

BAY BAROMETER

2015-2016

Health and Restoration

in the Chesapeake Bay Watershed



Chesapeake Bay Program
Science. Restoration. Partnership.




From the Director

"Improving" describes the current barometer of the Chesapeake Bay watershed. Several important ecological indicators of the outcomes set forth in the *Chesapeake Bay Watershed Agreement* show we are making significant progress toward meeting our established goals. Bay grasses and protected lands are halfway there, while blue crab abundance is at 90 percent. One-third of the tidal Bay segments are meeting water quality standards and Bay waters are noticeably clearer.

These improvements would not be possible without the significant actions taken by our partners, local governments, watershed organizations and federal agencies. In 2016, we established pollution reduction targets for more than 800 federal facilities within the watershed. In addition, nutrient and sediment pollution was reduced, in part, due to the wastewater sector meeting its pollution reduction targets ten years ahead of schedule. And thanks to Clean Air Act regulations and enforcement actions, airborne nitrogen was cut by 65 percent of its goal.

New tools are being developed to help us continue to achieve these improving trends. High-resolution land cover data now exists for the entire watershed, and thanks to the efforts of local governments, land use data has been updated for 80 percent of the watershed. This data, available for free, will help better determine pollution loading rates for different land uses, and allow for the placement of pollution control measures where they will be most effective. It will allow local governments to make better informed decisions that will yield multiple benefits, ultimately saving them thousands of dollars annually.

We continue to work better together and our progress shows it.



Nick DiPasquale

Nick DiPasquale
Director, Chesapeake Bay Program

About Bay Barometer

The Chesapeake Bay watershed is a dynamic ecosystem. Tracking changes in its health over time allows scientists to understand the effects of our management actions and our progress toward meeting health and restoration goals. The data in this report reflect just some of the conditions we monitor to better understand the Bay and how we might protect and restore it.

The Chesapeake Bay Program is guided by the goals and outcomes of the *Chesapeake Bay Watershed Agreement*. Signed in June 2014, this agreement commits our partners to protecting and restoring the Bay, its tributaries and the lands that surround them. It includes ten goals, each of which is linked to a set of time-bound, measurable targets called outcomes.

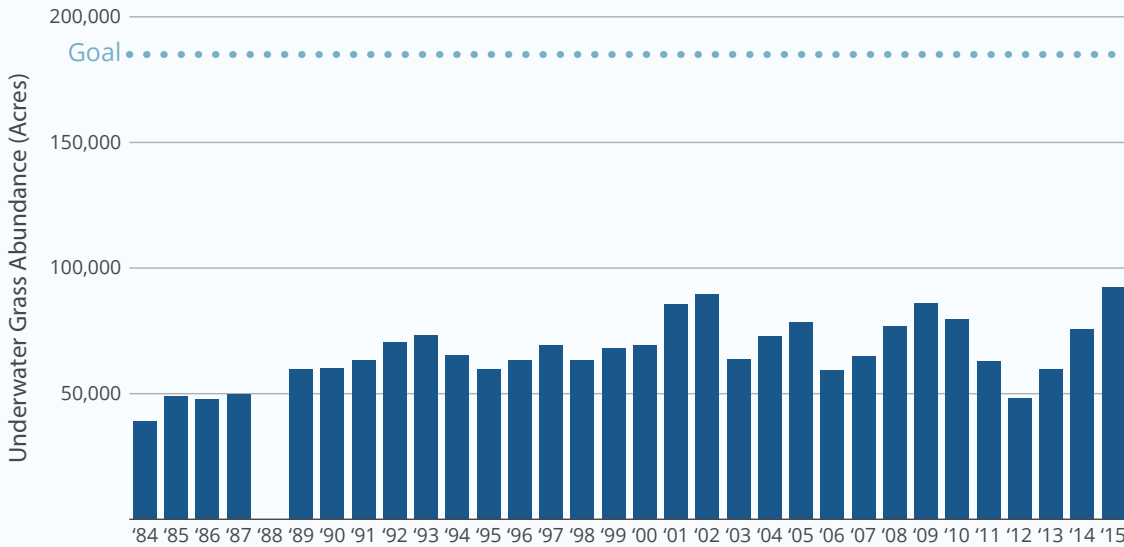
Track our progress toward the Watershed Agreement at www.chesapeakeprogress.com.

Vital Habitats



Underwater Grasses

Outcome: Achieve and sustain 185,000 acres of underwater grasses across the Chesapeake Bay.
Progress: 50 percent of outcome achieved.

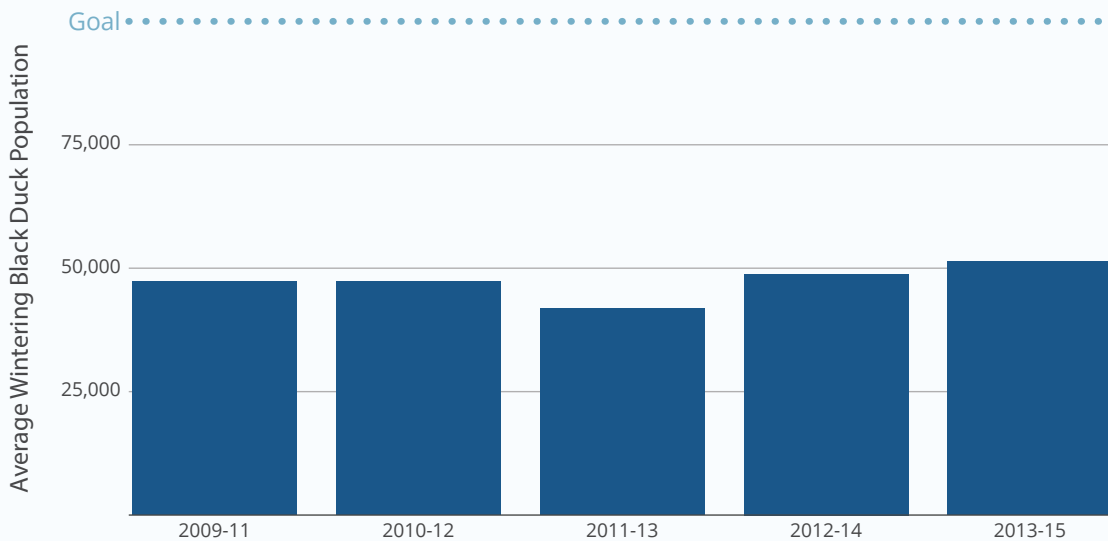


In 2015, there were an estimated 92,315 acres of underwater grasses in the Chesapeake Bay. This surpasses the Chesapeake Bay Program's 2017 restoration target two years ahead of schedule and marks a 50 percent achievement of the partnership's 185,000-acre goal. Researchers attribute the boost in bay grasses to the recovery of wild celery and other species in the fresher waters of the upper Bay, the continued expansion of widgeon grass in the moderately salty waters of the mid-Bay and a modest recovery of eelgrass in the very salty waters of the lower Bay. Experts have advised cautious optimism: widgeon grass is a "boom and bust" species whose abundance can rise and fall from year to year. Because underwater grass beds provide food and shelter to fish and wildlife, add oxygen to the water, absorb nutrient pollution, reduce shoreline erosion and help suspended particles of sediment settle to the bottom, their restoration will dramatically improve the health of the Bay ecosystem.



Black Ducks

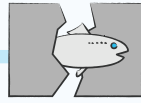
Outcome: By 2025, restore, enhance and preserve wetland habitat to support a wintering population of 100,000 black ducks.
Progress: 51 percent of outcome achieved.



The U.S. Fish and Wildlife Service conducts a Mid-Winter Waterfowl Survey each January to determine the abundance and distribution of several species of waterfowl. According to survey results, an average of 51,332 black ducks were observed in Chesapeake Bay watershed states between 2013 and 2015. This marks a five percent increase from the average number of black ducks observed in the region between 2012 and 2014 and 51 percent of the 100,000-bird goal.

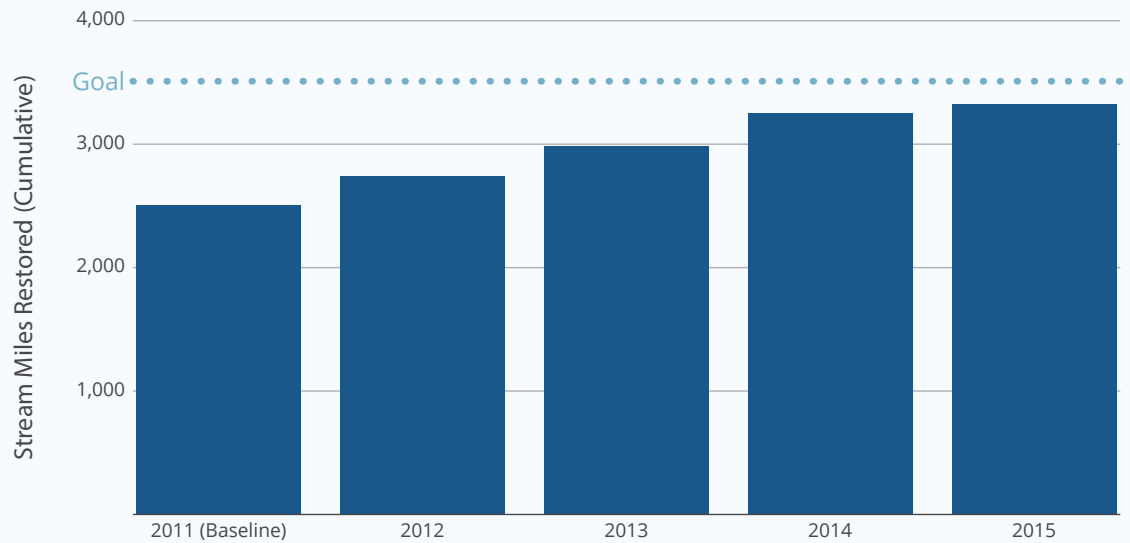


Vital Habitats



Fish Passage

Outcome: With a baseline of 2,510 stream miles open to the migration of fish, open an additional 1,000 stream miles to fish passage by 2025.
Progress: 82 percent of outcome achieved.

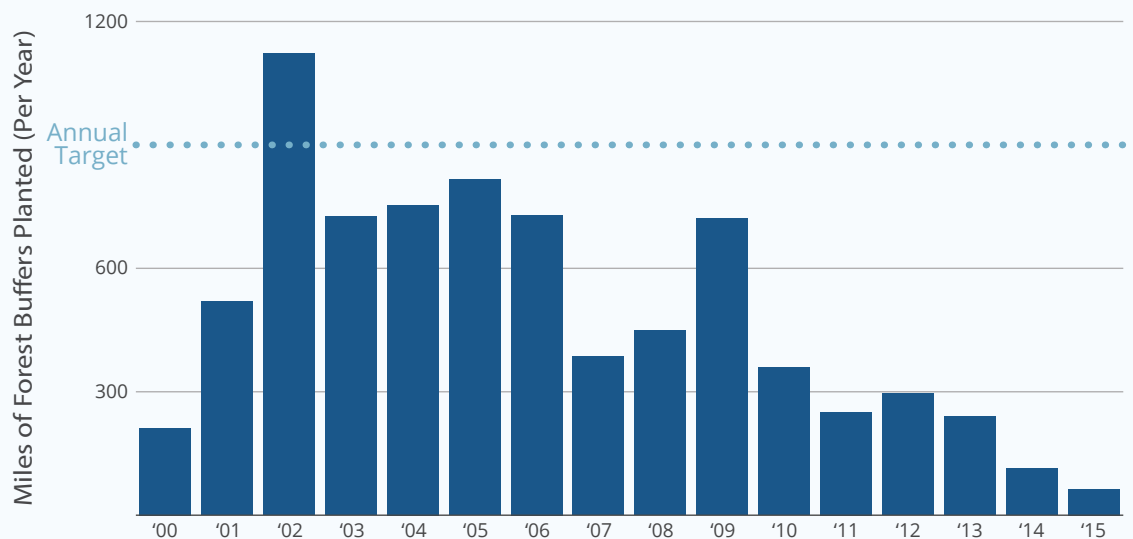


Progress toward the restoration of historical fish migration routes is measured against a 2011 baseline of 2,510 stream miles open to fish passage. Between 2012 and 2015, 817 additional miles were opened to the migration of fish, including almost 300 miles in Virginia and more than 500 miles in Pennsylvania. This marks an 82 percent achievement of the 1,000-mile goal. Removing the dams, culverts and other barriers that block migratory fish from reaching their spawning grounds can reduce sediment build-up in streams and allow shad, herring and other migratory species to move between fresh- and saltwater habitats.



Forest Buffers

Outcome: Conserve existing forest buffers and restore 900 miles of forest buffers each year until at least 70 percent of the watershed's riparian areas are forested.
Progress: 7 percent of annual target achieved.

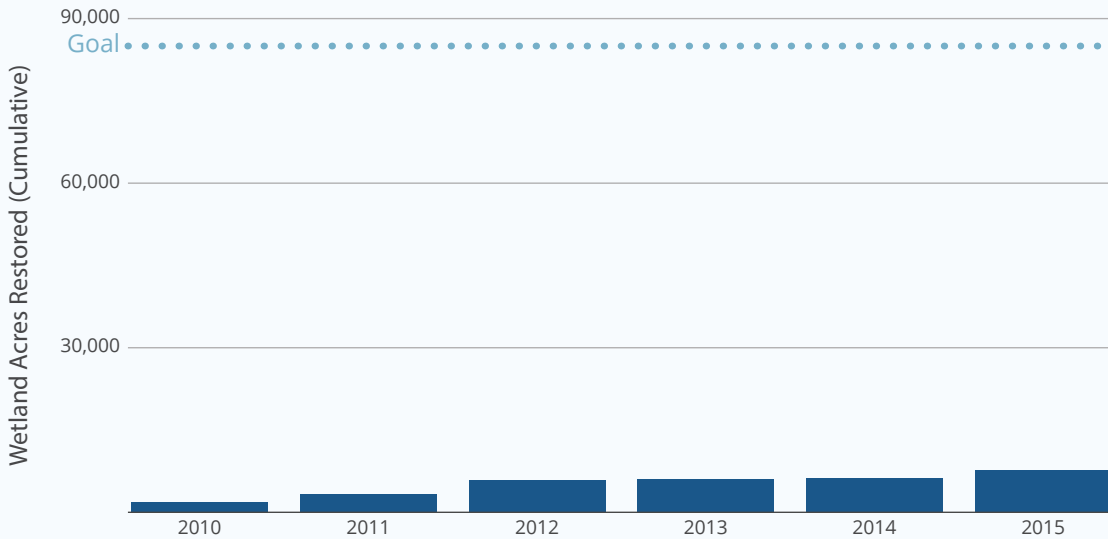


Between 2014 and 2015, about 64 miles of forest buffers were planted along the Chesapeake Bay watershed's rivers and streams. While this marks progress toward the outcome, it is significantly less than the progress made in past years: at 836 miles below the 900-mile-per-year goal, it is the lowest restoration total of the last 16 years. An estimated 55 percent of the watershed's 288,000 miles of stream banks and shorelines currently have forest buffers in place, and our partners will plant new buffers and conserve existing buffers until at least 70 percent of these areas are forested. Buffers stabilize stream banks, prevent pollution from entering waterways, provide food and habitat to wildlife and keep streams cool in hot weather.



Wetlands

Outcome: Create or reestablish 85,000 acres of wetlands, with 83,000 acres occurring on agricultural lands, and enhance the function of 150,000 acres of degraded wetlands by 2025.
Progress: 9 percent of outcome achieved.



Between 2010 and 2015, 7,623 acres of wetlands were created or reestablished on agricultural lands. This marks a nine percent achievement of the 83,000-acre goal. Healthy wetlands trap polluted runoff and slow the flow of nutrients, sediment and chemical contaminants into rivers, streams and the Bay. By soaking up stormwater and dampening storm surges, wetlands slow the erosion of shorelines and protect properties from the impacts of floods. Wetlands also provide critical habitat for fish, birds, mammals and invertebrates, and support recreational fishing and hunting.

In the News

Stream Health

In response to recent flooding, the state of New York developed a guide for visually assessing stream corridor health and flooding resiliency. This will help identify potentially critical issues that could require further evaluation by parties trained in advanced stream corridor management planning. The guide is one element of an emergency stream intervention program to improve resiliency against extreme rain events.

Tree Canopy

Accurately tracking changes in tree canopy relies not only on information about plantings, but on net gain or loss over time. The Bay Program expects to track urban tree canopy change over time by using high-resolution aerial imagery, available for public use for free in 2017. Forestry Workgroup partners will also launch the Chesapeake Tree Canopy Network, a web resource to help communities reach their tree canopy goals.

Brook Trout

According to the Eastern Brook Trout Joint Venture (EBTJV), wild brook trout occupy 33,200 square kilometers (km²) of habitat in the Bay watershed, including streams they share with brown and rainbow trout. There are 13,500 km² of “wild brook trout only” streams—the baseline from which progress will be measured—with a restoration goal of 14,600 km². The Bay Program is working to incorporate the EBTJV five-year brook trout census as a formal indicator.

Fish Habitat

The Fish Habitat Decision Support Tool was recently developed with funding from the U.S. Fish and Wildlife Service to provide access to the data and results from multiple fish habitat assessments. The tool helps resource managers identify restoration projects that will support aquatic species in the face of threats from climate change and development at multiple scales in multiple regions, including the Bay watershed.

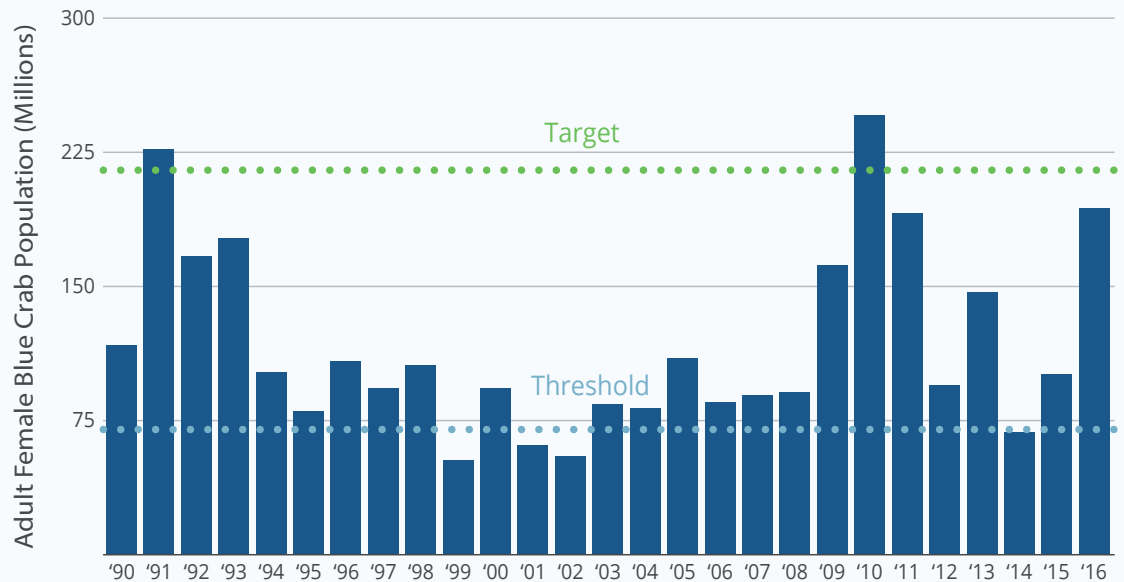


Fish & Shellfish



Blue Crab Abundance

Outcome: Maintain a sustainable blue crab population based on a target of 215 million adult females.
Progress: 90 percent of outcome achieved.



Between 2015 and 2016, the abundance of adult (age 1+) female blue crabs in the Chesapeake Bay increased 92 percent from 101 million to 194 million. This number is above the 70 million overfishing threshold but below the 215 million target that would support a sustainable blue crab stock. Blue crabs support commercial and recreational fisheries across the region, but varying environmental conditions, poor water quality, habitat loss, harvest pressure, predation and other environmental factors affect their population levels.



Oysters

Outcome: Restore native oyster habitat and populations in 10 tributaries by 2025 and ensure their protection.
Progress: Restoration moving forward in six tributaries.

Tributary	Tributary Restoration Plan	Reef Construction & Seeding	Monitoring & Evaluation	Completed/Target Acreage (2015)
Harris Creek (Md.)	In Progress			350 / 350
Tred Avon (Md.)	In Progress			2.6 / 147
Little Choptank (Md.)	In Progress			85.5 / 440
Piankatank (Va.)	In Progress			211 / TBD
Lynnhaven (Va.)	In Progress			63 / TBD
Lafayette (Va.)	In Progress			70 / 80

Six Chesapeake Bay tidal tributaries have been selected for oyster restoration: Harris Creek and the Little Choptank and Tred Avon rivers in Maryland, and the Lafayette, Lynnhaven and Piankatank rivers in Virginia. Each tributary is at a different level of progress. In Maryland, reef construction and seeding was completed in Harris Creek in 2015. As of 2015, just over 85 acres are complete in the Little Choptank and close to three acres have been built and seeded in the Tred Avon. In Virginia, planning for future restoration work and evaluation of existing reefs continues. As of 2015, 63 acres are complete in the Lynnhaven, 70 acres are complete in the Lafayette and 211 acres are complete in the Piankatank. Completed acreage totals include recent restoration, past restoration and naturally healthy oyster reefs. Once construction and seeding is complete, reefs will be monitored at three- and six-year checkpoints to determine if they meet oyster restoration success metrics.



In the News

Forage Fish

In 2016, researchers at the University of Maryland Center for Environmental Science analyzed the diets of key predator fish and developed a set of potential indicators to determine the status of forage species in the Bay. This research is part of the strategy to help the Bay Program's Sustainable Fisheries team assess forage species.

Blue Crab Management

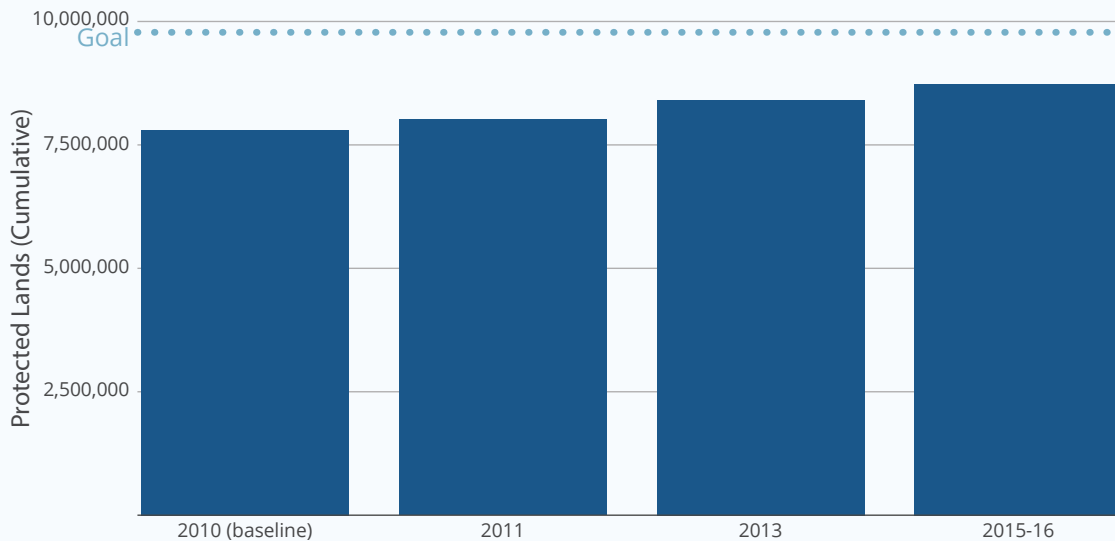
According to the Chesapeake Bay Stock Assessment Committee, the blue crab stock is currently not overfished and overfishing is not occurring. An estimated 15 percent of the female blue crab population was harvested in 2015, which is below the 25.5 percent target and the 34 percent overfishing threshold.

Conserved Lands



Protected Lands

Outcome: Beginning with a baseline of 7.8 million acres, protect an additional two million acres from development, including 225,000 acres of wetlands and 695,000 acres of forests.
Progress: 50 percent of outcome achieved.



Data collected between 2015 and 2016 show that, since 2010, approximately one million acres of land in the Chesapeake Bay watershed have been permanently protected from development. This marks an achievement of 50 percent of the goal to protect an additional two million acres, and brings the total amount of protected land in the watershed to 8.8 million acres. State agencies are the largest entity contributing to land protection: they hold approximately 46 percent of the protected acres in the watershed. Protecting land from development protects water quality, sustains fish and wildlife, maintains working farms and forests, preserves our history and provides opportunities for outdoor recreation.

In the News

Land Use

Over the past two years, the Bay Program and its partners have worked with local governments throughout the watershed to gain access to local land cover, land use and parcel and zoning data. This information has been combined with unprecedented high-resolution land cover data to inform the upcoming Phase 6 version of the Chesapeake Bay Watershed Model, which will provide 900 times the amount of information as the previous dataset. These datasets will be made available to local governments and the public at no cost.

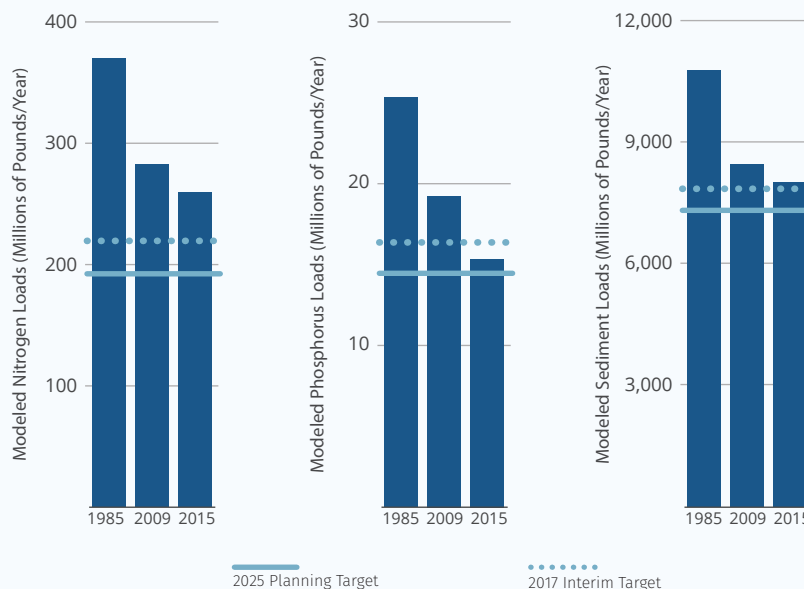


Clean Water



Estimated Pollution Reduced

Outcome: By 2025, have all pollution-reducing practices in place to achieve the water quality standards outlined in the Chesapeake Bay's "pollution diet," or Total Maximum Daily Load.

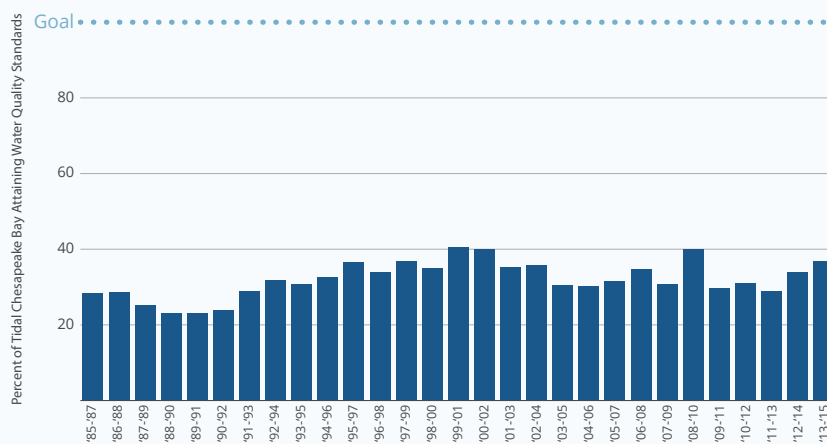


Computer simulations show that pollution controls put in place in the Chesapeake Bay watershed between 2009 and 2015 lowered nitrogen loads eight percent, phosphorus loads 20 percent and sediment loads seven percent. Experts attribute this drop in estimated pollution loads to a number of factors, including the increased implementation of agricultural conservation practices; a drop in the atmospheric deposition of nitrogen; and significant reductions of nitrogen and phosphorus loads in the wastewater sector. Indeed, for the first time—and ten years ahead of schedule—the Chesapeake Bay Program partnership as a whole has met its 2025 pollution reduction targets for the wastewater sector. Pollution-reducing practices are in place to achieve 31 percent of the nitrogen reductions, 81 percent of the phosphorus reductions and 48 percent of the sediment reductions necessary to attain applicable water quality standards for dissolved oxygen, water clarity/underwater grasses and chlorophyll *a* as compared to 2009, the year before the U.S. Environmental Protection Agency established the Chesapeake Bay Total Maximum Daily Load (Bay TMDL). This "pollution diet" limits the amount of nutrient and sediment pollution that can enter the Bay if it is to achieve standards necessary for clean water and a stable aquatic habitat.

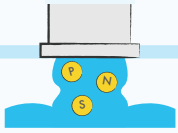


Water Quality Standards

Outcome: Achieve the water quality standards outlined in the Chesapeake Bay's "pollution diet," or Total Maximum Daily Load.

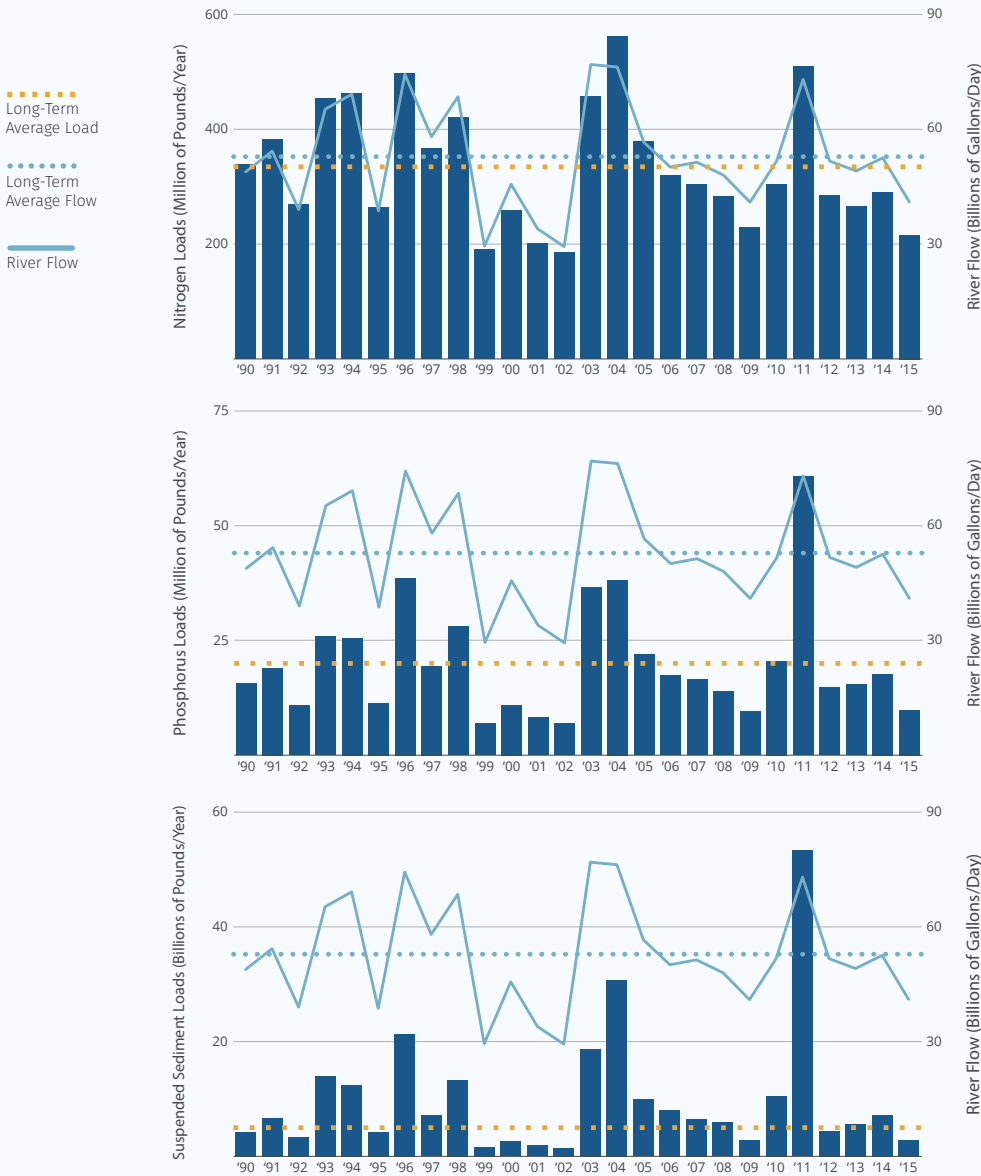


During the 2013 to 2015 assessment period, an estimated 37 percent of the Chesapeake Bay and its tidal tributaries met water quality standards. This marks an almost 10 percent increase from the previous assessment period, but is far below the 100 percent attainment needed for clean water and a stable aquatic habitat. Because the worms, clams and other invertebrates that live on the bottom of the Bay are unable to move to avoid environmental stress, their health is an indicator of water quality. In 2015, the health of the Bay's benthic or bottom-dwelling community improved: 62 percent of the benthic community met restoration goals (compared with 59 percent in 2014) and the extent of degraded and severely degraded conditions was the lowest it has been since Bay-wide monitoring began in 1996.



Nitrogen, Phosphorus and Sediment Loads

Outcome: Achieve the water quality standards outlined in the Chesapeake Bay's "pollution diet," or Total Maximum Daily Load.



From October 2014 to September 2015, approximately 217 million pounds of nitrogen, 9.9 million pounds of phosphorus and 2.9 billion pounds of sediment reached the Bay: a 25 percent, 44 percent and 59 percent drop from the previous year, respectively. These estimates are primarily based on monitoring data from the Bay's major rivers and wastewater treatment facilities. Experts attribute this drop to below-average river flow, but note local efforts to reduce pollution also played a role. Nutrient and sediment pollution are the leading causes of the Bay's poor health. Excess nitrogen and phosphorus fuel the growth of algae blooms that lead to low- or no-oxygen conditions harmful to aquatic life. Sediment can suffocate shellfish and block sunlight from reaching underwater plants.

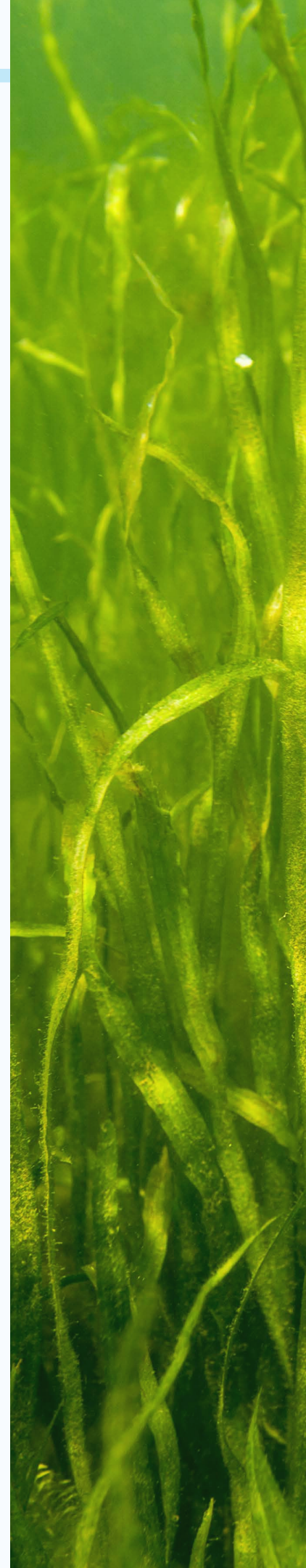
In the News

Toxic Contaminants

Toxic contaminants such as polychlorinated biphenyls (PCBs) are present in waters across the region, posing a threat to the health of wildlife and humans. A story map created by the Chesapeake Bay Program's Toxic Contaminants Workgroup and GIS Team will help track and ensure that restoration efforts are targeted in areas with a high prevalence of these contaminants.

Healthy Watersheds

The District of Columbia is working to install low impact development in the Fort Dupont watershed to reduce stormwater runoff. The District has also initiated an Environmental Assessment to explore opportunities to restore streams and wetlands and further improve the health of the Fort Dupont watershed so it can become the District's first healthy watershed.

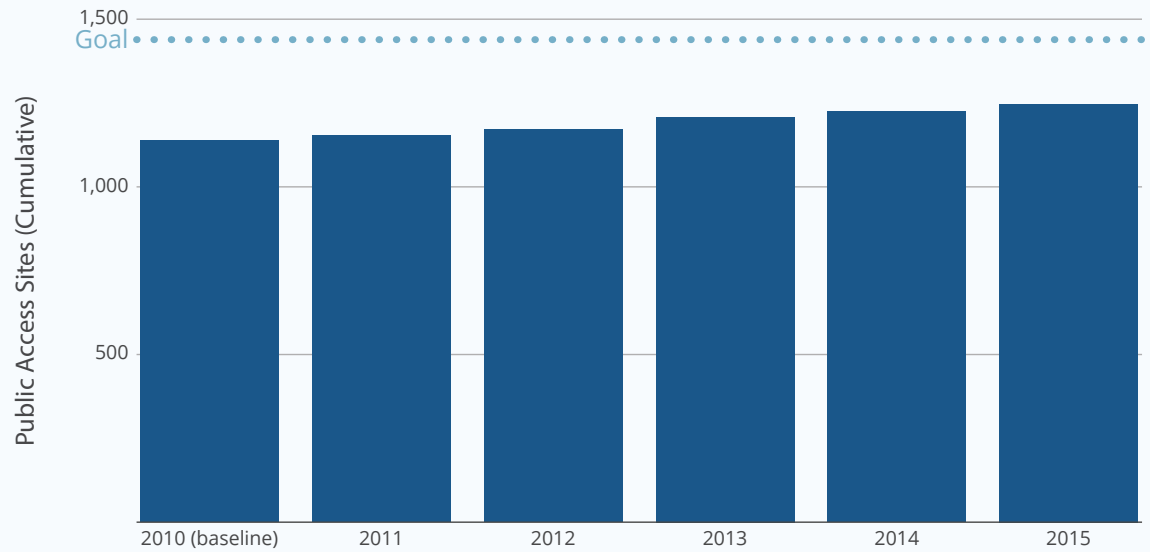


Engaged Communities



Public Access Sites

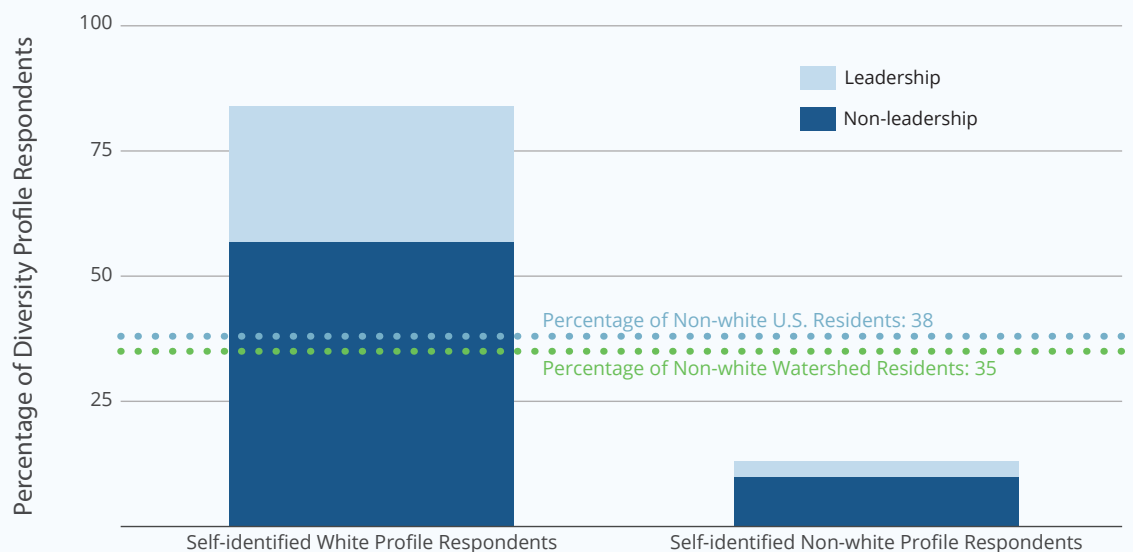
Outcome: Beginning with a 2010 baseline of 1,139 public access sites, add 300 new access sites to the watershed by 2025.
Progress: 36 percent of outcome achieved.



Between 2010 and 2015, 108 public access sites were opened to the public. This marks a 36 percent achievement of the goal to add 300 new access sites to the watershed, and brings the total number of sites in the region to 1,247. In the Chesapeake Bay watershed, there are currently seven public access sites in Delaware, 24 in the District of Columbia, 36 in New York, 44 in West Virginia, 203 in Pennsylvania, 336 in Virginia and 597 in Maryland. Preliminary data suggest that Chesapeake Bay Program partners added between 22 and 24 public access sites in 2016. Access to open space and waterways can improve public health and quality of life, build personal connections with places that have shaped life in the region, boost tourism and create stewards who care for local resources and engage in conservation efforts.

Diversity

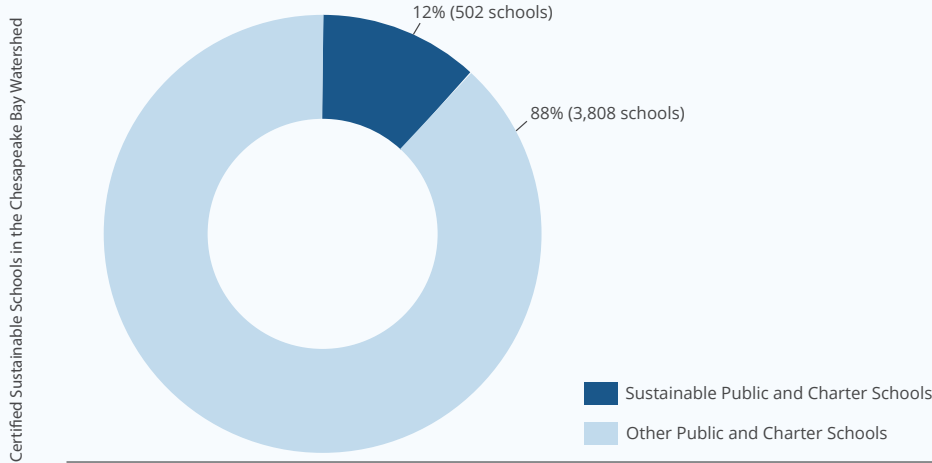
Outcome: Identify minority stakeholder groups not currently represented in the leadership, decision-making or implementation of current conservation and restoration activities. Create meaningful opportunities and programs to recruit and engage these groups in the Chesapeake Bay Program's work.



In its 2014 *Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program partnership adopted for the first time a formal initiative to increase the number and diversity of people who support and carry out environmental conservation and restoration activities. While there are many aspects of diversity, the Chesapeake Bay Program has chosen to focus first on expanding ethnic and racial diversity within the partnership. In 2016, the Alliance for the Chesapeake Bay, on behalf of the Chesapeake Bay Program, developed and distributed a profile assessment to evaluate the current demographics of the partnership. Almost 85 percent of respondents self-identified as white or Caucasian. About 13 percent identified as non-white or non-Caucasian. Of the respondents who identified as white, about one-third identified themselves as a member of Chesapeake Bay Program leadership. Of those who identified as non-white, about one-quarter identified themselves as a member of Chesapeake Bay Program leadership. Non-white respondents who identified themselves as Bay Program leadership comprise only three percent of total profile respondents.

Sustainable Schools

Outcome: Increase the number of schools in the region that reduce the impact of their buildings and grounds on their local watershed, environment and human health through best practices, including student-led protection and restoration projects.



In 2015, 12 percent of public and charter schools in the Chesapeake Bay watershed—a total of 502 schools—were certified sustainable by the U.S. Green Ribbon Schools, Virginia Naturally Schools, Maryland Green Schools and National Wildlife Federation Eco-Schools USA programs. At 82 percent of the total, Maryland is home to most of the certified sustainable schools in the watershed. Virginia is home to 17 percent of the sustainable schools in the watershed, with additional schools in Pennsylvania and Washington, D.C. Sustainable schools directly involve students in environmental protection and restoration, which contributes to a rise in overall environmental literacy.

In the News

Environmental Literacy

In April, for the first time in the history of the Bay Program partnership, a meeting of state superintendents of education and natural resource secretaries was convened to discuss environmental literacy. The group explored how states can support environmental literacy programming to meet both education reforms and commitments under the *Chesapeake Bay Watershed Agreement*.

Citizen Stewardship

The Kids in Kayaks Program offers Baltimore City 8th graders a unique outdoor experience that inspires environmental stewardship. The program, sponsored by partners like the National Park Service and the Baltimore National Heritage Area, is held in the fall and spring on the Patapsco River. Half of the day is spent kayaking, while the other half is spent taking part in activities related to wildlife, water quality and history.

Local Leadership

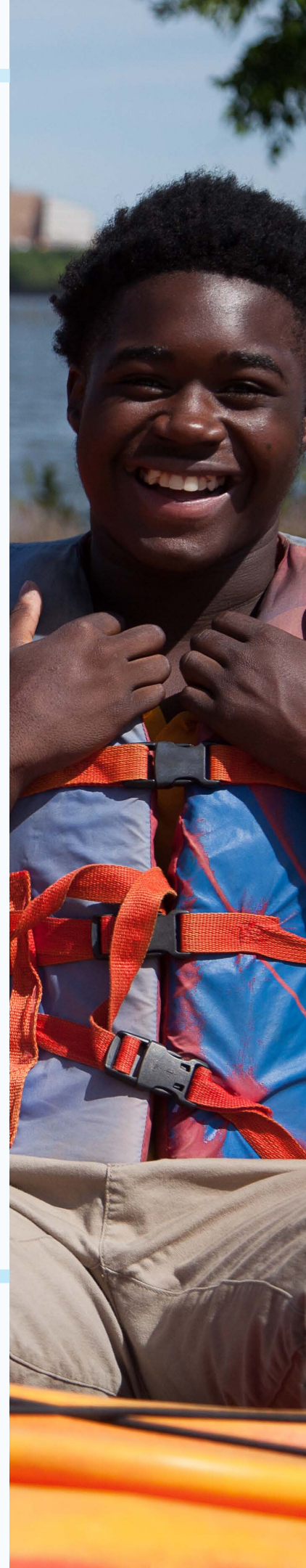
Local officials throughout the watershed vary in their knowledge of watershed issues and the capacity to implement restoration and protection initiatives. To help assess knowledge gaps and evaluate the need for a training program, the Bay Program's Local Leadership Workgroup is conducting a series of focus groups with elected officials from around the watershed to cover such topics as the most successful training programs for local leaders, how to best deliver information, funding, best practices and what areas need improvement.

Climate Change

In the News

Climate Resiliency

A report from the U.S. Environmental Protection Agency on climate change trends included new information on stream temperatures in the Chesapeake Bay region. As stream temperatures rise across the watershed, efforts are being redoubled to increase conservation measures that keep water cool, such as adding shade trees and removing dams.



The Chesapeake Bay Program is a regional partnership that works across state lines 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 all six watershed states. Through the Bay Program, federal, state and local agencies, non-profit organizations, academic institutions and citizens come together to secure a brighter future for the Bay region.

Learn more at www.chesapeakebay.net

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