

**Howard County, Maryland
Phase II
Watershed Implementation Plan
for the
Chesapeake Bay
Total Maximum Daily Load**

Originally Submitted November 18, 2011

Revised July 2, 2012

PREFACE

On December 31, 2010, the U.S. Environmental Protection Agency (EPA) set limits known as Total Maximum Daily Loads (TMDLs) on the amounts of nutrients and sediment that can enter the Chesapeake Bay. In response to this EPA requirement, the Maryland Department of the Environment (MDE) prepared a statewide Phase I Watershed Implementation Plan (WIP), which was followed by a Phase II WIP intended to provide more geographic detail and involve collaboration with local partners, including Howard County. On November 18, 2011, Howard County submitted a staff-level description of a county-scale WIP to support MDE's development of this statewide Phase II WIP for submission to EPA.

In March 2012, Howard County provided comments on the draft Phase II WIP for Maryland indicating that it would be submitting a revised county-scale WIP for inclusion in the final statewide Phase II WIP. This revised WIP addresses changes in WIP requirements (such as the implementation planning horizon and 2013 milestones) and additional guidance received from MDE since the original submittal. It includes more detail on the reductions to be obtained; the best management strategies to be used; resources and funding to be applied; and the tracking, reporting, and verification that will occur. These details remain only the best approximation of an implementation strategy that will have to be adapted over time to achieve the reductions in nutrient and sediment loads required to meet the Chesapeake Bay TMDL. We expect that advances in new technologies and refinements of the Bay model will affect this strategy. Howard County looks forward to working with MDE to refine both local and statewide WIPs to meet the goal of restoring Chesapeake Bay.

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1. Howard County WIP Process

1.1 Overview

Howard County began preparing the local Phase II WIP by forming a WIP Team with the following members:

- Department of Public Works
- Department of Planning and Zoning
- Howard Soil Conservation District
- Howard County Health Department
- Howard County Public School System
- Columbia Association

These agencies and organizations represent the four major sectors contributing sediment and nutrient loads to Chesapeake Bay: agriculture, wastewater treatment, septic systems, and stormwater.

All members worked cooperatively to develop a blueprint for meeting the goals of the Chesapeake Bay TMDL. The WIP Team met several times with the MDE liaison to Howard County, and members of the WIP Team attended several presentations on WIP development sponsored by MDE. In addition, the WIP Team held a public meeting on October 6, 2011, at Howard Community College that described the Chesapeake Bay TMDL, outlined the WIP development process, and solicited feedback from interested citizens.

Since the submission of the original Howard County WIP in November 2011, WIP development has continued with additional studies and analysis that are incorporated in this revised WIP.

1.2 Past Successes and Future Plans

Howard County has been and expects to continue to be successful in implementing significant controls on discharges from the agricultural and wastewater sectors, to the extent that both sectors are projected to meet or exceed the loading targets in the Chesapeake Bay TMDL. The Howard Soil Conservation District has been working with the Maryland Department of Agriculture and the farm community on the statewide WIP for the agriculture sector and expects to meet the local goals with its current program. The recent conversion of the Little Patuxent Water Reclamation Plant to enhanced nutrient removal (ENR) is the most important component of reductions in the wastewater sector. The conversion was completed ahead of schedule and is currently the most northern example of ENR in the country, which is significant because of the potential for low temperatures to reduce the biological activity required for ENR. Howard County also sends wastewater to the Patapsco Wastewater Treatment Plant, which Baltimore City expects to upgrade to ENR by 2016. Given that the agriculture and wastewater sectors are expected to achieve their required pollutant load reductions, this WIP focuses on the County's efforts in the septic system and stormwater sectors.

Reducing the nutrient contributions from septic systems and stormwater runoff to local waters and the Chesapeake Bay remain challenges. In its land and water resource planning, Howard County has used the principles of smart growth and strategic zoning to focus development in the eastern portion of the county known as the Planned Service Area (PSA), which receives public sewer service. The County also has a continuing program of watershed planning that sets priorities and guides efforts to protect, restore, and improve water resources that have degraded primarily due to stormwater runoff. The watershed management plans prepared to date have generated extensive lists of restoration projects that far exceed the historical capital budgets for these projects; therefore, additional funding is needed to increase the pace of restoration to the level needed to meet the Chesapeake Bay TMDL.

Protection of Water Resources. Howard County has invested in programs for protecting water resources because it is easier and more cost effective to protect high quality resources in a watershed than to allow those resources to become degraded and then attempt to restore them. Regulations on development can help protect water resources from the adverse effects of development. Specifically, Howard County has adopted the state’s new stormwater management regulations that increase requirements for pollutant removal, groundwater recharge, and stream channel protection for new development and redevelopment. The County is considering strengthening buffer requirements to enhance protection of streams, wetlands, and floodplains. Regulations must be implemented properly and enforced to be effective; therefore, the County is working to ensure that adequate resources are available to monitor and enforce regulations on development and to educate developers and contractors effectively. Specifically, the County must ensure that stormwater management facilities, which will increase in number significantly as a result of the new stormwater management regulations and the Chesapeake Bay TMDL, are inspected regularly and maintained over time.

Public Outreach. Most land in the county is privately owned; consequently, implementing best management practices (BMPs) on residential, commercial, and institutional property is critical to improving water quality and habitat. Outreach and education efforts, therefore, must be expanded and new programs must be initiated to increase BMP implementation on private property. The County can provide leadership in BMP implementation by incorporating environmentally sensitive site development and property management practices into its activities, thus providing a model for the community. Recent public outreach initiatives that will support improved stormwater management across the county include the following:

- GreenFest. Since 2008, Howard County has held annual GreenFest celebrations exploring all aspects of sustainability, including sponsorship in of “Green Screen” student video contests on the topic of stormwater in 2010 and 2011.
- Watershed Enhancement Grant. Since 2008, Howard County has offered watershed enhancement grants to residents with the goals of increasing citizen awareness and participation in water quality issues, providing education, and implementing restoration projects. The grant proposals must include measurable objectives and evaluation criteria that describe how the project will change the behaviors of citizens and community.
- Sustainable HOA Program. Beginning with a pilot project in 2009, Howard County began working with a small group of Homeowners Associations and Community Associations to meet greater levels of sustainability. The program aims to continue working with these associations, provide

a best practices manual for reference, and implement sustainability projects within each community.

- Pilot Rain Garden Program. As part of a comprehensive watershed restoration effort in the Red Hill Branch Watershed, the County created a pilot rain garden program in 2010. The County conducted several workshops and constructed 20 residential rain gardens, which included signage to promote the use of rain gardens.
- Support for the Watershed Stewards Academy. Since April 2011, Howard County has supported establishment of the Watershed Stewards Academy with other non-profit and volunteer organizations. The Academy’s mission is to train residents to create rain gardens, use “Bayscaping” on their properties, and encourage other residents to do so as well.
- Public outreach campaign. Beginning in July 2011, Howard County contracted with a social marketing consultant to develop a public outreach campaign to raise awareness of stormwater management issues and the need for participation by all residents. This campaign is based on successes in other jurisdictions and research on factors that motivate action in the local community.
- Sponsorship of “Slow the Flow.” On October 18, 2011, the Howard County Environmental Sustainability Board (ESB) sponsored the “Slow the Flow” forum on stormwater convened by the League of Women Voters. The forum included speakers from Howard County, Columbia Association, and community groups.
- Model stormwater management neighborhoods. In December 2011, the ESB endorsed a concept developed by the Department of Public Works to create one or more model neighborhoods where the widest range of stormwater management practices are implemented in conjunction with other infrastructure repairs needed in the communities. This initiative is moving forward with the hope of implementing similar improvements in established Howard County neighborhoods that were constructed prior to current stormwater management requirements.
- Youth jobs. In 2012, Howard County began funding Restoring the Environment And Developing Youth (READY), an innovative initiative with People Acting Together in Howard (PATH) and the Alliance for the Chesapeake Bay. READY will identify opportunities for and construct rain gardens and other stormwater management features on private property throughout the county.
- Historic Ellicott City innovative stormwater charrette. On May 16, 2012, Howard County convened a design charrette to discuss opportunities for installing innovative, site-scale and micro-scale stormwater management technologies (commonly known as low impact development or LID) in historic Ellicott City in both the near-term and longer-term future. The goal is to demonstrate “green street” and other stormwater designs in this high visibility area and showcase how these innovative technologies can blend into unique, established neighborhoods.
- Little Patuxent Water Reclamation Plant Web page enhancements. In 2012, Howard County added a virtual tour of the plant and a detailed section on the new ENR operations to the plant’s Web page.

New Investment in Stormwater Management. Howard County has increased its investment in watershed restoration through (1) acquisition of grants from the state Chesapeake Bay and Coastal Bays Trust Fund and (2) historically high appropriations to the stormwater budget of approximately \$10 million in each of the last two years. The County is also laying the groundwork for a sustained increase in stormwater management and the greater public outreach efforts described here by hiring a stormwater manager in the Office of Environmental Sustainability. Perhaps most importantly, the County is conducting a thorough study to structure and implement a stormwater fee designed to fund the restoration efforts required to achieve the Chesapeake Bay TMDL and other mandates. This study began in 2011, prior to the recent state legislation (HB 987) requiring implementation of such a fee.

Stormwater Remediation Fee. With contractor support, the County's staff and a citizen Stormwater Advisory Committee have developed a draft recommended program of services, identified and discussed rate structure policy issues, and developed a preliminary rate model. To date, recommendations include using the real property tax bill as the billing mechanism and using a 1,000-square-foot impervious cover billing unit, regardless of land use. The County will continue to work with an expanded advisory committee to refine the stormwater program, finalize the rate structure and billing system policies, develop credit and hardship exemption policies, develop the stormwater remediation fee implementation ordinance, develop and test the Master Account File and integrate it into the billing system, support public outreach activities, and provide customer service assistance. The schedule includes introducing the ordinance to the County Council in the Fall of 2012, so that the billing system can be tested and billing can begin in July 2013. Once the structure for the stormwater remediation fee is approved, it will provide increased and sustained funding for the watershed management program, as it expands in response to the Chesapeake Bay TMDL and other regulatory requirements.

Countywide Implementation Strategy. Although Howard County has consistently increased its watershed planning efforts to comply with its Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit and meet other water resource goals, detailed watershed plans have yet to be developed for much of the county. Development of such plans, which should include detailed inventories of projects that can be undertaken to treat impervious surface and control nutrients and sediment in stormwater runoff, are needed to meet the ambitious targets of the Chesapeake Bay TMDL.

To date, Howard County has prepared the following watershed assessments and plans (Figure 1-1):

- General watershed restoration assessments and strategies (WRASs) and stream corridor assessments (SCAs) for
 - Little Patuxent (WRAS and SCA 2001)
 - Middle Patuxent (SCA 2002)
 - Lower Patapsco and Deep Run (WRAS and SCA 2006)
 - Patuxent reservoirs (WRAS developed by Washington Suburban Sanitary Commission in 2010)
- Specific watershed plans with restoration projects
 - Deep Run and Tiber-Hudson (1999)

- Cherry Creek (2002)
- Centennial Lake and Wilde Lake in Little Patuxent (2005)
- Sucker Branch and Rockburn Branch in Lower Patapsco (2006)
- Downtown Columbia (by General Growth Properties 2008)
- Lake Elkhorn in Little Patuxent (by Columbia Association in 2009)
- Upper Little Patuxent (2010)

The County is developing a schedule for preparing plans for other watersheds. Several years of effort will be required to complete these plans; meanwhile, the County is using existing information to prepare a preliminary countywide implementation strategy (CIS) for meeting the MS4 permit and Chesapeake Bay TMDL. This preliminary CIS can be completed more quickly using detailed GIS analyses of land cover and land use, as well as extrapolations of existing plans to similar areas that do not yet have watershed plans. The preliminary CIS will include the following elements:

1. Desktop assessments of watersheds without plans
2. Watershed assessment framework for completing and revisiting individual watershed plans, including monitoring and adaptive management
3. Modeling of implementation scenarios relative to TMDL targets
4. Schedule and costs for the selected scenario of implementation projects and programs

Completing the preliminary CIS will help the County define priorities for preparing small watershed action plans (SWAPs) and implementing the most beneficial restoration projects. For example, several watersheds in the eastern part of the county have large proportions of impervious cover and have yet to be studied. Furthermore, the Middle Patuxent River watershed should be a priority for future study because it is projected to undergo the greatest change in land use in the future. At the same time, the Patapsco watersheds have a higher delivery rate to the Chesapeake Bay; therefore, treatment in those watersheds would have a greater effect on reducing pollutant loads to the Bay.

The final CIS will incorporate the SWAPs for the remaining highly impervious subwatersheds. Each SWAP will build on the desktop analysis conducted for the preliminary CIS and include field investigations and concept designs for specific restoration projects as part of the action inventory. The final CIS also will include a systematic public outreach and implementation program.

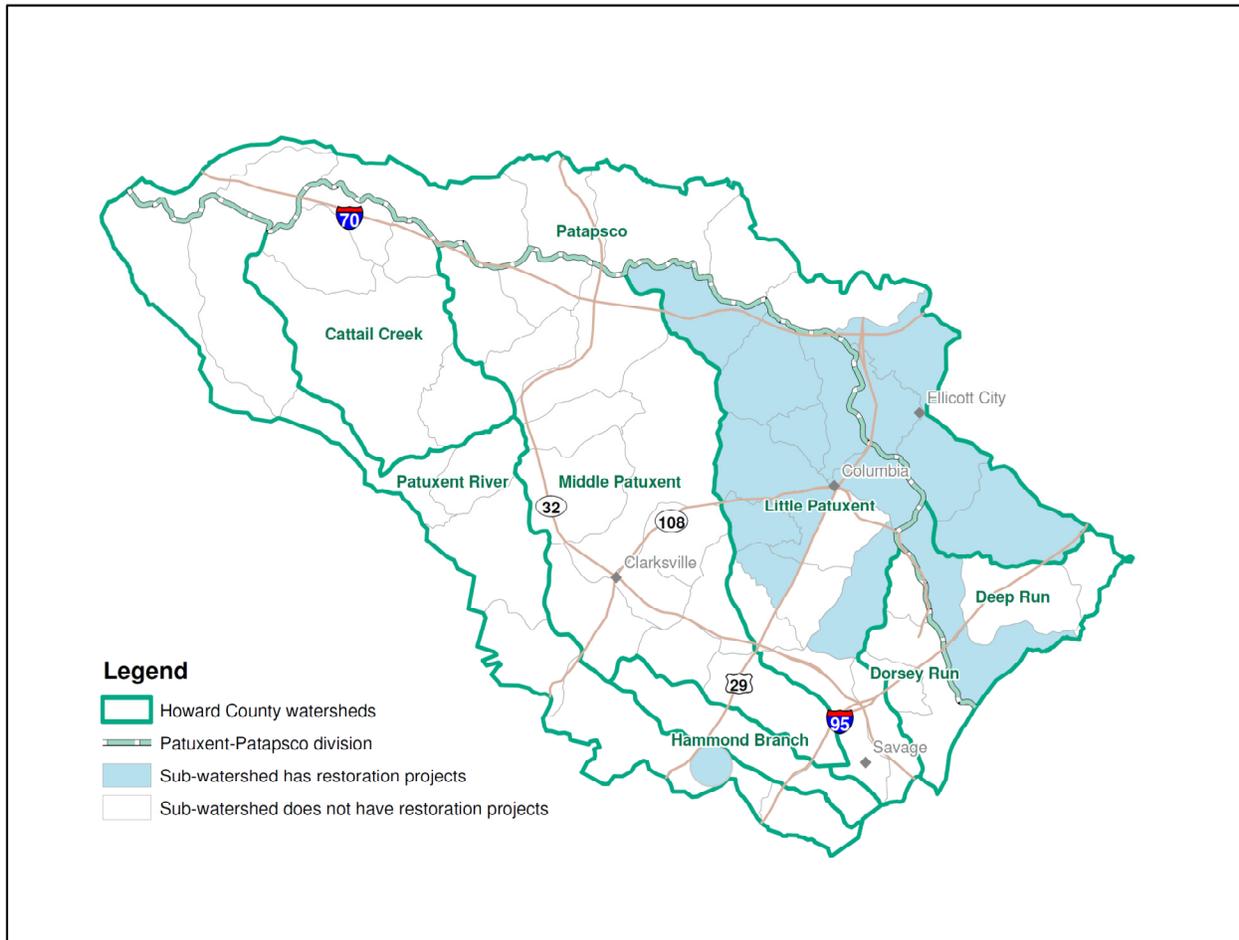


Figure 1-1. Howard County watersheds showing subwatersheds with watershed restoration project inventories

1.3 Remaining Challenges

Even though Howard County has a continuing program for protecting water resources, evolving public outreach, substantial new investments, plans for dedicated funding through a stormwater remediation fee, and an incipient countywide implementation strategy, meeting the targets of the Chesapeake Bay TMDL remains a daunting challenge. Beyond the challenges of funding and resource allocation, the following factors affect how the County and State will meet the TMDL goals:

- Land use conflicts and inadequate areas for BMPs. Even using the full suite of available technologies for stormwater management, finding cost-effective solutions is often difficult, and sometimes impossible.
- Private ownership of land. Howard County, like other counties, probably cannot achieve its TMDL goals solely through actions on public land. The County cannot require private property owners to construct BMPs on their property and must rely on uncertain voluntary approaches.
- Legacy and time-lag effects. Significant time-lags between completion of a restoration project and achievement of desired reductions in loadings are common for sediment, phosphorous, and nitrogen. In many cases, BMPs will be treating landscapes with sediment and nutrient legacies from previous land uses.
- Growth in population and development. TMDL targets are predicated on capping loads even though continued growth is anticipated. Meeting targets, therefore, will entail exceeding required reductions in loadings by an uncertain amount. These targets will be met by working within the state offset program, which is currently being developed.
- Maintenance of BMPs. The new environmental site design (ESD) approaches to stormwater management greatly increase the amount and complexity of maintenance, including involving private citizens. Such distributed maintenance has not yet been proven.
- Aggressive timelines. The magnitude of increase in both programmatic and construction activity needed to meet the 2025 TMDL deadline and shorter milestones is considerable. Two factors are particularly limiting: (1) permitting and construction timelines are typically much longer than needed for implementation of the TMDL and (2) the current capacity for contractor support in construction and staff augmentation is likely to be exceeded locally and statewide.
- Limitations within sectors and trading. We recognize the importance of equity among sectors that contribute to Chesapeake Bay loadings; however, achieving target reductions may not be equally feasible or cost effective in each sector. Additional flexibility or clarification in cross-sector trading programs would help local jurisdictions meet TMDL targets. A subset of this approach is “trading in time” among sectors to meet interim and final deadlines (e.g., using reductions beyond wastewater treatment milestone targets to compensate for slower attainment of stormwater targets).

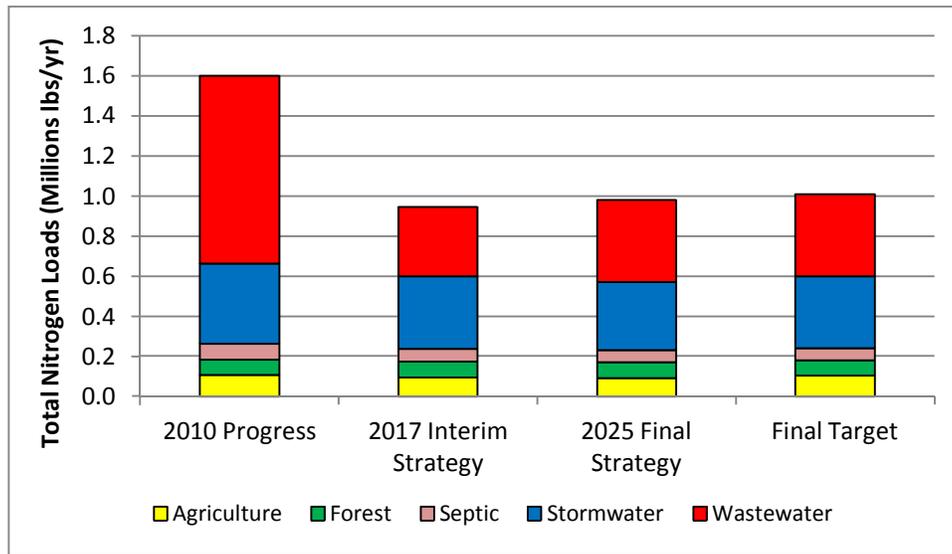
- Lack of credits for viable BMPs. The list of BMPs that can be used to obtain credit for reducing nutrient and sediment loadings in the Maryland Assessment and Scenario Tool (MAST) does not include all viable BMPs or give them the appropriate credit. Examples include pet waste reduction and various kinds of retrofits. Other options such as source control for emissions that lead to atmospheric deposition should be considered.
- Uncertainties in TMDL targets. Given the major implications for County costs and priorities, all jurisdictions are concerned about substantial discrepancies between local information and that included in the MAST and Chesapeake Bay Watershed Model.
- Complexity of meeting all regulatory requirements. Jurisdictions need to meet not only the Chesapeake Bay TMDL, but also all local TMDLs and other water resource regulations. This poses a major challenge for optimizing a cost-effective solution that meets all requirements.

1.4 General Approach to Meeting Reduction Targets

Howard County is committed to meeting the nutrient and sediment reduction targets of the Chesapeake Bay TMDL and has made significant investments to accelerate progress toward that goal. The general approach to preparing our local WIP began with evaluating the current rate of restoration actions and their effect on load reductions. We then determined how these efforts could be expanded to meet the TMDL targets and what new programs are needed to fill the remaining gaps. The details of our plan remain only the best approximation of an implementation strategy that will have to be adapted over time to achieve the required reductions in nutrient and sediment loads. We expect that advances in new technologies and refinements of the Bay model will affect this strategy.

Figures 1-2 and 1-3 show the pollutant load allocations for Howard County by sector for the 2010 baseline and target deadlines. As a surrogate for the Chesapeake Bay Program model upon which the allocations are based, we used MAST to evaluate possible combinations of restoration actions that would meet the load allocations. Both the agricultural and wastewater sectors are projected to meet or exceed the loading targets in the Chesapeake Bay TMDL based on efforts of the Howard Soil Conservation District, working with the farm community and the Maryland Department of Agriculture, and the recent conversion of the Little Patuxent Water Reclamation Plan to ENR. Therefore, the MAST analysis and WIP focus on the septic system and stormwater sectors.

In accordance with the latest EPA and MDE guidance on WIP development, Howard County is focusing on the programmatic capabilities needed to meet the TMDL targets. This revised WIP also incorporates MDE's new implementation planning horizon of 2025 for the final target, with 60% interim achievement by 2017. The County anticipates receiving its new MS4 stormwater permit in 2012 and plans to treat a total of 30% of impervious urban area that currently has little or no stormwater treatment (i.e., an additional 20% beyond the 10% impervious treatment goal to date). This level of impervious treatment provides the basis for meeting the local stormwater load reduction targets of the TMDL.



- Stormwater sector strategies overshoot the county target for nitrogen (N) to meet the phosphorus (P) target. This is because the N and P reduction targets differ and the same BMP has different effects on the reduction of N and P.

Figure 1-2. Howard County nitrogen allocation by sector for the 2010 baseline and target deadlines

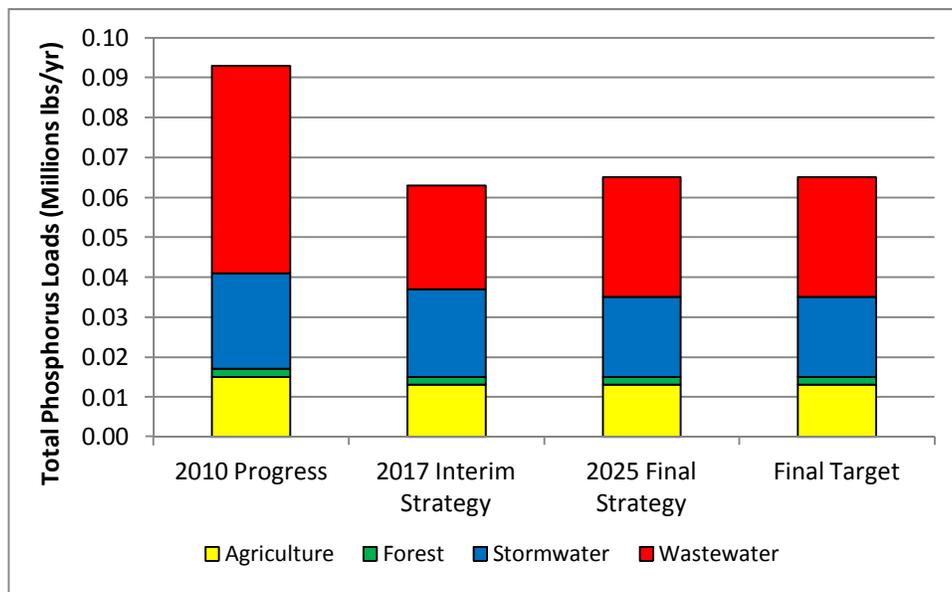


Figure 1-3. Howard County phosphorus allocation by sector for the 2010 baseline and target deadlines

2. Howard County Phase II WIP Strategies

2.1 Overview

The Howard County Phase II WIP strategies are designed to meet the state allocations to Howard County for nitrogen and phosphorus reduction by source sector. The strategy for the agriculture source sector was developed by the Howard Soil Conservation District, working with the farm community and the Maryland Department of Agriculture. The strategy for the wastewater sector involves converting both the Little Patuxent and Patapsco wastewater treatment plants to ENR. The load reductions for these sectors as reported by MDE are included here for completeness. The rest of this chapter focuses on the strategies for the septic system and the stormwater sectors developed by Howard County. The overall allocation by source sector is presented in Table 2-1 for nitrogen and Table 2-2 for phosphorus. The state has not allocated reductions for sediment.

Table 2-1. Howard County Total Nitrogen Final Target Load by Source Sector

Total Nitrogen (pounds) by Sector							
Sector	2010 Progress	2017 Interim Strategy	% Reduction from 2010 Progress	2025 Final Strategy	% Reduction from 2010 Progress	Final Target	% Reduction from 2010 Progress
Agriculture	107,000	94,000	12.1%	92,000	14.0%	103,000	3.7%
Forest	78,000	80,000	NA	80,000	NA	78,000	NA
Septic	79,000	65,000	17.7%	59,000	25.3%	59,000	25.3%
Stormwater	398,000	360,000	9.5%	340,000	14.6%	360,000	9.5%
Wastewater	936,000	346,000	63.0%	409,000	56.3%	409,000	56.3%
Total	1,598,000	945,000	40.9%	980,000	38.7%	1,009,000	36.9%

- The agricultural sector strategies were set to meet basin targets rather than county targets. Therefore, agricultural strategies are likely to overshoot or undershoot county targets, which can be reflected in the total countywide target results.
- Stormwater sector strategies overshoot the county target for nitrogen (N) to meet the phosphorus (P) target. This is because the N and P final TMDL reduction targets differ from each other, and the same BMP can result in different reductions of N and P.

Table 2-2. Howard County Total Phosphorus Final Target Load by Source Sector

Total Phosphorus (pounds) by Sector							
Sector	2010 Progress	2017 Interim Strategy	% Reduction from 2010 Progress	2025 Final Strategy	% Reduction from 2010 Progress	Final Target	% Reduction from 2010 Progress
Agriculture	15,000	13,000	13.3%	13,000	13.3%	13,000	13.3%
Forest	2,000	2,000	0.0%	2,000	0.0%	2,000	0.0%
Septic	0	0	0.0%	0	0.0%	0	0.0%
Stormwater	24,000	22,000	8.3%	20,000	16.7%	20,000	16.7%
Wastewater	52,000	26,000	50.0%	30,000	42.3%	30,000	42.3%
Total	93,000	63,000	32.3%	65,000	30.1%	65,000	30.1%

2.2 Agriculture

Table 2-3 shows the contribution of the Howard County agriculture sector to the Maryland Phase II WIP as reported by MDE. The annual contributions of nutrient management, conservation tillage, and cover crops will remain high, while the contributions of decision agriculture, enhanced nutrient management, cropland irrigation management, dairy manure incorporation, and soil conservation and water quality plans will increase substantially. Among additional agriculture BMPs, off-stream watering without fencing and tree planting/vegetative environmental buffers for poultry will remain high, while horse pasture management will increase significantly. These results confirm that the needed pollutant load reductions of the agriculture sector will be met.

2.3 Wastewater

Howard County uses both the Little Patuxent Water Reclamation Plant and the Patapsco Wastewater Treatment Plant for treating the wastewater entering the public sewer system. Both treatment plants were scheduled to be operating at the ENR level of treatment by 2016, and the Little Patuxent Water Reclamation Plant ENR went operational in the fall of 2011. The Little Patuxent Water Reclamation Plant was converted to ENR ahead of schedule and is currently the most northern example of ENR in the country, which is significant because of the potential for low temperatures to reduce the biological activity required for ENR. Both treatment plants are expected to achieve a level of nutrient reduction equal to or greater than required by their respective NPDES discharge permits. Howard County has no combined sewer systems (i.e., no combined sewer overflow discharges) and only minimal industrial discharges of nutrients or sediment. Table 2-4 shows the contribution of the Howard County wastewater sector to the Maryland Phase II WIP as reported by MDE.

Table 2-3. Howard County Agriculture Sector Strategies Reported in the Maryland Phase II WIP

Nutrient Management/Annual Practices

BMP Name	2010 Progress (Acres/Year)	2017 Interim Strategy (Acres/Year)	2025 Final Strategy (Acres/Year)
Decision Agriculture*	0	2,958	4,930
Enhanced Nutrient Management	203	2,165	3,609
Nutrient Management	8,815	11,656	8,505
Total	9,018	16,779	17,043

Other Annual Practices

BMP Name	2010 Progress (Acres/Year)	2017 Interim Strategy (Acres/Year)	2025 Final Strategy (Acres/Year)
Conservation Tillage	8,655	8,559	8,505
Cover Crop	2,102	1,967	2,000
Cropland Irrigation Management	0	160	160
Dairy Manure Incorporation	0	240	400
Soil Conservation and Water Quality Plans	5,493	14,518	16,200

Additional BMPs

BMP Name	2010 Progress (Acres/Year)	2017 Interim Strategy (Acres/Year)	2025 Final Strategy (Acres/Year)
Barnyard Runoff Control	50	50	50
Forest Buffers	537	543	547
Grass Buffers; Vegetated Open Channel	221	296	345
Horse Pasture Management	0	660	1,100
Land Retirement	325	422	511
Loafing Lot Management	0	0	0
Off Stream Watering Without Fencing	2,720	2,840	2,919
Prescribed Grazing	0	158	264
Stream Access Control with Fencing	16	16	16
Tree Planting; Vegetative Environmental Buffers - Poultry	1,035	1,035	1,035
Wetland Restoration	69	69	69

* A management system that is information and technology based, is site specific and uses one or more of the following sources of data: soils, crops, nutrients, pests, moisture, or yield for optimum profitability, sustainability, and protection of the environment.

Table 2-4. Howard County Wastewater Sector Pollutant Loadings Reported in the Maryland Phase II WIP

Total Nitrogen Loads

Source Sector	Land Use	2010 Progress (Million Pounds/Yr)	2017 Interim Strategy (Million Pounds /Yr)	2025 Final Strategy (Million Pounds /Yr)	Final Target (Million Pounds /Yr)
Wastewater	CSO	0.000	0.000	0.000	0
	Industrial	0.021	0.010	0.009	0.009
	Municipal	0.915	0.336	0.400	0.400
	Total	0.936	0.346	0.409	0.409

Total Phosphorus Loads

Source Sector	Land Use	2010 Progress (Million Pounds /Yr)	2017 Interim Strategy (Million Pounds /Yr)	2025 Final Strategy (Million Pounds /Yr)	Final Target (Million Pounds /Yr)
Wastewater	CSO	0.000	0.000	0.000	0
	Industrial	0.009	0.002	0.001	0.001
	Municipal	0.043	0.024	0.029	0.029
	Total	0.052	0.026	0.030	0.030

2.4 Septic Systems

Howard County is divided into the PSA in the urban eastern portion of the county and the more rural development in the western portion of the county. Public sewer service with ENR wastewater treatment by the Little Patuxent or Patapsco wastewater treatment plants is available only in the urban PSA. More specifically, service is provided only to properties in the Metropolitan District, a tax district set up to fund water and sewer service improvements. Approximately 400 homes and businesses in the PSA have on-site septic systems.

Howard County records indicate that there are about 15,000 septic systems within the county, whereas MDE reports about 20,000 septic systems within the county, which is a potential overestimate of one-third. We understand that this and other discrepancies will not be addressed until the Chesapeake Bay model is updated in 2017; therefore, we developed a MAST scenario that meets the TMDL load allocations assuming the MDE septic numbers. We anticipate that this allocation and our scenario will be adjusted in 2017, if not before. Table 2-5 shows the allocation of Howard County septic system BMPs as reported by MDE.

Table 2-5. Howard County Septic System BMPs

			2010 Progress	2017 WIP Team	2017 Interim Strategy	2025 WIP Team	2025 Final Strategy	Change in 2017 Submittal	Change in 2025 Submittal
BMP Name	Zone	Unit							
Septic Connection to Sewer	Outside of the Critical Area, not within 1000 ft of a perennial stream	Systems	0	67	67	67	67	0	0
	Within 1000 ft of a perennial stream	Systems	0	38	38	38	38	0	0
	Septic ConnectionTotal		0	105	105	105	105	0	0
<hr/>									
Septic BAT Upgrade to Denitrification	Critical Area (none in Howard County)	Systems	0	0	0	0	0	0	0
	Outside of the Critical Area, not within 1000 ft of a perennial stream	Systems	36	36	36	36	36	0	0
	Within 1000 ft of a perennial stream	Systems	20	4,149	4,149	6,412	6,487	0	75
	Septic DenitrificationTotal		56	4,185	4,185	6,448	6,523	0	75
<hr/>									
Septic Pumping	Outside of the Critical Area, not within 1000 ft of a perennial stream	Systems	0	12,045	12,045	12,714	12,714	0	0
	Within 1000 ft of a perennial stream	Systems	0	6,789	6,789	7,166	7,166	0	0
	Septic PumpingTotal		0	18,834	18,834	19,880	19,880	0	0

- The WIP Team columns are included to show differences between numbers originally submitted by Howard County and final numbers calculated by MDE, if any.
- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

We evaluated the following three potential BMPs for reducing nitrogen loads from septic systems:

- Abandon septic systems and connect homes or businesses to the public sewer system
- Upgrade septic systems to best available technology (BAT) denitrification systems
- Require regular pumping of existing septic tanks

All three of these of these options can be used in Howard County, although the opportunity to abandon septic systems and connect to ENR treatment within the current Metropolitan District is limited. No

Critical Area (i.e., land adjacent to the Chesapeake Bay) occurs in Howard County, but reductions of nitrogen loadings from septic systems would be greatest for systems within 1,000 feet of perennial streams.

With the passage of Senate Bill 236 (The Sustainable Growth and Agricultural Preservation Act of 2012), new requirements and limitations for planned development with on-site septic systems are now set to take place. Implementation is intended to minimize the effects of new development on water quality in Maryland's rivers, streams, and estuaries and is, in effect, designed to work in concert with the WIP (TMDL) process. As currently configured, future development of major subdivisions on septic systems will be significantly curtailed. This will result in slower (and presumably lower levels of) new nitrogen loading. Consequently, efforts to address loading from existing septic systems will remain a focal point of the county's WIP.

2.4.1 Connect septic systems to public sewer

Some of the 400 septic systems in the PSA are not in the immediate vicinity of public sewer pipes to which they could connect. Even when public sewer is available, current regulations mandate connection to the public sewer only if the on-site septic system is deemed to be failing. Nevertheless, as part of our WIP implementation, Howard County will investigate which on-site systems can be connected to the public system most economically (i.e., those that require the shortest pipe extensions of the public system) and survey septic system owners' interest in connecting to the public system when it is available. The County will use this information to rank septic systems according to how readily they might be connected to the public sewer. The County may also need to evaluate ways to encourage septic system owners to connect to the public sewer, perhaps through economic incentives or partial to complete funding under recent changes to the Bay Restoration Fund (BRF) program. Table 2-5 shows that the potential for connecting existing septic systems to public sewer is limited to about 100 systems.

2.4.2 Regular pump out of existing septic system tanks

Regular (e.g., biennial) pumping of septic tanks results in a modest improvement in the efficiency of on-site septic systems for removing pollutants (the current level of pumping in Howard County is unknown and is not reflected in Table 2-5). Regular pumping is a routine maintenance activity that is in the septic system owner's interest because it can prevent the higher cost of dealing with a septic system that fails due to lack of maintenance. The County will work with the Howard County Health Department to develop an outreach program to educate septic system owners regarding the proper maintenance of their systems by enhancing existing programs or developing a new program. Table 2-5 uses the targeted number of systems for connection, denitrification, or pumping based on MDE's estimates of the number of septic systems in Howard County (which is significantly higher than the number estimated by the County). Therefore, the interim and final strategy targets are expected to change when more accurate information on the total number of systems is known. The allocation of septic system BMPs between those within and outside 1,000 feet of a perennial stream (as defined by MDE) reflects the County's focus on systems with the most direct loading to streams.

2.4.3 Upgrade septic systems to BAT systems

Nitrogen discharges from septic systems can be reduced by upgrading the systems to technologies that provide better nitrogen-reducing treatment. At this time, such upgrades are required only as a result of mandatory repairs of failing septic systems.

Upgrades typically cost more than \$13,000 and result in long-term operating costs (e.g., electrical costs) that homeowners are generally reluctant to take on. To date, most of the BAT upgrades in Howard County have been funded by the BRF. Priorities for BRF funding for upgrading septic systems focus on Chesapeake Bay Critical Areas, which do not occur in Howard County; consequently, BAT upgrades have been very limited.

To date, fewer than 45 voluntary BAT upgrades of septic systems have been implemented in the county. Several thousand septic systems probably would need to be upgraded to BAT to be consistent with the Bay TMDL efforts. Table 2-5 shows that only 56 septic systems have BAT denitrification, but approximately 6,500 systems could be converted. The Howard County Water Resources Element (amendment to the General Plan) recommends an action to provide financial incentives to promote the use of nitrogen reducing treatment for new and upgraded septic systems.

2.5 Urban Stormwater

Howard County is an MS4 Phase I NPDES permitted jurisdiction. Addressing the legacy of the effects of stormwater runoff from untreated impervious surface is the major focus of restoration activities in the county. In addition to specific strategies for reducing the effects of urban stormwater, Howard County has specific plans for increased public outreach and creation of a dedicated funding source.

The County anticipates that its new MS4 stormwater permit will require treatment of a total of 30% of impervious urban area that currently has little or no stormwater treatment (i.e., an additional 20% over the 10% impervious treatment goal to date). This level of impervious treatment provides the basis for meeting the local load reduction targets of the TMDL. Evaluation of the current pace of capital projects and operational programs and their effect on load reductions determined how these efforts could be expanded to meet the TMDL targets and what new programs are needed to fill the remaining gaps.

The overall allocation of stormwater treatment strategies is as follows (These strategies are defined in Section 2.5.1):

- Stream restoration would account for 3% of the nitrogen and 10% of the phosphorus load reductions
- Urban nutrient management would account for 32% and 18% of the nitrogen and phosphorus load reductions, respectively
- Wet ponds and wetlands would account for 12% and 25% of the nitrogen and phosphorus load reductions, respectively
- Stormwater retrofits would account for 17% and 11% of the nitrogen and phosphorus load reductions, respectively

- Forest conservation would account for 17% and 9% of the nitrogen and phosphorus load reductions, respectively
- Other strategies accounting for less than about 7% each of nitrogen and phosphorus load reductions:
 - Bioretention and rain gardens
 - Bioswales
 - Filtering practices
 - Forest buffers
 - Infiltration practices
 - Impervious surface reduction
 - Street sweeping

Table 2-6 summarizes the urban stormwater reductions in nitrogen and phosphorus loads for all of Howard County. Table 2-7 and Figure 2-1 provide the County’s share (without extractive industries) of these reductions with 2017 and 2025 milestone reductions by pounds and percentage.

Table 2-6. Urban Stormwater Reduction Allocations for Howard County – All

	County MS4	Non-regulated ¹	Construction	Extractive ²	Total
Pounds Nitrogen					
2010 Progress	373,000	14,000	10,000	1,000	398,000
2017 WIP Team	336,000	14,000	9,000	1,000	360,000
2017 Interim Strategy	336,000	14,000	9,000	1,000	360,000
2025 WIP Team	324,000	14,000	9,000	1,000	348,000
2025 Final Strategy	317,000	13,000	9,000	1,000	340,000
Final Target	336,000	13,000	10,000	1,000	360,000
Pounds Phosphorus					
2010 Progress	21,000	1,000	2,000	0	24,000
2017 WIP Team	19,000	1,000	1,000	0	21,000
2017 Interim Strategy	19,000	1,000	1,000	0	21,000
2025 WIP Team	18,000	1,000	1,000	0	20,000
2025 Final Strategy	18,000	1,000	1,000	0	20,000
Final Target	18,000	1,000	2,000	0	21,000

- The WIP Team rows are included to show differences between numbers originally submitted by Howard County and final numbers calculated by MDE, if any.
- The rows for Interim and Final strategies include numbers for SHA, federal facilities, State lands, industrial facilities, Phase I and II MS4 and non-regulated stormwater where applicable. They also reflect changes made by the State.

¹The area of land in this category represents urban impervious (such as roads, roofs, and pavement) or pervious (such as lawn) areas not covered by a NPDES permit regulating stormwater discharges.

²The extractive-active and abandoned mines land use is composed of mines, gravel pits, and the like.

Table 2-7. Urban Stormwater Reduction Allocations for Howard County - County Share

	County MS4	Non-regulated	Construction	Total	Pounds Reduction	% Reduction
Pounds Nitrogen						
2010 Progress	373,000	14,000	10,000	397,000		
2017 Target	336,000	14,000	9,000	359,000	38,000	9.6%
2025 Target	317,000	13,000	9,000	339,000	20,000	5.0%
Total Reduction					58,000	14.6%
Pounds Phosphorus						
2010 Progress	21,000	1,000	2,000	24,000		
2017 Target	19,000	1,000	1,000	21,000	3,000	12.5%
2025 Target	18,000	1,000	1,000	20,000	1,000	4.2%
Total Reduction					4,000	16.7%

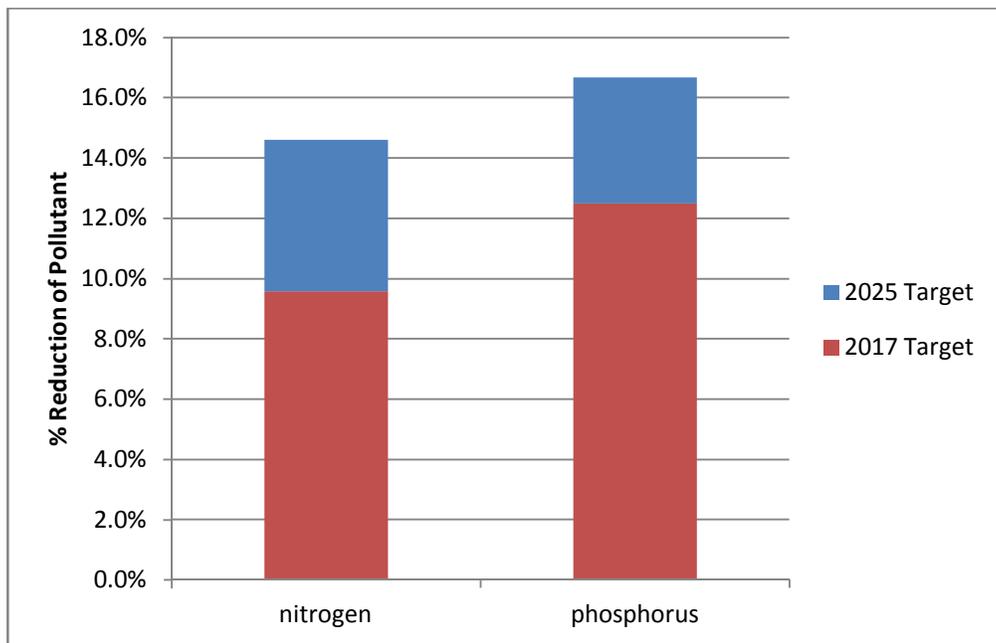


Figure 2-1. Percent reduction in nitrogen and phosphorus by potential urban stormwater BMPs in Howard County - County share interim 2017 and final 2025 targets

2.5.1 Urban Stormwater Strategies

To meet the required nitrogen and phosphorus load reductions, Howard County estimated the number of linear feet of stream restoration; acres of urban nutrient management, wet ponds and wetlands, stormwater retrofits, reforestation, bioretention, bioswales, rain gardens, and impervious surface reduction; and street sweeping that could be accomplished through potential restoration actions (Table 2-8). These details represent the best approximation of an implementation strategy that will have to be adapted over time to achieve the required reductions in nutrient and sediment loads.

Table 2-8. Howard County Potential Additional Restoration Actions to Meet Chesapeake Bay TMDL

Strategy	Acres/Linear Feet - 2017	Acres/Linear Feet - 2025
Bioretention/Raingardens	2,093	2,090
Bioswale	2,068	2,124
Impervious Surface Reduction	0	108
Stormwater Retrofit	9,158	15,516
Filtering Practices	380	1,776
Forest Buffers	37	170
Infiltration Practices	370	386
Urban Tree Planting	219	469
Wet Ponds and Wetland	8,281	8,253
Forest Conservation	4,217	4,225
Urban Nutrient Management	28,840	30,077
Street Sweeping (pounds)	470,703	508,202
Stream Restoration	102,951	184,781

Stream Restoration. Howard County has a continuing program of stream restoration that significantly reduces the downstream loading of sediment and associated nutrients from the restored segments. As in our original WIP submittal, this revision uses the nutrient reduction credits for stream restoration currently in MAST of 0.02 pounds of total nitrogen (TN) and 0.0035 pounds of total phosphorus (TP). Interim credits of 0.20 TN and 0.068 TP, or approximately an order of magnitude higher, have been published but not included in MAST; therefore, we anticipate that the stream restoration credits are likely to be increased in the future, though perhaps not by this magnitude. Stream restoration will continue to be one of the primary tools available to the County for addressing stormwater effects and may receive more consideration if the credits are increased.

Urban Nutrient Management. The state Fertilizer Act of 2011 limits the amount of phosphorus contained in lawn fertilizer products sold to the public; establishes a training, certification, and licensing program for people who are hired to apply fertilizer to non-agricultural landscapes; limits fertilizer amounts applied to turf; and requires the implementation of a homeowner education program about best management practices to be followed when using fertilizers. Howard County’s legislative initiative to manage fertilizer use was superseded by the state law, but the County will continue to educate the

public on reducing fertilizer use as part of its outreach campaign on stormwater. Table 2-9 shows the reductions in nitrogen and phosphorus expected to result from implementation of this state law.

Table 2-9. Howard County Urban Nutrient Management to Meet Chesapeake Bay TMDL by 2025

Strategy	Acres - 2017	Acres - 2025
Fertilizer Act of 2011	28,840	30,077
Nitrogen Reduction (pounds)		
Fertilizer Act of 2011	38,536	40,189
Phosphorus Reduction (pounds)		
Fertilizer Act of 2011	1,206	1,257

Wet Ponds and Wetlands. These water-impoundment structures intercept stormwater runoff and then release it to an open-water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients and toxics. Including vegetation within the pooled area or directing the outfalls through vegetated areas prior to open-water release increases nutrient removal. We plan to use this kind of BMP as the primary source of impervious surface treatment

Stormwater Retrofits. These retrofits usually involve converting dry ponds to extended detention ponds with enhanced water quality benefits and are effective ways of treating large areas of impervious surface. Such ponds are particularly important upland of stream restoration projects, where they serve to reduce hydrologic energy input to the streams. Howard County is conducting a survey of the more than 400 dry ponds, both public and private, throughout the county. We plan to use conversion of existing ponds to extended detention or to wet ponds and wetlands, as a major treatment of impervious surface.

Reforestation. Reforestation (including upland reforestation and planting trees within the riparian buffers of streams) is perhaps the most cost-effective way of reducing stormwater runoff and pollutant loads. Howard County has tree planting programs such as Stream ReLeaf, which provides eligible homeowners with trees for planting along streams. Such tree planting efforts implemented in agricultural or other non-stormwater areas will be credited for pollutant reductions in the regulated stormwater sector when the reductions are above and beyond the target reductions for these non-stormwater areas.

Bioretention, Bioswales, Rain Gardens, and Impervious Surface Reduction. Micro-scale projects such as bioretention, bioswales, and rain gardens are most likely to mimic the natural hydrology of forested conditions. In combination with other ESD practices, such as down-spout disconnection, rain barrels, and reduction in impervious surfaces, they are the preferred BMP options for residential properties. Howard County will pursue implementation of these ESD practices to the maximum extent practicable (MEP) throughout the county. The County is conducting a survey of more than 700 government properties, including schools, parks, maintenance facilities, and other lands, for ESD potential.

Street Sweeping. Street sweeping is an operational program in Howard County that can provide pollutant load reductions (Table 2-10). Currently, the County sweeps roads with curbs and gutters four times each year.

Table 2-10 Howard County Street Sweeping to Meet Chesapeake Bay TMDL by 2025

Strategy	Pounds Swept/Year 2010 Progress	Pounds Swept/Year 2017 Interim Strategy	Pounds Swept/Year 2025 Final Strategy
Street Sweeping	0	470,703	508,202
Nitrogen Reduction (pounds)			
Street Sweeping	0	824	889
Phosphorus Reduction (pounds)			
Street Sweeping	0	329	356

Table 2-11 and Figure 2-2 and Table 2-12 and Figure 2-3 show percentage reduction of nitrogen and phosphorus, respectively, for each of the restoration actions described above.

Table 2-11. Howard County Delivered Nitrogen Reduction from Restoration Actions

Strategy	BMP % of Total Nitrogen Reduction - 2017	BMP % of Total Nitrogen Reduction - 2025
Bioretention/Rain Gardens	4.6%	3.9%
Bioswale	3.7%	3.1%
Impervious Surface Reduction	0.00%	0.4%
Stormwater Retrofit	12.1%	17.2%
Filtering Practices	1.3%	5.3%
Forest Buffers	0.3%	1.0%
Infiltration Practices	2.6%	2.3%
Urban Tree Planting	1.1%	1.9%
Wet Ponds and Wetland	14.6%	12.2%
Forest Conservation	20.6%	17.3%
Urban Nutrient Management	36.5%	31.8%
Street Sweeping	0.8%	0.7%
Stream Restoration	2.0%	2.9%

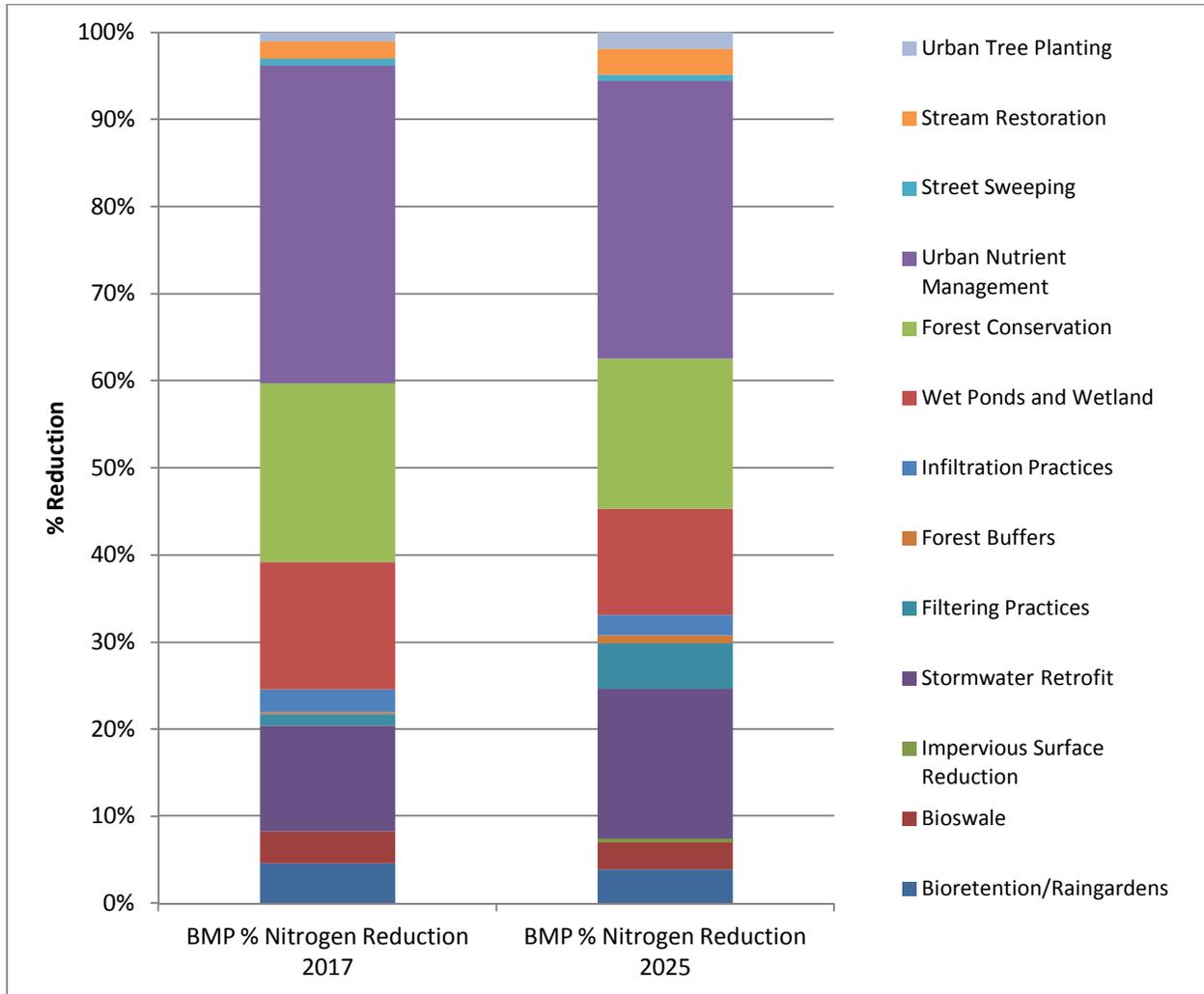


Figure 2-2. Delivered nitrogen reduction from potential restoration actions in Howard County

Table 2-12. Howard County Delivered Phosphorus Reduction from Potential Restoration Actions

Strategy	BMP % of Total Phosphorus Reduction - 2017	BMP % of Total Phosphorus Reduction - 2025
Bioretention/Rain Gardens	7.8%	6.4%
Bioswale	3.4%	2.9%
Impervious Surface Reduction	0.0%	1.4%
Stormwater Pond Retrofit	7.5%	10.5%
Filtering Practices	1.9%	7.2%
Forest Buffers	0.2%	0.8%
Infiltration Practices	2.6%	2.2%
Urban Tree Planting	0.6%	1.0%
Wet Ponds and Wetland	30.7%	25.1%
Forest Conservation	11.3%	9.3%
Urban Nutrient Management	21.6%	18.5%
Street Sweeping	5.9%	5.2%
Stream Restoration	6.5%	9.5%

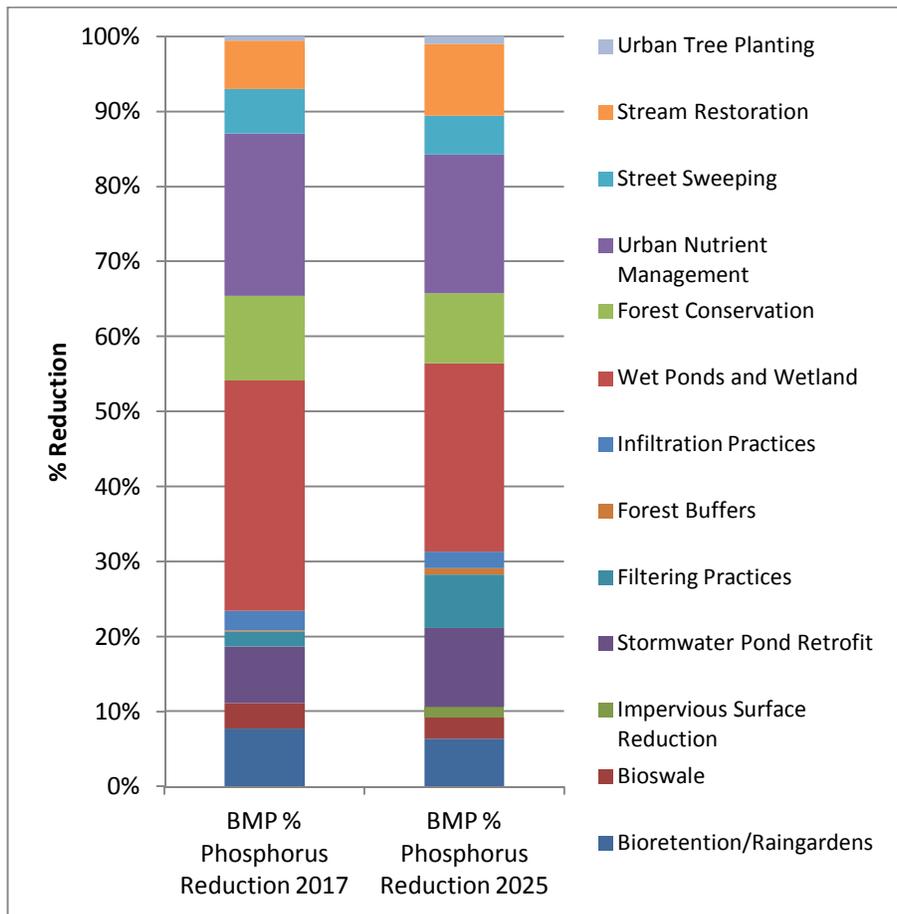


Figure 2-3. Delivered phosphorus reduction from potential restoration actions in Howard County Public Outreach. Howard County recognizes that the success of our increased stormwater efforts depends on increased public understanding and commitment. The County is expanding its outreach and developing new public involvement programs to increase BMP implementation on private property. These efforts include holding contests for student videos about stormwater at two annual GreenFest celebrations and sponsoring a stormwater forum called “Slow the Flow” with the League of Women Voters. In 2011, the County and others began sponsoring development of a Watershed Stewards Academy to work with local residents to construct rain gardens and implement “Bayscaping.” This program will supplement the County’s continuing grant program for non-profit groups to implement BMPs and provide an educational component. Later in 2011, the County contracted with a social marketing consultant to develop a public outreach campaign based on successes in other jurisdictions and research on motivating factors in the local community. In 2012, Howard County began funding an innovative initiative with People Acting Together in Howard (PATH) to identify and construct rain gardens and other stormwater management features on private property throughout the county. The County is also undertaking a model stormwater management neighborhoods program, wherein the widest range of stormwater management practices would be implemented in conjunction with other infrastructure repairs needed in the communities. In a similar initiative, the County has identified a suite of innovative stormwater demonstrations for downtown Historic Ellicott City that will serve as a visible model for the county.

Stormwater Remediation Fee. In 2011, Howard County initiated a thorough study of the feasibility of implementing a stormwater fee to fund the restoration efforts required to meet the Chesapeake Bay TMDL and other mandates. This study began prior to the recently passed state legislation (HB 987) requiring implementation of such a fee and should be completed in time to begin billing in July 2013. To date, the County and a Stormwater Advisory Committee have developed a draft program of services, identified and discussed rate structure policy issues, and developed a preliminary rate model. The County is continuing to work with an expanded advisory committee to further refine the stormwater program, finalize the rate structure and billing system policies, develop credit and hardship exemption policies, finalize the rate model, develop the stormwater remediation fee implementation ordinance, develop and test the Master Account File and integrate it into the billing system, support public outreach activities, and provide customer service assistance. We will submit the ordinance to the County Council in the Fall of 2012, so that it can be implemented in July 2013. Once a stormwater remediation fee is implemented, it will provide increased and sustained funding for the watershed management program described in this WIP.

2.5.2 Contingency Actions

Howard County recognizes that some of the restoration actions listed above will not be feasible or cost effective to implement, based on unforeseen or changing circumstances. Howard County also recognizes that meeting the current WIP II goal of having the programmatic and structural practices needed to achieve the Chesapeake Bay TMDL in place by the year 2025 is ambitious. This time frame imposes great demands on funding, staffing, and other resources to achieve these goals in the septic and stormwater sectors.

From time to time, Howard County will reevaluate the mix of projects listed in Table 2-8. This will allow the County to consider the availability of project sites, changes in technology and nutrient reduction credits for various types of projects, and the cost of implementing the projects. For example, the increase in nutrient reductions credits for stream restoration projects that is currently under consideration will boost the cost effectiveness of stream restoration projects. This may result in a reduced number of less cost-effective types of projects.

In addition, the wastewater treatment plants serving Howard County may have nutrient discharge loads below those allowed by their NPDES discharge permits, through or beyond 2025. Howard County, therefore, may consider as a contingency pursuing the option of “trading in time,” whereby the lower nutrient discharges from the Little Patuxent and Patapsco wastewater treatment plants can temporarily be credited towards the allowable urban stormwater and septic system nutrient loads.

Beyond 2025, the discharges from the treatment plants will increase and, as they do, the septic system and urban stormwater sectors will continue to implement BMPs to reduce their nutrient loads by a similar amount. The County would discuss with MDE how to implement this option for the Little Patuxent and Patapsco waste water treatment plants. The County would also coordinate with Baltimore City, Baltimore County, and Anne Arundel County to determine how to allocate the “trading in time” credits available from the Patapsco wastewater treatment plant.

2.6 Implementation Costs

The TMDL strategy described in this Plan requires a considerable increase in both effort and funding to implement. As presented, the cost of implementing the projects outlined in Table 2-8 may require expenditures in excess of \$800 million for the urban stormwater strategies alone. This cost estimate is based on project costs in the King and Hagen 2011 report prepared for MDE on the Costs of Stormwater Management Practices in Maryland Counties. Table 2-5 projects the need to upgrade more than 6,500 existing septic systems to BAT levels of treatment. The cost to achieve this is approximately \$85 million.

These costs, of course, are only estimates. Over time, as restoration efforts proceed, techniques are improved, and project costs are better defined, the funding needed to implement this Plan will be more accurately determined.

As mentioned above, Howard County will continue to evaluate different restoration techniques and make project-site-specific determinations on how to achieve the needed nutrient reductions in the most cost-effective way.

3. 2012-2013 Milestones

In addition to the 2017 interim WIP goal, MDE has instituted a 2-year milestone process to ensure that progress is being made toward meeting the pollutant reduction targets of the Chesapeake Bay TMDL. Since Howard County submitted its original WIP, MDE clarified the first milestone periods as follows:

- 2013 BMP Milestones: State Fiscal Year: July 1, 2011 - June 30, 2013
- 2013 Programmatic Milestones: Calendar Year: January 1, 2011 - December 31, 2013

Howard County has a continuing program of water resource protection, evolving public outreach, substantial new investments, plans for dedicated funding through a stormwater remediation fee, and an incipient countywide implementation strategy that will help it meet both its MS4 permit and Chesapeake Bay TMDL goals. The County is preparing to meet an anticipated requirement in its new MS4 stormwater permit to treat a total of 30% of impervious urban area that currently has little or no stormwater treatment (i.e., an additional 20% beyond the 10% impervious treatment goal to date). To meet that requirement and the TMDL targets we are accelerating the pace of capital projects and operational programs. The following specific actions constitute the Howard County 2-year milestones:

- Complete study to structure stormwater remediation fee and implement fee once approved by County Council
- Hire additional project restoration staff
- Complete a preliminary countywide implementation strategy for meeting all aspects of the MS4 permit and Chesapeake Bay TMDL, using existing information
- Complete evaluation of ESD stormwater opportunities on county-owned properties and begin implementation of identified retrofit projects
- Complete evaluation of dry ponds countywide and begin implementation of identified retrofit projects
- Construct stormwater pond retrofits treating 120 acres
- Construct stream restoration projects for 10,000 feet of stream
- Establish Watershed Stewards Academy and hold first round of classes
- Develop and begin implementing an enhanced public education and outreach program based on social marketing for stormwater management, septic system pump outs, and urban nutrient management
- Seek increased funding to expand the County-sponsored watershed enhancement grant program
- Seek additional funding for providing economic incentives to septic system owners to encourage retrofit of BAT systems
- Continue street sweeping and reforestation programs at current levels

4. Implementation Tracking, Verification, and Reporting Methods

Howard County recognizes that tracking, verifying, and reporting our progress toward meeting the Chesapeake Bay TMDL targets and milestones is an essential part of the WIP. Fortunately, nearly all of the activities and projects to be tracked are currently reported in an annual update required by Howard County's MS4 permit. The County's reporting to MDE under the MS4 permit includes both annual reports and accessory databases; the County also maintains records that could support audits of our files and on-the-ground implementation under the permit. The Storm Water Management Division of the Howard County Department of Public Works coordinates this annual tracking and reporting of stormwater management practices, erosion and sediment control, restoration actions, and progress toward meeting TMDL reduction requirements with other county agencies. In addition, the County has experience tracking the status and progress of projects implemented under the Chesapeake Bay and Coastal Bays Trust Fund programs and reporting to Maryland Department of Natural Resources.

Howard County anticipates that MDE may institute specific reporting requirements under the Chesapeake Bay TMDL and will endeavor to adapt existing reporting to meet those requirements with the minimum duplication. We are adapting our tracking spreadsheets and modeling methods to use MDE-approved BMP performance efficiencies when calculating nutrient load reductions resulting from completed projects. We also recognize that the ultimate verification of restoration success will be the response of the Chesapeake Bay and local water bodies to WIP projects and activities. The County will be developing an integrated monitoring strategy for tracking the success of restoration as part of its countywide implementation strategy. Howard County plans to implement the following additional actions to complete the tracking, verification, and reporting process:

- Create a system with the Howard County Department of Planning and Zoning to track stormwater management for redevelopment projects
- Establish regular reporting mechanisms with the Howard County Public School System and Columbia Association to ensure that the projects they complete are also tracked within the Howard County WIP
- Establish regular reporting mechanisms with the Howard County Health Department to track septic system upgrades or connections to the public sewer.