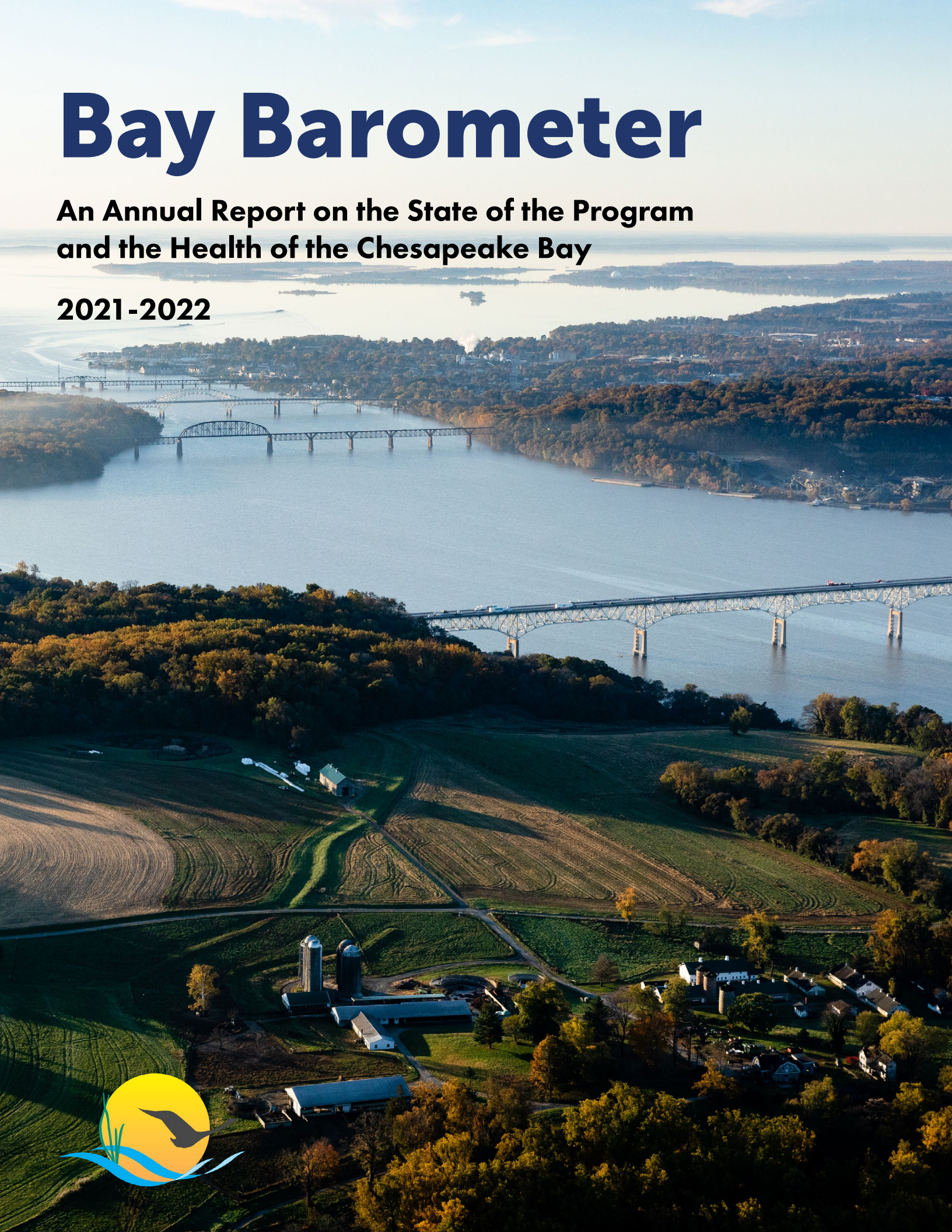
Bay Barometer

An Annual Report on the State of the Program and the Health of the Chesapeake Bay

2021-2022



Letter from the Director

Since becoming the Chesapeake Bay Program's new director in June 2022, I have been inspired by the talented and dedicated team working within this historic partnership. Our staff of over 100 experts, enthusiasts, scientists and specialists use their expertise for the betterment of the Chesapeake Bay watershed, truly demonstrating a passion for the Bay Program's three pillars of science, restoration and partnership.

As you will see in this report, the science indicates that improvements in watershed health are being made. Despite a growing population with more potential sources for pollution, the amount of nitrogen, phosphorus and sediment entering the Bay has declined since monitoring began in 1985. And yet we still have more work to do. As outcomes related to water quality, blue crabs and Bay grasses worsen or fluctuate, it is imperative that we guide restoration within the Chesapeake using sound data and sophisticated monitoring and modeling.

Though we often think of the Bay for its iconic wildlife, restoring the watershed is both an ecological and human issue. As we celebrate the 50th Anniversary of the Clean Water Act, which in many ways was the impetus for the creation of the Chesapeake Bay Program, we strive to provide healthy lands and water for people to enjoy, make communities more resilient to the impacts of climate change, and create new opportunities for businesses, schools and families to benefit from this priceless natural resource.

The Chesapeake Bay Program celebrates its 40th anniversary in 2023. And the verifiable fact is that we are better off now due to a partnership approach toward restoring the watershed. For the next 40 years, we will continue to strengthen collaboration and expand our network of partners to include all communities within the region, especially those historically underrepresented in restoration.

Now is the time to take a big step forward in cleaning up Chesapeake waters as we look toward 2025 and beyond. New funding from the American Rescue Plan and the Bipartisan Infrastructure Law will supercharge future initiatives through the lens of diversity, equity, inclusion, accessibility and justice, and will allow us to further our impact in neighborhoods with environmental concerns and communities of color.

I hope you all will join us in this critical endeavor.

Dr. Kandis Boyd
Director
Chesapeake Bay Program

Chesapeake Bay Health

STATUS

Toxic Contaminants

In 2018, 84% of the Chesapeake Bay's tidal segments were partially or fully impaired by toxic contaminants. This is an increase from 81.5% in 2016.

Underwater grasses

Approximately 67,470 acres of underwater grasses were mapped in the Chesapeake Bay in 2021, a 7% increase from 2020.

Blue Crabs

Between 2021 and 2022, the abundance of adult (age 1+) female blue crabs in the Chesapeake Bay decreased 39% from 158 million to 97 million.

Water Quality

An estimated 29.6% of the Bay and its tidal tributaries met water quality standards during the 2018-2020 assessment period, a 3.5% decrease from the 2017-2019 period.

Chesapeake Bay Restoration

STATUS

Forest buffers

In 2020, 169 miles of forest buffers were planted along rivers and streams in the Chesapeake Bay watershed.

Sustainable schools

In 2021, 14% of public and charter schools in the Chesapeake Bay watershed—597 schools in all—were certified sustainable.

Public access

Thirty-one new public access sites were opened on or around the Chesapeake Bay in 2021, with 237 opened since 2010.

Oysters

As of 2021, oyster habitat has been restored in six of the 10 originally selected tributaries.

Reducing pollution

Between 2020 and 2021, pollution loads are estimated to have been reduced by:

- Nitrogen: 1.4 million pounds
- Phosphorus: 0.004 million pounds
- Sediment: 74.2 million pounds

All of these outcomes were updated by the partnership in 2022. Learn more at: chesapeakeprogress.com

The Chesapeake Bay Program

The Chesapeake Bay Program is a regional partnership that works across political and geographic boundaries to protect and restore the Chesapeake Bay watershed. Our partners include the U.S. Environmental Protection Agency, the Chesapeake Bay Commission, the District of Columbia and the states of Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia. Through the Bay Program, federal, state and local agencies, non-profit organizations, academic institutions and residents come together to secure a brighter future for the Bay region.

Bay Barometer

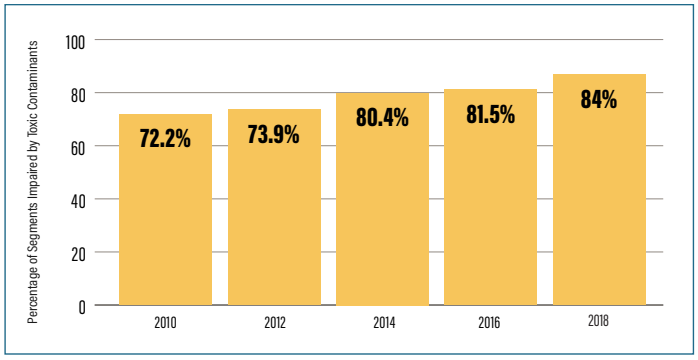
This report provides data related to a handful of outcomes outlined in the *Chesapeake Bay Watershed Agreement,* and highlights achievements made by the partnership in 2022. The nine outcomes showcased in the report—which were all updated in 2022—provide an overview of marine life, water quality and community engagement within the watershed. A full list of the status of all 31 outcomes is provided on the last page of this report.

Where do we get our data?

Data for this report is provided by a number of partners working within the Chesapeake Bay Program. Additional information for each outcome, including data sources, can be viewed at chesapeakeprogress.com. ChesapeakeProgress includes accurate, up-to-date and accessible data and information on more than two dozen indicators of environmental health, restoration and stewardship. The data and information on this site are drawn from a range of trusted sources, including government agencies, academic institutions, nongovernmental organizations and direct demographic and behavior surveys. In some cases, this data and information dates back three decades, and in others, data collection began shortly before the *Chesapeake Bay Watershed Agreement* was signed.

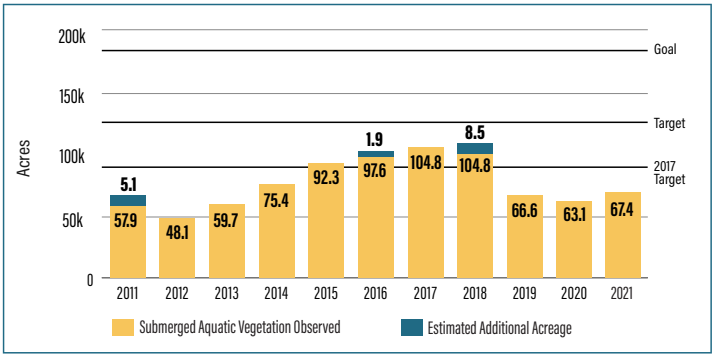
Chesapeake Health / TRENDS

TOXIC CONTAMINANTS



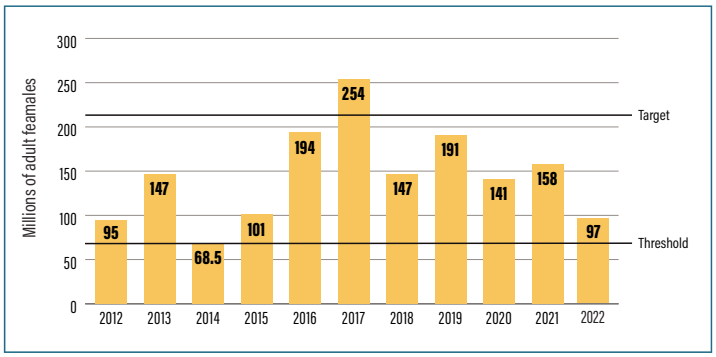
Since 2010, each biennial update has seen the number of tidal segments in the Chesapeake Bay that are listed as fully or partially impaired due to toxic contaminant increase, with the number reaching 84% in 2018.

UNDERWATER GRASSES



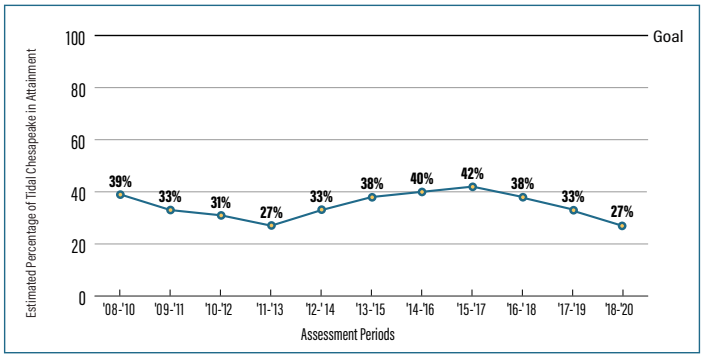
Underwater grasses (or submerged aquatic vegetation) continue to recover from a decline in 2019. The 67,470 acres mapped in 2021 is a 7% increase from 2020. This is 52% of the partnership's 2025 restoration target and 37% of our 185,000-acre goal.

ADULT FEMALE BLUE CRABS



Outside of 2014, the abundance of adult (age 1+) female blue crabs has remained above the 72.5 million threshold since 2003, indicating a sustainable population of blue crabs. However, the population has declined over the past few years. Since overfishing was not estimated to be occurring in 2021, the decline between 2021 and 2022 is of concern to experts who are in the process of identifying and addressing potential causes.

WATER QUALITY



Between 2018 and 2020, an estimated 29.6% of the Chesapeake Bay and its tidal tributaries met water quality standards. This score is lower than the previous 33.1% received during 2017 and 2019 and marks a consecutive decline in the assessment status since the record high of 42.2% achieved during 2015 and 2017.

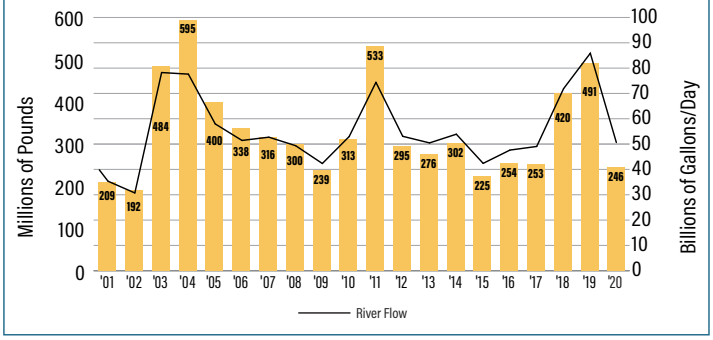
Trout Unlimited used forest buffers to help restore Reed Creek in Baker, West Virginia. (Photo by Will Parson/ Chesapeake Bay Program)

New actions to accelerate forest buffers & wetlands

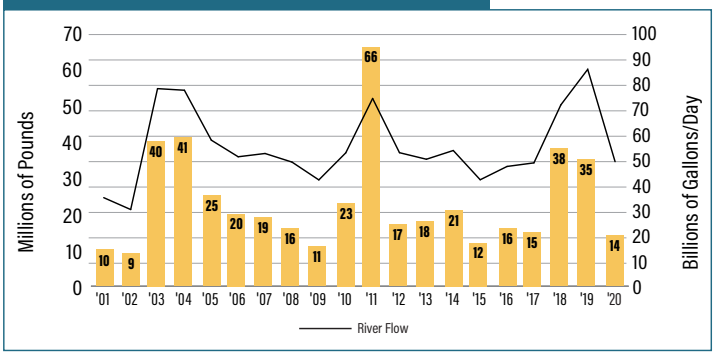
This year, two separate workshops were held in response to a Principals' Staff Committee recommendation to identify strategies for accelerating progress toward achieving the Forest Buffers and Wetlands outcomes, both of which have been identified as lagging in their progress. The Forest Buffers workshop provided information and discussion for the jurisdictions to build out their strategic action plans, while the Wetlands workshop sought to better understand the barriers toward meeting the outcome and identified approaches to increase the implementation of wetlands for 2025 and beyond. The outcome of the Wetlands workshop is the development of an action plan, that when implemented, will move the partnership closer to the 2025 target.

Pollution loads from river flows

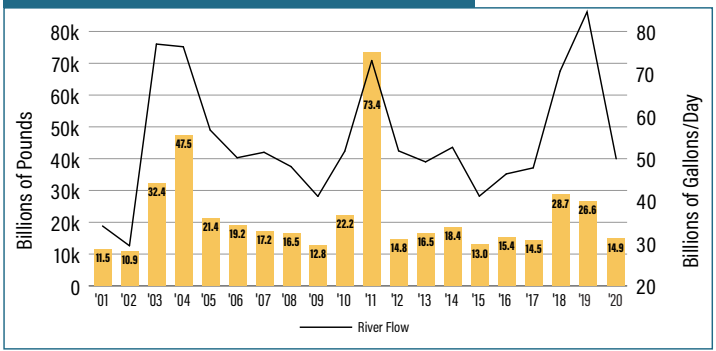
Nitrogen Loads and River Flow to the Chesapeake Bay (2001-2020)



Phosphorus Loads and River Flow to the Chesapeake Bay (2001-2020)

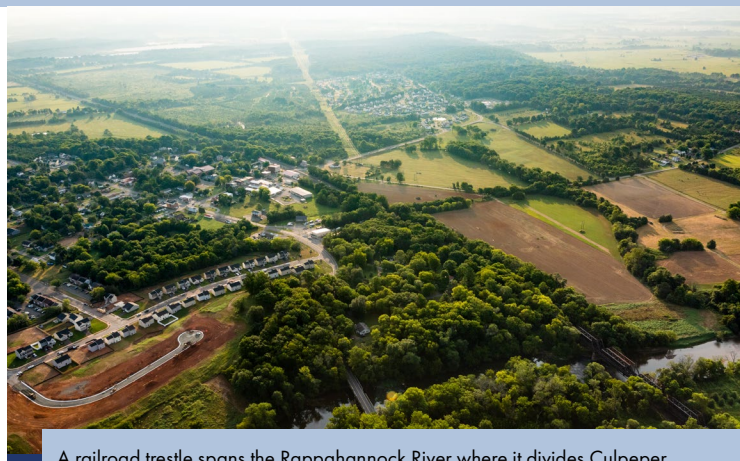


Sediment Loads and River Flow to the Chesapeake Bay (2001-2020)



The United States Geological Survey reported that during 2020, average river flow to the Bay measured 50.3 billion gallons per day, a 40% reduction from the previous year, which, at 83.7 billion gallons per day, was the highest recorded river flows to the Bay since measurements began in 1937. The corresponding pollutant loads entering the Bay in 2020 were approximately 246 million pounds of nitrogen, 14.4 million pounds of phosphorus and 14.9 billion pounds of sediment, a reduction of 49%, 47%, and 34% from the previous year, respectively.

For more detailed information go to:
chesapeakeprogress.com/clean-water/water-quality



A railroad trestle spans the Rappahannock River where it divides Culpeper County, bottom right, and Fauquier County, Virginia. (Photo by Will Parson/ Chesapeake Bay Program)

Ground-breaking technology advances restoration

In spring 2022, new data was released to update the 2013-14 one-meter-by-one-meter high-resolution dataset. In addition to updating the High-Resolution Land Cover and Land Use Data Project, the new data provides new land use and cover information captured in 2017-18 and includes a new data product that describes the changes in land use and cover throughout the Chesapeake Bay watershed. These data cover 99,000 square miles—an area comprising 206 counties that intersect or are adjacent to the watershed. The land change data product is the first such tool to map change at this large of a scale and is free to use.

Sustaining, enhancing & funding monitoring networks

At the request of the partnership's Principals' Staff Committee, the Scientific, Technical Assessment and Reporting Team prepared a report detailing a strategy to enhance current monitoring programs while addressing their shortcomings. The report found that while monitoring is critical to assess progress toward *Watershed Agreement* outcomes, it is often insufficient for many of them. Opportunities to address these shortfalls exist but funding them remains a challenge. The report suggests that the partnership invest in addressing these monitoring gaps by identifying which elements they wish to financially support. A meeting to discuss these recommendations will be held in fall 2022 with high-level monitoring program managers.

Chesapeake Restoration / TRENDS

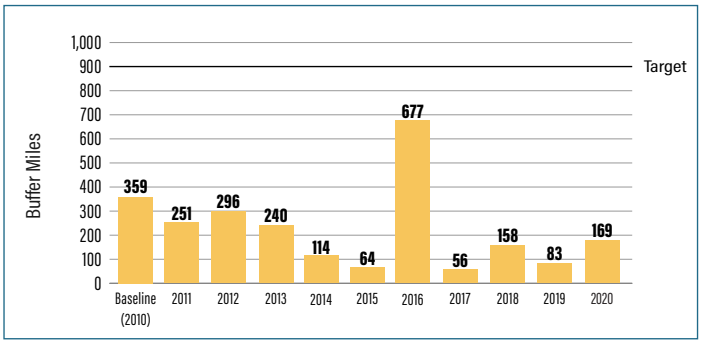
New tool targets resources to accelerate watershed restoration

Accelerated Conservation and Restoration, a new GIS tool, is helping Chesapeake Bay Program partners identify locations and activities throughout the watershed in which they can focus their funding to benefit multiple outcomes of the *Chesapeake Bay Watershed Agreement.* Interwoven with opportunities to enhance climate resiliency, the tool uses the themes of improving fish and wildlife populations and their habitats, increasing benefits to all people, water quality improvements and expanding land conservation efforts. The U.S. Geological Survey and the CBP GIS team has brought together various science-based applications, maps and tools into one convenient location so that partners can increase their return on funding investments while benefiting more outcomes.

Maryland Healthy Watersheds Assessment completed

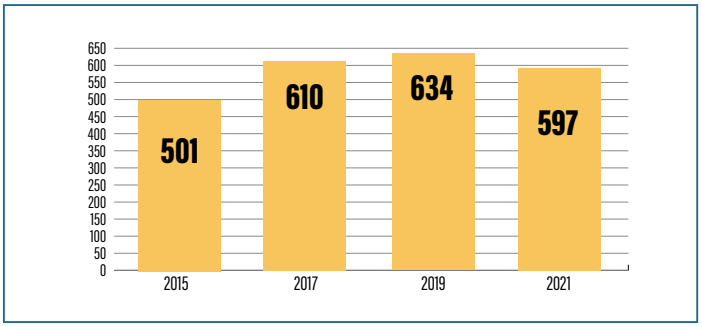
The Maryland Healthy Watersheds Assessment (MHWA) completed in 2022, establishes a framework of watershed health and vulnerability indicators for Maryland waters and watersheds. The state-specific assessment builds upon the completed Chesapeake Bay Healthy Watersheds Assessment and integrates state-specific data, as well as newly available high resolution land use land cover (2017/18) metrics. It is intended to inform watershed management decision-making to sustain the health of state-identified healthy watersheds, which has been defined in Maryland as the watersheds associated with its designated high-quality Tier II waters. Next steps are to expand the MHWA to the entire watershed and build upon the findings and recommendations in the assessment.

PLANTING FOREST BUFFERS



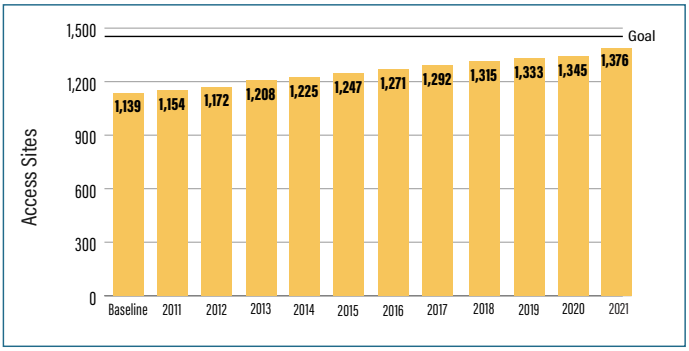
In 2020, 169 miles of forest buffers were planted along rivers and streams in the Chesapeake Bay watershed. While this is an increase from 2019 in which 83 miles of forest buffers were planted, it is 731 miles below the 900-mile-per-year target. Since 2010, the miles of forest buffers planted each year has averaged just 25% of the yearly restoration target that will help us reach our clean water goals.

GREENING SCHOOLS



In 2021, 14% of public and charter schools in the Chesapeake Bay watershed—597 schools in all—were certified sustainable. This marks a 6% decrease from the number of sustainable schools in the watershed in 2019. Experts believe the decrease is likely due to a decline in reporting during the COVID-19 pandemic.

INCREASING ACCESS TO THE BAY



Since 2010, when there were just 1,339 existing public access sites, 237 sites have been opened on and around the Chesapeake Bay. This marks 79% achievement of the partnership's goal to add 300 new access sites to the watershed by 2025.

A plan to move forward on the Conowingo Watershed Implementation Plan (WIP)

In January 2022, the EPA released their evaluation of the final Conowingo WIP, finding that the plan outlining the best management practices necessary to reduce an additional six million pounds of nitrogen and 0.26 million pounds of phosphorus would be effective. However, the evaluation noted that jurisdictions at the time did not have dedicated funding in place or firm commitments that would support the implementation of these practices by 2025. At the July Principals' Staff Committee meeting, members reached consensus that Maryland, New York and Pennsylvania could plan for reducing this extra pollution using a phased approach that extends beyond 2025, so it would allow the states more time to build an organizational infrastructure to implement the WIP. In 2026, implementation progress of the Conowingo WIP will be reassessed to determine if any adaptive management strategies are needed.

Phase III WIPs account for climate change

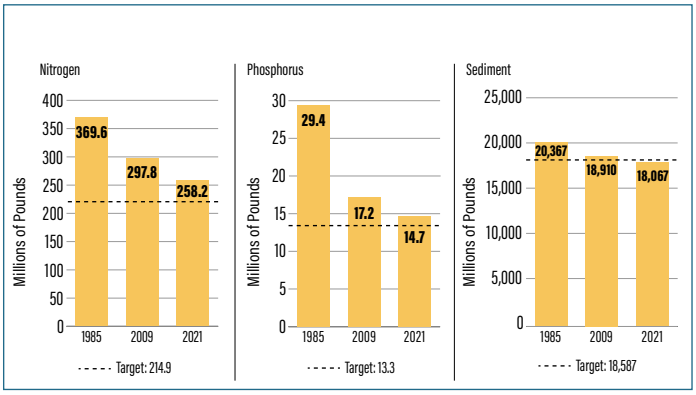
In 2020, the Principals' Staff Committee (PSC) updated the loads for nitrogen and phosphorus to account for climate change conditions through 2025 and issued a directive that by 2022 all jurisdictions would account for the additional nutrient loads in the existing 2019 Phase III WIP, a Phase III WIP addendum or in the two-year milestones. To determine the additional reductions needed, modeling scenarios were run for the years 2025, 2035, 2045 and 2055 to show the impacts from different competing climatic influences, such as sea level rise and temperature changes. The overall assessment predicts that future climate change impacts will continue and accelerate in the near-term, increasing the need for additional efforts to reduce pollution. At the August 2022 Principals' Staff Committee meeting, members reached consensus on extending the timeframe for jurisdictions to address additional climate-related reductions.

RESTORING OYSTER HABITAT

Tributary	Tributary Restoration Plan	Reef Construction & Seeding	Monitoring & Evaluation	Completed/ Target Acreage
Harris Creek (Md.)	Complete	Complete	In Progress	348/348
Little Choptank (Md.)	Complete	Complete	In Progress	358/358
Tred Avon (Md.)	Complete	Complete	In Progress	130/130
Upper St. Mary's (Md.)	Complete	In Progress	In Progress	49/60
Manokin (Md.)	Complete	In Progress	In Progress	35/441
Lafayette (Va.)	Complete	Complete	In Progress	82/80
Piankatank (Va.)	Complete	Complete	In Progress	444/438
Lynnhaven (Va.)	Complete	In Progress	In Progress	114/152
Lower York (Va.)	Complete	In Progress	In Progress	55/200
Great Wicomico (Va.)	Complete	Complete	In Progress	124/122
Eastern Branch of the Elizabeth River (Va.)	N/A	Complete	In Progress	24/20

As of the end of 2021, six of the 10 selected tributaries have been restored, in addition to an 11th bonus tributary, the Eastern Branch of the Elizabeth River. Restoration work is underway in the remaining four tributaries under this outcome and are expected to be completed by 2025.

MODELED POLLUTION LOADS



As of 2021, the best management practices in place to reduce pollution are estimated to achieve 49% of the nitrogen reductions, 64% of the phosphorus reductions and 100% of the sediment reductions needed to attain applicable water quality standards when compared to 2009 levels. According to our models, the pollution controls put in place in the Chesapeake Bay watershed between 2009 and 2021 are estimated to lower nitrogen loads 14%, phosphorus loads 14% and sediment loads 4%.

Between 2020 and 2021, nitrogen, phosphorus and sediment pollution were estimated to have decreased 1.4 million pounds, 0.004 million pounds and 74.2 million pounds, respectively. While the sediment reduction from 2020 to 2021 is above the average annual reduction for 2009 through 2020, nitrogen and phosphorus reductions for 2020 to 2021 are below average.

Deputy Secretary of the Delaware Department of Agriculture Nikko Brady, center, volunteers during a tree planting at Blackbird State Forest in New Castle County, Delaware, on Sept. 17, 2022. (Photo by Will Parson/ Chesapeake Bay Program)

Partnership responds to climate change impacts

In response to Executive Council Directive No. 21-1, *Collective Action for Climate Change*, signed in October 2021, a volunteer implementation team of Bay Program partners was formed to oversee its execution. The group completed a crosswalk of partner activities before drafting a workplan. Activities in the workplan are expected to be completed or substantially in progress by 2024 and calls for collaborative partner participation with regular Management Board direction. Also in response to the directive, federal partners of the Chesapeake Bay Program released a summary of actions they plan to take to counter climate change impacts in the Chesapeake Bay watershed. Each agency also committed to advance environmental justice and build partnerships with tribes and underserved communities, to assist in building their climate adaptive capacity.

Empowering change-makers in underrepresented communities

In 2022, the Chesapeake Bay Program advanced multiple aspects of its Diversity, Equity, Inclusion and Justice Implementation Plan (released in December 2021). A project that identified barriers and inequities encountered by underrepresented groups when engaging with the partnership was finalized. Based on those findings, the partnership is supporting a second effort that will help to bolster our partners' equitable funding strategies and reduce barriers that organizations from underrepresented communities face when accessing grant funding for their restoration work. The Bay Program also hosted an allyship training series to equip staff with the knowledge and skills to advance a culture of inclusion. Finally, the Bay Program translated key program documents to improve accessibility and expanded the dataset and capabilities of the partnership's Environmental Justice and Equity Dashboard.

Investments for the Bay

National funding supports the partnership's work

Infrastructure Investment and Jobs Act of 2021

This law boosts funding for the Chesapeake Bay Program by $238 million over five years. The $1.2 trillion infrastructure law also contains multiple other provisions that bring billions of dollars to the Bay watershed for improving water and air quality, fish passage, coastal resilience, transit upgrades and climate-friendly renewable energy.

Inflation Reduction Act

The historic Inflation Reduction Act of 2022 includes $369 billion in federal authorizations to invest in clean energy, reduce greenhouse gas emissions and invest in climate resiliency for landscapes across the United States, including coastal communities.

American Rescue Plan Act

With funding from this 2021 law, states and local governments of the Chesapeake Bay watershed are investing in improved water quality, sustainable energy, green jobs and more. The U.S. Environmental Protection Agency also received $100 million in funding from the act, split in half between environmental justice initiatives and air-quality monitoring.

Chesapeake WILD Act

Included in America's Conservation Enhancement Act, the Chesapeake WILD Act created a new grant program within the U.S. Fish and Wildlife Service to support habitat restoration in the Bay watershed. The program is authorized at $15 million.

America the Beautiful Initiative

In 2021, President Biden issued a call to action to conserve, connect and restore 30% of the nation's lands and waters by 2030. Partners within the Bay Program can apply for funding through this initiative annually to advance progress toward goals related to conservation and habitat for fish and wildlife.

Engagement and education

Bay Program takes part in events across the watershed

Smithsonian Folklife Festival

For 10 days during the Smithsonian Folklife Festival in Washington, D.C., the Chesapeake Bay Program sought to inspire conservation action to the over one million visitors. Our partners from Delaware, the District of Columbia, Maryland, Virginia and West Virginia each participated in a day of the festival alongside Bay Program staff.

Penn State's Ag Progress Days

Chesapeake Bay Program staff attended Pennsylvania's largest outdoor agricultural exposition to learn from the region's farmers and promote conservation practices and funding opportunities.

Naturally Latinos Conference

The Chesapeake Bay Program sponsored and exhibited at the Audubon Naturalist Society's 2022 Naturally Latinos Conference. Located in Washington, D.C., this conference is dedicated to connecting and empowering Latino/Latinx environmental leaders.

Chesapeake Bay Awareness Week

The Chesapeake Bay Program hosted its annual Chesapeake Bay Awareness Week with the theme "Restoration Brings Results." Events such as the Bernie Fowler Wade-In and Chesapeake Bay Foundation's Clean the Bay Day bookended the 10-day event, with a social media campaign celebrating restoration within the watershed.

Citizen's Advisory Committee

In 2022, the Citizens Advisory Committee (CAC) called upon the Chesapeake Executive Council to help enhance internal Diversity, Equity, Inclusion and Justice at the Bay Program by providing stipends to advisory committee members who are eligible for compensation as wage replacement for volunteer time and creating a watershed-wide approach to large-scale solar development for near-term and future planning beyond the 2025 Bay TMDL deadline.

Richard O'Keefe, left, and his husband John Chanik restored roughly 100 acres of forsest and wetland on a property they own outside of Morris, New York. (Photo by Will Parson/Chesapeake Bay Program)

Increasing environmental stewardship with Chesapeake Behavior Change

Chesapeake Behavior Change—an online tool designed to assist organizations and behavior change practitioners in promoting environmentally friendly stewardship behaviors—was launched in April 2022. The website integrates the data and findings from the groundbreaking Stewardship Index, first published in 2017, into a platform that is easily accessible for organizations interested in using the data to build their own behavior change campaigns. Chesapeake Behavior Change includes a database of behavior change campaigns, an introduction to behavior change complete with worksheets and helpful links, and trends and data from the Stewardship Index. The Stewardship Index was the first comprehensive survey of stewardship actions and attitudes in the Chesapeake Bay region, revealing what actions watershed residents were taking to protect clean water and restore environmental health.

Advising local governments on future restoration efforts

In 2022, the Local Government Advisory Committee (LGAC) played a key role in educating local decision-makers on how to use historic state and federal funding to resolve environmental challenges. The Advisory Committee hosted a webinar for over 170 local government leaders on how they could acquire funding from the Bipartisan Infrastructure Investment and Jobs Act for initiatives related to clean drinking water and wastewater and stormwater infrastructure. LGAC also brought back its Wandering Waterways series where local-decision makers from all parts of the watershed tour new and influential environmental efforts happening in their state and learn from each other on restoration efforts. Two-day tours took place in Maryland, Virginia and Pennsylvania, focusing on tourism and recreation, solutions to agricultural runoff, flood mitigation and more.

Examining high-profile scientific topics

The Scientific and Technical Advisory Committee (STAC) tackled several critical subjects in their 2022 workshops. Some covered topics that are often in the news, such as the implications of rising water temperatures in the Bay, and the impacts of PFAS on the Chesapeake ecosystem. Other workshops addressed improving modeling and mitigation strategies for ammonia emissions coming from the poultry industry; developing recommendations on monitoring and assessment for the next version of the tidal monitoring program by looking at chlorophyll a criteria, dissolved oxygen and water clarity; and evaluating opportunities to incentivize habitat benefits while better understanding how wetlands are considered in conservation practices.

Envisioning a greener future

Working with communities on green infrastructure blueprints

As sea level rise creates increased flooding across the Chesapeake Bay watershed, many low-income neighborhoods and communities of color are most vulnerable to its impacts.

To help manage flooding, the Chesapeake Bay Program advises a mix of "grey" infrastructure such as seawalls and storm drains and "green" infrastructure such as trees, rain gardens, swales and other natural landscapes. These green solutions not only absorb floodwater but add an array of community benefits, such as shading, wildlife habitat and beautified scenery.

This year, the Chesapeake Bay Program's Habitat Goal Implementation Team (GIT) completed a pilot project in which they worked with four separate communities to develop conceptual ideas that add green infrastructure to neighborhoods. Through a collaborative process known as Targeted Outreach for Green Infrastructure (TOGI), four communities were identified based on vulnerability to climate change and demographic criteria related to diversity, equity, inclusion, justice and accessibility. The communities were: Williamsport, Pennsylvania; Cambridge, Maryland; and the Upper Mattaponi Tribe and Mattoponi Tribe from Virginia.

The TOGI process brought together community stakeholders, experts from the Bay Program and an infrastructure contractor for a series of listening sessions and workshops to identify community needs and design solutions. For Cambridge, a conceptual plan was created for a 6.2 acre community park that includes multiple recreational areas plus a community garden. In Williamsport, the community designed a concept for an expanded urban garden to include pollinators and rain gardens, as well as green infrastructure along a popular boulevard to calm traffic and manage stormwater.

The Upper Mattaponi tribe used the TOGI process to develop a conceptual plan to convert degraded farm land in into a sustainable reservation with a tribal center and housing. With the Mattaponi Tribe, a blueprint was developed to use green infrastructure such as living shorelines and terraced slopes to reduce erosion of the tribe's reservation, which is located on a steep cliff.

Delivered in a final report to the communities, the designs can be used in grant applications for construction and implementation. Having partnered with the communities up-front, the Bay Program can ensure future infrastructure investments will be ecologically sound while also best serving the people who live in the areas.

This summer, Anna He, an intern working with our partners at the National Oceanic Atmospheric Administration, pioneered the use of an innovative oyster monitoring technology on the Harris Creek near Talbot County, Md. (Photo by Will Parson/Chesapeake Bay Program)

Intern projects advance our work

Six interns worked with the Chesapeake Bay Program this summer on a range of projects that are critical to the partnership's work. Efforts included monitoring oyster reefs, enhancing web products, chronicling the development of flood prone neighborhoods, engaging with organizations from underrepresented communities and more. Interns working within the partnership included those from the Chesapeake Research Consortium's Student Recruitment, Early Advisement, and Mentoring (C-StREAM) program. C-StREAM focuses on assisting students who identify as people of color and/or who are first generation college students.

100-year study on nitrogen pollution

USGS and Bay Program researchers publish an award-winning report

In 2022, the United States Geological Survey (USGS) received a Blue Pencil & Gold Screen Award, in the category of Technical/Statistical Reports, from the National Association of Government Communications (NAGC) for a report titled *Nitrogen in the Chesapeake Bay Watershed—A Century of Change, 1950–2050*.

USGS co-authored this award-winning report with Chesapeake Bay Program scientists to help inform management decisions and foster public awareness for better balancing the use and control of nitrogen. In this study, researchers provided a unique, long-term perspective of the major drivers of nitrogen pollution to the Bay from 1950-2012, and then simulated potential changes out to 2050, resulting in a 100-year timeline.

Through the monumental study, we can identify major shifts in nitrogen pollution based on climate, hydrology, land use changes and initiatives to reduce its sources.

A decrease in nitrogen from wastewater starting in 1990 matches the investments that jurisdictions made in upgrading wastewater systems to handle population increases. Declines in atmospheric deposition in the 1980's align with the introduction of the Clean Air Act, which reduced emissions from sources such as power plants and vehicles.

Forecasting the next 50 years, researchers found that the greatest opportunities for reducing nitrogen pollution will be in agricultural and developed areas. On farms, this includes the reduction of fertilizer and manure applications and installing best management practices, such as cover crops and forest buffers that manage runoff. For urban areas, this includes implementing green infrastructure to soak up stormwater runoff, as well as continuing to enhance wastewater treatment plants such as separating pipe systems that handle sewer and stormwater into two different systems.

Dr. Boyd joins U.S. Geological Survey (USGS) and other partners to learn about water quality monitoring conducted by USGS at Fishing Creek in Goldsboro, Pennsylvania. (Photo by Will Parson/Chesapeake Bay Program)

New director hits the ground running

This summer, Dr. Kandis Boyd stepped in as our new director following a period of excellent leadership from acting director, Michelle Price-Fay. With nearly thirty years of experience at some of the nation's top scientific institutions, including the National Center for Atmospheric Research, National Oceanic and Atmospheric Administration, and the National Science Foundation, Dr. Boyd is a proven leader who brings a unique perspective to our mission of restoring the Chesapeake Bay. Since joining the partnership, Dr. Boyd has attended over 50 partner events across the watershed, in a commitment to support all members of the organization.

What's on the horizon?

Chesapeake Bay Program gears up for 2023.

Clean Water Act Anniversary

Through the end of 2022 we will be celebrating the 50th anniversary of the Clean Water Act. This act, which protects the nation's waters, was one of the primary forces behind forming the Chesapeake Bay Program.

Blue crabs workshop

In fall 2022, the Chesapeake Bay Stock Assessment Committee will host a workshop to try and better understand why the abundance of adult female blue crabs declined so heavily from 2021 to 2022.

Chesapeake Bay Program 40th anniversary

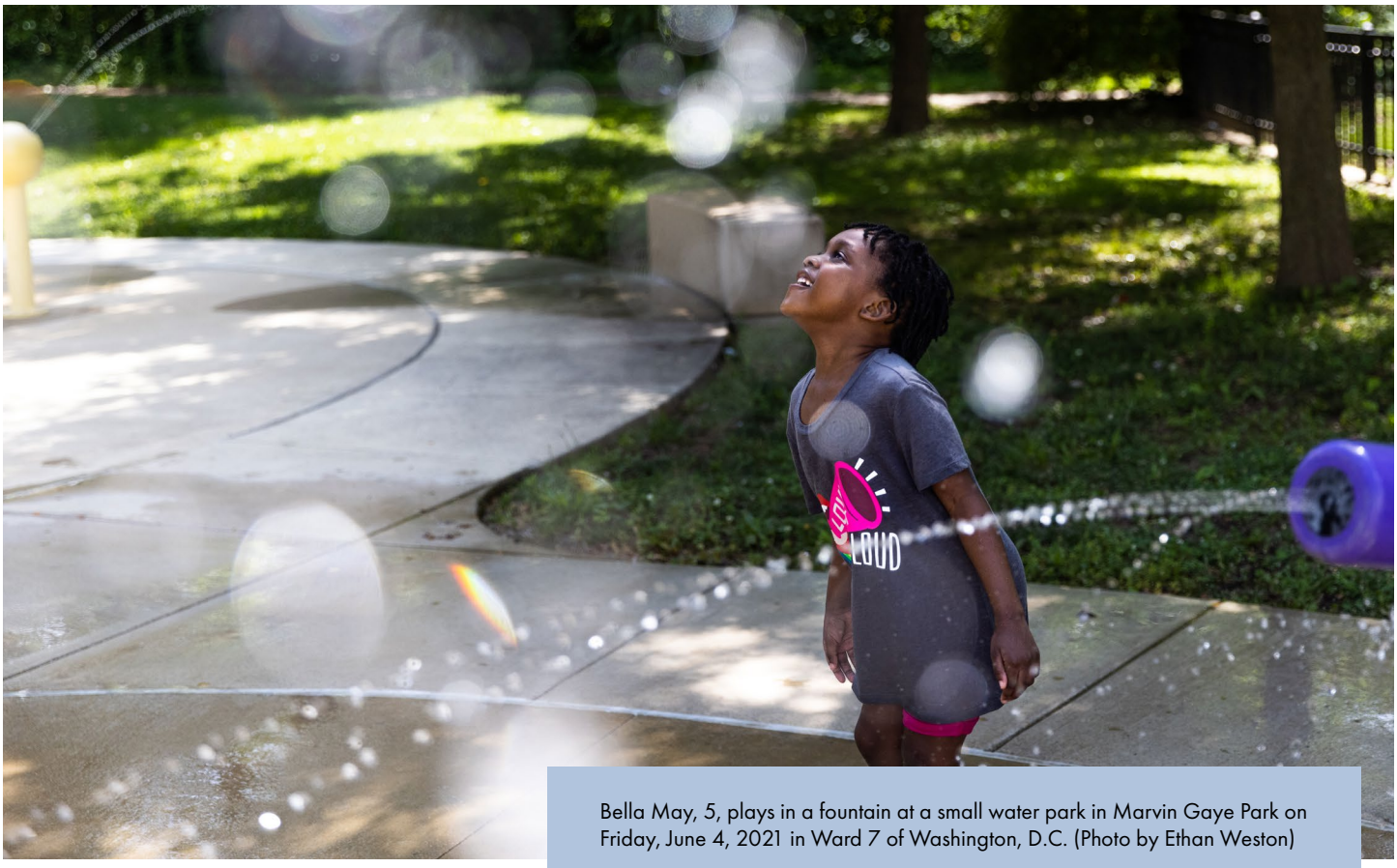
The Chesapeake Bay Program turns 40 in 2023! The anniversary will be celebrated throughout the year with events and commemorations by our partners.

Strategy Review System

In spring 2023, the fourth biennial Strategy Review System cycle will kick off with a two-day, in-person meeting. This review meeting will delve into the newest science, economic opportunities and policy that impact the work of the partnership.

New indicators

Both the Local Leadership Outcome and Land Use Methods and Metrics Development Outcome will unveil indicators starting in 2023. These indicators will be used to better track our progress.



Bella May, 5, plays in a fountain at a small water park in Marvin Gaye Park on Friday, June 4, 2021 in Ward 7 of Washington, D.C. (Photo by Ethan Weston)

Outcome Attainability

Progress toward meeting outcomes of the *Chesapeake Bay Watershed Agreement*.

The 10 interrelated goals of the *Chesapeake Bay Watershed Agreement* are linked to a set of outcomes, or time-bound and measurable targets, that directly contribute to its achievement. Each of the 31 outcomes uses quantitative or qualitative data to collectively advance the protection and restoration of the Bay and its watershed.

According to a recent assessment, two outcomes are completed, 11 outcomes are "on-course" to be achieved by 2025, 11 are "off-course" and 7 are "uncertain." We identified outcomes as uncertain for a variety of reasons, including when the data need to be updated or are no longer being updated, or when new data needs to be collected to determine a trend.

A concerted effort is being made to accelerate outcomes that are off-course, including workshops, targeted outreach and specialized projects. To learn more, visit chesapeakeprogress.com/outcome-status

On-course

Blue Crab Abundance
Oysters
Fish Passage
Protected Lands
Public Access Site Development
Fish Habitat
Forage Fish
Toxic Contaminants Research
Land Use Options Evaluation
Land Use Methods and Metrics
Sustainable Schools

Off-course

Brook Trout
Forest Buffers
Submerged Aquatic Vegetation
Tree Canopy
Wetlands
Black Duck
2025 Watershed Implementation Plans
Diversity
Water Quality Standards Attainments & Monitoring
Toxic Contaminants Policy and Prevention
Climate Adaptation

Uncertain

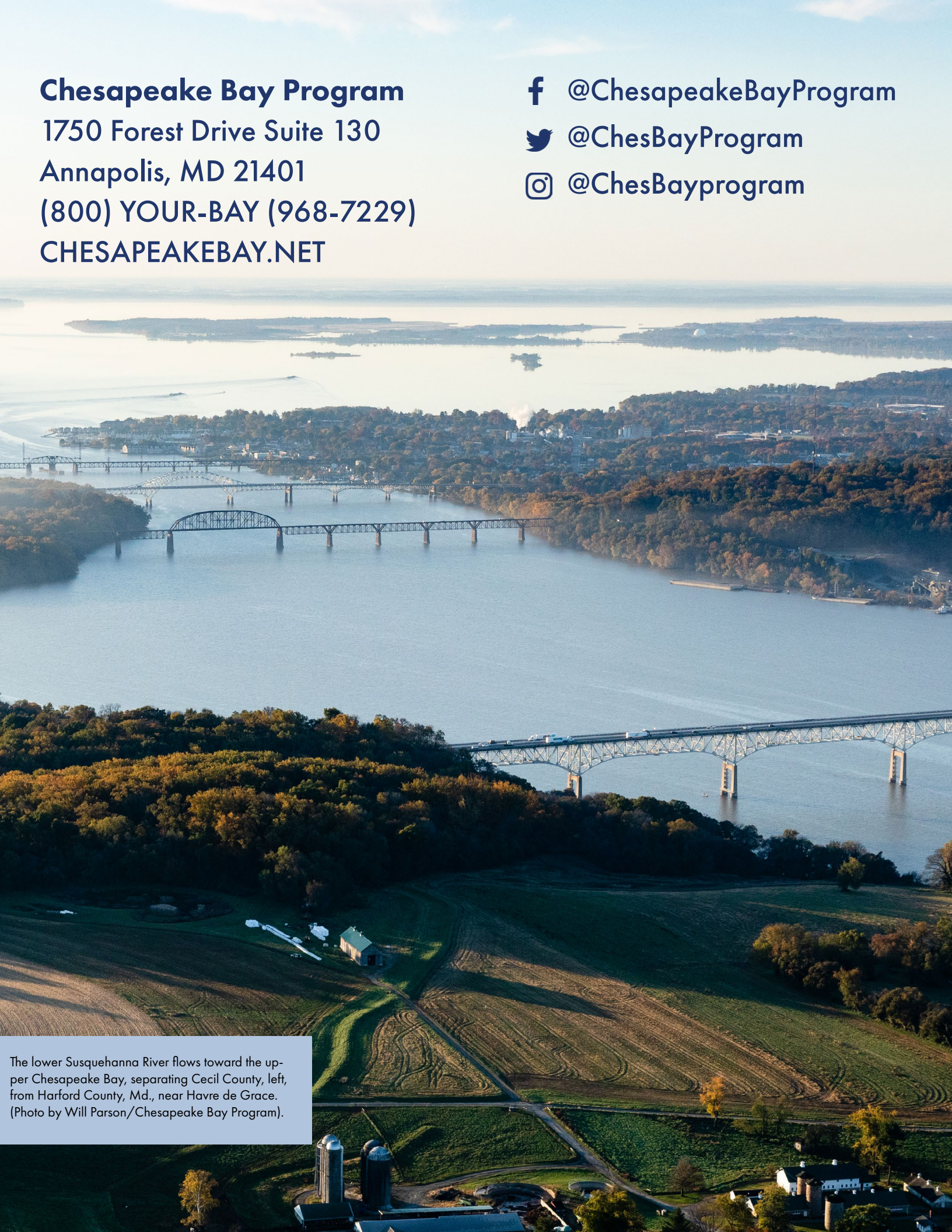
Stream Health
Healthy Watersheds
Local Leadership
Citizen Stewardship
Climate Monitoring and Assessment
Environmental Literacy Planning
Student MWEEs

Completed

Blue Crab Management
2017 Watershed Implementation Plans

Chesapeake Bay Program
1750 Forest Drive Suite 130
Annapolis, MD 21401
(800) YOUR-BAY (968-7229)
CHESAPEAKEBAY.NET

@ChesapeakeBayProgram
@ChesBayProgram
@ChesBayprogram



The lower Susquehanna River flows toward the upper Chesapeake Bay, separating Cecil County, left, from Harford County, Md., near Havre de Grace. (Photo by Will Parson/Chesapeake Bay Program).