BAY BAROMETER

Health and Restoration in the Chesapeake Bay Watershed

2023–2024

Planning for the future of Chesapeake Bay restoration

2024 was a year of great progress for the Chesapeake Bay Program as we continued working toward a healthier, more resilient Chesapeake Bay watershed.

By October, a partnership steering committee finalized a report that included our top recommendations for strengthening the partnership and improving its effectiveness, including how we will tackle the next phase of the Chesapeake Bay Watershed Agreement, a voluntary agreement signed by the seven Bay watershed jurisdictions, the Chesapeake Bay Commission and EPA on behalf of the federal government. The result of this report, which was based on extensive public feedback and scientific studies, was a charge from the Chesapeake Executive Council to officially begin revising the Watershed Agreement and to streamline and simplify structure and process to make the partnership more effective and efficient in achieving our commitments.

Meanwhile in 2024, the partnership continued to work toward achieving the existing outcomes of the Watershed Agreement. This year's Bay Barometer, which includes a subset of those outcomes that were officially updated in 2024, paints a mixed picture for the watershed's health. Outcomes related to oyster reef restoration, forest buffer planting and public access development show that Chesapeake Bay jurisdictions are making many parts of the watershed healthier and more welcoming to residents and tourists. Nitrogen, phosphorus and sediment reductions improved from 2022 to 2023, and yet the percentage of the Bay meeting water quality standards remains relatively low at 29%, showing that more work is needed.

With 2025 underway, we are at a critical juncture for Bay restoration. We have the opportunity to influence the next phase of conservation and restoration in the Chesapeake Bay watershed, and I'm confident that we have the expertise, talent and determination necessary to set the partnership on the best possible path. I would like to say thank you to all members of the partnership and am excited to continue working with you in 2025!

Lee McDonnell, Acting Director Chesapeake Bay Program Office, Environmental Protection Agency

2023-2024 BAY BAROMETER

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.

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.

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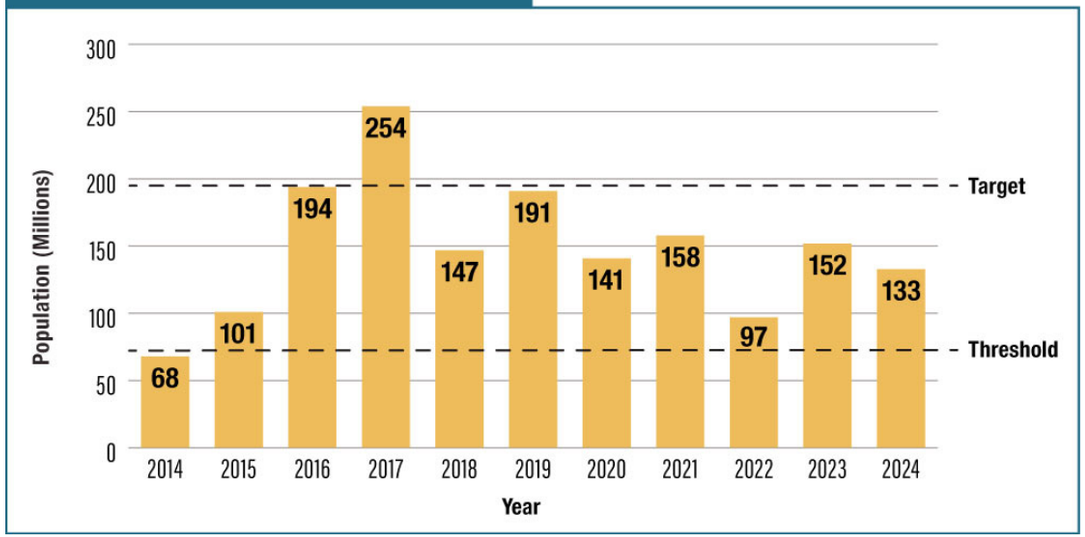
Adult Female Blue Crab Abundance (2014-2024)



Blue Crabs Abundance

Maintaining a sustainable blue crab population is critical to the health of the Bay and region's economy. The species plays a key role in the estuary's food web and supports an important commercial and recreational fishery, with a dockside value of roughly $84 million in 2023.

Between 2023 and 2024, the abundance of adult (age 1+) female blue crabs in the Chesapeake Bay decreased 12.5% from 152 million to 133 million. This number is lower than the partnership's target of 196 million, but well above the 72.5 million threshold that is considered to be the minimum sustainable level for female blue crabs in the Bay.

The abundance of adult female blue crabs has not fallen below the minimum level for a sustainable fishery since 2014, indicating that the population is sustainable. A stock assessment of the Chesapeake Bay blue crab population is expected to be completed in 2026, in which scientists will reevaluate the thresholds and targets that resource managers use to develop regulations for commercial and recreational harvest.

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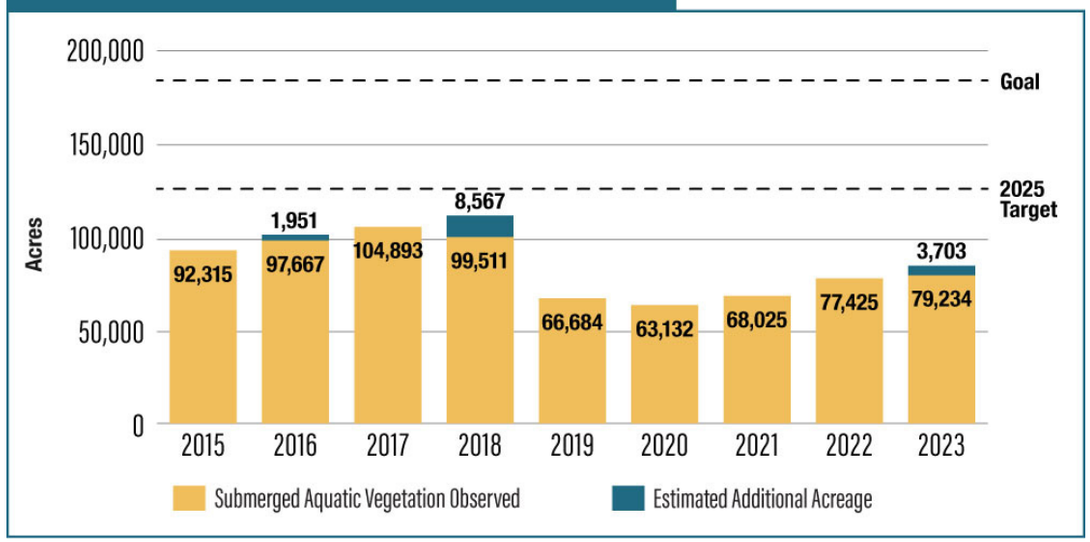
Submerged Aquatic Vegetation (SAV) Abundance (2015-2023)



Underwater Grasses

Benefiting the Bay's blue crab population is the slight increase in underwater grasses, also known as submerged aquatic vegetation (SAV). In 2023, 79,234 acres of SAV were mapped in the Chesapeake Bay and its tributaries, compared to 77,425 acres in 2022. This is 61% of the Chesapeake Bay Program's 2025 restoration target of 130,000 acres and 45% of the partnership's 185,000-acre goal.

However, the 2023 total is considered an underestimate because security restrictions prevented a portion of the Potomac River, where 3,703 acres of SAV were mapped in 2022, from being fully mapped in 2023. Based on 2022 data for the unmapped areas, it is estimated that the Bay may have supported 82,937 acres of SAV in 2023.

The steady increase of SAV since 2020 shows that the ecosystem is recovering from extreme rainfall in 2018 that contributed to the loss of over 30,000 acres of underwater grasses.

Chesapeake Wetlands

The abundance of healthy wetlands is vital to the restoration of the Chesapeake Bay. Not only do wetlands provide habitat for a variety of fish, birds and other wildlife, but they make the water cleaner by soaking up runoff and make communities safer by reducing floods.

Between 2014 and 2022, the Chesapeake Bay watershed gained 4,310 acres of tidal and nontidal wetlands, which represents a 5.07% achievement of the partnership's 85,000-acre goal. Additionally, 60,666 acres of tidal and nontidal wetlands have been enhanced between 2014 and 2022, representing 40.44% of the enhancement goal of 150,000 acres.

The Chesapeake Bay Program has begun using a new tracking system which is able to more accurately report on the created, restored and enhanced wetlands than past attempts. However, it is still likely that reported gains and enhancements have not accounted for all wetland restoration activities in the watershed.

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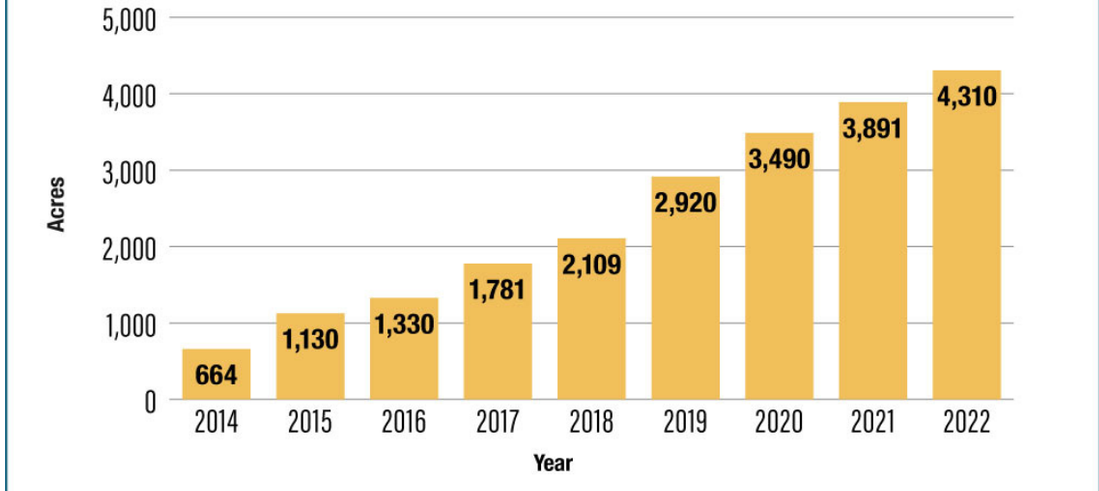
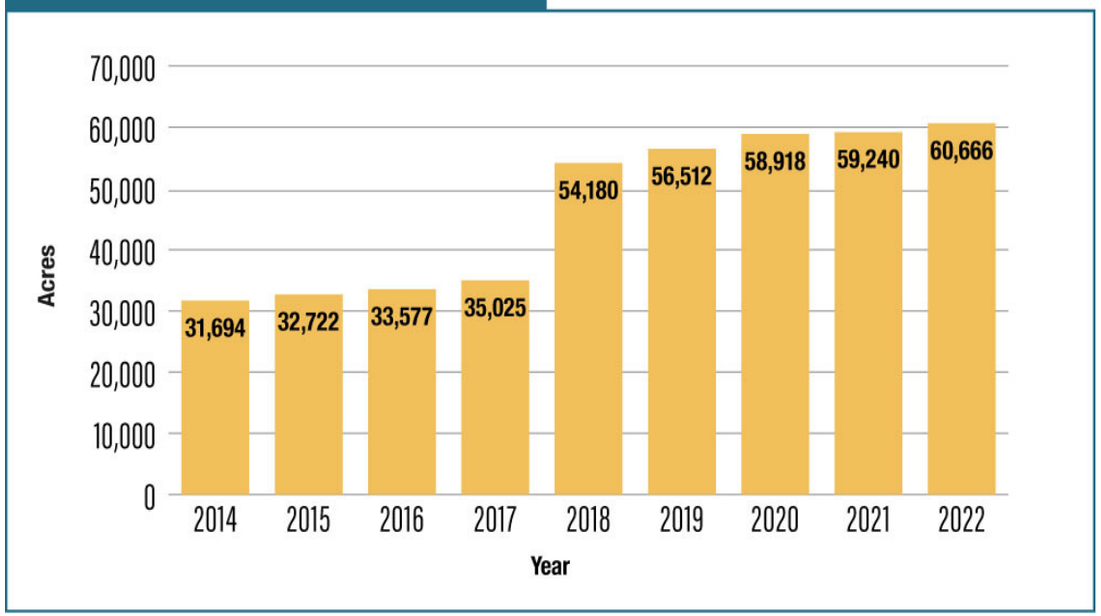
Wetland Gains, Cumulative (2014-2022)



Expanding Salt Marsh Habitat on Deal Island

In 2023, the U.S. Army Corps pumped 168,000 cubic yards of sediment from the Wicomico River to the Deal Island Wildlife Management Area, spreading it over 72 acres in order to create high marsh habitat. The next year, contractors planted over 300,000 plugs of native grasses, including Spartina patens, a species of grass used by saltmarsh sparrows. Waves of lush grasses have already filled in much of the site, with plantings continuing.

Wetland Enhancements, Cumulative (2014-2022)



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Oyster Reef Restoration Progress Dashboard

TRIBUTARY	TRIBUTARY RESTORATION PLAN	REEF CONSTRUCTION & SEEDING	MONITORING & EVALUATION	COMPLETED/ TARGET ACREAGE
Harris Creek (Md.)	COMPLETE	COMPLETE	COMPLETE	343/343
Little Choptank (Md.)	COMPLETE	COMPLETE	IN PROGRESS	358/358
Manokin (Md.)	COMPLETE	IN PROGRESS	IN PROGRESS	219/441
Tred Avon (Md.)	COMPLETE	COMPLETE	IN PROGRESS	130/130
Upper St. Mary's (Md.)	COMPLETE	COMPLETE	IN PROGRESS	60/60
Great Wicomico (Va.)	COMPLETE	COMPLETE	IN PROGRESS	124/124
Lafayette (Va.)	COMPLETE	COMPLETE	IN PROGRESS	82/82
Lower York (Va.)	COMPLETE	COMPLETE	IN PROGRESS	204/200
Lynnhaven (Va.)	COMPLETE	IN PROGRESS	IN PROGRESS	114/152
Piankatank (Va.)	COMPLETE	COMPLETE	IN PROGRESS	497/444
Eastern Branch of the Elizabeth River (Va.)	N/A	COMPLETE	IN PROGRESS	24/20

Restoration Wraps up on the York River

The Maryland and Virginia Oyster Restoration Interagency Teams are well on their way to the goal of achieving healthy oyster reefs in 10 tributaries by the end of 2025. Eight tributaries are now considered "restored," including Virginia's York River. At a celebration on Earth Day 2024 to mark completion of that project, Virginia Governor Glenn Youngkin and other dignitaries highlighted the ecological and economic benefits of healthy oyster reefs. Work and support for the York River project from the Virginia Marine Resources Commission and NOAA resulted in more than 200 acres of oyster reef habitat.

Oyster Reef Habitat

With their various nooks and crannies, oyster reefs provide habitat to hundreds of critters, from small fish and invertebrates seeking shelter to larger fish looking for food. The oysters that build these reefs also help clean the water through filter feeding.

In 2014, the Chesapeake Bay Program began selecting 10 rivers—five in Maryland and five in Virginia—to reestablish healthy oyster reefs. As of 2024, reefs at eight of the 10 originally selected tributaries have been restored, as well as an eleventh "bonus" tributary. In these 11 tributaries, more than 2,000 acres are considered restored under the initiative, making it the largest oyster habitat restoration project in the world.

The last two restoration sites are in the reef construction and seeding phase and will likely be finished by the end of 2025. Both Maryland and Virginia already are planning the way forward for the next tributaries they will target for oyster habitat restoration.

Forest Buffers

Streamside trees, also known as riparian forest buffers, improve the health of waterways by absorbing nutrient runoff, reducing erosion and providing shade that keeps the water cool.

Across the watershed, planting for forest buffers has steadily increased over the last two years with 457 forest buffer miles restored in 2022 and 640.5 miles restored in 2023, more miles of new buffers than any year since 2016. This increase, which is due primarily to a boost in state and federal funding and landowner willingness, brings the cumulative amount of forest buffers planted to 10,687 miles.

The Chesapeake Bay Program has a goal of restoring 900 miles of forest buffers per year, though the goal has only been met once, in 2002, since tracking of tree plantings began.

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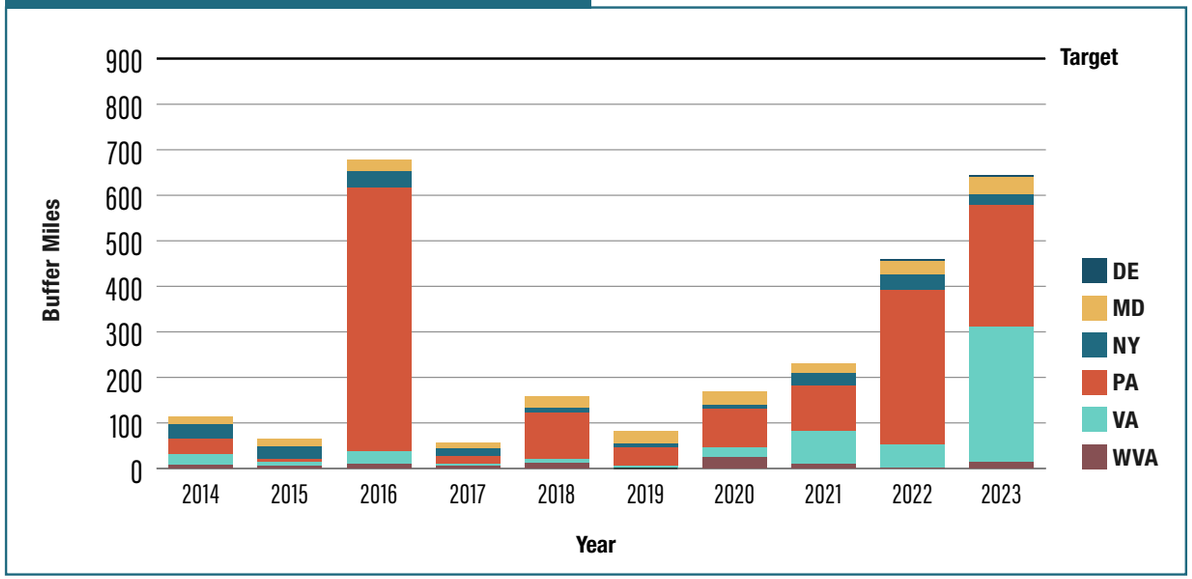
Annual Forest Buffers Planted by State (2014-2023)



Community Trees

Trees planted in developed areas—urban, suburban or otherwise—also play an important role in absorbing stormwater runoff. As of 2023, nearly 11,340 acres of community trees have been planted in the watershed since 2014. Tree plantings increased significantly in 2023 with 2,577.4 acres planted, up from 454.7 acres planted in 2022. This increase in progress is also likely due to a boost in state and federal investments.

Despite the progress in planting both community trees and riparian forest buffers, separate data show an overall net loss of trees in the Chesapeake Bay watershed. While jurisdictions have planted 11,340 acres of community trees since 2014, the watershed lost over 25,000 acres between 2013/14 and 2017/18, outpacing the gains. When forest buffer data was captured between 2013 and 2014, 69.3% of the watershed's riparian area was forested. That number fell to 68.9% in 2017/2018, a loss of 21,743 acres.

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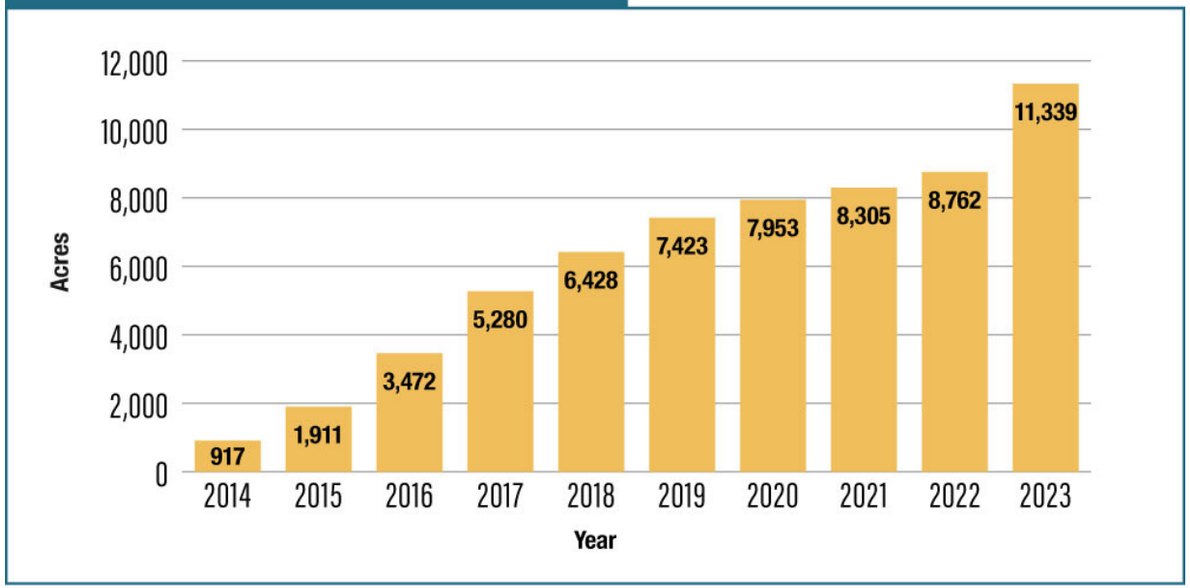
Community Tree Plantings, Cumulative (2014-2023)



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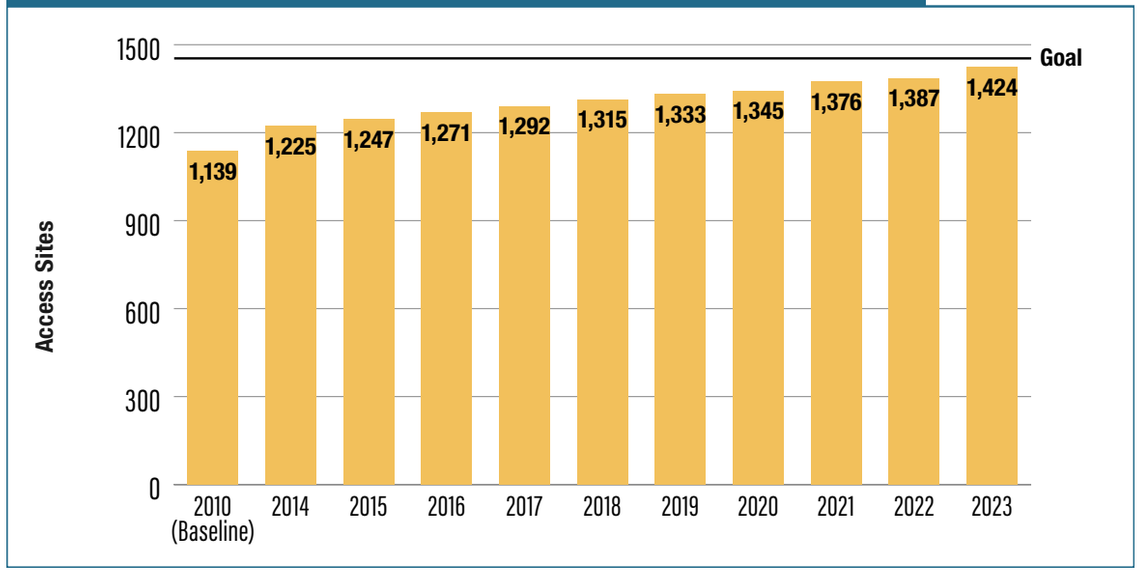
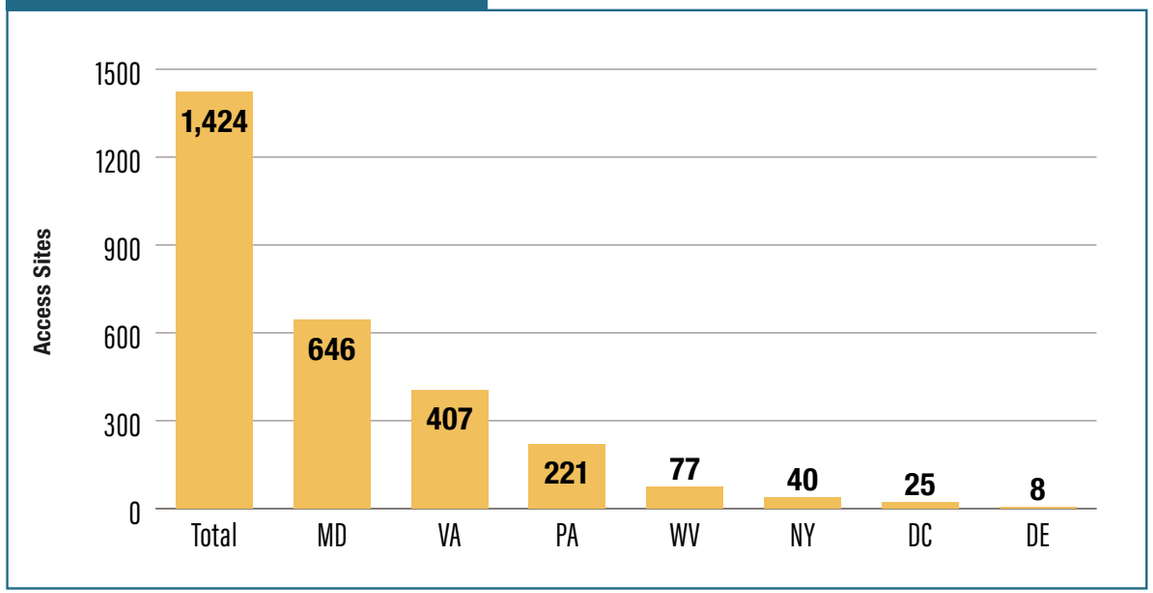
Public Access Sites in the Chesapeake Bay Watershed (Cumulative) (2010-2023)



Public Access Sites by Jurisdiction (2023)



Access to the Bay

Public boat ramps, soft launches and fishing areas provide people with opportunities to experience and enjoy the local waters of the Chesapeake region. Providing public access can help encourage environmental stewardship, spur economic development and boost tourism.

Since 2010, state and federal partners have identified 285 new public access sites throughout the Chesapeake Bay watershed. This brings the total number to 1,424 sites and marks a 90% achievement of the partnership's goal of adding 300 new access sites to the watershed by 2025.

There are currently 646 public access sites in Maryland, 407 in Virginia, 221 in Pennsylvania, 77 in West Virginia, 40 in New York, 25 in the District of Columbia and eight in Delaware. Visit the following websites for more information on public access sites within the jurisdictions:

- Delaware Boating and Fishing Access
- District of Columbia Parks
- Maryland Public Water Access
- Maryland Public Angler Access
- New York Boat Launch Sites
- Pennsylvania Boating Locations
- Pennsylvania Fishing Locations
- Virginia Public Boating Access
- Virginia Fishing Locations
- West Virginia Stream Access Points
- West Virginia Hunting and Fishing Locations

Local Leadership

Local government officials play a crucial role in the restoration of the Chesapeake Bay watershed, serving as the bridge between regional initiatives and community action. Through biennial surveys, the Chesapeake Bay Program tracks the knowledge and capacity of these local officials on issues related to clean water and conservation.

2024 survey results showed the percentage of elected officials who are uncertain about federal rules and regulations around water resources is significantly related to their time in office and community size. Those serving less than two years in office were “uncertain” on roughly 46% of the questions related to federal rules and regulations, as opposed to 37% from those who’ve been in office 3-5 years. Elected officials from communities with fewer than 9,999 residents were uncertain about 43% of the survey questions, compared to 31% from officials representing communities with over 100,000 residents. However, from 2022 to 2024, there was lower uncertainty amongst elected officials from small and mid-sized communities, as well as those who served relatively few years in office.

Looking at conservation actions, the percentage of local officials who reported implementing and/or enforcing local ordinances or regulations increased from 47% in 2022 to 61% in 2024. The percentage of officials who reported applying for grants/funding to assist with projects also increased from 64% in 2022 to 70% in 2024. However, there was no change for the implementation of on-the-ground projects between 2022 and 2024, remaining at 54%, and the percentage of local officials who reported adopting local ordinances or regulations decreased from 50% in 2022 to 44% in 2024.

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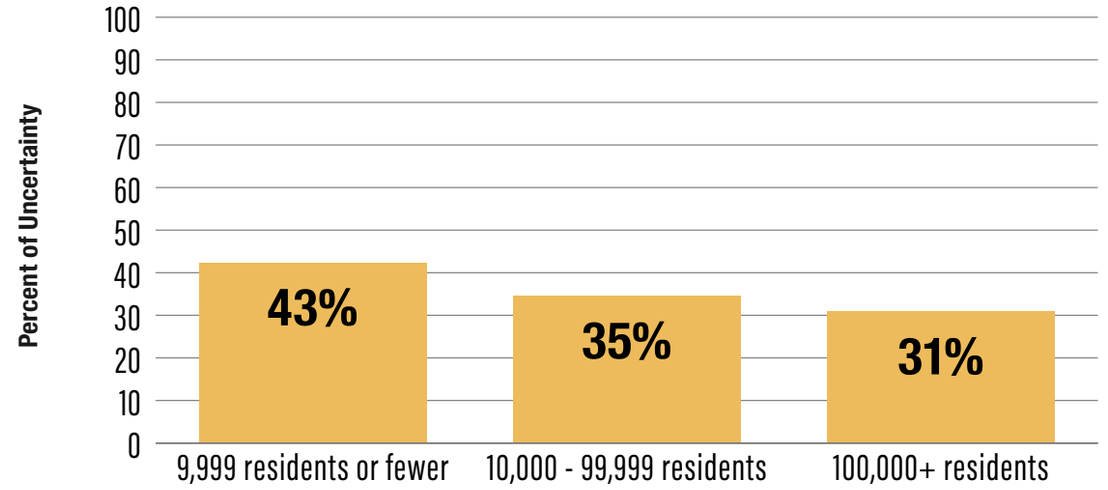
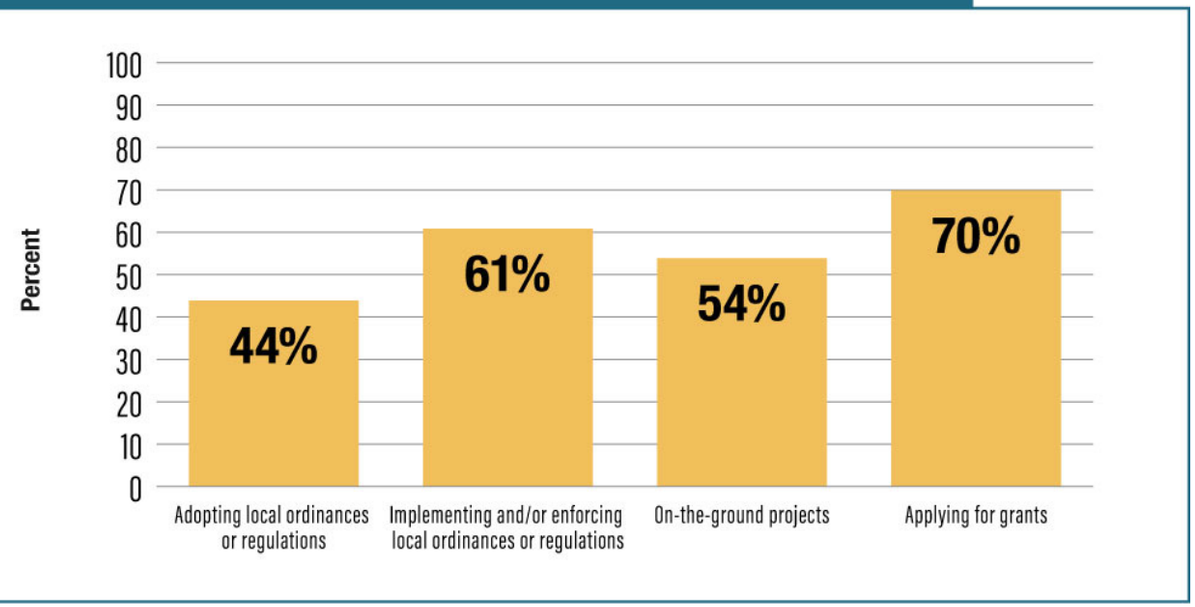
Local Officials' Average Uncertainty by Community Size (2024)



Percent of Local Officals Reporting Water Resource-Related Activities (2022-2024)



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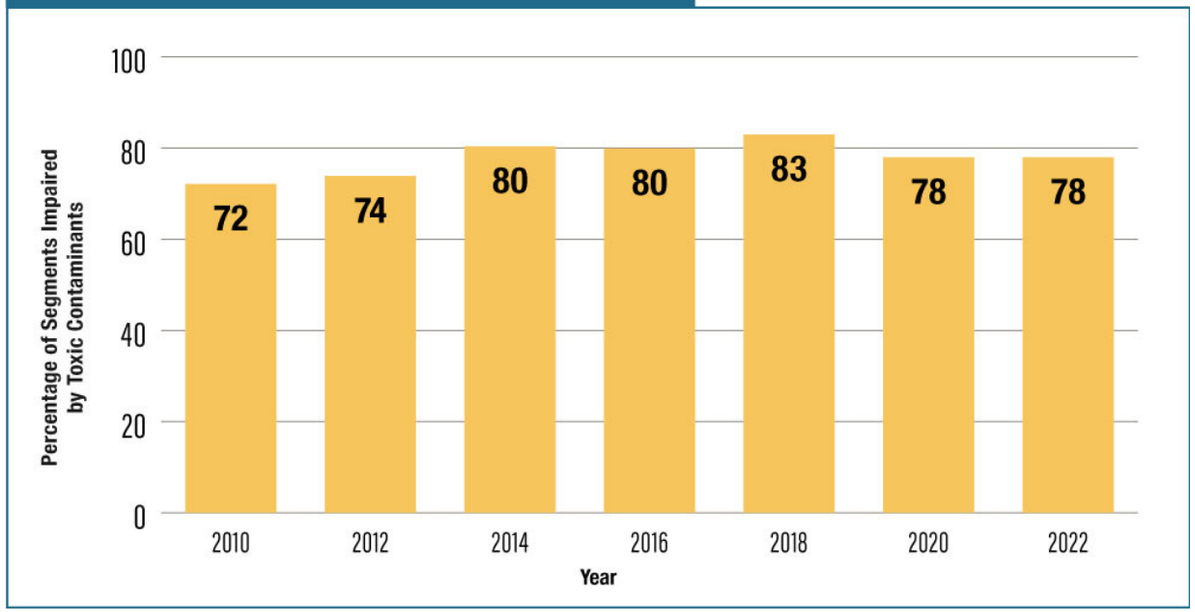
Toxic Impairments in the Tidal Chesapeake Bay (2010-2022)



Taking a Closer Look at PCBs

In 2024, the Chesapeake Bay Program's Toxic Contaminants workgroup completed an update of the Chesapeake Bay and Watershed PCB TMDL Story Map. Polychlorinated biphenyls (also known as PCBs) are a group of harmful organic chemicals common in many industrial and commercial products that accumulate in fish and make the fish dangerous to eat. The workgroup's story map illustrates which parts of the watershed are impaired due to PCBs, the many PCB TMDLs in place or under development and the impaired areas that have no planned TMDLs.

Toxic Contaminants

Toxic contaminants can negatively affect the survival, growth and reproduction of fish and wildlife. They also can pose a threat to human health, for example when people eat fish that have elevated levels of toxic contaminants in them.

According to data submitted by Delaware, Maryland, Virginia and the District of Columbia to the U.S. Environmental Protection Agency in 2022, 78% of the Chesapeake Bay's tidal segments were partially or fully impaired by toxic contaminants. This is the same percentage as in 2020, but slightly lower than in 2014, 2016 and 2018.

The decrease in toxic contaminants may be the result of pollutant reduction practices carried out across the watershed or the breakdown of pollutants over time.

The toxic contaminants included in the Chesapeake Bay Program's assessment are metals, polychlorinated biphenyls (PCBs), per- and polyfluoroalkyl substances (PFAS) and other unknown toxics. Contaminants such as PCBs are particularly harmful to humans because they can concentrate in fish tissue, which can make the fish unsafe to eat. The partnership's assessment showed that all areas of the Bay listed as impaired include PCBs.

Watershed Implementation Plans

In 2010, the Chesapeake Bay Total Daily Maximum Load (Bay TMDL) was put in place to help the Bay meet water quality standards established by the Clean Water Act. The jurisdictions within the watershed created Watershed Implementation Plans and put best management practices (BMPs) in place to reduce the amount of nitrogen, phosphorus and sediment pollution in order to achieve the goals of the Bay TMDL.

As of 2023, the BMPs in place across the watershed are estimated to achieve 57% of the nitrogen reductions, 67% of the phosphorus reductions and 100% of the sediment reductions needed to meet water quality standards when compared to the 2009 loads.

While the Bay-wide pollutant reduction goals for nitrogen and phosphorus are not on track to be achieved by 2025, models show that jurisdictions have reduced nitrogen loads by 16.9%, phosphorus loads by 17.3% and sediment loads by 5.8% since 2009. From 2022 to 2023, nitrogen, phosphorus and sediment loads decreased by an estimated 8.3 million pounds per year, 0.67 million pounds per year and 1,096 million pounds per year, respectively.

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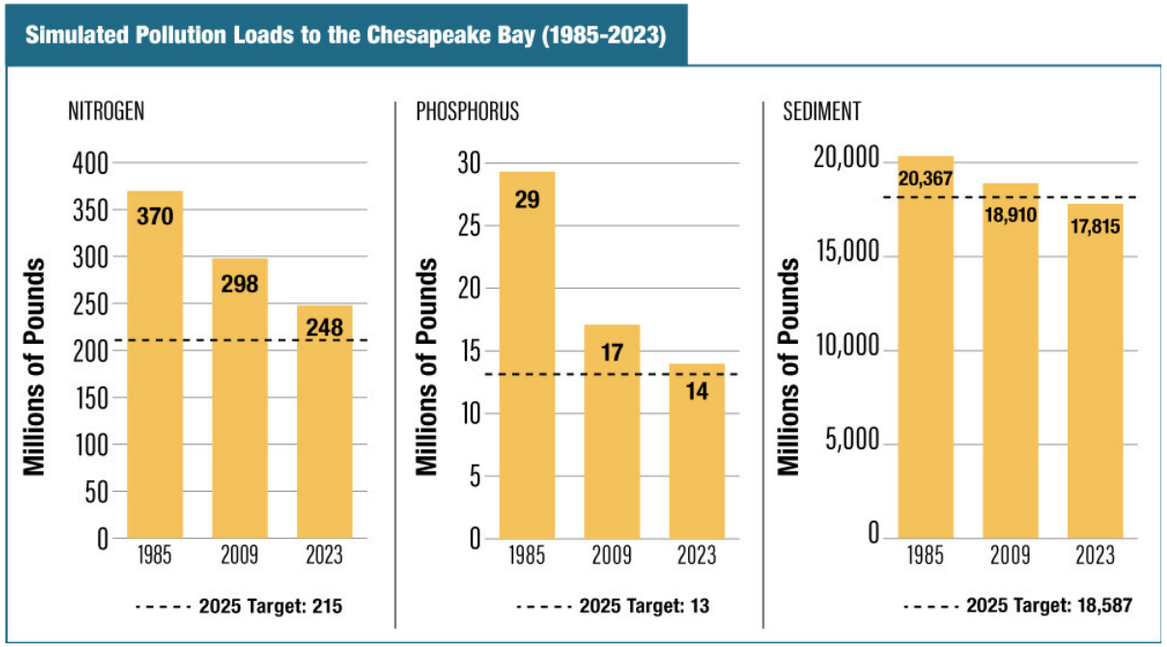
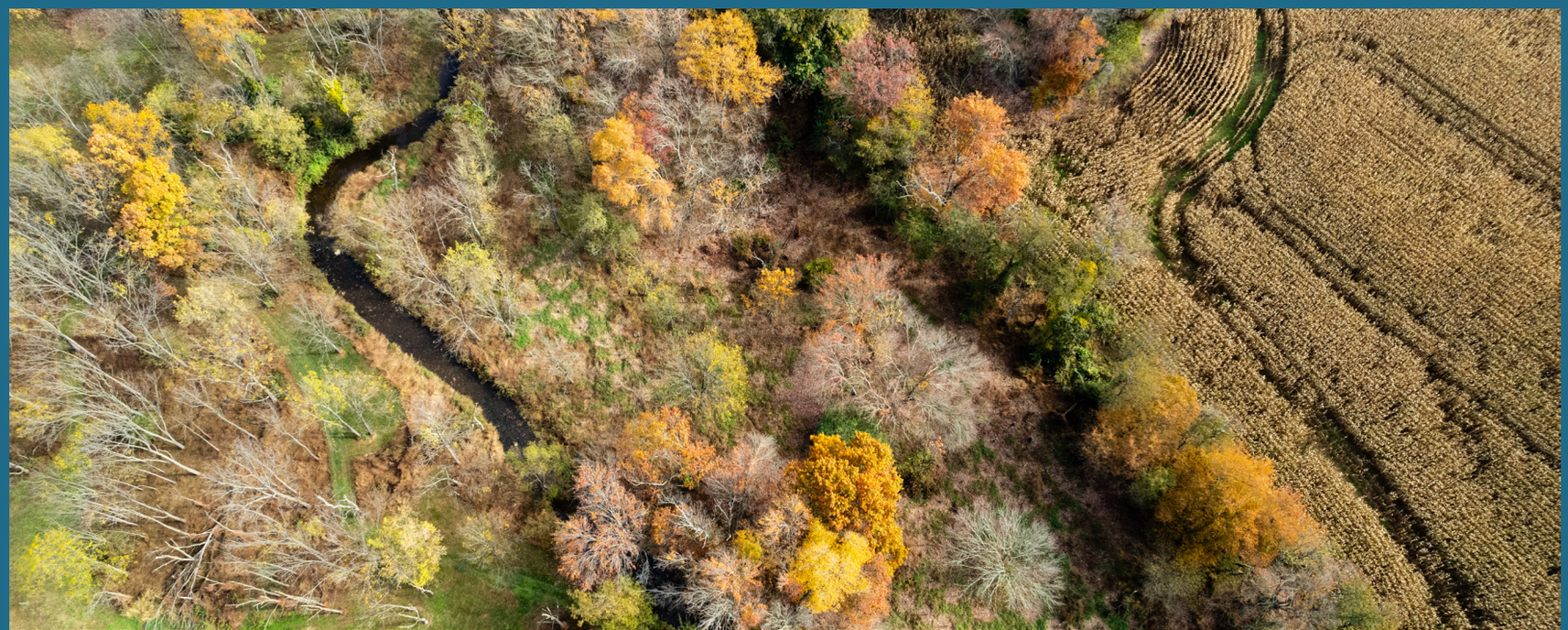


Reducing Agricultural Runoff Across the Region

With over 83,000 farms operating in the Chesapeake Bay watershed, agriculture is the largest source of nitrogen runoff to the Bay and the second largest source of phosphorus runoff. State and federal agencies, nonprofits and local governments continue to work with farmers across the region to put practices in place that reduce nutrient runoff, such as cover crops, forest buffers and manure storage. In 2025, the Chesapeake Bay Program will form its first-ever Agricultural Advisory Committee. Made up of rural and urban farmers, and other agricultural industry stakeholders from across the watershed, this committee will advise the Chesapeake Executive Council on how to best support the region's farmers while advancing clean water and conservation goals.



Water Quality Standards

The partnership estimates the water quality of the Chesapeake Bay each year by measuring dissolved oxygen, water clarity (using the acreage of underwater grasses) and chlorophyll a (a measure of algae growth).

In 2020-2022, it was estimated that 29.8% of the Chesapeake Bay met water quality standards. This is a slight rise from the previous assessment (2019-2021) when it was estimated that 28.1% of the Bay met applicable water quality standards. Scientists believe the increase is due in part to improving dissolved oxygen levels in the deep waters of the Bay.

The Bay Program has monitored the Bay's water quality since 1985. Water quality in the Chesapeake has improved during the period of 1985-2022. During the 2015-2017 assessment period, an estimated 42% of the estuary met water quality standards. A variety of factors have contributed to the decline of water quality since this time, namely high levels of rainfall in 2018 and 2019 that washed larger amounts of pollutants into the Bay.

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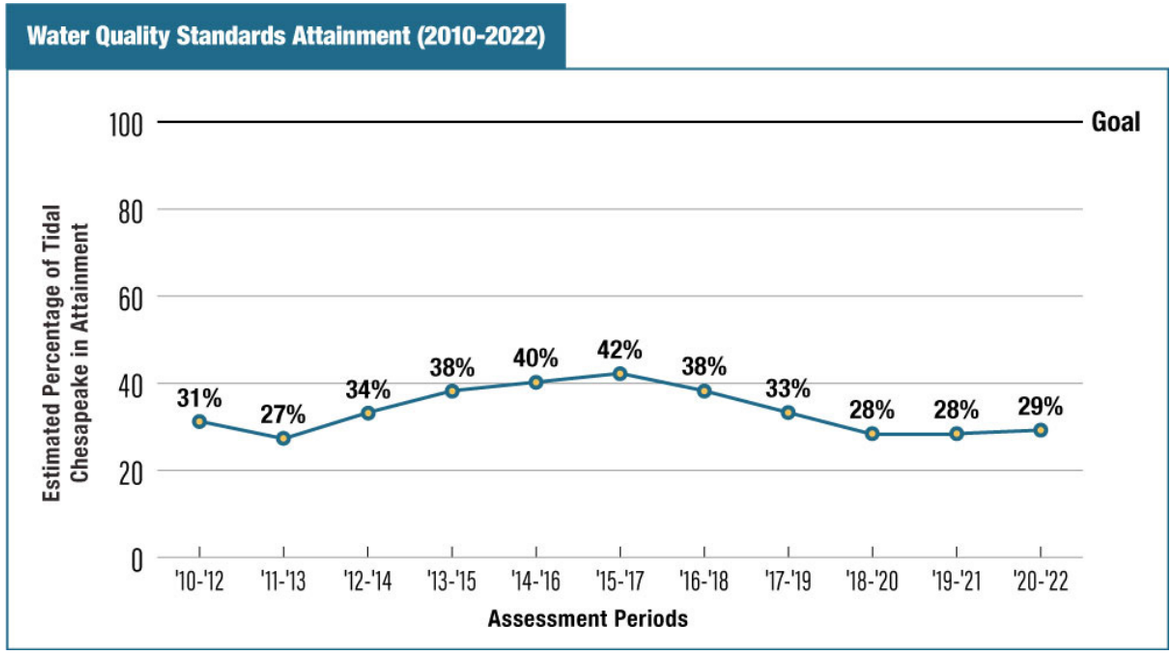

Bridging the gap between monitoring and modeling

The Chesapeake Bay Program uses models and monitoring data to estimate the amount of pollution entering the estuary. In 2024, a new indicator was launched that combines our modeling and monitoring to paint a more complete picture of pollutant reduction efforts across the watershed. The Chesapeake Bay Total Maximum Daily Load (Bay TMDL) Indicator shows that from 1995 to 2021, the reduction of the amount of nitrogen and phosphorus pollution is moving in the right direction. Each jurisdiction has a certain target for reductions that they are aiming to meet under the Bay TMDL, and this new indicator accounts for the natural lag time between when a best management practice is installed and when improvements in water quality are seen in the monitoring data. It also accounts for impacts from changing environmental conditions and other factors. Going forward, the Bay TMDL Indicator will be calculated on an annual basis to help determine how the entire watershed is doing in meeting our water quality goalsYou can learn more about the new Bay TMDL Indicator on Chesapeake Progress.

Pollution Loads and River Flows to the Bay

Each year, Chesapeake Bay Program partners assess the amount of nitrogen, phosphorus and sediment pollution flowing into the Bay from its tidal tributaries. The most recent data from 2022 showed that 47.2 billion gallons of water were measured flowing into the Chesapeake per day from the watershed's nine largest rivers. This is a decrease of 7.6 billion gallons from the previous year, and 10% decrease from the long-term average, taken between 1985-2022. River flows brought 253 million pounds of nitrogen, 13.4 million pounds of phosphorus and 14.2 billion pounds of sediment into the Bay in 2022, a decrease from the previous year and below the long-term average.

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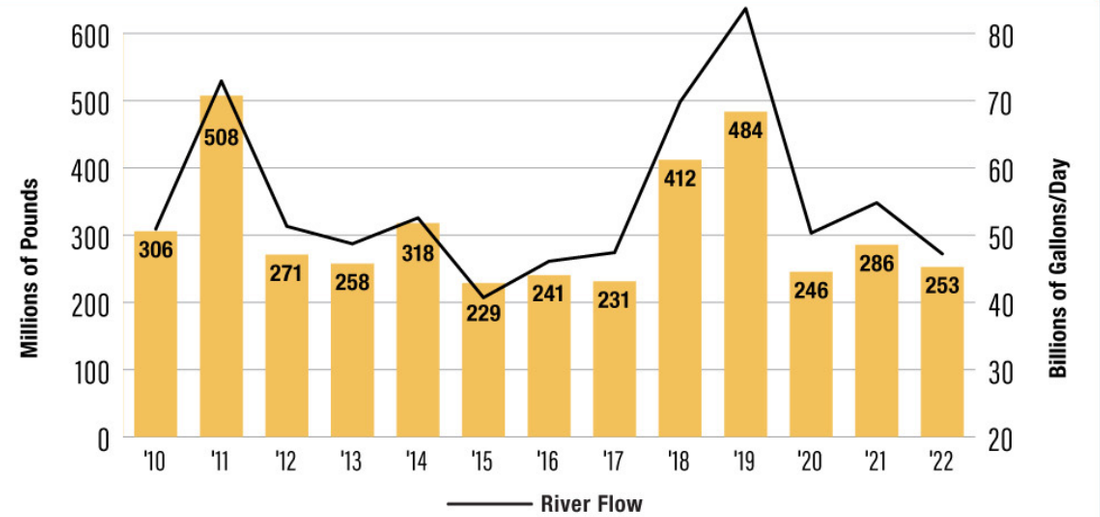
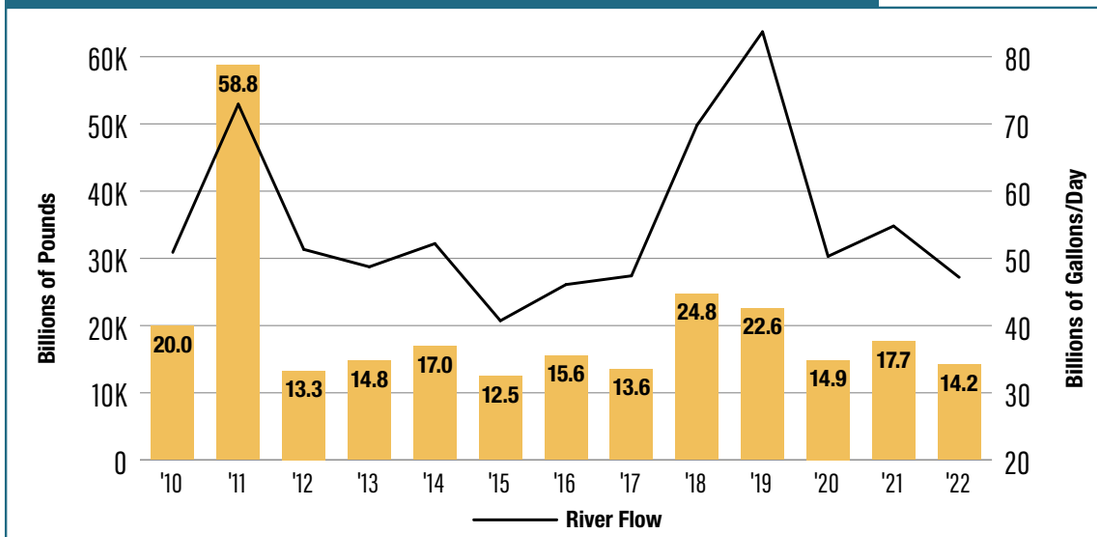
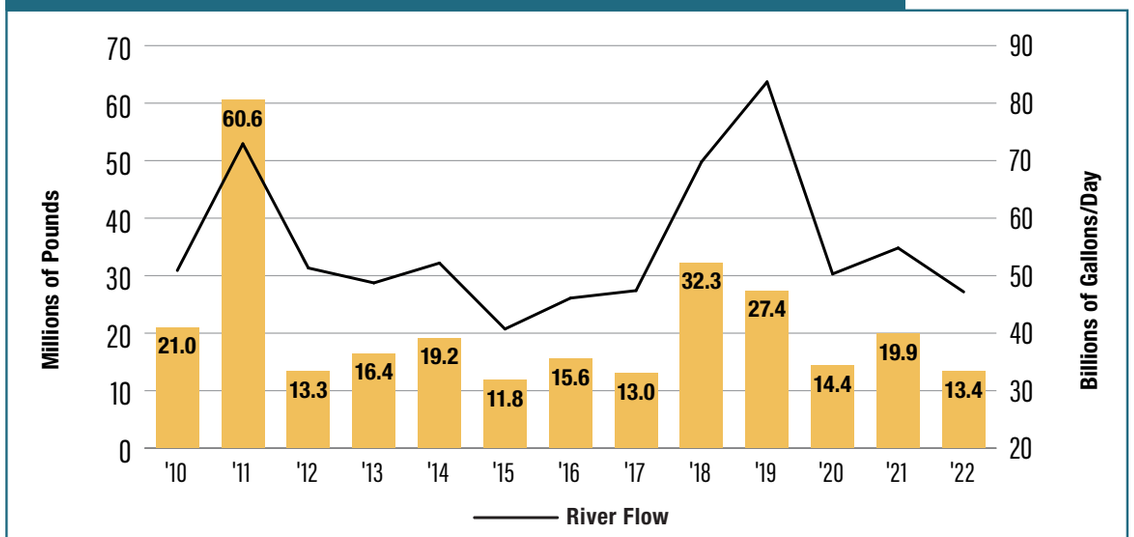
Nitrogen Loads and River Flow to the Chesapeake Bay, Cumulative (2010-2022)



Sediment Loads and River Flow to the Chesapeake Bay, Cumulative (2010-2022)



Phosphorus Loads and River Flow to the Chesapeake Bay, Cumulative (2010-2022)



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