

Pennsylvania Phase 3 Chesapeake Bay Watershed Implementation Plan

**Prepared by the
Pennsylvania Department of Environmental Protection**

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DISCLAIMER

The policies and procedures outlined in this document are intended to supplement existing requirements. Nothing in the policies or procedures shall affect statutory or regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of the Department of Environmental Protection (DEP) to give this plan that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this plan if circumstances warrant.

Nothing contained in this document shall be construed to establish a legal requirement on the part of the Commonwealth of Pennsylvania to appropriate funds, or to require the Commonwealth or any agency thereof to take actions not authorized by law.

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ADDENDUMS

The following are addendums to the Phase 3 WIP and are integral to the final plan. These documents are “stand alone” documents that further describe how Pennsylvania intends to implement the final Phase 3 WIP. They are further referenced within the Phase 3 WIP as to the role they play and how they will be used as Pennsylvania moves forward.

Community Clean Water Planning Guide – This document is a guide to be used by the lead planning team as the Countywide Action Plans for the Pennsylvania counties in the Chesapeake Bay watershed are developed.

Community Clean Water Implementation Guide – This document is a guide to be used to assist counties in implementing their Countywide Action Plans. It includes the Phase 3 WIP implementation framework, Countywide Action Plan implementation success strategy, resources for successful implementation, and tools for success.

County-Specific Clean Water Technical Toolbox – This document captures the county-specific information needed to serve as the framework for the completion of the Countywide Action Plan.

Individual Countywide Action Plans – These are the final plans completed for the counties, designed to address the nutrient local planning goals defined for them based on the assigned Pennsylvania nutrient planning targets. There are 34 Countywide Action Plans that have been developed and published to the Phase 3 WIP website.

The Best Management Practice Verification Plan – This document describes how Pennsylvania is tracking and verifying the long-term installation of best management practices in accordance with the protocols developed by the Chesapeake Bay Program Partnership.

Milestone Planning and Progress Reporting Template – This template captures the action steps and milestones that Pennsylvania is using to report progress to the United States Environmental Protection Agency on a six-month basis.

Phase 2 Watershed Implementation Plan Nutrient Trading Program Supplement – This supplement was developed to capture revisions to the Pennsylvania Department of Environmental Protection’s Nutrient Trading Program made in response to United States Environmental Protection Agency concerns with this program. It will be updated as needed as further enhancements described in the Phase 3 WIP are implemented.

Phase 3 Watershed Implementation Plan Wastewater Supplement – This supplement describes how the Wastewater National Pollutant Discharge Elimination System (NPDES) Program is implemented in Pennsylvania, with a listing of all the significant and nonsignificant wastewater and industrial dischargers in the Chesapeake Bay watershed.

Federal Agency Action Plans – These are the final plans for each of the federal agencies. These plans describe how each agency is managing their respective facilities to achieve the planning goals assigned to them, based on their respective loadings to the Chesapeake Bay.

EXECUTIVE SUMMARY

Approximately half of Pennsylvania's land area drains into the Chesapeake Bay primarily from the Susquehanna and Potomac river basins. The Susquehanna is the largest tributary to the Bay, providing half of the total freshwater flow and 90% of the freshwater flow to the upper bay. Without the support of Pennsylvania, the Chesapeake Bay cannot be restored. Even more importantly, the water that feeds into the Chesapeake Bay is local to Pennsylvania. It is crucial that the local waters of Pennsylvania be restored for use by our citizens.

Pennsylvania and our neighboring states with river basins that drain into the Chesapeake Bay (Delaware, Maryland, New York, West Virginia, and Virginia) along with the District of Columbia are each creating a Watershed Implementation Plan (WIP) that describes the work to be done to reduce nutrient and sediment pollution within the Chesapeake Bay watershed. In 2018, the Chesapeake Bay Program Partnership completed a Midpoint Assessment of the 2010 Total Maximum Daily Load (TMDL) allocations for each state and re-established nutrient reduction planning targets for each jurisdiction within the watershed. The goal of the Chesapeake Bay TMDL is to have all practices to achieve these reductions in place by 2025. Each jurisdiction's plan for meeting their phosphorus (P) and nitrogen (N) pollution reduction goals is outlined in WIPs.

Pennsylvania is committed to having all practices and controls in place by 2025 to achieve the nutrient and sediment reduction planning targets. This plan provides reasonable assurance that Pennsylvania will meet its Chesapeake Bay TMDL commitments. This document, formally known as the "Final Phase 3 Watershed Implementation Plan" (Phase 3 WIP), first finalized in August 2019, spells out how the state government will work in partnership with local governments and the private sector to meet Pennsylvania's goals by 2025. As part of the adaptive management process, Pennsylvania revised the Phase 3 WIP in 2021 to be inclusive of all completed Countywide Action Plans (CAPs) and the climate allocation that was approved by the Chesapeake Bay Principals' Staff Committee (PSC) in December 2020. The 2021 revision also provides updated information related to: programmatic changes; legislative action and funding programs; administrative and technical support; and reported best management practices (BMPs) that have been lost to credit duration expiration, not accounted for due to model cutoff, and progress for 2019 and 2020 reporting years. The 2021 revision to Pennsylvania's Phase 3 WIP also discusses the impact that the COVID-19 global pandemic has had on progress, as well as how Pennsylvania adjusted during that time to remain on track for success.

With 43 counties and over 49,000 miles of streams and rivers that flow into the Susquehanna and Potomac rivers, most of the work outlined in this document will be specific and local in scale. Early in the process, the Commonwealth sought out the leaders in these communities to determine the best way to employ practices and projects to clean up the pollution entering their waterways. Four counties were selected to be early planners — Lancaster, York, Adams, and Franklin. In 2020, four additional

counties completed their CAPs – Bedford, Cumberland, Lebanon, and Centre. These eight counties make up more than 50% of Pennsylvania’s total nitrogen load to the Chesapeake Bay. In 2021, 26 additional counties completed their CAPs. All of this work had been accomplished throughout the COVID-19 global pandemic; the counties and local stakeholders should be commended for their efforts.

This document is a comprehensive strategy based on unprecedented local-level support and engagement. In the development of the previous two phases of Pennsylvania’s Chesapeake Bay WIP, there was not this level of partnership committed to moving forward to improving local water quality. For the first time, Pennsylvania has local planning goals in a form best suited for directly engaging local, regional, and federal partners. Pennsylvania is committed to moving forward with the programmatic and legislative priorities outlined within this plan.

In addition to state government officials, hundreds of individuals representing local government, universities, businesses, agriculture, and environmental organizations contributed their time and expertise to the development of this Phase 3 WIP. The preparation of this plan is guided by the principle that clean water is “Great for PA, Good for the Bay.”



The Phase 3 WIP planning and adaptive management process is an opportunity for Pennsylvania state government to serve our residents and businesses — cleaning up our water, lowering flood risks, and improving the quality of life in our communities.

Public Comment

The Pennsylvania Department of Environmental Protection (DEP) sought public comment on the draft Phase 3 WIP from April 12 through June 7, 2019. Forty commenters submitted 152 comments on the draft Phase 3 WIP. [Appendix 4](#) is the Comment Response document to these comments.

Some common themes among the comments include:

- Support for collaborative approach
- Concern expressed over planning target and funding “gap”

- Clarification needed on how the CAP process will work
- Sector-specific suggestions for additional enhancements, initiatives
- Concern over additional requirements, “unfunded mandates”
- Questions over costs for implementation
- Editing and clean-up needed

The general response to these themes is:

- Pennsylvania’s implementation of the Phase 3 WIP continues the same collaborative approach used to develop the Phase 3 WIP.
- The Phase 3 WIP is realistic and implementable with multiple approaches to achieve the planning targets by 2025.
- The Phase 3 WIP is flexible, with opportunity for updates, improved accounting, and modifications continuing as part of the two-year milestone process to ensure success.

EPA Evaluation of Pennsylvania's Draft Phase 3 WIP

As part of the public comment period, the United States Environmental Protection Agency (EPA) also did a detailed evaluation of Pennsylvania's draft Phase 3 WIP. In this evaluation EPA identified the following strengths:

- Pennsylvania's collaborative approach for engagement of local partners and community engagement.
- The process for the development of the CAPs.
- The identification of specific various commitments for each sector.
- The inclusion of the detailed workload analysis, with an identification of available and needed resources.

EPA also identified some key areas where improvement was needed, including:

- A re-evaluation of activities since the current effort is not projected to achieve 100% of the planning targets.
- Encouragement to expand beyond the approved Bay Program partnership approved practices and approaches for other opportunities to reduce nutrients and sediment.
- An evaluation of the Bay Program Verification Protocols to ensure the higher rate of implementation can be tracked, verified, and reported.
- Enhancement of the level of implementation detail and programmatic commitment descriptions.

In response to EPA's evaluation, the final Phase 3 WIP has:

- Additional programs and practices not previously included to be counted towards progress.
- A re-evaluation of the goals that each sector could realistically achieve by 2025.
- Refined estimates for existing and available resources for implementation.
- Identification of a lead agency with a timeline for completion for each action step for reporting.
- Additional practices and programs not currently recognized that improve water quality in Pennsylvania that should be credited.
- Identified barriers to successful verification of practices that need to be addressed.

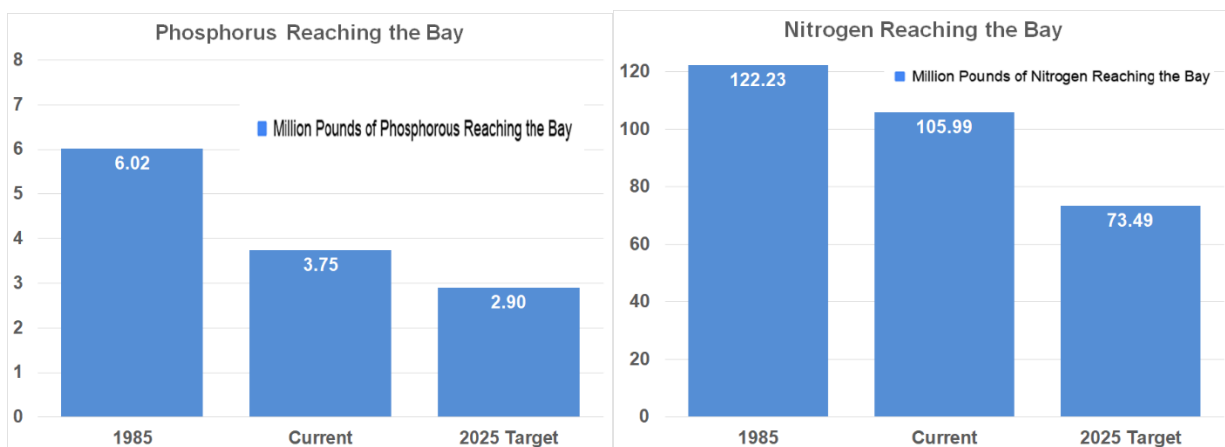
A Brief History

Pennsylvania's efforts to reduce nutrients running into the Chesapeake Bay began in 1985. Since then, Pennsylvania has invested a significant amount of resources through loan, grant, and tax credit programs aimed at restoration efforts. Over the four years preceding finalization of this Phase 3 WIP, Pennsylvania invested approximately \$197 million per year in efforts to reduce nutrient pollution of local waters throughout Pennsylvania's share of the Chesapeake Bay watershed. While significant pollution reductions from those investments have been realized, more is needed. In 2009, EPA set expectations for Pennsylvania and neighboring states to meet by 2025. In 2010, EPA and the Chesapeake Bay Program Partnership established a TMDL to address chlorophyll-A, dissolved oxygen, and clarity impairments within the Bay.

In 2011, Pennsylvania submitted its Phase 1 WIP to EPA. The goal of the Phase 1 WIP was to identify pollutant sources and develop source specific solutions to achieve reductions. In 2012, Pennsylvania submitted its Phase 2 WIP to EPA. The development of the Phase 2 WIP relied heavily on public input and the inclusion of adaptive management principles in the plan.

Both the Phase 1 WIP and Phase 2 WIP led to significant progress in Pennsylvania's share of the Chesapeake Bay watershed. Many streams that once were heavily polluted are now places where residents gather to swim, fish, boat, and play. Pennsylvania has cut the amount of phosphorus pollution going downstream by more than 1/3, and the amount of nitrogen pollution by about 1/6.

The figures below indicate the Edge of Tide (EOT) progress made over time from 1985 to 2020 based on annual BMP Progress Runs. A BMP Progress Run is completed annually by EPA after all reported BMP data is submitted through the National Environmental Information Exchange Network (NEIEN) to CAST and verified by EPA's Chesapeake Bay Program Office (CBPO). Current efforts will continue this progress moving toward the TMDL 2025 target.



Of the nearly 49,000 assessed miles of streams in the Chesapeake Bay watershed, more than 12,000 miles of streams remain polluted. As shown in the figures above, from current to the 2025 target, Pennsylvania must reduce nitrogen pollution levels by 32.5 million pounds and phosphorus levels by 0.85 million pounds.

Challenges

Pennsylvania is a state of nonpoint source “opportunities.” Throughout Pennsylvania, including in the Susquehanna and Potomac river basins, the vast majority of stream, river, and lake impairments are attributable to nonpoint sources like agriculture and urban runoff. Compared to the other states within the Chesapeake Bay watershed, the scale of the nonpoint source challenges in Pennsylvania is one of the most significant factors that has impacted past progress, but one that also presents opportunities for future success.

Pennsylvania has unique nonpoint source challenges and opportunities in urban, suburban, and rural communities. As a state with 33,000 farms covering more than 3 million acres within the Susquehanna and Potomac basins, the scale of nonpoint source challenges is staggering, but not insurmountable. Within Pennsylvania’s share of the Chesapeake Bay watershed, there are over 350 municipalities with National Pollutant Discharge Elimination System (NPDES) permitting obligations relative to Municipal Separate Storm Sewer Systems (MS4s), which is another challenge to address pollution of local waters and the Chesapeake Bay. Statewide, Pennsylvania has over 120 active Combined Sewer Overflow (CSO) communities with 1,584 outfalls. Pennsylvania is a large state that values its agricultural industry and local government partners. Since one size does not fit all, local level support is essential to meet pollution reduction goals.

Pennsylvania has steadily improved the capability to document reductions from programs not included in previous phases of Pennsylvania’s Chesapeake Bay WIPs. There continue to be more BMPs happening “on the ground” than what has historically been accounted for and credited in the Chesapeake Bay Watershed Model used to estimate the pollutant loads going to the Bay.

Consequences

Failing to restore Pennsylvania’s impaired waters will mean that our drinking water resources, outdoor recreation, wildlife, and public health and safety will remain impacted. Local communities will continue to suffer from pollution-related problems such as stormwater and flood damage, contamination of drinking water sources, fouled waterways, and lost recreation opportunities.

Additionally, if EPA determines that Pennsylvania cannot meet its goals on its own, EPA may increase federal enforcement and compliance efforts. For example, EPA has outlined possible consequences including:

- New nitrogen and phosphorus numeric water quality standards for streams and rivers in Pennsylvania.
- More animal feeding operations, industrial and municipal stormwater sources, and urban areas to obtain federal Clean Water Act permits.
- Stricter nutrient or sediment reductions for those that already have permits.
- Redirection of EPA grant funding away from the state's priorities to EPA's priorities.

Purpose

The Phase 3 WIP outlines how Pennsylvania will achieve its goals to reduce nutrient and sediment pollution in local waters that flow to the Chesapeake Bay. The Phase 3 WIP and the Addendums specify the steps Pennsylvania will take through 2025 to meet local water pollution reduction goals in the Bay watershed. Pennsylvania will continue to implement initiatives identified in the previous phases of Pennsylvania's Chesapeake Bay WIP. This Phase 3 WIP builds on the strengths of those previous plans and further sharpens the focus on accelerating progress to meet the 2025 goals.

Section 1 introduces Pennsylvania's Phase 3 WIP, including an overview of the collaborative process by which the Phase 3 WIP was created and an examination of the planning targets the Phase 3 WIP aims to achieve.

Section 2, State Actions, calls on the state government to coordinate the activities of all the partners, provide resources and technical assistance, and report on progress to EPA and our neighboring states, through a combination of programmatic and numeric strategies and priority initiatives. Pennsylvania DEP's Chesapeake Bay Office has the responsibility to coordinate the implementation support elements of Pennsylvania's efforts to implement the Phase 3 WIP.

This section of the WIP describes what state partners are already doing to reduce pollutants, as well as the various legislative, programmatic, regulatory and compliance initiatives for which the state agencies have the lead. Among the state-led initiatives described are the significant funding needs for the Phase 3 WIP that are being addressed by state agencies and state legislature. The Phase 3 WIP Funding Workgroup estimates that the public investment to clean up Pennsylvania waterways upstream of the Chesapeake Bay were approximately \$197 million per year in the years preceding finalization of this Phase 3 WIP. The total investment in both public and private funding from all sources needed to achieve the 2025 goals is estimated to be \$521 million per year — an annual gap of \$324 million. This section describes the range of options the Phase 3 WIP partners have recommended to the state legislature for

consideration for long-term funding of the Phase 3 WIP with a strong preference for legislation that create a dedicated and stable funding source for these investments.

Pennsylvania's Fiscal Year 2022-2023 Budget resulted in nearly \$700 million for environmental improvement programs, including a \$154 million investment for the new statewide Agricultural Conservation Assistance Program as well as more than \$380 million investment in other new and existing programs for the agricultural, stormwater, wastewater, and forestry sectors.

In addition to the programmatic priorities and the actions already being taken, this section lays out a vision for how the agriculture, forestry, stormwater, and wastewater sectors will achieve additional reductions of the pollution they contribute to Pennsylvania's waterways and the Bay downstream. To develop the Phase 3 WIP, a collaborative, deliberative approach was taken, with workgroups of stakeholders representing agriculture, forestry, stormwater, and wastewater sectors. This section of the Phase 3 WIP describes the new or additional actions on which the state partners are focusing in each of these sectors in order to achieve the 2025 targets.

Agriculture

As discussed above, the agricultural sector in Pennsylvania presents a significant nonpoint source opportunity. The Phase 3 WIP envisions the state and its partners working with agriculture in seven strategic areas:

1. Agricultural Compliance – Ensure farmers are continuing to implement their state required Agricultural Erosion and Sediment Control (Ag E&S) or conservation plan, Manure Management/Nutrient Management Plan, and are implementing required barnyard runoff controls, where needed.
2. Soil Health – Use crop and soil management practices that improve long-term soil health and stability.
3. Expanded Nutrient Management – Both manured and non-manured farmlands use nutrient management plans and precision nutrient management practices.
4. Manure Storage Facilities – Install and use animal waste management systems, meeting state regulatory requirements, to adequately store manure for effective nutrient use.
5. Dairy Precision Feeding – Use precision feed management to reduce nitrogen and phosphorus in manure.
6. Integrated Systems for Elimination of Excess Manure – Create integrated (county/regional) programs for transport and/or beneficial use of excess manure.
7. Forest and Grass Riparian Buffers – Plant perennial herbaceous or forest buffers along streams.

Forestry

Statewide, more than half of Pennsylvania's land area is forest (approximately 17 million acres). About 70% of Pennsylvania's forests are privately owned, including 5% held by forest products companies. Approximately 30% of Pennsylvania forests are public lands. Forests and trees in Pennsylvania provide numerous benefits to the Commonwealth, including recreational opportunities, habitat for animals and forest plants, timber, and non-timber forest products, as well as benefits to water quality. Forests are natural pollution filters – holding rainfall, trapping polluted runoff, and stabilizing soils.

However, many forests have been cleared in agricultural, urban, and suburban areas. The Phase 3 WIP envisions the state and its partners working with forestry in five strategic areas:

1. Forest Riparian Buffers – Plant trees and shrubs along streams.
2. Tree Canopy – Plant trees in developed areas.
3. Woods and Pollinator Habitat – Convert lawn and turf areas to woods and meadows.
4. Forest and Natural Area Conservation – Provide credits for land conservation and revise zoning and ordinances to conserve existing natural areas.
5. Stream and Wetland Restoration – Support efforts to restore local streams and wetlands.

Stormwater

Stormwater from developed land may carry pollutants such as sediment, automotive liquids, lawn fertilizers, pesticides, pet waste, trash, and other contaminants into waterways. The Phase 3 WIP contains recommendations for the following seven actions to further reduce stormwater related pollution to local waterways and the Bay:

1. Implement pollutant reduction plans for MS4 Communities – As one component of the 2018 permit, MS4 permittees must implement management practices to achieve the reductions identified in their respective Pollutant Reduction Plans (PRPs) by 2023.
2. New riparian forest buffers – Plant trees and shrubs along streams.
3. Control measures for illicit discharges – DEP to facilitate municipal ordinance amendments to control illicit discharges to storm sewer systems.
4. Industrial stormwater – DEP to develop technical guidance, intended to supplement existing requirements, to inform industrial stormwater discharge

permittees engaged in these activities. This guidance will list appropriate BMP utilization, design standards, and implementation to reduce pollution which are acceptable to manage industrial stormwater.

5. Fertilizer legislation – This legislation could result in nutrient reductions in urbanized areas.
6. Erosion and Sediment Control (E&S Control) and Post Construction Stormwater Management (PCSM) – Continue permitting, inspecting, and ensuring compliance with Pennsylvania’s E&S Control and PCSM permit requirements, found in 25 Pa. Code Chapter 102, including DEP programs that implement these provisions not previously reported to the Chesapeake Bay Program for progress. Initial estimates of the projected reductions from the implementation of these programs between now and 2025 are 433,000 pounds of nitrogen and 32,000 pounds of phosphorus.
7. Dirt and Gravel Roads – Continue to implement the Dirt and Gravel Roads Program through the Center for Dirt and Gravel Roads.

Wastewater

Wastewater is the sewage or liquid industrial waste from homes, businesses, schools, industrial facilities, and other institutions. Most wastewater in Pennsylvania is treated before it is released into waterways. Pennsylvania’s wastewater sector has greatly reduced its contribution of nitrogen and phosphorus to the state’s waterways. To reduce these pollutants even more would be extremely costly. The three priority strategies for wastewater are:

1. Continue Current Treatment – Existing significant wastewater treatment systems will continue the successful treatment levels already achieved with biological nutrient removal.
2. Plant Optimization Program – Expand DEP’s current assistance program to maximize operations at wastewater systems to achieve additional reductions where appropriate.
3. Municipalities Implement Onsite Septic System Inspection and Pumping Programs – As a requirement under the Pennsylvania Sewage Facilities Act (Act 537 of 1965), municipalities are required to implement onsite septic system inspection and pumping programs. However, the implementation of these programs is not currently tracked or documented. Municipalities will work with DEP to ensure proper tracking and achieve further reductions.

Finally, Section 2 proposes accounting for actions occurring in the state which reduce nitrogen, phosphorus, and sediment pollution that are not currently credited in the Chesapeake Bay Watershed Model. There are several very successful programs in place designed to improve Pennsylvania’s local streams and waterways that do not

currently report progress towards achievement of nutrient and sediment reductions to the Chesapeake Bay Program. There are also new initiatives underway in Pennsylvania that are further accelerating our progress. Section 2 provides details regarding these programs and the expected reductions from these programs. This section includes the state's commitment to expand its capabilities to collect real-time water quality data to document water quality improvement and progress.

Section 3, Countywide Actions, outlines how the counties located within the basin can reduce pollution flowing into Pennsylvania's streams that drain into the Chesapeake Bay. Forty-three of Pennsylvania's counties contain waterways that drain to one of the four major Chesapeake Bay river basins: Susquehanna, Potomac, Eastern Shore, and Western Shore Watersheds.

The Chesapeake Bay Program has modeled Chesapeake Bay pollution sources, including pollution entering Pennsylvania's waterways and where it originates. Each Pennsylvania county has its own goal to reduce its share of pollution. Some counties have more work to do than others. The Phase 3 WIP Steering Committee grouped the 43 counties into four tiers. Tier 1 counties have the most pollution to reduce, and Tier 4 counties have the least.

Continuing the collaborative, deliberative approach to meet the restoration goals, the Commonwealth continues to work with each of these counties to develop and support implementation of Countywide Action Plans (CAPs) for clean water that are realistic and able to be accomplished by local communities. County-level planning is the most feasible planning scale in terms of size, number, existing data, and ability to organize resources. Pennsylvania's nitrogen and phosphorus reduction targets are broken down into local planning goals for each of these 43 counties. There are some "minimal loading" counties that DEP has not asked to participate in the CAP development and implementation process. Instead, those counties will continue to implement the statewide and local programs and priorities, such as those conducted by conservation districts under delegated agreements and contracts with state agencies, and report their efforts through existing programs and processes.

It is important to note that the county clean water goals do not establish any new requirement or regulatory obligation on counties. These goals are simply a way for Pennsylvania to engage with local partners on shared issues and focus resources on efforts that help Pennsylvania reach its goals to clean up local waters that flow to the Chesapeake Bay.

Each of these counties received a county-specific pollution reduction goal, planning tools, and customized technical toolboxes. County leaders have used the toolboxes to develop a mix of approaches that best fits the local needs and desires for local waterways. As examples, some of these approaches included environmental education, regulation and permitting, public works investments, restoration projects, and assistance to streamside property owners.

As part of the Phase 3 WIP planning process, Pennsylvania invited four of the 43 counties in the Chesapeake Bay watershed to participate in a pilot project to develop local CAPs. Lancaster and York counties began in spring 2018, and Adams and Franklin counties began in fall 2018. The Tier 1 counties (Lancaster and York) were completed as part of the pilot project. For the next phase in 2020, the four remaining Tier 2 counties were completed. The Tier 1 and Tier 2 counties collectively account for 54% of Pennsylvania's nitrogen and 42% of Pennsylvania's phosphorus loads. The remaining Tier 3 and Tier 4 counties completed their plans in 2021; these counties collectively account for the remaining 46% of Pennsylvania's nitrogen and 58% of Pennsylvania's phosphorus goals.

Section 4, Federal Actions and Coordination, outlines the federal role in the Chesapeake Bay restoration effort. In 24 counties in Pennsylvania's portion of the Chesapeake Bay watershed, there are federal facilities operated by the U.S. Department of Defense (DOD or Department of Defense), National Park Service, U.S. Fish and Wildlife Service, and the General Services Administration. Each of these federal facilities has nutrient reduction goals assigned and each is required to submit a plan to the Commonwealth for how the facility will achieve these reduction goals. The Department of Defense and the U.S. Fish and Wildlife Service have submitted their plans. DEP worked with EPA and the other federal agencies to complete the plans for the other federal agencies. The total annual reduction goals from these federal facilities is 97,358 pounds of nitrogen and 9,316 pounds of phosphorus.

Successful implementation of the Phase 3 WIP continues to require improved coordination and cooperation between the Commonwealth and federal agencies to track and report on the work they do together to meet Phase 3 WIP goals. Additionally, Pennsylvania continues to need funding from EPA for pollution reductions projects. This section highlights three areas for further coordination:

- Tracking and reporting efforts by the Natural Resources Conservation Service (NRCS) to install many of the pollution prevention practices described in this document.
- Closing gaps in how the partners measure, verify, and report on BMPs and wetland restoration projects.
- Revisions to EPA's Clean Water Act Section 319 grants to make those funds available for projects that meet the goals of the Phase 3 WIP.

Section 5, Existing and Needed Resources, describes how achieving the Phase 3 WIP goals requires an increased investment of approximately \$324 million per year in both public and private funding, and outlines where the money comes from currently, how it is used, and possible sources of additional financial resources. These figures do not account for investments from individual, private investors or local funding that is not currently reported. Recent surveys show a large amount of water quality improvements come from private dollars either directly or indirectly that have not been captured in the

figures below. It would be valuable to capture not only all practices going on the landscape but also all resources being expended through this effort.

In 2019, there were approximately 88 state agency staff involved in the Chesapeake Bay cleanup effort, and it was projected that this number needed to increase to 188. At that time, there were approximately 186 external agency staff supported with state or federal agency resources, such as county conservation district staff, contributing this effort. It was estimated an additional 154 of these external agency staff people were needed. Total costs for these staff resources is \$52,008,734. The dollar amounts in the two tables below are based on information leading up to the 2019 Phase 3 WIP submission. Since that time, Pennsylvania has instituted efficiencies to direct available funding more quickly to the areas of highest impact to local and Chesapeake Bay waters.

Existing	Existing Resources 2018	\$168,522,608
	Existing Staff Resources	\$28,285,954
	Total	\$196,808,562
Total Needed Resources	Statewide Practice Implementation	\$311,779,000
	Pilot County Practice Implementation ¹	\$157,170,000
	Staffing Resources	\$52,148,734
	Total	\$521,097,905
Annual Funding Gap		\$324,289,173

Pennsylvania is taking a phased approach to filling this funding gap. With this approach, at a minimum, at least \$100 million annually for BMP implementation is recommended as a first phase for implementation. With this, the top four priority initiatives are identified. These four initiatives alone will help to achieve 50% of the nitrogen reduction goal and 86% of the phosphorus reduction goal. Some amount of the \$52 million identified for existing and new agency and external staff resources for technical support would also be needed to implement this effort. A minimum of 5% of the cost of implementation is recommended. See the table below.

Priority Initiative	Cost (in millions)	Nitrogen Reduction	Phosphorus Reduction
Agricultural Compliance	\$33.1	14%	12%
Soil Health	\$32.9	14%	14%
Forest Buffers	\$28.1	16%	41%
Grass Buffers	\$3.4	8%	37%
TOTAL	\$97.7	50%	86%

Section 6, Documenting, Tracking, and Verifying, describes Pennsylvania’s efforts to improve the existing Data Management Systems and the capability to document, track, and verify the installation of practices. Revisions and enhancements to Pennsylvania’s BMP Verification Plan are also highlighted. Finally, the inordinate amount of financial and staffing resources needed to “keep” BMPs in the modeling tools, while putting more BMPs on the ground, is insurmountable, and continued engagement with our partners, including EPA, is necessary.

Section 7, Milestones and Progress Reporting, describes the action steps that Pennsylvania is taking to implement the priority initiatives in the Phase 3 WIP. DEP is reporting progress on these action steps to EPA annually, as part of the Programmatic milestone submission. EPA also receives semi-annual progress reports on federal grants, including the Chesapeake Bay Regulatory Accountability Program (CBRAP) grant, the Chesapeake Bay Implementation Grant (CBIG), and the Clean Water Act Section 106 grant. In addition, DEP submits a Nonpoint Source Management Program annual report to EPA for approval. DEP also meets regularly, at least bi-weekly, with EPA's CBPO, and holds quarterly WIP progress calls with EPA's CBPO and Water Division programs. These progress reports are in addition to the annual numeric progress reports completed by DEP, and the annual progress reports completed by the counties on their CAPs. Updates to these action steps and the CAPs will continue to be done every two years.

The action steps are divided into five categories:

1. Communication and Outreach
2. Funding and Resources
3. Expanding Capacity for Technical Assistance
4. Reporting and Tracking
5. Compliance

Section 8, Accounting for Growth, considers growth within the watershed. Pennsylvania's framework to offset this growth includes:

- Conserving and protecting wetlands
- Conserving and limiting development in riparian areas
- Modernizing local planning and zoning to conserve critical forests and habitats
- Preserving farmland as part of a holistic approach to conserving working lands

Section 9, Climate Change, discusses how the Phase 3 WIP accounts for the trend that climate scientists forecast for more rain and more frequent intense storms in Pennsylvania. These anticipated climate change effects create new challenges for the effort to clean up local waterways that flow to the Chesapeake Bay.

The Chesapeake Bay Program Partnership has used computer models to predict how climate change will influence nutrient loads in 2025. In 2020, the Chesapeake Bay Program partnership PSC approved the new climate allocations based on the best available science as presented to the PSC.¹ The revised estimate is that, by 2025, Pennsylvania will need to reduce an additional 1.811 million pounds of nitrogen and an additional 0.095 million pounds of phosphorus due to changing weather patterns.² Preliminary estimates for the climate impact through 2035 indicate that this estimated

¹ See the PSC December 17, 2020 final decision on climate change [here](#).

² See the December 17, 2020 presentation to the PSC [here](#).

load effect could double from 2025 to 2035. The effect of climate change on Pennsylvania's ability to meet the Chesapeake Bay's water quality standards is significant and of increasing concern.

The Phase 3 WIP calls for many actions that are beneficial in a changing climate. The actions that reduce pollution also restore soil health, soften the blow from floods, create habitat, and capture carbon from the atmosphere. This section provides recommendations for making the most of the opportunities to target investments in areas that accelerate waterways cleanup and prepare our communities for a changing climate. This section also provides information about Pennsylvania's Local Climate Action Plan (LCAP) initiative and Pennsylvania's work to join the Regional Greenhouse Gas Initiative (RGGI), both of which began in 2020 and continued into 2021.

Section 10, Communication and Engagement Strategy, acknowledges that it will continue to take a team effort to accomplish the initiatives included in the Phase 3 WIP. This section outlines how the state has coordinated – and will continue to coordinate – the effort among dozens of partners through 2025.

The process for developing the Pennsylvania's Phase 3 WIP was inclusive and transparent, with dozens of organizations and scores of individuals actively engaged in all elements of the Phase 3 WIP. Nearly 100 people from the public and private sectors served on the Phase 3 WIP Steering Committee and workgroups. All Steering Committee and workgroup meetings were open to the public. As the Phase 3 WIP transitions from planning to implementation, this successful structure remains in place, with the Steering Committee being converted to the Phase 3 WIP State Team, which meets on a semi-annual basis. The workgroup leads, other agency partners, and external partners have also been transformed into the Phase 3 WIP Action Leaders Team, which meets on a quarterly basis. These teams are responsible for overseeing the implementation of the Phase 3 WIP, modifying the two-year milestones and tracking progress.

The Phase 3 WIP Communications and Engagement Workgroup developed a matrix of conferences, meetings, and professional periodicals to deliver information about the Phase 3 WIP to industry sectors and stakeholders. For the general public, DEP has developed a "Healthy Waters, Healthy Communities" communication campaign to guide its media and digital outreach. This includes a story map and monthly e-newsletter that showcases agency and partner progress and funding opportunities, which was commenced in June 2020. At the county level, the planning teams are also engaging in outreach to civic and business leaders and citizens as they write and implement their CAPs.

To fulfill the goals of this plan, it will continue to be critical to overcome the three primary hurdles to engagement: (1) ideologic – developing an understanding of the value of the practices; (2) technical – ensuring that once stakeholders are interested in implementation, tools are available to aid them in practice selection, design, and installation; and (3) funding – providing resources to those that are willing and able to

implement the selected practices. The Communications Offices of DEP, DCNR, and PDA, in partnership with the Phase 3 WIP Communications and Engagement Workgroup, have the lead in focusing on the ideologic hurdle to ensure that the Phase 3 WIP is implemented.

Section 11 discusses the sediment targets that were established upon completion of the Phase 3 WIP. Sediment targets developed for the Phase 3 WIPs are based on the sediment loads associated with management actions taken to address the Phase 3 WIP nitrogen and phosphorus targets.

Section 12 concludes Pennsylvania's Phase 3 WIP. The total projected reduction for nitrogen in the Phase 3 WIP is 32.725 million pounds, exceeding the 2025 nitrogen planning target by 222,000 pounds. The total projected reduction for phosphorus in the Phase 3 WIP is 1,151,000 pounds, exceeding the 2025 phosphorus planning target by 300,800 pounds. Pennsylvania's projected reduction for sediment is 1,088,128,000, exceeding the sediment planning target by 420.962 million pounds.

Pennsylvania's first full year of Phase 3 WIP implementation resulted in more than 4.4 million pounds of nitrogen reductions credited in 2020 annual progress. This was an impressive start and Pennsylvania continues to build momentum and adapt strategies to mitigate the short- and long-term challenges associated with the unprecedented global COVID-19 pandemic.

Pennsylvania commits to have practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP phosphorus and nitrogen targets. Pennsylvania, in conjunction with the Bay Program Partnership, is utilizing an adaptive management approach to achieve our collective desired outcome. The two-year milestones, annual progress reporting, semi-annual grant progress reporting, bi-weekly or monthly meetings with EPA's CBPO, and quarterly meetings with EPA Region 3 allow for the assessment of the implementation progress and targeted adjustments to programs and priorities to ensure the practices and controls called for in the Phase 3 WIP are achieved by 2025. EPA Section 319 Nonpoint Source Management staff in the EPA Region 3 Water Division also meet monthly with DEP Chesapeake Bay Office staff to assess progress toward nonpoint source pollution prevention goals and objectives, per the Nonpoint Source Management Plan. DEP also produces and submits annual Nonpoint Source Management reports to EPA Region 3. The additional reductions needed will be achieved through the completion of the remaining CAPs and improved documenting, tracking, and verification of existing practices and programs.

Development of the Phase 3 WIP was just the first step in this final phase of Chesapeake Bay TMDL implementation. With the Phase 3 WIP developed, Pennsylvania is undertaking a series of further planning and implementation activities necessary to restore and maintain the health of local waters and the Chesapeake Bay. Future activities will include: implementation of practices; tracking and reporting of implementation for evaluation of milestone progress every year; reporting every six months on tasks and deliverables for the EPA Section 106 grant, the CBRAP grant, and

the CBIG grant; and practice verification. Federal, state, and local coordination and partnership in these activities is vital.

To ensure sufficient progress to achieve the 2025 targets, Pennsylvania will adaptively manage Phase 3 WIP implementation efforts based on continuous evaluation of technical issues regarding the pace of implementation. Pennsylvania will also evaluate feasible implementation rates and share this information with the Pennsylvania partnership and stakeholders as part of the milestone development process.

SECTION 1. INTRODUCTION

I. BACKGROUND

In 2010, the Chesapeake Bay Total Maximum Daily Load (TMDL) was established by the U.S. Environmental Protection Agency (EPA). This historic clean-up plan provides a guide for reducing pollution and restoring clean water to the Chesapeake Bay and its local rivers and streams. To guide these efforts, Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia (collectively referred to as the “Bay jurisdictions”) created a series of roadmaps—known as Watershed Implementation Plans (WIPs)—describing how each will achieve the pollution reductions called for in the TMDL.

There are three phases of WIPs. Phase 1 and 2 WIPs were developed in 2010 and 2012, respectively, and describe actions to be implemented by 2017 and 2025 to achieve the goals of the TMDL. Phase 3 WIPs, under development in the 2017 to 2019 timeframe, describe actions the seven Chesapeake Bay jurisdictions intend to implement through 2025 to meet Chesapeake Bay restoration goals, based on the Chesapeake Bay Program Partnership’s midpoint assessment of progress. This midpoint assessment was completed in 2017.

The Phase 3 WIP builds on strengths and seeks to address the weaknesses of the Phase 1 and Phase 2 WIPs. Pennsylvania will continue to implement pollutant reduction activities identified in those earlier WIPs. The Phase 3 WIP specifies the steps Pennsylvania will take through 2025 to meet local water pollution reduction goals in the Chesapeake Bay watershed.

The Pennsylvania Department of Environmental Protection (DEP) is the primary state agency with the statutory mandate to implement the Chesapeake Bay TMDL under the federal Clean Water Act in Pennsylvania and is therefore the lead author of this document. DEP notes however, that the Phase 3 WIP development process was built on the fundamental recognition of the need to approach identification and implementation of goals and actions in a much more deeply collaborative fashion with all public, private, federal, state, and local stakeholders. Pennsylvania’s Phase 3 WIP will only be successful if all who have been engaged in the development of the recommendations and those that are currently implementing the programs and on-the-ground practices continue to work together to make this plan a reality.

It is important to recognize that Pennsylvania is unique to the rest of the Bay jurisdictions and will require a unique approach to meeting water pollution reduction goals. Pennsylvania is a large state and therefore inherently has a significant impact on the water quality of the Chesapeake Bay. For example:

- Pennsylvania encompasses 35.2% of the Chesapeake Bay watershed.
- The Susquehanna River provides 50% of the total freshwater flow to the Chesapeake Bay. Pennsylvania’s portion of the Potomac River basin provides an

additional 2%. There is also a portion of Chester County that drains to the Eastern Shore watershed, and a portion of York County that drains to the Western Shore watershed, which leads directly to the Chesapeake Bay.

- Pennsylvania is designated as responsible for 69% of the remaining basinwide nitrogen load reductions by 2025.

Pennsylvania is a state of nonpoint source “opportunities.” Compared to the other states in the watershed, the scale of the nonpoint source challenges in Pennsylvania is one of the most significant factors that has impacted past progress and will impact future success. For example:

- Agriculture Sector:
 - Of the 33,000 farms, less than 400³ are large enough to be considered a Concentrated Animal Feeding Operation (CAFO), which are required to have a National Pollutant Discharge Elimination System (NPDES) permit.
 - Less than 1,000 farms are regulated as Concentrated Animal Operations (CAOs), which are required to have and implement a Nutrient Management Plan.
 - All farms must comply with Pennsylvania’s Chapter 91 Manure Management and Chapter 102 Agriculture Erosion and Sediment (E&S) Control regulations.
- Urban Stormwater
 - There are over 350 Municipal Separate Sewer Systems (MS4s) in Pennsylvania’s portion of the Chesapeake Bay watershed.
 - Nearly 75% of developed acres in the Chesapeake Bay watershed are outside of an MS4 or combined sewer system area. However, any persons proposing earth disturbance activities must comply with planning, permitting, implementation and maintenance requirements in Pennsylvania’s Chapter 102 E&S Control and (Post Construction Stormwater Management (PCSM) regulatory requirements, regardless of location.

In contrast, Pennsylvania’s point source or Wastewater sector:

- Has met the required 2017 reduction goals three years early at a cost of \$1.4 billion.
- Is on track to meet the 2025 goals without further enhancements.

³ The public report of permitted CAFOs can be found on DEP’s website at www.pa.gov/CAFOs.

With the establishment of the TMDL, the need for consistent and broad-ranging BMP data became critically important to attain adequate yearly progress. These data sources and systems include permit programs, grant and cost-share awards, and special efforts to collect and report BMPs that have not been previously accounted for or are implemented outside of government oversight. On December 1 of each year, Pennsylvania reports these BMPs to the EPA Chesapeake Bay Program Office. There have been growing pains in developing this capacity while also working with limited funding.

Since 2010, improvements in data collection through programs and new data sources have been steady. Improving the data management protocols and the capability to document progress was one of six priorities identified as part of the 2016 Pennsylvania Restoration Strategy announced by Governor Wolf to accelerate progress. The results have shown that with each refinement of data submitted to the Chesapeake Bay Watershed Model, Pennsylvania is able to demonstrate increased reductions.

It is also important to note that Pennsylvania still does not receive full credit for many currently implemented practices, particularly practices implemented through permit programs and practices implemented without public assistance through grant and cost-share awards. Improved data collection around these practices continues to be addressed during implementation of the Phase 3 WIP at both the state and local level as part of the [BMP Verification Plan](#) and other steps taken as outlined in [Section 2, State Actions](#) and [Section 4, Federal Actions and Coordination](#).

DEP is currently evaluating and quantifying additional practices that Pennsylvania has previously implemented and will implement in the future to assure Pennsylvania will receive full credit and achieve its nutrient reduction planning targets. Pennsylvania will continue to work to receive full credit for implemented practices across the Chesapeake Bay watershed. Additionally, DEP is evaluating its permitting requirements to facilitate a smooth process for practice implementation. As part of that effort, DEP has identified the need for more timely reviews and responses when state and federal partners have a role in the permit process.

II. PENNSYLVANIA'S COLLABORATIVE PROCESS

Crucial to the development and future implementation of the Phase 3 WIP is the collaborative, deliberative approach taken. This approach focuses on impacts and projects at the local level, with the state as a committed partner in the effort. To facilitate this approach, a comprehensive, sustained engagement strategy is necessary. The strategy developed is described in detail in [Section 10, "Communication and Engagement Strategy."](#)

This strategy has three dimensions:

1. Widespread collaboration with multiple partners from multiple sectors and localities in developing, writing, and implementing the Phase 3 WIP;
2. Strategic inclusion and engagement with different sectors and localities throughout the Phase 3 WIP planning process to ensure that all concerns, needs, and goals are addressed throughout the planning process; and
3. A strategic communication effort to ensure understanding of and support for the plan among key stakeholders as well as throughout the watershed.

These extensive efforts have facilitated widespread improved understanding of the requirements for the Phase 3 WIP, in diverse and sustained collaboration, and in new partnerships. As a result, the Phase 3 WIP has widespread shared ownership, is well informed by those working on the ground, and enhances reasonable assurance that Pennsylvania will achieve improvements in local water quality and the 2025 Chesapeake Bay targets.

Completed efforts include the following:

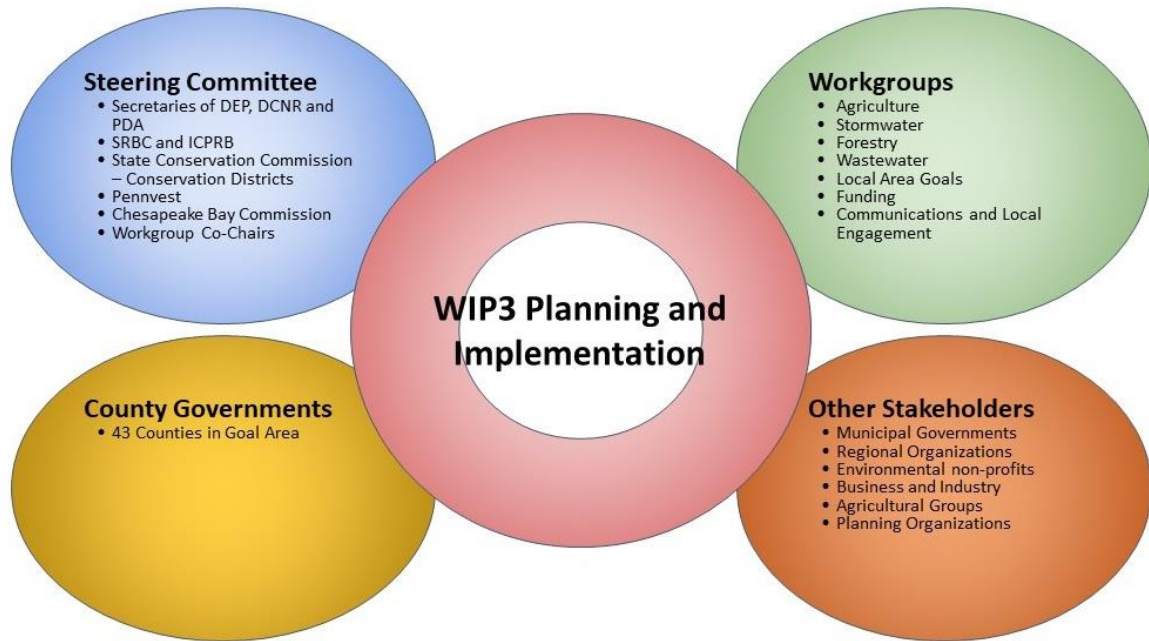
1. Widespread collaboration in developing and writing the Phase 3 WIP:
 - An active 20-member Steering Committee;
 - Seven active workgroups, including one dedicated to Communication and Engagement; and
 - Countywide Action Plans for four pilot counties.
2. Strategic inclusion and engagement throughout the planning process. A complete summary of the input received from the different listening sessions, forums, focus groups, etc. can be found in [Appendix 2, Summary of Local Engagement](#).
 - June 5, 2017 Phase 3 WIP Kickoff and Listening Session that attracted 240 participants from multiple sectors and communities;
 - April 10, 2018 Session with nearly 200 participants to review and discuss local planning and a Community Clean Water Toolbox to be used in the development of the Countywide Action Plans;
 - Aug. 30, 2018 Pennsylvania Best Management Practice Verification Program Planning Summit;
 - Other forums, focus groups, and roundtables focused on the completion of the sector-specific action plans for the Phase 3 WIP and other issues of interest to local governments in the watershed.

3. Strategic communication effort:
 - Development of a “Healthy Waters, Healthy Communities” communications strategy;
 - Development of accurate, readable, accessible outreach materials.
4. Public comment period on the draft Phase 3 WIP:
 - Received comments from 40 representatives of local, county, state government; academia; nonprofit and for-profit organizations; private consultants; and other interested parties.
 - [Appendix 4, Comment Response Document](#) is a complete summary of these comments and DEP’s response.
5. Continued partnerships and communication throughout the implementation of the Phase 3 WIP:
 - Hold and facilitate quarterly and semi-annual meetings to discuss progress and challenges with the Phase 3 WIP Action Leaders and State Team.
 - Hold and facilitate weekly webinars and regular one-on-one sessions with the Tier 1, 2, 3, and 4 counties as they develop and implement their local CAPs.
 - Provide strategic outreach to the counties through the DEP Region CAP Support Teams
 - Provide regular and as-requested updates to committees and boards, including but not limited to: the DEP Agriculture Advisory Board, the DEP Water Resources Advisory Committee (WRAC), the DEP Citizens Advisory Committee (CAC), the State Conservation Commission (SCC), the County Commissioners Association of Pennsylvania (CCAP), the Chesapeake Bay Commission (CBC), the Senate Environmental Resources and Energy (ERE) Committee, and the House ERE Committee.

A. Phase 3 WIP Steering Committee and Workgroups

To coordinate and lead this effort, a Pennsylvania Phase 3 WIP Steering Committee was created. Nearly 100 people from the public and private sectors are either members of this Phase 3 WIP Steering Committee or one of seven workgroups as illustrated in Figure 1.1. All Steering Committee meetings and workgroup meetings were open to the public.

Figure 1.1. Collaborative Process Framework



Chaired by the Secretary of DEP, members of the Steering Committee included the Secretaries of Agriculture and of Conservation and Natural Resources; Chair, Chesapeake Bay Commission; Executive Secretary, State Conservation Commission; Executive Director, Susquehanna River Basin Commission; Executive Director, Interstate Commission of the Potomac River Basin; Executive Director, Pennsylvania Infrastructure Investment Authority; and the Workgroup Co-chairs.

The mission of the Steering Committee was to advise DEP in the effective development of the Phase 3 WIP so that the final plan:

1. Is implementable to achieve the TMDL nutrient and sediment load reduction allocations for Pennsylvania.
2. Results in local water quality improvement while restoring the Chesapeake Bay.
3. Addresses EPA's expectations as described in their finalized "Expectations for the Phase III Watershed Implementation Plans" documentation including:
 - Pollutant Source Sector-specific plans for reductions;
 - Local area planning goals;
 - A consideration of climate change, Conowingo Dam, and sector growth, depending on Partnership resolution of these issues.

4. Addresses the additional special conditions and expectations EPA has delineated for Pennsylvania due to the Commonwealth's current "backstop" status for the agriculture and urban sectors.
5. Includes stakeholder input, public engagement, and public comment.

The seven workgroups established to develop the Phase 3 WIP are:

- Agriculture
- Communication and Engagement
- Forestry
- Funding
- Local Area Goals
- Stormwater
- Wastewater

Each workgroup was co-chaired by leaders in the private, nonprofit, and public sectors, and had dedicated state agency staff support. They set their own meeting schedules and conducted their own outreach to their relevant constituencies. These meetings were open to the public, and workgroups occasionally shared joint meetings. The dates and times of these meetings were posted on the DEP Phase 3 Steering Committee Actions webpage.

The workgroup co-chairs, besides being part of the Steering Committee, also met monthly to coordinate efforts. Two independent facilitators, Jennifer Handke, Consulting with a Purpose, and Dr. Frank Dukes, University of Virginia, facilitated the workgroup co-chairs meetings. Ms. Handke and Dr. Dukes also provided support to individual workgroups. The Susquehanna River Basin Commission and the EPA Chesapeake Bay Program Office provided technical support. Eric Eckl and Avia Huisman, Water Words That Works, provided marketing, outreach, and messaging support.

A complete list of the Steering Committee members and the seven workgroup members can be found in [Appendix 1, Steering Committee and Workgroup Members](#). A summary of the recommendations from the seven workgroups can be found in [Appendix 3, County and Phase 3 WIP Workgroup Recommendations](#).

B. Four County Pilot Planning Process

The Local Area Goals Workgroup developed a planning process, a [Community Clean Water Planning Guide](#), and a county-specific [Community Clean Water Technical Toolbox](#) with support from DEP, the EPA Chesapeake Bay Program Office, the Susquehanna River Basin Commission (SRBC) and the Communications and Engagement Workgroup. The purpose of this planning process and the toolbox was to assist in the development of the local Countywide Action Plans (CAPs) as defined in [Section 3. Countywide Actions](#). The process and materials were pilot tested in Lancaster, York, Franklin, and Adams counties in the summer and fall of 2018.

Lancaster and York presented their respective final CAPs to the Steering Committee in January 2019; Franklin and Adams presented theirs in March 2019.

The CAPs are intended primarily to improve local water quality and to provide related benefits for those localities. The CAPs developed by the counties included priority goals and initiatives, action steps, the identification of responsible parties, and available and needed technical and financial resources. In addition, the four pilot counties shared lessons learned throughout the process to make the development of CAPs in other counties across Pennsylvania's Chesapeake Bay watershed more efficient and effective.

On September 21, 2018, midway through the pilot projects, the pilot counties gathered to share updates. Pilot counties shared their local planning process and identified challenges, lessons learned, and recommendations for a more effective process.

In November and December 2018, joint planning meetings were held with each of the four pilot counties and the Steering Committee workgroup co-chairs, DEP Chesapeake Bay Program office staff and the Phase 3 WIP technical support team. The purpose of these meetings was to share both county planning team and state Phase 3 WIP workgroup draft recommendations for nutrient reduction, identify overlaps and resulting nutrient reductions, explore areas for further reductions, and recommend and decide next steps for moving forward together. The final CAPs for the four counties are a merging of the Phase 3 WIP workgroup sector recommendations and the identified local initiatives and priorities.

Relevant lessons from this pilot process were incorporated into a revised [Community Clean Water Planning Guide](#) and county-specific [Clean Water Technical Toolbox](#) that were provided to other counties. In addition, to help counties shift from the planning phase to the implementation phase, DEP and SRBC developed the Community Clean Water Implementation Guide. The [Community Clean Water Implementation Guide](#) was developed and distributed in 2020 and 2021. The county-specific Technical Toolbox can be located on the [DEP Countywide Action Plan webpage](#), filed with each individual county.

C. Engagement Strategy

The Engagement Strategy incorporates communications and outreach tools to raise awareness, increase knowledge, and inspire actions to help reduce pollution in local streams and rivers in Pennsylvania. This strategy is targeted to residents, municipal officials, legislative leaders, farms, and businesses within the 43 counties in the Chesapeake Bay watershed and across the Commonwealth.

The strategy contains three goals:

1. Help Pennsylvania make significant progress in reducing the amount of nitrogen, phosphorus, and sediment Pennsylvania is putting into local waters and, ultimately, the Chesapeake Bay.
2. Demonstrably increase target audience's awareness and knowledge of the value and benefits of healthy local streams and rivers; the negative impacts of nonpoint source pollution; and actions they can take.
3. Increase positive behaviors by individuals to help reduce these pollutants.

Principles used to accomplish these goals may be summarized as follows:

- Focus on the restoration of Pennsylvania's waters.
- Develop and provide timely, mainstream, and relatable messaging. Avoid governmental, policy and academic jargon.
- Increase efforts to garner positive mainstream media coverage.
- Enlist and leverage supportive advocates such as farmers, hunters and other outdoor sportsmen/women, business owners, sports figures, and others who are not conventional environmental advocates, to show support of clean water to their audiences through their own channels.
- Publicly recognize positive actions, progress, and successes by highlighting success stories through social media, blogs, and newsletters, and by hosting press events.

Partners engaged in the effort to raise awareness and promote plan engagement goals include Pennsylvania Department of Environmental Protection (DEP) Communications Office; Pennsylvania Department of Agriculture (PDA) Communications Office; Pennsylvania Department of Conservation and Natural Resources (DCNR) Communications Office; Phase 3 WIP Communications and Engagement Workgroup; DEP Chesapeake Bay Office; other Bureaus within DEP's Office of Water Programs, and private industry.

A critical piece to the Phase 3 WIP's success is the development and distribution of a clear and easy to understand message. Partner assistance is needed to:

- Identify the appropriate audience(s).
- Develop effective audience-focused outreach materials that are easily accessible.
- Identify appropriate communication tools and methods to reach those audiences.
- Identify and enlist supportive advocates who can assist in delivering materials and messages.

To address identified outreach needs:

1. DEP hired a Communications and Marketing firm to help with the development of outreach materials and the identification of methods to reach different target audiences. Work products include summary informational sheets, graphics for presentations, whole overview presentations to brief the counties and the basics for the larger WIP presentation. Additionally, the firm provided the framework for the updated WIP website and translated technical language to be readable for the general public.
2. The Steering Committee created the Communications and Engagement Workgroup to facilitate the development and definition of the message for different target audiences and to serve as the core group of committed partners to help with the delivery of these materials and their messages.
3. Through a federal grant, DCNR is engaging a contractor to prioritize the riparian buffer landscape, particularly in southcentral Pennsylvania, for outreach, design outreach strategies, design landowner-specific outreach messages and develop targeted messaging and delivery strategies based on consumer patterns.

At the time of the amendment of this Phase 3 WIP, the following DEP outreach and engagement initiatives have been developed:

1. Multiple outreach and data management publications and tools have been published on DEP's Phase 3 WIP webpages, including but not limited to the following:
 - [Phase 3 WIP Summary](#)
 - [Local Clean Water Planning Summary](#)
 - [Healthy Waters, Healthy Communities Story Map](#)
 - [Healthy Waters. Pennsylvania. Partnership. Progress monthly e-newsletter](#)
 - Online form for interested parties to [Join In](#)
 - [Countywide Action Plan: Why is this Valuable to My County](#)
 - [The Local Role in Developing a "Countywide Action Plan"](#)
 - ["Why WIP" Local Stakeholder Letter Template](#)
 - [Countywide Action Plan Planning and Progress Template](#)
 - [Countywide Action Plan Programmatic Recommendation Template](#)
 - [Detailed BMP Entry Form Template](#)
 - [County Resources Inventory Template](#)
 - [Data Management Summary](#)
2. The [Pennsylvania Clean Water Academy](#) provides timely and responsive web-based training and recorded webinars, as well as continually updated FAQ documents, for Community Clean Water Coordinators, conservation districts, and other internal and contracted agency staff.

D. The Phase 3 WIP Implementation Action Team

The collaborative approach used to develop the Phase 3 WIP will be instrumental to the success of its implementation. For this reason, the Phase 3 WIP Steering Committee was converted to the Phase 3 WIP State Team (State Team) comprised of the same members. The main purpose of the State Team is to:

1. Adaptively manage the ongoing implementation of the priority initiatives identified in the Phase 3 WIP.
2. Provide input into the development and revision of future two-year milestones for the Phase 3 WIP.
3. Track progress and provide input into the programmatic progress reports and annual Countywide Action Plan progress reports.

The Workgroup Co-Chairs as well as other individuals that are actively implementing the Phase 3 WIP have been identified as Action Leaders. The Action Leaders will continue to meet as needed to accomplish the above purpose, but no more frequently than quarterly. The Action Leaders may re-convene their workgroups on an as-needed basis, determined by the Action Leaders. All State Team and workgroup meetings will be open to the public. Additionally, the virtual State Team meetings that have transpired throughout the COVID-19 pandemic have been recorded and published to the [Phase 3 WIP State Team webpage](#).

III. PARTNERSHIP AGREEMENT

To support Chesapeake Bay cleanup efforts, all the states in the watershed, including Pennsylvania, Maryland, Virginia, Delaware, New York, West Virginia and the District of Columbia and several federal agencies formed the Chesapeake Bay Program Partnership (Partnership). The lead federal agency is EPA, but the other federal agencies involved are the US Departments of Agriculture, Commerce, Defense, Homeland Security, Interior and Transportation. Also involved are the US Geological Survey, National Park Service, the US Fish and Wildlife Service, and the US Army Corps of Engineers. Another key member of the “Partnership” is the Chesapeake Bay Commission. This Commission is comprised of representatives of the state house and senate for the states of Pennsylvania, Maryland and Virginia and the Cabinet-level head of the lead environmental agency for these states responsible for the implementation of the Chesapeake Bay Program.

In 2014, the Partnership executed the non-binding “Chesapeake Bay Watershed Agreement” (2014 Watershed Agreement), through which the parties committed to work together on specific priority management strategies to clean up local watersheds and the Chesapeake Bay. The 2014 Watershed Agreement established ten goals: sustainable fisheries, vital habitats, improved water quality (of which the implementation

of the TMDL is one component), toxic contamination, healthy watersheds, stewardship (including diversity, local leadership, and citizen stewardship), land conservation, public access, environmental literacy, and climate resiliency. There are 31 management strategies and associated workplans with identified action items and indicators for these goals. These goals and outcomes are all designed to further restore and protect the Chesapeake Bay.

Early in the process of the 2017 Midpoint Assessment of the TMDL, the Partnership recognized a significant overlap in priorities identified in the 2014 Watershed Agreement and the priority areas for the Phase 3 WIPs including:

- Sustainable Fisheries - Fish Habitat
- Vital Habitats:
 - Brook Trout
 - Submerged Aquatic Vegetation
 - Forest Buffers
 - Tree Canopy
 - Wetlands
 - Stream Health
- Land Conservation - Protected Lands
- Healthy Watersheds
- Public Access
- Toxics Contaminants
- Climate Resiliency

Many of the priority initiatives identified under [Section 2, State Actions](#) to achieve the TMDL also address priorities in the 2014 Watershed Agreement.

IV. PHASE 3 WIP PLANNING TARGETS FOR PENNSYLVANIA

The Partnership assigned planning targets for Pennsylvania based on the estimated amount of nutrient loadings that reach the Chesapeake Bay from Pennsylvania waters. These planning targets are the reduction numbers that Pennsylvania's Phase 3 WIP must demonstrate will be achieved by having all practices in place by 2025. These planning targets are based on a modeled methodology first defined in the TMDL established in 2010. This same methodology was then translated to local planning goals defined for counties for federal facilities in Table 4.1 and Table 4.2 in [Section 4](#). Two basic concepts behind this methodology are described below:

- Controllable Load
- Edge of Stream vs Edge of Tide Load

A. Calculation of "Controllable Load"

To assign these planning targets, the Partnership started with the concept of a "controllable load". This was first defined when the TMDL was published in 2010. The

mathematics behind the Partnership's rule of equity was defined for the TMDL. This rule of equity is that those who pollute more should do more. To quantify the controllable load, the Partnership designed two model scenarios: (1) the No-Action scenario and (2) the E3 scenario. The No-Action scenario is a condition in the Chesapeake Bay watershed without any BMPs on land controlling nutrient and sediment loads. The E3 scenario stands for Everything, Everywhere, by Everyone and is the opposite condition in the watershed, where there is full implementation of the most effective BMPs on all pollutant sources and land, whether agricultural or developed. The difference between the very high No-Action loads and very low E3 loads is defined as the "controllable load".

The E3 scenario is a hypothetical condition that does not consider costs of implementation and considers few physical limitations to implementing BMPs. By applying the same rules of No-Action and E3 across all sources of nutrients in the Chesapeake Bay watershed, there is equity among the many localities, counties, regions, tributaries, and states. For example, those areas with high densities of animal manure, impervious surface, fertilizer use, and septic system discharges, will have greater controllable loads than areas of entirely pristine forest. Comparing the difference in these scenario loads (the controllable load), defines where the excess nutrient pollution is greatest and where it is least.

For determining the planning goals among these areas, each controllable load is multiplied by the same fraction so that when all the individual planning goal loads are added, the total is the Planning Target. For Pennsylvania, this fraction is 0.7392, or Pennsylvania's planning targets are 73.92% of the difference between the No-Action and E3 loads. In other words, each county and each federal facility in Pennsylvania is expected to reduce 73.92% of the controllable load for Pennsylvania to meet water quality standards in the Chesapeake Bay. The level of effort required to achieve the outcome is the same for each county and federal facility (73.92% of E3) but the load reductions are different because each area has a different load, some areas are high-loaders while others are low.

B. Edge of Stream (EOS) and Edge of Tide (EOT) Planning Targets

Not all the nutrients that reach Pennsylvania's waterways reach the Chesapeake Bay. When nitrogen and phosphorus enter local waterways, these loads are much higher than when the loads ultimately reach the Chesapeake Bay. Aquatic ecosystems help remove some nitrogen and phosphorus as the runoff travels across Pennsylvania's waterways and toward the Chesapeake Bay.

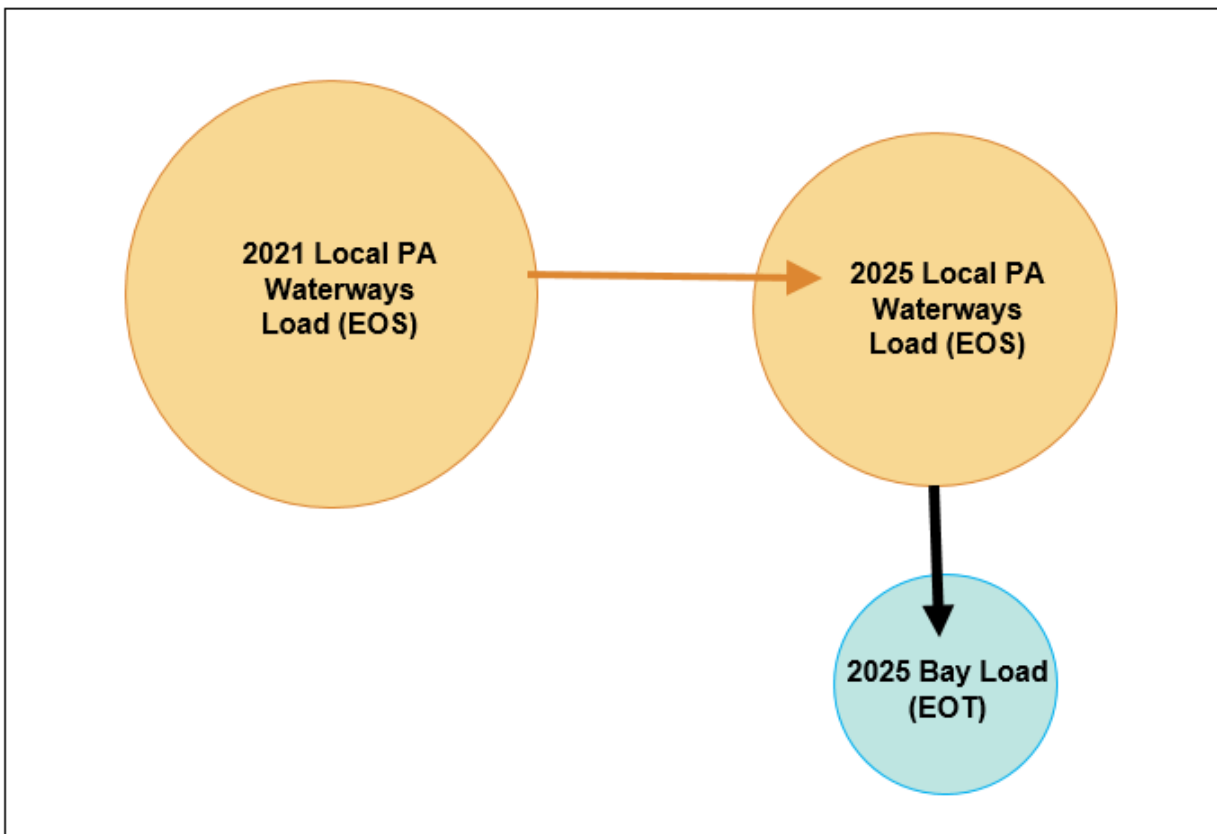
The loads and reduction numbers come from the EPA Chesapeake Bay Program's Office tool called the Chesapeake Assessment Scenario Tool (CAST). Each county in Pennsylvania's Chesapeake Bay watershed has a varied attenuation factor based on geographic proximity to the Chesapeake Bay. CAST accounts for the variation in attenuation and calculates the difference between the loads delivered to the "local waterways" as *Edge of Stream* (EOS) and the loads delivered to the Chesapeake Bay

as *Edge of Tide* (EOT). Figure 1.2 visually demonstrates the relationship between current and future EOS and future EOT; there is a larger EOS load due to attenuation factors noted above. Pennsylvania’s focus is on local water quality; therefore, Pennsylvania works with two sets of planning targets for its nutrient loading.

Pennsylvania has decided to focus on nutrients loads from local waterways to resonate a stronger message with its citizens. The initial Phase 3 WIP submitted in 2019 stated that Pennsylvania must reduce 51.06 million pounds of nitrogen and 2.02 million pounds of phosphorus annually to local waterways to successfully meet the 2025 planning target to the Chesapeake Bay.

Reductions of nutrients in local waterways equate to reductions of loads delivered to the Chesapeake Bay. In 2019, Pennsylvania needed to reduce 34.13 million pounds of nitrogen and 0.75 million pounds of phosphorus annually to the Chesapeake Bay. Including 2020 annual progress, Pennsylvania’s reductions for nitrogen is currently 32.5 million pounds and 0.85 million pounds of phosphorus annually to the Chesapeake Bay. That means between our Phase 3 WIP submission in 2019 and the Phase 3 WIP Amendment, there was an EPA modeled reduction of 1.63 million pounds of nitrogen. The additional phosphorus reduction is a result of the phosphorus to nitrogen exchange after the Phase 3 WIP was submitted.

Figure 1.2. Pennsylvania Planning Targets



Please note that these planning targets do not include any additional reductions that will be achieved through the separate Conowingo WIP (CWIP) that has been developed to address the additional six million pounds per year of nitrogen and 260,000 pounds of phosphorus attributed to the loss of trapping capacity behind Conowingo Dam. The Partnership has agreed to address this additional loading together in a separate CWIP. It also does not include any additional reductions due to climate change, as discussed in [Section 9, Climate Change](#).

C. Sediment Planning Targets for Pennsylvania

Sediment loads are managed in the Chesapeake Bay TMDL to specifically address the water clarity/submerged aquatic vegetation (SAV) water quality standards. Research has shown that the water clarity/SAV water quality standard is generally more responsive to nutrient load reductions than it is to sediment load reductions. This is because algae fueled by nutrients can block as much, or more, light from reaching SAV as suspended sediments.

The Phase 3 WIP sediment targets did not affect the BMPs called for in the Phase 3 WIP and are not intended to be the driver for implementation moving forward. The sediment targets developed for the Phase 3 WIPs as they have been for previous WIPs, were formed on the basis of the sediment load delivered to the Chesapeake Bay associated with management actions taken to address the Phase 3 WIP nitrogen and phosphorus targets. In other words, the Best Management Practices (BMPs) that are identified in this WIP to meet the Phase 3 WIP nitrogen and phosphorus targets were run through the Partnership's Phase 6 suite of modeling tools, and the resulting sediment loads formed the basis for the Phase 3 WIP sediment targets. These sediment loads were adjusted proportionally to account for any overshooting or undershooting of the Phase 3 WIP nitrogen and phosphorus targets. An additional 10% allowance was added to the calculated Phase 3 WIP sediment target in each major basin.

The resulting final Phase 3 WIP sediment targets has been appended to this final Phase 3 WIP in October 2019, once they have been approved by the Partnership.

V. EPA EXPECTATIONS FOR THE PHASE 3 WIP

EPA provided the jurisdictions written "expectations" of what they expected from jurisdictions' Phase 1 and Phase 2 WIPs in 2009 and 2011, respectively. For the Phase 3 WIP, EPA provided final "Expectations for the Phase III Watershed Implementation Plans" to the jurisdictions on June 19, 2018. For Pennsylvania, EPA highlighted:

- Comprehensive strategies for engagement of the full array of Pennsylvania local, regional, and federal partners in WIP implementation.
- Local planning goals below the state major basin scales and in the form best suited for directly engaging local, regional, and federal partners.
- Definition of programmatic and numeric implementation commitments between 2018 and 2025 needed to achieve the Phase 3 WIP planning targets.

EPA recognizes that the Phase 3 WIP commitments may need to be modified as part of the adaptive management process during the 2018-2025 timeframe and expects the jurisdictions to update those programmatic and/or numeric commitments, as appropriate, through their two-year water quality milestones. Based upon EPA's conclusion that Pennsylvania has not demonstrated adequate progress, EPA requested that Pennsylvania report progress on a six-month basis. With that in mind, DEP has been meeting with EPA quarterly to discuss progress and inviting EPA to attend the semi-annual State Team and quarterly Action Leaders meetings.

EPA also identified additional expectations for Pennsylvania to accelerate its progress towards achievement of the planning goals. These additional expectations can be summarized as follows:

- Commitment to programmatic, policy, legislative, and regulatory changes needed to implement Pennsylvania's Phase 3 WIP; citing such initiatives as an Agriculture Recognition or Certainty Program, expansion of the Act 38 Nutrient Management Program, further restrictions on winter spreading of manure, development of an agriculture cost share program and tax incentive programs and revisions to the nutrient trading program regulations as examples.
- Commitment to the level of staff, partnerships, and financial resources needed to successfully implement the Phase 3 WIP.
- Commitment to additional reporting and tracking requirements for EPA grant monies and the use of 3rd parties to expeditiously spend EPA grant monies.
- Consideration of additional reductions of loadings from point sources.

VI. PENNSYLVANIA REASONABLE ASSURANCE FOR ITS PHASE 3 WIP

Pennsylvania's Phase 3 WIP must provide "reasonable assurance" that nonpoint source controls will achieve the load reductions required of the state in the Chesapeake Bay TMDL. In Section 7.1 of EPA's 2010 Chesapeake Bay TMDL, EPA explains that it will use best professional judgment to assess "reasonable assurance," using criteria including whether practices included in a state's WIP to reduce nonpoint source pollutant loads: (1) exist; (2) are technically feasible at a level required to meet allocations; and (3) have a high likelihood of implementation.

NPDES permitting programs demonstrate reasonable assurance that waste load allocations (WLAs) in the TMDL will be achieved, because by regulation, those permits include specific numeric or narrative effluent limits and other permit terms and conditions that require discharges be consistent with "the assumptions and requirements of any available [WLA]" in an approved TMDL.

Pennsylvania's Phase 3 WIP demonstrates reasonable assurance through a comprehensive, integrated framework of federal, state, and local collaboration in a variety of regulatory programs and voluntary initiatives. The Phase 3 WIP is founded on,

and reasonable assurance is demonstrated in large measure through, the intensive collaborative, deliberative local engagement process undertaken since the 2017 milestones.

Additionally, reasonable assurance is provided by robust non-NPDES permitting programs that require controls that reduce nitrogen, phosphorus, and sediment pollutant loads, and require compliance with Pennsylvania Water Quality Standards and antidegradation requirements, and include permit review, oversight, and inspection.

Pennsylvania's Phase 3 WIP also includes many nonpoint source control actions and initiatives which contribute to the demonstration of reasonable assurance. For example, the agriculture component in the Phase 3 WIP includes regulatory and non-regulatory initiatives. Non-regulatory and non-permitting initiatives include the expansion and reporting of soil health related practices (includes implementation of conservation tillage and no-till, cover crops, and enhanced nutrient management); dairy precision feeding; utilization of expanded forest and grass riparian buffers; and stream restoration/legacy sediment removal and ecosystem restoration projects. These non-regulatory and non-permitting initiatives are not "new" practices; in fact, these are readily accepted practices throughout the agriculture industry that help to ensure farm sustainability.

A final contributor to reasonable assurance is the Pennsylvania programs and initiatives that Pennsylvania has not accounted for or adequately accounted for in past WIPs that achieve net reductions in Bay pollutants of concern. DEP has steadily improved the capability to document reductions from programs not included in previous WIPs. These programs and initiatives are detailed in [Section 2, State Actions](#). In the Phase 3 WIP, Pennsylvania is committed to accounting for these reductions in the Chesapeake Bay watershed, enhancing reasonable assurance that Pennsylvania will meet the 2025 targets.

During the Phase 3 WIP planning process, as the Chesapeake Bay Program presented data and information to the Phase 3 WIP Steering Committee, the seven workgroups and county pilot partners, Pennsylvania became increasingly aware of discrepancies between what is on the ground and what is being reported to and what is being counted by the EPA Chesapeake Bay Program Office for input into the Chesapeake Bay Watershed Model for progress. Pennsylvania recognizes that this is due to challenges it has historically had with collecting and reporting data, as well as challenges with Pennsylvania's data fitting properly into the Chesapeake Bay Watershed Model. Going forward, Pennsylvania continues to discuss with the EPA Chesapeake Bay Program Office and the Chesapeake Bay Program Partnership on these reporting challenges as we continue to adaptively manage the program together to accurately reflect real world circumstances beyond the Watershed Model, so that resources and efforts are tailored most effectively to achieve local and Chesapeake Bay cleanup goals.

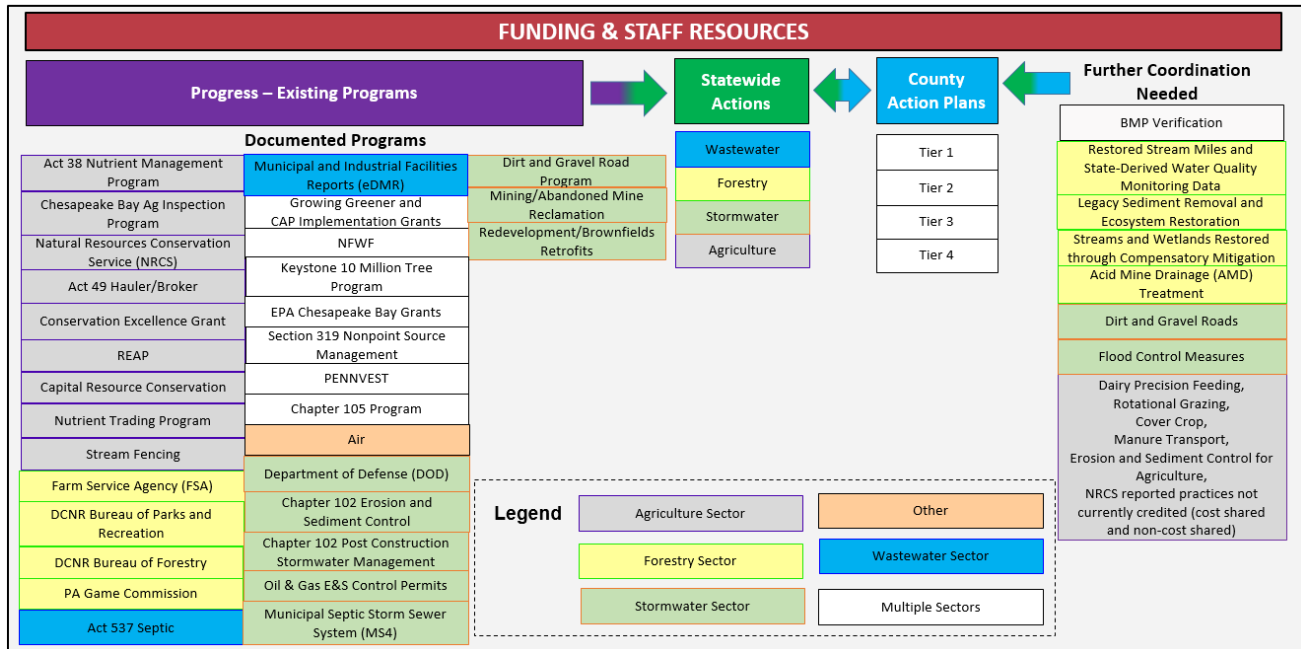
Pennsylvania commits to have all practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP planning targets. Pennsylvania, in conjunction with the Partnership, will utilize an adaptive management approach to achieve our collective

desired outcome. The two-year milestones and six-month progress reporting allow for the assessment of the implementation progress and targeted adjustments to programs and priorities to ensure the practices and controls called for in the Phase 3 WIP are achieved by 2025.

SECTION 2. STATE ACTIONS

This section describes how Pennsylvania’s Phase 3 WIP is designed to achieve the assigned nutrient reduction planning targets by 2025. Each section – [Section 2](#) through [Section 8](#) in particular – is designed to build on the preceding section(s) and to support the following section(s). Figure 2.1 below is a conceptual representation, not to scale, of Pennsylvania’s strategy to achieve the assigned nutrient reduction planning targets, including the modeled analysis of the progress towards those targets to date.

Figure 2.1. Graphic Representation of Pennsylvania’s Nutrient Reduction Plan



The **purple bar** represents the progress Pennsylvania has achieved to date. This progress includes all documented existing programs/practices that currently receive credit in the Chesapeake Bay Watershed Model ([Section 2, State Actions](#), subsections 2.III and 2.IV). The **purple bar** also includes reductions from existing programs that have not reported progress on accepted Bay Program BMPs in the past but have begun to report progress ([Section 2, State Actions](#), subsection 2.V and [Section 6, Documenting, Tracking, and Verifying](#)). Although these programs have not previously reported progress, they have achieved applicable reductions. The programs represented by the **purple bar** will support the statewide actions outlined in the **green bar** ([Section 2, State Actions](#)) through funding and resource support. Supporting the statewide actions may result in modification of existing programs, or creation of new programs. In many ways, the **purple bar** captures the key programs and is a graphical representation of how the statewide actions represented by the **green bar** will be achieved between now and 2025.

The **green bar** represents the statewide actions that Pennsylvania plans to achieve by 2025 ([Section 2, State Actions](#)). The **green bar** includes the numeric statewide commitments and the accompanying programmatic, legislative, and policy

recommendations. These statewide actions will be supported by existing, new, and undocumented programs represented in the **purple bar**. The statewide actions support the actions defined by the counties in their respective Countywide Action Plans (CAPs) and act as complementary goals for the county-specific plans.

The **blue bar** represents the CAPs. The **green bar** represents the statewide actions that complement the CAPs. The **purple** and **green** bars are designed to support the CAPs as well as show what could be achieved through additional financial, technical, and human resources outlined in [Section 5, Existing and Needed Resources](#).

Further coordination needs to occur to: continue documentation of currently undocumented practices; continue coordination with the Partnership to achieve credit for additional practices and programs that achieve water quality improvement in Pennsylvania and that are not currently credited in the Chesapeake Bay Watershed Model; and document completion of the CAPs.

Pennsylvania's strategy is built on the foundations of the programs and practices represented by the **purple**, **green**, and **blue** bars in addition to the further coordination needed to achieve the 2025 planning targets. The **purple bar** will continuously grow as state and county actions are implemented. Statewide programs and actions will continue to support counties as they continue to develop and adapt their CAPs through two-year milestone commitments and annual progress reporting. Pennsylvania commits to have practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP phosphorus and nitrogen targets. Pennsylvania, in conjunction with the Partnership, will utilize an adaptive management approach to achieve our collectively desired outcome. Through the adaptive management approach, Pennsylvania intends to gain accreditation of new practices that improve water quality and reduce nutrient and sediment pollution. The two-year milestones and six-month progress reporting will allow Pennsylvania to assess implementation progress and to target adjustments of programs and priorities to ensure sufficient practices and controls are in place by 2025. The rest of this section describes key details of each program, how the parts of the strategy fit together and how Pennsylvania will achieve its commitments.

I. TOTAL MODELED NITROGEN REDUCTION TO THE BAY

Table 2.1 summarizes the reduction estimates, quantified using the Chesapeake Bay Watershed Model, as a result of Pennsylvania's strategy for nitrogen. Also included are estimated reductions from practices that were considered "excess" in the Chesapeake Bay Watershed Model (Table 2.3) as well as estimated reductions from known non-reported programs (Table 2.5). There are many practices that have been deleted from the model due to credit duration expiration (Table 2.4), and a conservative estimate of reductions from those reported, credited, and deleted BMPs have been included as well. Pennsylvania included the BMPs from model excess/cutoff and those that have been expired in an effort to quantify the reduction potential of existing practices that should also be included in the numeric modeled progress.

Pennsylvania's CAPs for Tier 1, Tier 2, Tier 3, and Tier 4 counties result in an estimated additional reduction of 17,087,623 million pounds of nitrogen. Combined with Pennsylvania's EPA modeled progress through 2020 of 105.993 million pounds; the additional reductions to be achieved from the minimal loading counties and statewide priority initiatives of 6.369 million pounds; and the reductions quantified using the Chesapeake Bay Watershed Model from cutoff/excess of 784,000 pounds, non-reporting programs of 611,000 pounds, and re-verified BMPs lost to credit duration expiration of 7.873 million pounds result in a total estimated modeled load reduction of approximately 32.725 million pounds.

With the Phase 3 WIP submission in 2019, and in collaboration with EPA's Chesapeake Bay Program Office, EPA determined an exchange ratio may occur if Pennsylvania exceeds its nutrient reduction goal. Through this same modeling analysis, Pennsylvania has met and exceeded its 2025 reduction goal for phosphorus by 139,367 pounds and exchanged that for nitrogen reduction based on EPA's provided conversion factors. For the Susquehanna River Basin, one pound of phosphorus may be exchanged for 2.36 pounds of nitrogen. In the Potomac River Basin, one pound of phosphorus may be exchanged for 1.58 pound of nitrogen. This resulted in Pennsylvania achieving an additional 307,946 pounds of load reduction for nitrogen.

II. TOTAL MODELED PHOSPHORUS REDUCTION TO THE BAY

Table 2.1 summarizes the modeled reduction estimates as a result of Pennsylvania's strategy for phosphorus. Also included are estimated reductions from practices that were considered "excess" in the Chesapeake Bay Watershed Model (Table 2.3) as well as estimated reductions from known non-reported programs (Table 2.5). There are many practices that have been deleted from the model due to credit duration expiration (Table 2.4), and an estimate of reductions from those reported, credited, and deleted BMPs have been included as well. Pennsylvania included the BMPs from model excess/cutoff and those that have been expired in an effort to quantify the reduction potential of existing practices that should also be included in the numeric modeled progress.

Additionally, the model phase used to determine projected reductions is the 2019 version, or CAST-19. CAST-19 includes the 2017 Agricultural Census data, whereas CAST-17 included the 2012 Agricultural Census. In some counties, there has generally been an increase in nutrient loads for the planning goal and in others there has been a slight decrease in nutrient loads for the planning goal. This was primarily caused by utilizing the newest agricultural census as the basis for land use, crop, hay, and pasture acres, crop yields, and animal numbers. The changes between CAST-17 and CAST-19 and the comments from the jurisdictions provided during the CAST-19 review are provided on the [CAST Model Documentation](#) website.

Table 2.1. Summary of Pennsylvania’s Modeled Reductions to the Chesapeake Bay

Reduction to the Chesapeake Bay	Nitrogen Reduction	Phosphorus Reduction	Sediment Reduction
	EOT*		
Tier 1	6,487,000	199,000	175,117,000
Tier 2	3,340,000	107,000	89,450,000
Tier 3	4,599,000	152,000	207,007,000
Tier 4	2,662,000	112,000	97,222,000
Minimal Loading	243,000	12,000	20,029,000
Additional from State Recommendations	6,126,000	271,000	116,727,000
Additional from Model Excess/Cutoff	784,000	36,000	11,499,000
Additional from Credit Duration Expiration	7,873,000	243,000	366,756,000
Additional from Existing Non-Reported Programs	611,000	19,000	15,165,000
Total Reductions	32,725,000	1,151,000	1,098,972,000

* Loads represented in the table are delivered to the Chesapeake Bay (EOT) and are quantified using CAST-19

Table 2.1 summarizes the load reduction estimates, quantified using the Chesapeake Bay Watershed Model, as a result of Pennsylvania’s Phase 3 WIP strategy. Reductions include: programs that have not been fully documented prior to 2018 but that have begun to track progress for credit in the Chesapeake Bay Watershed Model; CAP initiatives and statewide sector initiatives for all counties; reported creditable practices that have been determined to be “excess” in the modeling tools; verification of BMPs that were lost to credit duration expiration. Additional reductions would include continued quantification of undocumented practices including both funded and non-cost share BMPs. Through adaptive management, Pennsylvania also intends to gain accreditation of new practices and re-evaluate existing practice efficiencies shown to improve water quality and reduce nutrient and sediment pollution. Pennsylvania commits to have practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP phosphorus and nitrogen targets.

III. EXISTING REDUCTION EFFORTS TO DATE

A. Introduction

Pennsylvania has been working in support of Chesapeake Bay restoration since the mid-1980s. The establishment of the Chesapeake Bay Total Daily Maximum Load (TMDL) in 2010 increased the need for improved data collection to support TMDL compliance tracking and initiated additional local watershed restoration planning.

Figure 2.2 shows nitrogen loads from Pennsylvania to the Chesapeake Bay between 1985 and 2020. Loading rates from 1985 to 2020 reflect annual load results reported from annual BMP Progress Runs. In 1985, 122 million pounds/year) of nitrogen flowed

from Pennsylvania to the Chesapeake Bay. By 2020, that amount had dropped by 16.24 million pounds/year to a loading rate of 105.993 million pounds/year. Reflected in the 2020 data set in Figure 2.2 are the estimated reductions from practices that were cutoff in the modeling tools, known non-reporting programs, and those practices that expired due to credit duration as shown in Table 2.1. A projection was added to show what could be expected if the rate of estimated reductions continues from 2020 through future years. Current efforts will continue to reduce this rate. Pennsylvania continues to work toward reporting undocumented practice implementation and addressing lack of credit recognition within the Chesapeake Bay Program Partnership. Remedying this situation is part of Pennsylvania's strategy to achieve the nutrient and sediment planning targets by 2025. These planning targets require Pennsylvania to decrease its annual load of nitrogen to 73.49 million pounds/year (an additional reduction of 32.5 million pounds of nitrogen).

Figure 2.2. Pennsylvania's Nitrogen Load to the Chesapeake Bay

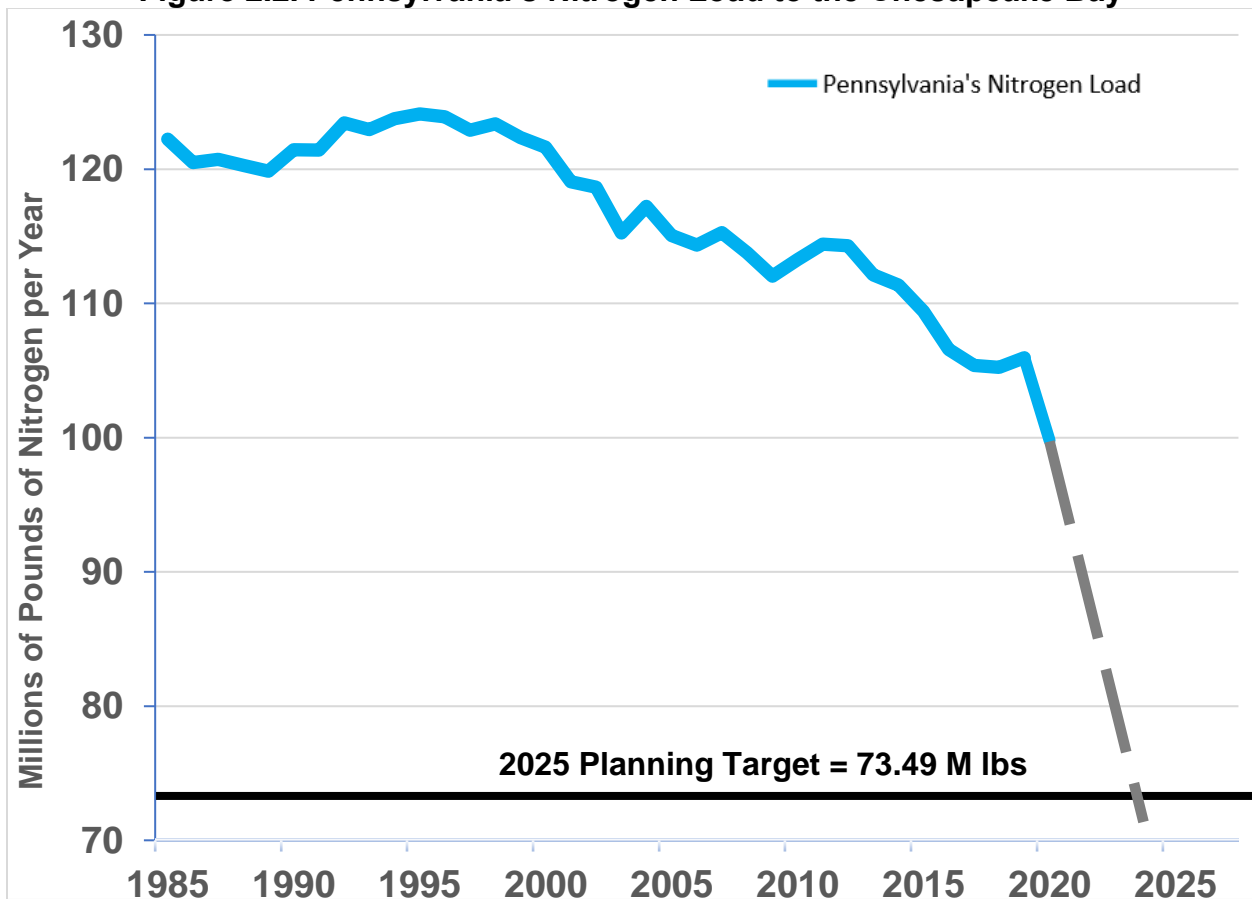
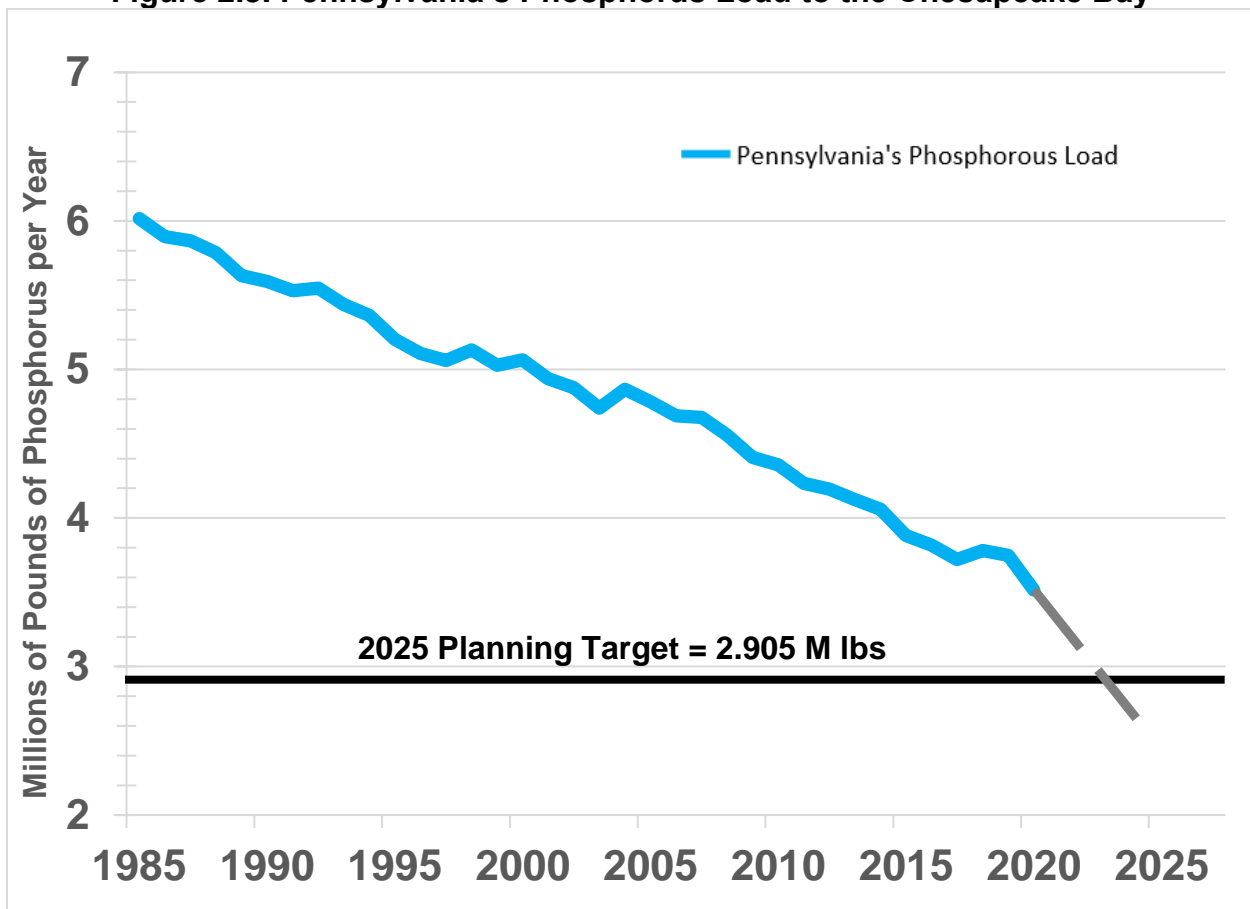


Figure 2.3 shows phosphorus loads from Pennsylvania to the Chesapeake Bay between 1985 and 2020. Loading rates from 1985 to 2020 reflect load results reported from annual BMP Progress Runs. In 1985, six million pounds/year of phosphorus flowed from Pennsylvania to the Chesapeake Bay. By 2020, this rate had decreased by 2.25 million pounds of phosphorus to a loading rate of 3.75 million pounds/year of phosphorus. Reflected in the 2020 data set in Figure 2.3 are the estimated reductions

from practices that were cutoff in the modeling tools, known non-reporting programs, and those practices that expired due to credit duration as shown in Table 2.1. A projection was added to show what could be expected if the rate of estimated reductions continues from 2020 through future years. Current efforts will continue to reduce this rate. The TMDL requires that by 2025, Pennsylvania will have practices in place to reduce its loading rate of phosphorus to 2.905 million pounds/year (an additional reduction of 0.845 million pounds of phosphorus). Pennsylvania's predicted reductions will exceed the planning target, with a projected load of 2.891 million pounds/year.

Figure 2.3. Pennsylvania's Phosphorus Load to the Chesapeake Bay



The achievement of nitrogen reductions will continue to be a primary driver in Pennsylvania's overall attainment of the TMDL goals.

With the establishment of the TMDL, the need for consistent and broad-ranging BMP data is critically important to document and report adequate yearly progress. These data sources and systems include permit programs, grant and cost-share awards, and special efforts to collect and report BMPs that have not been previously accounted for or are implemented outside of government oversight. There have been growing pains in developing this capacity while also working with limited funding. Since 2010, improvements in data collection through the programs described below and new data

sources has been steady. Improving the data management protocols and the capability to document progress was one of six priorities identified as part of the 2016 Pennsylvania Restoration Strategy announced by Governor Wolf to accelerate progress. The results have shown that with each refinement of the Chesapeake Bay Watershed Model, Pennsylvania is able to demonstrate increased reductions.

Each year on December 1, Pennsylvania reports these BMPs to the EPA Chesapeake Bay Program Office. The process of data collection and reporting to EPA is documented in the Pennsylvania Quality Assurance Project Plan (QAPP) which is updated annually with this submittal. The QAPP also describes assurances that reporting and crediting efforts are not double counted. These annual Progress Run submissions are the basis of the numeric assessment of Pennsylvania's BMP implementation. Progress on other programmatic BMP goals are reported annually and revised every two years in milestone documents. These documents are prepared for and reviewed by EPA as part of EPA's evaluation of TMDL compliance.

B. The 2016 Chesapeake Bay Restoration Strategy

In 2016, DEP, PDA, and DCNR worked with several partners and stakeholders to collaborate on the [2016 Chesapeake Bay Restoration Strategy](#) (2016 Restoration Strategy). This strategy included several short-, mid-, and long-term recommendations aimed at augmenting the approach to water quality improvements in the Chesapeake Bay watershed. The Phase 3 WIP builds on the progress achieved in implementing the 2016 Restoration Strategy, as described below.

1. Increased Compliance Program Efforts

As part of Phase 1 of DEP's Chesapeake Bay Agricultural Inspection Program (CBAIP), DEP and conservation district staff increased inspection and compliance efforts in the agriculture sector using existing staff who have inspected 10% of the agricultural lands in the Chesapeake Bay watershed annually since 2016. The CBAIP is now an integral part of DEP's compliance efforts. This program is now successfully reporting implemented BMPs to the EPA Chesapeake Bay Program Office for progress reporting based on the results of these inspections. In 2020, DEP expanded the CBAIP to include a Phase 2 Pilot program, working with one DEP regional office and three conservation districts to build the program. In 2021, DEP further expanded Phase 2 to four additional counties within the Chesapeake Bay watershed, as Phase 1 was completed. DEP publishes CBAIP outputs in an annual summary on DEP's [Agriculture Compliance](#) website as well as in the annual programmatic milestone progress report found on DEP's [Tracking Pennsylvania's Progress](#) website. These documents are also submitted to EPA. DEP also submits CBAIP outputs on a semi-annual basis to EPA through the CBRAP grant progress reports. More information relating to how DEP and the conservation districts continue to move forward with Phase 2 will be provided in the formats identified above as conservation districts determine the status of completion of Phase 1 within their counties. DEP also increased outreach and program development for urban stormwater systems.

2. Quantification of Undocumented Practices

The 2016 Restoration Strategy called for increased focus on local water quality improvement and protection by locating and quantifying previously undocumented BMPs, and putting new high-impact, low-cost BMP projects on the ground in watersheds impaired by agriculture or stormwater. An additional 15% of available statewide water quality funding (\$1,250,000) was shifted to Bay work to create the whole data system to track BMPs and report to the Chesapeake Bay Program, including: completing the Pennsylvania State University survey detailed below, purchasing the PracticeKeeper software, and developing the BMP warehouse that PracticeKeeper informs. PracticeKeeper continues to undergo enhancements, with accompanying Standard Operating Procedures and web-based training modules, to ensure that the data collected can be used toward annual numeric progress.

The Chesapeake Bay Program Partnership approved the procedures and protocols developed as part of the two projects below for future BMP verification efforts. As a result, any state in the Chesapeake Bay watershed can use these two methodologies as part of their BMP verification program. Both methodologies are an integral part of Pennsylvania's [BMP Verification Plan](#) moving forward, as described below in [Section 6, Documenting, Tracking, and Verifying](#) (see Figure 6.2).

a. The Pennsylvania State University Survey

In January 2016, Penn State University developed and mailed a survey to roughly 22,000 Pennsylvania Chesapeake Bay watershed farmers requesting that they voluntarily report non-cost share BMPs. In response, 6,751 farmers completed surveys (30%, a notably good response) and Penn State Extension staff completed verification of 10% of voluntary practices installed and identified in the surveys across the watershed. On December 16, 2016, the survey results were announced. These results demonstrated overwhelmingly that many farmers have, and will continue to, install BMPs without state and federal financial support. The survey catapulted the Commonwealth's commitment to documenting these previously unreported, voluntarily installed BMPs within the Chesapeake Bay Watershed Model.

The survey results were as follows:

- 475,800 acres of nutrient/manure management;
- 97,562 acres of enhanced nutrient management;
- 2,164 animal waste storage units;
- 2,106 barnyard runoff control systems;
- 55,073 acres of agricultural erosion and sedimentation control plans;
- 228,264 acres of conservation plans;
- more than 1.3 million linear feet of streambank fencing;
- 1,757 acres of grass riparian buffers; and
- 5,808 acres of forest riparian buffers.

DEP reported these results to the EPA Chesapeake Bay Program Office to include in the Chesapeake Bay Watershed Model for progress reporting. Using Scenario Builder and CAST, Pennsylvania received credit reduction of approximately 1,047,704 pounds of nitrogen per year, 79,620 pounds of phosphorus per year, and 10,395,906 pounds of sediment per year as a result of these practices.

The lessons learned from this effort have been incorporated into the revised [BMP Verification Plan](#). This includes the implementation of future producer surveys on a regular three- to five-year basis, depending on funding availability. These surveys will be implemented using the protocols approved by the Chesapeake Bay Program Partnership as part of this pilot project to verify agricultural BMPs.

Additionally, plans for Penn State University to conduct a second round of the non-cost share agricultural BMP survey were announced in August 2019. While details were still being worked out at the time the final Phase 3 WIP was published, Penn State University conducted their 2020 producer survey in the four pilot counties – Lancaster, York, Franklin, and Adams. The results of that producer survey were reported to the EPA Chesapeake Bay Program Office for annual numeric progress. In addition, Penn State University is also planning a third-round survey in 2022, focusing on the four Tier 2 counties. The results of these surveys of BMPs installed by farmers without state or federal financial support, including an inventory of historic BMPs as well as newly installed and implemented BMPs, will further advance the documentation of previously undocumented BMPs in Pennsylvania.

More information about the 2016 and 2020 Penn State Producer Surveys can be found on the Chesapeake Bay Office [BMP Verification](#) website.

b. NRCS Remote Sensing Project

The United States Department of Agriculture's (USDA) Natural Resources and Conservation Services (NRCS) explored the use of aerial photography and digital land cover data as a means of documenting and verifying the installation of over 28 different BMPs through a pilot project. Using the results of this pilot project, the Chesapeake Bay Program Agricultural Workgroup approved a standard methodology for verifying undocumented BMPs using remote sensing technologies on January 26, 2017. As long as states show that these standard methodologies are utilized, the data collected using these technologies will now be accepted into the Chesapeake Bay Watershed Model to document progress. The lessons learned from this pilot project were incorporated into the revised [BMP Verification Plan](#) regarding the types of practices this methodology can be used to verify. Future verification using this methodology will be done utilizing the approved Chesapeake Bay Program Partnership protocols developed from this pilot survey regarding statistical variability of the data, the amount of onsite validation required and the qualifications of the staff completing the onsite validation.

3. Data Management and Tracking System

The 2016 Restoration Strategy also called for improving reporting, recordkeeping, and data systems to provide better and more accessible documentation of progress made toward Pennsylvania's restoration effort, including consideration of establishing mandatory reporting requirements for the agriculture sector. Data management-oriented web-based training modules have been created and released via the Pennsylvania Clean Water Academy (CWA) to help the conservation districts and DEP staff to consistently document, track, and report outputs and BMPs implemented through the Nutrient Management Program, the CBAIP, and the Chesapeake Bay Technician/Engineer Agreements. A new data management and tracking system is now in place, as described in [Section 6, Documenting, Tracking, and Verifying](#).

4. Strategic Legislative, Programmatic, and Regulatory Changes

The 2016 Restoration Strategy also recommended identifying strategic legislative, programmatic, or regulatory changes that would give Pennsylvania the additional tools and resources necessary to meet the 2025 TMDL reduction goals. The process of identifying these changes resulted in the key programmatic initiatives described below.

5. Create a Chesapeake Bay Office within DEP

The 2016 Restoration Strategy also called for establishing a new Chesapeake Bay Office within DEP to assure the proper development, implementation, and coordination of the Commonwealth's efforts to restore the Chesapeake Bay, and administer DEP's Chesapeake Bay Program grant.

This DEP office has been in place since March 2016. A complete description of this office's role, responsibilities, and expansion is contained below under State Agency Capacity.

6. Seek Additional Resources for Water Quality Improvement

Finally, the 2016 Restoration Strategy called for obtaining additional resources for water quality improvement by seeking new sources of funding, with Chesapeake Bay compliance as a primary goal. As a result, DEP has set aside additional grant monies for the Chesapeake Bay for the past four Growing Greener grant rounds. In addition, at the 2016 Chesapeake Bay Executive Council meeting, EPA, USDA, and the Commonwealth committed an additional \$28 million dollars to enhance federal and state investments in Pennsylvania to accelerate nutrient reductions. This joint strategy strengthened existing partnerships between EPA, USDA, state agencies, and the conservation districts to assist farmers and provided some agriculture-led initiatives to improve local water quality. These agriculture-led initiatives are highlighted below and include the Agriculture Plan Reimbursement Program, implemented by DEP for four years and the Multi-functional Buffer Program implemented by DCNR.

IV. STATE AND FEDERAL PROGRAMS THAT RESULT IN REDUCTIONS (purple bar)

Table 2.2 is a summary of the Best Management Practices that have reported nutrient and sediment reductions to the DEP Chesapeake Bay Office. Pennsylvania has instituted a collaborative reporting effort, working with multiple state, federal, and local agencies in order to document implementation of on-the-ground efforts. Therefore, the table does not outline specific program outcomes, but total overall Best Management Practices reported.

Most of the reductions from the urban stormwater sector are through the implementation of the 25 Pa. Code Chapter 102 NPDES construction stormwater permits (Chapter 102 Permits). The Chapter 102 Permits include requirements for post construction stormwater management BMPs and erosion and sedimentation control BMPs. These permit requirements cover multiple programs. Some of these programs have reported practices installed from implementing the permit requirements. These reported practices result in the reductions included in the existing 2020 progress numbers; these reductions are included in Table 2.2. DEP captured the reductions achieved from additional programs covered by these regulations; these reductions are summarized below in Table 2.5.

There are also reductions attributed to the forestry, or the natural sector. These reduction categories in Table 2.2 are described in more detail below the table.

An important takeaway from Table 2.2 is the relative significance of agricultural field practices such as conservation tillage, cover crops, and nutrient management. These “annual” management practices are applied across such significant acreages that even modest changes in implementation have a significant impact in documenting nutrient reductions.

Table 2.2. Modeled Existing Practices Resulting in Reductions

Source: CAST modeling of 2020 Progress Run input files by SRBC, October 2021.

Sector	Composite Practices	Practices	Duration	Unit	Pennsylvania (CBWS Portion Only) 1985 to 2020 Implementation	Nitrogen (lbs/yr EOT)	Phosphorus (lbs/yr EOT)	Sediment (lbs/yr EOT)
Agriculture	Ag Nutrient Management	Nutrient Application Management Core Nitrogen	annual	Acres	322,606	1,269,315	31,275	-
		Nutrient Application Management Rate Nitrogen	annual	Acres	84,322			
		Nutrient Application Management Placement Nitrogen	annual	Acres	39,789			

		Nutrient Application Management Timing Nitrogen	annual	Acres	63,428			
		Nutrient Application Management Core Phosphorus	annual	Acres	200,999			
		Nutrient Application Management Rate Phosphorus	annual	Acres	54,469			
		Nutrient Application Management Placement Phosphorus	annual	Acres	29,360			
		Nutrient Application Management Timing Phosphorus	annual	Acres	34,202			
	Soil and Water Conservation Plan	Soil and Water Conservation Plan	cumulative	Acres	469,574	734,337	31,237	45,546,781
	Tillage Management	Conservation Tillage	annual	Acres	368,799	4,375,933	450,507	680,010,178
		High Residue Tillage	annual	Acres	709,437			
		Low Residue Tillage	annual	Acres	208,601			
	Cover Crops	Cover Crop	annual	Acres	222,177	1,314,066	2,120	2,549,158
		Cover Crop with Fall Nutrients	annual	Acres	9,906			
		Commodity Cover Crop	annual	Acres	1,727			
	Pasture Management	Pasture Alternative Watering	cumulative	Acres	55,900	64,557	10,374	40,931
		Prescribed Grazing	cumulative	Acres	30,029			
	Buffers with exclusion fencing	Forest Buffers on Fenced Pasture Corridor	cumulative	Acres in Buffers	420	93,806	16,773	8,872,559
		Grass Buffers on Fenced Pasture Corridor	cumulative	Acres in Buffers	934			
	Forest Buffers	Forest Buffers	cumulative	Acres in Buffers	9,693	327,661	3,685	3,421,569
	Grass Buffers	Grass Buffers	cumulative	Acres in Buffers	16,739	655,943	8,288	11,015,409
	Agriculture Tree Planting	Tree Planting	cumulative	Acres	4,040	2,958	51	46,212

	Other Ag practices	Manure Incorporation	annual	Acres	21,994	243,583	4,314	-
		Agricultural Drainage Management	cumulative	Acres	21,245			
	Land Retirement	Land Retirement	cumulative	Acres	48,389	148,193	(558)	2,990,124
	Livestock Waste Management Systems	Livestock Waste Management Systems	cumulative	Animal Units	180,200	1,101,552	30,806	-
	Poultry Waste Management Systems	Poultry Waste Management Systems	cumulative	Animal Units	941,178	749,638	30,721	-
	Barnyard Runoff Control	Barnyard Runoff Control + Loafing Lot Management	cumulative	Acres	3,493	1,099,050	34,518	5,381,540
	Manure Transport	Manure Transport Out of Area	annual	Dry Tons	32,803	83,945	5,814	-
Manure Transport into Area		annual	Dry Tons	21,342				
Developed	Stormwater Management	Runoff Reduction Performance Standard	cumulative	Acres Treated	66,537	476,118	21,279	55,064,510
		Storm Water Treatment Performance Standard	cumulative	Acres Treated	1,284			
		Wet Ponds & Wetlands	cumulative	Acres Treated	3,085			
		Dry Ponds	cumulative	Acres Treated	1,473			
		Extended Dry Ponds	cumulative	Acres Treated	45			
		Infiltration Practices	cumulative	Acres Treated	14,248			
		Filtering Practices	cumulative	Acres Treated	7			
		Bioretention	cumulative	Acres Treated	105			
		Bioswale	cumulative	Acres Treated	6			
		Vegetated Open Channel	cumulative	Acres Treated	275			

	Erosion and Sediment Control	Erosion and Sediment Control	annual	Acres	18,493	-	-	75,837,333
	Urban Practices	Street Sweeping	annual	Acres	178	47	1	193
		Impervious Surface Reduction	cumulative	Acres	18			
		Urban Nutrient Management	annual	Acres	76			
	Urban Forest Buffers	Urban Forest Buffers	cumulative	Acres in Buffers	296	1,126	64	97,287
	Urban Trees	Urban Tree Planting	cumulative	Acres	568	1,082	45	8,181
	Septic connection and pumping	Septic Connections	cumulative	Number of Systems	56,223	65,451	-	-
		Septic Pumping	annual	Number of Systems	13,485			
Natural	Wetland Restoration and Protection	Wetland Restoration	cumulative	Acres	1,273	25,044	564	329,333
		Wetland Creation	cumulative	Acres	88			
		Wetland Enhancement and Rehabilitation	cumulative	Acres	107			
	Non-Urban Stream Restoration	Non-Urban Stream Restoration	cumulative	Feet	421,736	20,400	10,786	24,062,181
	Urban Stream Restoration	Urban Stream Restoration	cumulative	Feet	2,752	141	81	213,357
	Forest Harvesting Practices	Forest Harvesting Practices	annual	Acres	16,245	71,072	1,041	1,616,532
	Dirt & Gravel Road E&S	Dirt & Gravel Road E&S	cumulative	Feet	2,226,815	-	-	3,651,199

* This table includes both structural and annual practices. The sum of this table is not an accurate representation of the total progress for Pennsylvania from 1985 to 2020.

A. Agriculture

1. National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Program

DEP has been administering the NPDES CAFO program in Pennsylvania for approximately 20 years. A discharge of pollutants from a CAFO production area is not authorized except during extraordinarily heavy precipitation events called “design storm events.” CAFO permits require the use of BMPs that meet certain “design-storm” requirements to prevent pollutant discharges during storm events. While federal NPDES CAFO regulations require CAFOs that discharge to have NPDES permit coverage (40 CFR 122.23(d)(1)), all CAFOs in Pennsylvania, regardless of if they discharge, are required under 25 Pa. Code Chapter 92a to have and maintain an NPDES permit.

Since 2018, DEP centralized all CAFO permitting in the DEP Southcentral Regional Office (SCRO), as the majority of CAFOs are located in the counties served by SCRO. This allows for efficient and effective use of permitting staff; training is provided on an as-needed basis to the CAFO permit writers. DEP reports on the outputs of the CAFO permitting program on a semi-annual basis as part of the CBRAP grant.

The inspection frequency of CAFOs in Pennsylvania is robust. All CAFOs are inspected annually as part of the Nutrient Management Program, as described below. Additionally, as part of the NPDES Compliance Monitoring Strategy (CMS), each CAFO is inspected by DEP staff at least once every five years.

2. Nutrient Management Program

Pennsylvania’s Nutrient Management Law, Act 6 of 1993, was among the first in the nation to establish specific nutrient management planning requirements through law and implementing regulations. The Pennsylvania State Conservation Commission (SCC) is responsible for implementing the law, with the Nutrient Management Advisory Board (NMAB), which serves the SCC in an advisory capacity.

[Act 38 of 2005](#) amended Pennsylvania’s original nutrient management law. 3 Pa.C.S.A. §§ 501-522. The implementing regulations for Act 38 placed a greater emphasis on phosphorus management in addition to the existing nitrogen management practices. The Act 38 nutrient management regulations ([25 Pa. Code Chapter 83](#)) also establish year-round setbacks for regulated entities for manure applications with respect to certain bodies of water; specifically, perennial and intermittent streams, lakes, ponds, and existing open sinkholes. See 25 Pa. Code Chapter 83.

All agricultural operations that are permitted as CAFOs under the federal NPDES permit are required to have and implement an Act 38 Nutrient Management Plan (NMP). All Concentrated Animal Operations (CAOs) that meet the animal density threshold of 2.0 Animal Equivalent Units (AEUs) per acre are required to have and implement an NMP. The SCC provides in-person and web-based training to further develop certified Nutrient Management Specialists. The certification program is administered in

partnership with Penn State University. Since 2019, Penn State University also offers a Certificate in Agricultural Stewardship and Conservation, which includes a minimum of 11 credits in nutrient management, soil science, soil and water engineering and resource management, and natural resources conservation and community sustainability. Most of the students who have graduated from this certificate program are conducting work in Pennsylvania's Chesapeake Bay watershed and are working for or with conservation districts. The NMPs are written by certified planners, reviewed by certified conservation district or SCC staff, and publicly approved or disapproved by the local conservation district board of directors. All farms with approved NMPs are inspected by conservation district or SCC staff annually. This inspection includes identifying that current NMPs and Ag E&S plans exist and that the plans are being implemented in accordance with the schedule of operations.

In addition to the annual status review inspections, on-site farm visits are executed for all new and amended NMPs. NMPs are amended at least once every three years. This farm visit and plan review includes verifying the existence of a current Agriculture E&S plan and that the NMP includes a schedule of operations for BMP implementation complementary to the current Agriculture E&S plan.

As provided to the Chesapeake Bay Program in 2017, a comparison of 2012 Ag Census Data to 2017 data provided in NMPs shows that 99% of all chickens, 98% of all swine, 70% of all turkeys, and 20% of all dairy related cattle are covered by NMPs and the associated Nutrient Management Program.

Workload analysis of CAOs and CAFOs is conducted regularly and at least once every five years by the SCC in alignment with the revisions to the Nutrient and Manure Management Delegation Agreement. DEP also provides funds and assists with the administration of the program. The funding allocation to the conservation districts is derived according to available funding and CAO, CAFO, and non-CAO/non-CAFO workload assessment.

3. *Chesapeake Bay Agricultural Inspection Program (CBAIP)*⁴

DEP and conservation districts inspect the agricultural land within Pennsylvania's portion of the Chesapeake Bay watershed. The required compliance metric is that the agricultural operations meet the environmental planning requirements for DEP Chapter 102 Agriculture E&S and Chapter 91 Manure Management Planning (MMP). Beginning in 2016, as part of the Chesapeake Bay Restoration Strategy, DEP's CBAIP focused on less-intensive, smaller-scale agricultural operations (i.e., those operations that are not regulated by NPDES CAFO permits or the Act 38 Nutrient Management Program). In 2020, DEP expanded the CBAIP to include a Phase 2 Pilot program, working with one DEP regional office and three conservation districts to build the program. Phase 2 assesses farms for both meeting the environmental planning

⁴ More information regarding this inspection program can be found in [Chesapeake Bay Agricultural Inspection Program Standard Operating Procedure \(BCW-INSP-018\)](#) at www.dep.pa.gov **Keyword: Agricultural Compliance**

requirements and being on schedule for implementing their plan(s). In 2021, DEP further expanded Phase 2 to additional counties within the Chesapeake Bay watershed. DEP also publishes an annual summary of CBAIP accomplishments on DEP's [Agricultural Compliance](#) website.

4. Resource Enhancement and Protection (REAP) Program

The Resource Enhancement and Protection (REAP) program was established in 2007 as an opportunity for farmers and landowners to offset costs associated with the implementation of conservation BMPs and the purchase of conservation equipment (like no-till planting equipment). It is a first-come, first-serve program administered by the SCC. Eligible applicants can receive 50% or 75% (depending on the BMP) of out-of-pocket expenses in the form of Pennsylvania tax credits.

In July 2019, the REAP program was expanded by \$3 million under the Pennsylvania Farm Bill, and eligible applicants can now receive 90% of eligible costs in the form of tax credits for certain high-priority BMPs that are implemented within a watershed covered under an approved TMDL, including: riparian forest buffers, livestock exclusion from streams, stream crossings, cover crops, soil health best management practices, and other BMPs as determined by the SCC. The additional \$3 million for REAP has been allocated in both the 2020 and 2021 budgets. The Farm Bill includes language that authorizes the SCC to target up to \$3 million of the total \$10 million REAP program for geographic areas and BMPs within the Chesapeake Bay watershed.

An applicant's eligibility for the REAP program is determined by compliance with the Pennsylvania Clean Streams Law, namely compliance with the Conservation or Agriculture E&S Plan, and Nutrient/Manure Management Plan obligations. Individuals that are qualified to verify a REAP applicant's compliance status include conservation district employees, NRCS employees, and private sector agriculture technical service providers who have Act 38 Nutrient Management Certification. A farmer must have their Agriculture E&S and Manure Management compliance status verified each time they apply.

Farmers must be on schedule for full implementation of the plans and any animal concentration area-related practice listed in the plan must be fully implemented before an applicant is eligible for REAP credits. Often, REAP applicants have completed NRCS/Environmental Quality Incentives Program (EQIP) projects or have worked closely with their conservation district on other projects on the farm. Since 2007, approximately 70% of REAP applicants had their compliance status verified by either a conservation district or NRCS; the rest have been verified by qualified private service providers.

5. Pennsylvania Conservation Reserve Enhancement Program (CREP)

The Conservation Reserve Enhancement Program (CREP) is a federal program, under the USDA Farm Bill, that funds conservation practices aimed at benefiting water quality

and wildlife habitat of highly erodible and marginal lands. There currently are three legally binding basin-wide cooperative agreements (Ohio, Chesapeake, and Delaware) between USDA and Pennsylvania. Multiple state agencies participate, including DEP, DCNR, Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), the SCC, and PDA. To meet the state's requirements under the agreements, DEP supplements USDA's Farm Service Agency (FSA) 50% practice cost-share payment by reimbursing farmers up to another 50% of the cost or up to the maximum per acre rate for installing conservation practices and maintaining riparian buffers. CREP is a voluntary program and offers financial incentives to encourage agricultural landowners and operators to enroll targeted environmentally sensitive pastureland and cropland, since improving water quality depends on the land management decisions of private landowners. CREP is the country's largest private-lands environmental improvement program. Pennsylvania has the largest CREP program in the nation and began enrolling landowners in the year 2000.

The goals of [Pennsylvania CREP](#) are twofold:

- Protection of water quality by reducing erosion and preventing sediment, phosphorus, nitrogen, and other pollutants from entering streams and rivers.
- Creation of wildlife habitat.

The cost-share payments are for the cost of installing CREP practices and maintaining riparian buffers. DEP's cost-share makes the program attractive to landowners who are installing buffers that are 50 feet in width or greater. Pennsylvania CREP has a maximum authorized enrollment of 279,746 acres across 66 counties. There are currently 155,475 acres currently under contract in Pennsylvania, with most of those acres in the Chesapeake Bay watershed.

The Pennsylvania CREP Outreach Program Office was created and is maintained by the Pennsylvania Association of Conservation Districts (PACD). The office is funded in part by the DEP Growing Greener grants program and USDA. Pennsylvania CREP features:

- Signed, contractually obligated cooperative agreements between USDA and Pennsylvania;
- Ensures long-term commitment to installing and maintaining conservation practices;
- Known as the largest CREP program in the nation;
- FSA provides one-time incentive payments, annual soil rental payments, and 50% of the cost-share. DEP provides the remaining 50% for the installation of practices and for every \$1 that DEP provides, USDA provides \$10 in support of conservation practices;
- Convenient for farmers and other landowners to participate resulting in a high level of participant satisfaction;

- PACD administers the cost-share payments through Growing Greener grants to ensure timely reimbursement;
- Ensures that 50 feet of forested riparian buffers are installed on all streams on enrolled and adjacent tracks to receive DEP's cost-share and landowners who participate are responsible to maintain and ensure tree survival;
- Helpful for farmers to assist with complying with agricultural erosion and sediment control and manure management requirements.

B. Forestry

1. *State-Owned Forest Lands*

Commonwealth-owned lands are periodically timber harvested as part of ongoing forest management. Contracts awarded for these activities mandate that Forest Harvesting BMPs are implemented throughout this process and acreages of implemented BMPs are reported from the PGC and DCNR annually.

C. Urban Stormwater

1. *Chapter 102 Erosion and Sediment Control Program*

DEP and delegated conservation districts administer the statewide E&S Control and PCSM program under 25 Pa. Code Chapter 102. Inspections are performed on active sites and upon permit termination. Permits are required for the following activities: construction activities with earth disturbances on one acre or more require an NPDES permit; timber harvesting activities or road maintenance activities 25 acres or more require an E&S Permit; and Oil and Gas Activities that involve five acres or more of earth disturbance also require an E&S Permit. Agriculture plowing and tilling and animal heavy use areas are exempt from Chapter 102 permitting, but are still required to have and implement an Agriculture E&S Plan. All Chapter 102 permits for construction activities require E&S control and PCSM BMPs.

Prior to 2010, General or Individual NPDES permits were required for persons proposing construction activities equal to or greater than five acres in size. This requirement also includes mining activities, and waste management activities such as municipal landfills, land recycling, and the reclamation of brownfields. Since 2010, the threshold for the NPDES permit requirement has been one acre or greater. The permit requires E&S control BMPs to be implemented during construction to minimize accelerated erosion and sedimentation. The permit also requires PCSM BMPs and establishment and maintenance of vegetation in perpetuity.

In August 2021, the DEP Office of Oil and Gas Management published the draft [“Prioritized Review Process Under the Erosion and Sediment Control General Permit for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing, or Treatment Operations or Transmission Facilities \(ESCGP\)”](#) technical guidance

document. This guidance document outlines a Prioritized Review Process to encourage persons preparing Notices of Intent (NOIs) for an Authorization of Coverage (AOC) under the Erosion and Sediment Control General Permit (ESCGP) to voluntarily develop and implement superior environmental enhancements to proposed projects by providing priority status in the NOI review process to qualifying applicants. In the draft guidance document, there are two Priority Groups. Group A includes forest conservation, wetland conservation and protection, species protection and enhancement, seeding and mulching using only Pennsylvania native species, stormwater management through non-discharge BMPs and/or antidegradation best available combination of technologies (ABACT) BMPs, invasive species management, extended setbacks, and restoration practices. Group B includes noise management, impaired resource enhancement for water resources and abandoned/orphaned wells, air quality improvements using low or zero emission technology, carbon neutrality, and renewable energy.

2. *Dirt and Gravel Road Program*

Pennsylvania's Dirt Gravel, and Low Volume Road Maintenance Program provides funding to eliminate stream pollution caused by runoff and sediment from the Commonwealth's comprehensive network of unpaved and low volume public roads. The program was enacted into law in April 1997 as Section 9106 of the Pennsylvania Vehicle Code and expanded in 2014 to dedicate \$20 million to unpaved roads and \$8 million to paved low volume roads. The goal of the program is to implement Environmentally Sensitive Maintenance practices aimed at reducing the environmental impacts of public roads, while reducing long-term maintenance costs.

3. *Stream Restoration, Flood Protection*

DEP administers the Waterway and Wetland Protection, and the Submerged Lands License Agreement (SLLA) programs under Pennsylvania's Dam Safety and Encroachments Act, Pennsylvania's Clean Streams Law, and the 25 Pa. Code Chapter 105 regulations. Stream restoration and stabilization projects associated with this regulatory program contribute pollutant reductions to Pennsylvania's Chesapeake Bay goals.

In 2020, the DEP Chesapeake Bay Office published [The Pennsylvanian's Guide to Permitting for Watershed Improvement Projects](#) to help applicants understand DEP's permitting process and some of the regulations most relevant to watershed improvement efforts, and to assist applicants in efficiently obtaining permits for these improvement projects.

D. Grant and Low-Interest Loan Programs

1. *PENNVEST*

The Pennsylvania Infrastructure Investment Authority (PENNVEST), supports communities and citizens of Pennsylvania by funding sewer, stormwater, and drinking

water projects throughout the Commonwealth. These projects not only contribute to improving Pennsylvania's environment and the health of its people, they also provide opportunities for economic growth and jobs for Pennsylvania's workers.

In funding point source (e.g., sewage treatment plants), stormwater and nonpoint source (e.g., manure storage) projects, PENNVEST's low-cost financial assistance and grants help improve rivers and streams in communities for the enjoyment of citizens and the protection of natural resources.

2. Growing Greener

The Environmental Stewardship Fund (ESF) is the overarching source of funds for Growing Greener. Voter-approved bond initiatives, Growing Greener I and II, have provided significant funding to reduce the backlog of farmland preservation projects, protect open space, eliminate the maintenance backlog in state parks, clean up abandoned mines, and restore watersheds. These funds have also been used for recreational trails and local parks, to help communities address land use, and to provide new and upgraded water and sewer systems. The funds are distributed among four state agencies: (1) PDA to administer farmland preservation projects; (2) DCNR for state park renovations and improvements; (3) PENNVEST for water and sewer system upgrades; and (4) DEP is authorized to allocate these funds in grants for watershed restoration and protection, abandoned mine reclamation, and abandoned oil and gas well plugging projects.

The 2022 DEP Growing Greener Plus Grants Program, for which the application period opened on April 22, 2022, prioritizes implementation of projects in support of the *Pennsylvania Climate Action Plan 2021*. These projects could include agricultural and stormwater BMPs, stream restoration, or bank stabilization projects to reduce runoff volumes, increase infiltration, and assist in future flood prevention and climate resiliency. Examples could include no-till farming, riparian forest buffers, green infrastructure, and other agricultural and stormwater BMPs.

The 2022 DEP Growing Greener Plus Grants Program also includes the Growing Greener Watershed Renaissance Initiative, with the goal to complete implementation of BMPs within seven years and rapid delisting of small, agriculturally-impaired streams within ten years. The program will be completed in phases, with Phase 1 as a comprehensive approach of landowner education and outreach, agricultural planning, design/engineering, permitting, and data management. This first phase will effectively "ready" the projects for funding through any number of sources, including but not limited to NRCS, the SCC's Conservation Excellence Grant program, CAP Implementation grants, Growing Greener grants, and National Fish and Wildlife Foundation (NFWF) grants.

More information regarding DEP's Growing Greener Plus program can be found on DEP's [Growing Greener Plus Grants](#) website.

3. EPA Grant Programs

The EPA Chesapeake Bay Regulatory Accountability Program (CBRAP), Chesapeake Bay Implementation Grant (CBIG) Program, and the Section 319 Nonpoint Source Management Program Grant are used to implement agriculture, urban stormwater, and stream restoration projects. The CBIG was also the funding source for the historic DEP Chesapeake Bay Special Projects and Streambank Fencing Programs. Typically, DEP receives between \$4.5 million and \$4.9 million annually in Section 319 funds, of which at least 50% is required to be invested in local WIP implementation. Section 319 is a statewide program, not specifically focused on Chesapeake Bay watershed efforts.

V. EXISTING STATE AND FEDERAL PROGRAMS THAT HAVE NOT BEEN FULLY DOCUMENTED FOR PROGRESS (purple bar)

Pennsylvania has reported creditable practices in the Chesapeake Bay Watershed Model that were pulled out of the overall numeric progress due to model processes. Pennsylvania used the public BMP Submission vs Credited report for 2020 progress provided in CAST to identify the BMPs and their reported parameters to determine the estimated reductions of these practices and included those reductions in Table 2.1.

Historically, BMPs have either been “backed out” of the Chesapeake Bay Watershed Model due to assumed absorption into land use or “cut off” due to perceived excess BMP reporting. Pennsylvania has identified back-out and cut-off issues with the Chesapeake Bay Program Partnership over the course of the last 10 years and it remains an unaddressed problem. Back-out is the subtraction of historic land use change practices implemented prior to a baseline for the Chesapeake Bay Watershed Model’s land use. Currently, the back-out baseline for land use change is 2017, with the 2017 Agriculture Census and 2013 – 2015 land use acres. However, new land cover data and Agriculture Census may not pick up these historic implemented practices. There are uncertainties regarding this absorption of implemented practices in land use land cover data, especially since the data used in CAST-19 is based on prior land use. Table 2.3 summarizes the BMPs identified as having undergone back-out in the Chesapeake Bay Watershed Model.

Cutoff or “excess” BMPs are those that do not get incorporated into EPA modeled progress because the implementation level of a BMP within the submitted spatial scale (e.g. land-river segment or county-scale) artificially exceeds a 100% implementation level due to model processes. This occurs when the land use acres are exceeded for that BMP type.

As shown in Table 2.3, Pennsylvania has identified that many of our historic and current reported stormwater practices fall into this “excess” category due to inaccuracies in land use in the Chesapeake Bay Watershed Model. As documented in the 2020 BMPs submitted vs credited report, Pennsylvania reported a total of 831 acres treated by infiltration practices on A/B soils with no underdrain across all developed load sources.

Only 33 acres treated were credited (4% of the total reported), leaving an “excess” of 798 acres treated that were not credited toward Pennsylvania’s total reductions. Additionally, Pennsylvania reported a total of 23,647 acres treated by wet ponds applied to “developed, non-regulated” load sources. However, of the total amount reported, only 2,892 acres treated were credited (12% of the total reported), leaving an “excess” of 20,755 acres treated that were not credited toward Pennsylvania’s total reductions. These “excess” BMPs were reported by the Department of Defense for their facilities in Pennsylvania. The issues with excess and cutoff are not due to over-reporting of BMPs, but rather reporting the real on-the-ground efforts where they are occurring; the model applies them based on what it determines to be available space.

In the agricultural sector, there are also cutoff issues due to inaccuracies in the application of BMPs using the 2017 Agriculture Census as the basis for the proportion of crop-types or animal numbers found in the reported spatial scale. For example, as shown in the 2020 BMPs submitted vs credited CAST report, Pennsylvania submitted 3,978 acres of barnyard runoff controls, with 3,435 acres credited (86% of the total reported). This left 543 acres of barnyard runoff control as “excess,” not credited toward Pennsylvania’s reductions. Pennsylvania submitted 1,469,598 animal units of Animal Waste Management Systems (AWMS), with 1,121,378 animal units credited (76% of the total reported). This left 348,220 animal units as “excess,” not credited toward Pennsylvania’s reductions, the majority of which are broilers and pullets. Pennsylvania submitted 124,281 animal units of mortality composters, with 53,518 animal units credited (43% of the total reported). This left 70,672 animal units as excess, not credited toward Pennsylvania’s reductions, the majority of which are broilers.

Pennsylvania generally reports implementation aggregated at the county-scale so that counties and other stakeholders can assess progress to date, identify in their CAP progress reports where success has been achieved, and plan for future implementation efforts. The issues with excess and cutoff are not due to over-reporting of BMPs, but rather reporting the real on-the-ground efforts where they are occurring; the model applies them based on what it determines to be available space.

More information regarding back-out and cutoff can be found on the Chesapeake Bay Program [Watershed Technical Workgroup \(WTWG\) September 30, 2020](#) meeting webpage.

**Table 2.3. Existing Reported Practices Not Included in Progress
Due to Model Cutoff**

Source: CAST modeling of 2020 BMP Submitted vs. Credited Report input files by SRBC, October 2021.

Practices	Unit	Excess Amount	Nitrogen (lbs/yr EOT)	Phosphorus (lbs/yr EOT)	Sediment (lbs/yr EOT)
Nutrient Management Core N	Acres	4,403	7,378	0	0
Soil and Water Conservation Plan	Acres	422	672	36	61,842
Pasture Alternative Watering	Acres	58	31	4	19
Livestock Waste Management Systems	Animal Unit	2,735	12,770	309	0
Poultry Waste Management Systems	Animal Unit	345,486	483,521	24,684	0
Barnyard Runoff Control	Acres	544	221,433	6,809	859,865
Stormwater Management*	Acres Treated	23,121	56,238	3,684	10,506,567
Erosion and Sediment Control	Acres	5	1	0	20,481
Street Sweeping	Acres	26	1	0	45
Forest Harvesting Practices	Acres	508	2,227	34	50,367
Total Estimated Reductions			784,272	35,560	11,499,186

*Stormwater Management practices include Runoff Reduction and Stormwater Treatment Performance Standards, Wet Ponds and Wetlands, Dry Ponds, Extended Dry Ponds, and Infiltration Practices

BMP verification remains a high priority for Pennsylvania, since the initial Chesapeake Bay Program BMP Verification Framework Guidance was finalized in 2014. However, documented challenges with BMP Verification, and more specifically in the agricultural sector, have remained. The primary challenge with verifying agricultural BMPs is due to the inability to locate BMPs that were implemented with financial and/or technical assistance provided by NRCS. There are statutory requirements that preclude sharing of specific locational information with other agencies. While Pennsylvania agreed to conducting BMP verification, this agreement and the Chesapeake Bay Program BMP Verification Framework Guidance was predicated on the ability to locate these historically reported practices through data sharing between federal and state agencies. As a result of the inability to locate and verify federally reported practices, many historically reported and credited agricultural practices have been removed from Pennsylvania's progress toward meeting the Planning Target. The assumption is that if the BMPs are not re-verified at the time of credit duration expiration, zero percent are assumed to be functioning. This is an arbitrary assumption, and one that has been shown through other jurisdictions' verification programs to be largely inaccurate⁵. Pennsylvania has identified a large percent of the barnyard runoff control and loafing lot

⁵ Chesapeake Bay Program BMP Verification Ad Hoc Action Team, April 9, 2021: https://www.chesapeakebay.net/channel_files/41816/brc_and_ilm_report_md_and_ny_data_only.pdf

management practices functioning far beyond their assumed credit duration of 10 years⁶. This demonstrates a significant disconnect between the modeling tools and reality; the assumption that nothing is functioning if it is not assessed has not been validated throughout the past five years of jurisdictions' verification programs. Furthermore, even as most jurisdictions have identified the issue of verification as a primary concern, documented in the September 2019 Water Quality Goal Implementation Team [letter](#) to the Management Board, there has not been adequate movement toward addressing this historic problem.

Pennsylvania's reported BMPs that were identified in the public 2020 NEIEN Validation Report as errors due to credit duration expiration are summarized in Table 2.4 below, along with their estimated nitrogen, phosphorus, and sediment EOT reductions. Reverification of all reported and credited practices would result in estimated reductions of 7.873 million pounds of nitrogen, 243,221 million pounds of phosphorus, and more than 366 million pounds of sediment.

It is of utmost importance to recognize where BMPs exist and continue to function in parallel with implementing more BMPs in areas of determined need. Arbitrary drop-offs of cumulative and multi-year BMPs do not result in jurisdictions' ability to identify where there is a need for greater rates of new implementation versus where there is a need to maintain what is currently in existence. For example, Table 2.1 shows that Pennsylvania is currently credited less than 9,700 acres of forested buffers. However, Table 2.4 shows that more than 50,400 acres of forested buffers have been lost due to credit duration expiration. This means that Pennsylvania's numeric progress shows less than 10,000 acres are credited toward the numeric goal, but rather there could be more than 60,000 reported acres currently thriving and resulting in on-the-ground nutrient and sediment reductions.

BMP Verification requires additional personnel for continued assessment of BMP function. It also requires innovative solutions and the recognition amongst the partnership that as jurisdictions continue to gain more insight through assessment of BMP success and failure rates, the partnership must adaptively manage to adjust guidance and recommendations accordingly.

⁶ Chesapeake Bay Program BMP Verification Ad Hoc Action Team, April 9, 2021: https://www.chesapeakebay.net/channel_files/41816/pa_bmp_verification_brc_and_llm_4.9.2021.pdf

**Table 2.4. Existing Reported Practices Not Included in Progress
Due to Model Credit Duration Expiration**

Source: CAST Modeling of the NEIEN Validation Report by DEP, November 2021

Sector	Composite Practices	Practices	Duration	Unit	Uncredited Amount Due to Credit Duration Expiration	Nitrogen (lbs/yr EOT)	Phosphorus (lbs/yr EOT)	Sediment (lbs/yr EOT)
Agriculture	Soil and Water Conservation Plan	Soil and Water Conservation Plan	cumulative	Acres	1,404,597	2,176,146	117,028	204,800,111
	Pasture Management	Alternative Watering Facility, Water Well	cumulative	Count	8,242	71,383	8,449	42,731
		Prescribed Grazing	cumulative	Acres	56,368	60,758	10,138	51,288
	Buffers with Exclusion Fencing	Grass Buffers on Fenced Pasture Corridor (Narrow)	cumulative	Feet in Buffers	1,334,126	53,819	10,663	6,003,503
	Forest Buffers	Riparian Forest Buffer, CREP Riparian Forest Buffer	cumulative	Acres in Buffers	50,402	2,584,266	38,129	49,428,245
	Grass Buffers	Field Border, Filter Strip, Grass Buffers, Grassed Waterway	cumulative	Acres in Buffers	5,599	187,156	2,783	4,607,622
	Agriculture Tree Planting	Tree Planting, Tree/Shrub Establishment, Windbreak/ Shelterbelt Establishment	cumulative	Acres	3,107	5,103	132	184,849
	Other Ag Practices	Agricultural Drainage Management/ Vegetated Treatment Area	cumulative	Acres	4	2,859	138	10,843
	Land Retirement	Conservation Cover, CREP Wildlife Habitat, Critical Area Planting, Land Retirement, Pasture and Hay Planting, Upland Wildlife Habitat Management	cumulative	Acres	152,254	1,640,272	8,827	55,994,436
	Animal Waste Management Systems*	Livestock and Poultry Waste Management Systems	cumulative	Count	22	12,809	375	0
Barnyard Runoff Control	Barnyard Runoff Control + Loafing Lot Management	cumulative	Acres	2,344	957,336	29,341	3,629,920	
Developed and Natural	Stormwater Management	New and Retrofit Runoff Reduction, Urban Filter Strip Runoff Reduction	cumulative	Acres Treated	31,389	18,291	755	1,776,896
		New and Retrofit Storm Water Treatment Performance Standard	cumulative	Acres Treated	6,613	2,380	125	349,600
		Wet Ponds & Wetlands	cumulative	Acres Treated	200	400	30	87,914
		Dry Ponds	cumulative	Acres Treated	1,064	531	35	77,952
		Extended Dry Ponds	cumulative	Acres Treated	125	250	8	54,940
		Infiltration Practices	cumulative	Acres Treated	119	951	34	82,832
		Filtering Practices	cumulative	Acres Treated	32	128	6	18,748
	Wetlands	Vegetated Open Channel	cumulative	Acres Treated	869	3,906	130	445,640
		Wetland Creation	cumulative	Acres	5	86	3	2,532
		Wetland Enhancement and Rehabilitation (Restoration)	cumulative	Acres	2,720	65,780	1,865	1,413,270
	Non-Urban Stream Restoration	Non-Urban Stream Restoration	cumulative	Feet	435,076	20,432	10,075	22,147,151
	Urban Stream Restoration	Urban Stream Restoration	cumulative	Feet	179,258	8,418	4,151	9,124,963
	Dirt & Gravel Road E&S	Dirt & Gravel Road E&S	cumulative	Feet	3,456,622	0	0	6,420,016
Total Estimated Reductions						7,873,463	243,221	366,756,003

* Animal Waste Management Systems are generally reported by units, or count. A default animal unit number is applied in these cases.

Table 2.5 is a tabulation of the programs discussed below and the expected reductions for which Pennsylvania would have received credit if the practices installed from the implementation of these programs from 2013 through 2018 had been reported. Pennsylvania is diligently working toward reporting practices from these programs, as well as receiving full credit in the Chesapeake Bay Watershed Model. For example, in 2020, DEP reported stormwater BMPs from the Oil and Gas Erosion and Sediment Control Permits (ESCGPs) for gathering lines and well pads. Another example is the documentation of streams and wetlands restored through compensatory and mitigation banking regulatory requirements. Additionally, several programs were identified as likely having practices installed through implementation of those programs, but further coordination is needed to determine associated nutrient reductions.

The estimated reductions from Table 2.5 have been included in Pennsylvania’s reductions summarized in Table 2.1 above.

Table 2.5. Additional Existing Programs That Will Result in Reductions

Sector	Agency/Program	Description	Reductions		
			Nitrogen (lbs/yr EOT)	Phosphorus (lbs/yr EOT)	Sediment (lbs/yr EOT)
Agriculture	Nutrient Trading Program	Manure Treatment Technology; Manure Transport; Agriculture BMPs	142,450	16,076	8,303,949
Forestry	Chapter 105 Wetland Mitigation Banking, Compliance	Forest Buffers; Stream Restoration; Wetland Restoration; Wetland Enhancement; Wetland Creation	1,527	547	1,275,560
Stormwater	**Oil and Gas – Erosion & Sediment Control General Permits (ESCGP)	E&S Control Level 3; Bioretention/Rain Garden; Vegetated Swale; Wet Ponds and Wetlands; Dry Extended Detention Ponds; Infiltration Practices; Stormwater Performance Standards (New); Forest Buffers	12,783	635	1,822,449
	Industrial Stormwater Permits		Further coordination needed	Further coordination needed	Further coordination needed
Wastewater	**Act 537 Sewage Facilities Program	Septic Denitrification; Septic Secondary Treatment; Septic Pumping	1,969	0	0
Waste	Municipal Waste Landfills	102.8(g)(2)(ii) Post Construction Stormwater Management BMPs	41,191	1,624	3,762,569
	Land Recycling		Further coordination needed	Further coordination needed	Further coordination needed
	Environmental Cleanup and Brownfields		Further coordination needed	Further coordination needed	Further coordination needed
Air	Reductions from the VW Settlement		410,798	N/A	N/A

* Pennsylvania does not receive full credit for these practices; improvements in data collection around them are currently being addressed. Pennsylvania programs are estimated based on an annual year of data collection, or unreported structural BMPs.

** In the 2019 and 2020 reporting years, Oil and Gas and Act 537 programs provided reports, respectively.

A. Agriculture

1. Nutrient Trading Program

DEP issued an interim Final Trading Policy in October 2005, which was finalized in November 2006. This policy was the basis for the development of the Nutrient Credit Trading Program. The primary purpose of the program is to provide a more cost-efficient way for National Pollutant Discharge Elimination System (NPDES) permittees in the Chesapeake Bay watershed to meet their effluent cap load limits for nutrients.

On October 9, 2010, DEP's nutrient trading program regulations ([25 Pa. Code § 96.8](#)), entitled "Use of offsets and tradable credits from pollution reduction activities in the Chesapeake Bay Watershed," were published in the *Pennsylvania Bulletin* ([40 Pa.B. 5790](#)). Requirements for generating credits were updated effective October 1, 2015 in the [Phase 2 Watershed Implementation Plan Nutrient Trading Supplement](#). The Nutrient Credit Trading Program involves three steps: certification, verification, and registration:

1. *Certification* means DEP has given approval for a pollutant reduction activity to generate credits. The approved credit generator may or may not generate credits during a compliance year. Generated credits must be verified by DEP before they may be sold and registered to an NPDES permit.
2. *Verification* means DEP has given approval that a generator has used their approved verification plan to demonstrate that a pollutant reduction activity generated credits during the compliance year. Verified credits may be sold.
3. *Registration* means DEP has given approval for a sale of credits upon review of an agreement between a buyer and seller. Registered credits may be applied to meet NPDES permit cap load requirements or resold.

Trades can take place through direct communication between credit buyers and credit generators.

Pennsylvania has a very active Nutrient Trading Program within its Chesapeake Bay watershed. During compliance year 2020, Pennsylvania registered 100 sales of nutrient credits, to 49 buyers, for a total of over 261,000 N credits and 28,000 P credits. Pennsylvania generally has a limited need or market for credits and, therefore, nutrient credit sales are limited by permitted entities' need to buy credits, not by the number of nutrient credits generated.

DEP is currently working with the World Resources Institute (WRI) and the Texas Institute for Applied Environmental Research (TIAER) to determine the extent of work needed to revise the current Chesapeake Bay Nutrient Trading Tool (CBNTT) to allow Pennsylvania's Nutrient Trading Program to transition into the use of this EPA and regionally accepted credit calculation and tracking tool. Transitioning to the CBNTT tool will allow Pennsylvania to incorporate the performance-based, TMDL-linked agriculture

baseline analysis for determining nonpoint source nutrient credits, as has been requested by EPA. In October 2021, after extensive review by EPA Region 3 as well as neighboring states, DEP published the [Nutrient Credit Trading Program Manure Treatment Technology Nutrient Credit Calculation Methodology](#), which will go into effect upon finalization of the CBNTT. Making this transition to the new trading tool and baseline methodology is dependent on funding to make this transition, with the funding planned to come from DEP's EPA Chesapeake Bay Implementation Grant. DEP intends to work with WRI and TIAER to make the necessary revisions to the CBNTT tool by mid-2022, allowing Pennsylvania to transition to this new tool, and the new TMDL-based agriculture baseline analysis in 2022 credit trading season.

Pennsylvania is interested in continually enhancing its Nutrient Trading Program, as evidenced by its work to move its program toward using the EPA-supported CBNTT trading tool, and incorporating a performance-based, TMDL-linked agriculture baseline analysis into its nutrient credit calculations through Pennsylvania's transition to the CBNTT tool. DEP remains interested in working directly with EPA to discuss program enhancements that EPA may suggest improving Pennsylvania's Nutrient Trading Program.

Once the CBNTT tool is revised to accommodate Pennsylvania's program and DEP transitions to using this new tool, DEP will revise the Phase 2 WIP Nutrient Trading Supplement to be consistent with the new model, the Phase 3 WIP, and the revised CBNTT tool. Updates to this Trading Supplement are expected to be made by the 2022 credit trading season.

B. Forestry

1. Wetland, Stream Restoration, and/or Riparian Buffer Restoration or Replacement Above 1:1 Ratio

Although the Chesapeake Bay Program Partnership never set a policy prohibiting the crediting of wetland and stream mitigation, the Chesapeake Bay Watershed Model does not currently acknowledge wetland gains established under state regulatory permitting and compliance programs. DEP believes that it is both reasonable and practicable to track the regulatory wetland gains greater than the 1:1 ratio impact to mitigation within Pennsylvania's portion of the Chesapeake Bay watershed, especially considering that the standards that are commonly associated with these practices are the same. To accomplish this, DEP will track all wetland restoration and enhancement acreage gains through regulatory means via DEP's [eFACTS](#) database to ensure such efforts are credited toward achieving the Pennsylvania Chesapeake Bay goals going forward. This database currently has the components to track this information. Further collaboration by DEP with the Wetland Expert Panel and the Chesapeake Bay Program Modeling Team to improve wetland reporting is also anticipated. For example, DEP presented these issues to the Chesapeake Bay Program Partnership's Management Board in April 2020, outlining the challenges with the inability of the Partnership to recognize wetland gains through regulatory mechanisms. DEP had requested further information and

clarification from EPA's CBPO in July 2020 and received the requested clarification in December 2020. In July 2021, the Chesapeake Bay Program Partnership identified that, across all watershed outcomes, wetland restoration ranks among the top tier of outcomes that are not on track. As of October 2021, according to the [Outcome Attainability Update](#), as provided to the Management Board, wetlands remain significantly off trajectory across the entire watershed, with incomplete tracking information and data support and intervention identified as needed to increase rate of implementation. Innovative, yet not new, concepts such as private investments through compensatory mitigation and In-Lieu Fee (ILF) programs should be accepted and recognized by the Partnership for ensuring no net-loss and, in fact, net-gain of wetland acres. The reductions included in Table 2.5 are only those attributed to existing wetland, stream and/or riparian buffer mitigation banks, which are a portion of the larger regulatory permitting and compliance program. In 2020, DEP reported the wetland acres restored through compensatory mitigation banking as part of Pennsylvania's annual numeric progress.

C. Stormwater

DEP and delegated conservation districts administer the statewide E&S Control program under 25 Pa. Code Chapter 102. Inspections are performed on active sites and upon permit termination. Permits are required for the following activities:

1. Erosion and Sediment Control Permits for Oil and Gas Activities

Oil and gas activities (e.g., exploration, production, processing, treatment operations, or transmission facilities) involving five or more acres of earth disturbance. The E&S permit is required under Pennsylvania's Clean Streams Law for these activities. If eligible, persons conducting these activities may submit a Notice of Intent (NOI) for coverage under the E&S General Permit (ESCGP-3). In the 2019 reporting year, for the first time, DEP reported BMPs installed under the ESCGP-3 and permitted by the DEP Oil and Gas Program. DEP will continue to report BMPs installed and re-inspected as part of Pennsylvania's annual numeric progress.

2. Industrial Stormwater Permits

Certain specific classes of industrial facilities must apply for Industrial Stormwater NPDES permit coverage. For those facilities that qualify for PAG-03 General Permit coverage, an alternative to obtaining permit coverage is to request "No Exposure Certification" if the facility qualifies. In general, all industrial materials and activities must be stored and conducted indoors or under roof for a facility to qualify for No Exposure Certification. The No Exposure Certification alternative is not available to facilities in High Quality or Exceptional Value watersheds and must be renewed every five years. Some industrial stormwater permittees utilize practices that reduce Chesapeake Bay pollutants. DEP will further coordinate to identify opportunities to achieve additional reductions from these permittees through incentivized priority BMP installation and reporting. For the PAG-03 NPDES General Permit for Discharges of

Stormwater Associated with Industrial Activity, DEP commits to developing and improving the Standard Operating Procedure (SOP) document that outlines the procedures and processes used for future data collection and analysis in order to inform the next iteration of the permit. DEP also commits to collecting data to determine the feasibility of sediment and/or nutrient reductions at PAG-03 permitted facilities.

D. Wastewater

1. Act 537 Sewage Facilities Program

Septic denitrification, septic secondary treatment, and septic pumping can achieve net reductions in Chesapeake Bay pollutants of concern and will be tracked to ensure such efforts are credited toward achieving the Pennsylvania Chesapeake Bay goals going forward. In 2021, DEP requested additional funds through the EPA WIP Assistance Grant program to implement a more modernized and functional tracking system; however, EPA was unable to provide these funds.

E. Waste

1. Municipal Waste Landfills

Municipal Waste Landfills (MWLFs) located within the Chesapeake Bay watershed have implemented many stormwater BMPs. The regulation at 25 Pa. Code § 273.151 relates to soil erosion and sedimentation control plans for MWLFs. That regulation requires that each proposed MWLF application includes a plan based on the requirements of 25 Pa. Code Chapter 102 (relating to erosion and sediment control), 25 Pa. Code §§ 273.242, 273.243, and 273.244 (relating to soil erosion and sedimentation control, sedimentation ponds, and discharge structures, respectively) and other applicable state and federal requirements. MWLFs are required to manage surface water and control erosion and sedimentation based on the 24-hour precipitation event expected once in 25 years. Surface drainages from disturbed areas are required to pass through a sedimentation pond or multiple sedimentation ponds constructed, maintained, and operated in accordance with 25 Pa. Code Chapters 102 and 105 prior to leaving the site, unless deemed unnecessary by DEP. Discharges from dams, ponds, embankments, impoundments, and diversions are controlled by energy dissipaters, riprap channels, or other devices when necessary to reduce erosion, to prevent deepening or enlargement of stream channels, and to minimize disturbance to surface and groundwater. Those discharge controls are required to be designed and maintained in accordance with Chapter 105. DEP will further coordinate to identify opportunities to achieve additional reductions from MWLF permittees through incentivized priority BMP installation and reporting.

2. Land Recycling (Act 2)

Pennsylvania's Land Recycling Program (LRP) was established in law in 1995 and is commonly known as Act 2. LRP is a voluntary cleanup program that has no permitting or enforcement functions associated with it. The objective of this program is to reuse former industrial sites in any capacity possible, but the program is also available for sites where recent spills or pollution releases have occurred. Sites that have participated in the program range from gas stations and small commercial properties that may have had a single heating oil tank that leaked to large heavy industrial areas such as chemical or pesticide plants and steel mills. The focus of the program is to ensure that the property is cleaned up to an Act 2 standard and that the property is safe for the intended use. There are no permits associated with the LRP, but any program activities requiring permits must go through the usual process for obtaining those permits. For example, any type of stream restoration or floodplain reconnection implemented as part of the LRP would require permits under Chapters 102 and 105. DEP will further coordinate to identify opportunities to achieve additional reductions from these permittees through incentivized priority BMP installation and reporting.

3. Environmental Cleanup and Brownfields

Pennsylvania's LRP is one program within DEP's Bureau of Environmental Cleanup and Brownfields. DEP will further coordinate to identify opportunities to achieve additional reductions from programs in this bureau.

F. Air

EPA and California Air Resource Board (CARB) filed a complaint against the Volkswagen Corporation and its subsidiaries (VW) that alleged that VW violated the Clean Air Act (CAA) by selling motor vehicles with emissions defeat devices that would contribute to more vehicle air pollutant emissions of nitrogen oxides (NOx) than allowed under the Act. Atmospheric NOx is harmful to human health because it is a precursor to ground level ozone and to fine particulate matter (PM2.5), both damaging to the lung. The emissions defeat devices involved about 590,000 motor vehicles containing 2.0- and 3.0-liter diesel engines in model years 2009 to 2016. Through three partial settlements, agreements were reached between the U.S. Justice Department and VW. VW agreed to pay \$16.35 billion to settle allegations of emissions standard cheating. The settlement is divided into four separate parts:

- \$10 billion will be used to buy back or modify offending diesel vehicles from consumers.
- \$2 billion will be used on zero emission vehicles (ZEV) infrastructure and programs and brand neutral media activities aimed at increasing public awareness of zero emission vehicles. The amount will be divided between California (\$800 million) and the rest of the U.S. (\$1.2 billion).

- \$1.45 billion civil penalty for the alleged civil violations of the CAA and conjunctive relief to prevent future violations.
- \$2.9 billion will be used to establish an Environmental Mitigation Trust (Trust), which states and territories may use to invest in eligible transportation projects to reduce NOx emissions.

All of the states, including the Chesapeake Bay Program (CBP) partnership states and the District of Columbia (DC), have been allocated a portion of the trust based on the number of violating vehicles in their jurisdiction and must file as “beneficiaries” to receive their allocations. Such filings cannot occur until the Trust agreement is finalized by the court. All requests for funding made by beneficiaries must be approved by a court appointed Trustee. Trust funds can only be spent on 10 categories of eligible mitigation projects defined in the final settlement agreements.

Governmental and nongovernmental entities are eligible to apply for Trust funds. Beneficiaries, including the CBP partnership States and DC, are required to develop a “beneficiary mitigation plan” that provides a high-level summary of how they intend to spend their allocated funds. Beneficiaries are required to submit a mitigation plan 30 days in advance of submitting a funding request to the Trustee.

Eligible mitigation actions include projects to reduce NOx from heavy duty diesel sources near population centers, such as large trucks that make deliveries and service ports, school and transit buses, and freight switching railroad locomotives. Thus, for example, eligible mitigation actions could include replacing or repowering older engines for newer engines at a rail switchyard; or could include replacing older city transit buses with new electric-powered transit city buses. Eligible mitigation actions may also include, in a more limited capacity, charging infrastructure for light duty zero emission passenger vehicles. Beneficiaries have the flexibility to choose which projects on the list of eligible mitigation actions are the best options for their citizens.

Pennsylvania’s Final Beneficiary Mitigation Plan proposes 55,525,940 pounds of NOx reductions. Of these reductions, only 2.43% of this load reduction will reach the tidal estuary. After stoichiometric transformation from NOx to nitrogen, a reduction of 410,798 pounds of nitrogen will be realized through Air Program reductions above planned Clean Air Act reductions.

Citation: Influence of Volkswagen Settlement Agreements on Chesapeake Water Quality, August 20, 2018, and www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement.

G. Abandoned Mine Reclamation

Pennsylvania has 1,891 miles of Abandoned Mine Discharge impacted streams which have limited biologic activity and nutrient uptake. These discharges are the second largest source of impairment in the state behind agriculture.

With federal and state funding, such as the 2006 re-authorization of the Abandoned Mine Lands Fund, Pennsylvania has successfully restored 55 stream miles to attain designated use criteria with a fully functioning ecosystem. Table 2.6 is a summary of the amount of funding received by each county between 2013 and 2018 for these types of projects.

In addition, previously mined areas on State Forest lands are reclaimed or reforested through work of DEP’s Bureau of Abandoned Mine Reclamation (BAMR), in partnership with DCNR’s Bureau of Forestry, and other partner organizations including the Pennsylvania Environmental Council (PEC). When mine land is reclaimed to grass or forested landcover, pollution reductions occur. BMPs will be reported from DCNR and DEP BAMR annually, and resulting reductions accounted for if the reclaimed or reforested land is within the Chesapeake Bay watershed of Pennsylvania. In 2020 through 2021, DEP worked with the Chesapeake Conservancy, USGS, and the counties to identify which lands had been captured as an agricultural land use (which has a higher loading rate) rather than a mixed open land use. For example, in cases of abandoned mine lands, DEP Chesapeake Bay Office and BAMR worked with USGS, providing GIS-based point data from the public Pennsylvania Spatial Data Access (PASDA) to ensure that abandoned mine lands were categorized properly as mixed open as opposed to agricultural.

Table 2.6. Abandoned Mine Land Funding by County, 2013 – 2018

County	Total Dollars Spent	Total Number of Projects
Bedford	\$1,278	1
Blair	\$1,385,897	2
Cambria	\$3,634,530	30
Centre	\$3,336,437	12
Clearfield	\$33,643,110	150
Clinton	\$11,476,371	5
Columbia	\$42,028,883	7
Dauphin	\$1,016	1
Elk	\$2,667,716	6
Lackawanna	\$12,767,838	77
Luzerne	\$15,388,792	97
Northumberland	\$2,704,877	29
Schuylkill	\$3,271,760	28
Susquehanna	\$57,783	2
Tioga	\$1,884,621	5
Wyoming	\$38,049	2
TOTAL	\$134,288,958	454

VI. PHASE 3 WIP PRIORITY INITIATIVE STATE NUMERIC COMMITMENTS (REDUCTIONS FROM 2018 THROUGH 2025) (green bar)

DEP, PDA, DCNR, the other members of the Phase 3 WIP Steering Committee and workgroups plus many other local government, agriculture, environmental, community, academic, and business partners (Phase 3 WIP partners) participated in development of the priority initiatives and numeric commitments described in this section.

The programs described in this section will move forward as part of a broader, watershed-wide effort in concert with the CAPs. These initiatives will become part of each county's CAP as they are developed as described in [Section 3, Countywide Actions](#). Through the planning process implemented at the county level, these recommendations will be tailored to meet the county-specific demographics, conditions, and priorities. The specific goals, recommendations and action steps are summarized below.

A. Agriculture

The 15-member Agriculture Workgroup produced an action plan that seeks to maintain a vibrant and productive agricultural sector while also meeting local water quality goals that will contribute to cleaning up the Chesapeake Bay and the Pennsylvania Partners and other stakeholders are adopting the action plan as part of the Phase 3 WIP. In addition to compliance with basic regulatory obligations, the plan focuses on three key elements: soil health; manure and nutrient management; and riparian ecosystem improvements and restoration.

These reductions will be made as part of seven priority initiatives:

1. Agricultural Compliance
2. Soil Health
3. Expanded Nutrient Management
4. Manure Storage Facilities
5. Precision Feeding
6. Integrated Systems for Elimination of Excess Manure
7. Forest and Grass Riparian Buffers

As stated throughout the Phase 3 WIP, there are several challenges that need to be overcome to attain the reductions via these priority initiatives. This includes financial, technical, and cultural hurdles, as well as statewide coordination and federal acceptance of data.

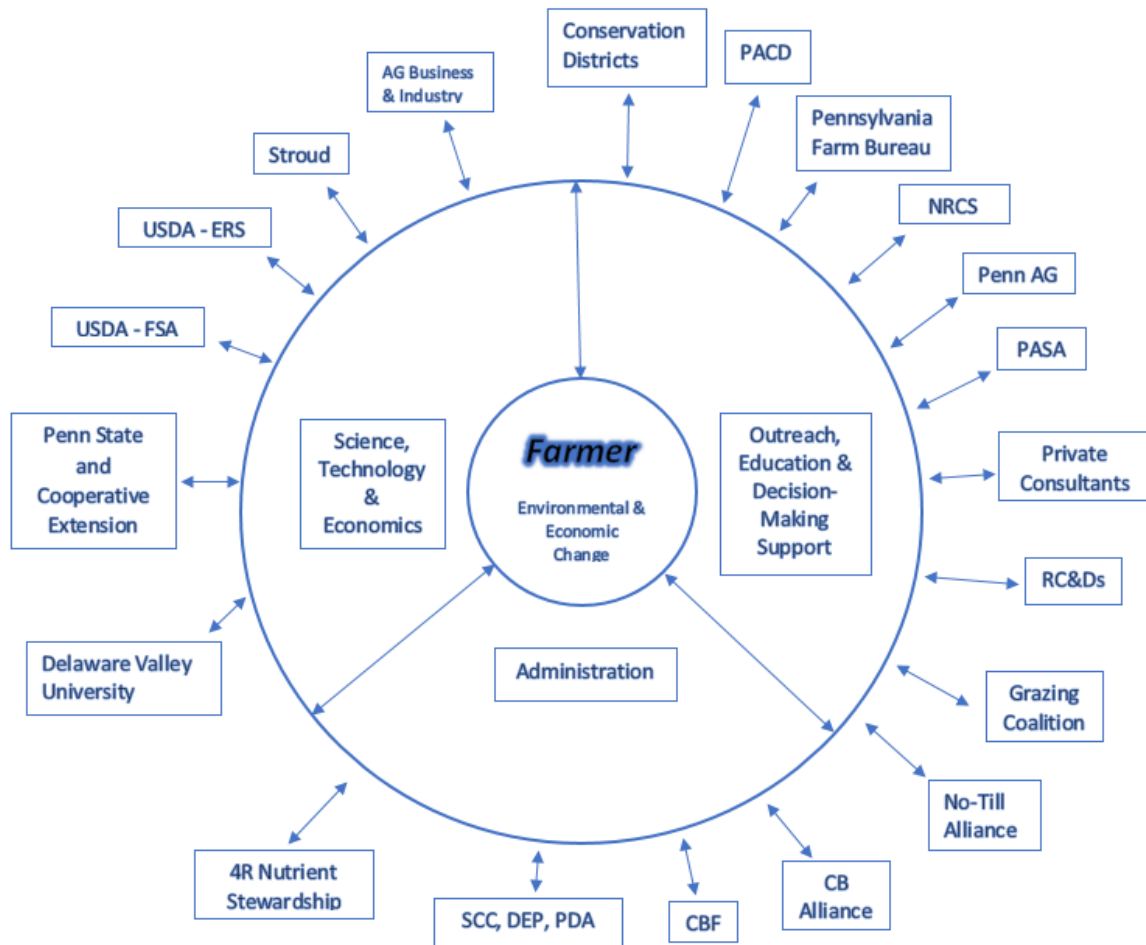
Culture is the largest intangible challenge to implementation. Agriculture within Pennsylvania's Chesapeake Bay watershed is widely diverse, with significant differences among farm operators in size, types of commodities produced, degree of mechanization and incorporation of technology, religious beliefs, and willingness to accept and use innovative ideas purported to improve profitability and/or environmental

effectiveness of their farm operations. Given the unpredictability in outcomes arising from management of nonpoint pollution, many farmers remain skeptical of incurring real costs or financing real debt in response to projections by others that environmental or farm operational efficiency will be improved. Substantial time and effort will be dedicated to ensuring collaboration with farmers through education and demonstration that investment in conservation measures is economically viable and will improve not only their farm's quality and function, but also local water quality.

Farms are holistic systems. All seven priority initiatives are integrated as one whole system, so programs instituted to educate, assist, manage, regulate, and mitigate are used interchangeably for all initiatives. Management of nutrients, to include timing of nutrient application through the use of manure storage systems, plays a significant role in the ability to improve soil health through minimum tillage and planting of cover crops. Using conservation tillage and no-till systems, alongside planting cover crops, minimizes accelerated erosion and sedimentation, which is one piece of agriculture compliance. Dairy precision feeding reduces the amount of nutrients available to application and dealing with excess manure through treatment and export also minimizes the amount of available nutrients to be applied. Nutrient application setbacks from surface waters, wells, and sinkholes are also implemented alongside grassed and forested buffers.

Figure 2.4 shows the numerous entities involved in agriculture BMP implementation efforts and is by no means all-inclusive. Many of these entities are multi-faceted in their approach. This partnership builds on the concept that farmers, and farm-level decision making, are the central focus. Member agencies and organizations are cooperating in their area of expertise to develop a well-articulated, coordinated, science-based, farmer support network aimed at improving decision making and practice implementation at the farm level.

Figure 2.4. Graphic Representation of Agriculture Partners (Not All-Inclusive)



1. Agricultural Compliance

Action: Ensure farmers are implementing their state required Ag E&S plan or conservation plan, Manure Management/Nutrient Management Plan, and implementing required barnyard runoff controls, where needed.

- Goal 1: Continue the compliance, inspection and enforcement programs associated with Pennsylvania’s Clean Streams Law and federal requirements.

Responsible Parties: See Pennsylvania’s programmatic milestones and progress reports published on the [Tracking Pennsylvania’s Progress](#) website.

2. Soil Health

Action: Use crop and soil management practices that improve long-term soil health and stability.

- Goal 1: Conservation tillage on 20% of croplands.

- Goal 2: High Residue Low Disturbance tillage (No-till) on 47% of croplands.
- Goal 3: Non-harvested cover crops on 33-50% of croplands.
- Goal 4: Prescribed grazing on 50% of pastures, including exclusion fencing, where appropriate.

Responsible Parties: See Pennsylvania’s programmatic milestones and progress reports published on the [Tracking Pennsylvania’s Progress](#) website.

3. *Expanded Nutrient Management*

Action: Non-manured farmlands use nutrient management plans and precision nutrient management practices.

- Goal 1: 20% of non-manured croplands have and implement Nutrient Management Plans.
- Goal 2: 20% of manured and non-manured croplands use the “4Rs” principles of “Right Source, Right Rate, Right Time and Right Place” for increased nitrogen and phosphorus reductions.

Responsible Parties: See Pennsylvania’s programmatic milestones and progress reports published on the [Tracking Pennsylvania’s Progress](#) website.

4. *Manure Storage Facilities*

Action: Install and use manure storage systems that meet state or federal standards.

- Goal 1: 90% of swine and poultry operations have adequate manure storage facilities.
- Goal 2: 75% of other livestock operations have adequate manure storage facilities.

Responsible Parties: See Pennsylvania’s programmatic milestones and progress reports published on the [Tracking Pennsylvania’s Progress](#) website.

5. *Dairy Precision Feeding*

Action: Use precision feed management to reduce nitrogen and phosphorus in manure.

- Goal 1: 70% of dairy cows fed with precision management.

Responsible Parties: See Pennsylvania’s programmatic milestones and progress reports published on the [Tracking Pennsylvania’s Progress](#) website.

6. Integrated Systems for Elimination of Excess Manure

Action: Create integrated (county/regional) programs for removal of or beneficial use of excess manure.

- Goal 1: Develop coordinated county/regional systems for removing excess manure (through treatment or transportation) from the Chesapeake Bay watershed.

Table 2.7 presents the percentage of nutrients a crop needs compared to the nutrients applied from biosolids, fertilizer and manure combined in the Phase 3 WIP scenario. The crop need was established by data from land grant universities and the Agriculture Modeling Subcommittee of the Chesapeake Bay Program Partnership Agriculture Workgroup. Nutrients applied is calculated from fertilizer sales data and animal numbers provided by the Agriculture Census. Counties that are over 100% (over their crop need) are highlighted in yellow. Therefore, these counties should be the first to document and report manure transport and nutrient management implementation to address excess nutrients.

Table 2.7. Counties with Excess Crop Nitrogen

County	Total N Applied to Crop Need	County	Total N Applied to Crop Need
Adams	87%	Lackawanna	98%
Bedford	102%	Lancaster	128%
Berks	107%	Lebanon	130%
Blair	118%	Luzerne	86%
Bradford	106%	Lycoming	98%
Cambria	90%	Mckean	89%
Cameron	92%	Mifflin	121%
Carbon	87%	Montour	112%
Centre	101%	Northumberland	100%
Chester	105%	Perry	118%
Clearfield	85%	Potter	105%
Clinton	111%	Schuylkill	98%
Columbia	93%	Snyder	125%
Cumberland	108%	Somerset	97%
Dauphin	112%	Sullivan	95%
Elk	90%	Susquehanna	95%
Franklin	120%	Tioga	113%
Fulton	119%	Union	138%
Huntingdon	108%	Wayne	93%
Indiana	89%	Wyoming	86%
Jefferson	89%	York	94%
Juniata	128%		

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

7. Forest and Grass Riparian Buffers

Action: Plant forest buffers and grassy vegetation along streams. For accreditation buffers must be a minimal of 35 feet in width up to 300 feet in width from the edge of the stream.

- Goal 1: 25% of non-buffered streamside farm lands add 35 ft wide forest buffer. (based on up to 300 feet available streamside area)
- Goal 2: 15% of non-buffered streamside farm lands add 35 ft wide grass buffer (based on up to 300 feet available streamside area)

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

Table 5.3 in [Section 5, Existing and Needed Resources](#), provides a summary of the existing and new state agency resources needed within DEP, PDA, and the State Conservation Commission to implement these priority initiatives. In addition to these resources, the Phase 3 WIP Agriculture Workgroup performed a workload analysis and estimated 87 people from a combination of private industry, non-governmental organizations, and federal agencies dedicated to the delivery of technical assistance, planning BMP practice design and engineering above what is already dedicated to this effort may be needed. The amount of existing resources or the cost of these additional resources is unknown at this time; however, DEP has reported the state and federal funds that flow through the state agencies to meet the Chesapeake Bay Accountability and Recovery Act (CBARA) requirements. DEP's CBARA report can be found on the [Chesapeake Progress](#) website.

B. Forestry

Forestry BMPs such as riparian forest buffers and upland tree plantings are cost-effective for improving water quality while also providing significant environmental and social benefits in both agricultural and developed areas. Trees along streams improve habitat, reduce flooding impacts, and provide shade to cool waterways. Trees in backyards and communities increase property values and improve human health. These restoration activities help connect citizens to their local watersheds.

The 15-member Forestry Workgroup produced an action plan with forestry practices that seek to reduce nitrogen and phosphorus pollution and meet water quality standards and the Pennsylvania Partners and other stakeholders are adopting the action plan as part of the Phase 3 WIP.

This action plan is divided into the following five priority initiatives:

1. Forest Riparian Buffers
2. Tree Canopy

3. Woods and Pollinator Habitat
4. Forest and Natural Area Conservation
5. Stream and Wetland Restoration

In developing these priority initiatives, overarching themes emerged. These overarching themes include:

- Increased coordinated and comprehensive outreach and communications strategies;
- Engagement of leadership at all levels to prioritize effective best management practices;
- Increased technical assistance in the governmental, private, and nonprofit sectors to assist landowners of all types;
- Development of new comprehensive funding and cost-share options and mechanisms for landowners;
- Improved reporting and tracking of all priority BMPs; and
- Further development of BMP maintenance and establishment care programs.

Whether working with established programs, like riparian forest buffer programs, or starting a brand-new statewide effort, like a turf conversion program, there will be many challenges to adding staffing and capacity, finding new funding, and coordinating communications to reach Pennsylvania's planning targets. However, by working through groups like Pennsylvania's Riparian Forest Buffer Advisory Committee and forming similar groups for new efforts as they emerge, Pennsylvania will accelerate progress and coordinate the delivery of these BMPs and associated reductions in a more efficient manner than in the past.

Note that some of the forestry priority practices are developed specifically to reduce nitrogen and phosphorus, but some are being instituted for other reasons where nitrogen and phosphorus reductions are co-benefits.

1. *Forest Riparian Buffers*

Action: Plant trees and shrubs along streams. For accreditation, buffers must be a minimum of 35 feet in width up to 300 feet in width from the edge of the stream.

- Goal 1: 83,000 acres of forest riparian buffer on agricultural lands.
- Goal 2: 2,650 acres of forest riparian buffer in developed areas.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

2. Tree Canopy

Action: Plant trees in developed areas.

- Goal 1: 50 acres of urban tree canopy planted (15,000 trees).

Responsible Parties: See the Progress and Tracking Template for a specific listing of individual agencies involved in specific action steps designed to implement this priority initiative. A summary of the key action steps that will be reported annually can be found in [Section 7, Milestones and Progress Tracking](#).

3. Woods and Pollinator Habitat

Action: Convert lawn and turf areas to woods and meadows.

- Goal 1: 5,000 acres of lawns to woods.
- Goal 2: 5,000 acres of lawns to meadows.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

4. Forest, Farm and Natural Area Conservation

Action: Provide credits for land conservation and revise zoning and ordinances to conserve existing natural areas.

- Goal: 20,000 acres of land conserved annually.

Note: The estimated annual cost for these actions cannot be determined due to variations in the cost of land "crediting" programs across the watershed.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

5. Stream and Wetland Restoration

Action: Support efforts to restore local streams and wetlands.

- Goal 1: 60,000 linear feet of urban and non-urban streams restored per year utilizing appropriate measures for the site such as stabilization, natural stream channel design, floodplain restoration, etc.
- Goal 2: 400 acres of wetlands restored per year.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

In Table 5.3 in [Section 5, Existing and Needed Resources](#) there is a summary of the existing and new state agency resources needed within DCNR and the conservation districts to implement these forestry priority initiatives.

C. Stormwater

The 12-member Phase 3 WIP Stormwater Workgroup developed an action plan for BMPs to help localities reduce nitrogen and phosphorus and meet local water quality standards and the Pennsylvania Partners and other stakeholders are adopting the action plan as part of the Phase 3 WIP.

This action plan prioritized:

1. MS4 Pollutant Reduction Plans
2. Riparian Forest Buffers
3. Control measures for illicit discharge
4. Industrial stormwater
5. Fertilizer Legislation
6. Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Program

1. Implement Pollutant Reduction Plans (PRPs) for Municipal Separate Storm Sewer System (MS4) Communities

Action: As one component of the 2018 MS4 permit, permittees must implement management practices to achieve the reductions identified in their PRPs by 2023.

- Goal 1: MS4s in the Chesapeake Bay watershed implement BMPs in current MS4 NPDES permits by 2023.
- Goal 2: Implement the Pennsylvania Department of Transportation (PennDOT) and Pennsylvania Turnpike Commission MS4 Permits in concert with the other MS4 NPDES permits by 2023.

DEP recognizes that the BMPs installed by MS4 permittees typically reduce only limited amounts of nitrogen. Urban stormwater is not a major source of nitrogen, and most stormwater BMPs capture limited nitrogen. The primary purpose of urban stormwater permits (MS4, Industrial Stormwater, and Construction) is to protect local waters. Streams within and downstream of developed areas are frequently impaired because most older development was built without consideration of urban stormwater impacts. The result is often habitat destruction, extreme flow variability, high temperature in dry weather, illicit discharges, and sediment deposition. The MS4 permits and PRPs are designed to address these impacts. Since these urban stormwater BMPs do also

capture some nitrogen, it is appropriate to also include these reductions in the Phase 3 WIP.

PRPs within the Bay drainage are in various stages of implementation. The reductions are required to be operational within five years of the PRP approval. Virtually all of these reductions will therefore be in place before 2025.

DEP anticipates additional reductions from PennDOT and Turnpike Commission and other institutional MS4 permits. PennDOT and the Turnpike Commission are actively pursuing BMP installation, both independently and in collaboration with municipalities, with the understanding that qualifying BMPs will be creditable to their upcoming permit term.

In the 2020 reporting year, for the first time, DEP worked with PennDOT to gather and report all of PennDOT's implemented and inspected stormwater BMPs. PennDOT's installed BMPs were reported to EPA Chesapeake Bay Program Office as part of Pennsylvania's annual numeric progress.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

2. New Riparian Forest Buffers

Action: Plant trees and shrubs alongside streams.

- Goal 1: Incentivize and facilitate new acres of riparian forest buffers associated with the MS4 Pollutant Reduction Plans.

These acres are in addition to the riparian forest buffers identified as part of the Forestry and Agriculture Workgroups and are listed here due to their association with MS4 communities.

A large proportion of developed lands are not regulated under MS4 permits because they are not included in the "Urbanized Areas" delineated by the United States Census Bureau. The expectation is that a limited acreage of buffers will be voluntarily constructed in those developed, non-regulated areas.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

3. Control Measures for Illicit Discharges

Action: DEP facilitates municipal ordinance amendments to control illicit discharges to storm sewer systems.

- Goal 1: Municipal ordinance adoption for control of pool drainage.

- Goal 2: Municipal ordinance adoption for control of residential car washing draining.

Many municipalities need to update their stormwater ordinances to make them consistent with the current DEP model stormwater management ordinance. The needed changes vary from municipality to municipality, but virtually all of them need to reflect the new 2018 MS4-required controls on pool drainage and car washing.

The changes are prompted through MS4 permit processes for those municipalities with MS4 permits. They are prompted for non-MS4s when counties update their Stormwater Management Plans as required by Pennsylvania's [Storm Water Management Act](#) (Act 167 of 1978); those plans include a county-recommended model ordinance for municipalities to enact.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

4. Industrial Stormwater

Action: DEP develops technical guidance, intended to supplement existing requirements, to inform industrial stormwater discharge permittees engaged in these activities. This guidance will list appropriate BMP utilization, design standards, and implementation to reduce pollution which are acceptable to manage industrial stormwater.

- Goal 1: Implementation of Chesapeake Bay BMPs by industrial stormwater discharge permittees.
- Goal 2: Identify appropriate industrial stormwater permits suitable for impervious surface retrofit BMPs with the goal of facilitating industrial impervious surface to pervious cover or other volume reduction retrofit BMP.

Industrial stormwater permits vary because of the many types of industrial facilities. Those permits control the quality and quantity of stormwater to a degree, but do not require a current load calculation or a specific load reduction. Nevertheless, there are opportunities for voluntary BMPs appropriate to each industry classification.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

5. Fertilizer Legislation

Action: Pass the fertilizer legislation described below in Section 2.IX.A.1.b.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

In addition to the Priority Initiatives developed by the Stormwater Workgroup, the following priority initiatives are added based on DEP's analysis of existing programs described above:

6. Continue to Implement Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Program

Action: Continue permitting, inspecting, and ensuring compliance with Pennsylvania's E&S control and PCSM permit requirements, found in 25 Pa. Code Chapter 102 for all activities including construction, timber harvest, oil and gas exploration, mining, and waste management.

- Goal 1: Increase the number of county conservation districts with PCSM delegation.
- Goal 2: Increase the inspection outputs as well as DEP staff to ensure compliance with NPDES permit and Chapter 102 obligations.
- Goal 3: Improve the tracking and reporting to include all DEP programs implementing the provisions of these regulations.

Load reductions from BMPs required by Chapter 102 permits are creditable to the Chesapeake Bay Watershed Model and should therefore continue to be reported; their continued operation should also be ensured and reported to maintain reduction credit in the Chesapeake Bay Watershed Model into the long-term future. Strengthened conservation district and DEP compliance staff resources will support that goal, along with improved DEP Chapter 102 data management using [GreenPort](#) and the PracticeKeeper system. Additionally, in 2019, DEP's Chapter 102 program began to require every applicant to perform a quantitative demonstration that the project will not cause post-construction total suspended sediments (TSS) and nutrient loads in excess of pre-construction loads. Prior to this requirement, there was a presumption that if volume management was met, water quality requirements would also be met.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

Table 5.3 in [Section 5, Existing and Needed Resources](#), provides a summary of the existing and new state agency resources needed within DEP to implement these stormwater priority initiatives.

7. Dirt and Gravel Roads

Action: Continue to implement the Dirt and Gravel Roads Program through the Center for Dirt and Gravel Roads.

Responsible Parties: See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website.

In Table 5.3 in [Section 5, Existing and Needed Resources](#), is a summary of the existing and new state agency resources needed within DEP to implement this priority initiative.

D. Wastewater

Wastewater is the liquid waste, sewage, or industrial waste from homes, businesses, schools, industrial facilities, and other institutions. Treated wastewater makes its way directly or indirectly into our waters. If wastewater contains excess nitrogen and phosphorus, it supports the growth of algae blooms that create low-oxygen "dead zones" that suffocate marine life. Excess nitrogen and phosphorus in freshwater streams can impact aquatic life and other surface water uses. Wastewater treatment provides protection of water resources and public health and allows water to return to the environment safely.

Previously, the Pennsylvania wastewater sector was required to reduce their contribution of nitrogen (N) and phosphorus (P) from their treatment plants. The original wastewater contribution to receiving streams was 11% of the nitrogen load, and 18% of the phosphorus load (found in the 2004 Pennsylvania Bay Tributary Strategy, DEP). The Pennsylvania wastewater sector's required 33% reduction would result in an overall 4% nitrogen decrease, and a 6% phosphorus decrease to the Bay by 2025. The 190 wastewater plants, using Biological Nutrient Reduction (BNR) techniques (with some plants treating to a level between BNR and Enhanced Nutrient Reduction (ENR)) proved highly successful in removing nutrients, and allowed these plants to meet both their 2017 midpoint goals and 2025 final goals years ahead of schedule. These goals were achieved at an estimated cost of \$1.4 billion. The cost projections were done by the former Metcalf and Eddy engineering firm (now AECOM), under contract with the state, spending six months studying Pennsylvania wastewater plants in the Chesapeake Bay watershed.

Significant Industrial Wastewater (Sig IW) Dischargers are defined as non-sewage dischargers with loadings of 75 pounds/day total nitrogen (TN) and 25 pounds/day total phosphorus (TP) or greater. Nutrient cap loads for Sig IW dischargers were based on the facility specific nutrient reduction evaluations. There are 23 Sig IW facilities with nutrient cap load in their permits. Industrial facilities' waste streams vary widely (food processors, paper mills, landfill leachate dischargers), so an across-the-board concentration-based load limit is not feasible. A site-specific nutrient reduction evaluation allowed each facility to propose reductions based on what was possible at that facility. For significant or nonsignificant dischargers, IW discharger expansion is not permitted without offsetting the resulting nutrient discharge increase. Nonsignificant discharges are sewage dischargers with design flow less than 0.4 million gallons per day (MGD) and non-sewage dischargers who do not meet the definition of significant IW. Nonsignificant sewage dischargers who propose expansion are provided with nutrient cap loads in their NPDES permits. Typically, the load will be based on the

existing load, but the cap load will not be greater than a load based on 0.4 MGD and 6.0 mg/liter TN and 0.8 mg/liter TP.

A consistent approach to reporting the nonsignificant discharger loads is necessary. Pennsylvania is currently reporting many of the nonsignificant load assuming that the facility is at its design flow capacity, which is not true for most circumstances. The reporting assuming design flow condition results in inflated TN reporting. DEP has required many of its facilities to electronically report their discharge monitoring data. The resulting data will allow for a more accurate accounting of nutrient loads from nonsignificant facilities. All nonsignificant dischargers to the Chesapeake Bay have been electronically reporting nutrient loads since the end of reporting year 2020. In 2021, based on the best available data, DEP used the reported flow and concentration over a three-year period (reporting years 2018, 2019, and 2020) as the WIP scenario as opposed to the design flow capacity. This provides a more accurate depiction of predicted management actions in the wastewater sector. This update also resulted in modified sediment loads for 2025 conditions, using a similar approach employed by New York and other jurisdictions to develop real “average-flow” based loading conditions compared to “designed flow” totals used previously. Pennsylvania does not anticipate further revision to the sediment load target. The Center for Rural Pennsylvania, a legislative entity of the Pennsylvania General Assembly, released a report in 2014, Pennsylvania Population Projections 2010-2040. Among other things, the report estimates Pennsylvania’s population of 13,504,614 by 2025. The Pennsylvania State Data center currently estimates Pennsylvania’s population is 12,801,989. The Center for Rural Pennsylvania report discusses the distribution of population increase across the state. The report estimates that about 75% of the growth will be in the area tributary to facilities that discharge to the Chesapeake Bay. The percent increase in population based on the current and estimated 2025 populations is 5.2%. Accounting for 75% increase expected in the Chesapeake Bay watershed area and assuming equal change in population over the 2010 to 2025 time period, a flow increase of 1.04% was added to the three-year average flows for all sewage facilities other than small flow sewage treatment facilities which are already shown at their design capacity. Industrial facility flows and loads are not expected to increase; no adjustment was made to these flows or loadings. Any facility not reporting nutrient information will have reporting incorporated into their NPDES permit at the next renewal.

Current information on wastewater treatment plants (WWTPs) in the Chesapeake Bay may be found in the [Phase 3 Watershed Implementation Plan Wastewater Supplement](#), revised December 17, 2019 and September 13, 2021. This supplement provides an update on Chesapeake Bay TMDL implementation activities for point sources and DEP’s current implementation strategy for wastewater. This document is updated periodically to reflect changes due to DEP’s permit actions as well as changes to strategies in managing the wastewater sector’s allocated loads under the TMDL.

Pennsylvania and other states also have created nutrient trading programs that allow wastewater treatment plants to design upgrades with greater nutrient reductions, then sell nutrient credits to other facilities; this promotes cost-effective reduction.

The 14 members of the Wastewater Workgroup researched the feasibility of treating to ENR in Pennsylvania. ENR effluent total nitrogen and total phosphorus concentrations are 3.0 mg/l and 0.4 mg/l, respectively. Currently, the 190 significant wastewater treatment systems with BNR effluent load limits, reached their 2025 nitrogen and phosphorus reduction goals in 2018 (seven years ahead of schedule). BNR effluent total nitrogen and total phosphorus concentrations are 6.0 mg/l and 0.8 mg/l, respectively. Although a number of these systems are treating to a level between BNR and ENR, they are currently obligated to meet an annual load limit based on BNR requirements.

Priority initiatives that have the potential to directly result in nutrient reductions that will be explored for Wastewater include:

1. Continue Current Treatment Course
2. Plant Optimization Program
3. Municipalities Implement Onsite Septic System Inspection and Pumping Programs

1. *Continue Current Treatment Course*

Given the ongoing reduction success, one priority initiative is to continue the treatment course described above. The ongoing tracking of the 190 publicly owned treatment works and their wasteload allocations is described in the [Phase 3 Watershed Implementation Plan Wastewater Supplement](#) that will continue to be updated on a regular basis.

2. *Plant Optimization Program*

DEP's treatment plant optimization program helps troubled facilities get into compliance with permitting requirements. DEP will further investigate the feasibility of how this program could be expanded to help facilities optimize their process for nutrient removal by establishing a facility nutrient removal optimization program. The existing DEP optimization program does not have the capacity to run such a program, and expansion of the program would include a section dedicated to statewide implementation. Varying degrees of implementation could be considered to make the effort slightly less costly; however, the reduction in proposed DEP staffing would shift the burden to the facility to hire operations consultants.

Table 5.3 in [Section 5, Existing and Needed Resources](#), provides a summary of the existing and new state agency resources needed within DEP to implement this initiative. These costs include the cost for staff, as well as the additional costs for equipment and lab analyses.

3. *Municipalities Implement Onsite Septic System Inspection and Pumping Programs*

Properly operated and maintained systems provide better protection of local ground water resources as well as a reduction to the total nitrogen loading to the Chesapeake Bay. If all municipalities with on-lot systems would implement sewage management programs that include inspection of the on-lot system and pumping of septic tanks 55,000 pounds of total nitrogen reduction could be realized.

Sewage management programs that incorporate septic system inspection and pumping are recommended. On-lot system oversight is the responsibility of municipalities per the Pennsylvania Sewage Facilities Act.

To facilitate the implementation of this recommendation, DEP proposes to develop a GIS-based online monitoring and reporting program that municipalities can use to report on-lot system operation and maintenance and permitting information for Chesapeake Bay reporting. See the action step on the [Progress and Reporting Template](#) and in [Section 7, Milestones and Progress Tracking](#).

VII. NEW PROGRAMS THAT SUPPORT IMPLEMENTATION OF THE STATE NUMERIC COMMITMENTS (green bar)

In the years preceding finalization of this Phase 3 WIP, several new initiatives and programs were developed to accelerate Pennsylvania's progress towards achieving the nutrient and sediment reduction planning targets. Since these programs were new, the results of these programs had not been captured in the progress reports to that time, but these programs support achievement of the priority numeric commitment initiatives described in [Section 2.VI](#) above and further ensure implementation of priority initiatives.

See the Progress and Tracking Template for a specific listing of individual agencies involved in specific action steps designed to implement many of these initiatives. A summary of the key action steps relative to some of these programs that will be reported annually can be found in [Section 7, Milestones and Progress Tracking](#).

A. Agriculture

1. *Pennsylvania Farm Bill*

In recognition of the need for new, targeted investments and in response to EPA's comments, Governor Wolf proposed, and the Pennsylvania General Assembly passed, with near unanimous approval, the 2019 Pennsylvania Farm Bill. This historic \$23.1 million investment in Pennsylvania agriculture includes new and expanded conservation funding with priority given to the Tier 1, 2, and 3 counties in the Chesapeake Bay watershed and creates a new delivery mechanism to drive a mix of loans, tax credits, and grants to the local level. The State Conservation Commission (SCC) oversees more than \$9 million in new and expanded funds, with new tools offering more competitive

assistance for priority practices identified by the Phase 3 WIP Agriculture Workgroup, including cover crops, buffers, stream fencing, livestock crossings, manure storage, and more.

The new and expanded funds include: \$2.5 million for Conservation Excellence grants, an additional \$3 million for the Resource Enhancement and Protection tax credit program, and \$500,000 for AgriLink low interest loans, anticipated to make available \$3-\$4 million in low interest loans. This investment has carried forward annually since the initial investment in 2019. The Conservation Excellence Grant (CEG) program has been implemented and is administered by the SCC. In May 2020, the SCC published the [Standards and Requirements for the Conservation Excellence Grant Program](#). In FY2019-2020, the SCC worked with Lancaster and York counties. In FY2020-2021, the CEG program was expanded to include Bedford and Centre counties, with additional funds put towards Lancaster County. This also included an EPA CBIG subaward through DEP to add to the CEG state fund allocation, which allowed the SCC to partner directly with the Lancaster Farmland Trust. In FY2021-2022, the CEG program has since expanded to include Cumberland, Franklin, and Lebanon counties, with additional funds put toward Bedford, Centre, and Lancaster counties.

Table 2.8 identifies specific projects completed using CEG funding from October 2020 through May 2022.

Table 2.8. Projects completed using CEG funding, October 2022 – May 2022

Practice Name	Amount	Unit	Count
Access Road	690	feet	3
Animal Trails and Walkways	615	feet	2
Cover Crop	1494	acres	49
Diversion	1222	feet	3
Fence	1016	feet	4
Grassed Waterway	2.22	acres	2
HUAP	23886	square feet	8
Lined Waterway or Outlet	2100	square feet	4
Mulching	0.53	acres	1
Roof Runoff Structure	842	feet	4
Roofs and Covers	24036	square feet	4
Stream Crossings	4	quantity	4
Structure for Water Control	2	quantity	2
Subsurface Drain	320	feet	1
Terrace	2500	feet	3
Underground Outlet	3137	feet	10
Vegetated Treatment Area	0.4	acres	1
Waste Storage Facility (1 separate unit)	8000	cubic yards	1
Waste Storage Facilities	8	quantity	8
Waste Transfer (2 units)	515	feet	2
Waste Transfer	4	quantity	4

Other Pennsylvania Farm Bill programs support the Commonwealth's conservation efforts, such as the new Agricultural Business Development Center, which connects producers to business planning resources, including conservation resources.

2. Agriculture Plan Reimbursement Program (APRP)

DEP's APRP provided direct reimbursement to farmers for the costs incurred for the development of nutrient management, manure management, and agriculture erosion and sediment control plans for their farms. Farmers had until April 1 of each year to apply to participate in the program and May 30 to submit the completed plans to one of DEP's two contractors for reimbursement. Team Ag administered the program for DEP in the southcentral part of the watershed; Larson Design in the northcentral and northeast part of the watershed. This program completed its fourth and final year in summer 2021. In total, the APRP provided nearly \$2.4 million to farmers in Pennsylvania's portion of the Chesapeake Bay watershed. This cost-share investment led to more than 3,200 environmental plans covering more than 515,000 acres. Moving forward, while this particular contracted program has sunset, DEP continues work with partners to ensure that funds are available to support nutrient management, manure management, and agriculture erosion and sediment control plans, either through the REAP tax credit program or other grant programs. For example, PACD was awarded a 2021 Growing Greener Plus grant to oversee and administer funding that will expand the agricultural plan reimbursement program statewide. The period of performance for this grant is three years, with the potential to extend up to an additional two years.

3. Funding for Piloting Chesapeake Bay Agricultural Inspection Program (CBAIP) - Phase 2

The initial phase of the CBAIP has been very successful and has resulted in bringing 96% of farms inspected into compliance without the need for an enforcement action. The main reason for the success of this program is due to conservation districts and DEP regional offices having the tools and funding available to provide planning-related compliance assistance before it reaches a level requiring enforcement.

Conservation districts typically provide planning assistance or refer farmers needing a plan to a list of private consultants while also providing information about DEP's Agriculture Plan Reimbursement Program or other funding support options. DEP regional offices either refer farmers to conservation districts or to private consultants while also providing information about DEP's Agriculture Plan Reimbursement Program or other funding support options. Without compliance assistance, through both technical assistance and funding, there would be a significantly higher rate of continued non-compliance. The need for enforcement would then also be significantly higher, but with very limited staffing available to meet that need.

To that end, more than \$2.5 million in state funding has been allocated to pilot "Phase 2" of the CBAIP in Lancaster, Adams, and Chester counties. The focus of this funding is strictly for farms that have been or will be inspected in targeted watersheds selected in

the counties' inspection strategies, with a maximum cap on funding per farm. The goal is to assist farmers who are out of compliance to attain compliance quickly by offsetting costs for BMPs such as: grassed waterways, terraces, and diversions; barnyard runoff controls; fencing; etc. As Pennsylvania moves forward with bringing other counties into Phase 2 of the CBAIP, funds will be available through multiple recently created mechanisms as well as others that will continue to be available, such as the DEP Countywide Action Plan Implementation Grant, the SCC Conservation Excellence Grant, the SCC REAP tax credit program, and federal sources like the NFWF Most Effective Basin Grant and the NRCS Environmental Quality Incentives Program (EQIP).

4. *Pennsylvania Agriculture Conservation Stewardship Program (PACS)*

PDA, DEP, and SCC developed a new and voluntary program, known as the Pennsylvania Agricultural Conservation Stewardship (PACS) Program. The program's objective is to recognize and reward Pennsylvania agricultural producers who volunteer to document, with proper verification, the performance of practices demonstrating their farms meet required state erosion and sediment and manure management standards, as well as all recommended Phase 3 WIP practices applicable to their operations. Farmers successfully participating in this program receive a PACS program certification which will remain valid as long as the farmer continues to sufficiently demonstrate that the farm meets minimum criteria for PACS certification.

The PACS program focuses on engaging qualified third-party personnel to perform environmental assessments of farms to determine if the operation meets the minimum criteria necessary for recognition. Commitment of resources for recruiting, training, and authorizing qualified and supportive third-party individuals is a key measure for this program's success. Qualified third-party personnel who work practically with farmers to achieve and affirm legal compliance and additional conservation measures help to significantly move the needle toward Pennsylvania's TMDL goals.

In 2021, PDA and SCC renegotiated an EPA grant agreement which will provide resources to further refine and implement the PACS Program, based on lessons learned from the initial pilot program. In 2022, the SCC approved moving forward with adding PACS program verification to the list of approved BMPs for REAP tax credits. The intent is to provide a funding resource for the verification of a farmer's agricultural compliance status when working with the PACS Certification Program. The REAP BMP would be initially designed as a two-year pilot effort that would be available to qualified technical service providers (TSPs). The PACS verification BMP would be used to provide a tax credit to a TSP for up to \$500 per agricultural operation of REAP-eligible costs associated with the PACS application process. Eligible costs include PACS application, farm inspections, and verification of compliance with Pennsylvania's Clean Streams Law. The TSP must be Act 38-certified and/or qualified to write Ag E&S Plans, and must participate in other PACS related training provided by the SCC.

5. Most Effective Basins (MEB) Funding

In 2020, EPA allocated funds for areas throughout the Chesapeake Bay watershed that were identified by the EPA Chesapeake Bay Program Office to be the most effective at reducing nitrogen loads to the Chesapeake Bay. Pennsylvania DEP directly received \$300,000 in the initial year and \$550,000 in 2021 to be put toward agricultural BMPs as well as BMPs located in Environmental Justice (EJ) communities. The funds provided to DEP have been allocated to Lancaster and Chester counties for implementation of BMPs in MEBs. The funds for EJ communities were directed to a large-scale stream restoration and floodplain reconnection project in the Little Conestoga River watershed in Lancaster County. EPA published a Request for Proposals for third-party administration of the remaining \$6 million for 2020 and 2021, as well as future years of funding allocations. NFWF is currently administering these funds on behalf of Pennsylvania; the initial solicitation round for these funds was open in July 2021 and the awards were announced in November 2021. The list of awardees for the initial round of MEB funding as well as other 2021 Pennsylvania Small Watersheds Grants and Innovative Nutrient and Sediment Reduction (INSR) awardees can be found in the [NFWF Chesapeake Bay Small Watershed Grants Program in Pennsylvania 2021 Grant Slate](#).

In May 2022, EPA announced that they will direct \$5,598,333 in the initial year of Chesapeake Bay Restoration Infrastructure Investment and Jobs Act (IIJA) funding to Pennsylvania. In the initial year, DEP, SCC, and DCNR will administer the MEB IIJA funding allocation to further implement priority projects and practices throughout Pennsylvania's Chesapeake Bay watershed within EPA-designated MEB areas and with a focus on positively impacting the EPA-identified disadvantaged communities.

6. Rapid Stream Delisting – 30 x 30 Initiative

The Chesapeake Conservancy has been working with county CAP teams, DEP, SCC, PDA, PFBC, and others to implement the rapid stream delisting strategy in agriculturally impaired watersheds throughout Pennsylvania's Chesapeake Bay watershed. This strategy aims to use the best available science and data to focus in on small watersheds or "catchments." This approach has gained momentum in Huntingdon, Centre, Lancaster, and other counties, as it relies on local knowledge and expertise alongside state and local water quality monitoring data to identify impaired streams that are on the cusp of restoration. These areas need a push to get them over the edge, and the ability to see success in a shorter period of time motivates individuals and organizations to invest resources. This strategy may sound similar in effect to the Section 319 Watershed Based Plans (WBPs) or local WIP strategies; however, the rapid stream delisting strategy is an acceleration of the Section 319 nonpoint source management strategy, as the rapid stream delisting strategy does not require the development and approval of local WIPs. The momentum behind this strategy has grown over time, and in 2021, [Governor Wolf announced his support](#) for the goal of restoring 30 agricultural impaired streams by 2030.

B. Forestry

1. DCNR Community Conservation Partnerships Program (C2P2) Buffer Grants

The DCNR Riparian Forest Buffer Program provides financial assistance to identify locations in need of riparian forest buffers and to design, establish, monitor, and provide short-term maintenance for those buffers. Applicants are encouraged to include the Multifunctional Buffer Concept in their proposed project. Eligible activities include landowner outreach, buffer design, site preparation and buffer installation, plant materials and tree shelters, and short-term maintenance (approximately 3 years). DCNR considers a variety of forest buffer project types, including conventional riparian forest buffers and multifunctional buffers. Approximately \$500,000 is awarded to partners annually through this program, if funding is available. The C2P2 Buffer Grants are available to use on all land types. Municipalities and non-governmental organizations working with municipalities, homeowners, and landowners are eligible applicants for C2P2, which can also fund green infrastructure projects.

Each annual grant round typically results in 75-100 acres of Riparian Forest Buffer plantings across Pennsylvania, both within and outside of the Chesapeake Bay watershed. Grants require a 1:1 match from partners. Matches can be cash or non-cash, such as in-kind staff, volunteers, equipment usage, etc. Eligible applicants include local governments in Pennsylvania, nonprofits, and educational organizations. DEP and DCNR worked together to build a Partner BMP Submission module in the PracticeKeeper system, allowing for consistent and standardized reporting of project implementation.

2. DCNR/PENNVEST Pilot Grants

DCNR has partnered with the Pennsylvania Infrastructure and Investment Authority (PENNVEST), to provide a special grant round through the C2P2 program for three years specifically for testing the “multifunctional buffer concept”. A multifunctional buffer is a riparian forest buffer that provides opportunities for harvesting products such as nuts, berries, woody florals, forbs, and potentially woody biomass, with the idea that the potential to gain an income from buffered streamside land might interest new landowners in buffer implementation.

The final round of the pilot multifunctional buffer grants opened to applicants in late 2019. During each prior grant round, approximately \$1 million was awarded to partners. Grantees and DCNR will report implemented acres to DEP as the projects are completed through the PracticeKeeper data system. As available, funds are awarded to partners for implementation projects both within and outside of the Chesapeake Bay watershed in Pennsylvania.

3. *TreeVitalize Grants*

TreePennsylvania, an independent nonprofit agency, manages the statewide TreeVitalize grant program. Funding is provided by DCNR to promote and develop sustainable urban forestry programs in Pennsylvania. Annual grant terms provide the opportunity for funding in three priority areas: tree planting, urban riparian buffers, and community forestry management. Tree planting grants provide assistance for tree plantings in community and urban areas along streets, parks, and other publicly accessible areas. Urban riparian buffer grants provide assistance for urban riparian buffer tree plantings adjacent to community and urban waterways. Community forestry management grants provide assistance for tree care management plans, tree inventories, pruning, short term employment (including internships), educational workshops, webinars, urban wood utilization, ordinance development, land banks design, urban agriculture design, and other aspects of urban forestry.

Approximately \$100,000 is currently awarded annually. Grantees and DCNR will report implemented acres to DEP as projects are completed. DEP and DCNR worked together to build a Partner BMP Submission module in the PracticeKeeper system, allowing for consistent and standardized reporting.

4. *Stream ReLeaf*

A DCNR project funded by NFWF through a \$750,000 INSR grant, Stream ReLeaf funded buffers in seven southcentral Pennsylvania counties through a streamlined, flat-rate method to help partners implement projects in areas of high nutrient loading. While the original funds made available through this program were nearly expended as of spring 2019, a valuable lesson learned through the implementation of this program is that a large appetite exists for riparian forest buffer implementation, even in traditionally buffer-resistant areas, if a streamlined, easy-to-access, flexible, flat-per-acre-rate buffer implementation program is available to partners. In less than three years, 95 acres of buffer will be planted with \$380,000. These acres were reported as a result of the completion of the grants in 2021.

This funding mechanism has been continued via a partnership between DCNR and the Western Pennsylvania Conservancy through the utilization of Oil and Gas Lease Funds. During the 2021-2022 state fiscal year, DCNR invested approximately \$785,000 to fund watershed forestry projects through this mechanism, which will result in the planting of 118.98 acres of watershed forestry projects, including riparian forest buffers, conservation landscaping, and urban forest planting.

5. *Fish and Boat Commission Stream Restoration Initiative*

PFBC works with a diverse group of partners including local, state, and federal agencies, nonprofit organizations, and landowners to develop and implement stream restoration projects in the Northcentral Region of the Susquehanna River watershed. The program initially focused on instream fish habitat enhancement and bank

stabilization but has expanded to include the incorporation of riparian buffer plantings and streambank fencing when feasible.

From the initial program focused in the Northcentral Region of the Susquehanna River watershed, DEP and the PFBC expanded this initiative into other areas of the watershed, starting with one or more of the four pilot counties including Franklin, Adams, York and/or Lancaster. To accomplish this, additional staff resources at the PFBC are funded from the EPA Chesapeake Bay Implementation Grant starting with the EPA FY20 grant allocation.

6. *Chesapeake Bay Foundation Keystone 10 Million Trees Partnership (K10)*

The Keystone 10 Million Trees Partnership (K10), coordinated by the Chesapeake Bay Foundation, is a collaborative effort to add 10 million trees in priority landscapes in Pennsylvania by the end of 2025 by increasing agricultural, urban, and suburban forest riparian buffers, urban and suburban tree canopy, and abandoned mine land reclamation.

Launched in spring 2018, a coalition of diverse organizations are committed to making the Keystone 10 Million Trees Partnership goal a reality. This growing list of partners includes: a range of local, regional, and national conservation groups; Commonwealth and federal government organizations; nursery and tree supply businesses; and other businesses throughout Pennsylvania and the Mid-Atlantic.

The K10 Partnership will accelerate native tree planting efforts in identified locations, raise public awareness, and help establish sustainable, science-based management of tree planting and ongoing tree care and maintenance. It hopes to galvanize all efforts to plant streamside, urban, and other trees in Pennsylvania, to eventually reach 10 million trees.

Ultimately, adding 10 million native trees to Pennsylvania's landscape will not only help achieve local and regional water quality goals, but also reduce nuisance flooding, improve air quality, beautify communities, protect sources of public drinking water, along with boosting the local economy.

In 2020, for the first time, DEP worked with the Chesapeake Bay Foundation to ensure that all trees planted through the K10 initiative are captured and reported to EPA Chesapeake Bay Program Office for annual numeric progress. These plantings have been reported through the Partner BMP Submission module in the PracticeKeeper system. DEP aims to work with the Chesapeake Bay Foundation to report their efforts annually.

7. Restoration “Invitation to Qualify” (ITQ)

DCNR has worked with PFBC, PGC, and the Pennsylvania Department of General Services to create an Ecological Restoration ITQ through which environmental restoration companies and organizations can pre-qualify for implementation projects, including riparian forest buffer installation and maintenance. So far, this method for implementation has not been tested, but has potential to be a new way to utilize state and federal funding sources for the implementation of forestry practices.

C. Stormwater and Agriculture

1. Training, Technical Guidance, Frequently Asked Questions

In order to ensure statewide consistency, DEP has focused attention on tools and resources such as web-based training, technical guidance documents, Frequently Asked Questions (FAQ) documents, Standard Operating Procedures (SOPs), and other publications for agency and external staff as well as the regulated community. Knowing that communication and consistent application is key to the success of any program, the [Pennsylvania Clean Water Academy](#) (CWA) has been established. The CWA houses web-based training modules for sewage enforcement officers (SEOs), municipalities, conservation districts, Community Clean Water Coordinators, and DEP and SCC staff. The goal of the CWA is to reach more people with relevant information and to conduct effective and efficient training, using staff time and resources appropriately. Throughout the COVID-19 pandemic, the CWA has been utilized to ensure that staff are provided the resources they need in a virtual format, as in-person trainings and meetings were halted due to the public health emergency.

The [Soil Erosion and Sediment Control Manual for Agricultural Operations](#) – also known as the Agriculture Erosion and Sediment Control (Ag E&S) Manual – a technical guidance document that provides a detailed description of what is required of farms for Ag E&S planning and plan implementation, was published as final in October 2019. Complementary CWA web-based training modules were released and DEP continues to work with Penn State University on training development and enhancements to the [PAOneStop](#) tool.

FAQ documents and SOPs relating to permitting and compliance for construction stormwater (E&S and PCSM) are posted on DEP’s [Construction Stormwater](#) webpage and have been provided to county conservation districts. The CWA houses many web-based training modules for new and existing construction stormwater permitting, inspection, and compliance staff. Multiple in-person trainings have been provided for conservation district and DEP regional staff relating to construction and municipal stormwater permitting, compliance, inspection, and enforcement.

2. Pennsylvania Local Government Implementation (PA-LGI) Grants

NFWF continues to work with Pennsylvania DEP to administer the PA-LGI grants, with funding provided by EPA. The PA-LGI grant program provides \$1.2 million in awards annually for projects to implement one or more high-priority nutrient and sediment load reduction practices in counties in Pennsylvania's Chesapeake Bay watershed. These projects could be in the agricultural, developed, or natural sectors. In 2021, NFWF awarded the PA-LGI funds in conjunction with the NFWF Chesapeake Bay Small Watersheds Grant program to allow grant applicants to apply to one solicitation.

3. Act 13 of 2012 – Marcellus Legacy Fund – Pennsylvania Department of Community and Economic Development (DCED)

The Marcellus Legacy Fund was created by Act 13 of 2012 to provide for the distribution of unconventional gas well impact fees to counties, municipalities, and Commonwealth agencies. A portion of the fee revenue is transferred to the Commonwealth Financing Authority for statewide initiatives, including: abandoned mine drainage abatement; abandoned well plugging; sewage treatment; greenways, trails, and recreation; baseline water quality data; watershed restoration; and flood control. The Greenways, Trails, and Recreation Program can be a potential funding source for green infrastructure practices along with the development, rehabilitation, and improvement of public parks, recreation areas, greenways, trails, and river conservation. Applications for funding for the seven programs are accepted annually between February 1 and May 31. More information about each of the programs can be found on DCED's [Act 13 Programs](#) website.

4. DEP Office of Water Programs and Regional Office Reorganization

In September 2020, the DEP Office of Water Programs was reorganized to ensure consistency and standardized oversight. First, the Conservation District Field Representatives (CDFRs), who previously reported to the DEP regional offices, were centralized under the Conservation District Support Section. Second, the Bureau of Clean Water's Nonpoint Source Compliance Section was bifurcated, with Agricultural Compliance becoming its own section under the Chesapeake Bay Office, and Stormwater Compliance becoming its own section under the NPDES Permitting Division in the Bureau of Clean Water. Third, the Watershed Support Section (which oversees nonpoint source management grant programs such as Growing Greener and Section 319) and Conservation District Support Section (which oversees activities related to the operations and support to Pennsylvania's 66 conservation districts) were moved under the Chesapeake Bay Office. This reorganized structure allows for more continuity between and amongst the nonpoint source management and watershed restoration programs, as they are all housed under the Chesapeake Bay Office Director.

D. Stormwater and Wastewater

1. H2O PA Act - DCED

The H2O PA Act was established in 2008 and provides for single-year and multi-year grants for the construction of drinking water, sanitary sewer and storm sewer projects; the construction or renovation of flood control projects; and the repair or rehabilitation of high-hazard unsafe dams. More information about each program can be found on DCED's [H2O PA Programs](#) website.

2. Small Water and Sewer Program – DCED

The Small Water and Sewer Program is to assist with the construction, improvement, expansion, or rehabilitation or repair of a water supply system, sanitary sewer system, storm sewer system, and flood control projects. Eligible projects are those that have a total project cost of not less than \$30,000 and not more than \$500,000. More information about this program can be found on DCED's [Small Water and Sewer Program](#) website.

3. Clean Water State Revolving Fund (CW-SRF)

DEP and PENNVEST work together to provide funding and technical assistance to point and nonpoint source projects, through a low-interest loan and principle forgiveness program. Beginning in 2022, \$340 million will be added annually for the next five years to the CW-SRF from the IJA / Bipartisan Infrastructure Law (BIL). In 2022, DEP and PENNVEST prepared and published an RFP for Technical Assistance and Outreach. The overall goal of the RFP is to assist project sponsors in order to get projects in for funding. Technical assistance and outreach efforts are essential to help project sponsors understand the funding options and break down the barriers to projects moving through planning and design and eventually to funding.

VIII. ANTICIPATED REDUCTIONS FROM CAP DEVELOPMENT AND IMPLEMENTATION / MERGING THE STATE PRIORITY INITIATIVES FOR NUMERIC REDUCTIONS WITH THE CAPS (blue bar)

This section describes how priority initiatives described above will be merged with the local initiatives identified as part of the CAP planning process described in [Section 3, Countywide Actions](#). The reductions identified in this table account for Pennsylvania's entire portion of the Chesapeake Bay watershed and do not account for individual county progress. Watershed-wide runs cannot account for variation in county plans.

The variation in county plans and nutrient reductions is summarized in Table 2.1 with the Tier level groupings of the counties as well as the minimal loading counties.

Figure 2.5 shows EPA modeled nitrogen reduction progress and projected reductions for the 43 Pennsylvania counties in the Chesapeake Bay watershed. This graphical representation is not to scale.

- The **purple bar** represents the progress each county has achieved to date. The programs represented by the **purple bar** will support the statewide actions outlined in the **green bar** ([Section 2, State Actions](#)) and the county actions identified in the **blue bar** through funding and resource support.
- The **blue bar** represents the CAPs. The **green bar** represents the statewide actions that complement the CAPs. The **purple** and **green** bars are designed to support the CAPs as well as show what could be achieved through additional financial, technical, and human resources outlined in [Section 5, Existing and Needed Resources](#).
- Further coordination needs to occur to: show progress that includes practices that have been backed-out or cutoff in the model; continue reporting of undocumented practices; continue coordination with the Partnership to achieve credit for additional practices and programs that achieve water quality improvement in Pennsylvania and that are not currently credited in the Chesapeake Bay Watershed Model; and document completion of the CAPs.
- Each county's strategy is built on the foundations of the programs and practices represented by the **purple**, **green**, and **blue** bars in addition to the further coordination needed to achieve the 2025 planning target. The **purple bar** will continuously grow as county actions are implemented. Statewide programs and actions will continue to support counties as they continue to develop and adapt their CAPs through two-year milestone commitments and annual progress reporting. Pennsylvania commits to have practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP phosphorus and nitrogen targets.

Note the following for Figure 2.5 and 2.6:

- For Cumberland, Franklin, Perry, and Snyder counties the change from CAST-17 to CAST-19 increased the planning goals due to the updated 2017 Agriculture Census increased animal numbers applied to outdated 2013 – 2015 land use. The purple "Progress to Date" is not depicted for these counties, but all of these counties have increased BMP implementation for 2020. One reason for this could be BMPs that were backed out or cutoff in the model as well as BMPs that were historically providing estimated nutrient reductions reaching their credit duration expiration. In addition, EPA's CBPO is updating CAST-21 with 2017 – 2018 land use change with 2017 Agriculture Census. The CAST-21 updated planning goals may be more representative of the land use and loading for counties in Pennsylvania's portion of the Chesapeake Bay Watershed due to the use of updated land use change.

- In 2021, and in an effort to represent more actual reported data, DEP updated its wastewater data to reflect a 3-year annual average to include 2018, 2019, and 2020 modeled progress. This resulted in a higher load for the following counties: Cameron, Carbon, Elk, Lackawanna, Lebanon, Luzerne, McKean, and Somerset.

Figure 2.6 shows the same information for phosphorus reduction.

The state nutrient reduction priority initiatives serve as a starting point for counties as the counties completed their individual planning processes. The state priority initiatives were identified for easy reference in each county's [Community Clean Water Technical Toolbox](#). Once a county's planning process is completed, that county's progress will be updated to reflect the results of its planning process. After all of the planning and implementation is complete for the state priority initiatives and for BMPs identified by the counties, Pennsylvania will reach the 2025 reduction goal.

Figure 2.5. EOS Modeled Nitrogen Reductions by County

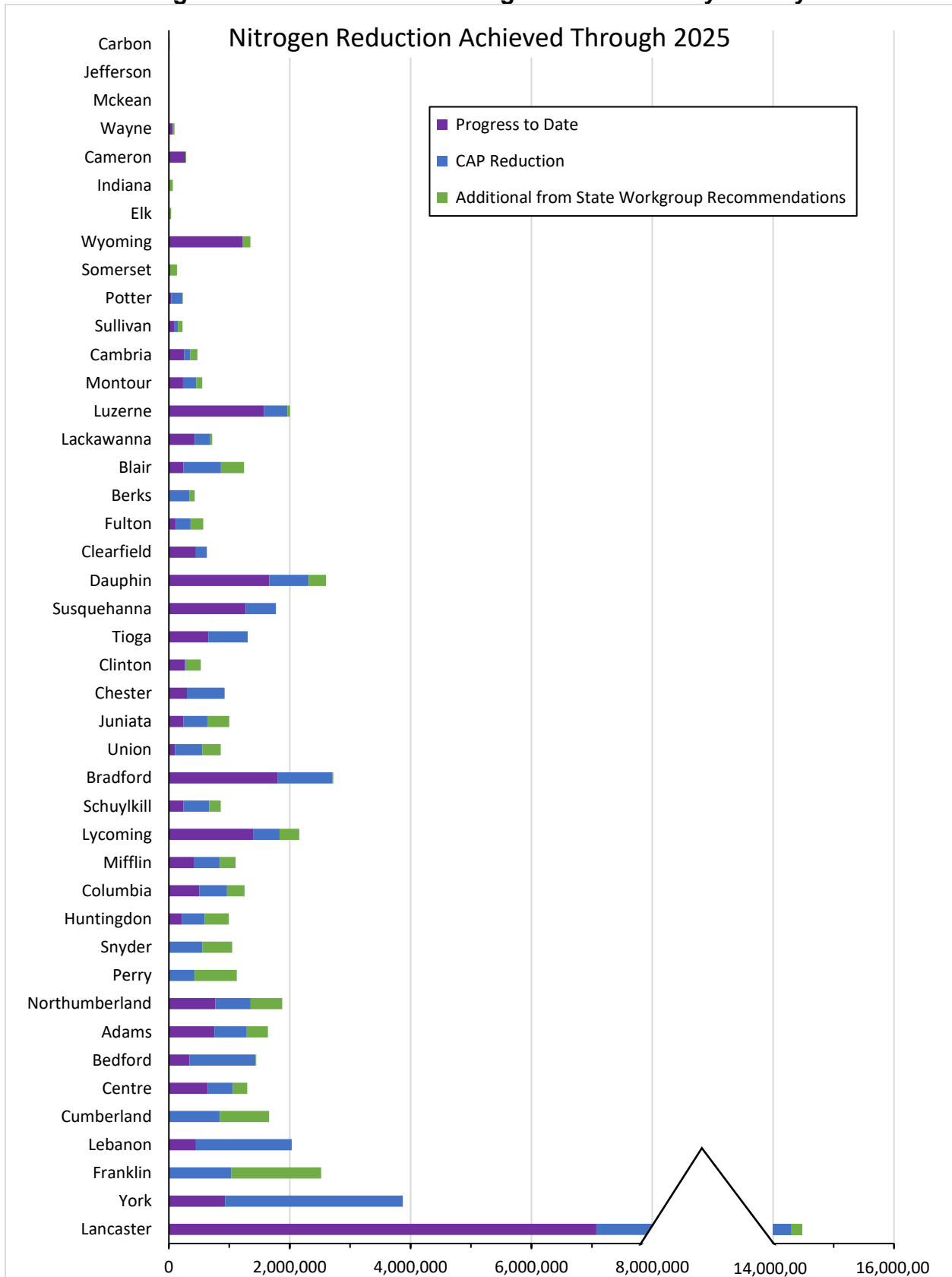
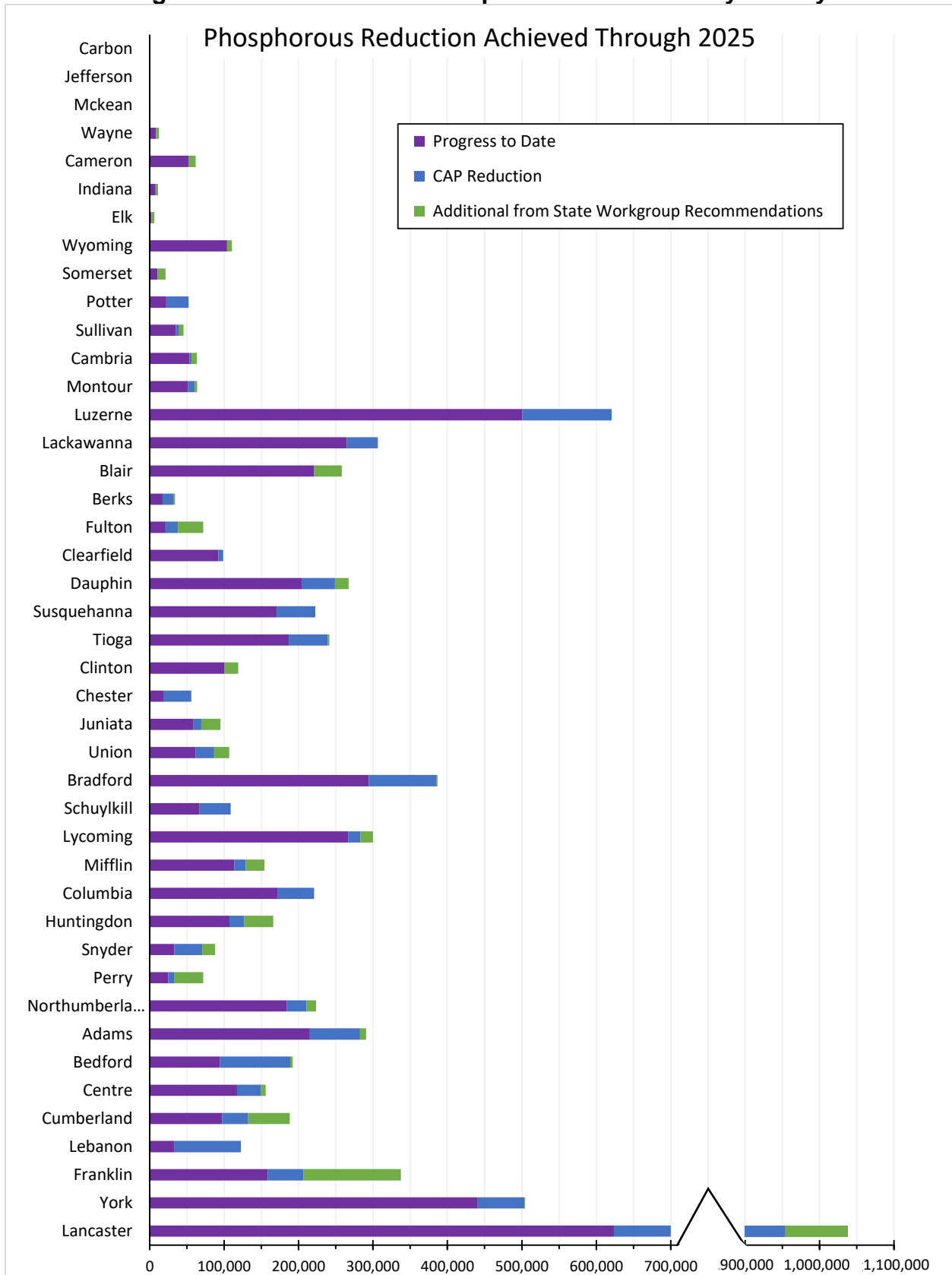


Figure 2.6. EOS Modeled Phosphorus Reductions by County



IX. PHASE 3 WIP PRIORITY INITIATIVE STATE PROGRAMMATIC AND NARRATIVE COMMITMENTS

A. Legislative

Several legislative actions have been introduced related to funding, practice implementation or authority for further reductions in the state legislature. Below is an itemization of legislative actions specific to environmental and natural resources to include funding, practice implementation, and authority for further actions. In addition to legislation enacted during the 2019-2020 General Assembly session, legislation introduced or contemplated in the 2021-2022 legislative session is identified, along with investments in environmental protection and water quality included in the enacted Fiscal Year 2022-2023 state budget.

1. Legislation to Fund and Facilitate Practice Implementation and Nutrient Reductions

To meet 2025 reduction goals, the estimated funding gap between existing and available funding is approximately \$324 million annually. While some of this gap may already be covered through private investments not currently tracked, a significant increase in public funding was determined as necessary if Pennsylvania’s Phase 3 WIP is going to be successful. Pennsylvania’s Fiscal Year 2022-2023 budget resulted in \$154 million investment in the new statewide Agricultural Conservation Assistance Program and more than \$380 million investment in other new and existing programs for the agricultural, stormwater, wastewater, and forestry sectors. The four priority initiatives identified in Table 2.9 below will help to achieve 50% of the nitrogen reduction goal and 86% the phosphorus reduction goal. Some amount of the \$52 million identified for existing and new agency and external staff resources for technical support would also be needed to implement this effort; a minimum of 5% of the cost of implementation is recommended.

Table 2.9. Implementation Costs for Top Priority Initiatives

Priority Initiative	Cost (in millions)	Nitrogen Reduction	Phosphorus Reduction
Agricultural Compliance	\$33.1	14%	12%
Soil Health	\$32.9	14%	14%
Forest Buffers	\$28.1	16%	49%
Grass Buffers	\$3.3	8%	37%
TOTAL	\$97.7	50%	86%

The enacted Fiscal Year 2022-2023 budget include provisions for local water quality improvement across the state. However, targeting or prioritizing funding to the Chesapeake Bay watershed is recommended for purposes of this Phase 3 WIP.

a. 2019 – 2020 Legislative Session

As noted in Section 2.VII.A.1, the set of bills under the banner of the 2019 Pennsylvania Farm Bill included funding for a few key programs administered by the State Conservation Commission: REAP tax credits ([Act 13 of 2019](#)), AgriLink loans ([Act 37 of 2019](#)), and the new Conservation Excellence Grants Program ([Act 39 of 2019](#)).

[Act 78 of 2019](#) established the Keystone Tree Fund, where people renewing Pennsylvania driver's licenses or vehicle registrations can choose to contribute \$3 to the fund, which DCNR can use to support their riparian buffer grant program and TreeVitalize program.

b. 2021 – 2022 Legislative Session

The following programs and funding were included in the Fiscal Year 2022-2023 budget and Fiscal Code ([HB1421](#)):

- Clean Streams Fund – funding for the following programs equals \$220 million:
 - \$154 million (70%) for the Agricultural Conservation Assistance Program (ACAP), administered by the State Conservation Commission
 - \$22 million (10%) for the Pennsylvania Clean Water Procurement Program, administered by PENNVEST
 - \$22 million (10%) for the Nutrient Management Fund, jointly administered by the State Conservation Commission and DEP
 - \$8.8 million (4%) for grants and reimbursements to municipalities and counties under the Stormwater Management Act (Act 167), administered by DEP
 - \$8.8 million (4%) for the Keystone Tree Restricted Account (Keystone Tree Fund), administered by DCNR
 - \$4.4 million (2%) to the Acid Mine Drainage Abatement and Treatment Fund
- H2O PA – funding for the H2O PA Act, administered by the Commonwealth Financing Authority (CFA) of DCED equals \$214 million.
- Small Water and Sewer Program – funding for the CFA Small Water and Sewer Program equals \$105.6 million.

More descriptions related to the Clean Streams Fund programs are as follows:

- Agricultural Conservation Assistance Program (ACAP) – this new program provides for local conservation districts throughout the Commonwealth to directly receive and manage funding for agricultural conservation projects. The legislation was developed through a collaboration of both governmental and non-

governmental entities, including but not limited to the Pennsylvania Farm Bureau and the Chesapeake Bay Foundation.

- Pennsylvania Clean Water Procurement Program – this new program establishes a competitive bidding process for nutrient reductions, inclusive of a pay-for-performance method, where private partners would implement projects and be reimbursed after the reductions were created and verified.
- Nutrient Management Fund – the existing Act 38 Nutrient Management Program and CEG are funded through the Nutrient Management Fund. Additional funding will be used to further support this program, which may include funding for conservation district staff, the Nutrient Management certification program, state agency personnel, and CEG.
- Stormwater Management Act Grants and Reimbursements – this new funding program provides grants and reimbursements to counties and municipalities to develop and implement Stormwater Management (or Act 167) Plans.
- Keystone Tree Fund – this existing fund is used to support the DCNR riparian buffer grant program and TreeVitalize program.

The Fiscal Year 2022-2023 budget also included the following agency programmatic highlights:

- Funding for Conservation Districts increased by \$6.8 million, of which \$1.8 million would go toward the existing PDA Agriculture Conservation Technician (ACT) program and \$5 million would go toward the existing DEP Conservation District Fund Allocation Program (CDFAP).
- Funding for Agricultural Research and Extension increased by \$2.75 million, or 5%.
- Oil and Gas Lease Fund revenues will support a new \$56 million State Parks and Forests Infrastructure program.

In addition to the funding allocated to new and existing programs, the legislature passed the following in the 2021-2022 legislative session:

- Fertilizer Legislation (SB 251) – This bill is a reintroduction of [SB 915](#) from the 2019-2020 legislative session, and would limit nitrogen and phosphorus in consumer-level fertilizer as well as nitrogen and phosphorus applications by professional lawn companies, unless they prepare a site-specific nutrient management plan.

Legislative proposals that are still being contemplated in the 2021-2022 legislative session are the following:

- Growing Greener III (SB 525) – This bill, which has bipartisan sponsorship, would establish a framework for a Growing Greener III program to protect Pennsylvania’s water, land, forest, and other natural resources and stimulate economic growth in Pennsylvania’s communities. Funding is proposed from an infusion of \$500 million appropriated from the federal American Rescue Plan Act, allocated as follows:
 - 45% to DCNR for grants and land trust projects
 - 20% of DCNR’s allocation would be provided to projects and programs located within the watershed of the Susquehanna River and its tributaries
 - 40% to DEP
 - At least 40% of DEP’s allocation would be provided to projects and programs located within the watershed of the Susquehanna River and its tributaries
 - 15% to PDA
 - At least 30% of PDA’s allocation would be provided to authorized organizations to preserve farmland
 - At least 50% of PDA’s allocation would be provided to projects and programs located within the watershed of the Susquehanna River and its tributaries
- Stream Fencing (HB 810) – This bill would give municipalities the authority to require livestock exclusion fencing along streams, while allowing for livestock crossings, as needed. Currently, Section 702 of Pennsylvania’s Clean Streams Law (35 P.S. § 691.702) prohibits Commonwealth agencies or political subdivisions from requiring fencing for the purpose of keeping farm livestock out of the streams, a provision which impedes progress in water quality improvement.
- Pennsylvania Water Resource Act (HB 20) – This bill is a reintroduction of legislation from the 2019-2020 legislative session. The legislation would charge those who withdraw more than 10,000 gallons a day a nominal per gallon fee for removing water from Pennsylvania waterways. The fee would not apply to municipal uses, and revenue would be distributed back to the watersheds in which it was generated to fund water improvement projects. A 2018 study by the Legislative Budget and Finance Committee estimated that modest fees on each gallon of water withdrawn over 10,000 gallons per day could generate millions of dollars statewide.

The following co-sponsorship memoranda contemplating legislation that could advance Phase 3 WIP efforts have also been filed in the current legislative session.

- Environmental Justice – This [co-sponsorship memo](#) by Representative Sturla contemplates legislation to enhance DEP’s Environmental Justice Public Participation Policy and to require mandatory permit denials if an environmental justice analysis determines a new facility will have a disproportionately negative impact on overburdened communities. The envisioned legislation would also create the Commission on Environmental Justice and Sustainable Communities to advise the Commonwealth.

c. Other Potential Legislation

- Restore Pennsylvania – The Restore Pennsylvania initiative proposes a \$4.5 billion bond initiative to restore critical infrastructure in Pennsylvania. The initiative includes investments for critical flood control infrastructure, green infrastructure, and municipal and institutional stormwater management improvements. Among other things, the initiative would fund BMPs on farms, clean up abandoned mines and restore watersheds, protect open space, address maintenance needs in state parks, preserve working farms, provide funds for recreational trails and local parks, help communities address land use, and provide new and upgraded water and wastewater systems. If enacted, Governor Wolf’s Restore Pennsylvania proposal would be the single largest investment in environmental programming in Pennsylvania history. Restore Pennsylvania bills were introduced with bipartisan support in the 2019-2020 legislative session ([SB 725](#) and [HB 1585](#)). At the time this Phase 3 WIP was amended, no Restore Pennsylvania bills were introduced in the 2021-2022 legislative session.
- Integrators and Private Investors, Public-Private Partnerships – A public-private partnership is a contractual agreement between a public agency and a private entity that allows for greater private sector participation in the delivery and (in some cases) financing of a project. This form of public-private partnership is difficult for local governments to implement due to procurement limitations at the municipal level. Legislation to amend provisions governing municipal procurement may help to allow local governments to solicit proposals to implement stormwater management programs using one of the following contract arrangements:
 - Operation and Maintenance Management – Through this arrangement, the contractor commits to providing operation and maintenance services to a specific performance standard and accepts the risk of managing certain costs through their expertise, asset management and economies of scale.
 - Design, Build, Operate and Maintain (DBOM) – Through this arrangement, the contractor agrees to not only design and build a project or practice, but operate and maintain what is built for a defined period of time.
 - Design, Build, Finance and Maintain (DBFM) – This arrangement is like the DBOM arrangement, only the contractor also agrees to finance the project or practice and any improvements or enhancements. The contractor may

be able to finance the project or practice at a lower cost than the public entity needing the project or practice completed.

- Lease and Concession – This is a long-term lease of a project or practice in return for either an upfront payment, or long-term payments over time.
- Revisions to Pennsylvania’s Right to Know Law – If additional reporting requirements become a reality, the Phase 3 WIP partners recommend an amendment of the Pennsylvania Right to Know Law to create exemptions from public record production requirements and to extend confidentiality protections to any farm-specific information reported by the agricultural industry. Without this protection, many landowners are reluctant to report BMPs that they have installed with their own resources or with public resources. Such an amendment ensuring the confidentiality of information submitted to regulatory agencies would facilitate the Commonwealth’s efforts to track and verify the implementation of BMPs at agricultural facilities. Lack of confidentiality is hindering Pennsylvania’s ability to track progress toward meeting reduction goals.

B. Regulatory

1. Chapter 105 Regulatory Amendments

DEP is working towards regulatory amendments to Chapter 105 including clarifying waiver provisions and a new section to clearly outline the environmental assessment requirements associated with a restoration project such as a stream, wetland, or a floodplain restoration project within the watershed context. These proposed regulatory amendments were published in December 2020 ([50 Pa.B. 6863](#)) for a 60-day public comment period. At the time of the amendment of this Phase 3 WIP, DEP is in the process of drafting the final-form regulatory amendments. In the interim until these regulatory amendments are finalized, DEP is also considering and advancing revisions or clarifications to existing permits, policy, guidance, and other information that promotes and enhances water quality and aquatic resources through existing requirements. This will help with the implementation of stream and wetland restoration projects. As one example of this effort, in September 2021, DEP published a draft technical guidance document on Chapter 105 alternatives analyses, which DEP will be working to finalize, after considering public comments provided on the draft guidance document.

The Chapter 105 proposed rulemaking also includes amendments to Section 20a, which is proposed to be retitled *Compensation for impacts to aquatic resources*. These requirements have not been updated since the 1991 Rulemaking with the introduction of Section 20a, although concepts of mitigation and compensatory mitigation have been required under these regulations, incorporated by definition, since the 1980 Rulemaking. The proposed update to Section 20a coincides with advances in science and current understanding of environmental and aquatic resource restoration principles. These revised requirements will also dovetail with the federal mitigation requirements, introduced under the 2008 federal mitigation rule, so that applicants and the regulated

community will not have to comply with two different standards; Pennsylvania's standards will satisfy the federal standards. Specifically, the proposed amendments to Section 20a will establish compensatory mitigation standards including siting criteria for service areas, standards for assessment of impacts and the valuation of proposed compensation, monitoring and performance standards. This section, along with the technical guidance documents referenced therein, will allow for all three methods of providing compensation for unavoidable impacts including permittee responsible, mitigation banking and in-lieu fee. Applicants are still encouraged to reduce the amount of compensatory mitigation required by following the progression of avoid, minimize, repair, and rehabilitate found in the long-standing definition of *mitigation* under §105.1.

2. *Enhanced BMP Requirements for Agriculture Erosion and Sediment Control*

If needed in the future, DEP may consider revisions to current language in the Chapter 102 Erosion and Sediment Control regulations to provide authority in the agricultural erosion and sediment control requirements for mandatory installation of additional priority BMPs in watersheds identified by DEP as impaired.

C. Programmatic & Policy

The following programmatic and policy enhancements will be implemented to address either the county or Phase 3 WIP workgroup recommendations.

1. *Enhanced Nutrient Management Planning for Biosolids*

Municipal biosolids may be land applied onto Pennsylvania's agricultural lands, including those agricultural lands in the Chesapeake Bay watershed. While providing nutrient benefits to those farms that utilize biosolids, the increased presence of biosolids is adding to the nutrient management challenge that already exists on Pennsylvania's lands. Current regulatory standards require generators of biosolids to perform nitrogen-based nutrient management planning and implementation when land applying biosolids on agricultural land. DEP is exploring the expansion of required management planning and implementation for biosolids to also include management of phosphorus consistent with the nutrient management planning standards established for animal manure. DEP believes this can be addressed through further consideration of the Phosphorus Index and potentially incorporating a revised Phosphorus Index into future planning requirements. DEP is in the process of consulting with stakeholders regarding the incorporation of the Phosphorus Index into updated permits for the land application of biosolids.

2. *Enhanced NPDES Stormwater Construction Consideration of MS4 Priority Restoration BMPs*

During the development of the Phase 3 WIP, it was recommended that greater collaboration occur between NPDES Stormwater Construction permit applicant use of

BMPs identified as MS4 priorities, such as impervious surface restoration, storm sewer disconnection, and other retrofitting activities to address increases in stormwater. DEP will continue to evaluate the best mechanisms to enhance this coordination.

3. Expanded Coordination of MS4 and Nonpoint Source Nutrient Pollution Reduction Actions and Offsetting

DEP has provided guidance to counties and MS4-regulated communities, enabling, and encouraging them to work outside of Urbanized Area boundaries to mitigate local impairments. These guidelines have been published in the form of [MS4 Frequently Asked Questions \(FAQs\)](#). This locally led, holistic approach can mitigate nutrient and sediment impairments through implementation of sediment reducing BMPs such as stream restoration, riparian forest buffers, legacy sediment removal and ecosystem restoration, etc.

4. Chapter 102 Erosion and Sediment Control and Stormwater Management

DEP is currently updating the Stormwater BMP Manual, which will include updated recommendations for calculating BMP water quality, volume, and rate efficiencies. Future initiatives related to the stormwater management programs include prioritized reviews of permit applications within the Chesapeake Bay watershed or with specific Chesapeake Bay improvement BMPs, such as Forest Buffers or other Restoration BMPs (such as Stream Restoration, Wetland Restoration, Landscape Restoration, etc.) Additionally, DEP developed an NPDES General Permit (PAG-01) for construction sites between one and five acres, effective March 1, 2022. Prioritized reviews of permit applications within the Chesapeake Bay watershed or with BMPs that would net the greatest improvement to water quality may also incentivize implementation. These programs will be tracking and reporting those outputs for Chesapeake Bay Program annual progress.

5. Stormwater Management Act (Act 167) Program Improvements

The multiple recommendations related to the Act 167 Program also focused on integration of Act 167 plans with other planning efforts and more robust compliance and enforcement. DEP will prioritize Act 167 compliance and enforcement to align with Phase 3 WIP priorities and will undertake education and outreach related to the benefits of Act 167. For example, DEP provided additional preference for projects located in counties with DEP-approved Act 167 plans in the 2021 Growing Greener Plus grant round. DEP will also undertake outreach and training refinements to these programs underway since 2002, and as reflected in the 2010 amendments to the Chapter 102 regulations. DEP continues to propose hiring two additional employees to implement these efforts.

6. *Bradford County Stream Reconstruction Pilot Program*

DEP has provided, by delegating the Bradford County Conservation District, the ability to authorize stream reconstruction actions under the Chapter 105 Water Obstructions and Encroachments Program Emergency Permit. The activities authorized under this special Emergency Permit will utilize the “Bradford County Stream Reconstruction Pilot Program” and the “Emergency Stream Intervention Protocol Manual” during a three-year trial and assessment period. Work under these Emergency Permits includes removal of debris, bank stabilization, and removal of accumulated silt and sediment from stream channels beyond the normal maintenance area. The authorization for the excavation/removal of debris, sand, gravel, bedrock material, deposited or collected in and along the floodway will be addressed using this Emergency Permit. DEP will meet periodically with the conservation district to assess the capacity and level of accomplishment that the pilot program provides through the implementation of remedial actions and alleviation of adverse public health, safety, and environmental conditions before and after flood events.

The three-year trial and assessment period should be a sufficient time period to determine the pilot program’s effectiveness because flooding is likely to occur during that time period. Once the pilot program assessment is complete, a determination will be made as to whether the program should be expanded to other areas or counties. The timeline for this three-year trial period is July 2019 to July 2022.

7. *Real-time Water Quality Data*

Currently, DEP’s Water Quality Division (WQD) operates the Water Quality Network (WQN). WQN data is used to generate pollutant loads, yields, and trends. These statistical evaluations of water quality data are one of the most powerful water quality datasets that inform water quality improvements in the Chesapeake Bay watershed. They answer questions like, “How much nitrogen, phosphorus, and sediment has the Susquehanna River contributed to the Bay at any specific time?” These data and evaluations have been incorporated into the Phase 3 WIP development. In addition to the WQN, WQD staff operate and coordinate the collection of continuous instream water quality data that is available, at least initially as preliminary data, on the USGS website. This data is supplemental to the WQN data and provides real-time information but is not appropriate to be used as a real-time barometer of water quality. Water quality conditions fluctuate greatly and are primarily driven by the amount and timing of precipitation. As such, it is very difficult to provide real-time characterization of water quality and creates the need to rely on long-term water quality data to measure changes in water quality.

The WQD has worked to better inform the overall water quality dataset by conducting extensive quality assurance and quality control on additional records from 2010-2020 and submitting them to EPA’s Water Quality Portal, a national, publicly accessible database. This project was funded through the EPA National Environmental Information Exchange Network (NEIEN) and Section 106 federal grants and resulted in a statewide

submission of 2,021,291 records from 64,907 sampling events, of which about half were located within Pennsylvania's Chesapeake Bay watershed.

One complicating factor is that existing water quality data often does not account for water quality improvements that may be occurring on relatively smaller scales. The difficulty lies in the time lag from implementation of BMPs to actual resulting change in water quality. WQD staff, along with regional DEP biologist and county staff, are actively pursuing these characterizations, with the goal of deploying additional WQN stations and gages in the lower Susquehanna River and potentially some targeted tributaries (e.g., the Conestoga River). The real-time data would be available and would also provide additional information for annual and milestone reporting.

In an attempt to characterize nitrogen, phosphorus, and sediment, data collection at new and existing stations would need to occur for a period of at least two years. This data would be used to develop models that could display nitrogen, phosphorus, and sediment information in a real-time format. DWQ is currently evaluating additional locations and the potential for gage installation, as well as the resources necessary to deploy multiple monitoring stations that would provide results akin to one "Super Gage."

This effort will require a moderate reorganization of effort, approximately \$600,000, and at least one additional staff member.

D. Incentives or Methods to Accelerate Practice Implementation

There are several different funding sources across multiple Commonwealth agencies that can contribute to nutrient reductions for the Chesapeake Bay. Each program has their own procedures, timeline, criteria, and goals for selecting and awarding program funds. In many cases, these criteria and goals are similar. More importantly, where appropriate, the funding from these programs could be combined or better coordinated to accelerate practice implementation. To achieve this outcome, the Commonwealth will continue to look at the programmatic goals of the different agency funding sources and combine them where appropriate or, at a minimum, look for ways to ensure that they are complementary and not competitive.

1. Use of "Block Grants"

DEP's Chesapeake Bay Office and its Office of Water Resources Planning developed two "block grant" programs, which were initially rolled out in the fall of 2019 and have been awarded annually since that time. The first is the Community Clean Water Coordinator Grant, and the second is the Countywide Action Plan (CAP) Implementation Grant. To be eligible for the Community Clean Water Coordinator Grant, counties needed to voluntarily agree to develop a CAP utilizing the Phase 3 WIP County Clean Water Technical Toolbox and Planning Guide. To be eligible for the CAP Implementation Grant, counties need to first complete their CAP and submit an application that shows how the projects would connect to county priority initiatives, with a goal of reducing nutrient and sediment in an accelerated period of time. As projects

are identified and developed, applicants are then be “pre-approved” to receive funds to implement these projects, adding funds to their existing award as they become available.

In the initial year, \$1,479,400 was awarded for coordinators for Pilot and Tier 2 counties and implementation in Pilot counties. In the second year, a total of \$6 million was awarded for coordinators and implementation in the Pilot and Tier 2 counties and \$1 million was awarded for coordinators in Tier 3 and 4 counties. In the third and most recent year, more than \$15 million is being awarded for coordinators and implementation in all Pilot, Tier 2, Tier 3, and Tier 4 counties. The decisions on which projects to fund are then locally-driven; projects may be located in urban, developed, agriculture, and/or natural sectors depending on the priority initiatives and focus of the counties.

The fluidity associated with designing, financing, and implementing BMPs creates a need to be able to allocate funds quickly and to the intended party. Those responsible for the coordination, implementation, installation, and long-term maintenance of these BMPs should be provided flexibility to determine and prioritize the proportionate amounts of disbursement of funds to expedite this work. Where possible, the combination of different state and federal funding sources can be more effectively utilized if provided in the form of an allocation-based funding mechanism, where the funds can be managed to meet changing local conditions.

2. Creation of County State Revolving Loan Fund

PENNVEST will utilize federal State Revolving Loan Fund monies to facilitate the creation of county or regional revolving loan funds to implement practices in a streamlined manner. With these funds, PENNVEST will offer counties or other local/regional entities low-interest loans for capital improvements and grants for practices, coordinate loans with other existing programs, or supplement other federal and state funding programs with low interest loans. These County State Revolving Loan Funds will be administered by a county or regional governmental agency or other entity with the financial capability to coordinate the use of such funds.

3. Expansion of Existing Funding Programs Like REAP, TreeVitalize, and Growing Greener

The Phase 3 WIP Funding Workgroup looked at different existing funding programs and made recommendations such as expanding the REAP program, revising the criteria of the TreeVitalize program, and creating a Growing Greener III program, with Chesapeake Bay-focused funding. As identified earlier, there is bipartisan support for the creation of a Growing Greener III program, with focus on projects and programs located within the Susquehanna River basin in urban, developed, agriculture, and natural sectors. These recommendations were identified as effective means to accelerate implementation of priority practices. As noted previously, the 2019 Pennsylvania Farm Bill included new or expanded funding for the State Conservation

Commission’s Conservation Excellence Grants Program, AgriLink loans, and REAP tax credits. Every year since 2019, additional funds have been budgeted for all three programs.

4. *Establishment of the Center for Water Quality Excellence (CWQE)*

The purpose of the [Center for Water Quality Excellence](#) (CWQE) is to support efforts and coordination among governmental agencies and stakeholders to facilitate cohesion of state and local interests, programs and projects, and funding to support initiatives.

The CWQE was established in 2021, with a specific focus in the Tier 1 counties – Lancaster and York – as a pilot. The CWQE headquarters is located in the city of Columbia in Lancaster County, bordering the Susquehanna River. Depending on the results of this pilot project, this “One Stop Shop” concept may be expanded to other counties.

The CWQE serves as a clearinghouse for sharing ideas, proposals, and projects for effective conservation management, financing, and assistance on a countywide, inter-county, regional, and watershed-wide basis. The CWQE is success- and results-driven while providing the necessary outreach and engagement to all sectors with a focus on agriculture and stormwater. The CWQE is flexible and adaptable and uses various methods to supplement and/or complement the services already provided by Pennsylvania’s many committed partners such as: practice design standards, regulatory obligations, technical assistance, data collection, progress summarization, project prioritization, and financial assistance.

The CWQE is funded through PENNVEST’s EPA State Revolving Loan Fund administrative funds to allow the CWQE to be implemented by an entity outside of a state or federal agency structure.

5. *Practice Installation on State Lands*

Pennsylvania state agencies and state-affiliated agencies should put buffers and other BMPs in place on state-owned lands wherever feasible. Possibilities include roadways, parks, school and college campuses, and prisons. One example of this coming to fruition is the coordinated effort between DCNR, PFBC, the Juniata County Conservation District, the Keystone 10 Million Trees Initiative, Western Pennsylvania Conservancy, and the Juniata Watershed Alliance to plant native trees and shrubs on PFBC-owned land. To accelerate Pennsylvania’s progress towards achieving the nutrient reduction planning targets, agency planning goals for all state agencies will be established. Also, state agency specific plans, much like the federal agency plans in [Section 4, Federal Actions and Coordination](#), will be developed to achieve these planning goals within the next two years.

6. *Enhanced BMP Requirements for Agriculture Erosion and Sediment Control*

DEP will evaluate how to ensure Ag E&S Plans include enhanced BMP requirements in watersheds identified by DEP as impaired or having a TMDL. DEP has revised the appropriate technical guidance documents to highlight the recommended priority practices identified within the Phase 3 WIP to achieve the priority initiatives identified. DEP has also developed and released applicable training, tools, and publications specific to the implementation of the priority initiatives defined by the Phase 3 WIP.

7. *Review and Consideration of DEP Permitting Process Modifications*

DEP is evaluating its permitting requirements to facilitate a smooth process for farmers and others seeking to resolve existing resource concerns or prevent future impacts by increasing implementation of BMPs. Projects reducing or even eliminating existing discharges or having an overall positive environmental benefit will be considered for prioritization and an incentivized process to ensure BMPs are installed in an efficient, cost-effective manner as soon as possible. Chapter 105 regulatory amendments, PAG-01, and the Bradford County Pilot Project described in other sections, are examples of efforts underway.

In 2020, DEP published [The Pennsylvanian's Guide to Permitting for Watershed Improvement Projects](#), as a result of local stakeholder engagement and requests for a user-friendly guide.

A companion effort to these permitting modifications includes the necessary alterations to existing permitting program procedures to continue to collect and report the practice data identified during the undocumented practices effort moving forward. Existing data gathering and reporting will continue, and all feasible new data gathering and reporting efforts will be implemented moving forward. These regulatory programs include a high likelihood of practice implementation due to permitting requirements and compliance efforts. This combination of practice data gathering and reporting efforts also provides reasonable assurance that Pennsylvania will meet its Chesapeake Bay TMDL commitments.

8. *Improvements to DEP's Cross-Program Reporting*

There is a DEP-wide initiative to institute electronic permitting (ePermitting) and electronic inspections (eInspection), with linkages between the two in DEP's [eFACTS](#) database. As these tools progress, much more information will be available to extract and report. For instance, DEP's Bureau of Oil and Gas was the first to institute ePermitting and eInspection applications, with other DEP programs currently developing these applications. DEP will work to ensure that long-term, agency-wide reporting is integrated for annual progress reporting.

9. Incentivizing Industry-Driven Programs

Regional producer cooperatives and businesses regionally purchasing or processing agricultural products may provide a meaningful opportunity for developing effective and integrated programs. These programs would work with and provide technical and financial assistance to farmers marketing products through the cooperative, or to the business in planning and performing conservation measures on farms. The industry-based (and industry-led) programs allow farmers to obtain needed financial and technical assistance on a higher scale than what many can obtain individually. A prime example of such a program is the [Turkey Hill Clean Water Partnership](#) – a cooperative effort of Turkey Hill Dairy, Maryland & Virginia Milk Producers Cooperative Association (MDVA), and the Alliance for the Chesapeake Bay. Additionally, in 2021, a new initiative called [Sustainable Dairy PA](#) has launched to support a more sustainable and climate-friendly dairy supply chain in Pennsylvania for Hershey’s milk chocolate. Sustainable Dairy PA is a collaboration by the Alliance for the Chesapeake Bay, The Hershey Company, and Land O’ Lakes to support installation of on-farm BMPs to help reduce greenhouse gas emissions and improve water quality in the Chesapeake Bay watershed. The Sustainable Dairy PA initiative has prioritized 119 Land O’ Lakes member-owners in central Pennsylvania who ship 50% or more of their milk supply to Hershey. Overall, partners have worked collaboratively to provide Pennsylvania dairy farmers with technical and financial assistance in reviewing and updating erosion and sedimentation management and nutrient management plans, and where needed, providing financial support to improve management practices to levels to meet standards required under state law. Most industry-driven programs are led by cooperative partnerships at the local level, and these grassroots efforts are being fostered by Pennsylvania state agencies through working with partnering organizations and implementing existing state programs. State funds are also used to leverage federal grants, for example, as match to NFWF grant applications.

10. Expanding Technical Assistance through Partnerships

Through the local efforts to engage partners and build coalitions, there have been many examples of expanded technical assistance. In 2021, the Lancaster Clean Water Partners were awarded \$7.4 million in NRCS Regional Conservation Partnership Program (RCPP) funds to implement BMPs on agricultural lands. This was a unique collaboration of nine local groups, including private consultants, and non-profit and public entities that is designed to encourage farmers to work with neighbors and invest in improving their farms and local watersheds. NRCS RCPP also provided \$4 million to the Alliance for the Chesapeake Bay, Turkey Hill, and ten other partners to rapidly implement agricultural BMPs on dairy farms in southcentral Pennsylvania. Another example is in Salisbury Township, Lancaster County, where municipal, private consultants and non-profit groups provided one-on-one planning and technical assistance, bringing together resources like the State Conservation Commission Conservation Excellence Grant and REAP tax credits, as well as other funding in a collaborative and cooperative manner.

X. STATE AGENCY CAPACITY

A. DEP Chesapeake Bay Office

There are several roles and responsibilities for the DEP Chesapeake Bay Office. Four of these roles and responsibilities are:

1. The Coordination of the Development of the Phase 3 WIP

DEP's Chesapeake Bay Office coordinated development of the Phase 3 WIP, which includes updating milestones and action steps on a two-year basis and progress reporting on an annual basis. The milestones will continue to be updated using the same template used by the workgroups and counties to develop their respective action plans. Progress reporting will be done using Figure 7.1, [Progress Reporting Template](#). The action steps being tracked for milestone progress can be found on [Tracking Pennsylvania's Progress](#).

2. The Coordination and Oversight for the Implementation of Support Elements of the Phase 3 WIP

DEP's Chesapeake Bay Office Phase 3 WIP implementation and support includes development processes associated with: 1) the CAP described in [Section 3, Countywide Actions](#); 2) the BMP Verification Program Plan that ensures successful tracking of progress and verification that practices installed on the ground are properly operating; and 3) the EPA Chesapeake Bay Accountability and Regulatory Program and Chesapeake Bay Implementation Grants.

3. The Coordination of Pennsylvania's Activities Related to the Other Identified Goals and Outcomes

The Chesapeake Bay Partnership identified additional goals and outcomes in the 2014 Chesapeake Bay Watershed Agreement. Those goals and outcomes focus on activities or areas that can have a direct impact on, and facilitate successful implementation of, the Phase 3 WIP. The goals and outcomes most relevant to Pennsylvania's Phase 3 WIP identified by the Chesapeake Bay Program Partnership relate to the following: Brook Trout, Climate Resiliency, Fish Habitat, Forest Buffers, Healthy Watersheds, Protected Lands, Public Access, Stream Health, Tree Canopy, and Wetlands.

DEP's Chesapeake Bay Office currently has eight people filling the different roles and responsibilities described above. Table 5.4 in [Section 5, Existing and Needed Resources](#) includes a list of these staff and the additional 12 staff needed to implement the additional work described in this section and in [Section 3, Countywide Actions](#). DEP has taken action to hire four of the additional 12 staff needed; three of these staff are Internal Coordinators for the implementation of the CAP development process and one staff to accelerate the implementation of Pennsylvania's [BMP Verification Plan](#).

4. *The Oversight and Management of Pennsylvania DEP's Nonpoint Source Management and Watershed Restoration Programs*

In September 2020, DEP's Chesapeake Bay Office was reorganized and expanded to include oversight and management of the Conservation District Support, Agriculture Compliance, and Watershed Support sections. These groups play a key role in the development and dissemination of guidance for conservation districts and nonpoint source pollution prevention through agriculture regulations and grant funding programs. Two of the primary sources of funding for nonpoint source pollution prevention are administered in the Watershed Support section – EPA Section 319 Nonpoint Source Management and DEP Growing Greener Plus. DEP has taken action to hire two managers and eight staff in these three sections. The two managers are in the Agriculture Compliance and Conservation District Support sections. Of the eight staff, one staff is in the Agriculture Compliance Section, two staff are in the Watershed Support Section, and five staff are in the Conservation District Support Section. The consolidation of these three sections under the Chesapeake Bay Office allows for a more effective delivery of key decisions and results pertaining specifically to programs that are generally implemented outside of the federal permitting programs.

B. Other DEP and State Agency Capacity

1. *SCC and Conservation Districts – CAFO and Nutrient Management Program Oversight*

The State Conservation Commission (SCC) employs a Nutrient and Odor Management Program Director who oversees all Act 38-related activities. An additional staff of five people (four nutrient managers and one odor manager) work in conjunction with staff from 57 delegated conservation districts, to implement and enforce the provisions of the Act 38 nutrient management regulations.

Conservation districts are delegated authority to: review and approve Nutrient Management Plans; perform site visits for new and amended Nutrient Management Plans; investigate complaints; and perform annual status reviews (inspections) of all Act 38-regulated agricultural operations. Where there is no delegation, the SCC takes on those tasks. The SCC and DEP work together in administering the Nutrient and Manure Management Delegation.

In addition to the annual on-site inspections, conservation districts also perform complaint investigations under the Nutrient Management and Chapter 91 Manure Management delegation agreement. Complaint processing and follow-up include both CAFO and non-CAFO agricultural operations.

2. *Other Agency Staff*

To implement the various initiatives and enhancements described above, DEP, DCNR, PDA, and the SCC have existing staff resources to devote to this effort. However,

additional resources will also be needed. Table 5.4 in [Section 5, Existing and Needed Resources](#) includes a listing of both the existing and additional staff resources needed.

XI. KEY ACTION STEPS

To track and report progress, key action steps were selected to be reported on an annual basis for the initiatives described above. These action steps are identified in the milestone commitments and progress reports, published on [Tracking Pennsylvania's Progress](#).

SECTION 3. COUNTYWIDE ACTIONS

I. BACKGROUND

Since April 2017, a collaborative effort has been underway to develop Countywide Action Plans (CAPs). The initiative includes representatives from government agencies, the state legislature, county and local governments, industry associations, non-governmental organizations (NGOs), and citizens. The Environmental Protection Agency (EPA) expressed support for jurisdiction-specific plans tailored to the unique considerations of each state and the District of Columbia. To that end, Pennsylvania created a Local Area Goals Workgroup to investigate options and make recommendations for local planning in the Commonwealth.

In fall 2017, the workgroup looked at several geographic options for assigning local planning goals for nitrogen and phosphorus (from land-river segments (505) to sub-basins (6)). Based upon the workgroup’s recommendation, the Phase 3 WIP Steering Committee decided that county-based goals would be the most feasible in terms of size, number, existing data levels, and ability to organize resources. Pennsylvania’s nitrogen and phosphorus reduction targets are broken down into local planning goals for each of these counties. Collectively, these local pollution reductions will help Pennsylvania reach its clean water goals. To calculate the local planning goal for each county, it was further decided that each county would achieve an equal percentage of the total level of effort possible – the E3 (“Everybody does Everything, Everywhere”) scenario noted in Section 1.IV.A.

The 43 counties in Pennsylvania’s Chesapeake Bay watershed were further divided into four tiers and minimal loading, based on the relative opportunity to improve water quality in the Chesapeake Bay through nutrient reductions in each county. Minimal loading counties were not asked to develop CAPs. Each tier is assigned 25% of the total planning targets for Pennsylvania. The listing of each county in the watershed and the tier to which they were assigned is provided below.

Tier 1 - First 25% of Reductions	Tier 2 - Second 25% of Reductions	Tier 3 - Third 25% of Reductions		Tier 4 - Last 25% of Reductions		Minimal Loading Counties
Lancaster York	Bedford Centre Cumberland Franklin Lebanon	Adams Columbia Dauphin Huntingdon Juniata Lycoming	Mifflin Northumberland Perry Snyder Tioga	Berks Blair Bradford Cambria Chester Clearfield Clinton Fulton Lackawanna	Luzerne Montour Potter Schuylkill Sullivan Susquehanna Union	Cameron Carbon Elk Indiana Jefferson McKean Somerset Wayne Wyoming

II. THE FOUR-COUNTY PILOT PROJECT

With support from the EPA Chesapeake Bay Program Office, the Susquehanna River Basin Commission (SRBC), DEP, and the Communications and Engagement Workgroup, the Local Area Goals Workgroup developed a planning process and a county-specific [Community Clean Water Toolbox](#). The purpose of this planning process and toolbox was to assist in the developing the local CAPs intended primarily to improve local water quality and provide related benefits for those localities.

As part of the Phase 3 WIP planning process, four counties participated in a pilot project to develop local CAPs. Lancaster and York counties began in spring 2018, with Adams and Franklin counties beginning in late summer 2018.

During this process, pilot counties gathered to share updates including their local planning process, identified challenges, lessons learned, and recommendations for a more effective process. Additionally, joint planning meetings were held to share both county planning team and state Phase 3 WIP workgroup draft recommendations for nutrient reduction, identify overlaps and resulting nutrient reductions, explore areas for further reductions, and recommend and decide next steps for moving forward together.

The final CAPs for the four pilot counties merge the Phase 3 WIP priority state initiatives numeric commitments described in [Section 2, State Actions](#) and the identified local initiatives and priorities. The result of this process is a brand new, county-based clean water planning approach that brings all levels of partners together for collaboration. Using this locally driven planning approach, the state and local communities can share responsibilities, resources, and plan how to address local water quality goals, resulting in CAPs that are realistic and implementable.

The Commonwealth continues to work closely with the pilot counties as they implement their CAPs, providing resources and coordination efforts, as well as facilitation and outreach support to counties as they build their coalitions and developing action teams around their plans. The Commonwealth also continues to hold meetings with the pilot counties to encourage information sharing among and between the Commonwealth and county partners, and to provide and seek feedback on the process in order to continually build on and support the implementation process.

The pilot county CAPs, which include BMP scenarios and numeric results, are published to the [Countywide Action Plan](#) webpage. As Lancaster, York, Adams, and Franklin counties continue to move forward, they will provide updates to their progress and two-year programmatic milestones, with the opportunity to update their CAPs as well. The most current information on each county's CAP will be published to the CAP webpage; due to the dynamic nature of this information, it is not included in the body of Pennsylvania's amended Phase 3 WIP.

III. TIER 2, 3 AND 4 COUNTY ENGAGEMENT

A. The CAP Development Process

The county-based planning process provided an opportunity for everyone involved to learn more about their local waters and to make recommendations and decisions based on local knowledge and expertise. The planning process began with a review of the county waters, the nutrients and pollutants running into them, and how local actions can lead to local water quality improvement. It ended with the development of CAPs for 34 of the 43 counties in Pennsylvania's share of the Chesapeake Bay watershed. The reason why the other nine counties did not complete CAPs is because they were identified as "minimal loading" counties, and were determined to be able to achieve necessary nutrient reductions by continuing to implement their existing programs and practices without developing and implementing CAPs. To assist with the development of a CAP, each county planning team receives county-specific planning tools, templates, a customized technical toolbox, and technical support resources described below as they complete the process. The development process is detailed in the [Community Clean Water Planning Guide](#).

B. Agency Support Team

Each county planning team will be provided technical support resources to complete the planning process and begin implementation of CAPs. The technical support team will be comprised of:

- **Internal Coordinator:** This coordinator is a member of the DEP Chesapeake Bay Office. The internal coordinator serves as the point of contact for the technical support team and the county planning team. The internal coordinator is responsible for:
 - managing external coordinators, facilitator, and technical contract staff.
 - oversight and management of technical contracts.
 - facilitating state resources for local planning and implementation.
 - assisting with the permitting and grant process for external coordinators.
 - helping in coordination with the verification process.
 - management and oversight of annual reporting and two-year milestone tracking.
- **County Community Clean Water Action Plan Coordinator:** The external coordinators serve as the point of contact to their assigned county or counties and are funded through an agreement between DEP and the lead agency of the county planning team. These coordinators provide regular progress updates to the DEP internal coordinator. They would support county efforts to develop and implement the CAP by:
 - facilitating planning team efforts and coordinating regular meetings.

- seeking financial resources to support county efforts (grants, partnerships, etc.).
 - helping counties with permitting of plan related projects.
 - developing and updating county plans and progress as needed.
 - submitting annual reports.
 - coordinating verification process within their designated county or counties.
- **Technical Coordinator:** The technical coordinator(s) are members of the DEP Chesapeake Bay Office as well as SRBC through a contract to provide technical support to the county planning team. These coordinators report to the DEP Internal Coordinator. The Technical Coordinator will:
 - be responsible for providing information and facilitation of planning tools through the planning and implementation process.
 - assist with reporting and tracking of milestones and annual progress.
 - assist in model runs for plan development and during annual milestone updates.
- **Facilitation Coordinator:** The facilitation coordinator reports to the DEP Internal Coordinator. This coordinator is contracted by DEP to provide:
 - facilitation services
 - organizational support
- **Region CAP Support Teams:** While the DEP Chesapeake Bay Office is providing leadership, coordination, and support for all areas of Phase 3 WIP implementation, there is tremendous value in the Northeast, Northcentral, and Southcentral DEP Regional Offices to create region-based CAP Support Teams. These region-based CAP Support Teams provide necessary local outreach and connections needed to fully support local clean water countywide action planning and implementation.
 - outreach to county leadership
 - connecting local partners for success
 - assist local partners in leveraging resources
 - be a liaison between local partners and the DEP Chesapeake Bay Office as needed

C. Schedule for Implementation

The completion and implementation of the CAPs will be done in a staged approach, incrementally scaling the resources and coordination of planning efforts. The staged approach to planning rolled out in two phases over 24 months. Phase 1 completed the CAPs in the remaining four Tier 2 counties. There was and still is a continued focus on implementation in the four pilot counties where CAPs are completed, with an emphasis on the two Tier 1 counties of Lancaster and York. These eight counties encompass 54%

of PA's nitrogen and 42% of PA's phosphorus loads. This approach also allowed for additional outreach to Tier 3 and 4 counties before their planning starts.

1. *Staged Approach, Phase 1*

Staged Approach, Phase 1, focused on planning and long-term implementation of the Phase 3 WIP. It includes continuation of the pilot process in the four pilot counties as they transition into implementation of their CAPs.

Phase 1 also is where the planning process for the four remaining Tier 2 counties of Bedford, Centre, Cumberland, and Lebanon began. The kickoff of Phase 1 was held in February 2020, with a four-day in-person Coordinator Training Academy. This Academy was geared toward providing the tools and resources for the newly hired and contracted Community Clean Water Coordinators, funded by DEP appropriations from the Environmental Stewardship Fund. In March 2020, the Tier 2 counties began meeting with their local stakeholders and were able to continue forging ahead even throughout the COVID-19 global pandemic. It took many adaptive measures for DEP and the Pilot and Tier 2 counties to stay on track and to ensure planning and implementation were being accomplished. The Tier 2 counties were provided nine months to build countywide coalitions and develop CAPs and began implementing their CAPs in the late fall and early winter of 2020.

2. *Staged Approach, Phase 2*

Staged Approach, Phase 2, focused on planning and long-term implementation of Pennsylvania's WIP for 26 of the remaining 35 Tier 3 and Tier 4 counties, and target the remaining 46% of Pennsylvania's nitrogen and 58% of phosphorus loads.

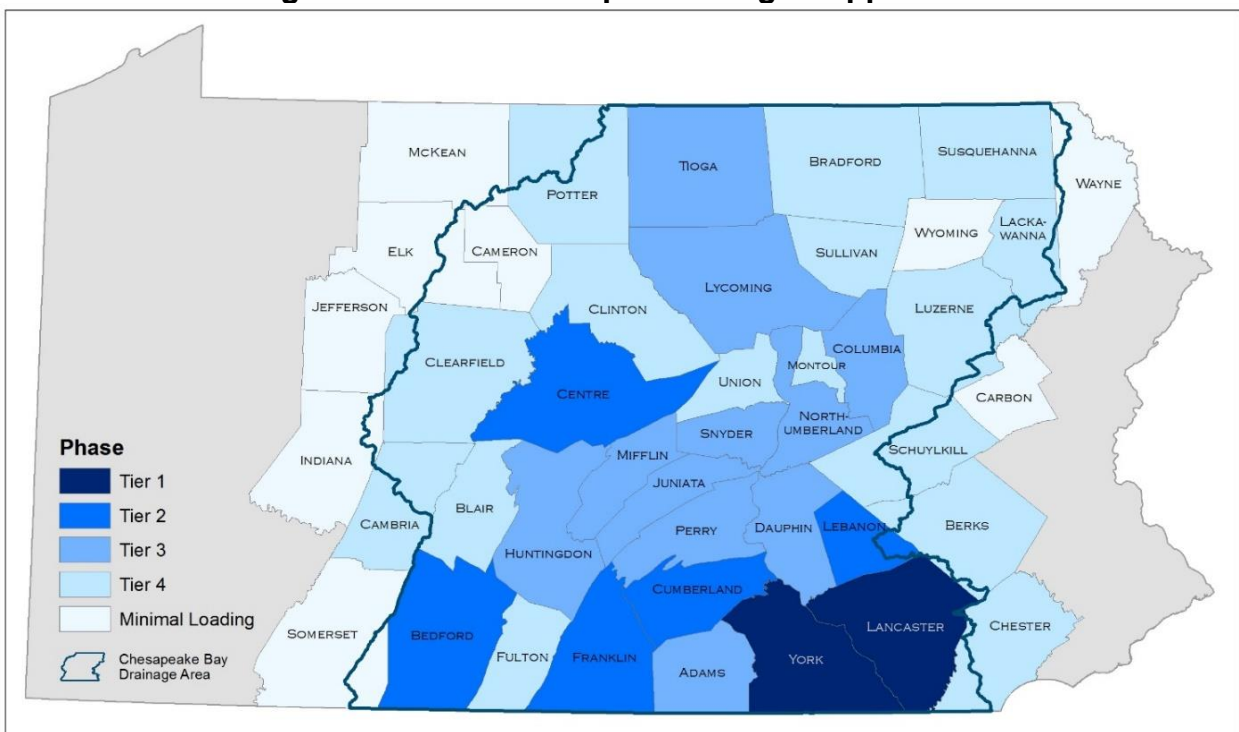
During Phase 2, the technical support team and internal coordination team described above will continue to provide support on a regionalized basis for Tier 3 and 4 counties. The DEP Chesapeake Bay Office enlisted assistance from the Northeast, Northcentral, and Southcentral DEP Regional Offices. In July 2020, the DEP Chesapeake Bay Office provided the Region CAP Support Teams with tools and resources and held a day-long virtual training session in August 2020. The DEP Region CAP Support Teams provide the one-on-one assistance to the Tier 3 and 4 counties, and in October 2020, the Tier 3 and 4 county groupings were devised. These groupings allowed for a finite amount of funds provided through the Community Clean Water Coordinator grant to be shared effectively, resulting in 10 groups of two to four counties. Each group was then able to hire or contract a Community Clean Water Coordinator, with funds provided through the Fall 2020 grant round. Due to the ongoing public health concerns associated with the COVID-19 global pandemic, the DEP Chesapeake Bay Office held a virtual Coordinator Training Academy for the Tier 3 and 4 counties and provided the tools and resources that had been developed for the Pilot and Tier 2 counties. Pre-recorded webinars and web-based training are housed on DEP's Pennsylvania Clean Water Academy (CWA), and each coordinator and their county lead entities have access to those resources. Each county is encouraged to work together with other counties during planning and

subsequent implementation to share technical resources and information and maximize on existing cooperative efforts.

Phase 2 began when the planning process for Phase 1 counties was nearing completion in early September 2020. The Tier 3 and Tier 4 counties were provided additional time as it took more proactive measures to gather and group the counties based on their local knowledge and expertise, as well as provide the necessary funds through the Community Clean Water Coordinator grant, which were also funded by the DEP appropriations from the Environmental Stewardship Fund. The deadline for completion of the Tier 3 and Tier 4 counties was the end of September 2021.

Figure 3.1 is a graphic representation of this staged approach and shows which counties are involved in each phase. These phases are well thought out and planned in detail, but there remains flexibility to adjust if opportunities and/or limitations become apparent over time.

Figure 3.1. CAP Development Staged Approach



3. Counties with Minimal Loadings

There are currently nine counties with less than 200,000 pounds of nitrogen per county: Somerset, Wyoming, Elk, Indiana, Cameron, Wayne, McKean, Jefferson, and Carbon. Progress in these counties based on existing programs will continue to be documented and tracked. No additional staff resources will be devoted to additional planning efforts in these counties.

D. Resource Needs

This initiative is one of the core responsibilities for the DEP Chesapeake Bay Office. As a result, the resource needs for this initiative are incorporated into the overall description for this office in [Section 2, State Actions](#) and listed in Table 5.4 in [Section 5, Existing and Needed Resources](#).

IV. Key Actions for Implementation of Countywide Action Plans

A significant part of the pilot countywide planning process was the open exchange of issues and challenges regarding implementation of CAPs. DEP's Chesapeake Bay Office built on previous relationships and established additional partnerships throughout the planning process with the goal of successful implementation of its Phase 3 WIP. Moving forward on this collaborative effort, DEP's Chesapeake Bay Office is working with two of the pilot counties, Lancaster, and York, to assist with the next steps of moving from planning to action. In July and August 2019, the Chesapeake Bay Office and its facilitation and outreach contractors led a series of meetings with these counties to discuss their needs for resources, tools and training that would support the countywide interests to move from planning to action.

Key takeaways from these meetings included the important roles the proposed internal coordinators and external coordinators will have moving forward. These coordinators are essential to facilitate the necessary coordination, collaboration and data collection needed for successful implementation. Using funding from the EPA Chesapeake Bay Regulatory Accountability Program Grant and Chesapeake Bay Implementation Grant, DEP hired two internal coordinators. Due to gaps in federal funding in 2019 and 2020, the eight external coordinators were funded using the DEP Environmental Stewardship Fund: one for each of the four pilot counties and one for each remaining Tier 2 county. The DEP appropriation of Environmental Stewardship Funds was used to expand the Community Clean Water Coordinator funding to the 26 Tier 3 and Tier 4 counties, funding 10 additional coordinators.

Beyond these staffing needs, the meetings revealed the value of facilitation support, project management tools, and training that the Chesapeake Bay Office's contractors,

Water Words That Work (WWTW) and Jennifer Handke, Consulting with a Purpose (CWP) can provide. A framework was built to provide Lancaster and York with tools and

- Structuring an Implementation Team
- Prioritizing and Sequencing Projects/Activities
- Project Management
 - Meeting cycles
 - Facilitation
 - Expectations and Deliverables
- County Implementation Plan Template
- Facilitation Support
- Training Support
 - Leadership and Facilitation
 - Communication Skills
 - Managing Multiple Interests (Collaboration)

As a result, the Chesapeake Bay Office, WWTW and CWP are working with Lancaster and York in their efforts to move from planning to action - facilitating implementation strategy sessions, providing tools and structure for project planning and management, developing, and delivering training to meet the needs of each counties' partners.

The outreach and support developed for these two counties have been utilized to further develop tools and resources that will be made available to assist other counties as they begin implementation.

The Chesapeake Bay Office carried this coordination effort, including outreach, training and support, into the second phase of CAP implementation, and used the successes and lessons learned from working with the Pilot counties to inform and build on this solid foundation for the Tier 2, then subsequently, the Tier 3 and 4 counties. The Chesapeake Bay Office and its consultants, WWTW and CWP, provided higher level facilitation, training, planning, coordination, project management and support to all four tiers of counties in various ways.

Building on the Pilot and Tier 2 counties' experience, Chesapeake Bay Office, WWTW and CWP focused on the following four areas in order to set its Tier 3 and 4 county partners up for success:

- DEP Region CAP Support Teams - newly created for Tier 3 and 4
- Timelines with benchmarks - newly created for Tier 3 and 4
- Pennsylvania Clean Water Academy - revised and enhanced for Tier 3 and 4
- Sharing and adapting Pilot and Tier 2 County resources and tools for Tier 3 and 4

The value of partnering with DEP Regional office staff, who serve as a liaison for the Tier 3 and 4 counties, provides much-needed "on the ground" support during CAP development and implementation and is paramount to successful implementation of CAPs in these counties. DEP created three Region CAP Support Teams in the Northeast, Northcentral, and Southcentral regional offices, developed a Region CAP Support Outreach Guide and separate CAP Support Implementation Guide for their use with the counties, and provided these teams training and additional resources.

Understanding the process that the Pilot and Tier 2 counties employed to develop their CAPs, the Chesapeake Bay Office created a timeline with benchmarks to enable the Tier 3 and 4 counties to successfully develop their CAPs while meeting aggressive timelines. These timelines and benchmarks provided opportunities for continual support and coordination between the Chesapeake Bay Office, the Region CAP Support Teams and the county coordinators and their CAP action teams. Leveraging the lessons learned and information gathered during the Pilot and Tier 2 CAP planning processes was integral in achieving success, with 100% of the Tier 3 and 4 counties developing CAPs.

The Chesapeake Bay Office's work with the Pilot and Tier 2 counties also helped to refine and expand the Pennsylvania CWA, creating more specialized tools and resources for county partners, based on their implementation needs. CAP county partners have access to many training webinars on a variety of substantive topics that help them to translate the technical details of the statewide WIP and CAPs for wider audiences, provide CAP overviews, conduct partner surveys, and build communication and engagement plans and project management spreadsheets. The CWA also includes resources for partnership building and outreach, creating and maintaining a social media presence, and meeting or public engagement design and facilitation that have been updated and enhanced for their use. While counties are afforded access to these online tools, CWP and WWTW also work with them one-on-one to meet specific needs or provide support in certain areas that will further enable their success. These meetings often lead to sharing tools from Pilot and Tier 2 county partners or adapting and enhancing existing tools to meet unique needs, such as project and funding tracking spreadsheets. Through the CWA, all of these tools and resources can then be shared among all county partners in order to maximize their potential uses.

V. KEY ACTION STEPS

To track and report progress, key action steps were selected to be reported on an annual basis for the initiatives described above. These action steps are identified in the milestone commitments and progress reports, published on [Tracking Pennsylvania's Progress](#).

SECTION 4. FEDERAL ACTIONS AND COORDINATION

I. FEDERAL FACILITIES

EPA, in partnership with the states, has developed planning goals for all federal facilities in the Chesapeake Bay watershed. Table 4.1 is a summary of the total nitrogen reductions addressed by the different federal facilities in Pennsylvania by county. Table 4.2 is the same table for phosphorus.

Like the local planning goals for counties, the planning goals federal facilities do not specify which sector should achieve the load reductions. In the case of federal facilities, the reductions would come from managing excess nutrients and sediment in the developed sector since stormwater is the primary source.

The Action Plan developed by the Department of Defense (DOD) was unable to attain the 73.92% controllable load reduction due to the scarcity of higher-loading land uses on which to install control practices based on this methodology. Since 2019, DEP worked with the DOD and EPA to devise an alternate method. EPA developed a default method that applies reductions equitably between federal and non-federal partners, only applying in sectors which the DOD receives credit (natural and developed). As a result, the DOD 2025 Federal Planning Goal (FPG) nutrient loads are 304,315 pounds per year of nitrogen and 14,346 pounds per year of phosphorus. Sediment goals have not been defined for federal agencies however, the EPA default method Total Suspended Sediment (TSS) target is 15,562,196 pounds per year.

The DOD has 10 Parent Installations and 292 BMPs reported through 2020. DEP has worked with DOD to better account for BMPs implemented and reported for nutrient and sediment reduction. For example, in 2017, only 64% of the DOD BMPs reported to DEP were fully credited in the Chesapeake Bay Watershed Model. In 2020, 99% of the DOD BMPs reported to DEP fully credited in the Chesapeake Bay Watershed Model.

Table 4.1. Nitrogen Reductions for Pennsylvania Federal Facilities by County

County	Department of Defense			National Park Service			U S Fish and Wildlife Service			General Services Administration			Total Reduction 2017-2025
	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	
Adams	2,267	1,818	449	26,590	20,406	6,185	-	-	-	-	-	-	6,834
Bedford	3,666	2,976	689	-	-	-	-	-	-	-	-	-	689
Berks	-	-	-	2,296	2,237	59	-	-	-	-	-	-	59
Blair	59	37	22	3,839	3,264	574	-	-	-	-	-	-	597
Bradford	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambria	-	-	-	1,517	1,208	309	-	-	-	-	-	-	309
Cameron	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre	15,883	15,176	707	-	-	-	-	-	-	-	-	-	707
Chester	-	-	-	-	-	-	-	-	-	-	-	-	-
Clearfield	5,711	5,621	89	-	-	-	-	-	-	-	-	-	89
Clinton	1,376	1,196	181	-	-	-	856	640	215	-	-	-	396
Columbia	-	-	-	-	-	-	-	-	-	-	-	-	-
Cumberland	64,483	40,634	23,849	8,734	7,713	1,022	-	-	-	-	-	-	24,871
Dauphin	29,034	23,185	5,850	3,183	3,056	127	-	-	-	-	-	-	5,976
Elk	-	-	-	-	-	-	-	-	-	-	-	-	-
Franklin	81,489	61,344	20,145	859	771	88	-	-	-	0.5	0.3	0.20	20,233
Fulton	-	-	-	-	-	-	-	-	-	-	-	-	-
Huntingdon	119,271	111,169	8,102	-	-	-	-	-	-	-	-	-	8,102
Indiana	-	-	-	-	-	-	-	-	-	-	-	-	-
Jefferson	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniata	-	-	-	-	-	-	-	-	-	-	-	-	-
Lackawanna	308	282	26	-	-	-	-	-	-	-	-	-	26
Lancaster	327	205	121	-	-	-	-	-	-	-	-	-	121
Lebanon	78,147	59,433	18,714	863	836	27	-	-	-	-	-	-	18,741
Luzerne	885	569	316	-	-	-	-	-	-	27	17	9.70	326
Lycoming	-	-	-	-	-	-	-	-	-	9	3	5.30	5
Mckean	-	-	-	-	-	-	-	-	-	-	-	-	-
Mifflin	207	132	75	-	-	-	-	-	-	-	-	-	75
Montour	-	-	-	-	-	-	-	-	-	-	-	-	-
Northumberland	163	119	44	-	-	-	-	-	-	-	-	-	44
Perry	-	-	-	508	426	81	-	-	-	-	-	-	81
Potter	-	-	-	-	-	-	-	-	-	-	-	-	-
Schuylkill	8	5	3	1,550	1,507	42	-	-	-	-	-	-	45
Snyder	-	-	-	-	-	-	-	-	-	-	-	-	-
Somerset	-	-	-	-	-	-	-	-	-	-	-	-	-
Sullivan	-	-	-	-	-	-	-	-	-	-	-	-	-
Susquehanna	177	115	63	-	-	-	-	-	-	-	-	-	63
Tioga	28,513	24,699	3,814	-	-	-	-	-	-	-	-	-	3,814
Union	56	37	19	-	-	-	-	-	-	-	-	-	19
Wayne	-	-	-	-	-	-	-	-	-	-	-	-	-
Wyoming	-	-	-	-	-	-	-	-	-	-	-	-	-
York	17,754	12,419	5,335	-	-	-	-	-	-	-	-	-	5,335
Total	449,784	361,171	88,613	49,939	41,425	8,515	856	640	215	36	21	15	97,358

Table 4.2. Phosphorus Reductions for Pennsylvania Federal Facilities by County

County	Department of Defense			National Park Service			US Fish and Wildlife Service			General Services Administration			Total Reduction 2017-2025
	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	2017 Load	2025 Target	Reduction	
Adams	244	200	44	4,966	4,296	669	-	-	-	-	-	-	713
Bedford	297	250	47	-	-	-	-	-	-	-	-	-	47
Berks	-	-	-	105	102	3	-	-	-	-	-	-	3
Blair	2	1	1	416	314	102	-	-	-	-	-	-	103
Bradford	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambria	-	-	-	81	55	26	-	-	-	-	-	-	26
Cameron	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon	-	-	-	-	-	-	-	-	-	-	-	-	-
Centre	1,363	1,261	102	-	-	-	-	-	-	-	-	-	102
Chester	-	-	-	-	-	-	-	-	-	-	-	-	-
Clearfield	460	451	9	-	-	-	-	-	-	-	-	-	9
Clinton	101	92	9	-	-	-	65	43	23	-	-	-	32
Columbia	-	-	-	-	-	-	-	-	-	-	-	-	-
Cumberland	3,633	2,157	1,476	591	459	131	-	-	-	-	-	-	1,607
Dauphin	2,125	1,621	503	85	78	7	-	-	-	-	-	-	510
Elk	-	-	-	-	-	-	-	-	-	-	-	-	-
Franklin	7,056	4,696	2,360	50	37	13	-	-	-	0.04	0.02	0.02	2,373
Fulton	-	-	-	-	-	-	-	-	-	-	-	-	-
Huntingdon	10,904	9,605	1,299	-	-	-	-	-	-	-	-	-	1,299
Indiana	-	-	-	-	-	-	-	-	-	-	-	-	-
Jefferson	-	-	-	-	-	-	-	-	-	-	-	-	-
Juniata	-	-	-	-	-	-	-	-	-	-	-	-	-
Lackawanna	31	26	5	-	-	-	-	-	-	-	-	-	5
Lancaster	7	4	3	-	-	-	-	-	-	-	-	-	3
Lebanon	3,855	2,223	1,632	34	15	19	-	-	-	-	-	-	1,651
Luzerne	25	15	10	-	-	-	-	-	-	1.16	0.68	0.49	10.33
Lycoming	-	-	-	-	-	-	-	-	-	0.29	0.09	0.20	0.20
Mckean	-	-	-	-	-	-	-	-	-	-	-	-	-
Mifflin	18	10	8	-	-	-	-	-	-	-	-	-	8
Montour	-	-	-	-	-	-	-	-	-	-	-	-	-
Northumberland	6	4	2	-	-	-	-	-	-	-	-	-	2
Perry	-	-	-	45	39	6	-	-	-	-	-	-	6
Potter	-	-	-	-	-	-	-	-	-	-	-	-	-
Schuylkill	0	0	0	40	39	1	-	-	-	-	-	-	1
Snyder	-	-	-	-	-	-	-	-	-	-	-	-	-
Somerset	-	-	-	-	-	-	-	-	-	-	-	-	-
Sullivan	-	-	-	-	-	-	-	-	-	-	-	-	-
Susquehanna	15	11	4	-	-	-	-	-	-	-	-	-	4
Tioga	3,599	3,030	569	-	-	-	-	-	-	-	-	-	569
Union	3	2	1	-	-	-	-	-	-	-	-	-	1
Wayne	-	-	-	-	-	-	-	-	-	-	-	-	-
Wyoming	-	-	-	-	-	-	-	-	-	-	-	-	-
York	1,299	1,068	231	-	-	-	-	-	-	-	-	-	231
Total	35,043	26,727	8,316	6,412	5,434	977	65	43	23	1.49	0.79	0.70	9,316

Each agency was expected to submit a plan to address the nutrient loadings assigned to their respective facilities, as established in the EPA document, “US Environmental Protection Agency’s Expectations for Federal Lands and Facilities in Supporting Chesapeake Bay Watershed Jurisdictions’ Phase III Watershed Implementation Plans”, dated August 16, 2018. See the [Department of Defense](#), [US Fish and Wildlife Service’s](#) and [National Park Service](#) plans.

II. FEDERAL AGENCY SUPPORT AND COORDINATION

A. Coordination Between the USDA Natural Resource Conservation Service and EPA

As part of the Chesapeake Bay Program Partnership, EPA, and the Natural Resource Conservation Service (NRCS) work very closely together. One area in which state partners in the Chesapeake Bay Partnership have identified the need for improved coordination between the two agencies involves the tracking and verification of practices installed by NRCS. Due to provisions in the Federal Farm Bill related to confidentiality of some cost-share data and NRCS program staff interpretation of these restrictions, most states only receive this data in an aggregated format. While this aggregated format allows for progress reporting, it does not allow for ongoing verification of these practices once the credit life of the practice has expired. Without the exact location of these practices, the states cannot find them in order to meet the Chesapeake Bay Program Partnership protocols for verification. As a result, the reductions associated with these practices continues to be eliminated as part of the progress documentation over time.

An additional concern is the inability to receive Chesapeake Bay Watershed Model credit for NRCS Conservation Stewardship Program (CSP) funded practices as well as other non-EQIP cost-share programs. CSP is generally an “enhanced” suite of agricultural conservation practices and, as of September 2021, the NEIEN appendix does not include synonymous or “crosswalk” Chesapeake Bay Program BMPs. This means that CSP reported practices cannot enter NEIEN and therefore do not show up as reported in the Chesapeake Bay Watershed Model. The DEP Chesapeake Bay Office has begun the process of outreach to the EPA Chesapeake Bay Program Office and NRCS to work toward solutions, which should include a full evaluation of the suite of NRCS practices and the crosswalk to NEIEN as part of the CAST-23 development workplan. This would ensure that all practices reported by NRCS and Farm Service Agency (FSA) cost-share programs are credited.

EPA, as the lead agency responsible for coordination between all the federal agency partners involved in the Chesapeake Bay Program, should continue to take the lead and resolve these concerns. The Federal Farm Bill, and in particular, Section 1619, is a statutory requirement, whereas the Chesapeake Bay Program BMP Verification Framework Guidance is a policy. In 2020, the Chesapeake Bay Program partnership identified multiple concerns regarding BMP verification and the BMP Verification Framework Guidance, including the issues surrounding verification of USDA reported

practices and credit durations. These issues were initially raised during the development of the Chesapeake Bay Program BMP Verification Framework Guidance and documented in the final guidance. DEP continues to be an active participant on the BMP Verification Ad Hoc Committee, which reports to the Chesapeake Bay Program Water Quality Goal Implementation Team.

DEP also continues to work with USDA NRCS and FSA. One example of the federal-state collaboration is through a pilot data sharing agreement. In 2020, a Letter of Understanding (LOU) was signed between DEP, SCC, USGS, and NRCS in order to submit data from DEP's PracticeKeeper data set from four counties to USGS to review against the data set submitted by NRCS. This pilot project is funded in part by EPA, to help determine the amount of potential duplication between data sources, primarily focusing on Conservation Technical Assistance (CTA) practices, which meet NRCS standards and specifications but are not federally funded. To date, DEP has not reported NRCS-reported CTA practices, due to provisions in the Chesapeake Bay Program BMP Verification Framework Guidance that notes prohibition of reporting CTA practices due to potential for duplication of records.

B. Coordination with the EPA Chesapeake Bay Program Office Regarding BMP Verification

During the [September 22, 2014 PSC meeting](#), the PSC “[a]greed to adopt the basin-wide BMP Verification Framework on behalf of larger partnership (recognizing that the program will continue to adapt BMP verification efforts over time in response to new information and experiences).” Since that time, the Partnership, led by EPA, has demonstrated an unwillingness to adapt the BMP Verification Framework Guidance and protocols. Pennsylvania has been involved in Chesapeake Bay Program Partnership discussions related to BMP Verification Protocols and, alongside our jurisdictional partners, highlighting the need for reviewing and revising those protocols. The protocols in place now require an inordinate amount of staffing and financial resources to “keep” BMPs in the modeling tools. As a result of the need for these resources, and in response to the EPA evaluation of Pennsylvania’s Phase 3 WIP, DEP took another look at these protocols with a focus on the importance of verifying the accelerated implementation of BMPs needed to document successful completion of the Phase 3 WIP in mind. Several barriers were identified. Pennsylvania will continue to work with our partners, including EPA, to find acceptable approaches that do not pull funding and manpower away from implementing additional BMPs on the ground to address these barriers. Specifically:

- The equity of how the protocols are applied to practices across different jurisdictions.
- The need for better representation of practices on the ground over time in that the defined credit life of some practices does not accurately reflect the actual duration of those practices in the field.
- The actual cost of verification in many cases is prohibitive.

- Loss of credit for practices captured through changes in land use and the use of the land cover data set for documenting these changes.
- Substantially more effort put forth by EPA to ensure that all NRCS and FSA reported practices are reported, credited, and remain in the model to show how taxpayer and private investments in BMP implementation continue to yield nutrient and sediment reductions over time.
- A Verification Panel comprised of BMP experts and jurisdiction representatives reviewed the original BMP Verification Plans. These reviews are now completed only by the EPA Chesapeake Bay Program Office. A review of this evaluation process is needed. The potential for the BMP Verification Ad Hoc Committee to be a part of the BMP Verification Plan reviews should be considered.

C. Coordination with the EPA Chesapeake Bay Program Office and the Chesapeake Bay Program Partnership Wetland Workgroup

The primary goals of the Wetland Workgroup, within the Chesapeake Bay Program Partnership, is to facilitate the implementation of projects that protect, restore, and enhance tidal and non-tidal wetlands across the Chesapeake Bay watershed and to coordinate the collection and organization of wetland restoration data reported by the Chesapeake Bay Program.

A significant gap that is hampering these goals is the inability to report wetland gains achieved through state and federal regulatory actions that are greater than a 1:1 ratio (acreage or function). DEP recommends that the EPA Chesapeake Bay Program Office accept the reporting of wetland gains greater than 1:1 ratio from all regulated activities by state or federal programs.

In April 2020, DEP presented to the Chesapeake Bay Program Management Board. As a result of that presentation, DEP worked with other jurisdictional and signatory members of the Chesapeake Bay Program Partnership to ascertain answers to questions related to the inability to report wetlands restored through regulatory and compensatory measures. In December 2020, EPA provided their responses to the questions posed by the partners and by DEP. DEP subsequently reported some of the recorded wetland restoration through compensatory measures as part of the 2020 annual numeric progress, however EPA determined that it would not accept the reported wetland restoration acres.

In September 2021, EPA presented the preliminary findings of the Outcome Attainability Committee to the PSC. As part of those findings, wetland restoration has been identified as being “off target” for the 2014 Chesapeake Bay Watershed Agreement, and discussions have been ongoing related to this issue. The Chesapeake Bay Program Partnership should re-evaluate the current practice which does not allow crediting of wetlands restored through regulatory and compensatory measures.

D. Coordination with the EPA Chesapeake Bay Program Office and the Chesapeake Bay Program Partnership Agriculture Workgroup

Much like the urban stormwater crediting of stormwater BMPs under the Chesapeake Bay Program-approved expert panel report for Performance Standards, which relies on state regulatory requirements and technical guidance for crediting of BMPs, EPA and the Chesapeake Bay Program Partnership should be amenable to agriculture BMPs implemented following state regulatory requirements and technical guidance recommendations.

Additionally, Pennsylvania has made strides in accounting for BMPs that have been implemented and not reported. The “inventorying” of BMPs helps to revise the historic reported practices as well as identify newly implemented practices. Through efforts to survey, inspect, and document, there have been several BMPs that are being implemented and, due to modeling protocols and criteria changes through Expert Panel Report revisions over time, do not meet the current Chesapeake Bay Program criteria. The agriculture BMPs identified below have been noted as either being inconsistent with Pennsylvania regulatory requirements or common practice within the agricultural landscape:

- Dairy Precision Feeding – this BMP needs to be reported on an annual basis. However, as documented in more than 114 published research papers, milk urea nitrogen (MUN) is a viable and valid option to use as a metric to correlate the amount of urinary urea nitrogen excreted. Much like recent studies on swine and poultry manure nutrients, the use of MUN should be reviewed by the partnership to build into the modeling tools versus tracking and reporting Dairy Precision Feeding. Pennsylvania representatives on the Chesapeake Bay Program Agriculture Workgroup have been working with Penn State University experts to develop a reporting method to be accepted by the Chesapeake Bay Program Partnership, and in June 2021, a presentation was provided to the Agriculture Workgroup on the topic, seeking a path forward for making adjustments in the near-term. Support from the Chesapeake Bay Program Partnership, including our federal and jurisdictional partners, is needed to bring this innovative and scientifically-sound approach to fruition.
- Rotational/Prescribed Grazing – this BMP needs to be reported on an annual basis, following either standards set forth in an NRCS Grazing Plan or as a Resource Improvement (RI) BMP. Per Pennsylvania’s Manure Management technical guidance standards, all pastures must either be managed based on an NRCS Grazing Plan or to a minimum of three inches of vegetation over the growing season. Meeting the pasture requirement set forth in Pennsylvania’s Manure Management technical guidance standards should be acceptable to the Chesapeake Bay Program for reporting of this BMP. The 2020 Penn State Producer Survey documented rotational/prescribed grazing in survey respondents from the four Pilot counties. DEP subsequently reported the 2020

Penn State Producer Survey results as part of the 2020 annual numeric progress.

- Cover Crop – there are three categories of cover crop accepted in the Phase 6 Chesapeake Bay Watershed Modeling Tools:
 - Traditional Cover Crop – non-harvested
 - Traditional Cover Crop with fall nutrients – non-harvested
 - Commodity Cover Crop without nutrients

“Commodity Cover Crop with nutrients” does not receive a reduction value within the model beyond that which is applied for the regular crop rotation. In Pennsylvania, commodity cover crop is planted to provide soil cover and, in the act of harvesting, removes nutrients from the system. The cover crop BMPs should be reviewed and incorporate the value of sediment reduction specifically for cover crop implementation. The 2017 Census of Agriculture shows Pennsylvania had reported 595,309 acres of cover crop statewide, versus 446,295 acres reported in the 2012 Census. This is a 33.4% increase overall, and, according to the Sustainable Agriculture Research and Education (SARE) program, ranks Pennsylvania as 10th in the nation. Pennsylvania is the only state in the Chesapeake Bay watershed to make the top 10 in total cover crop acres; however, this record of cover crop implementation has not been translated in the Chesapeake Bay Watershed Model due to BMP reporting requirements.

The proposed path forward for Pennsylvania to receive nutrient and sediment reduction credit for submission of commodity cover crops documented via the transect survey has been discussed at length on multiple occasions over the course of the past few years with EPA CBPO and Agriculture Workgroup partners. Most recently, the topic was presented by DEP to the Agriculture Workgroup in May and June 2022. Further discussions are slated throughout the summer of 2022 so that commodity cover crops will be able to be reported through the transect survey method for 2022 annual numeric progress.

- Manure Transport – as recommended by the Chesapeake Bay Program Agriculture Modeling Subcommittee and approved by the Chesapeake Bay Program Agriculture Workgroup, there is an assumed “backfill” of commercial fertilizer when manure is removed (exported) from the county. It is based on the idea that the farmer would not change their application rate just because they changed or lowered the application of the nutrient source. In addition, the loading rate increases when fertilizer is assumed to be applied instead of manure. This assumption does not apply in most instances in Pennsylvania, specifically in the case of poultry. For example, many of the large, concentrated poultry facilities in the southeastern part of Pennsylvania’s Bay watershed have broker and/or importer agreements to be exported outside of the county. These operations have limited or no land acreage under their ownership or operational control; the manure would not have been land applied. Having to apply Nutrient Management

BMP on top of any Manure Transport or Manure Treatment Technology is onerous and does not avail itself to ease of reporting. The modeling of manure transport should be reviewed and revised.

- Soil and Water Conservation Plan - Erosion and Sediment Control for Agriculture (Ag E&S) – In order to minimize the potential for accelerated erosion and sedimentation, Pennsylvania regulations require the development and implementation of Ag E&S Plans for all plowable/tillable acres and / or Animal Heavy Use Areas (AHUAs) equal to or greater than 5,000 square feet. No-till operations also need to comply with this regulatory requirement. At a minimum, Ag E&S Plans must limit soil loss from accelerated erosion to the soil loss tolerance (T) over the planned crop rotation as well as implement erosion control measures for both sheet and concentrated flow erosion. The Chesapeake Bay Program Partnership has not re-evaluated the Soil and Water Conservation Plan criteria since 2009, which was largely based on research reviewed in 2003. The Chesapeake Bay Program Partnership should prioritize re-evaluation of the available research for soil erosion as well as the component practices within the Soil and Water Conservation Plan BMP.

E. Coordination with the EPA Chesapeake Bay Program Office and the Modeling Workgroup

Pennsylvania, through engagement with the Chesapeake Bay Partnership Program and Workgroups, has concerns with crediting practices that have not yet been sufficiently recognized through the modeling framework. In response to the EPA Evaluation of Pennsylvania's Phase 3 WIP, a more detailed review of those concerns was done. As a result of that review, Pennsylvania intends to continue to work with Chesapeake Bay Program Partnership to develop Pennsylvania-specific practice definitions for several BMPs including:

- Legacy Sediment Removal (LSR) – Work has continued with the Chesapeake Bay Program Urban Stormwater Workgroup to bring data related to establishing the credit for this practice. Pennsylvania believes there is enough data and local need to establish Pennsylvania-specific crediting criteria for this practice. While there have been several pilot projects that have developed data, as additional implementation occurs, it is important that these projects are accurately characterized in the model based on Pennsylvania's methodologies. DEP has worked with other jurisdictional and federal partners to finalize the updated Stream Restoration Protocols, which allow for LSR and ecosystem restoration projects to be properly credited. However, one caveat to this is the requirement to ensure that any wetlands restored or enhanced as part of the LSR projects are also tracked and reported separately. DEP will work to ensure that all practices are properly collected, tracked, and reported for crediting.
- Flood Control Measures – Pennsylvania recognizes that there may be opportunities to bridge Federal Emergency Management Agency-funded stream

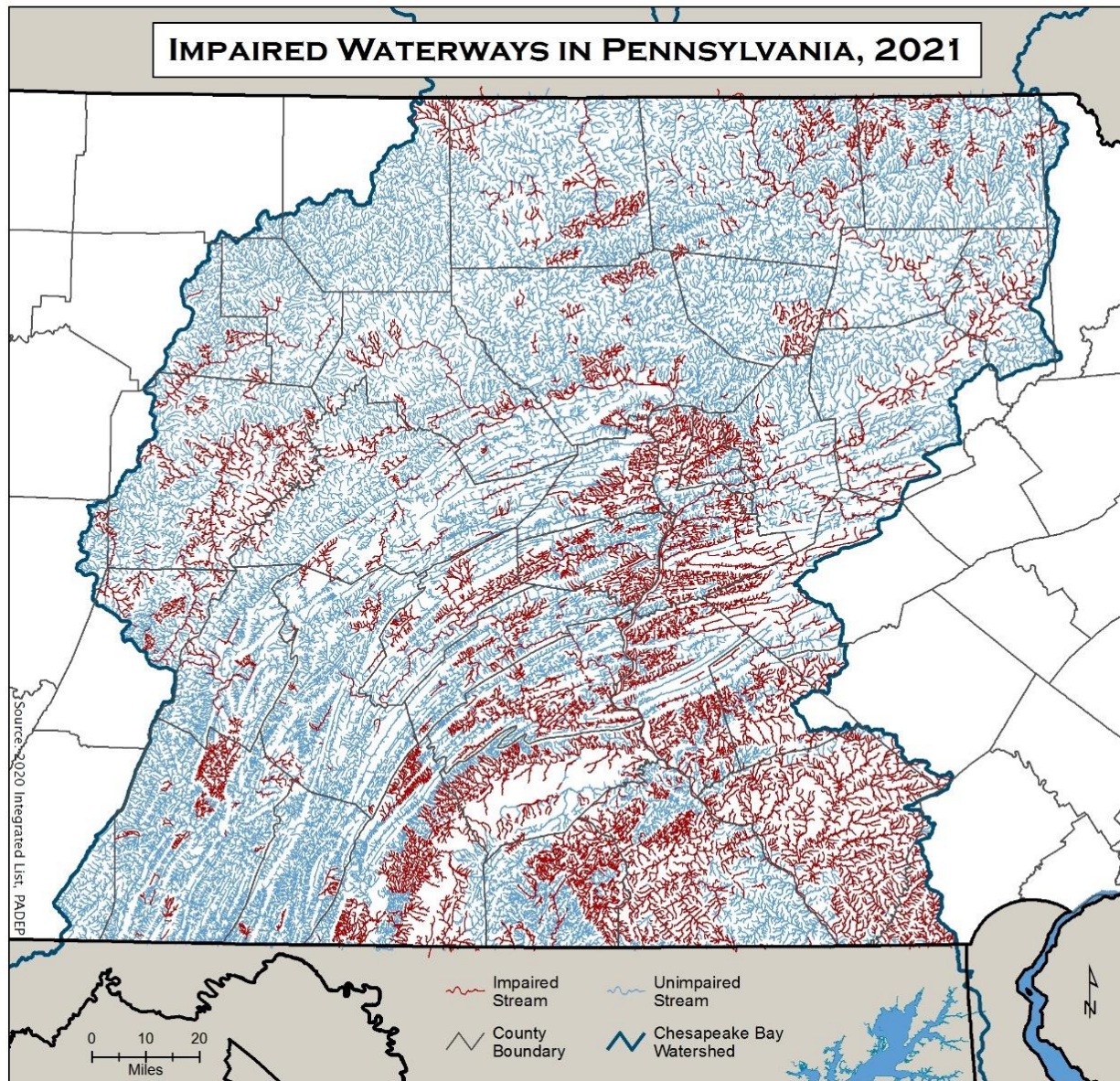
projects related to local flood control for crediting in the Chesapeake Bay Watershed Model. Additional projects include the Act 13 Watershed Restoration and Protection Program (WRPP) grants, administered by DCED. Pennsylvania intends to take advantage of any information obtained and developed through these projects that we do not currently report in the model.

- Restored Stream Miles and Acid Mine Drainage (AMD) treatment – Pennsylvania has over 12,000 miles of impacted streams which have limited biologic activity and nutrient uptake. Acid Mine Drainage accounts for more than 3,300 of the impaired stream miles. Through AMD treatment projects, more than 178 stream miles have been restored to attain designated use criteria with a fully functioning ecosystem. Streams with fully functioning ecosystems effectively process and remove nutrients. While these changes may be captured in longer-term monitoring, the improvements evident with restoration are significant. In February 2022, DEP submitted a request for a Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC) workshop on the water quality benefits associated with AMD treatment. STAC recommended the AMD treatment analysis undergo a technical review, scheduled to begin June 2022. The goal is to complete the analysis by December 2022, present to the Chesapeake Bay Management Board, and – if nutrient and/or sediment reduction benefits are identified in the technical review – seek concurrence with moving forward with inclusion into CAST-23.
- Dirt and Gravel Roads – Pennsylvania has a very successful program to address stormwater runoff from dirt and gravel roads. However, this program only receives credit for sediment reductions in the Chesapeake Bay Watershed Model. There are associated nutrient reductions that are achieved from the practices installed as part of this program that should also be credited as part of the implementation of this program.
- Water Quality Monitoring – As noted in Section 2, Pennsylvania has worked to better inform the overall water quality dataset by conducting extensive quality assurance and quality control on additional records from 2010-2020 and submitting them to EPA’s Water Quality Portal, a national, publicly accessible database. It is imperative that state-derived water quality monitoring data, including the data that is accepted by EPA for the two-year Integrated Water Quality Reports, is incorporated into the Chesapeake Bay Watershed Model. Since 2019, DEP’s Chesapeake Bay Office has facilitated multiple discussions and brought together water quality monitoring experts and program leaders to discuss approaches and proposed paths forward on water quality monitoring with other federal, state, and local stakeholders. This includes discussions surrounding providing more state-derived water quality monitoring data for inclusion in the next Chesapeake Bay Watershed Model calibration.

Table 4.3. Impaired Stream Miles in Pennsylvania's Chesapeake Bay Watershed

Impairment Source	Total Length (miles)
ACID MINE DRAINAGE	3,388.5
AGRICULTURE	5,968.3
ANIMAL FEEDING OPERATIONS (NPS)	7.3
ATMOSPHERIC DEPOSITION	574.3
CHANNEL EROSION/INCISION FROM UPSTREAM HYDROMODIFICATIONS	17.3
CHANNELIZATION	88.4
COAL MINING	1.8
COMBINED SEWER OVERFLOWS	39.0
CONSTRUCTION	52.6
CROP PRODUCTION (CROP LAND OR DRY LAND)	505.0
DAM OR IMPOUNDMENT	77.5
EROSION FROM DERELICT LAND (BARREN LAND)	19.0
GOLF COURSES	32.4
GRAZING IN RIPARIAN OR SHORELINE ZONES	685.6
HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION	1,115.0
HIGHWAY/ROAD/BRIDGE RUNOFF (NON-CONSTRUCTION RELATED)	384.1
HIGHWAYS, ROADS, BRIDGES, INFRASTRUCTURE (NEW CONSTRUCTION)	3.9
IMPACTS FROM HYDROSTRUCTURE FLOW REGULATION/MODIFICATION	82.9
IMPERVIOUS SURFACE/PARKING LOT RUNOFF	25.3
INDUSTRIAL POINT SOURCE DISCHARGE	63.1
LANDFILLS	3.6
MUNICIPAL (URBANIZED HIGH DENSITY AREA)	10.3
MUNICIPAL POINT SOURCE DISCHARGES	68.7
NATURAL SOURCES	20.6
ON-SITE TREATMENT SYSTEMS (SEPTIC SYSTEMS AND SIMILAR DECENTRALIZED SYSTEMS)	34.3
RECREATION AND TOURISM (NON-BOATING)	0.5
REMOVAL OF RIPARIAN VEGETATION	130.9
RURAL (RESIDENTIAL AREAS)	239.4
SILVICULTURE ACTIVITIES	1.6
SITE CLEARANCE (LAND DEVELOPMENT OR REDEVELOPMENT)	47.4
SOURCE UNKNOWN	7,905.1
STREAMBANK MODIFICATIONS/DESTABILIZATION	33.1
SURFACE MINING	43.2
URBAN RUNOFF/STORM SEWERS	1,248.6
Total	12,883

**Figure 4.1. Map of Impaired Stream Miles
in Pennsylvania's Chesapeake Bay Watershed**



Pennsylvania has over 12,000 miles of impaired streams within the Chesapeake Bay watershed. Of the known sources of pollution, agriculture is the primary source of impairment for Pennsylvania's local waterways. Agriculture, animal feeding operations, crop production, and grazing in riparian or shoreline zones accounts for approximately 55% of the known impaired waterways. The second largest source of impairment is abandoned mine drainage, which accounts for approximately 26% of the known impaired waterways.

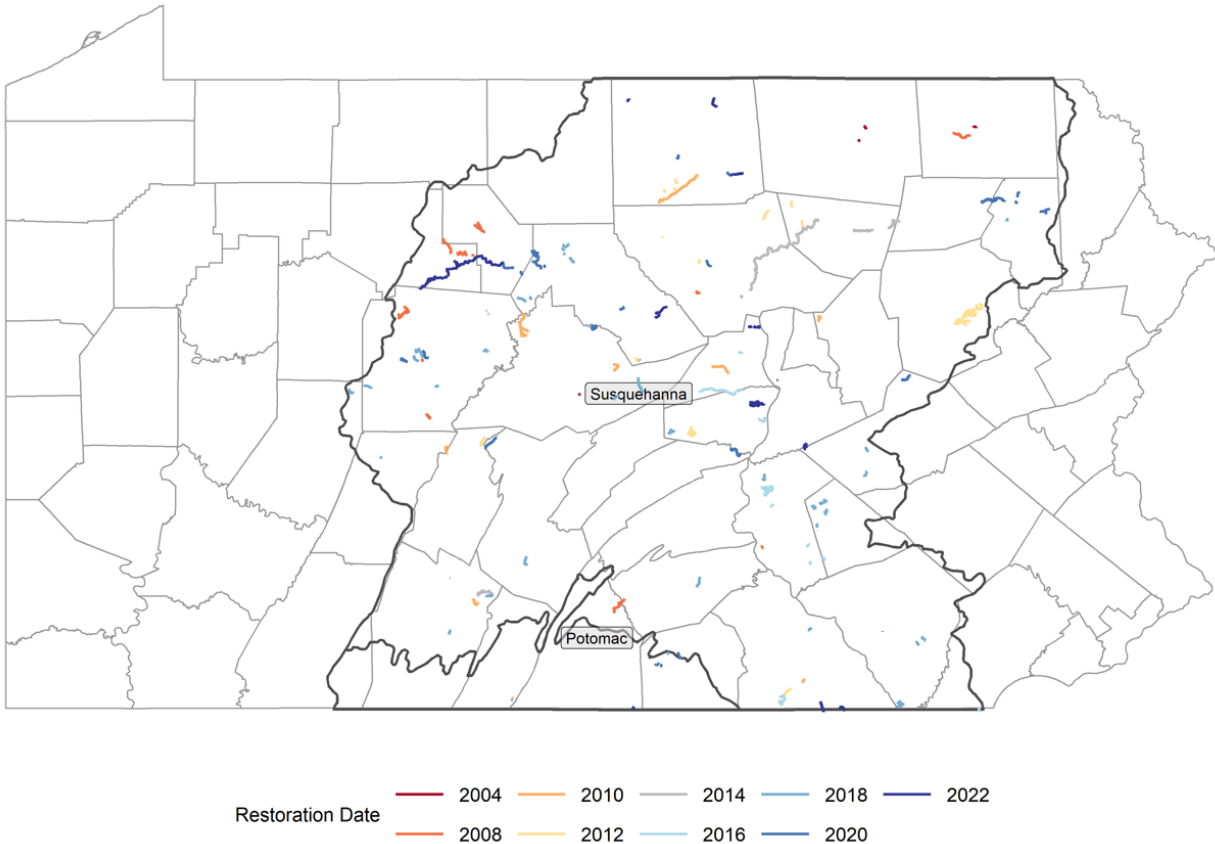
Included in Pennsylvania's many success stories are the restoration of over 429 miles of streams in the Chesapeake Bay watershed alone between 2010 and 2022. More than 474 miles of Pennsylvania streams in the Chesapeake Bay watershed have been

restored since 2004, first two-year cycle of reporting for the Integrated Water Quality Report (Table 4.4). A restored stream is one that was once impaired but is now attaining full water quality function. Currently, the Chesapeake Assessment Scenario Tool (CAST) does not provide nutrient and sediment reduction credit for water quality restoration despite the growing body of scientific evidence that suggests restored streams function to increase nutrient uptake and retention through various physical, chemical, and biologic processes.

Table 4.4. Restored Stream Miles in Pennsylvania’s Chesapeake Bay Watershed

Original Impairment Source	Restored Length (miles)
ACID MINE DRAINAGE	178.1
AGRICULTURE	56.4
ANIMAL FEEDING OPERATIONS (NPS)	1.5
ATMOSPHERIC DEPOSITION	19.6
CHANNELIZATION	3.5
COMBINED SEWER OVERFLOWS	5.9
CONSTRUCTION	0.8
CROP PRODUCTION (CROP LAND OR DRY LAND)	19.7
DAM OR IMPOUNDMENT	1.0
EROSION FROM DERELICT LAND (BARREN LAND)	1.0
GRAZING IN RIPARIAN OR SHORELINE ZONES	18.3
HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION	14.0
HIGHWAY/ROAD/BRIDGE RUNOFF (NON-CONSTRUCTION RELATED)	24.4
INDUSTRIAL POINT SOURCE DISCHARGE	8.3
MUNICIPAL POINT SOURCE DISCHARGES	37.0
NATURAL SOURCES	7.9
REMOVAL OF RIPARIAN VEGETATION	4.4
RURAL (RESIDENTIAL AREAS)	15.7
SILVICULTURE ACTIVITIES	5.0
SITE CLEARANCE (LAND DEVELOPMENT OR REDEVELOPMENT)	1.1
SOURCE UNKNOWN	107.9
URBAN RUNOFF/STORM SEWERS	20.6

Figure 4.2. Map of Restored Stream Miles in Pennsylvania's Chesapeake Bay Watershed



The major restored source of impairment in Pennsylvania's streams is abandoned mine drainage (AMD), with more than 178 miles of streams restored. Streams impaired by AMD are colloquially described as "dead streams." These are aquatic ecosystems with little to no biological activity. After restoration efforts, these streams can support native plant and animal species, as well as the biological and nutrient removal benefits of an attaining stream. Many of Pennsylvania's AMD-restored streams that are now attaining full ecological benefits, are documented at www.epa.gov/nps/nonpoint-source-success-stories-pennsylvania.

As identified in Pennsylvania's draft 2022 Integrated Water Quality Report, there were approximately 120 stream miles statewide where a use was restored to water quality standards during the reporting time period, of which more than 77 miles are in the Chesapeake Bay watershed. This includes 32 miles of Aquatic Life use restoration in the Bennett Branch Sinnemahoning Creek, a tributary to the West Branch Susquehanna River, which is the largest recorded AMD restoration in DEP's history. Compared to other years, 2022 is also the third highest recorded restoration of miles for any two-year Integrated Water Quality Report cycle.

Pennsylvania recognizes that other future practices may be developed over time. All potential additional BMPs will take continued coordination with other workgroups within

the partnership as well as input from outside experts. Pennsylvania would also assist in the developing these additional BMPs.

F. Coordination with the Chesapeake Bay Program Office, EPA Region 3, and DEP's Nonpoint Source Management Program

DEP's Nonpoint Source Management Program, part of the DEP Chesapeake Bay Office, provides grants to assist watershed associations, conservation districts, and other nonprofit organizations in addressing nonpoint source pollution. This grant program manages funds EPA awards to DEP under Section 319(h) of the Clean Water Act. DEP uses awarded funds in part to fund programmatic efforts and in part as sub-grants to local partners to implement water quality improvement projects specified in EPA-approved 319 Watershed Implementation Plans (WIPs). DEP also develops a Nonpoint Source (NPS) Management Plan, and develops, publishes, and submits the Nonpoint Source Management Annual Report to EPA. Currently, 319 grant-funded projects must be associated with implementation of an EPA-approved 319 WIP. One efficiency that has come about in recent years is the development of Alternative Restoration Plans (ARPs) by DEP's TMDL Section. These ARPs are not viewed as TMDLs but can be used as local WIPs or Watershed Based Plans (WBPs). This allows for a more streamlined approach to planning, allowing local stakeholders to get a head start on implementing projects in the ARP that meets the Section 319 criteria. DEP is actively working with the EPA Water Division to discuss additional flexibilities in the Section 319 grant program. DEP also recommends EPA consider additional efficiencies in the requirements set forth by EPA's CBPO and Water Division, specifically as it relates to nonpoint source pollution prevention programs, including but not limited to Quality Assurance Program Plans (QAPPs), connection between the EPA NEIEN and Grants Reporting and Tracking System (GRTS), and other annual reporting requirements.

G. Coordination with DEP Regulatory Programs and Other State and Federal Agencies

In addition to the above listed Chesapeake Bay-specific coordination needs, DEP's regulatory programs work closely with their state and federal partners to coordinate permitting efforts for applicants. DEP has identified the need for more timely responses when state and federal partners – including the Pennsylvania Fish and Boat Commission, the Pennsylvania Historical and Museum Commission, the United States Fish and Wildlife Service, and the United States Army Corps of Engineers – have a role in DEP permit processes. While this coordinated review effort allows for a more linear application process for permit applicants, it sometimes creates backlogs in DEP's permit decision process. DEP recommends permitting through these programs be aligned with priorities in the Phase 3 WIP to meet the Chesapeake Bay TMDL. State and federal counterparts should evaluate opportunities to shorten review time for Phase 3 WIP priority projects.

SECTION 5. EXISTING AND NEEDED RESOURCES

I. INTRODUCTION

This section identifies existing financial and staffing resources in Pennsylvania, costs associated with actions identified in the Phase 3 WIP and additional resources that are needed to meet Chesapeake Bay TMDL goals.

II. APPROACH TAKEN

A. Data Collection Efforts

The Phase 3 WIP Funding Workgroup collected data from four sources:

- Reported funding amounts spent through state and federal funding programs.
- The Phase 3 WIP workgroups identified technical and financial resources available and needed.
- The four pilot counties identified resources available and needed during the pilot planning process for their CAPs.
- The EPA Chesapeake Bay Program data system and CAST model for cost information on BMPs.

III. SUMMARY OF RESULTS

A. State Agency Fiscal Data – Chesapeake Bay Accountability and Recovery Act

One of the early WIP Funding Workgroup efforts was to compile the fiscal data from a wide range of state and federal agencies that relate to restoration of local waters and in turn the Chesapeake Bay. Table 5.1 below shows what has been reported to EPA in July 2021 regarding state funds expended as part of the congressional Chesapeake Bay Accountability and Recovery Act (CBARA) annual reporting requirements. More information regarding state and federal agency CBARA reporting can be found on the [ChesapeakeProgress Funding](#) website. Figure 5.1 is a graphic representation of this data arranged by county. Figure 5.2 is the same data with the counties arranged by the Tiers as described in [Section 3, Countywide Actions](#).

Table 5.1. State Funds Expended for Chesapeake Bay Watershed Restoration

Note		Federal Fiscal Years		
		FY 2019	FY 2020	FY 2021
Department of Environmental Protection				
1	Growing Greener/ Environmental Stewardship Fund (ESF)	\$1,964,125	\$27,906,353	\$6,850,390
2	Water Pollution Control (Section 106; Section 106 Supplemental; Section 604(b))	\$9,684,850	\$9,639,822	\$7,708,159
	Agriculture Plan Reimbursement Program	\$772,824	\$680,936	\$839,767
3	Chesapeake Bay Implementation			
	Program Management and Administration	-	-	-
	Chesapeake Bay Regulatory and Accountability			
4	Chesapeake Bay Agricultural Nonpoint Source Abatement	\$2,017,007	\$4,812,857	\$2,917,218
2	Non-Tidal Monitoring Network	\$700,612	-	\$664,492
2,5,6	Chapter 102 - Construction Stormwater (E&S, PCSM, NPDES) Program Implementation and Administration	\$2,295,780	\$2,932,501	\$3,971,605
2,7	Chapter 105 - WOE and Dam Safety Program Implementation and Administration	\$58,193,950	\$52,398,212	\$43,301,349
	Chesapeake Bay Commission	\$300,000	\$300,000	\$300,000
State Conservation Commission				
	Conservation District Fund Allocation Program	\$2,130,945	\$2,298,000	\$2,264,900
	Dirt, Gravel, and Low Volume Road Program	\$17,157,461	\$16,790,000	\$14,600,000
	Nutrient Management Program	\$1,548,040	\$1,548,000	\$1,591,000
	Resource Enhancement and Protection Program	\$4,913,807	\$10,900,000	\$8,520,000
	Conservation Excellence Grant	-	-	\$2,000,000
	Agri-Link	-	-	-
Department of Agriculture				
	Farmland Preservation	\$20,640,702	\$20,000,000	\$19,341,896
Pennsylvania Infrastructure Investment Authority				
	Project Construction and Implementation	\$13,321,252	\$15,590,007	\$18,340,483
Department of Community and Economic Development				
8	Watershed Restoration and Protection Program (Act 13)	\$967,672	\$1,713,268	-
Department of Conservation and Natural Resources				
	Land Conservation	\$4,865,530	\$711,000	\$3,290,000
	Riparian Buffers (PENNVEST Funding)	\$682,600	\$279,387	-
	Riparian Buffers (DCNR)	\$963,000	\$1,194,748	\$600,000
	Tree Canopy (TreeVitalize Program)	\$58,800	\$60,000	\$113,270
	Lawn Conservation (Conservation Landscaping and Urban Forest Planting)	-	\$72,000	\$150,000
Total		\$143,178,957	\$169,827,091	\$137,364,529

Note 1: Amounts awarded are based on projects approved; an estimation can be performed based upon budgeted amounts. FY21 and FY22 are estimated.

Note 2: Expended funds are calculated at 49% of the total statewide expenditures because the Chesapeake Bay Watershed makes up approximately 49% of Pennsylvania. FY2021 expenditures are equivalent to 9 months.

Note 3: Beginning FY19, match is provided in Growing Greener/ESF and Ag Plan Reimbursement Program.

Note 4: FY19 Chesapeake Bay Agricultural Source Abatement funded via ESF; FY2021 expenditures are equivalent to 9 months.

Note 5: Chapter 102 - construction stormwater (erosion and sediment control (E&S), post construction stormwater management (PCSM), NPDES state expenditures do not equate to total cost to implement the program. Permit fees collected are not included in this report. These numbers are provided on a state fiscal year basis, based on the state required triennial cost and fee analysis.

Note 6: FY20 and FY21 are estimated based on potential program costs / expenditures.

Note 7: Chapter 105 – water obstruction and encroachments (WOE) and dam safety state expenditures do not equate to total cost to implement the program. Permit fees collected are not included in this report. These numbers are provided on a state fiscal year basis, based on the state required triennial cost and fee analysis.

Note 8: DCED Watershed Restoration and Protection Program is reported on a state fiscal year basis. FY21 applications are being accepted through July 31, with awards anticipated Spring 2022. Varying levels of funding is received from year to year and this program competes directly against other Act 13 funding programs. Therefore, an estimate of FY21 or FY22 cannot be provided.

Figure 5.1. Funding by County FY14-FY19

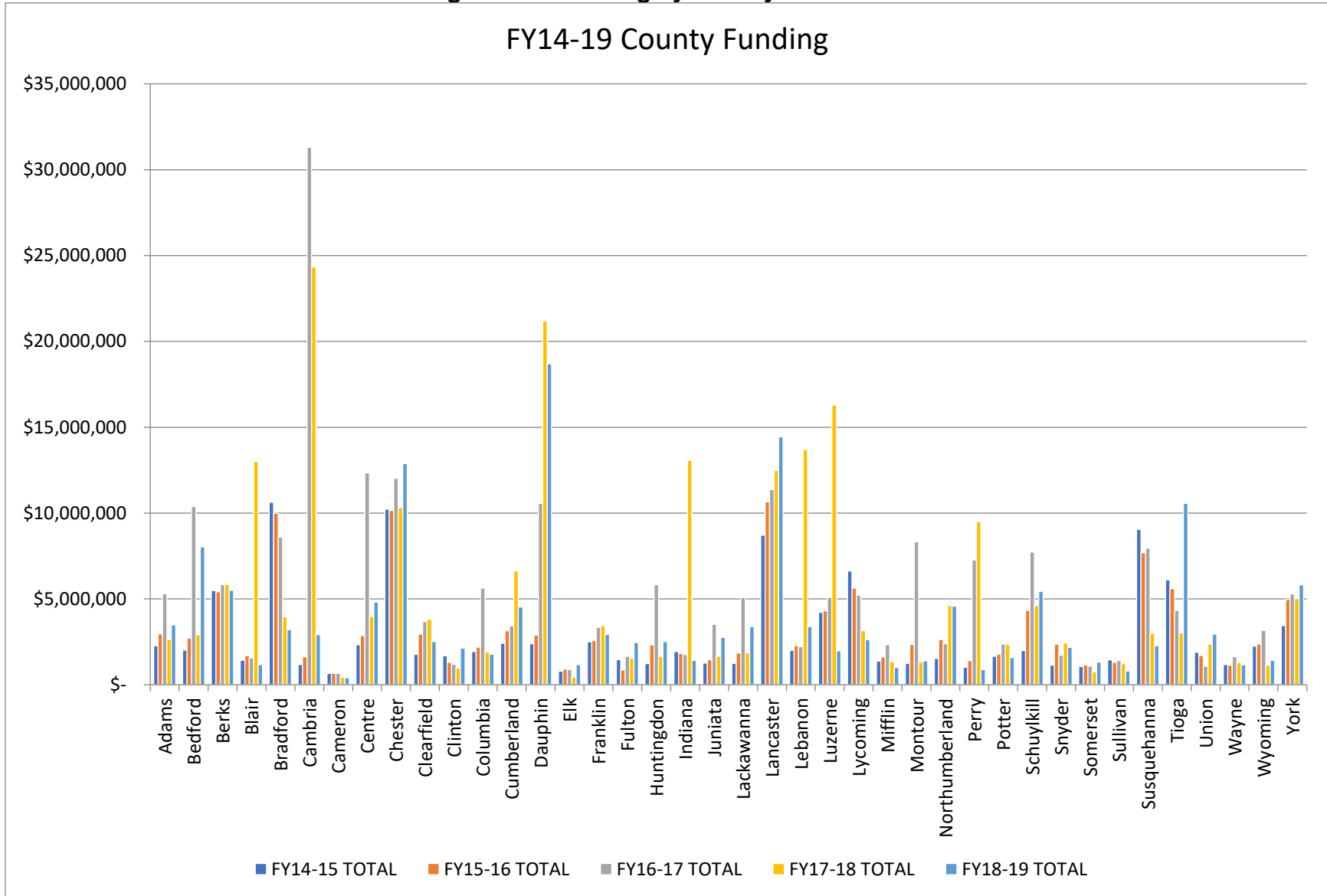
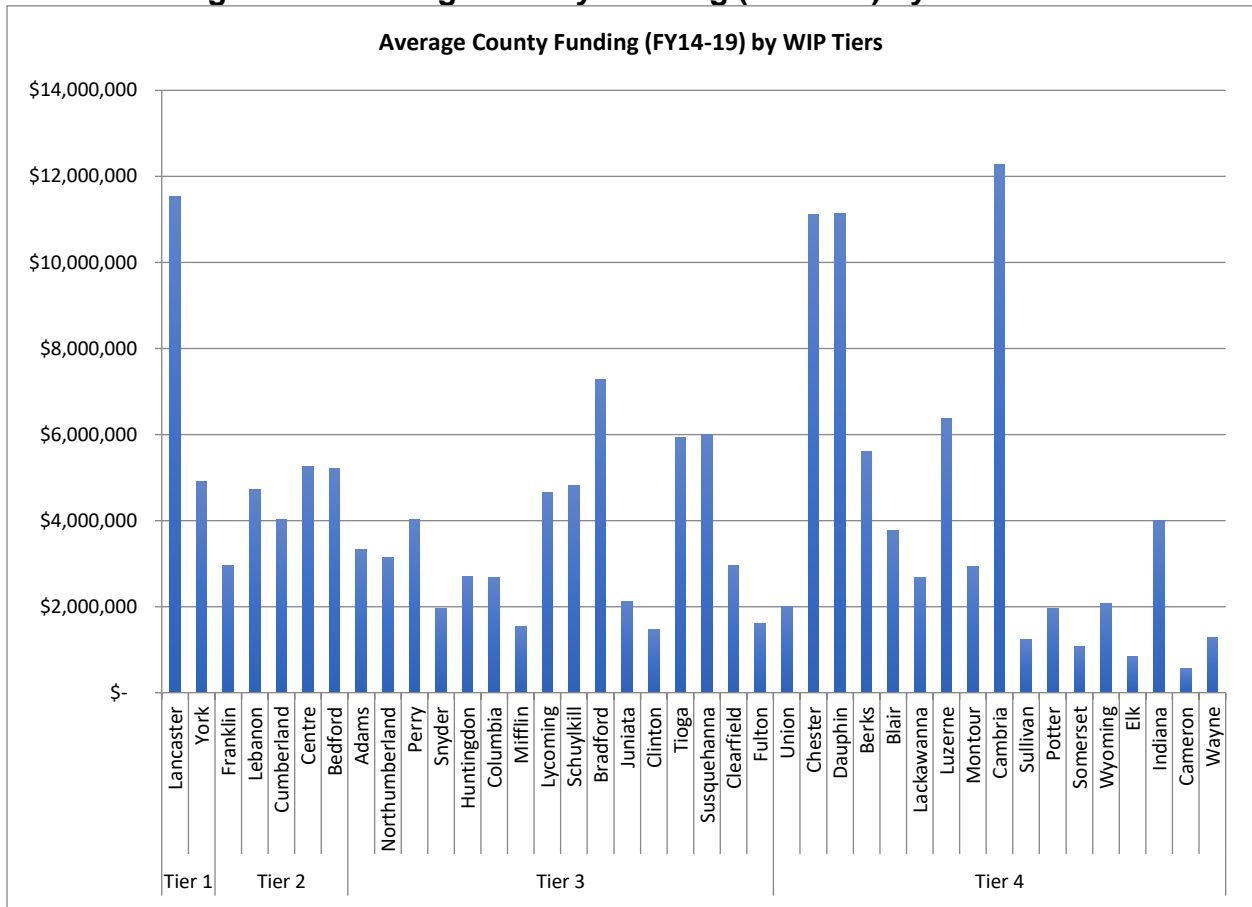


Figure 5.2. Average County Funding (FY14-19) by WIP Tiers



B. Priority Initiative Costs, Numeric Commitments

Table 5.2, Summary of Priority Initiative Costs, is an overview of the annual BMP installation costs needed to implement the numeric commitments identified in [Section 2, State Actions](#). The annualized costs are derived from the Chesapeake Bay Program’s Chesapeake Assessment Scenario Tool (CAST). Costs are estimated in 2010 dollars. Capital and opportunity costs are amortized over the BMP lifespan and added to annual operations and maintenance (O&M) costs for a total annualized cost. The interest rate for capital and opportunity costs is 5%. Costs are those incurred by both public and private entities. Costs represent a single year of cost rather than the cost over the entire lifespan of the practice. Default costs were prepared for EPA using existing data. Chesapeake Bay jurisdictions were provided with the opportunity to review and amend the unit costs for BMPs in the Phase 2 WIP. The primary source of costs, specifically in the agriculture sector, are from NRCS payment schedules and cost estimates as well as state sources such as Penn State Extension research. For more information, see <https://cast.chesapeakebay.net/Documentation/CostProfiles>.

These costs do not include associated technical assistance costs provided at the local level to facilitate implementation of these BMPs. Those additional costs are provided in Table 5.3.

Table 5.2. Summary of Priority Initiative Costs for BMP Implementation in Pennsylvania's Chesapeake Bay Watershed Counties Excluding Pilot Counties

Statewide Workgroup Recommendation	Annual Projected Cost (Final WIP)	Annual Projected Cost (Draft WIP)
Agriculture		
Total	\$206,370,000	\$187,600,000
Agriculture Compliance	\$24,058,000	\$24,058,000
Soil Health	\$21,090,000	\$21,090,000
Expanded Nutrient Management	\$31,735,000	\$8,611,000
Manure Storage Facilities	\$125,615,000	\$125,615,000
Precision Feeding	(-\$1,901,000)	(-\$894,000)
Integrated Systems for Elimination of Excess Manure	\$3,278,000	\$2,205,000
Grass Riparian Buffers	\$2,495,000	\$6,914,000
Stormwater		
Total	\$61,899,000	\$60,242,000
Meet Current MS4 Permit Requirements	\$57,789,000	\$57,789,000
New Riparian Forest Buffers	\$48,000	\$48,000
Pools and Car Washing	\$451,000	\$451,000
Industrial Stormwater	\$1,953,000	\$1,953,000
Fertilizer Legislation	TBD	TBD
Meet Current Erosion and Sediment (E&S) Control and Post Construction Stormwater Management (PCSM) Requirements*	N/A	0
Dirt and Gravel Roads	\$1,657,000	0
Forestry		
Total	\$42,950,000	\$53,522,000
Forest Riparian Buffers	\$20,562,000	\$31,012,000
Tree Canopy	\$4,000	\$4,000
Woods and Pollinator Habitat	\$751,000	\$8,711,000
Forest, Farm, and Natural Areas Conservation	TBD	TBD
Stream and Wetland Restoration	\$23,287,000	\$23,287,000
Wastewater		
Onsite Septic Management	\$309,000	0
Total Workgroup Implementation Annualized Costs	\$311,779,000	\$300,810,000

*These costs are not included as part of the "funding gap," permit holders incur the cost of these practices.

A word of caution is warranted when using these cost estimates. CAST cost estimates are intended to be a starting point for users to create their own BMP cost projections. Many of the CAST estimates originate from documents and communications that are at least ten years old. Regarding the agriculture BMPs, CAST cost estimates originate from sources such as Pennsylvania NRCS payment schedules and Penn State Extension research. There was no accounting for inflation, which may have raised these estimates by approximately 15%. In addition, cost estimates will differ from locality to locality for reasons beyond inflation.

CAST BMP costs often reflect a single point estimate derived from multiple cost sources and ranges. While not fully inventoried, data and sources of costs feeding into CAST have inherent variability. Original sources of costs are not consistent in how they account for major components, such as cost of land, intensity of operation and maintenance (O&M), management, and coordination (to secure opportunities). Because the CAST estimates are averages, they mask the variability in the underlying data.

Other important sources of cost variability include:

- Changes in technology and inputs to BMPs. The cost structure to inputs for many of these practices has changed in the last ten years. County estimates reflect each area's understanding of current prices and current technologies.
- Any given BMP is likely to use different ratios of labor and capital/equipment reflecting the entity's ability to leverage its existing resources (equipment, capital, labor). This mix can substantially change a given BMP's cost.
- Design and scale can significantly drive cost estimate variation by several orders of magnitude.
- Local costs differences. In addition to changes through time in input costs, local economic conditions can also account for cost variability, particularly with respect to labor and materials.
- Differences in assumptions about O&M. Different practices and approaches to BMP O&M can explain variation and uncertainty in costs for any given BMP. For example, some organizations assume that tree planting or riparian buffer plantings require a five-year rather than three-year establishment period. Changes in this assumption not only impact the "capital costs," but also have flow-on effects for ongoing maintenance requirements.

Table 5.3 below provides a summary of existing state agency and external staff resources currently supported with either state or federal funding devoted to providing technical and compliance assistance and support to implement the priority initiatives listed in Table 5.2. This table also lists additional resources needed. A complete description of these priority initiatives can be found in [Section 2, State Actions](#).

**Table 5.3. Summary of Technical Assistance and Staff Resources,
Priority Initiatives, Numeric Commitments**

State Actions, On the Ground Implementation						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Agriculture						
Agriculture Permitting	Permit Engineers and Env. Eng. Manager	DEP – SCRO	2.5	0	\$395,552	
Agriculture Compliance	Inspectors	DEP – Regional Offices	5.5	7	\$572,357	\$728,455
Agriculture Compliance	Compliance Specialists	DEP- Regional Offices	2	2.5	\$237,898	\$297,373
Agriculture Compliance	Inspector Supervisors	DEP – Regional Offices	1	2	\$135,662	\$271,324
Agriculture Compliance	Program Specialist	DEP – Central Office	1.5	1	\$203,493	\$135,662
Nutrient and Odor Management (Act 38)	Conservation Program Specialists	State Conservation Commission	7	0	\$728,000	
Nutrient Management Support (Act 38)	Penn State Extension	Penn State University	5	0	\$356,000	
Nutrient Management (Act 38)	NM Technicians	Conservation Districts	39	0	\$3,510,000	
Technical Assistance, Planning, Inspections	Bay Technicians	Conservation Districts	35	50	\$3,150,000	\$4,500,500
BMP Design, Engineering Support	Bay Engineers	Conservation Districts	8	10	\$720,000	\$900,000
	<i>Subtotal Agriculture (Agency Resources)</i>		19.5	12.5	\$2,272,962	\$1,432,814
	<i>Subtotal Agriculture (External Resources)</i>		87	60	\$7,736,000	\$5,400,500

State Actions, On the Ground Implementation						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Stormwater						
Outreach	Water Quality Specialists	DEP – Bureau of Clean Water	0	3		\$328,000
MS4 Annual Report Reviews	Water Quality Specialists	DEP Regional Offices	1	1	\$105,000	\$105,000
MS4 Permit Reviews	Engineers	DEP Regional Offices	4	2	\$250,000	\$250,000
MS4 Inspections	Water Quality Specialists	DEP Regional Offices	4	2	\$420,000	\$210,000
MS4 Compliance and Enforcement	Compliance Specialists	DEP Regional Offices	0.25	1	\$29,737	\$118,949
Water Quality Monitoring	Aquatic Biologist	DEP – Bureau of Clean Water	7	1	\$735,000	\$105,000
Chapter 102 Construction Permit Reviews and Inspections – Increased Inspection Frequency	E&S Technicians	CCDs	82.5	19	\$5,940,000	\$1,368,000
Chapter 102 Permit Reviews – PCSM Delegation	Engineers	CCDs	3	34	\$270,000	\$2,448,000
Chapter 102 Construction Permit Reviews	Engineers	DEP Regional Offices	15	7	\$2,034,930	\$1,899,268
Chapter 102 Construction Permit Compliance	Compliance Specialists	DEP Regional Offices	2	5	\$237,898	\$594,745
Chapter 102 Permitting and Compliance Management	Management (EPM, EGM, WPS)	DEP Regional and Central Office	17.25	2	\$3,404,182	\$271,324
<i>Total (Agency)</i>			50.5	24	\$7,216,747	\$3,882,286
<i>Total (External – CCD)</i>			85.5	53	\$6,210,000	\$3,816,000

State Actions, On the Ground Implementation						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Forestry						
Watershed-wide Forestry BMP Leadership and Management	Program Manager	DCNR	0	1	0	\$116,250
Watershed-wide Forestry BMP coordination, communication, interagency cooperation, guidance	Program specialists	DCNR	3	4	\$305,226	\$406,968
Grants administration	Recreation and Conservation Advisor 2	DCNR	.25	4	\$21,787	\$348,588
Riparian Forest Buffer outreach and technical assistance (including identifying funding for landowners)	Foresters	DCNR	5	15	\$390,600	\$1,171,800
Riparian Forest Buffer outreach and technical assistance (including identifying funding for landowners)	Resource conservation technician	Conservation Districts	5	20	\$390,600	\$1,562,400
Stream Restoration		Fish and Boat Commission	0	8		\$ 430,906
<i>Subtotal Forestry (Agency Resources)</i>			8.25	32	\$717,613	\$2,474,512
<i>Subtotal Forestry (External Resources)</i>			5	20	\$390,000	\$1,562,400
Wastewater						
Web-based Septic System management and permitting system			0	1		\$160,000
Sewage Management Program Administration	Water Program Specialist			1		\$140,000
Optimization Program	Water Program Specialists	DEP – Bureau of Clean Water	1.5	4.0	\$250,000	\$1,260,000
<i>Subtotal Wastewater (Agency Resources)</i>			1.5	5.0	\$250,000	\$1,560,000
Total Numeric Commitments (Agency Resources)			79.75	74.5	\$10,457,322	\$9,349,612
Total Numeric Commitments (External Resources)			177.5	133	\$14,336,600	\$10,778,900

Agriculture

There is a significant need for more “boots on the ground” to assist farmers and help ensure compliance with the regulatory requirements. Agency staff resources, along with conservation district and Penn State Extension, are identified above. However, private industry, non-governmental entities, and federal agency staff are needed to fill gaps in planning and technical assistance across the Chesapeake Bay watershed. The existing scope and breadth of coverage is unknown. The workload analysis showed a need for at least 87 private, non-governmental, and federal staff providing direct technical assistance for Agricultural BMP implementation. This number does not include supervisors, administrative support or contractors providing construction services, so the total number could be greater.

In calculating the resource needs for Agriculture implementation, the following factors were considered:

- Permitting – Average number of NPDES CAFO and Water Quality Management (WQM) Permits reviewed and approved for agricultural facilities per year. Time spent includes permit review and approval, staff meetings, client communications, responding to Right to Know Law requests, responding to DEP central office information requests, site visits, and field work.
- Compliance – Average number of DEP and conservation district inspections and site visits per year for CAFOs and non-CAFOs (this includes the Chesapeake Bay Agricultural Inspection Program); average number of hours per inspection including preparation time, travel time, data management activities, and planning assistance; time spent on continued non-compliance, preparing documentation and follow-up inspections; complaint investigation and documentation; time spent on data management (administrative) for mailings and reporting purposes.
- Technical Assistance –
 - Engineering/Structural Practices (Manure Storage/Barnyards) – Includes an estimated time for design and construction checks; pre-construction meetings, meetings with private consultants, engineers, farmers, and contractors. (17% of livestock and poultry operations annually)
 - Engineering/Structural Practices (Grassed Waterways, Diversions, Terraces, Stream Crossings, etc.) – Includes estimated time for design and construction checks; pre-construction meetings, meetings with private consultants, engineers, farmers, contractors. (5% of all agricultural operations annually)
 - Non-structural practices (Contour lines/strips, Fence, Prescribed Grazing Plans, No-Till/Cover Crop Assistance, Workshops/Field Days, etc.) – Includes estimated time for travel, survey, tracking payments; workshop

events, field days, meetings with farmers. (5% of all agricultural operations annually)

- **Enforcement** – Average number of enforcement actions performed by DEP central and regional offices per year and average amount of time spent per action.

Specific to conservation district staff costs, current funding is provided at \$65,500 per Full Time Equivalent (FTE). In order to keep qualified and certified staff engaged and employed at the conservation districts, it has been noted that this amount of funding does not provide comparable salary and benefits over time, which results in significant staff turnover and many certified and qualified staff leaving the field all together. One of the commitments noted in the Chesapeake Executive Council's *Directive in Support of Agricultural Technical Assistance and Conservation Practice Implementation* is the following:

- Provide stable and sufficient technical assistance to help farmers implement the conservation practices necessary to meet the Bay TMDL goals.

To accomplish this commitment, a close look at conservation district agriculture staffing costs needs to be made, with an adjustment of federal and state funding provided for staff. Therefore, a funding estimate of \$90,000 per FTE has been made for existing and future conservation district staff needs.

Stormwater

In calculating the resource needs for Stormwater sector implementation, the following factors were considered:

- Chapter 102 Increased Inspection Frequency – Double the amount of inspections performed by conservation districts annually. Inspections provide assurance that the erosion and sediment control measures are being implemented and maintained throughout the life of the permit. Conservation district staff that perform permit reviews also complete inspections.
- Chapter 102 PCSM Delegation – The PCSM delegation provides authority to conservation districts to perform engineering (technical) reviews of PCSM Plans, thereby streamlining the permit review process. If all conservation districts had PCSM delegation, each county would need a licensed Professional Engineer on staff to perform the job duties.
- Chapter 102 Permitting – Increase the total FTE for DEP Permitting Staff by one per four counties for additional conservation district support, training, and permit review functions to ensure program consistency.

- Chapter 102 Compliance and Enforcement – Increase the total FTE for DEP Compliance Staff for additional conservation district support, compliance assistance and enforcement functions.

The basis for the Chapter 102 construction stormwater existing and additional staff is the conservation district quarterly reports, which include delegated duties such as: education, outreach, and awareness of Chapter 102 requirements; general and individual permit applications received, permit reviews and approvals; inspections performed; complaint investigations; and referrals to DEP for non-compliance.

Forestry

Implementing Forestry-related BMPs will also require a significant need for more “boots on the ground” to assist farmers and other landowners. Agency staff and conservation district resource needs are identified in Table 5.3 above. However, efforts from federal agency staff and non-governmental entities, including nonprofit organizations and private businesses, have a great impact and will also be needed to fill the gaps in planning and technical assistance for forestry practices across the Chesapeake Bay watershed. Additional support for these groups providing “boots on the ground” technical assistance is needed to meet the Phase 3 WIP goals. This additional support should come from grants, Memorandums of Understanding, and other funding mechanisms, as well as coordination with resource needs identified in the Countywide Action Plans (CAPs).

Further, Table 5.3 assumes Pennsylvania realizes dramatic efficiencies and increases in both funding and communications based around forestry BMPs through the Phase 3 WIP implementation process. Realizing these efficiencies and increases will help lead to more streamlined implementation by a smaller number of new, dedicated staff. Without a change to funding or communication strategies in Pennsylvania through Phase 3 WIP implementation, and if the Commonwealth continues with current rates of funding and current communication avenues surrounding BMP implementation, Pennsylvania would need a total of 230 additional technical assistance providers, or FTEs. These 230 new FTEs would be spread across state agencies, conservation districts, and non-governmental/private/federal partner agencies, businesses, and organizations.

With partial streamlining, a partial increase in funding, and limited investments in new communication efforts that would essentially double current efficiency, 140 new FTEs would be required for implementation of forestry BMPs alone by 2025.

To make the dramatic increases in efficiency necessary to make substantial progress toward Phase 3 WIP forestry BMP implementation goals with only 44 new FTEs (plus an increase in resources directed to partner agencies, organizations, and businesses to employ more “boots on the ground”, as outlined above), dramatic increases in implementation funding and communications must accompany this increase in positions.

In calculating the resource needs for Forestry sector implementation, the following factors were considered:

1. Primary Forestry BMPs include urban and agriculture riparian forest buffers, turf to trees and meadows, and tree canopy.
2. Existing resources are calculated as FTEs, not necessarily dedicated staff.
3. DCNR program specialists would be placed in Bureau of Forestry and Bureau of Recreation and Conservation.
4. Resource conservation technicians in conservation districts would focus primarily on agricultural riparian forest buffers.
5. Foresters in DCNR would focus on agricultural riparian forest buffers, urban riparian forest buffers, turf to trees and meadows, and tree canopy.

C. Priority Initiatives, Programmatic and Narrative Commitments

[Section 2, State Actions](#) identifies several priority initiatives that have existing staff resources devoted to them, or will require additional staff resources, to implement the proposed programmatic enhancements. These additional resources are also connected to initiatives in [Section 3, Countywide Actions](#) and [Section 10, Communication and Engagement Strategy](#).

A complete description of these priority initiatives can be found in the respective sections, to include:

1. Implementation of the BMP Verification Program Plan
2. Administrative activities of the DEP Chesapeake Bay Office
3. Implementation of legislative initiatives such as the proposed Fertilizer Bill
4. Expansion of existing technical assistance, compliance and enforcement, and funding programs
5. Development and implementation of the CAPs
6. Implementation of the Communication and Engagement Strategy

Table 5.4, Summary of Resources, Priority Initiatives, Programmatic and Narrative Commitments provides the existing state agency and external staff resources that are currently supported with either state or federal funding devoted to this effort. This table also summarizes the additional resources needed to support the implementation these priority initiatives.

**Table 5.4. Summary of Staff Resources, Priority Initiatives,
Programmatic and Narrative Commitments**

State Actions						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
BMP Verification Tracking and Reporting Milestone Tracking	Water Program Specialist, Licensed Geologist	DEP – Chesapeake Bay Office	2		\$200,000	
BMP Verification Tracking and Reporting	Contractor Support	Multiple public and private agencies			\$540,000	
EPA Grant Development, Management	Administrative Officer or Water Program Specialist	DEP – Chesapeake Bay Office		1		\$100,000
Project Management, Program Evaluation	Water Program Specialist	DEP – Chesapeake Bay Office	1		\$100,000	
Supervisor, Coordination with Bay Program Partnership	Administrative Officer or Environmental Group Manager	DEP – Chesapeake Bay Office	1		\$105,000	
Contract Management, Invoicing, Personnel Support	Administrative Officer 1	DEP – Chesapeake Bay Office	1		\$87,032	
Office Manager	Program Manager	DEP – Chesapeake Bay Office	1		\$110,000	
Act 167 Outreach, Compliance and Enforcement	Water Program Specialists	DEP – Bureau of Clean Water		2		\$200,000
Real-Time Water Quality Monitoring		DEP – Bureau of Clean Water		1		\$600,000
Support for REAP and Pennsylvania Farm Bill	Administrative Officer 1	State Conservation Commission		1		\$87,032
Additional Support for REAP (\$10-\$20 million increase)	Administrative Officer 1	State Conservation Commission		2		\$174,064
Technical Assistance to counties	Program Specialist	State Conservation Commission		3		\$295,530
Farmland Preservation Conservation Coordinator and Compliance	Administrative Officer 2	Department of Agriculture, Bureau of Farmland Preservation		2		\$98,152
Policy and District Operations and Outreach	Executive Policy Specialist	State Conservation Commission		1		\$61,203
Deputy Secretary for Water Quality, Conservation and Farmland Preservation	Deputy Secretary	Department of Agriculture		1		\$115,000

State Actions						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Fertilizer Bill Compliance	Inspectors	Department of Agriculture, Bureau of Plant Industry		3		\$147,228
Fertilizer Bill Administration	Program Specialist	Department of Agriculture, Bureau of Plant Industry		1		\$56,059
<i>Subtotal (Agency Resources)</i>			6	18	\$602,032	\$1,934,268
<i>Subtotal (External Resources)</i>			0	0	\$540,000	\$-
Countywide Actions						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Supervisor	Administrative Officer 4 or Environmental Group Manager	DEP – Chesapeake Bay Office		1		\$120,000
Support to counties in plan development and implementation	Water Program Specialists	DEP – Chesapeake Bay Office	2	6	\$200,000	\$600,000
Contract Management, Invoicing	Management Technician	DEP – Chesapeake Bay Office		1		\$80,000
County External Coordinators		Counties	8	10	\$800,000	\$1,000,000
Technical Support	Contractors	SRBC, EPA, Others		9	\$900,000	
Facilitation	Contractor	Consulting with a Purpose		1	\$200,000	
<i>Subtotal (Agency Resources)</i>			2	8	\$200,000	\$800,000
<i>Subtotal (External Resources)</i>			8	20	\$1,900,000	\$1,000,000
Communication and Engagement Strategy						
Activity	Position	Agency	Number		Cost	
			Existing	New	Existing	New
Development of outreach materials for two years	Contractor	Water Words That Works	1		\$200,000	
Development of videos		Commonwealth Media Services		1	\$50,000	
<i>Subtotal (External Resources)</i>			1	1	\$250,000	
Total Programmatic and Narrative Commitments (Agency Resources)			8	26	\$802,032	\$2,734,268
Total Programmatic and Narrative Commitments (External Resources)			9	21	\$2,690,000	\$1,000,000

D. Countywide Action Plans

The four pilot counties (Adams, Franklin, Lancaster, and York) worked to identify priorities, practices, and resources needed to improve their local waters. The Funding Workgroup decided to use a two-prong approach to estimate the cost associated with implementing the priorities and practices identified by each county. Both methods were based on Pennsylvania specific default costs in the CAST model.

1. Cost Estimate from County Templates for BMP Input into CAST

The first method to estimate the costs for implementation of BMPs used the default annualized CAST costs to be consistent with the above estimates used for the Phase 3 WIP workgroup recommendations. Described below is a brief description of how the Phase 3 WIP Funding Workgroup used data submitted by the four pilot counties to calculate these annualized costs using CAST.

Costs are estimated in 2010 dollars. Capital and opportunity costs are amortized over the BMP lifespan and added to annual O&M costs for a total annualized cost. The interest rate used for capital and opportunity costs is 5%. Costs are those incurred by both public and private entities. Costs represent a single year of cost rather than the cost over the entire lifespan of the practice. Default costs were prepared using existing data. The Chesapeake Bay Program states are able to review and amend the unit costs for BMPs in the Phase 3 WIP if they have a source of more accurate data.

Table 5.5. Annualized CAST Costs for Pilot Counties

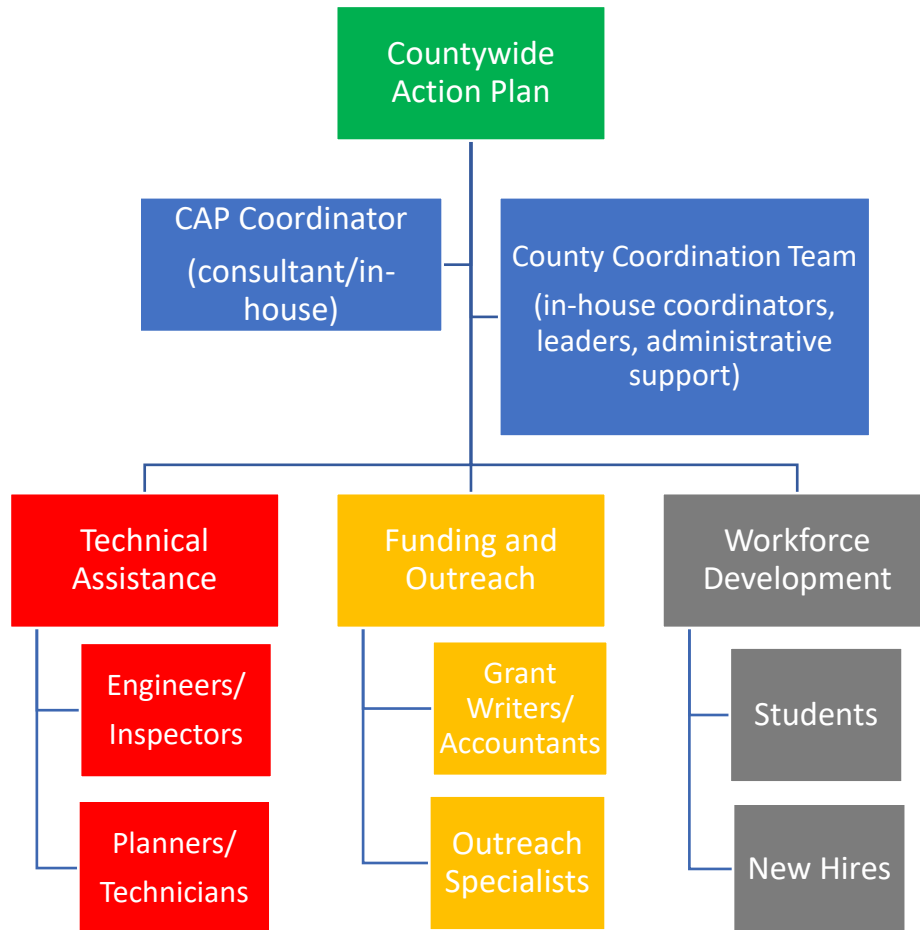
	Adams	Franklin	Lancaster	York	Total
Agriculture	\$6,557,000	\$11,911,000	\$93,114,000	\$15,915,000	\$126,752,000
Developed	\$559,000	\$4,623,000	\$7,202,000	\$10,269,000	\$27,958,000
Septic	\$-	\$-	\$2,461,000	\$-	\$2,461,000
Total	\$7,115,000	\$16,534,000	\$107,337,000	\$26,184,000	\$157,170,000

The CAPs include more information related to cost assessments and resource needs to implement the priority initiatives. The CAPs can be accessed on the [Countywide Action Plan](#) website and have not been included in the Phase 3 WIP to reduce redundancy and allow for adaptive management of the CAPs.

2. County Challenges – Human Resource Constraints and Workforce Development–

Counties have identified other necessary resource needs, especially as it relates to implementing their CAPs. Through the CAP development process, some counties have identified an organizational structure that would ensure long-term implementation success (Figure 5.3). With that comes a recognition of the need for workforce development and additional administrative support.

Figure 5.3. Proposed Countywide Action Plan Organizational Structure for Long-Term Implementation Success



County-level staff are critical to the successful CAP implementation, but conservation district and planning commission staff are not the only organizations where enhanced support is needed.

A skill set assessment should be considered by the local agencies and leaders for each county team. County organizations typically operate with lean employee counts, which results in staff having multiple tasks and, at times, competing priorities. Though this is a necessary approach due to staff budget constraints, it also results in technical staff completing administrative work. A common example is technical field staff completing grant applications and financial paperwork for a project they are familiar with, managing the project from start to finish, and handling all aspects of that project. Though it is logical for that staff person to see the project through from concept through funding and construction, it keeps that staff person away from developing the landowner relationship and scoping the project to the available funding options. The proposed human resource expansion not only demonstrates how conservation should result in significant job creation, but also how scaling up efforts can enlist non-conservation skills (e.g.,

administrative, financial, management). A more diversely skilled workforce should yield creative solutions to conservation outcomes.

Counties have identified challenges and solutions to addressing resource/staffing constraints at the local practitioner level. These challenges will change over time along with the proposed resource requirements; however, at this stage of planning and implementation, county partners have observed these challenges and the feasibility of county partner recommendations to resolve these challenges are being assessed.

1. Additional staff or contractual support is needed to support the day-to-day operations of implementing the CAP.
2. Conservation District funding for salaries and benefits should be increased as well as promotion of sustainable career opportunities to minimize staff turnover.
3. Expand technical assistance capacity in the public sector as well as the private sector through additional financial resources, career development, and training.
4. Grants management is key to the success of CAP implementation. Watershed Specialists perform much of the grants management at the Conservation Districts, however in order to expand funding opportunities, additional support is needed.
5. One-on-one landowner outreach is an essential step to building and maintaining relationships and trust. Provide opportunities for public, private, and non-profit entities to build capacity for long-term maintenance of landowner engagement.
6. Predictable funding will help drive implementation strategies forward, allowing public and private sector to add sufficient staff to support the needs for engineering, design, permitting, and construction.
7. Develop internship opportunities to assist with data management and reporting while training students to be career ready.
8. Address communications and marketing needs through additional staff or contractors.
9. Additional focus on supporting volunteer watershed and environmental organizations through increased messaging from state agencies, potential to explore paid positions within watershed organizations, and basic training to support organizational structure and daily operations of organization.

Table 5.6. Summary of Technical Assistance and Staff Resources Needed Per County to Support Successful Implementation of the Countywide Action Plan (Multi-sectors)

ACTIVITY	POSITION	AGENCY	NUMBER	
			EXISTING	NEW
GIS Analysis, Rapid Delisting Approach, Watershed Plan Development, Landowner Engagement	Environmental Technician, GIS Analyst, Outreach Specialist	Environmental Organization, Nonprofit, Private Sector	0 – 1	3
Marketing and Outreach, Communication Plan, Outreach Coordination	Marketing and Outreach Coordinator, Communication Director	Planning Commission or Conservation District	0	1
Stream Restoration, Stream Sampling	Stream Biologist, Aquatic Specialist, Environmental Scientist	Conservation District, Nonprofit, Private Sector	0 – 1	2
GIS Analysis, BMP Verification, PracticeKeeper Support, Minor Inspections Support, Field Support	Internship Opportunities	Conservation District, Planning Commission, Private Sector, Nonprofit	0 – 2	5
Subtotal Multi-sectors			0 – 4	11
Subtotal All Positions			7 – 23	37

E. The Annual Funding Gap

From Table 5.1, the average resources dedicated to efforts relating to improving Pennsylvania waters over the last five fiscal years is approximately \$196 million, with the most recent FY2019 at \$156 million. Additionally, combining Tables 5.3 and 5.4, Table 5.7 is a summation of staffing resources that are already existing as of 2019 that are dedicated to this effort which is approximately \$28.3 million annually.

The statewide workgroups estimated the total annual resources needed at approximately \$312 million, plus an additional \$23.9 million needed for additional staffing resources, also totaled in Table 5.7. Agency resources are state agency staff involved in the Chesapeake Bay cleanup effort. External agency staff are staff supported with state or federal agency resources, such as county conservation district staff, contributing to this effort. Using the most recent existing funding as of 2019, the funding gap for the WIP Workgroup scenarios is approximately \$324 million annually, as itemized in Table 5.8, Funding Scenario Gap.

Table 5.7. Total of Existing and New Resource Needs

	Number		Cost	
	Existing	New	Existing	New
Total (Agency Resources)	87.75	100.5	\$11,259,354	\$12,083,880
Total (External Resources)	186.5	154	\$17,026,600	\$11,778,900
TOTAL	274.25	254.5	\$28,285,954	\$23,862,780
GRAND TOTAL		528.75		\$52,148,734

Table 5.8. Funding Scenario Gap

Existing	Existing Resources 2018	\$168,522,608
	Existing Staff Resources	\$28,285,954
	Total	\$196,808,562
Total Needed Resources	Statewide Practice Implementation	\$311,779,000
	Pilot County Practice Implementation ¹	\$157,170,000
	Staffing Resources	\$52,148,734
	Total	\$521,097,905
Annual Funding Gap		\$324,289,173

¹These costs are for practice implementation identified in Countywide Action Plans

While the funding gap is approximately \$324 million annually in terms of federal and state funding, the Phase 3 WIP does not have to be completed strictly from the above-mentioned funding sources; funding from Pennsylvania’s Fiscal Year 2022-2023 state budget as well as investments from the federal IIJA/BIL would substantially help to fill this gap. Table 5.1, above, captures many funding sources and catalogs available dollars. However, for many of the devoted resources there is often a match required from either a private landowner or other stakeholder that is implementing the practices on the ground. Also, recent surveys show a large amount of water quality improvements come from private dollars either directly or indirectly that have not been captured in Table 5.1. It would be valuable to capture not only all practices going on the landscape, but also all resources being expended through this effort. To that end, DEP has been incorporating funding sources as part of the PracticeKeeper data collection effort, allowing those that are implementing, tracking, and verifying the opportunity to denote the funding source(s) for the BMPs in the centralized geodatabase. This enhancement then allows DEP to begin tracking how much federal, state, local, nonprofit, and private funds are being provided and to assist with duplicate record checks when the data is compiled for annual progress reporting.

As mentioned in [Section 2, State Actions](#), another approach would be to look at a phased approach to filling this funding gap. With this approach, at a minimum, at least \$100 million annually for BMP implementation is recommended as a first phase for implementation. This is based on the summary results in Table 2.5, Summary of Reductions from Priority Initiatives in [Section 2, State Actions](#).

In Table 5.9 below, the four more effective priority initiatives are identified. These four initiatives alone will help to achieve half of the nitrogen reduction goal and 86% of the phosphorus reduction goal. Some amount of the \$52 million identified for existing and

new agency and external staff resources for technical support would also be needed to implement this effort. A minimum of 5% of the cost of implementation is recommended.

Table 5.9. Implementation Costs for Top Priority Initiatives

Priority Initiative	Cost (in millions)	Nitrogen Reduction	Phosphorus Reduction
Agricultural Compliance	\$33.1	14%	12%
Soil Health	\$32.9	14%	14%
Forest Buffers	\$28.1	16%	41%
Grass Buffers	\$3.4	8%	37%
TOTAL	\$97.7	50%	86%

F. The Cost of Not Filling This Gap

Failure to meet the federal Chesapeake Bay TMDL could have significant and wide-ranging consequences for the Commonwealth.

First and foremost, a lack of substantial progress in restoring Pennsylvania’s impaired waters will mean continued negative impacts to drinking water resources, outdoor recreation, wildlife, and public health, and safety. Local communities will continue to suffer from pollution-related problems such as stormwater and flood damage, nitrogen and bacterial contamination in drinking water sources, degradation of aquatic resources, loss of fisheries, and many more issues (each of which create their own societal costs and economic losses) that could be addressed through a robust and timely implementation of the Phase 3 WIP.

Beyond the consequences to local communities that would be felt by failing to implement the Phase 3 WIP, an array of backstop measures and consequences have been outlined in the Chesapeake Bay TMDL (Chesapeake Bay TMDL Section 7: Reasonable Assurance and Accountability Framework) and correspondence from EPA to the PSC in December 2009.

Most specifically, EPA outlined the following potential consequences in the EPA Expectations for the Phase 3 WIP, dated July 19, 2018:

- EPA may continue to target federal enforcement and compliance assurance in the watershed which could include both air and water sources of nitrogen, phosphorus, and sediment.
- EPA may expand NPDES permit coverage to additional animal feeding operations, other industrial and municipal stormwater sources, and/or urbanized areas.
- EPA may redirect Chesapeake Bay or other EPA grant funding to other third-party entities to implement practices in priority areas or direct Chesapeake Bay funding to identified priorities in the EPA evaluations if Pennsylvania does not adequately target workplans and funding toward priority actions.

- EPA may establish finer scale nutrient or sediment reductions for municipal and industrial wastewater facilities, concentrated animal feeding operations, and municipal separate storm sewer systems as well as require additional load reductions from the wastewater sector above and beyond what has already been accomplished.
- EPA may initiate a process to propose promulgating nitrogen and phosphorus numeric water quality standards for appropriate streams in Pennsylvania that are within the Chesapeake Bay watershed.

SECTION 6. DOCUMENTING, TRACKING, AND VERIFYING

Pennsylvania has existing tracking, reporting, and verification protocols in place that are accepted by the Chesapeake Bay Program Partnership. DEP has also taken steps since 2016 to enhance the capabilities of several programs to capture and document practices that have been put on the ground including creating the following:

- A central BMP Warehouse to house all the implemented practices reported to DEP.
- Software tools to facilitate reporting practices by those responsible for their implementation, including: the geodatabase PracticeKeeper for use by DEP and conservation district staff involved in agriculture and construction stormwater compliance inspections; eInspection apps and modules for NPDES-permitted facilities as well as for the Chesapeake Bay Agricultural Inspection Program, and the development of an interactive website for use by Municipal Separate Storm Sewer Systems (MS4s) for the submitting annual reports.

In addition, DEP worked with the Phase 3 WIP partners to revise the existing BMP Verification Program Plan, engaging over 60 people who have different roles in BMP tracking and reporting. This revised BMP Verification Program Plan focuses on verifying the Phase 3 WIP priority BMPs for nitrogen, phosphorus, and sediment control in the Agriculture, Urban Stormwater, and Forestry sectors.

Pennsylvania is committed to working with the Chesapeake Bay Program partnership in an open dialogue and evaluating the existing Chesapeake Bay Program BMP Verification protocols. Pennsylvania has already engaged with jurisdictional partners in an effort to collaborate and review the protocols. Many lessons have been learned since the partnership approved the BMP Verification protocols in 2014; the inordinate amount of financial and staffing needed to “keep” BMPs in the modeling tools, while putting more BMPs on the ground, is insurmountable, and continued engagement with our partners, including EPA, is necessary. See [Section 4, Federal Agency Support and Coordination](#), subsection 4.II for further details.

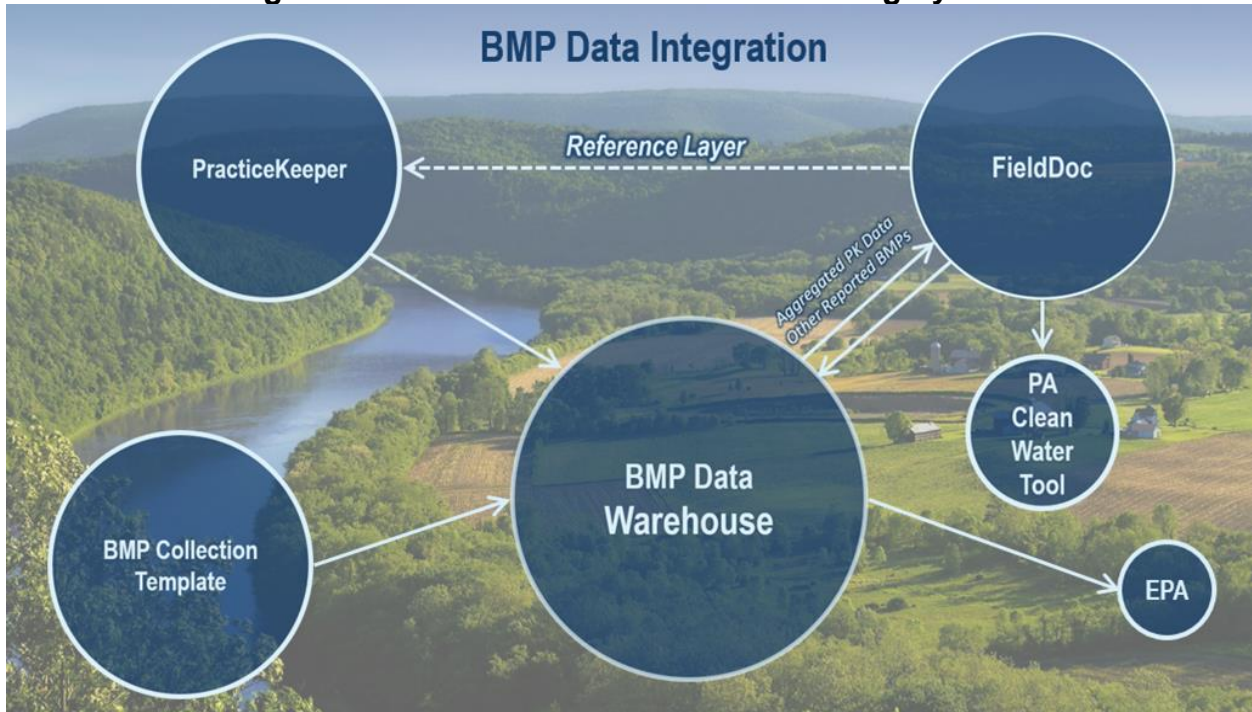
I. DATA MANAGEMENT SYSTEM

Figure 6.1 below illustrates the flow of BMP data from the DEP BMP Warehouse through the National Environmental Information Exchange Network (NEIEN), and finally reporting to the EPA Chesapeake Bay Program Office. The DEP BMP Warehouse is the central collection application that serves as a pipeline to transfer this data.

Data is generally collected from the program sources and from PracticeKeeper then imported into the BMP Warehouse using formatted Excel templates. This data reporting process is documented in Pennsylvania’s Quality Assurance Project Plan (QAPP). Annual report records are available as backup from each reporting source or program.

While not finalized, it is planned that some form of public access to report BMPs will be included within the FieldDoc and PA Clean Water Tools. Planning meetings with the Chesapeake Conservancy are ongoing. Currently, I Conservancy project gives local Phase 3 WIP planners the ability to locate and track their implementation progress, generate local BMP reports, and provide a platform for local BMP verification.

Figure 6.1. Schematic for Data and Tracking System










II. TRACKING, REPORTING AND VERIFICATION PROTOCOLS

Figure 6.2 shows the priority BMPs by sector and color-coded verification methodologies approved by the Chesapeake Bay Program Partnership and selected for the verification of these priority practices. Some BMPs have more than one verification methodology.

Figure 6.2. Priority BMPs and Verification Methodologies Matrix

WIP Priority BMPs for Verification	Agriculture	Manure Transport	Tillage Practices	Dairy Precision Feeding	Cover Crop (Traditional)	Nutrient Management - Core Nitrogen and Core Phosphorus	Soil Conservation and Water Quality Plans	Nutrient Management- Supplemental Nitrogen and Phosphorus	Animal Waste Management Systems	Agriculture
		Manure Treatment Technologies	Prescribed Grazing	Barnyard Runoff Controls and Loafing Lot Management	Cover Crop (Commodity)	Grassed Buffers- with and without Stream Fencing	Forested Buffers- with and without Stream Fencing	Stream Restoration	Wetland Restoration	
	Urban Stormwater	Dry Detention Ponds and Hydrodynamic Structures	Dry Extended Detention	Vegetated Open Channels	Performance Standards: Bioretention Practices	Performance Standards: Infiltration Practices	Wet Ponds and Wetlands	Urban Forest Buffers	Stream Restoration	Urban Stormwater
		Riparian Forest Buffers	Urban Forest Expansion/ Conservation Landscaping	Urban Tree Canopy Expansion	Ag Stream Restoration	Urban Stream Restoration	Wetland Creation	Wetland Restoration	Forestry	

Approved Methodologies:	
 Survey	 Remote Sensing using Aerial Imagery
 Survey and/or Inspection	 Remote Sensing using Aerial Imagery and/or Inspection
 Inspection	 Remote Sensing using Lidar
	 Remote Sensing using Lidar and/or Inspection

The BMP Verification Program Plan focuses on the plan for verifying the priority BMPs in sectors with non-point source pollution concerns.

The plan outlines:

- 1) Four sections: Agriculture, Urban Stormwater, Forestry and Plan Implementation;

- 2) The WIP priority initiatives in each sector;
- 3) The sector-specific inspector/verifier qualifications listing the requirements for verifying that the priority BMPs are installed and functioning as designed;
- 4) Each WIP priority initiative and the associated priority BMPs for implementation and verification as part of that initiative; and
- 5) An outline of existing programs and new verification projects that Pennsylvania will use to verify the priority BMPs.

Pennsylvania's BMP Verification Program Plan's goal is to build a comprehensive, implementable program which verifies that priority practices identified in the Phase 3 WIP are installed, operational, and continue to provide pollution reductions. This verification plan not only functions as a part of the data quality assurance, but also as an integral part of the Phase 3 WIP so that, as the CAPs are implemented, and as needs and resource allocations change, this plan may be updated to include other projects and proposals.

A. Tracking, Reporting and Verification Improvement Initiatives

More work is needed for Pennsylvania to capture all undocumented practices that have either already been installed or will be installed in the future without public assistance or with funding sources not tracked by the current program.

Specifically, DEP is taking the following immediate action steps:

1. CAP Refinement Planning and Prioritization Tool

Using funding from Pennsylvania's Chesapeake Bay Regulatory and Accountability Program Grant, the Chesapeake Conservancy and EPA Chesapeake Bay Program Office are working on software for a planning and prioritization tool for use in the development and future refinement of the CAPs. Providing timely release of numeric progress is imperative so counties can be responsive and make incremental changes, as needed.

2. Remote Sensing Pilot Project

Solicit requests for proposal for a pilot project to use remote sensing technology to identify BMPs installed for stormwater control as part of development activities described in the revised Pennsylvania BMP Verification Program Plan. This proposal will also include the utilization of qualified individuals to do onsite verification of the results of this analysis. DEP Chesapeake Bay Office is reviewing proposals from multiple counties. These counties have also met with and are currently working with the Chesapeake Conservancy and NRCS to consider expansion of the Potomac watershed remote sensing pilot project. In April 2021, the HRG, Inc. and the Chesapeake

Conservancy presented their approach to remote sensing to the Chesapeake Bay Program Agriculture Workgroup. They intend to work in small watersheds identified in ten counties within Pennsylvania's Chesapeake Bay watershed. Phase 1 of this project is being funded through CBRAP and the project goals are to: develop and implement methods for automating the remote identification of previous BMP implementation sites; utilize automated remote sensing data to bolster BMP reporting in CAST; reduce human capital needs on verifying previous BMP implementation; and support data going into long-term water quality monitoring efforts. The proposed project tasks are to: map and catalogue certain visible BMP types using high-resolution imagery and GIS analysis (digitizing and automated methods); field-verify a percentage of automated BMP types; field-verify all non-automated BMP types that require site-specific information for reporting (e.g. waste management systems, wet pond/detention basins, barnyard runoff controls); and report field-verified practices through PracticeKeeper. The partners involved in this effort have also submitted a NFWF MEB application for Phase 2, as Phase 1 is slated for completion in Fall 2022.

3. PracticeKeeper Enhancements

Continue to build enhancements to PracticeKeeper to allow the capture of additional practices by other partners beyond conservation districts and DEP program staff. Enhancements including, but not limited to, a Conservation Excellence Grant (CEG) Module and Partner BMP Submission Module have been completed to expand the ability for partners to track implementation of additional programs as well as allow for consultants and other entities outside of the conservation districts to report their implemented BMPs. DEP is also working toward a Partner Plan Submission Module, so that consultants that are developing Ag E&S and Manure Management Plans can enter those into the centralized database. Qualifications required under the Chesapeake Bay Program Verification protocols for external parties to provide quality assurance, document, and report should be reviewed by the Chesapeake Bay Program partnership and revised accordingly. By 2023, PracticeKeeper enhancements to the Growing Greener and Section 319 grant modules will lead to more reliable project tracking from two of DEP's largest nonpoint source management grant funding programs.

4. PAOneStop

In 2020, a Letter of Understanding was executed by DEP, SCC, and PDA for the continued collaboration on [PAOneStop](#). PAOneStop is designed to assist agricultural producers in managing their operations through the use of online tools, which provide producers an opportunity to make informed management decisions and ensure they are meeting regulatory requirements for conservation and manure management planning under 25 Pa. Code Chapter 91 (relating to manure and nutrient management) and 25 Pa. Code Chapter 102 (relating to erosion and sediment control). As of September 2021, PAOneStop has more than 7,300 users statewide with more than 32,000 farms and more than 237,000 fields recorded in the PAOneStop system. The Pennsylvania State University has developed two modules for PAOneStop through previous contracts with PDA, DEP, and the SCC and Penn State will continue to provide services to the

extent that resources are available and provided to support the program. PAOneStop is also being used to transition the hard copy Penn State Producer Survey to an online self-reporting survey module. This allows accessibility across Pennsylvania and verification of BMPs will be facilitated through an online submission of information to qualified entities, such as Penn State Extension and county conservation districts. This module is projected to be released in 2022, with a first phase in the Tier 2 and Tier 3 counties to be used as a part of the 2022 Penn State Voluntary Producer Survey. The focus is in Tier 2 and Tier 3 counties in 2022 because farmers in the Pilot Counties were surveyed in 2020.

5. Other Innovative Strategies for BMP Verification

Using funding provided in January 2022 through the Community Clean Water Coordinator and CAP Implementation Grant, counties have begun to expand the existing BMP Verification Program using modern technologies that are free and available to them. For example, Clearfield County Conservation District (CCCD) provided information during the annual Conservation District and Pennsylvania Agency Statewide Agriculture Meeting on their use of GIS and LandSat and LiDAR imagery to prioritize areas for verification. Using this approach, beginning in Spring 2022, CCCD has already identified multiple sites with more than 14,000 feet of stream fencing; some of the projects were cost-shared in the 1990s by the DEP Chesapeake Bay Program and others were voluntarily installed by farmers with no cost-share provided. More than 600 acres of rotational grazing have also been verified through this prioritization and verification effort. These BMPs will be entered into PracticeKeeper with the original installation date and implementation date.

Beginning in state fiscal year 2022-2023, additional funds will be provided to conservation districts participating in the Chesapeake Bay Technician Agreement program as part of their renewed agreements specifically for expanding and enhancing verification efforts in their counties.

B. Verification Goals

In addition to the existing verification protocols and improvement initiatives listed above, Pennsylvania will explore an adjustment to the overall verification concept to be less of a routine practice and more of an audit process. If this shift can be made, more resources can be utilized to implement BMPs and install monitoring devices. Verification data will continue to be available and could be extrapolated for broader use.

SECTION 7. MILESTONES AND PROGRESS REPORTING

I. COORDINATION AND TRACKING OF PROGRESS

DEP's Chesapeake Bay Office coordinates development and implementation of the Phase 3 WIP. This includes updating milestones and action steps on a two-year basis and progress reporting on an annual basis. DEP's Chesapeake Bay Office also meets with EPA Chesapeake Bay Program Office on bi-weekly, quarterly, and at times more regular, virtual meetings to discuss outputs, outcomes, and achievements and to seek resolution of challenges. The milestones will continue to be updated using the same template used by the workgroups and counties to develop their respective action plans. Progress reporting will be done using Figure 7.1. Progress Reporting Template.

Every year, numeric progress will be reported through the EPA NEIEN submission tool. In odd years (e.g., 2021, 2023, 2025), programmatic progress will be reported to EPA by January 15 using the template provided below. Pennsylvania's programmatic progress is published to the [Tracking Pennsylvania's Progress](#) webpage. In even years (e.g., 2020, 2022, 2024), programmatic progress as well as the next two-year numeric and programmatic milestone commitments are reported to EPA by January 15. Pennsylvania's milestone commitments are also published to the [Tracking Pennsylvania's Progress](#) webpage.

Figure 7.1. Progress Reporting Template¹

Phase 3 Watershed Implementation Plan (WIP) Progress and Milestones Template												
<u>Green</u> - action has been completed or is moving forward as planned <u>Yellow</u> - action has encountered minor obstacles <u>Red</u> - action has not been taken or has encountered a serious barrier												
Action #	Description	Performance Target(s)	Responsible Party(ies) and Partnerships	Geographic Location	Expected Timeline	Potential Implementation Challenges or Recommendations	Resources <u>Available</u>		Resources <u>Needed</u>		Progress to Date	Justification for Change to Action Item
							Technical	Financial	Technical	Financial		
Priority Initiative 1:												
1.1												
1.2												
Priority Initiative 2:												
2.1												
2.2												

¹Responsible Party as used in this template is defined as the lead individuals or organizations involved in the implementation of the action step.

II. KEY ACTION STEPS

Key action steps are identified to implement elements of the Phase 3 WIP. Progress on these action steps will be reported on an annual basis. These action steps are grouped around five priority initiatives and numbered using the same numbering protocol of:

- Phase 3 WIP Section Number First
- Priority Initiative Number Second (See below for the initiatives and their respective numbers)
- Action Step Number within the priority initiative

The five priority initiatives are:

1. Communications and Outreach
2. Funding and Resources
3. Expanding Capacity for Technical Assistance
4. Reporting and Tracking
5. Compliance

More information regarding the Key Action Steps can be found in Pennsylvania's Programmatic Milestones and Progress Reports, published to the [Tracking Pennsylvania's Progress](#) webpage.

III. SCHEDULE FOR REPORTING AND DATA MANAGEMENT

DEP's Chesapeake Bay Office developed a milestone period for the counties, reflective of Pennsylvania's two-year milestone period identified above. The Pilot and Tier 3 and 4 counties provide their CAP updates in odd years (e.g. 2021, 2023, 2025) and Tier 2 counties provide their CAP updates in even years (e.g. 2020, 2022, 2024). Along with the ability for counties to adaptively manage their CAPs through milestones, DEP's Chesapeake Bay Office also provides the numeric progress from that year and works with SRBC to update the County Snapshots with this new information. In 2021, DEP's Chesapeake Bay Office reviewed and consolidated the Programmatic Recommendations provided by the Pilot and Tier 2 Counties when they submitted their CAPs (2020 for Tier 2 and 2019 for Pilot Counties). Developed using a reader-friendly template, these recommendations were shared with the relevant state and federal program contacts and / or Phase 3 WIP Action Leaders for input and feedback. In Summer 2021, DEP's Chesapeake Bay Office provided the completed recommendations template from the state and federal agency partners directly to the county coordinators in written format. The Programmatic Recommendations have played and will continue to play an important role in building and maintaining strong state and local relationships, allowing for mutual accountability as the county planning efforts have transitioned to implementation. See Figures 7.2 through 7.5 below.

Figure 7.2. Calendar Year 2019 and 2020

2019				
	Q1	Q2	Q3	Q4
EPA Reporting			Finalize WIP, Update Program Milestones (Replace EPA)	Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting		Finished Lancaster, York, Adams and Franklin County CAPs	Start Tier 2 Counties (Bedford, Cumberland, Centre and Lebanon)	
2020				
	Q1	Q2	Q3	Q4
EPA Reporting		Progress on State Programmatic Milestones		Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting	Pilot Counties Annual Reporting Tier 2 Counties Finalize CAPs Start Tier 3 & 4 Regional Planning Process			

Figure 7.3. Calendar Year 2021 and 2022

2021				
	Q1	Q2	Q3	Q4
EPA Reporting	Update State Programmatic Milestones		Finalize WIP, Update Program Milestones (Replace EPA)	Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting		Pilot Counties Revise 2-year Milestones Tier 2 Counties Annual Report	Finalize First Half of Tier 3 & 4 Regional Plans	Finalize Second Half of Tier 3 & 4 Regional Plans
2022				
	Q1	Q2	Q3	Q4
EPA Reporting		Progress on State Programmatic Milestones		Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting	Pilot Counties Annual Reporting Tier 2 Counties Revise 2-year Milestones			Tier 3 & 4 Annual Reporting

Figure 7.4. Calendar Year 2023 and 2024

2023				
	Q1	Q2	Q3	Q4
EPA Reporting	Update State Programmatic Milestones		Finalize WIP, Update Program Milestones (Replace EPA)	Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting		Pilot Counties Revise 2-year Milestones Tier 2 Counties Annual Report		Tier 3 & 4 Regional Plans Revise 2-year Milestones
2024				
	Q1	Q2	Q3	Q4
EPA Reporting		Progress on State Programmatic Milestones		Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting	Pilot Counties Annual Reporting Tier 2 Counties Revise 2-year Milestones			Tier 3 & 4 Annual Reporting

Figure 7.5. Calendar Year 2025

2025				
	Q1	Q2	Q3	Q4
EPA Reporting	Update State Programmatic Milestones		Finalize WIP, Update Program Milestones (Replace EPA)	Progress on State Programmatic Milestones (Dec.)
Progress Reporting				Progress on State Numeric Commitments (Dec.)
County Reporting		Pilot Counties Revise 2-year Milestones Tier 2 Counties Annual Report		Tier 3 & 4 Regional Plans Revise 2-year Milestones

SECTION 8. ACCOUNTING FOR GROWTH

I. IMPACT OF SECTOR GROWTH IN PENNSYLVANIA

Pennsylvania's Phase 3 WIP relies on the sector growth projections provided by the Chesapeake Bay Program's Chesapeake Assessment Scenario Tool (CAST). CAST has built-in sector growth projections based on a land use model that uses a combination of USDA Census of Agriculture data, land use analysis using one meter by one-meter high resolution land use GIS, county level construction data, and other attributing data to best predict the land use change by sector. The projected changes to land use accounted for in CAST are only projections. As new information becomes available, it will better inform the current growth projection that is accounted for in the model.

Figure 8.1 below shows the projected change in sector growth between 2017 and 2025, as of 2019. Pennsylvania's agriculture sector is projected to lose 33,429 acres in total. The natural sector is projected to lose 443 acres. The developed sector is projected to increase by 33,872 acres, due to losses in natural and agricultural lands.

Figure 8.1. Pennsylvania's Projected Growth to 2025

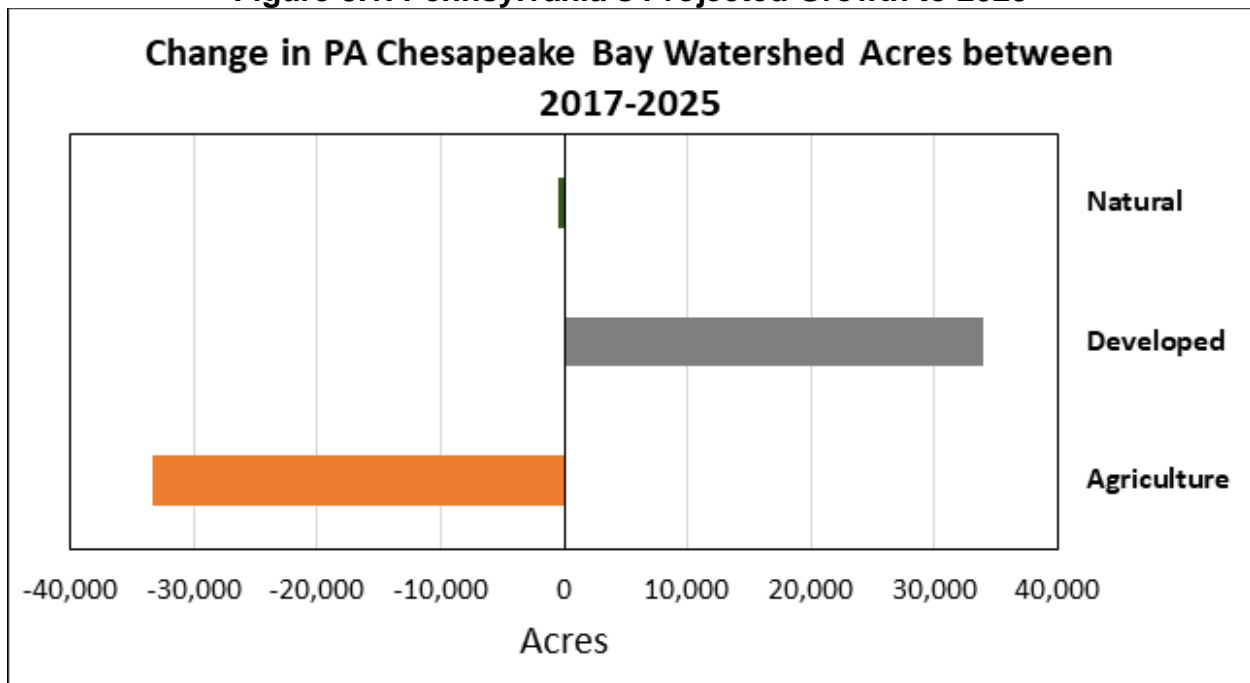


Figure 8.1 above represents the broad sector land use change and does not account for important land use change within each sector. While the total sector land use change is important in understanding sector growth, it only represents a small portion of the growth outlook. Figure 8.2 is a more specific sector breakdown.

Figure 8.2. Specific Sector Land Use Change Breakdown

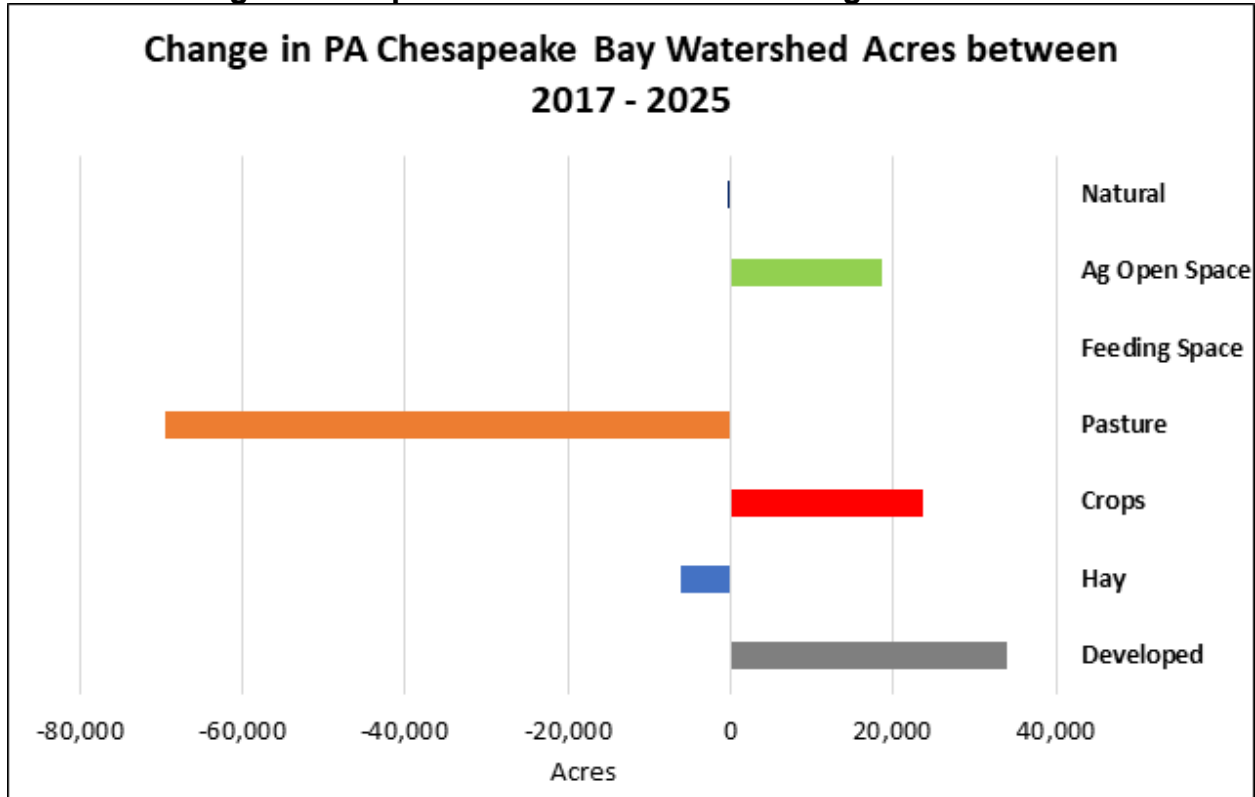


Figure 8.2 above shows the projected change in land source growth and change between 2017 and 2025, as of 2019. Pennsylvania is projected to experience a large shift in land sources within the agriculture sector between 2017 and 2025. Pasture land is projected to decrease by 69,562 acres. Hay land is also projected to decrease by 6,187 acres. Agriculture open space, which includes meadows is projected to increase by 18,621 acres. Feeding space is projected to increase by 155 acres. Cropland is projected to increase by 23,851 acres. Natural land is projected to decrease by 443 acres. Developed land is projected to increase by 33,871 acres.

The projected load source differences between 2017 and 2025 do not account for the differences in loading rates. Each of these variations in load sources attribute various loading rates for nitrogen and phosphorus. To see how the nitrogen load is affected based on sector growth, please see Figure 8.3.

Figure 8.3. Changes in Nitrogen Load Due to Sector Growth

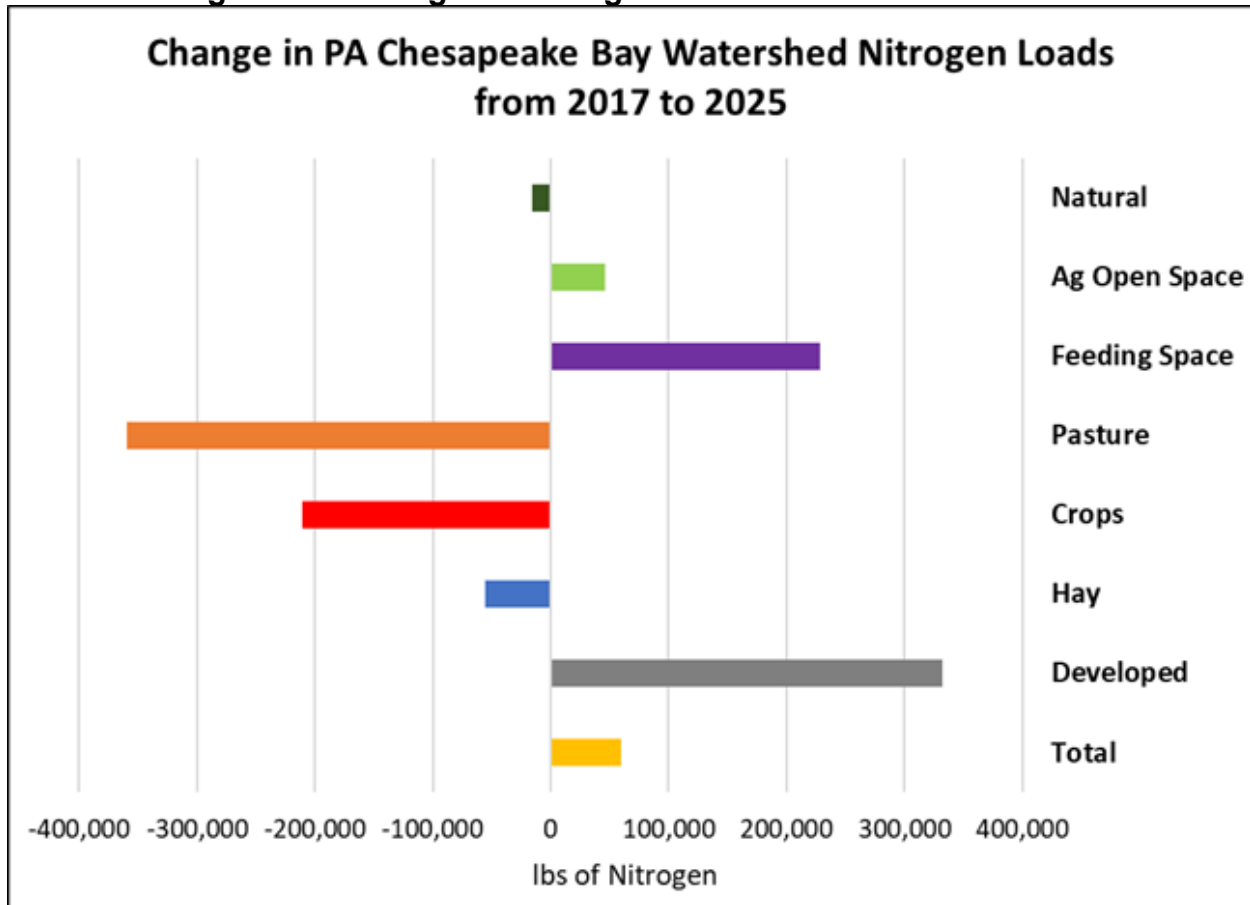


Figure 8.3 displays the projected difference in nitrogen loading rates from Pennsylvania to the Chesapeake between 2017 and 2025, as of 2019. In total Pennsylvania is projected to gain 59,891 pounds of nitrogen loading and gain 21,838 pounds of phosphorus loading, due to sector growth. The agriculture sector is projected to lose 376,225 pounds of nitrogen and gain 8,228 pounds of phosphorus between 2017 and 2025. The developed sector is projected to gain 332,114 pounds of nitrogen and gain 9,938 pounds of phosphorus between 2017 and 2025. The natural sector is projected to lose 15,961 pounds of nitrogen and gain 3,672 pounds of phosphorus between 2017 and 2025.

In the agricultural sector, the largest differences in loading rates occur due to the switch of load sources between 2017 and 2025, as of 2019. Agriculture open space, which includes meadows, gained 46,147 pounds of nitrogen. Feeding space increased its nitrogen load by 228,165 pounds. Pasture land decreased its nitrogen loading rates by

360,062 pounds. Cropland also decreases its nitrogen loading 210,430 pounds. Hay decreased its nitrogen loading by 55,241 pounds.

II. PENNSYLVANIA'S STRATEGY TO ADDRESS SECTOR GROWTH

A. Introduction

Forests, wetlands, and other natural areas significantly improve and protect water quality by absorbing rainfall, reducing stormwater runoff, and helping to recharge groundwater aquifers. Conserving working lands provides significant values well beyond protecting and improving water quality. Working lands, like farms and forests, are deeply rooted in Pennsylvania's cultural heritage, contribute significantly to the Commonwealth's rural economy, and provide valuable products to society. Forests provide clean water, wood products, tourism and recreation opportunities, habitat, climate mitigation, and provide the backdrop to our aesthetic landscape.

B. Planning for Growth

After several years of dialogue, the Chesapeake Bay Program agreed to a framework for "crediting" land conservation actions, programs, and policies as part of the Phase 3 WIP. Opportunities to receive "credit" for land conservation include land acquisition by agencies and municipalities, conservation easements, and planning and zoning to limit conversion of forests to commercial and residential development. A recent publication titled *"Sustaining and Improving Forest Land through Comprehensive Plans"* provides advice to local governments to fully consider the conservation of forests in comprehensive planning.

Pollution reduction "credits" will be calculated based on the change in magnitude and patterns of future land use and development resulting from implementing conservation programs and policies. For example, if future growth is managed in a way that conserves forests in a county, the resulting pollutant loading will be less than if the forest had been developed for commercial or residential uses.

The Chesapeake Bay Program's framework for land conservation includes:

- Conserving and protecting wetlands
- Conserving and limiting development in riparian areas
- Modernizing local planning and zoning to conserve critical forests and habitats
- Preserving farmland as part of a holistic approach to conserving working lands

1. Pennsylvania's Land Conservation Scenario

Pennsylvania's approach to land conservation consists of four main components: Forest Conservation, Private Forest, Wetlands, and Farmland. Most land use planning and decisions are made locally within the context of the Pennsylvania Municipalities Planning Code, which enables local planning, zoning, ordinances, and other measures

that affect growth and development. Planning for growth also needs to consider impacts to future business activity and economic development opportunities, historical land uses and the many benefits of conserving natural resources. Pennsylvania chose to follow the Chesapeake Bay Program's framework for sector growth. Goals were established for forest and natural area conservation, as well as farmland preservation based on the highly popular and nation-leading Farmland Preservation Program.

The Pennsylvania state-specific scenario for Sector Growth had not been completed when the four pilot counties developed their CAPs. The [Community Clean Water Planning Guide](#) and text for the [County Clean Water Technical Toolbox](#) have been enhanced with additional information relating to Sector Growth and this scenario. By revising these two documents, the intent is to facilitate more-purposeful conversations with the remaining counties and revisit the concept with the four pilot counties, with the goal of producing locally driven plans for conservation and managing growth.

a. Forest Conservation

Forest conservation of working lands, park lands, and other natural areas by agencies and land trusts: the Commonwealth and its conservation partners have a tremendous history of conserving important forests and natural areas, resulting in over four million acres of State Forests, State Parks, State Game Lands, the Allegheny National Forest, and many local parks open for public use. Local land trusts have helped conserve thousands more acres by facilitating conservation easements with private landowners. Additionally, state and private agencies hold conservation easements which help keep working lands in private ownership. Pennsylvania's goal is to continue this current approach while increasing efforts to conserve land, resulting in an additional 20,000 acres of forest conservation annually for the years 2019 through 2025. This is a statewide goal that will be prorated to counties in the Chesapeake Bay watershed.

Pennsylvania regulations for erosion and sediment control, specifically found in 25 Pa. Code § 102.14 (relating to riparian buffer requirements), require protection of existing riparian buffers. Where existing riparian buffers cannot be protected, this section requires conversion of existing riparian buffer to riparian forested buffer or the establishment of a new riparian forest buffer.

b. Private Forests

Acknowledging private working forests with forest management plans. Private forest landowners across the Commonwealth have worked with natural resource professionals to develop management plans covering approximately 33,000 acres of private forests. Understanding that these landowners have a basic intent to keep these lands forested, this amount of forest will be excluded from development in Pennsylvania's land conservation scenario. This exclusion is for planning purposes only. Information on these owners' and their properties is not available and these lands are not subject to any development restrictions. Additionally, for the scenario, trends for future management plan adoption will be assumed to follow recent trends on a county basis

and will form the basis for future estimates of forest management plan development. As such, Pennsylvania’s land conservation scenario will acknowledge the small portion of forest properties managed under guidance of a forest management plan.

c. Wetlands

Jurisdictional wetlands are excluded from development in the scenario.

d. Farmland

Pennsylvania is preserving farmland according to Pennsylvania’s nation-leading Farmland Preservation Program. Historical rates have averaged approximately 12,000 acres preserved annually. This annual rate will be assumed for the 2019-2025 Phase 3 WIP horizon. These acres will be excluded from development, in perpetuity.

Pennsylvania’s approach to land conservation has resulted in nutrient and sediment reductions. Table 8.1 represent the total reductions from land conservation activities described above by 2025.

Table 8.1. Summary of Reductions from Pennsylvania Land Conservation Scenario

Priority Initiative	Nitrogen Reduction (EOS)	Phosphorus Reduction (EOS)	Estimated Annualized Cost for Practice Implementation ¹
<i>Pennsylvania Land Conservation</i>	32,000	1,000	N/A

2. Future Considerations

In addition to the four components described above, the Commonwealth, its partners and local governments have other tools available to promote long-term land conservation, such as engaging in county-level land conservation efforts as part of continued Phase 3 WIP development and implementation. Since this portion of the Phase 3 WIP was finalized toward the end of the planning process, there will be future efforts to engage counties and local governments on land conservation efforts as part of the milestone review process for the Phase 3 WIP and future implementation. While not currently included in Pennsylvania’s watershed-wide land conservation scenario, additional tools for use during the CAP development process include:

a. Riparian Areas

Conserving and limiting development in riparian areas. These areas along streams are sensitive and critical to habitat and protecting local water quality. Pennsylvania regulations for erosion and sediment control, specifically found in 25 Pa. Code § 102.14 (relating to riparian buffer requirements), require protection of existing riparian buffers. Where existing riparian buffers cannot be protected, this section requires conversion of existing riparian buffer to riparian forested buffer or the establishment of a new riparian forest buffer.

b. Local Planning and Zoning

Modernizing local planning and zoning to conserve critical forests and habitats. Examples include increasing urban densities and growth in urban areas versus rural areas, managing sewer service area expansions, avoiding growth on soils unsuitable for septic systems and increasing infill and redevelopment. A model available for localities includes the Chapter 102 permit, when triggered, the permittee must manage 20% of the existing impervious area as if it were a “meadow in good condition,” which decreases the post-construction stormwater runoff generated from the project site when compared with the existing developed condition. The intent of this provision is to provide some stormwater controls on property that was previously developed with few or no stormwater BMPs. This “retrofit” stormwater runoff requirement can result in a net reduction of pollutants to the Chesapeake Bay. Additionally, street tree ordinances and shade tree commissions help to retain critical tree canopy in communities. A recent publication titled “*Sustaining and Improving Forest Land through Comprehensive Plans*” provides advice to local governments in fully considering forests in comprehensive planning.

c. County Roles in Land Conservation

Pennsylvania’s Land Conservation Scenario can be broken down to individual goals for each county in Pennsylvania’s Bay watershed. Each county can incorporate its own local zoning ordinances and policies to prioritize land conservation. The following are examples of local zoning ordinances that can be incorporated into CAPs.

i. Zoning Ordinances

The Pennsylvania Municipalities Planning Code (MPC, Act 247 of 1968) grants certain zoning powers to municipalities. Within these powers, a municipality could choose to include measures for land conservation in its local zoning ordinance. Such a choice would also have an impact on sector growth management and would be particularly pertinent during efforts to modernize local planning and zoning. Local governments can go above and beyond current state recommendations for land conservation and sector growth management by implementing more stringent policies, so long as they stay within the powers and purposes granted by the MPC.

“Use zoning” is one measure which could be used for land conservation. Through use zoning, a municipality can assign forests, farms, and wetlands to zones that restrict commercial and residential development. Use zoning may be constitutionally sensitive and should be approached judiciously.

Another measure would be using “density zoning” to manage growth by delineating density restrictions. For example, a zoning ordinance may establish a maximum number of units per acre or a minimum lot size in acres. Density zoning could also be implemented on a sliding scale. For example, a zone could have a permitted and preferred use for agriculture but also allow for limited residential development on a

sliding scale – such as up to two units allowed on the first 50 acres and then gradually increasing the number of allowed units on additional acres. This variation on density zoning is known as “sliding-scale zoning.”

ii. Subdivision Ordinances

A local “subdivision ordinance” manages the development and division of property parcels. Municipalities may use a subdivision ordinance to permit agricultural and residential development on rural land while controlling for density.

iii. Conservation Easements

Pennsylvania has enacted enabling legislation which authorizes municipalities to adopt a local ordinance and thereby establish a program for purchasing “conservation easements.” These easements are voluntary agreements which restrict uses or development on a property to protect natural resources and manage growth. Any restrictions assigned to an easement will remain with the title of the land for the duration of the easement term, sometimes guaranteeing conservation in perpetuity. A municipality could also partner with other government entities or land trusts as a strategy for leveraging resources for easement purchases.

iv. Transfer of Development Rights

Pennsylvania has enacted enabling legislation which authorizes local governments to create “Transfer of Development Rights” (TDR) programs. Under a TDR program, a landowner may voluntarily sell development rights to a buyer, such as a municipality, for use on the landowner’s property while still retaining ownership. Any existing agricultural or forestry uses may continue but the landowner may not develop the property after selling his or her development rights. By purchasing development rights on private property, a municipality can protect private land and natural resources from the environmental implications of growth and development.

v. Multi-Municipal Planning

A regional approach to land conservation policies may be optimal for managing growth and designating rural resource areas where there is additional strength of law to promote such conservation. Multi-municipal planning may offer local governments increased agility in zoning and planning efforts as well as mutually beneficial environmental outcomes.

SECTION 9. CLIMATE CHANGE AND CLIMATE RESILIENCY

I. BACKGROUND

A. Estimated Impact Due to Climate Change

The Chesapeake Bay Program partnership relayed preliminary modeling results of climate change in 2025 in the form of nutrient load projections as part of the Midpoint Assessment completed in July 2018. In 2020, the climate change impacts by state were updated to reflect the best available science and data and were approved by the Chesapeake Bay Program Partnership PSC. The 2018 preliminary results showed that Pennsylvania's climate change impact was 4.135 million pounds for nitrogen and 0.141 million pounds for phosphorus. The 2020 revised results showed that the climate change impact is 1.811 million pounds for nitrogen and 0.095 million pounds for phosphorus. The revised results are summarized below in Table 9.1 for nitrogen and Table 9.2 for phosphorus.

Table 9.1. Climate Change Impacts by State (in millions of pounds) for Nitrogen

Jurisdiction	1985 Baseline	2013 Progress	Climate Change	Phase 3 Planning Target
NY	18.64	13.24	0.40 (3.4%)	11.80
PA	122.23	105.99	1.81 (2.5%)	73.49
MD	85.33	47.96	1.14 (2.5%)	45.83
WV	8.70	7.96	0.00 (0%)	8.23
DC	6.48	1.42	0.01 (0.3%)	2.42
DE	7.00	6.90	0.04 (0.8%)	4.55
VA	84.34	58.00	1.59 (3.0%)	52.95
Basinwide	332.71	241.47	4.99 (2.5%)	199.28

Table 9.2. Climate Change Impacts by State (in millions of pounds) for Phosphorus

Jurisdiction	1985 Baseline	2013 Progress	Climate Change	Phase 3 Planning Target
NY	1.189	0.578	0.044 (9.3%)	0.476
PA	6.015	3.745	0.095 (3.3%)	2.905
MD	7.616	3.697	0.111 (3.0%)	3.680
WV	0.757	0.445	0.009 (2.0%)	0.433
DC	0.090	0.063	0.001 (0.5%)	0.130
DE	0.220	0.121	0.003 (2.8%)	0.108
VA	13.546	6.067	0.337 (6.0%)	5.583
Basinwide	29.432	14.717	0.599 (4.5%)	13.314

The existing Planning Targets are in the last column. The estimated additional reductions to mitigate the additional impact due to climate change are shown in Column 4 and were updated with the revised climate allocations in 2020.

The Chesapeake Bay Program partnership also committed to the following strategy to address climate change between now and 2025:

- By refining the climate modeling and assessment framework, continue to sharpen the understanding of the science, the impacts of climate change and any research gaps and needs. Develop an estimate of pollutant load changes (nitrogen, phosphorus, and sediment) due to 2025 climate change conditions.
- Develop a better understanding of BMP responses; including new, enhanced and climate-resilient BMPs.
- In March 2021, the Partnership will consider results of updated methods, techniques, and studies and refine estimated loads due to climate change for each jurisdiction.
- The PSC agreed that in September 2021, jurisdictions will account for additional nutrient and sediment pollutant loads due to 2025 climate change conditions in a Phase 3 WIP addendum and/or two-year milestones beginning in 2022.
- Finally, in developing the narrative strategy, the Partnership approved guiding principles that will be considered, described below.

A. Partnership Guiding Principles

The following are guiding principles, approved by the partnership, for consideration by the jurisdictions in developing Climate Resiliency Strategies:

1. Capitalize on Co-Benefits

Maximize BMP selection to increase climate or coastal resiliency, soil health, flood attenuation, habitat restoration, carbon sequestration, or socio-economic and quality of life benefits.

a. Account for and Integrate Planning and Consideration of Existing Stressors

Consider existing stressors such as future increase in the amount of paved or impervious area, future population growth, and land-use change in establishing reduction targets or selection/prioritizing BMPs.

b. Align with Existing Climate Resiliency Plans and Strategies Where Feasible

Align with implementation of existing greenhouse gas reduction strategies; coastal/climate adaptation strategies; hazard mitigation plans; floodplain management programs; DoD Installation Natural Resource Management Plans (INRMPs); fisheries/habitat restoration programs, etc.

c. *Manage for Risk and Plan for Uncertainty*

Employ iterative risk management and develop robust and flexible implementation plans to achieve and maintain the established water quality standards in changing, often difficult-to-predict conditions.

d. *Engage Federal and Local Agencies and Leaders*

Work cooperatively with agencies, elected officials and staff at the local level to provide the best available data on local impacts from climate change and facilitate the modification of existing WIPs to account for these impacts.

II. PROGRAMMATIC COMMITMENTS

Like every state in the country, Pennsylvania has already begun to experience adverse impacts from climate change, such as flooding, heat waves, and drought. Based on the overwhelming scientific evidence, those harms are likely to increase in number and severity unless aggressive steps are taken to reduce carbon dioxide (CO₂) and other greenhouse gas (GHG) emissions.

[Pennsylvania's Climate Change Impacts Assessments](#) and the United Nation's Intergovernmental Panel on Climate Change recognize that, based on decades of research and evidence, GHGs from human activities are causing long-term changes in climate, as well as increasing the likelihood and intensity of significant weather events. In fact, Pennsylvania is expected to continue to experience higher temperatures, changes in precipitation, sea level rise, and more frequent extreme events and flooding over the next century due to climate change.

Since the early 20th century, temperatures have already increased by more than 1.8 °F. If GHG emissions are not curtailed significantly, Pennsylvania is projected to be nearly 6 °F warmer by 2050 than it was at the end of the 20th century. Similarly, average annual precipitation has increased by approximately 10% over the past 100 years and, by 2050, it is expected to increase by an additional 8%, with most precipitation increases occurring in the winter and spring.

These impacts could alter many fundamental assumptions about climate intrinsic to the Commonwealth's infrastructure, governments, and businesses. For example, bridges are designed for certain flooding return intervals, energy systems are designed for certain temperature ranges, farmers plant crops suited to historical climate conditions, and communities are planned around historical floodplains. If not properly accounted for, changes in climate could result in more frequent road washouts, higher likelihood of power outages, shifts in economic activity, among other impacts. It is estimated that events such as these have cost governments, citizens, and businesses in the United States more than \$1.1 trillion in the last 30 years.

Climate change can also affect vital determinants of health such as clean air, safe drinking water, sufficient food as well as secure shelter. This can include impacts from increased extreme weather events such as heat, droughts, and floods, wildfire, decreased air quality, and illnesses transmitted by food, water, and disease carriers such as mosquitoes. The World Health Organization expects climate change to cause around 250,000 additional deaths globally per year between 2030 and 2050, with additional direct damage costs to health to be estimated around \$2 to \$4 billion per year by 2030. GHGs must be reduced very quickly if these impacts are to be avoided.

In 2015, DEP estimated GHG emissions from all sources in Pennsylvania to be 256.05 million metric tons of CO₂ equivalent (MMTCO₂e), after including forestry and land use sinks. Industrial sources (31%), transportation (21%) and in-state energy production (32%) accounted for 84% of CO₂ emissions. The remaining sources include residential (7.2%), commercial (3.9%), agriculture (2.7%), and waste management (4.2%) sectors. Including consideration of land use sinks, GHG emissions in 2000 totaled 299.19 MMTCO₂e, so emissions have been reduced by 14.4%.

A. Current Action Strategies

Pennsylvania has continued to bear the impacts of climate change caused by manmade emissions of GHGs, while developing several initiatives to reduce emissions. These initiatives include:

1. Executive Order 2019-01

In January 2019, Governor Wolf signed [Executive Order 2019-01](#) which stated that Pennsylvania shall strive to reduce net GHGs 26 percent from 2005 levels by 2025, and 80 percent by 2050 from 2005 levels, among other initiatives and goals including:

- a. Collectively reduce overall energy consumption by 3 percent per year, and 21 percent from 2017 levels by 2025.
- b. Procure renewable energy to offset at least 40 percent of the Commonwealth's annual electricity use.
- c. Implement a state-wide benchmarking strategy and platform for energy and water consumption.
- d. Establish a state-wide Governor's Sustainability Council and/or interagency workgroup dedicated to the implementation of leadership actions listed in the Climate Action Plan, as well as actions in department-level plans.
- e. Incorporate climate change considerations into decision making processes and criteria. For example, add climate change resilience as a prioritization factor for new capital projects.
- f. Consider ENERGY STAR certification for existing buildings, and Architecture 2030, LEED, net-zero designs, and climate resilience design guidelines to drive

higher performance in new construction and major renovation projects in public buildings.

- g. Implement emissions reduction and climate resilience activities in public facilities, including distributed generation, backup power generation, water efficiency, climate resilient vegetation, and proper tree maintenance.
- h. Replace 25 percent of the state passenger car fleet with battery electric and plug-in electric hybrid cars by 2025.
- i. Conduct more training, education, and outreach on energy efficiency, clean energy, climate resilience, and related skills for facility managers and the facility management workforce.

2. Executive Order 2019-07

In October 2019, Governor Wolf signed [Executive Order 2019-07](#), which directed DEP to develop a proposed rulemaking to abate, control, or limit carbon dioxide emissions from fossil-fuel-fired electric power generators. Executive Order 2019-07 directed that the proposed rulemaking shall:

- a. Include a robust public outreach effort working with the business community, energy producers, energy suppliers, organized labor, environmental groups, and others to ensure that the development and implementation of this program results in reduced emissions, economic gains, and consumer savings;
- b. Establish a carbon dioxide budget consistent in stringency to that established in the Regional Greenhouse Gas Initiative (RGGI) participating states;
- c. Provide for the annual or more frequent auction of carbon dioxide emissions allowances through a market-based mechanism; and
- d. Be sufficiently consistent with the RGGI Model Rule such that allowances may be traded with holders of allowances from other states.

Responding to the charge of Executive Order 2019-07, DEP developed the CO₂ Budget Trading Program proposed rulemaking, which the Environmental Quality Board (EQB) adopted on September 15, 2020. EQB adopted the CO₂ Budget Trading Program final-form rulemaking on July 13, 2021, and the final-form rulemaking was approved by the Independent Regulatory Review Commission on September 1, 2021.

3. Pennsylvania Climate Change Act

DEP is working under the [Pennsylvania Climate Change Act](#) (Act 70 of 2008) to develop strategies to reduce and offset GHG emissions and adapt to the impacts of climate change. As required by the Pennsylvania Climate Change Act, DEP – in consultation with the Climate Change Advisory Committee – has developed the [Pennsylvania Climate Action Plan](#). In September 2021, DEP published the *Pennsylvania Climate Action Plan 2021*, which updated the previous *Pennsylvania Climate Action Plan 2018*.

The *Pennsylvania Climate Action Plan 2018* includes nearly 100 actions that government, businesses, and citizens can take to both mitigate and adapt to climate change. The analysis team modeled 15 of those actions, including actions such as increasing the alternative energy portfolio standards (AEPS), investing in renewable energy generation, increasing energy conservation and energy efficiency, and more.

Using all 15 actions, the analysis team aimed at reducing GHG emissions 26% from 2005 levels by 2025 and 80% by 2050. DEP found that even if the 15 key actions were implemented, GHG emissions in Pennsylvania would only be projected to decrease 21% from 2005 levels by 2025 and 36% by 2050.

This finding further emphasizes the need for more ambitious and quicker climate action from all Pennsylvanians, including government, businesses, and citizens. It is clear that actions expected to significantly reduce GHG emissions need to be enhanced in order to ensure human activities do not cause irrevocable climate change.

The *Pennsylvania Climate Action Plan 2021* outlines a pathway to reaching Pennsylvania's greenhouse gas reduction goals: 26% by 2025 and 80% by 2050 from 2005 levels. The plan identifies 18 strategies – in electricity generation, transportation, agriculture, fuel supply, and residential and commercial buildings – that quantitative modeling shows how Pennsylvania will meet those goals. *Pennsylvania Climate Action Plan 2021* also charts specific adaptation pathways for priority climate change hazards in *Pennsylvania Climate Impacts Assessment 2021* as already impacting Pennsylvania and projected to worsen if emissions are not reduced.

4. *Pennsylvania's Alternative Energy Portfolio Standard (AEPS)*

Pennsylvania's alternative energy portfolio standard (AEPS) enacted in 2004, administered by the Public Utility Commission (PUC) in cooperation with DEP, requires that 18% of electric power come from alternative and renewable sources, including 8% from renewable resources like solar and wind, by 2021. The standard has helped to grow the clean energy industry, while providing clean energy options to Pennsylvania businesses and homeowners.

5. *Finding Pennsylvania's Solar Future*

[Finding Pennsylvania's Solar Future](#) was a 2017-2019 statewide planning project led by DEP's Energy Programs Office with a goal of increasing solar generation to 10% of Pennsylvania's energy portfolio by 2030. The stakeholder effort modeled and developed 15 strategies to achieve that goal, and the final [Pennsylvania's Solar Future Plan](#) concludes that the goal is technically and economically achievable. The modeling used in the plan also predicts that GHG emissions from the electricity sector will decrease by nearly 10% by 2030, if the goal is achieved.

6. Methane Emission Controls

DEP is implementing methane emission controls on natural gas production, compression, processing, and transmission facilities through the Governor's [Methane Reduction Strategy](#). The comparative impact of methane on climate change is more than 72 times greater than CO2 emissions on a 20-year timeframe.

7. Emissions Reduction Initiatives

DEP is working to reduce emissions from vehicles and other mobile air pollution sources through several initiatives, including the [Driving PA Forward](#) suite of grants and rebates and the [Alternative Fuels Incentive Grant](#) (AFIG) program. In addition, DEP formed the Drive Electric PA Coalition, which developed an [Electric Vehicle Roadmap](#) for Pennsylvania.

8. Energy Efficiency

Pennsylvania's 2008 energy efficiency law requires the state's major electricity distributing companies to meet savings targets established by the PUC. Since 2009, the Commonwealth has saved over 8.8 million megawatt hours of electricity usage resulting in \$6.4 billion in savings.

9. Climate Change Adaptation and Mitigation

DCNR's Climate Change Adaptation and Mitigation Plan outlines 123 actions to make the Commonwealth more resilient to climate change. Staff members from across DCNR's bureaus participated in a rigorous process to determine and prioritize DCNR's greatest climate change vulnerabilities and identify strategies to address them. The plan includes recommendations for dealing with higher temperatures, flooding, more extreme weather events, changes in outdoor recreation, range shifts for wildlife and plant species, and an increase in invasive species. DCNR is beginning to implement the adaptation strategies in state parks and forests, including a pilot project that includes Caledonia, Pine Grove Furnace, and Kings Gap state parks, and the 85,000-acre Michaux State Forest. Activities there are focused on addressing flooding issues, planting trees adapted to future climatic conditions, eliminating unnecessary dirt roads, control of invasive species, relocating and hardening trails damaged by flooding, fuel mitigation to reduce the likelihood of catastrophic wildfire and more.

10. Local Climate Action Program

DEP's Energy Programs Office initiated a [Local Climate Action Program](#) in July 2019, helping 53 local governments across Pennsylvania that wanted to reduce their GHG emissions. Local governments are matched with college students across the state and trained by a DEP contractor to develop GHG inventories and climate action plans. Via a series of live training webinars and one-on-one technical assistance, the contractor

guides the student/local government teams in creating GHG inventories and climate action plans.

11. *Pennsylvania Climate Leadership Academy*

This project supports the GreenGov Council through technical assistance to achieve the goals set forth in Executive Order 2019-1. In 2020 and 2021, DEP developed an accredited Climate Training Course for DEP participants which can now be delivered to a wider audience as the [Pennsylvania Climate Leadership Academy](#). This Academy, when paired with the public facing mission of the Commonwealth's GreenGov Council, can be used to educate local governments and the public on climate and the benefits of sustainable governance.

12. *Clean Energy Program Plan*

The [Clean Energy Program Plan](#) is intended to guide DEP's Energy Programs Office in fulfilling its obligations to support energy conservation and efficiency, advance clean energy technologies, and provide energy security and resilience while improving the environment and health of Pennsylvanians through education, outreach, funding, and technical support.

III. PHASE 3 WIP IMPLEMENTATION: BEST MANAGEMENT PRACTICE (BMP) EVALUATION

A. Evaluation and Implementation of BMPs

As mandated by the Pennsylvania Climate Change Act, DEP conducted a study of the potential impacts of global climate change on Pennsylvania over the next century. Previous studies were conducted by the Pennsylvania State University (Penn State) and presented to DEP in 2009, 2013, and 2015.

The Penn State team updated the prior reports through three in-depth studies of climate change impacts and adaptations in high priority areas for the Commonwealth: agriculture, infrastructure, and water quality. The [Pennsylvania Climate Change Impacts Assessment Update](#) published in April 2020 focused on specific Chesapeake Bay watershed restoration related issues such as agriculture and watershed restoration.

The following three topics were studied:

- Implications of climate change for planning, policies, and practices to achieve Pennsylvania's obligations under the 2011 Chesapeake Bay TMDL.
- Climate change impacts on Pennsylvania livestock production and livestock production impacts on water quality.

- Resilience of Pennsylvania's critical infrastructure to extreme weather and climate events.

The first topic, designed specifically to help with further enhancement of the Phase 3 WIP, is described below.

1. Climate Change Impacts on Pennsylvania's Watershed Management Strategies and Water Quality Goals

Many BMPs, such as cover crops and forest riparian buffers, have been designed and managed using climate data from the 20th century. Thus, as climate continues to change, one expects the suitability and effectiveness of existing BMPs to change throughout the state. For example, as intense precipitation becomes more frequent, cover crops are likely to be less effective at reducing soil erosion and forest riparian buffers are likely to experience short-circuiting through the development of gullies and ditches. Furthermore, forest riparian buffer systems are likely to see increased invasive vegetation coverage and decreased sapling success with greater annual fluctuations in groundwater levels.

In addition, because climate change impacts drivers of water quality throughout the Chesapeake Bay watershed, local and countywide planning associated with the Phase 3 WIP should also account for changing conditions due to climate.

This study provided answers for the following questions:

- What impact will a changing climate have on the proposed tiered approach in Pennsylvania's Phase 3 WIP for local and countywide planning goals?
- What potential impact will projected 21st century climate change have on the suitability and effectiveness of water quality-driven BMPs (e.g., forest riparian buffers and cover crops) across the different landscapes and ecoregions of Pennsylvania?
- What changes in policies, new recommendations, or changes to current management practices (e.g., buffer site selection, frequency of invasive vegetation control efforts, etc.) might Pennsylvania adopt increase the effectiveness of BMPs in Pennsylvania as the climate continues to change? This work will draw on existing climate projections for Pennsylvania and recent scientific research and literature on the potential impacts of climate change on the effectiveness of current BMPs specific to the landscapes and land use patterns of Pennsylvania.

The study provided recommendations for management actions and research needs to better inform Pennsylvania on future decisions related to meeting water quality goals impacted by changing climate.

In May 2021, DEP published the [Pennsylvania Climate Change Impacts Assessment 2021](#), which provided recommendations for environmental justice and equity considerations along with other recommendations and conclusions.

In 2022, DEP developed multiple BMP scenarios for the Phase 3 WIP Action Leaders to consider. Most of the BMPs that were selected for consideration are those that are also reflected in the [Pennsylvania Climate Action Plan 2021](#). Soil health practices, for example, have multiple benefits, reducing soil erosion and nutrient runoff while also increasing carbon sequestration. Practices implemented in the urban sector – such as tree planting, forest buffers, and stream restoration – provide multiple benefits as well, reducing urban heat islands and increasing flood resiliency. The numeric model output of the proposed climate change modeled scenario, summarized in Table 9.3, yields estimated reductions of 2,207,335 pounds of nitrogen and 95,096 pounds of phosphorus annually. Over the course of the next few milestone periods, Pennsylvania will consider adding more detail to the milestone commitments and progress reports as it relates to the additional climate change BMPs.

Table 9.3. Climate Change BMP Scenario

Agriculture Practices	Duration	Unit	Phase 3 WIP	PA Climate Change Scenario plus Phase 3 WIP	Additional Amount for Climate Change
Nutrient Application Management Rate Phosphorus	annual	Acres	334,143	893,577	559,434
High Residue Tillage	annual	Acres	831,553	935,775	104,221
Commodity Cover Crop	annual	Acres	11,000	53,331	42,331
Prescribed Grazing	cumulative	Acres	166,275	197,289	31,014
Grass Buffers	cumulative	Acres in Buffers	49,321	79,321	30,000
Wetland Restoration	cumulative	Acres	5,163	6,163	1,000
Tree Planting	cumulative	Acres	2,973	12,973	10,000
Alternative Crops	cumulative	Acres	-	3,000	3,000
Soil and Water Conservation Plan	cumulative	Acres	2,195,252	2,466,186	270,934
Non Urban Stream Restoration	cumulative	Feet	901,790	1,076,790	175,000
Poultry Mortality Composting	cumulative	Animal Units	54,862	58,653	3,791
Manure Treatment Technologies Out Of Area	annual	Dry Tons	19,937	23,925	3,987
Urban/Suburban Practices					
Runoff Reduction Performance Standard	cumulative	Acres Treated	103,125	123,125	20,000
Conservation Landscaping Practices	cumulative	Acres Treated	3,669	4,669	1,000
Urban Forest Buffers	cumulative	Acres in Buffers	3,076	13,076	10,000
Urban Tree Planting	cumulative	Acres	472	14,472	14,000
Urban Forest Planting	cumulative	Acres	3,618	14,618	11,000
Urban Stream Restoration	cumulative	Feet	606,295	731,295	125,000

SECTION 10. COMMUNICATION AND ENGAGEMENT STRATEGY

I. BACKGROUND

Local engagement, communication, and outreach will continue to occur at multiple levels and in multiple ways as the Phase 3 WIP actions are implemented. This intentional, strategic engagement is key to the successful implementation of the Phase 3 WIP and improvement of local waters. Critical to this strategy is overcoming the three primary hurdles: (1) ideologic – developing an understanding of the value of the practices; (2) technical – ensuring that once interested in implementation, tools are available to aid in selection, design, and installation; and (3) funding – providing resources to those that are willing and able to implement the selected practices. The Communications Offices of DEP, DCNR, and PDA, in partnership with the Phase 3 WIP Communications and Engagement Workgroup, have the lead in focusing on the ideologic hurdle to ensure the Phase 3 WIP is implemented.

Building on the “Healthy Waters, Healthy Communities” Communications Strategy described in [Section 1, Introduction](#), engagement, communication and outreach will continue as the Phase 3 WIP is implemented. The Communication and Engagement workgroup has identified strategies and actions described below. Their work is intended not only to facilitate such engagement but also to inspire people to want to become involved and take actions through implementing practices.

II. ENGAGEMENT, COMMUNICATION, AND OUTREACH DURING REVIEW OF THE DRAFT PLAN

The draft Phase 3 WIP was submitted to EPA and the Chesapeake Bay Program partnership on April 12, 2019. This started a formal public comment period that ended June 7, 2019. In response to recommendations from the Communication and Engagement Workgroup, DEP and its sister agencies focused on developmental tactics to encourage public review of the draft Phase 3 WIP, while the Communications and Engagement Workgroup led delivery-related tactics. Forty commentators submitted comments on the draft Phase 3 WIP. [Appendix 4](#) is the Comment Response document to these comments.

A. Developmental Tactics

The cornerstone of the communications strategy relies on DEP’s digital media assets, such as social media, blogs, and the DEP website. DEP developed an actively maintained, accessible subsite to the DEP main website aimed at both the general public and participants active in the development and implementation of the Phase 3 WIP. These pages can be found at www.dep.pa.gov/chesapeakebay/phase3.

These assets also include a “resource email account” (RA-EPChesBay@pa.gov) for interested parties to submit questions, comments, and concerns about the Phase 3 WIP and the Chesapeake Bay Program. This resource account is also be available for those

wanting to express interest in participating in future Countywide Action Plan development and implementation. Success stories, written by stakeholders, were featured on the DEP blog "[Our Common Wealth](#)" and were promoted through social media platforms Facebook, Twitter, and LinkedIn.

Other resources identified by the Communications and Engagement Workgroup developed by DEP include:

- A series of informational sheets outlining the details in the Phase 3 WIP to use at events and in public forum discussions.

In addition, the communication offices of DEP, DCNR, and PDA promoted the opportunity to comment on the draft Phase 3 WIP by:

- Providing links through all three agencies websites to the DEP webpage for the draft Phase 3 WIP.
- Highlighting the opportunity in departmental newsletters.
- During PDA's focused three weeks of intentional conservation outreach and messaging, highlight the comment opportunity.
- The Secretaries of the three agencies will use speaking events to encourage input on the draft WIP when appropriate.

DEP also met with the following advisory groups to solicit input during the public comment period:

- Joint meeting of the Pennsylvania delegates to the Chesapeake Bay Program Partnership Local Government and Citizen Advisory Committees – April 18, Susquehanna River Basin Commission, Harrisburg
- Nutrient Management Advisory Board to the State Conservation Commission – April 18, Room 309, Department of Agriculture, Harrisburg
- Agriculture Advisory Board – April 25, DEP Southcentral Regional Office, Harrisburg
- Citizen Advisory Committee – May 22, Room 105, Rachel Carson State Office Building, Harrisburg
- Water Resources Advisory Committee – May 23, Room 105, Rachel Carson State Office Building, Harrisburg
- DCNR Advisory Council – May 29, Room 105, Rachel Carson State Office Building, Harrisburg

DEP conducted a webinar on April 23 to describe the phased approach for the development of the Countywide Action Plans (CAPs) described in [Section 3](#).

[Countywide Actions](#) and the proposed schedule so that those impacted will know what to expect and can plan accordingly.

1. *Delivery Tactics*

Members of the Communications and Engagement Workgroup scheduled industry and public events to present information about the Phase 3 WIP and encourage input through the public comment period. These events included:

- Industry Conferences as agendas allow including:
 - The Pennsylvania State Association of Township Supervisors Annual Conference – April 14 -17
 - Pennsylvania Water Environment Association – June 2-4
- Focused sessions for specific purposes including:
 - The Pennsylvania Organization of Watersheds and Rivers (POWR) – Webinar on May 28 on the draft Phase 3 WIP with a focus on the CAP planning process.
 - POWR, The Linn Conservancy/Conservation Union – May 31 Workshop on the Phase 3 WIP, Union County Government Center
 - Chesapeake Conservancy – June 4 Workshop on Precision Conservation and the Phase 3 WIP, Lockhaven University

In addition, where appropriate, focus groups were organized to target sectors, such as farmers. For example, the Phase 3 WIP Agriculture Workgroup hosted four small focus group forums with farmers in April to solicit input on the agriculture components of the Phase 3 WIP and the Phase 3 WIP Forest Workgroup solicited comment through the 60+ member Riparian Forest Buffer Advisory Committee.

More broadly, all workgroup members, co-chairs and Steering Committee members were asked to send the DEP website link for the Phase 3 WIP to members, list serves and other communication vehicles.

III. ENGAGEMENT, COMMUNICATION AND OUTREACH DURING PHASE 3 WIP IMPLEMENTATION

Much of what was used for engaging the public during the comment phase will be used for engagement around implementation.

A. Messages

Local messaging will emphasize the importance for all the partners involved in the CAP, both at the state and local level, to be committed to the completion of action items and the actual implementation of the plan.

Again, building on the communications strategy already established and described above, key messages to be used in the development of additional outreach materials to motivate people to put practices on ground include the following:

- The economic benefit of cleaner water, such as lower tillage and equipment costs, and improved crop, herd, and soil health
- The health and environmental benefits of cleaner water, such as herd and soil health improvements, more productive fisheries, and recreation opportunities
- Voluntary actions can reduce the need for government intervention.

B. Message Delivery

These messages will be delivered through the following mechanisms:

- [Healthy Waters, Healthy Communities: Pennsylvania in the Chesapeake Bay Watershed StoryMap](#) – This is a web-based outreach tool that was published June 2020:
 - To increase Pennsylvanians’ awareness and knowledge of the value of healthy local waters to their lives; nonpoint source water pollution in our part of the Chesapeake Bay watershed; efforts underway by many people and organizations to reduce it, including DEP’s and other state agencies’ work; and what they can do to help.
 - To be the big-picture digital home for the story of all the DEP-led and -partnered work happening in Pennsylvania’s part of the Chesapeake Bay watershed and a jumping-off point to other storymaps and websites for more specific facets.
 - The StoryMap has links to other information shared by partners, other agencies, and groups of interest.
- [Tracking Pennsylvania’s Progress - Milestones and Progress Reporting](#) –
 - Milestones and action steps for the Phase 3 WIP must be updated every two years. Updating will allow for adjustments to be made and for those who are actively implementing elements of the Phase 3 WIP and the CAPs to adaptively manage the progress they are making based on lessons learned.
 - Programmatic milestones and action steps will be reported annually using the Progress and Reporting Template to the EPA Chesapeake Bay Program Office. In addition, progress on BMP implementation will be reported on an annual basis to the EPA Chesapeake Bay Program Office.

- Public meetings, held both virtually and in-person, as applicable
 - Semi-annual [State Team](#) Meetings, with recordings and materials published to the DEP webpage
 - Participation in public forums to share Pennsylvania’s message as requested by advisory committees, stakeholder groups, and legislative entities
- The potential development of recorded webinars and videos for use on the website, YouTube, Facebook, or as Public Service Announcements (PSA’s) to include:
 - The State Priority Initiatives and action plans for each sector
 - Webinars relating to priority BMPs, their implementation, and potential funding sources
 - The economics and benefits of specific practices, including stakeholder testimonials
 - Short messages from the agency Secretaries
 - How to leverage partnerships and sources of funding for technical and financial assistance
- Whenever possible, the use of outreach means such as:
 - Regular meetings with key stakeholder communicators (agency and partners) to keep the messaging about implementation going
 - Existing social media platforms of agencies and partners
 - Agency Education Centers
 - Fact sheets on the CAPs, elements of the Phase 3 WIP
 - Short messages on company bills to customers, such as utility bills
- Development and implementation of outreach campaigns focused on:
 - Landowner Outreach to include:
 - [PA CREP Resources](#) like the [2021 Landowner Guide to Buffer Success](#)
 - The Countywide Action Plan effort to include:
 - Letters and Fact Sheets
 - Opportunities for counties to share with others what has been achieved
 - Opportunities for stakeholders to share and be proud of accomplished practices
 - Case studies to showcase cost savings

IV. RESOURCES

In addition to existing program staff in DEP, DCNR, and PDA’s communications offices, support will be needed for the immediate future for the development of outreach materials as described above. This effort will be funded through the EPA Chesapeake Bay Regulatory and Accountability Program Grant. Table 5.4 in [Section 5, Existing and](#)

[Needed Resources](#) has a summary of the resource needs for the next two years needed to complete this communications and engagement strategy.

V. KEY ACTION STEPS

To track and report progress, key action steps were selected to be reported on an annual basis for the initiatives described above. See Pennsylvania's programmatic milestones and progress reports published on the [Tracking Pennsylvania's Progress](#) website for more information.

SECTION 11. SEDIMENT TARGETS

Sediment loads are managed in the Chesapeake Bay Total Maximum Daily Load to specifically address the water clarity/submerged aquatic vegetation (SAV) water quality standards. Research has shown that the water clarity/SAV water quality standard is generally more responsive to nutrient load reductions than it is to sediment load reductions. This is because algae fueled by nutrients can block as much, or more, light from reaching SAV as suspended sediments. Sediment targets for the Phase 3 WIP were not established at the completion of the August 2019 Final Phase 3 WIP. As stated in the Phase 3 WIP, sediment targets were to be included as an appendix to the WIP which are now incorporated within this Phase 3 WIP Amendment.

As established by EPA in the Phase 3 WIP development process, sediment targets will not affect the BMPs called for in the Phase 3 WIP and are not intended to be the driver for BMP implementation moving forward. As completed in previous WIPs, sediment targets developed for the Phase 3 WIPs are based on the sediment loads associated with management actions taken to address the Phase 3 WIP nitrogen and phosphorus targets. In other words, the Best Management Practices (BMPs) that are identified in this WIP to meet the Amended Phase 3 WIP nitrogen and phosphorus targets will be run through the Partnership's Phase 6 suite of modeling tools, and the resulting sediment load reductions used as the basis for the Phase 3 WIP sediment targets.

Pennsylvania's current Phase 3 WIP sediment planning target is 2,161 million pounds. In comparison, Pennsylvania's sediment target is approximately 25% of Maryland's sediment planning target (8,343 million pounds) and 31% of Virginia's sediment planning target (6,872 million pounds).

According to the EPA modeled progress as of 2020, Pennsylvania's current sediment load is 2,828 million pounds. In order to meet the 2025 Planning Target, 667 million pounds is left to reduce. However, factoring in the excess/cutoff, credit duration, and existing non-reported programs, quantified using the Chesapeake Bay Watershed Model, added to the EPA modeled progress, there would only be 274 million pounds of reduction needed. The total new implementation from Tier 1, 2, 3, and 4 counties; minimal loading counties; and state recommendations yield more than 705 million pounds of additional reduction, far exceeding the sediment planning target by more than 430 million pounds.

SECTION 12. CONCLUSION

The Pennsylvania Phase 3 WIP demonstrates reasonable assurance through a comprehensive, integrated framework of federal, state, and local collaboration in a variety of regulatory programs and voluntary initiatives. The Phase 3 WIP is founded on the intensive collaborative local engagement process undertaken since the 2017 milestones, through which reasonable assurance is demonstrated.

The total projected reduction for nitrogen in the Phase 3 WIP is 32.725 million pounds, exceeding the 2025 nitrogen planning target by 222,000 pounds. The total projected reduction for phosphorus in the Phase 3 WIP is 1,151,000 pounds, exceeding the 2025 phosphorus planning target by 300,800 pounds. Pennsylvania's projected reduction for sediment is 1,088,128,000 pounds, exceeding the sediment planning target by 420.962 million pounds.

Pennsylvania is very fortunate to have many partners and stakeholders that have made significant commitments to the Phase 3 WIP process and to the Chesapeake Bay and local water restoration efforts.

Development of the Phase 3 WIP was just the first step in this final phase of TMDL implementation, followed by a series of further planning and implementation activities necessary to restore and maintain the health of the Chesapeake Bay and restore local waters. Future activities will continue to include practice implementation, implementation tracking and reporting to evaluate milestone progress, and practice verification. Federal, state, and local coordination and partnership in these activities is vital.

To ensure sufficient progress to achieve the 2025 targets, Pennsylvania will continuously evaluate and adaptively manage technical issues regarding pace of implementation. Pennsylvania will also continue to evaluate feasible implementation rates and share this information with the Pennsylvania partnership and stakeholders in advance of developing milestones.

Pennsylvania has heard many concerns about the total cost of the Phase 3 WIP. The way to begin to address those concerns is to demonstrate progress. Pennsylvania's legislative and executive leadership have responded to the demonstrated progress and documented need for additional resources, enacting a budget in Fiscal Year 2022-2023 with nearly \$700 million for environmental programs across the state, including \$154 million for the new Agricultural Conservation Assistance Program. Other areas for consideration have been the establishment of voluntary programs for reforestation, signup commitments to use less lawn fertilizer, subsidize rain barrels and rain gardens, and provide incentives for re-development.

At the same time, DEP recognizes the need to track and report progress, and to be prepared for the possibility that progress will be delayed in some areas. If reporting indicates that milestones are not being met, DEP will continue to work adaptively with the identified responsible parties to overcome obstacles and get back on schedule.

Throughout this document, concerns about data collection and input into the Chesapeake Bay Watershed Model are raised. These concerns include information about voluntarily implemented BMPs and regulatory programs that were not captured in the model input. It will be up to the Pennsylvania partners and stakeholders, including federal agencies, to work between now and 2025 to assure that all implementation, both urban and agricultural, is accurately inventoried and reported so it can be properly credited and so that new practices and programs can be approved for input into the Chesapeake Bay Watershed Model for proper crediting.

During the Phase 3 WIP planning process, as the Chesapeake Bay Program presented data and information to the Phase 3 WIP Steering Committee, the seven workgroups, and county pilot partners, Pennsylvania became more aware of discrepancies between what is on the ground and what is being reported to the EPA Chesapeake Bay Program Office for input into the Chesapeake Bay Watershed Model for progress. Pennsylvania recognizes that this is due to challenges it has historically had with collecting and reporting data, as well as challenges with Pennsylvania's data fitting properly into the Chesapeake Bay Watershed Model. Going forward, Pennsylvania welcomes continued discussions with the Chesapeake Bay Program partnership on these reporting challenges as well as action taken to mitigate these challenges as we continue to adaptively manage the program together to accurately reflect real world circumstances beyond the model, so that resources and efforts are tailored most effectively to achieve local and Chesapeake Bay cleanup goals.

With the establishment of the Chesapeake Bay TMDL, the need for consistent and broad-ranging BMP data became critically important to attain adequate yearly progress. These data sources and systems include permit programs, grant and cost-share awards, and special efforts to collect and report BMPs that have not been previously accounted for or are implemented outside of government oversight. On December 1 of each year, Pennsylvania reports these BMPs to the EPA Chesapeake Bay Program Office. There have been growing pains in developing this capacity while also working with limited funding. Since 2010, improvements in data collection through programs and new data sources has been steady. Improving data management protocols and capability to document progress was one of six priorities identified as part of the 2016 Pennsylvania Restoration Strategy announced by Governor Wolf to accelerate progress. The results have shown that with each refinement of data submitted to the Chesapeake Bay Watershed Model, Pennsylvania is able to demonstrate increased reductions. For the period of 2009 – 2020, as documented on [ChesapeakeProgress](#), Pennsylvania's efforts were credited as 7.24 million pounds of nitrogen reductions, 0.716 million pounds of phosphorus reductions, and 471 million pounds of sediment reductions to the Chesapeake Bay. Pennsylvania's 2020 annual progress submission resulted in 4.41 million pounds of nitrogen load reductions for all sources combined. Another highlight of Pennsylvania's 2020 annual progress was the greatest phosphorus reduction for Pennsylvania's agricultural sector since the 2009 start of the Chesapeake Bay TMDL, as documented by EPA. This exemplifies the efforts that Pennsylvania has

been putting forth in not only implementing practices but ensuring that what has been implemented is also being accurately captured and reported.

Improvements in data collection around practices and programs not currently documented in the Chesapeake Bay Watershed Model are being addressed in this Phase 3 WIP at both the state and local level. Additionally, DEP is evaluating its permitting requirements to facilitate a smooth process for those that seek to implement practices. As part of that effort, DEP has identified the need for more timely responses when state and federal partners have a role in the permit process and recommend that shorter review times should be evaluated by state and federal counterparts.

Pennsylvania commits to have practices and controls in place by 2025 necessary to achieve the final Phase 3 WIP phosphorus and nitrogen reductions. Pennsylvania, in conjunction with the Partnership, will utilize an adaptive management approach to achieve our collective desired outcome. The two-year milestones and progress reporting allow for implementation progress assessment and targeted adjustments to programs and priorities to ensure the practices and controls called for in the Phase 3 WIP are achieved by 2025.