

State of the Chesapeake Bay Program

Report to the Chesapeake Bay
Program Executive Council

September 2019





In 1983, when the original Chesapeake Bay Program partners signed the first *Watershed Agreement*, they Bay's underwater grasses were disappearing, taking with them the blue crabs that rely on grasses for protection. In 2019, the abundance of female blue crabs throughout the Chesapeake Bay increased 30% from 147 to 191 million. (Photo by Will Parson/Chesapeake Bay Program)

Introduction

In December 2018, the Chesapeake Bay Program celebrated 35 years of leading and directing the restoration of the Chesapeake Bay. The governors of Maryland, Pennsylvania and Virginia, along with the mayor of the District of Columbia, the chair of the Chesapeake Bay Commission (CBC), and the administrator of the Environmental Protection Agency (EPA), couldn't have envisioned at the time that the simple one-page agreement they signed back in 1983 would evolve into the unique regional partnership that exists today.

Today, the Chesapeake Bay Program also includes the states of Delaware, New York and West Virginia, who formally signed the most recent *Chesapeake Bay Watershed Agreement* (*Watershed Agreement*) in 2014. The extended Chesapeake Bay Program partnership includes local governments, federal agencies, businesses, watershed and other non-governmental organizations, the interested public and academia representatives who participate in different levels of the organization.

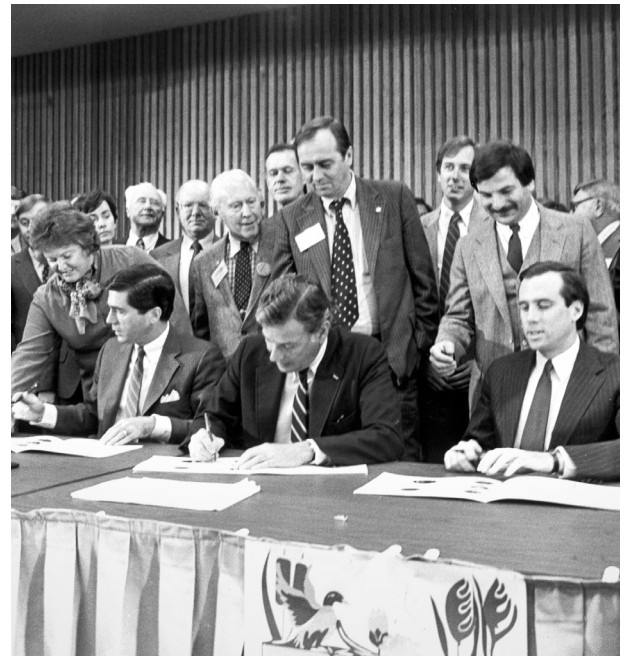
To those signatories of the first *Watershed Agreement*, the Bay they knew in 1983 would be unrecognizable today. At that point, nutrients from wastewater, suburban and urban runoff, farm fields and air pollution were overfertilizing the Bay, resulting in massive algae blooms, low-oxygen "dead zones" and disappearing underwater grass beds, which took with them abundant harvests of oysters, crabs and fish.

Today, because of the efforts of this unique partnership, we are seeing improvements both on the land and in the water: water quality is improving, underwater grasses are rebounding and vital fisheries are coming back. These fisheries generate an annual income of \$56 million dollars and 5,000 jobs across the region (source: U.S. Census Bureau, employment and income data from County Business Patterns).

In addition, those who live, work and recreate throughout this region are enjoying increased access to the bountiful natural resources of the Chesapeake Bay watershed. The National Park Service lands throughout the watershed produce over 27,000 jobs and generate \$2.3 billion dollars of economic benefits annually (source: U.S. Army Corps of Engineers, Chesapeake Bay Comprehensive Plan), while the region's recreation and tourism industries directly support over 820,800 jobs and an annual income of \$13 billion dollars (source: U.S. Census Bureau, employment and income data from County Business Patterns).

While the Chesapeake Bay Program partnership is guided by the 10 goals and 31 outcomes in the most recent *Watershed Agreement*, as well as the Chesapeake Bay Total Maximum Daily Load (Bay TMDL) that was put into place by the EPA in 2010, the signs of resilience that are being seen throughout the watershed are due in large part to the hard work and efforts of every single partner.

While this report celebrates our accomplishments over the past year by providing an overview of the progress being made toward the outcomes of the *Watershed Agreement*, it also acknowledges the need to continue our restoration work to succeed in our pursuit of a healthy and restored Chesapeake Bay.



The first *Chesapeake Bay Agreement* was signed on Dec. 9, 1983 by the governors of Maryland, Pennsylvania and Virginia; mayor of the District of Columbia; chair of the Chesapeake Bay Commission and administrator of the Environmental Protection Agency. (Photo by Environmental Protection Agency)

Strategy Review System

The *Watershed Agreement* established 10 goals to advance the restoration and protection of the Chesapeake Bay watershed. Each goal is linked to a set of outcomes, most of which contain time-bound and measurable targets, which will directly contribute to its achievement. Signatories promised to openly and publicly engage watershed residents in implementing these goals and outcomes. Partners work through Goal Implementation Teams (GITs), workgroups and advisory committees to collaborate, share information and set goals. Following the adoption of the *Watershed Agreement*, the partners crafted Management Strategies, and subsequently, two-year Logic & Action plans for each outcome.

Adaptive management, a “learning-by-doing” concept, is a key component of the *Watershed Agreement*. It is taking action amidst uncertainty, carefully monitoring outcomes, transparently assessing progress and redirecting efforts when necessary.

In 2017, the partnership established a sophisticated adaptive management process to track the progress of each outcome, called the Strategy Review System (SRS). Now in its second cycle, the SRS addresses new and ongoing challenges, requests for action or assistance from the Management Board and identifies areas that require management support.

In March 2019, the second cycle of the SRS was formally kicked off with a two-day meeting in Richmond, Virginia. During the meeting, attendees representing every GIT, workgroup and advisory committee, identified lessons learned during the first cycle, recommended adjustments to the process to make it more efficient, and discussed recent developments in the scientific, fiscal and policy arenas to consider during the next cycle.

The first cycle of the SRS process recommended the following actions to help achieve the goals of the *Watershed Agreement*:

- Focusing on environmental co-benefits to prioritize efforts addressing multiple outcomes.
- Aligning and leveraging government and private sector funds to achieve maximum impact.
- Prioritizing science needs across the partnership in a coordinated way.

In summer 2019, the partnership launched ChesapeakeDecisions to support the SRS process and guide the partnership through preparing for and participating in quarterly progress meetings. This tool promotes transparency and accountability by providing access to the documents used to support the quarterly progress meetings and maintains a record of the requests, decisions and needed follow-up to continue making progress toward the goals and outcomes of the *Watershed Agreement*.

Refined Governance Document

To accommodate the SRS process, the partnership revised the existing Governance and Management Framework for the Chesapeake Bay Program Partnership September 2018 (Governance Document), to include the purpose, overall model, expectations and responsibilities for the SRS, in addition to the organizational function and governance of the partnership.

Through the comprehensive and predictable learning-based approach of the SRS, a coordinated strategy is now in place to ensure the partnership is able to fulfill the vision outlined in the *Watershed Agreement* of a restored and protected Chesapeake Bay and watershed. The SRS, therefore, has a significant impact on the governance of the program, including expected timeframes for SRS milestones, responsibilities and the roles of the different organizational units in operating the process. The governance document plays a key role in capturing changing expectations and policies as the partnership continuously improves its operation.

Tracking Progress

The Chesapeake Bay Program uses a suite of environmental health, restoration and stewardship indicators to track progress toward the *Watershed Agreement*. These indicators support the partnership's adaptive management-based decision-making process and highlight the critical work taking place to further our commitments.

The data and information that support our indicators 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 *Watershed Agreement* was signed.

Our indicators are published on ChesapeakeProgress, which supports federal, public and internal oversight of our work. Some of these indicators track the factors that influence our ability to achieve our goals, while others track whether we are putting our management approaches and actions in place, and still others track whether we are achieving the goals and outcomes that will support our vision of a sustainable watershed. It is important to note that we are making progress toward all of our outcomes—even those currently without a performance indicator.

Additionally, an update of the progress that the Chesapeake Bay Program is making toward meeting the goals and outcomes of the *Watershed Agreement* is published annually in the Bay Barometer, our review of environmental health and restoration.



Underwater grasses grow in the Susquehanna Flats south of Havre de Grace, Md., on Aug. 2, 2019. In 2018, 91,559 acres of underwater grasses were mapped in the Chesapeake Bay. However, nearly a quarter of the Bay was not fully mapped due to prolonged turbidity, weather conditions and security restrictions. It is estimated that the Bay may have actually supported up to 108,960 acres of underwater grasses—a 4% increase from 2017 figures and a 59% achievement of the partnership's 185,000-acre goal. (Photo by Will Parson/Chesapeake Bay Program)

Our Progress

For the first time, the most recent Bay Barometer tracked progress toward the Climate Monitoring and Assessment Outcome in the *Watershed Agreement*. The partnership is now able to observe the impact that a changing climate is having on the Chesapeake Bay watershed. Patterns and trends observed in these indicators—which include air temperature, stream temperature, precipitation, river floods and sea level rise—will help us understand how these shifting environmental conditions could influence our ability to protect and restore the Bay. Some highlights include:

Air temperature: Between 1901 and 2017, 32 out of the 33 climate divisions in the Chesapeake Bay watershed experienced statistically significant long-term increases in air temperature, ranging from 0.4 to 2.5 degrees Fahrenheit.

Sea-level rise: At each of the long-term tide gauge stations in the Bay, sea-level rise has increased between one-eighth of an inch to approximately one-sixth of an inch each year between 1960 and 2017.

Stream temperature: Between 1960 and 2014, 31 of 72 stream sites across the Chesapeake Bay watershed experienced a statistically significant increase in stream temperature, averaging about 2.1 degrees Fahrenheit.

Positive Highlights

Blue crab abundance: The abundance of female blue crabs throughout the Chesapeake Bay increased 30% from 147 to 191 million. This number is above the 70 million threshold, but lower than the target of 215 million. Blue crabs have a natural variability and their abundance is expected to fluctuate from year to year.

Blue crab management: An estimated 23% of female blue crabs were harvested from the Bay in 2018. For the 11th consecutive year, this number fell below the target and overfishing threshold, but experts still agree that the blue crab stock is not depleted or being overfished.

Fish passage: Bay Program partners have exceeded the goal to open 1,000 miles of historical fish migration routes. Between 2012 and 2017, 1,236 miles were opened to fish passage, marking a 124% achievement of the goal.

Oysters: Ten tributaries have been selected in Virginia and Maryland for oyster restoration. All of these are in different levels of progress, and two of those—Harris Creek and the Lafayette River—have reached their restoration target (they are still considered to be in progress, as they are now in the monitoring and evaluation stage).

Protected lands: Approximately 1,364,000 acres of land throughout the Chesapeake Bay watershed has been permanently protected from development since 2010. The Bay Program committed to protect an additional two million acres of land throughout the watershed by 2025 and has now achieved 68% of the outcome.

Public access: Between 2010 and 2018, 176 public access sites were opened throughout the Chesapeake Bay watershed, a 59% achievement of the goal to add 300 new public access sites across the region by 2025.

Underwater grasses: In 2018, 91,559 acres of underwater grasses were mapped in the Chesapeake Bay. However, 22% of the Bay was not fully mapped due to prolonged turbidity, weather conditions and security restrictions. Using 2017 levels for these unmapped areas, it is estimated that the Bay may have supported up to 108,960 acres of underwater grasses in 2018. This would be a 4% increase from 2017 figures and a 59% achievement of the partnership's 185,000-acre goal.



Visitors cool off in the James River amid 90-degree temperatures in Richmond, Va., on Aug. 13, 2019. Between 2010 and 2018, Chesapeake Bay Program partners opened 176 new places to swim, fish, boat, kayak or otherwise enjoy the water. This is a 59% achievement of our goal. (Photo by Will Parson/Chesapeake Bay Program)

Promising Highlights—But More Work is Needed

2017 and 2025 Watershed Implementation Plans: The Watershed Model estimated in 2017 that jurisdictions have practices in place to reduce 40% of nitrogen, 87% of phosphorus and 67% of sediment reductions flowing into the Bay. According to the Watershed Model, practices put in place over the past eight years (2009-2017) have lowered nitrogen pollution by 11%, phosphorus loads by 21% and sediment loads by 10%.

Diversity: The Chesapeake Bay Program has set a target to increase the percentage of people in the partnership to 25% by 2025. As of 2016, 13% of partners self-identified as non-white.

Meaningful Watershed Educational Experiences (MWEs): In a voluntary 2017 survey, 39% of responding schools reported having system-wide MWEs in place for at least one grade in the elementary level, 43% have them in at least one grade in the middle school level and 31% reported having them in place for at least one course in high school.

Water quality standards attainment and monitoring: Water quality monitoring shows that in 2017, approximately 240 million pounds of nitrogen, 12.7 million pounds of phosphorus and 4.3 billion pounds of sediment reached the Bay. This indicates that an estimated 42% of the Chesapeake Bay watershed meets water quality standards—the highest ever recorded since monitoring began over 30 years.

Phase III Watershed Implementation Plans

WIPs are developed by the six states in the Chesapeake Bay watershed and the District of Columbia (jurisdictions) to help them determine how they will meet their pollutant reduction goals as outlined in the Chesapeake Bay Total Maximum Daily Load (Bay TMDL). Phase III of the WIPs provides information on what actions the jurisdictions intend to implement between 2019 and 2025 to reduce pollution flowing into their local waterways. While developing these plans, the jurisdictions take into consideration the results of the 2017 Bay TMDL Midpoint Assessment, which evaluated whether each jurisdiction had practices in place to achieve 60% of its pollutant reductions. The jurisdictions also accounted for future population growth based on estimates of how the land in the watershed will be used in 2025. Experts believe that the population of the watershed will reach 20 million by 2030—an increase of more than two million since 2010. This projected growth will also lead to a growing population of agricultural animals, such as chicken and cows.

The draft Phase III WIPs were received in April 2019 and evaluated by the EPA. This initial evaluation provided the EPA with the opportunity to provide comments on whether the activities proposed by each jurisdiction would meet their pollutant reduction goals by 2025. It was determined that all jurisdictions should have 100% of practices in place to meet their phosphorus goals, but two jurisdictions would fall short of meeting their nitrogen goals. Each jurisdiction submitted their final Phase III WIP in late August 2019 and they are currently under review by the EPA. The biggest challenges identified to address moving forward is pollution associated with stormwater and agricultural runoff.

Areas of Continued Focus

Environmental literacy: In 2017, a voluntary environmental literacy survey found that 22% of schools in the Chesapeake Bay watershed self-identified as being well-prepared to put a comprehensive and systemic approach to environmental literacy in place.

Forest buffers: In 2017, 56 miles of forest buffers were planted along the rivers and streams throughout the Chesapeake Bay watershed. The per-year target for buffers is 900 miles, marking the lowest restoration total of the last 22 years at 6% achieved.

Stewardship: In 2017, in the first ever survey of its kind in the Chesapeake Bay watershed, residents scored a 24 out of 100 regarding potential stewardship actions that they would be willing and able to take.

Stream health: While thousands of samples have been taken from streams around the watershed, 54% of these waterways are not reflected in the indicator for stream health due to insufficient or absent data. Those samples that were included, showed that 25% of streams are in fair, good or excellent condition, and 21% are in poor or very poor condition.

Sustainable schools: In the 2017 voluntary environmental literacy survey noted above, 14% of public and charter schools in the Chesapeake Bay watershed self-identified as being certified sustainable.

Toxic contaminants: In 2016, 83% of the Chesapeake Bay and its tidal tributaries were found to be partially or fully impaired by toxic contaminants. This is a continued increase in the observation of toxic contaminants since 2010.

Wetlands: In 2017, the Chesapeake Bay Program achieved 11% of its goal, a total of 9,103 acres, to restore or create 85,000 acres of wetlands, specifically 83,000 acres of them on agricultural lands.



Cattle are grazed rotationally at Pine Draft Farm, seen in Hampshire County, W.Va. (Photo by Will Parson/Chesapeake Bay Program)

Follow-up from 2018 Executive Council Meeting

Moving Forward on Environmental Literacy

At the 2018 Executive Council meeting, Governor Ralph Northam committed to host the Chesapeake Bay Program's biennial environmental literacy summit in Virginia. Held in June 2019, leaders from state departments of education and natural resources came together to highlight challenges and explore possible solutions to ensure environmental education resources and opportunities are distributed equitably among all students. The meeting also explored how environmental literacy can help address inequities in our education system and discussed strategies for how to increase diversity into the environmental movement.

Agriculture Technical Assistance Directive

The agriculture sector is one of the largest sources of nutrient and sediment pollution flowing into the Chesapeake Bay. With agriculture covering 30% of the watershed on approximately 83,000 farms, most states need to accelerate implementation of agriculture practices to achieve further nutrient and sediment reductions. Recognizing this need, at the 2018 Chesapeake Executive Council meeting, members signed a directive recognizing the crucial role that farmers play throughout the Chesapeake Bay watershed, while acknowledging the need for increased technical assistance to help the agricultural sector meet their pollutant reduction goals.

The Chesapeake Bay Program Agriculture Workgroup is currently working to address the recommendations laid out in the directive, and when ready, will share their response with the Chesapeake Bay Program Water Quality GIT and then the Management Board for their review and approval. The Phase III WIPs developed by each state, as well as the passing of the most recent Farm Bill in December 2018, are the first steps to making tangible progress towards addressing technical assistance gaps.



Binford Middle School in Richmond, Va., hosts several features that reduce stormwater, including a rain harvesting sculpture, “Taking a School by Storm,” seen on Aug. 13, 2019. The centerpiece of the school’s green infrastructure efforts, the sculpture was a collaborative design by artists Matt Lively and Tim Harper, landscape expert Scotty Dilworth, stormwater specialists Dave Hirschman and Charlene Harper, Meredith Dash of the Alliance for the Chesapeake Bay, as well as Binford educators and students. The project was funded with \$200,000 from the National Fish & Wildlife Foundation Small Watershed Grant program. (Photo by Will Parson/Chesapeake Bay Program)

Emerging Concerns

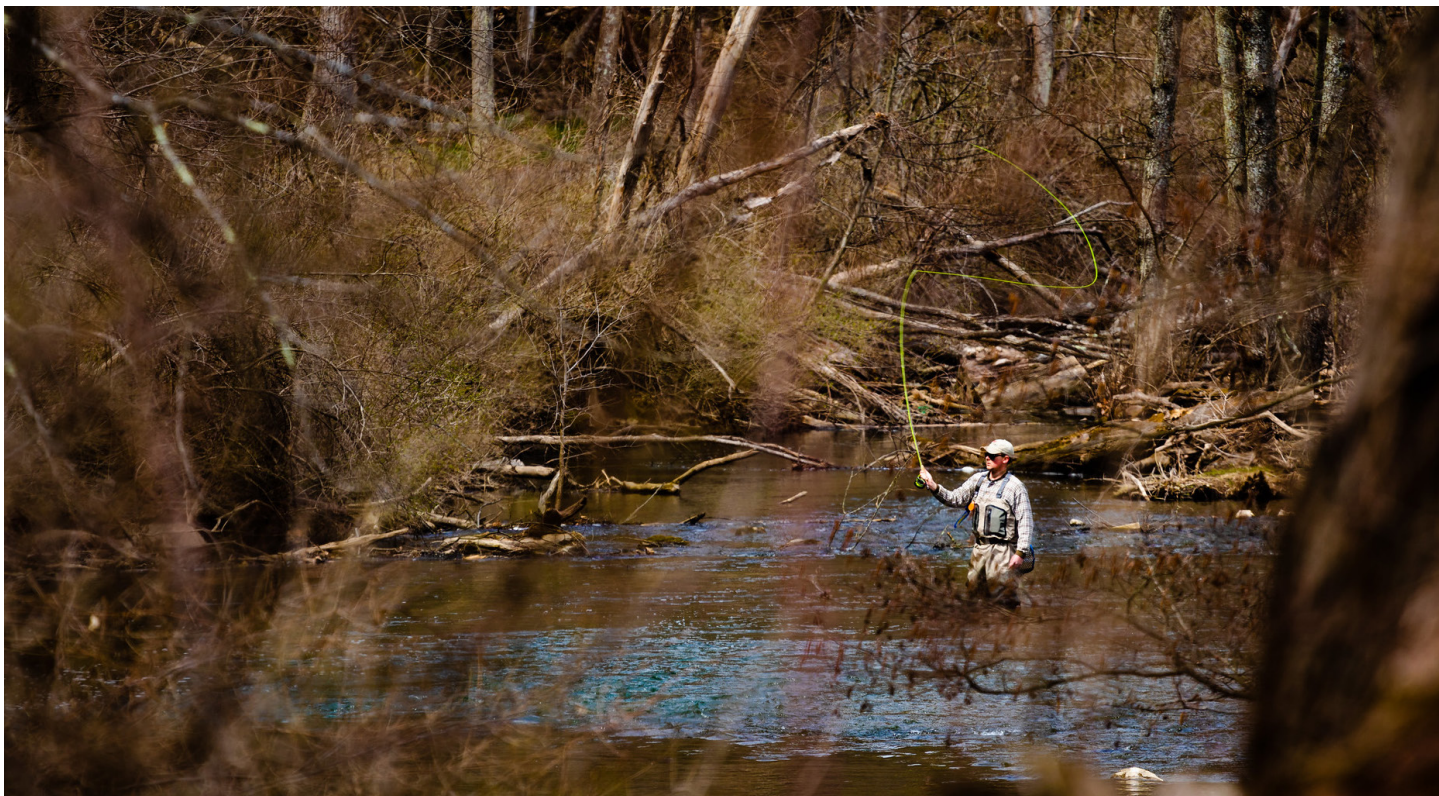
Urban/Suburban Stormwater Runoff

Stormwater runoff is one of the fastest growing sources of pollution impacting the Chesapeake Bay, due in part to increased development across the watershed. Stormwater runoff is the precipitation in urban and suburban areas that does not fully evaporate or soak into the ground but instead runs across the land and into the nearest waterway. It can erode stream banks, lead to flooding and push excess nutrients, sediment and chemical contaminants into waterways.

Conowingo Dam

For more than 90 years, the Conowingo Dam, one of three along the lower Susquehanna River, has produced hydroelectric power generation. At the same time, a 9,000-acre reservoir located behind the dam has collected sediment and nutrient pollutants and kept them from flowing downstream and into the Chesapeake Bay. When the Bay TMDL was put into place in 2010, it was estimated that the Conowingo Dam would continue trapping pollutants through 2025. New research has determined that this is not the case, and that the reservoir has become less effective at trapping pollution because it has become filled with sediment and is almost at capacity. During large storms and severe floods, the fast-moving flows of the Susquehanna River moves sediment and attached nutrients over the dam and downstream into the Chesapeake Bay.

To figure out how to best account for these additional nutrient and sediment pollutant loads, the Chesapeake Bay Program convened a steering committee with members from each jurisdiction to develop and implement a separate WIP for the Conowingo Dam. The EPA issued a Request for Applications for the Conowingo WIP earlier this year and is in the process of completing the grant approval process. Final awards are expected this fall and the WIP will be completed in 2020.



A fly fisher casts a line in Spring Creek in Centre County, Pa. Largely fed by groundwater springs that keep the water cool, Spring Creek is the most densely populated wild brown trout stream in Pennsylvania, and portions support native brook trout as well. (Photo by Will Parson/Chesapeake Bay Program)

Conclusion

Hard work, collaboration and a committed partnership are the drivers behind the restoration successes of the Chesapeake Bay watershed. But although significant progress has been made, challenges in the form of rising populations, extreme weather events, loss of vital habitats and increased stormwater runoff are serious issues that need to be accounted for and addressed. Through continued coordination, dedicated and strong collaboration, and increased understanding between partners, the Chesapeake Bay Program will be able to address these challenges head on and help the Bay continue to recover and grow stronger.



Chesapeake Bay Program
Science. Restoration. Partnership.