



**PATUXENT RESERVOIRS WATERSHED  
ANNUAL REPORT  
2005**



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## **ACKNOWLEDGMENTS**

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

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# TABLE OF CONTENTS

A MESSAGE FROM THE CHAIR .....	iii
Background.....	1
Status on Priority Resources Protection.....	1
Priority Resource: Reservoir / Water Supply.....	1
Priority Resource: Terrestrial Habitat.....	1
Priority Resource: Stream Systems.....	2
Priority Resource: Aquatic Biota .....	3
Priority Resource: Rural Character and Landscape .....	3
Priority Resource: Public Awareness and Stewardship .....	3
Progress on Implementation Items.....	4
1) Reservoir and Tributary Water Chemistry Monitoring .....	4
2) Tributary Biological and Habitat Monitoring.....	4
3) Stream Corridor Management .....	5
4) Reservoirs and Watershed Models .....	5
5) Agricultural Management Local-Cost Share Initiative .....	6
6) Sediment Study.....	7
<i>Rocky Gorge Reservoir Surveys</i> .....	7
<i>Triadelphia Reservoir Delta Surveys</i> .....	7
<i>Upcoming Work</i> .....	7
7) Forestry Management and Recreational Use Survey .....	8
8) Public Outreach and Involvement Initiatives .....	8
Funding for FY06 and FY07.....	9
Conclusion .....	10
TABLE 1. PRIORITY RESOURCES CHARTS .....	11-16
TABLE 2. PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY06 and FY07.....	17-18
TABLE 3. PATUXENT RESERVOIRS WATERSHED AGRICULTURAL PROGRESS 2005 .....	19

## **A MESSAGE FROM THE CHAIR**

The Patuxent Reservoirs Watershed Technical Advisory Committee (TAC) herein submits the *Patuxent Reservoirs Watershed Annual Report 2005*. The report presents TAC progress during the past year towards achieving long-term protection of priority resources. The priority resources include: reservoirs and drinking water supply; terrestrial habitat; stream systems; aquatic biota; rural character and landscape; and public awareness and stewardship.

Much of the TAC's work program during 2005 focused on refining and ranking the implementation items previously identified as being necessary to meet watershed protection goals. At the annual Policy Board meeting in 2004, the Policy Board initiated and the TAC supported a request to the Washington Suburban Sanitary Commission (WSSC) for dedicated resources to achieve the implementation timeline for priority resources protection. The TAC proposed that two full-time positions and \$500,000 in project seed money be included in the FY2006 budget for WSSC. One position would provide needed coordination to expand watershed stewardship, while the second position would provide technical assistance and pursue grant funding opportunities to support the TAC's work program.

Subsequent guidance on the WSSC budget process indicated that this request needed more specificity in how the \$500,000 would be spent before it would be considered in a request for fiscal year funding. The TAC consensus was that establishing and maintaining forested riparian buffers should be the highest priority for implementation. These buffers provide multiple benefits for reservoirs and stream water quality, terrestrial habitat, instream habitat, and maintaining the rural landscape.

The TAC work program during 2005 continued its emphasis on increasing environmental stewardship. The TAC's Outreach Workgroup and its watershed partners organized and conducted 10 activities during April for Earth Month, which attracted over 400 participants. Throughout the year, the Outreach Workgroup maintained its focus on school-based activities, including the Patuxent Reservoirs Watershed Schools Mentoring Partnership. The Outreach Workgroup identified the need for a full-time coordinator as its highest priority in order to achieve the watershed protection goals for public outreach and stewardship.

During the last year, TAC member agencies made significant progress on the established work program items for: water chemistry monitoring and stream resources assessments; reservoir sedimentation study and water quality modeling; agricultural best management practices; the assessment and management recommendations of the forest resources in the watershed; and public outreach and involvement. However, without additional resources it will not be possible to complete implementation items in the timeline proposed for reservoir and watershed resource protection. The TAC will continue to pursue the dedicated staffing and priority project funding required for successful long-term protection of the six priority resources.



## **Background**

Since 1997, the TAC has completed an Annual Report to summarize accomplishments and identify funding needs to address watershed priority resources issues. The priority resources are: reservoirs and drinking water supply; terrestrial habitat; stream systems; aquatic biota; rural character and landscape; and public awareness and stewardship. Table 1, Priority Resources, provides information about each priority resource, including the associated issue, measures, goals, implementation items and implementation dates. In 2005, a key task for the TAC was to further prioritize the implementation items and develop associated costs for these priority items to support the request to WSSC for dedicated staff and funding.

This Annual Report will be accompanied by a separate Technical Supplement to provide detailed background information and additional documentation. The Technical Supplement will be issued at the end of the year.

## **Status on Priority Resources Protection**

### **Priority Resource: Reservoir / Water Supply**

The WSSC and the Maryland Department of the Environment (MDE) led discussions on this priority resource. There were no changes to the five performance measures (chlorophyll-a, dissolved oxygen, reservoir monitoring, total organic carbon, sediment) or the implementation items (reservoir monitoring, model reliability, nutrient reduction, trend analysis, bathymetric survey). The lead agencies determined that there was no need for additional funding for monitoring until the reservoir water quality model was completed and results available. Additional funding is required to continue the bathymetric survey and sediment oxygen demand determination.

### **Priority Resource: Terrestrial Habitat**

This priority resource focuses on forest resources. The resource management agencies from Howard County and Montgomery County, and the Montgomery County Department of Planning in the Maryland-National Park and Planning Commission (MNCPPC-Planning) led discussions on protection of forest resources. Both Howard and Montgomery County have ongoing programs that cover half of the implementation items listed in Table 1 to protect forest resources. Additional funding and staffing are needed to address the remaining implementation items. The initial focus for implementation continues to be on creating and maintaining forested riparian buffers, as defined under the Stream Systems priority resource.

Recent discussions among the Montgomery County Interagency Forest Conservation Team (IFCT) members has led to a reconsideration of forested buffer needs on public land in the Montgomery County portion of the Patuxent Reservoirs Watershed. Montgomery County currently provides for a minimum forested buffer of 100 feet countywide to protect stream

and water quality. There are also arguments in favor of 100-foot minimum buffers in terms of forest viability and habitat quality. As a result, the Montgomery County TAC members requested that the recommended minimum forested buffers on public land in Montgomery County be increased from the current 35' minimum width.

By the end of 2005, the Maryland Department of Natural Resources (DNR) will conclude the Forestry Study of the WSSC property, which will be used to determine potential next steps for enhancement of forest resources in the entire reservoirs watershed.

### **Priority Resource: Stream Systems**

There are two performance measures for Stream Systems: buffers and stream stability. The buffer measure includes two implementation items: 1) establish 35-foot minimum riparian buffers throughout the watershed on all publicly-owned land by 2013, and 2) establish 35-foot minimum riparian buffers on all developed private land by 2023. These implementation items have also been adopted as a priority for protection of the Terrestrial Habitat priority resource.

#### *Buffers*

During 2005, Howard and Montgomery County continued their efforts to refine the maps that show existing and non-existing buffer areas, based on public and private land ownership.

In Montgomery County, the IFCT determined that it needed additional mapping analytical support and asked its members about providing this service. The IFCT attempted to identify the total cost for not just planting, but also the multi-year maintenance costs, to assure that the trees and shrubs planted will survive to maturity and provide maximum environmental benefits.

The IFCT identified criteria for prioritizing lengths of streams needing buffers. Higher priority would be given to stream reaches meeting the following criteria:

- Longer lengths of 1<sup>st</sup> and 2<sup>nd</sup> order streams;
- Lands that will most likely receive long-term maintenance;
- Lands with other special environmental resources such as steep slopes and wetlands;
- Properties with livestock;
- Properties with higher percentage of non-forested lands;
- Stream reaches that would connect larger blocks of existing forest lands;
- Larger properties (including those owned by PEPCO); and
- Publicly-owned lands such as the landfill.

## **Patuxent Reservoirs Watershed Annual Report November 2005**

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In Howard County, the Department of Public Works (DPW), Stormwater Management Division took the lead to develop a budget to achieve the riparian buffer goal. The focus will be on privately-owned land, since there is very little publicly-owned land not already forested or targeted for reforestation. The DPW is considering a model used in the Little Patuxent watershed, by which the County reviewed aerial photos and tax maps, identified parcels that needed buffers, and then contacted property owners to offer trees for the area of their property adjacent to streams.

### **Priority Resource: Aquatic Biota**

The TAC had previously agreed that stream reaches with "severe" or "very severe" erosion, that were located within subwatersheds with "fair" aquatic biota conditions, would be targeted for restoration. Due to funding and logistic constraints, no new stream restoration projects were initiated during 2005. Work continues on the Lower Hawlings and Cherry Creek Restoration Projects in Montgomery and Howard County, respectively.

### **Priority Resource: Rural Character and Landscape**

The planning and agricultural land preservation agencies in the watershed took the lead on discussions about this priority resource. They include: the Howard County Department of Planning and Zoning (HCDPZ), Howard Soil Conservation District (HSCD), Montgomery County Department of Economic Development, Montgomery Soil Conservation District (MSCD), and MNCPPC-Planning. All but one of the implementation items for this priority resource have ongoing implementation dates. The status of ongoing rural land preservation efforts in both Counties, including efforts to support the agricultural industry and to implement best management practices (BMPs) for soil and water quality conservation were identified during 2004. Both Counties have significant ongoing levels of activities to protect this priority resource. The workgroup did not identify any priority implementation items needing additional funds at this time.

Howard County is currently looking at ways to refine and enhance its rural zoning and agricultural land preservation program, including a proposal to increase the maximum lot size to 2 acres for cluster lots within 2,500 feet of the reservoirs. The current 1-acre maximum lot size for cluster development does not meet MDE lot size requirements for residential development on septic systems.

### **Priority Resource: Public Awareness and Stewardship**

The TAC's Outreach Workgroup includes members from WSSC, Howard and Montgomery County, Prince George's County Health Department, and the HSCD. During 2005 the Workgroup continued its focus on Earth Month activities and the Patuxent Reservoirs Watershed Schools Mentoring Partnership. The Workgroup has requested additional staff support from the other partner agencies to help assist with planning and implementation of

the action items for this priority resource. The workgroup awaits the funding of a requested full-time Outreach Coordinator position to expand outreach efforts.

### **Progress on Implementation Items**

Table 2, Patuxent Reservoirs Watershed Work Program for FY06 and FY07, lists ongoing implementation items and identifies the priority resource or resources that will be protected or enhanced by completion of the associated task. Progress for each implementation item is given below.

#### **1) Reservoir and Tributary Water Chemistry Monitoring**

The WSSC is currently in the 14<sup>th</sup> year of monitoring the reservoirs water quality. Three sites at each reservoir are monitored monthly during March, April, October, and November, and twice monthly during May thru September. The focus is on water chemistry, including phosphorus, nitrogen, total organic carbon, pesticides, metals, turbidity, fecal coliform, and chlorophyll. In addition, in-situ transparency and profile measurements of pH, depth, conductivity, temperature, reduction-oxidation potential, and dissolved oxygen are performed.

To date, the reservoirs still show a trend towards low dissolved oxygen during the summer months. Carlson's trophic state index (TSI), used to define the degree of eutrophication of a lake, places the reservoirs in the eutrophic state for lakes that are nutrient rich with limited oxygen levels in the bottom waters. Chlorophyll-a in both reservoirs has a TSI of about 52.

#### **2) Tributary Biological and Habitat Monitoring**

This task is needed to track progress in protecting Stream System and Aquatic Biota priority resources. The results from the tributary biological and habitat monitoring are being used to track stream system changes as watershed land cover changes and stream restoration, streamside BMPs, and buffer enhancements are implemented.

During 2004, the Montgomery County Department of Environmental Protection (DEP) modified its schedule for Patuxent watershed monitoring to accelerate the monitoring of the Rocky Gorge Dam subwatershed, to collect data for the environmental impact study for the Intercounty Connector. During 2005, the DEP monitored the Upper Patuxent and the Hawlings River in the reservoirs watershed; results for the 2005 monitoring will be available for the next Annual Report.

During 2004, 12 stations were monitored in the Rocky Gorge Dam subwatershed. Most of these stations scored "Good" for benthic macroinvertebrates and for benthic habitat, but "Poor" for fish. The reason for the "Poor" fish scores had to do with small stream size, small contributing drainage area, and possible fish blockages. Only one station, upstream of Tucker

Lane, was identified as needing additional follow-up. This station had good habitat but impaired fish and benthic communities. While there were heavy deposits of fine sediment at this station, there were no apparent ongoing land disturbance activities in the contributing drainage areas.

In March 2005, Howard County started the second round of benthic biomonitoring in the Rocky Gorge, and the Upper and Lower Brighton Dam watersheds. The benthic sampling was completed July 2005 and the taxonomic identification is currently underway. A draft report will be available in the fall of 2005.

### **3) Stream Corridor Management**

This task includes follow-up for stream restoration projects to address priority areas of instability. Implementation is needed to protect the Stream System and Aquatic Biota priority resources and to support long-term protection of the Reservoir/Water Supply priority resource.

In fall 2005, Montgomery County will complete construction of its first restoration project in the Patuxent River Watershed: Project 7a, in the Lower Hawlings River. The project cost has increased to \$460,405 from the original estimate of \$231,000, which included \$125,000 in grant funding from DNR. The project covers the 2,700-foot reach of the Hawlings River above Brighton Dam and is addressing streambank stability, floodplain access, and in-stream habitat. Winter and early spring work proceeded slowly as contractors adapted to a wet season and subsequently higher than anticipated flows. After suspending work for the instream closure period, contractors resumed work in the lower reaches, completing many of the extensive floodplain benches and terraces. Work already completed in the upper end has withstood the test of several large spring runoff events as well as some substantial summer thunderstorms.

Howard County continues to improve the Cherry Creek Watershed. Using a \$25,000 grant from the DNR and \$37,600 from the Chesapeake Bay Trust, the County is moving forward to restore 300 linear feet of headwater stream. In July 2005, the County started construction of the three new stormwater management ponds, followed by the stream restoration.

### **4) Reservoirs and Watershed Models**

This task is needed to support protection of the Reservoir/Water Supply priority resource. A preliminary version of the watershed model had been completed but, without significant refinement, was determined not to be suitable for Total Maximum Daily Load (TMDL) development. The MDE has entered into an agreement with the Interstate Commission on the Potomac River Basin (ICPRB) to refine and enhance the existing watershed and reservoir models. The models will facilitate the improved tracking of phosphorus in the system, allow better estimates of loading by land use type, enable the inclusion of the effects of late winter/early spring algae blooms, and provide more sensitive responses to watershed load changes. The modeling work will be used as the basis for TMDL development to address

## **Patuxent Reservoirs Watershed Annual Report November 2005**

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nutrient impairment in the Rocky Gorge Reservoir, and nutrient and sediment impairments in the Triadelphia Reservoir. The TMDLs will be submitted to the Environmental Protection Agency (EPA) for review and approval in 2006.

### **5) Agricultural Management Local Cost-Share Initiative**

Table 3, 2005 Agricultural Progress, provides a summary of agricultural best management practices implemented in the Patuxent Reservoirs Watershed during 2005.

Between October 2004 and July 2005, the HSCD initiated four cost-share agreements and successfully completed one contract. The completed contract was for a diversion in the amount of \$1,353. The practices for the four new contracts include spring development, a trough, stream crossings, and a grassed waterway. Technical assistance to landowners to prevent soil erosion and protect water quality is an ongoing effort.

The HSCD continues to provide educational programs for horse owners. A Horse Seminar was held in March 2005 with approximately 22 individuals attending. This program focused on heavy use areas, hay quality evaluation, fertilizing, and soil sampling. A Horse Pasture Walk took place in May 2005 with 25 attendees. This event focused on converting abandoned cropland to horse pasture and rotational grazing.

The MSCD has continued efforts to engage the equine community in conservation practices. In November 2004, MSCD hired an Equine Resource Conservationist (ERC) to provide information and technical assistance to horse farm owners in Montgomery County. In January 2005, the new ERC sent letters to over 270 horse owners in the Patuxent watershed to encourage these landowners to take advantage of soil conservation and nutrient management planning assistance offered by MSCD and Cooperative Extension. Another focus of this effort was to generate interest in the Patuxent Reservoirs Watershed Protection Cost-Share Program. The Patuxent Cost-Share Program may have more applicability to horse farms or other smaller operations, since it provides more limited funding than other grant programs, but has fewer administrative requirements.

Education and outreach programs were an important focus for MSCD this year. In addition to Close Encounters with Agriculture (2,700 4<sup>th</sup> graders) and Envirothon (120 high school students), MSCD also provided important adult education programs this year. In October 2004, MSCD coordinated a Farm Tour in the Patuxent Watershed that focused on a variety of conservation practices, land management issues, and research opportunities. About 40 participants attended the tour, including several State Delegates and County Council staff. In February 2005, MSCD co-sponsored a Deer Management Workshop that was attended by over 70 people, mainly farmers.

## **6) Sediment Study**

The study is funded by the WSSC and is being conducted by DNR Watershed Services in conjunction with the Maryland Geological Survey (MGS) to perform bathymetric surveys and related analysis in the reservoirs during the period July 1, 2004 to June 30, 2007. A further study funded by WSSC in conjunction with the MGS is to conduct in-situ sediment oxygen demand measurements in the Triadelphia Reservoir to support MDE's effort in developing the reservoir model and TMDL development.

### *Rocky Gorge Reservoir Surveys*

The collection of bathymetric data in Rocky Gorge Reservoir was initiated by MGS during the spring of 2005. The methodology used was the same as used in Triadelphia Reservoir in 2004, including use of both 200KHz and 28KHz sounding signals. Water level data for that period was also collected to correct for pool levels. Preliminary analysis of the collected data indicates that follow-up data collection in the reservoir will be necessary. A return data collection run will be completed in the fall of 2005.

Once completed, the bathymetric survey of the Rocky Gorge Reservoir will be evaluated in conjunction with topographic survey data previously obtained from Scott's Cove. The topographic survey of the Scott's Cove delta area was performed to investigate a location not covered by the primary open-water bathymetric survey. The data collection is intended to evaluate sedimentation from small tributaries draining to the reservoir. The surveys were conducted using an automatic level to measure six cross sections that extended across the upper limits of the cove. Sediment cores were extracted from the cove for grain size and bulk density analyses. Locations of proposed sediment cores were noted in the cross section data. Data is being organized into an Excel spreadsheet.

### *Triadelphia Reservoir Delta Surveys*

Core samples extracted from the Cattail Creek delta area in 2004 were sent to Dr. Jerry Ritchie of the USDA in Beltsville for Cesium-137 analysis. Dr. Ritchie completed the analysis and has returned the preliminary results. Several of the cores show trends in Cesium-137 concentrations that may indicate the presence of 1954 (pre-atomic testing) horizon. This will allow for an estimate of sediment aggradation from 1954 to the present to be developed. A meeting will be scheduled with Dr. Ritchie in the fall of 2005 to interpret the results in conjunction with the topographic surveys.

### *Upcoming Work*

MGS is preparing to return to the Rocky Gorge Reservoir for a follow-up bathymetric and shoreline survey in the fall of 2005. A finalized bathymetric surface of both reservoirs will be prepared once the Rocky Gorge data collection has been fully completed. Digital map products and analyses of reservoir storage capacities will be completed thereafter. Work on the reservoir delta areas will be continued in 2006. Additional topographic surveys and

coring is proposed in Triadelphia Reservoir at the parking area and boat ramp located on Triadelphia Mill Road.

### **7) Forestry Management and Recreational Use Survey**

In May 2003, DNR entered into an agreement with WSSC to conduct an in-depth study of the forest resources and associated recreational uses on WSSC land in the watershed. Fieldwork for the forest assessment was completed in June 2005. The recreational user survey is being prepared for distribution by WSSC. Once the survey data is collected, it will be analyzed and the results will be provided to WSSC and other stakeholders. User groups have been targeted for response to the survey. One group will receive information on available recreation opportunities and costs, while the other group will not. WSSC is considering incentives for ratepayers to respond to the survey. On-site surveys will be conducted at recreational areas in English and Spanish. There may also be an online reply to the survey for certain groups. The first draft of the report is due out for review in October 2005.

### **8) Public Outreach and Involvement Initiatives**

The TAC has identified the need for sustained environmental stewardship as critical to long-term protection of all Priority Resources and significant efforts continue despite limited funding. The focus continues on Earth Month activities and the Schools Mentoring Partnership.

- Earth Month (April, 2005) was successful, with over 400 people participating in the 10 events that were held. A new event for this year, "Earth Day Celebration," was not well attended but efforts will be made to expand this program with increased publicity and activities to include involvement by school children and teachers, art or poetry contests, and other family friendly activities.
- The Patuxent Reservoirs Watershed Schools Mentoring Partnership continues to move forward. Two more of our schools, Scotchtown Hills Elementary School in Prince George's County and Hammond Elementary School in Howard County, earned Maryland Green School certification and were honored at a ceremony in June 2005. They join High Point High School from Prince George's County, which received this certification last June. This makes three schools in our watershed to be so honored. Additional efforts will be made to reach other schools in the watershed by offering watershed tours for administrators and teachers.
- The "Family Campfire" held at the Brighton Dam Recreation Center in October 2005 was again a tremendous success reaching over 500 people. The major purpose of this annual event is to recognize the accomplishments of teachers, students, and schools that participated in the Mentoring Partnership during the year. It is also a significant

## **Patuxent Reservoirs Watershed Annual Report November 2005**

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opportunity to provide additional information on source water protection and ways to get involved with environmental stewardship.

- The Mentoring Partnership "Gazette" will continue to be produced and sent electronically to the teachers, parents and administrators in our partnership. We will also strive to distribute this newsletter to local and municipal governments, in order to increase awareness of our program among local government officials.

### **Funding for FY2006 and 2007**

The tasks that are underway and expected funding expenditures during FY2006 and requested funds for FY2007 are shown in Table 2. During 2004, the TAC identified the need for dedicated staff and funding resources to accomplish the watershed protection goals. At the Policy Board meeting in 2004, the consensus among all but the WSSC representative was that the funding to cover these two full-time staff and project funding be included in the WSSC budget request to the Montgomery and Prince George's County Councils.

The proposed request included two full-time staff for public outreach and implementation support. These positions would coordinate projects and activities, increase public stewardship efforts in the watershed, provide technical analysis and tracking, and seek out and apply for grant funding to support implementation in coming years. During 2005, the TAC refined the estimate for dedicated project funding to \$485,000 during FY2007 to accelerate the rate of buffer establishment and maintenance. This represents estimates of \$185,000 in Howard County for a private land initiative and \$300,000 in Montgomery County for a public land initiative.

Howard County estimates that 450 acres of privately-owned land, involving approximately 1,800 property owners, needs stream buffer plantings. In order to meet this goal by 2023, approximately 100 property owners per year need to be contacted and 26.5 acres of buffers planted. The plantings are estimated to cost \$6,500 per acre, for an annual cost of \$172,500. The property owners will be provided with the trees, and will be responsible for the actual planting and follow up maintenance. Contacting the cooperating property owners and coordinating the delivery of trees to the owners will require part-time staffing at an annual cost of approximately \$12,500. The total FY07 cost for the program is estimated to be \$185,000. This estimate may vary depending on the degree to which property owners agree to participate in the reservoirs watershed buffer planting program. Where possible, other grant opportunities will be explored to reduce the local cost-share for the program.

The Montgomery County Department of Park and Planning will focus on reforesting stream buffers located on public land and within existing conservation easements on private land. Reforestation techniques will draw from County guidelines as well as the reforestation experience of Park staff. Emphasis will be placed on protection from deer damage and maintenance to control invasive species. The plan for the first year is to reforest the largest contiguous Park property with unforested buffers. This site is located within the Reddy Branch subwatershed of the Hawlings River. This subwatershed has only fair water quality and would benefit by restoring the stream buffers where encroachment from neighboring properties has

## **Patuxent Reservoirs Watershed Annual Report November 2005**

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taken place. This location accounts for approximately one-fifth of the unforested buffers on public land. The total cost, not including staff time, will be approximately \$300,000.

### **Conclusion**

Over the past year, the TAC continued to evaluate potential implementation items and set priorities for effective long-term watershed management. In order to assure our success, the consensus within the TAC is to focus on public outreach, a need for two full-time staff, and riparian buffer establishment and maintenance.

The TAC recognizes that an educated and involved public is needed to assure drinking water quality, terrestrial and stream resource protection, and maintenance of the rural character of the watershed landscape. Successful completion of our goals will require a full-time position to coordinate more effective outreach to residents and resource users in the watershed. In addition, the TAC will need a full-time liaison capable of coordinating across agencies and diverse projects, tracking the success and rate of implementation across the watershed, and seeking out and applying for grant funding to support implementation. The TAC also recognizes the importance of fully-functioning riparian forested buffers to achieve multiple goals for protecting priority resources.

Without proper staffing and funding resources, the TAC will not be able to accelerate or track the success of ongoing efforts, nor achieve implementation within the timelines established as necessary to protect the priority resources of the watershed.

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resource: Reservoir/Water Supply</b>				
<b>Issue:</b> 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 (DBPs) precursors, and limit reservoirs capacity loss.				
<b>Measures</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
Chlorophyll-a	<ul style="list-style-type: none"> <li>Chl-a not to exceed a 10 ug/l mean during the growing season and not to exceed a 30 ug/l instantaneous concentration</li> </ul>	<ul style="list-style-type: none"> <li>Perform reservoir monitoring for Chl-a, DO, and TOC during the growing season</li> </ul>	Ongoing	WSSC
Dissolved oxygen	<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>Enhance and fine tune model reliability for watershed management.</li> </ul>	Ongoing	WSSC/MDE
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> </ul>	2006 - 2008	TAC
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>Update trend analysis for reservoir water quality parameters on a 5-year cycle</li> </ul>	2009	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>	2006	WSSC

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resource: Terrestrial Habitat</b>				
<b>Issue:</b> 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> </ul>	<ul style="list-style-type: none"> <li>Encourage private property owners to participate in tree planting programs.</li> </ul>	Ongoing	TAC
Forest Connectivity	<ul style="list-style-type: none"> <li>Increase forest interior habitat</li> </ul>	<ul style="list-style-type: none"> <li>Ensure publicly owned parkland and open space is forested to the maximum extent possible.</li> </ul>	2006 - 2023	TAC
Forest Size	<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 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	TAC
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> </ul>	Ongoing	TAC
		<ul style="list-style-type: none"> <li>Implement strategies for control of invasive plants.</li> </ul>	2006 - 2008	TAC

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resource: Stream System</b>				
<b>Issue:</b> 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 stormflow 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.				
<b>Measures</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
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' riparian buffers on all publicly-owned land</li> <li>Accelerate programs to establish and maintain streamside buffers to a minimum of 35' on privately-owned lands to the maximum extent possible</li> </ul>	<p>2006 -2013</p> <p>2006 - 2023</p>	<p>WSSC, MNCP&amp;PC, HC,MC</p> <p>WSSC, MNCP&amp;PC, 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 stormwater retrofits to the maximum extent possible</li> </ul>	<p>2006 - 2013</p> <p>2006 - 2013</p>	<p>HSCD, MSCD</p> <p>HC,HSCD MNCP&amp;PC, MC</p>

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resource: Aquatic Biota</b>				
<b>Issue: Biological Integrity</b> – This is the condition of the benthic macroinvertebrate communities based on a comparison to a reference streams in Montgomery County, i.e. 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>Aggressively pursue cost-share funds to construct agricultural BMPs, stream restoration, and stormwater retrofit projects to address factors contributing to degraded biological integrity</li> </ul>	2006 - 2023	HC,HSCD MC,MSCD MNCP&PC
		<ul style="list-style-type: none"> <li>Mitigate runoff impacts from land use changes</li> </ul>	2006 - 2023	HC,MC MNCPPC
	<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>	2006 - 2023	HC,HSCD MC,MSCD MNCP&PC

IBI - Index of Biological Integrity, also referred to as Index of Biotic Integrity in MBSS publications

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resources: Rural Character and Landscape</b>				
<b>Issue: Preserve open spaces and maintaining an economically viable and environmentally protective agricultural community.</b>				
<b>Measures</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
<p>Agricultural Preservation Enrollment</p> <ul style="list-style-type: none"> <li>Total Acres Enrolled</li> <li>Number of Farms Enrolled</li> </ul> <p>Agricultural Demographics</p> <ul style="list-style-type: none"> <li>Acres of Ag Land</li> <li>Market Value of Ag Production</li> <li>Size of Farms</li> <li>Types of Farms</li> </ul> <p>Open Space and Parkland Acquisition and Easement Programs</p> <ul style="list-style-type: none"> <li>Acres of open space land preserved by non-agricultural easements or acquisition</li> </ul> <p>Participation in agricultural conservation programs and percent of conservation plans that are implemented</p>	<p>Preserve the agricultural and rural nature, and open space of the watershed</p>	<p>Continue zoning and land use policies in the watershed to maintain rural character</p>	Ongoing	HC/MNCP&PC
		<p>Continue easement acquisition through agricultural land preservation programs</p>	Ongoing	HC/MC
	<p>Create a landscape that is protective of water quality</p>	<p>Encourage participation in other conservation and open space preservation programs</p>	Ongoing	HC/MC MNCP&PC
		<p>Continue agricultural economic development programs</p>	Ongoing	HC/MC
	<p>Encourage enrollment in federal and state nutrient management and stream protection programs</p>	Ongoing	HSCD/MSCD	
	<p>Promote greater utilization of funding provided by the Res. Protection Group to supplement federal and state agricultural programs</p>	Ongoing	HSCD/MSCD	
	<p>Utilize effective open space land management practices that are beneficial to water quality</p>	Ongoing	HC/MNCP&PC WSSC	
	<p>Create and routinely update an electronic map based system to track BMP implementation</p>	2006 - 2013	HSCD/MSCD	

**TABLE 1. PRIORITY RESOURCES CHART**

<b>Resource: Public Awareness and Stewardship</b>				
<b>Issue: Awareness and support by residents and resource users</b>				
<b>Measure</b>	<b>Goals</b>	<b>Implementation Items</b>	<b>Time Line</b>	<b>Responsible Partner</b>
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>2006-2008</p> <p>Ongoing</p> <p>2006 - 2008</p> <p>2006 - 2008</p>	<p>WSSC HC,MC,PG MNCP&amp;PC HSCD, MSCD</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,PG MNCP&amp;PC HSCD, MSCD</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>2006 - 2008</p>	<p>MC,PG,HC MNCP&amp;PC</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 – 2008</p>	<p>WSSC HC,MC,PG MNCP&amp;PC</p>

Implementation dates are contingent upon adequate staff support; with limited support, focus will be on Earth Month activities and Green Schools Partnership

**Patuxent Reservoirs Watershed Annual Report  
November 2005**

<b>TABLE 2. PATUXENT RESERVOIRS WATERSHED WORK PROGRAM FOR FY06 and FY07.</b>					
<b>PRIORITY RESOURCES PROTECTED</b>	<b>IMPLEMENTATION NEED</b>	<b>IMPLEMENTATION ITEM</b>	<b>AGENCY</b>	<b>FY06</b>	<b>FY07 (proposed)</b>
Reservoir/Water Supply	1. Reservoir and tributary water chemistry monitoring	Reservoir monitoring and lab analysis	WSSC	In-kind	In-kind
		5 USGS watershed flow gauge stations	WSSC	\$44,700	\$50,000
Stream System Aquatic Biota	2. Tributary biological and habitat monitoring	Conduct second round of biomonitoring program in the reservoir watershed	HC	In-kind for report review and completion	No additional funding
		Upper Patuxent and Hawlings River	MC	In-kind services (monitoring)	In-kind services (data analysis and report writing)
		Hawlings River Restoration Monitoring	MC	\$0	\$5,000
Reservoir/Water Supply Stream System Aquatic Biota	3. Stream Corridor Management	Cherry Creek Study and Implementation	HC	\$230,000	\$220,000
		Hawlings River Project Implementation	MC	\$ 300,000	\$0
		Hillsborough Low Impact Development Retrofit	PG		\$15,000
Reservoir/Water Supply	4. Reservoir and Watershed Models	Complete reservoir eutrophication model and data trend analysis and support ongoing model enhancement	MDE WSSC	\$40,000	\$20,000
Reservoir/Water Supply Stream System Aquatic Biota Rural Character and Landscape Public Awareness and Stewardship	5. Agricultural management local cost-share initiative	Funding for local cost-share program	HC, MC, WSSC	No additional funding	No additional funding
		Program oversight for voluntary implementation of agricultural BMPs	HSCD, MSCD	In kind services	In kind services
Reservoir/Water Supply	6. Sediment Study	Perform bathymetric survey and sediment accumulation study and conduct in-situ sediment oxygen demand determination	WSSC	\$67,000	\$60,000

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Reservoir/Water Supply Terrestrial Habitat Stream System Aquatic Biota Rural Character and Landscape Public Awareness and Stewardship	7. Forestry Management and Recreational Use Study	Study on status and threats to sustainable forests on WSSC properties, including recreational uses	DNR	\$9,800 (Recreational Use Survey Federal Grant)	\$0
			WSSC	In-kind services	\$0
Reservoir/Water Supply Terrestrial Habitat Stream System Aquatic Biota Rural Character and Landscape Public Awareness and Stewardship	8. Public outreach and involvement initiatives	Earth Month, Annual Policy Board Meeting and other outreach activities	All TAC agencies	In-kind services \$400 HC \$500 WSSC \$400 MC	In-kind services \$500 HC \$500 WSSC \$500 MC
		Green Schools Mentoring Partnership	WSSC and MC	\$1,000 WSSC In-kind services (WSSC and MC)	\$1,000 WSSC In-kind services (WSSC and MC)
Reservoir/Water Supply Terrestrial Habitat Stream System Aquatic Biota Rural Character and Landscape Public Awareness and Stewardship	9. Complete Annual Report	Compilation and editing	All TAC Agencies	In-kind services	In-kind services
		Printing and distribution	WSSC	\$200	\$200
<b>TOTAL FUNDING*</b>				\$694,000	\$372,700

\* Totals do not include \$69,000 US Forest Service grant to DNR for WSSC Forestry Study. MDE contribution for the reservoirs water quality model has not been finalized. For FY2007, there is a TAC request to include funding in the WSSC budget for two full-time staff support (one for public outreach and one for administrative and technical support) and \$485,000 to accelerate riparian buffer implementation

<b>TABLE 3. 2005 Agricultural Progress</b>		
<b>Practice</b>	<b>Howard SCD</b>	<b>Montgomery SCD</b>
Conservation Plans developed	4 (197.0 ac.)	10 (546 ac.)
Conservation Plans Revised	2 (66.4 ac)	
Landowners Contacted or Requested information	21	300
Landowners Applying BMP'S	2	21
BMP'S Installed	5	65
Cover Crop		5 (227 ac.)
Conservation Tillage	4 (262.7 ac.)	26 (542 ac.)
Grassed Waterways		
Diversion	1 (200 ft.)	
Fencing		
Filter Strip		
Grade Stabilization Structure		
HUA (Heavy Use Area)		
Nutrient Management		37 (902 ac.)
Pest Management		11 (347 ac.)
Roof Runoff		
Stream Crossing		
Trough	1	
Waste Storage Structure		
New Cost Share Agreements	4	
Cost Share Agreements Completed	1	
Pipeline	1 (1100 ft.)	
Ag Chemical Facility		1
Subsurface Drainage	1 (1000 ft.)	
Educational/Outreach Events	2	6 (about 3,000 participants)