

Baltimore County

Two-Year Milestone Interim Progress Report



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Introduction

Two-year milestones are required to measure progress in meeting the Chesapeake Bay TMDL nutrient and sediment targets to meet water quality standards in the tidal waters of the Chesapeake Bay. Implementation of all restoration actions are required to be in place by June 30, 2025. There will be a total of 7 two-year milestone periods. This interim report covers the first two-year milestone period (July 1, 2011 – June 30, 2013) and the first half of the second two-year milestone period (July 1, 2013 – June 30, 2015).

The two-year milestone commitments are divided between programmatic milestones, those actions needed to set up the ability to implement restoration actions, and restoration actions milestones. While the restoration actions follow the two-year milestones referenced above and are fiscal year based, the programmatic actions are based on the calendar year.

For purposes of allocation of nutrient and sediment load reductions, the State of Maryland designated four source categories; agricultural sources, urban stormwater sources, septic system sources, and point sources (Waste Water Treatment Plants and permitted point source discharges). This report will cover programmatic and restoration implementation progress made for the urban stormwater sources and the septic system sources; the agricultural source reduction progress is reported through the Maryland Department of Agriculture, and the point source reduction progress is reported through Maryland Department of the Environment, which has permitting authority for point sources.

Programmatic Milestones

The 2014-2015 programmatic milestones and their status are displayed in Table 1. For the most part Baltimore County is on track to meet all of the programmatic milestones, with only one milestone that was slated for 2014. That was the development of a document that details Baltimore County methodologies for pollutant load calculations, pollutant load reductions calculations, tracking, validation, and reporting. That document is now slated for completion in the spring of 2015.

Table 1: Status of 2014-2015 Programmatic Milestones

Target Date	Milestone	Deliverable	Lead Agency	Comments/Status Updates
Reforestation				
2014	Reforestation: Develop a geo-referenced database for planting project implementation and tracking	GIS data layers and project spreadsheets	EPS, SFM	All reforestation and tree planting projects are being tracked using a geo-referenced database.
2014-2015	Rural Reforestation: Establish a new “turf-to-trees” planting program for rural residential subdivisions, following previous grant-funded pilot projects	List/maps of planting sites; right-of-entry agreements for landowners; education/outreach materials for discussion with rural landowner groups; updated	EPS, SFM	This project type for WIP reforestation has been established. EPS has secured contractors, identified several project sites, coordinated with landowners, and awarded contracts for planting. Rural “turf-to-trees” planting is a continuing program and specific projects are developed for each spring and fall planting season.

Target Date	Milestone	Deliverable	Lead Agency	Comments/Status Updates
		project maintenance booklet and training workshop		
2014-2015	Urban Tree Planting: Develop a street tree planting program in cooperation with DPW	List/maps of approved street tree planting opportunities	EPS, SFM	The WIP planting program includes street tree projects, which require coordination with DPW if located on public road rights-of-way. EPS continues to identify sites and to work with communities on planting projects.
2014-2015	Urban Tree Planting: Develop a reforestation program for private urban "managed grounds"	List/maps of planting sites and agreements with private owners for planting managed grounds (apartments, condos, businesses, institutions)	EPS, SFM	This project type for WIP reforestation has been established. EPS has secured contractors, identified several project sites, coordinated with landowners, and awarded contracts for planting. Urban tree planting on managed grounds is a continuing program and specific projects are developed for each spring and fall planting season.
On-Site Disposal Systems (OSDS)				
2014-2015	Investigate households within the URDL that are indicated as being on OSDS to determine the correctness of the designation	Changes in the Metro databases regarding the designation of type of facility on-site.	EPS, GWM	80% Complete
2014	Improve tracking of OSDS connections to the sanitary sewer	Tracking methodology for crediting connection of existing OSDS to sanitary sewer	EPS, GWM, WMM	With OIT assistance, query was developed to determine when existing properties on OSDS are connected to public sewer.
Watershed Planning/Restoration Tracking and Reporting				
2014	Develop TMDL Implementation Plans for local TMDLs	Completed TMDL Implementation Plans submitted to MDE	EPS, WMM	22 TMDL Implementation Plans were developed during 2014 with a public comment period from November 8, 2014 – December 8, 2014. Three public informational meetings were held. The plans were submitted to MDE for review and approval December 23, 2014
2014	Develop a Trash Reduction Strategy	Completed Trash Reduction Strategy submitted to MDE	EPS, WMM	A Trash and Litter Reduction Strategy was developed after holding three citizen listening sessions and meeting with appropriate Baltimore County Agencies. A public comment period was held (see above) and the strategy was submitted to MDE for review and approval December 23, 2014

Target Date	Milestone	Deliverable	Lead Agency	Comments/Status Updates
2014-2015	Complete 5 additional Small Watershed Action Plans	Completed SWAPs submitted to MDE	EPS, WMM	Two SWAPs were completed in 2014 (Middle Gwynns Falls and Bird River). Four SWAPs are currently in development with an anticipated completion date of spring/summer 2015 (Urban Lower Gunpowder Falls, Rural Jones Falls, Northern Loch Raven Reservoir, and Liberty Reservoir).
2014	Complete Baltimore County's Manual on Pollutant Load Calculations, Pollutant Load Reduction Calculations, Tracking, Validation, and Reporting.	Completed manual to be update annually.	EPS, WMM	This manual is to be completed in 2015 with a target completion of Spring of 2015.
Street Sweep/Storm Drain Cleaning				
2014	Complete purchase of additional equipment	New equipment delivered	DPW, BHEM	<p>3 Vacuum Leaf Loaders delivered March 2014</p> <p>10 Roll-off containers delivered in March 2014 (storage and weighing of street sweeping debris)</p> <p>3 Sewer Catch Basin Cleaners "Megawind" delivered Aug. 2014</p> <p>6 Street Sweepers "Elgin Eagle" 3 delivered in March 2014, 3 in Sept. 2014</p> <p>Began Leaf Vac. Program Oct. 2014</p> <p>Operators received training and began Sewer Catch Basin Cleaning Program Nov. 2014</p> <p>Street Sweeping Contract for Eastern Balto. Co. began May 2014</p> <p>Enhanced sweeping county wide began Sept. 2014 Completed</p>
Storm Drain Retrofits/Public Facility Restoration				
2014-2015	Continue to work with consultants to identify and prioritize storm drain repairs and retrofits	Completed consultants' reports on storm drain outfall conditions and retrofit opportunities.	DPW, BEC, SDDS	Initiated 11 outfall treatment and storm drains rehabilitation projects, in various locations throughout the County; continue with design and construction of rehabilitation work meant to curtail significant sediment pollution in receiving waterways.
2014-2015	Continue to assess public facilities subject to the General Permit for Stormwater Discharges	Completed assessment reports, restoration/retrofit designs.	DPW, BEC, SDDS	Installed ESD grade SWM at 17 sites and initiated 12SW facilities compliance program; continue with the 12SW permit mandated inspections and with installation of additional SWM BMP's,

Target Date	Milestone	Deliverable	Lead Agency	Comments/Status Updates
	Associated with Industrial Activity			for assistance with the MS4 implementation countywide; regular monitoring and maintenance on the SWM facilities already in operation.

EPS = Department of Environmental Protection and Sustainability

SFM = Sustainability and Forest Management Section of EPS

GWM = Groundwater Management Section of EPS

WMM = Watershed Management and Monitoring Section of EPS

DPW = Department of Public Works

BHEM = Bureau of Highways and Equipment Maintenance of DPW

BEC = Bureau of Engineering and Construction of DPW

SDDS = Storm Drain Design Section of DPW

Restoration Milestones

Urban Stormwater Load Reduction Progress – Restoration Milestones

Baltimore County submitted its Phase II Watershed Implementation Plan (WIP) to MDE on July 2, 2012. To view the Baltimore County Phase II WIP, see:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/FINAL_PhaseII_Report_Docs/Final_County_WIP_Narratives/Baltimore_County_WIPII_2012.pdf

The Baltimore County proposal for the first two sets of 2-year milestones for urban stormwater source nutrient reductions in the Phase II WIP are presented in Table 2. This table displays the individual strategies, by milestone years and the proposed amount of action to take place. The column “Type” indicates whether the practice is a cumulative practice “C” (once installed the practice provides pollutant reduction credits for each year subject to periodic verification) or an annual practice “A” (credit is only given for the year in which the reduction occurs). The expected nitrogen and phosphorus reductions that will result from implementation are presented in Tables 3 and 4, respectively. The nitrogen and phosphorus reductions are expressed as delivered load.

Table 2: Cumulative 2-year Milestone Targets for Each Restoration Strategy

Strategy	Type*	Units	July 1, 2011 – June 30, 2013 (1 st 2-Year Milestones)	July 1, 2013 – June 30, 2015 (2 nd 2-Year Milestones)	Total at end of the 2 nd 2-year milestone
Stream Restoration	C	feet	63,174	25,800	88,974
Shoreline Erosion Control	C	feet	5,190t	13,067	18,257
SWM Retrofit/Conversions	C	acres	669	675	1,344
Street Sweeping	A	Pounds	Current Rate	Current Rate	Current Rate
Storm Drain Cleaning	A	Pounds	Current Rate	Current Rate	Current Rate
Nutrient Management 1998	A	acres	6,125	NA	
SSO Elimination	C	NA	20% reduction	20% Reduction	40% Reduction
Upland Reforestation	C	acres	20	144	164
Riparian Buffer Reforestation	C	acres	10	45	55
Urban Tree Canopy Planting	C	trees	1,400	1,100	1,500

Redevelopment	C	acres	200	200	400
Watershed Association Projects	C	Pounds	Current Rate	Current Rate	Current Rate

Table 3: Expected Nitrogen Reductions through the First 2-Year Milestones

Strategy	Type*	Nitrogen Reduction		
		July 1, 2011 – June 30, 2013	July 1, 2013 – June 30, 2015	Total at end of the 2 nd 2-year milestone
Stream Restoration (Interim Rate)	C	7,165	2,926	10,091
Shoreline Erosion Control	C	830	2,090	2,920
SWM Retrofit/Conversions	C	1,268	1,279	2,547
Street Sweeping	A	4,238	4,238	4,238
Storm Drain Cleaning	A	734	734	734
Nutrient Management 1998	A	4,565	0	4,565
SSO Elimination	C	230	230	460
Upland Reforestation	C	85	612	697
Riparian Buffer Reforestation	C	57	257	314
Urban Tree Canopy Planting	C	59	46	105
Redevelopment	C	915	915	1,830
Watershed Association Projects	C	155	155	310
Total Reductions		20,301	13,511	28,811

Table 4: Expected Phosphorus Reductions through the First 2-Year Milestones

Strategy	Type*	Phosphorus Reduction		
		July 1, 2011 – June 30, 2013	July 1, 2013 – June 30, 2015	Total at end of the 2 nd 2-year milestone
Stream Restoration (Interim Rate)	C	4,225	1,725	5,950
Shoreline Erosion Control	C	571	1,438	2,009
SWM Retrofit/Conversions	C	165	1,279	1,444
Street Sweeping	A	1,620	1,620	1,620
Storm Drain Cleaning	A	284	284	284
Nutrient Management 1998	A	204	204	204
SSO Elimination	C	76	76	152
Upland Reforestation	C	3	22	25
Riparian Buffer Reforestation	C	4	18	22
Urban Tree Canopy Planting	C	2	2	4
Redevelopment	C	106	106	212
Watershed Association Projects	C	15	15	30
Total Reductions		7,275	6,789	11,956

The actual implementation of the restoration strategies through FY2014 is presented in Table 5. Also included in this table is the percent of target achieved for each strategy. In a number of cases the tracking mechanism has not been developed, but actions have occurred. The table presents the actions completed in the first 2-year milestone period and those completed in fiscal year 2014, which is the first year of the current 2-year milestone period.

Table 5: 2-year Milestone Progress on Restoration Strategies and Percent of Target Achieved

Strategy	Type*	Unit	Combined Target	First 2-year Milestone Complete	Completed FY2014	Total Completed	Remaining	% Target
Stream Restoration (Interim Rate)	C	Feet	88,974	9,600	1,973	11,573	77,401	13.0%
Shoreline Erosion Control	C	Feet	18,257	5,710	0	5,710	12,547	31.3%
SWM Retrofit/Conversions	C	Acres	1,344	305.4	135	440.4	903.6	32.8
Street Sweeping	A	Pounds	Current Rate	Current Rate	Current Rate	NA	NA	NA
Storm Drain Cleaning	A	Pounds	Current Rate	Current Rate	Below Historic Rate	Below Historic Rate	NA	NA
Nutrient Management 1998	A	Acres	6,125	6,125	6,125	NA	NA	100.0%
SSO Elimination	C	Pounds	40% reduction	20% reduction	Need to develop tracking mechanism			
Upland Reforestation	C	Acres	164	39.6	16.7	56.3	127.7	34.3%
Riparian Buffer Reforestation	C	Acres	55	10	Need to develop tracking mechanism			
Urban Tree Canopy Planting	C	Trees	1,500	2,046	646	2,692	-1,192	179.5%
Redevelopment	C	Acres	400	122	**	**	**	**
Watershed Association Projects	C	Pounds	Current rate	> Current Rate	~ Same as Historic Rate	> Current Rate	> Current Rate	

** Not analyzed for FY2014, will be included in next years' report

Tables 6 and 7 show the progress made by strategy in reduction nitrogen and phosphorus delivered loads, respectively. The load reductions are expressed in delivered loads.

Table 6: Progress in the Reduction of Nitrogen by Strategy for the First 2-year Milestone Period (Delivered Load, pounds)

Strategy	Type*	Combined Target	First 2-year Milestone Complete	Completed FY2014	Total Completed	Remaining	% Target
Stream Restoration (Interim Rate)	C	10,091	1,660	50	1,710	8,381	16.9%
Shoreline Erosion Control	C	2,920	909.5	0	909.5	2,010.5	31.1%
SWM Retrofit/Conversions	C	2,547	1,725	372.1	2,097	450	82.3%
Street Sweeping	A	4,238	1,553	4,617	NA	NA	108.9%
Storm Drain Cleaning	A	734	112	286.6	NA	NA	39.0%
Nutrient Management 1998*	A	4,565	4,565	4,565	NA	NA	NA
SSO Elimination**	C	460	0	Need to develop tracking mechanism			
Upland Reforestation	C	697	168	74	242	455	34.7%
Riparian Buffer Reforestation**	C	314	0	Need to develop tracking mechanism			
Urban Tree Canopy Planting	C	105	87.7	18.7	106.4	-1.4	101.3%
Redevelopment***	C	1,830	399	Not tracked in FY2014			

Watershed Association Projects	C	310	844.7	126.0	970.7	-660.2	313.1%
Total Reductions		28,811	12,023.9	10,109.4	20,468.3	8,343	71.0%

* Expert Panel results not available for- use yet

** Additional reductions due to these efforts, but tracking mechanism not yet developed. These actions account for a total of 2.6% of the nitrogen reduction.

*** Redevelopment tracking mechanism recently developed, additional redevelopment projects have not been analyzed for reduction credits at this time.

Table 7: Progress in the Reduction of Phosphorus Strategy for the First 2-year Milestone Period (Delivered Load, pounds)

Strategy	Type*	Combined Target	First 2-year Milestone Complete	Completed FY2014	Total Completed	Remaining	% Target
Stream Restoration (Interim Rate)	C	5,950	571.4	89.5	660.9	5,333.4	11.1%
Shoreline Erosion Control	C	2,009	571	0	571	1,438	28.4%
SWM Retrofit/Conversions	C	1,444	329	36	365	1,079	25.3%
Street Sweeping	A	1,620	862.8	2,044	NA	NA	126.2%
Storm Drain Cleaning	A	284	36.8	122.8	NA	NA	43.2%
Nutrient Management 1998*	A	204	204	204	NA	NA	NA
SSO Elimination**	C	152	0.0	Need to develop tracking mechanism			
Upland Reforestation**	C	25	0.0	3.8	3.8	21.2	15.2%
Riparian Buffer Reforestation**	C	22	0.0	Need to develop tracking mechanism			
Urban Tree Canopy Planting	C	4	2.8	0.6	3.4	0.6	85.0%
Redevelopment***	C	212	51.4	Not tracked in FY2014			
Watershed Association Projects	C	30	35.8	5.3	36.3	-6.3	121.0%
Total Reductions		11,956	2,665	2,506	4,067.4	7,000.6	34.0%

* Expert Panel results not available for use yet

** Additional reductions due to these efforts, but tracking mechanism not yet developed. These actions account for a total of 2.6% of the nitrogen reduction.

*** Redevelopment tracking mechanism recently developed, additional redevelopment projects have not been analyzed for reduction credits at this time.

As can be seen from Table 6 and 7, Baltimore County has achieved a 71% of nitrogen target and a 34% of the phosphorus target through the first 2-year milestone and halfway through the second 2-year milestone. There are a significant number of projects that are currently in construction, in design, or ready for construction during the next year.

Additional Pollutant Load Reductions Not Specified in the Baltimore County Watershed Implementation Plan or the 2-Year Milestones

While Baltimore County has not yet achieved its' combined 2-year milestone targets through the actions identified in the Baltimore County Watershed Implementation Plan, additional reductions have been achieved through other actions; specifically reductions through an overestimate of the amount of land development in the Chesapeake Bay Watershed Model as reflected in MAST and conversion of operating quarries to development with subsequent reductions due to the termination of the associated discharge permits and a lower land use load with stormwater treatment.

Reductions due to overestimate of the amount of land under development: The Chesapeake Bay Watershed Model predicts a certain number of acres to be under development on an annual

basis. This data is reflected in the Maryland Assessment Scenario Tool (MAST) based on the July 2011 model run. The actual acres of disturbance is based on the grading permits issued by Baltimore County (acres of disturbance due to State projects are not captured). Table 8 displays the actual versus the predicted acres of disturbance, and the difference between the two by watershed.

Table 8: Actual Acres of Disturbance versus Predicted Acres of Disturbance (FY2014)

Watershed	Number of Permits	Acres of Disturbance	Model Acres of Disturbance	Difference
Upper Western Shore				
Deer Creek	0	0.0	9.34	-9.34
Prettyboy Reservoir	0	0.0	35.65	-35.65
Loch Raven Reservoir	23	24.4	415.87	-391.5
Lower Gunpowder Falls	9	40.2	212.18	-172.0
Little Gunpowder Falls	0	0.0	16.97	-16.97
Bird River	19	65.0	179.08	-114.08
Gunpowder River	2	5.8	8.57	-2.77
Middle River	8	76.8	0.00	76.8
UWS Totals	61	212.2	877.66	-685.51
Patapsco/Back River				
Liberty Reservoir	4	41.1	50.92	-9.8
Patapsco River	24	43.4	237.64	-194.2
Gwynns Falls	27	169.1	331.85	-162.8
Jones Falls	12	16.7	152.77	-136.1
Back River	15	33.1	95.90	-62.8
Baltimore Harbor	7	7.8	0.00	7.8
P/B Totals	89	311.2	869.08	-557.9
County Totals	150	523.4	1,746.7	-1,243.4

County-wide there were 1,243 fewer acres of disturbance than predicted by the Chesapeake Bay Watershed Model and reflected in MAST. Using the watershed specific per acre loading rates due to construction for nitrogen, phosphorus, and sediment the difference between the model loading and the actual loading was calculated. This difference reflects a reduction in the amount of nitrogen, phosphorus, and sediment loadings in Baltimore County. Tables 9 and 10 display the analysis for nitrogen and phosphorus, respectively.

Table 9: Difference between Modeled and Actual Nitrogen Loading Rates Due to Construction

Watershed	Acres of Disturbance	Model Acres of Disturbance	Difference	Model Load Rates N	Model N Load	FY14 Actual N Load	Difference
Upper Western Shore							
Deer Creek	0.0	9.34	-9.34	32.3	301.7	0.0	301.7
Prettyboy Reservoir	0.0	35.65	-35.65	32.3	1,151.5	0.0	-1,151.5
Loch Raven Reservoir	24.4	415.87	-391.5	32.3	13,432.6	788.1	-12,644.5
Lower Gunpowder Falls	40.2	212.18	-172.0	32.3	6,853.4	1,298	-5,554.9
Little Gunpowder Falls	0.0	16.97	-16.97	32.3	548.1	0	-548.1
Bird River	65.0	179.08	-114.08	17.89	3,203.7	1,162.6	-2,040.9
Gunpowder River	5.8	8.57	-2.77	17.89	153.3	103.8	-49.5
Middle River	76.8	0.00	76.8	17.89	0.0	1,374.0	1,374

UWS Totals	212.2	877.7	-665.5		25,644.3	4,726.5	-20,614.7
Patapsco/Back River							
Liberty Reservoir	41.1	50.92	-9.8	32.3	1,644.7	1,327.5	-317.2
Patapsco River	43.4	237.64	-194.2	38.84	6,853.5	1,685.7	-5,167.8
Gwynns Falls	169.1	331.85	-162.8	32.3	10,718.8	5,461.9	-5,256.9
Jones Falls	16.7	152.77	-136.1	32.3	4,934.5	539.4	-4,395.1
Back River	33.1	95.90	-62.8	17.89	1,715.7	592.2	-1,123.5
Baltimore Harbor	7.8	0.00	7.8	29.21	0.0	227.8	227.8
P/B Totals	311.2	869.1	-557.9	182.8	25,867.2	9,834.5	-16,032.7
County Totals	523.5	1,746.8	-1,223.4		51,511.5	14,561.0	-36,637.4

Table 10: Difference between Modeled and Actual Phosphorus Loading Rates Due to Construction

Watershed	Acres of Disturbance	Model Acres of Disturbance	Difference	Model Load Rates P	Model P Load	FY14 Actual P Load	Difference
Upper Western Shore							
Deer Creek	0.0	9.34	-9.34	5.15	48.1	0.0	-48.1
Prettyboy Reservoir	0.0	35.65	-35.65	5.15	183.6	0.0	-183.6
Loch Raven Reservoir	24.4	415.87	-391.5	5.15	2,141.7	125.7	-2,016.0
Lower Gunpowder Falls	40.2	212.18	-172.0	5.15	1,092.7	207.0	-885.7
Little Gunpowder Falls	0.0	16.97	-16.97	5.15	87.4	0.0	-87.4
Bird River	65.0	179.08	-114.08	5.1	913.3	331.5	-581.8
Gunpowder River	5.8	8.57	-2.77	5.1	43.7	29.6	-14.1
Middle River	76.8	0.00	76.8	5.1	0.0	391.7	391.7
UWS Totals	212.2	877.7	-665.5		4,510.5	1,085.5	-3,425
Patapsco/Back River							
Liberty Reservoir	41.1	50.92	-9.8	5.15	262.2	211.7	-50.5
Patapsco River	43.4	237.64	-194.2	4.6	1,093.1	199.6	-893.5
Gwynns Falls	169.1	331.85	-162.8	5.15	1,709.0	870.9	-838.1
Jones Falls	16.7	152.77	-136.1	5.15	786.8	86.0	-700.8
Back River	33.1	95.90	-62.8	5.1	489.1	168.8	-320.3
Baltimore Harbor	7.8	0.00	7.8	5.14	0.0	40.1	40.1
P/B Totals	311.2	869.1	-557.9		4,340.2	1,577.1	-2,763
County Totals	523.4	1,746.8	1,223.4		8,850.7	2,662.6	-6,188

As can be seen from the preceding tables, there were 36,600 fewer pounds of nitrogen, and 6,200 fewer pounds of phosphorus. This difference combined with the restoration projects detailed above would meet the nitrogen reductions and almost meet the phosphorus reductions targeted for the end of the second 2-year milestone period.

Reductions due to closing of quarries and conversion to development: This information was presented in last years' report, but is applicable to the progress made to date in reducing nitrogen and phosphorus. Two quarries have recently closed and are in the process of being developed, this results in pollutant load reductions due to several factors; elimination of nutrients and sediment due to discharges from the quarry that reflect loads due to quarry operations and change in land use with differential nutrient and sediment loading rates. The two quarries are Greenspring Quarry in Jones Falls and Delight Quarry in Gwynns Falls. Information on the two quarries is provided in Table 11. Greenspring Quarry had already terminated its discharge

permit and this is reflected in the Chesapeake Bay Watershed Model, however, the discharge permit for Delight Quarry was still in effect at the time of model development.

Table 11: Load Reductions Due to Development of Quarries

Quarry	Discharge Permit			Land Use			Total		
	N	P	TSS	N	P	TSS	N	P	TSS
Quarry Loadings									
Greenspring	NA – not in the model			1,291	205	153,515	1,291	205	153,515
Delight	1,244	444	4,164	653	104	176,847	1,897	548	181,011
Development Loadings									
Greenspring	0	0	0	1,066	57	33,649	1,066	57	33,649
Delight	0	0	0	542	29	38,515	542	29	38,515
Difference									
Greenspring	NA – not in the model			-225	-148	-119,866	-225	-148	-119,866
Delight	-1,244	-444	-4,164	-111	-75	-138,332	-1,355	-519	-142,496
Totals	-1,244	-444	-4,164	-336	-233	-258,198	-1,580	-667	-262,362

The effect of changing land use and retirement of discharge permits for these two quarries results in a reduction of 1,580 pounds of nitrogen and 667 pounds of phosphorus. The reduction is actually greater, as these calculations do not take into account the installation of stormwater management on the development sites. Taking into account these two additional reductions Baltimore County will have exceeded its 2-year milestone targets for nitrogen and is on target for making the reduction for phosphorus by the end of fiscal year 2015 as displayed in Table 12.

Table 12: Total Reductions in Relation to Target Reductions

Constituent	Target	Restoration	Reduced Grading	Quarry Development	Remaining
Nitrogen	28,811	-20,468	-36,637	-1,580	-29,874
Phosphorus	11,956	-4,067	-6,188	-667	1,034

As can be seen from Table 12, Baltimore County with the inclusion of the reduced grading load and the load reduction from quarry development is exceeding the target reduction for nitrogen and is within ~ 1,000 pounds for making the target reduction for phosphorus with one more year remaining in the second 2-year milestone period. The grading reduction will vary from year to year dependent on the amount of development occurring within the county. With the advent of the Stormwater Remediation Fee, the county was able to hire additional staff and begin the process of increasing the rate of restoration implementation. Given that a restoration project through identification, design, permitting, and construction can take approximately three years for completion and therefore pollutant removal crediting; the county does not expect to see the increase in project completion until during fiscal year 2016. There has been an increase in the number of restoration projects underway and restoration projects have been initiated by the Baltimore County Department of Public Works, along with an increase in street sweeping and storm drain inlet cleaning. The status of restoration projects being implemented by the Department of Environmental Protection and Sustainability – Watershed Restoration Section is presented in Table 13, while a listing of project underway in the Department of Public Works is presented in Table 14. It is anticipated that through the implementation of the projects listed in Tables 13 and 14 that Baltimore County will be able to meet its' restoration milestones by the conclusion of the second 2-year milestone period. Through the continuing process of project identification, design, permitting, and construction; additional projects will be commenced in the future to meet the 2025 target of having sufficient restoration projects in place to meet the nutrient reductions allocated to Baltimore County for the urban stormwater sector.

Table 13: Status of Restoration Projects (Watershed Restoration Section)

Project Name	Watershed	Quantity	Status
Stream Restoration (Units in Linear Feet)			
East Beaverdam	Loch Raven	1,600	Awaiting As-built submittal
Kelly Branch	Loch Raven	3,500	100% Design
Long Quarter Branch – Shetland Hills	Loch Raven	1,500	30% Design
White Marsh Road	Bird River	8,653	Under Construction
West Branch of North Fork White Marsh Run	Bird River	6,500	90% Design
Lower Gunpowder at Proctor Lane	Lower Gunpowder Falls	3,000	50% Design
Lower Gunpowder At Seven Courts	Lower Gunpowder Falls	5,000	Beginning Design
Catonsville Park	LNB Patapsco	2,340	30% Design
Scotts Level Branch @ Scotts Level Park	Gwynns Falls	7,700	Feasibility Study
Dead Run @ Westview Park	Gwynns Falls	2,550	50% Design
Cooper Branch @ Oella	LNB Patapsco	2,400	30% Design
Cedar Branch @ Inwood Ave.	LNB Patapsco	3,320	30% Design
Roland Run @ Greenspring	Jones Falls	3,500	Permit Approval
Gwynns Falls @ Chartley II	Gwynns Falls	2,800	30% Design
Towson Run @ Cloisters	Jones Falls	3,000	Permit Approval
Slaughterhouse Run (Upper)	Jones Falls	2,500	Survey of reaches
Slaughterhouse Run (Middle)	Jones Falls	3,000	Survey of reaches
Deep Run @ Meadowood Regional Park	Jones Falls	800	Feasibility Study
Lightfoot Ave.- Unnamed Trib	Jones Falls	2,600	Feasibility Study
Herring Run @ Overlook Park	Back River	6,000	90% Design
Bread and Cheese Creek	Back River	1,523	Awaiting As-builts
Total Linear Feet		73,786	
Shoreline Management Projects (Units in linear feet of stabilization and (sq.ft of marsh creation)			
Stansbury Park	Baltimore Harbor	317(6,980)	Awaiting as-builts
Fort Howard	Baltimore Harbor	4,000	Design Initiated
Inverness Park	Baltimore Harbor	2,600	Design Initiated
Cox Point	Back River	2,000	Design Initiated
Watersedge Park	Baltimore Harbor	2,000	Design Initiated
Total Linear Feet (acres)		10,917(6,980)	
Retrofits (Units in Acres)			
Kelly Branch	Loch Raven	40.8	100% Design
Magnolia	Lower Gunpowder Falls	6.5	Awaiting As-built submittal
Roland Run @ Greenspring WQ Retrofit	Jones Falls	3.2	Permit Approval
Total Acres		50.5	
Conversions (Units in Acres)			
Pond #421	LNB Patapsco	14.0	Awaiting Construction
Pond # 2090	Gwynns Falls	5.8	Awaiting Construction
Pond # 1687	Gwynns Falls	3.8	Under Construction
Pond # 1688	Gwynns Falls	5.4	Under Construction
Pond # 115	Loch Raven	9.0	Construction Proposal
Pond # 1868	Loch Raven	14.5	Construction Proposal
Pond # 1064	Loch Raven	24.9	Construction Proposal
Pond # 832	Back River	4.4	Construction Proposal
Pond # 451	Gwynns Falls	23.5	Complete 1/9/15
Pond # 358	LNB Patapsco	9.3	100% Design

Pond # 631	Lower Gunpowder Falls	4.5	90% Design
Pond # 452	Lower Gunpowder Falls	4.6	100% Design
Pond # 435	Gunpowder River	38.1	100% Design
Pond # 473	Lower Gunpowder Falls	8.3	100% Design
Pond # 535	Back River	15.9	100% Design
Pond # 850	Lower Gunpowder Falls	19.2	100% Design
Pond # 453	Lower Gunpowder Falls	7.8	100% Design
Pond # 524	Lower Gunpowder Falls	10.3	100% Design
Pond # 624	Back River	8.0	100% Design
Total Acres		231.3	

Table 14: Listing of the Department of Public Works Restoration Projects

Project Name	Watershed	Project Type
Stags Head Road (2 locations)	Loch Raven	Outfall Stabilization
Salem Village Road	Lower Gunpowder Falls	Regenerative Stormwater Conveyance
Tributary 12 to Redhouse Run	Back River	Stream Stabilization
6 Yew Road	Back River	Outfall Stabilization
Madeline and Linden Avenues	Back River	Stream Stabilization
Freeland Road	Loch Raven	Stream Stabilization
Beach Road	Bird River	Outfall Stabilization
Chesapeake Avenue (Millers Island) (4)	Baltimore Harbor	Silt Trapping Inlets
Bayside Drive Storm Drain	LNB Patapsco	Silt Trapping Manhole
Cherry Hill TMDL Drainage Retrofits	Gwynns Falls	Outfall Stabilization
Dogwood Hill Road TMDL Drainage Retrofits	Loch Raven	Outfall Stabilization
North Forest Park TMDL Drainage Retrofits	Gwynns Falls	Outfall Stabilization
Chapel Road TMDL Drainage Retrofits	Bird River	Outfall Stabilization/Stream Stabilization
Clark's Point Road Drainage Remediation	Gunpowder River	Microbioretenion
Milbridge Road Drainage Retrofit	Jones Falls	Outfall Stabilization
Maple Avenue	Baltimore Harbor	Wetland Creation/Bioswale
Clubhouse Road	Loch Raven	Outfall Stabilization
Weyburn Road	Back River	Stream Stabilization
Branchwood Court	Jones Falls	Outfall Stabilization
Valewood Road (2 outfalls)	Loch Raven	Outfall Stabilization
Sipple Avenue	Back River	Storm Drain Retrofit
Karl Avenue	Back River	Outfall Stabilization
Todds Lane	Back River	Dry Swale Restoration
Alabama Avenue	LNB Patapsco	Outfall Stabilization

On-Site Sewage Disposal Systems (OSDS) Nutrient Reduction Progress – Restoration Milestones:

The OSDS Strategy for meeting the nitrogen reduction target for 2025 is presented in Table 15. This translates into 20 upgrades per year of existing OSDS to denitrifying systems, 14 hook-ups to the sanitary sewer system per year of existing OSDS, and 7,800 pump-outs per year.

Table 15: OSDS Strategy for Meeting Nitrogen Reductions Targets by 2025

Strategy	# of Systems	Nitrogen Reduction	Remaining Nitrogen Load	Remaining to Meet Target

2009 Progress from MAST			166,285	60,148
Health Projects	1,537	-24,201	142,084	35,947
Growth Area Adjustments	7,805	-33,649	108,435	2,298
De-nitrifying Systems	220	-897	107,538	1,401
Future Health Projects	200	*	*	*
OSDS Pump-outs	7,800/yr	-464	106,469	332

The installation of OSDS denitrifying systems is supported by the Bay Restoration Fund (see: <http://www.mde.maryland.gov/programs/Water/BayRestorationFund/OnsiteDisposalSystems/Pages/Water/cbwrf/index.aspx> for further information). Maryland Department of the Environment provides assessment of the nitrogen removal efficiencies for the various denitrifying systems available through the Maryland Verification Process. There are five different types of systems installed in Baltimore County during the reporting period. Table 16 indicates the number of systems installed by type, location, and the MDE reported pollutant removal efficiencies for the first reporting year and Table 17 presents the same data for the first reporting year of the FY 2014-2015 2-year milestone.

Table 16: FY 2012 and FY 2013 - Number of Denitrifying Systems Installed by Type and Removal Efficiency

System Type	Number Installed			Removal Efficiency
	CBCA	>1,000	<1,000	
Hoot	4	7	5	64%
Singular	5	3	5	55%
Biomicrobics – Microfast/Retrofast	0	1	1	57%
Adventex	1	0	0	71%
Septi-Tech	0	2	0	67%

Table 17: FY 2014 - Number of Denitrifying Systems Installed by Type and Removal Efficiency

System Type	Number Installed			Removal Efficiency
	CBCA	>1,000	<1,000	
Hoot	1	8	9	64%
Singular	0	1	5	55%
Biomicrobics – Microfast/Retrofast	0	0	1	57%
Adventex	0	2	2	71%
Septi-Tech	0	1	1	67%
Bionest	0	0	6	unknown

The amount of nitrogen delivered to the Chesapeake Bay from OSDS is the result of the landscape location of the system and the delivery ratio of the watershed for nitrogen. There are three landscape position factors that relate to the delivery of nitrogen from OSDS to the edge-of-stream:

- Chesapeake Bay Critical Area (CBCA) – 16.44 pounds nitrogen per OSDS
- Less than 1,000 feet from a perennial stream (<1,000) – 10.27 pounds nitrogen per OSDS
- Greater than 1,000 feet from a perennial stream (>1,000) – 6.16 pounds nitrogen per OSDS.

The numbers above are derived from Maryland Assessment Scenario Tool (MAST) by dividing the number of MAST derived septic systems into the Edge-of-Stream nitrogen load. Using this information and the geographical location of the installed denitrifying systems, the edge-of-stream (EOS) nitrogen load, the EOS nitrogen reduction and delivered load (based on the watershed specific nitrogen delivery ratio) can be calculated. The results of the calculations are presented in Table 18 for first 2-year milestone period and in Table 19 for the first year of the FY

2014-2015 septic 2-year milestone. The OSDS pumpout information for fiscal year 2014 is presented in Table 20 for fiscal year 2014.

Table 18: OSDS Upgrades to Denitrifying Systems January 1, 2011 Through June 30, 2013 by Watershed

Watershed	OSDS Location			EOS Total Nitrogen	EOS Total Reduction	Delivery Ratio	Delivered Load Reduction
	CBCA	<1,000 feet	>1,000 feet				
Deer Creek	0	0	0	0	0	57.4%	0
Prettyboy	0	0	0	0	0	5.5%	0
Loch Raven	0	4	1	43.13	24.94	25.9%	6.46
Lower Gunpowder	0	5	10	112.95	69.41	88.8%	61.64
Little Gunpowder	0	2	0	20.54	12.22	70.8%	8.65
Bird River	5	0	0	82.20	53.75	87.5%	47.03
Gunpowder River	3	0	0	49.32	27.12	100%	27.12
Middle River	0	0	0	0	0	100%	0
Liberty	0	0	1	6.16	3.39	0.0%	0
Patapsco River	0	0	0	0	0	53.2%	0
Gwynns Falls	0	0	0	0	0	33.7%	0
Jones Falls	0	0	1	6.16	3.94	18.6%	0.73
Back River	1	0	0	32.88	18.08	96.2%	17.39
Baltimore Harbor	0	0	0	0	0	100%	0
Totals	10	11	13	353.34	212.85		169.02

Table 19: OSDS Upgrades to Denitrifying Systems July 1, 2013 through June 30, 2014 (FY14) by Watershed

Watershed	OSDS Location			EOS Total Nitrogen	EOS Total Reduction	Delivery Ratio	Delivered Load Reduction
	CBCA	<1,000 feet	>1,000 feet				
Deer Creek	0	0	0	0.00	0.00	57.4%	0.00
Prettyboy	0	0	0	0.00	0.00	5.5%	0.00
Loch Raven	0	4	14	127.32	59.84	25.9%	15.50
Lower Gunpowder	0	3	1	36.97	23.04	88.8%	20.46
Little Gunpowder	0	0	2	12.32	8.07	70.8%	5.71
Bird River	0	0	1	6.16	3.94	87.5%	3.45
Gunpowder River	0	0	0	0.00	0.00	100%	0.00
Middle River	0	0	0	0.00	0.00	100%	0.00
Liberty	0	0	0	0.00	0.00	0.0%	0.00
Patapsco River	0	3	1	36.97	24.38	53.2%	12.97
Gwynns Falls	0	0	0	0.00	0.00	33.7%	0.00
Jones Falls	0	2	3	39.02	20.48	18.6%	3.81
Back River	1	0	0	16.44	10.52	96.2%	10.12
Baltimore Harbor	0	0	0	0.00	0.00	100%	0.00
Totals	1	12	22	275.20	150.28		72.03

Table 20: OSDS Pump-outs July 1, 2013 Through June 30, 2014 by Watershed (FY2014)

Watershed	OSDS Location			EOS Total Nitrogen	EOS Total Reduction	Delivery Ratio	Delivered Load Reduction
	CBCA	<1,000 feet	>1,000 feet				
Deer Creek	0	5	17	156.07	7.80	57.4%	4.48
Prettyboy	0	5	35	266.95	13.35	5.5%	0.73
Loch Raven	0	339	709	7,848.97	392.45	25.9%	101.64
Lower Gunpowder	0	158	152	2,558.98	127.95	88.8%	113.62
Little Gunpowder	0	69	148	1,620.31	81.02	70.8%	57.36
Bird River	4	11	18	289.61	14.48	87.5%	12.67

Gunpowder River	3	1	1	65.75	3.29	100%	3.29
Middle River	2	0	0	32.88	1.64	100%	1.64
Liberty	0	32	92	895.36	44.77	0.0%	0.00
Patapsco River	0	38	128	1,178.74	58.94	53.2%	31.35
Gwynns Falls	0	41	82	926.19	46.31	33.7%	15.61
Jones Falls	0	108	228	2,513.64	125.68	18.6%	23.38
Back River	0	1	2	22.59	1.13	96.2%	1.09
Baltimore Harbor	1	0	1	22.30	1.13	100%	1.13
Totals	10	808	1,613	18,398.64	919.93		367.99

The installation of thirty-four denitrifying systems during the first 2-year milestone period resulted in 169 pounds of nitrogen reduction. During the first year of the second 2-year milestone period (FY2014), an additional 35 denitrifying systems were installed for an additional 72 pounds of reduction. The lower reduction for FY2014 is the result of the distribution of the installed systems, both in relation to the tidal water and the streams, and with a greater number in watersheds that have lower delivery ratio to the Bay. The target of the 2-year milestones was 40 denitrifying systems and 163.2 pounds of nitrogen reduction (an average of 4.08 pounds nitrogen reduction per system times 40 systems). Table 21 presents the progress in meeting the first 2-year milestones. The total number of septic system pump outs continues to be below the target 7,800 systems per year.

Connection to the sanitary sewer system and abandonment of OSDS systems (AKA septic hook-ups) reduce nitrogen discharges from the OSDS source sector. These reductions are partially offset by increases in discharges from WWTPs, however the WWTPs have load limits set by their discharge permits that are above the current discharge rates. Year-over-year comparison of Bay Restoration Fund billing files, with quality control provided by review of plumbing permits, enables Baltimore County to track the number and location of septic hookups, and estimate the associated nitrogen load reductions. The method described earlier is applied, and the results are shown in Table 21. Hook-ups of 132 septic system resulted in a 1,345.4 pound reduction in nitrogen delivered to the Bay.

Table 21: Progress in Meeting the 2-Year Milestones for OSDS Remediation – Connections to Sanitary Sewer

Watershed	OSDS Locations			EOS Total Nitrogen	Delivery Ratio	Delivered OSDS Load Reduction
	CBCA	<1,000 feet	>1,000 Feet			
Loch Raven	0	1	1	16.4	25.9%	4.26
Bird River	1	0	3	34.9	87.5%	30.56
Gunpowder River	4	0	0	65.8	100.0%	65.76
Middle River	1	0	0	16.4	100.0%	16.44
Patapsco River	0	1	1	16.4	53.2%	8.74
Gwynns Falls	0	2	3	39.0	33.7%	13.15
Jones Falls	0	2	0	20.5	18.6%	3.82
Back River	8	0	0	131.5	96.2%	126.52
Baltimore Harbor	104	0	0	1,709.8	100.0%	1,709.76
Totals	118	6	8	2,050.7		1,979.01

Table 22 presents the progress in meeting the second 2-year milestone for onsite disposal systems.

Table 22: Progress in Meeting the 2-Year Milestones (2014-2015) for OSDS Remediation

Strategy	Target	First Year	Second Year	Total	% of Target
Denitrifying Systems #	40	35			87.5%
Denitrifying N Reduction (#s)	163	72			44.2%
Hook-ups to Sanitary Sewer	110	132			120.0%
Hook-up N Reduction (#s)	474	2,051			132.7%
OSDS Pump-outs	4,500	2,431			54.0%
Pump-out N Reduction (#s)	573	368			64.2%
Total Nitrogen Reduced	1,210	2,491			205.9%

While we have not achieved the OSDS implementation target in terms of pump outs, we have exceeded the number of hookups of OSDS to the sanitary sewer and are on track to exceed the number of denitrifying systems installed. We have also exceeded the amount of nitrogen reductions, mainly due to the greater number of sanitary sewer connections and the locations of the various improvements being in zones of higher OSDS loading rates. Based on progress to date and the corrections made regarding the number of OSDS in the County, Baltimore County will have no problem meeting the Baltimore County OSDS reduction allocation for nitrogen.