

EPA EVALUATION OF PENNSYLVANIA'S 2018-2019 and 2020-2021 MILESTONES

Executive Summary

The seven jurisdictions (Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia) in the Chesapeake Bay Program (CBP) partnership agreed to develop and implement a framework for holding each partner accountable for reducing nitrogen, phosphorus, and sediment loads to meet water quality standards in the Chesapeake Bay (Bay) and its tidal tributaries. The CBP partnership established the goal to have all programs and practices in place by 2025 that were necessary to achieve applicable water quality standards in the tidal Bay. Part of the U.S. Environmental Protection Agency's (EPA's) role in the partnership's accountability framework is to evaluate and report each jurisdiction's progress toward meeting this goal every two years.

In that role, EPA has evaluated Pennsylvania's progress toward attaining the goal of having programs and practices in place by 2025. This evaluation includes an assessment of progress toward attaining this goal at the state and state-basin levels and progress toward meeting sector-specific programmatic commitments for the 2018-2019 milestone period. This evaluation also provides an assessment of other sector-specific programmatic and numeric commitments (e.g., Best Management Practices or BMP implementation targets) for the 2020-2021 milestone period and the status of the relevant water quality monitoring trends.

In reviewing Pennsylvania's final progress for the 2018-2019 milestones, the 2019 numeric progress, and the 2020-2021 milestones, EPA found many areas in which the Commonwealth achieved the goals it set. EPA also identified key areas to address during the 2020-2021 milestone period and beyond, such as developing specific programmatic milestones during the 2020-2021 milestone period to support Phase III WIP initiatives to increase implementation. According to the data provided by Pennsylvania for the 2019 progress run¹, Pennsylvania did not achieve its statewide and state-basin 2019 targets for nitrogen, phosphorus, and sediment.

Some notable strengths identified in this evaluation of the Pennsylvania 2018-2019 milestones and the 2020-2021 milestones include commitments to:

- Amend the Phase III WIP by December 2021 to incorporate the remaining County Action Plans (CAPs) to ensure Pennsylvania closes the 9.8 million-pound nitrogen gap to meet the 2025 targets.
- Develop specific numeric targets for each of the BMPs highlighted in Pennsylvania's Phase III WIP and listed in EPA's evaluation of Pennsylvania's Phase III WIP that account for significant reductions in nitrogen and increases in implementation.
- Link the numeric goals for each priority BMP to the specific Phase III WIP programmatic goals that are set up to help achieve the numeric targets.

¹ 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 the Chesapeake Assessment Scenario Tool, this information (or "annual progress runs") provides an estimate of how much nitrogen, phosphorus and sediment pollution has been reduced.

- Continue to make progress in implementing Phase 1 of the Agricultural Compliance and Enforcement Strategy and committing to implement Phase 2 of the program in the 2020-2021 milestones to achieve the inspection baseline of 10% of agricultural acres.
- Complete initial reviews for Chesapeake Bay Pollutant Reductions Plans (PRPs) required by the Municipal Separate Storm Sewer Systems (MS4) permits.
- Remain on track in the wastewater sector and ensuring all significant wastewater facilities have permits issued with cap loads to maintain progress in the sector.

Some key areas that EPA recommends that Pennsylvania address during the 2020-2021 milestone period and beyond include:

- Provide written quarterly status updates to EPA and the CBP partnership for the 2020-2021 milestone period and meeting quarterly with EPA to discuss progress.
- Provide actions and timelines in the 2020-2021 milestone period for milestones that currently only have expected timelines of December 2025 or are labeled ongoing.
- Provide details specific to actions, strategies and programs expected during the 2020-2021 time period and how those actions support the increased BMP implementation called for in the numeric milestones and Phase III WIP. Examples of actions that need specific programmatic milestone reporting and timelines include:
 - Action #2.2.1A - Investigate alternative manure treatment technologies and other potential strategies to address areas of excess manure.
 - Action #2.3.3A - Implementation of Animal Waste Management Systems.
 - Action #2.4.3A - Expand reporting of Enhanced Nutrient Management
 - Action #2.4.4A - Expand reporting of grass buffers
- Establish a funding source or combination of funding sources for the implementation of the Phase III WIP and milestones.
- Provide revised BMP implementation levels as part of the amended Phase III WIP, using the list of BMPs from the EPA Phase III WIP evaluation, if the CAPs do not close the remaining 9.8 million-pound nitrogen gap.
- Provide details on how pollutant reduction activities will be achieved for those developed lands not subject to the PRP requirements of the MS4 permit, which accounts for approximately 70% of the sector.

Load Reduction Review

When evaluating 2018-2019 milestone implementation, EPA compared nutrient and sediment loads simulated using the 6.0 suite of the CBP partnership's modeling tools and wastewater discharge data reported by Pennsylvania to the statewide and state-basin (Susquehanna, Potomac, Eastern Shore, and Western Shore) Phase III WIP planning targets. According to the data provided by Pennsylvania for the 2019 progress run², Pennsylvania did not achieve its statewide and state-basin 2019 targets for nitrogen, phosphorus, and sediment.

² 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 the Chesapeake Assessment Scenario Tool, this information (or "annual progress runs") provides an estimate of how much nitrogen, phosphorus and sediment pollution has been reduced.

EPA's Phase III WIP evaluation recommended that Pennsylvania develop specific numeric BMP implementation targets for the 2020-2021 milestone period. EPA's evaluation included a recommendation for numeric targets for those BMPs that account for at least 60% of the nitrogen reductions between now and 2025 and the BMPs with significant increases in implementation levels over historic implementation rates. EPA included a third list of suggested BMPs in the Phase III WIP evaluation to help close Pennsylvania's 9.8 million-pound nitrogen gap.

Pennsylvania developed specific BMP implementation targets for the 2020-2021 milestone period, including numeric targets for the priority BMPs highlighted in Pennsylvania's Phase III WIP and listed in EPA's evaluation of Pennsylvania's Phase III WIP. The implementation of these practices is a forecast for the two-year milestone periods through 2025 with a commitment to adapt the goals for the next two-year milestone period based on progress, successes, and lessons learned. Pennsylvania's 2020-2021 milestones commit to amending the Phase III WIP to incorporate the additional reductions that come from the remaining CAPs by December 2021.

Included in the tables below are a summary of the 2009 and 2019 progress, the 2020-2021 numeric milestone commitments, and the 2025 goals for the BMPs Pennsylvania selected to achieve most of the nitrogen reductions from the Phase III WIP, BMPs with significant implementation increases, and four additional BMPs highlighted by Pennsylvania. Each of Pennsylvania's numeric milestones is linked to multiple programmatic milestones; however, many of the programmatic milestones do not include details specific to actions, strategies, and programs expected during the 2020-2021 time period. The summary progress from the CBP partnership's modeling tools for 2009 and 2019 incorporate BMP credit duration. The CBP partnership decided to remove reported BMPs from the model simulation at the end of their established lifespans unless verified by the state as inspected and continuing to function as designed.

Table 1. Pennsylvania's numeric progress and targets for the BMPs expected to account for at least 60% of the nitrogen reductions between now and 2025.

BMP³	2009 Progress	2019 Progress	2020-2021 Milestone Target	2025 WIP Target
Animal Waste Management Systems - livestock and poultry (animal units, unless otherwise noted)	242,678	1,071,174	1,250,000	2,320,984

³ BMP levels are units reported or planned by the jurisdiction. The levels are calculated using 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 2019, etc., not just new reported implementation, unless otherwise noted.

*Evaluation of Pennsylvania's 2018-2019 and 2020-2021 Milestones
July 29, 2020*

BMP³	2009 Progress	2019 Progress	2020-2021 Milestone Target	2025 WIP Target
Forest Buffers (acres)	33,539	9,788	30,980	73,378
Nutrient Management – Core Nitrogen Plans (acres)	162,567	365,926	929,920	2,058,447
Cover Crops, Traditional (acres)	267,279	200,562	189,742	227,955
Soil Conservation and Water Quality Plans (acres)	446,464	387,085	1,029,616	2,314,594
High Residue Tillage Management (acres)	None reported ⁴	616,826	681,994	850,450
Grass Buffers (acres)	3,997	12,365	24,731	49,467
Forest Buffers – Streamside with Exclusion Fencing (acres)	None reported	9	6,979	20,920
Cover Crops, Traditional with Fall Nutrients (acres)	None reported	17,164	175,109	496,470

⁴ 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.

Table 2. Pennsylvania's numeric progress and targets for the BMPs with significant increases in implementation levels over historic implementation rates.

BMP¹	2009 Progress	2019 Progress	2020-2021 Milestone Target	2025 WIP Target
Grass Buffers – Streamside with Exclusion Fencing (acres)	172	390	3,618	10,074
Forest Buffers – Streamside with Exclusion Fencing (acres)	None reported ²	9	6,979	20,920
Soil Conservation and Water Quality Plans (acres)	446,464	387,085	1,029,616	2,314,594
Prescribed/Rotational Grazing (acres)	32,383	28,711	75,242	168,520
Manure Incorporation/Injection (acres)	None reported	None reported	10,000	30,000
Urban Stream Restoration (linear feet)	667	2,153	203,534	606,295
Urban Nutrient Management (acres)	None reported	None reported	10,000	123,815
Bioswales (acres treated)	None reported	None reported	2,021	6,063
Grey Infrastructure (IDDE) (acres treated)	None reported	None reported	24,883	74,650

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Table 3. Additional BMPs identified by Pennsylvania to support implementation of its Phase III WIP.

BMP¹	2009 Progress	2019 Progress	2020-2021 Milestone Target	2025 WIP Target
Conservation Tillage (acres)	396,097	396,097	374,974	361,050
Wetland Restoration (acres)	2,733	1,559	2,759	5,170
Non-urban Stream Restoration (linear feet)	287,987	500,414	634,206	901,790
Land Conservation Policy (acres)	None reported ²	None reported	6,667	12,359,916

Agriculture

2018-2019 Milestone Achievements

- Implemented Agricultural Compliance and Enforcement Strategy and achieved inspection baseline of 10% of agricultural acres.
- Reissued Pennsylvania General Permit (PAG)-12 for Concentrated Animal Feeding Operations (CAFOs) in 2018.
- Developed or updated 46 state-required agriculture plans, installed livestock exclusion fencing, and installed several in-stream habitat restoration BMPs in Fishing Creek.

2018-2019 Milestones Missed

- Did not initiate a pilot program for the inspection phase (Phase 2) of the Agricultural Compliance and Inspection Program. This milestone is carried forward into the 2020-2021 milestones.
- Did not approve a revised phosphorus index planning tool. This milestone is carried forward into the 2020-2021 milestones.
- Did not initiate implementation of Pennsylvania's Agriculture Conservation Stewardship (PACs) program. This milestone is carried forward into the 2020-2021 milestones.

2020-2021 Milestone Strengths

- Provided numeric targets for the practices that comprise 60% of Pennsylvania's nitrogen reductions and those BMPs that will see a 10-fold increase, as recommended by EPA in the

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evaluation of the Phase III WIP. The milestones will support key Phase III WIP priorities such as: initiating implementation of the Pennsylvania Agriculture Conservation Stewardship program and passing legislation to provide a funding source for implementing the Phase III WIP.

- Commitment to incentivize the BMPs that comprise 60% of the nitrogen reductions or with a 10-fold increase through various funding programs. The commitment to incentivize funding and tracking also expands to manure transport, especially from Lancaster County.
- Commitment to focus agricultural technical assistance and financial resources in areas of highest need and impact to the Chesapeake Bay to include a targeted watershed approach.
- Commitment to provide EPA with quarterly status updates for agriculture programs and agricultural BMP implementation.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

- Develop specific programmatic actions within the 2020-2021 milestone period for its Phase III WIP initiatives (e.g., nutrient management, agriculture compliance, animal waste storage, buffers) and milestones that link specific programs, strategies, or actions to support BMP implementation increases. Examples of actions that currently have a December 2025 deadline and that need specific programmatic milestones and timelines within the 2020-2021 milestone include:
 - Action #2.2.1A - Investigate the incorporation of alternative manure treatment technologies and other potential strategies to address areas of excess manure nutrient generation and capital investment required for implementation of manure treatment systems.
 - Action #2.3.2A - Work with third-parties, integrators, and co-ops to identify alternative methods to support and assess compliance with regulations without use of regulatory entities.
 - Action #2.3.3A - Implementation of Animal Waste Management Systems.
 - Action #2.4.2A - Expand reporting of dairy precision feeding.
 - Action #2.4.3A - Expand reporting of Enhanced Nutrient Management
 - Action #2.4.4A - Expand reporting of grass buffers
- Provide details specific to actions, strategies and programs expected during the 2020-2021 time period and how the actions support the increased BMP implementation called for in the numeric milestones and Phase III WIP.

Urban/Suburban Stormwater

2018-2019 Milestone Achievements

- Completed initial reviews for Chesapeake Bay PRPs required by the MS4 permits. Pennsylvania committed to complete final reviews of all plans in 2020.
- Conducted MS4 inspector training.
- Published Frequently Asked Questions document for MS4s to allow for flexible, cost-effective approaches to achieving required numeric reductions.
- Reissued PAG-02, the general permit for stormwater associated with construction activities.

2018-2019 Milestones Missed

- Did not publish a draft Stormwater BMP Manual. This milestone is carried forward into the 2020-2021 milestones.
- Did not develop an electronic reporting system for MS4 annual reports. This milestone is carried forward into the 2020-2021 milestones.
- Did not provide progress update information regarding locations and/or dates for training and outreach activities.

2020-2021 Milestone Strengths

- Commitment to completing final reviews of Chesapeake Bay PRPs and issuing all MS4 permits in the Bay watershed, including the Pennsylvania Department of Transportation (PennDOT) and the Pennsylvania Turnpike Commission permits, by the end of 2020.
- Commitment to begin developing the small MS4 general permit, which will expire in 2023, during this milestone period.
- Commitment to begin developing the stormwater industrial general permit and finalize it prior to its September 2021 expiration date.
- Commitment to track and incentivize MS4 and nonpoint source coordination and collaboration.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

- Explain whether Pennsylvania intends to shift the urban sector allocation to another sector or provide milestones to address the gap in meeting the 2025 nitrogen target.
- Provide additional information on the programs, strategies and incentives that will be used to support the increased BMP implementation called for in the Phase III WIP.
- Provide detail on how pollutant reduction activities will be achieved for those developed lands not subject to the PRP requirements of the MS4 permit, which accounts for approximately 70% of the sector.
- Describe how Pennsylvania intends to provide outreach and resources to achieve the stormwater BMP implementation levels.

Wastewater Treatment Plants and Onsite Systems

2018-2019 Milestone Achievements

- Issued facility permits with cap loads for all significant wastewater and industrial facilities.
- Conducted optimization performance assessments at three wastewater treatment plants (WWTPs) as of end of fiscal year 2018, and at four WWTPs as of the end of fiscal year 2019 (as documented by Clean Water Act section 106 grant reporting).

2018-2019 Milestones Missed

Did not provide a status report of its WWTP optimization performance assessments within the 2018-2019 progress report. Pennsylvania should provide this detail within the milestone progress report, and not rely on grant progress reports that are not publicly available.

2020-2021 Milestone Strengths

Commitment to enhance technical assistance to support nutrient reductions through the purchase of equipment and supplies for use on-site at WWTPs, and through committing to provide training on reducing nutrient loads for eight WWTPs.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

Report additional detail on the development of the Geographic Information Systems (GIS) based online monitoring and reporting program from municipalities to report on-lot system operation and maintenance.

Growth, Offsets and Trading

2018-2019 Milestone Achievements

- For each compliance year, 2018 and 2019, Pennsylvania Department of Environmental Protection (PADEP) identified the pollutant reduction activities that generated certified, verified and registered credits and the number of credits associated with each activity that are consistent with the expectations of the TMDL.
- Developed a credit calculation tool, Nutrient Trading Tool (NTT), for the generation of nonpoint source credits that is to be used to quantify credits used for compliance and offsetting increased and/or new loads in the Chesapeake Bay watershed. A few refinements to the tool, such as the Trading Registry, still need to be completed.

2018-2019 Milestones Missed

Did not revise its Nutrient Trading and Offsetting polices and applicable regulations to document state program decisions made to move to a performance-based agriculture baseline determination and nutrient credit calculation process. These revisions have been on hold since 2015.

2020-2021 Milestone Strengths

Chose to follow the CBP partnership's framework for sector growth.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

- Pennsylvania is projecting a shift in the land use between 2017 and 2025 due to projected sector growth that is included in the CBP partnership's Chesapeake Assessment Scenario Tool. Pennsylvania should track how it will manage increased and/or new nutrient and sediment loads to maintain implementation levels necessary to address changes in loads from the stormwater sector.
- Revise its Nutrient Trading and Offsetting polices and applicable regulations to document state program decisions made to move to a performance-based agriculture baseline determination and nutrient credit calculation process.

Natural Sector

2018-2019 Milestone Achievements

- The final annual pilot Pennsylvania Infrastructure Investment Authority (PENNVEST) grants awarded a total of \$3 million dollars for buffer installation through 2022.
- Added a partner BMP submission module for buffers to Practice Keeper, its web-based BMP reporting tool, which will be launched in early 2020.

2018-2019 Milestones Missed

Did not develop an income-producing forest buffer pilot project due to lack of interest.

2020-2021 Milestone Strengths

- Commitment to maximize existing funding sources for riparian forest buffer implementation.
- Commitment to expand its “TreeVitalize” program and utilize other programs to facilitate community tree planting and maintenance.
- Commitment to continue and increase urban tree canopy grants to communities and non-governmental organization partners.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

Include detail and actions to explain what specific actions will occur during the 2020-2021 milestone period.

Other (Federal Facilities, Communication, Climate, Local Engagement Strategies, Local Planning Goals, BMP Verification)

2018-2019 Milestone Achievements

- Developed and implemented a local engagement strategy for the development of the Phase III WIP.
- Developed and implemented a process for the development of county-based local planning goals and the resulting CAPs.

2018-2019 Milestones Missed

None.

2020-2021 Milestone Strengths

- Commitment to complete the CAPs and amend the Phase III WIP by December 2021.
- Commitment to continue communication and outreach to support achieving the Phase III WIP targets.
- Commitment to continue to conduct outreach and information on the Phase III WIP, defining the WIP expectations and next steps to prepare the remaining counties for the WIP planning process.
- Commitment to complete the Pennsylvania State University Climate Change study by July 2020.
- Commitment to collaborate with the CBP partnership to support a joint remote sensing project and the establishment of creditable practices for implementation of advanced soil health strategies.
- Commitment to work with the Federal Facilities Workgroup and federal facilities to report BMPs and to finalize local planning goals for federal facilities in the Pennsylvania portion of the Chesapeake Bay watershed.

Key Areas to Address in the 2020-2021 Milestone Period and beyond

- Provide written quarterly status updates to EPA and the CBP partnership for the 2020-2021 milestone period and meeting quarterly with EPA to discuss progress.

- Provide interim actions and timelines in the 2020-2021 milestone period for actions that currently have expected timelines of December 2025 or for actions labeled ongoing.
- Demonstrate how the completed CAPs and additional actions, if necessary, will meet the full 2025 nitrogen target. If the 2025 nitrogen target is not achieved, Pennsylvania should provide revised BMP implementation levels as part of the amended Phase III WIP, using the list of BMPs from the EPA Phase III WIP evaluation to close the remaining 9.8 million-pound nitrogen gap.
- Provide detail and actions to explain what specific actions will occur during the 2020-2021 milestone period.

Potential Federal Actions and Assistance

As noted in its Phase III WIP evaluations, EPA remains prepared to assist each of the seven watershed jurisdictions in implementing the 2020-2021 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.

2009-2018 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 (SRBC), 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 (<https://cbrim.er.usgs.gov/summary.html>) over the period of 2009-2018 were made available in March 2020. While identifying drivers behind individual trends is often complex, the monitoring results are worthy of Pennsylvania'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 Pennsylvania watersheds can potentially inform planning are below.

- Implementing efforts in high loading areas can potentially yield the greatest nutrient reduction benefits. Trends are improving at the majority of Pennsylvania's highest loading monitored watersheds for nitrogen. However, for phosphorus, more of Pennsylvania's highest loading monitored watersheds show degrading trends than improving. Most of the highest loading monitored watersheds for both nitrogen and phosphorus are in the Lower Susquehanna region. Most of Pennsylvania's highest loading watersheds are agricultural, suggesting agriculture should continue to be a focus.
- Within the Susquehanna River basin, the Lower Susquehanna stations are mostly improving for nitrogen, whereas the Upper Susquehanna and West Branch stations are mostly degrading. Conversely, for phosphorus, the Lower Susquehanna stations are mostly degrading, whereas most of the West Branch stations are improving.
- Additional exploration of these trends can help elucidate what may be driving differences between nitrogen and phosphorus trends regionally and locally, which can in turn help inform adaptation of programs, policies, or practices.
- Most monitored watersheds in the Potomac River basin show improving nitrogen trends, while most show no trend in phosphorus. More exploration on what is occurring in improving watersheds or areas can potentially reveal successful programs, policies, or practices.

