

**Partial Progress Report on the Implementation of the  
2005 Reservoir Watershed Action Strategy  
for CY 2006**

Baltimore Reservoir Technical Group  
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**Introduction**

The Reservoir Watershed Management Agreement of 2005 was accompanied by a 2005 Action Strategy, which included a long list of policy commitments and program commitments reflecting many different aspects of watershed protection, restoration and management. Many of the policies, activities and program commitments listed in the 2005 Action Strategy are being continued from the past and were included in the prior Action Strategies.

This report is partial in the sense that it does not include numerical units or other indicators of accomplishment for many of these longstanding programs and policies. Also not included herein are many *new* Action Strategy commitments on which work has not yet begun. The status of all of these will be summarized in the biennial progress report called for in the 2005 Reservoir Agreement and expected to be released in early 2008.

This document should be seen as an interim report released by the Reservoir Technical Group. The focus here is on those commitments for which work has been (or was to have been) undertaken since November 2005.

**Status of Selected Action Strategy Commitments**

**Note:** The numbers refer to the numbering system in the 2005 Action Strategy, and the text next to each number comes directly from the Action Strategy. Gaps in the sequence of numbers represent commitments not being reported on at this time.

**1.1 Monitoring**

1.1.1 Baltimore City will continue to conduct comprehensive water quality monitoring in the three reservoirs and in selected major tributaries. Concentrations of key pollutants of concern will be measured, and estimated annual loadings of sediment and total phosphorus will be calculated.

- The City is continuing to do the dry-weather sampling at 28 stations (12 in-lake and 16 on tributaries). Because the City labs are short-staffed, it is not possible to do all the storm-event sampling/analysis that is needed. Over a normal year, storm-related loadings are significant. This means that annual load inputs (e.g., for phosphorus and sediment) are underestimated.

- The City has modified its ongoing contract with the U.S. Geological Survey (USGS) to include the development of annual load estimates for sediment and nutrients entering two of the reservoirs, based on samples taken by the City at six USGS gauging stations on major tributaries (three stations above Loch Raven and three above Liberty).

1.1.3 The Reservoir Technical Group will evaluate the existing reservoir/watershed monitoring programs and will determine the resources needed to develop and maintain a monitoring program which will meet certain informational/management objectives. (Refer to the Action Strategy for details.)

- A committee including representatives of Baltimore City, the two counties and BMC has been working on this. During 2006, agreement was reached with USGS on a detailed “scope of work” for the evaluation study. Carroll County is going to enter an agreement (on behalf of the other two jurisdictions) with the USGS for a detailed technical study evaluating the current monitoring datasets and recommending improvements for future monitoring efforts. The USGS study is estimated to take 16 months, running until sometime in the spring of 2008.

## **1.2 Reservoir Modeling and Predictive Analysis**

1.2.1 MDE and its contractors, working in consultation with the RTG, will develop in-lake models of Prettyboy and Loch Raven Reservoirs. These models will be in support of MDE’s efforts to develop TMDLs (total maximum daily loads) for nutrients and sediments entering Loch Raven and for nutrients entering Prettyboy. (The TMDL program is required of the State (MDE) under the federal Clean Water Act.)

- MDE has completed the work to develop in-lake models of Prettyboy and Loch Raven. The TMDLs for the two reservoirs were released as a draft report in May 2006 and were commented on by the RTG in July. MDE modified portions of the draft TMDL report in response to some of the RTG’s comments. The Gunpowder Reservoirs TMDL report currently is being reviewed by EPA.
- The final draft Gunpowder TMDL report sets a “total phosphorus” TMDL to Prettyboy of 23,192 pounds per year, which represents a 54% reduction from the TP loads to Prettyboy calculated to have existed during the baseline period (1992-97). It sets a total phosphorus TMDL to Loch Raven of 55,098 lbs/year, which represents a 50% reduction of the TP load calculated for Loch Raven during the baseline period. The document also sets an annual limit of 28,925 tons of sediment per year to Loch Raven, which represents a 25% reduction from the load estimated for the baseline period.
- It is the position of the RTG that these new loading goals should replace earlier loading goals for the two reservoirs developed by the RTG in the mid-1980s.

### **1.3 Watershed Studies and Modeling**

1.3.1 MDE will link its hydrologic and water quality model of the Prettyboy and Loch Raven watersheds with the in-lake models described in Section 1.2, in order to develop TMDLs for the two reservoirs and to allocate load-reduction goals among the various land uses in the respective watersheds.

- This work has been completed. The two watershed models have been updated by MDE, and the draft Gunpowder TMDL report allocates load-reduction goals among the major source categories in each watershed.
- The watershed models used for the TMDL indicate that most of the phosphorus and sediment loads entering the two reservoirs wash off the landscape. (Point sources make up a very small percentage of the total annual loads.) To demonstrate compliance with the loading goals set forth in the TMDL, participants in the Reservoir Program (including MDA, MDE, Baltimore County, and Carroll County) will be required to summarize changes in the watersheds since the baseline period (1992-97) that relate to nutrient and sediment loads to the Gunpowder reservoirs.
- Several specific commitments in the 2005 Reservoir Watershed Action Strategy involve developing the ability to estimate and track some types of changes in the landscape. These include the development and reporting of “landscape indicators” (item 1.3.3) and the tracking of a variety of agricultural “best management practices” or BMPs (item 3.1.17). Action Strategy commitment 3.2.3 says that the counties will estimate the annual nutrient load reductions (on a watershed basis) resulting from completed capital projects, such as stormwater retrofits/conversions and stream restoration projects.
- Members of the RTG began discussions in 2006 as to what kinds of changes in the watersheds would be worthwhile to tabulate and track, what data and methods would be used, and who would do the work.

1.3.3 Baltimore and Carroll Counties will work with the RTG to conduct GIS-based landscape assessments of the watersheds and will develop appropriate “landscape indicators” for use in summarizing watershed conditions and tracking progress over time.

- No work has yet been done on this item. This is one of the efforts that will help the Reservoir Program to document significant landscape changes over time, which relates directly to demonstrating compliance with the Gunpowder TMDL.

### **2.0 Point Source Management**

(No new issues arose in 2006. Existing permits and policies continued in effect.)

### **3.0 Nonpoint Source Management, Land Use and Resource Protection**

#### **3.1 Agricultural Practices**

3.1.11 The signatories will work to evaluate the pollution potential from horse operations located in the reservoir watersheds. The two SCDs will expand outreach and assistance to those operations.

- During 2006, staff members began to review the available literature on the water-quality impacts of sizeable horse operations. In general, the adverse effects of horse wastes and horse farms have not been studied as extensively as have the effects of cow, steer and swine operations.
- MDA has compiled data on the horse populations in each reservoir watershed, drawing solely upon MDA's "nutrient management plan" database. In comparison with other data (the 2002 Maryland Equine Census), the MDA numbers seem to be missing significant numbers of horses. This needs to be pursued further.
- The Baltimore County SCD submitted a proposal during 2006 to the Chesapeake Bay Trust to fund staff for this specific effort, but the proposal was turned down.

3.1.16 The signatories agree to investigate the possibility of increased staffing support for the Baltimore County SCD, so that more outreach and assistance effort can be focused on farms in the reservoir watersheds in the county.

- During 2006, the Baltimore Co SCD received a new, permanent MDA position, supported with EQIP funds from USDA. The new employee is focusing on developing grazing plans for farmers (with an eye to minimizing erosion), as well as developing new overall farm plans. There have been other recent shifts in personnel at the SCD, but there still has been a net gain of one full-time position.
- During 2006, the Baltimore Co SCD also shared a technician with the Harford SCD. This was a temporary position supported with EQIP funds.

3.1.17 The two SCDs, working with MDA staff and with the RTG, will develop "indicators" of agricultural-pollution-reduction program effectiveness in the watersheds. These indicators should include measures of BMPs actually applied, which can be related directly to the need to reduce phosphorus and sediment inputs to the reservoirs. This is another effort which relates directly to documenting compliance with the Gunpowder TMDL.

- A background paper was developed in October 2006 which summarizes the types of BMP progress-reporting the two SCDs already are required to do, and how that data might be related to estimates of cumulative nutrient load reductions achieved by farms in the reservoir watersheds. Discussions are currently underway with MDA, to see what kind of tracking/estimating system they would support.

## **3.2 Sediment Control and Stormwater Infrastructure**

3.2.5 Baltimore and Carroll Counties will review and revise, as necessary, their respective design standards for roads and parking areas, in order to reduce the extent of impervious surfaces.

- The Baltimore County “Builders for the Bay” report was finalized in 2006. Among many other issues, it includes recommendations for new design standards for roads and parking facilities, with an eye to reducing impervious surface areas. These recommendations are being reviewed by the appropriate County agencies for possible inclusion in the County’s design manual for new developments.
- Carroll County is planning to set up its own “Builders for the Bay” process in 2007.

3.2.6 The RTG will investigate the feasibility of having local and state agencies adopt an alternative de-icing policy in the reservoir watersheds.

- Several RTG members have made preliminary literature searches on the available alternatives to the exclusive use of sodium chloride as a pavement de-icing compound. The main alternatives involve the use of either much more expensive de-icing materials than NaCl or specialized trucks (for “pre-wetting” roads with brine or with CaCl at the start of a snowstorm).
- Carroll County presently has 16 trucks capable of “pre-wetting” roads with a calcium solution, and will be purchasing more. This practice is believed to reduce the total amount of NaCl that needs to be applied during a typical snowstorm.

## **3.3 Sewerage System Infrastructure**

3.3.2 Baltimore County will implement new capital and operating/maintenance programs for its county-wide sewerage system, consistent with the recent Consent Decree entered into with federal and state agencies.

- During 2006, the County completed improvements (mostly intended to better prevent overflows during power outages) at two sewage pumping stations in the Loch Raven watershed, Springdale A and Merryman’s Branch. A major upgrade to the Texas pumping station (in the same watershed) was begun in 2006, and is on schedule for completion in 2007.

3.3.3 Carroll County will implement computer-based inspection/maintenance systems for the Hampstead and Freedom sewer service areas.

- To date, the County Bureau of Utilities has begun to use computerized data to field-check sewer lines and manholes. Contractual television inspection services are being added to the bureau’s program this year.

### **3.4 Septic Systems**

3.4.1 The signatories will seek funding through the Chesapeake Bay Restoration Fund to carry out a study regarding the extent to which residential septic systems in the reservoir watersheds contribute nutrients, sodium and pathogens to the tributary streams.

- This initiative was discussed with key staff at MDE's Water Management Administration. They have indicated that CBRF dollars cannot be used to support this kind of study.

3.4.8 The Department of the Environment (MDE) will develop a protocol to evaluate and verify the stated performance of "best available technology" being used to remediate conventional on-site wastewater disposal systems which have experienced problems.

- MDE is committed to monitoring the performance of several of the new disposal system designs that are being installed in the field.

### **3.5 Urban Nutrient Management**

3.5.4 Baltimore City and Baltimore County will conduct a cooperative study of the water-quality benefits of regular street-sweeping and stormdrain-inlet cleaning.

- The field work for this study is under way. The City and the Center for Watershed Protection are monitoring the runoff from selected city streets that are being swept regularly. The City reports that there will be 6 to 12 more months of field work.
- Baltimore County has been measuring the monthly accumulation of debris in 100 storm drain inlets, and has been taking samples from 16 of these for categorization and for limited lab analysis. The aim is to be able to estimate the average nutrient load reductions in storm runoff that could be expected to result from routine inlet-cleaning.

### **3.6 Land-Use Planning and Zoning**

3.6.4 Baltimore and Carroll Counties will protect the reservoir watersheds by limiting insofar as possible additional urban development zoning within the reservoir watersheds.

- The RTG has discussed the need to set up a mechanism to track proposed new urban development in the watersheds, regardless of the current zoning. We need a way to estimate the additional loadings that will result from the new development and to project how these will be offset by accompanying BMPs. This question relates directly to documenting compliance with the TMDLs for the Gunpowder reservoirs.

3.6.6 The signatories will work with the Department of Natural Resources (DNR) to include the reservoir watersheds in the Forest Legacy Program and to seek funding for protection of selected forested areas.

- Maryland's 2006 "Assessment of Need" for the Forest Legacy Program submitted by DNR to the US Forest Service included forested lands in the reservoir watersheds. The Forest Legacy Program provides matching funds for voluntary conservation easements intended to protect forested lands.

### **3.7 Resource Protection and Restoration; Development Guidelines**

3.7.2 Baltimore County will work to establish a comprehensive forest resource management program in the watersheds, with the goal of ensuring the ecological and economic sustainability of forest resources as a means to help stabilize watershed hydrology and to help protect water quality.

- DEPRM is leading this effort for the County. Working with a diverse steering committee, a Forest Sustainability Program for Baltimore County was launched in 2003. Working subcommittees were established during 2006 in such areas as forest ecology, forest economics, easements, and landowner education. Because of the extensive forest areas present within the County's portions of the three reservoir watersheds, this program will benefit the reservoirs.
- During 2006, the County contracted for the preparation of a forest health assessment and management plan for Oregon Ridge Park (in the Loch Raven drainage). With nearly 900 acres of contiguous forest, Oregon Ridge is the County's largest publicly-owned forest patch in the reservoir watersheds. The plan will be completed in early 2007.
- In FY 2006, Baltimore County developed and piloted the Rural Residential Stewardship Initiative, a project to engage landowners in large-lot rural residential subdivisions to become better stewards of shared forest patch/stream systems. Under the program, landowners agree to convert unused, mowed fields or lawn areas to forest cover. During 2005-2006, a total of 17 acres of new forest was added to 12 lots in two RC 4-zoned subdivisions within the Loch Raven Reservoir watershed.
- Baltimore County DEPRM has initiated projects intended to increase tree canopy in urban/suburban areas, countywide. This is relevant to the developed portions of the reservoir watersheds, such as the Timonium-Hunt Valley corridor in the Loch Raven watershed. The County has committed to become one of five Maryland jurisdictions for the Chesapeake Bay Program's directive on Urban Tree Canopy Goals. (Data analysis for this project is under way.) In addition, with US Forest Service funding through a Small Watershed grant, DEPRM developed and piloted the Growing Home Campaign, a project that provides education and incentives (coupons for tree purchases) to encourage homeowners to plant trees in their yards.

3.7.3 The signatories will encourage the Maryland DNR to manage its land holdings in the reservoir watersheds so as to benefit reservoir protection.

- DNR is proposing to do a controlled deer hunt in an area it owns (on both sides of Jarrettsville Pike, south of Blenheim Road and east of Loch Raven) on land presently leased for farming. This is expected to help relieve grazing pressure on young trees in the adjacent City-owned watershed area.
- Baltimore County has planted trees on 5.45 acres near the headwaters of several streams draining westward to Loch Raven.

3.7.4 Baltimore City will work with Baltimore and Carroll Counties to evaluate the adequacy of land-acquisition and development-rights easement programs (e.g., Rural Legacy, etc.) for protecting critical or sensitive areas in the reservoir watersheds which are vulnerable to development. Following this evaluation, the City and the two counties will develop a strategy for supplementing current preservation and/or acquisition efforts in the reservoir watersheds.

- Since 2005, RTG members have discussed other approaches, such as paying for the reforestation of portions of existing rural tracts, which might be more cost-effective for overall water quality purposes than purchasing conservation easements. It seems that more acreage could be “improved” for a given amount of money.
- No action has been taken so far. A work group needs to be set up on this issue.
- During 2006, Carroll County received some Rural Legacy funds (\$1 million) from DNR. These funds will go towards agricultural land preservation in the Upper Patapsco Rural Legacy Area (located above Liberty Reservoir).
- Baltimore County contracted with The Conservation Fund to conduct an Agricultural Land Prioritization Study, which assessed all rural parcels in the county 50 acres or greater (and parcels contiguous to larger parcels) for their agricultural, forestry, ecological, water quality, and community (aesthetic and historical/archaeological) values. This report will help the County to determine an optimal strategy (spatial, function and costs) for protecting the additional 30,000 acres of land which are needed to meet the County’s long-term preservation goal of 80,000 acres.

3.7.5 Baltimore City and Baltimore County will work cooperatively with DNR to develop a comprehensive deer management program for the reservoir watershed areas, with an initial focus on the Loch Raven watershed. [During 2006] the City and the County will develop a preliminary set of recommendations for deer management, and will present these recommendations to the BMC Management Committee.

- Baltimore County DEPRM convened a work group on this problem in early 2006. Baltimore City DPW participated in the work group. The group discussed the need to develop a county-wide deer management plan. Members of the group are gathering information on deer impacts. There are plans to reconvene in spring 2007.

3.7.6 Baltimore County will continue to implement its capital improvement program for stream restoration and for upgrading of existing stormwater BMPs to stabilize selected stream channels and to improve water quality in the reservoir watersheds.

- The following Baltimore County projects involving reservoir tributaries are either in design or under construction this year: Lower Spring Branch, south of Pot Spring Road; Dulaney Gate (a stormwater basin converted to a wet pond); and East Beaver Dam Run near Cockeyville Middle School (stream restoration project). Funds are also in the capital budget for an unspecified project, expected to be called for by the Prettyboy WRAS (see below, at the report's end) when that study is completed.

3.7.7 Carroll County will continue its multi-year process of systematically assessing the condition and integrity of various tributary streams in the reservoir watersheds. Portions of these streams will be selected on a priority basis for restoration work, to be supported with County capital funds.

- Carroll County has recently selected a watershed project in the Liberty Reservoir drainage basin, involving an area that floods frequently. The area (about 530 acres) is adjacent to the intersection of Route 140 and Bethel Road. The stream is an unnamed tributary to the West Branch Patapsco River. A comprehensive watershed assessment and subsequent stormwater management retrofits are anticipated.

3.7.8 Baltimore and Carroll Counties will evaluate and implement, where desirable, the site-design recommendations of the Builders for the Bay Roundtable, in order to enhance resource protection in the reservoir watersheds

- The Baltimore County "Builders for the Bay" report has been finalized. It includes recommendations for new design standards for residential and commercial properties, and for roads and parking facilities. These recommendations will be reviewed by the appropriate County agencies for possible inclusion in the County's design manual.
- Carroll County is planning to set up its own "Builders for the Bay" process in 2007.

#### **4.0 Management of Municipal Watershed Property**

4.0.2 When and where appropriate, Baltimore City will implement the recommendations of the *Comprehensive Forest Conservation Plan for Long-term Watershed Protection on the City of Baltimore's Reservoirs* (DNR Forest Service, 2003) [During 2006] the City will evaluate the DNR report and develop a list of recommended actions for implementation.

- The City did not develop the list, but nevertheless took action on some of the report's recommendations.

- The City is developing an improved “woods road” maintenance program, focusing on soil stabilization and erosion control measures intended to reduce sediment loads to the reservoirs from interior forest roads.
- Boundary encroachment: The City has initiated actions against six adjacent property owners at Loch Raven who have encroached on watershed property. The Department of Public Works and the Department of Law are working jointly on these cases.

## **5.0 Toxics, Pathogens, Potential Spills, and Disinfectant Byproduct Precursors**

5.0.4 Baltimore City will analyze the raw (untreated) reservoir water for a range of pathogens, in compliance with new federal EPA requirements.

- The City continues to be in compliance with EPA’s Long-term 2 Enhanced Surface Water Treatment Rule. This includes daily analysis of the raw water entering the two treatment plants for total coliform bacteria and fecal coliform or *E. Coli* bacteria, and monthly analysis of the water for *Giardia* and *Cryptosporidium*.

5.0.5 Baltimore City will track sodium and chloride levels in both the raw water and the finished water. Using the information gained, Reservoir Program participants, working through the RTG, should establish a goal for sodium concentration in the lakes.

- The Baltimore City labs have begun routine analysis of the raw water from Loch Raven and Liberty (sampled at the head of each respective WTP) for sodium. (Chloride was already being done previously.) They will soon begin to also analyze samples from the major tributaries for sodium and chloride.
- In 2006, Baltimore County added routine analysis for sodium concentration at all of its tributary stations upstream of the two Gunpowder reservoirs. During 2007 (a Patapsco sampling year), they will do the same for the Baltimore County tributaries to Liberty Reservoir.

5.0.8 Reservoir Program signatories will review and comment on the existing arrangements and established procedures for notification of all appropriate agencies in the event of a significant spill or discharge of a hazardous substance in any of the reservoir watersheds.

- During 2006, an interview was held with Baltimore County emergency response officials, to gather information about the current notification and coordination mechanisms. Interviews need to be held with Carroll County and MDE response officials.

## **6.0 Reservoir Program: Coordination and Administration**

(No new issues arose in 2006. The six local governments continued their support.)

## 7.0 Public Awareness

7.0.3 Reservoir Program participants will use the BMC website to disseminate current information and to promote public awareness about the Reservoir Program and its activities and accomplishments.

- In early 2006, BMC staff expanded and updated the information about the program that is available on the BMC website. The 2005 Agreement and Action Strategy are both available on the website.
- Working in cooperation with the RTG, the program coordinator and other BMC staff prepared a printed and bound version of the 2005 Agreement and Action Strategy, which has been distributed widely to interested local and state agencies and to watershed-area citizens' groups.

7.0.4 Reservoir Program signatories will continue to assist and encourage the efforts of local citizens' organizations which are concerned about watershed management issues and reservoir protection.

- The local participating agencies and BMC maintain ongoing working relationships with such groups as the Gunpowder Valley Conservancy and the Prettyboy Watershed Alliance.
- During 2006, Baltimore County DEPRM provided "watershed association planning and implementation grants" to the Gunpowder Valley Conservancy and the Prettyboy Watershed Alliance, for staff support.

### **Significant project that was not included in the 2005 Reservoir Action Strategy:**

The **Prettyboy Watershed Restoration Action Strategy** (Prettyboy WRAS). This effort was begun in 2004 by Baltimore and Carroll Counties, working in cooperation with DNR and MDE, as well as with local citizens' and sportsmen's organizations. During 2005-2006, field surveys of the main tributary streams to Prettyboy were completed by several different multi-agency technical teams. These included surveys of stream water quality, in-stream biological diversity, and assessment of physical conditions (including observed potential threats) in selected stream corridors.

During 2006, the WRAS steering committee agreed upon a list of goals, objectives, and possible restoration or protection actions that could be taken in the Prettyboy watershed. In January 2007, a workshop was held for area residents, in order to present the steering committee's proposed major recommendations. Once finalized, the WRAS can be used to qualify portions of the watershed for restoration/protection grants under different federal and state grant programs.