CHESAPEAKE
# BAY JOURNAL

May 2021 Volume 31 Number 3

Independent environmental news for the Chesapeake region

Celebrating 30 YEARS

# Bay restoration effort stumbling in race to 2025 finish line

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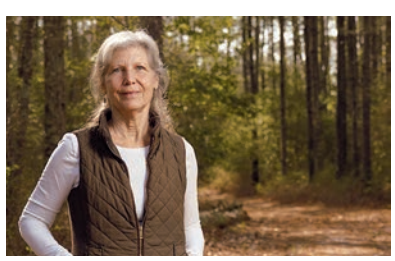
## POCOMOKE STATE FOREST



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## ANACOSTIA ISLANDS

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*Environmental violations by the natural gas industry in Pennsylvania have resulted in a record fine and pipeline closures. Here, construction takes place in 2018 along the Revolution Pipeline in western Pennsylvania. See the article on page 11. (Erica Jackson/TracTracker Alliance)*


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## EDITOR'S NOTE

# Contemplating kindness

My husband was entranced by the very large piles of mail on the table newly added to my office to accommodate them. "That's actually kind of heartwarming," he said.

He's right. Those mountains of envelopes are from *Bay Journal* readers across and beyond the Chesapeake watershed, responding to our spring giving campaign. Not all of our readers are able to donate, and that's fine — our mission, first and foremost, is to make sure that everyone with an interest in environmental news has access to it. But to those of you who have come forward with a first-time gift or ongoing support, our gratitude cannot be overstated. You truly make our work possible!

What's more, many of those envelopes contain handwritten notes with thanks for our reporting, suggestions for the future and insight on ways that you share the *Bay Journal*. One reader shares his copy with Amish neighbors. Another passes it on to both of her sons. I pass these comments on to our staff, so they can see the results of their work.

An apology, though: mail delays continue to plague us. We heard from a reader who received his December issue in April! And donations from earlier this year may have crossed in the mail with our spring letter. Please know that we are working hard to process the mail as we receive it, but the timing is not completely in our control.

This issue of the *Bay Journal* is packed with news, so take time to delve in. We're serving up an in-depth look at a whole package of 2025 goals for the Chesapeake Bay ecosystem, as restoration leaders admit that a number of them are unlikely to be met. There's exciting news about a Harriet Tubman site at Blackwater National Wildlife Refuge, a look at impacts from natural gas activity in Pennsylvania, a shortnose sturgeon caught in the Potomac River and much more. I hope you enjoy the read and share the *Bay Journal* with a friend.

*— Lara Lutz*

## ON THE COVER

Grasses are planted in a marsh at Shorters Wharf along Maryland's Blackwater River in 2017. (Dave Harp)

Bottom photos, left to right, by Dave Harp, by Krista Schlyer, and courtesy of the Library of Congress.

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## BY THE numbers

**9**
Feet of wingspan of the trumpeter swan, the largest native swan to the Bay, now extirpated

**13**
Inches of wingspan of the big brown bat, one of several bat species in steep decline because of white-nose syndrome

**1917**
The year beaver were reintroduced to Pennsylvania, after being extirpated

**1,100**
Estimated acreage of Poplar Island in 1847

**5**
Acres left of Poplar Island in 1994, before efforts began to rebuild it using sediment dredged from shipping channels

**1,715**
Projected acres of Poplar Island when rebuilding is complete

**2.2 million**
Acres of land in the Chesapeake Bay watershed controlled by the federal government

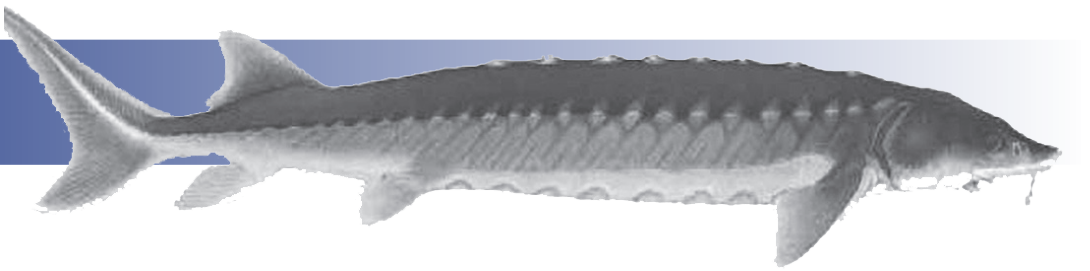
# Sturgeon: An ancient species in the Bay & its rivers

In the early 1600s, English explorer John Smith contended that "no place affords more plenty of sturgeon" than the Chesapeake Bay. Sturgeon are the largest fish native to the Bay and were an important source of food for Native Americans and early European settlers. Later, their eggs were sought for caviar.

Despite their large size, sturgeon primarily eat bottom-dwelling creatures such as mollusks, crustaceans, worms and insects. The species has been around for 100 million years, dating back to the time when when dinosaurs walked the Earth. Unlike modern fish, which are usually covered with scales, sturgeon have protective bony plates, called scutes, which give them an armored appearance.

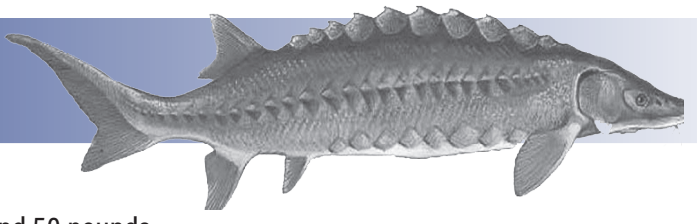
The Bay is home to two sturgeon species — the Atlantic and the shortnose. Both are sensitive to low-oxygen water conditions. Atlantics are larger, while shortnose, as their name implies, have blunt snouts. Though common when Smith explored the Bay 400 years ago, both are now listed as endangered. See *Catch of a lifetime: Anglers hook rare sturgeon on Potomac*, page 15.

## Atlantic Sturgeon



- Found more often in the Bay in recent years
- Grow to lengths of up to 14 feet and weights of up to 800 pounds, though most adults seen in the Bay are 5–6 feet and less than 200 pounds
- Can live 60 years but do not reach maturity until they are 10–20 years old, after which they return to spawn in their natal rivers every 3–5 years
- Live in freshwater rivers for several years before migrating into the ocean
- Spawn mostly in late summer or early fall

## Shortnose Sturgeon



- Rarely seen in the Chesapeake
- Can reach lengths of 4.5 feet and weights of around 50 pounds
- Can live 30 years, though some have exceeded 60 years
- Reach maturity at 5–7 years old
- Spawn in the spring in freshwater portions of rivers and spend time in brackish areas downstream, but only occasionally venture into the ocean

*Illustrations: National Marine Fisheries Service*

## LOOKING BACK

Celebrating 30 YEARS AT WORK FOR YOU

### 30 years ago

**Eroding shores reshape the Bay**

A report from the U.S. Army Corps of Engineers found that the average rate of erosion along the Bay and its tidal rivers was one foot per year. In the past century, 45,000 acres of shoreline had eroded — an area equivalent to the District of Columbia. ■

*— Bay Journal, May 1991*

### 20 years ago

**DC seeks aid to upgrade sewers**

District of Columbia Mayor Anthony Williams called on Congress to invest millions of dollars to upgrade the city's 130-year-old sewer system as part of the regional effort to clean up the Chesapeake Bay. ■

*— Bay Journal, May 2001*

### 10 years ago

**Land conservation funds lacking**

Land preservation funds were on the chopping block throughout the Chesapeake watershed, with spending down significally in Maryland, Pennsylvania and Virginia over recent years. ■

*— Bay Journal, May 2011*

# ABOUT US

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

Bay Journal Media also operates the Bay Journal News Service, which distributes *Bay Journal* articles and op-eds about the Chesapeake Bay and regional environmental issues to more than 400 newspapers in the region.

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# BAY JOURNAL NOTEBOOK

*This view of the Blackwater River in Maryland is about 50 yards from the newly discovered homesite of Harriet Tubman's father, Ben Ross. It's likely quite similar to what Tubman and Ross would have seen in the early to mid-1800s. (Dave Harp)*

## Standing where Tubman stood is cause for pause

When *Bay Journal* photographer **Dave Harp** got permission to visit the recently discovered cabin site of Ben Ross, Harriet Tubman's father, he wasn't sure what to expect, because the permission came with a question: "Do you have four-wheel drive?"

Dave didn't. But he went with a friend, Bill Thompson, down a narrow, primitive dirt road along the Blackwater River, with Thompson getting out occasionally to scout the path ahead.

Finally, they got within a few hundred yards of the historic site. They walked the rest of the way, with tall phragmites on either side, until they reached the site and Dave was able to take photos for the article in this issue, *Tubman historic site discovered at Blackwater*, on page 13.

Standing in a small clearing surrounded by trees, "it was almost eerie, because you knew that this icon of the Underground Railroad, and of the Eastern Shore and Cambridge, had been right there were you're standing," Dave said.

Upon visiting the site, Dave realized he had been paddling by it for many years in his kayak. "Now I've been there by road and by water," he said, "and I prefer going by water."

In other news, after a one-year hiatus because of COVID-19, the *Bay Journal* was back on the air in partnership with Maryland Public Television for the Chesapeake Bay Summit in April. Produced as part of MPT's annual Bay Week programming, the hourlong summit delves into various issues facing the Bay.

This year's summit focused on the challenges of meeting the Bay region's 2025 pollution reduction goals and featured environmental leaders from Pennsylvania, Virginia, Maryland and the U.S. Environmental Protection Agency.

As part of the panel, **Tim Wheeler**, *Bay Journal* associate editor and senior writer, added insight and clarity on complicated topics. (Spoiler alert: The region is probably not going to make the 2025 goals.)

The discussion was moderated by Frank Sesno, former CNN anchor and current director of Strategic Initiatives at George Washington University. The summit can be viewed on MPT's website: mpt.org/bayweek/summit.

*— Karl Blankenship*

# NEWS briefs

LOCAL
REGIONAL
NATIONAL

## Senators press EPA to act against PA

A group of U.S. senators from Maryland, Virginia and Delaware in April called upon the U.S. Environmental Protection Agency to use "all tools available" to meet the 2025 Chesapeake Bay cleanup goals.

In an April 5 letter to EPA Administrator Michael Regan, the senators urged the agency to take greater actions to prod Pennsylvania to meet nutrient reduction goals established in 2010 by the Chesapeake Bay total maximum daily load, which set limits on the amount of nitrogen, phosphorus and sediment that can reach the Bay.

Although the region as a whole, along with multiple states, will likely miss its 2025 goals, Pennsylvania is much further behind, and a cleanup plan it submitted two years ago would achieve only 75% of its target. State officials say they will complete a revised plan this year.

Frustrated that the EPA under the Trump administration had failed to take more assertive action, the states of Maryland, Delaware, Virginia, along with the District of Columbia and the Chesapeake Bay Foundation, last year filed suit against the EPA, urging it to use various enforcement powers.

"We are at a critical juncture in implementation of the Bay TMDL," the senators said, echoing concerns expressed in the suit. "We ask that you use all tools at your disposal to make sure that all jurisdictions are on track for 2025."

The letter was signed by Sens. Chris Van Hollen (D-MD), Tom Carper (D-DE), Ben Cardin (D-MD), Mark Warner (D-VA), Chris Coons (D-DE), and Tim Kaine (D-VA). ■

## UPDATE: NAACP sues over state decision to approve Wegmans project

A chapter of the NAACP is appealing a state board's decision to allow a Wegmans grocery distribution center to be built in Hanover County, VA.

The grocery chain's complex is planned for 219 acres in a rural county where opponents say it would negatively impact a historic Black community called Brown Grove and destroy forested wetlands. But the State Water Control Board in late February approved a permit allowing the project to impact what has been tallied as nearly 15 acres of wetlands.

"For years, the voices of this community of color have been ignored for the gain of corporate entities," Patricia Hunter-Jordan, president of the Hanover County NAACP, stated in a press release. "We can no longer sit idly by and watch the destruction of our people to appease corporate wealth."

Wegmans Food Markets, Inc., says the 1.7-million-square-foot complex is needed to supply additional supermarkets in Virginia and to expand into North Carolina. County and state officials, including Gov. Ralph Northam, support the project for its promise of providing 700 jobs.

The project is also opposed by environmental groups who see its location on a wetland-laden property as shortsighted. ■

## DC receives $156 million loan for water infrastructure projects

U.S. Environmental Protection Agency Administrator Michael S. Regan in April announced a $156 million loan to the District of Columbia Water and Sewer Authority, known as DC Water.

The loan will help finance water infrastructure improvements throughout the city, with a combination of 20 drinking water and wastewater projects to rehabilitate, upgrade or replace aging parts of the system.

The aim is to better protect public health and benefit water quality in local rivers. Upgrades to water mains and pumps throughout the system will

*See* **BRIEFS**, *page 6*

# briefs

*From page 5*

improve drinking water distribution, and upgrades to stormwater management systems will protect the Potomac and Anacostia rivers from sewage contamination.

DC Water serves more than 700,000 residents, including many lower income communities and communities of color. ■

## UPDATE: MD agency seeks to overturn air pollution ruling

The Maryland Department of the Environment plans to appeal a state judge's ruling that the agency must account for ammonia discharges to the air before issuing water permits to high-density poultry farms.

The move would bring the legal clash to the Court of Special Appeals, the state's second-highest court.

"We are committed to advancing the science, stewardship and conservation practices that seek to reduce pollution from poultry houses," MDE Secretary Ben Grumbles said. "We are also committed to regulatory certainty in the wake of the unprecedented ruling in the lower court."

Last year, the MDE finalized a revision to the five-year general discharge permit governing waste discharges into local waters from industrial-scale chicken-raising operations. The U.S. Environmental Protection Agency subsequently accepted the changes.

But Montgomery County Circuit Court Judge Sharon Burrell ruled March 11 this year that state officials must also regulate ammonia released into the air, because some of it falls into waters protected by the federal Clean Water Act, namely the Chesapeake Bay and its tributaries.

Ammonia is a form of nitrogen, a nutrient that can trigger algae blooms in the Bay, creating oxygen-deprived "dead zones" where nearly no life exists. Reducing nitrogen runoff from farms is one of the top goals of the state-federal Bay restoration program.

MDE officials say that, if the state is also required to limit ammonia air emissions from poultry operations to improve water quality, it would open the door to regulating similar air emissions from a wide variety of sources, ranging from vehicles to landfills. Confusion and regulatory chaos would ensue, they say.

The circuit court lawsuit was initiated by the Assateague Coastal Trust, a group based in Berlin, MD, that has long opposed the chicken industry's expansion on the Delmarva Peninsula. Maryland's portion of peninsula boasts appoximately 2,000 chicken houses, which emit gaseous ammonia through giant fans. The gas is largely the product of poultry urine.

The Delmarva Chicken Association, the region's leading poultry trade group, applauded the state's decision to appeal the ruling.

"We look forward to a fair-minded judicial review of a lone judge's decision to strike down the EPA-approved Maryland [animal feeding operation permit]," Executive Director Holly Porter said. "This appeal will provide an opportunity to correct the unjustified, sudden insertion of air emission regulation into a water quality permit." ■

## Blinken charts renewed U.S. action on climate change

With the Chesapeake Bay as a backdrop, U.S. Secretary of State Antony Blinken called on world leaders April 19 to reduce greenhouse gas emissions, warning that a lack of action could wreak widespread social and ecological damage in such coastal regions.

Citing sea level rise and sinking land, Blinken said, "If this continues at the current pace, in just 80 years, the Bay will extend inland for miles, overtaking the homes of 3 million people, destroying roads, bridges, farms. Many of the Bay's plants and animals will die out. So will the fishing industry. To my children's children, the landscape will be unrecognizable."

In a 26-minute speech from the deck of the Chesapeake Bay Foundation's Philip Merrill Environmental Center in Annapolis, Blinken outlined how diplomats will put climate policy at the fore in their dealings with their foreign peers. And he vowed that the U.S. government wouldn't let other countries use climate progress as

a "trading card" in negotiations to excuse bad behavior.

His comments offered no specifics on new spending, nor did they prescribe new pollution-reduction targets. But the speech struck a starkly different tone on climate compared with the Trump administration, whose political leadership tended to downplay the threat.

Blinken's talk came three days ahead of President Biden's virtual climate summit with 40 world leaders. ■

## VA announces leadership for environmental justice office

The Virginia Department of Environmental Quality on April 23 announced Renee Hoyos as director of the its new environmental justice office.

Hoyos has 14 years of experience as an environmental justice advocacy leader in Tennessee, most recently serving as executive director of the Tennessee Clean Water Network. Before that she served in California Gov. Gray Davis's administration as special assistant to Secretary Mary D. Nichols for the state's Natural Resources Agency, where she focused on watersheds and outreach.

"Throughout my career, I have worked with communities on the processes government agencies use to make environmental decisions," Hoyos said. "I've learned that decisions that impact communities benefit from early engagement of all parties, which creates a better project and a safer community."

Hoyos will be joined by environmental justice coordinator Jerome Brooks, who for 15 years has worked at DEQ as manager of the office of water compliance and director of the office of air compliance coordination. Brooks also has been serving as the agency's environmental justice coordinator for the past 13 years.

"EPA is very excited about the Virginia Department of Environmental Quality taking this important step toward integrating environmental justice into its programs," said Charles Lee, senior policy adviser for environmental justice at the U.S. Environmental Protection Agency. "These actions build on a nearly two-year effort involving engagement with Virginia communities and independent evaluation. We look forward to seeing the results of the Commonwealth of Virginia's investment in improving public health and the environment." ■

## Groups: Revoke Conowingo license

A group of environmentalists are asking the Federal Energy Regulatory Commission to reconsider its approval in March of a new 50-year license for the Conowingo Dam on the Susquehanna River.

In the petition filed April 19, the groups contend that the conditions Maryland had established in 2018 for relicensing the hydroelectric facility should have been included when the license was issued in March.

Those conditions, aimed at protecting water quality downstream, were part of a certification the state was required to issue before a new license could be issued. Because the certification was never withdrawn, the new license is unlawful, they contend.

After setting out needed water quality conditions, the state then negotiated a settlement with Exelon, the utility that owns the dam, which was less restrictive.

"Maryland issued a timely water quality certification with substantial protection, then inexplicably made an agreement to waive their authority to issue this very certification more than a year and half later," said Betsy Nicholas, executive director of Waterkeepers Chesapeake.

"By entering into this secret settlement agreement, the state and FERC ignored public participation procedures — which is also illegal under the Clean Water Act," she said.

The effect of FERC's decision, the groups contend, is to remove the requirements that the Maryland Department of the Environment found necessary to assure the dam's compliance with water quality standards from its license.

The petition was filed by the Waterkeepers Chesapeake, Lower Susquehanna Riverkeeper and Sassafras Riverkeeper, represented by Earthjustice and joined by the Chesapeake Bay Foundation. ■

# Lawsuit threatened against MD chicken-rendering plant

## Valley Proteins scrutinized as it wins $7.6 million state grant

**By Jeremy Cox**

Three environmental groups have moved to file a lawsuit against a Virginia company that operates a chicken-rendering plant on Maryland's Eastern Shore, accusing it of repeatedly exceeding pollution limits and fouling a Chesapeake Bay tributary.

The Chesapeake Bay Foundation, ShoreRivers and Dorchester Citizens for Planned Growth on April 13 sent a notice of intent to sue to Valley Proteins, Inc. The groups say the action is aimed at bringing wastewater discharges at the company's Linkwood facility, near Cambridge, into compliance with the federal Clean Water Act.

The plant discharges into a pond that forms the headwaters of the Transquaking River, which empties into the Chesapeake Bay about 20 miles downstream. The river has been classified since 1996 as impaired by nutrients.

The threatened lawsuit comes in the wake of the Maryland legislature's decision to award $7.6 million to the company to upgrade the plant's wastewater treatment facility. The Maryland Department of the Environment grant was initially set at $13 million, but lawmakers reduced the total after critics contended that the private company could afford to pick up a larger share of the tab.

State regulators have identified the Valley Proteins plant as the largest single contributor of nitrogen to the Transquaking, estimating that about one-third of the river's nitrogen originates at the facility. In the Bay, the nutrient causes algae blooms that lead to oxygen-starved "dead zones" where there is almost no aquatic life.

"At this point, we feel like nothing will change except through litigation," said Doug Myers, Maryland senior scientist for the Chesapeake Bay Foundation. "We hope the outcome will result in a cleaner Transquaking River and Chesapeake Bay for those who depend on these waterways for their livelihoods and recreation."

A Valley Proteins official said the company was still reviewing the notice of intent. "There's nothing really for us to comment on at this time until we look at it further," said Michael Smith, Valley Proteins' vice chairman.

The legal action is focused on the plant's environmental violations, not the state's grant funding, said Matt Pluta, director of ShoreRivers' river-monitoring program.

Valley Proteins uses a chemical process to transform unused chicken parts into protein for animal feed. The Dorchester County plant's water-pollution permit expired in 2006, but the state has administratively extended it for 15 years, allowing the facility to continue operating.

The plant frequently exceeds its limits for pollutants such as fecal coliform, nitrogen, phosphorus and ammonia, the environmental groups say, citing discharge reports compiled by the company for state and federal regulators. During three months last summer, for example, the facility exceeded its ammonia limits by 2,518%, the groups said.

The groups contend in their notice that the high nitrate levels found in monitoring wells may be from water leaking into the groundwater from two wastewater storage lagoons on the property. The notice also argues that the company hasn't properly documented the thousands of tons of sludge being hauled away from the property each year.

Volunteers with the Dorchester Citizens group have also found higher-than-average levels of *E. coli* bacteria, nitrogen and phosphorus in the river. Plus, the groups say there have been reports of oxygen-depleted water, a leading indicator of potential dead zones, and that algae blooms have been documented near where the plant's waste discharges into the water.

The company has been fined a total of $5,000 over the last five years, according to a U.S. Environmental Protection Agency database. Pluta said the groups hope to exact stiffer penalties for violations they believe are still occurring.

The April 13 notice gives Valley Proteins 60 days to potentially settle claims before a lawsuit is filed against the company. ■

# Phillips Wharf center closes after COVID saps its bottom line

## Nonprofit hopes to continue environmental mission

**By Jeremy Cox**

The Phillips Wharf Environmental Center, the Talbot County, MD, nonprofit that rose from the ashes of a family tragedy to become a leader in educating a new generation of Chesapeake Bay guardians, has closed its doors.

Whether the 14-year-old organization will soldier on in a new location remains to be seen, but the center's leaders say they hope to continue providing environmental programming to schoolchildren and others in some fashion in the future.

Matthew Albers, president of the center's board, announced the closure in a Facebook post in March, saying the board was busy "liquidating our assets on Tilghman Island," home to the center's headquarters and oyster-farming operation. The board is looking into using proceeds from those sales to finance a new location in or near Easton.

It is uncertain what Phillips Wharf's future will look like. But Albers explained it will probably be a "leaner version" of itself, avoiding the trajectory the organization was on last year, when it was often only six months away from exhausting its resources.

At its height, the center hosted guided tours of its 3-acre waterfront campus, dispatched a "Fishmobile" to carry its conservation message to schools and special events, recruited a corps of more than 100 homeowners who raised oysters in cages off their docks, and served as an incubator for aspiring commercial oyster farmers.

Its visitors center closed in the spring of 2020 as the world locked down to slow the spread of the coronavirus. That halted the flow of income from public tours and school field trips.

The pandemic also wreaked havoc on the center's oyster aquaculture operation. Many restaurants suspended indoor dining, and the loss of that key market segment caused oyster prices to plummet. With the center only able to recoup about 9 cents for each oyster instead of the previous 30 cents, the aquaculture business was no longer making a profit, said Albers, who works as a financial consultant.

*Kelley Phillips Cox teaches youth about horseshoe crabs at the Phillips Wharf center in 2013. (Dave Harp)*

Amid the turmoil, the center's founder and executive director, Kelley Phillips Cox, stepped aside in September because of medical problems.

Cox, the daughter of one of the Chesapeake's top watermen, Garland Phillips, grew up with a love for the Bay and its creatures. But that relationship was severely tested when her father perished aboard his boat with four other family members during an ice storm in 1979.

Albers said the board made the painful decision to shut down the center sooner rather than later with hopes of preserving what he called a "small endowment" toward the nonprofit's future. ■

# Kingman, Heritage to become Anacostia's treasure islands

## $5 million project will create natural classroom

**By Whitney Pipkin**

Dredged up, dumped on and overgrown with invasive plants for decades, a pair of islands in the District of Columbia is about to get a long-awaited makeover.

Created when the Anacostia River was dredged in the early 1900s, Kingman and Heritage islands were always envisioned as a park in the southeastern reaches of a growing city. And, after languishing under a lack of funding and direction for decades — a century, all told — that vision in recent years is at last coming into focus.

City-supported nonprofits and volunteers chipping away at layers of trash, invasive species and other evidence of neglect over the last 15 years realized that they were slowly unearthing a natural treasure — at a time when appetites for green havens in the city are growing. The narrow, nearly 2-mile-long Kingman Island reaches from well above the river's Benning Road bridge to just south of the East Capitol Street bridge, alongside the now defunct RFK Stadium. Heritage Island is only a quarter-mile long, tucked in between the larger island and stadium in what is called Kingman Lake. A pair of footbridges connects the islands to the west side of the river.

Recognizing the potential of these landscapes, District Mayor Muriel Bowser in 2018 announced plans to invest $4.7 million in major restoration work on the islands. (More funds have been added since then for a total of $5.5 million.) The mayor also directed the District's Department of Energy and Environment to designate portions of both islands as state conservation areas and classify the southern area of Kingman Island a critical wildlife area.

Kingman and Heritage Islands Park, a project of the District in partnership with the nonprofit Living Classrooms, already provides public trails through 50 acres of natural habitats. In recognition of its resources, the National Park Service added the park to its Chesapeake Bay Gateways and Watertrails Network in 2011.

"It's a man-made island where there was trash and waste," said Jay Wilson, a senior policy adviser at DOEE who is overseeing one of the first phases of work on the islands. "[But] over the course of the years, Kingman is now thought of as a crown jewel of the Anacostia River. The natural ecology has emerged, and it's become a quiet respite in the middle of the city."

Cleanup days and workforce development programs have benefited the islands over the years, keeping them at what Wilson calls "an awesome status quo." But the current initiative allows park managers and the community to create a vision, with an eye toward improving the land's ecological health and making it more accessible to more people.

The state conservation area designation also comes with some constraints: The islands need to be used for environmental, educational and recreational purposes. Those core uses will be further shaped by a public input process. Project managers will present their ideas during a series of online meetings in late April and May.

"One of the things people want [so far] is to keep Kingman wild," Wilson said.

One of the main goals of the work is to restore the ecosystems of Kingman and Heritage islands. But that can be a tricky undertaking; as a constructed landscape, it offeres no baseline for what *should* be growing there.

For that reason, the approach at the islands has been to remove what clearly should *not* be there — discarded refrigerators and such in the early days and, now, persistent stands of invasive honeysuckle and kudzu — and to see what emerges in their wake.

"Because the islands are [made of] fill material and not native in the first place, we're not sure what's going to come up when we give opportunities for that to emerge," Wilson said.

Damien Ossi, a wildlife biologist with DOEE, said similar ecosystems nearby at the Kenilworth Aquatic Gardens or Theodore Roosevelt Island could give clues as to what might thrive on these islands.

"We're really looking to what's living there now to help us figure out what could potentially be there in the future," Ossi said.

Plans are still in the early stages. So far, renderings imagine replacing vine-choked shrubs with trails winding through native meadows. One mown area could include a sheltered outdoor classroom. Another outdoor classroom could be built near a marshy bank and another in the forest, each design mimicking its surroundings.

Kingman and Heritage islands are already the setting for what aspires to be "meaningful watershed educational experiences" for students in the District. The islands could also host an entire grade of students, which would justify having multiple classroom settings onsite.

*Students participate in the Kingman Explorers program led by Living Classrooms at the Kingman and Heritage Islands Conservation Area in the District of Columbia. (Teresa Martin/Living Classrooms)*

Education has been a linchpin of the islands' restoration since the District tapped the nonprofit Living Classrooms to spearhead the effort in 2007. Living Classrooms, which promotes "learning by doing," educates youths and young adults through environmental work, benefitting community spaces in the process.

Until restoration efforts began in earnest, the islands continued to be used as an unofficial dumping ground. There were also other ideas floated for the islands — an airport or amusement park, for instance.

The improving health of the Anacostia River that surrounds the islands makes a much stronger case for a nature-oriented revitalization today. The city and others have begun a more than $35 million undertaking to clean up toxic sediments along the river bottom, making future recreation even more feasible.

"The city has a different relationship with the river than we used to," Wilson said. "All of that, we hope, is bringing renewed life to the Anacostia River. Kingman Island is sort of the centerpiece of that."

Register to virtually attend public meetings on the future of Kingman and Heritage islands at KingmanIsland.com. The meetings take place May 12 & 26. ■

# PA natural gas problems lead to record fine, closed pipelines

## Damage includes buried wetlands, stream eliminations

**By Ad Crable**

*Several fracking well pads and a wastewater impoundment are located in this forest of northcentral Pennsylvania. (Ted Auch/FracTracker Alliance)*

Pennsylvania's robust natural gas industry has been embarrassed by three environmental scandals in 15 months. Among the fallout: temporarily closed pipelines, the state's largest environmental fine, the elimination of streams, and the illegal burial or alteration of parts of 163 wetlands.

In one case, Texas gas company Range Resources was found to have classified spent gas wells as temporarily inactive, rather than closed, thus avoiding a requirement to plug the wells to prevent leaks of methane, a powerful greenhouse gas.

In another case, Chesapeake Appalachia, an arm of Chesapeake Energy and one of the largest fracking gas companies in Pennsylvania, signed a consent agreement March 24 with the U.S. Department of Justice, U.S. Environmental Protection Agency and Pennsylvania Department of Environmental Protection.

The agreement, which included a $1.9 million civil penalty, acknowledges that Chesapeake Appalachia had, according to its own reports, filled approximately 26 acres of wetlands with dirt, rock or sand, without state or federal authorization, at 76 of its gas wells across five counties.

The company will have to restore about 11 acres of affected wetlands. To compensate for the remaining 15 acres, which are irreparably damaged, the company must create twice that many acres of new wetlands nearby, ideally in the same watershed.

Chesapeake Appalachia's record of the damage goes back to 2013, when the EPA and Justice Department fined the company $3.2 million for violations in West Virginia. The company agreed then that it had impounded and filled in 2.2 miles of streams and smothered portions of wetlands at 27 well pad sites without required federal permits from the U.S. Army Corps of Engineers. The violations were discovered by routine EPA inspections, complaints from nearby residents and reports from the gas company itself.

After that case and a management shake-up at the company, Chesapeake Energy did an internal audit of 500 gas well sites in Pennsylvania and informed state officials that it had discovered similar violations at 76 sites.

Gordon Pennoyer, a Chesapeake Energy spokesman, said of the enforcement action, "Having voluntarily disclosed these issues with the DEP and EPA seven years ago, we are pleased to resolve this legacy matter."

Under federal regulations, Chesapeake has a choice of restoring violated wetlands or creating new ones elsewhere at double the amount destroyed. The company has submitted a plan to restore wetlands at some of the drilling sites, restore wetlands elsewhere to compensate for places where steep slopes prevent work at the original location, and conduct a combination of on-site and off-site work in some cases.

DEP Secretary Patrick McDonnell applauded Chesapeake Appalachia for coming forward with its violations and called the settlement a "significant benefit to Pennsylvania's public natural resources" because it will result in an increase of wetlands in the Chesapeake Bay watershed.

Diana Esher, acting administrator of the EPA's Mid-Atlantic region, said wetlands are "critical ecological and economic resources for all Pennsylvanians."

The Chesapeake Appalachia penalties followed another high-profile case that concluded in early 2020, when a gas pipeline company was fined an unprecedented $30.6 million by the DEP, partly for widespread wetlands and stream violations.

The case against ETC Northeast Pipeline stemmed largely from a landslide that ruptured the one-week-old Revolution Pipeline in rural western Pennsylvania on Sept. 10, 2018. The blast from ignited natural gas burned one house, caused six power transmission poles to collapse, and destroyed two garages, a barn and several vehicles, as well as forced evacuations.

The DEP found that the company, an arm of Texas-based gas pipeline builder Energy Transfer Corp., used poor construction and oversight practices in building the pipeline. But an investigation after the blast uncovered more widespread environmental harms along the 40-mile pipeline.

According to the DEP, the company's violations included 120 altered streams, 23 "eliminated" streams, 17 buried wetlands, 70 altered wetlands, 352 cases of erosion and sedimentation, 540 cases of sediment washing into streams, and 1,359 violations of required best management practices.

That laundry list of violations prompted the DEP to take the rare step of freezing pipeline permits for Energy Transfer Corp. subsidiaries, including that of the cross-state pipeline known as Mariner East 2.

That pipeline's construction had already amassed a list of environmental violations, including sinkholes and 320 spills of drilling fluids. One spill into a central Pennsylvania lake cost Energy Transfer a $2 million fine.

"There has been a failure by Energy Transfer and its subsidiaries to respect our laws and our communities," Gov. Tom Wolf said at the time of the Revolution Pipeline consent order. "This is not how we strive to do business in Pennsylvania, and it will not be tolerated."

But after a one-year freeze, the DEP allowed Energy Transfer pipelines to resume or proceed with construction.

The DEP ordered Energy Transfer to restore all wetlands and stream sections where possible. Seventy of the 87 damaged or destroyed wetlands will be restored. The other 17 harmed wetlands will be atoned for with the restoration of four times as much wetlands in the same watershed.

In a much smaller case, the DEP and Range Resources agreed in February to a consent order after the DEP found that the company was trying to avoid plugging spent gas wells as required. The agency fined Range Resources $294,000 and required plugging all but one of the 42 wells in question.

"Abandoned wells can be an extreme hazard to the health and safety of people and the environment," said Jamar Thrasher, DEP spokesman. "That contributes to air, water and soil contamination, so it's an environmental hazard."

Abandoned wells can leak methane, a potent greenhouse gas. These were conventional gas wells dating mostly from the 1980s or older, and not new fracking wells.

The company had filed paperwork with the DEP, mostly from 2012 to 2016, saying the wells were "inactive." But an internal memo that Range sent to the DEP three weeks before paperwork was received on one well had reported that the well "was incapable of economic production."

The DEP then investigated other wells and found 41 more that had been improperly classified. ■

# Chesapeake Bay goals over time: What's changed? What hasn't?

**By Karl Blankenship**

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

As the region approaches another major deadline for the Chesapeake Bay — 2025 — when it will again miss many of its goals, it is interesting to look back over 30 years of the *Bay Journal*'s effort to chronicle those cleanup and restoration efforts and see how they have changed (or not).

When we first published the *Bay Journal* in 1991, the 1987 *Chesapeake Bay Agreement* was in the rearview mirror. That document, signed by state and the federal leaders, set the region's the first measurable cleanup goal — achieving a 40% reduction in nutrient pollution by the year 2000 — along with many other goals, mainly related to developing reports and studying issues.

In March 1991, the first issue of the *Bay Journal* highlighted efforts to re-evaluate the 2000 nutrient reduction goal, questioning whether it was the "right" goal and whether it was "achievable." What quickly became evident was that people thought it was too hard.

The re-evaluation quickly redefined the 40% goal to become a 40% reduction in controllable nutrients (although the caveat "controllable" never appeared in the 1987 agreement).

What was deemed "uncontrollable?" Things like nitrogen deposition from air pollution, inputs from Delaware, New York and West Virginia — states that were not yet part of the cleanup effort — and some other discrete nutrient sources. This essentially got everyone off the hook for a sizable chunk of work. That 40% reduction goal ended up being roughly a 25% reduction.

Of course, even that lower goal was missed. And, as 2000 approached, it was recognized that a 25% reduction wasn't enough to eliminate the Bay's oxygen-starved "dead zone" anyway.

That led to a new goal to clean up the Bay by 2010, "or else" as a *Bay Journal* headline proclaimed in September 1999. "Or else" meant that the U.S. Environmental Protection Agency might force a total maximum daily load for nutrients on the region that, in theory, would establish more enforceable pollution limits.

Other objectives were also facing challenges. Early on, there was recognition that sprawl, which was gobbling up the watershed, was a threat to the Bay and to habitats that support critical living resources across the region.

The cover story of the second issue of the *Bay Journal* was *Growth Management and the Bay,* and it reported that a commission established under the 1987 agreement had concluded that programs "for managing and providing for growth and development are inadequate." The report cautioned that growth trends "will slowly overtake gains being made in improving environmental quality."

Indeed, early years of the paper were filled with articles about controversies over the loss of valuable resource lands, such as wetlands and forests.

The Bay Program had a goal of "no net loss" of wetlands, which was later changed to a "net resource gain" of wetlands, though studies showed that wetlands continued to be lost. Many articles also highlighted concerns about the loss of forests — estimated at 100 acres per day at the time — and the fragmentation of large forest tracts, which diminished their habitat value.

Despite the clear connection between development and the loss of those critical habitats, the push to manage growth became more controversial over time. In the March 2000 issue, when debate was under way as to whether there should be a growth goal in the next Bay watershed agreement, this *Bay Journal* headline said it all: *Bay partners split on policy for land conversion.* Some questioned whether states should even be involved in local decision-making.

Only two issues later, the *Bay Journal* indirectly highlighted the consequences of development in a special six-page report on the Maryland Biological Stream Survey that had been launched a few years earlier. The survey found that only 12% of streams in the state were in good condition, with land use being one of the key predictors of stream health. No stream that had a watershed with more than 15% impervious cover was in good condition.

*Rather than manage growth in the Chesapeake region, a lot of emphasis is on promoting green infrastructure and stream restoration. (Dave Harp)*

Bill Matuszeski, then the director of the EPA Bay Program office, held the *Bay Journal* up at a meeting and said the article should be required reading for everyone.

Ultimately, the Chesapeake 2000 agreement included a goal to reduce the rate of "harmful" sprawl 30 percent by 2012. Of course, it was hard to differentiate between harmful and unharmful sprawl — a debate the *Bay Journal* documented numerous times — and then figure out how to measure it.

It was a goal that just fizzled away. And that has ramifications today. Rather than managing growth, the bulk of the emphasis is on promoting green infrastructure and stream restoration. That's good, though, in effect, it is often trying to mitigate impacts after the fact, rather than preventing them upfront.

Forests remain vulnerable to loss; efforts to plant streamside buffers have stalled. We have wetland restoration goals that are again largely unmet.

It is bad that the pollution reduction goals are missed. But it is equally bad — and too often overlooked — that these other goals, which protect the landscape and the ecological communities they support, have fallen even further behind schedule.

Those efforts are as much a part of the healthy Bay equation as pollution reduction goals. And they come with an "or else" as well. As a *Bay Journal* article reported in June 1993, a Bay Program report about ecologically valuable species warned that "efforts focused only on reducing nutrients … may not restore the bountiful Chesapeake that people expect." ■

*This waterfront site in what is now Blackwater National Wildlife Refuge was once home to Ben Ross, Harriet Tubman's father. (Dave Harp)*

# Tubman historic site discovered at Blackwater

## Homesite of Tubman's father found on refuge, in woods along river

**By Timothy B. Wheeler**

The homesite where famed abolitionist Harriet Tubman likely spent time with her father before escaping slavery and leading others to freedom has been discovered in Dorchester County, MD. The forested site is located on land added last year to Blackwater National Wildlife Refuge.

Maryland and federal officials announced April 20 that a state archaeological team uncovered a trove of artifacts at the site believed to be where Tubman's father, Ben Ross, had lived in a cabin during his enslavement and which he owned outright as a free man by the 1840s.

The site was found on a 2,600-acre tract that the U.S. Fish and Wildlife Service bought last year on Peters Neck, a mostly wooded peninsula southwest of Cambridge. It was purchased for $6 million to give the extensive marsh at the Blackwater refuge room to migrate inland as climate change raises sea level around the Chesapeake Bay.

The property includes 10 acres that records show had been bequeathed in the early 1840s to Ross by Anthony Thompson. Ross had been enslaved by Thompson, who in his will directed that Ross was to be freed and granted the land five years after Thompson's death, which occurred in 1836.

Archaeologists from the Maryland State Highway Administration began investigating the tract in November 2020. The team returned in March and found numerous artifacts dating to the 1800s, including nails, brick, glass, dish fragments and even a button. Their discovery confirmed the location of the Ross homesite.

"The importance of discovering Ben Ross's cabin here is the connection to Harriet Tubman," said Julie Schablitsky, the SHA's chief archaeologist. "She would've spent time here as a child, but also she would've come back and been living here with her father in her teenage years, working alongside him.

"This was the opportunity she had to learn about how to navigate and survive in the wetlands and the woods," Schablitsky added. "We believe this experience [benefitted] her when she began to move people to freedom."

Tubman was born Araminta Ross in March 1822 on the Thompson farm near Cambridge. She and her mother were enslaved by the Brodess family, who moved them away from the farm when she was a toddler. In her teens, though, Araminta had a chance to work with her father, who felled and sold timber that was then shipped to Baltimore. It was in those years, historians believe, that the woman who became known as Harriet Tubman learned the skills she used to escape and return to help members of her family and others to do likewise.

"This discovery adds another puzzle piece to the story of Harriet Tubman, the state of Maryland, and our nation," said Maryland Lt. Gov. Boyd Rutherford. "It is important that we continue to uncover parts of our history that we can learn from, especially when they can be lost to time and other forces."

Descendants of Ross also hailed the find.

"Discovering the location of patriarch Ben Ross Sr.'s home and artifacts he used has humanized a man responsible for giving us a woman of epic proportions, Harriet Ross Tubman," said Tina Wyatt, Ben Ross's great-great-great-great granddaughter.

Douglas Mitchell, a great-great-great grandson of Ross, called the discovery "truly inestimable."

"Dr. Schablitsky's findings hold the promise of both deepening and broadening our understanding of the remarkable life not only of the patriarch and his beloved wife, but also, of course, that of his legendary daughter and heroine, Harriet Tubman," Mitchell said.

Officials eventually plan to add the Ross site to the Harriet Tubman Underground Railroad Byway, a 125-mile, self-guided scenic drive that includes more than 30 sites related to Tubman's life and legacy.

*Harriet Tubman (1822-1913) was born into slavery on the Eastern Shore of the Chesapeake Bay, but escaped to Philadelphia in 1849. She returned to lead others to freedom, becoming a famous "conductor" on the escape route known as the Underground Railroad. (Library of Congress)*

"When we protect vulnerable habitats, we help preserve the stories of those who came before us, like Harriet Tubman's father, Ben Ross," said Cynthia Martinez, USFWS chief of the National Wildlife Refuge system.

"Acquiring Peters Neck last year was a critical addition to Blackwater National Wildlife Refuge," she explained, "[because] the area is predicted to naturally convert to marsh by 2100 because of sea level rise. We look forward to working with our partners to create more opportunities to connect people to nature and strengthen the bond between the land and community." ■

# ‘Forever chemicals’ detected at Navy sites near MD rivers

## PFAS found at Patuxent air station, Webster Field

**By Timothy B. Wheeler**

The U.S. Navy has reported finding high concentrations of toxic “forever chemicals” in groundwater beneath its Patuxent River air base in Southern Maryland and beneath a smaller airfield nearby on the St. Mary’s River.

Per– and polyfluoroalkyl substances, or PFAS, were detected in all 16 areas sampled last year at Naval Air Station Patuxent River, and at both areas checked at the Webster Field Annex, the Navy disclosed in a 50-page document recently posted online. The shallow groundwater contaminated by PFAS seeps into “nearby streams and rivers,” the Navy document says. The Patuxent River is a tributary of the Chesapeake Bay, while the St. Mary’s River flows into the Potomac River, another Bay tributary.

The sprawling Patuxent River facility includes headquarters for the Naval Air Systems Command and a test range for aircraft and pilots. Webster Field is a 1,000-acre naval air research facility a dozen miles to the south with its own smaller airfield.

Public concern about PFAS contamination around the facilities has been heightened since early 2020. That’s when Pat Elder, an environmental activist in St. Mary’s County, reported that a private lab test of water from the tidal creek separating his home from Webster Field found an elevated concentration of PFAS.

PFAS are a group of thousands of chemicals that since the 1940s have been used in a host of consumer and industrial products, including nonstick cookware, waterproof clothing, stain-resistant fabrics and carpets, some cosmetics and some firefighting foams. PFAS have been found in groundwater, streams and drinking water supplies in nearly 1,600 places nationwide, according to the Environmental Working Group. There are several dozen sites in the six-state Bay watershed.

The 16 areas checked at the Patuxent River base were all used to train firefighters or demonstrate fire suppression techniques, or they were crash sites, the Navy report said.

Health effects of ingesting many PFAS compounds haven’t been thoroughly researched. But the most frequently studied ones, including those used in firefighting foams, have been found to interfere with the body’s hormones, increase cholesterol levels, affect the immune system and raise the risk for some cancers.

The U.S. Environmental Protection Agency has indicated it is moving to regulate a number of PFAS compounds. To date, it has only set a lifetime exposure guideline of 70 parts per trillion for drinking water containing two of the more studied PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

PFAS levels in all 16 sites sampled at the Patuxent River base exceed the EPA drinking water threshold. The highest concentration — a combined total of more than 37,000 parts per trillion for the three compounds the Navy checked for — was found at a site where personnel inspected and tested “crash trucks” used to suppress runway fires.

At Webster Field’s Fire Station 3, a few hundred feet from the banks of the St. Mary’s River, testing showed a level more than twice as high — a combined total of 87,000 parts per trillion for the three PFAS compounds — the Navy reported. Firefighting foam has been stored there, the report said.

The report said there were “no known concerns” that PFAS had seeped off base to contaminate nearby drinking water wells, and tests of base drinking water wells did not detect the chemicals.

But Elder called the Webster Field detection “truly frightening,” noting that the level of PFOS in groundwater tested at the fire station there was 1,200 times the federal guideline. He said that the findings reinforce his worries that PFAS from the Navy facilities may be contaminating fish and shellfish in waters used by recreational anglers, oyster farmers and commercial watermen.

The Maryland Department of the Environment has been working to identify sites where PFAS may have been used or disposed of, to pinpoint any continuing releases of the chemicals into groundwater and to weigh the risks they may pose to human health. As part of that effort, the MDE did a pilot study last year testing water and oysters around the two naval air sites. It reported finding no PFAS in the shellfish and only “very low” levels in the water.

*Groundwater contamination has occurred at or near sites that use or used PFAS-containing foam to suppress fires. In this 2013 photo, a fire crew at Dover Air Force Base in Delaware responded to an inadvertent foam release from a fire suppression system. (U.S. Air Force photo/Greg L. Davis)*

Environmental groups questioned the MDE’s interpretation, though, and later reported private lab results detecting high PFAS levels in an oyster, a crab and a fish sampled from Southern Maryland waters. A rockfish caught near the mouth of the Potomac River, less than 10 miles downriver from Webster Field, had a total of 23,000 parts per trillion, representing nine different PFAS compounds, according to Public Employees for Environmental Responsibility.

Elder contended that the Navy’s new disclosure “explains why the fish are poisoned, and it explains why the foam builds on my beach, 1,800 feet from Firehouse 3.”

He also questioned why the Navy’s report showed a much higher level of contamination at Webster Field, which was relatively lightly used for air operations, compared with the Patuxent River naval air station.

David Steckler, remedial project manager for naval facilities in the Washington, DC, region, said that “we don’t know why concentrations of PFAS at firehouse 3 are as high as they are.” Records of past PFAS releases there are “not as complete as we’d like,” he said.

Steckler said that, as part of the Navy’s investigation, much more sampling is likely. That sampling will help determine whether the contamination poses any human health or ecological risks, he said.

MDE spokesman Jay Apperson said that state regulators are reviewing the information from the Navy and are consulting with EPA officials involved in monitoring investigations of contamination at the military installations.

“The high reported PFAS concentrations in shallow groundwater are of particular concern in light of the potential pathway for these contaminants to move off-site,” Apperson said. He said state regulators recently contacted Patuxent River officials to explore what might be done now “to reduce the further spread of contamination” while the investigation continues and a plan is developed to remediate it.

As the *Bay Journal* went to press, the Navy was planning to present its findings at an April 28 virtual public meeting of its restoration advisory board, a group of local community leaders and others briefed periodically on environmental issues at the installation.

Bob Lewis, executive director of the St. Mary’s River Watershed Association, wrote in an email, “We hope the Navy will move quickly to determine the extent and to remove these substances safely.” ■

# Catch of a lifetime: Anglers hook rare sturgeon in Potomac

## Shortnose sturgeon hasn't been seen in region for years

**By Karl Blankenship**

Early one April afternoon under a bright blue spring sky, Josh Cohn and Connor Lynch were bouncing a fishing jig off the bottom of the Potomac River thinking they might catch a sucker or quillback carp.

Lynch felt the line tug, and Cohn pulled the fish to the surface.

"It's a sturgeon!" Lynch said.

"The hell it is," Cohn replied.

But Lynch was right. The line had snagged the back of a shortnose sturgeon, a relic of the age of dinosaurs that is rarely seen in the Chesapeake Bay or its rivers — and not reported at all in more than a dozen years.

> *"I wouldn't have taken pictures if it had been anything else. But there's a reason no one believes in Bigfoot."*
> — Josh Cohn

Fishing across the river from Fletchers Boathouse in the District of Columbia, Cohn said he would have been less surprised to have landed a bull shark. But it was a 2-foot sturgeon, he said, "the coolest thing that's ever happened to me, period. Full stop."

Keeping the endangered species in the water, they snapped a couple of photos of the sturgeon — covered with bony "scutes" that give it an armored appearance — to prove the story they had to tell. "I wouldn't have taken pictures if it had been anything else," Cohn said. "But there's a reason no one believes in Bigfoot."

The Chesapeake is home to two species of sturgeon. The Atlantic sturgeon, which historically could reach lengths of more than 14 feet and weigh hundreds of pounds, and the smaller shortnose, which can reach a bit more than 4 feet and about 50 pounds.

Both are endangered, but scientists in recent years have found an increasing number of Atlantic sturgeon in the Bay and some of its rivers. Shortnose, though, are hardly ever seen.

In fact, during a three-year study on the Potomac River starting in 2004, biologists with the U.S. Fish and Wildlife Service and U.S. Geological Survey caught and tagged only one shortnose sturgeon. A commercial fisherman caught another, and it also was tagged.

Before the catch by Lynch and Cohn on April 9, the last time one was documented was in 2009, also in the Potomac.

The Fish and Wildlife Service, in cooperation with the Maryland Department of Natural Resources, operated a reward program in the Chesapeake region from 1996 to 2012 for recreational and commercial fishers to report incidental sturgeon catches.

During that time, 1,590 Atlantic sturgeon turned up, but just 93 shortnose sturgeon — even though the shortnose spend most of their lives in the freshwater rivers where they spawn and in nearby brackish water. Atlantics, in contrast, spend most of their lives in the ocean after spawning in rivers.

While some of the shortnose were found in the Potomac, most were captured north of the Bay Bridge.

That has contributed to speculation that many, if not all, shortnose seen in the Bay in recent decades are migrants — not Chesapeake natives — who have come into the Bay from the adjacent Delaware Bay through the Chesapeake and Delaware Canal.

A 2009 paper studying DNA collected from shortnose along the East Coast found that samples from within the Chesapeake showed that the fish appeared to have originated in Delaware Bay.

"In the Delaware, there's a healthy spawning population," said Mike Mangold, a biologist with the Fish and Wildlife Service who tracks sturgeon reports along the East Coast. "It could be they might out-migrate and are colonizing a new area."

Such colonization might be necessary if, in fact, any remnant native population in the Bay has vanished, as the genetic works suggests.

Still, it's also possible that shortnose sturgeon are simply being overlooked. Marty Gary, executive director of the Potomac River Fisheries Commission, said that he hears reports from commercial fishermen that shortnose occasionally turn up in their nets, but they "have some trepidation" about reporting catches of an endangered species because they worry it could trigger restrictions.

*Anglers Josh Cohn and Connor Lynch snapped a photo of the shortnose sturgeon they caught in the Potomac River, keeping it in the water to prevent harm. (Courtesy of Josh Cohn)*

For his part, Cohn, who caught the sturgeon in DC, said he viewed the catch as tangible evidence that the river was improving. A native of the District, Cohn worked at Fletchers when he was young and volunteers to help address pollution problems in the river.

"It just really made me hopeful for the upward trend of the health of the river and all that goes with that," Cohn said.

The Potomac Conservancy's most recent grade of the river's health last year was a B- which, although a slight drop from the group's previous report card, still reflected a "river on the mend" from a legacy of industrial and agricultural pollution decades ago. As recently as 2011, the group had given the river a D.

"Thirty to forty years ago if you jumped in the Potomac you would be getting a tetanus shot if you were within sight of downtown," Cohn said. "Now we got shortnose sturgeon hanging out. It seems like the water quality is dramatically improved." ■

*Northern spicebush blooms golden yellow at Crow's Nest Natural Area Preserve in Virginia during late March. (Whitney Pipkin)*

# Landscape conservation by the numbers

## Harnessing big data helps to direct preservation decisions

**By Whitney Pipkin**

When a hiking guide stops dead in his tracks on a trail, it's often to point out a rare salamander crossing the path or an endangered bird singing in the treetops. But, at Crow's Nest Natural Area Preserve in Stafford County, VA, the experts pause for plants.

On a recent hike, they stooped over the leaves of a yet-to-bloom orchid and pointed out the expansive crowns of chestnut oaks and tulip poplars that survived Colonial era farming. Gary Fleming, a vegetation ecologist with the Virginia Department of Conservation and Recreation, stopped to marvel at a groundwater seepage wetland, vibrant with skunk cabbage leafing out of the soggy soil in late March.

Each of these plant communities — some of them globally rare — helps to explain why this property of more than 3,000 acres became a top priority for state preservation funding in 2008 and 2009. But none of them tells the story as well as the data.

Big data and the systems that help make sense of the numbers now form the backbone of modern life, orchestrating everything from shipping containers to the NFL draft. Natural resources are no exception. Increasingly — with the help of organizations like NatureServe — an abundance of biodiversity data is being harnessed to preserve landscapes with value that is otherwise hard to quantify.

"It's not just the plants" that are unique at places like Crow's Nest, said Sean O'Brien, president and CEO of NatureServe, an umbrella organization that manages the type of biodiversity data that helped set this landscape apart. "It's the soil, the insects, the associated animals, the whole community."

Similar to the methods that determine whether a species is considered endangered, NatureServe uses a classification system to assess entire ecosystems or habitat types. That system was used, for example, to identify the biodiversity value of Crow's Nest. Synthesizing huge amounts of biodiversity data — NatureServe scientists processed nearly 1 billion data records in 2020 alone — allows decision makers to determine which places are most in need of saving, even if they don't have an iconic species steering the way toward preservation.

That was the case, at least, at Crow's Nest. The state and Stafford County paid $34 million to preserve the land from development in 2008 and 2009 after a regional trust brought it to their attention. The now mostly preserved peninsula is carved out from Stafford County in Northern Virginia by a pair of large creeks on their way to the Potomac River. While portions of the county have been developing at a breakneck pace, this piece of land remained relatively untouched and somewhat undiscovered, with ridges and ravines making it difficult to traverse in places.

"So, when they were trying to determine the future of this place," O'Brien said during the hike at Crow's Nest, "they were able to use [ecological] community information, not just species information, to say that this was an interesting and important place to save."

Tom Smith, deputy director of operations for the Virginia DCR, remembers working at The Nature Conservancy in the 1980s when, he said, conversations revolved almost entirely around whether a rare animal or plant existed on a landscape. It could be frustrating to make a broader case for saving a unique ecosystem.

"As a vegetation ecologist, we spent a number of years arguing that we could also identify these significant [plant]

*NatureServe CEO and President Sean O'Brien and Allison Gratz, NatureServe's Director of Network Relations, zoom in on the leaves of a yet-to-bloom orchid at Crow's Nest Natural Area Preserve. (Whitney Pipkin)*

communities, and that they need to be as high or a higher priority for biodiversity conservation," he said.

NatureServe has championed that idea since its inception 50 years ago, originally as a collaborative project between the Natural Heritage Network and The Nature Conservancy. Built on the idea that the

ecological diversity of places could be measured and, in some cases, improved, NatureServe's database now informs land-purchasing strategies as well as restoration work across the Western Hemisphere.

## Road trip

NatureServe's O'Brien, who lives in Arlington, VA, invited officials to join him for the Crow's Nest hike in late March to kick off a road trip to similar sites across the country. O'Brien converted a utility van into a camper — complete with woodgrain-fabric seat covers made by his brother — for the occasion, deeming it "Van Humboldt" as an homage to the German naturalist Alexander von Humboldt.

One of O'Brien's goals for the trip is to remind partners in each state — and the funders of NatureServe's programs — of the inherent value of these natural areas.

What sets NatureServe's data apart, O'Brien said, is its symbiotic relationship with state-based Natural Heritage Programs. Those on-the-ground experts collect and confirm environmental data; NatureServe then analyzes the data, makes it comparable with other data points and helps communicate it back to stakeholders. Every state has a Natural Heritage Program, but some are more robust than others, reliant as they are on state funding.

*Gary Fleming (left) and Mike Lott, both with Virginia's Department of Conservation and Recreation, stand on a trail at Crow's Nest Natural Area Preserve in Northern Virginia. Fleming and Lott were among those who used data about the land's ecological diversity to make a case for preserving it more than a decade ago. (Whitney Pipkin)*

Mike Lott, Northern Regional Natural Areas Stewardship Supervisor for Virginia's DCR, was one of those state partners who helped map natural resources at Crow's Nest when it became clear the land could be conserved.

The movement to protect Crow's Nest started back in the 1970s after a project that never got financed in the '60s proposed placing pyramid-like housing along the shoreline with marinas, a golf course, airport and convention center. Another project to place approximately 700 larger lots for homes on the land gained steam in the early 2000s. Somehow, one owner remained for nearly 3,000 of the peninsula's acres when the state made the two-part purchase.

"This trail would have been the main road, and then every ridge would have had a cul de sac," Lott said.

Now, visitors can explore a trail network that winds through the woods from a small parking lot straight into globally rare types of forests. On either side of the trail, towering oaks make breathing room for a leafy understory of pink-flowered mountain laurels, black huckleberry bushes and wild azaleas, creating a textbook example of an oak-heath forest.

Around a bend farther down the trail, the understory opens up, revealing an entirely different type of forest. This one is rare, too, in part because so many others like it across the Coastal Plain were cleared or logged.

"What's unique about Crow's Nest is the topography here didn't lend itself to farming across a wide scale," Lott said, "so the forest out here is pretty mature for the Coastal Plain. It was considered maybe the best Coastal Plain hardwood forest in Virginia that wasn't protected when we purchased it in 2008 and '09."

That means a few of the "relic trees," as vegetation ecologist Gary Fleming calls them, are up to 200 or 300 years old. Many nestled in the ravines are about 100 years old. Now that those trees are on protected land, they are part of a landscape that's trending toward old growth.

Fleming, who is also with Virginia's DCR, said that, "In another 50 years, it will be a legitimate old growth forest by any definition."

O'Brien remarked on how unique it is to protect such an old landscape so close to ever-changing Washington, DC. Data, he said, helped conservationists realize the value of the landscape even before it could be fully plumbed on foot.

"It's really exciting to be in suburban Washington and see globally endangered habitats," he said.

## Conserve or not?

These are the types of places Virginia conservation officials want to be ready to preserve when the opportunities present themselves. And big data is the tool they intend to use more and more, said Joshua Saks, Virginia's Deputy Secretary of Natural Resources.

The state consults ConserveVirginia, a tool that uses data to identify landscapes that are worthy of preservation for any number of criteria. Layers of digital maps help decision makers hone in on properties that could protect endangered ecosystems while preserving history and enhancing resiliency to flooding, for example.

"We don't want to just stop development. We want to protect water quality, wildlife, recreation areas, scenic vistas — all of that," Saks said during the Crow's Nest hike. "Everybody thinks the place they live is that, but we can use this science and data to show us."

Saks said the technology, which came online in the last couple of years, could help identify "the next Crow's Nest." It will also help to identify areas that do not meet any preservation criteria but might be good places to locate solar panels and help meet energy goals for the state.

Pennsylvania is also using data-based maps to guide development and preservation, requiring new projects to run their concepts through the NatureServe-backed network to make sure there aren't conflicts with endangered spaces or species before they break ground.

"For a long time, in the land conservation space, the concept was 'more is better,'" Saks said, noting large acreage preservation goals of previous governors. "But now we know that more isn't better. Better is better."

Not every piece of land will produce the same reductions in nutrient and sediment runoff, for example. One that hits all of the marks could help the state save money on wastewater treatment upgrades elsewhere in that watershed, while protecting a space that is culturally or ecologically valuable.

As more of the landscape gets developed, those decisions will continue to get more complicated.

"None of these things just spit out the answer," Saks said. "But having this and understanding what's good and bad about the land you're dealing with is like, what power! You can make really informed decisions." ■

*The 2025 goal to create or re-establish 85,000 acres of wetlands in the Chesapeake Bay watershed is unlikely to be met. (Dave Harp)*

# Bay restoration effort stumbling in the race to 2025 finish line

## One in three outcomes promised in 2014 watershed agreement lagging badly or in limbo

**By Timothy B. Wheeler**

On a warm, sunny afternoon in June 2014, state, federal and local officials leading the long-running struggle to restore the Chesapeake Bay gathered in Annapolis and pledged themselves anew to bringing back the ailing estuary's ecological health.

The new *Chesapeake Bay Watershed Agreement* signed that day laid out 10 broad goals and 31 outcomes, many to be achieved by 2025 or even earlier. The fourth Bay restoration pact inked in a little more than three decades, it contained fewer specifics than the last one signed in 2000, which had failed to fulfill many of its goals.

While the new agreement focused on the Bay's core problems with nutrient and sediment pollution, it also promised a variety of other initiatives to restore the vitality of the Chesapeake, its tributaries and the lands that drain into them.

"Today we celebrate the most inclusive, collaborative, goal-oriented agreement the Chesapeake Bay watershed has ever seen," said Maryland Gov. Martin O'Malley. Leaders of all six Bay states, the District of Columbia, the U.S. Environmental Protection Agency and the Chesapeake Bay Commission signed the 21-page document.

Now, with just four years to go before the deadline, a few of the targets set in 2014 have been reached. The Bay's blue crab fishery, for example, has been put on more sustainable footing, as promised.

Some other commitments also appear on track, such as protecting 2 million more acres of land and adding hundreds of new spots for public boating, fishing and swimming. Oyster reefs have been rebuilt and restocked in three of the 10 Bay tributaries pledged for restoration, and work is under way or in planning for the remainder.

Efforts are lagging or in limbo, though, to achieve at least a third of the outcomes promised in the 2014 agreement.

A recent review by some members of the Chesapeake Bay Program, the federal-state partnership guiding the restoration effort, found that seven of those outcomes are "unlikely to be met without a significant change in course." Nearly as many others appear uncertain, based on available data and interviews conducted by the *Bay Journal.* Several efforts are far short of their goals, while others lack sufficient data to tell how much progress, if any, has been made.

The agreement's checkered track record reflects this sobering fact: Overall, the region is far off pace in doing what's needed to restore the Bay. Many of those shortcomings will have local impacts, too, in failing to restore streams and rivers and provide crucial wildlife habitat. Efforts to increase forest buffers along streams — critical water quality, as well as fish, birds and amphibians — have largely stalled. Similarly, efforts to restore wetlands, already near historically low levels, are dragging, despite their importance for water quality and habitat. And as the watershed's human population grows and more land is developed, efforts to maintain what's left are struggling.

In the 2014 agreement, for example, the states and District vowed to plant a combined 900 miles of riparian buffers every year. Since then, they've averaged only about one-fourth of that rate. In 2019, the most recent tally showed just 83 miles of streamside forests were planted — less than 10% of the annual target.

They likewise promised to create or restore 85,000 acres of wetlands. As of 2019, they had added 16,000 acres — less than 20% of the goal.

Those numbers are "screaming that we need help," said Ann Swanson, executive director of the Bay Commission, a tri-state legislative advisory body that has signed every Bay restoration agreement.

"We really should be very concerned about the progress we're making," Swanson said, with expanding forests and wetlands.

Sean Corson, head of the small group of Bay Program participants that identified seven outcomes as unlikely, acknowledged there could be other efforts in trouble. But for those seven, he said, "the gaps are significant, there's no question."

Corson, director of the Chesapeake Bay office of the National Oceanic and Atmospheric Administration, said the group's report, submitted in March to the Bay Program's management board, is intended to get the attention of restoration leaders. The board is scheduled to meet May 12–13 to conduct its latest biennial status check on progress toward fulfilling the agreement.

"I think it's incumbent on us to explore all the avenues, to really make sure that we ask ourselves, 'Can we do this? Is it possible? Could things be changed?' " Corson said. "And if the answer is no," he added, "it's important to … start communicating that to our constituents."

### Shaping the 2025 goals

Those involved in crafting the 2014 Bay Watershed Agreement say that falling

short of its stated goals and outcomes does not mean the overall restoration effort is failing. It was never intended as a definitive road map, they say, but rather a set of directions to get everyone moving in the right direction.

*Chesapeake 2000,* the preceding restoration pact, had been too detailed and ambitious, said Nick DiPasquale, who directed the EPA's Chesapeake Bay Program office from 2011 through 2017. It was larded with more than 100 goals, many of which were not met.

"It had deadlines that were supposed to be met by 2010," DiPasquale recalled. "But obviously that didn't happen. I think it was kind of an overreach."

So, beginning in 2012, state and federal officials began drawing up a new pact, winnowing down the previous goals while adding a few new ones. In the process, they walked back or abandoned a number of commitments in the 2000 Bay pact, including goals for difficult and politically touchy issues like curbing sprawl development and freeing the Bay of toxic contaminants.

"The sense was to make as many of the outcomes so that they're achievable, measurable and you'd know when they're met," said Carin Bisland, chief of partnerships and accountability in the EPA Bay Program office.

"A lot of the outcomes were what the partnership thought they could get to by 2025," she added, not necessarily what anyone thought would be needed to get a fully restored Bay.

*Surveys indicate the Bay region needs about 150,000 more acres of wetlands to support 100,000 overwintering black ducks, the eggs of which are shown here. (Dave Harp)*

In hindsight, a number of the targets in the 2014 agreement are also considered idealistic or unlikely, at least by 2025. And one-third of the outcomes set only a general goal to "continually increase" or "continually monitor" some effort or issue.

Even so, there's no data to enable an assessment for some of those general outcomes, and some efforts are losing steam or going in the wrong direction.

## Nutrient pollution

There are often particular reasons for each Bay agreement shortfall. But there are some common threads.

On the core issue of restoring the Bay's water quality, the jurisdictions agreed to have all of the pollution control practices and programs in place by 2025 to meet the nutrient and sediment reduction targets called for in the total maximum daily load, or "pollution diet," that the EPA developed in 2010.

As of 2019, the most recent year for which data are available, the states and District have reached the overall sediment reduction target. But they have only done enough so far to achieve 39% of the needed nitrogen reductions and 49% of the phosphorus reductions.

James Martin, co-chair of the Bay Program's water quality goal implementation team, called it "a reasonable conclusion" to deem nutrient reduction outcome unlikely to be met by 2025. That's especially so, he added, because climate change and an increased flow of pollution from behind the Conowingo Dam will only make it "that much harder to achieve."

Not only is the region not on track to meet nitrogen goals, new modeling indicates the jurisdictions will need to reduce nitrogen pollution by an extra 5 million pounds to offset the impacts of climate change on Bay water quality, Martin said. They will also need to reduce an additional 6 million pounds, he added, to remove nitrogen no longer being captured by the Conowingo Dam. Combined, they require about 20% more nitrogen reductions between 2019 and 2025 than originally thought.

Pennsylvania is lagging badly in meeting its reduction targets, which led Maryland, Virginia, the District and environmental groups to sue the EPA for not taking action to enforce its pollution diet. But the Keystone State is not the only jurisdiction expected to struggle. Maryland, Virginia, New York and Delaware also face challenges because between now and 2025 they rely heavily on reductions from agriculture and stormwater, two areas where they have struggled in the past.

*Tara Hill-Coursey and her son, Jayden, plant trees at a farm near a tributary of Maryland's Choptank River. Reluctance of farmers to give up cropland to plant trees has hindered the effort to restore streamside forest buffers, which help prevent polluted runoff and increase wildlife habitat. (Dave Harp)*

Martin said he believes it's still "theoretically" possible to meet the pollution reduction goals. But most of the actions needed must target nutrient runoff from farmland, he noted, and require the voluntary cooperation of farmers who are pinched between rising costs and slumping prices for the commodities they produce. Adding to the challenge, he said, federal and state programs that offer farmers financial incentives to adopt pollution-reducing conservation practices are "mature bureaucracies" that can't be changed easily or quickly.

## Wetlands, forests & grasses

The same challenges hamper efforts to extend forest buffers and restore or create wetlands. Most of the available sites are on farms, and farmers are reluctant to give up acreage used for growing crops or grazing livestock.

Wetlands restoration is likewise handicapped by the reluctance of farmers and other landowners, say those engaged in trying to advance the effort. Increasing financial incentives might help, advocates say, but there's also a lack of technical staff to help track and promote wetland restoration and enhancement.

"There's not enough money and not enough people," said Pam Mason, chair of the Chesapeake Bay Program's wetland workgroup. Mason is director of the Center for Coastal Resource Management at the Virginia Institute of Marine Science.

There are federal and state programs that offer farmers financial incentives to give up land for streamside forests and wetlands, the largest of which is the U.S. Department of Agriculture's Conservation Reserve Enhancement Program. But many farmers have soured on that program because of the red tape involved in participating, the burden of maintaining the trees for 15 years and the program's recent history of erratic funding and administration.

"Honestly, it's so hard to get traction," said Sally Claggett, the U.S. Forest Service liaison to the Bay Program. States frustrated with the federal program have begun offering their own incentives to create stream buffers, but those have yet to really take off. One glimmer of hope: The Biden administration just announced that it would expand the USDA umbrella program that pays farmers to set land aside for riparian buffers and wetlands.

Competing priorities are also a problem. Stream restorations are more likely to be funded than wetlands projects, Mason noted, because they're credited with curbing more nutrients and sediment per dollar spent. Indeed, the regulatory imperative of meeting nutrient reduction goals can draw money away from initiatives that would provide greater benefit for habitat.

"Because there's been such a priority on water quality, that has sucked a lot of the oxygen [out of] the room," said Chris Guy,

*See* **BAY GOALS**, *page 20*

**BAY GOALS** *from page 19*

a biologist with the U.S. Fish and Wildlife Service who is acting coordinator for the Bay Program committee overseeing efforts to achieve habitat goals.

Also in jeopardy is the commitment to restore the Bay's underwater grasses, critical habitat for fish and crabs. The agreement set a 2025 target of having 130,000 acres of vegetation growing on the bottom of the Bay and its tributaries, with a longer-term aim to get back to 185,000 acres.

The grasses appeared well on their way to reaching that goal until two years ago, when they shrank from a restoration high of 108,000 acres to 66,000 acres. That nearly 40% drop has been attributed to record rainfall in the watershed that fouled the water with sediment and nutrients.

With more favorable weather and continued efforts to curb pollution, the grasses should recover and begin to spread again, said Brooke Landry, a Maryland Department of Natural Resources biologist who chairs the workgroup dealing with grasses. But the recent loss was so great, she said, "it'll be hard to get back in time."

## Murky status

For some efforts, there's not enough information to know where they stand.

That's the case with the agreement's pledge to increase urban tree canopy throughout the watershed by 2,400 acres to help improve air and water quality and provide more wildlife habitat.

The goal was set based on nothing more than state officials' estimates of what they thought could get planted by 2025. Only later did participants learn there are roughly 2 million acres of tree canopy covering urban and suburban landscapes — making the new goal seem pretty modest.

There have been a lot of trees planted in urban areas since 2014, but there's also some evidence that losses to pests, disease, drought and development may have offset and possibly even outpaced the plantings. The Bay Program's forestry workgroup is awaiting results from high-resolution aerial surveys to see how much, if any, progress has been made.

Efforts to restore two key fish and wildlife species — brook trout and black duck — are similarly in the dark.

On brook trout, states and nongovernmental organizations like Trout Unlimited have been restoring streams across the watershed to make them habitable for the prized game fish. Because "brookies" require clean, cool water to survive, they are considered the embodiment of a healthy stream ecosystem. The agreement pledged to achieve an 8% expansion in their stream habitat by 2025.

"What we do know is we're not on a trajectory to make that," said Stephen Faulkner, a U.S. Geological Survey biologist who chairs the Bay Program team on brook trout. Such a goal may be reachable eventually, he said, though continued development and climate change are working against it.

*Nick DiPasquale, retired head of the U.S. Environmental Protection Agency's Chesapeake Bay Program office, sits with his dog by the Chester River in Maryland. DiPasquale said the 2014 Bay watershed agreement was meant to focus on the highest priorities for restoring the Bay and its tributaries. (Dave Harp)*

The agreement likewise pledged to restore habitat for black duck, considered an indicator of the status of waterfowl, in general, in the Bay watershed. Experts figure more than 700,000 acres of wetlands are needed to support the hoped-for wintertime population of 100,000 black ducks. Surveys indicate there's a shortage of about 150,000 acres.

It's not clear because of reporting gaps in how much progress has been made toward increasing wetland habitat, said Ben Lewis, a scientist with the Virginia Department of Wildlife Resources who leads the Bay Program's black duck team. The birds' winter population is only about half of the desired level.

## Moving targets

A few of the agreement's outcomes have been tweaked, which proponents cite as examples of "adaptive management" — taking into account changed circumstances. In one or two cases, interim deadlines were extended. But one adjusted goal, for fish passage, went from "mission accomplished" to being deep in the hole.

With the help of a change in how progress was being counted, the effort to reopen rivers and streams to migratory fish blew past its original target of adding 1,000 miles in 2016.

But with spawning runs of American shad and river herring still far below historic levels, the Bay Program set a new target, to open 132 more miles to fish passage every two years. They've fallen well short of that pace so far, as the number of dam removals has declined.

"We've reached the point where all the dams that are easy to remove are already removed by now," said Julianna Greenberg, staffer for the group working on fish passage.

Another outcome that got tweaked, but still faces a steep uphill climb, is the pledge to increase the diversity of the people participating in and leading the Bay Program.

Though more diversity was expressed as a general aim in the 2014 agreement, Bay Program leaders set specific targets in 2019. They vowed to increase the percentage of people of color participating in the restoration effort to 25% by 2025 and to have people of color occupying 15% of the leadership positions by then.

A 2019 survey found slight improvements in diversity since 2016, but less than 15% of those involved with the Bay Program self-identified as people of color, and only about 10% held leadership spots.

Another survey is scheduled in 2022, according to Wendy O'Sullivan, superintendent of the National Park Service's Chesapeake Bay office, who is vice chair of the Bay Program's diversity workgroup.

O'Sullivan said she believes the outcome was identified as unlikely to be met to highlight the need to increase those efforts.

"For the long-term success of the Chesapeake Bay Program and its efforts, it really depends on people," O'Sullivan said, and on the "equitable and just inclusion of peoples throughout the watershed."

Patuxent Riverkeeper Fred Tutman looks askance, though, at the Bay Program's approach to diversity.

"I don't know where they get these quotients," said Tutman, who is the only African American waterkeeper in the nation. "They come up with these targets and just want people to jump on board." He said the Black and Brown communities he works in are dealing with serious pollution problems that aren't really addressed by the Bay agreement.

The EPA's Bisland acknowledged Tutman's criticism, saying, "We've got a lot to learn. We've got a lot of listening to do...but we have to start somewhere."

Some who criticized the 2014 agreement when it was unveiled say they're not surprised to learn of difficulties fulfilling it.

Gerald Winegrad, a former Maryland state senator, said the 2014 pact represented a retrenchment from the ambitious restoration goals of the preceding agreement.

"We changed the goals because we didn't meet them," he said.

Winegrad drew up an alternative 28-point Citizens' Bay Agreement calling for more mandatory measures to curtail nutrient pollution from farming and development and to protect forests.

"The time for all of these commitments … has long passed," Winegrad said. "It's time for penalties. If there are not penalties — only money and carrots — we'll never get anywhere."

But Bisland defended the overall 2014 agreement and the spirit of voluntary cooperation in which it was created. Without the partnership and the goals set then, "we would be nowhere near where we are now," she said.

And even if some efforts are too far behind to catch up by 2025, she added, that's no reason to declare them a lost cause.

"It's going to take us longer to restore and protect the Bay," she said. With climate change and other challenges, to even maintain status quo, she added, "it's important that we stay on this and push forward. It will only be harder." ■

# 2025 Bay goals — *where do they really stand?*

The Chesapeake Bay restoration is about more than the Bay itself. The 2014 *Chesapeake Bay Watershed Agreement* spells out 31 desired outcomes in support of 10 broad goals. They cover a wide range of issues that support a healthy regional ecosystem, from clean water and wildlife habitat to an increasingly diverse public participation in the restoration effort.

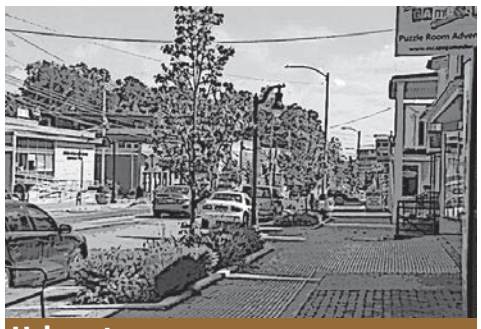
According to the state-federal Chesapeake Bay Program, which leads the restoration effort, several outcomes with a 2025 deadline have either been met or appear to be on track. Seven have been deemed unlikely to be achieved and at least five more are challenged with minimal or negative progress or a lack of data. The status of others is unclear because they lack number-based targets or resources to check their status.

This status summary of key outcomes is produced by the *Bay Journal*. The Bay Program's accounting of progress and challenges can be found at chesapeakeprogress.com.

## UNLIKELY

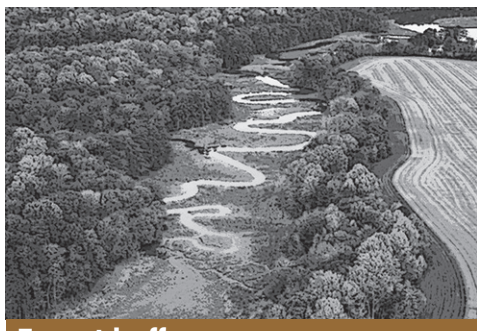
### Nutrient & sediment pollution

**GOAL:** Have all practices and controls in place to reach nutrient and sediment reduction targets to meet water quality standards for the Bay
**CHALLENGES:** Costs of pollution practices, limited funding, competing priorities, unwilling landowners, additional challenges from climate change, filling of Conowingo Dam reservoir



### Urban tree canopy

**GOAL:** Expand by 2,400 acres
**CHALLENGES:** Conflicting priorities; inadequate or patchy funding or outreach; losses to development, storms and pests



### Forest buffers

**GOAL:** Seventy percent of stream and river shorelines are forested
**CHALLENGES:** Unwilling landowners, lack of technical assistance, inconsistent government buffer programs that are difficult to use, competing water quality practices, low incentives

### Diversity and inclusion

**GOAL:** Increase participation by people of color in the Bay Program to 25% and increase their presence in leadership positions to 15%
**CHALLENGES:** Low survey response rate (38% in 2019) undermines data reliability, lack of effective outreach and communication, lack of opportunities to gain training and employment in relevant occupations, need for systemic change slows progress

*Photos by Dave Harp with the exception of urban tree canopy by Donna Morelli; diversity by Will Parson / Chesapeake Bay Program; brook trout by U.S. Fish & Wildlife Service; and black duck by Gene Nieminen / USFWS).*

### Wetlands

**GOAL:** Create or re-establish 85,000 acres of tidal and nontidal wetlands and enhance 150,000 acres of degraded wetlands
**CHALLENGES:** Conflicting priorities, unwilling landowners, limited funding, lack of training, reporting gaps

### Brook trout

**GOAL:** Increase in-stream habitat occupied by wild brook trout by 8%
**CHALLENGES:** Unwilling landowners, limited funding, restoration priorities are often outside Bay watershed, reporting gaps, habitat loss

### Black duck

**GOAL:** Restore, enhance and preserve enough wetlands to support 100,000 overwintering black ducks
**CHALLENGES:** Reporting and information gaps, continued habitat loss and degradation, shoreline disturbance, unwilling landowners

## Progress varies

While seven Bay restoration outcomes have been deemed unlikely to be met, the status of other goals vary. A few have been achieved, and some appear to be on track for success by 2025. Others face challenges yet to be resolved. Here's a look at some of them.

### CHALLENGED

**Far below goal, with minimal or negative progress, or lacking data**

- Increase underwater grasses
- Improve stream health
- Keep existing healthy watersheds
- Suggest ways to limit sprawl
- Engage more local leaders
- Increase fish passage

### ON TRACK

**Progress rate and funding levels seem adequate**

- Restore oysters in 10 rivers
- Maintain a sustainable blue crab populatio
- Protect more priority lands
- Increase public water access
- Track losses of farmland, forest and wetlands

### ACHIEVED

**Currently at target levels**

- Manage a stable blue crab fishery

# At Deal Island, marsh grass predicts where land will drown

## Clues in plant growth help identify threatened areas

**By Jeremy Cox**

*Photo: George Washington University researchers Keryn Gedan, Man Qi, Justus Jobe and Connor Judd survey insect life and plant biodiversity in a marsh on Cedar Island off Virginia's Eastern Shore. (Courtesy of Keryn Gedan)*

Deal Island is disappearing beneath the Chesapeake Bay from the inside out.

The water is rising faster than the island's coastal marshes can replenish themselves, a process driven by climate change and land subsidence. Its mucky shorelines remain relatively intact, though. When tides sweep across the low-lying terrain, that's where sediment tends to settle, firming up the terra firma.

The trouble is farther inland. Cut off from the influx of sediment, the interior of the marsh can't raise its elevation. After a while, the frequent flooding devastates the meadows of salt-adapted grasses and other plants. The bare earth collapses, creating a pond. Over time, the water spreads into the surrounding marsh, and another piece of the island is gone forever.

A scientific analysis of aerial photographs taken between 2009 and 2017 shows that parts of Deal Island, located in the Bay off Maryland's Eastern Shore, are rapidly converting from marshland to open water. "It's only an eight-year gap, but you can see some of the areas are degrading pretty fast," said Man Qi, a member of a George Washington University team studying the island's marshes.

Qi and her colleagues believe they have unlocked a mystery of the marsh at Deal Island that could help save it from sea level rise. The key is the marsh itself — how it responds to the barrage of incoming tides.

The U.S. Army Corps of Engineers says it is already using the group's findings to modify a long-planned marsh restoration project on the island. But the scientists hope their research will help preserve other vulnerable marshes across the Chesapeake — before it's too late.

### 'Getting rapidly wetter'

Tidal marshes are one of the Chesapeake region's most recognizable landscapes. Together, they cover about 282,000 acres, an area larger than New York City.

Most stand in a vast swath between Dorchester County, MD, and Accomack County, VA, on the Bay's Eastern Shore.

Straddling the divide between land and water, marshes play several important ecological roles. They nurture a wide variety of birds, including waterfowl, and serve as the home for two rare species, the black rail and saltmarsh sparrow. They are the nursery grounds for crabs and several fish species. They filter nutrient and sediment pollution. And they can act as a buffer against storm surges, shielding coastal communities from damage.

Deal Island, population 350, has a close relationship with the water. The Somerset County village is the home port for many Bay watermen and hosts an annual skipjack race that dates back more than 60 years.

As recently as the 1990s, there were few signs that Deal Island's marshes were drowning. Studies conducted in 1994 and 1998 showed little change in the island's total marsh area, apart from some erosion along the western shoreline, which faces the Chesapeake's busy shipping corridor.

But that's no longer the case, said Keryn Gedan, a coastal ecologist with George Washington University and co-author on the Deal Island study. "The whole area is getting rapidly wetter," she said.

Like many coastal marshes in the region, those on Deal Island are failing to keep pace with rising water. Measurements taken by the Maryland Department of Natural Resources and Chesapeake Bay National Estuarine Research Reserve between 2011 and 2018 show that water levels around the island rose almost twice as fast as the marsh elevations: The water rose about a quarter inch during a typical year in that span, but the marsh elevation only increased at an average rate of one-eighth inch per year.

The National Wildlife Federation in 2008 conducted a wide-ranging analysis of sea level rise scenarios on various habitats around the Chesapeake. It found that along the shores of Tangier Sound, where Deal Island resides, about 85% of tidal swamps and brackish marshes are poised to disappear if seas rise 27 inches by 2100.

### Plants hold the key

For Qi, the Deal Island research was a test of mental and physical endurance.

During the course of the study, she trained herself to spot plant species from the subtle color differences in marsh vegetation that could be observed through aerial photography.

Then came the days filled with slogging through the marshland in cumbersome chest waders, making sure that what she and Gedan saw in the photos matched what was happening on the ground. More than once, a quick leap over a ditch would lead to a foot stuck deep down in the muck.

"In places, [wading] is very easy where the peat is pretty strong, but it can also be pretty precarious where it's hummocky," Gedan recalled.

*Marshes like this one, near Deal Island on Maryland's Eastern Shore, play an important ecological role in the Chesapeake Bay watershed and act as a buffer against storm surges. (Dave Harp)*

"There are some places where the marsh is just disintegrating beneath your feet and you just punch through."

Zeroing in on six pond sites, Qi, a post-doctoral student at the time, began noticing an important trend in the marsh's degeneration.

Before the land gave way to open water, the marsh would often abound with less-flood-tolerant plant species, such as saltgrass, saltmeadow cordgrass and Jesuit's bark. But as conditions got wetter, they were replaced by plant life that could withstand more flooding, such as smooth cordgrass, black needlerush and Olney's three-square bulrush.

"We found by looking at the vegetation, you can predict that the ponds are coming," Gedan said.

That finding could help land managers in the Chesapeake region identify waning marshland and take measures to shore it up before it goes under water, she said. Getting an early jump on restoration is critical because the conversion from marsh to pond can happen quickly. All of the ponds in the George Washington study formed between 2005 and 2015.

The study was published in December in the journal *Limnology and Oceanography.*

## Role in restoration

Their research is already playing a role in the efforts to preserve marshes on Deal Island and elsewhere.

When the U.S. Army Corps of Engineers dredges the shipping channels leading to Baltimore, Maryland's largest port, the spoil is used to expand Poplar Island in Talbot County as a haven for birds and other wildlife. But what of the state's second-largest port at Salisbury? No such "beneficial use" has been employed for the periodic dredging of the Wicomico River.

Until now.

The idea to pipe the dredged material 12 miles south to Deal Island pre-dated the publication of the George Washington study, said Danielle Szimanski, the Army Corps' project manager. The Corps went on the hunt for a new place to put the material after the previous site it used was no longer available.

But the research team's work will help show where the muddy material is needed most on Deal Island. And there will be plenty of it: 130,000 cubic yards to be spread across 72 acres of wetlands in the Deal Island Wildlife Management Area.

"It's one of those things where the stars aligned," Szimanski said.

The $5 million project will raise the marsh's average elevation from 2.3 feet above sea level to 3.5. The restored portions represent a fraction of the 13,000-acre wildlife management area, but the extra height should protect them from sea level rise for decades to come, Szimanski said.

The project is scheduled to take place from October this year to February 2022.

*David Curson, director of bird conservation for Audubon Mid-Atlantic, stands in the marsh at the Deal Island Wildlife Management Area, gesturing to indicate the depth of sediment the group would like to see added to the marsh to prevent it from converting to open water. (Dave Harp)*

In the meantime, Qi, now a lecturer at the Central China Normal University in Wuhan, is working remotely as she continues her Chesapeake marsh research with Gedan. They are turning northward to southern Dorchester County, where the Audubon Mid-Atlantic is leading a restoration effort at a 700-acre sanctuary called Farm Creek Marsh.

In 2018, the group extended an existing tidal creek toward an area of drowned marsh, seeking to drain the water and encourage the marsh to recover. But it didn't work as well as they'd hoped, said David Curson, the chapter's director of bird conservation. The pond stayed about the same 20 acres in size. Perhaps the creek wasn't dug wide enough, Curson speculated.

Extending creeks toward wet areas holds promise, Qi and Gedan found at Deal Island. Their study showed that areas closer to creeks tended to gather the types of marsh plants that prefer less water. The researchers believe that the creeks wash in sediment during floods, which settles onto the ground afterward, leaving higher ground. They are monitoring transplanted marsh plants at the Farm Creek site to see how they respond to the creek project.

Audubon's goal is to increase the amount of habitat for saltmarsh sparrows, which are struggling to nest in the area because of the frequent flooding, Curson said.

"If we want to facilitate the transition to a healthy marsh fairly quickly, we need to intervene," Curson said. "It's like we almost have to play gods a little bit to correct our mistakes." ■

# $1 million study races to save Bay oysters from acidification

## Computer model could predict where climate change would make waters inhospitable

**By Jeremy Cox**

When Bruce Vogt launched his oyster farm a decade ago, he opted to raise his bivalves in a creek near the mouth of the York River because of its exceptionally clean water. But he worries that an invisible change in those waters will someday destroy his livelihood.

It's a threat facing waters around the world: acidification.

"The possibility of it coming in the future is real," said Vogt, owner of Big Island Aquaculture in Gloucester, VA. "I don't think we're in imminent danger, but if we don't start now, we might find ourselves with high mortality and dead oysters."

Scientists at the Virginia Institute of Marine Science have just begun a three-year, $1 million research project that seeks to show how acidification — a consequence of climate change — will impact the Chesapeake Bay's famous oyster industry.

They hope to emerge with a computer model, depicting where and when water conditions will become unfavorable for supporting oyster growth. The results will have wide-ranging implications for oyster farmers and watermen as well as state and federal officials who oversee the 10 oyster restoration initiatives around the Bay, said Emily Rivest, one of the study's lead investigators.

"It's not a threshold in the sense of 'this is when all the oysters are going to die,'" said Rivest, an expert in marine life physiology. "It's more of 'what is the biological transition that is meaningful for this group of people whose livelihoods depend on oysters?'"

Oceans absorb about 30% of the carbon dioxide emitted into the atmosphere, according to the National Oceanic and Atmospheric Administration. In the water, it triggers a chemical reaction that lowers the water's pH and raises its acidity. Since the Industrial Revolution of the 1700s and 1800s, when carbon releases began escalating, the pH of the world's oceans has fallen by 0.1 units, the equivalent of a 30% jump in acidity, researchers say.

If little or no action is taken to reduce emissions, the ocean's acidity is expected to climb another 100–200% by 2100, according to the Intergovernmental Panel on Climate Change.

Higher acidity can harm oysters by robbing the water of the carbonate ions they need to make new shell material. The corrosive water can also dissolve their existing shells in the same way that soft drinks, another acidic liquid, eat away at the enamel of human teeth.

Studies show that ocean acidification leads to slower shell growth, reduced shell weight, weakened immune systems and lower water-filtration capacity. Oyster larvae and juveniles are particularly vulnerable to the changes.

Some parts of the world are already feeling the effects. In the Pacific Northwest, oyster die-offs have numbered in the billions since they began in 2005. The region is believed to be experiencing acidification earlier than other places because of rising water temperatures in the region and water upwelling, which pushes acidic water to the surface.

The Chesapeake Bay's oysters aren't in immediate danger, partly because they evolved differently than their West Coast counterparts, Rivest said.

"Chesapeake Bay oysters are really resilient. They are very tolerant of extreme water conditions because they've evolved in this really dynamic coastal estuary," she said. "But we do need to get our act together" to reduce greenhouse gas emissions before the damage sets in, Rivest added.

Devastated by decades of disease and overharvesting, the Bay's oyster population stands at about 1% of its historic size. The Bay, though, still supports a $50 million oyster industry, encompassing farmed oysters, wild harvests and oyster seed sales.

The bivalve is also considered a linchpin in the state-federal Chesapeake Bay Program. The bottom-feeders filter and purify water, straining out nutrients that can trigger destructive algae blooms.

The Bay Program's partners have invested millions of dollars into rebuilding oyster reefs in 10 tributaries spread across Maryland and Virginia in what is collectively the largest oyster restoration project in the world.

A strike against the Chesapeake's oyster population: Nutrient pollution flowing off the land in stormwater can also increase a water body's acidity.

*The Pacific Northwest is experiencing oyster die-offs believed to be caused by acidification of the water, which occurs as the ocean absorbs greater amounts of carbon dioxide. Higher acidity harms oysters by weakening their shells and immune systems, and it lowers their ability to filter water. Young oysters are especially vulnerable to such problems. (Dave Harp)*

Acidification may already be affecting some of the Bay's oysters, Rivest suggested. As in other parts of the world, acidity levels ramp up at night because underwater plants and algae, which take up carbon dioxide as part of photosynthesis during the day, go dormant in the darkness. A long-term lab experiment led by Rivest shows that nighttime acidity levels could be so high in some parts of the Bay that shells could be dissolving "a little," she said.

Some oyster farmers may be able to adapt and survive the changes to the water chemistry. Others may not.

One of the goals of the VIMS project, which is funded by NOAA, is to identify which factors will contribute to that success or failure. Researchers will also interview aquaculture operators and watermen to learn how much financial distress they can withstand before choosing to get out of the business.

Vogt said the West Coast's acidification woes were a wake-up call for many oyster farmers on the East Coast. It happens all too often that when oysters get sick or die in Chesapeake aquaculture operations, the cause is shrouded in mystery, he said.

"It would be nice to get more specific information than, 'Well, something stressed them,'" Vogt said. "My question is, 'What stressed them?'"

The size of an oyster company could make the difference between whether it can survive the changes in water chemistry, Rivest said. Larger operations may be better positioned because they are likely to have more financial resources to invest in new equipment or relocate to areas of leased bottom where the acidity is lower.

Location could play a huge role as well. Alkalinity, the ability of water to neutralize acid, varies dramatically among the Bay's rivers and streams — by as much as a factor of six, according to a 2019 study led by Penn State researchers.

Much of the VIMS work will involve combining two existing computer models created by VIMS — an ocean acidification model and an oyster population model — into one, said Marjy Friedrichs, the VIMS researcher leading the study with Rivest. Right now, scientists can't predict how long it will take for the Chesapeake's oysters to start showing signs of stress.

"Is it going to be in 2030, 2050 or in the end of the century?" Friedrichs asked. "We're hoping this will be really useful for the aquaculture industry." ■

# Retired biology professor pleads for Pocomoke forest

## State workplan includes clear-cutting old trees

**By Jeremy Cox**

*Retired Salisbury University Professor Joan Maloof examines the stump of a tree that once stood in the Pocomoke State Forest, removed as part selective harvesting in some state-owned forests. (Dave Harp)*

If a tree falls in the forest, Joan Maloof hears it. Sometimes, she even hears it before it has fallen.

It is with this sense of arboreal fatalism that she writes letters to the Maryland Department of Natural Resources year after year, imploring the agency to withdraw its forestry division's latest plans to cut down old trees on the Eastern Shore. She writes. They cut. Nothing ever seems to change.

This year, the retired Salisbury University biology and environmental sciences professor hopes to break that cycle. Maloof opposes the felling of 120 acres of woodland in the Pocomoke State Forest, where some trees are believed to be nearly 100 years old.

"This is the kind of stuff we're talking about here," Maloof said as she tromped through one of the shady tracts that's set to be logged. "[These are] some of the last older patches. There's the holly and the understory trees."

Her stance was joined by dozens of conservation organizations, including the Audubon's Mid-Atlantic office.

Chances appear slim that they'll get their way. Mike Schofield, manager of Chesapeake forests for the DNR's Maryland Forest Service, says there are no plans to heed commenters' objections to the cutting.

"There isn't anything in there of substance that would warrant a change in our minds," Schofield said. "Although I can sympathize with people's attraction to the idea [of] older trees, the reality is the forest is full of older, larger trees. The areas [where] we are conducting the harvest are areas that are designated for fiber production."

The long-running back-and-forth underscores the challenges and tensions involved with operating a public forest.

For some members of the public, forests are recreational and ecological oases, where activities such as hiking and birdwatching mingle with the environmental benefits that trees provide, such as capturing carbon dioxide from the atmosphere. For others, the forest is their livelihood, and trees, if managed sustainably, are as much of a commodity as corn or soybeans.

"Those balances need to be struck, and I believe they are in our sustainable forest management plan," Schofield said.

The 18,000-plus acres of the Pocomoke State Forest lie mostly in Worcester County, but also in small portions of Wicomico and Somerset counties. The Maryland Forest Service manages it along with what is collectively known as the Chesapeake Forest Lands, which consists of more than 75,000 acres spread across dozens of tracts in six counties.

Across those two state forest entities, the Forest Service prohibits cutting on about 10,000 acres, or about 10% of its Eastern Shore holdings, Schofield said. Much of that is considered old growth, he added.

Dave Wilson, a Worcester resident and longtime environmental advocate, asserts that the state could do more to protect older trees in the region. The acreage that critics want spared from the state's harvest plan represents just 5% of the 2,400 acres being targeted for thinning or clear-cutting in the document, he pointed out.

"It doesn't make much sense to those of us who are concerned about biodiversity" to keep allowing mature forests to be cut down, Wilson said.

The 120 acres, however, does comprise the entire allotment of clear-cutting in the Pocomoke Forest in the work plan. The remaining 143 acres is reserved for thinning.

In the Chesapeake Forest Lands, about 1,900 acres of forest is set for a first or second thinning, and 150 acres is planned to be clear-cut.

Within the clear-cut areas, Schofield said, about 6% of the existing trees will be left standing. Those trees will help seed and regenerate the forest.

Older forests tend to have a greater variety of trees and animal life than their younger counterparts. And studies show that the older a tree is, the better it is at trapping carbon.

After the Forest Service released a draft of its annual plan earlier this year, the Pocomoke proposal drew 52 comments, with support from forestry industry members and opposition from environmentalists.

"Trees, like all species, have a biological age limit," the Dorchester County Forestry Board wrote. "During the comment periods, DNR often receives negative comments mostly aimed at the harvesting of mature timber. …[But] conservation — the wise use of natural resources — trumps preservation any day. A hands-off approach is not the answer."

After retiring in 2011, Maloof founded the Old-Growth Forest Network, a nonprofit that seeks to protect at least one forest in each of the 2,370 U.S. counties where conditions are suitable for forest growth. Since then, the group has added 118 forests in 24 states to its network.

But Maloof, also a Worcester resident, has found less success in her own backyard.

"You're just shaking your head," she said. "It's like, why are they going to do this to this public forestland?"

If finalized, the work plan would be in effect from July 1, 2021, through June 30, 2022. ■

# Climate accord eludes MD legislators, tree planting campaign passes

## Other measures include bus electrification, ban on balloon releases

**By Timothy B. Wheeler**

*Lawmakers directed the Maryland Department of the Environment to update state stormwater management regulations to account for precipitation changes brought by climate change. (Dave Harp)*

Maryland lawmakers failed again this year to come together to strengthen the state's goal for reducing climate-altering greenhouse gas emissions, and they balked again at banning single-use plastic bags. But they did push through several other environmental initiatives, including a massive tree planting campaign, a move to electrify transit buses and a statewide prohibition on helium-filled balloon releases.

The annual General Assembly session, which adjourned April 12, was dominated by debates over police reform, sports betting, education funding and financial relief from the COVID-19 pandemic. Environmental issues took a back seat of sorts in what Kim Coble, executive director of the Maryland League of Conservation Voters, called a "different and often difficult" session. Hearings were live-streamed and public access to the State House was restricted to prevent a COVID outbreak like the one that prematurely ended last year's session.

Environmental advocates were sorely disappointed by the failure for the second year in a row to get lawmakers to accelerate the state's greenhouse gas reduction efforts, which are required by current law to be 40% below 2008 levels by 2030.

"We had a chance this year to put Maryland among the world's leaders in reducing harmful emissions that are causing climate change as well as the stronger storms and higher temperatures that result from it," said Josh Kurtz, Maryland executive director of the Chesapeake Bay Foundation. "Unfortunately, legislators couldn't arrive at a consensus on how to move forward, and we ran out of time."

*Maryland lawmakers reauthorized forest mitigation banking, which lets developers pay to protect existing woodlands instead of having to replace trees they clear. (Dave Harp)*

In mid-March, the Senate overwhelmingly passed the Climate Solutions Now Act, which called for reducing emissions 60% by the end of the decade and for reaching net-zero emissions by 2045. Late in the session, the House passed a different bill calling for a smaller 50% reduction, without some requirements for curbing emissions, particularly from new buildings. Talks between the chambers didn't officially begin until the final day — and went nowhere.

While the House bill was weaker in some respects than the Senate version, Coble said, it still "provided some steps forward that we believed were better than none."

Still, some elements of the stalled omnibus climate legislation passed both chambers but in different forms.

Under another bill, for instance, 5 million trees are to be planted over the next decade, including 500,000 in urban watersheds. Likewise, lawmakers ordered the Maryland Transit Administration to switch its bus fleet from diesel to electric power by 2023, and they funded a six-year upgrade in transit infrastructure. They also overhauled the state's Commission on Environmental Justice and Sustainable Communities with legislation broadening its membership, expanding its duties and requiring it to hold more meetings.

Another casualty for the second year in a row was legislation that would have barred retailers from distributing single-use plastic bags starting in July 2022. The House passed it, but the Senate never took up the vote. Baltimore city has adopted a local plastic bag ban, and a few other localities have imposed small fees on the use of plastic bags or enacted other regulations.

Lawmakers seemed leery of imposing this regulatory burden on the state's retailers, many of them small businesses, which are struggling to survive amid COVID pandemic restrictions and sales declines. Advocates vowed to keep pressing the case.

"Plastic bags are virtually unrecyclable, and there's no way to dispose of them that doesn't harm our health and our environment," said Emily Scarr, director of the Maryland Public Interest Research Group. "The time to stop using single use plastic bags is not next year nor next week. It's today."

Also failing to pass were bills that would have provided legislative oversight of the state's public-private partnership to widen the Capital Beltway and would have imposed conditions on the project, including a prohibition on awarding contracts until the final environmental impact study is completed. The project, promoted by state officials as a remedy for traffic congestion in the Capital region, has drawn fire over its climate and environmental impacts.

Advocates praised lawmakers for a number of other, less-heralded actions.

■ **Balloon ban:** Maryland became the latest state to ban intentional releases of helium-filled balloons. The legislative action caps a three-year campaign in the state that began with Queen Anne's County prohibiting balloon releases locally, followed by a few other counties, before going statewide.

Statewide legislation on balloon releases failed to pass in the pandemic-shortened Assembly session last year but it sailed through this year with backing from environmentalists and others. Advocates said it was needed to stop littering water and land with deflated foil and latex balloons that can entangle or be fatally ingested by marine animals, birds and other wildlife.

Like the Virginia bill passed earlier this year, the Maryland legislation makes it a violation to launch even a single balloon or plan an organized release.

Maryland lawmakers softened the penalty from what sponsors had proposed, reducing the fine from $250 to $100 per violation. But they tacked on a requirement that offenders must perform six hours of community service or watch a video about the harm done by pollution.

Coble credited Jay Falstad, executive director of Queen Anne's Conservation Association, with instigating and organizing the ultimately successful effort. "Can one person make a difference?" she asked. "When you meet Jay Falstad, the answer is, 'Oh, yeah!'"

■ **Citizen rights in pollution cases:** Individuals and communities affected by water pollution may be able at last to intervene in cases involving environmental violations. A 2010 ruling by the state's highest court effectively excluded outside parties from seeking to enforce the federal Clean Water Act once the state has taken a polluter to court.

"This bill ensures that individuals, communities and other groups in Maryland have a right to intervene, to have their voices heard and to have a chance to advocate for their interests in attaining cleaner waterways and a healthier Maryland," said Sylvia Lam, an attorney with the Environmental Integrity Project.

■ **Climate adaptation:** Lawmakers required the Maryland Department of the Environment to update its stormwater management regulations and Bay restoration plans to account for precipitation changes brought on by climate change.

"Rainfall measured during heavy precipitation events in the Northeastern United States increased by more than 70% since the 1990s," said Sen. Sarah Elfreth, D-Anne Arundel County, one of the sponsors. "We need to use data that reflect today's climate reality to stop extreme flooding and sewage overflows that devastate our communities."


*The Maryland General Assembly made it illegal to intentionally release even a single helium-filled balloon into the air. The original $250 fine per violation was reduced to $100 in the final bill. (U.S. Marine Corps)*

■ **Community solar project:** Montgomery County, the state's most populous county, won passage of a bill that allows it to buy solar-generated electricity on behalf of its residents, businesses and local government entities. Such "community choice aggregation," which can reduce the cost of procuring electricity from clean energy sources, is catching on around the nation. This measure is a pilot project, but advocates hope that it paves the way to permit it in other communities.

■ **Pollution information:** The MDE would be required to create and maintain a public online database of pollution complaints, inspections and enforcement actions. The legislation also requires the Department of Natural Resources to report to lawmakers annually on its enforcement of natural resources and conservation laws.

■ **Forest "banking":** Lawmakers passed legislation re-authorizing forest mitigation banking, which allows developers to compensate for tree cutting by paying to protect existing trees elsewhere rather than replacing the trees that they cleared. The practice had been thrown into doubt by an attorney general's opinion, prompting local officials and developers to warn that it could halt housing and other building projects already in the pipeline.

Environmentalists opposed the measure, arguing that it was at odds with the state's goal of no net loss of forest. The bill ultimately passed with a requirement that the practice be studied and revisited in three years. "The developers are [a] pretty formidable fundraiser for elected officials," said the conservation league's Coble. "This was about as good as we could get right now."

■ **Pollinator protection:** Legislators closed a loophole in a 2016 law aimed at keeping untrained homeowners from using neonicotinoid pesticides, a class of chemicals toxic to bees and other pollinating insects. The law barred stores from selling lawn and garden products containing neonicotinoids if they did not have licenses to sell restricted use pesticides. Advocates say many retail stores have since obtained those licenses and continue to sell the product to consumers. The new law restricts sales only to certified pesticide applicators.

■ **Buying cleanups:** Lawmakers renewed a 2017 law, the Clean Water Commerce Act, under which the MDE can pay public or private entities for projects that promise to make cost-effective reductions in nutrient and sediment pollution. The legislation increases the amount available from $10 million to $20 million a year and requires the MDE to purchase "environmental outcomes" that will help restore the Chesapeake Bay for at least 10 years. It also specifies that a portion of the funds go to communities "disproportionately burdened by environmental harms and risk."

■ **"Forever chemicals":** Legislation failed to pass that would have clamped down on the production or sale of fire-fighting foams, rugs and food packaging containing poly— and perfluoroalkyl substances, known as PFAS. But lawmakers did hold back some funding for the MDE until it had reported to the General Assembly on the extent of PFAS contamination and its plan for remediating it. ■

*The legislature closed a loophole in a 2016 law restricting retail sales of neonicotinoid pesticides that had allowed many merchants to continue selling the chemicals, which are toxic to bees and other pollinating insects. (Dave Harp)*


*Photo: Scientists with the Susquehanna River Basin Commission measure the health of a Pennsylvania stream where water is withdrawn to support natural gas drilling. (Susquehanna River Basin Commission)*

# Controlling the flow

## Susquehanna River Basin Commission marks 50 years managing the river

**By Ad Crable**

It may seem odd that anyone would worry that the largest river on the East Coast, which discharges an average of more than 18 million gallons into the Chesapeake Bay every minute, might run out of water.

But a half century ago, concerns that the Susquehanna River might not have enough water to go around weren't far-fetched: Large-scale drinking-water withdrawals from cities like Baltimore and Chester, PA, were raising red flags.

And, the Three Mile Island and Peach Bottom nuclear plants were under construction. Another one, the Susquehanna Steam Electric Station near Berwick, PA, was planned. Each would suck out vast amounts of water for cooling.

"Having just struggled with record low flows in the prolonged 1962 to 1966 drought, there was a real concern among the states that the new diversions and power plants would use more water than the river could sustain during a dry summer," said Andrew Dehoff, executive director of Susquehanna River Basin Commission. "And there was an awareness of the need for adequate freshwater flow to the Chesapeake Bay."

The solution was to create the Susquehanna River Basin Commission. A regional compact between Pennsylvania, Maryland, New York and the federal government launched the commission as an independent agency that was given broad powers and duties to manage the many water users in a river basin as large as South Carolina.

The commission's early efforts were aimed at regulating water withdrawals to protect against droughts and setting up early warning systems to protect against floods. But the commission, now marking its 50th anniversary, has played pivotal roles in other issues, including detecting invasive fish species, restoring degraded watersheds, addressing mine drainage issues, and keeping tabs on the impacts of fracking for natural gas in the Marcellus Shale.

Following orders set up by member states and the federal government, the SRBC has to both encourage the use of the river's water and protect the ecological functions of the nation's longest commercially non-navigable waterway.

"The basin's land and water are interconnected in ways that invite strong sensitivity to development activities," Dehoff said. "When we disrupt the harmony without appropriate management and planning, vital resources can be depleted."

The SRBC is also an important partner in the Chesapeake Bay cleanup. The Susquehanna provides the Bay with half of its freshwater — and is the largest single source of its nitrogen and sediment pollution.

The SRBC has faced criticism over the years. It has been accused of usurping states' rights and being "unchecked government." Anti-fracking protesters once took over a quarterly meeting, and some Pennsylvania legislators have pushed to undermine its enforcement powers and ability to assess fees on water users. The New York legislature once cut its financial support in half after the SRBC started limiting water withdrawals by golf courses. And the states, which provide about 6% of the commission's annual $11.9 million budget, tend to reduce funding when budgets get tight.

But in the eyes of many, the SRBC has performed admirably in protecting communities from flooding and making sure there is enough water, both on the surface and in the ground, to go around. Those are complex tasks. It's been estimated that a raindrop falling in Susquehanna headwaters near Cooperstown, NY, may be withdrawn and used seven times before it gets to the Chesapeake Bay.

"They deal with a huge issue in a reasonable and responsible way," said Pennsylvania state Sen. Gene Yaw, who serves on the interstate Chesapeake Bay Commission, an advisory panel that represents state legislatures.

"When you have a basin that covers that size of land mass and so many people, and you field so few complaints, it's a pretty good indicator that they're doing what they are supposed to."

Added Cindy Adams Dunn, secretary of the Pennsylvania Department of Conservation and Natural Resources, "A river this magnificent requires cohesive management, and SRBC has done a phenomenal job over its 50 years of existence to provide the signatory states with the science and tools to manage the flow and quantity as a system."

Yet, despite being the arbiter of a precious resource for 4 million people, the actions of the SRBC and its 62 staff members remain unknown to many.

### Forged by floods

Though founded to ensure an adequate water supply, the SRBC quickly had the opposite problem. Only 18 months after President Richard Nixon signed the law creating the commission on Christmas Eve 1970, Tropical Storm Agnes wreaked havoc by dumping up to 19 inches of rain, causing some of the worst flooding ever experienced along the Susquehanna. In Pennsylvania, 48 people were killed, 569 bridges were washed out and damage totaled more than $2 billion.

Hurricane Eloise followed in 1975, driving more than 20,000 residents from their homes.

The events dictated the SRBC's focus for years to come. It created maps for 250 communities, showing which buildings were likely to be flooded at various flood levels. The maps helped homeowners qualify for flood insurance and flood victims qualify for federal aid.

In the 1980s, the commission worked with the National Weather Service, U.S. Geological Survey and Congress to launch a state-of-the-art early flood warning system using real-time rain gauges and radar and satellite transmissions.

It's one of several monitoring systems that help the commission keep tabs on the river. An 80-station water monitoring network established in 2003 continuously checks water quality and alerts public water suppliers of spills or other pollution events. That system has been put to use several times, such as a 2015 incident when a fire broke out at a chemical and fertilizer warehouse in York County. Alerts warned water utilities to switch to alternate supplies before contaminants reached their intake pipes.

## Ensuring water for all

In the mid-1970s, the commission began regulating entities that draw, but do not return, large amounts of water from the river and its tributaries — such as nuclear and coal-powered plants, drinking water treatment systems, manufacturers and large agricultural users.

The goal was to ensure that enough water remains in the river during droughts to sustain industry, provide drinking water and protect aquatic resources, such as fish and the tiny creatures they eat. The commission has imposed water rationing and mandatory bans on nonessential uses of water during dry periods.

In 1978, the SRBC began regulating groundwater withdrawals as well.

"Without a check on the quantity and rate of water withdrawals, we would see the permanent loss of groundwater supplies, degraded water quality and habitat, and severely reduced stream flows," Dehoff said.

When flows drop below a certain level, consumptive water users have to either cut back on withdrawals or pay for make-up water to be released elsewhere.

Increasingly, those releases have come from two water reservoirs owned by the U.S. Army Corps of Engineers in New York and Pennsylvania. But other sources can also be tapped, including an old rock quarry near the lower Susquehanna and untainted water that has filled some old underground coal mines.

## Fracking controversy

Drilling for natural gas by underground hydraulic fracturing, or fracking, has been controversial in the Susquehanna watershed, 85% of which sits atop the Marcellus Shale gas deposit.

New York and Maryland have banned fracking. The SRBC's counterpart, the Delaware River Basin Commission, first put a moratorium on the practice, then banned it in late February.

But the SRBC took a markedly different stance, viewing fracking as an allowed water withdrawal by a business.

"Fundamentally, SRBC didn't pass judgement on whether a proposed water withdrawal was good, bad or indifferent," said Paul Swartz, who served as executive director from 1992 to 2013. "We looked at natural gas as a legitimate business interest in the basin."

"Those opposed to natural gas viewed us as enablers. The water use is what we had to consider, not fracking."

But the SRBC did recognize that water withdrawals for fracking posed risks, especially for smaller, high-quality streams, because the practice requires large amounts of water that would not be returned.

Many of those streams had never been sampled before, so there was no benchmark to gauge whether fracking was harming them or not. So, in 2009, the commission deployed a network of 60 real-time water monitoring devices to detect subtle changes in water quality in remote streams and smaller rivers.

If problems are found, an alarm triggers an investigation. In 2011, for example, a release of drilling mud at a gas pipeline stream crossing set off alarms, and state environmental and fish agencies were called to investigate.

In addition, metals, nutrients, ions and radioactive materials are sampled on a quarterly basis. The SRBC conducts surveys to look for effects on fish, water insects, wildlife habitat, recreation and water flows.

To help safeguard aquatic resources, the SRBC added conditions to withdrawal permits, limiting intakes when streams run low and requiring more in-depth technical reviews for permits.

Gas drilling is now the third-largest water user in the basin, behind public drinking water suppliers and power plants. Drilling companies have been fined for erosion violations at well pads and access roads. But, after 10 years of water withdrawals and drilling operations, the SRBC says it "has not detected discernible impacts on the basin's water resources."

Today, the SRBC's monitoring network is among the largest basin-specific, real-time water quality monitoring systems in the nation. And it has helped find problems unrelated to fracking. For example, it has shown that two high-quality streams are slowly becoming saline from the use of road salt on Interstate 80.

*A boat navigates a flooded street in Harrisburg after Tropical Storm Agnes brought record floods in 1972. The flooding steered the work of the Susquehanna River Basin Commission in its early years. (Susquehanna River Basin Commission)*

## Changing times

The SRBC has embraced projects and technology not imagined when it was created a half-century ago.

For example, SRBC scientists have used environmental DNA — unique codes left in the water by organisms — to confirm the presence of potentially harmful invasive species. They have used the technique to screen for didymo or "rock snot" (a form of algae that can form dense mats), round goby fish, northern snakeheads and blue catfish.

The commission also has been working to bring back the American eel in the Susquehanna and beat back nonnative species such as rusty crayfish and quagga mussels.

Its monitoring networks are used to measure both the amount of nutrients and sediment flowing down the river to the Bay and the successes or failures of conservation practices. Watershed groups use the monitoring data to measure the success of their stream projects.

After 50 years of management, "we're in much better shape with regards to warning and preparing our basin citizens of hazardous flood conditions, providing for adequate water supply to both basin users and our aquatic ecosystems and supporting the progress made improving water quality," said Andy Gavin, SRBC deputy director.

But new challenges lie ahead. Changing weather patterns are expected to increase the amount of pollution running off farmland and urban areas during more intense storms. Less snowpack could reduce groundwater discharge. More dry periods could decrease stream flows, compounding water supply issues. Sensitive high-quality streams may become endangered by changing temperatures and reduced flows. More flash floods are expected, as well as "flash" droughts.

After half a century, Gavin noted, "much work remains" to keep up with emerging challenges. ■

# Art woven into the landscape at Potomac's Glenstone Museum

**By Whitney Pipkin**

Soon after arriving at Glenstone — a world-class, contemporary art museum in Montgomery County, MD — the visitor faces a crossroads. "I call it the aha moment," said Paul Tukey, who, as the museum's director of sustainability, has put plenty of thought into how visitors experience the property. "The lines of sight here are highly intentional."

To the left, a narrow footpath leads uphill to the museum's beguiling and most iconic outdoor sculpture, Jeff Koons' *Split-Rocker*. The 37-foot-tall steel structure is half-pony, half-dinosaur and entirely floral — its surface painstakingly planted each April with plugs of 27,000 flowering annuals. To the right, a wider winding path gives a glimpse of the museum's pavilions. The square corners of the concrete-brick exhibit buildings stand in sharp contrast to the rounded landscape from which they seem to be emerging.

Signs telling you which way to go first would be superfluous in a landscape simply begging to be explored. They would also be against the spirit of a museum that "encourages you to generate your own interpretations about the works you encounter," according to the pamphlet provided at the entrance. Walking in either direction from this crossroads, visitors should be prepared to spend hours wandering and wondering.

After closing for a few months due to COVID-19, Glenstone's grounds reopened this spring. Its largest indoor exhibit reopens in May. Tickets, released online three months in advance on the first of each month, can be difficult to get, but are sometimes re-released throughout the month or available on a same-day basis.

The museum reopened its gallery in April with an exhibit by African American artist Faith Ringgold, best known for her narrative quilts featured in books such as *Tar Beach*.

But, indoor exhibits aside, it's easy to spend a contemplative half-day with the grounds and outdoor sculptures alone, strewn across 180 acres of the property.

Most modern-art museums are situated on bustling city streets, where their inner quiet is a startling sanctuary from the surroundings. But Glenstone was created and expanded over the years to give visitors an entirely different experience.

A 2018 expansion of the museum's footprint also allowed for more imaginative play on the landscape, achieving a longtime goal for Tony Cerveny, the museum's chief operating officer.

Creating a lengthy walking path between the arrival hall and the pavilions "gave us more latitude," Cerveny said, and it sets the stage for "the slow reveal of the landscape and the architecture and sculpture."

Here, the interplay between art, architecture and nature is the main point. Time spent wandering long pathways between buildings not only "cleanses your palate" from the artwork inside, Tukey said, but also brings visitors face-to-face with the artistry of nature itself.

"We don't like to use the word 'peak,'" Tukey

*Top photo: At Glenstone Museum in Potomac, MD, artist Jeff Koons'* Split-Rocker *is half-pony, half-dinosaur and entirely floral. Its surface is planted each April with plugs of 27,000 flowering annuals. (Dave Harp)*

*Inset photo: A fothergilla blooms near a sprawling outdoor sculpture by Tony Smith at Glenstone Museum. (Dave Harp)*

said as he walked past rows of flowering dogwoods, purple-pink redbuds and a carpet of golden groundsel, all in full bloom in April. "It suggests that you might be missing something" at other times of year.

Tukey and 16 full-time groundskeepers work year-round to make sure that's not the case. Unlike a traditional natural area or park, these landscapes — along many of the paths, at least — are as curated and cared for as the art pieces. They are an homage of sorts to what this part of the Chesapeake Bay watershed might look like were it not plagued by invasive plant species and an abundance of runoff from the mansions that surround it in the town of Potomac.

But don't let the native and natural part fool you. Behind the scenes, it takes a lot of work.

"This whole view here was very much choreographed," Tukey said, following a stair-stepped path down to a stream near the museum's original art gallery. But, "if this looks like it was restored by the hand of man, then we've failed. If we haven't done this the way nature would do it, then we've failed."

To that end, Glenstone staff and longtime landscape designers Peter Walker Partners have worked with nature to curate undulating meadows, stream-crossed woodlands and thought-provoking vantage points throughout the landscape.

Credited with helping to lead the modern movement against synthetic chemical use on lawns, Tukey first came to Glenstone as a Maine-based consultant more than a decade ago. The museum's founders, billionaire Mitchell Rales and his wife Emily, hired Tukey — author of the *2007 Organic Lawn Care Manual* — to transition what was at the time more than 15 acres of mown turfgrass into more organic management.

Tukey came on full-time in 2013 and since then has scaled back turfgrass to about 5 acres, making way for more planted areas and meadows.

Though Glenstone's original gallery opened in 2006, the private museum for years welcomed only a few thousand visitors annually to the property. The majority of the public didn't learn about what was considered one of the art community's best kept secrets until 2018, when Glenstone opened a cluster of buildings called the pavilions, dwarfing its original museum footprint, and made more daily tickets available.

Over the last decade, the Rales family purchased surrounding properties, including a dozen modern-day mansions, which were torn down and replaced with natural landscapes.

The original Glenstone property, previously the grounds of a fox hunting club, was destined to become another pocket of the sprawling sylvan estates that Potomac is known for when Mitchell Rales bought it in 1984. Alongside expanding exhibit spaces, Glenstone's outdoor experience has grown, too, from 35 acres to about 180.

The grounds are not wilderness by any stretch, but neither are they coifed like a theme park.

A visitor with a keen eye — or plant ID app — could replicate much of this aesthetic at home, and that's part of the point. The gift shop sells a guide that includes not only background information on the art but also sketches and descriptions of plants that are plentiful on the grounds.

"All we did was walk around and see what was already growing here. We pulled it out into the landscaping and planted more," Tukey said.

The Rales family and Glenstone Foundation are stalwarts about using paid employees, not volunteers, to keep the museum running, and the same is true for the grounds. Glenstone has deployed that talent to plant more than 10,000 trees in the last six years, while transplanting several others to locations that made more sense aesthetically and environmentally.

Landscape maintenance often entails hand-pulling invasive Japanese stiltgrass and barberry plants from the woodlands and replacing them with native fox sedge where possible. The museum works closely with the state to manage 64 wooded acres placed under forest conservation easements, which limit their development.

Work on Greenbriar Branch, one of two named streams running through the property to the Potomac River, didn't start until 2015. Mitchell Rales suggested at a meeting that the team find a way to "turn an eyesore into an asset," Tukey said. The stream was badly eroded, with 8-foot-high mud banks in places. Tapping stream restoration guru Dave Rosgen to mastermind the project, work began to open up the flood plain and create a softer path for the stream. "We're trying to be regenerative," Tukey said. "We want to make it better than it was when we got here."

The now-peaceful waterway provides a fitting backdrop to a trio of stone one-room cabins built into the hillside, created by British artist Andrew Goldsworthy. Opened to visitors at noon each day, the cabins feature interior walls of entirely untreated, unfired clay that changes over time.

Near a lily pad pond along that same path — Glenstone also employs an aquatic horticulturalist — a zigzagging boardwalk floats over a wetland adjacent to the stream. The boardwalk was built on ground screws to avoid excavating the sensitive habitat and carefully arranged along sight lines with each piece of art.

Here, sculptor Robert Gober's *Two Partially Buried Sinks* pop out of the woods at a turn in the boardwalk. In the wetlands below, a small Jack-in-the-pulpit competes for attention.

Tukey says it's normal to get a little whiplash trying to take in both the natural beauty and museum pieces. But, for Tukey, these walks around the museum grounds have become as much about inspiring change as about admiring beauty.

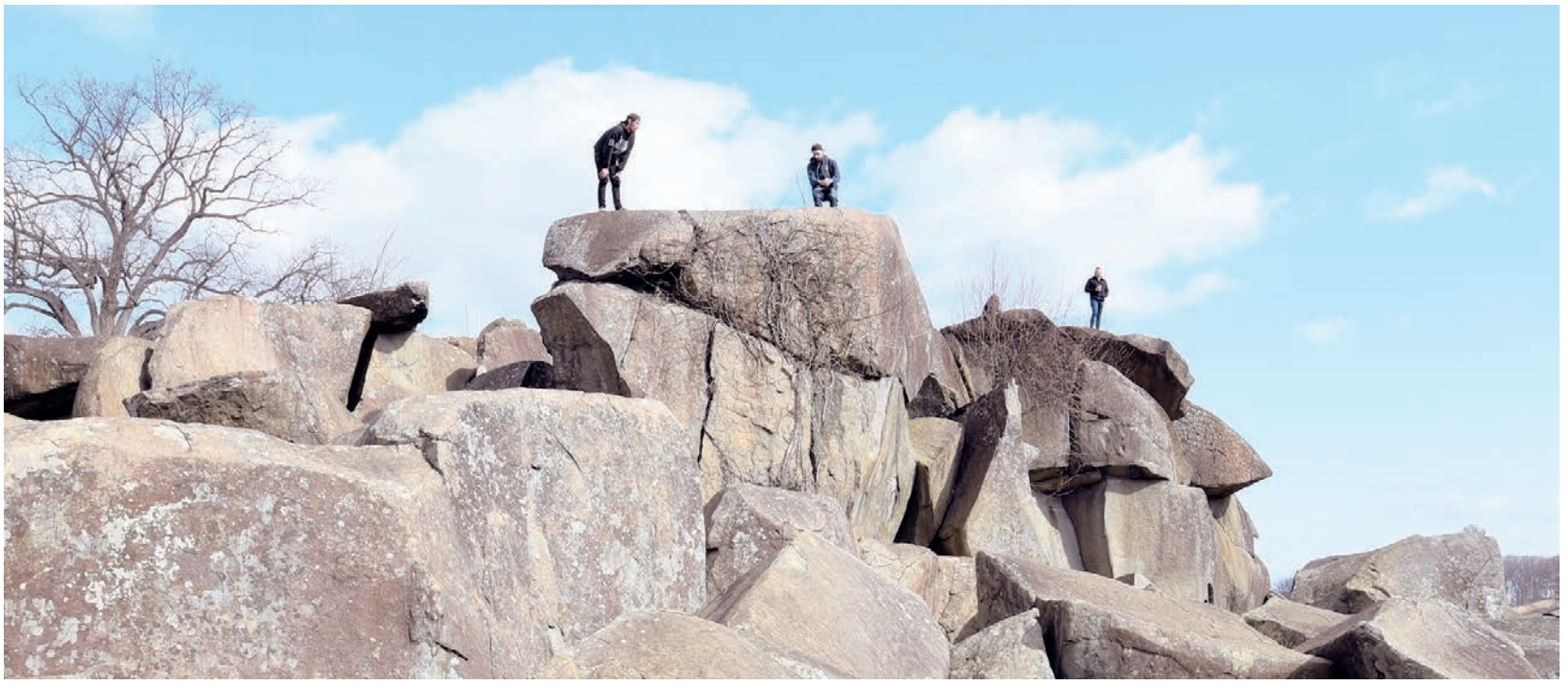
"The focus was on just having an organic lawn, but it became, 'How do we make this the most sustainable museum we possibly can?' " he said. "Now that we've built it, we want it to be a model." ■

**VISITING GLENSTONE MUSEUM**

Visit Glenstone.org for information about the museum or to reserve free, time-specific tickets. Food is available at Glenstone's outdoor patio, though its café remains closed due to COVID-19.

*Top photo: One-room stone cabins built into a hillside were created by artist Andrew Goldsworthy. They feature interior walls of untreated, unfired clay that changes over time. (Dave Harp)*

*Bottom photo: A zigzagging boardwalk was carefully crafted to avoid excavating sensitive habitat. It was also carefully arranged along sight lines as it approaches various pieces of art. (Dave Harp)*



# Unearth PA's ancient geological wonders

**By Ad Crable**

In a treeless plain on the edge of Gettysburg in southcentral Pennsylvania lies a jumble of dark and rounded boulders.

This "boulder city" is made up of diabase rock, a very hard igneous rock that ended up here 200 million years ago — originating as hot magma oozing to the surface from underground volcanoes. Within the last few centuries, it became known as Devil's Den.

On a hot summer day in 1863, Confederate soldiers desperate for cover drove Union forces from the rocks, then squeezed into the cracks and fired on their rivals hiding behind another diabase outcropping at Little Round Top.

Other long-ago geologic forces had helped steer Union and Confederate armies toward that battlefield.

Confederate troops had used the looming barrier of the Blue Ridge Mountains to move secretly north. A windy gap enabled them to move a large force with wagons through South Mountain and on to Gettysburg, where a surprise encounter awaited them.

Neither side wanted to fight there because the Gettysburg plain had diabase rocks just below the surface and soldiers couldn't dig in for protection. That meant the elevated outcrops became turning points in the battle.

The formation of Pennsylvania's land features and bedrock has been going on for millions of years. Along the way, there have been dinosaurs, volcanic eruptions, glaciers, erosion and sedimentation, and the crash of tectonic plates that formed mountains and oceans.

Those forces have shaped many facets of the state's landscape, history and communities, from battle sites and industrial activity based on natural resources to the renowned fertility of the state's farmland.

Geologic processes have also delivered a variety of outdoor delights: waterfalls, gorges, glacial lakes, river gaps, salt springs from trapped ancient seas, boulder fields, ice mines, "ringing" rocks and more.

If you seek out the state's geologic landmarks, you may come to appreciate what are known as drumlins, rock cities and moraines, and you may learn that Pennsylvania was once an ancient seabed — and was south of the equator.

"I just hope people get a little appreciation of what's under their feet," said Pennsylvania Geological Survey geologist Stuart Reese. "Rocks tell a story. It's really incredible how much has happened, and the beauty of it, and the story you can piece together from studying rocks. It's amazing."

The Geological Survey has compiled guides for 122 sites that can be accessed through an online map at gis.dcnr.state.pa.us/pageode. Caution: It may take some persistence to navigate the site. Under the Layers menu, choose to make the Trail of Geology visible. Click on the map icons for individual sites, and you'll see a brief summary in the side panel. Click on the Trail of Geology site number found there for access to more detailed information.

Here's a brief sampling of Pennsylvania geologic landmarks to explore.

- **Chickies Rock:** This tower of quartzite, located along the Susquehanna River in Lancaster County, probably originated as beach sand deposited there 1 million–2 million years ago.
- **Pole Steeple, Michaux State Forest:** A short, steep hike in Cumberland County leads to a dramatic 80-foot spire of rock, an exposed remnant of an ancient collision between what are now North America and Africa.
- **Grand Canyon of Pennsylvania:** Here, Pine Creek used to flow north, but the current was reversed when lakes formed by glaciers overflowed and eroded through the lowest point in the drainage divide.
- **Susquehanna water gaps:** Fans heading to Penn State football games can get a good view of these five dramatic gaps in the mountains from PA Route 322 and U.S. Routes 11 and 15. The exact origins of the gaps are still debated. The most popular theory is that over time the river carved its way through weaker ridges.
- **Devils Race Course, State Game Lands 211:** This boulder field located north of Harrisburg was formed when glaciers caused freeze-thaw cycles that slowly moved exposed rocks from downhill. You can hear a small, invisible stream gurgling under the rocks.
- **Cornwall mines and iron furnace:** Iron oxides were deposited at this site, just east of Harrisburg, when molten magma cooled 200 million years ago. The iron ore fueled furnaces that operated from 1742 to 1883, producing cannons for the Continental Navy at one point. The mine is now filled with clear water.
- **Standing Stone:** Seen from U.S. Route 6, this 25-foot high block of sandstone along the Susquehanna River tumbled there during a landslide 8,000–10,000 years ago. ■

*Photo: This rock formation, called Devil's Den, was the scene of fierce fighting during the Civil War's Battle of Gettysburg. (Ad Crable)*

# CHESAPEAKE CHALLENGE

— Kathleen A. Gaskell


Surveys show that blue is the most popular color in the world. Yet it's one of least common colors in nature. Some animals, especially birds and butterflies, appear blue, but only because the structure of their feathers or wings alter the wavelength of light. How much do you know about the "blue" biology of the Chesapeake Bay and its watershed's creatures? Answers are on page 43.

1. Hemoglobin, which transports oxygen in our blood, is rich in iron and the reason blood is red. The blood in some animals uses copper-hemocyanin to carry oxygen, which results in blue blood. Which of these Bay creatures is a blue blood? There may be more than one answer.
   A. Brief squid
   B. Horseshoe crab
   C. Marsh periwinkle
   D. Wolf spider

2. Which of these pests are attracted to dark colors, especially *dark* blue? Which ones are attracted to blue in general?
   A. Black flies
   B. Gnats
   C. Mosquitos
   D. Ticks

3. Why do blue crabs turn red when they are cooked?
   A. Heat causes their blood to move just below the surface of their shell.
   B. Turning red is how they respond to pain.
   C. Heat destroys the dark protein surrounding the reddish orange pigment in the shell.
   D. Turning red is their response the fear.

4. A young five-lined skink's tail appears iridescent blue, the result of cells that interfere with light. As the lizard ages, the tail takes on the color of the rest of its body. What do biologists think is the reason for the tail's blue color?
   A. The tail, which can grow back, is a decoy for predators. Should a predator bite the tail, it snaps off and starts to wiggle, letting the skink escape.
   B. It lets older skinks know it is too young to mate.
   C. The tail does not get enough oxygen until the skink gets older.
   D. It camouflages the skink, which hangs out in blue wildflowers.

5. Blue jays are not blue. Their feathers include pockets of air and keratin (the protein in fingernails), which absorb all of the colors in the wavelength of light except blue, which is reflected back and is the color our eyes see. If you backlight a blue jay feather, the light is not reflected, and our eyes see the feather's true color. What is it?
   A. Brown
   B. Gray
   C. Green
   D. White

*Blue icon: Eastern bluebird. (Michele Danoff)*

*A. The "blue" of this blue jay in flight is actually the reflection of the one color that is not absorbed by its feathers. (Jim Ridley/CC BY-SA 4.0)*

*B. The mantis shrimp is able to move its eye stalks independently, allowing it to look in different directions at the same time. (Courtesy of Chris Crippen / Virginia Living Museum)*

*C. When this young five-lined skink matures, its tail will match the rest of its body. (Michael Holroyd)*


## Do you see what I see?

**And the winner is...** For the 16 color-receptive cones in its eyes (humans have only three) that allow it to see ultraviolet, infrared and polarized light, the Chesapeake Bay's mantis shrimp takes the crown for its ability to see the most colors.

**Size doesn't matter:** Their eyes may be among at the largest of land mammals, but horses can only see two colors.

**You read it here:** Infant humans are unable to see the entire color spectrum until they are about 5 months old. The first color they are able to distinguish, at about two weeks of age, is red.

**The blue ribbon goes to... blue!** In surveys from the U.S. and beyond, people name blue as their favorite color. In the U.S., the second favorite color is purple for women and green for men.

**Bird's-eye hues:** Some birds see a fourth primary color (and not always the same fourth color) in the ultraviolet spectrum, as well as the secondary colors produced when this color is mixed with the other three primary colors. A study revealed that this trait helps the birds distinguish between upper and lower foliage surfaces, which helps it forage for insects. It might also help with navigatation through dense vegetation.

**Go green!** Humans can detect more shades of green than any other color.

**Bleu bleh!** In 2012, Beekeepers in Ribeauville, France,couldn't believe their eyes when bees began producing blue and green honey. Turns out the little buggers were sweet on waste — from a M&Ms factory — that was being processed at a biogas plant about 2 miles from the hives. ■

*A bottle discarded in a wooded farm dump decades ago became a terrarium when the cap rusted open, allowing spores and nutrients to enter. Warm spring sunlight through the glass spurred the new growth. (Dave Harp)*

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*A blue crab shell, bleached by the winter sun, rests in sea of spartina grass on Hollands Island in Dorchester County MD. (Dave Harp)*

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*A prothonotary warbler explores branches along the Delmarva Peninsula's Nassawango Creek. The bird breeds in the Chesapeake watershed. (Dave/Harp)*

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# New wave of streamside forests plantings needed now

**By Beth McGee**

Forested buffers along waterways could go a long way toward improving local water quality, mitigating climate change and saving the Chesapeake Bay. But progress to put them in the ground is sorely lacking.

The most recent data (2019) from the Chesapeake Assessment Scenario Tool are very troubling. Pennsylvania has only implemented 10% of its 2025 goal for forest buffers. Virginia has only implemented 4% of its goal. And while Maryland has achieved 86% of its commitment, its goal was low, at only one-third of Virginia's and one-fifth of Pennsylvania's. While some states may dispute the accuracy of the tool's numbers, no matter how you slice it, implementation is lagging watershedwide.

Forested streamside buffers remain one of the most cost-effective ways to cut pollution from agricultural lands, trapping soil and nutrients before they can pollute local streams and travel farther downstream to the Bay as well as increasing the instream processing of nutrients. Buffers also sequester carbon and can be an important tool to mitigate climate change.

Planting buffers in farm fields is a shared responsibility. Both the U.S. Department of Agriculture and state agricultural agencies must play significant roles.

For years, the federal Conservation Reserve Enhancement Program has been the most important federal program for implementing buffers. The program is a state-federal partnership administered by the USDA's Farm Service Agency, which provides contracts and funding, and the Natural Resources Conservation Service, which delivers technical assistance to farmers. Unfortunately, CREP is languishing.

The 2018 federal Farm Bill contained language by Pennsylvania Sen. Bob Casey to provide substantial improvements to CREP. The new measures would ensure farmers have adequate financial support to maintain buffers and protect their investments. They also ensure that farmers are fairly compensated for expenses associated with buffers, such as installing fencing along streams and providing alternative water sources for livestock.

*Ryan Davis of the Alliance for the Chesapeake Bay removes protective netting from young trees on a Pennsylvania farm in July 2020. The Alliance planted the trees in 2019 to form a 1-acre stream buffer that will filter stormwater runoff before it leaves the 88-acre farm. (Will Parson/Chesapeake Bay Program)*

Instead of increasing access to this essential program, the farm agency under the previous administration created bureaucratic impediments to putting these programs on the ground. In a letter to the U.S. Secretary of Agriculture in 2020, representatives from Bay-state environmental and agricultural agencies expressed concern about the agency's position that implementation of the new provisions would require a renegotiation of each state's farm agency agreement, saying, "This unnecessary and unwise delay will reduce our ability to meet our stated conservation and restoration goals for water quality and wildlife habitat, an undesirable outcome for all parties involved."

There is no time left for delay. Less than five years remain until the 2025 deadline to have programs and practices in place that restore water quality in local rivers, streams and the Chesapeake Bay.

Planting trees reduces greenhouse gases and improves resiliency to a changing climate. On January 27, 2021, President Biden issued an executive order, *Tackling the Climate Crisis at Home and Abroad.* This laid out a series of actions for federal agencies to take regarding climate change mitigation and resilience, including directing the secretary of agriculture to collect public input on a climate-smart agriculture and forestry strategy. Leveraging CREP and its umbrella program, the Conservation Reserve Program, will no doubt be important components of this strategy.

USDA leadership, in partnership with the states, is critical to re-invigorate CREP and accelerate forest buffer plantings. The Farm Service Agency must allow states to take advantage of the new CREP provisions in an expedited manner, update cost-share rates to ensure farmers are adequately compensated and administer the program efficiently and effectively. The NRCS should devote more resources providing outreach and technical assistance to deliver the program.

But the states also need to do their share.

In Pennsylvania, the primary responsibility for getting forested buffers on farms falls to the conservation districts. While they are working hard and have made progress, they are consistently underfunded by state leaders.

That could change. Sen. Gene Yaw has proposed SB 465, developed with the help of the Chesapeake Bay Foundation, Pennsylvania Farm Bureau and Pennsylvania State University, that would set up a structure to accelerate conservation adoption. There is also discussion of using federal stimulus funds. Both could boost the implementation of conservation practices in the state.

Virginia recently increased investment in agricultural conservation programs, passed regional greenhouse gas inventory legislation and added additional incentives to protect streams by using buffers. But the state has yet to provide adequate funding to achieve the level needed. More investments will be needed for Virginia to achieve its 2025 goals.

To address the shortfall, Pennsylvania and Virginia must accelerate outreach efforts to landowners, underscoring that buffers help reduce pollution and provide benefits to them and their communities.

Although Maryland appears to be on track to meet its buffer goals, more investment in this practice that has multiple environmental benefits is important. The Maryland General Assembly just passed legislation that includes a commitment to plant 5 million trees statewide by 2031, along with the resources needed to put that commitment into action. Officials will begin this decade-long effort to plant millions of trees that will sequester carbon and play an important role in efforts to fight climate change and restore the Chesapeake Bay.

Accelerating conservation efforts in all of the Bay states, but especially in Pennsylvania, both at the federal and state levels is crucial to achieving the goals of a healthy Chesapeake Bay and its streams. If Pennsylvania falls short, the Clean Water Blueprint will be yet another failure in a series of efforts to restore the Bay.

We hope the Biden administration's USDA will embrace CREP as a program that is good for farmers, water quality and climate change, as well as provide the necessary investment to increase outreach, technical assistance and funding for implementation. ■

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

# The gradual and sudden decline of striped bass

**By Mike Spinney**

*Research shows that the population of the Chesapeake Bay's striped bass faces trouble once again. (Dave Harp)*

Striped bass, also known as rockfish, are arguably the most economically important finfish on the Atlantic seaboard. According to a 2005 economic study by Southwick Associates, commercial and recreational fishing for stripers generated more than $6.8 billion in total economic activity, supporting more than 68,000 jobs. At the time, striped bass were abundant in the Chesapeake Bay and throughout their migratory range, from North Carolina to Maine.

Twenty years earlier, striped bass were practically nonexistent. Scooped up in commercial nets and plucked by rod and reel by a growing number of recreational anglers throughout the 1970s, stripers had been fished to the brink of oblivion when a moratorium was enacted in 1985. Remarkably, once left alone to reproduce in the Chesapeake and Delaware bays, as well as the Hudson River, the fish were spawning in record numbers. In 1995, five years after the moratorium was lifted, the species was declared "fully recovered" by the Atlantic States Marine Fisheries Commission, the interstate body tasked with managing them.

The rebound was touted as a success. Rockfish became a symbol of the ASMFC's fisheries management prowess. But almost as soon as the commission resumed the task of allotting states their portion of the striped bass pie, things started to go downhill until, in 2019, the commission declared striped bass overfished.

According to the National Oceanographic and Atmospheric Administration, Maryland's commercial striped bass catch went from 2.3 million pounds in 2005 to 1.2 million in 2019, while the recreational catch fell from 7.6 million pounds to 2.6 million. Massachusetts' commercial catch declined from 1.1 million pounds to 0.5 million; the recreational catch went from 7.5 million to 2.6 during the same span. Massachusetts' commercial striped bass fishermen have failed to fill their quota each of the last three years. The fish simply aren't available.

The ASMFC dithered in the face of this steady decline. Because it must serve the interests of both commercial fishermen and recreational anglers, and because it believes it must achieve what is known as "maximum sustainable yield" (a fancy way of saying, kill the most fish possible without destroying the fishery), the commission has tinkered with ways to keep everyone happy. In the process, it has failed the fish and frustrated fishermen.

Now, the ASMFC is creating a new plan to manage striped bass. Known as Amendment 7 to the *Interstate Fishery Management Plan for Atlantic Striped Bass,* the commission has asked for public input as it considers its options.

The primary objective of Amendment 7 is "To perpetuate, through cooperative interstate fishery management, migratory stocks of striped bass; to allow commercial and recreational [harvests] consistent with the long-term maintenance of a broad age structure, a self-sustaining spawning stock; and also to provide for the restoration and maintenance of their essential habitat."

If the commission is serious about achieving this goal, it knows how to do it: Implement a new moratorium on the harvest of striped bass. A harvest moratorium is the only approach that has thus far been proven to achieve these goals for rockfish. That is why the organization Stripers Forever is calling for the ASMFC to take bold action and impose a 10-year moratorium on the harvest of striped bass.

Stripers have demonstrated they can replenish their numbers when given the opportunity. If the commission adopts a 10-year harvest moratorium as we suggest, striped bass will return to healthy abundance and with the balanced age structure necessary for sustaining the fishery in the long term.

Furthermore, the ASMFC can use those 10 years to adopt better, more scientific means for collecting the data it needs to sustain the fishery after the moratorium is lifted.

A harvest moratorium would still allow recreational anglers to fish for striped bass, but on a catch-and-release basis only. That means the recreational striped bass angling economy — which far exceeds the commercial fishery — would remain largely intact. Remember the Southwick study that found the entire striped bass fishery worth $6.8 billion? The recreational fishery accounted for $6.2 billion of that total.

In Ernest Hemingway's novel, *The Sun Also Rises,* the character Mike Campbell is asked how his bankruptcy came about. "Two ways," Mike said. "Gradually and then suddenly." If the ASMFC fails to take the bold and courageous action needed to rescue striped bass from the brink of collapse, it will have no choice when asked about the inevitable failure but to look back over 30 years of compromises and half measures and say it happened "gradually and then suddenly."

But it doesn't have to be that way. With a moratorium, rockfish — like the sun — can still rise. ■

*Mike Spinney, a resident of Massachusetts, is a member of the national board of Stripers Forever.*

# Letters to the Editor

## A different perspective on the striped bass problem

I read with interest last month's Forum piece, *Bold action needed to help striped bass.* I am in total agreement with the title. But the knee-jerk reaction to an abnormally low population of adult fish has been to reduce catch limits or put on a moratorium. The author wrote, "We know it can be done because we have done it before."

It is my opinion that the striped bass problem is different this time, and I would not expect the problem to be solved so easily.

My friends and I began fishing for stripers in the James River soon after the moratorium was lifted in the late '80s. On most trips, we saw schools of undersize stripers with birds working over them. We soon learned that if you saw birds, the fish were undersize. We called them next year's fish.

About 10 years ago, we began to see fewer schools of undersize fish. In a few years, they were gone. A few years later, the legal-size fish disappeared, too.

*An angler's catch of striped bass is displayed on a sandy shoreline. (Dave Harp)*

It is clear to me that the problem on the James is that the young don't make it to adult size. Researchers check results of the spring spawn but, unfortunately, they just assume a normal number will grow up. If they did a second year or third year check, I believe they would find that most of them have vanished.

I suspect that the culprit in Virginia's rivers is the blue catfish, introduced to provide freshwater fishing opportunities. They have been extraordinarily successful. If the blue cats are eating striper young, they are also likely eating shad, sturgeon, white perch and river herring. The cats are good eating, so a commercial cat fishery might be part of the solution to the striper problem.

It would be a shame to rely on catch limits if the real problem is predation. By the time we figure out that the solution is not working, spawning females might have died off. We need scientists to work on the problem, and the James would be the place to start.

*Nelson Burkholder, Jr.*
*Harrisonburg, VA*

## Poor development choices make cleanup impossible

As critical as our wetlands are to the health of the Bay and its tributaries, there is an obvious assault on our wetlands and our elected officials, both state and local, are acting in very bad faith where their constituents are concerned. In Virginia, Wegmans could certainly find a better spot to build instead of impacting forested wetlands, as described in the *Bay Journal's* articles. Looking at ways to use all of the empty buildings and parking lots would make much more sense.

Why are we proceeding with this foolishness while talking about a cleanup? Any fool knows it's nearly impossible to clean things up when you're allowing destructive permits, building and disturbances to wetlands.

Regarding the article, *Giant development plans loom for tiny town:* Developers always promise there won't be problems. Building a new sewage plant is a strategy to get what they want. I think it will fail, and every bad storm and overflow will send effluent and raw sewage into the waters.


*A sign advertises a large development planned for the town of Trappe, MD. (Dave Harp)*

Say good-bye to Miles Creek, the Choptank River and life as you all knew it.

Does anyone really believe that the daily spraying 540,000 gallons of treated wastewater on 88 acres of grass is viable from a development of 2,501 homes? The article says it all: low rates of compliance in the spray process.

What a laugh that developers, council members and local officials tell you it will strengthen the local economy and provide a better quality of life. For who, them? Certainly not the townspeople. Once in place, there will be nothing you can do to enforce compliance. I've been there on a much smaller scale. It's heartbreaking. You can watch all you want and turn them in when they break the rules or spill sewage. More than likely, they will not even be fined.

*Donna L. Wilson*
*Parkton, MD*

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Letters to the editor should be 300 words or less. Submit your letter online at bayjournal.com by following a link in the Opinion section, or use the contact information provided below.

Opinion columns are typically a maximum of 900 words and must be arranged in advance. Deadlines and space availablility vary.

Text may be edited for clarity or length.

Contact editor Lara Lutz at llutz@bayjournal.com or 410-798-9925. You can also reach the *Bay Journal* by mail at P.O. Box 300, Mayo, MD, 21106. Please include your phone number or email address.

# Two-wheeled meditations on the working of watersheds


**By Tom Horton**

*A cypress tree in the watershed of Maryland's Pocomoke River spreads its "knees" through the water. The Great Cypress Swamp once covered about 100 square miles of the Delmarva Peninsula. (Dave Harp)*

Water's way: slow and swampy, spread out and oozy, soaking in, life affirming, purifying, beautifying.

Our way: water *away,* as fast as possible, pave and ditch, drain and channel, banish meanders, linearize.

Creatures of the wet meet creatures of the dry, a clash of Earth's two seminal terra-formers, the fate of the Chesapeake Bay and planet hangs on the outcome. Guess who's winning? (For now, at least … nature bats last, they say).

Oh! Hey there. I forgot that all of you faithful *Bay Journal* readers were tuning in. Bicycling country roads does that to me, inducing a meditative state where I zone out amid cosmic truths.

Today's ride is sunshine-y, temps in the 40s, a February breeze making wool underwear feel ever so snug.

I've chosen the little-trafficked Willards-to-Whaleyville route, looping through Maryland's Worcester County. It's a county everyone thinks they know because of Ocean City and Assateague National Seashore, though most only know its surfy fringes. Those are attractive slivers, to be sure, but then there's the whole interior — now oceans of corn and soybean fields cruised by chicken houses as long as seagoing ships, but once something as naturally spectacular as any Atlantic beach.

The Great Cypress Swamp — headwaters of the Pocomoke River — for millenia covered about 100 square miles of the Delmarva Peninsula's interior across Worcester county and Delaware's Sussex County immediately north.

Early European accounts described it as impassable, a place of near impenetrable gloom harboring wolves and bears and deafening arrays of birdsong. The din of frogs and other amphibians and insects must have charged the nights.

It would have been, too, the happiest of homes for beavers, which numbered in the millions in the pristine Chesapeake watershed, damming and ponding and retaining water, creating a landscape we moderns can scarcely comprehend, much less see, not even in places that now pass for "natural" and "untouched."

We ditched and drained and developed all that over a couple centuries — timbered it and paved it and bled it dry, causing vast, months-long fires that cooked the moisture out of the organic peat, several feet down, destroying what had been the literal foundation of the cypress swamp. Only remnants survive, and nothing like the original. Its guardian beavers were pretty much trapped out everywhere in the Chesapeake watershed by 1750.

Water's way would never be the same.

And yet, as I bicycle the site of ancient swamplands, stubbled with the stalks of last fall's corn and soybean harvests, it is clear that this is land still badly wanting to be that wet, beautiful swamp again.

The underlying hydrology didn't go away. It is just held in check by drainage ditches that on many fields must be so closely spaced there is barely room to turn around between them with today's large farm machinery (let alone space to plant ditch-side buffer strips of natural vegetation that protect water quality).

Across Delmarva, this ditching — ranging from narrow, shallow field ditches to 80-foot-wide canals deep enough to accommodate boats — keep the Bay watershed shedding water with hyper-efficiency that allows a highly productive agriculture. But it also pipes polluted runoff Bayward and is the major cause of stream degradation across much of Delaware and Maryland's Eastern Shore. If we stop ditching, nature will reassert. But don't hold your breath.

My spirits rise as I come to a dirt road. Such "unimproved" byways always suit me. Better yet, this one is on my GPS named Swamp Road. Onward!

Bumping and splashing along, I recall an insightful essay called *Speed,* by the pioneer environmental educator David Orr. He begins with how we ditch and pave to unnaturally speed the flow of water away from our farms and cities — water from rain, from sewage, from industries — to the detriment of everything downstream.

Orr doesn't stop there. He proceeds to explain how we've unnaturally sped up the flow of money with an economy that pulls local dollars rapidly out of communities via WalMarts and Targets and Starbucks. Like water, money no longer sticks around to circulate, recycle and enrich locally.

Finally, he writes, we've sped the flow of information, to where a grade school student can Google up more citations than a team of scholars could a few decades ago — though this leap in quantity does little or nothing to improve actual wisdom.

So it's not just ditches we're talking about. It's whether humans can slow down, think ecologically, move back toward being a part of nature, instead of apart from it.

It's why I'm working on a new *Bay Journal* film called *Think Like a Watershed,* using beavers to focus on how water once moved through the landscape, how we changed it, how we might go back — in part by coexisting with the Bay's original terra-formers, gravity and the creatures of the wet.

And wet it has been traversing Swamp Road, but it has brought me to something hopeful. Heavy machinery I spotted along the ditched channel of the upper Pocomoke turns out to be part of an impressive restoration project by The Nature Conservancy and Maryland and federal environmental agencies.

They are leveling enough of the dikes thrown up when the river was channelized in the 1930s to reconnect its flows with about 4,000 acres of degraded floodplain wetlands. They are acting like beavers, spreading the water out, cleansing it, letting it take its time on its way to the Bay, nourishing a diversity of life as it goes.

Water's way. It's the way home. ■

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

# BULLETIN BOARD

## VOLUNTEER OPPORTUNITIES

### WATERSHEDWIDE

#### Citizen Science: Creek Critters

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

### VIRGINIA

#### Goose Creek Association

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

#### 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.

#### Cleanup support & supplies

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

To register for an event: trashnetwork.fergusonfoundation.org.

#### Become a water quality monitor

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

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

#### VA Master Naturalists

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

#### Chemical water monitoring teams

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

### PENNSYLVANIA

#### Middle Susquehanna River

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

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

### MARYLAND

#### Anita C. Leight Estuary Center

Remove invasive plants and install native species 12–2 p.m. May 16 at the Anita C. Leight Estuary Center in Abingdon. Volunteer, ages 14+, will be taught how to identify problem plants, removal & restoration strategies. Wear sturdy shoes, long sleeves, work gloves for field work, weather permitting. Preregistration required. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org.

#### Severn River Association

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

#### Raise, plant, maintain trees

Stream-Link Education in Walkersville needs volunteers of all ages to help reforest Frederick County. Opportunities include helping to grow native Maryland trees at outdoor nurseries, planting the trees, helping to maintain young trees at planting sites. Info/registration: streamlinkeducation.org/volunteer. Upcoming events:

- Frederick: 9–11 a.m. May 8
- Emmitsburg: 9–11 a.m. May 15 & 22

#### Cromwell Valley Park

Help out at Cromwell Valley Park's Nature Center in Cockeysville. Ages 17 & younger must be accompanied by an adult. No walk-ins. Preregistration (online only) required for each program: cromwellvalleypark.campbrainregistration.com. Preregistration closes 4 p.m. Friday for weekend programs. Participants must sign Baltimore County liability and COVID-19 waivers when registering. Info: 410-887-2503, cromwellvalleypark.org, info@cromwellvalleypark.org. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible. Events include:

- *Habitat Restoration Team / Weed Warrior Days:* 2–4 p.m. May 15 & 29. Meet at Sherwood House parking lot. Remove invasive species, plant natives, maintain restored habitat. For this event, preregister with Laurie Taylor-Mitchell: Ltmitchell4@comcast.net.
- *Drop in Gardening*: 9 a.m.–12 p.m. May 15. Children's Garden. Ages 13+ Gloves, tools, water provided. Bring hat, sunscreen.
- *Drop in Gardening!* 9 a.m.–12 p.m. May 15. Ages 13+ Spend a morning in the garden. gloves, tools, water provided. Bring hat, sunscreen.

### WORKDAY WISDOM

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

### Submission Guidelines

**ONLINE**

The ***Bay Journal*** website has a section called ***Bulletin Board***, where you can log in and post your own events — and even include a photo. Visit bayjournal.com and click on "Bulletin Board."

**IN PRINT**

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 printed edition of ***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.
June issue: May 11
July-August issue: June 11

**FORMAT**

Submissions to ***Bulletin Board*** must be sent as a Word or Pages document or as text in an e-mail. Other formats, including pdfs, Mailchimp or Constant Contact, ***will only be considered if space allows*** and type can be easily extracted.

**CONTENT**

You must include the title, time, date and place of the event or program, and a phone number (with area code) or e-mail address of a contact person. State if the program is free or has a fee; has an age requirement or other restrictions; or has a registration deadline or welcomes drop-ins.

**CONTACT**

Email your submission to kgaskell@bayjournal.com. Items sent to other addresses are not always forwarded before the deadline.

# BULLETIN BOARD

## DOES YOUR EVENT OCCUR IN MID-JULY THROUGH MID-SEPTEMBER?

This is to remind organizations and centers with events or deadlines that take place between mid-July and mid-September that announcements for these items must reach the *Bay Journal* office no later than June 11 if they are to run in the combined July-August 2021 issue. Please e-mail news about upcoming events to this address: kgaskell@bayjournal.com.

### St. Mary's County museums

Become a member of the St. Mary's County Museum Division Volunteer Team or Teen Volunteer Team. Info: 301-769-2222.

- Adults: Assist with student/group tours, special events, museum store operations at St. Clement's Island Museum and Piney Point Lighthouse Museum & Historic Park. Work varies at each museum. Info: St. Clement's Island Museum 301-769-2222 / Piney Point Lighthouse Museum & Historic Park 301-994-1471.
- Students: (11 & older) Work with artifacts that have been excavated from St. Mary's County, witness behind-the-scenes operations of preserving a historical lighthouse, receive training to work in the museum's collections management area.

### Mount Harmon Plantation

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

### Report a fish kill

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

### Breeding Bird Atlas project

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

### Severn River Association

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

### Ruth Swann Park

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

### Chesapeake Bay Environmental Center

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

### Chesapeake Biological Laboratory

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

### Citizen science: angler survey

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

### Patuxent Research Refuge

Volunteer at the Wildlife Images Bookstore at the National Wildlife Visitor Center of the U.S. Fish and Wildlife Service's Patuxent Research Refuge in Laurel. Open & close the store, help customers, operate the register. Training provided. Info: 301-497-5771, lindaleechilds@hotmail.com.

## CONFERENCES/CLASSES

### Watershed Forum RFP

The Alliance for the Chesapeake Bay's *16th Annual Chesapeake Watershed Forum: The Future is Now: Getting to (and Moving Beyond) 2025,* takes place virtually Nov. 4–5. The forum will consider the dualistic priorities of our time. The best practices and approaches in agriculture, stormwater, and forestry that will get us to our 2025 goals are already here. The challenge is disseminating, implementing these practices, approaches efficiently, rapidly, and at scale by 2025. We must look to, plan for the future beyond the TMDL. The planning committee is seeking theme-related sessions that spotlight a case study or introduce innovative, and/or hot topics or more in-depth presentations that ease discussion and application to activities, organizations at the local level. Submission deadline is 11:59 p.m. May 14. Info: jmcgarvey@allianceforthebay.org.

## VIRGINIA

### VAEE virtual mini-conference series

Learn about the state's regions and seasonal changes at the 2021 Virginia Association for Environmental Education virtual mini-conference series scheduled 12 a.m.–11:59 p.m. July 17 *Summer on the Shore*; and Oct. 23, *Fall in the Piedmont*. There is enough space to offer up to nine, 50-minute sessions each date. Each conference includes professional development, learning, collaboration, and environmental education efforts and resources in Virginia, beyond. All registrations include invitations to the May 22 Inaugural VAEE Spring Symposium and social & silent auction. Those who register for the full conference receive access to recordings of all concurrent sessions & keynotes for one year after the final conference date. (Recordings are not available for single-day registrants.) For pricing details, registration (required) packet, scholarship opportunities, visit vaee.wildapricot.org. Click on Events in the menu. Info: April Harper at events@virginiaee.org, 804-916-9302 The conference is issuing requests for proposals for the Oct. 23 conference: forms.gle/XZyPcbVcTURhFCyVA.

## MARYLAND

### Climate Leadership Academy

The Maryland Department of Natural Resources is accepting enrollees its Maryland Climate Leadership Academy, a free, virtual course May 18–July 13. This series is designed to prepare anyone interested in seeking Certified Climate Change Professional credentials or increasing competencies in climate change-related areas. Registration is open until May 14. Info: mdclimateacademy.org.

### Virtual boater safety class

The Chesapeake Bay Maritime Museum in St. Michaels is offering Maryland Department of Natural Resources-approved boater safety courses via Zoom. Three-session courses are scheduled 5–8 p.m. May 26, June 2 & 9; July 12–14; and Aug. 25, Sept. 1& 8. Participants learn how to safely operate a vessel on Maryland waterways. Individuals, families welcome. Maryland boaters born after July 1, 1972, are required to have a Certificate of Boating Safety Education. Participants must attend all sessions and pass the DNR exam to earn a certificate, which is good for life. Fee: $25/person. Participants must be 10 or older. Early registration recommended: cbmm.org/boatersafety. Info: dnr.maryland.gov/boating.

### Trace organic contaminants seminar

The University of Maryland Center for Environmental Science's Horn Point Laboratory in Cambridge invites the public to a virtual seminar, *Fate of Trace Organic Contaminants in Urban Stormwater Green Infrastructure,* 11 a.m. May 19. The talk by Elodie Passeport of the University of Toronto is part of UMCES' spring seminar series, *The Universe to Unicellular Organisms & Everything In-Between.* Watch live or via a recording at your convenience. The seminar is

*See* **BULLETIN**, *page 44*

## CHESAPEAKE CHALLENGE

### ANSWERS TO Am I Blue?

on page 33

1. All of these animals have blue blood. 2. Black flies and mosquitoes (A &C) are attracted to dark blue. Gnats are attracted to blue. Ticks (D) are thought to be attracted to light colors. 3. C 4. A 5. A

# BULLETIN BOARD

**BULLETIN** *from page 43*

free. Register to receive a link: umces.edu/hpl.

## RESOURCES

### WATERSHEDWIDE

#### Farm tool, equipment sharing forum

Future Harvest / Chesapeake Alliance for Sustainable Agriculture has created a tool & equipment sharing platform to facilitate farmer-to-farmer lending, renting, or custom hiring with the aim of increasing access to tools. Farmers with tools that aren't used every day can fill out, submit a form that sets terms for the lending arrangement: fee charged; length of rental period; pick-up, delivery options; custom hire availability; other details. Equipment submitted is automatically listed under one of five categories: hand tools, tractors, implements, shop tools and other. Users can search by any field to locate nearby equipment that meets their needs. Farmers who would like to try out equipment before buying it are also welcome to browse the list. The site is regularly updated, check for new listings. Info: Lisa Garfield at Lisa@futureharvest.org

#### Susquehanna River CD

The Middle Susquehanna Riverkeeper presents *Songs of the Susquehanna 2021*, a CD containing 20 original river-inspired songs from 36 regional musicians and musical groups. The concept is to collect a diverse mix of music highlighting the environmental, recreational, historical, therapeutic aspects of the river and its tributaries, as well as give musicians a platform to share their skills, connect with audiences after a year of lost gigs. The cost is $15; all proceeds benefit the work of the Susquehanna Riverkeeper. CDs are available at the Riverkeeper office in Sunbury or can be ordered by mail. An online download option for songs via music streaming platforms is being explored. Info and lyrics: middlesusquehannariverkeeper.org/song-project. A 2022 CD is being planned with a Jan. 31 submission deadline. For help in finding a resource to create a polished recording, email Riverkeeper John Zaktansky at midsusriver@gmail.com.

### MARYLAND

#### African American heritage grants

The Maryland Commission on African American Heritage and Culture and Maryland Historical Trust are awarding grants for construction projects on properties important to African American history, culture in Maryland. Applicants may apply for grants of up to $100,000 for: acquisition; rehabilitation/capital improvements; new construction; predevelopment costs such as studies, surveys, plans & specifications; and architectural, engineering or other services directly related to preconstruction work for a capital project. To learn about the program or get an application, search engine: African American Heritage Preservation Program. Info: Charlotte Lake at charlotte.lake@maryland.gov or Chanel Compton at chanel.compton@maryland.gov.

#### Free streamside buffers

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

#### Million Acre Challenge

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

- *Resources:* Peer-reviewed research, articles, reports.
- *Farmer spotlights:* Learn what others are doing.
- *Ways to join the challenge:* Farmers, consumers, service providers, researchers, funders, can find out how to get involved in the challenge. Information will be updated. Visit @soilchallenge on all social media platforms for updates. Info: Amanda Cather at amanda@millionacrechallenge.org

#### Fishing report

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

## EVENTS / PROGRAMS

### WATERSHEDWIDE

#### Garden Thyme podcasts

Get timely gardening tips, information about native plants, more during the *Garden Thyme* podcast presented by the University of Maryland Extension. May's topic, *Growing Spring Herbs* will be released on May 7. A mini-episode on Brood X Cicadas with Mike Raupp should be released in mid-May. Podcasts typically include a native plant of the month, bug of the month and timely garden tips. If you have garden-related questions, email UMEGardenPodcast@gmail.com, visit facebook.com/GardenThymePodcast. Info: UME Home & Garden Information Center at extension.umd.edu/hgic. Watch past episodes at gardenthymepodcast.buzzsprout.com or on iTunes, Stitcher, Spotify and Google.

### MARYLAND

#### Cromwell Valley Park

Take part in a May event at Cromwell Valley Park's Nature Center in Cockeysville. Ages 17 & younger must be accompanied by an adult. No walk-ins. Preregistration (online only) required for programs: cromwellvalleypark.campbrainregistration.com. Preregistration closes 4 p.m. Friday for weekend programs. Participants must sign Baltimore County liability and COVID-19 waivers when registering. Info: 410-887-2503, cromwellvalleypark.org, info@cromwellvalleypark.org. For disability-related accommodations, call 410-887-5370 or 410-887-5319 (TTY), giving as much notice as possible.

- *Saturday Bird Walks:* 8–10 a.m. May 8, 22, 29. Meet at Willow Grove gravel parking lot sign. Ages 14+ Free.
- *Adult Garden Club:* 8:30–10:30 a.m. Mondays, through Oct. 25 or Thursdays through Oct. 28. Children's Garden. Adults. Like to garden but don't have space/deer-proof fence? Grow your own vegetables, herbs, flowers at CVP; tend to shared garden plots. Park provides seeds, seedlings, tools. Attend one or both days each week, but register for *ONE* session only. Fee: $50.
- *Orioles - Neo-Tropical Migrants:* 11 a.m.–1 p.m. May 8. All ages. Look for an oriole nest, listen for its song, learn where it's been. Bring binoculars. Fee: $4.
- *Tea for Two:* 1–3 p.m. May 9. Ages 8+ Learn about natural teas' health benefits, gather local plants, have a hot cup of tea, then take the cup home. Fee: $7.
- *Colonial Coffee:* 1–3 p.m. May 15. Ages 14+ Learn where coffee came from, how it was processed in 18th century America. Fee: $5.
- *Hike through History:* 1–3 p.m. May 22. Adults. Historic homes, hidden civic works projects, mysterious grave sites. Discover the park's secrets. Prepare to walk, wear sturdy shoes. Fee: $4.
- *Beaver Valley:* 1–3 p.m. May 23. Ages 8+ Learn how these mammals shape the landscape, hike to see beaver-cut trees. Fee: $4.
- *Flower Moon Night Hike & Campfire:* 8–9:30 p.m. May 28. Ages 8+ Take a moonlit stroll, gather around the campfire for s'mores. Due to COVID-19 regulations — the park provides roasting sticks but participants must bring their own s'mores. Fee: $5.
- *Cicada Crunch:* 1–2:30 p.m. May 29. Ages 5+ Sample these delicious critters, learn about their role in local food chains. Fee: $5.
- *Frog Roundup:* 11 a.m.–12:30 p.m. May 30. Ages 8+ Hike to Marble Springs. Nets, capture containers provided. Wear waterproof shoes/boots. All creatures are returned to the pond after they are identified. Fee: $4.

#### Calvert Marine Museum

Visit a May event at the Calvert Marine Museum in Solomons. Ages 5 & older must wear a mask during their visit. The museum is operating at limited capacity with a timed entry system. Make a reservation before visiting. Admission is $9/adults; $7/seniors, military with valid ID, AAA and AARP members; $4/ages 5–12; free/children 5 & younger. Registration, links to virtual programs: calvertmarinemuseum.com.

- *Sea Squirts/Caterpillar to Butterfly:* 20-minute sessions meet at 11:15 a.m., 1:15 p.m., and 3:15 p.m. May 13. Ages 18 months to 3 years w/adult, are invited to discover the museum together through music, stories, activities. Story time & a carry-out craft, available while supplies last. Free w/admission. Limited capacity. No preregistration; sign up at admissions desk.
- *Public Cruise/Dee of St. Mary's:* 2:30–4:30 p.m. May 15 & 23. Ages 5+ Fee/$25 ages 13+; $15/ages 5–12. Limited seating to allow for social distancing. Preregistration required by noon the Friday before each cruise. Visit: calvertmarinemuseum.com/238/Dee-of-St-Marys-Cruises.
- *Maryland in the Age of Sail/Battle of Hampton Roads & the Civil War on the Chesapeake and in Maryland:* 5 p.m. May 20. Virtual Zoom lecture. Chronicle the transition from the sailing Navy to one made of iron. Learn why the Bay was important during the Civil War. Free. Visit website for link. Info: Mark.Wilkins@calvertcountymd.gov, 410-326-2042 x8046.
- *Night at the Museum for Friends with Disabilities:* 5–7 p.m. May 14. The museum, grounds will be open exclusively for guests with disabilities, their families, friends, caregivers. Learn about skates & rays, fish, fossils, maritime history, river otters in a supportive environment. Take a 30-minute cruise on *Wm. B. Tennison*. Proper face coverings required. Free. Preregistration required: webtrac.co.cal.md.us, search for Activity #470773 and #470774. Guests registering for the cruise must call Calvert County Parks & Recreation Therapeutic Recreation Services office directly at 410-535-1600 x8205. Free.
- *Minnows/Hungry Caterpillar:* 20-minute sessions scheduled 10:15 a.m.; 11:15 a.m.;

12:45 p.m.; 1:45 p.m.; 3:15 p.m. & 4:15 p.m. May 20 & 27. Ages 3–5 w/adult. Story & carry-out craft (while supplies last). Free w/admission. Limited capacity. No preregistration; sign up at admissions desk.

- *Maryland in the Age of Sail/Development of Chesapeake Bay Watercraft & Fishing:* 5 p.m. June 3. Virtual Zoom lecture. Learn about the design, construction, history of skipjacks, bugeyes, draketails, crabbing skiffs, lesser-known vessels that have worked the Bay. Free. See website for link. Info: Mark.Wilkins@calvertcountymd.gov, 410-326-2042 x8046.
- *Toy Boat Building:* 1–4 p.m. May 22. Corbin Nature Pavilion. Ages 5+ Sponsored by Patuxent Small Craft Guild. $2 donation per boat requested. Space is limited; visitors accommodated on first-come, first-served basis.

### DNR photo contest

The Department of Natural Resources is accepting entries for its annual photo contest. Photographers, novice or professional, can enter for a chance to win cash, park passes and other prizes. Winning entries will be posted online, featured in an issue of *Maryland Natural Resource* magazine, placed in the department's 2022 wall calendar. Entries can include images from anywhere in Maryland featuring birds, insects, flora, recreation, scenic landscapes, weather and wildlife. First, second, and third place awarded for each season; an overall grand prize winner will be chosen from the first-place winners. Social media users will also be able to select a "fan favorite" via facebook.com/MarylandDNR. Photographers may submit up to three entries for $10 with additional entries (no limit) at $3 each before Aug. 5, 2021. All photos must be original and unpublished. The contest is open to residents and visitors alike, but only photos of Maryland will qualify to win.

### African American schoolhouse

The Drayden African American Schoolhouse in Drayden has scheduled open houses 11 a.m.–2 p.m. June 5, June 19 & 20, July 3, Aug. 7, Sept. 4, and Oct. 2. Drayden, one of the nation's best-preserved one-room African American schoolhouses, has a rich history and played an important educational role in St. Mary's County. Visitors will learn real stories about its students up until the mid-20th century. Staff, volunteers will offer tours, answer questions. Info: 301-994-1471, Facebook.com/DraydenSchool.

### Ladew Topiary Gardens

Join ecologist John Canoles 9:30–11:30 a.m. June 8 at Ladew Topiary Gardens Monkton, for a leisurely *Tree and Shrub ID Hike* on the grounds' Nature Walk. Participants, ages 13+, should wear hiking gear; the 1-mile trail can be muddy. Registration required. $20 fee includes admission to the gardens. Info: 410-557-9466, 410-557-9570, information@ladewgardens.com, adewgardens.com.

### Anita C. Leight Estuary Center

Participate in one of the programs at Anita C. Leight Estuary Center, Abingdon. Preregistration required for all programs. Ages 12 & younger must be with an adult. Info: 410-612-1688, 410-879-2000 x1688, otterpointcreek.org. Schedule:

- *Kayak Cruising on the Creek:* 10 a.m.–12:30 p.m. May 14 & 28. Adults. Explore nooks, crannies of Otter Point Creek, upper Bush River; track spring changes. Fee: $12.
- *Meet a Critter:* 2 p.m. May 15. See a live animal up close, discover what makes it special. Free.
- *Hurricanes!* 12:30–1:30 p.m. May 16. Ages 8+ Learn about what causes Atlantic hurricanes, will this season bring Maryland hurricanes, how they get their names. Fee: $3.
- *Cicada Madness Hike:* 10:30 a.m.–12 p.m. May 22. Ages 6+ Learn about the Brood X cicadas. Venture into the woods to observe them. Fee: $10/family.
- *Bay Bingo Canoe:* 2:30–5 p.m. May 22. Ages 8+ Learn about estuaries while playing bingo. Participation, bingo prizes. Fee: $15.
- *Tails & Tots:* 1 p.m. May 23. Ages 0–6. Stories, songs, activities. Free.
- *Pollinator Palooza*: 3–4:30 p.m. May 23. Ages 7+ Learn about Maryland's pollinators, their favorite wild plants, how to provide proper habitat for them. Fee: $6.
- *Super Tide Friday Float:* 9:30–11 a.m. May 28. Ages 2+ Ride the rising tide to see areas of the reserve rarely accessible to the *Water Strider.* Fee: $10.
- *High Tide Marsh Exploration Canoe:* 9–11:30 a.m. May 29. Ages 8+ This unusually high tide allows access to hidden parts of the marsh. Explore seldom seen reaches of the creek. Fee: $12.
- *Fun with Macro-Litter & Micro-Plastics:* 3–4:30 p.m. May 30. Ages 8+ Learn about the problems of seen and unseen litter, how to reduce it, use it, lose it. Hike, shoreline litter cleanup, eco-theme craft. Fee: $4.

### Severn River floating classroom

Tour the Severn aboard the Severn River Association's Floating Classroom's 20-foot skiff, *Sea Girl*. During the tour, participants learn how oxygen and salinity levels— which they collect — affect oyster habitat, dead zones, oyster restoration efforts and wildlife that visit, depend on the Severn. They also sample, identify, map underwater grasses, check on oysters, review other habitat for the river's creatures. The SRA practices COVID-19 safety measures and limits the class size to four students plus a parent/guardian. Info: Info@severnriver.org. Put "classroom" in the message box.

## VIRTUAL EXPERIENCES

### Middle Susquehanna River podcasts

The Middle Susquehanna River Association has compiled a library of podcast interviews with outdoor influencers from throughout the watershed. To access the podcasts, put "middle susquehanna river podcasts" in your search engine. Guests speakers include:

- Peter Petokas, a hellbender expert with 15 years experience, talks about the amphibian's dwindling populations in our watershed, its importance, what can be done.
- The Foundation for Pennsylvania Watersheds' John Dawes discusses how his agency helps small watershed groups, the dangers of acid mine drainage, fracking, other waterway concerns.
- ProtectNorthernPA.org founder Diana Dakey discusses concerns about the production, transportation of liquified natural gas.
- Teen kayaker and angler Lila Oast discusses how kayaking has opened doors for her.
- Outdoor educator Jon Beam and Audubon member Gary Metzger discuss threats to the watershed's duck species.
- Renee Carey of the Northcentral PA Conservancy discusses the importance of preservation, public access.
- Benjamin Hayes, director of Bucknell University's Watershed Sciences & Engineering Program, discuss the health of the Middle Susquehanna River.
- Salmon angler Steve Kurian discusses the benefits of clean water.
- Educator Van Wagner discusses his Eels in the Classroom program, the importance of eels.
- Waterkeeper Alliance Executive Director Marc Yaggi discusses growing up in the Middle Susquehanna watershed, his quest in the fight for clean water.
- Outdoor educator Jolene Connelly discusses the importance of getting youth, women on waterways.
- Diving instructor Rich Best discusses trends, treasures, underwater threats in the Susquehanna.
- Pennsylvania Organization for Watersheds and Rivers spokesperson Tali MacArthur discusses the importance of assisting a watershed group.
- Falconer Mike Dupuy discusses the raptors of the Middle Susquehanna River.
- Pennsylvania Fish & Boat Commission spokesman Mike Parker discusses the agency's efforts during COVID-19 pandemic, historic unexpected start to trout season.
- Wesley Forest Camp Director Emily Sliski will share stories of getting young people engaged with nature at camp, on the Penns Creek.
- Professional angler and YouTuber John Oast discusses how he got his start, what he has learned along the way, observations of the river.
- Biologist David Lieb discusses the concerning trend of exotic crayfish eradicating native species in the watershed, how it is impacting the ecosystem.

### Virtual Bay trivia nights

The Chesapeake Bay Maritime Museum in St. Michael's, MD, invites people to put their Bay knowledge to the test during two virtual trivia nights scheduled 8–9 p.m. May 24 & July 26. Create your own team or connect with friends virtually to join the game. Non-museum members are asked to pay what they can by adding a donation at checkout. Register: cbmm.org/virtualtrivia. For tech tips on how to run a trivia team: registration@cbmm.org.

### Tour Maryland parks

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

### Connect with nature

The Maryland Department of Natural Resources is providing an assortment of free, low-cost programs for various grade levels. To learn about birds, bees, scat, leaves, nature journals, put MD wildlife education resources" in your search engine. To learn what a ranger does, web search: Maryland Junior Ranger Program Maryland DNR.

### Wayback Wednesdays

St. Mary's County (MD) Museums are bringing history to people who are unable to visit them during the COVID-19 pandemic. Their weekly video series, *Wayback Wednesdays*, features everything from the quirky to the fascinating in the county's history. At present, there are more than 30 titles in the series, including: *Horse Racing in Leonardtown, The Old Jail & the Underground Railroad, John Donahoo & the Lighthouses of St. Mary's County* and *The Pony Express & U.S. Postal Service in St. Mary's County*. Visit facebook.com/watch/SCIMuseum/817869892069064/.

# To know nature is to love it — and to pitch in to care for it


**By Adam Bray**

*People who connect with the outdoors recreationally are often more motivated to participate in projects and programs that promote stewardship of natural resources. (Alicia Pimental/Chesapeake Bay Program 2013)*

They say a picture is worth a thousand words. If that's true, how many words is an experience worth? Seeing a photo, watching a video or even reading about a subject adds to one's knowledge of it, but to truly understand something you really have to get out and experience it firsthand.

During the past year, citizens all around the Chesapeake Bay watershed have been doing exactly that. Due to lockdowns and social distancing measures, countless people have increased their awareness and understanding of the Bay's regional ecosystem simply by going outside and enjoying its diverse natural resources. From camping and hiking in forests to boating and fishing in streams and rivers, or just sitting on a bench in a city park, people have immersed themselves in nature more than ever, experiencing its beauty and benefits.

The first Chesapeake Bay Awareness Week was observed the second week of June 2016. Originally championed by the Chesapeake Bay Commission and adopted by the legislatures of Maryland, Pennsylvania and Virginia, the week is devoted to raising awareness of the importance of the Bay watershed and highlighting opportunities for citizens to play a role in restoring its lands, rivers and streams.

In previous years, local governments, businesses and environmental nonprofits like the Alliance for the Chesapeake Bay have come together to host educational events around the watershed to highlight and celebrate the importance of the Bay for our region, the nation and the world. But, as successful as those efforts might have been in their own ways, none was as universally effective as the COVID-19 pandemic in getting people outdoors and meaningfully connected to nature. With their favorite indoor activities shut down and mitigation efforts in place, countless people — many for the first time — have turned to nature as a place for recreation, entertainment, comfort and solace.

## Connecting dots

Data show a huge increase in the number of people using the region's parks and green spaces last year. For many, parks have become a necessary outlet to cope with pandemic-induced stress and anxiety. In the world of Chesapeake Bay restoration, green spaces have long been associated with environmental sustainability, but this last year has shown us just how vital they are for social and personal sustainability, too. We've learned the hard way that staying indoors, cut off from friends and all but immediate family is not a sustainable way for most humans to live.

But here's the deeper question: As more of us become aware of not only the existence of parks and public green spaces but also just how important they are to society and the planet, will we become better stewards in preserving and protecting these resources? Will it make us better advocates, collectively, for creating more green spaces and increasing access for all citizens? It's difficult to find COVID-19 silver linings, but one potential positive impact of the pandemic is a burgeoning population of nature lovers, of newly engaged citizens who value and appreciate these public spaces.

## What can you do?

For the second year in a row, plans for in-person social events for Chesapeake Bay Awareness Week have been thwarted by this persistent pandemic. But, if you found comfort in the waters and lands of the Chesapeake Bay watershed last year, consider celebrating the week by going a step further, deepening your involvement in protecting and conserving the natural resources you've grown to love. Here are a few ideas:

- **Keep it up:** Continue to visit parks and enjoy nature. As vaccinations become readily available and restrictions on indoor social activities are lifted, don't forget about the comfort you found outdoors.
- **Volunteer:** There are many incredible environmental nonprofits in the watershed, and most of them need volunteers for trash cleanups, tree plantings, and monitoring and maintenance projects.
- **Donate:** Consider donating to an environmental nonprofit with a mission that is meaningful to you, like a stewardship group supporting your nearest park. Parks and other public green spaces, both big and small, need continued funding and support for maintenance and conservation.

Since 1971, the Alliance for the Chesapeake Bay has been uniting communities, companies and conservationists in our mission to improve the lands and waters of the Chesapeake Bay watershed. The past year presented all of us with unforeseen and unique challenges, but our 50 years of conservation experience tells us that establishing a close connection to a particular natural resource — a park, a river, a forest, whatever it might be — is one of the best ways to ignite a passion for protecting it.

In what ways have the last 12 months allowed you to connect with the watershed? Did you spend more time outside engaging with the watershed that you live, work and play in? If you're feeling that connection and want to get involved, please visit allianceforthebay.org to learn about how you can do your part. ■

*Steward's Corner is a column from the Alliance for the Chesapeake Bay. Adam Bray is the Alliance's operations specialist and Citizen Advisory Committee administrative assistant.*

# Red-tailed hawks looking for love, maybe a nest site near you


**By Mike Burke**

The white branches of the big sycamore looked like outstretched, bleached arms held up against the azure sky. On an upper branch, a big raptor perched upright and motionless. Just below, an even bigger bird completed the static scene.

It was early April, and the nation was dealing with a surge in coronavirus infections. My worries were temporarily interrupted by this pair of red-tailed hawks *(Buteo jamaicensis).* They were quiet now but would soon be busy, as new parents always are.

We tend to think of red-tails as solitary creatures because we ordinarily see them alone, perched on a fence post or soaring high over fields or parks. The reality is quite different. Every spring, these impressive hawks re-establish bonds with their lifelong partners. Red-tails can live to be 30 years old. Only death breaks their bond. Nevertheless, every year the male courts his mate anew. He flies high above the female, suddenly diving straight down before a dramatic turn brings him back to his original position. He repeats these "stoops" several times, ending by gently touching the back of the female with his talons

The red-tails in the sycamore will likely nest nearby in the tall trees at the edge of our community's picturesque campus. Just beyond, the county's Regent Forest Park provides a protective buffer.

Red-tails are the most common hawks in North America. They live year-round across the United States, Mexico and parts of the Caribbean. A small percentage lives in Central America. A portion of the U.S. population annually ventures into Canada and Alaska to breed.

In the Chesapeake Bay region, most red-tails begin to court in May. Both parents incubate the two or three eggs for a month. The chicks hatch in July, but it takes another six weeks before the birds fledge. Even though they are adult-size, the youngsters will spend the rest of the year near their parents, periodically begging for food.

As with most raptors, red-tail females are noticeably bigger than their mates. Some ornithologists speculate the extra size is needed to help the female through the rigors of egg-laying, brooding and parenting. But the male is responsible for supplementing the diet of his mate as well as being the sole source of food for the newborn chicks. In truth, the demands are heavy on both parents.

*A red-tailed hawk perches on a cemetery statue in New York. (Rhododendrites, CC-BY-SA-4.0)*

*Red-tailed hawks can live to be 30 years old. (Virginia Department of Conservation and Recreation)*

The red-tail is a carnivore, but it is also a generalist in food selection. Voles and mice are its dietary mainstays. But these hawks also eat rabbits, squirrels, birds, reptiles, amphibians, arthropods and fresh carrion. In the West, red-tails eat prairie dogs, ferrets and other small and medium-size mammals.

Red-tails are buteos, a group of raptors characterized by large, rounded wings and short tails. The anatomy is ideally suited for soaring. Using their tails as rudders, the birds navigate the skies with ease. They use their extraordinary eyesight to locate prey scampering through the landscape below. Red-tails often land adjacent to their prey and then pounce.

Most red-tail hunting is not done on the wing. Typically, the hawk finds a high perch and waits patiently for its next meal to appear. A sudden dive follows, and the creature below is dispatched with speed and lethal skill.

Open landscapes are this hawk's milieu. You'll see them on fence posts overlooking a farm field, on a telephone pole looking out on a meadow or even in a sycamore tree watching the open spaces around a retirement community. In the desert Southwest, red-tails perch on a saguaro cacti. In New York City, a pair of red-tails became celebrities as they took up residence on a high ledge of an apartment building overlooking Central Park. In 1999, the book *Red-Tails in Love* celebrated the pair.

Red-tailed hawks of the eastern U.S. are easy to describe. The pair I saw were brown above and mostly white underneath except for a "belly band" of brown feathers. The sexes look alike, and both sport gorgeous red tails. That said, there are more than a dozen other subspecies of red-tails, and they represent huge variability in coloring. Some are extremely pale, almost white. Others are quite dark and have no discernable belly band. Some don't even have red tails. The variability in plumage is matched by the variety of landscapes the birds inhabit. The success of the species derives in large part from its adaptability.

Today, I wait for signs of another successful red-tail nest here near my home. All around us, development is roaring ahead with new housing and retail stores. Fields that used to support voles and rabbits and mice are now covered with buildings and parking lots. Even here in my neighborhood, an oasis of trees and meadows and lawns, there are plans for expansion.

Will our red-tails find enough food in this increasingly paved-over landscape? Will they adapt fast enough to survive in a rapidly warming world? Red-tails are remarkably resilient, so perhaps mice at the dumpster will replace voles in the field. Pigeons may supplant songbirds. The hawks, I pray, will adapt.

I'll be watching for that nest, looking for the next generation, hoping the red-tails' powerful wings will lift my hopes, finding a way in turbulent times. ■

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

# A spring without birds? Our fault, ours to fix


**By Kathy Reshetiloff**

According to a report published in *Science,* written by researchers from seven institutions, North America's bird population has declined by nearly a third since 1970. The estimated population of breeding adult birds on the continent was roughly 10 billion in 1970. By 2019, when the report was published, the number had fallen to a little more than 7 billion, a decline of 2.9 million birds in just 50 years — across the majority of species and in most of the varied habitats.

The decline has been seen not only in rare, threatened or endangered birds, but also in what some would think of as "common" species — dark-eyed juncos, white-throated sparrows, barn swallows, eastern meadowlarks, Baltimore orioles and wood thrushes. More than 90% of the total decline was in just 12 bird families, including sparrows, warblers, blackbirds, swallows and finches.

Although losing nearly 3 billion birds in less than a person's lifetime may seem alarming to many people, others may not see the significance in how this loss can affect our lives and our environment. So why should you, your friends or your family care about birds?

■ **Your health:** Experiencing nature and observing wildlife, including birds, has been shown to improve physical health, decrease stress, and increase education and workplace satisfaction. In fact, listening to bird songs and calls can help improve a person's mood and attention.

■ **Pest control:** Birds are our best natural insect control, eating tons of insects annually. As green leaves emerge each spring, so do millions of caterpillars and insects. Coinciding with this event, an array of birds, like orioles, vireos, flycatchers, warblers and swallows return to North America and feast upon the abundant insects. Insect-eating birds protect farm crops from pest damage, free of charge

■ **Clean water:** Roughly 65% of U.S. drinking water comes from rivers and streams. By planting forest buffers and hedgerows along these waterways, we not only create habitat for birds, we help protect our waterways and improve water quality.

■ **The economy:** Birds and bird-related activities have a significant economic impact. When people purchase bird food and bird feeders or pay for travel and accommodations when they go birdwatching or bird hunting or attend birding festivals, they help create thousands of jobs and generate millions of dollars in tax revenue. According to an addendum to the 2016 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* report, 45 million Americans participated in bird-related recreation, spending $39 billion on equipment and trips, pumping $96 billion to the overall economy.

Here are some simple actions we can all take to help birds.

■ **Make windows less deadly:** In the U.S., an estimated 365 million to 988 million birds die each year from collisions with glass. During the day, birds fly into windows, often fatally, because what we see as a reflection, they see as more air space. At night, during spring and fall bird migrations, some birds are attracted to lighted buildings, resulting in building collisions or exhaustion as they often circle around them. A few simple steps can save birds. On the outside of the window, install screens or break up reflections some other way — using film, tape, paint or even free-hanging lengths of cord or thick string, spaced a few inches apart. Check with local birding organizations for products you can apply to windows. At night, turn off unneeded lights or close blinds or curtains.

■ **Keep cats indoors:** Cats make great pets but instinctively hunt and kill birds and other wild animals even when they are well-fed. This not only affects birds and small mammals, but cats themselves can pick up diseases and parasites from hunting. You can save birds and keep your cats healthy by keeping the natural hunters indoors and providing them with engaging toys or creating a semi-outdoor enclosure, or "catio," as many cat owners do.

■ **Less lawn, more natives:** More development means less wetlands, forests and meadows — habitats that are critical for birds to rest, feed, nest and raise their young. The typical yard, composed of large swaths of turf grass, doesn't provide enough food, homes or protection for birds. We can all support birds and other wildlife by replacing some lawn area with native grasses, flowers, shrubs and trees.

*Birdwatchers gather (in pre-COVID days) on a bridge at the Adkins Arboretum in Maryland's Caroline County. (Willcook3, CC-BY-SA-4.0)*

■ **Go easy on the pesticides:** Common weed and insect killers can be toxic to wildlife. Pesticides can harm birds directly through contact or if birds eat contaminated seeds, insects or other foods or prey. Many birds feed exclusively on insects, so fewer insects equals fewer birds. Reduce your use of pesticides or, better yet, eliminate them altogether.

■ **Drink shade-grown coffee:** Many of the migratory birds in North America spend their winters in Mexico, Central and South America and the Caribbean. These areas have lots of coffee plantations, many of which follow the standard agricultural practice of clearing trees (bird habitat) so they can plant their crop in open fields. But coffee can be grown underneath a forest canopy, and it is in many places. Coffee grown in the shade conserves the forest ecosystem and the birds that depend on them. If you drink coffee, consider switching to a shade-grown brand.

■ **Cut back on plastics:** Plastics pollute our oceans, bays and rivers. Birds, especially seabirds and shorebirds, are especially threatened by plastics. They, and other wildlife like turtles, often eat plastic, having mistaken it for food. We can all do our part in reducing plastic pollution by not using single-use plastic items like bags, bottles, wraps and disposable utensils. Choose reusable items instead.

*The cerulean warbler population has declined 70% since the 1970s. (Alan Schmierer, CC Zero 1.0)*

■ **Watch, count and share:** Monitoring birds is essential to help protect them, but tracking birds across the United States and the globe is a huge undertaking. You can get involved in bird conservation by becoming a citizen scientist, helping researchers answer key questions about birds — such as arrival dates, abundance and departure dates of migratory birds, as well as reporting sightings of rare and common birds. There are many opportunities to observe and report bird findings. Join a project like eBird, Project FeederWatch, the Christmas Bird Count or Breeding Bird Survey to work with other citizen scientists and report your bird observations. ■

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