EPA EVALUATION OF PENNSYLVANIA'S 2020-2021 and 2022-2023 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 seven jurisdictions (Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia) in the 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 Bay and its tidal tributaries. The U.S. Environmental Protection Agency (EPA) is providing this evaluation of Pennsylvania's 2020-2021 and 2022-2023 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 Pennsylvania's progress toward attaining its portion of the 2025 Goal. This evaluation includes an assessment of progress toward attaining the nutrient and sediment goals at the state and state-basin level and progress toward meeting sector-specific programmatic commitments for the 2020-2021 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 2022-2023 milestone period and the status of the relevant water quality monitoring trends.

In reviewing Pennsylvania's final programmatic progress for the 2020-2021 milestones, the 2021 numeric progress, and the final 2022-2023 milestone commitments, EPA identified sector-by-sector strengths as well as areas for enhancement. According to the data provided by Pennsylvania for the 2021 progress run, Pennsylvania did not achieve its statewide 2021 targets for nitrogen, phosphorus, and sediment. EPA stands ready to assist Pennsylvania with implementing its 2022-2023 two-year milestone commitments.

Some notable strengths identified in this evaluation of Pennsylvania's 2020-2021 milestones and the final 2022-2023 milestones include:

- Pennsylvania's programmatic milestones describe a range of activities including regulatory programs, outreach efforts, strategic partnerships, and potential barriers to success required for a comprehensive effort to address water quality.
- Updated several milestones to commit additional resources to supporting counties as they transition from County Action Plan (CAP) development to CAP implementation.
- Committed to build capacity by filling several state agency positions, updating data management systems and processes, expanding outreach efforts, and updating technical assistance documents. These additional milestones illustrate specific actions Pennsylvania will take in 2022 and 2023 to advance longer-term goals.

Some key areas that EPA recommends that Pennsylvania address during the 2022-2023 milestone period include:

- Provide details and specific actions, strategies and programs expected during the 2022-2023 time period and how those actions support the increased BMP implementation called for in the numeric milestones and final amended Phase III Watershed Implementation Plan (WIP).

Detailed Evaluation of Overall Load Reduction and Source Sectors

Load Reduction Review

When evaluating Pennsylvania's 2021 implementation progress, EPA simulated nutrient and sediment loads using the Chesapeake Assessment Scenario Tool 2019 (CAST-19)[1] and wastewater discharge data reported by Pennsylvania, and compared those simulated loads to Pennsylvania's 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 2021 progress run[2], Pennsylvania did not achieve its statewide or state-basin 2021 targets for nitrogen, phosphorus, and sediment.

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

Pollutant	2009 Progress Loads (M lbs/year)	2021 Progress Loads (M lbs/year)	2025 Target (M lbs/year)
Nitrogen	113.23	104.50	73.49
Phosphorus	4.461	3.715	2.905
Sediment	3,300	2,785	2,161

Pennsylvania developed specific BMP implementation targets for the 2020-2021 and 2022-2023 milestones for those practices identified in Pennsylvania's final amended Phase III WIP that account for the majority of the nitrogen reductions. Table 2 provides a summary of Pennsylvania's 2021 progress compared to the 2009 baseline and the 2025 targets, as well as the 2022-2023 commitments, for these priority BMPs.

[1] CAST-19 is part of the Phase 6.0 suite of modeling tools for the Chesapeake Bay.
[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 has been reduced.

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

BMP[3]	2009 Progress	2021 Progress	2022-2023 Milestone Target	2025 WIP Target
Nutrient Application Management Core Nitrogen (acres)	162,567	535,893	1,494,184	2,058,447
Soil Conservation and Water Quality Plan (acres)	446,464	534,968	1,672,105	2,314,594
Cover Crop, Traditional (acres)	267,279	341,524	208,848	227,955
Cover Crop, Traditional with Fall Nutrients (acres)	None reported[4]	None reported	335,790	496,470
High Residue Tillage Management (acres)	None reported	740,367	766,222	850,450
Animal Waste Management Systems (animal units)	242,678	1,156,393	1,700,000	2,320,984
Grass Buffers (acres)	3,997	15,842	37,099	49,467
Forest Buffers (acres)	33,539	10,822	52,179	73,378
Forest Buffers, Streamside Exclusion Fencing (acres)	None reported	1,445	13,949	20,920

The summary progress from the CBP partnership's modeling tools for 2009 and 2021 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. Pennsylvania is expected to provide detailed programmatic milestones to support these BMP implementation targets. In the sector-specific sections below, EPA provides its evaluation of the programmatic milestones and the connection to increased implementation.

Looking Forward for Future Reviews of Progress

The CBP partnership is just a few years away from the 2025 date that has been agreed upon for several of the goals and outcomes under the *2014 Chesapeake Bay Watershed Agreement*, including the 2025 Goal. Given the number of changing conditions (e.g., human and animal population growth, 2025 and 2035 climate impacts, model updates) that have and will continue

[3] 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 2021, etc., not just new reported implementation, unless otherwise noted.

[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.

to impact progress and the level of effort needed to meet these goals, it is critical to begin planning for the future.

Source Sector Review

Agriculture

Pennsylvania is predominantly relying on agriculture BMP implementation to meet its 2025 targets based on its final amended Phase III WIP. Pennsylvania continues to make incremental progress toward its goals; however, the current pace of implementation is not on track to meet its overall nutrient and sediment targets. EPA expects Pennsylvania to accelerate BMP implementation in the agricultural sector.

2020-2021 Milestone Achievements

- Inspected 8.9 percent of agricultural acreage under the Chesapeake Bay Agriculture Inspection Program (CBAIP) Phase I in 2020-2021, which is commendable during COVID, although it falls short of its 10 percent annual goal.
- Used several incentives to promote agricultural BMPs in 2021 including $3.5 million in tax credits that were awarded for no-till equipment and $210,500 in tax credits that were awarded for cover crops through the Resource Enhancement and Protection Program (REAP).
- Continued to work on partnerships with private companies to promote sustainable practices and use of voluntary conservation plans.
- Reported approximately $10 million in funding through REAP and Conservation Excellence Grants (CEG) to promote BMP implementation with a strategic focus on Phase III WIP Tier 1 and 2 counties in 2021.

2020-2021 Milestones Not Achieved

- Proposed "Adequate manure storage for 90 percent of swine/poultry operations; 75 percent of all other animal types." Pennsylvania does not identify the criteria for "adequate storage" (for example, six-months of storage capacity). Pennsylvania also does not identify what the baseline was, what progress was made in 2020-2021, and what the current level of implementation is for swine/poultry and for all other animal types.
- Did not initiate implementation of Pennsylvania's Agriculture Conservation Stewardship (PACS) Program during the 2020-2021 milestone period. This programmatic milestone was also missed during the 2018-2019 milestone period.
- Did not complete the revised phosphorus index planning tool during the 2020-2021 milestone period. This programmatic milestone was also missed during the 2018-2019 milestone period.

2022-2023 Milestone Strengths

- Pennsylvania's programmatic milestones describe a range of activities including regulatory programs, outreach efforts, and strategic partnerships required for a comprehensive effort to address water quality.
- Provides additional detail about the projected outcomes and anticipated progress toward numeric targets for several milestones.

- Commits to develop the allocation methodology for and distribution of Clean Streams Fund in 2023.
- Commits to increasing and improving staffing in agricultural programs by, for example:
  - Hiring 5 Conservation District Field Representatives in Northeast, North Central and South Central Regional Offices.
  - Hiring up to 5 new Natural Resources Conservation Service (NRCS) technical assistance support/ engineers.
  - Hiring 1 Environmental Engineer/ Environmental Engineer Specialist to support agricultural permitting and compliance activities.
  - Hiring 2 Water Program Specialists to support agricultural compliance inspection and enforcement activities, including Nutrient Management, Manure Management, Agriculture Erosion and Sediment (E&S), CBAIP, and Concentrated Animal Feeding Operation (CAFO) program.
  - Increasing funding for Conservation District Nutrient Management Technicians, Chesapeake Bay Engineer Specialists and Engineer Assistants in an effort to reduce staff turnover.
- Finalizes and commences utilization of the CAFO Compliance Evaluation and Inspection (CEI) standard operating procedures.

Key Areas to Address in the 2022-2023 Milestone Period

- Include additional programmatic milestones that demonstrate how Pennsylvania will achieve the necessary nutrient and sediment reductions.
- Amend the programmatic milestones to provide performance targets for milestones. For example, Pennsylvania states "2022-2023 Update: The CBAIP Phase 2 program will continue to be expanded as more counties complete their Phase 1 inspections." However, CBAIP Phase 2 does not have any measurable goals for the 2022-2023 milestone period.
- Provide more explicit details about the connection between the outreach and the communication milestones to promote conservation tillage, no-till practices, cover crops, and pasture management and numeric targets included as referenced in milestone table.
- Provide additional detail in discussions with EPA about efforts to incentivize manure transport in counties in excess of organic nutrients (Milestone 2.2.1A(I)).

Urban/Suburban Stormwater

Pennsylvania is expecting additional nutrient reductions from the stormwater sector by 2025 based on its final amended Phase III WIP. EPA expects Pennsylvania to accelerate BMP implementation in the urban/suburban stormwater sector.

2020-2021 Milestone Achievements

- Reissued the Municipal Separate Storm Sewer System (MS4) permits for Pennsylvania Department of Transportation and the Pennsylvania Turnpike Commission.
- Assisted in the planning and hosting of three MS4 forums in 2021.
- Completed the launch of the Chapter 102 ePermitting system in 2021.

2020-2021 Milestones Not Achieved

- Did not publish a draft Stormwater BMP Manual. This milestone is carried forward into the 2022-2023 milestones and has been a milestone since 2016 that continues to be missed and carried over.
- Did not complete development of an electronic reporting system for MS4 annual reports. This milestone is carried forward into the 2022-2023 milestones.
- Did not reissue the industrial stormwater general permit (PAG-03) prior to its September 2021 expiration date. This milestone is carried forward into the 2022-2023 milestones.

2022-2023 Milestone Strengths

- Started discussions with EPA to develop the small MS4 general permit (PAG-13), which will expire in 2023.
- Continues to require Chapter 102 National Pollutant Discharge Elimination System (NPDES) permittees to demonstrate that new projects will not cause post-construction sediment and nutrient loading in excess of pre-construction loads.

Key Areas to Address in the 2022-2023 Milestone Period

- Provide detail on how pollutant reduction activities will be achieved for those developed lands not subject to the Pollutant Reduction Plan (PRP) requirements under an MS4 permit, which accounts for approximately 70 percent of the sector.
- Describe how Pennsylvania intends to provide outreach and resources to achieve the stormwater BMP implementation levels.
- Report details specific to actions, strategies and programs expected during the 2022-2023 time period and how those actions support the increased BMP implementation called for in the numeric milestones and amended Phase III WIP. Examples of actions that need specific programmatic milestone reporting and timelines include:
    - Action 2.1.1S – This action does not contain any specific activities or timelines for task completion in the 2022-2023 milestone period
    - Action 2.1.2S - This action does not contain any specific activities or timelines for task completion in the 2022-2023 milestone period. An example of what EPA is requesting as an acceptable milestone would be "Pennsylvania Department of Environmental Protection (PADEP) will complete XX projects using MS4 flexibilities by Dec. 31, 2023."
    - Action 2.1.3S - This action does not contain any specific activities or timelines for task completion in the 2022-2023 milestone period. An example of what EPA is requesting as an acceptable milestone would be "PADEP will fund XX collaborative projects by Dec. 31, 2023."
    - Action 2.1.4S – This action does not contain any specific activities or timelines for task completion in the 2022-2023 milestone period.
    - Actions 2.5.3S, 2.5.5S, and 2.5.6S regarding the continued implementation of the overall construction, industrial, and municipal stormwater programs, (including permitting, inspection, and enforcement) are central tenets to the NPDES program and should not be listed as specific milestones that PADEP will undertake to meet the Chesapeake Bay Total Maximum Daily Load (Bay TMDL).

Wastewater Treatment Plants and Onsite Systems

2020-2021 Milestone Achievements

- Provided technical assistance and training related to reducing nutrient loads for 9 facilities.
- State funds are available for the GIS based online monitoring and reporting program for municipal on-lot system operation and maintenance reporting, and the project is now in queue for PADEP's Bureau of Information Technology.

2020-2021 Milestones Not Achieved

- Did not include in its milestone reporting a link to the detailed 106 grant reporting, as was discussed during meetings about 2020 programmatic milestone progress. While EPA has access to Pennsylvania's 106 grant reporting, that information is not publicly available. Pennsylvania should not solely refer to grant reports for detailed information in the milestone reporting.

2022-2023 Milestone Strengths

- Provides 2022 updates for Wastewater Plant Performance Technical Assistance activities and the GIS based monitoring/reporting program for onlot systems.
- Provides two new areas of activity regarding a Manual for Land Treatment of Treated Wastewater, and grant funded technical assistance for small wastewater systems.

Key Areas to Address in the 2022-2023 Milestone Period

- Provide clarity on whether the 2022 updates are meant to address progress projected during the entire 2022-2023 milestone period.

Growth, Offsets and Trading

2020-2021 Milestone Achievements

- Developed and published 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.
- Engaged in discussions with other Bay jurisdictions regarding interstate trading and cross-jurisdictional financing (e.g., Conowingo).
- Continued to work with EnergyWorks (gasification of layer manure), ESPOMA (transport and treatment of layer manure to a full line of bagged home use fertilizers), and Epcot Crenshaw Corporation/ Stroud Water Research (Bio-char) regarding the potential generation and calculation of nutrient credits.
- Continued work to update CBNTT which is used by the Nutrient Trading Program. The Trading Program intends to pursue updating Regulatory In lieu fee and Bank Information Tracking System (RIBITS) to serve as a tool for administering the Program.

2020-2021 Milestones Not Achieved

- Did not complete the revision of its Nutrient Trading and Offsetting polices and/or applicable regulations to document state program decisions to move to a performance-based agriculture baseline determination and nutrient credit calculation process.

2022-2023 Milestone Strengths

- Continues to implement 3:1 trading ratio for nonpoint source (NPS) credit generation and trading until performance-based or another method-based tool (e.g., CBNTT) is established.
- Intends to use the RIBITS developed by the US Army Corps of Engineers with support from EPA and other federal agencies to track water quality trading activities and credits for restoration banks recognized under Natural Resource Damage Assessment statutes. Pennsylvania's use of RIBITS will facilitate trading program activities and increase consistency and transparency in trading among Bay states.

Key Areas to Address in the 2022-2023 Milestone Period

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

Climate

In 2020, the Principals' Staff Committee (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 they had not already done so in their Phase III WIP. Pennsylvania addressed the 2025 climate change loads through its 2022 Final Amended Phase III WIP. Therefore, this evaluation reflects the work and effort that Pennsylvania put toward addressing the 2025 climate loads understanding that expectations related to 2025 climate change conditions could change as a result of future PSC decisions and future model updates.

At its August 29, 2022 meeting, the PSC decided to address "unaccounted additional loads" after 2025. The CBP partnership will define "unaccounted additional loads" and will determine how to address them. This decision came after Pennsylvania completed the work and effort noted in this section to address the 2025 climate loads.

2020-2021 Milestone Achievements

- Released the Pennsylvania State University Climate Change study in May 2021.

2022-2023 Milestone Strengths

- Addresses the 2020 PSC climate directive by including a CAST scenario to address the additional nutrient loads due to 2025 climate change conditions in its 2022 final amended Phase III WIP.
- Included a narrative in its final amended Phase III WIP to describe the current understanding of the 2035 climate change conditions.

Key Areas to Address in the 2022-2023 Milestone Period

- None.

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

2020-2021 Milestone Achievements

- Completed and incorporated 34 CAPs into its draft amended Phase III WIP and submitted a draft amended Phase III WIP by December 2021.
- Collaborated with the CBP partnership to support a joint remote sensing project and the establishment of creditable practices for implementation of advanced soil health strategies. During 2021, Pennsylvania provided grant funding to all counties participating in CAP implementation and encouraged use of remote sensing for verification as approved by the CBP partnership.
- Worked with 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.
- Met its commitment to provide quarterly updates to EPA and the CBP partnership throughout 2021 including frequent meetings with technical staff.

2020-2021 Milestones Not Achieved

- None.

2022-2023 Milestone Strengths

- Milestones provided by Pennsylvania indicate that all outreach and coordination efforts started in 2020-2021 milestones will continue through 2023.
- Updated several milestones to commit additional resources to supporting counties as they transition from CAP development to CAP implementation.

Key Areas to Address in the 2022-2023 Milestone Period

- None.

Potential Federal Actions and Assistance

As noted in its Phase III WIP evaluations, EPA remains committed to assist each of the seven watershed jurisdictions in implementing their 2022-2023 milestones. EPA will continue to work with each jurisdiction to review specific oversight and assistance activities and needs in order 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 2022-2023 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.

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 (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 (www.usgs.gov/CB-wq-loads-trends) over the long-term period 1985-2020 and short term 2009-2020 for most stations were made available in September 2020. New nutrient and suspended-sediment load and trend results became available for the nine River Input Monitoring (RIM) stations for the long-term period 1985-2020 and short term 2011-2020.

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's 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 trends. 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 clarify 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.