3 to help satisfy the owners' debts.

This will be the third sale of a Fones Cliffs property in recent years. The Conservation Fund and Chesapeake Conservation played key roles in purchasing two other large chunks of the Northern Neck landscape, which is home to one of the largest concentrations of bald eagles in the country and is culturally important to the Rappahannock Tribe.

Representatives from the nonprofit groups are aware of the upcoming sale but provided no further comment.

Bidding for the property — which sold for $12 million in 2015 — will start at $4.25 million.

Virginia True Corp., the land's owner, filed for bankruptcy in 2019 after plans to build a golf course, spa and hundreds of homes on the property ran into major headwinds. The bankruptcy filings included a revamped plan that includes a combination of federally funded housing, a hotel and luxury condos in 10-story towers.

The real estate listing states that the land is currently zoned for light agricultural use and says a preliminary development plan previously approved for the property is "now potentially expired."

Qualifying bids for the property are due by Oct. 31.

— W. Pipkin

UPDATE: Judge deals setback to large PA solar proposal

A Pennsylvania judge has upheld a municipality's 2021 rejection of a conditional-use permit, the second major setback for what would be the state's largest solar project on nearly 1,000 acres across 18 farms near Gettysburg.

The Sept. 2 court ruling comes after considerable opposition by local residents and 21 public hearings dating back to 2020. In June 2021, Mount Joy Township supervisors voted down a request for the conditional-use permit needed to build part of the solar array on 391 acres along a major highway.

Adams County Court of Common Pleas Judge Michael George upheld the denial. In his 43-page ruling, George said the developer, NextEra, failed to provide detailed analysis on such issues as whether stormwater runoff and glare from solar panels would have adverse impacts on surrounding property owners and public welfare.

"The nature of [NextEra's] application reminds one of trying to capture a cloud," George wrote in his ruling. "The application's constant shifting of critical details makes definitiveness for meaningful evaluation impossible. Unfortunately … the ordinance requires more."

A spokeswoman for NextEra Energy said the company was "evaluating our options."

Those options appear to be appealing the ruling to the Commonwealth Court, abandoning the project or downsizing it. Another 528 acres of the project would sit in the township's agricultural conservation district, where solar energy facilities are allowed. Township supervisors have approved a preliminary development plan for that area.

But Nathan Wolf, an attorney for a citizens group fighting the project, said the property affected by the conditional-use denial is critical for access to an electrical substation. He said the group would appeal the development plan for the ag conservation district if NextEra pursues it.

The solar array, with swiveling panels to follow the sun, would have an output of 75 megawatts, which is enough to power 14,250 homes for a year.

— A. Crable

Eastern Shore marshes now free of giant rodent, MD officials say

State and federal wildlife officials are declaring a rare victory over an invasive pest in Maryland.

After more than 20 years of effort, they announced Sept. 16 that the state is officially free of nutrias, a species of giant rodents that once numbered in the thousands on the Eastern Shore.

"After years of hard work and partnership, we have proven that eradication of this invasive species is possible," said Maryland Department of Natural Resources Secretary Jeannie Haddaway-Riccio.

Nutrias are believed to have been introduced from South America in the 1940s and were bred for the fur market. Once loosed into the wild, the rodents' habit of consuming marsh plants — roots and all — led to the destruction of 5,000 acres of wetlands in the Blackwater National Wildlife Refuge.

See **BRIEFS**, *page 6*

briefs

From page 5

A partnership involving DNR, the U.S. Fish and Wildlife Service and the U.S. Department of Agriculture's Wildlife Services division resulted in the removal of about 14,000 nutrias. Officials credit the use of specially trained detector dogs with speeding the eradication.

The last known nutria in Maryland was removed in May 2015. But officials weren't ready to declare they had won the battle until survey teams, guided by computer models, completed a search of the wet landscape for possible stragglers.

The fight now appears to be moving across the Chesapeake Bay to tidewater Virginia. In 2020, nutrias were detected north of the James River for the first time, prompting a renewed push to map their range and begin removing them. *— J. Cox*

Endangered James spinymussel reintroduced to the James River

The Virginia Department of Wildlife Resources, U.S. Fish and Wildlife Service and other organizations teamed up to place 1,300 James spinymussels onto the bottom of the James River this August at Scottsville.

The James spinymussel, one of about 80 species of freshwater mussels in Virginia, vanished from the mainstem of the James River more than 50 years ago but survived in some of its headwaters.

Improving water quality in the mainstem led to the recent reintroduction effort. A second spinymussel planting is expected to occur there this fall.

The planted mussels were propagated and raised at Harrison Lake National Fish Hatchery east of Richmond. They are marked with tags, and researchers will monitor the mussels for evidence of survival and reproduction.

Like oysters, mussels help filter pollution from the water, and their beds create habitat for small aquatic creatures, which in turn become food for fish.

— L. Lutz

Former PA environment secretary joins advocacy group

Former Pennsylvania Department of Environmental Protection Secretary Patrick McDonnell in September was named president and CEO of the nonprofit advocacy organization PennFuture.

McDonnell, who served as DEP secretary from 2016 through this July, spent more than 20 years with the regulatory agency, which oversees issues from natural gas drilling to Chesapeake Bay cleanup efforts to environmental justice.

"We set out to find a dynamic leader who was dedicated to the environmental movement with extensive policy experience," said Scott Tobe, PennFuture board chair. "We found that and more in Patrick and are so excited for him to lead PennFuture into its next phase of growth."

Prior to being named DEP secretary, McDonnell served as its director of policy. In addition, he ran the State Energy Office and was charged with coordinating renewable energy and energy efficiency issues. Previously, he served with the Pennsylvania Public Utility Commission, focusing on electric, natural gas and water issues, as well as cybersecurity and the impact of environmental regulation on energy markets.

"I am absolutely humbled and thrilled to be joining Pennsylvania's premier environmental organization," McDonnell said. "The challenges we face have never been greater — from climate change and polluted streams to the very real historical impacts of contamination in disadvantaged communities across the state."

McDonnell will assume his responsibilities at PennFuture on Oct. 15. *— K. Blankenship*

UPDATE: Asphalt-tainted oyster reefs in VA to be removed

Those oyster reefs built in Virginia's Lynnhaven River with chunks of asphalt, bricks and metal wire mixed in are finally going to come out.

The Virginia Marine Resources Commission had ordered the Chesapeake Bay Foundation back in July to remove all three reefs after finding they contained polluting and potentially harmful materials. Two of the reefs also had exceeded their authorized size, in one case burying part of an existing sanctuary reef relied on to produce new juvenile oysters.

The Bay Foundation had joined with Lynnhaven River Now earlier this year to create new oyster reefs in the river, one of five Bay tributaries in Virginia where the state has pledged to complete large-scale revival of oyster habitat by 2025.

Shortly after work began, waterfront residents reported wire and asphalt atop the reefs. VMRC inspectors confirmed the complaints and on June 2 ordered all work stopped. The Virginia Institute of Marine Science then detected toxic polyaromatic hydrocarbons in asphalt retrieved from the reefs. Amid growing public and political outcry, the commission ordered the Bay Foundation to completely remove the reefs.

In response, the foundation submitted what it called a "science-based" alternative, proposing to clean unauthorized materials from two of the reefs and remove just one.

But on Sept. 9, the VMRC rejected that alternative and gave the Bay Foundation until Sept. 23 to submit a detailed plan, including signed contracts to have the reefs dredged up from the bottom of the river.

Early this week, Kenny Fletcher, a foundation spokesman, said the group is "working with marine contractors and others to address the Lynnhaven oyster reefs as VMRC has directed." He offered no other details. *— T. Wheeler*

Chesapeake water quality declines for third consecutive year

Wet weather continues to wash more pollutants into the Bay

By Karl Blankenship

Just 29.6% of the Chesapeake Bay and its tidal waters fully attained their water quality goals in the three-year period of 2018–20, according to new figures from the state-federal Bay Program partnership released Sept. 14.

That was the third consecutive annual decline in the Bay's overall water quality, much of which was blamed on the impact of unusually high rainfall in 2018 and 2019, which drove more water-fouling nutrients off the land and into the Bay.

Before those events, 42.2% of tidal waters had achieved their goals in the 2015–17 assessment period, the highest since Baywide water quality monitoring began in 1985.

"In the past, the Bay responded positively during periods of average river flow but had short-term declines due to the effects of Hurricane Isabel in 2003 and Tropical Storm Lee in 2011," said Peter Tango, the Bay monitoring coordinator with the U.S. Geological Survey. "The high river flows in 2018 and 2019 have caused another short-term decline in the health of the Bay."

The Chesapeake's water quality goals are designed to ensure that Bay creatures — from bottom-dwelling worms to striped bass swimming along the surface — have enough oxygen to survive, and that underwater grass beds have clear enough water to thrive.

Attaining those water quality standards throughout the Bay has been the goal of multi-billion-dollar nutrient reduction efforts in recent decades. Excess amounts of nitrogen and phosphorus spur algae blooms that cloud the water, causing the loss of critical underwater grass habitats. When the algae die, they sink to the bottom and decompose in a process that draws oxygen from the water, causing dead zones that can be lethal to fish and other aquatic life.

Although progress has been made, the region remains off course in meeting its goal of putting all needed nutrient control practices in place by 2025. While overall nutrient trends in the Bay's largest rivers — the Susquehanna, Potomac and James — are generally improving, those in many other areas are mixed or degrading.

Officials evaluate water quality in the Bay and the tidal portions of major tributaries by examining measurements over three years, which reduces the influence of a single year's weather on the Baywide assessment.

Nutrient reductions had generally helped improve water quality over the years, before the recent setback. In 1985–87, the first assessment period, only 26.5 % of tidal waters met water quality goals.

Still, the new data are a reminder that while nutrient reduction progress has been made, those efforts are not great enough to offset the impacts of climate change, which is expected to bring more rain and more intense storms. That, in turn, will drive more nutrients off the land and into waterways.

"The Chesapeake Bay jurisdictions are well aware that the additional and more intense storms caused by climate change will require more to be done to reduce pollution," said Beth McGee, director of science and agricultural policy for the Chesapeake Bay Foundation.

The weather trend from previous decades in the Chesapeake Bay region is expected to continue: more rain and more of it coming in extreme storms. (Dave Harp)

She said the states needed to "accelerate efforts and prioritize practices, like planting more trees and using green infrastructure, that will reduce flooding and sequester carbon, as well as reducing polluted runoff." ■

Bay states to get millions for climate-smart ag practices

Many projects that reduce carbon will also help water quality

By Ad Crable

Federal grants totaling hundreds of millions of dollars are heading to Chesapeake Bay drainage states as part of an initiative to get farmers and forest landowners to adopt climate-smart practices.

The U.S. Department of Agriculture's Partnerships for Climate-Smart Commodities program is among the climate-fighting measures funded by the Biden administration's recently passed Inflation Reduction Act. In all, 70 projects were selected nationwide for $2.8 billion in grants. It includes approximately $980 million for 23 initiatives that are entirely directed to Bay states, with additional funds for three projects that are partly in the Bay region.

The grants range from $10 million to $95 million and will be headed by nonprofit organizations, universities, trade associations, farm groups, state agencies and large agriculture corporations. Funded projects will benefit farmers producing livestock, milk, grains, forage crops and vegetables, as well as timber and forestry practices that reduce greenhouse gases.

Conservation measures to be encouraged include cover crops, low– or no-till planting, nutrient and manure management, rotational grazing, more efficient fertilizers, streamside buffers, tree planting, soil amendments, and livestock feeds that reduce methane emissions from belching cattle.

Most of the initiatives will also help protect water quality in the Bay watershed by reducing agricultural runoff that carries harmful nutrients and sediment.

To encourage these practices, many of the grants will pay producers directly, while others will be aimed at getting food and beverage companies to market climate-friendly products and encouraging consumers to pay a little more for them.

Other projects will find ways to quantify and verify carbon-reduction methods on farms to improve the system of selling carbon credits to other sectors.

"There is strong and growing interest in the private sector and among consumers for food that is grown in a climate-friendly way," said USDA Secretary Tom Vilsack.

One of the largest grants, an $80 million pilot program led by Virginia Tech, will pay Virginia farmers $100 per acre to employ cover crops, no-till planting and advanced nutrient management, as well as plant streamside buffers. Livestock producers will get aid to implement manure-management plans, prescribed grazing, and the use of methane-reducing cattle feed.

The largest grant recipient is the National Fish & Wildlife Foundation, which is getting $95 million to increase the use of cover crops by corn and soybean farmers in Maryland, Delaware, New York, Pennsylvania and Virginia. Part of the project focuses on creating market demand for climate-friendly products.

Similarly, the National Association of Conservation Districts and its partners will get $90 million to subsidize best practices and boost demand for climate-smart grain and dairy products nationwide, including the Bay watershed states.

The Nature Conservancy and a host of partners will get $60 million to encourage the growth of agroforestry — integrating trees into farm and livestock operations to increase carbon uptake while growing timber, nuts, fruits and livestock feed.

The initiative received kudus from many environmental groups, including Britt Groosman of the Environmental Defense Fund. "This is the decisive decade for determining what our climate future will be. Agriculture currently contributes 10% of U.S. emissions, but it has enormous capacity to be part of the solution," she said.

But the Friends of the Earth was critical of sending tens of millions of taxpayer dollars to "some of the most egregious climate offenders — Big Ag corporations like JBS, Cargill and ADM. … It's a massive corporate giveaway."

To view a list of the grants affecting Bay states, visit usda.gov/climate-solutions/climate-smart-commodities/projects. ■

Scaled-down plan to widen Capital Beltway gets federal OK

Critics say project changes don't solve environmental impacts

By Timothy B. Wheeler

A controversial plan for widening congested highways in the Washington, DC, area has gotten the "go" sign from the Biden administration.

The Federal Highway Administration issued a "record of decision" on Aug. 25 endorsing the Maryland Department of Transportation's plan to add toll lanes to the western portion of the Capital Beltway as well as to a major feeder route, Interstate 270. It also involves replacing and widening the 60-year-old American Legion Bridge that carries traffic over the Potomac River.

Gov. Larry Hogan called the federal approval "a major milestone" and said the state is "ready to move forward with this transformative project."

The $7.6 billion project has the backing of the region's business leaders and some local officials, who say it is needed to address some of the nation's worst traffic jams.

But other local officials, community leaders and many environmentalists oppose it. They argue that it will degrade local waterways, harm disadvantaged communities, add to climate-warming air pollution and encroach on parkland and cultural and historic sites. Critics also contend that the state's deal with a private development group to finance and build the toll lanes would mostly benefit affluent commuters while leaving poorer ones stuck in gridlock.

Approval from the highway administration, which makes the project eligible for federal funding, came less than a month after federal officials notified Maryland that their review of the project's many environmental impacts had been put on hold. Hogan responded by publicly pressing for the project, saying that federal bureaucratic delays had driven construction costs up 20%. He said the state has applied for a federal grant to cover the increased costs.

The approved plan has been substantially scaled back from the version the state proposed five years ago. Then, state officials wanted to widen virtually the entire Maryland portion of the Interstate 495. The revision avoids displacing any homes or businesses. It also pledges to give commuter buses free access to the toll lanes and provide bicyclists and pedestrians with a shared path over the Potomac on the new, widened bridge.

The revised plan also shrinks the amount of parkland and other cultural sites that would be affected by the widening. For instance, it now proposes to reduce disturbance of the historic Morningstar Moses Cemetery, a burial ground bordering the Beltway that was founded in the late 1800s for a small Black community in the Cabin John area. It likewise promises that bridge work will impact only a sliver of Plummers Island, a rugged 12-acre wilderness in the Potomac that for 120 years has been a local biological research preserve.

"It is exactly the kind of bold and forward-thinking solution that Marylanders have been crying out for, for years if not decades," Hogan declared.

Those revisions have not mollified critics. "We are very concerned," said Robert Soreng, president of the Washington Biologists Field Club. The group of more than 100 scientists remains opposed to the damage the project would do to the island.

Josh Tulkin, director of the Maryland Sierra Club, pointed out that "this is not the final word on this fundamentally flawed project."

The developer announced in late September that it had picked a construction partner, but the state's Board of Public Works must still approve the 50-year contract to build and operate the toll lanes. Time grows short, though: Both major party candidates to succeed Hogan next year have suggested major changes to the project. Tulkin said project opponents are "considering our legal options."

"We're not going to fix the region's traffic problems by widening highways, ignoring climate change and signing over control of critical transportation infrastructure to a foreign corporation for the next 50 years," Tulkin said. ■

MD chicken rendering plant to fix violations, pay penalty

Environmental groups remain wary of state proposal to permit expanded discharges

By Timothy B. Wheeler

Maryland regulators and representatives of three environmental groups have reached an out-of-court settlement with the owner of a poultry rendering plant on Maryland's Eastern Shore that has been repeatedly cited over the years for polluting a Chesapeake Bay tributary.

Under the terms of a consent decree made public on Sept. 12, Valley Proteins has agreed to fix wastewater treatment violations at its Linkwood plant, curb polluted runoff from the site and investigate whether its pollution is seeping into groundwater that ultimately reaches the Transquaking River.

The plant's owner also agreed to limit odors emanating from the facility and to pay a $540,000 penalty to the state, plus another $160,000 to the environmental groups for water quality monitoring and restoration.

Assuming the decree is accepted by the Dorchester County Circuit Court, it would settle lawsuits brought earlier this year by the Maryland Department of the Environment and by ShoreRivers, Dorchester Citizens for Planned Growth and the Chesapeake Bay Foundation.

"This settlement and hefty penalty send a strong message to Valley Proteins and others that they are not free to pollute Maryland's waters and air," said Maryland Attorney General Brian Frosh, whose office filed suit on behalf of MDE.

Neighbors and environmental groups have complained for years about the Valley Proteins plant, which takes up to 4 million pounds of chicken entrails and feathers daily from poultry processing plants and renders them into pet food.

They also accused the state of failing to address multiple violations at the plant over the past decade and allowing it to continue operating with an outdated wastewater treatment system under a discharge permit that expired in 2006.

The plant releases its wastewater into a tributary of the Transquaking River, which flows into Fishing Bay, an offshoot of the Chesapeake in southern Dorchester County. The river has been classified for more than two decades as impaired by nutrient pollution, and the rendering plant is a major source, contributing to algae blooms and low oxygen levels in the water that stress fish and other aquatic animals.

At Valley Proteins' poultry rendering plant on Maryland's Eastern Shore, workers in Dec. 2021 clean up sludge that was discovered in a stream leading to the Transquaking River. (MD Department of the Environment)

In spring 2021, ShoreRivers, the Dorchester citizens group and the Chesapeake Bay Foundation formally notified Valley Proteins that they intended to sue it over pollution violations at the Linkwood plant, including repeatedly discharging excessive amounts of fecal coliform bacteria, nitrogen, phosphorus and ammonia.

Several months later, MDE issued its own threat of legal action, saying it had uncovered violations at the plant dating back to 2019.

The state and environmental groups filed suit in February after ShoreRivers captured drone images in late 2021 showing a discolored discharge coming from Valley Proteins' outfall into a waterway leading to the Transquaking. The visual evidence prompted MDE to inspect and briefly shut down the plant after finding more violations.

"It took a team of nonprofits, including the Chesapeake Legal Alliance [representing the environmental groups], to finally force MDE into taking a strong position to protect water quality from one of the state's worst permit violators," said Matt Pluta, director of riverkeeper programs at ShoreRivers.

Parties to the settlement expressed their satisfaction with bringing the litigation to a close. MDE Secretary Horacio Tablada called it a "strong, enforceable agreement that will allow this important facility that serves the agriculture community to continue to operate while achieving environmental compliance and helping us to meet our water and air quality goals."

Darling Ingredients Inc., a Texas-based international company specializing in "repurposing" animal parts and food waste, bought Valley Proteins during negotiations to settle the lawsuits. In a one-page attachment to the agreement, the company estimates it will cost $1.7 million to comply with the decree, plus another $442,000 for "remediation and restitution."

Alan Girard, the Bay Foundation's Eastern Shore director, said that "strict measures" imposed by the decree "coupled with enhanced MDE and citizen oversight" will ensure the new owners "end the facility's long record of pollution violations."

But the agreement does not require Valley Proteins to upgrade its outdated wastewater treatment plant, which ShoreRivers and the Dorchester group believe is necessary to protect water quality and prevent future pollution violations.

MDE had at one time proposed giving the company nearly $13 million in state funds to upgrade its treatment system, but the state withdrew the offer under criticism of using public funds to fix a polluting private facility.

Even as it was threatening to sue Valley Proteins, MDE last year proposed a new draft discharge permit for the Linkwood plant that would allow for an almost four-fold increase in the amount of wastewater it would release. ShoreRivers and the Dorchester group oppose that increase, given the plant's poor compliance record.

"We will remain vigilant in the coming months and years to see that the terms of the consent decree are followed and that any future discharge permit includes the necessary conditions for improving local water quality," ShoreRivers' Pluta said.

Fred Pomeroy, president of the Dorchester Citizens for Planned Growth, called the consent decree "a potential first step" toward reducing the plant's illegal discharges. But more is needed, he said.

"Now, we call on Maryland's Department of the Environment to produce a strict new operating permit for the facility that will actually contribute to restoration of the river," he said. "Markedly improved water quality downstream from the [Valley Proteins] operation will be the ultimate test of the effectiveness of this agreement." ■

Can the American marten make a comeback in PA?

Plan under way to help furry predator return to state's northern forests

By Ad Crable

A plan is in the works to return American martens, a member of the weasel family, to the vast forests of northern Pennsylvania. (Allison Gregor/CC BY-NC-ND 2.0)

The American marten, a furry cat-size predator and symbol of wilderness that has long been gone from Pennsylvania's deep forests, may return.

The Pennsylvania Game Commission has given staff the green light to prepare a reintroduction and management plan as the first step to repopulating the big woods in the northern part of the state with the member of the weasel family. A vote by game commissioners to proceed with the release of martens into state forest and game lands may occur in September 2023.

American martens, sometimes called pine martens, once occupied other states in the Chesapeake Bay drainage, such as Maryland, Virginia and West Virginia. But they were extirpated in those states, largely by the turn of the 20th century, by trapping, hunting, logging and development. Their dark fur was once second only to beavers in the fur trade.

The solitary martens have managed to remain established, though, in New York's Adirondacks region, other northern states and Canada.

Nearly two decades ago, Pennsylvania's wildlife managers considered reintroducing martens but said not enough was known about whether the state still had enough mature, contiguous forests for suitable habitat. There also were concerns about whether the predator would consume prize game like turkey and grouse.

With technological advances in satellite imagery, remote-sensing Lidar and geographic information systems, a 42-page feasibility study released by agency staff in July concludes that parts of Pennsylvania would indeed support martens.

"American marten reintroduction to Pennsylvania is likely to succeed and should be considered as the next step in a long history of restorative conservation efforts within the commonwealth," the study concludes.

Weighing 1 to 3 pounds, martens are anywhere from 19–27 inches long, from nose to tip of tail. They sport dense brownish-black hair and have large feet to aid them in traversing snow, as well as short legs to crawl into crevices and tree cavities.

Martens have a penchant for hunting and traveling in treetops of mature deciduous and conifer woods, where they build their dens in tree cavities. They will also rummage for prey under snow and downed logs.

The vast forested mountains of northern Pennsylvania, with large tracts of state forests, could provide those hunting grounds, according to the study. It was once thought martens needed exclusively dense conifer forests, but researchers discovered they thrive in old mixed forests as well.

The targeted Pennsylvania forests have a varied understory, important for foraging and resting, researchers found.

As for trepidation among hunters that martens would ambush their favorite game animals, extensive diet surveys in multiple northeastern states reveal 68% of their diet consists of voles, mice, shrews and other small mammals that inhabit forests. And research by the Western Pennsylvania Conservancy shows such rodents are plentiful in the potential home range.

Besides rodents, martens supplement their diet with insects, plants, carrion, fish, amphibians, reptiles and occasionally other martens. Game birds like grouse and turkeys were not found in the diet studies, nor were their eggs.

Martens are perfectly willing to be scavengers, so resource managers say the thousands of deer carcasses left by hunters will help feed them. Martens also have an appetite for plants and berries, so their droppings may help disperse native plants throughout the forest.

Snow is important to martens' survival as a means of hiding from larger predators such as bobcats, coyotes, weasels and fishers. (Fishers, another member of the weasel family, are a fairly recent reintroduction success story in the state). Snow also is where most rodents can be found in winter.

Though researchers acknowledge that less snow is expected for much of Pennsylvania in future years because of climate change, the areas targeted for marten habitat receive lake-effect snow from the Great Lakes.

Martens released in Pennsylvania would likely come from Canada and such states as New York, Maine, Vermont, Wisconsin, Michigan and New Hampshire. Genetic diversity is important to establishing a healthy new Pennsylvania population.

Why bring back martens at all?

Biologist Tom Keller, the Game Commission's furbearer specialist, can cite some reasons. One is that they were long part of a vibrant, interconnected forest ecosystem.

"When we have martens, we know we have a healthy forest," he said. Forest habitat managed to suit martens will also aid lesser-known wildlife that depends on similar mature, contiguous forests, he added.

Then there is the notion that martens deserve to be brought back because they are native to the state and can still thrive there, if given the chance. A research team at Penn State conducted a survey of 1,047 people, including hunters, and found that 92% favored reintroduction. ■

Conservation Corps delivers results — and expands

Program benefits the Chesapeake while helping to launch careers

By Whitney Pipkin

Top left photo: During her time with the Chesapeake Conservation Corps in 2019–20, Briana Yancy monitored underwater grasses with the Maryland Department of Natural Resources. She now works at the U.S. EPA's Chesapeake Bay Program office. (Courtesy of Briana Yancy)

Top right photo: Katie Kavanaugh, a participant in the 2021–22 cohort of the Chesapeake Conservation Corps, completes field work during her time with the Maryland Coastal Bays Program. (Chesapeake Conservation Corps)

A Chesapeake Bay workforce training program borne out of the Great Recession is expanding its footprint — and focus — to address emerging challenges.

For 12 years, the Chesapeake Conservation Corps has deployed young people to serve one-year stints at environmental organizations across the watershed. In addition to being paid stipends for the work, these 18– to 25-year-olds get on-the-job training, mentoring and networking opportunities that often launch them into environmental careers.

In return, the organizations that host them — from nonprofit groups to government agencies — get an extra set of hands to do work that is central to their missions.

Participants "find themselves more inspired and motivated," said Erica Anthony, a department chair at Morgan State University and a governor-appointed board member for the Chesapeake Bay Trust, which runs the corps program. After the corps, "they know exactly how they want to contribute to make the world a better place."

Maryland legislators this year acknowledged the corps' success by voting to more than double its capacity. The 2022 Climate Solutions Now Act included an additional $1.5 million for the program annually. The measure also directs the corps to expand its focus to train participants for careers in climate-benefitting sectors, such as clean energy and climate mitigation, through additional job placements. (Legislators did this in lieu of establishing a new climate-focused corps, which early language in the Senate bill had suggested.)

Spearheaded by longtime president of the Maryland Senate, the late Thomas V. Mike Miller, lawmakers established the Chesapeake Conservation Corps in 2010 to buffer young people seeking environmental work from the lingering impacts of an economic recession. The first year of the program recruited 16 participants. The corps now places about 30 young people a year in environmental positions, a number that will grow with the additional funding, said Kacey Wetzel, the Bay Trust's vice president of outreach.

In addition to funding from the state, the program receives money from the Maryland Department of Natural Resources, the National Park Service and BGE, an Exelon Company. While most of the positions are based in Maryland, some positions with the Park Service are in Virginia and Pennsylvania. Organizations that receive a corps participant for several years in a row are also asked to contribute funds to the program.

Wetzel said the Corps will be changing its name to include the climate aspect of its mission, but the details are still being worked out. The latest group of 33 young people began work with their host organizations in mid-August, and staff is reaching out to new organizations that could host participants in the coming year.

"It's a never-ending cycle," Wetzel said.

That cycle increasingly includes extra steps to make sure the program is engaging a broad swath of young people. The latest legislation encourages the corps to engage underserved communities and to find partners working in regions disproportionately impacted by climate change, moves that Wetzel said were already in motion. The measure also increased the stipend paid to participants to $15 per hour, higher than Maryland's minimum wage, or $31,200 for the year — a nearly $11,000 increase over the previous annual stipend.

After the corps

Carol Wong, 36, was among those who graduated into the Great Recession in 2008. She had a degree in engineering from the University of Maryland — and a desire to pursue environmental work.

She worked at an engineering firm after graduation and then applied to the Conservation Corps "to validate that I wanted to get a degree in environmental issues." She landed a spot in the 2011 program.

After serving in the corps for a year with the South River Federation

in Anne Arundel County, MD, Wong went on to get a master's degree in environmental engineering and science from Stanford University. She returned to Maryland in 2014 for a job as a water resources engineer at the Center for Watershed Protection, where she's been ever since.

"I had a lot of contacts from CCC, so it was fairly easy for me to find a job once I decided to come back," Wong said, after getting experience on both coasts. "The work that we do here is leading the charge in terms of stormwater management. A lot of people look at the Chesapeake and say, 'I wonder what they're doing.' "

The corps matches participants with host organizations through a process that Wetzel compared to speed-dating. Both the corps member and the organization must want to work together for the placement to be successful.

"We prioritize the young adults and where they're excited to go," Wetzel said. "If they're excited, then they'll show up ready to work every day."

For Briana Yancy, her year with the corps not only gave her the on-the-ground experience she was looking for but also the connections she needed to eventually land a position at the U.S. Environmental Protection Agency's Chesapeake Bay Program office.

Yancy spent 2019–20 with the corps, monitoring underwater grasses in Bay waters with the Maryland Department of Natural Resources. She spent some days scooping grasses into baskets in waist-deep water and other days conducting research. Yancy was getting her master's degree in biology from Miami University online at the time, and some of the research she did with the corps also applied to her studies.

"It was great for me to get my feet wet, literally, and be out on the water," Yancy said. "Coursework is great, but experience and connections mean a whole lot more for getting positions."

The Maryland-based corps program is different from others across the country. Most corps programs are modeled somewhat after President Franklin D. Roosevelt's Civilian Conservation Corps, established in 1933 to help put millions of people back to work with conservation and infrastructure projects during the Great Depression. (See *Civilian Conservation Corps: Tough times led to lasting legacies at Chesapeake region's parks* on page 26.) Most modern corps programs also deploy members on teams to tackle projects, such as building a new trail or addressing aging infrastructure.

The Chesapeake Conservation Corps, instead, disperses its participants to organizations that match their interests. In this way, it mimics more closely the types of jobs participants may later have in the environmental field.

"They learn real, on-the-job skills, and they build the capacity of these nonprofits and agencies," Wetzel said. In that respect, "it's very much a 'green' workforce pipeline."

In Yancy's case, her mentor Brooke Landry at DNR also chaired the Bay Program's workgroup on Bay grasses. When positions opened up at the Bay Program, Landry sent them to her and encouraged her to apply. Not long after her time with the corps, Yancy became a coordinator with the Bay Program's Diversity Workgroup.

"Now, I hold onto all those PowerPoints and resources and contacts, and I share them with people through the work I do with the Bay Program," Yancy said.

Climate connections

For Humon Heidarian, a stint with the corps in 2017–18 helped to define his career interests. It also set him on a trajectory that has him addressing climate and equity issues as a policy manager for the Rural Advancement Foundation International-USA.

Heidarian studied environmental science at the University of Maryland-Baltimore County and was involved in gardening clubs at school. Getting placed with ECO City Farms in Prince George's County, MD, allowed him to combine those interests and put his finger on a career path.

Working at a farm that was focused on food access, climate change and social justice "solidified a lot of the things I was thinking about," Heidarian said.

During his corps year, Heidarian also volunteered on the Prince George's County Food Equity Council, where the issues he was interested in were being worked out on the ground.

"[It] showed me that my little effort can make some difference in food equity and breaking down the barriers of food," he said.

Corps participants can apply for additional grant funds from the program to complete capstone projects during their year. For Heidarian's project, he built on existing efforts to increase the farm's food forest, designing and installing part of an expansion and developing a maintenance guide.

Heidarian went on to work in a variety of farm– and food-oriented jobs, including a year as manager of Waterkeepers Chesapeake's Fair Farms Campaign, before recently landing at RAFI-USA. He was happy to hear that the corps is expanding its focus to include more training for climate-oriented jobs like the one he now has.

"I think what legislators and foundations are seeing now is that climate is something everybody needs to focus more on, especially at the intersection of agriculture and equity," Heidarian said. "We've seen how it's all connected." ■

Top left photo: Humon Heidarian, a 2017–18 member of the Chesapeake Conservation Corps, is now a policy manager for the Rural Advancement Foundation International-USA. (Courtesy of Humon Heidarian)

Top middle photo: Samina Soin-Voshell worked at the Chesapeake Bay National Estuarine Research Reserve during a stint with the Chesapeake Conservation Corps that ended this summer. She is now pursuing a doctorate degree from Northeastern University. (Chesapeake Conservation Corps)

Top right photo: Avery Farrell and Samina Soin-Voshell paddle a canoe during an outing with the Chesapeake Conservation Corps. (Chesapeake Conservation Corps)

Inset photo: Madeline Talnagi got a taste for tagging turtles during her time with the Maryland Coastal Bay Program as a member of the Chesapeake Conservation Corps, 2020–21. She now tags sea turtles for the Conservancy of Southwest Florida. (Chesapeake Conservation Corps)

Judge puts MD forest clearing on temporary hold

Chesapeake Bay Foundation and neighbors challenged development of Abingdon Woods

By Timothy B. Wheeler

A developer's clearing of one of the last large, unprotected forests near the Upper Chesapeake Bay has been halted for the time being. A Maryland judge on Sept. 16 granted an environmental group's request for a temporary restraining order to protect the remaining trees.

Harford County Circuit Court Judge Diane Adkins-Tobin ordered the immediate stop to the deforestation while she considered the Chesapeake Bay Foundation's petition for a preliminary injunction, which would extend the halt in work until she could hear the foundation's challenge to the developer's forest conservation plan.

The judge's action comes on the heels of a ruling by the Maryland Court of Appeals that a developer's plans for clearing forested land may be challenged in court when it's still possible to affect the outcome.

Harford Investors LLP and BTC III I-95 Logistics Center LLC had received Harford County's approval to build four large warehouses, restaurants, shops, a hotel and gas station on the 326-acre tract known locally as Abingdon Woods. It is one of the largest unprotected patches of forest left in that heavily developed area along Interstate 95. Their forest conservation plan called for clearing 220 acres of woods while preserving 95 acres on the site and planting 10 acres of trees elsewhere.

The Bay Foundation and five neighboring residents filed suit in 2020, arguing that the plan for clearing Abingdon Woods failed to comply with Maryland's 1991 Forest Conservation Act. They noted, for instance, that county officials had authorized the developers to cut down 49 of the 85 largest trees on the site, despite the law's requirement to minimize removal of large "specimen trees."

Adkins-Tobin dismissed that lawsuit on procedural grounds. She ruled that the developers' forest plan could not be challenged in court at that time — because even though the county had approved it, local officials had not yet granted final approval to the overall project.

The foundation appealed the dismissal of its lawsuit but, earlier this year, the county issued the developers a permit to begin clearing the site. Adkins-Tobin denied the foundation's request to halt the tree removal while the appeal was pending.

Developers have begun removing trees from Abingdon Woods in Harford County, MD, as shown here in Aug. 2022. Project partners aim to cut down 220 acres of forest to construct warehouses, restaurants, shops, a hotel and gas station. (Nick Chryst)

A sediment pond collects runoff near a passage through the forested construction site in Harford County, MD. (Nick Chryst)

Then, on Aug. 26, the Court of Appeals reversed the Harford judge's original dismissal of the lawsuit. It sent the case back to her to decide whether the developers' plan fails to meet the state's requirements to preserve contiguous forest and large specimen trees.

Some of the forest and specimen trees have already been cleared. On Sept. 12, the foundation renewed its request for the court to halt tree removal until its lawsuit could be heard. It submitted an affidavit from Matthew Baker, a professor at the University of Maryland, Baltimore County, who specializes in forest and aquatic ecology and said that allowing work to continue while the legal challenge is pending would cause irreparable harm to the forest.

Trees have been removed along the entrance to the Abingdon Woods construction site in Harford County, MD, as shown here on Aug. 30, 2022. (AJ Metcalf/Chesapeake Bay Foundation)

"It would take many decades of management to recreate a forest such as the one being cleared here," he said, adding later, "Few properties encompass as many habitats on similar geology within Harford County's Coastal Plain ... this environmental legacy will be lost if clearing continues."

On Sept. 30, witht the developers' agreement, the judge granted an injunction barring any more tree removal until a decision is reached on the pending lawsuit, which could take months.

"This injunction ensures Abingdon Woods will still have trees as we work to obtain a court ruling on whether the proposed warehouse project's development plans met the requirements of state law," said Josh Kurtz, the foundation's Maryland director. The trees, especially the mature ones, filter air and water, sequester climate-warming carbon dioxide and provide habitat for animals, Kurtz noted.

"Forested land is a public resource that is protected by state law," he added. "Ensuring that the law was followed before more trees are cleared should be the minimum requirement before this project can proceed." ■

Tangier Island may receive $25 million to fight erosion

Proposal would create earthen barriers to fend off rising water

By Jeremy Cox

Rising seas, land subsidence and erosion have claimed approximately two-thirds of the land mass on Tangier Island, VA, since 1850. (Dave Harp)

A long-awaited, large-scale fix could soon move tons of earth to help save Virginia's Tangier Island from disappearing beneath the Chesapeake Bay.

But Congress will have to move first.

The latest version of the U.S. Senate's 2023 appropriations bill includes $25 million for a project that would repurpose dredge spoil into earthen barriers along Tangier's shoreline. Officials say the aim is to shield the island's most vulnerable spots from further erosion, a longstanding problem exacerbated by sea level rise.

"It's very, very early in the process," said Greggory Williams, a U.S. Army Corps of Engineers official based in Norfolk. "It's very conceptual at this point."

Sen. Tim Kaine, a Virginia Democrat, visited the island Aug. 31 to tout the home-state funding proposal. He acknowledged that several hurdles remain for the bill, including passing the full Senate vote and then getting rolled into the House's appropriations package. But he is optimistic.

"The good news is we finally have a way in the budget to get not just a little bit [of money] but a lot," he told a group of about a dozen Tangier residents gathered under an awning next to an ice cream shop on the island.

Kaine was referring to the process that allows legislators to nominate local projects for funding. The practice, used by Kaine to propose the Tangier spending, returned to Capitol Hill last year after criticisms of so-called "pork barrel spending" sent it to the political sidelines more than a decade ago.

Kaine's spending proposal received a mostly positive reception.

"I know it's not a completed deal, but it's very encouraging," Tangier Mayor James "Ooker" Eskridge told Kaine. "We do appreciate greatly the interest you've shown in the community, making Tangier a top priority."

If the project goes forward, sand and muck would be hauled from the Cape Henry Channel at the mouth of the Chesapeake Bay, said Williams of the Army Corps. The Corps dredges the bottom of that channel regularly to keep it deep enough for large vessels bound for the ports of Baltimore and Virginia.

Where that dredged material would be placed on Tangier is far from decided, but officials point toward two potential locations. One is along the eastern side of the island, where the land has crept so far inward that residents say saltwater routinely sprays onto homes. The other is just off the main island, along the northwest side of a marshy island that is splitting in two.

"Essentially, you're trying to reduce the energy of the waves coming in," said the Army Corps' Williams.

The project, he added, would be similar to the restoration of Poplar Island in Maryland. There, the Corps constructed walled "cells" and has been filling them with material dredged from the shipping channels leading to Baltimore. The island, which had eroded to just a few acres of land, is on target to reach nearly 1,700 acres, all of it protected as bird and wildlife habitat.

Tangier Island, lying 13 miles southwest of Crisfield, MD, rises only about 3 feet above sea level on average. The combined effects of sea level rise, erosion and storms have eaten away about two-thirds of the island's land mass since 1850, leaving slightly more than 700 acres, according to a 2015 study by a veteran Army Corps marine biologist.

Last year, the primary author of that study, David Schulte, forecast in a follow-up paper that the island's town will become uninhabitable by 2053, owing to its losing battle with the water. Saving it would cost up to $350 million, he wrote.

Schulte, in a phone interview, characterized the $25 million proposal as "really good news" for the island and its 400 remaining residents. The addition of the earthen offshore barriers likely would buy more time for Tangier by keeping erosion at bay, he said.

U.S. Sen. Tim Kaine (center) joins Mayor James "Ooker" Eskridge of Tangier Island, VA, and U.S. Rep. Elaine Luria for a tour around the island and a discussion of shoreline protection on Aug. 31, 2022. (Jeremy Cox)

The project won't be of much help, Schulte went on, in the fight against a related threat: rising seas. "Unless you elevate some of the land on Tangier, sea level rise is going to take them out," he said, adding that he hopes officials consider spraying dredge material onto Tangier's own land to raise its elevation.

Protection has traditionally come to Tangier in dribs and drabs. In 1990, the Army Corps completed a stone jetty along the airport runway that abuts much of the island's western shoreline. The only recent project of significant size was a $2.6 million jetty, completed two years ago on the northwest side of the island, aimed at protecting its harbor full of workboats.

Kaine said he is aware that $25 million won't be enough money to secure Tangier's future. But it's a start, he added. Once the Army Corps funds a project, it is more likely to continue funding efforts in the area, he said.

"Let's get this started with a big number," Kaine told the Tangier residents and community leaders, "not a small number."

Lynda Clary, a Tangier resident since 2006, had seen floods come and go over the years. But they were never much of a problem. Then came the nor'easter on Oct. 29, 2021, which flooded the home she rents to her son. The invading waters ruined the house's carpets and baseboard heating system.

After listening to Kaine's pitch, Clary said she has heard politicians making promises before, and she will believe them only if and when they turn into actions. "I hate to be a cynic," she said. "But it's like the sign on the bar: 'There is free beer tomorrow.'" ■

Bay region losing ground in effort to increase urban tree canopy

Development taking trees down faster than they can be replaced

By Timothy B. Wheeler & Jeremy Cox

Looking at the skinny elm sapling reaching for the sky in his backyard, James Bryant said that he hopes he lives long enough to be able to sit under its canopy and read a book in summer.

Bryant's neighborhood in Charlottesville, VA, has the dubious distinction of being the hottest in town. Walking the blocks around the intersection of 10th and Page streets, it's easy to see why — trees that could offer some shady relief from the broiling summer sun are few and far between.

"We couldn't sit out until late evening to have cookouts because it was so hot," he said.

Like many communities across the Chesapeake Bay watershed, Charlottesville and its nonprofit partners are trying to change that. Bryant has a new crape myrtle in his tiny front yard and a pair of nascent shade trees out back, courtesy of volunteers with the Charlottesville Area Tree Stewards. This fall, the city's Tree Commission is going door to door in the neighborhood looking for at least 20 more homeowners willing to have trees planted in their yards.

Despite such efforts, the city is losing mature trees faster than it can plant new ones. Across town, pink and orange surveyor's tape hangs from dozens of large trees in an 8-acre woods that a developer plans to clear to build 47 new homes. Another 12-acre woodland nearby was rezoned earlier this year, also for housing development.

"Rather than robust and flourishing, Charlottesville's overall tree canopy continues to decline at an accelerating rate," the Tree Commission warned last year. From 2014 to 2018, the city lost nearly 80 acres of leafy canopy, a 3% reduction, a new set of data show.

Charlottesville is far from alone. The new figures, compiled by scientists working as part of the state-federal Chesapeake Bay cleanup effort, show that communities in the Bay watershed cumulatively suffered a net loss of more than 29,000 acres in urban tree canopy during that time span.

Those losses come despite a pledge made in 2014 by all of the Bay watershed states — Maryland, Virginia, Pennsylvania, Delaware, New York and West Virginia, plus the District of Columbia — to increase their overall urban tree canopy by 2,400 acres by 2025.

Evidence that urban tree canopy is going in the wrong direction comes from aerial surveys conducted in 2013–14 and 2017–18, which were analyzed by the Chesapeake Bay Program and the nonprofit Chesapeake Conservancy. Two-thirds of the watershed's communities — cities, towns and villages, but also unincorporated clusters of homes recognized as "places" in the U.S. Census — lost tree cover. The rest held steady or registered mostly small gains.

Those losses are part of a broader canopy decline that extends into rural areas, the survey data found. But urban tree cover declines are of particular concern, experts say, because trees in developed areas not only prevent polluted runoff but reduce extreme heat and fight air pollution. They also reduce flooding, lower energy bills, raise property values and dampen noise, among other benefits.

Development takes a toll

The reasons for the decline are manifold. Diseases and pests, such as the emerald ash borer, are killing many mature trees. Ice and wind from storms fell others. Property owners take down other trees because they're seen as hazards to property or safety, or they're just inconvenient.

"There are so many different forces that are whittling away at the canopy," said Julie Mawhorter, Mid-Atlantic Urban and Community Forestry Coordinator for the U.S. Forest Service.

Some losses have even occurred, ironically enough, in an effort to improve the Bay's water quality. Stream restoration projects undertaken to reduce bank erosion and nutrient and sediment pollution often require sacrificing mature trees overhanging the water.

But the major cause of canopy declines is development, the aerial surveys showed. Woodland oases next to or surrounded by concrete and asphalt are cleared for new homes, warehouses and other buildings, while trees also come down for roads, power lines and pipelines.

When grouped by state, Maryland communities suffered the biggest declines in tree cover, losing a total of 14,592 acres for a 2.2% decrease in cumulative canopy, according to a *Bay Journal* analysis of Bay Program data. Virginia's communities collectively lost 9,955 acres, for a 1.3% decrease. Pennsylvania lost 3,256 acres or 0.7%.

The community with the biggest loss was Virginia Beach, that state's most populous city. It lost more than 1,700 acres — more than three times the next biggest decline, which occurred in Brandywine, a growing unincorporated area of Prince George's County, MD.

"When you have older trees, they do fail during storms, and they do die," said Brooke Costanza, Virginia Beach's city arborist. "And we think private property owners are cutting trees on their property because they're scared of storm damage."

The biggest gain, with a 268-acre increase in canopy, was in tiny Mount Vernon, an unincorporated village in Somerset County, MD, whose census-drawn boundaries encompass broad swaths of timberland.

Overall, large cities lost 1.9% of their canopy in just four years,

Photo: Malcolm Wilson of Blue Water Baltimore uses a concrete saw nicknamed "Big Baby" to cut out sections of sidewalk where trees will be planted on a nearly treeless block of North Smallwood Street. (Dave Harp)

Peggy Van Yahres, chair of Charlottesville's Tree Commission, talks with James Bryant about the trees planted in his backyard by volunteers with the Charlottesville Area Tree Stewards. His neighborhood is one of the hottest residential areas in the city. (Dave Harp)

nearly three times the decline seen in small towns, though there were small gains in the watershed's two largest municipalities, Baltimore and Washington, DC.

The new figures also seem to underscore longstanding racial inequities in urban landscapes. The percentage of tree cover in the 112 communities where Black residents make up 50% or more of the population declined on average 11 times more than other places. Baltimore as a whole was an exception, increasing its overall canopy by about 100 acres.

Such findings are significant because many predominantly Black neighborhoods already had a tree deficit, a legacy of historic housing segregation that often consigned them to cramped, relatively treeless environs.

Baltimore and Richmond, for example, were among more than 200 U.S. cities subjected for much of the 1900s to "redlining," the federally promoted practice of withholding home loan approvals from racially and ethnically diverse neighborhoods.

Tree-starved neighborhoods

Though outlawed in 1968, redlining's legacy lives on in many places, including Richmond's Southside area. The most glaring evidence of the decades of disinvestment can be seen in the predominately Black community's lack of trees. Research led by the Science Museum of Virginia has found that the resulting "heat islands" can be up to 16 degrees hotter than leafier parts of the city, putting Southside residents at far greater risk of heat-related illnesses and death.

Sheri Shannon wants to change that. She is one of the founders of Southside ReLeaf, a nonprofit that seeks to promote environmental justice by adding and improving green spaces.

"Planting trees is not going to solve environmental racism," Shannon said. "It's not going to solve the climate crisis, but it is one part of mitigation of lowering the temperature in neighborhoods that are disproportionately impacted by extreme heat."

The centerpiece of the effort is the Greening Southside Richmond Project, a partnership with other environmental groups to plant hundreds of trees while training local youths in green industries.

"We're focused on making sure we're improving the green infrastructure, which will eventually improve the social infrastructure of neighborhoods," Shannon said of the initiative, which received a $230,000 grant from the National Fish and Wildlife Foundation to support the work into early 2023.

But it's an uphill battle, she admitted. Developers are bulldozing tracts of trees, and she contends that they are not required to adequately compensate for the losses.

"Essentially, what we're seeing is a lot of multifamily housing going up, which is needed, but we're not seeing trees being planted and mature trees being preserved — and in an area that is already experiencing extreme heat and floods because of poor infrastructure," Shannon said.

Money for planting trees

Amid growing recognition of trees' value in restoring the Bay and battling climate change, nonprofit groups and governments at all levels are stepping up efforts to get more roots in the ground. Many are also trying to address historic inequities in the distribution of trees throughout their communities.

In Maryland, lawmakers last year passed the Tree Solutions Now Act, which calls for 5 million trees to be planted statewide by 2031. The legislation specified that at least 500,000 of those trees go in "underserved areas."

In June, the state's Board of Public Works gave $10 million to the Chesapeake Bay Trust to fund the first year of plantings in relatively treeless communities. The trust promptly handed out $7.7 million of that to nearly three dozen state and local agencies, nonprofits and community groups. Grants ranged from $9,000 to $1.9 million. Those funds should pay for planting 40,000 trees by next spring, said trust director Jana Davis. They'll have to pick up the pace in future years, though, to reach the state's 2031 goal.

Federal money is also on the way to boost urban tree plantings in the watershed. The Inflation Reduction Act will provide $1.5 billion nationwide over the next 10 years for the U.S. Department of Agriculture's urban forestry program — a fivefold increase from its current funding level.

But the overall rate of tree losses has been so great that even doubling or tripling plantings won't close the gap by itself, experts say.

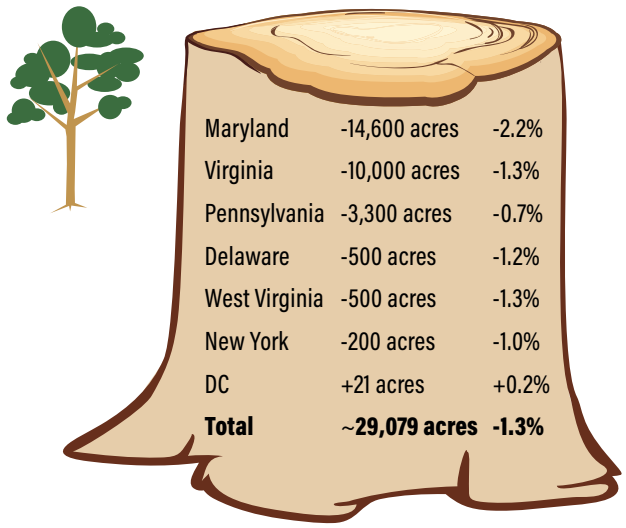
"You can't plant your way out of it," said the Forest Service's Mawhorter, who coordinates the Bay Program's urban tree canopy effort. "If you want to use trees for climate resilience and these Bay goals, you also need to be paying attention to your existing canopy and how you maintain it."

Money alone won't fill in holes in urban tree cover, either. It's no simple matter finding suitable spots for planting in some densely built neighborhoods. Houses around 10th and Page streets in Charlottesville hug the street on lots that are much smaller than average. Front yards aren't big enough to accommodate big shade trees, so backyards often offer the only alternatives.

Net Loss of Urban Tree Canopy in the Chesapeake Bay Watershed

Regionwide goal:
Add 2,400 acres
between 2013–25

Already lost:
29,000 acres
between 2013–18



Data source: Chesapeake Bay Program. Analysis by the Chesapeake Bay Journal. All numbers, with the exception of DC, are rounded to the nearest 100.

'Fill in the gaps'

James Bryant's neighborhood in Charlottesville is one of those urban "heat islands," where the tree canopy is less than half the citywide average of 40%. The historically Black neighborhood has one of the city's highest rates of heart attacks, heat stroke and asthma, according to Peggy Van Yahres, chair of the city's Tree Commission. Most families there pay up to 20% of their income for heating and cooling.

The commission helped launch ReLeaf Cville, a project aimed at improving health and living conditions in neighborhoods with skimpy canopy, starting with 10th and Page. They have already planted about 30 trees there and helped train a group of teens to canvass the area for more homeowners.

"We're going to fill in the gaps," Van Yahres said.

In Baltimore, you first need to make some gaps. The only way to plug trees in some treeless neighborhoods is to carve holes in the concrete. Just 28% of the city is shaded by trees, with as little as 4% canopy in some blocks.

Wearing headphones to dampen the deafening noise, Malcolm Wilson, restoration crew leader for Blue Water Baltimore, guided a wheeled rotary saw nicknamed "Big Baby" as it carved through the concrete walk on North Smallwood Street in West Baltimore.

Crew member Corbin Sulton then climbed into a skid loader fitted with a big steel punch to break up the cut-out patch. His next step was to grab the slabs with an excavator and hoist them into a nearby dump truck.

Next spring, Blue Water Baltimore plans to plant cherry, redbud and other hardy saplings in the newly created sidewalk pits. With limited exposed ground to soak up rainfall, the young trees face challenges getting established, so the

See **TREE CANOPY**, *page 18*

Arthur Ashe Boulevard in Richmond, shown here in 2019, experiences the urban "heat island" effect, with fewer trees and more impervious surface. (Will Parson/Chesapeake Bay Program)

Amputated tree trunks and mounds of shredded wood are all that's left of a patch of woods off Aris T. Allen Boulevard in Annapolis that was recently cleared for development. (Dave Harp)

TREE CANOPY *from page 17*

group plans to water and check on them for two years.

"If we could plant this block top to bottom and have only two or three trees die, then we're winning," said Wilson, who called blocks like this one "hidden gems."

"In the long run," he added, "it's going to create shade [and] draw enough [pollution] out of the air. It's going to draw some of these people out so they're actually sitting on their steps."

Reggie Parker, one of the few sitting out to watch the crew work, can hardly wait.

"We need some type of shade here," he said as he perched with his cats on the sill of his open front door. He said he hoped the trees would also "bring some more birds into the area."

Baltimore is one of the bright spots, along with Washington, DC, that has bucked the statistical trend of large and more diverse communities losing canopy. Baltimore's tree cover grew by about 1%, or more than 100 acres, according to the Bay Program data.

The city and its nonprofit partners have planted about 13,000 trees since 2016, according to Sam Seo, director of Tree-Baltimore, a city-run umbrella group. It has also begun to perform proactive pruning of mature trees to improve their chances of surviving storms.

The nonprofit Baltimore Tree Trust has been planting about 3,000 trees a year and intends to double its pace in 2023, according to CEO Bryant Smith. Within a few years, he said he hopes to be planting 10,000 trees annually.

But Baltimore's goal is to get 40% of the city shaded by trees by 2037, so there's a long way to go.

"If we're only doing 10,000 [a year], we're not going to get there," said Erik Dihle, who retired earlier this year after a decade as the city's arborist. To reach the goal in time would require boosting that rate by 2.5 times, he estimated.

Besides pests and storms, some of the biggest threats to Baltimore's tree canopy have come from infrastructure projects, including a new natural gas pipeline cutting through the forested wilderness of the city's Gwynns Falls/Leakin Park. Several stream restorations and sewer rehabilitation work have mowed down swaths of trees as well.

Weak tree protections

In many, if not most, communities, the vast majority of trees are on private property. That, experts say, is the Achilles' heel of the effort to expand the urban canopy.

"In general, the local policies to prevent loss are pretty weak across the watershed," Mawhorter said. "Maryland has the strongest laws, but in Maryland we've also had a lot of losses."

Maryland's Forest Conservation Act, first passed in 1991, requires developers to spare large "specimen" trees and those bordering streams and wetlands. They're also obligated to replace at least some of what they cut down.

But the law only applies when about an acre or more is to be cleared, and it allows developers to pay to preserve trees elsewhere rather than plant replacements. Several Maryland counties and Baltimore city have in recent years imposed stricter limits, but it's too soon to gauge their effectiveness.

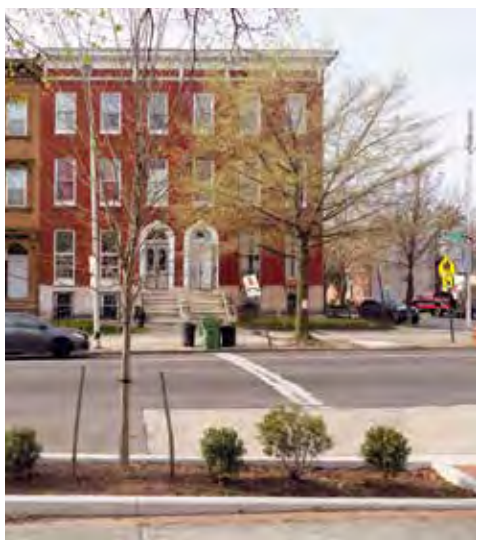
Virginia has a pair of laws that aim to conserve and replace trees, but until recently they only applied in the suburbs near DC. The tree replacement law, which has expanded statewide, actually limits how much localities may require developers to replant, according to Peggy Sanner, Virginia director of the Chesapeake Bay Foundation.

"We don't have very strong private [tree] regulations, other than what's given to us by the state," said Matt Alfele, a Charlottesville city planner.

In Pennsylvania, municipalities can form shade tree commissions. They also can regulate tree removal along streets and even in some development situations. But relatively few have gone that far, said Harry Campbell, advocacy director in the Bay Foundation's Harrisburg office.

The emphasis there, as in other states, is on appealing to private landowners to voluntarily keep trees and replace those that get taken down.

Takoma Park, a small Maryland city in the DC suburbs, has perhaps the strongest legal protections for trees on private property in the Bay watershed. A permit is required to cut down any tree with a trunk that measures more than 24 inches around, and only dead or hazardous trees can be taken down without being required to plant replacements or pay a hefty fee.



Formerly a stretch of bare concrete, this sidewalk in West Baltimore was planted with shrubs and trees in 2019. (Will Parson/Chesapeake Bay Program)

Marty Frye, Takoma Park's urban forester, said five permit applications were denied last year. Even so, because of widespread die-off from extreme weather and pests, he said he has approved 500–600 removals each of the last two years. And with small young trees replacing big old ones, the city's leafy canopy continues to shrink.

With the tree canopy declining faster than new trees can take their place, the Forest Service's Mawhorter said she doubts Bay watershed states can dig themselves out of the hole they're in and increase total tree cover by 2,400 acres by 2025.

"We're going to have to reassess," she said. "Is this the right goal? And if it is, what's it going to take to get there?" ■

Top 5 tree canopy losses

1. Virginia Beach, VA: 1,722 acres
2. Brandywine, MD: 502 acres
3. Waldorf, MD: 493 acres
4. Accokeek, MD: 483 acres
5. Potomac, MD: 472 acres

Top 5 tree canopy gains

1. Mount Vernon, MD: 268 acres
2. Eden, MD: 242 acres
3. Cambridge, MD: 180 acres
4. Salisbury, MD: 130 acres
5. Lexington Park, MD: 124 acres

Source: Chesapeake Bay Program

In the region's 'last cold places,' a fish defies climate change

Sculpin survive in cool WV streams as waters warm elsewhere

By Jeremy Cox

The day was turning balmy, surging toward 80 degrees. But the water gliding down this unusual West Virginia waterway on a sun-drenched August morning remained a cool 62 degrees.

Here, Nathaniel "Than" Hitt, a U.S. Geological Survey biologist, was reasonably sure his team would catch checkered sculpins, a small, mottled fish found only in the Potomac River headwaters of Maryland, Pennsylvania, Virginia and West Virginia.

If they did, it would signal that they had found another refuge from a warming planet.

"This species is only found in the coldest places," Hitt said. "It needs cold water, and it needs stable flows. This is important because it can tell us about where places are changing and where they're remaining intact."

Climate change isn't just making the air hotter — it's warming waters as well. Stream temperatures in the Chesapeake Bay watershed have warmed at a rate of about a half-degree per decade from 1960 to 2010, according to a USGS study.

Biologists predict that as rivers and streams heat up, organisms adapted to cooler temperatures eventually will be driven out, upending those ecosystems.

But certain waterways may offer a lifeline, Hitt said. He calls them "the last cold places." And he suspected that Bullskin Run, a Shenandoah River tributary, might be one of them.

To find out, Hitt and three fellow USGS researchers — Karmann Kessler, Joann Lamb and Karli Rogers — donned chest waders and trudged into the creek. As they walked upstream in shin-deep water, Rogers led the way, probing the water with a long wand. A cable connected the wand to a *Ghostbusters*-like backpack. This was the electrofishing device she used to briefly stun fish in her immediate vicinity.

Hitt and Kessler followed closely behind on both flanks, swooping down with nets to scoop up any living thing suddenly immobilized. Lamb trailed with a large bucket to collect the organisms.

Hitt, a West Virginia native, first encountered checkered sculpins during his dissertation work at Virginia Tech in the mid-2000s. Fully grown, they aren't much

U.S. Geological Survey researchers Karmann Kessler (left), Karli Rogers and Nathaniel Hitt wade down Bullskin Run south of Charles Town, WV, as they electrofish for checkered sculpins. (Jeremy Cox)

bigger than a human's index finger. Like other sculpin species, the checkered variety boasts an outsized head and fan-like fins protruding on each side of its body. Their finicky taste for cold, freshwater streams makes checkered sculpins stand out as strong candidates for further research.

In a way, the species is still waiting to be "discovered." It was long considered a geographical offshoot of the slimy sculpin population. But taxonomists now view checkered sculpins as distinct enough to warrant classification as their own species. There are subtle differences between them and other sculpins within the Potomac watershed, such as having one chin pore instead of two and slimmer heads, Hitt said.

The species has yet to be formally described in scientific literature and has no official Latin name (like we *Homo sapiens*, for example). Hitt is part of a team of scientists putting the finishing touches on a study that they say will elevate the checkered sculpin to full species status.

One of the lead authors, Rich Raesly, a biologist at Frostburg State University in Maryland who has studied the species for more than 30 years, said it has been a long

Checkered sculpins can only be found in the Potomac River's headwaters in Maryland, Pennsylvania, Virginia and West Virginia. (Jeremy Cox)

time coming. "It's taken me a while with my teaching commitments to finally work up a species description," he said.

It isn't necessarily good news for a species to stay below the scientific radar. Research shows that recently described species have significantly higher chances of extinction, compared with those discovered in the more distant past. Experts generally point to "newer" species having small populations and facing more human threats to their survival.

As for the checkered sculpin, it is listed as imperiled in Pennsylvania and critically imperiled in the other states where it has been found. "We should be concerned about the issue of climate," Raesly said.

While other sculpin species in the region can withstand warm waters, their checkered counterparts are limited to places that remain below 68 degrees.

"This is what's going to be rare as climate change continues," Hitt said, stepping through the silt-bottomed Jefferson County creek.

His survey of Bullskin Run quickly confirmed his assumptions about the waterway. Within the first 215 feet, the team snagged 158 checkered sculpins.

"That's a good sign," Hitt said. "Where they can occur, they can be locally abundant. And that gives you some sense that they're secure from a conservation perspective."

But there's a downside, he added. Today, places like Bullskin Run are few and far between and may be separated by miles of warmwater habitats, causing populations to become isolated.

"They are somewhat at risk," Hitt said, "because they are so fragmented across the landscape."

Bullskin Run flows for about a dozen miles from just south of Charles Town along a valley floor consisting of farm fields, rural subdivisions and sycamore-dotted forests before it empties into the Shenandoah.

For centuries, the fertile land lured settlers, including George Washington, who acquired thousands of acres of land in the region for farming. But what attracted USGS researchers was what lies beneath it: a topography called karst

The rock here dissolves more readily than elsewhere, creating a network of nooks and cracks. Once rainwater seeps deep enough, it cools along the broad expanses of rock. Where the cooled groundwater emerges at the surface, it forms creeks and rivers that retain much of that original coldness, Hitt said.

His study is analyzing fish communities at more than 40 sites. Scientists with the U.S. Environmental Protection Agency sampled the same locations three decades ago. Hitt's aim is to determine how the number and diversity of fish at each have changed since then, comparing conventional streams with their colder, karst-based counterparts.

So far, the karst systems appear to be protecting checkered sculpins from warming temperatures, Kessler said. Going forward, she added, it will be up to the public and government leaders to determine whether that habitat is worth protecting.

"They're an indicator species," Kessler said. "If we stopped seeing them, we know there's a real issue." ■

Video online at BayJournal.com

Sharing the sun: Community solar projects slowly expand

State policies vary, some prioritize low-income households

By Ad Crable

Members of the Cedar Ridge Community Church in Montgomery County, MD, stand on a prayer labyrinth near the 2-megawatt community solar project that the congregation erected on the church's property. (Dave Harp)

Energized by the recent federal climate bill and launch of a less-publicized initiative to bring sun-based power to low-income homes, solar energy is positioned for growth in Chesapeake Bay drainage states.

A recent Princeton University study predicts that tax incentives contained in the new $369 billion Inflation Reduction Act could swell the pace of nationwide solar projects fivefold each year, beginning as early as 2025.

Many projects will involve large utility-scale solar arrays, but a smaller, more grassroots form — known as community solar — will be indispensable in achieving both the nation's climate goals and those in Bay states, experts say.

Interest in community solar or "shared solar" is growing quickly, and the Biden administration has set a goal to have 5 million households signed up for it in the next three years. That's about a 700% increase from current numbers.

The concept is simple. Anyone who gets an electric bill can "subscribe" to such a project by paying a fee to an energy provider that has built a solar array in their community and is tied into the grid.

Subscribers then earn renewable energy credits that reduce their electric bill — usually by 10–20%.

The option appeals to some of the 50–70% of U.S. households that are not in a position to install solar arrays at their place of residence. This includes renters who cannot modify their properties, residents of developments where homeowner associations do not allow solar, and homeowners and businesses whose rooftops are too shady or otherwise unsuitable for solar panels.

Also on that list are those who can't afford the upfront costs of solar panels or want to make a financial contribution, no matter how modest, to clean energy.

Community solar projects are mostly built by private developers who then solicit subscribers. In some cases, communities and businesses band together to launch them. A business can place an array on a roof or parking lot and attract subscribers from nearby businesses or tenants. In

The Monastery of Our Lady of Mt. Carmel in northeastern DC allowed this community solar project to be built on its property. It saves about 50 local families $500 a year on their electric bills. (Ipsun Solar)

Montgomery County, MD, a church arranged to have an 8-acre community solar array built on its grounds as part of a faith-based commitment to fight climate change. (Visit bayjournal.com to read *How a mission to fight climate change led to the first faith-based community solar project in Maryland*).

Increasingly, economic justice is a part of such projects. Maryland, New York and the District of Columbia require that a portion of community solar subscriptions be reserved for low– and moderate-income residents or disadvantaged communities.

"At the end of the day, customers want options to participate in renewable energy, and community solar is an easy, scalable option," said Salar Naini of TurningPoint Energy, Maryland's leading private solar developer.

Over the last five years or so, legislators in 22 states and the District of Columbia have revised regulations to allow community solar options. Community solar projects have been built in 17 states, placed on commercial buildings, old industrial sites, landfills, farm fields and church grounds.

The average output is three megawatts, enough to power about 47 homes.

Virginia

Virginia, which intends to have carbon-free power by 2050, has invested heavily in solar power and ranks ninth in the nation in solar power production. But community solar has had a much tougher startup.

In 2017, state legislators passed the first laws to encourage Virginia's three utilities to develop community solar projects. In 2020, Solar Freedom legislation allowed third-parties not owned by a utility to build projects and sign up subscribers.

Dominion Power, the utility that covers 70% of the state, has approved 12 projects to be built by private developers, all set to launch in 2023. The company also sought a $74 monthly subscriber fee to cover the costs of billing, the use of its transmission lines and other services. State officials agreed but lowered the fee to $55.

Even though low-income customers would be exempt, according to Dominion, solar energy advocates have criticized the fee, claiming it could easily offset the 10–20% savings on subscribers' energy bills.

"It would likely wipe out savings opportunities," said Charlie Coggeshall, Mid-Atlantic regional director for the Coalition for Community Solar Access.

"There's a very real potential that projects will avoid that market altogether and focus exclusively on low-income customers [who may be exempt from subscription fees]. This isn't necessarily a bad result [but] it would fall short of the legislative intent, which was to enable broader access to solar for all types of customers."

Dominion argued that, because solar power is intermittent, subscribers would still need to rely on power from the utility's grid. Solar proponents disagree, contending that solar energy makes the entire grid more resilient by providing power during times of high demand. Some lawmakers say the minimum bill issue is not over.

Maryland

Maryland ranks 12th in the nation in terms of most solar installations per capita.

The General Assembly embraced the concept of community solar by passing a Community Solar Pilot Program in 2017. The initiative, which runs through 2024, calls for 414 megawatts of electricity to be produced by community solar — enough to power nearly 80,000 homes, roughly 30% of which are required to be low– and moderate income.

In 2021, lawmakers doubled the allowable size of community solar arrays to 5 megawatts — which many solar developers consider the "sweet spot" for economy of scale.

The state also now allows community arrays to be built on sites filled with "clean" construction waste, tapping previously unusable industrial sites. Those changes are expected to add 6,840 community solar-powered households.

"We cannot achieve our climate and renewable goals without community solar," said State Del. Luke Clippinger, referring to Maryland's ambitious mandate of getting to 50% renewable energy by 2030.

Naini of TurningPoint Energy agrees. "While utility solar has much more scale, [community solar] can be permitted and interconnected at a much faster pace."

Pennsylvania

Community solar advocates and entrepreneurs have big plans for the Keystone State. But for the last four years they have been stymied by legislators who have blocked bills to launch community solar, citing resistance from utility companies.

Pennsylvania has a fair showing in utility-scale solar projects built by universities, large companies and the utilities themselves. There are 40,000 solar installations in the state, from rooftop panels to utility-size solar farms covering hundreds of acres.

But community solar has not even gotten to the starting gate.

In the latest push to dislodge frozen community solar bills from legislative committees, proponents highlighted a survey of solar developers by Penn State University, which found that removing legal barriers would clear the way for more than 230 projects around the state.

This community solar array atop a warehouse in Carroll County, MD, has attracted 1,300 nearby residential and commercial subscribers, saving them money on future electric bills. One-third are low– and moderate-income residents. (Summit Ridge Energy)

A poll found 80% of Pennsylvanians surveyed want the community solar option, and 60% said they would subscribe if they could.

The Pennsylvania Farm Bureau is among those pushing for community solar, saying farmers suffering from low commodity prices could provide sites for solar arrays that would help their families and serve their communities.

But electric and natural gas utilities oppose such programs, saying subsidized solar energy is driving up costs for other ratepayers.

Pennsylvania's Consumer Advocate office disagreed, testifying that community solar increases the electricity grid's reliability and resilience.

"The consumers are ready for community solar. The industry is ready for community solar. We're just waiting on our legislators," said Henry McKay of the national nonprofit, Solar United Neighbors.

District of Columbia

The District of Columbia has moved aggressively to meet its goal of being carbon-neutral by 2050. Community solar in the densely packed city has been deployed as one way of getting there.

The city created its community solar model in 2013, and hundreds of communal arrays have since been erected on apartment building rooftops, churches and warehouses.

In 2016, DC launched its Solar for All program. More than 5,000 of the 6,800 households signed up for community solar are enrolled in the program so far. Qualified low– and moderate-income households can subscribe for free thanks to money collected by the District through noncompliance electricity fees by electricity suppliers. The goal is to enroll 100,000 households by 2032.

Those efforts have helped the District climb to 13th nationally in the number of solar installations per capita.

DC's Solar for All program, which aims to bring cheaper solar electricity to low-income households, resulted in this community solar array on roofs at the Atlantic Terrace Apartments in 2018. (WinnCos)

New York

New York has been a community solar pioneer, and officials keep expanding its reach.

In April, the New York Public Service Commission approved Gov. Kathy Hochul's goal of 10 gigawatts of solar power in the state by 2030. That's enough energy to power nearly 2 million homes, with 70% of that coming from community solar projects.

New York will need that widely dispersed use of solar power because it has the most ambitious climate goal in the northeast: 70% renewable energy by 2030, most of it from solar facilities.

The plan includes a strong energy justice goal. The state's Climate Leadership and Community Protection Act requires 40% of climate and energy funding to go to disadvantaged communities. Under its Solar for All program, eligible low-income residents participate in community solar programs for free.

"New York absolutely leads the nation in community solar. We're extremely pleased at how successful the market has been," said Kaitlin Kelly O'Neill, who represents New York for the Coalition for Community Solar Access, a national group of businesses and nonprofits.

West Virginia & Delaware

In 2020, the West Virginia legislature passed a bill to allow electric utilities to own and operate up to 200 megawatts of solar facilities. In May 2022, two utilities, Mon Power and Potomac Edison, started accepting community solar subscribers for five modest solar facilities they will build in various parts of the state.

However, as in Virginia, the legislature allowed utilities to levy a surtax for solar facilities. The two utilities said they would levy a "modest ratepayer surcharge."

Delaware legislators paved the way for community solar in 2021. In April 2022, the state's Public Service Commission began accepting applications for community solar projects from solar developers. One or two projects are expected to be up and running by the end of the year with more expected to come online in mid-2023.

Federal boosts

Congress and the Biden administration have added several major financial boosts to accelerate community solar, boding well for its expansion in Bay states.

Foremost, the Inflation Reduction Act passed by Congress this summer continues substantial clean energy tax credits that incentivize all forms of solar. In addition, there is substantial funding for rooftop solar.

Getting less attention than the legislation was a community solar executive action that will also help hook up more low-income residents to community solar.

The initiative would help 4.5 million participants in an existing federal program that subsidizes energy costs by connecting them to community solar projects.

Altogether, the program could account for 134 gigawatts of new solar capacity nationwide — enough to power 25 million homes — according to the U.S. Department of Energy.

"Expanding community solar is likely necessary to hit Biden's climate goals of achieving a net zero electric grid by 2035," McKay said. ■

PA creates three new state parks in Chesapeake watershed

Aim is to help address surge of interest in outdoor recreation

By Ad Crable

For the first time since 2004, Pennsylvania has a new state park. Three of them, actually — as well as a former mining area that will be turned into a playground for motorized offroad vehicles even as it is environmentally restored.

The new parks in eastern Pennsylvania, largely made possible by revenue from natural gas fracking operations on state forestland, were announced Sept. 27 by Gov. Tom Wolf, who spoke at one of the new parks in York County.

They are open to the public immediately, though with limited visitor amenities until management plans and new facilities are put in place.

All three of the new parks are in the Chesapeake Bay watershed. They include Big Elk Creek State Park, containing 1,712 acres once owned by the du Pont family and later the Strawbridge family. The southeastern Pennsylvania property, when combined with the adjacent 5,300-acre Fair Hill Natural Resource Management Area in Maryland, will be one of the largest public green spaces in the Mid-Atlantic region.

At Susquehanna Riverlands State Park, another 1,044 acres along the lower Susquehanna in York County preserves a view of the river in the fastest-growing area of the state.

And a 669-acre acquisition on an oxbow of the North Branch of the Susquehanna has led to Vosburg Neck State Park. It's a first for the Endless Mountains region of Wyoming County, which until now was one of only four of Pennsylvania's 67 counties without a state park.

"These are all serving areas with a growing need and growing demand for recreation that is not being met," said Cindy Adams Dunn, secretary for the state Department of Conservation and Natural Resources. She noted that, undoubtably because of the pandemic, visitors to state parks increased from 37 million in 2019 to nearly 47 million in 2020 and 42 million in 2021.

Here are short profiles of the three parks and future site for offroad vehicles. All have working names until the public helps choose permanent ones.

Big Elk Creek State Park

The acreage consists of former private estates purchased in 2010 and 2020 by the state, The Conservation Fund, Chester County and Mt. Cuba Center, a botanical garden in nearby Hockessin, DE. It will offer hiking, mountain biking, equestrian trails, water access, stream restoration and more.

The park features 190 acres of floodplains, 600 acres of woodland, 100 acres of native grass meadows, 800 acres of farmland and 3.5 miles of Big Elk Creek. The creation of pollinator meadows and more than 300 acres of streamside forest buffers are planned for 2024.

Big Elk Creek is one of the few tributaries in Pennsylvania that flow directly into the Bay. More than 2 miles of the state line separate the park from Maryland's Fair Hill Natural Resource Management Area.

Vosburg Neck State Park

Wrapped inside an oxbow bend of the Susquehanna River's North Branch, the park is mostly forested and includes a remnant of a canal system from the 1800s, a historic cemetery and a tunnel on an abandoned railroad.

The outside bend has steep cliffs with spectacular views across the river. Trails already exist on the property, which the state is purchasing from the North Branch Land Trust. Water access for paddlers and trailered boats will be expanded.

Intended as a day use park, it will eventually have picnic facilities, restrooms, parking lots and interpretive stations.

Susquehanna Riverlands State Park

Purchased from a family that accrued the riverside woodlands and farm country over 100 years, this park includes nearly 1 mile of shoreline along the Susquehanna River and 1.5 miles along Codorus Creek through a gorge popular with whitewater paddlers.

Its bluffs offer vistas of the historic Shocks Mill stone arch railroad bridge and, across the river, Lancaster County farmland. Along with an adjacent 1,041-acre natural area owned by the Lancaster Conservancy, it protects the last large, wooded area along the Susquehanna in the Lancaster, York and Harrisburg triangle.

The acquisition is important for the Susquehanna Riverlands Conservation Landscape, an effort launched by DCNR in 2010 to protect the ribbon of scenic and historic land along both shores of the river in Lancaster and York counties and to promote eco-tourism.

"The whole vision of the Susquehanna River is a mosaic of natural lands. It was time for DCNR to step up and own a piece of this mosaic," Dunn said.

Catawissa Motorized Recreation Area

Under pressure to provide more opportunities for the growing number of motorized offroad vehicles, DCNR has purchased the former private Paragon Adventure Park on abandoned coal land.

The agency plans to make the 5,600-acre property a destination for safe and environmentally sound roaming by all-terrain vehicles, dirt bikes and offroad vehicles. Mountain biking and hiking will likely be included.

The property, which had been closed for 10 years, was purchased partly with funds from the state's tax on gasoline and other liquid fuels. It's a new use of money mainly earmarked for the construction and repairs of public roads.

The tract will be managed as a section of the widely scattered Weiser State Forest. It has significant ecological features: bogs and wetlands, rock outcroppings, rare plant habitat and a stand of old-growth hemlocks. Off-roading will be restricted to less sensitive areas, state officials said.

The site also has scars from past abuse, and officials said a significant amount of money will be poured into treating acid mine drainage and managing the land more sustainably.

It is expected to open by late summer 2023. ■

Photo: An oxbow bend on the North Branch of the Susquehanna River is part of Vosburg Neck State Park in Pennsylvania. (PA Department of Conservation & Recreation)

Hampton students immersed in local environment, culture

Outdoor education program for 5th-graders receives national award

By Whitney Pipkin

Fifth-grade students from Hampton City Schools in Virginia raise their hands to answer questions during a field trip on the Longview, the James River Association's 50-foot deadrise vessel. (Hampton City Schools, VA)

Students attending Hampton City Schools in Virginia live on a peninsula bounded by the James and York rivers that juts into the Chesapeake Bay. Yet "some of our students had never left their neighborhoods, let alone been on a boat," said Janice Richison, science curriculum leader for the school district.

A collaboration between the school district, the James River Association and the National Park Service's Chesapeake office during the 2021–22 school year aimed to change that.

Staff from the organizations worked with 21 elementary schools to engage every fifth-grade student in the district — 1,600 in all — in a "meaningful watershed educational experience," a nationally recognized framework for environmental learning. The program not only took students outside but helped them experience water-quality science firsthand. It also introduced them to historical landmarks and generated conversations about personal connections to the place they call home.

The effort recently garnered an award from the U.S. National Park Service for overcoming COVID-era hurdles and introducing students to environmental and historical resources in their community.

The process began with teacher trainings and interactive virtual lessons introducing staff and students to concepts they would engage with during an upcoming field trip.

During boat trips on the James and Hampton rivers, the students donned masks for safety and used scientific tools to measure salinity and turbidity. They saw what a net thrown into local waters brings in — from blue crabs to pufferfish.

"That's the hands-on stuff," said Nat Draper, a former teacher who is now the director of education for the James River Association. "You know how peer pressure is: As soon as one student touches it, others say, 'Oh, I want to touch it now.' " (But the pufferfish, some species of which are venomous to handle, remained untouched.)

The boat trips took place on the *Longview*, the James River group's 50-foot deadrise vessel, retrofitted to accommodate educational trips. Each of the nearly 45 trips taking place in the fall and spring included 40–50 students. Half of the students went on the boat while the other half did land-based activities, then the groups switched, Draper said.

The field days also included a visit to nearby Fort Monroe National Monument, the largest stone fort built in the United States.

Interpreted now by the National Park Service, Fort Monroe also commemorates the arrival there of the first enslaved Africans in Virginia in 1619. The Hampton schools program used this historic backdrop to discuss with students, many of them with African American heritage, the cruelty and complexities of human enslavement. They also discussed how the enslaved Africans contributed to the developing nation with skills learned in their homeland.

The program's efforts to uplift stories of African Americans in the Chesapeake region was one of the aspects that set it apart. Brittany Hall, an education coordinator with the NPS Chesapeake office who helped shape the program, said she hopes it will inspire others.

"I think what made this [project] award-winning was that we included both the history and the science together," Hall said. "These stories are part of Hampton's culture. And we're saying, 'You guys are part of this heritage.'"

Hall brought her passion for African American history to her work at the Park Service. Connecting that with the natural environment has helped her see how students in particular can make a difference for their communities in the future.

Lessons on oysters helped connect the dots between the environmental lessons and the cultural ones. During their sessions on the landscape, the students learned that oysters help filter and clean water while they are growing, and that African Americans played a key role in that local industry.

"So, when kids walk down Shellfish Row [seafood market] they can now say, 'Oh, that relates to the oyster shells we learned about,'" Richison said. The lessons "took it to a different level, where our kids now are made aware of their surroundings and how it impacts our environment."

Students in the program also painted pictures of fish and other local species onto the concrete covers of stormwater drains. These art projects remind passersby that the water running off the streets is headed to a local waterway and to the Bay.

The National Park Foundation funded the first year of the program, and it continues during this school year with funding from the NPS Chesapeake Gateways Network.

Fort Monroe National Monument superintendent Eola Dance (right), National Park Service education coordinator Brittany Hall, and James River Association director of education Nat Draper talk to students in the Hampton City Schools environmental education program during a visit to Fort Monroe. (Hampton City Schools, VA)

Hampton schools have previously offered meaningful watershed educational experiences with the help of the National Oceanic and Atmospheric Administration's Bay Watershed Education and Training (B-WET) program.

"How we expose our children determines the path they create," Richison said. "There are careers on the water and in science that our children wouldn't otherwise know about." ■

Rare butterflies find refuge thanks to explosions at PA training base

Grasslands at Fort Indiantown Gap provide only remaining haven in Eastern U.S.

By Ad Crable

Above: This common yarrow grassland plant is used by regal fritillary butterflies at Fort Indiantown Gap in Pennsylvania. (Dave Harp)

Top left photo: A regal fritillary butterfly alights on milkweed at Fort Indiantown Gap, the only place the butterflies are found east of Indiana. (Dave Harp)

Top right photo: Mark Swartz, a biologist at Fort Indiantown Gap, talks to a tour group on the edge of a field where live shells are fired, creating unique habitat for regal fritillary butterflies. (Dave Harp)

It's the most unlikely of after-effects: Bombing, exploding grenades, artillery fire and dirt-churning tank maneuvers at Pennsylvania's Fort Indiantown Gap have produced grassland habitat that's ideal for the last notable population of beautiful and rare regal fritillary butterflies in the Eastern U.S.

"Right there, right there — see him?"

"It ran, like, right over my head!"

Those were among the unrestrained outbursts of youths tagging along on one of the dozen or so regal fritillary tours the military allows each July at the normally off-limits National Guard training center in central Pennsylvania.

Lucky visitors get to walk among the butterflies that have been described as "monarchs dipped in chocolate." Their forewings are bright red-orange, similar to monarchs. But their hindwings are darker, and the undersides of the hindwings are black with a striking array of white spots.

Regal fritillaries are vanishing or declining in much of their range. And Fort Indiantown Gap is the only place in the Eastern U.S. where you are likely to see them.

Oohs and aahs rose from the 30 or so guests as Mark Swartz, an enthusiastic wildlife biologist stationed at the center to nurture and study the regals, pointed out two mating on a lespedeza plant.

"You don't see that very often," Swartz beamed as he led the group of all ages on a 1.2-mile walk through the heart of prairie-like fields wedged in a valley between two Appalachian ridges. Towers where personnel monitor training and firing ranges rose from surrounding hillsides.

The undulating fields on a former farm are a medley of grasses and wildflowers that thrive on fires and newly disturbed earth. The 17,000-acre base includes five of these fields, totaling about 250 acres spread over 7 miles, that are intensely managed to coddle regals. But the butterflies also heavily use another 2,000 or so acres of training and firing ranges that are constantly pulverized and occasionally catch fire and burn.

"It actually gets a little beat up. What we don't want is for the field to turn into a bunch of trees," Swartz said.

These early successional fields harbor the plants, flowers and grasses needed by regals in their three growth phases. The caterpillars feed on arrowhead violets and other plants. In winter, when the caterpillars are still only the size of a grain of rice, they hunker down in welcoming microclimates provided by a variety of grasses such as little bluestem. Adult butterflies need nectar plants such as field thistle, milkweed and bee balm to survive.

Regal fritillaries are listed as critically imperiled in Pennsylvania, and the U.S. Fish and Wildlife Service is soon expected to announce its decision on a petition by scientists to declare eastern fritillaries threatened or endangered and thus get federal protection.

But at Fort Indiantown Gap, the nurturing has been so successful that, along with the help of offsite laboratory rearing, the butterflies are being reintroduced to other grasslands around the state. The effort may expand to other states in the future.

Unlikely pairing

It would not seem that pulverized earth and fragile butterflies would be good comrades. But they are. And it happened completely by accident.

Once common on grasslands, pastures and wet meadows throughout the Northeast, regal fritillaries were all but wiped out by habitat loss. In the 1990s, small populations were found at Gettysburg National Military Park in Pennsylvania and another military training facility in Radford, VA.

But those populations have disappeared, leaving Fort Indiantown Gap the last U.S. stronghold for the butterflies outside the Midwest. Western regals are now considered a distinct subspecies of the eastern regals.

The 2,500 acres of grasslands habitat and the fires that keep other plants at bay also harbor other rare plants, such as striped gentians (an early successional plant), yellow-fringed orchids (a spectacularly showy yellow perennial herb) and blunt-leaved milkweed.

Fort Indiantown Gap is the National Guard's busiest live-fire and maneuver training center. Each year, approximately 113,000 personnel from the National Guard, Army, and Air National Guard train there with helicopters, planes, tanks and artillery. The fort is owned by the Pennsylvania Department of Military and Veterans Affairs. It also is home to a military cemetery with more than 60,000 interments.

Visitors on a tour to see regal fritillary butterflies at Fort Indiantown Gap pause at a fence that divides butterfly habitat from a live-round training field. (Dave Harp)

A pair of regal fritillary butterflies mate in a meadow at Fort Indiantown Gap. (Dave Harp)

Fort Indiantown Gap biologist Mark Swartz talks about the whorled loosestrife plant used by regal fritillary butterflies. (Dave Harp)

Sightings of regals at the site go back to 1958, when a famous moth field guide author was stationed there. But it was not until the Pennsylvania Department of Conservation and Natural Resources did a flora survey in the 1990s that the rare species became more widely known to scientists.

That observation led to a federal environmental impact statement and the adoption of a conservation plan to protect the butterflies at the fort. When the military proposed a new firing range in regal habitat in the mid-1990s, the North American Butterfly Association filed a lawsuit to stop it.

As a result, more formal conservation and protection protocols were drawn up, including a staff of wildlife biologists who are now stationed at the base for ongoing studies and to doctor habitat that regals find ideal. Invasive plants are pulled out by hand.

Prescribed burns are also part of the regimen. Usually, they are set intentionally, though live ammunition triggers others. Fortunately, adult regals fly away and caterpillars seem to survive, though Swartz said scientists aren't sure how.

In 1998, the fort offered its first summertime public tours, timed for the peak appearance of adult regals in flight. They did not take place in 2020 and 2021 because of COVID.

Reinforcing success

Despite the constant tailoring of habitat to the regals' liking, the butterflies' existence at Fort Indiantown Gap is not guaranteed. Surveys have found the population there as high as 5,000 in some years and as low as 600 in others. The number crashed by 80% in 2017.

"That put us in panic mode," said Erika McKinney, a biologist at the fort. But numbers have rebounded since.

Tour participants this past July easily saw more than 100 adult regals, with males flitting everywhere in a semi-frantic search for mates, and females landing on drive-through nectar flowers.

Ever-present threats include disease, parasites and inbreeding. One particularly disruptive bacteria, *Wolbachia*, has been found in other butterflies at the site but not yet in any regals.

More recently, climate change has emerged as another threat. It's a major one: Moisture from increased precipitation raises conditions that favor diseases. Temperature is another factor.

"We're concerned about lots of warm days in winter," Swartz said. "Butterflies may wake up and need to eat. If there are no violets growing, they could starve."

Regals don't migrate, so if something went wrong at the fort it could wipe out their presence at that location.

"We're at the mercy of the planet. The best we can do is provide the best-quality habitat for the butterfly to keep the population getting larger," Swartz said.

To encourage regals elsewhere and help them survive the winter, in 2011 the military began a partnership with ZooAmerica, a nonprofit arm of the famous Hersheypark family theme park.

In one phase of the project, ZooAmerica staff capture female regals and take them back to the zoo's butterfly lab. There, females release up to 3,000 eggs each. When the eggs hatch into tiny caterpillars, they are placed in temperature-controlled chambers to hibernate through the winter, protected from predators and the vagaries of the weather.

The next spring, they are gently awakened and hydrated with water on a paintbrush. Some of the survivors, with tiny, numbered tags on their wings, are released at Fort Indiantown Gap, where they pupate on specific plants and become adult butterflies.

Since 2015, most of the tiny caterpillars have been delivered to a handful of grassy tracts on Pennsylvania state game lands, managed by the Pennsylvania Game Commission. The exact locations are not revealed to guard against collecting.

Despite the release of tens of thousands of regal caterpillars, it's too early to tell if the reintroduction effort has been successful in establishing a viable, reproducing population outside of the fort, said Tim Becker, a naturalist at ZooAmerica.

"We've finally used technology to give them a better chance," Swartz said.

McKinney called the lab rearing and reintroduction process "a game changer."

Giving regals a broader geographic toehold is critical to their longterm survival in the Eastern U.S. The biologists at the fort are optimistic that the military will try to replicate the success at other training sites in the East where similar environments could be produced.

"I feel good about this," Swartz said.

Regal fritillary field tours

Registration for the public tours at Fort Indiantown Gap usually begins in early June. For updates, visit ftig.isportsman.net/butterflytours.aspx or email ra-dmva-wildlife@pa.gov. For details on fritillary management at the fort, visit www.ftig.ng.mil and enter "regal fritillary butterfly" in the search box.

In 2022, there were 12 walking tours on four days in early July. A maximum of 20 people may sign up for each tour. An unlimited number of youths under the age of 12 may accompany adults who sign up. Tours often fill up quickly.

Visitors can expect to walk about 1.2 miles on gravel roads and mowed paths in unshaded areas. Sightings of regals are all but guaranteed, regardless of the weather. Tours take place rain or shine, led by wildlife biologists who may also point out, in addition to regals, some of the 143 species of breeding birds, 37 species of reptiles and amphibians and more than 800 species of plants found at the site. ■

Civilian Conservation Corps: Tough times led to lasting legacies at Chesapeake region's parks

Top photo: Westmoreland State Park in Virginia has 11 cabins built by the Civilian Conservation Corps that are available for reservation. (Virginia State Parks)

Right photo: Two of the hundreds of Black CCC men stationed at Virginia's Colonial National Historical Park in the 1930s rebuild carriages for canons at Yorktown Battlefield. (Courtesy of National Park Service)

By Karl Blankenship

Along a dusty road in Tioga State Forest near the northern edge of Pennsylvania, a sign marks the remains of Camp Leetonia. A picture shows a scene from nearly a century ago: a cleared field lined with military-style barracks and other buildings.

Camp Leetonia wasn't a military installation. It housed a company of President Franklin Delano Roosevelt's "tree army," better known as the Civilian Conservation Corps.

As I visited state and national parks over the years, I vaguely knew that I used rustic log picnic pavilions or other buildings built by impoverished young men during the Great Depression.

Over time, I became increasingly aware of how this organization, which existed less than a decade, shaped outdoor experiences for myself and millions of others. I hike, often unknowingly, on trails forged by the CCC. I stay in campgrounds, eat in pavilions, drive on roads and relax beside reservoirs built by the CCC. In places such as Yorktown and Jamestown, I visit historic earthworks, trenches and buildings that exist thanks to the work of segregated Black CCC crews.

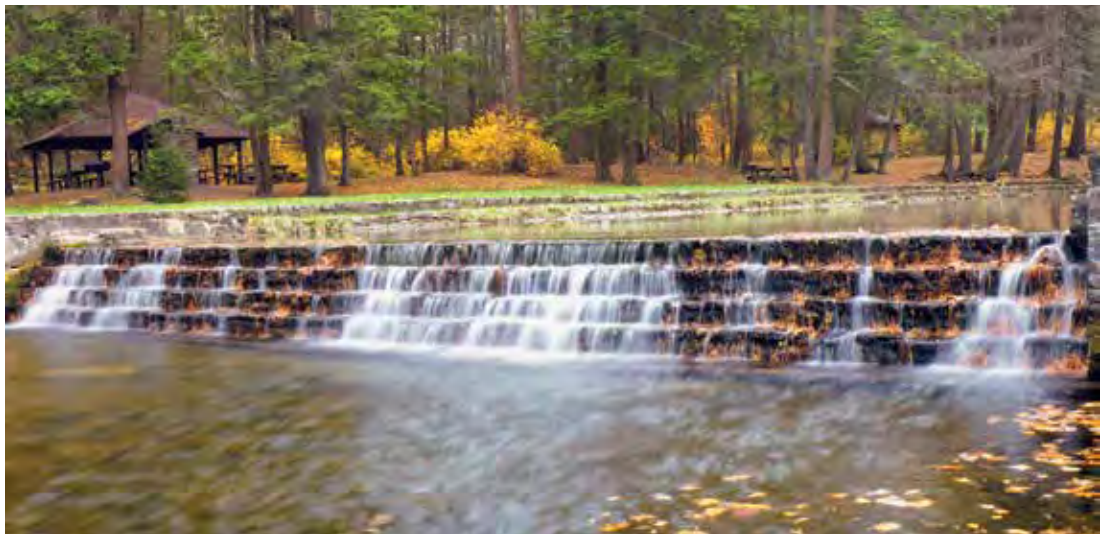
The roots of the CCC stem from a reforestation program that Roosevelt — a lifelong champion of improved forest management — launched as New York governor in 1932 to fix landscapes suffering from decades of abuse.

Others had advocated for a citizen army to aid conservation but "the spirit of the CCC, including many of its organizational details, was entirely concocted by Roosevelt," wrote historian Douglas Brinkley in his book, *Rightful Heritage*.

Roosevelt's request for the program cleared Congress in 10 days. Barely two weeks later, on April 17, 1933, Camp Roosevelt — the first of 2,514 camps — opened in the George Washington National Forest in Virginia.

At the time, the unemployment rate for adult men was at 25%. And by July, more than 250,000 young men, referred to as CCC "boys," were enrolled in hundreds of camps. Over the next decade, roughly 3 million would serve.

Enrollees were paid $30 a month. They usually



Ravensburg State Park in Clinton County, PA, features a dam across Rauchtown Creek that was built by the Civilian Conservation Corps during the 1930s. (Nicholas_ T/Creative Commons/Flickr)

sent $25 home to help their families, almost all of whom were on public relief. They signed up for six-month periods that could be renewed up to two years. Typical recruits had an eighth-grade education, but camps had libraries and incorporated classes to bolster education. For many, having three meals a day was novel. The average enrollee gained 12 pounds.

Each camp was organized into a company of about 200 men and included barracks and officers' quarters, as well as a mess hall, recreation hall, educational building and other structures. U.S. Army officers were in charge, while foresters, carpenters and other professionals guided the work.

The CCC may be best known for planting 3 billion trees, but recruits also constructed fire roads, lookout towers, bridges, hiking trails, cabins, picnic pavilions, fishing piers and dams. (Roosevelt thought all state parks should have a lake or swimming pool.) They fought forest fires and stocked fish. In agricultural areas, including the Chesapeake Bay watershed, recruits worked to control erosion.

The CCC's accomplishments are everywhere, including much of the original infrastructure for Shenandoah National Park, where recruits planted trees and built campgrounds, picnic areas and hiking paths. They helped construct Skyline Drive, including overlooks and stone walls.

But they also undertook tasks people know little about — even when the results are in plain sight. Four Black companies worked at the newly established Colonial National Historical Park from 1933 through 1941. They did archaeological work in Yorktown to identify trenches, fortifications and foundations of historic buildings. They also reconstructed earthworks on the battlefield where Gen. George Washington's victory effectively ended the Revolutionary War.

"In the 1930s, there wasn't much to look at as far as the battlefield goes," said Dwayne Scheid, an archeologist with the park. "Most of the remaining earthworks at that time were related to the Civil War because, after the [Revolutionary War] siege ended, Washington ordered most of the earthworks removed. So the landscape looked totally different."

Black CCC crews worked on the Colonial Parkway, which connects Jamestown, Yorktown and Colonial Williamsburg, planting trees and making other improvements. They made many of the cannon reproductions on display at Yorktown.

National Parks were not the only beneficiaries. Roosevelt also put a high priority on creating "localized recreational opportunities."

Virginia had only two state parks when he became president. Within three years of the CCC's creation, and thanks to 107,000 enrollees, six were added: Douthat, Westmoreland, Hungry, Fairy Stone, Staunton River and Seashore (First Landing).

In Maryland, the CCC worked on Swallow Falls, Herrington Manor, New Germany, Big Run, Cunningham Falls, Cedarville, Fort Frederick, Washington Monument, Gambrill, Patapsco Valley, Elk Neck and Pocomoke River state parks. They also restored two massive, historic stone structures: Fort Frederick and the state's Washington Monument.

In Pennsylvania, dozens of state parks benefitted. The public responded, with visitation jumping from 2 million in 1930 to 9 million in 1935.

Few were more pleased by the CCC than Pennsylvania Gov. Gifford Pinchot. Pennsylvania was second only to California for its number of camps, and Pinchot chose many of his state's 151 camp locations himself.

Pennsylvania crews racked up impressive work. Joseph M. Speakman, author of *At Work in Penn's Woods*, credits recruits for stringing 791 miles of telephone lines, building 3,386 miles of truck trails and 3,483 miles of foot and horse trails; planting more than 63 million trees; constructing 102 dams; operating tree nurseries; clearing 31,585 acres of forest fire hazards; and stocking 1,783 fish-rearing ponds.

Members of the Civilian Conservation Corps work in the George Washington National Forest. (USFS, Gerald W. Williams Collection/OSU Special Collections & Archives/ Wikimedia Commons)

They fought forest fires — sometimes losing crew members — and built forest fire observation towers. Acreage lost to forest fire in the state dropped by half within 5 years.

"Today, virtually every state forester or park manager in the country would drool at the prospect of having the labor of 200 men available to them for their ever-behind work needs," Speakman wrote.

The CCC was intended to be racially integrated — initially, some camps were — but by 1935 all camps were segregated to maintain the support of conservative southern Democrats. Camps were male-only despite First Lady Eleanor Roosevelt's pleas for counterparts to benefit unemployed women.

Congress defunded the CCC in 1942 with the onset of World War II, but many think the country would have benefited from its continuation. "The CCC is probably one of the most, if not the most, popular government programs ever created in terms of public perception," said Joshua Roth of the Pennsylvania Lumber Museum, which has an extensive exhibit on the corps. "When we do CCC programs, the number one thing that people say is, 'I don't understand why they still don't do that today.' "

The Chesapeake Conservation Corps, Pennsylvania Outdoor Corps, Maryland Conservation Corps, Virginia Service and Conservation Corps, and other similar programs all have their roots in the concept, though none approach its scale.

The impact of placing nearly 3 million young men over a nine-year period in the nation's forests, farms and parks was impressive. The signs of their work are everywhere, along with scattered memorials and museum exhibits.

But as I looked at the sign marking the site of Camp Leetonia, once deeply scarred by decades of abuse, I thought the most fitting memorial was right behind it: a healthy forest where the CCC camp once stood. ■

Explore the CCC legacy

Locations: The website CCClegacy.org lists all of the camps by state and approximate location.

Cabins: Some parks offer rentals of CCC cabins. Try Cacapon Resort State Park (WV), New Germany State Park (MD), Westmoreland State Park (VA) and Cowans Gap State Park (PA).

Museums and exhibits: Pocahontas State Park in Chesterfield, VA; Gambrill State Park near Frederick, MD; Parker Dam State Park near Clearfield, PA; Promised Land State Park near Greentown, PA; and the Pennsylvania Lumber Museum near Galeston.

Interpretive trails: Camp Roosevelt Recreation Area near Luray, VA; Michaux State Forest near Shippensburg, PA.

The fall harvest of feed corn begins on a farm in Carroll County, MD. (Michele Danoff)

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A passing skiff launches a flock of yellow legged sandpipers on Maryland's Smith Island. (Dave Harp)

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Saltwort shows its fall colors, brightening a marsh along the Honga River on Maryland's Eastern Shore. (Dave Harp)

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Beauty and the bog: water treatment at its natural best

By Tom Horton

Hope and the future for me are not in lawns and cultivated fields … but in the quaking swamps.

— Henry David Thoreau

I wish to speak a word for bogs, for dank, turbid and stagnant waters, where vegetation riots on the banks and rots in the pools, and where tangles of dark cedar sponge away the daylight and acidify the forest floor with their dropped needles.

I take my cues from Thoreau, who in the mid-1800s was a century and a half ahead of his time in appreciating America's soggy landscapes — and also from Keith Underwood, one of the Bay region's innovative wetlands resurrectionists.

Keith and his colleague Brooke Reynolds invited me, along with a gaggle of schoolkids, to spend a steamy summer morning along Maryland's Severn River, celebrating International Bog Day.

Bogs are a special subset of wetlands, with high-acidity, low-nutrient waters and a scarcity of oxygen that fosters the accumulation of layer upon layer of semi-decayed organic sludge that over centuries forms peat. Like all of the world's wetlands, there aren't nearly as many bogs as there once were because of human development.

"Bogged down," "boggy," "quagmire" — bogs historically have suffered an image problem. But that's fading as climate change, driven by an excess of human-spawned carbon dioxide, threatens to spoil humanity's future.

"Peat power," it turns out, is something special. Remaining bogs cover only about 3% of the globe's land surface, but they sequester twice the carbon of all the world's forests, which is close to a third of all land-based carbon, according to the United Nations Environment Program.

Maryland's remaining bogs are protected, considered "irreplaceable," Underwood said, which is why he has spent the last 20 years reclaiming Howard's Branch, a little tributary to the Severn. It was a degraded stream valley, fishless, overgrown with invasive plants, spewing sediment and nutrients toward the Chesapeake whenever it rained.

At the cost of about $350,000, his company, Underwood & Associates, hauled in thousands of tons of sand, gravel and boulders to construct a series of pools and dams along the stream course.

They introduced sphagnum moss, which can tolerate the acidity of a bog and eventually decay into peat. And they planted 1,000 Atlantic white cedars, a bog-associated species that has become a long-overdue target of restoration in the Chesapeake region.

Atlantic white cedar grows tall and arrow straight, and its wood is light, strong and extremely rot-resistant. It was coveted for everything from boatbuilding to roofing. Occurring in swamps that covered hundreds of thousands of acres along the Atlantic Coastal Plain, the cedars' thick carpets of decaying needles produced clean, clear runoff, low in the nutrients that plague our modern Bay. Water from cedar swamps was barreled for long-distance voyages in the days of sail. Its acidity and purity kept it from going bad.

Ecologically speaking, Howard's Branch has become a glorious expression of recovered nature. Yellow perch spawn there, and an array of toads and frogs and salamanders have moved in. Cranberry and cotton grass, acid-loving plants, grow in the shade of gums and maples and the cedars, which are reproducing. Nutrients and sediment going to the Severn are dramatically reduced.

But the boggy pools themselves are not immediately captivating — muddy-orange in color, surfaces strewn with algae. It's all he hoped for, Underwood explained. The coloration is iron leaching from the soils via groundwater. There's virtually no movement of water to whisk it away. "Bogged down" is perfection.

It's a good example of how we need to shift our lens, to comprehend things ecologically, to remember how water historically moved through the whole of the Chesapeake watershed — the whole of eastern North America, really, until Europeans arrived.

Keith Underwood and Brooke Reynolds of Underwood & Associates examine an area of sphagnum moss in the Howards Branch bog in Maryland. (Dave Harp)

Millions of beavers dammed and pooled and ponded the landscape, which we all know was greener but seldom appreciate how much wetter it also was. Water's way was slower, resulting in a healthier Bay.

Sarah Calder, the Severn Riverkeeper, said projects like this, while small, will be templates for healing our lands and waters.

I surmised that the bottleneck to more such success is, as usual, lack of money. Her answer surprised me.

"Often these days the money [for restorations] is there. It's getting government permits for the work that stops us … holds things up. Regulators still too often are not up to speed."

It was a hot summer day like this in June of 1840 when Thoreau plunged into a local swamp near Concord, MA, literally up to his eyeballs, seeking to get a bog's-eye view as he made his way.

"Surely, one may as profitably be soaked in the juices of a marsh for one day as pick his way dry shod over sand," he would recount.

So let's assign the U.S. Army Corps of Engineers' permitters to read Thoreau. Also read David Orr, a modern writer whose lovely little essay, *Speed*, came to mind while walking Howard's Branch.

"Water moving too quickly through a landscape does not recharge underground aquifers," Orr writes. "Money moving too quickly through an economy does not recharge the local wellsprings of prosperity. Information moving too quickly to become knowledge and grow into wisdom does not recharge moral aquifers …"

As Thoreau and Orr both understood, embracing the bog, restoring water's old ways, is only the start to a more sustainable planet. ■

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.

Big Chicken on Delmarva, and the road not taken

By Brad Johnson

No one today questions that "Big Chicken" is the economic juggernaut of the Delmarva Peninsula.

In 2021, the Delmarva chicken industry processed 4.2 billion pounds of chicken that was sold in wholesale markets for more than $4.2 billion. The industry reports that it employed more than 17,700 people who earned more than $800 million in wages. Local chicken producers purchased more than $1.3 billion in feed ingredients, much of it from local soybean and corn farms. (Source: *Delmarva Chicken Association: Facts and Figures 2021*.)

The birth of the modern poultry industry on Delmarva is the stuff of legend.

Back in 1923, Cecile Steele of Ocean View, DE, purchased 50 chicks to replace losses in her laying flock. By mistake, the local hatchery sent her 500 chicks. Rather than send the excess back, the story goes, the enterprising Mrs. Steele contracted with Roland Beauchamp of Berlin, MD, to construct a small shed. Eighteen weeks later, the story goes, she sold the 387 surviving chickens for 62 cents a pound, a tidy profit, to a local buyer who butchered them and shipped them north to hotels and restaurants.

Fast forward almost 100 years: Chicken is now a low-cost source of meat protein and widely available in supermarkets. Thanks in no small part to the risk-taking and innovations by entrepreneurs like Frank Perdue — a Salisbury, MD, farm boy who was a toddler when Mrs. Steele made her move — chicken is widely available to the American consumer at affordable prices.

But, as Big Chicken grew, the economy of the Delmarva Peninsula was transformed. Possibly, but not necessarily, forever.

Prior to Big Chicken, the Delmarva economy was a diverse agricultural region that exported myriad products to Philadelphia, Baltimore and Washington. Many Delmarva residents earned a living, but did not necessarily get wealthy, raising vegetables and fruits. Newly expanded railroads provided bulk transportation that ensured perishable fruits and vegetables could be grown profitably almost anywhere from Wilmington, DE, to Cape Charles, VA.

Gone are the days when Delmarva farmers grew fruit and vegetables. Now they're mostly contract growers, producing corn and soybeans to feed billions of chickens. (Dave Harp)

Today, those family farms are largely gone, replaced by chicken house CAFOs (concentrated animal feeding operations) and the vast fields of corn and soybeans that are integral to Big Chicken.

Much of the produce consumed in our region is still imported, but from much farther away, in many cases as far as California or South America. This may be economically efficient, which is probably why they are no longer produced in Delmarva — but is that a *sustainable* business model?

What are the greenhouse gas emissions associated with shipping a load of vegetables from Brazil to Pennsylvania?

What will happen to water resources in the western U.S. if agriculture continues to use almost 80% of available water supplies? Who is going to pay to clean up the quickly evaporating Salton Sea or the toxic chemical residue that the wind carries off dried-up farm fields?

Should we consider the model of European cities like Frankfurt, which are ringed with greenhouses that supply fresh vegetables to urban populations year-round?

In 20 years, while chicken production has increased enormously, there has been a 45% decrease in the number of chicken growers on Delmarva — because industry has consolidated and demanded larger and larger CAFOs from its contract growers, according the the Environmental Integrity Project. Of the 503 chicken operations that filed reports with the Maryland Department of the Environment, 439 reported that they do not have any cropland. So much for chickens providing supplemental income to the family farm.

The economic benefits of Big Chicken may be self-evident. But, what about the costs?

Of those 17,000-plus jobs, how many are low-wage jobs — on an assembly line in a processing plant or in the hot, dusty environments where vaccination and catching crews work? Of the $800 million in local wages, what percent goes to hourly employees versus poultry company managers and executives?

Of the $1.3 billion that goes to purchase local feed, how much of it goes to modest-scale soybean and corn farmers?

Who pays for disposing the 900 million pounds of chicken manure that is produced annually on Delmarva?

Is there an alternative to Big Chicken?

Food and Water Watch recently published a series of studies in *The Economic Cost of Food Monopolies*. The organization examined Delmarva farm sales before and after Big Chicken. They concluded that, if the same proportion of land had been used to grow produce, farm sales would have been 65% higher than those of Big Chicken contract growers.

A study from the University of Maryland also concluded that a shift back to fruit and vegetable production from commodity corn and soybeans would be more profitable for growers. Neither study addressed the concentration of income we see in Big Chicken's economic model.

Much has changed since the poultry industry was born on Delmarva 100 years ago. Today, there is rising interest in local food that is grown sustainably. Studies notwithstanding, it remains to be seen if this can be done economically on Delmarva. A transition back to the future would not be easy, nor would it happen overnight.

Nevertheless, there are alternatives to Big Chicken. We should not be afraid to contemplate them or to seriously reconsider the road not taken. ■

Brad Johnson is the former president of ACN Energy Ventures, where he managed equity investments in alternative and renewable electricity. Today he spends much of his time exploring the marshes of the lower Nanticoke River.

SHARE YOUR THOUGHTS

The *Bay Journal* welcomes comments on environmental issues in the Chesapeake Bay region. Letters to the editor should be 300 words or less. Submit your letter online at bayjournal.com by following a link in the Opinion section, or use the contact information below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availability vary. Text may be edited for clarity or length. Contact T. F. Sayles at tsayles@bayjournal.com, 410-746-0519 or at P.O. Box 300, Mayo, MD, 21106. Please include your phone number and/or email address.

Bay's blue crab history is repeating itself, unacceptably

By Gerald W. Winegrad

In September 1924, in response to a federal survey concluding that the Chesapeake blue crab fishery "was faced with destruction," the governors of Maryland and Virginia met to discuss solutions. The meeting yielded proposals:

- Virginia to ban all harvest of egg-bearing females (sponge crabs)
- Virginia to shorten its winter crab dredging season from six months to three months
- Both states to increase minimum size limits to 6 inches for hard crabs and 3.5 inches for soft crabs
- Both states to ban the taking of pre-molting "green crabs"

After resistance from the crabbing industry, no new restrictions were adopted, and it was back to business as usual. Harvest pressure intensified. In the 1930s, the invention of the crab pot permitted rapid expansion. A poor harvest in 1940 resulted in the Maryland legislature prohibiting crab pots in 1941, but the ban was overturned in 1943.

Crab pots now dominate the industry, with licensees in Maryland typically allowed 300 pots. Some multi-license vessels are allowed 900. The harvest of millions of egg-bearing sponge crabs continues in Virginia, as did — until recently — winter dredging, which targets females. Maryland allows the importation of these sponge crabs. Some Maryland watermen are catching many sponge crabs in Virginia waters to get around Maryland's ban on harvesting sponge crabs, which dates to 1916.

Nearly a century after the governors worked out conservation measures that went nowhere, history is repeating itself. A tragedy of the commons is occurring: 2022 crab numbers sank to a record low after a drop of 30% in 2021 and 32% in 2020. We are at less than one-third of the population of 30 years ago. In 2000, when the estimated number of spawning-age female crabs was 158,000, Maryland and Virginia committed to reach and maintain a target of 196 million spawners. In 2021, the number was half that, at 97 million.

Maryland crab landings in 2021 were 43% lower than 20 years ago. The Baywide harvest in 1950 accounted for 75% of U.S. landings. By last year it dropped to 25%. These declines are compounded by a third consecutive year of below-average recruitment, meaning that there are fewer juvenile crabs in the pipeline.

The simple but harsh truth is that harvests must be cut — even though there are other factors also likely responsible for the falling crab numbers. Unfortunately, until we can get the other causes under control, it is the hard-working harvesters and the picking/packing industry that must suffer.

Jeannie Haddaway-Riccio, secretary of the Maryland Department of Natural Resources, has for years bragged about keeping the crab harvest at sustainable levels while refusing to rein in harvests. She allows the crabbing industry to dictate management.

The most egregious proof of this usurpation of proper fishery management predates Haddaway-Riccio's DNR. That was the wrongful 2017 firing of Brenda Davis, a dedicated 28-year DNR fishery biologist in crab management. Her offense? She dared to stand up to a group of Dorchester County commercial crabbers who wanted her to reduce the minimum size for harvestable crabs. After the watermen met with Maryland Gov. Larry Hogan to complain, Davis was fired, causing outrage, legislative hearings and embarrassing press coverage.

With the acquiescence of commercial crabbers, DNR enacted new harvest restrictions for August and September: The male catch is to be reduced by a paltry 5% and the female take by 6–7%. But the near total lack of enforcement neuters even these marginal steps.

Besides harvest pressure, one of the key factors affecting abundance is the precipitous decline of Bay grasses, which serve as "crab nurseries." To restore the crab population, we must restore these grass beds. But the Bay states have failed to meet their pledge to restore these critically important grasses to cover at least 185,000 acres — a goal originally set for 2010 under the *Chesapeake 2000 Agreement*. In 2021, only 67,470 acres were covered, just 37% of the goal.

This, along with the oyster population collapse, indicates how badly the Bay restoration is going. The failure of Maryland and Virginia to rein in agricultural pollution, especially massive pollution from the poultry industry, is at the root.

Rachel Dermody, the author's granddaughter, holds up a sook (mature female) that she promptly returned to the Chesapeake Bay. (Carol Swan)

Other threats to blue crabs include "dead zones," introduced species such as blue catfish and climate change. Until we can restore the Bay, we have only one management tool in the toolbox: reducing harvest.

Recreational crabbing, which accounts for only 4% of the annual take, has already been cut in half. Here are suggestions for the commercial harvest:

- Enforce the regulations.
- Stop importing sponge crabs into Maryland and end Virginia sponge crab harvest.
- Adopt much lower bushel limits for males and females for the entire season.
- Close the fishery two days a week, and shorten the season at both ends.
- Greatly reduce the number of crab pots permitted in Maryland. (Virginia reduced theirs.)
- Adopt a harvester compensation fund, as was done during the rockfish moratorium.

To prevent another historical fishery collapse, regulators must take bold steps to prevent unsustainable harvest.

Meanwhile, the states must ramp up efforts to reduce nutrient pollutants, especially from agriculture.

May our beautiful, savory swimmers one day return to their past glory in this land of pleasant living. After all, Maryland is for crabs. At least it used to be. ■

Gerald W. Winegrad served 16 years in the Maryland legislature, 12 as chairman of the Senate Environment and Chesapeake Bay Committee, and 12 years on the tri-state Chesapeake Bay Commission.

LETTER TO THE EDITOR

Fairness in cleaning up the Bay

Two principles in our society are "equal treatment under the law" and "justice delayed is justice denied." Ongoing Chesapeake Bay clean water efforts show a great disparity on the application of those principles.

Recently, a consent decree was reached between the state of Maryland and Valley Proteins, a chicken rendering plant. Elements of the decree include:

- Valley Proteins to pay a fine of $540,000 as well as additional penalties for water quality discharge violations
- Additional fines if Valley Proteins fails to meet compliance deadlines
- Valley Proteins to pay legal fees and related expenses incurred by those who joined in the state legal action

Contrast that with virtually no action by regulators on decades-long discharges of untreated wastewater from treatment plants on the Back River and Patapsco River. These discharges have severely impacted water quality in the Upper Chesapeake Bay. While the state temporarily took over the Back River plant recently, the timing for long-overdue improved operations is still to be determined.

The Bay is at a tipping point. Steps need to be taken now to address the pollution from the Back River and Patapsco wastewater treatment plants.

Capt. Rob Newberry
Delmarva Fisheries Association

BULLETIN BOARD

VOLUNTEER OPPORTUNITIES

WATERSHEDWIDE

Project Clean Stream
The Alliance for the Chesapeake Bay, through its Project Clean Stream, provides supplies for stream cleanups anywhere in the watershed. To volunteer, register an event, report a site needing a cleanup: Lauren Sauder at lsauder@allianceforthebay.org.

Potomac River watershed cleanups
Learn about shoreline cleanup opportunities in the Potomac Riverwatershed. Click on "Cleanups" at fergusonfoundation.org.

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 & 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. Click on "Projects" menu at friendoftheearth.org.

Clean Swell App
Use the Ocean Conservancy's free Clean Swell app to instantly upload your cleanup results from anywhere in the world to a database that provides a global snapshot of trash and supplies researchers and policymakers with insight to inform solutions. The app also keeps track of your results and lets you share them on various social media. Earn badges based on the type, quantity of trash and cleanups recorded. Info: Put "Ocean Conservancy Clean Swell app" in search engine.

PENNSYLVANIA

York County Parks
York County Parks volunteer opportunities. Preregistration required: 717-428-1961, NixonCountyPark@YorkCountyPA.gov.
- *Front Desk Greeter/Nixon Park in Jacobus:* Ages 18+ can work alone. Families can work as team.
- *Invasive Plant Demolition Parties/Nixon Park in Jacobus:* 9–11 am & 1–4 pm Nov. 1–4 and 9–11 am Nov. 6. Remove invasive plants at selected sites.
- *Cleanup Walk/Kain Park, York:* 9–10:30 am Nov. 5. Meet at Hess Farm Road parking lot. Gloves, litter bags provided.
- *Habitat Restoration Plantings/Nixon Park, Jacobus:* 2–4 pm Nov. 5 & 6.

VIRGINIA

Neabsco Park boardwalk cleanup
Join the Prince William William Soil and Conservation District and REI for the Neabsco Regional Park Boardwalk Cleanup 9 am–12 pm Nov. 5 in Woodbridge. Info: pwtsc.org.

Reedville Fishermen's Museum
The Reedville Fishermen's Museum needs volunteers for docents and in the gift shop, boat shop, research collections/library. Click on "About us" menu at rfmuseum.org, office@rfmuseum.org.

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

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

Virginia Living Museum
Virginia Living Museum in Newport News needs volunteers and interns ages 11+ (11–14 w/adult) to work alongside staff. Opportunities include educating guests, native plant propagation, installation of new exhibits. Some positions have age requirements. Adults must complete a background check ($12.50). Financial aid applications available. Info: volunteer@thevlm.org.

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

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

MARYLAND

CBMM volunteer meeting
The Chesapeake Bay Maritime Museum in St. Michaels has scheduled a virtual meetings 12–1 pm Nov. 12 to recruit teen, adult volunteers. Opportunities include guiding tours & programs, exhibitions, collections, caring for grounds & gardens, helping with the Floating Fleet, working in shipyard. Free, registration required: bit.ly/CBMMVolunteerInterest. Applications for would-be volunteers: cbmm.org/ support/volunteer.

Frederick forest buffer
The Forest Buffers in Frederick County initiative is looking for volunteers. Info/registration: www.streamlinkeducation.org/volunteer.
- *Nursery Teams:* Dec. 3 & 10. Help grow native trees at outdoor nurseries.
- *Tree Planting:* Oct. 15, 22 & 29 and Nov. 5 & 12. Plant hundreds of trees next to streams.
- *Tree Teams:* Nov. 19 and Dec. 3 &10. Help maintain young forests.

Become a water quality monitor
The Izaak Walton League Gaithersburg office invites people of all ages to join one of its monitoring programs. Info: SOS@iwla.org or 301-548-0150 x229.
- *Clean Water Hub:* Explore water quality data in your community, around the country.
- *Salt Watch:* Test for excessive road salt in a stream.
- *Check the Chemistry:* Spend 30 minutes at a waterway with materials, downloadable instructions.
- *Stream Critters:* Use app to identify stream inhabitants.
- *Monitor Macros:* Become a certified Save Our Streams monitor. Learn to ID aquatic macroinvertebrates, collect stream data.

Lower Shore Land Trust
The Lower Shore Land Trust works with individual landowners who wish to protect the natural heritage of their properties. Info: lowershorelandtrust.org/ volunteer-sign-up.

Anita Leight Estuary Center
Remove invasive plants, install native species Oct. 9 at the Anita C. Leight Estuary Center in Abingdon. Volunteers, ages 14+, learn about problem plants, removal & restoration strategies. Wear sturdy shoes, long sleeves, work gloves. Weather permitting. Preregistration required: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

Patapsco Valley State Park
Volunteer opportunities include: daily operations, leading hikes & nature crafts, mounted patrols, trail maintenance, photographers, nature center docents, graphic designers, marketing specialists, artists, carpenters, plumbers, stone masons, seamstresses. Info: 410-461-5005, volunteerpatapsco.dnr@maryland.gov.

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

National Wildlife Refuge at Patuxent
Volunteer in Wildlife Images Bookstore & Nature Shop with Friends of Patuxent Research Refuge, near Laurel, for a few hours a week or all day 10 am–4 pm Saturdays; 11 am–4 pm Wednesdays–Fridays. Help customers, run the register. Training provided. Info: Visit the shop in the National Wildlife Visitor Center and ask for Ann; email wibookstore@friendsofpatuxent.org.

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

See **BULLETIN BOARD**, *page 36*

Submission Guidelines

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

DEADLINES
The ***Bulletin Board*** contains events that take place (or have registration deadlines) on or after the 11th of the month in which the item is published through the 11th of the next issue. Deadlines are posted at least two months in advance.
November issue: October 11
December issue: November 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.

Answers to CHESAPEAKE CHALLENGE on page 37

1. B
2. B
3. A
4. A and B

BULLETIN BOARD

BULLETIN BOARD *from page 35*

Invasive Species Tool Kit
The Lower Shore Land Trust is offering a free, online *Invasive Species Tool Kit* to identify, remove weeds on your land. Residents can also report invasive clusters in their neighborhood, parks, public lands: lowershorelandtrust.org/resources.

Citizen science: angler surveys
The *Volunteer Angler Survey* app helps the Department of Natural Resources collect species, location, size data used in developing management strategies. Surveys: artificial reef initiative, blue crab, freshwater fisheries, muskie, shad, striped bass. Win quarterly prizes. Info: dnr.maryland.gov/ Fisheries/Pages/survey/index.aspx.

Chesapeake Bay Environmental Center
Volunteer at the Chesapeake Bay Environmental Center in Grasonville a few times a month or more often. 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; monitor wood duck boxes; join wildlife initiatives. Or, participate in fundraising, website development, writing for newsletters, events, developing photo archives, supporting office staff. Volunteering more than 100 hours of service per year earns a free one-year family membership to CBEC. Info: volunteercoordinator@bayrestoration.org.

FORUMS / WORKSHOPS

WATERSHEDWIDE

Riparian forest buffer summit
The Alliance for the Chesapeake Bay's 2022 *Chesapeake Riparian Forest Buffer Networking Summit* takes place 9 am–3 pm Oct. 12 in Frederick County, MD. It will focus on building collaboration and facilitating discussions around implementing and maintaining riparian forest buffers throughout the watershed. Lunch provided. Free. Info/registration: Web search "riparian forest buffer summit."

Coastal & Island Symposium
The Center for Watershed Protection's *2022 Coastal & Island Symposium, Mitigation and Adaptation to Environmental Changes in Coastal & Island Communities*, is set for Nov. 10–11 in Fulton, MD. The in-person forum is an opportunity for watershed and resource conservation professionals to discuss innovations, best practices, challenges of these communities including the importance of climate resiliency. Topics: connecting those who live, work in areas surrounded by water; information sharing; case studies, role agriculture plays in improving watershed health and water quality. It includes technical/practical presentations. Fees vary. Info: cwp.org/2022-coastal-conference.

EVENTS / PROGRAMS

PENNSYLVANIA

Clean Water Celebration
The Middle Susquehanna Riverkeeper Association will mark the 50th anniversary of the Clean Water Act with a *Clean Water Celebration* on Oct. 15 at Lewisburg. Free events, scheduled 10 am–12 pm, in Hufnagle Park include presentations, hands-on activities, live music. A screening of *American River* will take place at 12:45 pm at the Campus Theater, with a panel discussion featuring filmmaker Scott Morris and local Susquehanna River experts. $10/ticket. Info/to purchase tickets: MiddleSusquehannaRiverkeeper.org.

York County Parks
York County Parks programs. Preregistration required: 717-428-1961, NixonCountyPark@YorkCountyPA.gov.

- *Hawk Watch Drop-in/Rocky Ridge Park, York:* 10 am–2 pm Fridays and Saturdays through Oct. 29. All ages. Learn to ID raptors. Bring binoculars, field guides, chairs. Poor weather may cancel event. Free.
- *Stream Discovery/Nixon Park, Jacobus:* 2–3:30 pm Oct. 23. Ages 5+ w/adult. Look for aquatic animals under a guide's supervision. Bring extra water shoes or rain boots. Free.
- *Nature Story Time & Craft/Turtles/Nixon Park, Jacobus:* 1–2:30 pm Oct. 30. Includes short walk. $5/child.
- *Raab Park History & Nature Park, Seven Valleys:* 10 am–12 pm Nov 10. Meet at Hoff Road parking lot. The 2-mile hike on steep terrain will explore how ore was removed and shipped, efforts to conserve bats in mineshaft, how animals prepare for winter. Wear good hiking shoes/boots. Free.
- *Sensory Nature Walk, Nixon Park, Jacobus:* 10–11 am Nov.12. Explore sensations of nature during short walk in woods, near pond. Free.

VIRGINIA

Second Sunday Hikes
The Greater Prince William Trails Coalition offers hikes that explore places in Prince William, Manassas and Manassas Park (weather permitting) 1–3 pm the second Sunday of every month through 2022. Info: info@gpwtrails.org.

MARYLAND

Calvert Marine Museum
Programs at Calvert Marine Museum in Solomons. Info: calvertmarinemuseum.com, 410-326-2042.

- *October Wm. B. Tennison Public Cruises:* 2–3 pm Wednesdays–Fridays and 2–3 & 3:10–4:10 pm Saturdays (no cruise 10/15) and Sundays. The log-built bugeye's passengers will be notified if inclement weather cancels cruise. $7/adults; $4/ages 5–12. Free/ages 4 & younger w/paying adult. Info/registration: web search "Wm. B. Tennison Cruises."
- *Sea Squirts/Otters:* 10:15 a.m. & 11:15 a.m. Oct. 13. Ages 18 months–3 years w/adult. Free w/admission. Sign up at the admissions desk upon arrival.
- *2022 Bugeye Ball:* 7–11 pm Oct. 15. Celebrating the museum's 50th Anniversary with food, music, dancing. Proceeds benefit project to replace the deck of the Dee of St. Mary's. $200. Info: calvertmarinemuseum.com/Bugeye-Ball. Museum is closed this day.
- *Dee of St. Mary's Public Sail:* 2:30–4:30 pm Oct. 16, 22 & 30. Ages 5+ Sail the Patuxent River aboard this historic skipjack. $35/ages 13+; $15/ages 5–12. Register: calvertmarinemuseum.com/Dee-of-St-Marys-Cruises.
- *Little Minnows/Otters:* 10:15 & 11:15 am Oct. 20 & 27. Ages 3–5, w/adult. Free w/admission. Limited capacity; sign up at admissions desk upon arrival.
- *Fossil Day:* 25– to 40-minute sessions, 1–4 p.m. Oct. 21. Ages 4-10. Learn about Calvert Cliffs' Miocene fossils, practice excavating real fossils from matrix (while supplies last). Included w/admission. Story time & takeaway craft (while supplies last).

Anita C. Leight Estuary Center
These programs take place at Anita C. Leight Estuary Center in Abingdon. Ages 12 & younger w/adult. Meet at center. Registration required for all programs; payment due at registration. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

- *Family Feed:* Participant chooses time, Oct. 13, 20 & 27 and Nov. 3 & 10. Go behind the scenes, help feed animals. Free. Register at least 24 hours ahead.
- *Critter Dinner Time:* 1:30–2:30 pm Oct. 15. Learn about turtles, fish, snakes while watching them eat. Free. Register by Oct. 14.
- *Wicked in the Woods:* 1–2:30 pm Oct. 16. Ages 6+ Learn how plants, animals defend/protect themselves, then hit the trails to look for them. $10/family. Register by Oct. 14.
- *Ollie's Not-So-Scary Halloween:* 3– 7 pm Oct. 22. All ages. Trunk or treat, live animal encounters, hot cider, marshmallow roast, costume contest, cash games. Purchase a pumpkins to race. $5/car.
- *Autumn Leaf Art:* 10:30–11:30 am Oct. 29. All ages. Learn why leaves change color, gather some for art project. $10/family. Register by Oct. 28.
- *Floating into Fall Canoe:* 12–2:30 pm Oct. 30. Ages 8+ (16 & younger with adult). $15.
- *Halloween Scavenger Hunt:* 1–3 pm Oct. 30. Ages 2+ Don costumes to search for clues hidden at creature stations in forest. Complete a word puzzle to earn a Halloween prize. Registrants stop by at any time during listed timeframe. $12/family. Register by Oct. 26.
- *Meet a Critter:* 1:30 pm Nov. 6. All ages. See, learn about an animal up close. Free. Register by Nov. 7.

2022 Flannel Formal
The Lower Shore Land Trust's *Flannel Formal* takes place 3–6 pm Nov. 12 at Brooklyn Meadows in Berlin. The event includes a pig roast, oysters, yard games, bonfire, alcoholic beverages, silent auction and the awarding of the Stephen Parker Conservation Legacy Award. $75. Info: Look for the 2022 Flannel Formal on Facebook.

Youth fishing rodeos
Youths, ages 3–15, are invited to take part in the Department of Natural Resources' *Youth Fishing Rodeo Program*. All events are free, but require registration (see info for each site). Most events provide bait or fishing gear and have volunteers on hand to help the kids learn to fish. Attendees should web search "MD DNR youth fishing rodeo" for any cancellations or rescheduling.

- *Baltimore City:* 10 am Oct. 29. Patterson Park. Info: Bob Wall at 443-955-0484.
- *Talbot County:* 10 am Nov. 12. Coastal Conservation Association of MD. Info: David Sikorski at 443-621-9186.

Piney Point Lighthouse
Piney Point Lighthouse Museum in Piney Point invites people of all ages to explore nature through hands-on activities. Included with museum admission. Registration encouraged. Rain or shine barring unsafe weather conditions. Info: 301-994-1471, Facebook.com/1836Light. Upcoming programs:

- *Piney Point Lighthouse/Outdoor Autumn Play Skills & Forest Stories:* 12–3 pm Nov. 12.
- *Piney Point Lighthouse/Outdoor Play for the Holidays:* 12–2 pm Dec. 10.

Horn Point open house
The University of Maryland Center for Environmental Science will host a free open house at its Horn Point Laboratory 11 am–4 pm Oct. 15 in Cambridge. This year's theme is "Explore the Shore through Science." Meet scientists, learn about their research through outdoor or open-air interactive exhibits. Exhibits & activities include healthy marshes; how oysters clean water, build resilience to sea level rise & climate change; the East Coast's largest oyster hatchery; DNA food chain game; digital sand box to create shorelines, model weather's impact with laser imaging; scientist dunk tank; and children's activities. Children get a free t-shirt if they complete a scavenger hunt. Masks are strongly encouraged. Info: umces.edu/hpl/openhouse or Carin Starr at cstarr@umces.edu, 410-221-8408.

CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell

My, what big teeth you have!

The scientific name for the megalodon, *Otodus megalodon*, means giant tooth, an appropriate name for a prehistoric shark with teeth that measured as much as 7 inches in diagonal length. How will you measure up on this quiz? Answers on page 35.

1. Teeth are the most common megalodon fossil. A full fossil skeleton has yet to be found, making it difficult for scientists to say for certain what it looked like or even which modern-day shark is its closest relative. Why is this prehistoric shark's skeleton so elusive?
   A. Megalodons cannibalized their dead.
   B. They were made of cartilage, which doesn't fossilize well, if at all.
   C. They became too encrusted with prehistoric oyster reefs and have deteriorated beyond recognition.

2. Megalodons preyed on whales, dolphins, seals, large fish, sea lions, sea turtles and other ocean animals. How many pounds of food is this shark thought to have eaten in one day?
   A. 1,500
   B. 2,500
   C. 3,500

Please note: Photos A and B of the shark teeth are a bit larger than life-size but roughly proportional.

3. Megalodons swam in all but the polar regions of the ocean. Their teeth are found in many coastal deposits, especially in the Carolinas, California, Spain, Peru, Panama and Maryland's Calvert Cliffs. In the U.S., the larger teeth tend to be found in and around Venice, FL. What is the typical size of teeth found at Calvert Cliffs?
   A. 1–3 inches
   B. 2–4 inches
   C. 3–5 inches

4. What factors are thought to have contributed the megalodon's extinction? More than one answer may apply.
   A. Cooling temperatures led to a decrease in its prey.
   B. An increasing population of early great white sharks and orcas led to increased competition for food.
   C. A meteor strike destroyed its most important nursery area.

Title graphic: *Courtesy of Calvert Marine Museum*

A *A megalodon tooth recovered in 1843 along the East Coast of the U.S. This tooth is 4 inches long. The largest found is over 7 inches. (James St. John/CC BY 3.0)*

B *The teeth of a modern great white shark are usually about 1.5–2.5 inches long. (istockphoto.com)*

C *Stephen Godfrey, curator of paleontology at the Calvert Marine Museum, holds up a megalodon tooth in front of the museum's recreation of the long extinct shark. (Calvert Marine Museum)*

D *A 5.4-inch long megalodon tooth discovered near Aurora, NC. (Public Domain)*

Jaw-dropping megalodon morsels

The monstrous megalodon shark once swam in Chesapeake waters — 15.9 million to 2.6 million years ago. Sink your teeth into these not-so-tiny tidbits.

Champion chomper: The megalodon's 10-foot mouth packed quite a punch. The force of its bite is estimated to have been as much as 182,000 newtons (one newton is the force needed to cause one kilogram of mass to accelerate at a rate of one meter per second, squared). For comparison, the force of a great white shark's bite is approximately 18,216 newtons; a human's is about 1,317.

The mother of all babies: Female megalodons, at an estimated length of 44–56 feet, were much larger than males (34–47 feet). They had to be that large to bear infant megalodons, which were more than 6 feet long!

Fancy feculence: Megalodon coprolites — fossilized feces — are spiral. Modern-day great white, megamouth and goblin sharks form spiral feces, too, because the valve at the lower end of their intestines is shaped like a corkscrew. It's likely the megalodon's was, too.

Bite your tongue! During the Renaissance, it was believed that gigantic fossil megalodon teeth, often found embedded in rocky formations, were the petrified tongues of dragons.

PA's elk herd a testament to conserving wide open spaces

By Jim Kauffman

A bull elk saunters through a clearing in Elk State Forest near Benezette, PA. (Richard Crook/CC BY-NC-ND 2.0)

Many miles from the mouth of the Chesapeake Bay, the early morning air of northcentral Pennsylvania is cool. Fog hangs low in the valleys, and the grass is wet with dew. As the sun begins to rise, the Allegheny mountains take shape, framing the river valleys in dawn light. Cold, clear streams run through the mountains, carrying their contents downstream.

A native brook trout rises to catch an emerging mayfly. A black bear feeds along a riverbank, fattening up on beechnuts and acorns, while an eastern hellbender scours the river bottom for crayfish.

Somewhere in the distance, a bull elk bugles, and the sound reverberates through the river valley. A silent witness, the waters of northcentral Pennsylvania continue their course downstream, en route to Havre de Grace.

In the headwaters of the Bay, there are no oysters, no blue crabs, no diamondback terrapins. But a few familiar Bay species, like blue herons, river otters and ospreys do call this place home. The northern mountains of the Bay watershed are also home to black bears, wood turtles, hellbenders and even elk — a species that was once widespread throughout the Chesapeake region.

While this part of Pennsylvania might seem far removed from the Bay itself, much of the water that flows through it ends up in the Bay. As a result, stewardship initiatives within these headwaters benefit both the local inhabitants and the organisms that reside downstream.

Pennsylvania's "elk range" includes portions of Cameron, Clinton, Clearfield and Centre counties, as well as the aptly named Elk County at the very edge of the Bay watershed. It has become a popular tourist destination for those who seek elk and wild places. The region's wilderness encompasses steep mountains, winding river valleys, grassy forest openings and small rural communities. The area is heavily forested, contains few roads and is relatively undeveloped.

People gravitate to elk country to enjoy all of the recreational opportunities it has to offer: fishing, hunting, hiking, biking, swimming, camping and peaceful solitude. These opportunities would not be available without intact forests, clean water and open spaces.

The eastern elk subspecies (*Cervus canadensis canadensis*) once roamed throughout the Bay watershed, occupying dense forests, river valleys, meadows and small grassy glades.

After European colonization, years of unregulated hunting and habitat alteration led to significant declines in elk populations as colonists spread into the continent's interior. By the late 1800s, the eastern elk subspecies had been completely wiped out.

The Pennsylvania Game Commission made the decision to reintroduce elk to their former haunts in the mountains of Pennsylvania. In 1913, the commission began the process by way of a trap-and-transfer program. Rocky Mountain elk (*Cervus canadensis 'nelsoni'*) were purchased from Yellowstone National Park, loaded into boxcars and shipped to Pennsylvania by rail. Miraculously, many of those elk survived their journey and were released into the wilds of northcentral Pennsylvania.

A pair of young male elk graze near the Elk Country Visitors Center in southeastern Elk County, PA. (Richard Crook/CC BY-NC-ND 2.0)

In subsequent years, the game commission purchased and shipped more elk to Pennsylvania, releasing them in multiple counties throughout the northcentral and northeastern region. The latest estimates put the state's wild elk population at more than 1,400.

Elk inhabit forest communities throughout this region but also gravitate to grasslands, meadows and farmland in search of food. The game commission has actively developed multiple elk viewing areas that provide educational information and allow visitors to observe the animals.

Most people visit the elk range when temperatures are cooler and especially during the September breeding season, known as "the rut," when bulls are "bugling." During the rut, bull elk "round up" females for breeding and are often much more visible in open fields and forest meadows. The bulls bugle to advertise their presence and attract females, and it is a sound like no other in nature. I would encourage you to take a trip to the elk range during September to experience it for yourself.

Unfortunately, it is unlikely that elk will repatriate most of their former range in the Chesapeake region. Elk are very large herd animals that require a lot of space and a lot of food. They are often unwelcome in suburban environments, not to mention being occasional road hazards and eating and trampling crops. For these reasons, natural resource agencies work to restore and manage elk populations in regions where suitable habitat and space exists — namely areas with expansive forests, few roads and few people.

The ability of the landscape to support elk populations is a testament to the importance of conserving wild places, clean water and contiguous forest habitats.

In today's developed world, it's sometimes hard to envision the vast herds of elk and other wildlife that once roamed the forests, meadows and streamsides of the Chesapeake region. But a trip to Pennsylvania's elk country provides a glimpse of what that spectacle was once like. It's like traveling back in time to experience the wilderness that once was. ■

Jim Kauffman is a Pennsylvania forest projects coordinator for the Alliance for the Chesapeake Bay.

Savannah sparrow: It's everywhere, but worth a second look

By Mike Burke

With its mostly brown, black and white coloration, the Savannah sparrow is not easy to distinguish from other sparrows, except for the distinctive yellow eyebrow. (Rejean J. Deschenes/CC BY-NC 2.0)

Sitting in the parked car, idly staring out the windshield, I suddenly realized there was a sparrow poking about in the grass right in front of me. I reached for my binoculars (we had been birding at Blackwater National Wildlife Refuge). The sparrow kept moving, walking methodically, as it snatched insects from the ground and off blades of grass.

With the binoculars I could see the bird in detail. I had registered "sparrow" without thinking about it. But which one? Maryland routinely has 10 different species. A diagnostic yellow eyebrow quickly answered my question: It was a Savannah sparrow (*Passerculus sandwichensis*).

Other than the eye stripe, the Savannah looks like most common sparrows. Primarily, it is brown with a white belly and a strongly striped breast. Sometimes the breast contains a central black spot, mimicking the song sparrow's coloring. Seen from above, the Savannah is a cryptic blend of brown and black. The short tail is a uniform brown and slightly forked. The top of the upper bill is black. The remainder is a pinkish bone color, the same color as the lower bill.

I saw this bird on Maryland's Eastern Shore. Years earlier, I saw my first one in California. They get around! ("Savannah" doesn't derive from the word meaning a grassy plain. The early U.S. naturalist who named it found his bird in Savannah, GA.)

The breeding season — early June to early August — finds Savannahs throughout Canada and Alaska. They also breed in the northern tier of the lower 48 states, from New England down to New York and Pennsylvania and west to the Pacific Ocean. In the East, the breeding range dips down the Appalachian Mountains, including all of West Virginia through to Georgia.

During the nonbreeding season, most of these middle-distance migrants take up residence below the Mason-Dixon line, including the Chesapeake Bay watershed and on through the Gulf states to the western Caribbean. Nonbreeding Savannah sparrows also overwinter in the U.S. Southwest and all of Mexico, inching into Central America. Both Mexico and California have small year-round ranges.

The fall migration starts in mid-September, peaks in October and ends in early November. Which raises the question: How do these birds, whether from Anchorage or Atlantic City, find their way to winter habitat?

In part because of their relative ubiquity, Savannahs have been studied for decades by scores of Canadian and U.S. scientists. Research has shown that these sparrows use a combination of internal solar, stellar and magnetic compasses. They are nocturnal migrants but use the setting sun to help with initial orientation. At night, they set their course by the stars and, if clouds interfere, the Earth's magnetic poles help to keep them on course. It is a remarkable feat, repeated millions of times every spring and fall.

Numbering an estimated 170 million, Savannahs are among the most common songbirds in North America, with 20 or more subspecies. Regardless of where they breed or spend the winter, these sparrows can always be found in the grasses.

They survive on insects, larvae, spiders, grasshoppers, millipedes and other small creeping, crawling and hopping creatures. In winter, they eat tiny seeds that drop from grasses or glean the seeds directly from the plant.

The female selects a well-hidden nesting site, close to the ground. Both sexes build the nest, which typically holds four eggs. Only the female has a brood patch, and she will spend every night on her eggs. During the day, the male provides some relief at the nest, but most of the time it is the female's responsibility.

After 12–13 days the eggs hatch. The chicks are helpless but mature quickly. Just 8–13 days later, the nestlings are ready for their first tentative steps. They are not yet able to fly but immediately begin learning to find the insects that will sustain them for life. The parents, which look alike, help feed the young birds for another two weeks. Then it's time for the parents to start a second brood and for the youngsters to fend for themselves.

There may be a third or fourth brood, depending on weather, latitude and other factors.

It is during these early days that young males learn the high, thin, buzzy song that characterizes the species. Their fathers' songs aren't the only source of learning. Hearing other nearby males sing is also formative.

The Savannah sparrows' songs come in three recognizable parts: a few opening notes, then the buzzy part, ending in a brief trill. Each young male will come up with a unique combination of notes that first summer, all based on this common pattern. He will sing that song for the rest of his life.

Savannah sparrows are easy to overlook. They fall into that unfortunate category of LBBs: little brown birds. Today, we like lots of color more than unremarkable browns. The everyday gets overlooked in favor of the odd or different. We see these trends throughout society, from fashion to entertainment.

Maybe these preferences are hard-wired in humans, just as the Savannah's navigation systems are. Or perhaps it is more akin to learned behavior, like the song-learning among the sparrow's young males. Either way, it suggests that we share more in common with these overlooked birds than meets the eye. Don't they deserve a second look? ■

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

Don't be tricked, these 'scary' animals are a treat

By Kathy Reshetiloff

Top left photo: A western screech owl glares from its dusky perch. (Frank D. Lospalluto/ CC BY-NC-ND 2.0)

Top right photo: Big brown bats are among the most common bat species in the Mid-Atlantic region. (Don Loarie/CC BY 4.0)

Inset photo: An orbweaver spider builds its web in front of a sliding door. (T. F. Sayles)

Halloween. It may very well be your children's favorite holiday (and maybe yours), with candy, costumes and ominous decorations — often featuring creepy-crawly creatures and other things that go bump in the night. Humans have long associated these animals with dark forces, but if we clear away the cobwebs, we see just how helpful these Halloween icons really are.

Bats

Like virtually all terrestrial mammals, bats have hair, and their young are born live and feed on milk. But bats are unique in one way: The fingers on their "hands" are elongated and connected by skin to form a wing, making them Earth's only flying mammal.

As primary predators of night-flying insects, bats help to control many of our most annoying pests, including those that do considerable damage to crops.

Contrary to popular myth, bats are not blind. Their eyesight is as good as most other small mammals. But they have developed a sensory system — echolocation, also known as bio-sonar — that, in low-light conditions, is far better than keen eyesight when it comes to "seeing" and catching flying insects. The animal emits a high-frequency sound and zeroes in on its prey using echoes from the sound.

Some bats are plant pollinators, ensuring the production of fruits that support local economies, as well as diverse animal populations. Fruit-eating bats in the tropics disperse seeds that are critical to restoring rainforests. Even bat droppings (called guano) are valuable as a natural fertilizer.

While tropical bats are active year-round, those in temperate regions like ours either hibernate or migrate during the winter. Many bats hibernate in caves in winter and move to trees and buildings during summer. Some bats reside in caves all year but have different summer and winter roosts.

The disturbance of maternity colonies and hibernation areas has been a major threat to many bat species. Bats now face a more menacing threat from white-nose syndrome. Named for the white fungus that sometimes appears on the noses of hibernating bats, the syndrome causes abnormal behavior, such as flying outside in winter, when the animal should be hibernating. To read more about what's being done to combat this, check out whitenosesyndrome.org.

Owls

Because of their nocturnal nature and eerie sounding calls, owls have been viewed as bad omens or messengers of misfortune. The reality is that owls are valuable predators. A single barn owl can eat more than 1,000 mice in a year!

Owls stalk their prey without a sound. Their wings have downy fringes along the stiff flight feathers that muffle noise, allowing the owl to swoop in unnoticed.

Owls are thought to have the most acute hearing of any bird and can hear sounds 10 times fainter than a person can detect. This is made possible by extra-large ear openings surrounded by deep, soft feathers that funnel sound.

Their eyesight is also excellent — even in the daytime, contrary to popular belief. At night their eyes are 10 times more light-sensitive than human eyes, owing to a concentration of light-sensitive rods in their retinas.

Spiders

As silly as it is, I have to admit that I am a bit of an arachnophobe. The big ones in particular, like wolf spiders, make my skin crawl. Yet I know this to be a largely irrational fear, because most spiders are harmless to people and will not bite unless they are trapped or held.

In our part of the world, one notable exception is the black widow spider. The female is about a half-inch long, black with a bright red hourglass shape on the belly. This spider's bite is poisonous, but it is more dangerous to children than adults. In any case, you should seek immediate treatment for a black widow bite.

By and large, spiders are here to help, performing a valuable service in our homes by eating insects. Spiders are not insects; they are arachnids, a different class of arthropod. Unlike six-legged insects, spiders have eight legs and lack wings and antennae. Most spiders have eight eyes. All species have a pair of claw-like fangs through which most deliver venom. At the tip of their abdomen are glands that produce silk for webs.

Different types and textures of silk may be used to construct snares or webs, egg sacs, draglines and ballooning threads. Some spiders use web snares to trap prey, and all species construct a silk sac to deposit eggs. Silk is secreted as a liquid that hardens on contact with air.

So, as you see spooky renditions of these animals this Halloween, remember the many benefits they provide for us and a healthy ecosystem. ■

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