PATUXENT RESERVOIRS WATERSHED PROTECTION GROUP

2011 ANNUAL REPORT OF THE TECHNICAL ADVISORY COMMITTEE

A Message from the Chair

The Patuxent Reservoirs Watershed Protection Group's Technical Advisory Committee (TAC) herein submits the *Patuxent Reservoirs Watershed Annual Report 2011*. The report presents TAC progress during the past year towards achieving long-term protection of the priority resources associated with the reservoirs and their watershed. The Report also documents the TAC's proposed work program for the coming year.

The TAC, this year, continued the discussion about developing a TMDL Implementation Plan for the Patuxent Reservoirs Watershed. There was a general recognition by the TAC that the staff and resources needed to develop such a plan would not be forthcoming. As a result, the TAC decided not to form a TMDL implementation work group this year.

The NPDES stormwater permit Montgomery County has received and similar permits which Howard and Prince George's Counties anticipate receiving in the near future may place extraordinary demands on their respective resources to achieve progress towards meeting the Chesapeake Bay TMDLs. As a result, the resources available from the Counties for developing a Patuxent Reservoirs TMDL Implementation Plan will be limited in the near future. However, it should be noted that while these permits will place a shorter time frame on meeting the Bay TMDL, preparing implementation plans to meet local TMDLs, such as the Reservoir TMDLs, will also be a requirement of the permits. The TAC can serve as a way for the three counties to compare and coordinate on their respective plans.

In addition to TMDL concerns, TAC efforts have been guided by the goals in the Priority Resources Chart. The TAC began this year to revise the priority resources chart. The other environmental restoration demands and budgetary constraints on the TAC members' jurisdictions have hindered the TAC's abilities to more fully pursue the Priority Resources goals.

Also, of note this year, the TAC reevaluated the purpose of Policy Board meetings. The TAC concluded the greater importance of the Board was to establish or advocate for policies that protect the reservoir watersheds rather than monitor routine TAC activities, as is done in the annual meetings now.

TAC member agencies continued progress in the following areas: agricultural BMP implementation, land acquisition, the Reddy Branch Stream buffer planting pilot project, reservoir monitoring, cleanup efforts, and public outreach. These and other accomplishments of the TAC members in 2011 are detailed later in this report.

The activities of the TAC continue to evolve as the availability of resources to the TAC and the environmental landscape with regards to watershed restoration changes. Constant, though, is our mission to safe guard our drinking water reservoirs and the surface and ground water that supply them.

Acknowledgements

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Our sincere thanks are given to the members of the Technical Advisory Committee and others listed below for their efforts over the last year. Special thanks go to Stan Wong who retired from Montgomery County's Department of Permitting Services in 2011. He served on the TAC since its inception, as well as the Patuxent Reservoir Protection Group, which was charged with developing both an interim and long-term watershed action program to protect the Patuxent Reservoirs system.

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Executive Summary

Two large 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 (TMDLs) 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 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 2011.

A work plan is provided at the end of this report (Table 4). 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 2011:

1. The Montgomery County DEP submitted to MDE a draft Countywide Coordinated Implementation Strategy to meet its stormwater permit requirements. The Patuxent Reservoirs implementation plans show that Montgomery County will be able to reduce its total phosphorus load in urban stormwater by 15% to both reservoirs.

2. The WSSC made improvements to the three properties purchased in 2010 as a result of a Supplemental Environmental Project to a Consent Decree. The improvements included among others removing a leaking underground storage tank and dumped trash as well as planting five acres of trees. These improvements are expected to result in environmental benefits and protection of water quality for the reservoirs.

3. The M-NCPPC and volunteers completed preliminary invasive species management at the planned forest buffer planting in the Rachel Carson Stream Valley Park. The planting is scheduled to begin in the fall of 2012.

4. Technical and financial assistance by the Howard and Montgomery Soil Conservation Districts resulted in the installation of 197 best management practices (BMPs), including over 1.6 miles of fencing restricting livestock access to adjacent stream channels. In addition, the districts developed or revised 29 Soil and Water Quality Conservation Plans for farms in the Patuxent Reservoirs Watershed.

5. The Maryland Department of Agriculture sponsored a new Equine Specialist for Montgomery County. This specialist is now employed with MSCD, has received the needed training, and has applied this training by completing several conservation plans within the Patuxent Reservoirs Watershed.

6. The MSCD used funds from the Patuxent Reservoirs Watershed Agricultural Cost-Share Program to install agricultural BMPs on a small equine operation. In a cooperative effort, MSCD also transferred $7,000 of WSSC funds to HSCD to cover several requests for BMP assistance in the Patuxent Watershed. The HSCD will soon use the remaining funds of this cost-share program; consequently, there is a need to renew funding for this program in Howard County to enable the HSCD to address requests for assistance in the watershed.

7. A variety of successful outreach events occurred this year with a conservative estimate of at least 970 participants and volunteers. The following events occurred throughout 2011: the MSCD-organized tree planting at the Oaks Landfill, the Patuxent River Clean up efforts, and the WSSC-sponsored events (H2O Fest, Watershed Festival and Family Campfire). In addition, five outreach events to the agricultural community were held by both Soil Conservation Districts including a pasture management workshop and an equine management seminar.

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Tables and Figures

List of Acronyms

Acronym	Definition
ac	Acres
BMP	Best Management Practice
CHL-a	Chlorophyll-a
CBT	Chesapeake Bay Trust
DO	Dissolved Oxygen
DPWT	Montgomery County Department of Public Works and Transportation
ea	Each
EPA	U.S. Environmental Protection Agency
ft	Feet
FY	Fiscal Year
H20	Water
HC	Howard County
HSCD	Howard Soil Conservation District
IBI	Index of Biological (or Benthic) Integrity
LA	Load Allocation (non-point source)
LID	Low Impact Development
MC	Montgomery County
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MSCD	Montgomery Soil Conservation District
MS4	Municipal Separate Storm Sewer System
mg/L	Milligrams per Liter (equivalent to part per million)
µg/L	Micrograms per Liter (equivalent to part per billion)
NPDES	National Pollution Discharge Elimination System
PGC	Prince George's County
pH	Power of Hydrogen
PRWPG	Patuxent Reservoirs Watershed Protection Group
SCD	Soil Conservation District
SSO	Sanitary Sewer Overflow
TAC	Technical Advisory Committee
TBD	To be determined
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
USGS	U.S. Geological Survey
WLA	Waste Load Allocation (point-source)

Introduction

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

This year marks the 15th year that the 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 2011 is provided of on-going efforts to address the implementation items for the Priority Resources. This Annual Report will be accompanied by a separate Technical Supplement to provide detailed background information and additional documentation 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 3). 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 drinking 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 inadequate agency work programs and budgets. The TAC will continue to implement items associated with each of the Priority Resources primarily through existing TAC agency responsibilities and work programs. A work plan is provided at the end of this report (Table 4) 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.

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. Significant phosphorus load reductions are required (58% for Triadelphia Reservoir, 48% for Rocky Gorge Reservoir). A large majority of the needed phosphorus load reductions (76% for Triadelphia, 65% for Rocky Gorge) were allocated to non-point sources of pollution (e.g., runoff from agricultural and low density residential lands).

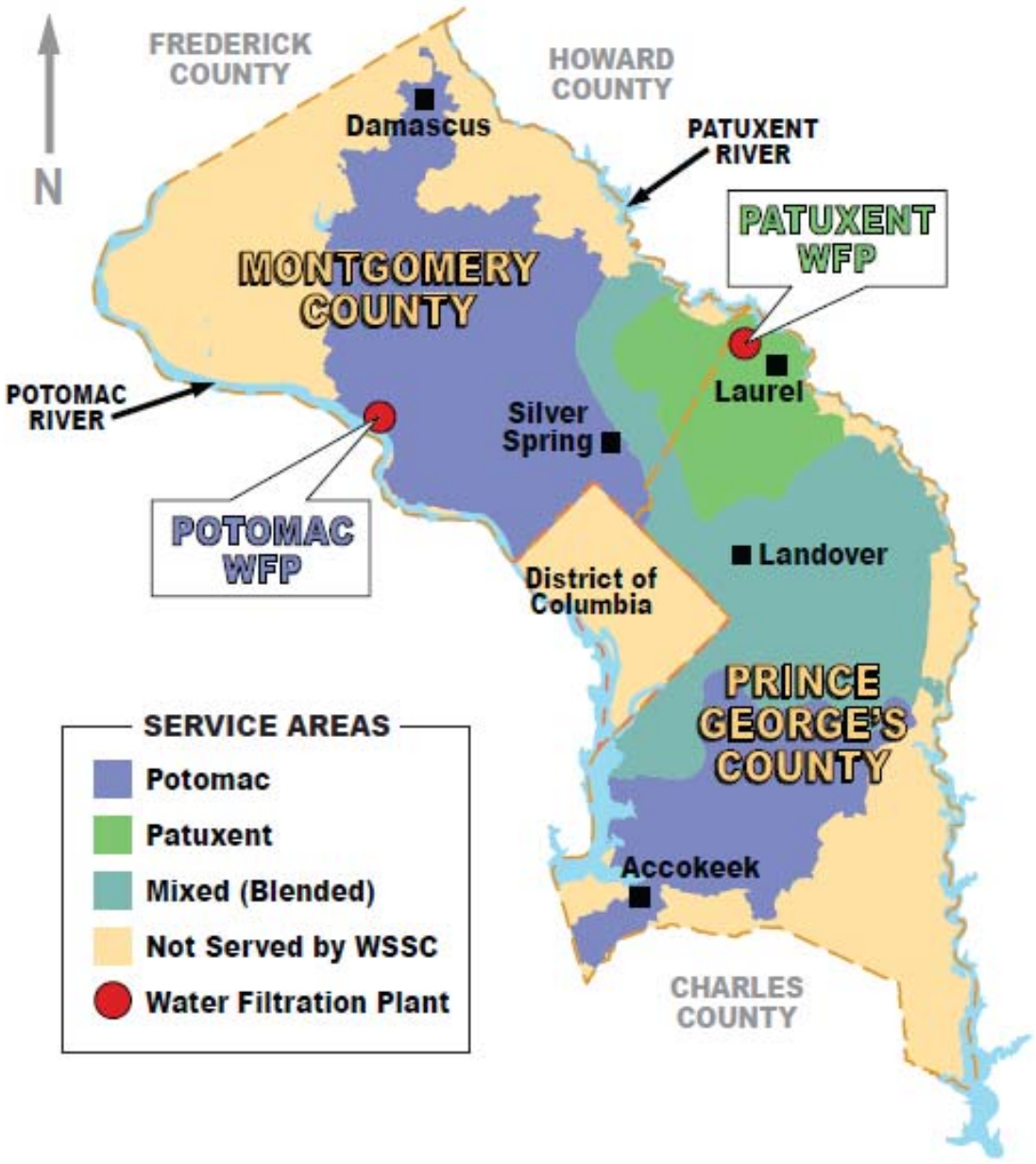

Figure 1. Drinking Water Service Area - Patuxent & Potomac Sources

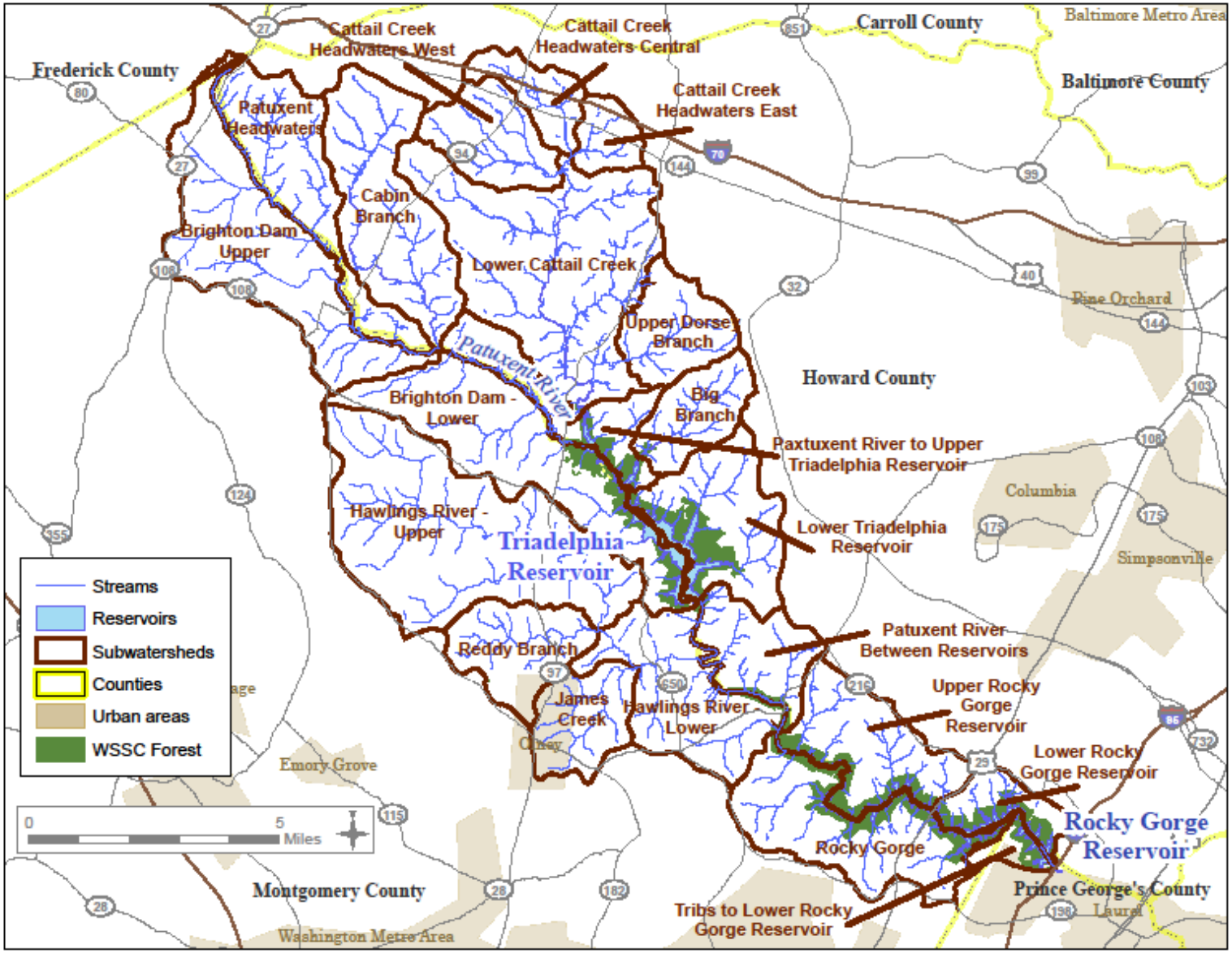

Figure 2. Patuxent Reservoirs Watershed (from Versar 2009)

Total Maximum Daily Load (TMDL) Implementation

NPDES Stormwater Permit Implementation Plans

In February 2011, the Montgomery County Department of Environmental Protection (DEP) submitted to Maryland Department of the Environment a draft Countywide Coordinated Implementation Strategy to meet its stormwater permit requirements. The countywide strategy reflected results from individual watershed implementation plans, including one for the Patuxent Reservoirs. These watershed-based plans include existing BMPs by type, drainage area controlled, and estimated pollutant load reduction, to meet waste load (i.e., point source) allocations for all watersheds for which EPA has approved TMDLs. The Patuxent Reservoirs implementation plans show that Montgomery County will be able to reduce its total phosphorus load in urban stormwater by 15% to both reservoirs. There is a sediment TMDL for the Triadelphia Reservoir, but no separate sediment reduction required from the baseline urban stormwater load.

Watershed Restoration Planning

In June 2010, Prince George's County Department of Environmental Resources (DER) performed a field assessment of the County's portion of Rocky Gorge watershed as part of an effort to assess the potential for protection and restoration opportunities in its portion of the watershed adjacent to Rocky Gorge Reservoir. Several potential sites were identified and DER staff revisited the sites and is drafting the report. This planning effort focuses on identifying projects that, when implemented, will reduce phosphorus loads to Rocky Gorge Reservoir.

Annual Progress on Implementation Items to Achieve Goals for the Priority Resources

Reservoir Water Chemistry Monitoring

The WSSC is in the 20th year of monitoring reservoir water quality to provide data for technical analysis and long-term trend evaluation to support protection of the reservoirs and drinking water supply. Three sites on each reservoir are monitored monthly, except during winter months. The reservoirs are monitored for chlorophyll, phosphorus, nitrogen, total organic carbon, chloride, color, turbidity, and selected metals. In addition, in-situ transparency and depth profile measurements of pH, conductivity, temperature, reduction-oxidation potential and dissolved oxygen are performed. A summary of the 2011 water quality results will be presented in the Supplementary Documentation to this Annual Report.

Chlorophyll-a (CHL-a) is one type of chlorophyll present in all algae, and it is often used as a surrogate for algal abundance. It is summarized in this report and used as one indicator of reservoir water quality. MDE recently amended Maryland's water quality standards by adding CHL-a criteria for public water supply reservoirs (COMAR, 2010). 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; and*
2. *The 90th-percentile of measurements taken during the growing season may not exceed 30 micrograms per liter.*

WSSC field crews collect samples from each reservoir on a monthly basis. Evaluating compliance with the first criterion would be based on only one set of samples; therefore, the first criterion cannot be assessed with the current sample design. The second criterion is considered in this report.

For most stations five sets of CHL-a samples were collected during the 2011 growing season (May-September). CHL-a results are used from all monitoring stations to determine 90th percentile values. Active CHL-a results are used to better indicate living algal biomass than total CHL-a. The top of each box corresponds to the 90th percentile value (Figure 3).

The 90th percentile threshold was not exceeded by either reservoir in 2011. The 90th percentile values for both reservoirs were similar (about 13 µg/L) (Figure 3).

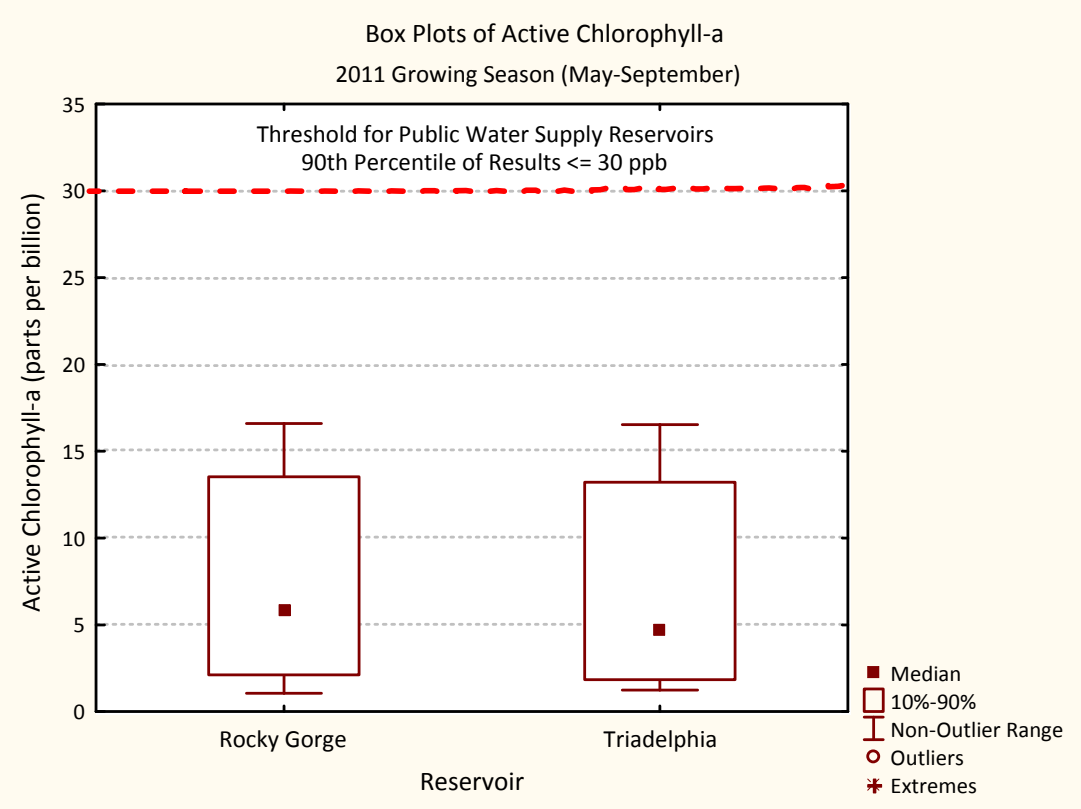

Figure 3. Chlorophyll-a results for 2011 growing season from Patuxent Reservoirs

Reservoir Water Quality Protection: WSSC Land Acquisition Program

In late 2005 the WSSC entered into a Consent Decree with regulatory authorities over sanitary sewer overflows (SSOs), one component of which is the acquisition of conservation easements and land in the Patuxent reservoirs watershed to enhance water quality. This program was a $3.29 million Supplemental Environmental Project (SEP) intended to provide environmental benefits in lieu of paying penalties for past Clean Water Act violations due to SSOs. The WSSC partnered with the Maryland Environmental Trust (a division of Maryland DNR) to pursue conservation easements.

The SEP was successfully completed in 2010 by purchasing three properties and two conservation easements. Details were reported in the 2010 Annual Report and Supplementary Documentation. However, in 2011 the WSSC made certain improvements to the three properties that were purchased, incurring additional expense of $81,000 that is expected to result in environmental benefits and protection of water quality for the reservoirs. An abandoned residence and derelict outbuildings were demolished on one property, and a leaking underground heating oil storage tank was removed and the impacted soil cleaned up; dumped trash was removed from two properties; and five acres of trees were planted on two of the properties to restore them to a more natural, forested condition consistent with the WSSC's protection buffer properties surrounding the reservoirs.

Tributary Biological and Habitat Monitoring

Biological and habitat monitoring of the tributaries is used to track progress in protecting the stream system and aquatic biota, as land cover changes occur and stream restoration and streamside best management practices are implemented. These monitoring efforts can also locate problem areas and provide indicators for possible problem sources to help guide future restoration efforts.

Howard County

In FY 2012, Howard County allocated $62,742 for its biomonitoring program. Included in the watersheds to be monitored are Cattail Creek and Upper and Lower Brighton Dam.

Montgomery County

During 2010, Montgomery County DEP completed its third round of biological monitoring in the Patuxent Reservoirs Watershed. The DEP is currently compiling results from the 2010 Patuxent Watershed monitoring and the Hawlings River stream restoration project monitoring for a combined final report.

Stream Corridor Management

Stream corridor management activities include stream channel stabilization and restoration, and implementing streamside best management practices (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.

Reddy Branch Riparian Forest Buffer Plantings

The Reddy Branch project in Montgomery County is continuing to move forward after a series of riparian plantings equaling nearly four acres buffering about 1,700 linear feet of this stream. Good weather and plenty of rain as well as rich, moist soil have helped to encourage significant growth over the past two and a half years. For this year maintenance included aggressive treatment for invasive plants such as thistles and mile-a-minute. The greatest challenge has been controlling deer damage, particularly buck rub. Deer protection measures occasionally fail and trees are damaged or destroyed. Protective measures continue to be adjusted for better results. The most recent planting area has seen significant natural regeneration. For this reason efforts in this location have been focused on placing deer protection on these young trees. On-going volunteer efforts, particularly by the Izaak Walton League, have accomplished most of the work. The final area of the planned riparian planting is dependent on a land swap with two adjacent property owners (Figure 4). Although the property has not yet changed hands, a fence has been moved to allow access to the southernmost riparian areas.

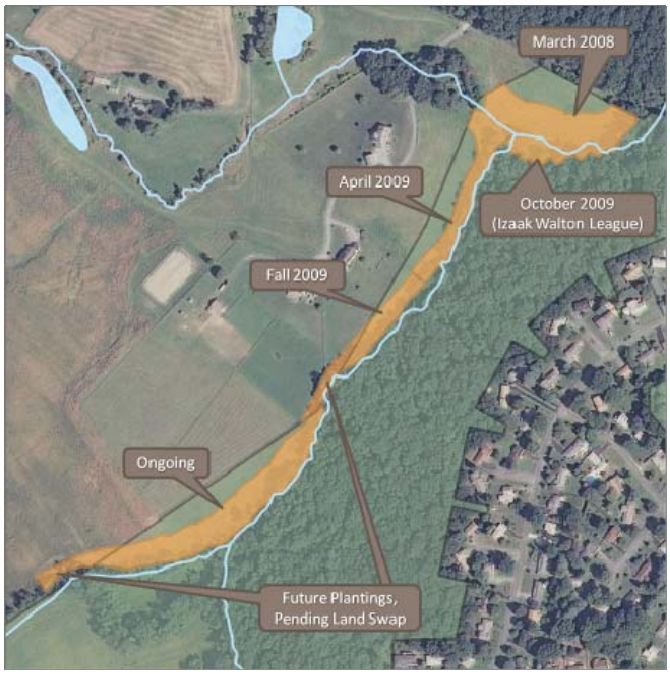

Figure 4. Reddy Branch Riparian Forest Buffer Planting History

Rachel Carson Stream Valley Park Buffer Planting

Approximately 12 acres of unforested stream buffer area have been identified for restoration along the mainstem of the Hawlings River between Sundown and Zion roads in Montgomery County. This stream reach was also identified in the Hawlings River Watershed Restoration Study (2003) as an area with severe and frequent problems and in need of restoration. Preliminary invasive species management has been completed. Forest planting should begin in the fall of 2012.

Agricultural Progress

A summary of the progress made during the past year by both the Howard and Montgomery SCDs is provided in Table 1. The SCDs use funding from local, state and Federal programs to provide technical and financial assistance to landowners with the installation of BMPs. The numbers reported account for activity from July 1, 2010 through June 30, 2011.

Table 1. Agricultural Progress for 2010 in the Patuxent Reservoirs Watershed

	Howard SCD	Montgomery SCD
Conservation Plans developed	11	11 (983 acres)
Conservation Plans Revised	7 (542.6 acres)	-
Landowners Applying BMPs	21	9
Educational/Outreach Events*	3	3
Best Management Practices Installed	94	103
Best Management Practice		
Ag Waste Storage Structure	-	1
Brush Management (acres)	-	112
Cover Crop (acres)	1409.5	619
Critical Area Planting (acres)	1.3	-
Conservation Cover (acres)	11.9	-
Conservation Crop Rotation (acres)	214.7	657
Conservation Tillage (acres)	-	-
Diversion (feet)	490	-
Forest Stand Improvement (acres)	61.7	-
Forage Harvest Management	-	35
Livestock Exclusion Fencing (feet)	692	7,812
Grade Stabilization Structure (each)	2	-
Grassed Waterways (acres)	1.1	-
Heavy Use Area Protection (acres)	0.2	0.5
Lined Waterway or Outlet (feet)	-	-
Livestock Watering System	2	6
Nutrient Management (acres)	362.5	973
Pasture /Hayland Planting (acres)	-	45
Pest Management (acres)	399.8	667
Pipeline (feet)	310	970
Prescribed Grazing (acres)	2.7	41
Residue Management – Mulch Till (acres)	99	-
Residue Management – No Till (acres)	346.5	-
Riparian Forested Buffer (acres)	7.1	-
Roof Runoff System	2	-
Stream Crossing	-	-
Spring Development	1	2
Waste Utilization (acres)	35	-

Patuxent Reservoirs Watershed Agricultural Cost-Share Program

In 1998, the Patuxent Reservoirs Watershed Protection Group created the *Patuxent Reservoir Protection Strategy Memorandum of Understanding,* which established as its second initiative the Patuxent Reservoirs Watershed Agricultural Cost-Share Program. This cost-share program focuses on implementing best management practices 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 watershed, many of these operations are small horse farms.

MSCD received an application for assistance under the Patuxent Cost-share program, which resulted in a signed agreement for funding to install agricultural best management practices on a small equine operation. This request resulted from a soil conservation and water quality plan completed by the new MDA Equine Specialist assigned to Montgomery County. In a cooperative effort, MSCD also transferred $7,000 in funding to HSCD to cover several requests for BMP assistance in the Patuxent Watershed. The remaining funds in this cost-share program as of June 30, 2011 are $50,597 (Table 2).

There remains a need for renewing funding for this cost-share program in Howard County to reach landowners with small farming operations (e.g., equine).

Table 2. Remaining Funds in Patuxent Reservoirs Cost-Share Program

Soil Conservation District	Patuxent Reservoirs Cost Share Program
Howard	$5,752
Montgomery	$44,845
Total	$50,597

Public Outreach Initiatives

The TAC agencies and other groups in the watershed continued to coordinate public outreach and involvement initiatives during 2011. Under the coordination of WSSC Communications and Community Relations Office staff, there were several outreach activities in 2011 as well as other successful outreach events coordinated by other TAC agencies that occurred in Howard and Montgomery Counties.

Family Campfire

The Annual Family Campfire event was held on Saturday, October 15, 2011 from 4:30-7:30 p.m. at WSSC's T. Howard Duckett Dam in Prince George's County. This year several significant changes were made to the campfire program in an effort to bring more people and provide more watershed education. The first change was moving the event from Brighton Dam to Duckett Dam and engaging an audience from another portion of the watershed. Close to 15,000 flyers were distributed to schools, community centers and libraries and a media release was sent out that was seen in several area newspapers. The second change was holding the event on Saturday, late in the afternoon into the evening, rather than a Friday evening, to provide more families the opportunity to come.

The third change was to include, for the first time, a "Watershed Fair" with numerous activities where the children and their families could gain some understanding of where they live in relationship to the watershed and what they can do to help protect the watershed and the source water. A watershed map was created where families could put a pin into where they live in or near the watershed. Fifteen other presentations were provided, including tours of the dam and native tree grove, EnviroScape, a Litter Game, Watershed Jeopardy provided by Prince George's County DER, HomeScape provided by Howard County, environmental crafts provided by Montgomery County, WSSC Lab Presentation, games made from recycled materials by Scotchtown Hills Elementary School's "Green Team", and others. All the children were encouraged to visit the displays with a Passport Sheet. When they answered the passport question at each display correctly they received a sticker on the passport. When the game sheet was filled they could turn it in for a bag of prizes provided by WSSC.

Registration for this event was 675 and based on the number of cars in the parking area and people on the property the attendance is estimated at around 600. Mr. Mujib Lodhi, WSSC's IT Team Chief, served as Master of Ceremonies, and Howard Saltzman gave a welcome address on behalf of the Patuxent Reservoirs Watershed Protection Group. Deborah Weller of the Prince George's County DER also welcomed the crowd. The campfire was managed by scouts from local Laurel Boy Scout Troops 1010 and 246. Music and refreshments were provided by WSSC. The WSSC takes great pride in hosting this event and provides the staff for all before and after preparations of the site. This year the preparation time was significant because of the new location.

Howard County Government Activities

Howard County held its 2011 annual GreenFest at Howard Community College. GreenFest is a well attended event that includes nearly 100 vendors and displays with information designed to encourage sustainable living. The County has also made rain barrels available to all interested residents. Lastly, the County's Stream ReLeaf program provides free trees to residents living near a stream for stream buffer plantings.

Izaak Walton League of America-Wildlife Achievement Chapter (IWLA-WAC)

The Izaak Walton League of America-Wildlife Achievement Chapter (IWLA-WAC) in Damascus continued to sponsor outreach and involvement events for its members and opened to the general public during 2011. These included:

- Spring and Fall watershed clean ups working with the Maryland Department of Natural Resources and the Montgomery County Department of Public Works.
- June and August Adopt-A-Road clean ups with the Montgomery County Department of Public Works.
- Free workshop in February for 'Make and Take' Rain Barrels.
- Two work days for deer exclusion and invasives maintenance for the Reddy Branch reforestation, led by M-NCPPC Planning.
- Two work days at Pigtail Branch, a tree planting site on WSSC property, to continue invasives management and tree maintenance.

The Chapter was successful in its nomination of Kim Knox, WSSC outreach coordinator, for one of the IWLA National Awards at the 2011 National Convention. Ms. Knox received an 'Honor Roll' award for her efforts in promoting conservation and environmental outreach. This award was presented to Ms. Knox at the summer 2011 TAC meeting.

Oaks Landfill Reforestation

The Montgomery SCD received a $25,000 grant from Chesapeake Bay Trust (CBT) to reforest a section of the County-owned Oaks Landfill just south of Laytonsville. This area is located in the headwaters portion of the Hawlings River watershed. Although this is not a traditional agricultural BMP, the area is a large open field that is mowed periodically and sometimes cut for hay. MSCD coordinated the project with Montgomery DEP, who owns the landfill site, and partnered with Montgomery County Public Schools to complete a large scale volunteer tree planting. Several groups donated planting stock for the project, including M-NCPPC, DNR, and PEPCO. Master Gardeners from the University of Maryland Extension program were enlisted to help supervise the volunteers.

On Earth Day 2011, about 100 volunteers from the school system and local organizations turned out to help plant 750 trees and shrubs on the old landfill site. A portion of the funding from CBT was used to install deer fencing around ten acres of open field. This fenced area will protect the trees and shrubs, and provide a large deer exclusion area for future planting projects. The goal of the project is to restore 10 acres of field to native forest, and to use the project as an educational tool to promote the important benefits forests provide for water and

air quality, wildlife habitat, and beautifying our communities.

Patuxent River Clean-up

In cooperation with the office of the Patuxent Riverkeeper, WSSC Communications and Community Relations Office participated again in the annual Patuxent River Clean-up. A Site Leaders meeting was held at the WSSC's Main Office Building on the evening of March 11, 2011 to meet the site leaders, get direction from the Riverkeeper and distribute clean up supplies. We also had a viewing of the film "Preacher for the Patuxent" to inspire our site leaders in their work of protecting the Patuxent River. On the designated clean up day, April 2, 2011, approximately 70 volunteers from the neighboring communities, church groups, and Boy and Girl Scout troops formed crews at nine WSSC recreation areas, and collected hundreds of pounds of trash and recyclables. As in the past, some sites were cleaned on other weekends in April and included in the final tallies for the Riverkeeper. Site leaders for this effort volunteer their time to organize, recruit, and report for the Clean-up event. A large group from Sandy Spring Friends School participated and collected trash at locations around the reservoirs as a school service project.

Rainscapes Rewards Program

The Montgomery County DEP continued its countywide Rainscapes Rewards Program with a total of 28 projects installed prior to FY2011 and 9 projects installed during FY2011 in the Patuxent Reservoirs Watershed. This program provides 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. The majority of these projects were urban tree canopy plantings which provide for combined savings possible using $25 coupons from both DNR and M-NCPPC and the RainScapes $150 per tree rebate. Rainwater harvesting practices using rain barrels or cisterns are the second most popular practices for the rebate program. No rain gardens have been installed in the Reservoirs watershed through the RainScapes Rewards program.

Soil Conservation District Agriculture Outreach Efforts

Both the HSCD and the MSCD continued to help sponsor a Pasture Management Workshop and pasture walks for horse owners at the University of Maryland – Central Maryland Research and Education Center (CMREC) farm in Clarksville. Although this location is in the Middle Patuxent Watershed, it included attendees from the Patuxent Reservoirs Watershed and surrounding areas. More than 100 people attended these events at CMREC.

The HSCD sponsored the Mid-Winter Agricultural Meeting that educated attendees concerning the details of federal cost share programs (e.g., eligibility requirements and practices possibly available for funding).

The MSCD collaborated with UM Extension to host an Equine Management Seminar evening workshop, providing information to about 25 landowners on rotational grazing and manure management.

Watershed Day (H2O Fest, Watershed Festival)

In 2011 the WSSC-sponsored Watershed Festival was moved from the Patuxent Reservoirs Watershed to the Seneca Wastewater Treatment Facility in Germantown, MD. A smaller event, "Watershed Day", was provided in the Patuxent Reservoirs Watershed. Watershed Day was held on April 30, 2011 at the WSSC's Supplee Lane Recreation Area in Laurel. Canoe/kayak instruction was provided by Prince George's County Park and Planning, a fishing workshop was led by a fisherman from Bass Pro in Hanover MD, and several interactive displays with watershed information were provided. Approximately 100 people attended with the most interest and attention to the canoe/kayak instruction and fishing workshop. This program will be reevaluated for the future to discuss creating other outreach opportunities that may be better attended.

WSSC-Owned Land Activities

WSSC coordinated 18 additional cleanups and five tree plantings at Triadelphia and Rocky Gorge during 2011. A total of 728 people from various organizations such as the IWLA-WAC, Montgomery Community College, Prince George's County Police Department's PAL Program, Pallotti High School, Sherwood High School, Richard Blair High School, and the University of Maryland removed weeds, planted trees and picked up trash. The cleanups and tree plantings allowed WSSC and the PRWPG to not only help the watershed around Triadelphia and Rocky Gorge reservoirs, but it also strengthens the ties with the community and the community's future leaders (middle school, high school and college students).

WSSC also held its second annual Warbler Day at Pig Tail Recreation Area with 12 attendees in the morning during the first Saturday in May in conjunction with the Howard and Montgomery County Bird Clubs. They saw 39 different species of birds. In the afternoon of the same day, WSSC, in conjunction with the Maryland Native Plant Society, conducted a Wildflower Tour with ten attendees.

Approximately 500 4th graders participated in WSSC's 6th Annual Children's Water Festival on May 4th and 5th at Brighton Dam. The elementary school students who attended were from Allenwood and Hillcrest Heights (Temple Hills), Thomas Stone (Mt. Rainier), Vansville (Beltsville), Sequoyah (Derwood), and Wyngate (Bethesda). Presenters from the MCDEP, the PGDER, and other agencies helped to create 13 hands-on activities for the students to learn about the Patuxent River and the Chesapeake Bay.

Doug Sievers, WSSC's arborist, conducted a Tree Tour at Pig Tail Recreation Area on October 9, 2011 with the Maryland Native Plant Society as a promotional partner. In part due to a news story in the Howard County Times, 16 people attended the morning tour to enjoy the rich fall colors of the oaks, persimmon, black gum and other trees at Pig Tail.

Table 3. 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-a (CHL-a)	• CHL-a not to exceed a 10 µg/L mean during the growing season and not to exceed a 30 µg/L instantaneous concentration	• Perform reservoir monitoring for CHL-a, DO, and TOC during the growing season	Ongoing	WSSC
Dissolved oxygen (DO)	• 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	• Perform reservoir monitoring for CHL-a, DO, and TOC during the growing season	Ongoing	WSSC
Suite of water quality parameters in reservoir monitoring protocol	• Five-year data trend analysis for other monitored water quality parameters shows no net deterioration	• Enhance and fine tune model reliability for watershed management • Develop and begin implementation of a plan to reduce nutrients, based on model/TMDL requirements • Update trend analysis for reservoir water quality parameters on a 5-year cycle	TMDL submitted to EPA for Approval Next Update: 2014	WSSC/MDE TAC WSSC
Total organic carbon (TOC)	• TOC – 20% annual reduction goal, with 40% reduction for peak quarter at the location where water is withdrawn for treatment purposes	• Perform reservoir monitoring for CHL-a, DO, and TOC during the growing season	Ongoing	WSSC
Sediment	• Sediment accumulation rate not to exceed previous years	• Perform bathymetric survey of reservoirs at 10 year intervals or less	Completed FY07	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.				
Measures	**Goals**	**Implementation Items**	**Time Line**	**Responsible Partner**
Forest Cover	• Maintain and increase forest cover • Increase forest interior habitat	• Encourage private property owners to participate in tree planting programs • Ensure publicly owned parkland and open space is forested to the maximum extent possible	Ongoing 2006 – 2023	TAC TAC
Forest Connectivity	• Improve forest connectivity (larger forest tracts are connected by forest corridors)	• Target reforestation and forest conservation programs to increase forest connectivity and forest interior habitat	Ongoing	TAC
Forest Size	• Increase forest size	• Encourage private property owners to participate in tree planting programs • Ensure publicly owned parkland and open space is forested to the maximum extent possible	Ongoing 2006 – 2023	TAC TAC
Forest Diversity	• Ensure diverse forest communities (communities contain a variety of species and ages)	• 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	2006 – 2013 Plan completed FY08	TAC
Forest Sustainability	• Ensure forests are self-sustaining and capable of long-term natural regeneration	• Implement deer management programs • Implement strategies for control of invasive plants	Ongoing Ongoing	TAC 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	• A minimum 35-foot riparian buffer on all streams on properties that were developed prior to current stream buffer requirements	• Establish and maintain minimum 35-foot riparian buffers on all publicly-owned land • Accelerate programs to establish and maintain streamside buffers to a minimum of 35 feet on privately-owned lands to the maximum extent possible	2006 – 2013 2006 – 2023	WSSC, M-NCPPC, HC, MC WSSC, M-NCPPC, HC, HSCD, MC, MSCD
Stream bank and stream channel stability	• No areas of "severe" or "very severe" stream bank erosion based on the Stream Corridor Assessments and other locally collected data.	• Establish and maintain streamside fencing programs to keep all livestock out of streams to the maximum extent possible • Address <u>significant</u> areas of stream bank and channel instability through stream restoration projects and storm water retrofits to the maximum extent possible	2006 – 2013 2006 – 2013	HSCD, MSCD HC, HSCD, M-NCPPC, MC

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.				
Measures	**Goals**	**Implementation Items**	**Time Line**	**Responsible Partner**
IBI - Index of Biological Integrity	• No subwatershed with a benthic IBI indicating "fair" or "poor" condition	• Aggressively pursue cost-share funds to construct agricultural BMPs, stream restoration, and storm water retrofit projects to address factors contributing to degraded biological integrity • Mitigate runoff impacts from land use changes	2006 – 2023 2006 – 2023	HC, HSCD, MC, MSCD, M-NCPPC HC, MC, M-NCPPC
	• Preserve conditions in subwatersheds with "excellent" and "good" benthic IBIs	• 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	2006 – 2023	HC, HSCD, MC, MSCD, M-NCPPC

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 • Total acres enrolled • Number of farms enrolled	• Preserve the agricultural and rural nature, and open space of the watershed	• Continue easement acquisition through agricultural land preservation programs • Continue agricultural economic development programs	Ongoing Ongoing	HC, MC HC, MC
Agricultural Demographics • Acres of agricultural land • Market value of agricultural production • Size of farms • Types of farms	• Preserve the agricultural and rural nature, and open space of the watershed	• Continue zoning and land use policies in the watershed to maintain rural character • Continue agricultural economic development programs	Ongoing Ongoing	HC, M-NCPPC HC, MC
Open Space and Parkland Acquisition and Easement Programs • Acres of open space land preserved by non-agricultural easements or acquisition	• Create a landscape that is protective of water quality	• Utilize effective open space land management practices that are beneficial to water quality	Ongoing	HC, M-NCPPC, WSSC
Participation in agricultural conservation programs and percent of conservation plans that are implemented	• Create a landscape that is protective of water quality	• Encourage participation in other conservation and open space preservation programs • Encourage enrollment in federal and state nutrient management and stream protection programs • Promote greater utilization of funding provided by the Reservoir Protection Group to supplement federal and state agricultural programs • Create and routinely update an electronic map based system to track BMP implementation	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	• Citizen action to improve watershed resources – see evidence of watershed friendly activities and practices • 10 to 15 stewardship offerings per year	• Identify citizen groups throughout watershed and be available for presentations upon request • Organize stewardship events and participate in other community events • Recognize good stewards through annual awards • Form "Friends of the Watershed" group of citizen volunteers that will take on tasks such as newsletter preparation and some Earth Month planning	2006 – 2009 Ongoing 2006 – 2008 2006 – 2009	TAC TAC MC, PGC, HC, M-NCPPC TAC
Schools participating in mentoring	• 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	• Continue and expand Green Schools Mentoring Partnership	Ongoing	WSSC, HC, MC, PGC, M-NCPPC
Active support by elected officials	• Routine communication with elected officials	• Routine communication with elected officials	Ongoing	TAC
Routine coverage by media	• Expanded media coverage of watershed events – print, radio and TV	• Increase communication with media • Support regional efforts to establish media-savvy campaigns that emphasize water quality protection	2006 – 2009 2006 – 2008	TAC

Table 4. Work Plan Expenditures for Current Year

PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY12 / CY 2011				
PRIORITY RESOURCES PROTECTED	**IMPLEMENTATION NEED**	**IMPLEMENTATION ITEM**	**AGENCY**	**FY 2012 / CY 2011**
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 (USGS) stream flow gauging stations	WSSC	$60,000
		5 year Trends Analysis (next due c. FY 2013)	WSSC	$0
Stream System Aquatic Biota	Tributary biological and habitat monitoring	Biomonitoring in Cattail Creek and Upper and Lower Brighton Dam	HC	$40,000
		Upper Patuxent and Hawlings River	MC	$0
		Hawlings River Restoration Monitoring	MC	$0
Reservoir/Water Supply Stream System Aquatic Biota	Stream corridor management	Patuxent Restoration Project Inventory	MC	$320,000
		Reddy Branch Project Implementation	M-NCPPC	$4,000
		Rachel Carson Park Project Implementation	M-NCPPC	$30,000 $ 5,000 (in-kind)

PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY12 / CY 2011				
PRIORITY RESOURCES PROTECTED	**IMPLEMENTATION NEED**	**IMPLEMENTATION ITEM**	**AGENCY**	**FY 2012 / CY 2011**
ALL Priority Resources	Management of agricultural cost-share initiatives	Funding for Patuxent Reservoirs Cost-Share Program	HC, MC, WSSC	$0
		Program oversight for voluntary implementation of agricultural BMPs through existing local, State of Maryland, and Federal programs	HSCD, MSCD	$80,000 (HSCD in-kind)
ALL Priority Resources	Public outreach and involvement initiatives	Rainscapes Rewards	MC	Rebates available to county residents for 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

PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY12 / CY 2011				
PRIORITY RESOURCES PROTECTED	**IMPLEMENTATION NEED**	**IMPLEMENTATION ITEM**	**AGENCY**	**FY 2012 / CY 2011**
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 Rocky Gorge Reservoir Watershed	PGC	$2,000 (in-kind)
Reservoir/Water Supply Stream System Aquatic Biota Public Awareness & Stewardship	TMDL Implementation	Develop the point source part of the TMDL Implementation Plan for Howard County portion of the watershed. (includes large lot residential development)	HC	$40,000
		Develop the point source part of TMDL Implementation Plan for Montgomery County portion of the watershed. (does not include large-lot residential development)	MC	$0**
TOTAL FUNDING				**$925,500**

** Completed draft and submitted to MDE in February 2011 to meet MS4 permit requirements