7.0 Permit Requirements

F. Watershed Assessment and Planning

Baltimore County shall continue to update and revise watershed assessments that have been developed for its 10 urban watersheds (Baltimore Harbor, Bird River, Back River, Gwynns Falls, Jones Falls, Little Gunpowder, Loch Raven, Lower Gunpowder River, Middle River, and the Patapsco River). The overall goal is to ensure that each County watershed is thoroughly evaluated and has an action plan to maximize water quality improvements. Additionally, the County shall encourage the public to participate in the development and implementation of watershed restoration activities. At a minimum, the County shall:

1. Continue to perform and update detailed assessments in all of its urban watersheds. These watershed assessments shall include:
    a. Determining current water quality conditions;
    b. Identifying and ranking water quality problems;
    c. Identifying all structural and non-structural water quality improvements opportunities;
    d. Reporting the results of a visual watershed inspection;
    e. Specifying how the restoration efforts will be monitored; and
    f. Providing an estimated cost and a detailed implementation schedule for those improvement opportunities identified above.

2. By 6/15/2006, the County shall complete the prioritization process for selecting subwatersheds for restoration started during the previous permit term. These subwatersheds shall contain at least 20% of the County's impervious cover. Restoration efforts resulting from this prioritization process shall be in addition to typical stormwater management facility maintenance; and

3. By the end of this permit term, the County shall propose for restoration subwatersheds containing another 10% of the County's impervious surface area with poor or no stormwater management. These sub-watersheds shall be in addition to the 20% already proposed for restoration under the requirements above.

G. Watershed Restoration

The County shall implement those practices identified in Part III. F. above to control stormwater discharges to the maximum extent practicable. The overall goal is to maximize the water quality in the County's urban watersheds, using efforts that are definable and the effects of which are measurable. At a minimum, the County shall:

1. Complete the implementation of those restoration efforts that were identified and initiated during the previous permit term to restore 10% of the County's impervious surface area..

2. Within one year of permit issuance, begin to implement restoration of an additional 10%

of the County's impervious surface area. .

3. Annually, Baltimore County shall update its impervious surface restoration accounting sheets for each of its urban watersheds. At a minimum, these data shall include:
   a. Total impervious acres for each urban watershed;
   b. A schedule and cost estimate for the design, construction, and completion for each retrofit project;
   c. The impervious acres controlled or restored within each watershed; and
   d. The monitoring data and surrogate parameter analyses used to determine water quality improvements.

J. Total Maximum Daily Loads

Stormwater BMPs and programs implemented as a result of this permit must be consistent with available waste load allocations (WLA's)[see 40 CFR122.44(d)(1)(vii)(B)] developed under a Total Maximum Daily Load (TMDL). MDE has determined that owners of storm drain systems that implement the requirements of this permit will be controlling stormwater pollution to the maximum extent practicable. Therefore, satisfying the conditions of the permit will meet WLA's specified in TMDL's developed for impaired water bodies. If assessment of the stormwater management program indicates TMDL WLAs are not being met, additional or alternative stormwater controls must be implemented to achieve WLAs.

7.1 Introduction

Environmental consultants managed by the Department of Environmental Protection and Resource Management (DEPRM) – Watershed Management and Monitoring Section have prepared watershed management plans for 10 of the 14 8-digit watersheds located in the Baltimore County. The remaining four watersheds do not have significant urban components and therefore are not required to have watershed management plans for this permit. These watershed management plans and the four watersheds that do not have plans will be enhanced through the creation of Action Plans that will set restoration goals, identify steps to achieve those goals, provide an implementation schedule and a monitoring plan. The Action Plans will be prepared with the input from stakeholders within the planning area and identify opportunities for citizen based watershed restoration. The Action Plans will include the identification of potential stormwater management conversion sites, capital projects, as well as citizen based stream restoration opportunities, operational program implementation, and an implementation schedule. In 2004, DEPRM hired a consultant to assist in engaging stakeholders in development of the Action Plans.

This section includes updates on the status of the watershed management plans, SWAPs and Capital Improvement Program's (CIP) restoration projects. Although the major focus of the implementation of the watershed management plans centers on capital projects, this component cannot alone satisfy water quality improvement. In Baltimore County water quality improvement is a multi-faceted effort involving other components such as sediment control, storm drain inlet cleaning, street sweeping, recycling, solid & hazardous waste management, illicit connection reduction, citizen education, sanitary sewer system infiltration/exfiltration reduction and others. These County-wide programs are described in other sections of this report.

The County's capital budget includes the current budget year and the subsequent 5 years. The capital budget is on a two-year cycle tied to bond referenda. Additional funding for these projects is provided by the Maryland Department of the Environment (MDE) through the Small Creeks and Estuaries and the Stormwater Pollution Control Cost-share Programs, and by the EPA Chesapeake Bay/Habitat Restoration Program. Section 11 details the entire funding budget for watershed planning and restoration implementation in Baltimore County.

7.2 Status of Watershed Management Plans

7.2.1 Water Quality Management Plans

Water quality management plans have been completed for ten of the fourteen major watersheds in Baltimore County. The four remaining watersheds have limited urban development and therefore are not required by the NPDES – Municipal Stormwater Discharge Permit to have water quality management plans. However, recognizing the benefits of a watershed management plan, Baltimore County is participating in the development of a Prettyboy Watershed Plan under the State's Watershed Restoration Action Strategy (WRAS) process. Harford County is also working under the WRAS process to develop a watershed plan for Deer Creek watershed. Table 7-1 presents the watersheds and the year of completion of the water quality management plan. The recently completed Gwynns Falls Watershed Management Plan was a cooperative effort between Baltimore County and Baltimore City.

Table 7-1: Status of Watershed Management Plans

Watershed	Watershed Plan Status	Completion Date
Upper Western Shore		
Deer Creek	WRAS	Under development
Prettyboy Reservoir	WRAS	Under Development
Loch Raven	Complete	9/30/96
Lower Gunpowder Falls	Complete	9/30/98
Little Gunpowder River	Complete	3/31/02
Bird River	Complete	3/29/96
Gunpowder River	Not Required	
Middle River	Complete	3/30/01
Patapsco/Back River		
Liberty Reservoir	Not Required	
Patapsco	Complete	9/30/98
Gwynns Falls	Complete	12/1/04
Jones Falls	Complete	9/30/96
Back River	Complete	9/30/96
Baltimore Harbor	Complete	3/30/01

Baltimore County enlisted the services of consultants for the preparation of the Watershed Management Plans. While the details of each plan vary, a common framework is incorporated into each plan. This framework includes:

1. watershed modeling using US EPA Storm Water Management Model (SWMM);
2. stream stability assessment using Rosgen classification methodology Levels I,II,III;
3. identification and ranking of water quality problems;
4. development of non-point source control management strategies;
5. prioritization of programs and projects; and
6. preparation of the final document, integrating the above tasks and preparing maps and tables to relate results.

Two of the watershed management plans (Middle River and Baltimore Harbor) did not include a stream stability assessment due to the limited mileage of open stream channels. These two watershed management plans did, however, include tidal estuarine water quality models, which were not a component in any of the other plans. The completed watershed management plans have been previously submitted to MDE and may be consulted for greater detail.
Table 7-2 indicates the consultants that have prepared the plans and the cost associated with each plan. The total cost for the preparation of the watershed management plans is slightly over two million dollars.

Table 7-2: Watershed Management Plans Consultants and Costs

Watershed	Consultant	Cost
Loch Raven Reservoir	Tetra Tech, Inc.	$180,827
Lower Gunpowder Falls	Parsons, Brinkerhoff, Quade & Douglas, Inc.	$262,461
Little Gunpowder Falls	Biohabitats, Inc.	$210,076
Bird River	Dames & Moore, Inc.	$165,450
Middle River	Versar, Inc.	$155,224
Patapsco River	Tetra Tech, Inc.	$284,100
Gwynns Falls*	Parsons Brinkerhoff	$326,422
Jones Falls	Dames & Moore, Inc.	$168,251
Back River	Camp, Dresser & McKee, Inc.	$149,905
Baltimore Harbor	Roy F. Weston, Inc.	$145,021
Total Cost		**$2,047,737.00**

*Includes Cost for Baltimore City Portion of the Plan

7.2.2 Small Watershed Action Plans (SWAPs)

In 2005, Baltimore County initiated a new round of watershed planning, entitled Small Watershed Action Plans (SWAPs). The SWAP planning process is meant to bring together the many mandates that the County is charged to meet in each individual watershed, including the requirements of the NPDES – Municipal Stormwater Discharge Permit, Total Maximum Daily Loads (TMDLs), goals in the Chesapeake 2000 and the Tributary Strategies, and the Reservoir Management Program. The small watershed action planning process is designed to bring all these individual mandates together at a subwatershed level that will help residents understand the intent of each program, how to most efficiently meet the goals, and define the roles of the partners. The SWAPs will build on the previously completed technical Water Quality Management Plans (Section 7.2.1).

Planning areas were selected on similarity of impacts within each area, allowing focus on specific issues related to the stakeholders that live and work within each planning area. Twenty-four planning areas have been delineated. Based on staffing constraints, it has now been determined that only two or three plans will be under development at any one time. The schedule presented last year has proven to be unrealistic. While the planning will be completed as expeditiously as possible, no schedule is proposed at this time.

Five SWAPs are currently under development. The Goodwin-Hunt Valley-Loveton SWAP in the Loch Raven Watershed, the Towson Run/Roland Run SWAP in the Jones Falls Watershed, and the Lower Patapsco SWAP in the Patapsco River Watershed are currently on hold due to staffing levels. The Lower Jones Falls and Upper Back River SWAPs are in active development with funding from an U.S. Environmental Protection Agency – Region III Water Quality Cooperative Assistance grant. This funding has permitted the hiring of contractual staff and Center for Watershed Protection to assist in the development of the Action Plans. There two

SWAPs are being developed in conjunction with Baltimore City, Herring Run Watershed Association, and Jones Falls Watershed Association. In addition, to the SWAPS, a Watershed Restoration Action Strategy (WRAS) is being prepared for the Prettyboy watershed, including both the Baltimore County and the Carroll County portions of the watershed. The two active SWAPs are anticipated to be completed in the late spring of 2008, while the WRAS will to be completed in the fall of 2007.

Stakeholders will be invited to participate in the development of each SWAP. A series of three meetings will be held over the course of the year. The first will introduce the stakeholders to the process and solicit their input on the characterization of the planning area and goals. The second meeting will present the final characterization document and solicit input on preferred restoration options. The third meeting will present the SWAP, which will include not only County actions and projects, but also citizen based and business based restoration activities and options.

7.3 Upper Western Shore Watersheds

The Upper Western Shore watersheds include: Deer Creek in the Susquehanna River Basin, and Prettyboy Reservoir, Loch Raven Reservoir, Lower Gunpowder Falls, Little Gunpowder Falls, Bird River, Gunpowder River and Middle River in the Gunpowder Falls River Basin. Five of the eight watersheds require watershed management plans based on NPDES requirements on the amount of urban development within the watershed.

7.3.1 Deer Creek

Due to the rural nature of this watershed a watershed management plan is not required by the NPDES – Municipal Stormwater Discharge Permit. Baltimore County's portion of this watershed is approximately eleven square miles. There are no capital improvement projects currently planned for this watershed. Deer Creek is part of the Susquehanna River Basin. The predominate land use in the watershed is agriculture. A Deer Creek WRAS is currently being prepared by Harford County. Baltimore County is participating in that effort.

7.3.2 Prettyboy Reservoir

The Prettyboy Reservoir serves as a holding reservoir for the Loch Raven Reservoir. When the Loch Raven Reservoir water levels are low, water is released from Prettyboy Reservoir to maintain the levels in Loch Raven. Water is also released from Prettyboy Reservoir during the summer to maintain the low temperatures necessary to support the trout fishery in Gunpowder Falls.

The Prettyboy Reservoir watershed in Baltimore County is approximately thirty-seven square miles. Its predominate land uses are agriculture and forest. The Prettyboy Reservoir watershed has been listed as impaired by Maryland Department of the Environment for nutrients, mercury in fish tissue, heavy metals, bacteria, and biological impairment. In 2003 a Water Quality Analysis for heavy metals, that indicated no impairment was submitted to EPA and approved. A copy of the document can be found on the web at: http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_prettyboy_final_metals.asp

A TMDL for mercury in fish tissue was prepared and submitted to EPA and approved in 2004. The major source of mercury is from air deposition due to discharges from power plants and incinerators. As such, the major factor in reducing mercury contamination in Prettybory Reservoir is reductions in emissions, with secondary actions including hazardous waste

collection days and "e-cycling". The document may be found on the web at: http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/TMDL_final_prettyboy_Hg.asp

The nutrient TMDL for Prettyboy has been prepared and was submitted to EPA on September 15, 2006 for review and approval. The TMDL calls for a 54% reduction in Total Phosphorus in order to maintain chlorophyll a levels below eutrophic levels and to maintain dissolved oxygen above the limit of 5mg/l. It was determined through the modeling effort that reductions in nitrogen would have limited effect on the chlorophyll a and dissolved oxygen concentrations. The draft document may be found on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Pub_Notice/tmdl_PN_Gunpowder_P_Sed.asp#TMDL_Prettyboy_Reservoir_Nut

The bacteria TMDL has not been prepared for the Prettyboy Reservoir watershed at this point. The biological impairment of the stream biological community is limited to one of five the 12 digit subwatersheds within the Prettyboy Reservoir drainage area. The 12-digit subwatershed immediately adjacent to the reservoir is listed as impaired. An examination of the data would seem to indicate that the impairment may be limited to the Prettyboy Branch in the south eastern portion of the subwatershed.

With this budget cycle capital money has been proposed for fiscal years 2010 and 2012 for the design and construction of a stream restoration project as indicated in Table 7-3.

Table 7-3: Prettyboy Reservoir Watershed – CIP Status

Capital Improvement Projects Through 2005 Prettyboy Reservoir Watershed									
Project	**Facility Type**	**DA (LF)**	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Projects Under Design or Construction									
Projects in the Capital Budget									
Prettyboy SR (Design)	SR		225,000	10					
Prettyboy SR (Const.)	SR		450,000	12					
Totals			675,000						

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

In calendar year 2002 Baltimore County participated in a study that examined this watershed to identify threats to the source water resource. Additional participants in this study included Baltimore City, Trust for Public Lands (TPL), USDA Forest Service, University of Massachusetts, and the Baltimore Metropolitan Council of Governments. GIS was used extensively to target areas for preservation and conservation. A draft report was prepared in November of 2002 and a final one completed in 2003. Residents have organized an

environmental organization called the Prettboy Watershed Alliance and are actively engaged in restoration and resource management activities within the watershed.

The Prettyboy watershed has been selected by Maryland Department of the Environment for the preparation of a Watershed Restoration Action Strategy (WRAS). The WRAS development is currently in the second year with an anticipated completion date of early spring 2007. Development of the WRAS will specifically address the nutrient TMDL, along with other stakeholder-identified goals. When complete the WRAS will be submitted to MDE.

To expand the County's overall restoration strategy DEPRM developed the *Watershed Association Restoration Planning and Implementation Grant* Program. This grant program was developed to address staffing needs of local Watershed Associations. The intent of the grant is to provide funding for staff time to volunteer groups to participate in County restoration planning, identification of restoration projects, implementation of restoration projects, identify Stream Watch participants, offer educational activities, and the ability to leverage additional funding. Annual funding is limited up to $30,000 with a minimum of 1000 hours of staff time to be expended on projects. Funding is provided for salaries, fringe, and overhead (limited to 10%). Funding is not provided for restoration materials, supplies, or the Executive Director's salary.

The Prettyboy Watershed Alliance (PWA) applied for and received a grant under this program in August of 2006. The organization intends to use the funds to increase their membership, expand their base of volunteers, engage citizens with Stream Watch, participate in the Prettyboy WRAS, and develop partnerships with local schools.

7.3.3 Loch Raven Reservoir Watershed

The Loch Raven Reservoir watershed is listed as impaired by heavy metals, mercury, nutrients, sediment, and biological impairments. A Water Quality Analysis for heavy metals was performed and submitted to EPA for approval. No impairment for heavy metals was found. The document may be found on the web at:
http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_lochraven_final_metals.asp

A TMDL for mercury in fish tissue was prepared and submitted to EPA and approved in 2004. The major source of mercury is from air deposition due to discharges from power plants and incinerators. As such, the major factor in reducing mercury contamination in Loch Raven Reservoir in reductions in emissions, with secondary actions including hazardous waste collection days and "e-cycling". The document may be found on the web at:
http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/TMDL_final_lochraven_Hg.asp

The nutrient and sediment TMDLs for Loch Raven Reservoir was submitted to EPA on September 15, 2006 for review and approval. As with the Prettyboy Reservoir, Total Phosphorus was found to be the limiting nutrient. The TMDL calls for a 50% reduction in Total Phosphorus and a 25% reduction in sediment. The sediment reduction is intended to expend the longevity of the reservoir by reducing the rate of infilling of the reservoir. The document can be found on the web at:
http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Pub_Notice/tmdl_PN_Gunpowder_P_Sed.asp#TMDL_Loch_Raven_Reservoir

The Loch Raven Reservoir Watershed Management Plan was completed in 1997. The plan has been submitted to Maryland Department of the Environment. Previous reports have discussed various aspects of the plan. The Goodwin Run-Hunt Valley-Loveton SWAP, discussed above will provide the level of detain necessary for meeting a diverse array of environmental goals.

Table 7-4 presents the status of the capital improvement projects in the Loch Raven Reservoir watershed.

Table 7-4: Loch Raven Reservoir Watershed – CIP Status

Capital Improvement Projects Through 2005 Loch Raven Reservoir Watershed									
Project	**Facility Type**	**DA (LF)**	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Spring Branch	NWET	47	276,473	97	145.4	14.0	5,821	5.3	1.8
Spring Branch	SR	(10,000)	1,868,380	97	236.4	35.2	25,522		
Long Quarter Branch	NWET	139	150,000	99	379.1	39.9	23,643	41.2	10.8
Long Quarter Branch	SR	(2,300)	564,581	99	54.4	8.1	5,870		
Dulaney Valley Branch	SR	(1,700)	220,000	98	23.7	3.5	2,552		
East Beaver Dam Run I	SR	(2,000)	372,000	00	47.3	7.0	5,104		
Goodwin Run - Padonia Rd	SR	(700)	491,000	02	16.5	2.5	1,787		
Hampton Branch	SR	(2,500)	630,000	04	59.4	8.8	6,380		
Western Run@Ashland Ch	SR	(500)	365,675	04	11.8	1.8	1,276		
Projects Under Design or Construction									
Spring Branch II	SR	(2,500)	750,000	07	59.1	8.8	6,380		
Dulaney Gate Repairs			150,000	07					
Projects in the Capital Budget									
Gypsy Lane Trib.	SR		825,000	08/10					
East Beaver Dam Run II	SR		850,000	10/12					
Loch Raven Retrofit	RET		150,000	12					
Loch Raven SR (Design)	SR		250,000	12					
Totals		186 (22,200)	7,913,109		1,033.1	129.6	84,335	46.5	12.6

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

To date seven stream restoration projects have been completed in the watershed and one more is in the design stage. Several additional stream restoration projects are in the Capital budget for the future years. The completed stream restoration projects have restored 19,700 linear feet of stream channel. This is equivalent to approximately 0.3% of the stream miles in the Loch Raven Reservoir watershed. The additional stream restoration project in the design phase will result in the restoration of an additional 2,500 linear feet of degraded stream channel.

Two new stormwater management wet ponds have been installed in the Loch Raven Reservoir watershed to date. These two facilities provide water quality and peak flow attenuation for a total of 186 acres of urban land. The resulting pollutant load reductions are displayed in Table 7-

3. An additional two retrofits, yet to be identified, and four stream restoration projects are currently funded for in the capital budget.

To expand the County's overall restoration strategy DEPRM developed the *Watershed Association Restoration Planning and Implementation Grant* Program. This grant program was developed to address staffing needs of local Watershed Associations. The intent of the grant is to provide funding for staff time to volunteer groups to participate in County restoration planning, identification of restoration projects, implementation of restoration projects, identify Stream Watch participants, offer educational activities, and the ability to leverage additional funding. Annual funding is limited up to $30,000 with a minimum of 1000 hours of staff time to be expended on projects. Funding is provided for salaries, fringe, and overhead (limited to 10%). Funding is not provided for restoration materials, supplies, or the Executive Director's salary.

The Gunpowder Valley Conservancy (GVC) geographically includes the Loch Raven Reservoir Watershed within their organization. The GVC applied for and received a grant under this program in July of 2006. The organization intends to use the funds to expand their membership base, identify new volunteers, improve their web communication, organize tree planting and clean-up projects, engage citizens in Stream Watch, and conduct neighborhood outreach events.

7.3.4 Lower Gunpowder Falls Watershed

The Lower Gunpowder Falls watershed exhibits a diversity of land uses, with the portion below the mainstem of the Gunpowder River within the Perry Hall planned growth area, and the portion above the mainstem devoted mainly to agriculture and forest cover. The Lower Gunpowder Falls is listed by MDE as being impaired by heavy metals, nutrients, and as being biological impaired. A Water Quality Assessment for heavy metals was conducted in 2003 and submitted to EPA for approval indicating that the waters were not impaired by heavy metals. The document can be found on the web at:
http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_lowergunpowder_final_metals.asp

The *2006 List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality* does not indicate the development of nutrient TMDLs within the next two years.

The Lower Gunpowder Falls Watershed Management Plan was completed in 1999. The plan has been submitted to MDE. Previous reports have discussed various aspects of the plan. The development of a SWAP within the Lower Gunpowder Falls is not anticipated to take place in the next several years. The timing of the development of the SWAPs for the Lower Gunpowder will depend on the development of TMDLs for the watershed. Table 7-5 presents the status of the capital improvement projects in the Lower Gunpowder watershed.

Two stream restoration projects, which encompass almost the entire Minebank Run watershed, have been completed to date for a total of 17,000 feet of restored stream channel. The amount shown in the table above does not include the construction cost of a bridge that crosses the stream and needs repairs. Two additional stream restoration projects are currently in the design phase. An additional stream restoration project and two retrofit projects have funding allotted in the capital budget.

The Gunpowder Valley Conservancy (GVC) geographically includes the Lower Gunpowder Watershed within their organization. The GVC applied for and received a Watershed

Association Restoration Planning and Implementation Grant under the County's program in July of 2006. The organization intends to use the funds to expand their membership base, identify new volunteers, improve their web communication, organize tree planting and clean-up projects, engage citizens in Stream Watch, and conduct neighborhood outreach events.

Table 7-5: Lower Gunpowder Falls Watershed – CIP Status

Capital Improvement Projects Through 2005 Lower Gunpowder River Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Minebank Run **I**	SR	(7,000)	1,189,684	00	165.5	24.6	17,865		
Minebank Run II	SR	(10,000)	4,400,000	05	236.5	35	25,522		
Projects Under Design or Construction									
Jennifer Branch	SR	(4,500)	1,650,000	07-08	54.4	8.1	5,870		
Cromwell Bridge	SR	(1,500)							
Proposed Projects									
Northwind Farms (design)	SR		250,000	10					
Lower Gunpowder (design)	SR		250,000	10					
Northwind Farms (const.)	SR		650,000	12					
Lower Gunpowder (design)	SR		400,000	12					
Totals		(23,000)	8,789,684		456.4	67.7	49,257		

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

7.3.5 Little Gunpowder Falls Watershed

The Little Gunpowder Falls watershed is located on the eastern side of Baltimore County. The mainstem of the Little Gunpowder Falls serves as the boundary between Baltimore County and Harford County. MDE has listed Little Gunpowder Falls as impaired by heavy metals, nutrients, and as being biologically impaired. A Water Quality Assessment for heavy metals was conducted in 2003 and submitted to EPA for approval indicating that the waters were not impaired by heavy metals. The document can be found on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_littlegunpowder_final_metals.asp

Currently, no capital improvement projects are under design or construction in this watershed. The Watershed Management Plan was completed in March 2002. There is relatively little urban land in the Little Gunpowder Falls watershed and consequently this watershed has fewer potential projects. The projects that were identified through the watershed management plan, while needed, have a lower priority when considered on a County-wide basis. Table 7-6 presents the capital commitment to the Little Gunpowder Falls watershed through FY2012. The funding for a stream restoration project has been allotted for FY 2012.

Table 7-6: Little Gunpowder Falls Watershed – CIP Status

Capital Improvement Projects Through 2005 Little Gunpowder Falls Watershed									
Project	**Facility Type**	**DA**	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
None									
Projects Under Design or Construction									
None									
Proposed Projects									
Little Gunpowder	SR		250,000	12					
Totals			250,000						

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

The Gunpowder Valley Conservancy (GVC) geographically includes the Little Gunpowder Watershed within their organization. The GVC applied for and received a Watershed Association Restoration Planning and Implementation Grant under the County's program in July of 2006. The organization intends to use the funds to expand their membership base, identify new volunteers, improve their web communication, organize tree planting and clean-up projects, engage citizens in Stream Watch, and conduct neighborhood outreach events.

7.3.6 Bird River Watershed

The Bird River is listed as impaired for sediment and as being biologically impaired. A Water Quality Assessment for nutrients was conducted in 2005 and with EPA concurrence (May 9, 2005) was delisted as impaired by nutrients. The Water Quality Assessment can be found at:

http://www.mde.state.md.us/assets/document/Bird%20River%20WQA_final.pdf

The Bird River Watershed Management Plan was completed in 1995 and was the first watershed management plan completed by Baltimore County. Much of the County's capital improvement work completed to date has been done in the Bird River watershed. Table 4-7 presents project status through calendar year 2005. A total of eight stormwater management facilities have been created or converted to water quality management to date. These facilities manage a total of 492 acres of urban land for water quality and peak flow attenuation.

A total of 30,480 linear feet of stream restoration has either been completed or is in the design phase in the Bird River Watershed. This number does not include the Maryland State Highway Administration stream restoration project on the White Marsh Run mainstem between Route 95 and Route 7, nor the Allison Transmissions stream restoration project below Route 7. Funds for an additional stream restoration project have been provided in the capital budget. Three additional stream restoration projects are in the design phase.

The Gunpowder Valley Conservancy (GVC) geographically includes the Bird River Watershed within their organization. The GVC applied for and received a Watershed Association Restoration Planning and Implementation Grant under the County's program in July of 2006.

The organization intends to use the funds to expand their membership base, identify new volunteers, improve their web communication, organize tree planting and clean-up projects, engage citizens in Stream Watch, and conduct neighborhood outreach events.

Table 7-7: Bird River Watershed – CIP Status

Capital Improvement Projects Through 2005 Bird River Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Burnam Woods	CNV	36	11,687	95	85.0	12.1	4,583	0.0	0.0
Featherhill	CNV	85	18,013	95	230.8	22.0	9,477	16.8	3.9
Lawrence Hill	CNV	58	102,091	96	90.7	5.8	4,437	3.0	1.1
Perryvale	SR	(800)	120,000	99	18.9	2.8	2042		
Perryvale-ex.-detention	CNV	38	120,000	99	65.3	4.1	3,489	2.0	0.8
Franklin Square	NWET	97	935,416	99	19.9	0.8	1,663	0.3	0.2
White Marsh Mall	CNV	112	435,838	99	209.4	15.6	14,734	10.7	4.9
White Marsh Run – Main	SR	(4,000)	982,387	00	94.6	14.1	10,209		
White Marsh Business	RET	40	235,597	99	173.5	24.9	14,038	20.9	8.4
S. Fork White Marsh	SR	(1,900)	391,803	98	44.9	6.7	4,849		
Bird-Silver Meadow	SR	(400)	128,945	99	9.5	1.4	1,021		
Bird-Woodcroft	SR	(2,000)	700,000	00	47.3	7	5,104		
Evergreen SWM	CNV	26	40,828	02	42.9	2.7	2,247	1.6	0.6
N. Fork White Marsh Run	SR	(7,000)	1,239,140	04	165.5	24.6	17,865		
East Br. Honeygo Run	SR	(4,000)	1,330,000	04	94.6	14.1	10,209		
S. Fork@ Franklin Square	SR	(2,600)	600,000	04	61.5	9.2	6,635		
Projects Under Design or Construction									
WMR @ White Marsh Rd.	SR	(5,280)	764,500	04	35.5	5.3	3,828		
S. Fork WMR@ Kings Ct.	SR	(2,500)	1,020,000	07	59.1	8.8	6,380		
Whitemarsh Run@ Orbitan	SR	(300)	325,000						
Proposed Projects									
N. Fork II (Design)	SR		300,000	10					
N. Fork II Construction	SR		850,000	12					
Totals		492 (30,780)	10,651,245		1548.9	182	122,810	55.3	19.9

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

7.3.7 Gunpowder River Watershed

A watershed management plan is not required for the Gunpowder River watershed for the NPDES – Municipal Stormwater Discharge Permit due to the limited urban development. This is a ten square mile watershed and a capital project has been completed in the watershed. This project is listed in Table 7-8.

Table 7-8: Gunpowder River Watershed – CIP Status

Capital Improvement Projects Through 2005 Gunpowder River Watershed									
Project	**Facility Type**	**DA**	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Carrollwood Park	RET	59	350,000	95	189.0	18.1	7,750.1	10.7	2.8
Projects Under Design or Construction									
None									
Proposed Projects									
None									
Totals		59	350,000		189.0	18.1	7,750.1	10.7	2.8

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined

The Gunpowder Valley Conservancy (GVC) geographically includes the Gunpowder River Watershed within their organization. The GVC applied for and received a Watershed Association Restoration Planning and Implementation Grant under the County's program in July of 2006. The organization intends to use the funds to expand their membership base, identify new volunteers, improve their web communication, organize tree planting and clean-up projects, engage citizens in Stream Watch, and conduct neighborhood outreach events.

7.3.8 Middle River Watershed

The Middle River Watershed Management Plan was submitted to Maryland Department of the Environment in 2001. Under DEPRM's Capital Improvement Program, dredging of many of the creeks within this estuary was completed in 2002. To fulfill the dredging permit requirements, a feasibility study was completed to identify potential retrofit sites. Capital projects in Middle River are displayed in Table 7-9.

Much of the capital improvement work that has been completed in the Middle River watershed consists of shoreline improvement projects. A total of five shoreline enhancements have been completed. Two retrofit projects have been completed and one is still under design. The revitalization efforts in the Essex community have provided opportunities for additional water quality enhancements. The Tall Trees project is a joint effort between the developer and the County. An additional retrofit is proposed for Galloway Creek to meet the requirements of its dredging permit.

Table 7-9: Middle River Watershed – CIP Status

Capital Improvement Projects Through 2005 Middle River Watershed									
Project	Facility Type	DA	Cost	Date	Removal Rate (lb./year)				
					TN	TP	TSS	Zn	Pb
Completed Projects									
Turkey Point	SE	na	127,539	97					
Sue Creek	STWET	22	93,274	97	65.3	6.3	2,656	2.5	0.9
Dark Head Park	SE	na	168,000	90					
Pottery Farm Park	SE	na	351,000	95					
Hawthorne Park	SE	na	64,000	95					
Dark Head Park II	SE	na	15,094	99					
Norman Creek	STWET	25	131,151	95	59.4	5.6	2,484	2.1	0.7
Tall Trees	SR	(1,000)	1,100,000	06	23.7	3.5	2,552		
Tall Trees	RET	135	combined	06					
Galloway Creek	RET		150,000	07					
Projects Under Design or Construction									
Frog Mortar	RET		82,000						
Proposed Projects									
None									
Totals		182 (1,000)	2,282,058		148.4	15.4	7,692	4.6	1.6

Abbreviations

CNV: SWM Pond Conversion
NEXT: New Extended Detention Pond
NWET: New Wet Pond
SCR: StormCeptor
SR: Stream Restoration
SE: Shoreline Enhancement
HAB: Habitat improvement
TBD: To Be Determined
RET: Retrofit
STWET: Stormwater Wetland

7.4 Patapsco/Back River Watersheds

The Patapsco/Back River Basin watersheds include: Liberty Reservoir, Patapsco River, Gwynns Falls, Jones Falls, Back River and Baltimore Harbor. Five of the six watersheds require watershed management plans based on the amount of urban development within the watershed.

7.4.1 Liberty Reservoir Watershed

The Liberty Reservoir is listed as impaired for nutrients, metals, sediment, with some streams listed as being impaired biologically. A TMDL for mercury in fish tissue was prepared and submitted to EPA and approved in 2004. The major source of mercury is from air deposition due to discharges from power plants and incinerators. As such, the major factor in reducing mercury contamination in Loch Raven Reservoir in reductions in emissions, with secondary actions including hazardous waste collection days and "e-cycling". The document may be found on the web at:

http://www.mde.state.md.us/assets/document/tmdl/liberty/Liberty_main_pn.pdf

A Water Quality Analysis for chromium and lead was performed and submitted to EPA. EPA concurred (November 10, 2003) that no impairment by chromium and lead is occurring. The document may be found on the web at:

http://www.mde.state.md.us/assets/document/Liberty%20Reservoir%20WQA_final(1).pdf

A watershed management plan is not required for the Liberty Reservoir watershed for the NPDES – Municipal Stormwater Discharge Permit due to the limited urban development. The Liberty Reservoir serves as a drinking water reservoir for portions of Carroll County, Howard County, Baltimore County, Anne Arundel County and Baltimore City. Much of the Baltimore County portion of the drainage area to Liberty Reservoir is under forest cover. While there are no planned capital improvement projects for this watershed, its importance as a water supply reservoir require that additional planning of preservation and reforestation activities be considered in the future.

7.4.2 Patapsco River Watershed

The Patapsco River Watershed Management Plan was submitted to Maryland Department of the Environment in 2000. Table 7-10 provides a summary of the capital improvement projects in the Patapsco River watershed. One retrofit and five stream restoration projects have been completed in the Herbert Run and Bens Run subwatersheds. A retrofit project was also completed in conjunction with the County's Department of Public Works. An additional stream restoration project is in the design and construction phase. A total of 4,750 linear feet of stream channel has either been restored or is in design to be restored. An additional four projects are planned in the capital budget through FY2012.

A Total Maximum Daily Load (TMDL) has been completed for nutrients, and was submitted to EPA on December 14, 2006 for consideration. This TMDL covers all of the watersheds draining to Baltimore Harbor. The TMDL has estimated that a 15% reduction in urban non-point source load will be needed, along with upgrades to the Patapsco WWTP to meet water quality standards for tidal Baltimore Harbor. The document can be found on the web at:

http://www.mde.state.md.us/assets/document/harbor-main-051906_PN.pdf

A SWAP has been initiated in the lower urban portion of the Patapsco River watershed, with the initial meeting held April 4, 2005. One of the goals for this SWAP will be to reduce nitrogen and phosphorus urban non-point pollutant loadings by 15% through a combination of County actions and projects, and citizen and business actions. The SWAP is anticipated to be completed in the winter/early spring of 2007.

The County has developed a grant program entitled, Watershed Association Restoration Planning and Implementation Grant Program. This grant program was developed to address staffing needs of local Watershed Associations. The intent of the grant is to provide funding for staff time to volunteer groups to participate in County restoration planning, identification of restoration projects, implementation of restoration projects, identify Stream Watch participants, offer educational activities, and the ability to leverage additional funding. Annual funding is limited up to $30,000 with a minimum of 1000 hours of staff time to be expended on projects. Funding is provided for salaries, fringe, and overhead (limited to 10%). Funding is not provided for restoration materials, supplies, or the Executive Director's salary.

The Friends of Patapsco Valley and Heritage Greenway (FPVHG) applied for and received a grant under this program in February of 2006. The organization intends to use the funds to expand their base of volunteers, increase their membership, organize stream clean ups, engage citizens in Stream Watch, and outreach to schools and institutions.

Table 7-10: Patapsco River Watershed – CIP Status

Capital Improvement Projects Through 2005 Patapsco River Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Bloomsbury (DPW)	RET	10		90					
Herbert Run@ Selma Ave.	SR	(550)	227,000	00	13.0	2.2	1,404		
Herbert Run @ Leeds Ave	SR	(300)	78,144	03	7.2	1.2	766		
2203 Sulphur Spring Rd	SR	(200)	111,000	03	4.8	0.8	510		
Halethorpe Streambank	SR	(100)	61,500	03	2.4	0.4	255		
Bens Run	SR	(2,000)	570,964	04	47.3	7.0	5,104		
Bens Run	STWET	30	incl. above	04	44.3	8.6	3,150	3.5	1.0
Projects Under Design or Construction									
Herbert Run @ First Ave	SR	(1600)	400,000	04	37.8	5.9	4,083		
Proposed Projects									
Totals		40 (4,750)	1,448,608		156.8	26.1	15,272	3.5	1.0

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
cd: Consent Decree requirement
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined
STWET: Stormwater Wetland

7.4.3 Gwynns Falls Watershed

The County has completed the Gwynns Falls watershed management plan as a joint effort with Baltimore City and using the services of a professional consultant. Approximately two-thirds of the watershed is located in Baltimore County. Owings Mills, one of the County's two designated growth areas, is highly urbanized and located within this watershed.

Table 7-11 displays the status of capital projects in the Gwynns Falls watershed. The Department is implementing several buffer enhancement projects in the Dead Run subwatershed. These consist mainly of streetscape plantings that are adjacent to Dead Run. Baltimore County is not claiming pollutant reduction benefits from these projects at this time. Baltimore County realizes that the pollutant reduction efforts for the Gwynns Falls watershed are lagging behind the other watersheds. Therefore, substantial capital dollars are allocated in future years in anticipation of completing the watershed management plan and catching up the Gwynns Falls Watershed with the County's other urbanized watersheds.

A TMDL for nutrients has been completed for the Patapsco Basin, including Gwynns Falls. The TMDL identifies a 15% reduction from urban non-point sources as necessary to meet water quality standards in tidal Baltimore Harbor. The document can be viewed on the web at the location given under the discussion of the Patapsco watershed in section 7.4.2 above. A TMDL for bacteria has also been developed for Gwynns Falls requiring a reduction in bacteria loads in the range of 98%. This document can be viewed on the web at: http://www.mde.state.md.us/assets/document/GwynnsFalls_TMDL_071206_PN.pdf#TMDL_Georges_Creek_bacteria

One hundred and eighty-five (185) acres of urban land have been address through enhanced stormwater management through conversion of existing stormwater management facilities or retrofits of uncontrolled urban discharge. A total of 2,235 feet of stream restoration has been completed with an additional stream restoration project in design. Over $7,000,000 have been allocated for restoration within the Gwynns Falls in fiscal years 2007 through 2012.

Table 7-11: Gwynns Falls Watershed – CIP Status

Capital Improvement Projects Through 2005 Gwynns Falls Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Greenshire Court	SR	(135)	17,690	99	3.2	0.5	345		
Dead Run @ Security/McD	BE	(250)	23, 690	02					
Rutherford Business Ctr.	CNV	56	134,000	03	160.7	45.5	13,188	17.4	13.2
Dead R@ HS Ftbridge/wall	SR	(200)	141,000	03	4.7	0.7	510		
Woodlawn HS retrofit	RET/BE	8.9	206,000	03	21.6	3.9	1,399		
Dead Run@ Whitehead Rd	SCR/BE	60	155,000	03	157.4	53.1	12,569		
DR@Woodlawn Dr (Fox)	SR	(450)	232,594	04	10.6	1.6	1,148		
Dead R @ Dogwood Rd	BE	(1,200)	Na	04					
Projects Under Design or Construction									
Chartley SR (Design)	SR	(2,000)	200,000	06	47.3	7.0	5,104		
Chartley SR (Const.)	SR		770,000	07					
Scotts Level, Feasibility	RET		150,000	07					
Proposed Projects									
I70 Interchange WQ	RET		1,100,000	08-12					
Scotts Level Retrofit	RET		300,000	08					
Scotts Level I (Design)	SR		500,000	08					
Scotts Level I (Con)	SR		1,250,000	10					
Western Hills Ret	RET		300,000	10					
West View Park Des-Con	SR		1,450,000	08-10					
Scotts Level II	SR		800,000	12					
Scotts Level Ret	RET		350,000	12					
Totals		124.9 (4,235)	8,056,284		405.5	112.3	34,263	17.4	13.2

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
HAB: Habitat improvement
RET: Retrofit
cd: Consent Decree requirement
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined
BE: Buffer Enhancement

7.4.4 Jones Falls Watershed

The Jones Falls Watershed Management Plan was submitted to Maryland Department of the Environment in 1997. Table 7-12 provides a summary of the capital improvement projects in the Jones Falls watershed either completed, in design or proposed.

Three outfalls with a combined acreage of 133 acres have completed retrofit projects to provide water quality improvement. A total of 7,050 linear feet of stream restoration has either been completed or is in the design phase. An additional two retrofits and two stream restoration projects have been allocated for in the future capital budget.

A TMDL for nutrients has been completed for the Patapsco Basin, including Jones Falls. The TMDL identifies a 15% reduction from urban non-point sources as necessary to meet water quality standards in tidal Baltimore Harbor. The document can be viewed on the web at the location given under the discussion of the Patapsco watershed in section 7.4.2 above. A TMDL for bacteria has also been developed for Jones Falls and was submitted to EPA September 22, 2006. This TMDL requires a reduction in bacteria loads in the range of ~95%. This document can be viewed on the web at:

http://www.mde.state.md.us/assets/document/Jones_Falls_TMDL_071706_PN.pdf

Water Quality Assessments were performed by MDE for zinc, copper, and lead. The analysis of zinc was performed first and received EPA concurrence on February 20, 2003. The document can be found at the first link listed below. EPA also concurred with the Water Quality Assessment for copper and lead on December 2, 2004 (second link). Both of these Water Quality Assessments found no impairment related to the heavy metals considered.

http://www.mde.state.md.us/assets/document/Jones%20Falls%20WQA_final(1).pdf

http://www.mde.state.md.us/assets/document/Jones%20Falls%20WQA_final(2).pdf

A SWAP for Roland Run and Towson Run is currently being developed. The initial meeting was held February 8, 2005. The SWAP will address the reductions of nitrogen and phosphorus loads necessary to meet water quality standards. It is expected to be completed in the winter/early spring of 2007.

Table 7-12: Jones Falls Watershed – CIP Status

Capital Improvement Projects Through 2005 Jones Falls Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Robin Hood Cr. minor outf	DET	17	307,359	98	3.7	0.7	185	0.7	0.3
Kenilworth Park #144	DET	83	Inc. above	98	273.8	28.5	14,031	29.5	6.9
Orchard Hills outfall #149	DET	33	Inc. above	98	22.0	4.3	1,362	6.0	2.3
Roland Run - Essex Rd.	SR	(400)	479,488	98	9.5	1.4	1,021		
Roland Run – Sem. Ave.	SR	(100)	Inc. above	98	2.4	0.4	255		
Towson Run – VFW Hall	SR	(600)	349,869	00	14.2	2.1	1,531		
Roland Run – Jeffers Rd.	SR	(1,550)	451,083	02	0.7	0.1	28		
Wood Valley	SR	(2,000)	1,077,510	04	23.7	3.5	2,552		
Projects Under Design or Construction									
Roland Run-Riderwd. Hills	SR	(2,400)	1,100,000	04-07	56.7	8.5	6,125		
Roland Run @Greenspring	SR	(3,500)	1,500,000	06-08					
Roland Run @Greenspring	RET		620,000	06					
Proposed Projects									
Towson Run @ Cloisters	RET		500,000	08					
Roland Run @ Kellog (D)	SR		600,000	08					

Roland Run @ Kellog (C)	SR		400,000	10					
Totals		133 (10,550)	7,385,309		406.7	49.5	27,090	36.2	9.5

Abbreviations
CNV: SWM Pond Conversion
NWET: New Wet Pond
SR: Stream Restoration
DET: Detention Pond
HAB: Habitat improvement
cd: Consent Decree requirement
NEXT: New Extended Detention Pond
SCR: StormCeptor
SE: Shoreline Enhancement
TBD: To Be Determined
BE: Buffer Enhancement

EPA Region III has awarded Baltimore County a Water Quality Cooperative Assistance Grant in the amount of $200,000 for the creation of two SWAPs. One of the SWAPs will be located in the lower Jones Falls and will include the subwatersheds of Slaughterhouse Run, Moores Run, Western Run and the Jones Falls portion of Baltimore City. The SWAP for this planning area will begin in December 2007 and be completed within an eighteen-month period.

To expand the County's overall restoration strategy DEPRM developed the *Watershed Association Restoration Planning and Implementation Grant* Program. This grant program was developed to address staffing needs of local Watershed Associations. The intent of the grant is to provide funding for staff time to volunteer groups to participate in County restoration planning, identification of restoration projects, implementation of restoration projects, identify Stream Watch participants, offer educational activities, and the ability to leverage additional funding. Annual funding is limited up to $30,000 with a minimum of 1000 hours of staff time to be expended on projects. Funding is provided for salaries, fringe, and overhead (limited to 10%). Funding is not provided for restoration materials, supplies, or the Executive Director's salary.

The Jones Falls Watershed Association (JFWA) applied for and received a grant under this program in October of 2006. The organization intends to use the funds to expand their base of volunteers, increase their membership, organize buffer plantings and removal of invasive plants, engage citizens in Stream Watch, and outreach to schools and institutions.

7.4.5 Back River Watershed

The Back River Watershed Management Plan was submitted to Maryland Department of the Environment in 1997. Table 7-13 provides a summary of the capital improvement projects in the Back River watershed either completed, in design or proposed.

Seven storm water retrofit/conversion projects, addressing 598 acres of drainage area, have either been completed or are in the design stage. Money has been allocated for an additional retrofit in the Back River watershed. Eight stream restoration projects addressing 10,181 linear feet of degraded stream channel have either been completed or are in the design phase. Two additional projects, a stream restoration project and a shoreline enhancement project, have been budgeted in future fiscal years.

A TMDL for nutrients has been completed for the Back River watershed and approved by EPA June 29, 2005. The TMDL identifies a 15% reduction from urban non-point sources as necessary to meet water quality standards in tidal Back River, along with nutrient reductions from the Back River WWTP. This document can be viewed on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/TMDL_final_backriver_eutro.asp

In addition to the nutrient TMDL, MDE has developed a TMDL for chlordane (EPA approval December 17, 1999) and a draft TMDL for bacteria. A Water Quality Assessment was performed for zinc (EPA concurrence December 23, 2004) indicating no impairment due to zinc. These documents can be viewed on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/tmdl_backriver.asp

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Pub_Notice/TMDL_PN_herringrun_bacteria.asp

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_final_backriver_zinc.asp

A revised TMDL for bacteria is currently available for public comment (released April 2007). The original TMDL for bacteria can be viewed on the web at:

http://www.mde.state.md.us/assets/document/Herring%20Run%20FC%20TMDL_main_051106_PN.pdf The revised bacteria TMDL document has not been posted on the MDE website at this point. The original and the revised TMDL indicate a 98-99% reduction in bacteria are needed to meet water quality standards.

EPA Region III has awarded Baltimore County a Water Quality Cooperative Assistance Grant in the amount of $200,000 for the creation of two SWAPs. One of the SWAPs will be located in the upper Back River and will include the subwatersheds of Herring Run, Moores Branch, Redhouse Run, and Stemmers Run. The SWAP for this planning area will began in December 2007 and will be completed within an eighteen-month period.

To expand the County's overall restoration strategy DEPRM developed the *Watershed Association Restoration Planning and Implementation Grant* Program. This grant program was developed to address staffing needs of local Watershed Associations. The intent of the grant is to provide funding for staff time to volunteer groups to participate in County restoration planning, identification of restoration projects, implementation of restoration projects, identify Stream Watch participants, offer educational activities, and the ability to leverage additional funding. Annual funding is limited up to $30,000 with a minimum of 1000 hours of staff time to be expended on projects. Funding is provided for salaries, fringe, and overhead (limited to 10%). Funding is not provided for restoration materials, supplies, or the Executive Director's salary. The Herring Run Watershed Association (HRWA) applied for and received a grant under this program in January of 2006. The organization intends to use the funds to expand their base of volunteers, increase their membership, organize street tree planting projects, organize stream clean up events, engage citizens in Stream Watch, and outreach to schools

Table 7-13: Back River Watershed – CIP Status

Capital Improvement Projects Through 2005 Back River Watershed									
Project	**Facility Type**	**DA** (LF)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Coxs Point I	SE		45,000						
Coxs Point II	SE		295,000						
Rocky Point I	SE		270,000						
Rocky Point II	SE		192,000						
Lynch Point Cove – SM	CNV	27	250,000	97	63.1	5.4	3,565	41.2	10.8
Stemmers Run	SR	(1,881)	362,905	97	35.5	5.3	3,828		
Stemmers Run	SCR	33	121,000	98	0	4.9	7,055	0	0
Redhouse E.S. Retrofit	RET	34	136,794	98	69.6	4.1	4,041	2.0	0.9
Greenhill WQ Retrofit	SCR	12	35,273	98	0	1.7	1,781	0	0
Rocky Point @ Ballestone	SE	NA	389,480	98					
Redhouse Run Md-7	SCR	11	49,925	99	1.0	0.3	104	0.8	0.3
Rossville Industrial Park	CNV	155	184,210	99	525.5	72.2	33,619	36.9	19.6
Herring Run (Wiltondale)	SR	(1,400)	295,860	99	23.7	3.5	2,552		
Herring Run (Goucher)	SR	(300)	158,538	00	7.1	1.1	766		
OverleaTrib @ HS Prop	SR	(2,600)	529,260	01	61.5	9.2	6,636		
Linover Park	SR	(1,000)	206,745	02	23.7	3.5	2,552		
Rocky Pt. Habitat Creation	HAB	na	519,000	02					
Martin Blvd Interchange	NEXT	191	629,144	04	390	66.8	23,332	63	15.1
Linwood Avenue	SR	(500)	283,968	04	11.8	1.8	1,276		
Glenwest	RET	135	458,000	04					
Glenwest	SR	(500)	Inc. above	04	11.8	1.8	1,276		
Herring Run @ Sussex Rd.	SRepair		96,572	07					
Red House Rn@ St. Pat Rd	SR		1,115,000	07					
Projects Under Design or Construction									
St. Patrick Rd.	SR	(2,000)	860,000	04	4.3	7.0	5,104		
Proposed Projects									
Essex Skypark	SE		650,000	08-10					
Totals		598 (10,181)	8,133,674		1,228.6	188.6	97,487	143.9	46.7

Abbreviations
CNV: SWM Pond Conversion
NEXT: New Extended Detention Pond
NWET: New Wet Pond
SCR: StormCeptor
RET: Retrofit
TBD: To Be Determined
SR: Stream Restoration
SE: Shoreline Enhancement
HAB: Habitat improvement

7.4.6 Baltimore Harbor Watershed

The Baltimore Harbor Watershed Management Plan was submitted to Maryland Department of the Environment in 2001. Table 7-14 presents the status of capital improvement projects through 2003.

Seven storm water retrofit/conversion projects have been completed to date along with twelve shoreline enhancement projects. The nine retrofit projects address 619 acres of urban development for water quality improvements. Twelve shoreline enhancement projects have been completed in the Baltimore Harbor watershed. The capital budget contains money for one additional retrofit project.

A TMDL for nutrients has been completed for the Patapsco Basin, including the Baltimore Harbor watershed. The TMDL identifies a 15% reduction from urban non-point sources as necessary to meet water quality standards in tidal Baltimore Harbor. The document can be viewed on the web at the location given under the discussion of the Patapsco watershed in section 7.4.2 above. In addition, a TMDL for chlordane (EPA approval March 23, 2001) has been developed. This document can be viewed on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/tmdl_baltoharbor.asp

A number of Water Quality Assessments have been performed in Baltimore Harbor resulting in the delisting of Baltimore Harbor as being impaired by zinc, lead, and chromium (EPA concurrence January 18, 2005). These documents can be found on the web at:

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_final_harbor_Cr.asp

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/ApprovedFinalTMDL/WQA_final_harbor_Zn_Pb.asp

Table 7-14: Baltimore Harbor Watershed – CIP Status

Capital Improvement Projects Through 2006 Baltimore Harbor Watershed									
Project	**Facility Type**	**DA** (ft.)	**Cost**	**Date**	**Removal Rate (lb./year)**				
					TN	**TP**	**TSS**	**Zn**	**Pb**
Completed Projects									
Concrete Homes	SE	na	65,000	90					
Watersedge Park	SE	na	92,000	90					
Merritt Point Park	SE	na	175,000	90					
Bear Creek I	SE	na	66,000	90					
West Inverness	SE	na	19,000	90					
Chink Creek	RET	12.6		90					
Hughes Ave	RET	17		90					
Charlesmont	SE	na	47,000	93					
Sandy Plains Elem.	SE	na	83,000	98					
Tabasco Cove	STWET	135	128,209	96	520.2	78.4	40,850.9	53.9	26.2
Lynch Point Cove	NWET	27	247,660	97	63.1	5.4	3,564.7	41.2	10.8
North Point Creek	NEXT	90	117,277	98	189.5	17.6	8,081.1	6.6	2.4
Schoolhouse Cove	SCR	29	419,133	98	0	4.1	4,259.0		
Bear Creek II Shore	SE	(500)	45,445	99					
Bear Creek II SD Retrofit	NWET	12	93,026	99	41.9	4.0	1,671.7	4.3	0.9
Sandy Plains Elem.	SE		97,349	99					
Watersedge Park II	SE	(100)	21,062	99					
Lynch Cove Retrofit site-I	STWET	217	500,000 combined	03					
Lynch Cove Retrofit site-II	STWET	109		03					
West Inverness	SE		372,000	03					
Concrete Homes	SE	(200)	110,000	03					
Fleming Park	SE		310,000	07					

Projects Under Design or Construction									
Proposed Projects									
Bear Creek Headwaters	RET		100,000	08					
Pleasure Island	SE		2,805,000	08-12					
Totals		648.6 (800)	5,913,161		814.7	109.5	58,427.4	106.0	40.3

Abbreviations
CNV: SWM Pond Conversion
NEXT: New Extended Detention Pond
NWET: New Wet Pond
SCR: StormCeptor
SR: Stream Restoration
SE: Shoreline Enhancement
STWET: Stormwater Wetland
HAB: Habitat improvement
TBD: To Be Determined

7.5 Pollution Reduction Tracking Database

The pollution reduction tracking database currently tracks reductions from capital construction projects. It includes elements that are shown in the pollutant reduction tables in this section. In addition, pollutant reduction attributable to certain types of restoration (stream channel restoration and buffer planting) must continue to be monitored and assessed. Spring Branch has provided the data for a preliminary estimate of pollutant load reduction per linear foot of restored stream channel. A grant project that DEPRM and the Water Environment Research Federation (WERF) have recently completed will provide information on pollutant reduction benefits of urban forested riparian buffers. The Chesapeake Bay Program has assigned a tentative pollutant removal efficiency of 25% for Total Nitrogen and 50% for Total Phosphorus and Total Suspended Solids. In addition to the pollutant removal efficiencies the Chesapeake Bay Program counts urban forest riparian buffers as a land use conversion. The County has not included these reduction efficiencies in the current report, but anticipates that credit for urban-forested riparian buffers will be applied in future reports. In addition, the urban loads will be adjusted by a reduction in urban land use due to forest riparian buffers that are now included in the urban land use categories, due to the way the land use is derived by Maryland Department of Planning. A data tracking spreadsheet that includes operational programs will be completed when reduction amounts are quantified.

7.6 Impervious Surface Calculation

The impervious surface acreage in Baltimore County was calculated by using a GIS planimetric building footprint data layer and a planimetric roadway data layer that was created from aerial photography flown from 1995-1997. The building data layer does not include sidewalks or driveways. The roads data layer includes parking lots. The data are presented by watershed in Table 7-15.

Using this methodology a total impervious coverage of 34,000 acres was derived for Baltimore County. All of the watersheds in the Patapsco/Back River Basin have higher impervious percentages then the watersheds in the Upper Western Shore Basin. This is with the exception of the Liberty Reservoir watershed, which has a low impervious percentage because of its value as a source for drinking water. The Baltimore Harbor watershed had the highest percentage of impervious area. Roadways and parking lots account for 63.1 % of the impervious surface coverage in Baltimore County.

Table 7-15: Baltimore County Impervious Area by Watershed

Watershed	Drainage Area	Building Acres	Road Acres	Total Acres Impervious	% Impervious
Upper Western Shore Watersheds					
Deer Creek	7,131	39.6	118.3	157.9	2.21
Prettyboy Reservoir	25,545	125.9	318.4	444.3	1.74
Loch Raven Reservoir	139,554	1,983.2	4,159.3	6,142.5	4.40
Lower Gunpowder Falls	29,471	767.6	846.0	1,613.6	5.48
Little Gunpowder Falls	17,229	190.3	403.7	594.0	3.45
Bird River	16,463	698.5	873.6	1,572.2	9.55
Gunpowder River	6,065	120.1	112.4	232.5	3.83
Middle River	6,520	429.0	351.3	780.3	11.97
Upper Western Shore Totals	**247,978**	**4,354.2**	**7,183.0**	**11,537.3**	**4.65**
Patapsco/Back River Watersheds					
Liberty Reservoir	17,555	133.3	363.5	496.9	2.83
Patapsco River	33,186	1,465.9	2,606.4	4,072.3	12.27
Gwynns Falls	28,643	2,170.3	3,983.5	6,153.8	21.48
Jones Falls	25,945	1,306.8	2,215.1	3,521.9	13.58
Back River	23,248	1,958.9	3,299.5	5,258.4	22.62
Baltimore Harbor	11,453	1,154.4	1,806.7	2,961.1	25.86
Patapsco/Back River Totals	**140,030**	**8,189.6**	**14,274.7**	**22,464.4**	**16.04**
County-Wide Totals	**388,008**	**12,543.8**	**21,457.7**	**34,002**	**8.76**

To meet the current NPDES permit requirement Baltimore County must provide restoration for impervious land areas that are equal to or greater than 10% of the County's urban impervious cover. Roads that are owned by the Maryland State Highway Administration do not have to be addressed by Baltimore County. Therefore the roadways that are maintained by the Maryland State Highway Administration were identified and the acreage of impervious cover associated with those highways was removed from Baltimore County's requirement. The results are presented in Table 7-16. The roadways owned by the Maryland State Highway Administration account for 3,455 acres of impervious area in Baltimore County or 10.2% of the total impervious area.

Table 7-15 calculates that Baltimore County is required to manage 10% of 31,090 acres, which equals 3,100 acres of impervious cover. This is currently accounted for through the construction of restoration projects. Watershed management plans list specific potential projects that address water quality restoration. The capital budget provides funds on a watershed basis for implementation of the projects found to be feasible. The specific projects completed and currently under design or construction are listed in Tables 7-3 through 7-14 by watershed. Unidentified projects for each watershed are also listed by type.

Table 7-16: Baltimore County and Maryland State Highway Impervious Acreage

Watershed	Impervious Acres in Baltimore Co.	Impervious Acres owned by SHA	Remaining Impervious Acres
Upper Western Shore Watersheds			
Deer Creek	157.9	26.8	131.1
Prettyboy Reservoir	444.3	25.4	418.9
Loch Raven Reservoir	6,142.5	630.8	5,511.7
Lower Gunpowder Falls	1,613.6	119.4	1,484.2
Little Gunpowder Falls	594.0	98.9	495.1
Bird River	1,572.2	276.7	1,848.9
Gunpowder River	232.5	8.4	224.1
Middle River	780.3	64.5	715.8
Upper Western Shore	**11,537.3**	**1,250.9**	**10,829.8**
Patapsco/Back River Watersheds			
Liberty Reservoir	496.9	93.1	403.8
Patapsco River	4,072.3	473.9	3,598.4
Gwynns Falls	6,153.8	539.2	5,614.6
Jones Falls	3,521.9	403.7	3,118.2
Back River	5,258.4	526.9	4,731.5
Baltimore Harbor	2,961.1	167.4	2,793.7
Patapsco/Back River	**22,464.4**	**2,204.2**	**20,260.2**
County-Wide Totals	**34,001.7**	**3,455.1**	**31,090.0**

The drainage areas for most of the completed projects and the associated impervious acreage have been delineated with the use of GIS. The drainage area for each CIP project that has been completed was delineated using topography or consultant information. An associated GIS data layer created was created of all the CIP project drainage areas. The area of impervious surfaces within each digitized drainage area was measured. The total of these impervious surfaces was categorized by watershed and is included in Table 7-17.

The impervious acreage addressed by completed capital improvement projects is listed in Table 7-17. Baltimore County through its Capital Improvement Program has addressed 2,769 acres (8.9%) of its impervious acreage required under the current NPDES permit. In addition, 2,045 acres of impervious cover has been address through installation of stormwater management that does not have potential for retrofits and is providing water quality benefits. The addition of this acreage results in a total of 15.5% of the impervious area in the County addressed through water quality controls.

Table 7-17: Impervious Acreage Addressed by Completed Capital Improvement Projects

Watershed	Impervious Acres to be Addressed Watershed	CIP Projects Drainage Area	CIP Project Impervious Acres	SWM Impervious Acres	Total Impervious Area Addressed	Total Percent of Impervious Addressed
Upper Western Shore						
Deer Creek	131.1	0	0	0	0	0%
Prettyboy Reservoir	418.9	0	0	2.7	421.6	.6%
Loch Raven Reservoir	5,511.7	2,341.9	562.8	307.1	8,723.5	15.8%
Lower Gunpowder Falls	1,484.2	2,324.3	426.3	175.7	4,410.5	40.6%
Little Gunpowder Falls	495.1	0	0	17.7	17.7	3.6%
Bird River	1,848.9	2,193.2	452.7	327.3	4,822.1	42.2%
Gunpowder River	224.1	65.9	16.6	11.0	317.6	12.3%
Middle River	715.8	232.7	61.3	44.1	1053.9	14.7%
Upper Western Shore Totals	**10,829.8**	**7,158.0**	**1519.7**	**885.6**	**19,766.9**	**22.2%**
Patapsco/Back River						
Liberty Reservoir	496.9	0	0	3.1	3.1	0.6%
Patapsco River	3,598.4	486.2	138.7	131.8	4,355.1	7.5%
Gwynns Falls	5,614.6	113.9	57.2	500.5	6,286.2	9.9%
Jones Falls	3,118.2	1,013.1	319.0	147.1	4,597.4	14.9%
Back River	4,731.5	1,703.5	463.1	337.9	7,236.0	16.9%
Baltimore Harbor	2,793.7	696.2	271.4	38.7	3,800	11.1%
Patapsco/Back River Totals	**20,353.3**	**4,012.9**	**1249.4**	**1159.1**	**26,277.8**	**11.9%**
County-Wide Totals	**31,090.0**	**11,170.9**	**2,769.1**	**2,044.7**	**4,813.8**	**15.5%**

The SWAPs that are currently under development will provide the information necessary to determine the extent of the restoration options necessary to meet TMDL determined pollutant load reductions, and the Maryland Chesapeake Bay Tributary Strategies. At the same time these plans will satisfy the NPDES – MS4 permit to address impervious area. Table 7-18 presents the information of the impervious cover that will be addressed by these five plans.

Table 7-18: Impervious Cover Addressed by the Current SWAPs

Planning Area	Drainage Area	Acres Buildings	Acres Roads	Total Impervious Area	% County Imp. Area (total = 31,090)
Goodwin Run/Hunt Valley/ Loveton	9,126	633	1,190	1,823	5.9
Roland Run/Towson Run	7,463	623	1,045	1,668	5.4
Lower Patapsco	17,569	1,224	2,141	3,365	10.9
Prettyboy WRAS	25,545	126	318	444	1.4
Lower Jones Falls	5,241	357	548	899	2.9
Upper Back River	7,463	1,599	2,619	4,218	13.6
Total	**72,407**	**4,562**	**7,861**	**12,417**	**40.1**

As can be seen from the Table 7-18, over thirty percent of the impervious area in the County will be addressed by these five plans. As projects are implemented through these plans or in other portions of the County, the impervious area address by those projects will be added to Table 7-17.