

EPA EVALUATION OF MARYLAND'S 2022-2023 and 2024-2025 MILESTONES

Executive Summary

The Chesapeake Bay Program (CBP) partnership established the goal to have all practices and controls in place by 2025 that were necessary to meet applicable water quality standards in the Chesapeake Bay (Bay) and its tidal tributaries (“2025 Goal”). The CBP partnership, including the seven jurisdictions (Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the U.S. Environmental Protection Agency (EPA), agreed to develop and implement a framework for holding each partner accountable for reducing nitrogen, phosphorus, and sediment loads to meet the 2025 Goal. EPA is providing this evaluation of Maryland’s 2022-2023 and 2024-2025 milestones to the CBP partnership and the public in accordance with its oversight role and responsibility under the CBP partnership’s accountability framework.

In that role, EPA has evaluated Maryland’s statewide progress toward attaining its portion of the 2025 Goal. This evaluation includes an assessment of progress toward attaining nutrient and sediment goals at the state and state-basin level and progress toward meeting sector-specific programmatic commitments for the 2022-2023 milestone period. This evaluation also provides an assessment of sector-specific programmatic and numeric commitments (e.g., Best Management Practices (BMP) or BMP implementation targets) for the 2024-2025 milestone period and the status of the relevant water quality monitoring trends.

In reviewing Maryland’s final programmatic progress for the 2022-2023 milestones, the 2023 numeric progress, and the final 2024-2025 milestone commitments, EPA identified sector-by-sector strengths as well as areas for improvement. According to the data provided by Maryland for the 2023 progress run, Maryland did not achieve its statewide 2023 target for nitrogen but did achieve its statewide 2023 targets for phosphorus and sediment. EPA stands ready to assist Maryland with implementing its 2024-2025 two-year milestone commitments.

Some notable strengths identified in this evaluation of Maryland’s 2022-2023 milestone progress and the final 2024-2025 milestone commitments include:

- Bolstered existing wastewater facilities through equipment upgrades, increased staffing, and additional technical and financial support.
- Supported the 5-Million Trees Initiative to increase seedling production and provide tracking tools to further support forest buffer and tree planting projects. This resulted in increased implementation for both forest and grass buffers, such that Maryland met its 2025 planning target for forest buffers.
- Continued targeting land conservation and climate resilience projects through efforts such as Targeted Resilience Areas Project Portfolio Development and the creation of the Coastal Resilience Easement in Talbot County.
- Maryland Department of the Environment released its Environmental Justice Screening Tool on June 6, 2022, to provide data to inform decisions on siting, permitting, enforcement, and infrastructure improvements to help underserved communities in Maryland.

Some key areas that EPA expects Maryland to address in the final 2024-2025 milestone period and beyond include:

- Accelerate BMP implementation in the agricultural sector, especially since Maryland did not meet several of its agriculture BMP implementation targets in the 2022-2023 milestone period. Include updates on specific programmatic efforts and associated BMP implementation in progress reporting.
- Include updates in the 2024-2025 milestone progress that speak to the activities related to the Infrastructure Investment and Jobs Act (IIJA)/Bipartisan Infrastructure Law (BIL) investments. Significant funding has been provided to the Chesapeake Bay watershed jurisdictions and milestone progress reporting should highlight the benefits and activities that result from those investments.

Looking Forward for Future Reviews of Progress

At the 2022 [Executive Council meeting](#), the Executive Council discussed the upcoming year of 2025—the target date the partnership set for achieving certain outcomes under the [2014 Chesapeake Bay Watershed Agreement](#). At that meeting, the Executive Council [charged the Principals' Staff Committee](#) (PSC) to recommend a critical path forward that prioritizes and outlines the next steps for meeting the goals and outcomes of the *Chesapeake Bay Watershed Agreement* leading up to and beyond 2025 with specific considerations for science, restoration, and partnership. Recommendations for actions beyond 2025 will be presented at the 2024 Executive Council meeting.

At the [September 2023 PSC meeting](#) the CBP partners agreed to define the targets to be met by 2025 as the Phase III planning targets, the 2025 targets for climate change, and Conowingo targets.¹ Consistent with that decision, this evaluation measures progress toward the goal of meeting the 2025 planning targets and 2025 climate change targets. In doing so, this evaluation of Maryland's 2022-2023 progress and 2024-2025 commitments uses the Chesapeake Assessment Scenario Tool (CAST) 2019, as agreed to by the CBP partnership.

In the next round of two-year milestones, progress will be measured using [CAST-23](#) and will include progress toward unaccounted additional loads and 2025 climate change conditions. In September 2023, the PSC approved the finalization and use of CAST-23 (update released June 2024) for tracking progress until the Phase 7.0 suite of modeling tools is complete (estimated in 2028). The PSC also determined that unaccounted additional loads (i.e., modeled load increases identified after the PSC adopted the jurisdictions' Phase III planning targets in 2018) will be added to the jurisdictions' existing Phase III planning targets to create interim planning targets and that these will be addressed in the Phase 7.0 suite of modeling tools along with 2035 climate change loads.

In addition, in January 2024 the CBP partnership finalized the [Chesapeake Bay Total Maximum Daily Load \(TMDL\) indicator](#) which is a new indicator designed to combine monitored and modeled data to estimate the progress of annual pollutant loading rate reductions since 1995 in

¹ The PSC approved a phased approach for what can be achieved at Conowingo by 2025. Conowingo has a separate WIP and milestones to meet those targets.

response to implemented management practices. This indicator was developed to address a CBP partnership interest in comparing modeled and monitoring data. This indicator may be used in future evaluations of progress.

Detailed Evaluation of Overall Load Reductions and Source Sectors

Load Reduction Review – Statewide and by Major River-Basin²

Each year, jurisdictions in the CBP partnership report on the BMPs installed, tracked and verified and the pollutant load reductions from wastewater treatment plants. Using CAST-19, this information (or “annual progress runs”) provides an estimate of how much nitrogen, phosphorus, and sediment has been reduced. When evaluating Maryland’s 2022-2023 milestone implementation, EPA simulated nutrient and sediment loads using CAST-19³ and wastewater discharge data reported by Maryland and compared those simulated loads to where Maryland progress should be by 2023 (90% of the statewide and state-basin Phase III planning targets).

According to the data provided by Maryland for the 2023 progress run, Maryland did not achieve its statewide 2023 target for nitrogen but did achieve its statewide 2023 targets for phosphorus and sediment. These targets include adjustments for 2025 climate change as approved by the PSC. At the state-basin level, Maryland achieved its 2023 nitrogen targets for the Western Shore and Patuxent basins but did not achieve its 2023 targets for nitrogen in the other major basins (Eastern Shore, Potomac, and Susquehanna). While not achieved, the Potomac basin is within 5% of achieving its 2023 target for nitrogen. Maryland achieved its 2023 phosphorus targets for the Western Shore, Potomac and Patuxent basins but did not achieve its 2023 phosphorus targets for the other major basins (Eastern Shore and Susquehanna). Maryland achieved its 2023 sediment targets for the Eastern Shore, Western Shore, Potomac, and Patuxent basins but did not achieve its target for the Susquehanna basin.

² Major river-basin refers to the eight major river basins draining to the Chesapeake Bay, some of which are shared by more than one Bay jurisdiction. For example, the Susquehanna River is shared by New York, Pennsylvania, and Maryland; Pennsylvania-Susquehanna refers to the Pennsylvania portion of the river. The phrase major river-basin is interchangeable with "state-basin" in this document.

³ CAST-19 is part of the Phase 6.0 suite of modeling tools for the Chesapeake Bay.

Table 1. Loads and Targets for Maryland based on CAST-19 and reported wastewater data.

Pollutant	2009 Progress Loads (M lbs/year)	2023 Progress Loads (M lbs/year)	2025 Planning Target Load (M lbs/year)	Additional Load due to 2025 Climate Conditions (M lbs/year)	2025 with Climate Target load (M lbs/year)	% of goal Achieved (90% is considered on track to meet 2025 with climate load)
Nitrogen	57.61	46.91	45.83	1.14	44.69	83%
Phosphorus	4.15	3.50	3.68	0.11	3.57	100%
Sediment	7,663	7,554	8,343	N/A	8,343	100%

Maryland developed specific BMP implementation targets for the 2022-2023 and final 2024-2025 milestones for those practices identified in Maryland's Phase III Watershed Implementation Plan (WIP) that account for the majority of the nitrogen reductions. Table 2 provides a summary of Maryland's 2023 progress compared to the 2009 baseline and the 2025 targets, as well as the final 2024-2025 commitments, for these priority BMPs.

Table 2. Progress toward Targets for Maryland’s priority BMPs (those that account for the majority of the nitrogen reductions).

BMP⁴	2009 Progress	2023 Progress	2024-2025 Milestone Target	2025 Planning Target
Cover Crops (acres)	120,616	384,605	470,000	464,191
Tillage Management – Continuous High Residue (acres)	548,015	658,561	643,000 annually	618,411
Animal Waste Management Systems – Poultry (animal units)	1,219,662	1,601,071	1,798,116	1,798,116
Animal Waste Management System- Livestock (animal units)	72,751	40,663 Dairy 53,898 Other Livestock	35,712 Dairy 71,695 Other Livestock	99,654
Soil Conservation and Water Quality Plans (acres)	780,852	802,492	1,000,000	1,022,031
Grass Buffers (acres)	37,323	37,243	4,295 annually, or 42,516 cumulatively	42,516
Nutrient Management Core Nitrogen (% compliance rate)	None reported ⁵	80%	70.0%	63%

The summary progress from the CBP partnership’s modeling tools for 2009 and 2023 incorporate BMP credit duration. The CBP partnership decided to remove reported BMPs from the model simulation at the end of their established credit durations unless verified by the state as inspected and continuing to function as designed. Maryland is expected to provide detailed

⁴ BMP levels are units reported or planned by the jurisdiction. The levels are calculated using CAST-19 of the Phase 6.0 suite of modeling tools and include everything established or installed, reported, and functioning through the particular year, e.g., through 2009, or through 2023, etc., not just new reported implementation, unless otherwise noted.

⁵ CBP partnership modeling tools evolve based on CBP partnership decisions. As a result, some BMPs have “none reported” listed since those particular BMP names were not available for reporting. These practices were often included in another BMP category before the refinement to be more specific in the naming convention.

programmatic milestones to support these BMP implementation targets. In the sector-specific sections below, EPA provides its evaluation of these programmatic milestones and the connection to increased implementation.

Source Sector Review

Agriculture

Maryland is predominantly relying on agriculture BMP implementation to meet its 2025 targets based on its Phase III WIP. Maryland continues to make incremental progress toward its goals, but the current pace of implementation is not on track to meet its statewide nutrient targets. EPA expects Maryland to accelerate BMP implementation in the agricultural sector.

2022-2023 Milestone Achievements

- Continued to increase conservation land adoption through multiple initiatives.
- Supported the 5 Million Trees Initiative to increase seedling production and provide tracking tools to further support forest buffer and tree planting projects. This resulted in increased implementation for both forest and grass buffers, such that Maryland met its 2025 planning target for forest buffers.
- Exceeded compliance rate goal for the Nutrient Management Core Nitrogen BMP, raising this from 59% in 2018 to 80% in 2023.

2022-2023 Milestones Not Achieved

- Did not achieve the Soil Conservation Water Quality Plan or Cover Crop implementation goals.

2024-2025 Milestone Strengths

- Provides additional detail on achieving future milestones through increased technical assistance to private landowners, for both conservation efforts and BMP implementation.
- Commits to further targeting of land conservation opportunities.

Key Areas to Address in the Final 2024-2025 Milestone Period and beyond

- Report progress on efforts to accelerate BMP implementation in the agricultural sector and identify what programs were implemented to achieve the implementation targets, especially since some BMP implementation targets were not met in the 2022-2023 milestone period.

Urban/Suburban Stormwater

2022-2023 Milestone Achievements

- Reissued expired Phase I Municipal Separate Storm Sewer System (MS4) permits.
- Reissued the construction stormwater general permit.
- Reissued the industrial stormwater general permit.
- Finalized the Advancing Stormwater Resiliency in Maryland (A-StoRM) Report.
- Developed a GIS map to help understand where flooding has frequently occurred (post 2000) and recognize where watershed studies are needed.

2022-2023 Milestones Not Achieved

- Did not complete updates to the Stormwater Design Manual or update design standards for Environmental Site Design (ESD) practices.
- Did not complete a draft of regulations to require comprehensive watershed studies.

2024-2025 Milestone Strengths

- Commits to the reissuance of the Maryland Department of Transportation State Highway Administration (MDOT-SHA) MS4 permit.
- Commits to continuing to advance stormwater resiliency through the A-StoRM initiative and completion of design updates and regulations that were started during the last milestone period.

Key Areas to Address in the Final 2024-2025 Milestone Period and beyond

- Report the amount of equivalent impervious acreage restored.
- Remove completed permit issuances from 2024-2025 milestones.
- Maryland is expecting additional nutrient reductions from the stormwater sector by 2025 according to its Phase III WIP. EPA expects Maryland to accelerate BMP implementation in the urban/suburban stormwater sector.

Wastewater Treatment Plants and Onsite Systems

2022-2023 Milestone Achievements

- Bolstered existing wastewater facilities through equipment upgrades, increased staffing, and additional technical and financial support.

2022-2023 Milestones Not Achieved

- Did not achieve Septic Best Available Technology (BAT) upgrade goal.

2024-2025 Milestone Strengths

- Commits to make further improvements to wastewater facilities to continue to enhance the capacity of those facilities to meet permit requirements.

Key Areas to Address in the Final 2024-2025 Milestone Period and beyond

- None.

Growth, Offsets, and Trading

2022-2023 Milestone Achievements

- Continued to provide the Chesapeake Bay Program Office with Maryland's own projections of growth in the urban sector.
- Continued service on the Chesapeake Bay Program Land Use Workgroup to ensure Chesapeake Bay Program land use data, impervious cover change data, and Chesapeake Bay Land Change model forecasts are as accurate as possible and incorporate Maryland's data base.
- Continued exploration of the use of the Maryland Department of Planning's Growth Simulation Model to account for 2025 projected growth.

- Continued to update and maintain Maryland's land preservation datasets to inform the Chesapeake Bay Program Phase 6 suite of modeling tools.
- Supported ongoing Water Quality Trading Program Enhancements.

2022-2023 Milestones Not Achieved

- Delayed in finalizing the Water Quality Trading Registry and online marketplace.

2024-2025 Milestone Strengths

- Focuses on working to include credits generated from agriculture sources into the Water Quality Trading Program.
- Commits to finalizing the Water Quality Trading Registry and online marketplace.
- Commits to increase the quantity of credit buyers in the program through encouragement of participation by non-traditional partners.

Key Areas to Address in the Final 2024-2025 Milestone Period and beyond

- Continue to work with EPA in offsetting any new or increased nutrient and sediment loads identified in their portion of the Chesapeake Bay watershed.

Climate

In 2020, the PSC issued a directive that by 2022 all jurisdictions would account for the additional nutrient loads due to 2025 climate change conditions in a Phase III WIP addendum, or in the two-year milestones, if it had not already done so in its Phase III WIP. All Bay jurisdictions met this goal in 2022 to update Phase III WIPs or milestones to address the 2025 climate change conditions. Maryland addressed the 2025 climate change conditions in a Phase III WIP addendum. The Bay jurisdictions maintained the commitment to meet the 2025 climate change conditions by 2025.

2022-2023 Milestone Achievements

- Commits to releasing a first draft of its Adaptation Framework by end of 2023 to further focus on adapting actions given a shifting climate.
- Released first draft of Adaptation Plan in August 2023 to further outline actions related to a shifting climate.
- Committed to focusing on both Environmental Justice (EJ) and Climate Resiliency goals to develop more climate resilience resources and target more at-risk communities.

2022-2023 Milestones Not Achieved

- None.

2024-2025 Milestone Strengths

- Commits to focusing on EJ and Climate Resiliency goals to develop more climate resilience resources and target more at-risk communities.

Key Areas to Address in the 2024-2025 Milestone Period and beyond

- None.

Other (Environmental Justice, Climate Resiliency, and Local Engagement)

2022-2023 Milestone Achievements

- Completed the Maryland Healthy Watershed Assessment (MHWA) to help create a relative state watershed health baseline.
- Continued the Healthy Forests, Healthy Waters Initiative to further increase planted acres, particularly in the form of riparian buffers.
- Completed and initiated oyster reef restoration efforts in the St. Mary's and Manokin portions of the Bay.

2022-2023 Milestones Not Achieved

- None.

2024-2025 Milestone Strengths

- Commits to finalize the MHWA Standard Operating Procedure to help local planners utilize the findings for healthy watershed.
- Continues to focus on oyster reef rehabilitation.
- Continues to further utilization of the EJ Screening Tool to assist in prioritization of underserved communities for projects.

Key Areas to Address in the Final 2024-2025 Milestone Period and beyond

- None.

Potential Federal Actions and Assistance

EPA remains prepared to assist each of the seven watershed jurisdictions in implementing the 2024-2025 milestones. EPA will work with each jurisdiction to develop specific oversight and assistance activities to provide prioritized support for implementation efforts, including funding, technical assistance and analysis, training, and regulatory reviews.

EPA plans to continue to commit staff, contractual and funding resources to support the seven watershed jurisdictions in implementing the 2024-2025 milestones and future two-year milestones. This support includes evaluation of the most-effective practices and locations, annual funding assistance to address priority implementation needs, evaluation of Bay jurisdictions' implementation capacity under various staffing, funding, regulatory and programmatic scenarios, local planning outreach, legislative and regulatory gap analysis, and monitoring trend analyses.

At the sector level, every jurisdiction, except the District of Columbia, is significantly off track in meeting its Phase III WIP commitments in the urban/suburban stormwater sector. Recognizing this, and that the stormwater sector supplies a significant portion of the nutrient and sediment loads to the Bay, EPA is exploring opportunities for increased oversight in this sector.

In addition, EPA will continue to work with federal partners to provide leadership and coordinate with Bay jurisdictions on WIP and two-year milestone implementation to reduce pollutants from federal lands. EPA will continue its commitment to track annual progress of the Bay jurisdictions and make those results available to the partnership and the public. [See:

<https://www.epa.gov/chesapeake-bay-tmdl/epa-oversight-watershed-implementation-plans-wips-and-milestones-chesapeake-bay> and <https://www.chesapeakeprogress.com/>]

Monitoring Trends Summary

The CBP partnership's Chesapeake Bay Program Nontidal Water Quality Monitoring Network, supported by EPA, the U.S. Geological Survey (USGS), the Susquehanna River Basin Commission, and the Bay jurisdictions, generates water quality monitoring data in freshwater rivers and streams throughout the watershed that is analyzed by USGS for nutrient and sediment loads and trends. The most recent USGS results (www.usgs.gov/CB-wq-loads-trends) over the long-term 1985-2020 and short term 2011-2020 were made available in January 2023. The below analysis mainly focuses on the short term 2011-2020 trends.

While identifying drivers behind individual trends is often complex, the monitoring results are worthy of Maryland's consideration as it develops the programs and BMPs planned for the next two years. EPA's initial summary of how the monitoring results in Maryland's watersheds can potentially inform planning are below.

- Trends are improving in the majority of Maryland's highest loading monitored watersheds for nitrogen and phosphorus. Implementing efforts in high loading areas can potentially yield the greatest nutrient reduction benefits. Most of Maryland's highest loading monitored watersheds for nitrogen and phosphorus are mostly agricultural but loads from developed areas also contribute to high nitrogen and phosphorus loads in the Western Shore and Potomac River basins. This information can be used to inform implementation efforts by sector and/or geographically.
- Trends in Maryland's monitored watersheds that are dominated by agriculture loads show that nitrogen and phosphorus loads are improving in some areas but degrading in others. While more information would be needed to determine what is driving individual trends, agricultural areas should be a continued focus for both nitrogen and phosphorus.
- Trends in Maryland's monitored watersheds that are dominated by urban/suburban stormwater loads show that nitrogen and phosphorus are improving or show no trend. More exploration on what is occurring in these monitored watersheds can potentially reveal successful programs, policies, or practices.
- Trends at the two monitored watersheds on the Eastern Shore continue to degrade for phosphorus and nitrogen. While groundwater can contribute to a delayed response in nitrogen levels, phosphorus loads are most associated with overland runoff. This suggests the Eastern Shore should be explored as an area of focus for future milestones.

A comprehensive effort has been made to compile and analyze data sets for the watersheds of the Chesapeake Bay Program Nontidal Water Quality Monitoring Network stations. For the first time, station-level monitoring and modeling results, available through the [Monitored and Expected Total Reduction Indicator for the Chesapeake \(METRIC\) tool](#), can be compared to help resource managers gauge expectations on the trajectory and pace of reduction progress at a localized scale.