

10.0 Permit Requirements

Part IV. Program Review and Annual Progress Reporting

A. Annual Reporting

1. Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of Baltimore County’s NPDES stormwater program. The County shall submit annual reports on or before June 15th of each year that include:
 - e. The identification of water quality improvements or degradation

10.1 Introduction

The following analysis provides a recalculation of watershed pollutant loads for nitrogen and phosphorus based on guidance from Maryland Department of the Environment on pollutant loading analysis for the Water Resources Element and the Chesapeake Bay Program – Phase 5.2 Watershed Model (Section 10.2). It also presents a summary of the pollutant load reductions (water quality improvements) that have resulted from implementation of the management programs required under this permit. It includes reductions due to implementation of stormwater Best Management Practices (Section 1), reductions due to street sweeping and storm drain cleaning programs (Section 3), and reductions due to capital restoration projects, reforestation, and volunteer efforts (Section 7). Further reductions resulting from illicit connection removals (Section 5) and education activities (Section 4) are discussed under the appropriate section. Actual pollutant load reductions due to illicit connection removals and education activities have not been determined.

With the completion of a number of Total Maximum Daily Load analyses for impaired waters, target load reductions for nutrient, sediment, and bacteria have been determined for a number of watersheds. In addition, additional Water Quality Analyses and modification of the biological listing criteria have resulted in changes to the impairment listings (2008 Integrated Report). Table 10-1 summarizes the reductions required for urban stormwater where they have been determined, on a percentage basis.

Table 10-1: Status of TMDLs and TMDL Reduction Requirements for Urban Stormwater

Watershed	Total Phosphorus	Total Nitrogen	Sediment	Bacteria	Biological	Other (Metals, Toxics)
Deer Creek	NA	NA	NA	NA	NA.	NA
Prettyboy	54% (15% Urban)	NA	NA	70%	NA	Complete (Mercury)
Loch Raven	50% (15% Urban)	NA	25%	23% -98%	Not Comp.	Complete (Mercury)
Lower Gunpowder	Not Comp.	Not Comp.	NA	NA	Not Comp.	NA
Little Gunpowder	NA	NA	NA	NA	NA	NA
Bird River	NA	NA	NA	NA	Insuff. Info	NA

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Gunpowder River	NA	NA	NA	NA	Insuff. Info	NA
Middle River	NA	NA	NA	NA	Insuff. Info	NA
Liberty Res.	Not Comp.	Not Comp.	Not Comp.	65%	Not Comp.	Complete
Patapsco	15%*	15%*	15.1%	13% - 56%	Not Comp.	Not Comp.
Gwynns Falls	15%*	15%*	23.5% - 44.6%	67.2-93.2%	Not Comp.	NA
Jones Falls	15%*	15%*	21.9%	92.4-95.3%	Not Comp.	Not Comp.
Back River	15%	15%	NA	95%	Not Comp.	Complete
Baltimore Harbor	15%*	15%*	NA	Not Comp.	Not Comp.	Complete

* Based on TMDL developed for tidal Baltimore Harbor

Additional TMDLs have been completed for chlordane (Back River and Lake Roland), and for mercury in fish tissue (Prettyboy Reservoir, Loch Raven Reservoir, and Liberty Reservoir (not EPA approved)). However, these TMDLs have limited options to address inputs from stormwater discharge due to the nature of the source of pollution (chlordane – historic, mercury – air deposition). A number of listings for impairment have been removed due to Water Quality Assessments that have indicated that the level of particular pollutants is below the existing standards. The most recent Water Quality Assessments have indicated that Jones Falls is not impaired for zinc, and the Patapsco is not impaired for lead or zinc. A summary of the current status of all TMDLs and Water Quality Assessments can be found on the Maryland Department of the Environment web site; <http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Sumittals/index.asp>.

The TMDL for the Chesapeake Bay impairments was finalized December 30, 2010. To address implementation to meet the TMDL reduction requirements for nitrogen, phosphorus, and sediment, the six states and the District of Columbia were required to develop a Watershed Implementation Plan (WIP) for their jurisdiction. These WIPs were included with the Chesapeake Bay TMDL. The Maryland WIP included reduction targets by source sector for two time periods; reductions by 2017 and reductions by 2020. For the Urban Regulated Source Sector the reduction targets for nitrogen were 9% and 18%, for phosphorus were 12% and 34%, and for sediment were 20% and 37%, for 2017 and 2020 respectively. These reduction targets will supersede the Maryland Tributary Strategies, and the local TMDLs developed for nutrient impairment in Back River and Baltimore Harbor.

The Chesapeake Bay Program – revised Watershed Model Phase 5.3 will be available July 2011. The revision will address issues that arose regarding the December 2010 model results. These issues included, an underestimate of rural urban land, nutrient reduction credits for agriculture Nutrient Management Plans, and calculations related to septic systems. The revisions may result in a change in the reduction allocations for the various source sectors.

10.2 Pollutant Load Calculations

The pollutant loading rates for nitrogen and phosphorus were derived from two sources, the technical guidance provided by Maryland Department of the Environment (MDE) entitled *User's Guide for Nutrient Load Analysis Spreadsheet in Support of the Water Resources Element* (MDE 2008) and the Chesapeake Bay Program – Watershed Model Phase 5.2.

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The MDE technical guidance provided loading rates for Baltimore County based on three basins, Western Shore (above the fall line), Western Shore (below the fall line), and Susquehanna (above the fall line). These loading rates are based on the Chesapeake Bay Program Watershed Model Phase 4.3 and include the full implementation of the Maryland Tributary Strategy for nutrient reduction, thereby eliminating the need to consider nutrient controls. For consideration of the impacts related to urban development, Baltimore County determined that the urban loading rates without the implementation of urban BMPs would best serve the intent of the MS4 Permit in tracking restorations actually completed and the progress in meeting the various TMDLs that have been developed to date. Thus the final model of nutrient loads was a hybrid between the MDE guidance document for loading rates for all non-urban land uses and the segment specific nutrient loading rates for urban land uses.

The loading rates for the Chesapeake Bay Program (CBP) Watershed Model Phase 5.2 were provided by the Chesapeake Bay Program Office and include four categories of urban land loadings: low density urban pervious, low density urban impervious, high density urban pervious, and high density urban impervious. These loading rates are pre BMP reduction loading rates and apply to all of Baltimore County. It is anticipated that refined loading rates will be provided upon development of the Phase 5.3 Watershed Model, with loading rates by watershed segment, and loading rates for sediment. The loading rates applied to each watershed, the MDE segment and the CBP segment used in the pollutant loading analysis are displayed in Table 10-2 for nitrogen and Table 10-3 for phosphorus.

It should be noted that the Phase 5.2 Watershed Model has significantly different urban loadings than the Phase 4.3 Watershed Model. The impervious urban loadings increased while the pervious urban loadings decreased. Urban impervious went from a phosphorus loading of 0.51 pounds/acre to 2.26 pounds/acre. Conversely, the urban pervious phosphorus loading went from 2.06 pounds/ down to 0.43 pounds/acre. The same change occurred with the nitrogen loading with impervious urban increasing from 8.22 pounds/acre to 14.1 pounds/acre, and pervious urban decreasing from 13.63 pounds/acre to 7.24 pounds/acre.

These load calculations will be revised next year based on the revised Chesapeake Bay Watershed Model. Those results will not be available until July 2011.

Table 10-2: Nitrogen Per Acre Pollutant Rate, MDE Segment and CBP Segment

	Deer Creek	Liberty Patapsco River	Bird River Gunpowder River Middle River Back River Baltimore Harbor
MDE Seg	Sus	AFL	BFL
Low Density Impervious Urban	14.10	14.10	14.10
Low Density Pervious Urban	7.24	7.24	7.24
High Density Impervious Urban	14.10	14.10	14.10
High Density Pervious Urban	7.25	7.25	7.25
Crop	12.23	16.55	13.54
Pasture	8.42	7.35	5.64
Livestock	15.62	24.87	19.68
Forest	2.36	1.41	1.29
Water	10.61	10.05	10

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Bare soil	8.42	7.35	5.64
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Table 10-3: Phosphorus Per Acre Pollutant Rate, MDE Segment and CBP Segment

	Deer Creek	Prettyboy Loch Raven Lower Gunpowder Little Gunpowder Falls Gwynns Falls Jones Falls Liberty Patapsco River	Bird River Gunpowder River Middle River Back River Baltimore Harbor
MDE Seg	Sus	AFL	BFL
Low Density Impervious Urban	2.26	2.26	2.26
Low Density Pervious Urban	0.427	0.427	0.427
High Density Impervious Urban	2.26	2.26	2.26
High Density Pervious Urban	0.431	0.431	0.431
Crop	0.85	0.72	0.69
Pasture	0.44	0.73	0.66
Livestock	1.60	1.18	0.99
Forest	0.03	0.02	0.02
Water	0.57	0.57	0.57
Bare soil	0.44	0.73	0.66

In order to determine the acres of impervious cover associated with urban land use, the MDP 2002 (modified to make it current with the 2005 planimetric layer) land use GIS layer was overlain with the planimetric buildings and roadways developed from the 2005 aerials for each watershed. The resulting distribution of land use by watershed is displayed in Table 10-4.

Table 10-4: 2005 Land Use (Acres)*

Watershed	Urban		Agricultural Load		Forest	Total Acres
	Impervious	Pervious	Crop	Pasture		
Deer Creek	94	423	3,148	981	2,520	7,173
Prettyboy	247	1,537	8,109	1,839	12,309	25,548
Loch Raven	5,352	22,115	39,935	11,082	58,815	139,573
Lower Gunpowder Falls	2,110	7,280	5,792	3,193	10,891	29,468
Little Gunpowder Falls	538	2,442	4,310	3,087	6,847	17,275
Bird River	2,499	5,926	1,944	53	5,726	16,408
Gunpowder River	348	1,570	267	0	3,674	5,859
Middle River	1,364	2,952	274	15	1,861	6,465
UW Shore Totals	12,552	44,245	63,779	20,250	102,643	247,769
Patapsco/Back River						
Liberty	531	2,286	3,868	728	8,854	17,503
Patapsco River	4,218	13,842	2,391	1,508	11,255	33,580
Gwynns Falls	6,704	15,257	620	353	5,666	28,654
Jones Falls	3,907	11,033	2,138	590	8,185	25,933
Back River	5,649	11,458	440	7	5,487	23,113
Baltimore Harbor	3,050	6,328	343	0	1,592	11,387
Patapsco/Back River	24,059	60,204	9,800	3,186	41,039	140,170
County Total	36,612	104,448	73,578	23,435	143,684	387,939

* Total Acres will be greater than the sum of the acreage in the table due to leaving out small acreage land uses.

The estimated pollutant loads by watershed are presented in Table 10-5 for nitrogen and Table 10-6 for phosphorus. Each watershed load is broken down into the urban load, the agricultural load, and the forest load with the percentages of each. Note that the nitrogen load calculations include an estimate of the septic load for each watershed.

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Table 10-5: Watershed Nitrogen Loads – Pounds and Percentage*

Watershed	Urban Load		Septic Load		Agricultural Load		Forest Load		Total Load
	Pounds	%	Pounds	%	Pounds	%			
Deer Creek	4,383	7.0	5,027	8.0	46,764	74.4	5,948	9.5	62,868
Prettyboy	14,617	7.0	15,106	7.2	147,713	70.4	17,356	8.3	209,923
Loch Raven	235,705	18.9	165,678	13.3	743,460	59.5	82,929	6.6	1,250,125
Lower Gunpowder Falls	82,508	31.7	36,988	14.2	123,950	47.6	15,357	5.9	260,469
Little Gunpowder Falls	25,279	15.9	28,233	17.8	95,007	59.9	9,654	6.1	158,636
Bird River	78,190	64.2	8,035	6.6	26,621	21.9	7,387	6.1	121,725
Gunpowder River	16,287	59.7	2,655	9.7	3,613	13.2	4,740	17.4	27,294
Middle River	40,633	82.5	2,419	4.9	3,788	7.7	2,401	4.9	49,240
UW Shore Totals	497,601	23.2	264,819	12.4	1,190,916	55.6	145,772	6.8	2,140,281
Patapsco/Back River									
Liberty	24,055	17.4	19,888	14.4	69,369	50.2	12,484	9.0	138,220
Patapsco River	159,804	60.2	36,386	13.7	50,648	19.1	15,870	6.0	265,618
Gwynns Falls	205,124	81.5	25,297	10.1	12,854	5.1	7,990	3.2	251,669
Jones Falls	135,033	59.5	40,025	17.6	39,726	17.5	11,541	5.1	227,040
Back River	162,705	90.5	3,513	2.0	5,993	3.3	7,079	3.9	179,746
Baltimore Harbor	88,882	91.6	765	0.8	4,650	4.8	2,053	2.1	97,078
Patapsco/Back River	775,604	66.9	125,873	10.9	183,240	15.8	57,014	4.9	1,159,372
County Load	1,273,205	38.6	390,693	11.8	1,374,156	41.6	202,788	6.1	3,299,653

* Percentages may be less than 100% - direct loading to the water surface and loading from bare ground are not included.

Table 10-6: Watershed Phosphorus Loads – Pounds and Percentage*

Watershed	Urban Load		Agricultural Load		Forest Load		Total Load
	Pounds	%	Pounds	%	Pounds	%	
Deer Creek	393	11.0	3,108	86.8	76	2.1	3,580
Prettyboy	1,217	12.8	7,181	75.6	246	2.6	9,504
Loch Raven	21,588	35.4	36,871	60.5	1,176	1.9	60,961
Lower Gunpowder Falls	7,896	53.1	6,620	44.5	218	1.5	14,870
Little Gunpowder Falls	2,262	29.0	5,382	68.9	137	1.8	7,813
Bird River	8,199	83.1	1,376	14.0	115	1.2	9,861
Gunpowder River	1,463	85.1	184	10.7	74	4.3	1,720
Middle River	4,355	94.9	199	4.3	37	0.8	4,591
Upper Western Shore	47,372	42.0	60,290	53.4	2,078	1.8	112,898
Patapsco/Back River							
Liberty	2,183	34.2	3,316	52.0	177	2.8	6,381
Patapsco River	15,489	82.4	2,822	15.0	225	1.2	18,791
Gwynns Falls	21,721	96.2	704	3.1	113	0.5	22,578
Jones Falls	13,568	86.1	1,970	12.5	164	1.0	15,763
Back River	17,699	97.4	308	1.7	110	0.6	18,163
Baltimore Harbor	9,620	96.9	237	2.4	32	0.3	9,931
Patapsco/Back River	80,281	87.6	9,358	10.2	821	0.9	91,597
County Load	127,653	62.4	70,278	34.4	2,899	1.4	204,495

* Percentages may be less than 100% - direct loading to the water surface and loading from bare ground are not included.

The same type of analysis was used to determine the loading rates to stormwater management facilities (Section 1) and for stormwater management retrofits and conversions (Section 7).

10.3 New Nutrient Reduction and Impervious Cover Addressed Tracking Added

Starting with the 2009 Annual Report, the nutrient reductions attributable to the Baltimore County Community Reforestation Program, the Growing Home Campaign, and the efforts of Watershed Associations are included. See Section 7 for a description of how the reductions were calculated. We will continue to seek methods for tracking

other efforts to include in future reports. These other efforts include the Tremendous Program, the Growing Home Campaign, and the number of septic connections to the sanitary sewer. Assessing the effects of education on nutrient reduction is anticipated to take longer and would best be done through cooperation of other MS4 permittees and MDE.

The impervious cover addressed by the Storm Drain Cleaning Program and the Street Sweeping Program was calculated for the first time in the 2009 Annual Report. The methods are detailed in Section 3.

Next years report will be based on the recently released Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated (MDE June, 2011).

10.4 Summary of Pollutant Reduction Programs

Seven components of the County's overall effort to reduce pollutant loads are summarized in Tables 10-7 and 10-8, which address the Upper Western Shore and the Patapsco/Back River drainages, respectively. The components are the Stormwater Management Program (Section 1), the Storm Drain Cleaning Program (Section 3), the Street Sweeping Program (Section 3), the Capital Improvement Program (Section 7), the Community Reforestation Program (Section 7), Growing Home Campaign, and Watershed Association restoration actions (Section 7).

To account for impervious cover addressed by certain types of restoration activities where the drainage area is typically not applicable, a standard formula was used to calculate equivalent impervious acres. The Chesapeake Bay Program – Watershed Model Phase 5.2 has an urban impervious loading of 2.26 pounds per acre of phosphorus. To determine the equivalent impervious acres, the pounds of phosphorus for the practice was divided by 2.26. This formula was applied for the following restoration practices:

- Street sweeping (Section 3)
- Storm drain cleaning (Section 3)
- Reforestation and tree planting (Section 7)
- Shoreline erosion control projects (Section 7).

The results are displayed in the appropriate section and in the summary Tables 10-7 and 10-8 below.

The acreage of impervious surface that are served by stormwater management facilities is not counted toward meeting the impervious surface requirements of the Permit (restore 20% of the impervious surface controlled by Baltimore County). Instead, the impervious surface controlled by State-of-the-Art stormwater management or that which has little or no potential for conversion is subtracted from the Baltimore County controlled impervious surfaces to derive the overall impervious surface acreage that will ultimately be required to be addressed by the current and future NPDES Permits. That number will change annually as more advanced storm water facilities are installed as a result of new development and new redevelopment.

The urban loads for each watershed are presented in each table, along with the progress to date in reducing phosphorus and nitrogen, and in addressing impervious cover. This is

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a change from previous reports where TSS reductions were reported. We currently have not developed a satisfactory TSS loading rate analysis. This will be done in the future.

If a TMDL has been developed, the pollutant load reduction expressed as a percentage is shown. In the nutrient TMDLs developed to date, the expectation for the urban non-point source load reduction is 15%. In the case of Prettyboy and Loch Raven Reservoirs, this is less than the over all load reduction needed to meet water quality standards in the receiving waters. The Maryland Tributary Strategies urban pollutant load reduction for nitrogen and phosphorus are 24% and 42%, respectively. However, with the results from the development of the Chesapeake Bay Program – Phase 5.3 Watershed Model available in December 2010, it is expected that the urban reductions will be assigned by tidal segment and will therefore change for the next annual report.

Table 10-7: Pollutant Removal (Pounds) by Upper Western Shore Watersheds Attributed to BMP's

Upper Western Shore			
Deer Creek			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	0	0
Inlet Cleaning	0	0	0
Street Sweeping	0	0	0
Restoration Projects	0	0	0
Reforestation Projects	0.1	0.2	1.8
Watershed Association Projects	0	0	0
Totals	0.1	0.2	1.8
Urban Watershed Imp./Load	203	393	4,383
% Urban Load Removed	0.0	0.0	0.0
Prettyboy Reservoir			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	18.7	182
Inlet Cleaning	0	0	0
Street Sweeping	0	0	0
Restoration Projects	0	0	0
Reforestation Projects	3.0	6.8	84
Watershed Association Projects	0	0	0
Totals	3.0	25.5	266
Urban Watershed Imp./Load	535	1,217	14,617
TMDL % Reduction/Imp.		54% (15% Urban)	NA
% Urban Load Removed	0.6%	2.1%	1.8%
Loch Raven Reservoir			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	1,577.4	11,181
Inlet Cleaning	4.8	10.8	28
Street Sweeping	85.1	192.3	496
Restoration Projects	470.9	339.1	4,860
Reforestation Projects	6.5	14.7	191
Watershed Association Projects	11.5	26.0	331
Totals	578.8	2,160.3	17,087
Urban Watershed Imp./Load	6,170	21,588	235,705
TMDL % Reduction		50% (15% Urban)	NA
% Urban Load Removed	9.4%	10.0%	7.2%

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Table 10-7: Pollutant Removal (Pounds) by Upper Western Shore Watersheds Attributed to BMP's (continued)

Lower Gunpowder River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	453.8	3,323
Inlet Cleaning	1.2	2.7	7
Street Sweeping	47.4	107.0	276
Restoration Projects	379.9	203.2	3,834
Reforestation Projects	0.3	0.7	11
Watershed Association Projects	0.4	0.8	4
Totals	429.2	768.2	7,455
Urban Watershed Imp./Load	2,059	7,896	82,508
% Urban Load Removed	20.8%	9.7%	9.0%
Little Gunpowder River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	88.3	1,002
Inlet Cleaning	1.4	3.1	8
Street Sweeping	10.4	23.4	60
Restoration Projects	0	0	0
Reforestation Projects	0.1	0.2	3
Watershed Association Projects	0	0	0
Totals	11.9	115.0	1,073
Urban Watershed Imp./Load	608	2,262	25,279
% Urban Load Removed	2.0%	5.1%	4.2%
Bird River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	976.6	5,925
Inlet Cleaning	2.4	5.5	14
Street Sweeping	43.7	98.7	255
Restoration Projects	484.1	508.1	6,417
Reforestation Projects	0.3	0.6	8
Watershed Association Projects	0	0	0
Totals	530.5	1589.5	12,619
Urban Watershed Imp./Load	2,080	8,199	78,190
% Urban Load Removed	25.5%	19.4%	16.1%
Gunpowder River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	65.9	343
Inlet Cleaning	0.4	0.8	2
Street Sweeping	4.4	10.0	26
Restoration Projects	25.6	41.9	139
Reforestation Projects	0.1	0.2	2
Watershed Association Projects	0	0	0
Totals	30.5	118.8	512
Urban Watershed Imp./Load	397	1,463	16,287
% Urban Load Removed	7.7%	8.1%	3.1%

Table 10-7: Pollutant Removal (Pounds) by Upper Western Shore Watersheds Attributed to BMP's (continued)

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Middle River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	152.0	765
Inlet Cleaning	0.5	1.2	3
Street Sweeping	16.3	36.8	95
Restoration Projects	674.7	1,501.7	3,097
Reforestation Projects	0.2	0.4	6
Watershed Association Projects	0	0	0
Totals	691.7	1,692.1	3,966
Urban Watershed Imp./Load	1,146	4,355	40,633
% Urban Load Removed	60.4%	38.9%	9.8%

Table 10-8: Pollutant Removal (Pounds) by Patapsco/Back River Watersheds Attributed to BMP's

Patapsco / Back River			
Liberty Reservoir			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	75.7	675
Inlet Cleaning	0.0	0.0	0
Street Sweeping	4.4	10.0	26
Restoration Projects	0	0	0
Reforestation Projects	0	0	1
Watershed Association Projects	0	0	0
Totals	4.4	85.7	702
Urban Watershed Imp./Load	572	2,183	24,055
% Urban Load Removed	0.8%	3.9%	2.9%
Patapsco River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	986.7	6,482
Inlet Cleaning	11.6	26.2	68
Street Sweeping	102.1	230.8	595
Restoration Projects	202.7	87.2	844
Reforestation Projects	0.2	0.5	8
Watershed Association Projects	2.2	4.9	43
Totals	318.8	1336.3	8,040
Urban Watershed Imp./Load	3,552	15,489	159,804
TMDL % Reduction		15%	15%
% Urban Load Removed	9.0%	8.6%	5.0%
Gwynns Falls			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	1,993.7	12,299
Inlet Cleaning	14.2	32.1	83
Street Sweeping	192.4	434.8	1,122
Restoration Projects	94.1	48.0	646
Reforestation Projects	0.2	0.5	6
Watershed Association Projects	1.4	3.2	27
Totals	302.3	2,512.3	14,183
Urban Watershed Imp./Load	4,919	21,721	205,124
TMDL % Reduction		15%	15%
% Urban Load Removed	6.1%	11.6%	6.9%

Table 10-8: Pollutant Removal (Pounds) by Patapsco/Back River Watersheds Attributed to BMP's (continued)

Jones Falls			
	Impervious Cover (ac.)	TP	TN

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Stormwater Management	**	770.9	4,930
Inlet Cleaning	3.2	7.3	19
Street Sweeping	40.7	92.0	237
Restoration Projects	342.3	116.1	1,850
Reforestation Projects	0.4	0.9	13
Watershed Association Projects	10.9	24.6	241
Totals	397.5	1011.8	7,290
Urban Watershed Imp./Load	3,154	13,568	135,033
TMDL % Reduction		15%	15%
% Urban Load Removed	12.6%	7.5%	5.4%
Back River			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	731.4	3,885
Inlet Cleaning	11.6	26.2	68
Street Sweeping	136.9	309.4	798
Restoration Projects	1,288.7	2,010.3	5,481
Reforestation Projects	0.4	1.0	14
Watershed Association Projects	1.8	4	38
Totals	1,439.4	3,082.3	10,284
Urban Watershed Imp./Load	4,931	17,699	162,705
TMDL % Reduction		15%	15%
% Urban Load Removed	29.2%	17.4%	6.3%
Baltimore Harbor			
	Impervious Cover (ac.)	TP	TN
Stormwater Management	**	118.2	648
Inlet Cleaning	8.4	18.9	49
Street Sweeping	56.2	127.1	328
Restoration Projects	541.5	894.7	2,147
Reforestation Projects	0.2	0.2	3
Watershed Association Projects	0	0	0
Totals	606.3	1159.1	3,175
Urban Watershed Imp./Load	2,818	9,620	88,882
TMDL % Reduction		15%	15%
% Urban Load Removed	21.5%	12.0%	3.6%

10.5 Progress in Meeting MS4 Impervious Restoration and Nutrient TMDLs

This section discusses the progress made to date in meeting the impervious cover addressed by water quality and restoration efforts in the current MS4 Permit (Section 10.5.1), and the TMDLs urban non-point nutrient reduction targets (10.5.2).

10.5.1 MS4 Impervious Restoration

The current MS4 Permit required that Baltimore County address 20% of the County controlled impervious cover by June 15, 2010. The next term of the permit is anticipated to require an additional 10% impervious cover be addressed over the 5-year term of the permit. Table 10-9 summarizes the Baltimore County efforts to date. The data is compiled from Tables 10-7 and 10-8 above, excluding the impervious cover controlled by state-of-the-art stormwater management facilities installed through the development process.

Table 10-9: Impervious Cover Addressed by Water Quality Improvement Efforts to Date

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Watershed	Impervious Cover to Be Addressed	20% Target	Impervious Cover Addressed	% Addressed
Upper Western Shore				
Deer Creek	202.7	40.5	0.1	0.0
Prettyboy	534.5	106.9	3.0	0.6
Loch Raven	6,169.6	1,233.9	578.8	9.4
Lower Gunpowder Falls	2,059.1	411.8	429.2	20.8
Little Gunpowder Falls	608.4	121.7	11.9	2.0
Bird River	2,080.1	416.0	530.5	25.5
Gunpowder River	397.2	79.4	30.5	7.7
Middle River	1,145.8	229.2	691.7	60.4
Upper Western Shore	13,197.4	2,639.5	2275.7	17.2
Patapsco/Back River				
Liberty	572.4	114.5	4.4	0.8
Patapsco River	3,551.8	710.4	318.8	9.0
Gwynns Falls	4,918.6	983.7	302.3	6.1
Jones Falls	3,154.3	630.9	397.5	12.6
Back River	4,931.3	986.3	1,439.4	29.2
Baltimore Harbor	2,818.2	563.6	606.3	21.5
Patapsco/Back River	19,946.6	3,989.3	3,068.7	15.4
County Impervious	33,171.1	6,634.2	5,344.4	16.1

With the inclusion of street sweeping and storm drain cleaning, the county is currently addressing 17.6% of the impervious cover controlled by Baltimore County. That estimate is a liberal estimate, in that it does not account for the overlap in the various water quality improvement efforts. Future reports will attempt to correct this deficiency. It is anticipated that the ability to address additional impervious cover will become more difficult over time as the easier projects are completed. We will rely on our Small Watershed Action Plans to identify actions needed to meet the various TMDLs that are developed for each watershed for a variety of constituents. Implementation of those plans and meeting the TMDL reduction requirements will be considered as meeting the impervious cover requirement in each planning area. It is not anticipated that a water quality device will treat every impervious acre.

10.5.2 Nutrient TMDL Progress

Baltimore County has not yet developed a mechanism for estimating bacteria loads, nor efficiencies of the various urban best management practices in reducing bacteria loads. Table 10-10 presents the progress in meeting TMDLs for nutrients. This progress includes the nutrient reductions achieved by stormwater management facilities installed through the development process.

Table 10-10: Progress in Meeting Nutrient TMDLs Where Developed

Watershed	Phosphorus		Nitrogen	
	Target	Progress	Target	Progress
Prettyboy	15% (54%)	1.2%	NA	NA

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Loch Raven	15% (50%)	6.6%	NA	NA
Patapsco	15%	7.3%	15%	4.4%
Gwynns Falls	15%	10.3%	15%	6.3%
Jones Falls	15%	7.3%	15%	6.1%
Back River	15%	20.3%	15%	7.0%
Baltimore Harbor	15%	14.7%	15%	3.8%

As can be seen from Table 10-10 the target reductions for phosphorus and nitrogen have not been met, with the exception of the phosphorus reduction for Back River. In the cases of Prettyboy and Loch Raven Reservoir watersheds, the target phosphorus reduction is much higher (shown in parentheses), however, the reduction scenario developed by Maryland Department of the Environment indicates a 15% reduction of phosphorus from urban lands. When the new allocations for the Chesapeake Bay TMDL are available, they will be added to this section.

10.6 Summary

Nutrient pollutant load reduction from urban sources is progressing through the use of a variety of urban best management practices. As of this time, we have not achieved the target percentage reductions for the TMDLs developed to date. We are close to meeting the NPDES Permit requirement in addressing impervious cover through water quality improvements. Baltimore County will work towards establishing a mechanism to account for urban nutrient management progress through our education programs.