

PATUXENT RESERVOIRS WATERSHED  
PROTECTION GROUP



2014 ANNUAL REPORT  
OF THE  
TECHNICAL ADVISORY COMMITTEE

## A Message from the Chair

The year 2014 marks 18 years since the agreement establishing the Patuxent Reservoirs Watershed Protection Group (PRWPG) was signed. This agreement demonstrates two facets of drinking water source protection: first, it often takes a long time for incremental progress to produce measurable effects at the watershed scale; and second, watershed protection is commonly a voluntary activity, not compelled by statutory or regulatory mandates, that needs a stakeholder/partnership approach to function effectively.

I want to recognize and thank my colleagues on the PRWPG's Technical Advisory Committee (TAC), who for these many years have met and shared news of the activities that their agencies are doing, as well as the not inconsiderable costs entailed, to maintain and improve water quality and watershed conditions. While we operate as a partnership guided by the priority resources framework, in reality the annual budgets reported by the TAC are often a compilation of in-kind agency work programs with specified water quality and environmental benefits. Reporting the progress in the TAC annual reports serves as a validation of the hard work that each agency and its staff does, as well as the financial commitments made by the agencies.

The PRWPG partnership has taken major actions this year that will promote further progress towards the PRWPG's watershed protection and drinking water quality improvement goals. Two memoranda of understanding (MOU) were finalized and signed. One of these establishes a joint funding mechanism for a consultant study to evaluate and account for interim progress made over the past decade in nutrient and sediment load reductions towards meeting the Total Maximum Daily Loads (TMDL) for the reservoirs. The other MOU formalizes further joint funding for the existing agricultural cost-share program and expands the scope and flexibility of the program.

The TAC has continued its efforts to seek perspectives on drinking water source protection efforts at a broader regional scale. At one of its meetings during the year, the TAC considered the impact of increasing highway winter deicing salt on water quality, which is a regional problem not limited to the Patuxent reservoirs. We established a working relationship with a University of Maryland researcher whose studies of long-term changes in surface water quality due to anthropogenic effects may help inform the TAC and the PRWPG partnership regarding ways to limit future adverse changes. Also at the regional scale, the TAC continued its liaison with the Baltimore Reservoirs Technical Group, with a joint meeting where State agency representatives described how local TMDLs are being accounted for in the regional Chesapeake Bay TMDL modeling framework.

Finally, I want to acknowledge and thank my colleague Steve Nelson, who serves as the administrative coordinator of the TAC and handles most of the meeting preparations and documentation tasks. WSSC's Community Outreach Manager Kim Knox retired from her post during the year, and I also want to record on behalf of the TAC our appreciation for the outreach efforts coordinated by WSSC's Office of Communications and Community Relations in support of education and outreach for watershed protection of the Patuxent reservoirs.

Martin Chandler, Washington Suburban Sanitary Commission  
2014 Chair, Technical Advisory Committee

## Acknowledgements

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Our sincere thanks are given to the members of the Technical Advisory Committee for their efforts over the last year.

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## Abbreviations

Abbreviation	Definition
aka	Also Known As
BMP	Best Management Practice
chl- <i>a</i>	Chlorophyll- <i>a</i>
DEP	(Montgomery County) Department of Environmental Protection
DO	Dissolved Oxygen
DOT	(Montgomery County) Department of Transportation
DPW	(Howard County) Department of Public Works
ea	Each
EPA	U.S. Environmental Protection Agency
ESD	Environmental Site Design
FY	Fiscal Year
HC	Howard County
HSCD	Howard Soil Conservation District
IWLA-WAC	Izaak Walton League of America-Wildlife Achievement Chapter
LID	Low Impact Development
MAST	Maryland Assessment Scenario Tool
MC	Montgomery County
MDE	Maryland Department of the Environment
M-NCPPC	Maryland-National Capital Park and Planning Commission
MS4	Municipal Separate Storm Sewer System
MSCD	Montgomery Soil Conservation District
mg/L	Milligrams per Liter (equivalent to part per million)
µg/L	Micrograms per Liter (equivalent to part per billion)
PGC	Prince George's County
pH	Power of Hydrogen
PRWPG	Patuxent Reservoirs Watershed Protection Group
PSA	(Howard County) Planned Service Area
RC	(Howard County) Rural Conservation
RR	(Howard County) Rural Residential
SCD	Soil Conservation District
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
WLA	Waste Load Allocation
WSSC	Washington Suburban Sanitary Commission

## Executive Summary

Two reservoirs on the Patuxent River, Triadelphia and Rocky Gorge (aka T. Howard Duckett), are significant water supply sources for the Washington D.C. metropolitan area serving residents primarily in Montgomery and Prince George's Counties ([Figure 1](#)). The Patuxent Reservoirs' 132-square mile watershed includes land mostly in Howard and Montgomery Counties (about 99%) and the remaining land is in Prince George's and Frederick Counties ([Figure 2](#)).

In 1998, the Maryland Department of the Environment (MDE) identified both reservoirs as impaired by nutrients and identified Triadelphia Reservoir as impaired by sediment; consequently, MDE determined that the reservoirs were unable to achieve State water quality standards for their designated uses, one of which is public water supply. To address these impairments, the US Environmental Protection Agency (EPA) approved Total Maximum Daily Loads (TMDL) for both reservoirs in November 2008. A phosphorus TMDL was established for each reservoir, and a sediment TMDL was established for Triadelphia Reservoir.

Since 1997, the Technical Advisory Committee (TAC) has completed an Annual Report to summarize its accomplishments and identify funding needs to address watershed priority resource issues. This annual report provides an update of on-going efforts and those completed in 2014.

A work plan is provided at the end of this report ([Table 6](#)). The work plan lists implementation needs and items for each of the priority resources along with the responsible agency or agencies and the corresponding budget expenditure for the current year.

The following are highlights from 2014:

1. Howard and Montgomery Counties continue to make progress towards meeting local TMDL goals via their Municipal Separate Storm Sewer (MS4) Permits. Howard County has completed two countywide assessments, which identified projects to help the County meet its MS4 and TMDL requirements. The list of projects will be evaluated based on impervious acres treated and available funding and, if possible, may be implemented over a number of years. For Montgomery County, draft reports on the Patuxent Reservoirs watershed assessment and project inventories were published in 2014. Meeting the required phosphorus reductions for the County's TMDL wasteload allocation (i.e., MS4 point sources) by implementing structural controls is estimated to cost over \$4 million for the Triadelphia Reservoir and over \$10 million for the Rocky Gorge Reservoir. Sediment reductions to the Triadelphia Reservoir will be easily met by existing high priority retrofit projects.

2. In 2012, the Policy Board approved a request for \$50,000 to continue funding the Patuxent Reservoirs Watershed Agricultural Cost-Share Program at the Howard Soil Conservation District (HSCD). A subcommittee was tasked with revising the original Memorandum of Understanding (MOU) that established the agricultural cost-share program and developing recommendations to improve the usefulness of the cost-share program by broadening the practices and landowners that could qualify for assistance. On May 27, 2014 the new MOU became effective to continue and expand the existing cost-share program. The requested funding was then provided to the HSCD. The committee also made draft revisions to the cost-share program agreement.
3. The Washington Suburban Sanitary Commission (WSSC) completed its 23<sup>rd</sup> year of reservoir water quality monitoring to provide data for technical analysis and long-term trend evaluation to support protection of the reservoirs and drinking water supply. Chlorophyll-*a* and dissolved oxygen are two of the indicators of water quality presented in this annual report. Chlorophyll-*a* results from 2014 did not exceed either threshold established by the MDE for public water supply reservoirs. Dissolved oxygen results did not fall below the MDE threshold except during summer periods when natural reservoir conditions caused DO concentrations to fall below this threshold.
4. Technical and financial assistance from the Howard and Montgomery Soil Conservation Districts (SCDs) resulted in the installation of 82 agricultural Best Management Practices (BMPs) in the Patuxent Reservoirs Watershed. In addition, the districts developed or revised 31 Soil Conservation and Water Quality Plans for 2,978 acres of farm land in the watershed.
5. A variety of successful outreach events occurred again in 2014 including: watershed and Adopt-A-Road clean-ups sponsored by the Izaak Walton League of America-Wildlife Achievement Chapter; and three annual WSSC-sponsored events (Children's Water Festival, Warbler Day and Fishing Derby).

## Introduction

The Washington Suburban Sanitary Commission (WSSC) continues to provide potable water from the Patuxent Reservoirs system to about 650,000 customers, located mainly in eastern Montgomery County and Prince George's County (Figure 1). The Patuxent Reservoirs Watershed (the Watershed) encompasses about 132 square miles located almost entirely (99%) in Howard County (HC) and Montgomery County (MC), with the remaining drainage area located in Prince George's and Frederick Counties (Figure 2).

This year marks the 18<sup>th</sup> year that the Technical Advisory Committee (TAC) has completed an Annual Report, which summarizes accomplishments and funds expended to meet goals set by the TAC to protect the six priority resources. An update of activities in 2014 is provided of on-going efforts to address the implementation items for the Priority Resources. This Annual Report will be accompanied by a separate, supplemental document to provide detailed background information for items summarized in this report.

In 2003, the Goals-Setting Workgroup of the TAC re-evaluated the original list of action items and proposed a revised action plan, which was approved by the Policy Board. This revised list of action items or work plan, titled *Performance Measures and Goals for Priority Resources*, represents a continuation of the commitment to coordinate protection efforts in coming years (Table 5). This table contains goals, performance measures, implementation items, and a time line to achieve each goal for six priority resources selected by the TAC. Those priority resources include the following:

- Reservoirs and water supply
- Terrestrial habitat
- Stream systems
- Aquatic biota
- Rural character and landscape, and
- Public awareness and stewardship.

Although progress towards a number of these goals has been made over the years, the timelines established for the implementation items have generally not been met due to limited agency work programs and budgets and other priorities. The TAC will continue to implement items associated with each of the priority resources primarily through existing TAC agency responsibilities and work programs. A table of work plan expenditures is provided at the end of this report (Table 6) containing a list of implementation needs and action items for each of the priority resources, along with the responsible agency or agencies and the corresponding budget expenditure for the current year.

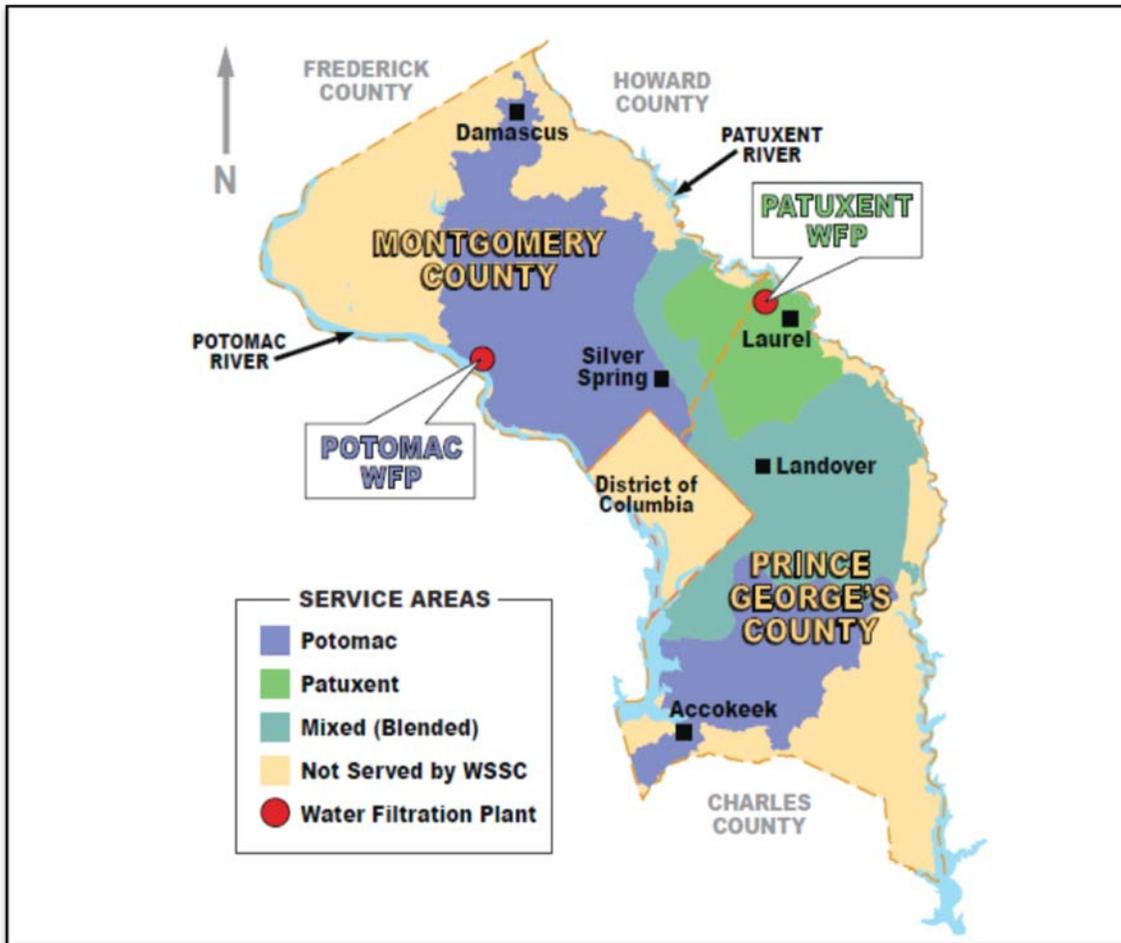


Figure 1. WSSC Drinking Water Service Area - Patuxent & Potomac Sources  
(excludes wholesale service to Howard and Charles Counties)

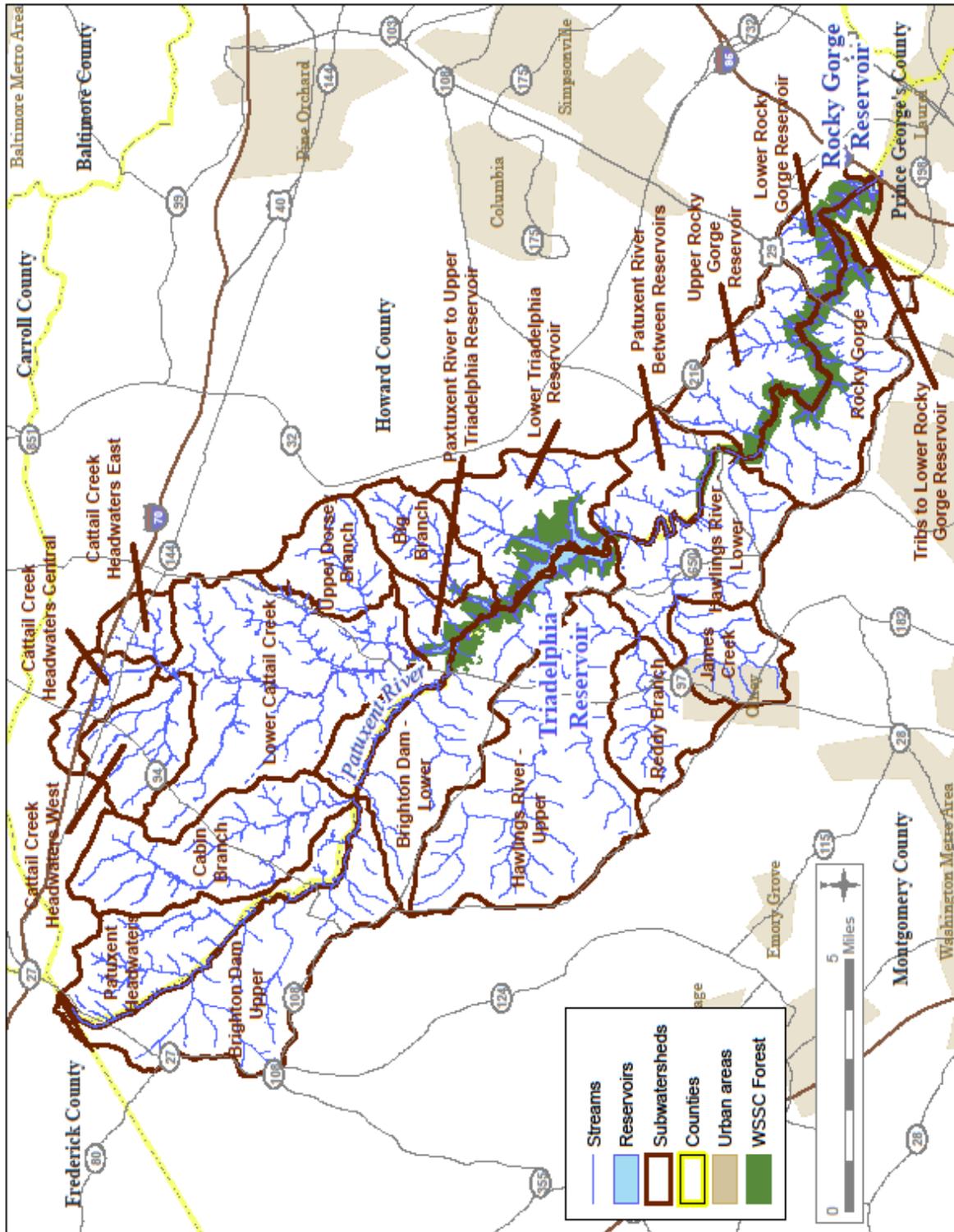


Figure 2. Patuxent Reservoirs Watershed (from Versar 2009)

## Total Maximum Daily Load Implementation

In 1998, the Maryland Department of the Environment (MDE) identified both reservoirs as impaired by nutrients and identified Triadelphia Reservoir as impaired by sediment; consequently, MDE determined that the reservoirs were unable to achieve State water quality standards for their designated uses, one of which is a public drinking water supply. To address these impairments, the US Environmental Protection Agency (EPA) approved Total Maximum Daily Loads (TMDLs) for both reservoirs in November 2008. A phosphorus TMDL was established for each reservoir, and a sediment TMDL was established for Triadelphia Reservoir (29% reduction required). Significant phosphorus load reductions are required (58% for Triadelphia Reservoir, 48% for Rocky Gorge Reservoir) to meet Maryland's water quality standards.<sup>1</sup> A large majority of the needed phosphorus load reductions (76% for Triadelphia, 65% for Rocky Gorge) was allocated to non-point sources (NPS) of pollution (i.e., load allocation). Runoff from land uses such as low density residential and agricultural land, in addition to eroding stream banks are considered as NPS of pollution for the Patuxent Reservoirs Watershed.

During the December 2012 meeting of the Patuxent Reservoirs Watershed Protection Group (PRWPG), the Policy Board approved the TAC's recommendation to allocate \$70,000 in Fiscal Year 2014 (FY14) for a consultant or temporary staff position. The project will assess progress made towards achieving the pollutant reduction goals specified in the TMDLs for the reservoirs.

### Municipal Separate Storm Sewer System (MS4) Permit Implementation Plans

According to the TMDL document, one way to provide assurance that the TMDLs will be implemented is through the MS4 permits that regulate urban stormwater systems. Every county within the Watershed has been assigned an MS4 permit by the MDE. While important, the MS4 permit only addresses the pollutant load reductions needed to meet the TMDL from point sources of pollution (i.e., waste load allocation). Renewed MS4 permits now contain a requirement for each jurisdiction to meet its waste load allocation (WLA) for all local TMDLs.<sup>2</sup>

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<sup>1</sup> Maryland Department of the Environment. June 2008. *Total Maximum Daily Loads of Total Phosphorus and Sediments for Triadelphia Reservoir (Brighton Dam) and Total Maximum Daily Loads of Total Phosphorus for Rocky Gorge Reservoir, Howard, Montgomery and Prince George's Counties, Maryland*. Baltimore, MD.

<sup>2</sup> Howard County Department of Public Works, Stormwater Management Division. September 2014. *National Pollutant Discharge Elimination System, Annual Update Report 19*. Columbia, MD

## Montgomery County

### Watershed Assessments and Project Inventories

Draft reports on the Patuxent Reservoirs watershed assessment and project inventories were published in 2014. These assessments had begun in April 2013 with a desktop review for all data and maps in the target watersheds. Three types of projects were considered and are summarized in Table 1. Stream restoration was not considered because most of the stream areas are on private property and Department of Environmental Protection (DEP) experience has shown that success for implementation requires public access.

Potential projects were screened using specified criteria to set priorities. The screening is based on criteria including: stream resource condition (poor or fair), amount of stormwater management added, potential for enhancing adjacent natural areas, and ease of access. The priority projects will be added to the DEP's restoration projects inventory for consideration in future fiscal years. The report includes conceptual designs that will need to be finalized prior to permitting and construction.

**Table 1. Montgomery County Project Inventory Types**

<b>New BMP Assessments</b>	<b>Conventional and ESD practices to add runoff management to unmanaged or undermanaged impervious areas</b>
<b># Targeted</b>	<b>goal of up to 52</b>
<b>Pervious Area Assessments</b>	<b>Possible reforestation or enhancement to meet MDE criteria for equivalent impervious area managed</b>
<b># Targeted</b>	<b>goal of up to 10</b>
<b>Neighborhood Assessments</b>	<b>Assess residential properties for on-lot ESD practices (RainScapes) Most of these are in the Olney area</b>
<b># Targeted</b>	<b>13.6 field days (goal of up to 2048 lots)</b>

The best management practices (BMPs) identified through the watershed assessments, already known possible retrofits, and non-structural BMPs (such as pet waste and lawn care education, street sweeping) were reflected as restoration practices in resulting watershed implementation plans. The County's MS4 permit requires that these plans be developed by watershed to meet assigned WLAs for any EPA approved TMDL. Plans include cost estimates and projections for pollutant reductions from baseline conditions towards TMDL WLA targets. Results are shown in the following three figures (Figures 3 - 5) taken from the Patuxent Watershed Implementation Plan, October 2014.

Meeting the required phosphorus reductions by implementing structural controls is estimated to cost over \$4 million for the Triadelphia Reservoir and over \$10 million for the Rocky Gorge Reservoir. Sediment reductions to the Triadelphia Reservoir will be easily met by existing high priority retrofit projects.

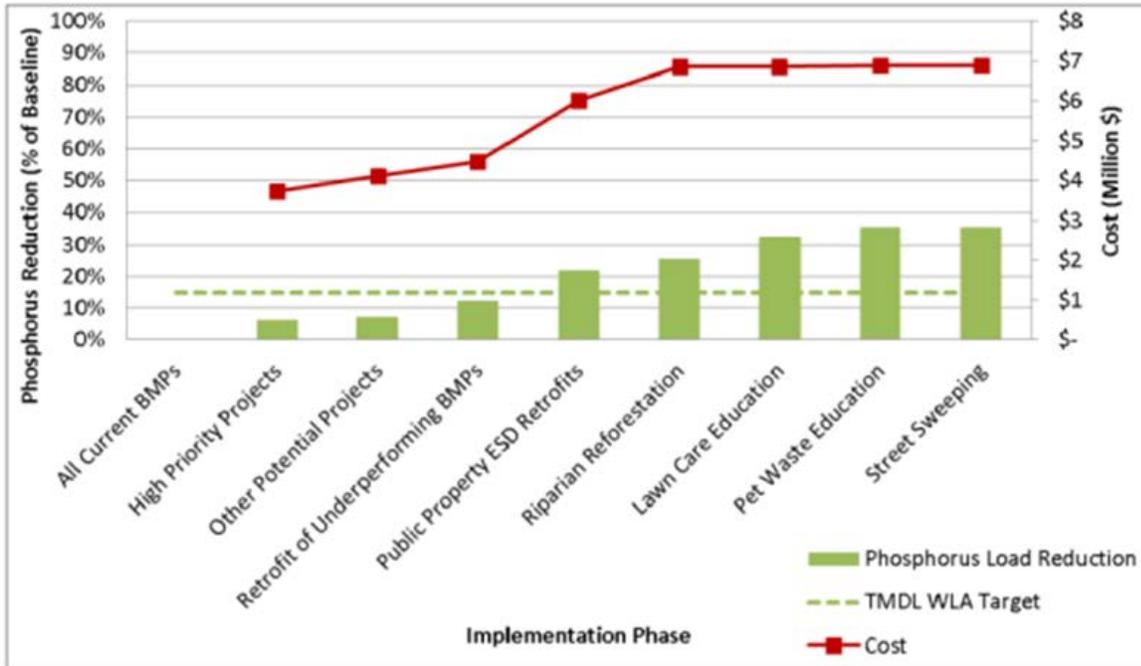


Figure 3. Cumulative reduction in total phosphorus loading over restoration practices implementation for Triadelphia Reservoir.

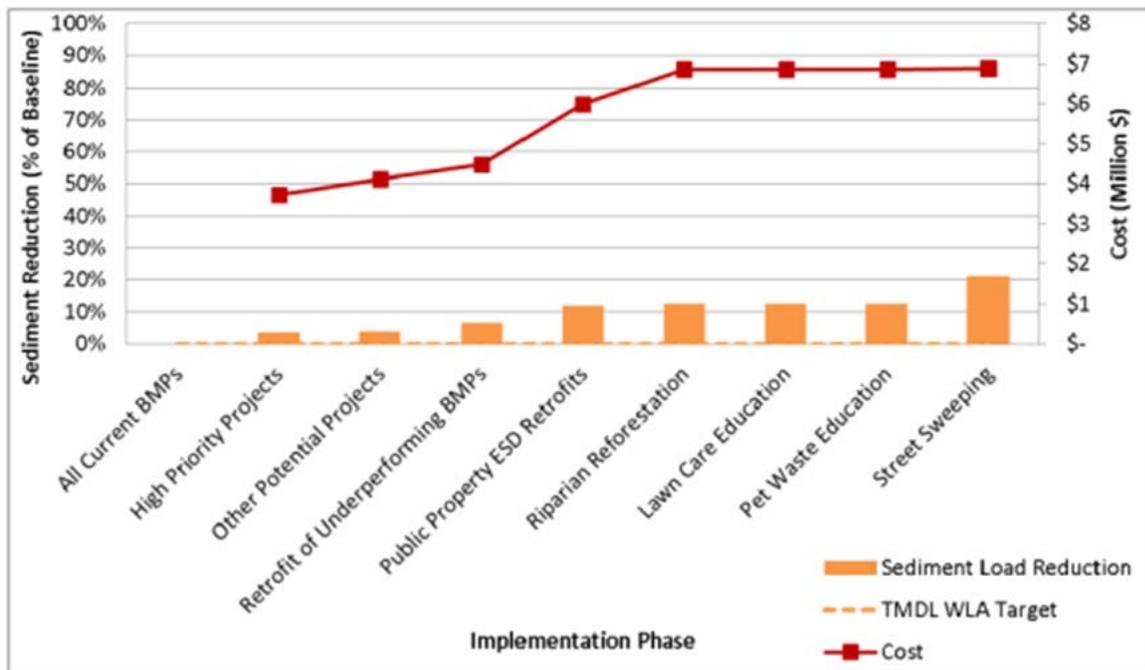


Figure 4. Cumulative reduction in total suspended solids loading over restoration practices implementation for Triadelphia Reservoir.

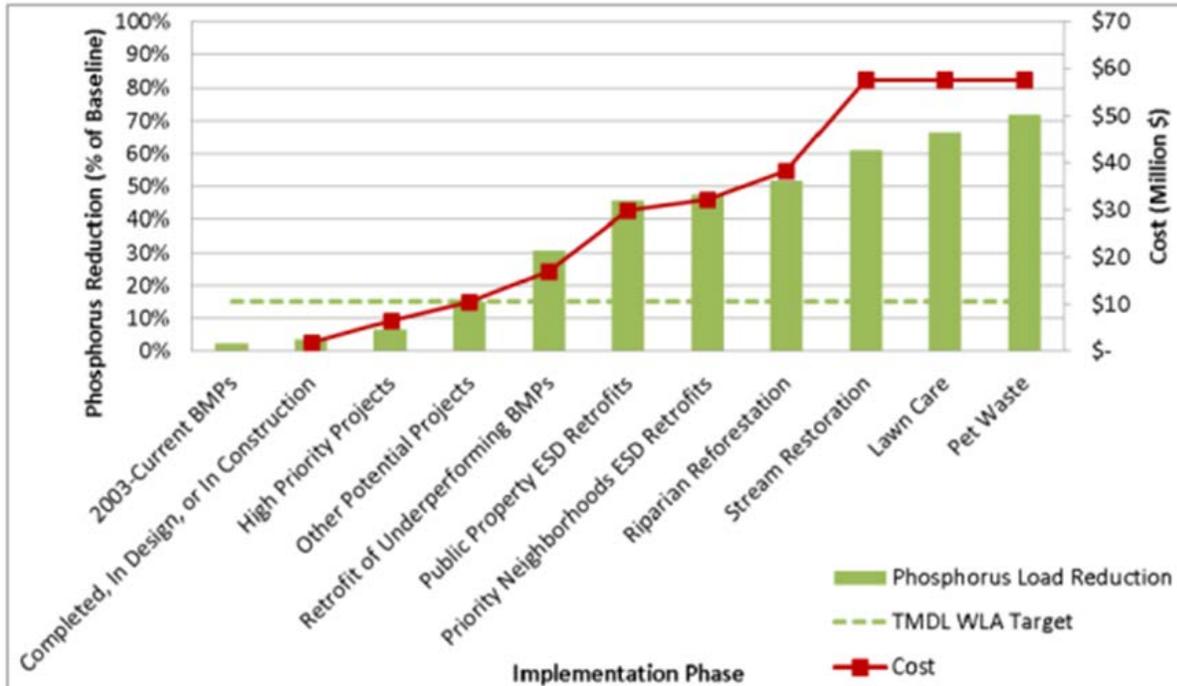


Figure 5. Cumulative reduction in total phosphorus loading over restoration practices implementation for Rocky Gorge Reservoir.

## Howard County

Howard County reports on progress towards meeting MS4 requirements in its Annual Report. Annual Report number 19, submitted in September 2014, is available through the County government's [Stormwater Management web page](#).

To-date, BMPs within the Patuxent Reservoirs watersheds of Howard County produce the following pollutant load reductions based on the approved Maryland Assessment Scenario Tool (MAST) pollutant load removal efficiencies (Table 2).

**Table 2. Pollutant Reductions to Patuxent Reservoirs from Howard County Urban BMPs**

Reservoir	Nitrogen	Phosphorus	Sediment
<b>Triadelphia</b>	1.90% (2,980 lbs.)	2.51% (324 lbs)	3.58% (363,748 lbs)
<b>Rocky Gorge</b>	4.08% (1,350 lbs)	7.65% (167 lbs)	10.89% (205,904 lbs)

At the time of Annual Report number 19, these reductions were based on 1,590 structural BMPs in the Triadelphia Reservoir watershed and 580 structural BMPs in the Rocky Gorge Reservoir watershed.

Howard County has completed two countywide assessments, which identified water quality enhancement projects to help the County meet its MS4 and TMDL requirements. The list of projects will be evaluated based on impervious acres treated and available funding and, if possible, may be implemented over a number of years.

- The first study evaluated all county-owned properties (including properties owned by the Howard County Public School System) to identify low impact development (LID) projects and reforestation areas to treat currently untreated impervious areas. Within the Triadelphia Reservoir watershed, one LID site was identified at the former Bushy Park Elementary School site, with the potential for up to 1.1 acres of impervious acre treatment. Two reforestation sites have been planted to-date as part of the County’s Chesapeake Bay Trust Fund grant, Student’s Branching Out. A total of 7.47 acres of native trees was planted at Glenwood Middle School and Bushy Park Elementary School, and a total of 2.24 acres was planted at Lisbon Elementary School.
- The second study evaluated all dry ponds and extended detention ponds in the County to identify opportunities for water quality retrofits. The following sites were identified within the Patuxent Reservoirs Watershed (Table 3).

**Table 3. Opportunities in Howard County for water quality retrofits**

Reservoir	Proposed Project Name	Project Type	Impervious Acres treated
<b>Triadelphia</b>	Glenelg High School	Infiltration basin	2.59
		Sub-total	2.59
<b>Rocky Gorge</b>	Cherrystone Court	Wet extended detention	1.05
	Heron’s Flight	Step pool conveyance system upstream of dry pond	8.91
		Sub-total	9.96
		Grand total	12.55

The Heron’s Flight Repair and Retrofit project is scheduled for design in FY16. More detailed watershed assessments and restoration plans for the Patuxent Reservoirs watersheds are scheduled to be developed within the County’s current 5-year MS4 Permit term, which became effective December 18, 2014.

# Annual Progress on Implementation Items for the Priority Resources

## Reservoir and Water Supply

### Reservoir Water Quality Monitoring

The WSSC completed its 23<sup>rd</sup> year of reservoir water quality monitoring to provide data for technical analysis and long-term trend evaluation to support protection of the reservoirs and drinking water supply. Three sites or more on each reservoir are normally monitored monthly, except during winter months. The reservoirs continue to be monitored for alkalinity, chloride, chlorophyll-*a*, color, phosphorus, nitrogen, sodium, total organic carbon, and turbidity. In addition, in-situ transparency and depth profile measurements of conductivity, dissolved oxygen, oxidation-reduction potential, pH, and temperature were performed.

According to the TMDL document for the Patuxent Reservoirs, *“The water quality goal of the nutrient TMDLs is to reduce high chlorophyll-*a* concentrations that reflect excessive algal blooms, and to maintain dissolved oxygen at a level supportive of the designated uses for Triadelphia and Rocky Gorge Reservoirs. The water quality goal of the sediment TMDL for Triadelphia Reservoir is to increase the useful life of the reservoir for water supply by preserving storage capacity.”*

### **Chlorophyll-*a***

Chlorophyll-*a* (chl-*a*) is one type of chlorophyll present in all algae, and it is often used as a surrogate for algal abundance. The monitoring results for this constituent are summarized in this report and used as one indicator of reservoir water quality. The MDE amended Maryland’s water quality standards by adding chl-*a* criteria for public water supply reservoirs in 2010 (Code of Maryland Regulations 26.08.02.03-3). The two criteria for public water supply reservoirs are:

1. *The arithmetic mean of a representative number of samples of chlorophyll-*a* concentrations, measured during the growing season (May 1 to September 30) as a 30-day moving average may not exceed 10 micrograms per liter (µg/L); and*
2. *The 90th-percentile of measurements taken during the growing season may not exceed 30 micrograms per liter.*

Weekly, active chl-*a* samples collected from the Patuxent Water Plant are used to determine compliance with the first criterion. The 30-day moving average did not exceed the 10 µg/L threshold during the growing season (Figure 6). The moving average ranged from about 1–4 µg/L.

Five sets of chl-*a* samples were collected from the reservoirs during the 2014 growing season (May-September). Chl-*a* results were averaged from all monitoring stations to determine the 90<sup>th</sup> percentile values for each reservoir. Active chl-*a* results were used to better indicate living algal biomass rather than total chl-*a*. The top of each box corresponds to the 90<sup>th</sup> percentile value (Figure 7). The 90<sup>th</sup> percentile threshold was not exceeded by either reservoir in 2014.

The 90<sup>th</sup> percentile value for both reservoirs were about the same (16 µg/L), and the median (50<sup>th</sup> percentile) value for both reservoirs were about the same (8.0 µg/L).

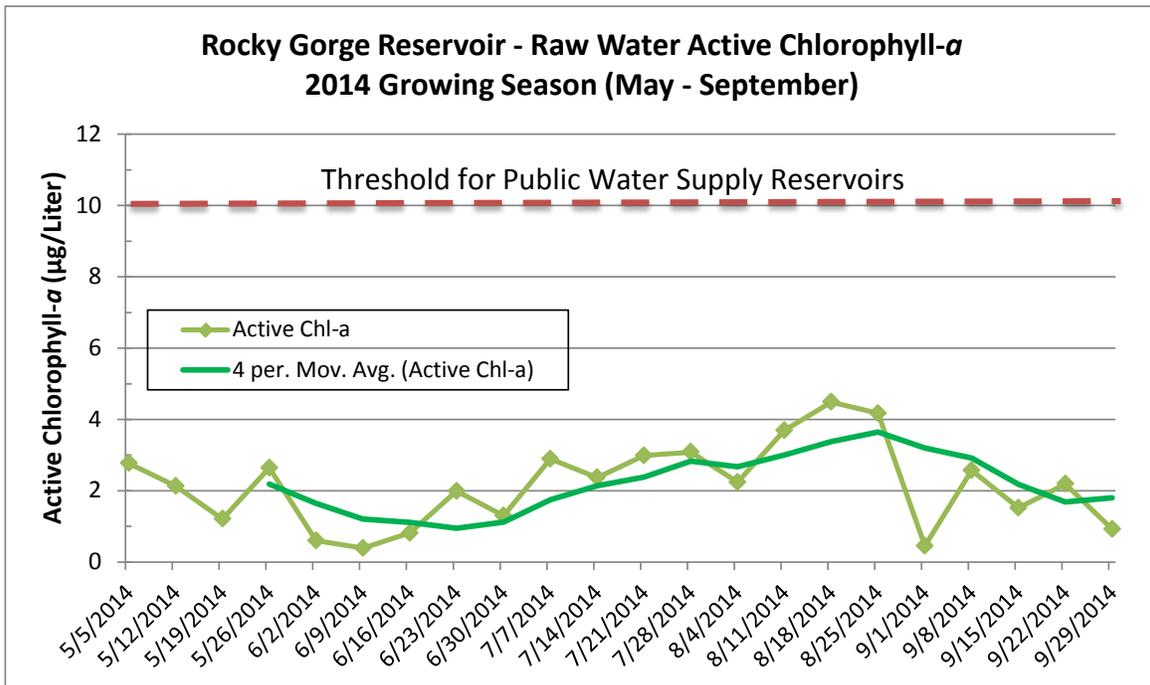


Figure 6. Chlorophyll-a results for 2014 growing season from Patuxent Water Plant

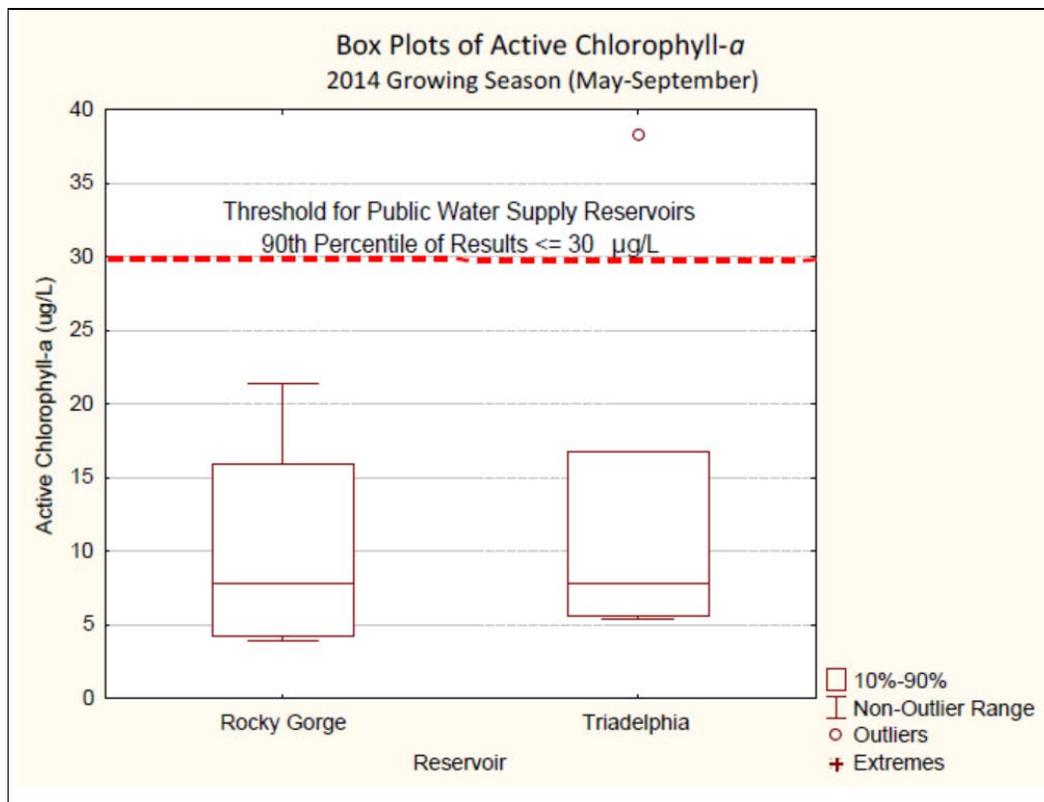


Figure 7. Chlorophyll-a results for 2014 growing season from Patuxent Reservoirs

## Dissolved Oxygen

Maryland's water quality standard for dissolved oxygen (DO) of 5 milligrams/Liter (mg/L) is the minimum threshold for all state waters, except when natural conditions, such as thermal stratification in reservoirs, cause DO concentrations to fall below this threshold. Bottom (hypolimnetic) waters of deep portions of reservoirs can become depleted of oxygen during summer months when thermal stratification prevents oxygen from entering into deeper waters and the remaining oxygen is consumed during decomposition of organic matter (e.g., decaying algae). Maryland adopted guidelines for interpreting DO and chl-*a* criteria for thermally stratified reservoirs in 2006 (MDE 2012). Historically, these hypoxic, or low DO conditions, have occurred seasonally within both Patuxent Reservoirs, although more pronounced in Triadelphia Reservoir.

The three MDE guidelines<sup>3</sup> to help determine compliance with water quality standards pertaining to DO include:

1. *A minimum DO concentration of 5 mg/L to be maintained in surface layers at all times (except during periods of spring and fall overturn);*
2. *A minimum DO concentration of 5 mg/L to be maintained throughout water column when reservoir is well mixed (non-summer months); and*
3. *Hypoxia (generally thought to be less than 2 mg/L DO) in bottom waters will be addressed by MDE on a case-by-case basis.*

Depth-time (or contour) plots of DO for each reservoir illustrate the degree of hypoxia (<2 mg/L) throughout the water column over time (Figures 8 and 9). The stoplight color pattern of these figures identifies the areas within each reservoir during 2014 where DO concentrations are above Maryland's water quality standard of 5 mg/L (green), between 2 mg/L and 5 mg/L (yellow), and below 2 mg/L (red). For these plots, data are shown for the monitoring stations located nearest the dams of both reservoirs.

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<sup>3</sup> Maryland Department of the Environment. *Guidelines for Interpreting Dissolved Oxygen and Chlorophyll-*a* Criteria in Maryland's Seasonally Stratified Water-Supply Reservoirs*. Revised February 2012.

## **Rocky Gorge Reservoir**

As is typical near the Duckett Dam, Rocky Gorge exhibited little thermal stratification during 2014. The fall over turn began in mid-September.

### **Guideline 1**

This guideline was satisfied considering the sampling events in mid-September and early October were collected during the fall over turn (Figure 8).

### **Guideline 2**

DO was measured on several occasions when the reservoir was well mixed (March and April). This guideline was met during those monitoring events.

### **Guideline 3**

Hypoxia (less than 2 mg/L) occurred in the bottom waters of the reservoir beginning in late June and persisted until late September (Figure 8).

## **Triadelphia Reservoir**

Triadelphia Reservoir exhibited a more pronounced thermal stratification for a longer period of time than did Rocky Gorge Reservoir during 2014. The fall over turn began in mid-September. The thickness of the surface layer was greater than Rocky Gorge, extending to approximately 15 feet below the water surface.

### **Guideline 1**

This guideline was satisfied (Figure 9).

### **Guideline 2**

This guideline was satisfied when the reservoir was well-mixed in the spring, but destratification occurred after the last sampling event. Therefore, it is unknown whether this guideline was fully satisfied (Figure 9).

### **Guideline 3**

Similar to results from recent years, hypoxic conditions occurred more frequently and to a greater extent in Triadelphia compared to Rocky Gorge. Hypoxia occurred in the bottom waters of Triadelphia beginning in early May and persisted until late September. The maximum extent of hypoxic conditions occurred from mid-July through August (Figure 9).

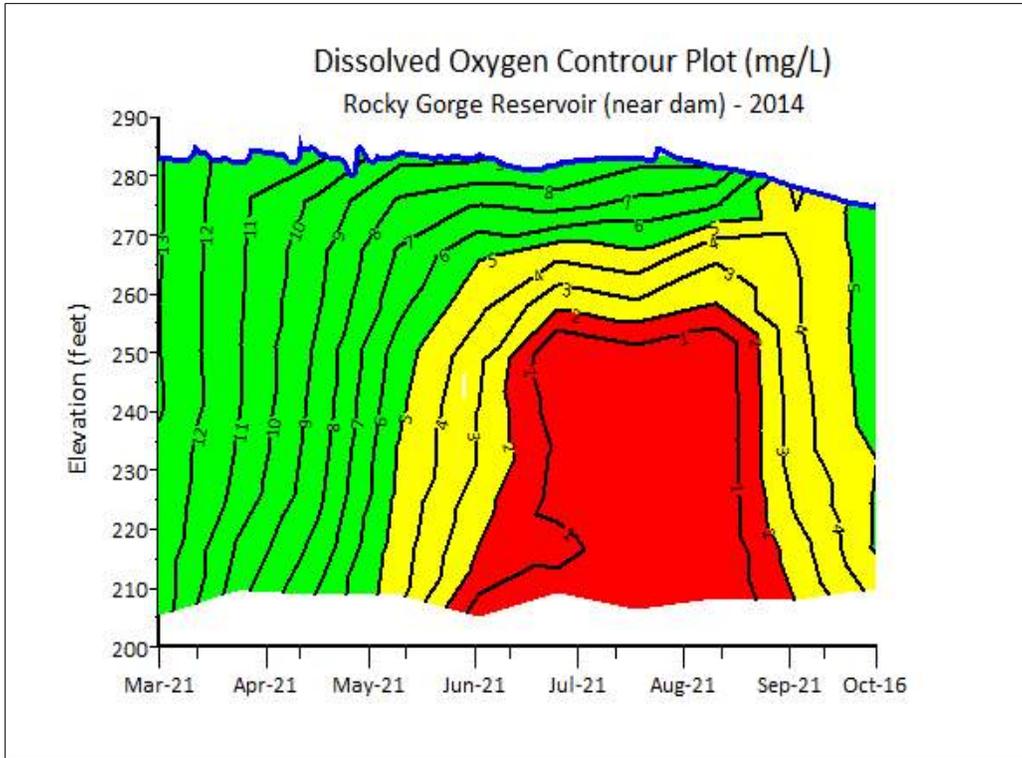


Figure 8. Contour plot of DO concentrations in Rocky Gorge Reservoir

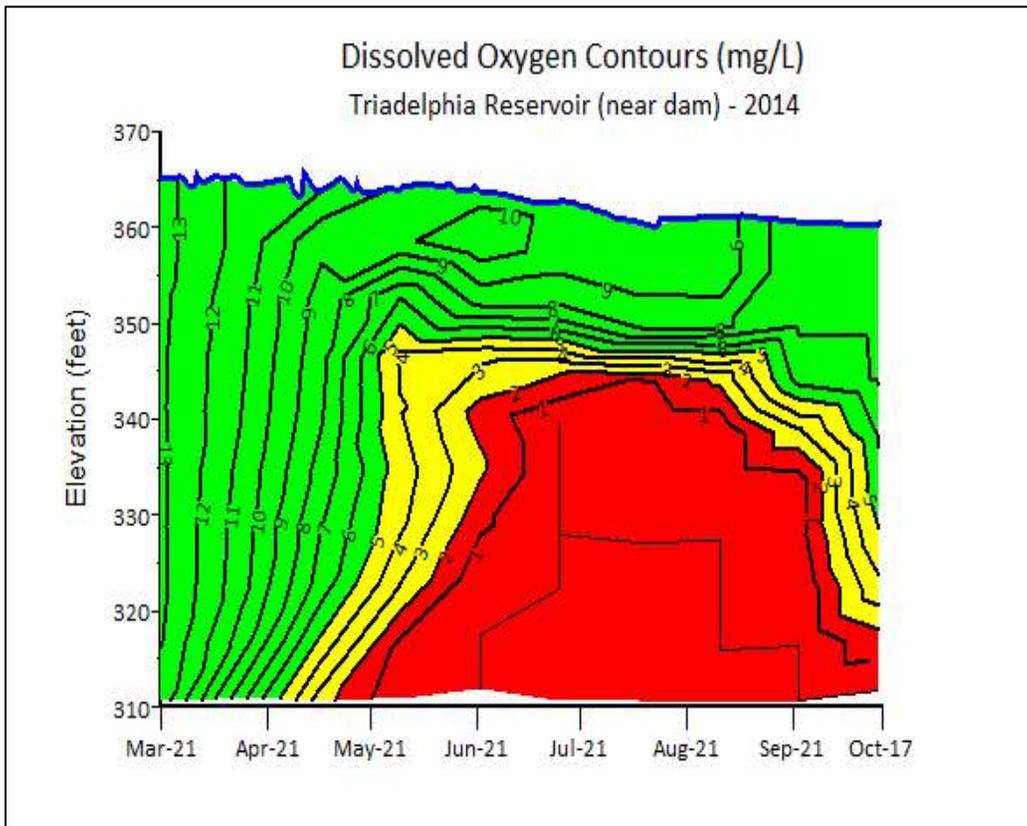


Figure 9. Contour plot of DO concentrations in Triadelphia Reservoir

## Terrestrial Habitat

The focus of this priority resource continues to be the preservation and management of forested land that provides water quality benefits to the reservoirs and their tributaries. Forests provide numerous, well-documented water quality benefits such as filtering and infiltrating runoff, stabilizing stream banks, and reducing thermal impacts, as well as providing habitat for wildlife.

In terms of water quality protection, it is beneficial that almost the entire main stem of the Patuxent River upriver of the reservoirs is forested land that is publically owned. According to the 2007 Maryland Department of Planning land use data, about 31% of the land within the Patuxent Reservoirs Watershed is forested<sup>4</sup>. Publically owned forests account for 58% of the total (Figure 10). The Maryland Department of Natural Resources (DNR) manages the largest amount of forests in the watershed within the Patuxent River State Park (about 22,300 acres) followed by the WSSC, which manages about 5,500 acres that surround both reservoirs.

One of the TAC's goals for this priority resource is to ensure forests are self-sustaining and capable of long-term natural regeneration, and one way to implement this goal is by managing the white-tailed deer population within the watershed.

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<sup>4</sup> Boado, A., Roth, N., B. Morgan. *Patuxent Reservoirs Interim Watershed Management Report*. Prepared by Versar, Inc., Columbia, MD for the Patuxent Reservoirs Watershed Protection Group's Technical Advisory Committee. December 2009

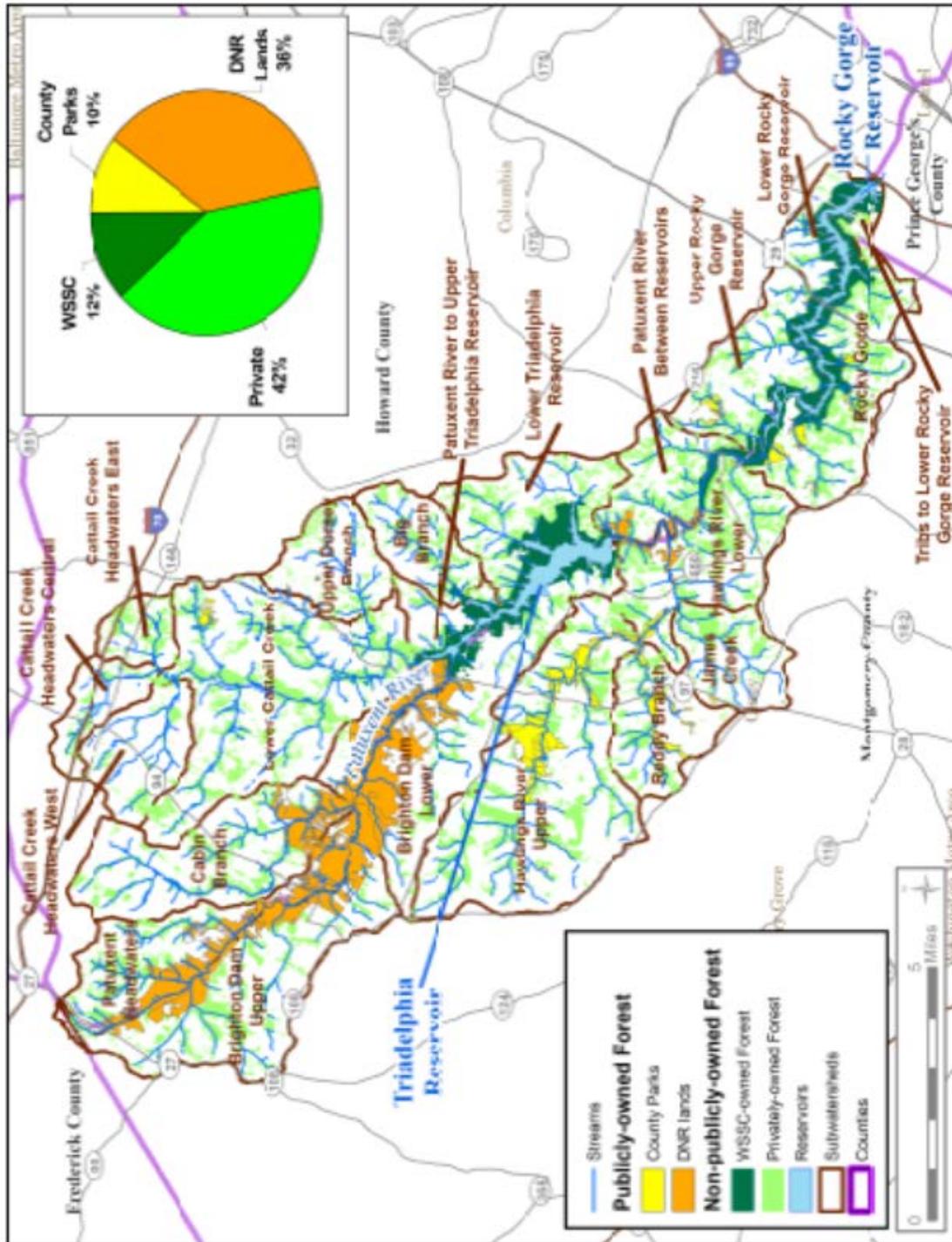


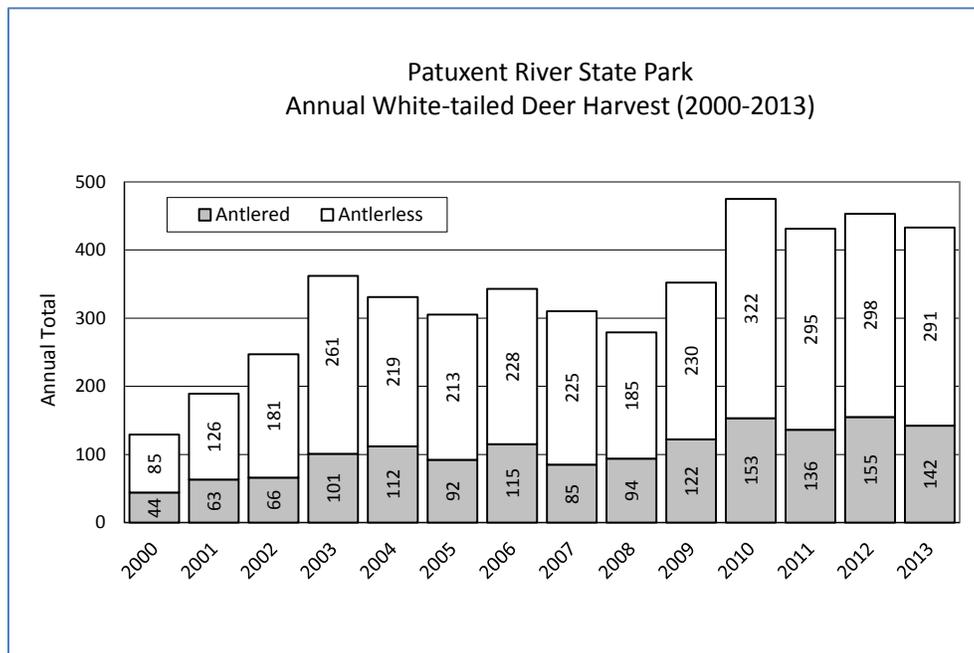
Figure 10. Forest Cover by ownership in the Patuxent Reservoirs Watershed/

## **White-tailed Deer Management**

The DNR, the Montgomery County Department of Parks, the Howard County Department of Recreation and Parks, and the WSSC continued to implement their deer hunting programs in 2014. Deer population control is needed given the many harmful effects associated with an over-abundance of deer including deer-vehicle collisions, agricultural crop damage, and damage to a naturally regenerating and self-sustaining forest ecosystem.<sup>5</sup>

### **Patuxent River State Park**

The DNR's Wildlife and Heritage Service manages the deer population in Maryland. Annual harvest totals have increased since 2000, with over 400 deer being harvested annually since 2010 (Figure 11). Totals reported include data from Howard and Montgomery Counties.



**Figure 11. Annual Deer Hunts from the Patuxent River State Park (2000-2013)**

<sup>5</sup> The Montgomery County Deer Management Work Group. *Comprehensive Management Plan for White-tailed Deer in Montgomery County, MD*. Revised 2004.

## Montgomery County Parks

During 2014, the Montgomery County Department of Parks has continued to implement its Deer Management Program, which reduces the number of deer in M-NCPPC parkland, and the adverse effects of deer overpopulation on forest and other ecosystems. The M-NCPPC Deer Management Program focusses on large wooded areas within parkland and along stream valley parks. Within the Patuxent River Reservoirs Watershed, the program has centered on the Rachel Carson Park. The program has been effective in reducing deer. Prior to program implementation, the deer density in Rachel Carson Park was about 180 deer/sq. mile. By 2012 the deer population in the park was reduced to a density of about 29 deer/sq. mile.

## WSSC

The WSSC continued its managed hunting program on about 55% of its 5,500 acres of land surrounding both reservoirs. For the 2014-15 hunting season, 19 managed hunts occurred on 1,335 acres surrounding Triadelphia Reservoir and 1,678 acres surrounding Rocky Gorge Reservoir. For the 2014-15 hunting season, 348 deer were harvested, raising the total since 2000 to 3,417 (Figure 12). The most recent hunting season began in October 2014 and finished in January 2015.

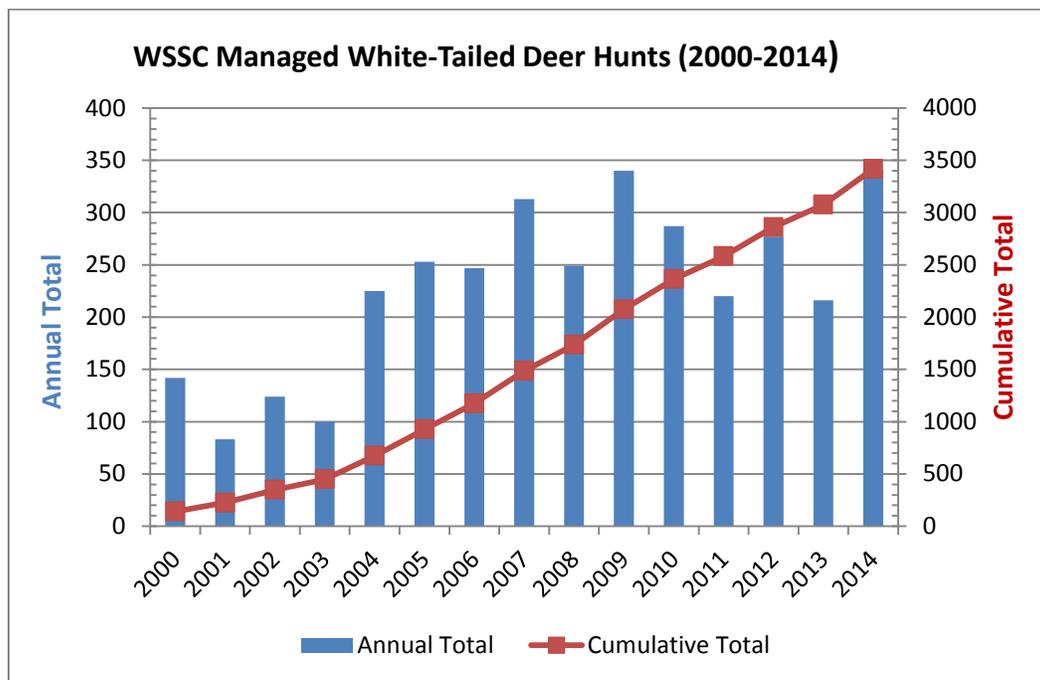


Figure 12. WSSC Deer Hunt Totals (2000-2014)

## **Stream Systems**

Stream corridor management activities include stream channel stabilization and restoration, and implementing streamside BMPs. These activities are targeted at stream channel reaches that were identified in stream corridor assessment surveys as severe problem areas for erosion. These activities help restore and protect the stream system, improve habitat and water quality for aquatic biota, and support protection of the reservoirs and water supply (i.e., minimize loss of capacity due to sedimentation).

### **Cherrytree Farms Stream Restoration Project**

The fourth year of post-construction monitoring by Howard County for the Cherrytree Farms stream restoration project was completed in winter 2014. The restoration reach is an unnamed tributary to the Rocky Gorge Reservoir and is adjacent to Sand Cherry Lane in Scaggsville. The project area consists of a total of approximately 670 linear feet. Construction of the restored channel was completed in April 2010. Overall, results from four annual monitoring assessments indicate that minor channel adjustments are occurring, but do not appear to pose a threat to the overall stability of the channel. No rehabilitation repairs were recommended. The report also noted that, while the original plantings installed as part of the project had moderate survival, native volunteer species have established and re-vegetated the site.

## **Rural Character and Landscape**

### **Agricultural Progress**

A summary of the progress made during 2014 by both the Howard and Montgomery Soil Conservation Districts (SCDs) is provided in Table 4. The SCDs use funding from local, State and federal programs to provide technical and financial assistance to landowners for the installation of agricultural BMPs. The numbers reported account for activity from July 1, 2013 through June 30, 2014. Note that estimated pollutant load reductions have been assigned in the Chesapeake Bay Program Model for nutrients and total suspended solids for BMPs shaded in Table 4. Estimating load reductions from agricultural BMPs will be part of the TAC's planned assessment of progress made thus far toward achieving the reservoir TMDL goals.

**Table 4. Agricultural Progress for 2013-14 in the Patuxent Reservoirs Watershed**

	Howard SCD	Montgomery SCD	Total
Conservation Plans developed (acres)	17 (1772.5)	13 (1150)	30 (2922.5)
Conservation Plans revised (acres)	-	1 (55)	1 (55)
Landowners Applying BMPs	-	15	15
Educational/Outreach Events	-	2	2
Best Management Practices Installed	58	24	82
<b>Best Management Practice</b>			
Access Control (acres)	-	1 (5)	1 (5)
Ag Waste Storage Structure	-	-	-
Critical Area Planting (acres)	-	-	-
Conservation Crop Rotation (acres)	-	-	-
Cover Crop (acres)	27 (786.5)	(2631.0)	(3417.5)
Diversion (feet)	-	1 (400)	1 (400)
Forage Harvest Management	-	12	12
Grassed Waterways (acres)	8 (1.9)	1 (2.5)	9 (4.4)
Heavy Use Area Protection (acres)	11 (1.1)	4 (0.1)	15 (1.2)
Livestock Exclusion Fencing (feet)	-	2 (1444)	2 (1444)
Livestock Watering System/Watering Facility	2	-	2
Nutrient Management (acres)	-	4 (280)	4 (280)
Pasture /Hayland Planting (acres)	-	-	-
Pest Management (acres)	-	-	-
Pipeline (feet)	-	-	-
Prescribed Grazing (acres)	-	2 (3.6)	2 (3.6)
Residue Management – Mulch Till (acres)	-	-	-
Residue Management – No Till (acres)	-	-	-
Roof Runoff System	-	-	-
Sediment Control Pond	-	-	-
Spring Development	-	-	-
Structure for Water Control	-	-	-
Waste Utilization/Recycling (acres)	-	6 (211.0)	6 (211.0)

Two charts are also included to summarize progress of the SCDs since 2000. The MDE used the water quality data collected from 2000 to establish the TMDLs for the reservoirs and used WSSC data from 1998-2003 for model calibration. Therefore, summarizing the cumulative progress since that time period provides a partial means to support an assessment of pollutant reductions since the EPA established the reservoir TMDLs. The charts show the number of farm acres with an established Soil Conservation and Water Quality Plan (farm plans) (Figure 13) and the number of BMPs installed (Figure 14). In 2014 farm plans were written for more than 2,900 acres. Since 2000, farm plans have been written for 18,565 acres (29 square miles), and 2,429 BMPs have been installed.

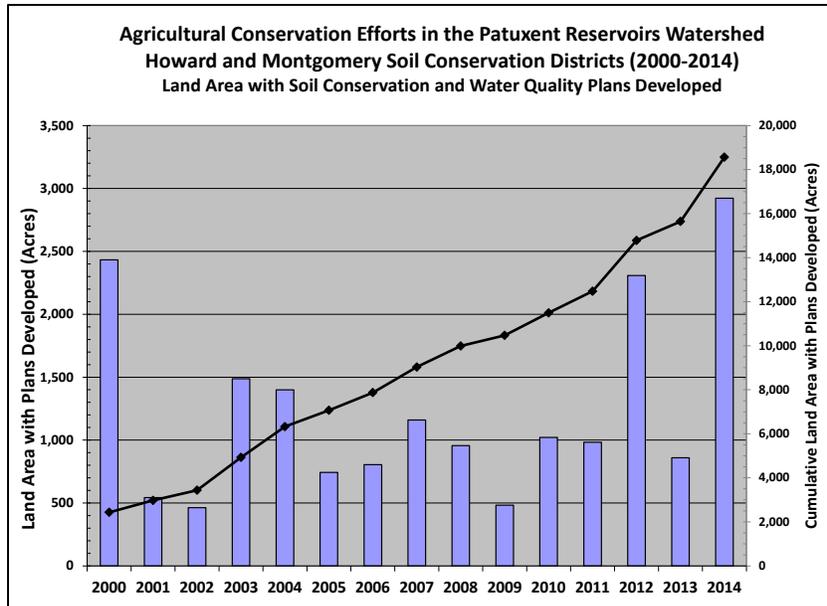


Figure 13. Farm Acres with Soil Conservation and Water Quality Plans

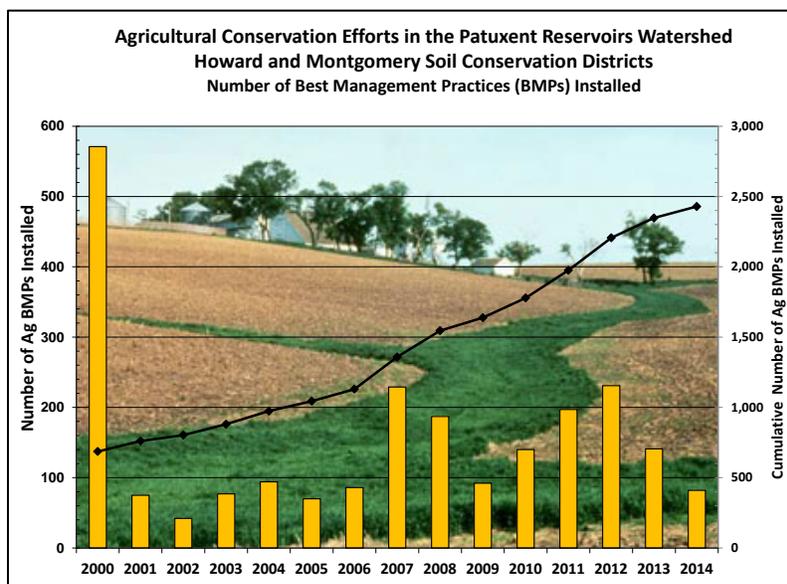


Figure 14. Number of Best Management Practices Installed

### Patuxent Reservoirs Watershed Agricultural Cost-Share Program

In 1998, the Patuxent Reservoirs Watershed Protection Group created the *Patuxent Reservoir Protection Strategy Memorandum of Understanding (MOU)*, which established the Patuxent Reservoirs Watershed Agricultural Cost-Share Program. This cost-share program focuses on implementing BMPs that will benefit nearby stream systems. The program is targeted at small agricultural operations that may not qualify for other State and federal cost-share programs. In the Patuxent Reservoirs Watershed, many of these operations are small horse farms.

Collaboration last year among partnership agencies led to changes to the agricultural cost-share program. A subcommittee was tasked with developing recommendations to improve the usefulness of the cost-share program by broadening the practices and landowners that could qualify for assistance. Many details of the original program established fifteen years ago were outdated and did not reflect current conservation objectives. The subcommittee drafted a new MOU that underwent a succession of technical and legal reviews. The new MOU went into effect on May 27, 2014, which released new funding for the program. The subcommittee is optimistic that these amendments to the program will elicit additional interest from the agricultural community.

In 2014, the HSCD received \$50,000 from Howard County (contributed two-thirds of the total) and the WSSC (contributed one-third of the total) to continue assisting qualifying land owners. The remaining funds in this cost-share program as of June 30, 2014 are:

HSCD	\$50,752
MSCD	<u>\$39,845</u>
Total	\$90,597

Efforts this year have focused on restructuring the terms of the agricultural cost share application and process. Members of the subcommittee that revamped the MOU were also involved in the process of updating the guidelines for the cost-share program to better reflect the current needs of agricultural landowners in the reservoirs watershed area. The revised documents and program details should be completed by spring 2015.

Although interest in the program has been spotty in Montgomery County there are 2 applications currently approved which are awaiting final BMP installations. It is anticipated that the update in cost-share rates and the broadening of program applicability will lead to increased participation throughout the watershed.

## **Howard County Land Use**

The majority of the Patuxent Reservoirs Watershed in Howard County is outside the Planned Service Area (PSA) for public water and sewer service, and is zoned Rural Residential (RR), for low density residential development, or Rural Conservation (RC), for farming and low density, clustered residential development. A small portion of the watershed is within the PSA and is zoned for more dense residential development.

Howard County adopted a new comprehensive plan, PlanHoward 2030, in 2012. This was followed by the Comprehensive Zoning Plan process in 2013, to implement key policy recommendations in PlanHoward 2030. During this process, a large parcel of just over 91 acres in Fulton, known as Maple Lawn South, was rezoned from Rural Residential to Residential-Environmental Development (R-ED) with a Mixed Use Development (MXD) overlay district. This parcel was designated in PlanHoward 2030 to be included in an expansion of the PSA, because it is close to US Route 29 and the Maryland Transportation Administration commuter bus service/park and ride lot, as well as immediately adjoining the approved Maple Lawn Mixed Use Development, which was designated as a mixed use growth area in the 1990 General Plan.

The R-ED zoning district yields two units per net acre, with a mandatory 50 percent open space requirement. The MXD overlay district allows a maximum of 3 units per net acre with a minimum of 35 percent open space. The MXD overlay process requires the owner to first apply for Zoning Board approval of a Preliminary Development Plan (PDP). The PDP would show the development mix, lay-out, and the open space to be protected. This process would allow additional opportunities for public comment before the Planning Board and Zoning Board. The Department of Planning and Zoning is currently reviewing an Environmental Concept Plan for this property that proposes 176 single family detached homes in compliance with the R-ED zoning district.

In 2014, the County Council convened a Task Force to study current zoning regulations for mulching, composting and wood processing facilities, and to make recommendations for changes to these regulations, if necessary. Bert Nixon was appointed to be a member of the Task Force, which has been meeting regularly since July. The Council requested a draft report from the Task Force by mid-November 2014. The November timeline has been extended as the Task Force continues to meet and develop a list of agreed upon recommendations. It is likely that some items will not be fully resolved, resulting in some instances of a majority and minority report providing differing recommendations.

## **Public Awareness and Stewardship**

The TAC agencies and other groups in the watershed continued to coordinate public outreach and involvement initiatives during 2014. Under the coordination of WSSC's Communications and Community Relations Office staff, there were about 45 environmental stewardship events in 2014, as well as other successful outreach events coordinated by other TAC agencies that occurred in Howard, Montgomery, and Prince George's Counties.

### **Izaak Walton League of America-Wildlife Achievement Chapter**

The Izaak Walton League of America-Wildlife Achievement Chapter (IWLA-WAC) in Damascus continued to sponsor outreach and involvement events for its members and the general public during 2014. These included:

- Workshop in March at the Chapter for 'Make and Take' Rain Barrels with 30 participants.
- Work day in March at the WSSC Pigtail recreation area in Howard County with about 40 participants, including chapter members, girl scouts and their chaperones, and students needing service work credits. WSSC provided native trees and shrubs for planting, the Chapter provided caging material to protect those plantings, and the group also cleared invasive plants from prior plantings.



Group at Pigtail Recreation Area before planting, caging, and invasives management

- Spring watershed clean-up in April with DNR and 60 participants, including volunteers from Trout Unlimited and from Camp Waredeca, at Howard Chapel Road and Rte. 650. The Montgomery County Department of Transportation (MCDOT) disposed of all litter and debris. The group picked up 35 contractor bags of trash, along with 3 tires, a full

room equivalent of used linoleum flooring, miscellaneous wood and masonry debris, 3 realtor signs, and about 20 quarts of household hazardous waste like paint, paint thinner, other solvents, and a variety of cleaning agents.

- June and August Adopt-A-Road clean ups for Mullinix Mill Road and Long Corner Road. During these two events, 18 people collected 28 bags of litter and numerous miscellaneous items that wouldn't easily fit into plastic bags.

- May and September work days for the Reddy Branch reforestation, led by the M-NCPPC, Montgomery County Planning Department. Over the two days, 43 members continued deer exclusion and invasives maintenance on this partnership project begun back in 2008.



- Hosted the well-attended public meeting in June and follow up presentation in October for the Patuxent River State Park Trail Assessment and Mapping project. This phase has been funded by the Mid-Atlantic Off-Road Enthusiasts and is focused on improving existing conditions and the sustainability of trails in the northern part of the Park.



Attendees at the Public Meeting on the Patuxent River State Park Trail Study

- October work day with M-NCPPC and an enthusiastic crew of 21 in Rachel Carson Park at a new site for the Chapter for deer exclusion and invasives management. The Chapter intends to plant more native trees and shrubs during 2015 as well as continued maintenance of existing plantings.
- Fall watershed clean-up in November with 47 workers divided into 9 teams, from the Long Corner Road crossing down to an area of parkland near Georgia Avenue. A total of 35 bags of litter, along with other miscellaneous larger items--including a toilet--were collected for disposal by the MCDOT.
- Numerous other work days on the Chapter's 120-acre property in Montgomery County for invasives management.

### **Oaks Landfill Reforestation**

A reforestation project is underway at the Oaks Landfill in Laytonsville to convert mowed fields to forest land of native trees. The project began in 2011 with a \$25,000 grant to the Montgomery Soil Conservation District from the Chesapeake Bay Trust. The project is now funded through the Maryland DNR Chesapeake and Atlantic Coastal Bays Trust Fund for \$259,200. This spring Montgomery County staff coordinated the planting of an additional 31,000+ bare root seedlings on 30 acres of open field and expanded the deer protection fencing to include 45 acres for this forest restoration project.

During March and April 2014, the project included installing fencing around the entire area to protect trees from damage by deer. Native tree seedlings were planted in April 2014. Intensive

management of non-native and other competing plants has kept the area relatively free of invasives. Management will continue for several more years. At this time, seedling survival is high and volunteer trees of desirable species are present in higher numbers than expected.



By the end of June 2014, most of the seedlings were flourishing. This swamp white oak grew more than six inches since it was planted.

### **Patuxent River Clean-up**

In cooperation with the office of the Patuxent Riverkeeper, the WSSC's Communications and Community Relations Office participated once again in the annual *Patuxent River Clean-up*. The designated clean-up day was April 13, 2014, but groups also worked on other Saturdays in April to accomplish the massive clean-up. Approximately 70 volunteers from the neighboring communities, church groups, and Boy and Girl Scout troops formed work crews at seven WSSC recreation areas, collecting hundreds of pounds of trash and recyclables. All clean-up efforts for the month were included in the final tallies reported to the Riverkeeper. Site leaders for this effort volunteered their time to organize, recruit, and report for this clean-up event.

### **RainScapes Rewards Program**

The Montgomery County DEP continued its countywide RainScapes Rewards Program to provide rebates to property owners who voluntarily install practices that capture and store runoff from rooftops and paved areas in their yards, thus reducing storm water impacts downstream.

By the end of FY13, there were 40 projects installed in the Patuxent Reservoirs Watershed, managing runoff from 23,835 square feet of impervious surfaces. There were 19 tree canopy projects for over 70 trees planted, along with 15 rain barrels and three cistern projects, four

conservation landscapes, and one pervious paver project installed. Applicants spent \$53,586 and received \$18,088 in rebates.

The majority of these projects have been urban tree canopy plantings. Combined savings are possible for these projects using \$25 coupons from both the Maryland DNR and the M-NCPPC, and the RainScapes \$150 per tree rebate. There were no additional RainScapes Rewards projects in the Reservoirs Watershed completed during FY14.

### **WSSC Property - Environmental Stewardship**

WSSC's community outreach events are focused on promoting environmental stewardship. The WSSC once again sponsored the annual Children's Water Festival in May. About 600 children in the 4th grade gathered at Brighton Dam to learn about environmental stewardship. Students rotated among 12 activity stations including: recycling, watersheds, water pollution, and water conservation.

The WSSC also sponsored the annual Fishing Derby on May 17, 2014 held at the Triadelphia Recreation Area. Representatives from the IWLA-WAC, the Potomac-Patuxent Trout Unlimited Club and the Big Bass Fishing Club helped young anglers to bait their hook, cast and reel in fish.

WSSC also sponsored a Warbler Day and a Native Tree Walking Tour at two of their recreation areas adjacent to the reservoirs.

WSSC's outreach also included many environmental stewardship opportunities (e.g., planting trees, collecting trash and removing invasive weeds on WSSC property).

**Table 5. Performance Measures and Goals for Priority Resources**

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES

**Resource: Reservoir/Water Supply**

**Issue:** The public need for a sufficient quantity of safe and high quality drinking water calls for adopting a proactive and multi-barrier approach, which starts with utilizing raw water of the highest quality and sustainable quantity, now and in the future. To achieve this for the Patuxent water filtration plant, we need to control reservoir eutrophication, reduce disinfectant by-products precursors, and limit reservoirs capacity loss.

Measures	Goals	Implementation Items	Time Line	Responsible Partner
Chlorophyll- <i>a</i> (chl- <i>a</i> )	<ul style="list-style-type: none"> <li>Chl-<i>a</i> not to exceed a 10 µg/L mean during the growing season and not to exceed a 30 µg/L instantaneous concentration</li> </ul>	<ul style="list-style-type: none"> <li>Perform reservoir monitoring for chl-<i>a</i>, DO, and TOC during the growing season</li> </ul>	Ongoing	WSSC
Dissolved oxygen (DO)	<ul style="list-style-type: none"> <li>DO not to fall below 5 mg/L at any time in the epilimnion, not to fall below 5 mg/L in the entire water column during completely mixed periods, and not to fall below 10% saturation at any time in the hypolimnion</li> </ul>	<ul style="list-style-type: none"> <li>Perform reservoir monitoring for CHL-<i>a</i>, DO, and TOC during the growing season</li> </ul>	Ongoing	WSSC
Suite of water quality parameters in reservoir monitoring protocol	<ul style="list-style-type: none"> <li>Five-year data trend analysis for other monitored water quality parameters shows no net deterioration</li> </ul>	<ul style="list-style-type: none"> <li>Develop and begin implementation of a plan to reduce nutrients, based on model/TMDL requirements</li> <li>Update trend analysis for reservoir water quality parameters on a 5-year cycle</li> </ul>	Ongoing  Next Update: 2014	TAC  WSSC
Total organic carbon (TOC)	<ul style="list-style-type: none"> <li>TOC – 20% annual reduction goal, with 40% reduction for peak quarter at the location where water is withdrawn for treatment purposes</li> </ul>	<ul style="list-style-type: none"> <li>Perform reservoir monitoring for CHL-<i>a</i>, DO, and TOC during the growing season</li> </ul>	Ongoing	WSSC
Sediment	<ul style="list-style-type: none"> <li>Sediment accumulation rate not to exceed previous years</li> </ul>	<ul style="list-style-type: none"> <li>Perform bathymetric survey of reservoirs at 10 year intervals or less</li> </ul>	Next Survey in 2014/2015	WSSC

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES (continued)

**Resource: Terrestrial Habitat**

**Issue:** Preservation of forests provides water quality benefits by reducing sediment and nutrient loading of streams from surrounding land uses.

<b>Measures</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
Forest Cover	<ul style="list-style-type: none"> <li>Maintain and increase forest cover</li> <li>Increase forest interior habitat</li> </ul>	<ul style="list-style-type: none"> <li>Encourage private property owners to participate in tree planting programs</li> <li>Ensure publicly owned parkland and open space is forested to the maximum extent possible</li> </ul>	Ongoing	TAC
			2006 – 2023	TAC
Forest Connectivity	<ul style="list-style-type: none"> <li>Improve forest connectivity (larger forest tracts are connected by forest corridors)</li> </ul>	<ul style="list-style-type: none"> <li>Target reforestation and forest conservation programs to increase forest connectivity and forest interior habitat</li> </ul>	Ongoing	TAC
Forest Size	<ul style="list-style-type: none"> <li>Increase forest size</li> </ul>	<ul style="list-style-type: none"> <li>Encourage private property owners to participate in tree planting programs</li> <li>Ensure publicly owned parkland and open space is forested to the maximum extent possible</li> </ul>	Ongoing	TAC
			2006 – 2023	TAC
Forest Diversity	<ul style="list-style-type: none"> <li>Ensure diverse forest communities (communities contain a variety of species and ages)</li> </ul>	<ul style="list-style-type: none"> <li>Develop a forest management plan to ensure forest diversity and long-term natural regeneration, identifying and addressing potential problems such as excessive deer populations, invasive species and human impacts</li> </ul>	2006 – 2013  WSSC Plan completed FY08	TAC  WSSC
Forest Sustainability	<ul style="list-style-type: none"> <li>Ensure forests are self-sustaining and capable of long-term natural regeneration</li> </ul>	<ul style="list-style-type: none"> <li>Implement deer management programs</li> <li>Implement strategies for control of invasive plants</li> </ul>	Ongoing	TAC
			Ongoing	TAC

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES (continued)

**Resource: Stream System**

**Issue:** Preventing stream habitat degradation - The stream system includes all intermittent and perennial streams and their adjacent floodplains. A stable stream system provides significant nutrient and sediment removal during both baseflow and storm flow events. The stream and its associated riparian buffer are also important as sources of high quality food and habitat for both aquatic and terrestrial organisms.

Measures	Goals	Implementation Items	Time Line	Responsible Partner
Buffer corridor width and continuity	<ul style="list-style-type: none"> <li>A minimum 35-foot riparian buffer on all streams on properties that were developed prior to current stream buffer requirements</li> </ul>	<ul style="list-style-type: none"> <li>Establish and maintain minimum 35-foot riparian buffers on all publicly-owned land</li> <li>Accelerate programs to establish and maintain streamside buffers to a minimum of 35 feet on privately-owned lands to the maximum extent possible</li> </ul>	<p>2006 – 2013</p> <p>2006 – 2023</p>	<p>WSSC, M-NCPPC, HC, MC</p> <p>WSSC, M-NCPPC, HC, HSCD, MC, MSCD</p>
Stream bank and stream channel stability	<ul style="list-style-type: none"> <li>No areas of "severe" or "very severe" stream bank erosion based on the Stream Corridor Assessments and other locally collected data.</li> </ul>	<ul style="list-style-type: none"> <li>Establish and maintain streamside fencing programs to keep all livestock out of streams to the maximum extent possible</li> <li>Address <u>significant</u> areas of stream bank and channel instability through stream restoration projects and storm water retrofits to the maximum extent possible</li> </ul>	<p>2006 – 2013</p> <p>2006 – 2013</p>	<p>HSCD, MSCD</p> <p>HC, HSCD, M-NCPPC, MC</p>

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES (continued)

**Resource: Aquatic Biota**

**Issue:** Biological Integrity– This is the condition of the benthic macroinvertebrate communities based on a comparison to a reference stream in Montgomery County. A reference stream is relatively undisturbed and therefore the best quality to be expected in the region that includes the Patuxent Reservoirs Watershed.

<b>Measures</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
IBI - Index of Biological Integrity	<ul style="list-style-type: none"> <li>No subwatershed with a benthic IBI indicating "fair" or "poor" condition</li> </ul>	<ul style="list-style-type: none"> <li>Pursue cost-share funds to construct agricultural BMPs, stream restoration, and storm water retrofit projects to address factors contributing to degraded biological integrity</li> <li>Mitigate runoff impacts from land use changes</li> </ul>	<p>2006 – 2023</p> <p>2006 – 2023</p>	<p>HC, HSCD, MC, MSCD, M-NCPPC</p> <p>HC, MC, M-NCPPC</p>
	<ul style="list-style-type: none"> <li>Preserve conditions in subwatersheds with "excellent" and "good" benthic IBIs</li> </ul>	<ul style="list-style-type: none"> <li>Protect existing habitat and water quality of streams in high-quality subwatersheds to the maximum extent possible by pursuing programs to maintain or increase existing land cover</li> </ul>	<p>2006 – 2023</p>	<p>HC, HSCD, MC, MSCD, M-NCPPC</p>

IBI - Index of Biological Integrity is also referred to as Index of Biotic Integrity in Maryland Biological Stream Survey publications.

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES (continued)

**Resources: Rural Character and Landscape**

**Issue:** Preserving open spaces and maintaining an economically viable and environmentally protective agricultural community.

Measures	Goals	Implementation Items	Time Line	Responsible Partner
Agricultural Preservation Enrollment <ul style="list-style-type: none"> <li>• Total acres enrolled</li> <li>• Number of farms enrolled</li> </ul>	<ul style="list-style-type: none"> <li>• Preserve the agricultural and rural nature, and open space of the watershed</li> </ul>	<ul style="list-style-type: none"> <li>• Continue easement acquisition through agricultural land preservation programs</li> <li>• Continue agricultural economic development programs</li> </ul>	Ongoing  Ongoing	HC, MC  HC, MC
Agricultural Demographics <ul style="list-style-type: none"> <li>• Acres of agricultural land</li> <li>• Market value of agricultural production</li> <li>• Size of farms</li> <li>• Types of farms</li> </ul>	<ul style="list-style-type: none"> <li>• Preserve the agricultural and rural nature, and open space of the watershed</li> </ul>	<ul style="list-style-type: none"> <li>• Continue zoning and land use policies in the watershed to maintain rural character</li> <li>• Continue agricultural economic development programs</li> </ul>	Ongoing  Ongoing	HC, M-NCPPC  HC, MC
Open Space and Parkland Acquisition and Easement Programs <ul style="list-style-type: none"> <li>• Acres of open space land preserved by non-agricultural easements or acquisition</li> </ul>	<ul style="list-style-type: none"> <li>• Create a landscape that is protective of water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Utilize effective open space land management practices that are beneficial to water quality</li> </ul>	Ongoing	HC, M-NCPPC, WSSC
Participation in agricultural conservation programs and percent of conservation plans that are implemented	<ul style="list-style-type: none"> <li>• Create a landscape that is protective of water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage participation in other conservation and open space preservation programs</li> <li>• Encourage enrollment in federal and state nutrient management and stream protection programs</li> <li>• Promote greater utilization of funding provided by the Reservoir Protection Group to supplement federal and state agricultural programs</li> <li>• Create and routinely update an electronic map based system to track BMP implementation</li> </ul>	Ongoing  Ongoing  Ongoing  2006 – 2013	HC, MC, M-NCPPC  HSCD, MSCD  HSCD, MSCD  HSCD, MSCD

PRIORITY RESOURCES: GOALS & PERFORMANCE MEASURES (continued)

**Resource: Public Awareness and Stewardship**

**Issue:** Awareness and support by residents and resource users

Measure	Goals	Implementation Items	Time Line	Responsible Partner
Residents participating in stewardship activities	<ul style="list-style-type: none"> <li>• Citizen action to improve watershed resources – see evidence of watershed friendly activities and practices</li> <li>• 10 to 15 stewardship offerings per year</li> </ul>	<ul style="list-style-type: none"> <li>• Identify citizen groups throughout watershed and be available for presentations upon request</li> <li>• Organize stewardship events and participate in other community events</li> <li>• Recognize good stewards through annual awards</li> <li>• Form “Friends of the Watershed” group of citizen volunteers that will take on tasks such as newsletter preparation and some Earth Month planning</li> </ul>	<p>2006 – 2009</p> <p>Ongoing</p> <p>2006 – 2008</p> <p>2006 – 2009</p>	<p>TAC</p> <p>TAC</p> <p>MC, PGC, HC, M-NCPPC TAC</p>
Schools participating in mentoring	<ul style="list-style-type: none"> <li>• School and community involvement – 20 participating Green School partners by end of 2003 and 5 additional schools participating each year thereafter until all 43 are attained</li> </ul>	<ul style="list-style-type: none"> <li>• Continue and expand Green Schools Mentoring Partnership</li> </ul>	<p>Ongoing</p>	<p>WSSC, HC, MC, PGC, M-NCPPC</p>
Active support by elected officials	<ul style="list-style-type: none"> <li>• Routine communication with elected officials</li> </ul>	<ul style="list-style-type: none"> <li>• Routine communication with elected officials</li> </ul>	<p>Ongoing</p>	<p>TAC</p>
Routine coverage by media	<ul style="list-style-type: none"> <li>• Expanded media coverage of watershed events – print, radio and TV</li> </ul>	<ul style="list-style-type: none"> <li>• Increase communication with media</li> <li>• Support regional efforts to establish media-savvy campaigns that emphasize water quality protection</li> </ul>	<p>2006 – 2009</p> <p>2006 – 2008</p>	<p>TAC</p>

**Table 6. Work Plan Expenditures for Current Fiscal Year**

<b>PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY14</b>				
<b>PRIORITY RESOURCES PROTECTED</b>	<b>IMPLEMENTATION NEED</b>	<b>IMPLEMENTATION ITEM</b>	<b>AGENCY</b>	<b>FY 2015</b>
Reservoir/Water Supply	Reservoir and tributary water chemistry and flow monitoring	Reservoir monitoring and lab analysis	WSSC	\$162,000 (in-kind)
		5 US Geological Survey stream flow gauging stations	WSSC	\$60,000
Reservoir/Water Supply Stream System Aquatic Biota	Stream corridor management	Patuxent Restoration Project Inventory	MC	*\$320,000
ALL Priority Resources	Management of agricultural cost-share initiatives	Program oversight for voluntary implementation of agricultural BMPs through existing local, State of Maryland, and Federal programs	HSCD, MSCD	\$165,000 (SCD in-kind)
	Update Patuxent Reservoirs Watershed MOU and Cost-Share Agreement	Provide funding to HSCD after revising existing MOU and cost-share program to allow more effective, continued use of program funds.	HC, WSSC	\$50,000 (\$33,333 from HC and \$16,667 from WSSC)

\* Funding continued from FY2014 for Patuxent, Monocacy, and remaining Potomac subwatershed, not new funding for FY14

**PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY14**

<b>PRIORITY RESOURCES PROTECTED</b>	<b>IMPLEMENTATION NEED</b>	<b>IMPLEMENTATION ITEM</b>	<b>AGENCY</b>	<b>FY 2015</b>
ALL Priority Resources	Public outreach and involvement initiatives	RainScapes Rewards	MC	Rebates available to county residents for Low Impact Development (LID)
ALL Priority Resources	Public outreach and involvement initiatives	Earth Month, and other outreach activities	WSSC  Other TAC agencies	\$140,000 (in-kind)  \$2,500 (in-kind)
ALL Priority Resources	Complete Annual Report and Technical Supplement	Compilation and editing	WSSC  Other TAC Agencies	\$10,000  In-kind
	Coordination and Collaboration	Provide administrative support & coordination among partners	WSSC	\$35,000

<b>PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY14</b>				
<b>PRIORITY RESOURCES PROTECTED</b>	<b>IMPLEMENTATION NEED</b>	<b>IMPLEMENTATION ITEM</b>	<b>AGENCY</b>	<b>FY 2014</b>
Reservoir/Water Supply Terrestrial Habitat Stream System Aquatic Biota Public Awareness & Stewardship	Assessment of potential watershed protection & restoration opportunities	Watershed restoration planning effort in Prince George's County portion of the Rocky Gorge Reservoir Watershed	PGC	\$2,000 (in-kind)
Reservoir/Water Supply Stream System Aquatic Biota Public Awareness & Stewardship	TMDL Implementation	Begin scoping study for TMDL Implementation Plan for both reservoirs	MC, M-NCPPC, PGC, WSSC	\$70,000
<b>TOTAL FUNDING</b>				<b>\$1,016,500</b>