Conowingo Watershed Implementation Plan

Discussion Draft for Review by the Steering Committee

Prepared by the Center for Watershed Protection, Inc

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Contents

Executive Summary

This first draft of the Conowingo WIP (CWIP) is intended to provide the PSC, CWIP Steering Committee Members, EPA, and stakeholders with a draft strategy to implement the nitrogen load reductions required to adjust for Conowingo infill. The CWIP is developed as a stand-alone WIP and therefore requires consideration for state, local, and regional efforts already being applied to the Chesapeake Bay WIP requirements. As such, the CWIP will need to accomplish load reductions by working in concert with stakeholders to implement targeted on-the-ground actions that reduce watershed load and provide flexibility to use innovative and cost-effective strategies that deliver equivalent reductions to the Chesapeake Bay.

This process started with identification of the most effective basins, which was then further refined to priority watersheds based on estimated BMP opportunity, total nitrogen delivery rate, and state agency efforts. Coordination with the Activity 2 team (financing strategy), the Activity 3 team (tracking and verification) and the CWIP Steering Committee requires an iterative process to develop potential BMP strategies and scenarios. Underlying all these discussions is the recognized desire and need to use flexible, cost-effective, and innovative approaches to address the additional load reduction responsibility associated with the Conowingo. The CWIP is a first attempt to provide a road map for on-the-ground BMP implementation based on geospatial data, local outreach, and state agency input, with built in the flexibility to allow private sector innovation to develop and implement new or enhanced load reduction measures.

Some BMPs such as stream restoration, bioswales, and living shorelines are expected to be included as part of the final WIP, however, are not included in this initial CAST scenario as additional information is needed, and will be gathered during the outreach process, to be able to develop planning level estimates. Stream restoration, specifically, is likely to be a key load reduction BMP which, in most cases, will include either a forest or grass buffer and potentially wetlands. Stream restoration is particularly difficult to model at the planning level given the myriad of site specific and design specific inputs that impact individual project nitrogen reduction credit. However, to provide the most cost-effective nitrogen reductions, stream restoration projects will likely incorporate buffers and wetland therefore providing an initial starting point for discussion on load reductions as a result of full-scale stream corridor restoration.

This draft CWIP serves as a starting point for outreach and coordination with local stakeholders as well as an initial indication of load reductions associated with a base level effort in the initial priority watersheds. The draft is intended to initiate discussion with the CWIP Steering Committee and stakeholders providing the opportunity for feedback on the direction of the strategy and guidance on adjustments and modifications to close the load reduction gap.

Introduction

The Conowingo Watershed Implementation Plan (CWIP) is developed to address the additional nitrogen, loads entering the Chesapeake Bay that were not previously addressed by the 2010 Chesapeake Bay total maximum daily load (TMDL). When the Chesapeake Bay TMDL was established in 2010, it was estimated that the Conowingo Dam would be trapping sediment and associated nutrients through 2025. New research determined that this is not the case, and the reservoir behind Conowingo Dam has now reached dynamic equilibrium USACE and MDE (2015). As a result, more nitrogen and phosphorus are now entering the Chesapeake Bay than was estimated when the TMDL was established. As such, no jurisdictions were assigned the responsibility to achieve these additional reductions when the allocations were finalized in 2010. Even with full implementation of the seven Bay jurisdictions' Watershed Implementation Plans (WIPs), this additional pollutant loading due to the Conowingo Reservoir reaching dynamic equilibrium, will cause or contribute to water quality standards exceedances in the upper Chesapeake Bay. Consequently, these nutrient loads compromise the recovery of the Chesapeake Bay if no further action is taken. EPA documented[1] that adjustments to sediment and associated nutrient load reduction obligations would be needed if monitoring showed the trapping capacity of the dam was reduced (USEPA 2010, Appendix T).

On October 28, 2018, the Chesapeake Bay Program (CBP) Principals' Staff Committee (PSC) approved a Framework for developing the CWIP and identified the nitrogen load reductions as the primary goal of the CWIP since most of the Bay states are projected to exceed the phosphorus goals.[2,3]

Background

The Conowingo Reservoir is in the lower portion of the Susquehanna River basin. The Susquehanna River basin has a 27,500 square mile drainage area that is largely in Pennsylvania with 1% (281 sq. miles) of its area in Maryland and 22% in New York before emptying into the Chesapeake Bay. The reservoir was constructed in 1928 and is owned and operated by Exelon with a design capacity of 30,000 acre-

[1] Letter from the US EPA Region 3 Regional Administrator to the Principal's Staff Committee Members, October 26, 2018

[2] Framework for the Conowingo Watershed Implementation Plan, January 2019

[3] Placeholder for PSC Meeting, January 24, 2020

feet. It is the most downstream of the four hydroelectric dams and their reservoirs located on the lower Susquehanna River (Figure 1).

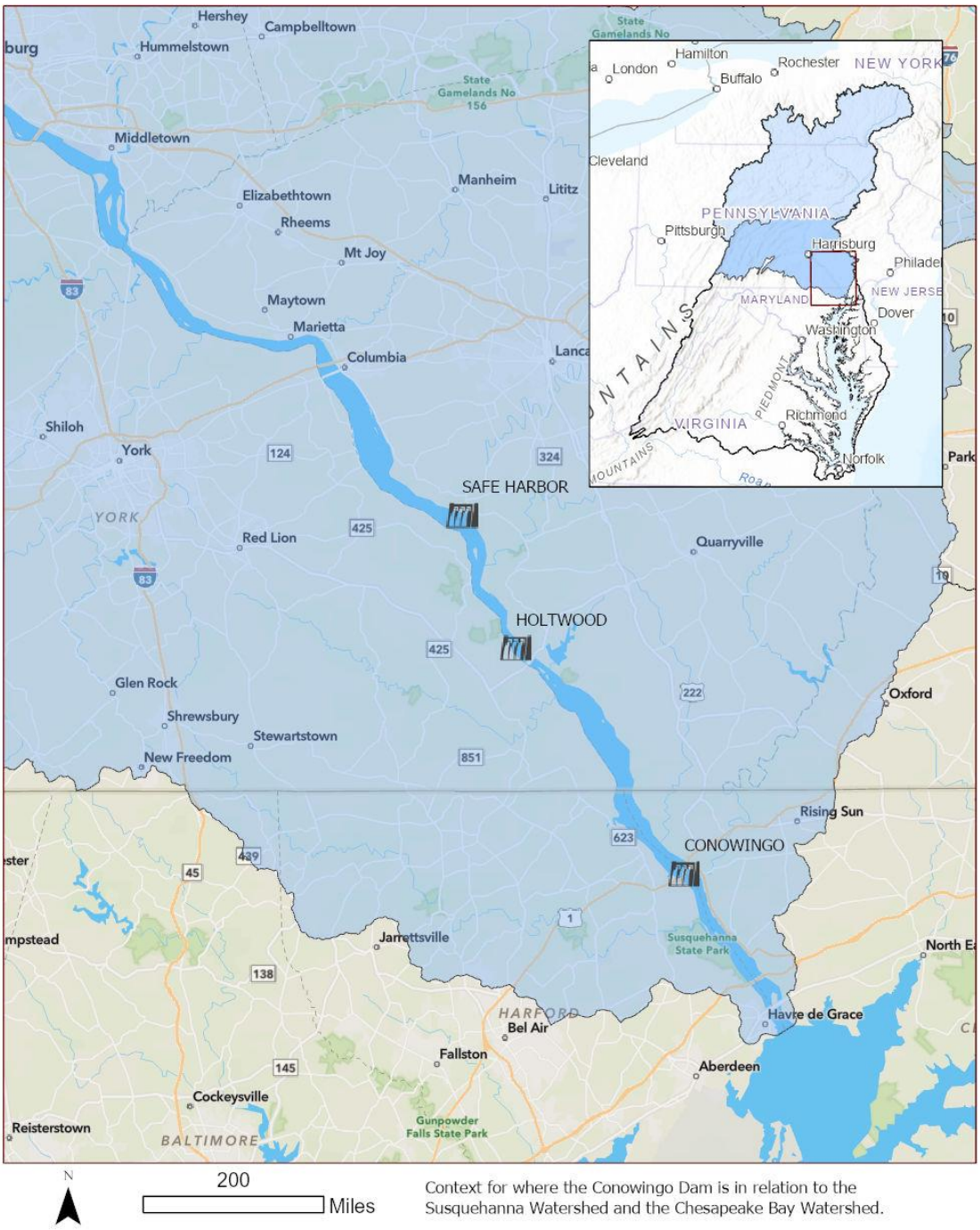

Figure 1. The Conowingo Reservoir in the Lower Susquehanna River Basin.

The dams in lower Susquehanna River have historically trapped and stored sediment and associated nutrients transported through the watershed, reducing the amount of materials reaching the Chesapeake Bay. Decades prior to the establishment of the 2010 Chesapeake Bay TMDL, scientists had concern over impacts to the Chesapeake Bay from the lower Susquehanna River dams filling, reaching their capacity. In 1995, it was determined that two of the three reservoirs, Safe Harbor and Holtwood, had reached their sediment trapping capacity. Bathymetry data from the Conowingo Reservoir (1996 to 2011) found a thirty-three percent decrease in reservoir sedimentation equating to a ten percent increase in sediment load to the Bay of 20.3 – 22.3 million tons. The inability for these reservoirs to trap sediment results in sediment transported downstream and severe impacts to the Bay where nutrients associated with the sediment would be more harmful to Bay aquatic life than the sediment alone.

Analyses of the source of sediment transport from the reservoirs finds most of the sediment load from the lower Susquehanna River entering the Chesapeake Bay during storm events originates from the watershed, with less contributions from scour from the reservoirs (USACE and MDE, 2015). Analyses find the three reservoirs are no longer trapping sediment and associated nutrients over the long term and accumulated sediment is being released episodically during high-flow storm events. USACE and MDE (2015) concluded that the dams have reached a state of dynamic equilibrium where there is no appreciable change in the sediment transport through the Conowingo Reservoir over the periods of years to decades, rather there are periodic releases of sediment during high flow events temporarily increasing the capacity of the reservoir, that subsequently continues to accumulate sediment until the next high flow event.

The Chesapeake Bay Program Partnership (Partnership) estimates that, after fully implementing the Bay TMDL and the Phase III WIPs, an additional reduction of six million pounds of nitrogen and 0.26 million pounds of phosphorus is needed in order to mitigate the water quality impacts of Conowingo Reservoir infill[4]. These current estimates of additional pollutant loads are based on reductions occurring in the most effective sub-basins of the watershed – that is, the geographic areas with the greatest influence on Chesapeake Bay water quality. If implementation were directed watershed-wide, or not targeted in the most-effective sub-basins, the total pollution reduction needed would increase.

The decision to develop a CWIP by the PSC is based on the studies[5,6] indicating that conditions in the watershed have changed since 2010, and that additional load reductions of nutrients are needed to

[4] Framework for the Conowingo Watershed Implementation Plan, January 2019

[5] U.S. Army Corps of Engineers. (2016, March 7). *Lower Susquehanna River Watershed Assessment, Maryland and Pennsylvania.* Retrieved from https://dnr.maryland.gov/waters/bay/Documents/LSRWA/Reports/LSRWAFinalMain20160307.pdf

[6] CBP Partnership Phase 6 Model Analyses

mitigate the water quality impacts of the Conowingo Dam infill on the Chesapeake Bay. This decision by the PSC is based on the following[7]:

- At the December 2017 PSC Meeting, the PSC agreed to assign the total pollutant reductions attributed to the Conowingo Dam infill to a separate Conowingo Planning Target and to collectively development a separate CWIP.
- At the December 2018 PSC Meeting, all PSC jurisdictional members agreed to pool resources and to identify a process to fund and implement the CWIP (e.g., the allocation of future EPA Chesapeake Bay Implementation and Regulatory and Accountability Program grant funding to the seven Bay watershed jurisdictions).
- At the March 2018 PSC Meeting, it was agreed with EPA's request that the agency not have a member on the CWIP Steering Committee due to EPA's oversight role for the implementation of all the jurisdictions' WIPs, include the CWIP.
- At the October 2018 PSC Meeting, the PSC approved a Framework for developing the CWIP.

Conowingo WIP Framework

The CWIP is not a jurisdictional WIP, similar to the WIPs in support of the Chesapeake Bay TMDL. The CWIP presents an opportunity to build on existing, successful programs, as much as is feasible, to avoid creating duplicative bureaucracies. The CWIP encompasses an adaptive management approach consistent with other WIPs that represents the collective agreement amongst the Partnership and a transparent, fair and equitable process for all stakeholders. At the same time, the strategies for financing and implementation endeavor for innovation, leverage new technologies, and, where appropriate, stimulate new implementation approaches. The CWIP is based on the best available information and supporting analyses to achieve the designated nitrogen reductions. The CWIP acknowledges the need to adapt its approach as new information becomes available throughout the implementation phase, while putting in place a process to monitor outcomes and transparently assess progress and redirect resources as necessary. As such, the CWIP will be updated as needed in recognition that programmatic and, or numeric commitments may need to be modified as part of the adaptive management process during the WIP timeframe through their two-year water quality milestone reporting process.

The Framework represents an agreement amongst all Bay jurisdictions that recognize[8]:

A. Trapping of pollutants by the Conowingo reservoir over the past 80+ years has benefited the water quality of the Bay, and it has also benefitted states to varying degrees by lessening load reduction responsibilities, but now those benefits are greatly diminished; and,

[7] See the "PSC Actions and Decisions" document posted on each PSC Meeting page. PSC Meeting Pages can be found: https://www.chesapeakebay.net/who/meetings-archive/principals_staff_committee
[8] Framework for the Conowingo Watershed Implementation Plan, January 2019

B. No reservoir maintenance to restore trapping capacity has occurred over the life of the dam and the reservoir is now near full capacity; and

C. The most cost-effective approach to mitigate current adverse water quality impacts, of the Conowingo reservoir in a state of dynamic equilibrium, are realized by pooling resources to pay for pollutant reduction practices in the most effective locations (i.e., the locations with the most influence on Bay water quality). Pollutant reduction practices placed in the most effective areas will limit the overall load reductions needed.

Geography of the Conowingo WIP

The basis for the Framework is targeting implementation in the most effective sub-basins of the watershed to achieve an additional reduction of six million pounds of nitrogen and 0.26 million pounds of phosphorus to mitigate the water quality impacts of Conowingo Reservoir infill on the Chesapeake Bay. The method used to identify the initial geographies focused on phosphorus and are consistent with those developed by the Partnership and applied as part of the original TMDL allocations in 2009. However, the Phase 6 Chesapeake Bay Watershed Model used the condition of dynamic equilibrium of the Conowingo and does not include nutrient loadings from Wastewater Treatment Plants. In general, the method to identify the most effective sub-basins considered transport of nutrients through the watershed into the tidal areas, then from the tidal areas to the Bay resulting in multiple watershed and estuary delivery factors affecting dissolved oxygen (DO) levels in the Bay. The most-effective basins are not necessarily the areas within the upland drainage of the Conowingo Dam, nor closest to the Chesapeake Bay given the effect of local watershed characteristics on travel time, to include the impact of dams and impoundments. Further delivery to the Bay from the estuary considers the Bay's circulation and bathymetry (depth), for example.

The geographic boundary for the CWIP is shown in Figure 2. This boundary is based on the analysis that identified the areas within the Susquehanna River basin that were most effective to improve the DO in the Chesapeake Bay. These include the major river basins segmented by geologic factors or geo-basins: Susquehanna, Western Shore, Eastern Shore (Upper, Middle, and Lower).

The identification of the most-effective sub-basins follows an evaluation of four options of varying geography using phosphorus as the focus of the load reductions and assuming the Conowingo Reservoir is in dynamic equilibrium[9]. These options did not factor in the provisions for Maryland's 401 Water Quality Certification for Conowingo.

[9] Framework for the Conowingo Watershed Implementation Plan, January 2019

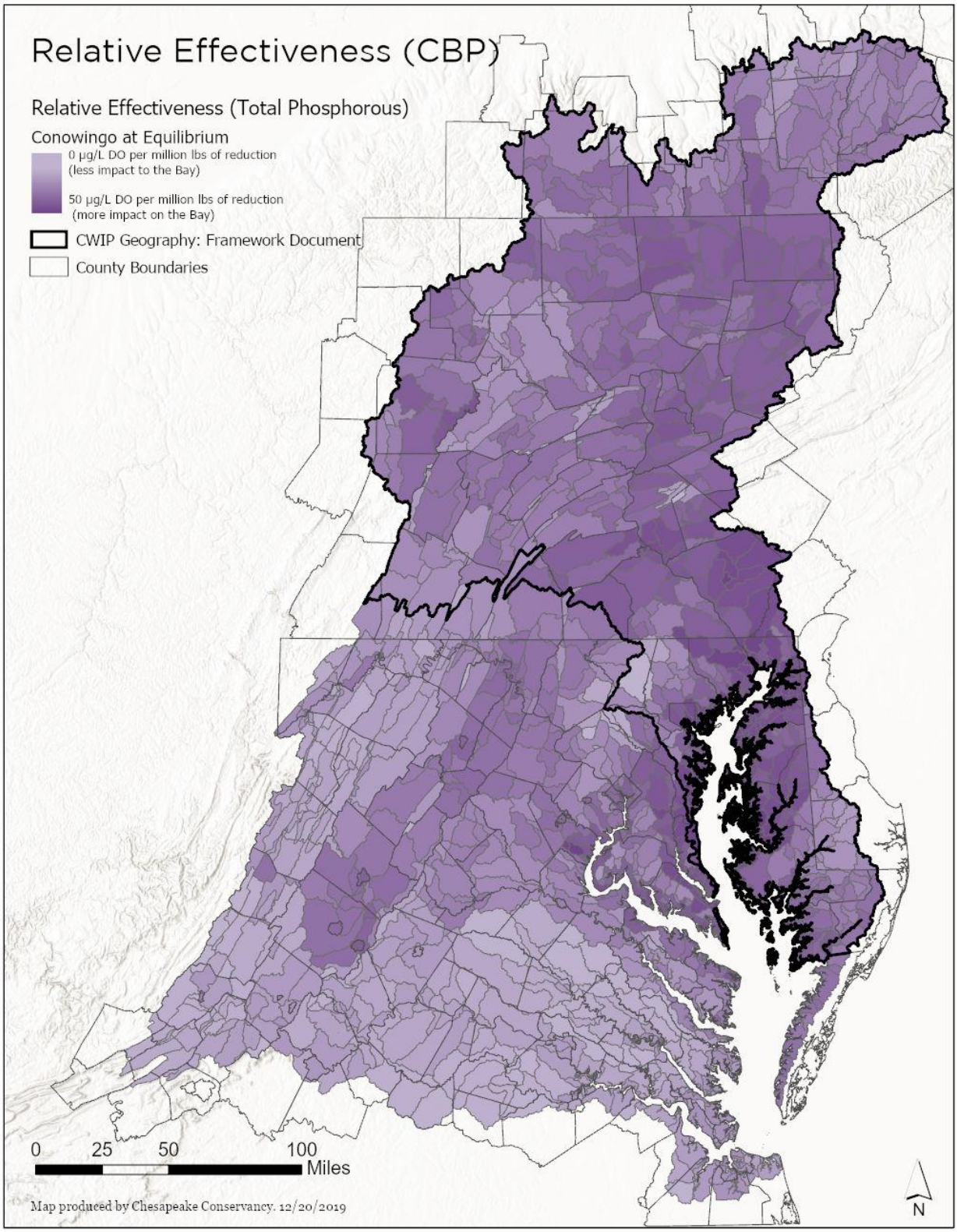

Figure 2. The geographical extent of the CWIP and the most effective basins in the Chesapeake Bay Watershed.

Roles and Responsibilities

The CWIP was developed through the guidance and recommendations of a Steering Committee, a subcommittee of the PSC. This committee is composed of a representative from each Bay jurisdiction and the Chesapeake Bay Commission (CBC). The membership of this committee is provided in Appendix A. EPA does not participate on this committee due to its oversight role as part of the Bay TMDL accountability framework. The decisions of the committee follow a list of guiding principles[10].

The roles and responsibilities of the EPA, Steering Committee, PSC and third-party contractors as it pertains to the development and implementation of the CWIP are summarized below.

EPA will:

a. Evaluate the CWIP and provide biennial evaluations of the progress toward attaining the goals in the CWIP. EPA's evaluations, in consultation with the PSC, and any needed improvement will be used to determine if corrections or adjustments are necessary to attain the goals of the CWIP (e.g., whether the targets need to be re-evaluated or assigned to specific jurisdictions).
b. Provide technical staff and contractor support such as modeling or GIS analysis to the CWIP Steering Committee.

The Steering Committee will:

a. Consist of a representative from each jurisdiction and the CBC. Each Bay jurisdiction and the CBC may also solicit comments on the CWIP framework from key stakeholders.
b. Develop the CWIP with EPA staff and contractor support.
c. Guide the development of a financing strategy and implementation of the CWIP, working with the third party.

The PSC will:

a. Approve the final draft CWIP for submittal to EPA and the Partnership for review and comment.
b. Approve the final CWIP before posting on the CBP Partnership website in June 2020.

Guiding Principles

Fairness Principle: Strive for fairness, equity, and feasibility among state, local, and federal and other partners participating in the CWIP regarding level of effort, financing, tracking, resource sharing, and third -party access.

Governance Principle: Operate as an Action Team as defined in the document "Governance and Management Framework for the Chesapeake Bay Program Partnership". Strive for consensus using the Chesapeake Bay Program Partnership Consensus Continuum as described in the document. When consensus cannot be reached, the issue will be deferred to the PSC with a summary of the issue and the different options and opinions expressed by the members.

Consistency Principle: Ensure consistency with the EPA Phase 3 WIP expectations and CWIP framework documents.

Transparency Principle: Establish clear tracking, accountability and verification consistent with expectations for jurisdictions and to transparently demonstrate which practices are planned for, implemented and maintained in the CWIP vs state WIPs in order to avoid double-counting.

Efficiency in Innovation Principle: Implement the CWIP building on existing, successful programs, as much as is feasible, to avoid creating duplicative bureaucracies. At the same time, strive for innovation, leverage new technologies, and, where appropriate, develop new implementation approaches.

[10] Appendix A in "Framework for the Conowingo Watershed Implementation Plan", January 2019

c. Review the progress of the CWIP Steering Committee in the development and implementation of the CWIP on a regular basis.

Third Party Contractor, herein referred to as the CWIP Implementation Management Team will:

a. Work with the Steering Committee to establish a timeline to implement the CWIP.

b. Develop draft and final CWIP documents, to include two-year milestones, that will articulate the programmatic, implementation and numeric commitments to achieve the necessary load reductions due to the Conowingo Dam infill.

c. Document approaches and strategies to select and implement best management practices to cost-effectively and efficiently achieve the necessary load reductions and create a BMP Opportunity Blueprint that identifies catchment-scale prioritization of high-priority opportunities for the load reductions.

d. Facilitate the implementation of projects funded specifically in pursuit of CWIP goals or as identified through the financing framework.

e. Develop and implement tracking and reporting protocols and tools to readily track and verify creditable practices for the CWIP.

f. Work with the States to develop and implement engagement strategies with local communities in the priority geographies to advise the Steering Committee on locally relevant and actionable load reduction strategies.

g. Develop a draft and final financial strategy and establish a financing authority (or act as a fund manager) that will ultimately provide the administrative and financial resources to implement load reduction strategies.

The CWIP Implementation Management Team is currently divided into three EPA contracted activities:

Activity #1: Develop and implement the CWIP (Center for Watershed Protection & Chesapeake Conservancy)
Activity #2: Develop a Conowingo implementation financing strategy (Chesapeake Bay Trust)
Activity #3: Track/ verify progress made in the implementation of the CWIP and report to EPA on an annual basis (Chesapeake Conservancy)

Accounting for the Impacts of Climate Change

According to the Partnership, the CWIP will be assigned additional load reductions due to the impacts of climate change. Modeling efforts estimate that across the Bay watershed an additional 9 million pounds of nitrogen and 0.5 million pounds of phosphorus reductions are needed to offset the effects of climate change by 2025. Recognizing these additional loads will impede the progress to improve the health of the Bay, the PSC agreed to a three-part approach for addressing climate change impacts in the Phase III

WIPs and future two-year milestones. These are also applicable to the CWIP. The approach included the following commitments:

1. Incorporate climate change in the WIPs by including a narrative strategy that describes the state and local jurisdictions' current action plans and strategies to address climate change.
2. Understand the science 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.
3. Incorporating Climate Change into Two-year Milestones by no later than 2022-2023, starting to account for additional nutrient and sediment pollutant loads due to 2025 climate change, determining how climate change will impact the BMPs included in the WIPs and address these vulnerabilities. The PSC also acknowledged that jurisdictions could address additional nutrient and sediment pollutant loads due to 2025 climate change in the WIPs.

At such time the additional loads are assigned, the two-year milestone periods will be used to adjust the scale and scope of the load reduction strategies. Following the Framework, a similar process will be put into place using the most effective basins to identify additional locations or expand existing priority geographies that have capacity for implementation. An expanded list of creditable and reportable BMPs may be considered that provide an effective means to mitigate the effects of climate change.

The CWIP was developed, in part, to focus resources to an initial set of priority practices including riparian buffers, cover crops, and wetlands that also provide co-benefits that may help reduce the vulnerability of communities to the effects of climate change, making communities more resilient, and providing vital habitat corridors for the migration of biota.

Key features and processes of these land-based priority BMPs provide enhanced storage capacity for flood mitigation of more intense and larger precipitation events and reduce emissions of greenhouse gases through carbon sequestration. Focusing CWIP resources and funding to these practices in priority watersheds may stimulate the development of versatile designs that provide multiple benefits to local communities.

As project implementation moves forward, two-year milestones and investment decisions on individual projects will be refined using the most up to date and available climate modeling data and assessment framework. The CWIP will function in concert with the overall Chesapeake Bay WIPs, which allows CWIP Implementation to adjust to the impacts of climate change as the science evolves and advances.

Accounting for the Impacts of Growth

The geography of the CWIP extends across both local and state political lines. As a result, there is not an organized entity responsible for growth management. The priority geographies represent an aggregation of land-river segments within portions of counties in Pennsylvania and Maryland.

Consequently, it is expected that the change in load reductions due to growth will be accounted for through the Phase III WIPs accounting process as defined by the State-specific WIP.

Priority Geographies (Areas for Implementation)

There are six priority geographies recommended in Pennsylvania and three in Maryland based on their ranking as a most effective basin following the analysis described in the Framework, the perceived capacity to implement load reduction strategies, and the amount of regulated land (Figure 3). The priority geographies were agreed upon by the Steering Committee and PSC based on State-specific input. Capacity is defined as the opportunities available for implementation, existing knowledge of the capacity of local communities and state agencies to implement strategies and their support to reduce targeted pollutant loads. The opportunities available for implementation were determined based on a two-step process by the CWIP Implementation Management Team. Results of a CAST analysis comparing the "E3" and "Phase III WIP" nitrogen load reductions were used to develop a coarse BMP opportunity analysis.

While it is recognized that York and Lancaster counties in Pennsylvania provide the greatest contributions to nutrient and sediment loads within the Susquehanna River Basin, these counties are designated by Pennsylvania as priority areas to achieve load reductions towards Pennsylvania's Phase IIII WIP load reductions, providing less opportunity for additional implementation strategies targeting the Conowingo nutrient and sediment load reductions. In Maryland some watersheds on the Western Shore also provide significant nitrogen loads however due to the amount of regulated land, primarily due the NPDES MS4 program, there are less opportunities for additional cost-effective implementation strategies. However, by identifying priority watersheds with-in the most effective basins, but away from local and state jurisdictional priorities, implementation can advance more rapidly than in watersheds that currently have a lower priority status or lack the resources of larger, regulated communities.

This approach will continue to be evaluated as part of future CWIP milestones with reports on progress to determine if priority geographies could be expanded, or new priority areas identified. Especially, if it was determined that cost-effective opportunities are not being implemented as part of the Chesapeake Bay WIP.

The following aggregation of the land-river segments with the greatest opportunities for nitrogen load reductions are shown in Table 1.

Table 1. Recommended location of priority geographies and their justification for the CWIP.			
PENNSYLVANIA		*MARYLAND*	
1. Luzerne County	Geographically isolated from other priority land-river segments.	1. Top of the Bay Eastern Shore: Harford and Cecil counties	Maryland Portion of Susquehanna River Watershed
2. Confluence (portions of Lycoming, Northumberland, Montour, Union, Snyder Counties)	Adjacent land-river segments. Potential to tap into existing coordinated efforts including the Northcentral Stream Restoration Partnership and the Conservation Union.	2. Mid-Eastern Shore: Kent and Queen Anne's counties	Nitrogen loading rates similar to Conowingo; limited regulated land.
3. Central (portions of Clinton, Centre, Mifflin Counties)	Adjacent land-river segments. Potential to tap into existing coordinated efforts including the Precision Conservation Partnership.	3. Lower Eastern Shore. Caroline, Talbot, Dorchester, Wicomico and Somerset counties	
4. Western (Blair, Bedford Counties)	Adjacent land-rive segments.		
5. Cumberland County	Geographically isolated from other priority land-river segments.		
6. Lebanon County	Geographically isolated from other priority land-river segments		

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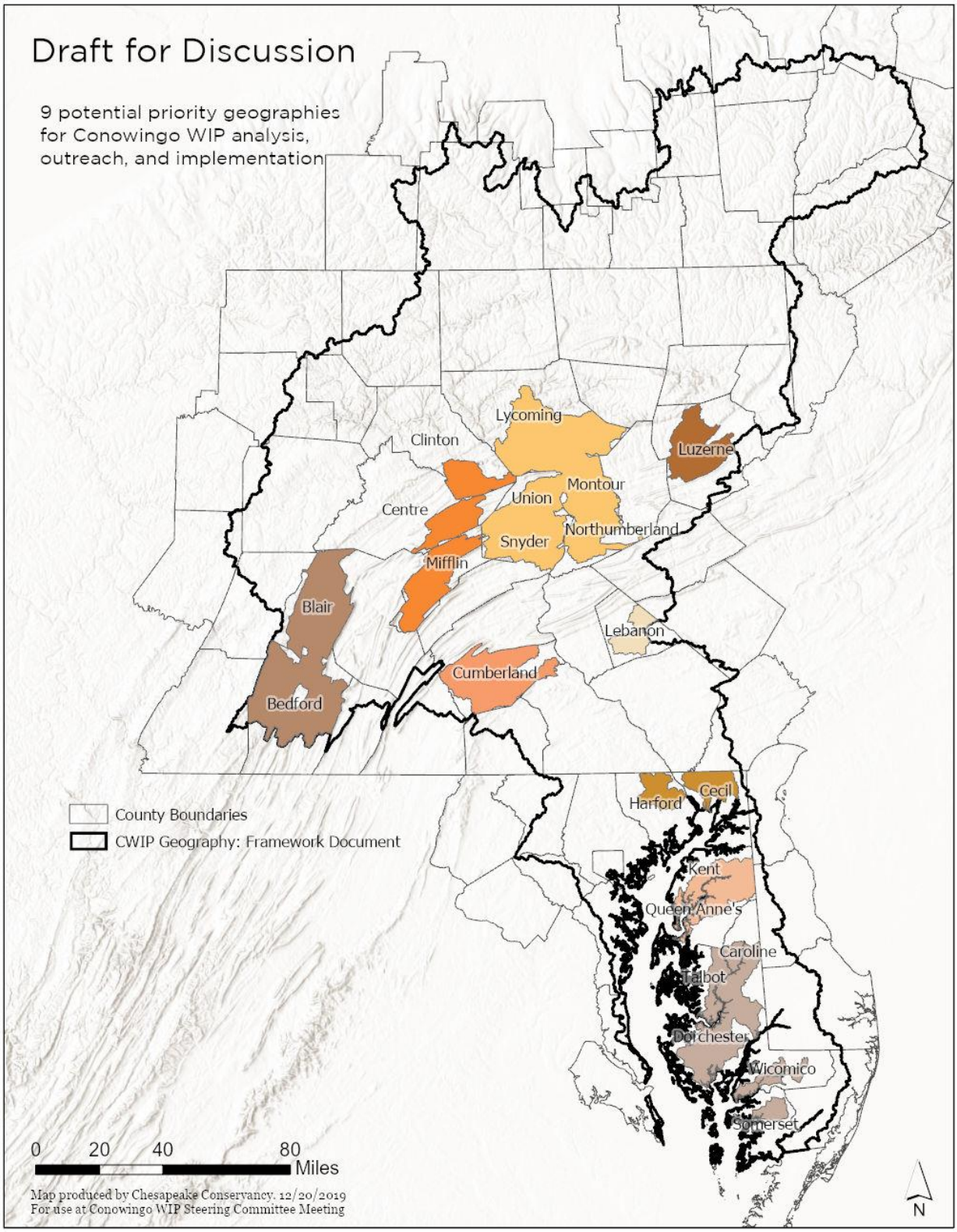

Figure 3. Nine (9) priority geographies for the CWIP differentiated by color.

Comprehensive Local, Regional, and Federal Engagement Strategies and Commitments

Consistent with the Framework for the CWIP, the engagement strategy adopts a Bay-wide effort to ensure that additional nutrient and sediment load reductions needed to achieve a healthy Chesapeake Bay is achieved. The CWIP does not require the development of plans specific to local or priority geographies, rather an aggregation of targeted, priority implementation of practices, that together will achieve the necessary load reductions. While the implementation of load reduction strategies, to include BMPs and other measures, focus on targeted geographic locations, the success of the WIP requires participation from all six States and the District of Columbia to ensure accountability that all actions needed are taken within the agreed upon timeline, and consistent with the guiding principles. The engagement strategy will be carried out in concert with the Partnership and state governments and will engage with federal agencies, regional and local governments, quasi- and non-governmental organizations, private sector for-profits, and individual citizens. Overall the strategies identified in this WIP build upon the efforts by the states to develop the state-specific Phase III WIPs. This ensures consistency in messaging and efficiency in the delivery of important communications to a variety of stakeholders.

There are four phases for local and regional stakeholder outreach developed by the CWIP Implementation Management Team. Consistent with the adaptive management approach, there will be a review and evaluation of the strategies and their effectiveness to achieve the desired level of engagement with the completion of each phase.

- Phase 1 (2019-2020): Planning phase for stakeholder outreach and development of general materials and focus on soliciting input on draft CWIP.

- Phase 2 (2020 – 2021): Outreach will focus on delivering the WIP, collecting data on specific projects that will be implemented to achieve the two-year milestones and provide training to local stakeholders on the data tools produced as part of the CWIP to support project planning for implementation.

- Phases 3 – 4 (2021 – 2025): These phases include Years 3 through 6 where outreach will focus on reconvening stakeholders twice per year to review and evaluate progress and make recommendations on the next two-year milestones. The development of additional training and guidance documents may be pursued based on feedback from stakeholders to include the Steering Committee.

Federal and Partnership engagement will be achieved through the continuation of the CWIP Steering Committee. The success of CWIP implementation will require continuous input from Steering Committee members to assist determining potential adaptive management strategies and adjust strategies to reflect future changes in standards, policy, and Phase III WIP strategies. Steering Committee meetings may occur quarterly or monthly based on the needs of the CWIP.

A draft of Frequently Asked Questions (FAQ) document has been completed and provided in Appendix B. A webinar is planned in the July – December timeframe following the adoption of the CWIP in June, 2020.

Engagement and Communication Goals

The success of the CWIP requires fulfillment of the EPA expectation for all WIPs to include a comprehensive strategy to engage local, regional and federal partners in WIP implementation. The measures taken to adopt and implement nutrient load reduction strategies need to be representative of the available local capacity and technical and financial resources to achieve the desired outcomes. This requires broad-based local community support that is guided and coordinated by State agencies. As such, a central goal of the CWIP is to sustain communication and engagement of federal, state and local stakeholders involved in the development phase through-out its implementation. This will include both the public and private sector.

A second goal is to effectively communicate and provide timely information about financing options to implement nutrient reducing strategies.

A third goal is to develop broad-based support for implementation by addressing the needs and capacity of specific sectors, communities and organizations that are directly involved in implementation, tracking, and reporting.

Currently, outreach strategies are developed in priority geographies of Pennsylvania and Maryland.

Strategies

Pennsylvania

PA DEP developed a phased approach to implement the Phase III WIP through their Countywide Action Plans or CAPs. The CAPs assign each of the 43 counties into one of four tiers (Tier 1 – 4), where each tier is responsible for 25% of the pollutant load reduction for the Phase III WIP. Four counties (Lancaster, York, Franklin and Adams) participated in a pilot CAP process with completed plans in 2019. The engagement strategy for the Pennsylvania portion of the CWIP works to align development of the CAPs for the Phase III with the CWIP (Figure 4)(Table 2). The ongoing CAP process allows the CWIP Implementation Management Team to interact directly with local stakeholders and state agency staff in the development of integrated strategies. The six priority geographies in Pennsylvania will provide flexibility to accommodate implementation of practices through the CAP process.

Implementation efforts in the Tier 1 counties of Lancaster, York, and the Tier 3 county of Adams are designated by PA DEP to largely meet the Chesapeake Bay TMDL and therefore additional capacity for the CWIP in these three counties is expected to be limited at this time. Therefore, the CWIP is focusing engagement and implementation efforts in Pennsylvania to Tier 2, 3 and 4 counties. This will allow the CWIP Implementation Management Team to integrate the engagement strategy into the Phase III WIP strategy creating efficiencies for all participates ensuring consistent communication and fostering collaboration. Together the CWIP and PA DEP will use the two-year milestone process to improve the

alignment of the Tier 3 and Tier 4 Action Plans with the CWIP timeline in the identified priority geographies(Table 3).

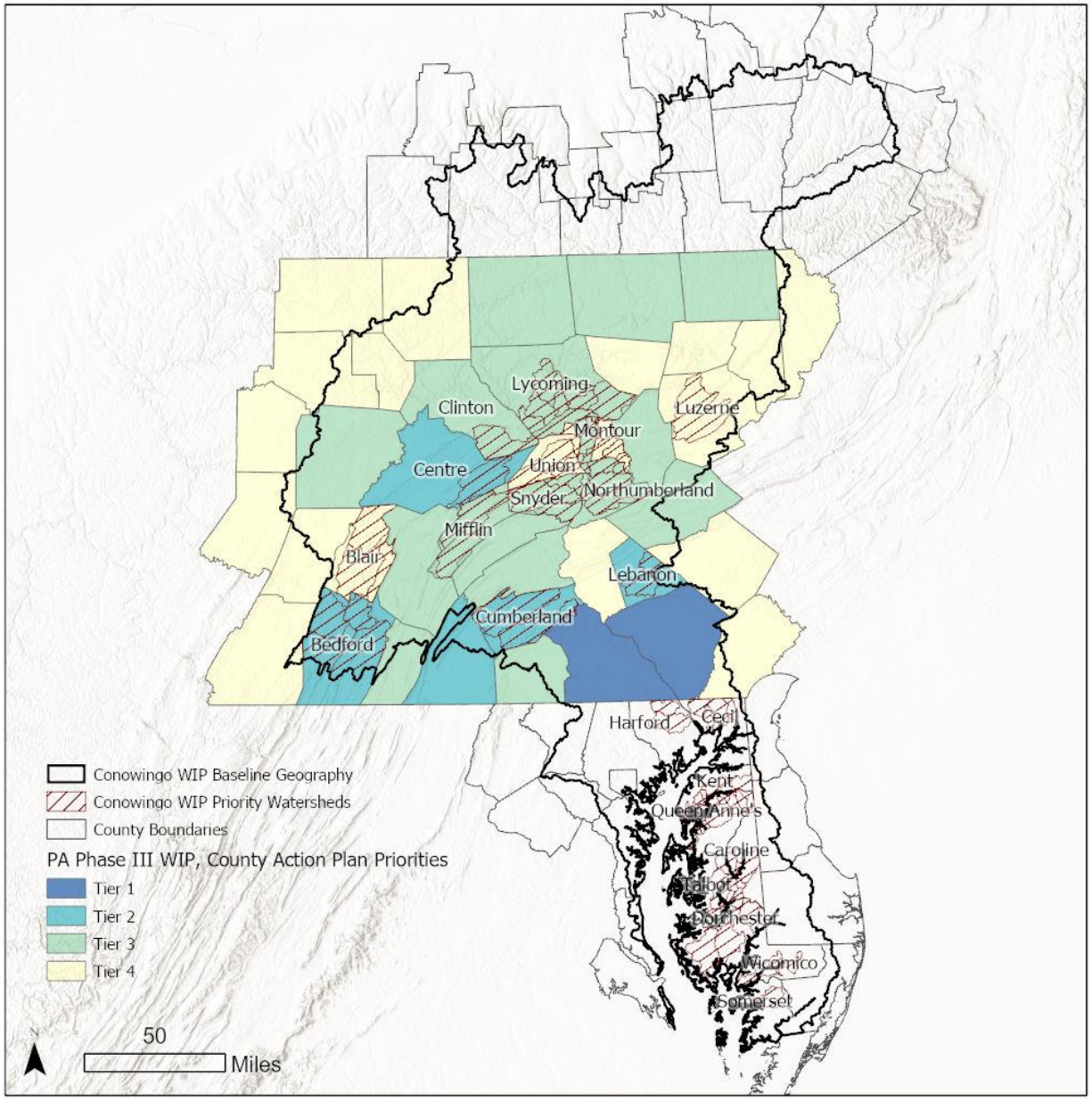

Figure 4. An overlay of the CWIP priority geographies in Pennsylvania with the tiers associated with the CAPs.

Table 2. Pennsylvania counties and their Tiers for CAPs. (the bold typeface indicates the counties within or a part of CWIP priority geography).

Tier 1	Tier 2	Tier 3		Tier 4	
Lancaster	Franklin	Adams	Schuylkill	**Union**	Potter
York	**Lebanon**	**Northumberland**	Bradford	Chester	Somerset
	Cumberland	Perry	Juniata	Dauphin	Wyoming
	Center	**Snyder**	**Clinton**	Berks	Elk
	Bedford	Huntingdon	Tioga	**Blair**	Indiana
		Columbia	Susquehanna	Lackawanna	Cameron
		Mifflin	Clearfield	**Luzerne**	Wayne
		Lycoming	Fulton	**Montour**	Mckean
				Cambria	Jefferson
				Sullivan	Carbon

Table 3. PA DEP Proposed Draft Alignment of CAP development and CWIP in Priority Geographies and the Chesapeake Bay Program Two-year Milestones. (The milestone periods are based on July 1 – June 30).

Two-Year Milestone Period	Initial Schedule for CAP Development	Proposed
2018-2020	July 2019: Centre, Bedford, Cumberland, Lebanon February 2020: Blair, Northumberland/Montour April 2020: Lycoming, Union/Snyder June 2020L Luzerne	Jan/Feb 2020: Center, Bedford, Cumberland, Lebanon
2020-2022		Late Fall 2020: Blair, Northumberland/ Montour, Lycoming, Union/Snyder, Luzerne

Audience (for stakeholder engagement workshops)

Currently three counties identified as CWIP priorities are scheduled to begin County Action Planning efforts in January 2020: Centre, Lebanon, and Cumberland. Table 4 provides a preliminary list of potential collaborative efforts in the identified counties. This information will assist the CWIP Implementation Management Team identify how outreach can be integrated into the CAPs planning process as well as existing regional collaboratives. These organizations were identified in the PA DEP local area goals document. Meetings with these organizations are planned in January through February 2020 to further discuss the CWIP and their potential capacity and role in its development and implementation.

Table 4. Local and regional outreach efforts to facilitate CWIP engagement.

Geography #	Counties	PA DEP priority for WIP outreach	PA DEP ideas for WIP leads per Local Area Goals Doc dated December 2018	Existing Collaborative Efforts
1	Luzerne	Tier 4		
2	Lycoming	Tier 3	DEP/SRBC, North Central Regional Office, Penn State	Northcentral Stream Restoration Partnership
	Northumberland	Tier 3	DEP/SRBC North Central Regional Office, Heartland Coalition, Local Planning Leaders	
	Montour	Tier 4	DEP/SRBC North Central Regional Office, Heartland Coalition, Local Planning Leaders	
	Union	Tier 4	Heartland Coalition, Chesapeake Conservancy, DEP/SRBC	
	Snyder	Tier 3	Heartland Coalition, Chesapeake Conservancy, DEP/SRBC	
3	Clinton	Tier 4	DEP/SRBC, North Central Regional Office, Penn State	Precision Conservation Partnership
	Centre	**Tier 2**	DEP/SRBC, North Central Regional Office, Penn State	
	Mifflin	Tier 3		
4	Blair	Tier 4		Blair County Stormwater Consortium
	Bradford	Tier 4	North Central Regional Office, DEP, SRBC	
5	**Cumberland**	**Tier 2**	DEP/SRBC	County Action Planning
6	**Lebanon**	**Tier 2**	DEP/SRBC	County Action Planning

Communications

CWIP Implementation Management Team members will join DEP staff at County Action Plan meetings beginning in January 2020 to discuss the complementarity of CWIP with Phase 3 Chesapeake Bay WIP. County Action Planning will continue in the remaining geographies beyond the delivery of the final CWIP; therefore, the CWIP Implementation Management Team will work with DEP to conduct outreach to the remaining CWIP priority geographies during the March-May CWIP public comment period.

Timeframe

CWIP Implementation Management Team members will join DEP staff at CAP meetings beginning in January 2020 to discuss the complementarity of CWIP with Phase 3 Chesapeake Bay WIP. County Action Planning in the remaining geographies will begin after the delivery of final CWIP; therefore, CWIP Implementation Management Team will work with DEP to conduct outreach to the remaining CWIP priority geographies during the March-May CWIP public comment period.

Tier 2 Counties

January 2020- April 2020 – The CWIP Implementation Management Team will integrate outreach to Tier 2 Counties through the County Action Planning process by coordinating with PA DEP and participating in County Action Plan meetings and phone calls with Action Plan coordinators/Leaders. These Tier 2 counties include Lebanon, Cumberland, Center and Bedford.

Tier 3 and 4 Counties

February 2020- May 2020 - CWIP Implementation Management Team outreach to Tier 3 and 4 counties who are not currently going through the County Action Planning process with PA DEP but are scheduled to go through that process in the near future. The outreach will focus on providing the stakeholders with an understanding of how the CWIP is structured and how the development of CWIP two-year milestones will integrate with the County Action Plan process. Outreach in these locations will include participating in regional partnership meetings as well as phone calls and in-person meetings with key stakeholders. These counties include Luzerne, Blair, Clinton, Mifflin, Lycoming, Northumberland, Montour, Union, Snyder

Maryland

A Maryland specific outreach strategy has been developed in recognition that Maryland is not currently going through a County Action planning process and has completed county-based strategies as part of the Maryland Phase III WIP. Instead, the outreach strategy for the priority geographies in Maryland has been modified to follow a process similar to the strategy developed for the Phase III WIPs. The primary stakeholders identified for Maryland WIP and CWIP engagement strategies are the same and includes organizations that have a central role in project implementation. The organizations include county, municipal, federal and soil conservation district staff associated with source-sector specific organizations to include stormwater, agriculture, wastewater and septic and federal facilities.

Audience (for stakeholder engagement workshops)

Emphasis will be placed on reaching out to targeted groups currently working on and/or familiar with local WIP implementation. This should include Soil and Water Conservation Districts, municipal and county-based staff, key state agency reps and land managers including local MD Department of

Agriculture and Department of Natural Resources, those providing funds for WIP-related projects, and local watershed groups working on local WIP committees or doing WIP projects.

Although the meetings will be "open" the goal is to get feedback from those familiar with WIPs related to the draft CWIP strategy.

Communications

The CWIP Implementation Management Team members will utilize its *Constant Contact* database it developed during the Phase III WIP process to send out initial workshop notices and can include the ability for respondents to ask questions that can be passed along to the CWIP Implementation Management Team.

Three meeting locations in Maryland will be identified based on the priority geographies to convene the Stakeholder Engagement Workshops. The timeline for Year 1 is summarized below.

December 2019 – June 2020

During this timeframe outreach will focus on identifying project opportunities to reduce loads associated with the CWIP

December 2019-January 2020: Front-load ***Constant Contact*** email addresses.
January: Select three locations for Maryland Stakeholder Engagement Workshops based on Most Effective Basins.
February: Send out workshop notices and open registration.
March thru May: Hold three workshops in Maryland.
March thru June: Provide workshop feedback to the CWIP Management Implementation Team in other related Activities.

July 2020-June 2021

Upon finalizing the CWIP and draft two-year milestones, outreach will focus on delivering the CWIP and collecting data on specific projects that will be implemented to achieve the two-year milestones.

July /August- Conduct a webinar to share the Final WIP.
October-December 2020- In-person regional engagement meetings with to solicit input on two-year milestones due January 2021.
February 2021- Roll out of the BMP opportunity blueprint with support to local stakeholders on the data tools produced to support planning of projects to implement the WIP.

Years 3 - 6

Provide technical assistance to local stakeholders to support implementation and reporting of projects toward meeting the two-year milestones by providing access to partner-led and external training opportunities

Reconvene local stakeholders in eight communities at the conclusion of each two-year milestone deadline to evaluate progress and make recommendations on the next set of two-year milestones.

Targeted Implementation

The BMPs considered for targeted implementation for the CWIP were among a list of the most cost-effective BMPs developed during the planning phases of the WIP. The following BMPs considered in this initial analysis were selected as they are accepted BMPs by the Partnership and can be mapped. This initial evaluation will quantify the capacity of these BMPs, combined with local stakeholder engagement, to achieve the required load reductions given the CWIP time constraints. The initial four BMPs include: forest buffer restoration opportunities, cover crop opportunities, wetland restoration opportunities, urban BMP opportunities. The BMP opportunities analysis included the identification of areas within the priority geographies where there is: 1) suitable watershed and land cover characteristics to implement the four BMPs within the land-river segments (LRS); 2) area within a specific landscape for the BMPs to have the greatest corresponding load reductions in the Chesapeake Bay and 3) additional opportunities for nitrogen load reductions over and above the jurisdictions' Phase IIII WIP goals. The data sources and methods used to derive the BMP opportunities are included in Appendix C.

Figures 5 - 8 illustrate the extent to which these four BMPs may be implemented in the priority geographies with corresponding load reductions shown in Table 6 based on preliminary CAST analyses.

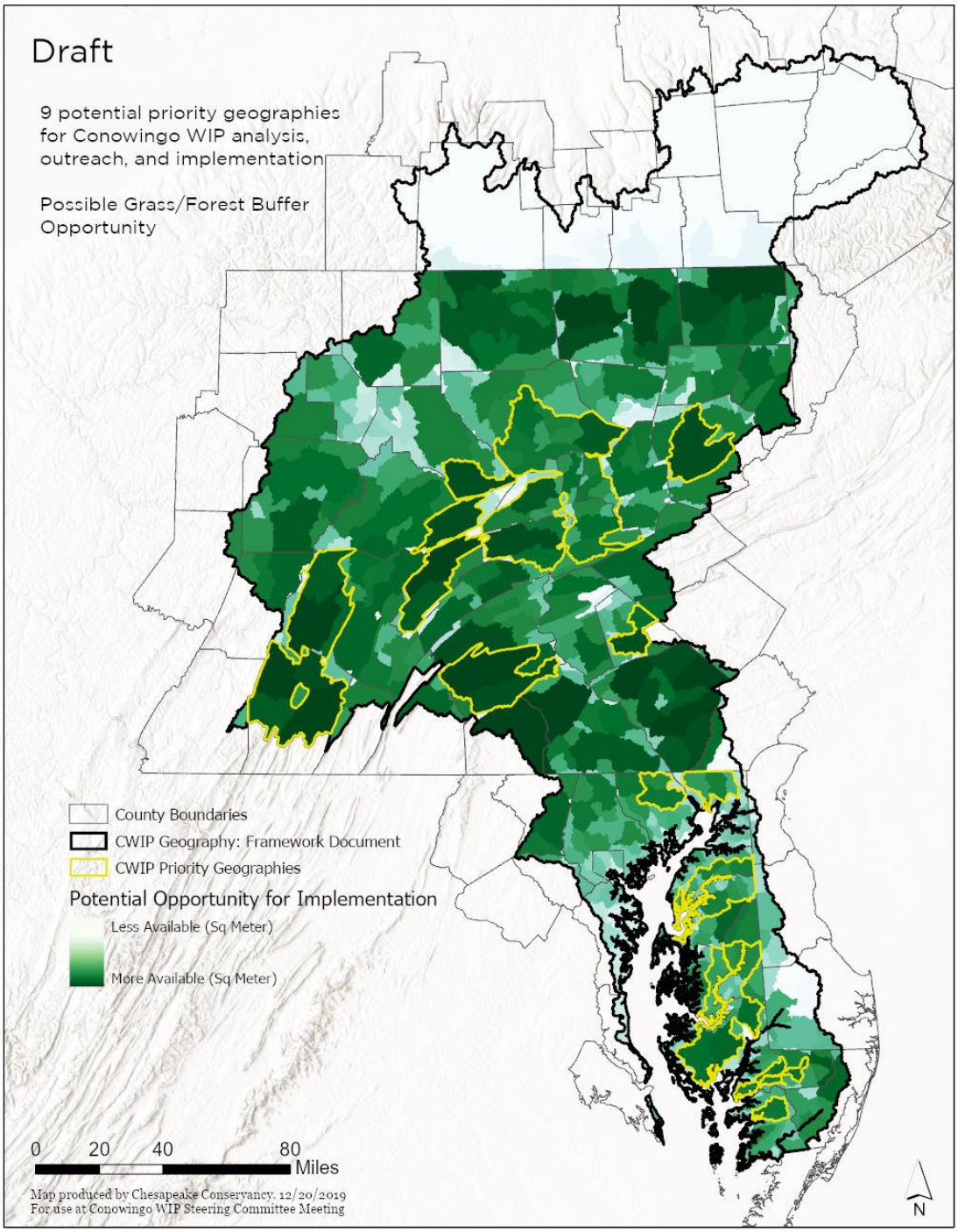

Figure 5. Opportunity to implement grass/forest buffers in the priority geographies.

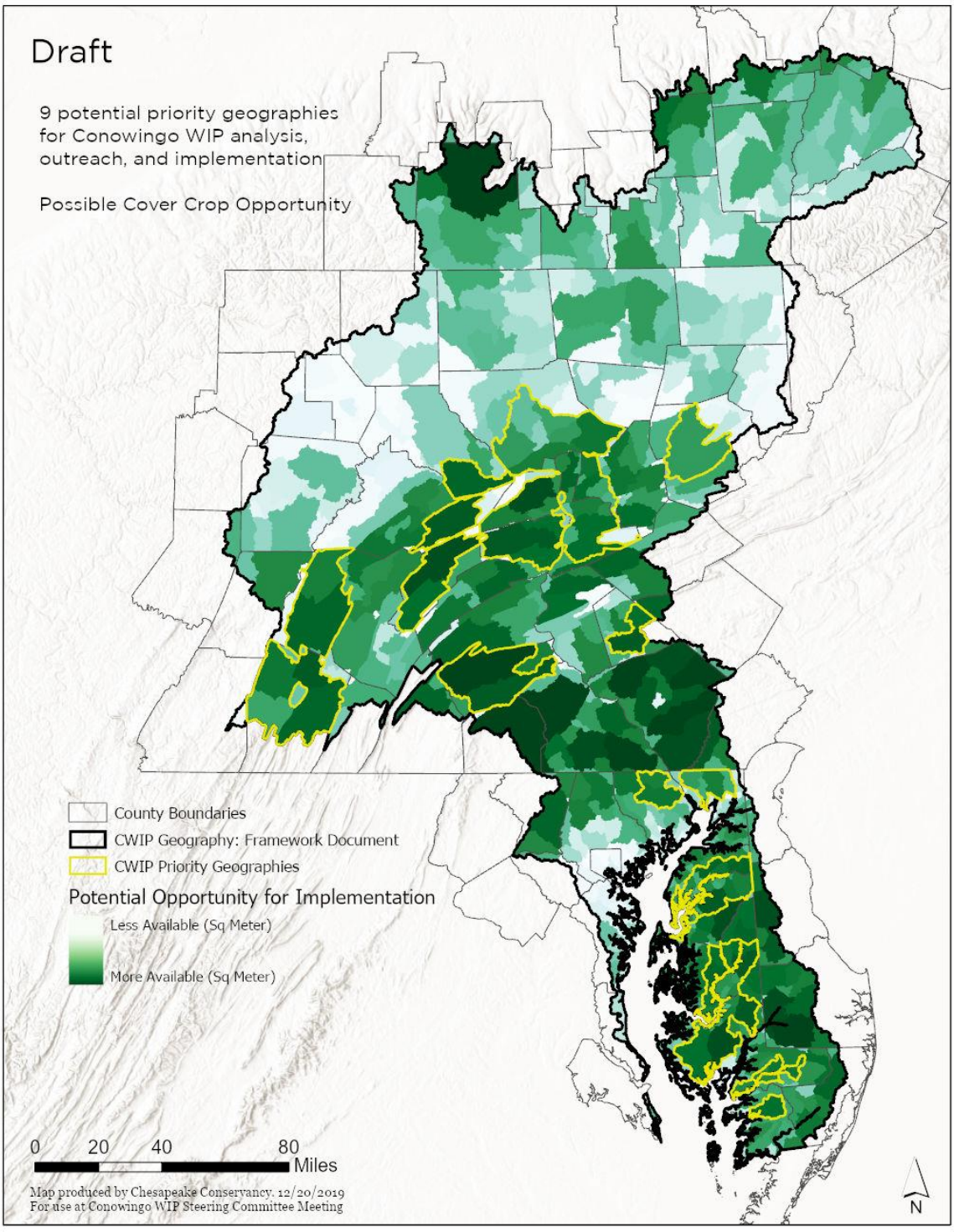

Figure 6.Opportunity to implement cover crops in the priority geographies.

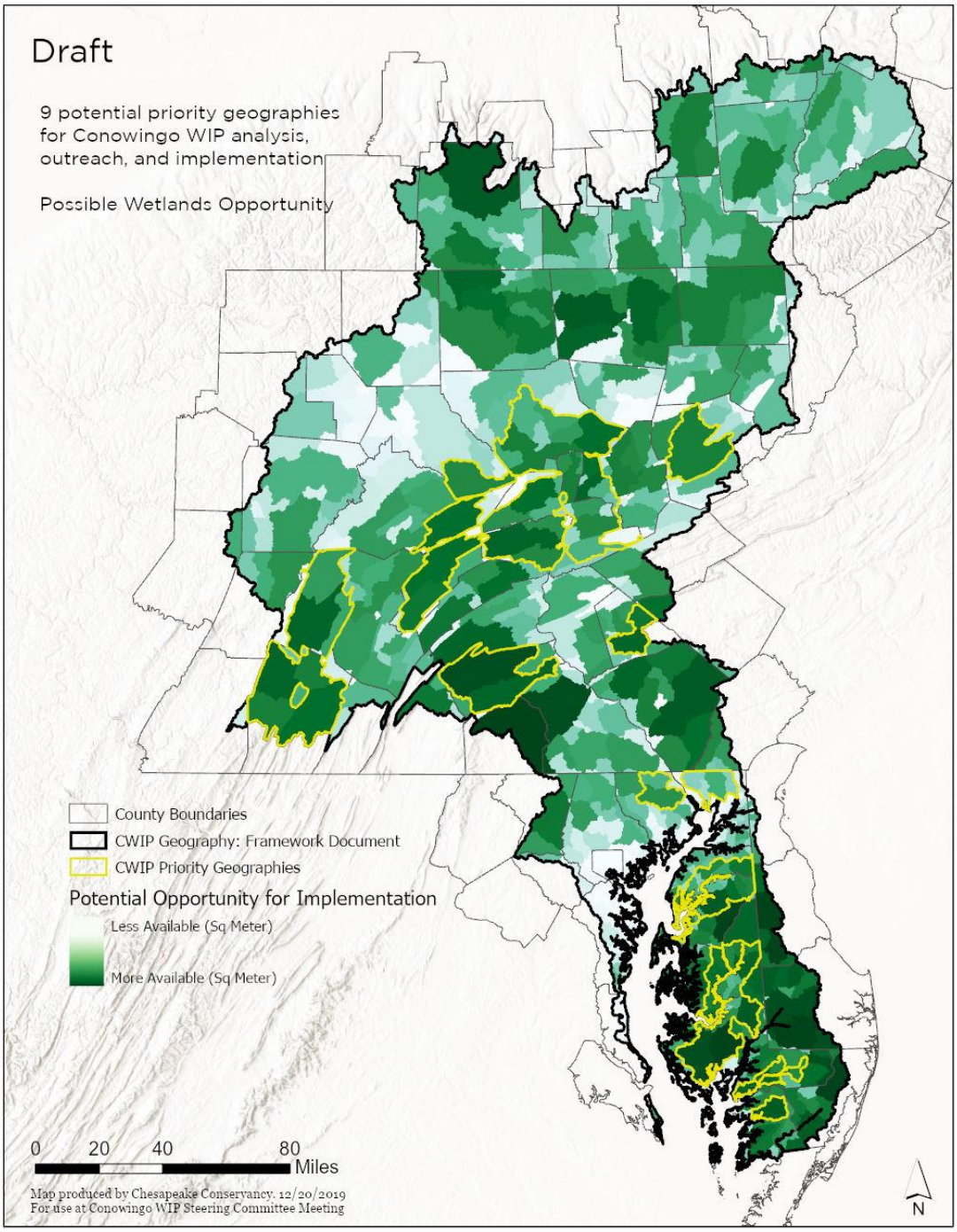

Figure 7. Opportunity to implement wetland restoration in the priority geographies.

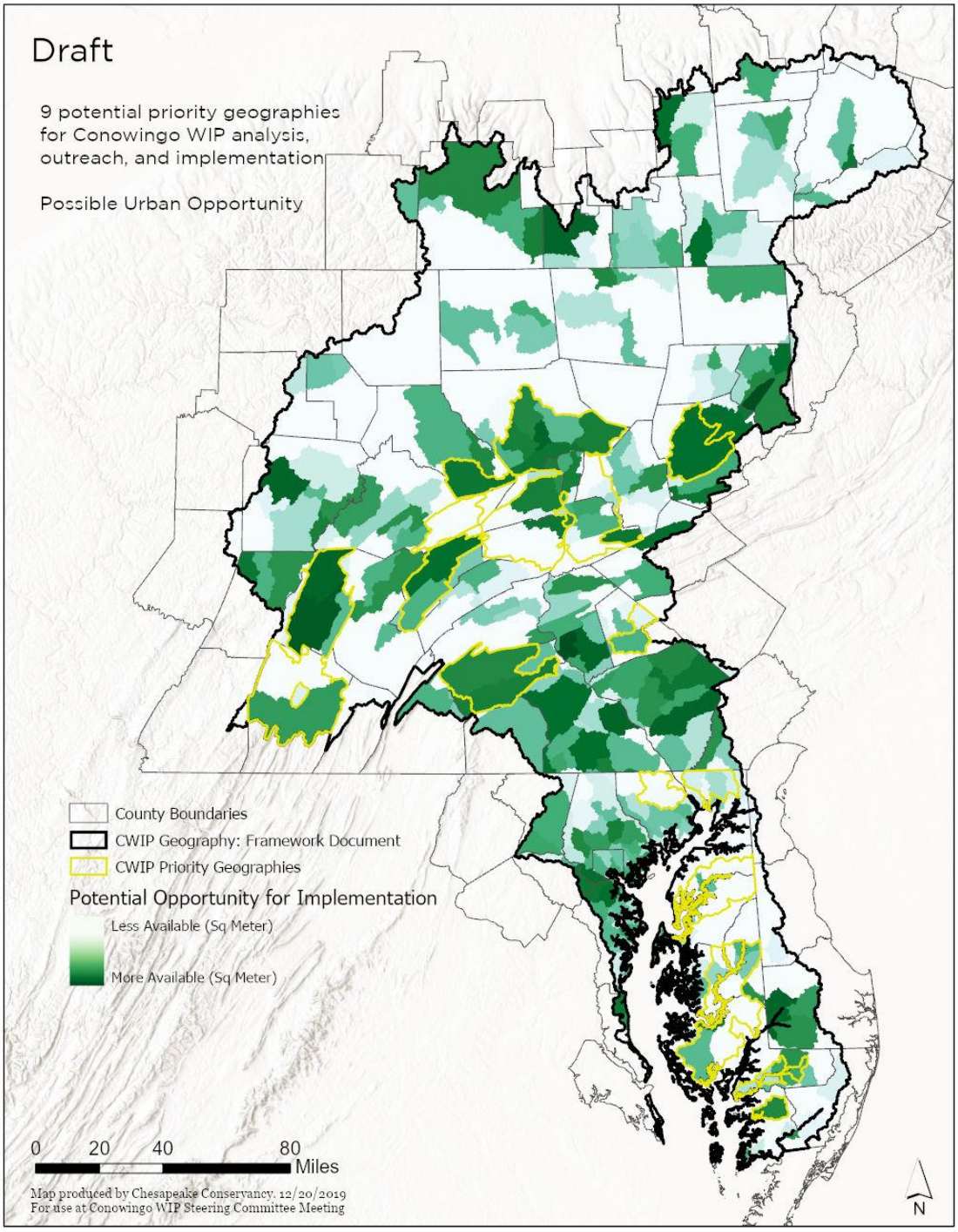

Figure 8. Opportunity to implement urban stormwater BMPs in the priority geographies.

Programmatic and Numeric Implementation Commitments

Approach

Implementation of the CWIP requires a flexible approach that dovetails and supports Chesapeake Bay State-specific WIPs but does not duplicate or double count efforts. As a result, implementation is likely to take place on private property throughout the priority and potentially the broader "most effective basins" geographic framework. To accomplish implementation at the scale and timeframe needed, the CWIP will use Pay for Performance (PFP) contract mechanism. This approach creates the ability to tie financing directly to the nitrogen reduction outcomes; will make investing in these projects more efficient; and allow access to a more diverse and growing set of investors seeking to align financial returns with environmental and social ones.

The CWIP focuses private sector resources and stakeholders on the end goals of water quality and other co-benefits—rather than identifying specific project sites and designs. The CWIP also signals to the private sector and stakeholders which watersheds and implementation practices are likely to receive priority funding -- motivating them to create and implement cost-effective solutions that achieve the maximum nitrogen load reductions and additional co-benefits. The targeting analysis uses CAST to assure there are ample opportunities for a PPF contract to meet required load reductions.

This approach harnesses the local knowledge of resource professionals, landowners, with capital from public and private investors creating incentives for scalable solutions designed to reduce nitrogen loads the Bay. This approach also creates flexibility in project implementation allowing the potential for investments to occur in non-priority watersheds--still located within the WIP most effective basins" shell or innovative practices that can provide, quantifiable, trackable, and verifiable nitrogen load reductions. Thus, the opportunity for financial gain motivates an industry of professionals to identify and secure high priority project opportunities on private lands.

Pay for Performance (PFP) Implementation

The RFP approach is an established contractual relationship between investors (private sector) and a designated authority/entity as defined in the Financial Strategy. This may be a jurisdiction of the priority geographies, for example or some other entity. The PFP approach lessens the financial burden of public funds as Investors implement practices to achieve measurable CWIP outcomes that are most cost-effective and dovetail with the Chesapeake Bay load reduction outcomes. The payment terms for these contracts will be tied directly to the CWIP nitrogen load reduction goals and focus primarily on the reduction of pounds of nitrogen delivered to the Chesapeake Bay. Focusing investment to priority geographies offers opportunities to more rapidly achieve overall Chesapeake Bay load reduction goals (including the Conowingo) and local water quality and habitat goals by driving implementation investments to watersheds that are not currently receiving priority funding from State agencies or other organizations due to lack of capacity to develop projects and/or local regulatory drivers.

An RFP process will be used to solicit projects in the priority watersheds which will include a review and selection process that ensures the projects meet Chesapeake Bay Program standards and are creditable, verifiable, and trackable. The RFP process will utilize a Full-Delivery RFP process similar to that used by Penn DOT and MDOT SHA to fund projects that deliver the most cost-effective pollutant reductions. This RPF process will seek project offers from conservation districts, watershed groups, the private sector, and others to reduce nitrogen pollution in the Priority watersheds as per the Conowingo Watershed Implementation Plan goals.

All project offer offerors will be required to utilize FieldDoc as part of the submittal process which will be evaluated for technical merit. This evaluation will be conducted by a committee of technical experts including the CWIP Implementation manager, restoration expert(s), a modeler, and an engineer. The committee will review and evaluate submitted project information and FieldDoc data to determine if the project is technically sound, if the credit calculations are accurate, and if there are any co-benefits. This process may also include site visits to potential project sites to evaluate existing conditions against project goals and estimated nitrogen load reduction credit. Any project offer that is deemed to be technical deficient will be removed from consideration. All technically sound project offers will then go through cost-basis review which will look specifically at the cost benefit of each project offer. The CWIP will award contracts to the lowest responsive and responsible bidder who proposes the Best Management Practice (BMP) to reduce the most nitrogen from the Chesapeake Bay.

Full project delivery will be required prior to contract payment. Delivery will include providing complete project documentation (i.e. georeferenced photos, as-built drawings, model data), final FieldDoc data inputs, maintenance contracts/agreements, and inspection allowances. Post project site visits may also occur to ensure project implementation achieved the reported load reductions.

Projects will be tracked and credited and using the approach outlined in the “Accountability, Tracking, Crediting” section.

Modeled Nitrogen Reduction to the Bay

The initial BMP input deck developed for this draft WIP focused on grass and forest buffers, wetland restoration, and cover crops. A target of 25% of the BMP opportunity remaining after accounting for the Phase III WIP implementation shown in CAST (January 2020) was used an estimate for this

This additional implementation of 25% of the remaining available acres equates to approximately 8,879 acres of grass buffers, 8,879 acres of forest buffers, 53,253acres of wetlands, and 119,367 acres of cover crops across all priority geographies (Table 5).

Table 5. Summary of Acres for BMP Implementation in Priority Geographies

	Acres of BMPs Total	Acres of BMPs Applied in Maryland Land-River Segments	Acres of BMPs Applied in Pennsylvania Land-River Segments
Cover Crops	**119,367**	47,049	72,318
Forest Buffers	**8,879**	1,624	7,255
Grass Buffers	**8,879**	1,624	7,255
Wetland Restoration	**53,253**	26,760	26,493
Planning level implementation efforts based on implementation on 25% of available BMP opportunity land after WIP III.			

Implementation of this level of effort is shown in Table 6 and will result in additional reductions in total nitrogen load of approximately 2,132,870 pounds or 36% of the goal of 6 million pounds load reduction goal as shown in Table 7.

Table 6. Summary of Land River Segment EOT Nitrogen Loads for Phase 3 WIP and Conowingo WIP Implementation

	Nitrogen (pounds)
Phase 3 WIP EOT	25,829,077
Conowingo WIP Progress w/ 25% Implementation EOT	23,696,207
Above is loads for the Land River segments in the priority geographies from the agricultural load sources for which BMPs were applied.	

Table 7. Summary of Conowingo Nitrogen Load Reduction Goal

	Nitrogen (pounds)
Goal	6,000,000
Amount Achieved	2,132,870
Percent Achieved	36%

To close the load reduction gap in the final CWIP additional practices and, if determined, additional watersheds will be incorporated. The CWIP will also need to consider the additional load reductions to address the impact of climate change

Summary of Priority Initiative Costs

Table 8 provides an overview of the capital BMP installation costs needed to implement the BMP scenario identified in Table 5. The annualized costs are derived from the Chesapeake Bay Program's Chesapeake Assessment Scenario Tool (CAST). Default costs for Pennsylvania and Maryland within the CAST tool were used to develop the cost estimates.

Table 8. Summary of Priority Initiative Capital Costs for BMP Implementation in CWIP Priority Geographies

	Acres of BMPs Applied in Maryland Priority Geographies	Maryland Capital Cost Estimation from CAST	Acres of BMPs Applied in Pennsylvania Priority Geographies	Pennsylvania Capital Cost Estimation from CAST
Cover Crops	47,049	$0	72,318	$0
Forest Buffers	1,624	$2,852,783	7,255	$21,256,570
Grass Buffers	1,624	$406,893	7,255	$2,799,414
Wetland Restoration	26,760	$80,280,000	26,493	$73,693,989
Total Cost per State		**$83,539,676**		**$97,749,973**

Tables 9 and 10 provide the annualized costs for Pennsylvania and Maryland priority geographies derived from the Chesapeake Bay Program's Chesapeake Assessment Scenario Tool (CAST).

Table 9. Summary of Priority Initiative CAST Costs Data Analysis for BMP Implementation in CWIP Pennsylvania Priority Geographies

	Lifespan	Capital Cost ($/ac)	O and M ($/ac/yr)	Opportunity Cost ($/ac)	Total Annualized Cost ($/ac/yr)
Cover Crop	1	0	67	0	68
Forest Buffers	75	2929.92	0	139.64	157.35
Grass Buffers	10	385.86	0	139.64	56.95
Wetland Restoration	15	2781.64	44.65	139.64	319.62

Table 10. Summary of Priority Initiative CAST Costs Data Analysis for BMP Implementation in CWIP Maryland Priority Geographies

	Lifespan	Capital Cost ($/ac)	O and M ($/ac/yr)	Opportunity Cost ($/ac)	Total Annualized Cost ($/ac/yr)
Cover Crop	1	0	68	0	68
Forest Buffers	75	1,756.64	0	203.5	100.33
Grass Buffers	10	250.55	0	170.42	40.97
Wetland Restoration	15	3,000	44.65	203.5	343.85

These costs should be considered as initial estimates only and may change significantly on a per unit basis depending on how projects are financed and the scale at which the projects are implemented. As stated in the Pennsylvania Phase III WIP, there are other important sources of cost variability.

- Changes in technology, protocols, and/or credit inputs for BMPs. The cost structure to inputs for many of these practices has changed and continues to change as protocols are updated and the cost for raw materials, transportation, labor, etc. evolve.

• Design and scale can significantly drive cost estimate variation by several orders of magnitude. The use of full deliver contracting for CWIP implementation can drive the private sector to find efficiencies through design and create scalable implementation opportunities.

• Variation in Local costs. Although the CAST includes Maryland and Pennsylvania default costs the CWIP priority geographies are spread across as large geographic area and local economic conditions as well access to labor and materials.

• O&M assumptions and real costs. Each BMP has an estimated cost associated with O&M however design, location, materials, implementation methods, and weather are just a few factors that can impact both short- and long-term O&M Costs.

These costs do not include associated financial services costs or technical assistance costs provided at the local level to facilitate implementation of CWIP specific BMPs. Those additional costs will be identified during the outreach phase and with input from the Financing Strategy.

Financing Strategy

The Chesapeake Bay Trust is leading the effort to develop the financing strategy which will be inserted here when complete. Recognizing the CWIP strategy will need to evolve with time and the completion of a comprehensive financing strategy, adjustments to the implementation efforts may need to be considered based on the innovative financing tools and ideas.

Contingency Plans

A contingency plan for the CWIP provides safeguards to ensure the nitrogen load reductions are achieved if the initial strategy of priority BMPs and geographies are not enough to meet or exceed the stated goals in advance of the WIP timeline. The CWIP Implementation Management Team will work with the Steering Committee to evaluate actions needed given the options described in this WIP. The annual reports on State-specific and Conowingo load reductions, the two-year Milestones reporting on progress, along with the adaptive management approach, provides the necessary checks and balances throughout WIP implementation to evaluate if alternative actions need to be taken. Any relevant future outcomes from Maryland's 401 Water Quality Certification for Conowingo Dam will be considered in this process, as appropriate.

The CWIP is developed with the option to introduce full delivery/pay-for-performance strategies to provide the opportunity for private capital to cover project implementation costs. This strategy maximizes CWIP resource flexibility by allowing investments to flow to new and innovative projects while requiring the project offeror to demonstrate the amount of nitrogen load reductions achieved towards CWIP and take the bulk of the risk associated with bring the load reductions "online".

Alternative 1. Implementation Efforts Exceed Goals

The CWIP Implementation Management Team will provide an annual report to Steering Committee and EPA on the progress towards the Conowingo nitrogen load reductions. If the results demonstrate an exceedance of nitrogen load reductions beyond the targeted amount (with climate change factored in), the Steering Committee, PSC, and EPA may elect to review the allocation process from the CWIP to address load reductions needed to achieve the Phase III WIP goals. Following the CWIP principles, the PSC will ensure the methods and to whom the adjusted load reduction assignments are provided, needs to be fair, equitable and transparent.

Alternative 2. Implementation Efforts Do Not Meet Load Reduction Targets

2A. Dredging. While modeling results from the US ACE and MDE (2015) study notes that increasing or recovering the storage volume of the Reservoir provides limited and short-lived ecosystem benefits to the Chesapeake Bay at a high cost of dredging, MDE is funding a study and pilot project to study this action further with results expected in July 2020. The results of this study will evaluate the beneficial reuse of sediments as a result of dredging and help the Steering Committee to evaluate the cost-effectiveness of this activity. The CWIP can be adjusted to incorporate feasible, cost-effective, creditable, and trackable load reduction measures identified in the study.

2B. Re-evaluate Priority Watersheds. The CWIP focuses implementation on nine priority geographies based on their ranking of most-effective basins as well as efforts to align with existing state level planning and implementation efforts. A BMP Opportunity Blueprint will identify the extent of implementation for the priority BMPs in each of these areas, however the actual load reductions achieved will depend on the success of the PFP approach and the type of projects implemented. If the market to support implementation does not achieve the required level of implementation, or capacity of the priority geographies cannot meet the demand for implementation, the CWIP Implementation Management Team will work with the Steering Committee, PSC, and EPA to identify additional most effective sub-basins following the process outlined in the Framework.

2C. Other BMPs. The CWIP Implementation Management Team may utilize an extended list of BMPs that meet the Partnership requirements as a creditable and reportable practice. Additional BMPs may be desired given the response or direction indication by a market-driven approach, or if there is greater capacity for other BMPs given site-specific geographies. The CWIP Implementation Management Team expects that living shorelines and stream restoration may provide additional opportunities and may be incorporated into the CWIP as implementation funding becomes available and supported by the community engagement process.

Living shorelines present a specific opportunity on the un-regulated areas in the Eastern Shore priority geographies or additional opportunity given Phase III WIP implementation. The Management Team will work with MDE and local stakeholders to evaluate future opportunities to include this BMP in future updates to the CWIP.

The protocols to assign nutrient and sediment load reductions from stream restoration remain one of the most cost-effective BMPs and provide an opportunity to enhance capacity of the CWIP to achieve the required load reductions. At the time of WIP development, the protocols were under review by the Partnership and consequently provided uncertainty to quantify the benefits of practice implementation in the priority geographies. The stream restoration protocols have been recently updated to provide clarifications on how to apply the protocols, information needed to be eligible for, and quantify the credit, and changes to the protocols to include a new, eligible practice (Protocol 5, Outfall Stabilization). The CWIP Implementation Management Team may explore methods to account for the benefits of this practice. This would require the CWIP Implementation Management Team to propose generalized site conditions to quantify the nitrogen load reductions, along with input from the engagement process to understand the capacity to adopt this practice. Utilization of full delivery/pay-for-performance strategies would incentivize project offerors to identify, calculate, and provide site specific stream restoration data. Further, the focus of CWIP on nitrogen reduction will drive private sector design innovation to incorporate features that process nitrogen.

Other BMPs like Manure Treatment Technology and manure management are BMPs with tremendous potential to reduce nitrogen, however there are many significant logistical tracking challenges, particularly related to tracking and crediting, associated with incorporating it in the CWIP strategy at this time. However, similar to other potential innovate projects the use of pay-for-performance strategies may allow opportunities for the private sector to develop sufficient assurances to allow for CWIP implementation funding.

Accountability, Tracking, Crediting

The CWIP Implementation Management Team will work with PA DEP, MDE, the Partnership and Steering Committee to report and track practices implemented and their associated load reductions for the CWIP. The intent is to use the existing reporting and tracking tools to create efficiencies and reduce redundancy or unnecessary bureaucracies given the well-established and familiarity of the protocols by the Partnership and restoration practitioners (e.g. project implementer). The protocols provide assurance and accountability that load reductions associated with practices implemented in the priority geographies are credited towards the CWIP while the tools will help streamline the process across multiple geographic scales that align with the Chesapeake Bay TMDL.

There are three levels, or tiers for reporting to track practice implementation from the site specific-scale of implementation to the Chesapeake Bay-wide modeling scale. The tools include: Chesapeake Commons' FieldDoc; State-specific databases and the National Environmental Information Exchange Network (NEIEN). Each of these reporting tools will include common fields or metrics to track and report projects that meet CBP requirements and are credited towards the Conowingo, rather than Phase 3 WIPs. The Team is responsible for reviewing the accuracy of the information given the steps described in the quality assurance project plan (QAPP) and reporting the load reductions for the Conowingo to the

Partnership, annually. Reports may also be provided to Pennsylvania and Maryland based on their jurisdictional progress.

When a practitioner implements a project that will be tracked towards CWIP progress, they will be required to report the project through Chesapeake Commons' FieldDoc platform. This web-based tracking platform will allow the user to track practice implementation and assign it to both the CWIP program and other funding programs for reporting purposes. When a practitioner is done editing the project details and metrics, there will be a submission allowing them to report their practice to all attached programs. For a practice to be considered complete for CWIP reporting, there will be required metrics, including the information needed for a practice to be reported to the National Environmental Information Exchange Network (NEIEN), as well as a spatial footprint of the practice and a photograph of the project. A unique identifier in NEIEN will denote the project is credited towards the Conowingo, rather than the Phase III WIPs. An intermediate step may be taken at the state level, where projects reported in FieldDocs are input to a State-specific database that is then uploaded to NEIEN. The team may work with PA DEP and MDE to ensure the projects designated for the Conowingo are translated effectively.

Submitted practices will undergo an automated verification process that is being developed by the Team and will be approved by the Conowingo Steering Committee and CBP staff. Practices that are complete and pass verification will be included in an annual report for final submission and accreditation through CBP for the CWIP progress. The annual reports will be sent from the Team to jurisdictional nodes for NEIEN submission. The Team will coordinate with each jurisdiction to ensure that this submission can be tracked distinctly, is not duplicative, and meets CBP requirements.

Milestones and Progress Reporting

The EPA will evaluate the CWIP and provide biennial evaluations of the progress toward attaining the goals in the CWIP. EPA's evaluations, in consultation with the PSC, will be used to determine if corrections or adjustments are necessary to attain the goals of the CWIP (e.g., whether the targets need to be re-evaluated or assigned to specific jurisdictions).

Development of the initial set of two-year milestones will be based on anticipated levels of funding both prior to and after the implementation of the Conowingo financing strategy. Two-year milestone goals can be developed with additional information from the Partnership related to anticipated funding levels for CWIP implementation prior to the implementation of the financing framework and may be integrated into future drafts of this plan. However, the results of the financing strategy will largely determine the rate and scale of annual implementation.

The CWIP Implementation Management Team will work with Pennsylvania and Maryland to submit draft milestones to EPA by November 2021 and a final version by January 7 2022 . The milestone reporting is contingent upon funding available through the financing strategy or other sources to support implementation efforts.

Timeline and Next Steps

The development of the CWIP is arranged to occur in stages with the Plan completed in June 2020, followed by a financing strategy in March 2021. The timeline is established to dovetail with the Phase III WIPs where the CWIP identifies priority BMPs in focal geographies to achieve the required nitrogen load reductions to ensure the health of the Chesapeake Bay remains on track. The implementation of the WIP is expected to continue beyond 2025 with opportunities to start implementation as funding becomes available. For example, implementation may begin as early as 2021 pending the availably of funding prior to the completion and implementation of the of the Conowingo financing strategy. The timeline shown in Table 11 identifies key periods of the WIP development and its implementation.

Table 11. Conowingo WIP Development and Implementation Timeline

Year	Key Decisions and Outcomes
2018	• October 28, 2018, the Chesapeake Bay Program (CBP) Principals' Staff Committee (PSC) approved a Framework for developing the CWIP. • Formation of the Steering Committee
2019	• Begin development of the CWIP (September) • Phase 1 Stakeholder Outreach
2020	• WIP approved with updated timeline • Conowingo Reservoir dredging analysis complete (June/July) • Finalized tracking and reporting protocols and tools (March/April) • Phase 2 Stakeholder Outreach • Draft financing framework • Begin design of the financing framework
2021	• Submit draft two milestone November 1 • Phase 3 Stakeholder Outreach • Financial strategy complete • Economic development investment plan complete • Draft plan for the financing framework • Project-specific BMP opportunity blueprint for priority geographies
2022	• Submit two-year milestones for 2022-23 by January 7 • Phase 4 Stakeholder Outreach • Launch the financing framework • Implementation of investment activities (Winter)
2023	• Continued implementation of investment activities • Submit two-year milestone for 2024-2025 by November 1

Year	Key Decisions and Outcomes
2024-2025	• Continued implementation of investment activities • Submit two-year milestone 2024-25 by January 7

References

U.S. Army Corps of Engineers, Baltimore District (USACE), & Maryland Department of the Environment (MDE). 2015. Lower Susquehanna River Watershed Assessment, Maryland and Pennsylvania. Prepared for: U.S. Geological Survey (USGS), Maryland Department of Natural Resources (MD DNR), the Susquehanna River Basin Commission (SRBC), USACE's Engineer Research & Development Center, U.S. Environmental Protection Agency (US EPA), & the Nature Conservancy

Appendix A: Membership of the Conowingo WIP Steering Committee

JURISDICTIONAL REPRESENTATIVE	JURISDICTION
Brian Van Wye	District of Columbia
Marcia Fox/Brittany Sturgis (Alternate)	Delaware
Matthew Rowe*/Dave Goshorn	Maryland
Ken Kosinski/Lauren Townley	New York
Jill Wickham*	Pennsylvania
Ann Jennings	Virginia
Teresa Koon	West Virginia
Mark Hoffman/Ann Swanson (Alternate)	Chesapeake Bay Commission
*Co-chairs	

Appendix B.
Conowingo Watershed Implementation Plan Steering Committee meeting

November 21, 2019

Activity 1 Handout: Draft Conowingo WIP Outreach FAQ Document

Why do we Need to Reduce Pollution in the Chesapeake Bay?
The Chesapeake Bay is in poor health due to pollution from a variety of sources – including stormwater runoff, air emissions, wastewater, agriculture, development, and more. For many years, pollution that flowed into the streams and rivers of the Chesapeake Bay was not managed to meet water quality standards. At the same time the population in the 64,000-square mile watershed increased significantly – rising 43 percent between 1980 and 2017, from 12.7 million people to 18.2 million people. All of this has harmed water quality in the watershed.

In 2010, the U.S. Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL), which set nitrogen, phosphorous, and sediment reduction goals so that the Bay would meet clean water standards by 2025. Sediment can smother aquatic life and pollutants such as nitrogen and phosphorus cause algae to grow in local waterways and the Chesapeake Bay that rob the waters of oxygen. To meet these goals the seven jurisdictions (Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia) that drain to the Bay developed Watershed Implementation Plans to help guide their Chesapeake Bay clean-up efforts

How Does a Watershed Implementation Plan Work?
Watershed Implementation Plans (WIPs) identify pollutant sources and methods to address those pollutants. This is done across three general tracks: first, they identify local pollution sources by category (such as urban, agriculture, forests, wastewater treatment plants, and septic systems); second, they identify the partners and resources that can help reduce pollution; and third, they identify the best strategies to reduce pollution to meet the 2025 goals.

Why is this WIP Focusing on the Conowingo Dam?
Jurisdictions throughout the Chesapeake Bay watershed have made progress cleaning up the Bay since the TMDL was established in 2010. However, recent scientific studies have shown that the dam's reservoir is nearing "dynamic equilibrium" which means it will no longer serves as a sufficient sink for sediment and other pollutants and what flows in above the dam will eventually flow out. The Chesapeake Bay TMDL WIPs did not account for the Conowingo Dam's reduced ability to trap upstream pollution. To address this problem the EPA-Chesapeake Bay Program, and the Bay jurisdictions have been working since [2017] to develop a WIP specific to the Conowingo Dam.

Is the Conowingo WIP Independent from WIPs Currently in Development in Other States?
Yes. When complete, the Conowingo WIP will be its own plan, independent of the individual WIPs currently being developed by each of the Bay jurisdictions.

How Will the Conowingo Dam WIP be Created?
To assist in the development of the Conowingo WIP, the most up-to-date data, modeling, and technology will be used to target and track restoration practices where they will have the most strategic

impact. The Environmental Protection Agency contracted with the Center for Watershed Protection, the Chesapeake Bay Trust, and the Chesapeake Conservancy to assist in overseeing various tasks including coordination, project identification, and developing a financing strategy to reduce the total amount of Nitrogen delivered to the Chesapeake Bay.

Who Will Pay for the Practices in the Conowingo WIP?
New financing methods are being developed that will be designed to help expedite progress toward restoration of the Chesapeake Bay.

How Much Nitrogen Will Need to be Reduced as Part of the Watershed Implementation Plan?
Current estimates are that six million pounds of nitrogen need to be reduced as part of the Conowingo WIP. To meet this target, the Chesapeake Bay Program and partner jurisdictions are utilizing an approach called "most effective basins" that involve implementing projects on lands located both upstream and downstream of the dam. Based on the amount of pollutant load being delivered to the Bay and planned restoration efforts some watersheds downstream of the dam could offer restoration opportunities that deliver benefits to the Chesapeake Bay comparable to restoration opportunities located upstream of the dam. These cost-effective downstream restoration opportunities could also be included in the Watershed Implementation Plan if the cost per pound of nitrogen reduced is similar or better than reductions associated with projects upstream of the dam.

If you would like more information about the Conowingo WIP visit ***insert website address here***.

Bay Watershed Facts (for a call-out box):
Rivers and streams from Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia drain to the Chesapeake Bay.
The largest river that flows into the Chesapeake Bay is the Susquehanna River, which starts near Cooperstown, New York.
The land draining into the Chesapeake Bay is 64,000 square miles in size.
More than 100,000 streams, creeks, and rivers drain into the Chesapeake Bay.

Maps needed for the fact sheet:
Map of the overall Bay Watershed
Map of the most effective basins

Appendix C BMP Opportunities Analysis

Please see separate document.