

Phase II Watershed Implementation Plan Worcester County, MD

Prepared by the Worcester County Watershed Implementation Team and reviewed by the Worcester County Department of Development Review and Permitting and the Department of Environmental Programs.

Conceptually approved by the Worcester County Commissioners on December 13, 2011.

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I. Introduction

The United States Environmental Protection Agency (EPA), in coordination with the Chesapeake Bay Watershed jurisdictions of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC) established a Bay-wide Total Maximum Daily Load (TMDL) on December 29, 2010¹. A TMDL sets limits on the amount of nutrients and sediments that can enter the Chesapeake Bay in order to achieve and maintain a healthy water body that supports aquatic life as well as safe swimmable and fishable waters. When the TMDL was established, EPA also accepted Maryland's Final Phase I Watershed Implementation Plan (WIP) developed and submitted by the Maryland Department of the Environment (MDE)². The Phase I WIP allocated the allowable nutrient and sediment load among different source sectors which are agriculture, urban, wastewater treatment plants, septic tanks, and forests. The Phase I WIP also identified statewide strategies to reduce impairments in the Bay.

The second phase in a three-phase WIP process required the State of Maryland to submit to EPA a Phase II WIP; its purpose was to refine the Phase I WIP to include more local details about where and how nutrient and sediment loads will be reduced. In 2011, local teams organized at the county scale were formed to begin work on their part of the State's Phase II WIP. Members of Worcester County's Chesapeake Bay Phase II WIP Team are listed in Table 1. Phase II of the WIP process further subdivided the source sector impairments by County. This allocation process was important because it allowed each County to create its own "road map" toward the ultimate 2025 goal of cleaner local streams and a healthier Chesapeake Bay.

In this document, Worcester County's initial strategy toward reaching the TMDL is discussed. This Phase II WIP document addresses the following:

1. Worcester County's Chesapeake Bay TMDL Allocation
2. Existing Best Management Practices
3. Worcester County Chesapeake Bay Phase II WIP draft strategies
4. Two-Year draft Milestone Documents
5. Conclusion

Upon the Worcester County Commissioner's conceptual approval on December 13, 2011, the Worcester County Phase II WIP will be submitted to the Maryland Department of the Environment. This document will ultimately be merged into the final State of Maryland Phase II WIP document along with twenty three county-level WIP documents. The county-level WIPs will be summarized and presented as strategies for Maryland's major basins. The major basins that have been identified are the Potomac, Patuxent, Susquehanna, Western Shore, and Eastern Shore basins. In the following discussion, Worcester County's TMDL allocation is discussed.

¹ The Chesapeake Bay Total Maximum Daily Load document is available online at <http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html>.

² Maryland's Phase I Watershed Implementation Plan is available online at http://www.mde.state.md.us/programs/Water/TMDL/TMDLHome/Pages/Final_Bay_WIP_2010.aspx.

II. Worcester County's Chesapeake Bay TMDL Allocation

Water bodies are classified as "impaired" when they are too polluted to support their designated and existing uses. Currently, the majority of the County's subwatersheds in the Chesapeake Bay Watershed do not meet their designated use due to nutrient, sediment, biological, and/or bacteria impairments (see Table 2). The MDE defines a designated use for a waterbody as a description of an appropriate intended use like recreational swimming, fishing, and seashell harvesting by humans and/or aquatic life. Impaired water bodies that do not meet these uses are not suited to receive additional nutrient loads. The Pocomoke River is designated as Use II³ while the remaining waterways are designated as Use I⁴.

To achieve designated uses, this WIP document seeks to achieve nutrient TMDLs for the wastewater, urban and the septic tanks source sectors⁵. Worcester County's Chesapeake Bay TMDL allocation for total nitrogen and total phosphorus is shown in Tables 3 and 4 respectively⁶. The County's sector-based nutrient TMDL establishes a destination to reach as we follow the "road map" outlined in this Phase II WIP document; however, due to the Chesapeake Bay model's reduced level of accuracy at the County-scale, TMDL allocations are subject to change, thus potentially changing our ultimate destination.

To begin our discussion of WIP strategies, the following briefly describes implementation efforts already completed in Worcester County. These actions set the precedent for future implementation.

III. Existing Best Management Practices

Worcester County has been an active participant in installing best management practices (BMPs) that improve water quality and wildlife habitat in the Coastal Bays Watershed and the Chesapeake Bay Watershed. By actions and commitments already implemented by local decision-makers, Worcester County is a proven leader that leads by example. The following briefly describes existing programmatic changes and in-the-ground projects in Worcester County.

Programmatic Changes

Several programmatic changes were made through Worcester County's development review process that ensured consideration of natural resources. For example, on March 7, 2006, the

³ Use II: Support of estuarine and marine aquatic life and shellfish harvesting. Please note that water bodies designated as Use I do not necessarily support the shellfish harvesting use as some waters may be tidal but too fresh to support viable populations of shellfish. Retrieved July 27, 2010. Available online at <http://www.mde.maryland.gov/researchcenter/data/waterqualitystandards/index.asp>.

⁴ Use I: Water contact recreation, and protection of nontidal warm-water aquatic life. Retrieved July 27, 2010. Available online at <http://www.mde.maryland.gov/researchcenter/data/waterqualitystandards/index.asp>.

⁵ The Maryland Department of Agriculture is the WIP lead for the agriculture source sector and worked in cooperation with District Conservation offices statewide to develop an agricultural-centric Phase II WIP that will be submitted to the State of Maryland.

⁶ Worcester County target loads are available online at http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/WIP_Phase_II_Target_Load_Summaries/Phase_2_Loads_by_Sector_Worcester.pdf.

Worcester County Commissioners adopted its *Comprehensive Plan*. This plan's goal is "to maintain and improve the County's rural and coastal character, protect its natural resources and ecological functions, accommodate a planned amount of growth served by adequate public facilities, improve development's compatibility and aesthetics, continue the County's prosperous economy, and provide for residents' safety and health".

Through the development of the *Comprehensive Plan*, watershed analyses were conducted to select the most appropriate growth areas. Designated growth areas demonstrated the County's commitment to continue its concentrated development pattern and develop in low hazard and less environmentally sensitive areas while reserving agricultural and other significant lands for natural resource reasons. This commitment was implemented by the adoption of new zoning maps and an updated Zoning and Subdivision Control Article on November 3, 2009 and is currently administered by the Zoning Division within the Department of Development Review and Permitting (DRP).

Since the adoption of the Zoning and Subdivision Control Article, the County has required that most forms of land use development employ environmental site design. Likewise, the zoning maps limit higher density development to those areas having public services while retaining agricultural and resource protection zoning throughout most of the County. Continued implementation of the Zoning and Subdivision Control Article ensures the following:

- a. Lower number of required parking spaces compared to historical zoning code regulation, thus establishing maximum impervious parking spaces. Anything beyond the maximum impervious limit must use pervious materials.
- b. Compact development patterns.
- c. Consideration of TMDL in the development review process if applicable.
- d. Environmental site design standards that preserves the natural hydrology and floodplains.

Another division of DRP, Natural Resources, administers the Stormwater Management Program. The County's current stormwater management requirements, adopted in 2000, incorporate changes mandated by the State and referenced in the *2000 Maryland Stormwater Design Manual*. One of the significant changes outlined in this manual is a menu of non-structural BMPs that allowed for a more environmentally sensitive approach to site development. These practices incorporate existing site conditions along with vegetative filtering practices to provide water quality on development sites. The State's previous stormwater management law was amended by the passage of the Stormwater Management Act of 2007 by the Maryland General Assembly. The primary focus of the Act required environmental site design to the maximum extent practicable. This change required a more environmentally sensitive site development plan to be submitted as part of the regulatory review. Worcester County amended its stormwater management regulations to bring them into compliance with the 2007 Act on May 18, 2010. Other programs currently administered by the Natural Resources Division include Sediment-Erosion Control, Shoreline Inspection, Critical Area, and Forest Conservation.

Best Management Practices

Additional best management projects installed over the past few years have provided the public opportunities to understand environmental problems and see solutions. In May 2010, Worcester County Government (WCG) partnered with the Delmarva Discovery Center and the Pocomoke Middle School to install rain gardens and rain barrels at the Center. Pocomoke Middle School students also assisted WCG with the installation of a rain garden and native tree planting project at Newtown Park in Pocomoke, Maryland.

The Town of Snow Hill installed a submerged gravel wetland in Byrd Park during the summer of 2011 to assist with drainage while removing stormwater pollutants from surface runoff. In October of 2007, WCG and Pocomoke High School students installed a bioretention and expanded existing wetlands at the Cedar Hall Wharf boat ramp.

The Town of Snow Hill, WCG and The Nature Conservancy (TNC) have installed acres of native trees in recent years. In 2008 and 2010, the Town planted a total of 182 trees and shrubs in Byrd Park. Seven additional trees were planted at the Snow Hill train station in 2010. Ongoing restoration efforts by the Conservancy included planting twenty one acres of Atlantic White Cedar. Worcester County replanted two acres of native trees in Snow Hill near the James Walter Smith Park.

The Town of Snow Hill and State of Maryland via use of the Maryland Department of Natural Resources constructed a wastewater treatment plant (WWTP) within the Shad Landing Area of the Pocomoke River State Park. This system was connected to the Town of Snow Hill's WWTP. According to the *Shad Landing State Park and Snow Hill Sewer Agreement* dated August 26, 2009, it was agreed that any nitrogen credits obtained by disconnection of septic tanks at the Pocomoke State Park would belong to the Town in exchange for allowing the sanitary sewage connection to the Snow Hill WWTP. As a result of this project, it was estimated that 33 equivalent dwelling units were hooked up to the Snow Hill WWTP.

The WIP team members intend to continue implementation efforts as they have done for years. In the next discussion, programs and projects currently proposed for future implementation are described.

IV. Worcester County Chesapeake Bay Phase II WIP Strategies

The WIP team worked together to identify BMPs deemed feasible to accomplish given existing staffing and funding resources. Initially, the MAST online tool was used to estimate nutrient loads based on these proposed strategies⁷. Table 5 lists the proposed strategies described in this document as they would appear in the MAST online tool. MAST, however, does not provide the absolute nutrient reduction figure but only serves as a guidance tool for WIP teams to estimate

⁷ The MAST, or Maryland Assessment Scenario Tool, is an online tool local WIP teams used to estimate how effective their strategies were at reducing nutrient loads. Due to ongoing improvements to MAST, the Worcester County WIP team decided to revisit this tool during the Spring of 2012.

nutrient loads. Thus, MAST nutrient reduction figures are not reported in this Phase II WIP document.

Worcester County's strategy to achieve our sector-based TMDL allocation will occur over time. As shown in Table 6, Worcester County will work to achieve 70% of source sector TMDL goals by 2017 dependent upon adequate funding. Loads not achieved will be added to the remaining 30% balance resulting in an overall achievement of TMDLs by 2020. Interim TMDL goals may be revised should the current 2020 target date be extended to 2025 as is currently being discussed. The following discussion outlines implementation efforts, by source sector, which are in the process of being developed by WIP team members.

Wastewater Treatment Plants

The wastewater pollution source sector is currently being addressed by the Town of Snow Hill and Town of Pocomoke City by upgrading their individual WWTPs to meet State mandated nutrient loads. At this time, upgrades to the Town of Pocomoke City WWTP have been completed. Pocomoke City expanded and upgraded its WWTP system to ENR treatment in 1996. The Town of Snow Hill will complete BNR and ENR⁸ upgrades to their WWTP by May of 2012.

Forests

The Nature Conservancy will continue to harvest plantation loblolly pine to encourage native hardwood regeneration on its Nassawango Preserve. The Conservancy recognizes, however, that to make a real impact, all the forestry operations in the Chesapeake Bay Watershed within the County should be factored in. This should include lands held by the State, nongovernmental organizations and the private sector.

Urban

Following is a brief description of projects and programs currently being developed by WIP team members. Together, these projects are estimated to reduce approximately 50% of the urban source sector nutrient TMDL allocations.

Lower Pocomoke River Watershed Stewardship Program: This program will utilize existing forest conservation funds, critical area fees-in-lieu, and seek additional grant funding (if applicable) to implement water quality improvement projects. This type of program will be modeled after existing grant programs and rely on County staff within the Natural Resources Division to reach out and educate the public, administer program funds, and monitor project progress. Initial outreach efforts will target specific community groups, including the Pocomoke and Snow Hill Middle and High Schools, Towns of Snow Hill and Pocomoke City, Boys and Girls Scouts, church groups, home owners association, Rotary club, and gardening clubs to form

⁸ BNR, also known as biological nutrient removal, removes total nitrogen (TN) and total phosphorus (TP) from wastewater through the use of microorganisms under different environmental conditions in the treatment process. ENR, also known as enhanced nutrient removal, allow wastewater treatment plants to provide a highly advanced level of nutrient removal, achieving 3 mg/l TN and 0.3 mg/l TP.

the Lower Pocomoke River Watershed Stewards. These stewards will be able to submit project proposals, with the County's assistance, and request funds to purchase supplies and materials to implement approved projects. The County will administer all funds and oversee approved projects. These projects can lead to improvement and beautification of a neighborhood (public places) while improving water quality.

Rain Gardens: The County will continue to promote rain gardens throughout the County by educational workshops and demonstration projects. Two rain gardens are currently proposed at the Pocomoke Middle School. Grant funding in the amount of \$10,000 to \$15,000 will be requested to fund the projects. Additional rain gardens will be installed as the opportunity arises most likely through the Stewardship Program described above. In addition to demonstration projects, the County may print additional copies of *Rain Gardens Across Maryland*. Approximately \$10,000 is needed to print 3,000 copies that can be distributed countywide. Nearly 8,000 copies of this document have already been printed and distributed throughout the Chesapeake Bay Watershed. This document has been instrumental in promoting the implementation of rain gardens by homeowners.

Rain barrels: The Town of Snow Hill, in partnership with the Lower Shore Land Trust, will educate residents about the use of rain barrels. Worcester County Government will partner with the Pocomoke Middle School where school children will play a role in creating and installing rain barrels in the community. Rain barrels will also be displayed in Newtown Park for public visibility. Further grant funds may be required to develop workshops that allow interested residents to learn how to build, install and maintain rain barrels. A rain barrel is a fairly inexpensive option (price ranges from \$40 to \$100) that residents may choose to install in an effort to divert rooftop runoff away from impervious surfaces and reuse for later drier periods.

Tree plantings: Tree planting projects may occur within the city limits of Pocomoke City or Snow Hill or the rural parts of Worcester County. The Parks and Recreation Department are in the process of replanting large open grassed areas in an effort to reduce the amount of mowing and ultimately cost. Approximately five acres of grassland and Newtown Park are proposed for native tree plantings. Further opportunities in the Town of Snow Hill and Pocomoke City will be continuously sought. Tree plantings on publicly-owned land can range in pricing depending on the size and amount of plants purchased. The County government, however, have access to reduced pricing through the Treemendous Maryland Program. This program offers organizations the ability to purchase sizeable trees for a reduced cost.

Wetlands: The Town of Snow Hill received grant funding in the amount of \$25,000 to install a second submerged gravel wetland at Byrd Park. This project will be completed by the end of 2012.

Street sweeping: Both towns sweep, on average, 75% to 100% of their streets on a monthly basis excluding winter months. The Town of Snow Hill owns and maintains one streetsweeper for 163,250 feet of roadways. The cost to maintain a streetsweeper and operator is approximately

2,000 to \$3,000 annually. Pocomoke City sweeps approximately 318,754 feet of roadways that one streetsweeper maintains⁹.

Septic Systems

Development outside of designated sewer service areas relies on waste disposal systems located on-site, commonly known as “septic systems.” There are approximately 7,184 septic systems in Worcester County (*Worcester County Water Resources Element*, Adopted October 4, 2011). Of this amount, nearly 40% of the total are located in the Chesapeake Bay Watershed portion of the County. Approximately 5% of the total number of septic systems in the Chesapeake Bay Watershed is currently located in the Critical Area. Septic systems, however, are a source of excess total nitrogen (TN) which leaches through soils into groundwater that eventually discharges to local waterways and the Bay. There are several solutions that can reduce or eliminate TN from septic systems which are discussed below.

Locating and Design of septic systems: Location and technology choices are regulated by State and local requirements. Systems located closer to tidal waters (Bay) and their tributaries have a greater percentage of their transport load of nitrogen reach delivered to surface waters. Depending on the location of septic systems, each system may contribute 6 to 12 lbs of TN annually. According to the Chesapeake Bay Program Model, septic systems within the Critical Area contribute 12 lbs/sys/yr of TN whereas septic systems outside of the Critical Area contribute up to 6 lbs/sys/yr of TN. By locating septic systems further away from waterways, less nitrogen will enter the bays because of the distance traveled by groundwater which allows nitrogen removal processes to occur. This cannot always be accommodated due to preapproved lots and the true nature of the soils evaluation process that favors acceptable subsurface conditions, wherever they may exist on the property. Elevated and innovative systems designs that bring effluent into contact with the root zone and aerobic conditions found closer to the surface also encourage de-nitrification. These are acceptable and ongoing practices the County has incorporated and encouraged and will continue to do so to reduce loadings for replacement and new systems in the future. These will be tracked and hopefully the Bay Program will assign a nutrient reduction figure in the future for this type of BMP.

A final note on system location, loading and design considerations with respect to future outcomes for nutrient reduction should be made. Nitrogen delivery rates to surface waters are highest at the tidal line and diminish with increasing distance from the body of water. While a septic system’s nitrogen loadings to surface waters in the Critical Areas are assumed to be the highest, these loadings are impacted by many variables which includes soil type, local plant uptake, and depth to ground water. It stands to reason that a scientifically based rationale should be used when targeting grant funding for upgrades. Despite the Bay Model, there are areas within the County where septic systems may have a negligible effect on the Chesapeake Bay Watershed. These could include the aforementioned shallow systems located outside the Chesapeake Bay watershed and areas where the shallow aquifer flow regime recharges deeper aquifers through leaky confining layers. Reducing contributions should be the final goal and

⁹ The total street sweeping distance was derived from the centerline GIS data. Street sweeping is completed on both sides of the road therefore the total centerline linear feet was multiplied by a factor of two.

targeting retrofits in Critical Areas combined with selection of offsets and site specific design considerations should produce the greatest benefit.

Denitrification technology¹⁰: Recently installed systems and existing systems upgraded to denitrification standards leach up to 6 lbs of TN annually regardless of their location inside or outside of the Critical Area. As shown in Table 6, 20 septic systems were upgraded prior to 2011 with 18 of the 20 upgrades located within the Critical Area. By the end of 2025, the County anticipated upgrading 26 septic systems to denitrification standards. Forty six septic systems outside of the Critical Area were upgraded to enhance overall performance, not for denitrification. The current efforts for installation of Best Available Technology (BAT) retrofits should be continued for those areas that are most sensitive to nitrogen loadings, i.e Critical Area.

Connect septic systems to a public WWTP: The County estimated (1) the number of septic systems that may be connected to a public WWTP and (2) the number of new septic systems installed to calculate the number of septic systems located within the County by 2025. These estimates were inputted into equations 1 and 2 to calculate the amount of septic systems (see Appendix A). As shown in Table 7, the County anticipated connecting 123 septic systems (42 inside and 81 outside of the Critical Area) to a public WWTP. However, 86 new septic systems may be installed in the Lower Pocomoke River and Nassawango Creek Watersheds. These two factors resulted in an overall decline of 37 septic systems, thus, eliminating the TN sources from within the Chesapeake Bay Watershed portion of Worcester County (refer to Table 8). State legislation was passed last session that allow the limited use of BRF funds to facilitate connection of existing septic systems to ENR public wastewater plants. Due to the limited funding given the County each year, this is not a viable option at this time.

Challenges: Lack of funding is the primary challenge faced by the Department of Environmental Programs in implementing technological solutions discussed above. The cost to hook up septic systems to WWTPs increases as the distance between septic systems and WWTPs increases. In some cases, hooking up septic systems to a WWTP is simply not financially feasible because of its remote location. The Bay Restoration Funding (BRF) Grant Program, however, was established to fund the conversion existing outdated septic systems to less damaging nutrient reduction technologies. BRF funding may (1) cost share septic replacements or new septic systems (lower priority) within the Chesapeake Bay Critical Area and (2) cover up to 100% of the costs for Chesapeake Bay Critical Area septic upgrades and retrofits on existing properties, (3) voluntary upgrades within the Chesapeake Bay Critical Area in an income-based reimbursement, and (4) retrofits for upgrades for new construction with funding and income limitations. Worcester County has been awarded between \$225-250,000 annually through this grant program.

Due to the high demand, the County is unable to fulfill all requests for upgrades. This makes voluntarily participation from homeowners to upgrade their private septic systems much more challenging, especially in the Chesapeake Bay watershed where challenging financial circumstances are more prevalent than the Coastal Bays watershed. The limited financial

¹⁰ Denitrification is a process driven by microbes under anaerobic conditions. During the process of denitrification, nitrate, a form of the mineral nitrogen that is not absorbed by plants during growth, is converted to a form of nitrogen that can eventually be taken up by plants.

assistance received by the County from the BRF grant program is directed towards septic systems located within the Critical Area. Septic systems located outside of the Critical Area may receive BRF for failing septic systems that have a potential to cause a health and/or environmental threat to the property owner and adjacent property owners. To date, the County has received over \$1.3 million from the BRF grant program. The majority of grant funds, however, have been directed to the Maryland Coastal Bays given the high number of septic system replacements located within the Coastal Bays Critical Area. All assumptions with regard to septic system upgrades are based upon adequate funding from the State and provided that there are no future legislative mandates that require diversion of these limited funds to other purposes or areas.

The use of nutrient offsets and even nutrient trading will need to be further explored by the County and its state partners as a way to eventually reduce the existing and future contributions from the septic sector.

Additional measures: Some additional measures that will be considered to make progress in the Chesapeake Bay Watershed are:

1. Dedicate a fixed amount of funds awarded by the BRF Grant Program to the Chesapeake Bay Watershed.
2. Track septic system upgrades and connections to WWTPs.
3. Track septage totals for the WWTPs accepting septic pump out waste in order to estimate pump out frequency.
4. Consider tracking pump outs on a more detailed level.
5. Enhance the current public information given to new septic tank permit property owners to include information about the Chesapeake Bay “pollution diet” and how regular maintenance and pump outs can reduce nitrogen loads to the Bay.
6. Specifically address septic system conversions/connection in upcoming revision of the County Master Water and Sewerage Plan.
7. Explore the use of nutrient offsets as a means to limit the impact of new septic construction within the Chesapeake Bay watershed.

Target shortfall

The WIP team acknowledges that the TMDL allocation has not been achieved through this Phase II WIP document. Programs and projects identified within this Phase II document could be reasonably completed within 3 to 4 years provided adequate funding is available and there are no future legislative mandates that require diversion of our limited resources to other programs. The team also recognizes challenges in identifying programs and projects beyond the year 2015. Below are a few of the challenges faced by many decision-makers at the local level.

1. Impossible to select private property for BMPs because private property owners may not want to commit to a future project without knowing basic things such as how much money will they receive? Can they still develop the property? What if they sell the property, can the new landowners do what they want with the property?
2. Projects are often limited to public lands for the reasons stated in #1 and because grant funds are often funded by tax dollars that can only be spent on projects that are installed on publicly accessible lands.

3. Several unknowns make long-range planning efforts highly unpredictable.
 - a. New County priorities may arise
 - b. New politics may surface
 - c. New staffing and/or departmental changes may occur
 - d. New State Legislation
 - e. Economic uncertainty
4. Funding limitations
 - a. Declining County Revenue
 - b. Reduced grant funds
 - c. Increased competition for fewer grants offering fewer dollars
5. Limited staff with technical skills and experience with the following:
 - a. Grant proposal writing
 - b. Project management
 - c. Writing and research
 - d. Applying GIS and spreadsheet calculations

For these reasons, programs and projects recommended in this plan should remain flexible. Proposed strategies that fail to become reality should be replaced with strategies that will result in equivalent nutrient reductions. Local partners must have the flexibility needed to implement adaptive management approaches. The WIP team will continue to seek out strategies that are needed to reach either the 2020 or 2025 target should the end date be extended. As a result, this plan will be updated to reflect additional strategies. Those strategies may include stormwater retrofits, bioretention projects, wetland restoration and/or living shoreline projects. In the next section, the two-year milestone is discussed.

V. Two-Year Milestones

In an effort to ensure forward progress, Maryland jurisdictions are required to submit two-year milestone documents to MDE prior to the start of a new milestone. Projects and programs proposed in this Phase II WIP document serve as our “road map” towards reaching our ultimate destination, the 2020 or 2025 target, if so amended. A two-year milestone document provides the step by step directions to implement local Phase II WIP strategies.

The first two-year milestone document, 2013 Milestones, ends on June 30, 2013 and should articulate what must occur to reduce total nitrogen (TN) loads by 1,554 pounds and total phosphorus (TP) loads by 1,440 pounds. The timeline shown in Table 9 indicates how many pounds of nutrients should be achieved annually and each milestone. Any departures from the strategies originally proposed in the Phase II WIP must attempt to achieve the same pace of nutrient reductions. WIP team members will be able to refer to the local Phase II WIP and the milestone document to evaluate progress towards reaching the annual TMDLs as well as the 2020 or 2025 target, if so amended. Ongoing tracking efforts will allow the WIP team to make improvements to the Phase II WIP or Milestone documents as needed, keeping decision-makers informed on progress.

VI. Conclusion

This document demonstrates a commitment to working towards improving and maintaining the health of the Chesapeake Bay. The process to develop a Phase II WIP was one of many attempts towards reaching the goal of a healthy and clean Chesapeake Bay. In 1983, 1987 and 2000 Bay agreements were signed to achieve clean water standards by all States. Each Bay agreement failed to achieve clean water standards. As a result, EPA was sued by the Chesapeake Bay Foundation in 2008 to enforce their law, the Clean Water Act. By 2010, EPA issued a final Chesapeake Bay TMDL that required enforcement by all Bay States. In response to the Bay TMDL, each local jurisdiction is now responsible for developing and implementing a strategy that will meet their Bay TMDL allocation. With guidance from State partners, the Worcester County Chesapeake Bay WIP Team respectfully submits this Phase II WIP document with the intent of implementing proposed strategies and continuing to seek additional programs and projects that will achieve the final target. With this plan and intent, subject to adequate funding, the Worcester County WIP team has developed an implementation plan that brings us closer to reaching the goal of a cleaner and healthier Chesapeake Bay.

Table 1. Local Watershed Implementation Plan Team

Organization	Representative	Role
Department of Natural Resources	Carrie Decker	WIP Team Liason
Worcester County Department of Development Review and Permitting	Keota Silaphone	WIP Team Leader, Planner
Worcester County Department of Development Review and Permitting	Chris McCabe	Natural Resources Administrator
Worcester County Department of Environmental Programs	Robert Mitchell	Director
Town of Snow Hill	Karen Houtman	Town Planner
Town of Pocomoke City	Russell Blake	Town Manager
Worcester County Soil Conservation District	Doug Jones	District Manager
Natural Resources Conservation Service	Nelson Brice	District Conservationist
Private Citizen	Brooks Clayville	Worcester County Farmer
The Nature Conservancy	Joe Fehrer	Coastal & Lower Shore Project Manager

Table 2. Watershed impairments*

Watershed Name	Impairments			
	Nutrients	Sediment	Biological	Bacteria
Dividing Creek				Y
Lower Pocomoke River	Y		Y	
Nassawango Creek				
Upper Pocomoke River		Y	Y	
Wicomico Creek				

*Source: Maryland Department of the Environment

Table 3. Worcester County Total Nitrogen TMDL Allocation

Source Sector	Current Nitrogen Load as of 2009	2017 Reduction Goal (70% of 2020 Target)	Chesapeake Bay TMDL (2020 Target)	Total Load Reduction Goal
Wastewater	45,662	30,588	24,128	-21,534
Urban Runoff	45,044	40,383	38,386	-6,658
Septic Tanks	14,618	10,832	9,210	-5,408
Forests	208,220	n/a	211,239	3,019

*2017 reduction goals will change should the final target date be extended to 2025

Table 4. Worcester County Total Phosphorus TMDL Allocation

Source Sector	Current Phosphorus Load as of 2009	2017 Reduction Goal (70% of 2020 Target)	Chesapeake Bay TMDL (2020 Target)	Total Load Reduction Goal
Wastewater	5,124	2,810	1,818	-3,306
Urban Runoff	3,327	2,797	2,570	-757
Septic Tanks	0	n/a	0	0
Forests	4,520	n/a	4,576	56

*2017 reduction goals will change should the final target date be extended to 2025

Table 5. Maryland Assessment Scenario Tool Summary

BMP	Description	Land Use	% Amount*	Responsible Organization
Street Sweeping	Remove litter and sediment from town streets	Nonregulated impervious development	60-100% of streets	SH and PC
Urban and Rural Tree Planting; Urban Tree Canopy	Native tree planting on public lands in urban and rural areas; WC Newtown Park (5 acres of native trees by May 2012); Forest Conservation Funds and Critical Area Fee in lieu	Nonregulated impervious development	6	SH (3%), PC(3%), WC (5%)
Rain gardens (City Park and Public Places)	CBT grant proposal	Nonregulated impervious development	1	PC, WC
Bioretention (Pocomoke Middle School)	CBT grant proposal	Nonregulated impervious development	10 rain barrels	PC, WC
Rain barrels	CBT grant proposal	Nonregulated impervious development	0.5	PC, WC, SH
Rain garden education and outreach	CBT grant proposal and Critical Area match	Nonregulated impervious development		WC
Install two rain barrels at Newtown Park pavilion	CBT grant; work with Pocomoke Middle Schools	Nonregulated impervious development		WC
Rain garden and tree plantings	Pocomoke City and Snow Hill parks	Nonregulated impervious development		SH, PC

* Unless otherwise designated.

Table 6. Septic System Upgrades

Watershed Name	2006-2010		2011-2025	
	Outside Critical Area	Inside Critical Area	Outside Critical Area	Inside Critical Area
Dividing Creek	0	0	4	0
Lower Pocomoke River	2	18	25	25
Nassawango Creek	0	0	2	0
Upper Pocomoke River	0	0	15	1
Wicomico Creek	0	0	0	0
Grand Total	2	18	46	26

Source: Worcester County Commissioners. *Water Resources Element*. Adopted October 4, 2011.

Table 7. Total Number of Septic Systems Inside and Outside of the Critical Area

Watershed Name	Number of septic systems, 1960 - 2010	Predicted no. of connections, 2011 - 2025	Remaining septic systems, 1960 - 2010	Predicted no. of new septic systems, 2011-2025	Total no. of septic systems by end of 2025
See equations 1 & 2	S_i	C	S_c	S_n	S_f
Inside Critical Area					
Dividing Creek	0	0	0	0	0
Lower Pocomoke River	152	30	122	45	167
Nassawango Creek	12	12	0	15	15
Upper Pocomoke River	4	0	4	0	4
Wicomico Creek	0	0	0	0	0
Total	168	42	126	60	186
Outside Critical Area					
Dividing Creek	224	0	224	2	226
Lower Pocomoke River	1,461	60	1,401	12	1,413
Nassawango Creek	401	0	401	4	405
Upper Pocomoke River	774	21	753	7	760
Wicomico Creek	2	0	2	1	3
Total	2,862	81	2,781	26	2,807

Note: While MDP forecasts an additional 1,516 septic tanks from 2011-2025, the Worcester County Department of Environmental Programs remains confident that County-level historical data supports the 540 septic tank estimates listed in Tables 8 and 9. Source: Worcester County Commissioners. *Water Resources Element*. Adopted October 4, 2011.

Table 8. Summary of Septic Systems

Watershed Name	No. of septic systems, 1960-2010	No. of septic systems, 2011-2025	Change in no. of septic systems
Dividing Creek	224	226	2
Inside Critical Area	0	0	0
Outside Critical Area	224	226	2
Lower Pocomoke River	1,613	1,580	-33
Inside Critical Area	152	167	15
Outside Critical Area	1,461	1,413	-48
Nassawango Creek	413	420	7
Inside Critical Area	12	15	3
Outside Critical Area	401	405	4
Upper Pocomoke River	778	764	-14
Inside Critical Area	4	4	0
Outside Critical Area	774	760	-14
Wicomico Creek	2	3	1
Inside Critical Area	0	0	0
Outside Critical Area	2	3	1
Total Inside CA	168	186	18
Total Outside CA	2,862	2,807	-55
Grand total	3,030	2,993	-37

Source: Worcester County Commissioners. *Water Resources Element*. Adopted October 4, 2011.

Table 9. Milestones

Sector	2013 Milestone		2015 Milestone		2017 Milestone		2019 Milestone		Final Milestone	Reduction Goal (lbs)
	July 1, 2011	June 30, 2013	July 1, 2013	June 30, 2015	July 1, 2015	June 30, 2017	July 1, 2017	June 30, 2019	July 1, 2019 to June 30, 2020	
Wastewater										
TN		21,534	0	0	0	0	0	0	0	21,534
TP		3,306	0	0	0	0	0	0	0	3,306
Urban Runoff										
TN	777	777	777	777	777	777	667	667	662	6,658
TP	89	89	89	89	89	89	75	75	73	757
Septic										
TN	631	631	631	631	631	631	541	541	540	5,408

*Interim Milestones will change should the current 2020 target date be extended to 2025 as currently being discussed.

