Achieving the Chesapeake Bay Restoration Mandate in Maryland

DEPARTMENT OF LEGISLATIVE SERVICES 2012

Achieving the Chesapeake Bay Restoration Mandate in Maryland

Department of Legislative Services
Office of Policy Analysis
Annapolis, Maryland

December 2012

Contributing Staff

Writers

Lesley G. Cook
Andrew D. Gray
Chantelle M. Green
Crystal L. Heide
Amanda M. Mock
Ryane M. Necessary

Reviewers

Jonathan D. Martin
John W. Rohrer
Carol L. Swan

For further information concerning this document contact:

Library and Information Services
Office of Policy Analysis
Department of Legislative Services
90 State Circle
Annapolis, Maryland 21401

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December 11, 2012

The Honorable Thomas V. Mike Miller, Jr., President of the Senate
The Honorable Michael E. Busch, Speaker of the House of Delegates
Members of the Maryland General Assembly

Ladies and Gentlemen:

While efforts to restore the health of the Chesapeake Bay have proved insufficient to date, a federally mandated regional restoration initiative may finally prompt success. Maryland appears well positioned to meet its short-term bay restoration goals, in part due to several recent regulatory and statutory actions. However, the State's long-term success hinges on finalizing a plan for funding this effort and identifying effective strategies for managing pollution from new growth and development.

In an effort to identify additional steps that may warrant action, the Natural Resources, Environment, and Transportation Workgroup within the Office of Policy Analysis prepared this report on the current policy challenges associated with achieving bay restoration. Specifically, the report (1) provides bay restoration policy background and status information; (2) discusses challenges associated with funding and accounting for future growth in pollution; and (3) presents several policy considerations.

We trust this report will prove useful to the General Assembly in better understanding the State's bay restoration efforts and options to help the State achieve its bay restoration goals. If you would like additional information regarding this report, please contact Amanda Mock at (410) 946-5510.

Sincerely,

Warren G. Deschenaux
Director

WGD/AMM/ncs

cc: Ms. Lynne B. Porter
Mr. Karl S. Aro

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Chesapeake Bay Policy Background and Status

This report provides an update on Maryland's efforts to develop and implement the plans and policies necessary to achieve mandatory Chesapeake Bay restoration goals. After describing the State's current efforts and recent progress, the report examines two significant challenges the State faces, namely (1) securing adequate funding for bay restoration activities; and (2) managing the impacts of continued growth and development. After examining these two issues in more depth, the report discusses several policy considerations.

Policy Framework

Past efforts to restore the Chesapeake Bay watershed, which includes parts of Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia, have resulted in insufficient progress and continued poor water quality. However, a regional restoration initiative, required by the federal government and characterized by accountability measures and shorter term program evaluation, is underway. The current bay restoration policy framework is described below.

Executive Order

In May 2009, President Barack Obama signed an executive order that recognizes the Chesapeake Bay as a national treasure and calls on the federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed. The Chesapeake Bay Protection and Restoration Executive Order established a Federal Leadership Committee to oversee the development and coordination of reporting, data management, and other activities by federal agencies involved in bay restoration. Pursuant to the order, in May 2010, federal agencies released a strategy document summarizing a suite of federal initiatives that could be implemented to restore and protect the bay. Among other things, the document noted that the U.S. Environmental Protection Agency (EPA) would implement a Chesapeake Bay Total Maximum Daily Load (TMDL), expand regulation of urban and suburban stormwater and concentrated animal feeding operations, and increase enforcement activities and funding for state regulatory programs.

Two-year Milestones

Concurrent with issuance of the Chesapeake Bay executive order, bay jurisdictions committed to achieving specific, short-term bay restoration milestones in order to assess progress towards achieving nitrogen, phosphorus, and sediment pollution reduction goals. As part of this effort, jurisdictions submit pollution reduction progress and program information to EPA for review every two years. This milestone process has been incorporated into the Chesapeake Bay

TMDL process, which is described below, and is serving as an important periodic assessment tool.

Chesapeake Bay Total Maximum Daily Load

In December 2010, EPA established a Chesapeake Bay TMDL, as required under the federal Clean Water Act and in response to consent decrees in Virginia and the District of Columbia. The TMDL sets the maximum amount of nutrient and sediment pollution the bay can receive and still attain water quality standards. It also identifies specific pollution reduction requirements; all reduction measures must be in place by 2025, with at least 60% of the actions completed by 2017. The final target pollution loads for the five major basins in Maryland are shown in **Exhibit 1**. As shown in **Exhibit 2**, the State must establish pollution control measures by 2025 that, based on 2010 levels, will reduce nitrogen loads to the bay by 22.0%, phosphorus loads by 14.9%, and sediment loads by 1.9%.

Exhibit 1
Final Target Pollution Loads for Maryland's Major Basins
(Million Pounds Per Year)

Major Basin	Nitrogen Pollution	Phosphorus Pollution	Sediment Pollution
Susquehanna	1.19	0.06	64
Eastern Shore	11.82	1.02	189
Western Shore	9.77	0.55	243
Patuxent	3.10	0.24	123
Potomac	15.29	0.94	731
Total	**41.17**	**2.81**	**1,350**

Source: Maryland's Phase II Watershed Implementation Plan

Exhibit 2
Maryland's Pollution Reduction Goals in the Bay TMDL
(Million Pounds Per Year)

Pollutant	2010 Loads	Bay TMDL Target Load	Percent Reduction
Nitrogen	52.76	41.17	22.0%
Phosphorus	3.30	2.81	14.9%
Sediment	1,376	1,350	1.9%

TMDL: Total Maximum Daily Load

Source: Maryland Department of the Environment; U.S. Environmental Protection Agency

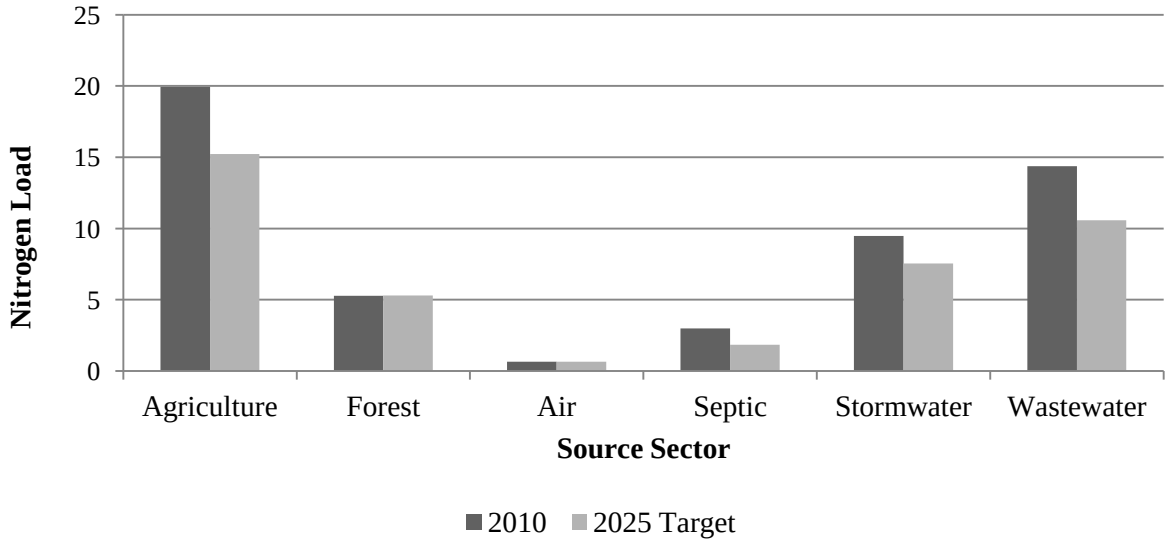
Watershed Implementation Plans

As part of the TMDL, bay jurisdictions must develop Watershed Implementation Plans (WIP) that identify the measures being put in place to reduce pollution and restore the bay. The WIPs (1) identify pollution load reductions to be achieved by various source sectors and in different geographic areas; and (2) help to provide "reasonable assurance" that sources of pollution will be cleaned up, which is a basic requirement of all TMDLs.

In 2010, bay jurisdictions submitted Phase I WIPs that detail how the jurisdiction plans to achieve its pollution reduction goals under the TMDL. Maryland's Phase I WIP proposed an aggressive schedule for reducing nutrient and sediment pollution and focused on (1) developing new pollution reduction technology and approaches before 2017; (2) expanding implementation of existing strategies, such as wastewater treatment plant (WWTP) upgrades and stormwater control projects; and (3) improving regulatory requirements.

The bay jurisdictions were required to submit Phase II WIPs in early 2012 that established more detailed strategies to achieve the bay TMDL on a geographically smaller scale. In the Phase II WIP, the State allocated the final target pollution loads by county-geographic area and by source sector. **Exhibit 3** shows Maryland's current and 2025 target nitrogen pollution loads by source sector and illustrates that agriculture, wastewater, and stormwater are the major sources of pollution and are being targeted for significant load reductions. A Phase III WIP, which must be submitted to EPA in 2017, will ensure that all practices are in place by 2025 so that water quality standards can be met. EPA will modify the TMDL, if necessary, in December 2017 after all the bay jurisdictions have submitted their final Phase III plans.

Exhibit 3
Current and Target Nitrogen Pollution Loads by Source
(Million Pounds Per Year)



Source: Maryland's Phase II Watershed Implementation Plan

Accountability Framework

EPA has the discretionary authority to ensure that the bay jurisdictions develop and implement appropriate WIPs; attain appropriate two-year milestones of progress; and provide timely and complete information as part of the TMDL process. Specifically, to ensure nutrient and sediment pollution reductions, EPA may, among other things, increase oversight of state-issued pollution permits, require additional pollution reductions, prohibit new or expanded pollution discharges, redirect or condition federal grant funds, and revise water quality standards to better protect local and downstream waters. EPA has used this authority to encourage more timely bay restoration action. Last summer, EPA withheld $1.2 million in federal aid from Virginia and made allocation of the funds contingent upon the state addressing specified stormwater management issues.

Progress to Date

2009-2011 Milestones Assessment

Maryland achieved its first set of two-year bay restoration milestone goals and is implementing strategies set forth in its WIP. The first set of two-year milestones required Maryland to reduce nitrogen loads by 3.75 million pounds and phosphorus loads by 193,000 pounds (relative to calendar 2008 load levels). In June 2012, it was announced that Maryland had met its 2009-2011 milestones and was on track to achieve its 2012-2013 milestones. Specifically, it was reported that Maryland:

- planted a record number of cover crops (429,818 acres), meeting about 123% of its cover crop goal for the milestone period;

- upgraded 25 of the State's largest WWTPs, meeting 165% of the wastewater nitrogen reduction goal for the milestone period;

- met 88% of its stormwater goals for the milestone period by establishing more rigorous requirements for new development and improving existing stormwater controls; and

- planted 895 acres of forest buffers to naturally remove nutrients and sediment, meeting 166% of its forest buffer goals for the milestone period.

Exhibit 4 shows the State's 2009 to 2011 pollution reduction milestones period, as reported in an EPA assessment. While the State met and even exceeded several goals, it did not meet all of its goals. For example, Maryland committed to installing 125 agricultural water control structures, but only met 39% of that goal. Additionally, the State committed to stormwater management retrofits to address 119,700 pounds of nutrients, but met only 88% of that goal. During the milestone period, Maryland assessed and adapted goals to reflect actual conditions and overshot its reduction goals for added security. Overall, EPA noted that Maryland "…has made significant progress in reducing pollution and moving forward with Phase I WIP commitments…"

Exhibit 4
Maryland's 2009-2011 Pollution Reduction Strategies and Milestones

	2009-2011 Commitment	% Achieved
Agriculture		
Animal Waste Management Systems, livestock/poultry (structures)*	130	109%
Animal Waste Management Systems, runoff control (systems)*	175	117%
Conservation Plans/SCWQP (acres)	257,049	58%
Cover Crops (acres/year)*	325,000	123%
Dairy and Poultry Manure Incorporation Technology (acres/year)*	2,500	190%
Forest Buffers (acres)	895	166%
Grass Buffers (acres)	2,319	155%
Heavy Use Poultry Areas Concrete Pads (farms)*	400	91%
Land Retirement (acres)	2,500	173%
Manure Transport (tons/year)	10,000	339%
Nutrient Management Plan Enforcement (acres)*	100,000	100%
Pasture Grazing/Stream Protection (acres)*	7,400	107%
Water Control Structures (structures)*	125	39%
Wetland Restoration (acres)	1,155	116%
Urban/Suburban		
Septic Retrofits (systems)	3,139	96%
Stormwater Management Retrofits (pounds)**	119,700	88%
Wastewater		
Wastewater Nitrogen (pounds reduced)	930,000	165%
Wastewater Phosphorus (pounds reduced)	39,000	367%
Air		
Maryland Health Air Act (Nitrogen pounds reduced)*	305,882	100%

SCWQP: Soil Conservation and Water Quality Plan

*Achievement data from BayStat.
**Original commitment was 90,000 acres; acres converted to pound reduction; achievement data from BayStat.

Note: For some of the best management practices above, the 2009-2011 commitment was adapted from the original commitment.

Source: U.S. Environmental Protection Agency, BayStat

Recent Bay Restoration Policy Actions

As noted by EPA in its June 2012 assessment of Maryland's progress to date, the State appears well positioned to meet its next two-year milestones, in part because of several recent legislative and regulatory actions, which are described below.

Bay Restoration Fee Increase: Chapter 428 of 2004 established the Bay Restoration Fund (BRF), which is administered by the Maryland Department of the Environment (MDE). One of the main goals of the fund is to provide grants to owners of WWTPs to reduce pollution by upgrading the systems with enhanced nutrient removal technology. Upgrading the State's 67 major publicly owned WWTPs is a key pollution-reduction strategy indentified in the State's Phase II WIP. The fund also provides financing to upgrade septic systems with best available technology (BAT) to remove nitrogen and plant cover crops that soak up excess nutrients from the soil.

The BRF's primary revenue source is a fee imposed on users of wastewater facilities, septic systems, and sewage holding tanks. At the urging of the Bay Restoration Fund Advisory Committee (which is charged with making recommendations regarding any increase in the bay restoration fee deemed necessary to meet the financing needs of the fund), Chapter 150 of 2012 generally doubled the BRF fee beginning July 1, 2012, in order to address a significant funding shortfall that would have made it very difficult to complete the upgrades to the 67 major publicly owned WWTPs by 2017, as required by the WIP. Chapter 150 also made several other changes such as establishing additional uses for the fund beginning in fiscal 2018. As a result of the Act, the State will be better positioned to complete the WWTP upgrades by 2017. The additional funding will also support upgrades to approximately 2,600 additional septic systems through 2017 and provide cost-share assistance for farmers to plant over 440,000 additional acres of cover crops through 2017.

Best Available Technology Regulations: While nitrogen pollution loading from many sources is declining, nitrogen loading from septic systems continues to increase due to development. Thus, the State's Phase II WIP includes a strategy to upgrade approximately 46,000 additional septic systems with BAT between 2010 and 2017 and to connect nearly 8,000 septic systems to WWTPs between 2010 and 2017. While Chapter 280 of 2009 already required BAT for new and replacement septic systems in the Chesapeake Bay Critical Area or the Atlantic Coastal Bays Critical Area, new regulations finalized in September 2012 expand the requirements of Chapter 280 to require BAT for all septic systems serving new construction in the Chesapeake Bay and Atlantic Coastal Bays watersheds, and in the watershed of any nitrogen impaired water body. The regulations also require BAT for any replacement system on property located in the Chesapeake Bay Critical Area and Atlantic Coastal Bays Critical Area, which is consistent with Chapter 280. Additionally, the regulations require operation and maintenance of BAT for the life of the system. The recent regulatory changes should help the State reduce nitrogen loading attributable to new development.

Local Stormwater Management Fee Authority: Due to the continued concern regarding nitrogen loading to the bay from stormwater runoff, stormwater best management practices

(BMP) are a significant component of the State's Phase II WIP. Legislation enacted in 2007 sought to enhance the State's stormwater management program by requiring environmental site design (ESD) to the maximum extent practicable, and minimizing the use of structural stormwater management practices (*e.g.*, stormwater ponds and open channels). The ESD relies on integrating site design, natural hydrology, and smaller controls to capture and treat stormwater runoff. Regulations implementing Chapters 121 and 122 of 2007 were approved in April 2010. As a means of assisting local governments, Chapter 151 of 2012 requires each county and municipal corporation subject to a National Pollutant Discharge Elimination System Phase I municipal storm sewer system permit (currently Baltimore City and the nine most populous counties) to adopt local laws or ordinances necessary to establish an annual stormwater remediation fee and a local watershed protection and restoration fund by July 1, 2013. These funds are to be used to provide financial assistance for the implementation of local stormwater management plans. Money derived from the fee is to be used only to support additional (not existing or ongoing efforts) improvements for stormwater management, including stream and wetland restoration projects; operation and maintenance of systems and facilities; and monitoring, inspection, and enforcement activities.

Agricultural Nutrient Management Regulations: The Maryland Department of Agriculture (MDA) recently adopted regulations that incorporate the latest scientific research and seek to further restrict pollution from agricultural lands in order to help the State achieve its bay restoration goals. The regulations, which took effect in October 2012, establish more rigorous requirements concerning the use of manure, biosolids, and other organic nutrient sources on crop fields. Key features of the new regulations include the following:

- Beginning July 1, 2016, nutrient applications will be prohibited between November 2 and February 28 for Eastern Shore farmers and between November 16 and February 28 for Western Shore farmers.

- Organic nutrients must be incorporated into the soil within 48 hours of application.

- Farmers will be required to plant cover crops when they use organic nutrient sources in the fall.

- Beginning in 2014, farmers will be required to establish a 10 to 35 foot "no fertilizer application zone" adjacent to surface water and streams.

- Beginning in 2014, farmers will be required to protect streams from livestock traffic by providing fencing or approved alternative BMPs.

- Fall fertilizer applications for small grains must be limited.

Managing Growth: Maryland is the fifth most densely populated state, and its population of more than 5.7 million people is expected to grow by at least 15% over the next 25 years. Maintaining nutrient and sediment reductions even while the State continues to grow will, therefore, be a significant challenge.

In accordance with State law, over the past three years, the Maryland Department of Planning (MDP) has worked with State agencies, local governments, private industry, and the general public to develop the State's first comprehensive development plan, known as PlanMaryland. PlanMaryland is a policy framework for growth and preservation in the State and a blueprint to help guide State agencies in their decisionmaking on programs and funding for growth and preservation. PlanMaryland was finalized in December 2011 and the Governor simultaneously filed an executive order which outlines a process for implementing the plan. PlanMaryland identifies three primary State planning objectives and proposes to achieve these goals by focusing State programmatic and financial assistance in specific geographic areas and streamlining State regulations and procedures. In a September 2012 PlanMaryland report submitted to the Governor, MDP noted that more than 90 implementing strategies are being refined; State agencies are working with local governments to identify areas to promote growth and protect valued resources; and an interactive mapping tool was developed to assist with the process.

To steer future residential growth toward more urban areas served by public sewer and away from undeveloped land that requires the use of septic systems, Chapter 149 of 2012 establishes a system of land use tiers which may be adopted by local jurisdictions. Beginning December 31, 2012, the Act prohibits a jurisdiction from approving a major residential subdivision served by septic systems, community sewerage systems, or shared systems unless it adopts the growth tiers. However, a jurisdiction that does not adopt a growth tier may authorize either a minor residential subdivision served by septic systems, or any subdivision in a "Tier I" area served by "public sewer." Specific land use and sewerage criteria and restrictions apply to each of the four growth tiers. Property within minor residential subdivisions is generally restricted from further subdivision beginning December 31, 2012. The Act establishes several exceptions from these restrictions and allows for the transfer of subdivision rights among specified agricultural property owners to mitigate the effect of the Act's restrictions. Finally, the Act requires MDE to propose regulations by December 2012 that establish nutrient offset requirements for new residential major subdivisions within Tier III areas to be served by septic systems or shared systems.

Opposition to Bay Restoration Efforts

While the recent legislative and regulatory changes described earlier will help the State achieve the nutrient and sediment reduction commitments required by the TMDL, significant legal and policy challenges remain. Several legal challenges to the bay restoration effort are currently underway. In January 2011, the American Farm Bureau Federation, the National Homebuilders Association, and others, filed a lawsuit against EPA alleging that by establishing the Chesapeake Bay TMDL, EPA exceeded its authority and used inaccurate or inadequate scientific information, among other things. In addition, two environmental organizations

recently filed a lawsuit that seeks to prevent EPA from implementing provisions of the TMDL that allow the use of pollution trading programs. Furthermore, several local governments, with assistance from a Maryland law firm, have formed a coalition to challenge the State's bay restoration efforts, potentially through legal measures. These actions could have a significant impact on the State's bay restoration efforts.

While the State has developed detailed plans for achieving the Chesapeake Bay TMDL, these plans are not complete. Currently, the State lacks a clear strategy for (1) paying for bay restoration actions; and (2) accounting for new pollution associated with future growth. Until these two overarching policy issues are resolved, significant and lasting improvements to the bay's health are unlikely. The remainder of this report addresses the funding and growth policy challenges in more detail.

The Funding Challenge

One of the State's most formidable bay restoration challenges is to identify new revenue sources and financing mechanisms to achieve the State's TMDL goals. In response to this need, the General Assembly did recently pass legislation – Chapters 150 and 151 of 2012 – to help generate additional funding for this purpose. Chapter 150 is estimated to increase BRF revenues by over $53 million in fiscal 2013 and by more than $55 million beginning in fiscal 2015. Chapter 151 may generate significant local stormwater remediation fee revenues that could effectively reduce or redirect State expenditures that would otherwise support these efforts. While these new revenue sources will clearly help the State achieve its bay restoration goals, new funding sources and approaches are still required for this aggressive effort, as discussed below.

Maryland's WIP Cost Estimate

Implementation of the State's Phase II WIP will demand significant resources and commitment at the federal, State, and local level and within both the public and private sectors. As shown in **Exhibit 5,** the total estimated cost of implementing Maryland's Phase II WIP, covering calendar 2010 through 2025, is approximately $14.4 billion. While this cost estimate provides helpful information, it is incomplete and may change significantly. For example, among other things, the estimate does not account for financing costs, inflation, private and federal government costs (*i.e.*, industrial source upgrades and federal WWTPs), and certain ongoing programmatic costs.

Exhibit 5
Maryland's Estimated Phase II WIP Implementation Costs
($ in Millions)

Source Sector	2010-2017 Cost	Total 2010-2025 Cost
Agriculture	**$498**	**$928**
Municipal Wastewater	**2,368**	**2,368**
Major Municipal Plants	2,306	2,306
Minor Municipal Plants	62	62
Stormwater	**2,546**	**7,388**
Maryland Department of Transportation	467	1,500
Local Government	2,079	5,888
Septic Systems	**824**	**3,719**
Upgrades	562	2,358
Connections	237	1,273
Pumping	25	88
Total	**$6,236**	**$14,403**

Note: The exhibit does not reflect costs associated with controlling combined sewer and sanitary overflows or the implementation of the Healthy Air Act. The exhibit reflects the final Phase II WIP estimate released October 26, 2012.

Source: *Phase II Watershed Implementation Plan*; Maryland Department of the Environment

The State's Phase II WIP implementation costs are allocated into four main sectors: agriculture, municipal wastewater, stormwater, and septic systems. Some of the major categories of implementation costs and the entities involved in addressing these costs are described in further detail below.

- ***Agricultural Best Management Practices –*** Funding for agriculture sector improvements represents $928 million or 6% of the total estimated WIP implementation cost. Currently, implementation of agricultural BMPs has been funded with private, federal, and State funding. Recent nutrient management regulations placed additional financial burden on farmers.

- ***Municipal Wastewater Treatment Plant Upgrades –*** Funding for municipal wastewater sector improvements represents $2.4 billion or 16% of the total estimated WIP implementation cost. State BRF revenue is providing a significant portion of the funding necessary to upgrade the State's major publicly owned WWTPs over the next five years. However, the source and likelihood of the funding necessary to upgrade the majority of minor municipal WWTPs is less clear.

- ***Local Government Stormwater Management*** **–** Funding for local stormwater management sector improvements represents $5.9 billion or 41% of the total estimated WIP implementation cost. Although Chapter 151 will help generate local funding, the fiscal impact of this legislation is unknown at this time. Furthermore, current economic conditions have limited what role, if any, the State will play in mitigating some of the financial burden that will be assumed by local government. Traditional State capital funding sources (*e.g.*, pay-as-you-go and general obligation bond funds) are likely to remain constrained in the coming years. Consequently, the ability of local jurisdictions to finance stormwater projects required by the WIP remains a concern.

- ***Transportation Stormwater Management*** **–** Funding for stormwater management sector improvements associated with State transportation infrastructure represents $1.5 billion or 10% of the total estimated WIP implementation cost. The State Highway Administration (SHA) owns over 2,500 stormwater management facilities and nearly 17,000 lane miles of roadway located throughout the State. Many of these roadway storm drain systems must comply with federal stormwater permits that require nutrient and sediment pollution to be reduced to a specified level by retrofitting systems and/or implementing practices such as forest buffer planting, stream and wetland restoration, pavement removal, or operational practices (*e.g.*, street sweeping). The Maryland Department of Transportation's (MDOT) 2012 *Consolidated Transportation Program* (CTP) included $55.1 million in funding for SHA's WIP efforts, approximately 4% of the total $1.5 billion estimated need. MDOT's draft 2013 CTP includes $91.2 million in fiscal 2013 to 2017 for SHA's WIP efforts. SHA is prioritizing lower cost projects that do not involve right-of-way acquisition and deferring more costly strategies to the future. **Exhibit 6** shows the significant funding gap, as of January 2012, between the 2012 CTP and what is required to achieve the State's 2017 goal.

- ***Septic System Projects*** **–** Funding for septic system sector improvements represents $3.7 billion or 26% of the total estimated WIP implementation cost. Septic system projects are among the most costly BMPs. MDE estimates that it costs approximately $13,000 to upgrade a system to BAT and approximately $30,000 to connect a system to an advanced WWTP. The BRF provides some funding for costs associated with upgrading septic systems and sewage holding tanks. Also, the recent BAT septic system regulations effectively allocate more financial responsibility for upgrading septic systems to developers and homeowners. Furthermore, the State's final growth offset strategy (discussed later in the paper) will likely include new requirements for reducing pollution from new or replacement septic systems.

Exhibit 6
State Highway Administration Watershed Implementation Plan Funding
Fiscal 2012-2017
($ in Millions)

	2012	2013	2014	2015	2016	2017	Total
CTP Funding	$15.6	$19.4	$11.1	$9.0	$0	$0	$55.1
Estimated Need	15.6	50.0	50.0	75.0	100.0	100.0	390.6
Difference	**$0**	**-$30.6**	**-$38.9**	**-$66.0**	**-$100.0**	**-$100.0**	**-$335.5**

CTP: *2012-2017 Consolidated Transportation Program*

Source: Maryland Department of Transportation; Department of Legislative Services

WIP Funding Shortfall

While a reliable estimate of the State's Phase II WIP implementation funding shortfall is not available, it is likely significant. In early 2012, the Department of Legislative Services (DLS) estimated the funding shortfall based on the Phase I WIP, which had a total estimated implementation cost of $11.1 billion. Specifically, DLS projected that existing State funding sources would provide approximately $2.8 billion between fiscal 2010 and 2017, leaving a projected funding shortfall of about $8.3 billion over that time period. It was further noted that WWTP and stormwater retrofits would require significant State and local government funding.

Strategy Considerations

In its Phase II WIP, Maryland distributed pollution reduction responsibility among the various pollution sources and did not necessarily propose the most cost-effective approaches. The Phase II WIP notes that the "…State's allocation of the maximum allowable load for each source is based on *equity* (fairness) rather than on *efficiency* (cost)…" and "…the allocations are based on the "polluter pays" principle in which everyone contributing to the problem must contribute to the solution." It is further argued that assigning equitable responsibility for pollution reduction helps ensure that sectors with lower cost pollution reduction practices (*e.g.*, agriculture sector) are not allocated a majority of the restoration burden. Pursuing the most cost-effective approaches has received attention in the past. In 2004, the federal-state Chesapeake Bay Watershed Blue Ribbon Finance Panel recommended establishing a regional financing authority to fund the most cost-effective best management practices at the watershed scale.

The use of marketplace strategies as a means of minimizing bay restoration costs is mentioned in the State's Phase II WIP. Specifically, it says that "…costs are expected to

decrease when market forces, and other strategy refinements, come into play in the future." It is anticipated that instead of implementing more costly practices such as septic system upgrades, individuals will be able to identify and pay for reduction from less costly sources. Specifically, the State's pending strategy for offsetting future pollution growth, which is expected to rely heavily on nutrient trading programs, may be able to harness the market and stimulate lower cost strategies. However, the potential impact of nutrient trading and other market-based strategies on overall WIP implementation costs is uncertain.

Responsibility Trends

Appendix A of the State's Phase II WIP provides information about funding the various WIP implementation strategies through 2017. While the likelihood of securing all of the funding necessary to implement this plan is still unclear, the allocation of funding responsibility among the various sectors is beginning to emerge. In general, the State and federal governments have taken responsibility for generating the revenue necessary to upgrade major WWTPs, with local governments assuming some of the subsidiary preconstruction costs, and the private sector assuming responsibility for minor industrial discharges. Stormwater costs are being assumed by MDOT and local governments, as recently underscored by the new requirement that local governments establish local stormwater remediation fees (Chapter 151 of 2012). Agriculture costs are borne by the State through efforts such as the Maryland Agricultural Water Quality Cost-share and Cover Crop programs, and by individual farmers with assistance from the federal government through programs such as the Environmental Quality Incentives Program. The Phase II WIP notes that more detailed agriculture funding strategies will be forthcoming. Finally, septic system upgrades are funded through BRF, to the extent funding is available, and by businesses and homeowners with septic systems.

Cost Estimate Challenges

Because the Phase II WIP incorporates dozens of strategies involving multiple partners across the State, it has been challenging to estimate the State's bay restoration funding needs. Estimating restoration costs has also been complicated by, among other things, (1) strategy adjustments in response to new demands and opportunities; (2) differing definitions of costs; and (3) conflicting ideas about what costs should be included. Overall, development of a reasonable cost estimate is clearly difficult. Three challenges to estimating these costs – potential fluctuations in federal funding levels, the need for monitoring and verification, and variability in best management practice implementation costs – are discussed in greater detail below.

Federal Funding – Federal funding for Chesapeake Bay restoration is allocated through a number of grants and is distributed directly to the State, local governments, nonprofit organizations, and individuals. **Exhibit 7** provides an overview of large fiscal 2013 federal funding awards for State agency bay restoration efforts. As illustrated, the largest federal grant is capitalization funding for the State's Water Quality Revolving Loan Fund, which provides low-interest loans to counties and municipalities to finance specified WWTP, septic system, and

Exhibit 7
Federal Funding for State Agency Bay Restoration Programs Greater Than $1.0 Million
Fiscal 2013

CFDA	Federal Funding Source	Recipient	FY 2013 Amount
66.458	Capitalization Grants for Revolving Funds	MDE	$35,959,501
66.466	Chesapeake Bay Program (Implementation Grant)	DNR; MDE	5,351,134
11.419	Coastal Zone Management Administration Awards	DNR	3,844,569
15.615	Cooperative Endangered Species Conservation Fund	DNR	3,021,000
11.452	Unallied Industry Projects	DNR	2,650,000
66.460	Nonpoint Source Implementation Grant	MDE	2,159,839
15.605	Sport Fish Restoration	DNR	2,000,285
11.457	Chesapeake Bay Studies	DNR, MSDE	1,289,711
10.664	Cooperative Forestry Assistance	DNR, MDA	1,268,967

CFDA: Catalog of Federal Domestic Assistance
DNR: Department of Natural Resources
MDA: Maryland Department of Agriculture
MDE: Maryland Department of the Environment
MSDE: Maryland State Department of Education

Source: Department of Budget and Management; Department of Legislative Services

stormwater construction projects. Federal funding is also allocated directly to local governments, nonprofits, and individuals from a variety of sources, such as the $9.2 million awarded by EPA and the National Fish and Wildlife Foundation in August 2012 to community initiatives throughout the watershed.

The State, local governments, businesses, and individuals all rely on federal funding to implement pollution reduction efforts throughout the State. However, future federal funding for bay restoration is uncertain. For example, due to lack of congressional action, the 2008 Farm Bill expired without a new bill or extension to take its place, effectively ending funding for many bay restoration related programs. Also, due to lack of congressional action on the fiscal 2013 budget, federal agencies are operating in a limited manner in accordance with the provisions of a continuing appropriations resolution. Furthermore, the impending federal "fiscal cliff," due to a number of laws which (if unchanged) could result in tax increases and spending cuts, may constrain federal funding for bay restoration in the future. To the extent federal funding for pollution reduction efforts in the watershed declines, the State will be required to identify other funding sources to achieve its TMDL goals.

Monitoring and Verification Infrastructure **–** The needs and costs associated with establishing the infrastructure necessary to effectively track, monitor, and verify all of the WIP implementation efforts are not clear at this time. While some State programs have clear

monitoring and verification protocols in place, others do not. Furthermore, there has been a shift towards more rigorous monitoring/verification protocols (*e.g.*, taking photos of new installations) that involve the use of geographic information systems mapping technology. The use of mapping technology can be costly, as it requires investment in software and equipment, field personnel, and employee training, among other things.

Variability in Estimated BMP Implementation Costs – It is possible that the actual cost to implement various BMPs in the Phase II WIP will differ significantly from the estimated cost. It has been particularly difficult to document the reductions in nonpoint source pollution loads (*i.e.*, pollution from unspecified diffuse sources, such as stormwater runoff) from BMPs, potentially due to the lag time between implementation and when the effects become apparent in water quality, and natural variability in water quality. Efforts are underway at the State and federal level to better estimate the costs of implementing various BMPs. EPA is conducting a study of BMP unit costs across the Chesapeake Bay watershed that may help the bay jurisdictions make better decisions. MDE and the Department of Budget and Management are also conducting cost-effectiveness analysis of BMPs, which is anticipated in early 2013.

Funding Strategies in Other Bay Jurisdictions

All of the bay jurisdictions are facing the challenge of identifying adequate revenue to finance WIP implementation. However, based on a review of the various Phase II WIPs, Maryland's efforts to quantify and address implementation costs are more advanced than those of the other jurisdictions.

Every bay jurisdiction is facing significant costs and funding gaps. There is no single or common funding source or strategy that will alleviate these concerns, but many jurisdictions are beginning to use creative methods to raise revenues. From popular financing strategies such as stormwater utilities and nutrient trading, to less common approaches such as green infrastructure and utilization of state lottery funds, bay jurisdictions have made some progress towards closing the funding gap. All of the bay jurisdictions, including Maryland, use in-kind and cash matching from various partners and agencies; state general funds for staffing and matching federal grants; and federal grant funds from EPA, the U.S. Department of Agriculture, and the U.S. Department of the Interior. A brief summary of each bay jurisdiction's funding strategies and sources, based on information in their WIPs, is provided in **Appendix 1**.

When considering various WIP implementation funding approaches, all of the bay jurisdictions are grappling with distributing funding responsibility among the various pollution sources versus pursuing the most cost-effective strategies. As previously mentioned, Maryland allocated pollution reduction responsibility among the various sources and did not prioritize the most cost-effective and/or administratively simple strategies. Other jurisdictions appear to be taking a similar approach. For example, the District of Columbia charges a stormwater fee based on the amount of impervious surface on a property, rather than charging a flat fee for all property owners. Thus, property owners pay a fee directly proportional to the amount of impervious surface on their property. Pennsylvania, Virginia, and West Virginia are considering similar approaches.

The bay jurisdictions have all designated a single entity – be it an agency or a specially created committee – to be responsible for researching and coordinating WIP funding sources and options. For example, a committee coordinates funding sources in Delaware and the Department of Conservation and Recreation does the majority of funding management in Virginia. In Maryland, coordination and leadership is provided by the BayStat Subcabinet, which is composed of the Secretaries of the Maryland Department of Agriculture; the Maryland Department of the Environment; the Department of Natural Resources; the Maryland Department of Planning; scientists from the University of Maryland; and other key staff.

Although the bay jurisdictions have developed plans for meeting the Chesapeake Bay TMDL requirements, significant gaps exist with regard to funding sources, strategies, and responsibility. Maryland has developed new funding sources over the past year and has developed fairly detailed plans for funding its bay restoration responsibilities; however, significant work remains, especially since continued growth and development will make maintaining the pollution load reductions under the TMDL challenging. The following section of this paper examines efforts to account for future growth in pollution loads.

The Pollution Growth Management Challenge

Offsetting Future Growth in Maryland

To comply with the bay TMDL, bay jurisdictions must not only reduce existing pollution loads, but also *maintain* reduced pollution loads as population growth and new development occurs. Therefore, as part of the bay jurisdictions' WIPs, EPA required each jurisdiction to include a method to account for future growth in pollution loads. Bay jurisdictions were given the option to either (1) offset any new or increased loads as they occur in the future; or (2) set aside currently unused pounds of nitrogen and phosphorous for future use. The State released an initial draft growth offset strategy in July 2012 for public comment that proposes aggressive new requirements for offsetting the pollution associated with development and redevelopment projects. In late October 2012, some revisions to the proposed growth offset strategy were released. These initial strategies are described below and are followed by a brief summary of the approaches being taken by the other bay jurisdictions.

Proposed July 2012 Offset Policy

Maryland's Phase II WIP requires that new or increased pollution loads be offset by reductions elsewhere, so there is no net increase in pollution entering the bay. Maryland plans to account for new pollution loads in the future by (1) upgrading pollution reduction technology at major WWTPs to accommodate sewage from new development, up to a certain amount; and (2) implementing a strategy by the end of 2013 to offset new pollution loads from development (other than specified WWTP discharges). While efforts to upgrade major WWTPs have been underway for quite some time, the State is still developing a strategy to manage pollution from new development, as described below.

MDE's July 2012 draft growth offset policy requires developers to offset new wastewater and stormwater pollution from development. Generally, the draft policy seeks to minimize nitrogen pollution from new growth, reduce existing pollution loads, and encourage local jurisdictions to concentrate growth in particular areas and utilize pollution offset strategies. Some of the specific requirements in the draft policy include:

- new development projects must meet all applicable regulations and offset the post-development nonpoint pollution by implementing various BMPs;

- redevelopment projects must satisfy applicable stormwater regulations *but are not* required to offset post-development nonpoint pollution;

- new septic systems must meet all applicable laws and regulations and fully offset the post-development wastewater pollution load; and

- new point source pollution loads and increased pollution from existing point sources above their pollution limits must be offset.

The draft growth offset policy specifies that the entire post-development load associated with specified projects must be offset, not just the "net difference" between the before and after pollution loads. Thus, in some circumstances it requires mitigation of pre-existing pollution loads. In addition, the draft policy assumes that offset requirements are *in addition to* federal, State, and local laws and regulations as well as any other baseline pollution reductions required by the WIP. It is assumed that developers will offset new pollution by establishing BMPs on-site or purchasing pollution credits from Maryland's nutrient trading market place. Examples of BMPs that developers may use as offsets include (1) establishing forested buffers that are protected by covenants or easements recorded in the land records; (2) connecting septic systems to WWTPs with room under their maximum pollution caps; (3) upgrading septic systems to BAT; and (4) converting dry stormwater management ponds to wet ponds.

The draft growth offset policy primarily affects MDE and developers and applies to development projects that disturb one or more acres. MDE anticipates implementing the policy through rulemaking, permitting, and the development of markets for obtaining offsets. The policy applies to any development that seeks coverage under a General Permit for the Discharge of Stormwater Associated with Construction Activity or applies for an individual Discharge Permit for Stormwater Associated with Construction Activity after December 31, 2014. Developers would be required to calculate loads, obtain permanent offsets, and certify offsets when filing for a general permit.

The State's existing nutrient trading program is identified as a key tool for helping developers achieve pollution offset requirements. Currently, the State has established nutrient trading frameworks for trading (1) between point sources (*i.e.*, WWTPs), and (2) point source to nonpoint source (*i.e.*, stormwater runoff). Nutrient trading is structured through a unit of trade called a credit, which is equal to one pound of pollution per year. In accordance with current

nutrient trading frameworks, credits may be traded *within* three defined areas; specifically, the Potomac basin, Patuxent basin, and everywhere else within the State. To date, nutrient trading involving point sources has occurred; however, due to limited interest, trading between point and nonpoint sources has not occurred.

Proposed October 2012 Offset Policy

In late October 2012, in response to public feedback on the July 2012 draft growth offset policy, several adjustments were proposed to the draft policy and the timeline for developing the overall policy was extended into 2013. The proposed changes to the draft policy include:

- requiring both nitrogen and phosphorus pollution, not just nitrogen, to be offset;
- excluding development associated with most agricultural activities from the policy;
- changing applicability from development disturbances of at least one acre to those of some *de minimis* level;
- requiring offsets to last for a minimum of 30 years, instead of being permanent;
- allowing fee-in-lieu, payable to BRF, and using the fee revenue to reduce the same amount of pollution elsewhere; and
- requiring offsets to be obtained in the same county where development is located, to some extent.

Over the next year, MDE plans to convene a growth offset policy stakeholder group to find common ground and clarify issues. With this feedback, MDE plans to develop comprehensive and coordinated policies for offsets and nutrient trading and propose associated implementing regulations. At this time, it is anticipated that implementing regulations will be adopted by the end of 2013 and programs required by the regulations will be in place by 2015.

The Impact of Related Growth Policies

Several recent State policies will impact the State's growth offset strategy, namely, stormwater regulations, PlanMaryland, Chapter 149 of 2012, and recent BAT septic system requirements. Stormwater regulations implementing Chapters 121 and 122 of 2007 already require redevelopment projects to adhere to strict water quality protection requirements. Implementation of PlanMaryland is already ensuring that State growth-related programs are better coordinated and aligned. Chapter 149, which seeks to steer future residential growth toward more urban areas served by public sewer and away from areas that require septic systems, is being labeled as the first element of the State's growth offset strategy. Because recent regulations already require installation of BAT septic systems in specified circumstances in the

watershed, the State's growth offset strategy will require developers to find alternative additional strategies to offset pollution from development. Thus, while the State must finalize a growth offset strategy in 2013, components of the State's strategy are already in place.

Growth Offset Strategies in Other Bay Jurisdictions

Like Maryland, other bay jurisdictions are considering and implementing a variety of strategies and practices to manage growth from development. Several growth management policy trends are emerging among the bay jurisdictions. Several jurisdictions (Delaware, Pennsylvania, and potentially New York) are developing stand-alone growth strategies, like Maryland has proposed. A majority of the jurisdictions, including Delaware, Pennsylvania, New York, Virginia, and West Virginia, are using offsets as one of the primary methods to manage pollution growth. Also, several jurisdictions are creating or expanding nutrient trading programs. Furthermore, because stormwater is the fastest growing source of pollution entering the bay, all of the jurisdictions are engaged in significant efforts to reduce stormwater pollution by strengthening regulations, establishing retrofit incentives, and using offsets. A brief summary of each bay jurisdiction's growth management strategy, based on information in their WIPs, is provided in **Appendix 1**.

Policy Considerations

While Maryland is on track to meet its short-term bay restoration goals, its long-term success depends on identifying (1) new funding for required restoration efforts, and (2) effective strategies for managing future pollution growth. The following issues may merit consideration when determining how the State should move forward with WIP implementation.

Funding Strategy

- The State's current $14.4 billion bay restoration cost estimate is incomplete and may change significantly in the future. The State should prioritize generating a more complete and detailed estimate of the additional revenue required for WIP implementation, to better inform future decisionmaking.

- The State must identify new revenue sources and financing strategies to generate the billions in new funding required to establish bay restoration programs by 2025. Funding for septic and stormwater sector improvements, which are among the most expensive, appear to be the greatest needs. Furthermore, the State should investigate and support environmental technologies that may reduce the bay restoration funding burden.

- Maryland's Phase II WIP sought to distribute responsibility for pollution reductions among the various sources and not prioritize implementation of the most cost-effective BMPs. The State may wish to recalibrate this approach and place additional emphasis on funding the most cost-effective strategies.

- Many local governments in Maryland have developed extremely high Phase II WIP implementation cost estimates that are generating significant local concern. Some local governments are working together to potentially reduce their bay restoration responsibilities. Local governments require access to more financing tools and revenue sources in the future to implement their plans.

- The federal government's participation in funding and enforcing bay restoration efforts is essential to Maryland's success. A significant reduction in federal funding for bay restoration programs or for federal facilities located in the watershed may make it extremely difficult for bay jurisdictions to be successful.

- While MDOT is responsible for funding an estimated 10% of the State's restoration effort, it lacks a financing strategy to do so. MDOT has expressed the need for a significant revenue enhancement to meet this obligation along with other priorities; and to date, one has not been provided.

Growth Offset Strategy

- The State's potential reliance on nutrient trading as a means for offsetting future pollution presents a significant challenge. The State's existing nonpoint source pollution program has not implemented any trades to date and the State is still trying, among other things, to determine how to (1) develop a more robust trading marketplace that is characterized by adequate verification of and certification of credits, enforceability, accountability, and tracking; and (2) best distribute trading marketplace roles and responsibilities among State, local, and private entities.

- Because the Administration plans to finalize a growth offset strategy and implementing regulations over the next year, the General Assembly may wish to establish a formal reporting requirement to help promote clarity and transparency and ensure that it is a partner throughout the process.

Conclusion

While the State has developed detailed plans for achieving the bay TMDL requirements and is currently well positioned to meet its short-term goals, efforts to establish and implement successful financing and growth management strategies over the next few years will determine its long-term success. In addition to developing new strategies, achieving bay restoration may require adjusting existing strategies to, for example, target only the most cost-effective approaches and largest polluting source sectors.

Appendix 1
Funding and Growth Management Strategies in Neighboring Bay Jurisdictions

Delaware

According to the U.S. Environmental Protection Agency (EPA), an estimated 1.6% (4.3 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in Delaware.

Funding

Delaware's Phase II Watershed Implementation Plan (WIP) does not clearly state how it intends to secure additional funding and resources to support best management practices (BMP) implementation levels outlined in its plan. In its evaluation of Delaware's Phase II WIP, EPA specifically notes that the state must add milestones that demonstrate what actions Delaware will take to fill agriculture and stormwater funding gaps.

According to Delaware's Phase II WIP, state land within the bay watershed is approximately 50% agricultural, 40% forests and wetlands, and 10% developed. In response to these land use trends, Delaware has prioritized increasing funding for agriculture BMP programs and development planning. The state plans to accommodate new loads through new stormwater regulations, a stormwater fee-in-lieu program, and an offset program for residual nutrient loads on another site within the same basin. Delaware also plans to develop a pollution offset program for septic systems.

Delaware established a funding committee to coordinate funding sources, close funding gaps, achieve WIP implementation milestones, coordinate grant applications, and develop mechanisms to track expenditures. Similar to other bay jurisdictions, Delaware's Phase II WIP states that "…any reduction of state or federal funding for programs related to implementation of the WIP will affect Delaware's ability to implement the WIP to achieve Total Maximum Daily Load (TMDL) goals." Based on information provided in its Phase II WIP, Delaware relies more heavily on federal funding for its programs than the other bay jurisdictions.

Growth

In accordance with its Phase II WIP, Delaware plans to account for the majority of its growth through a comprehensive stormwater offset strategy. Delaware plans to accomplish this through a combination of more rigorous statewide stormwater regulations, use of a stormwater fee-in-lieu program in certain circumstances, and allowing offsets at sites within the same basin. Delaware also plans to require new or replacement septic systems located within 1,000 feet of tidal waters and associated tidal wetlands to meet specified pollution reduction standards. Also, starting in 2013, Delaware plans to develop and operate an umbrella offset program and maintain a nutrient credit bank to provide additional flexibility for offsets. The state is considering delegating administration of the offset program to local governments.

District of Columbia

According to EPA, less than 1.0% (2.1 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in the District of Columbia.

Funding

The District of Columbia is in a unique position because it must work with the federal agencies that occupy one-third of its land surface area, rather than counties or municipalities, to achieve its TMDL goals. While helpful to date, federal agencies have stated that they are not bound to the pollution reduction targets in the TMDL. Specifically, the District of Columbia's Phase II WIP notes that federal agencies' WIP implementation efforts "…can be readily cut if any budget restrictions occur in 2012 and beyond."

The District of Columbia's most recent efforts to fund bay restoration have focused on stormwater and impervious surface fees. The jurisdiction's stormwater fees were revised in 2009 to help fund stormwater management activities and adjusted in 2010 to be more equitable. Efforts are underway to develop a stormwater fee discount program for property owners who utilize stormwater retrofits. Additionally, in 2009, the Water and Sewer Authority established an impervious area fee to reduce pollution running into rivers in the area. While not established in response to the Chesapeake Bay TMDL, both efforts are anticipated to help the District of Columbia meet its TMDL requirements.

Growth

The District of Columbia faces unique growth challenges due to its high percentage of developed land and a significant estimated population increase – a 17% increase by 2025. In response to these trends, more attention is being given to strategies that control pollution growth associated with redevelopment rather than new development. According to the District of Columbia's Phase I WIP, it "…has reserved loading for increased point and nonpoint sources that should be sufficient to meet its nitrogen, phosphorous, and sediment allocations through the timeframe of the Chesapeake Bay TMDL." Furthermore, the document notes that the "…District is not planning to use offsets to address increased loads from growth because a substantial portion of the nutrient and sediment loads are allocated to potential increases in the District's contribution to Blue Plains." The Blue Plains Wastewater Treatment Facility, the largest advanced WWTP in the world, is one of the major reasons the District of Columbia is capable of handling future increases in pollution loads. It is estimated that Blue Plains will be able to treat the anticipated increased load from population growth through 2030.

To address growth and comply with federal requirements, the District of Columbia is currently revising its stormwater regulations. Under these new regulations, the District of Columbia will accommodate some growth by requiring all new development and redevelopment sites larger than 5,000 square feet to retain the runoff from a 24-hour 1.2 inch storm. Additionally, under Executive Order 13514, all federal agencies conducting new development or redevelopment projects must retain the runoff from a 24-hour 1.7 inch storm. Regulated sites will have the option of meeting a portion of their stormwater retention volume offsite after retaining a minimum amount on site. Offsite retention options will include the use of stormwater retention credits to be traded on the private market, or payment of a fee-in-lieu to the district.

New York

According to EPA, an estimated 3.9% (10.3 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in New York.

Funding

New York is the only bay jurisdiction that has not submitted a final Phase II WIP, so its plan for financing bay restoration is not clear. However, New York's *draft* Phase II WIP does express concern about securing the federal funding it requires for WIP implementation, noting that it is usually more cost effective to fund projects located closer to the bay.

According to the draft Phase II WIP, nearly 25% of New York's land within the watershed is in agricultural use, and contributes approximately 42% of the total nitrogen, 55% of the total phosphorus, and 40% of the sediment loads from New York to the bay. In an effort to link existing funding opportunities with identified agricultural needs, New York created the Agricultural Environmental Management Program in 1996 to provide noncompetitive technical assistance funding to conservation districts. The conservation districts use funds to inventory and assess farms within priority watersheds, and then plan, design, and evaluate BMPs. More recently, the state established the Agricultural Nonpoint Source Abatement and Control Program to provide competitive financial assistance to farmers for planning, designing, and implementing BMPs.

Growth

New York's draft Phase II WIP does not include information on how it intends to account for growth. In EPA's evaluation of New York's draft Phase II WIP, the state was directed to (1) add a milestone to have a fully effective offset program in place by December 2013 for sectors with planned new or increased loadings, or make a demonstration that a specific sector will not experience net growth in loading; and (2) explain how new or increased loads that occur prior to offset program implementation in 2013 will be addressed.

Pennsylvania

According to EPA, an estimated 42.1% (112.5 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in Pennsylvania.

Funding

Pennsylvania's Phase II WIP includes a very limited discussion of its strategy for funding WIP implementation. The plan simply notes that additional resources may be required and adaptive management will be employed to determine what additional resources may be needed. However, Pennsylvania has taken several steps to generate additional revenue and establish new financing strategies that will help it achieve its bay restoration goals. In 2008, the Pennsylvania General Assembly authorized approximately $1.2 billion in debt for efforts to improve water quality and upgrade wastewater systems. Also, Pennsylvania developed the Resource Enhancement and Protection Program which provides a tax credit of up to $150,000 per operation in exchange for implementing BMPs on agricultural lands.

Local governments in Pennsylvania are playing an important role in funding creative WIP implementation strategies. A brief description of efforts being undertaken in Lycoming County and the city of Lancaster are described below.

- ***Lycoming County –*** In 2008, a group of stakeholders in Lycoming County elected to meet TMDL standards by implementing a county-based nutrient trading program. Lycoming County farmers whose operations exceed nutrient reduction requirements generate certified nutrient credits. The county conservation district calculates the number of nutrient credits an individual farmer generates, and then the state Department of Environmental Protection certifies the credits through a state nutrient trading program. The credits are then sold to permitted point sources, such as WWTPs. The program generated more than $110,000 in revenue during the first two nutrient credits auctions in 2010 and 2011. A county WWTP estimated a $1.2 million savings over 20 years as a result of purchasing credits rather than upgrading infrastructure.

- ***City of Lancaster –*** The city of Lancaster adopted a green infrastructure plan in 2011 that seeks to improve stormwater management by establishing tree trenches, porous surfaces, curb-extensions, enhanced street tree planting, green rooftops, rain barrels, and other green infrastructure methods. Because the majority of its impervious surface is on privately held lands, the city is using grants to implement demonstration projects on privately owned property. As a result of this effort, Lancaster is able to manage its 750 million gallons of stormwater per year for less than $140 million over 25 years, while a storage and treatment system would cost more than $300 million over the same period. Also, Lancaster has established a "first flush" program, which requires property owners who add new impervious surface to prevent the first inch of rainfall on their property from reaching the combined sewer system.

Growth

Pennsylvania plans to use its existing nutrient trading program and a variety of other strategies to account for growth in pollution. The statewide nutrient trading program is a market-based program that provides economic incentives for entities to go beyond statutory and regulatory requirements for removing nutrients from the watershed. The Pennsylvania Infrastructure Investment Authority facilitates the nutrient trading market by working directly with buyers and sellers. Other pollution growth offset strategies that Pennsylvania is considering include:

- requiring industrial waste dischargers to set aside 25% of their reserved capacity for future growth;
- encouraging landowners to adopt stormwater capture and reuse technologies;
- reducing or eliminating all new, additional, or increased stormwater discharge from new development projects;
- adopting statewide performance standards for new development and redevelopment; and
- developing a stormwater management offset policy.

In its evaluation of Pennsylvania's Phase II WIP, EPA expressed concern about the state's efforts to develop pollution offset strategies. Specifically, EPA noted that the state still must develop "…a fully effective offset program for sectors with planned new or increased loadings, in addition to the urban stormwater sector, or make a demonstration that a specific sector will not experience net growth in loading."

Virginia

According to EPA, an estimated 23.5% (62.6 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in Virginia.

Funding

In the appendices of its Phase II WIP, Virginia does include an analysis of general funding needs associated with implementation of various strategies, but it does not clarify the extent to which these resources are available or how it intends to secure these resources. Instead, the plan simply notes that WIP implementation teams will identify potential funding sources and develop timelines for implementing strategies and quantifying resources needs.

Generally, Virginia is planning to use existing regulatory and statutory authorities to increase available funding for WIP implementation. State regulations authorize localities to establish stormwater utility fees, service districts, or pro-rata fee programs to address sediment and nutrient loads associated with stormwater runoff. Also, the Virginia Water Facilities Revolving Loan Fund was established in 2010 to help local governments construct facilities or structures or implement other BMPs to reduce stormwater runoff. In 2008, the Virginia Natural Resources Commitment Fund was established, which dedicates new land transaction recordation fee revenue to agricultural BMP implementation. Virginia has several programs that use financial incentives to encourage implementation of agricultural BMPs, including (1) the Virginia Agricultural Cost-share Program, which provides a mix of flat-rate financial incentives and practices that are cost-shared with the participant, usually at a maximum rate of 75% of implementation costs; and (2) the Agricultural Best Management Practice Tax Credit Program, which provides a 25% state income tax credit, up to $17,500 annually, to encourage farmers to install eligible BMPs.

Growth

Virginia plans to account for growth in a variety of ways, including by reserving waste load allocations, requiring no net increase in stormwater nutrient and sediment loading, and creating an urban development area in which to concentrate future growth. The two following policy changes addressing septic systems and nutrient trading will also play a significant role in the state's growth management efforts.

- In 2011, regulations were adopted requiring (1) an approximately 50% reduction in delivered nitrogen for all new small alternative septic systems in the watershed; and (2) large alternative septic systems to demonstrate compliance with a total nitrogen limit of less than 3 mg/l at the project boundary.

- Senate Bill 77/House Bill 176 of 2012 expanded the state's nutrient credit exchange program. The program allows significant wastewater facilities to exchange credits with other facilities located within the watershed to comply with nutrient limits. Also, municipal separate storm sewer system permittees, concentrated animal feeding operations, and specified industrial stormwater facilities are authorized to generate and exchange nutrient credits.

In its evaluation of Virginia's Phase II WIP, EPA expressed dissatisfaction with the growth offset actions taken to date. Specifically, EPA noted that it expects the state to add milestones, amend its WIP, or provide other written commitment "…that clarifies that a fully effective offset program is in place by December 2013 for sectors with planned new or increased loadings or that demonstrations will be made to show that specific sectors will not experience net growth in loadings."

West Virginia

According to EPA, an estimated 2.0% (5.4 million pounds) of the total nitrogen pollution load entering the bay in 2011 originated in West Virginia.

Funding

West Virginia's Phase II WIP does not include a dedicated discussion of WIP implementation funding strategies and needs. However, the state has taken several recent steps to ensure adequate funding is available to achieve the bay TMDL. In 2011, the West Virginia General Assembly authorized the issuance of up to $180 million in bonds to support upgrading larger WWTPs. The state is considering whether to create stormwater utilities with dedicated funding sources to address stormwater priorities, such as maintenance and installation of stormwater management retrofits. West Virginia's Phase II WIP notes that local governments, in cooperation with state agencies, will take steps necessary to authorize municipalities and sanitary districts to create stormwater utilities.

Growth

West Virginia plans to offset new pollution loadings from new/expanded sources by establishing controls on existing sources that reduce loads beyond those required to achieve TMDL targets. The state intends to address pollution growth primarily through more rigorous management of industrial stormwater and wastewater. Currently, all wastewater discharges must be offset by 100% of new loadings. Facilities may offset new loadings by, for example, upgrading pollution reduction technology or participating in a pollution trading program. Secondly, to counter potential growth in the industrial stormwater sector, the state will (1) not provide waste load allocations for new post-construction loads; (2) require all new sources of industrial stormwater in specified areas to capture and manage the first one inch of rainfall; and (3) encourage industrial stormwater generators to use post-construction controls.