

1.0 Permit Requirements

E.1. Stormwater Management

An acceptable stormwater management program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, Baltimore County shall:

- a. Implement the stormwater management design policies, principles, methods, and practices found in the *2000 Maryland Stormwater Design Manual* or other innovative stormwater management technologies approved by MDE;
- b. Track progress toward implementing the *2000 Maryland Stormwater Design Manual* or other innovative stormwater management technologies approved by MDE and report annually the modifications needed to address any programmatic problems; and
- c. Maintain programmatic and implementation information according to the requirement established as part of MDE's triennial stormwater program review.

E.2. Stormwater Management BMP Inspections

- a. Within 6 months of this permit being issued, Baltimore County shall designate sufficient staff and resources to ensure that maintenance inspections are performed for all stormwater management BMPs in the County. At a minimum, the County shall:
 - i. identify the specific individual(s) responsible for BMP maintenance inspections;
 - ii. develop and implement specific written procedures for conducting routine maintenance inspections, preparing inspection reports, enforcing requirements, and following up to ensure that specified maintenance is performed for all BMPs in Baltimore County;
 - iii. perform routine maintenance inspections on all stormwater management BMPs in Baltimore County by June 15, 2007; and
 - iv. submit annually copies of all BMP maintenance inspection reports and a current database of all stormwater management BMPs in Baltimore County with each facility's maintenance status clearly described.
- b. In its first report, Baltimore County shall report the progress toward completing the BMP maintenance inspections specified in Part III E.2.a. above. Based on Baltimore County's progress toward inspecting all BMPs, MDE will approve a maintenance inspection frequency for the remainder of this permit.

1.1 Introduction

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The Stormwater Management Program addresses the impacts on stormwater quantity and quality resulting from new development after the construction phase is complete. These impacts are mainly associated with the increase in impervious area due to the installation of roadways and buildings. Effective July 2, 2001 the requirements of the new Maryland Stormwater Design Manual have been applied to new development. Baltimore County has been delegated authority by the State of Maryland to enforce stormwater management regulations. The Stormwater Management Program is located within the DEPRM – Stormwater Engineering Section. This program is periodically reviewed by the Maryland Department of the Environment (MDE) and has consistently passed the review requirements.

The Program contains several components, including:

- review of stormwater management facilities plans,
- review of variance and associated fee-in-lieu requests,
- as built inspections, and
- periodic inspections.

The Operations Program, located within the DEPRM Capital Program and Operations Section, performs inspections and maintenance on the stormwater management facilities owned by Baltimore County. Two inspectors and a supervisor were added in fiscal year 2006 to conduct three-year inspections of private stormwater management facilities. These personnel are located in the Stormwater Engineering Section.

1.2 Plan, and Variance and Fee-in-lieu Reviews

1.2.1 Plan Reviews

During the calendar year 2006 one thousand three hundred and fifty-three (1,353) plans were reviewed for stormwater management. Of these, two hundred and sixty-four (264) were approved, one thousand and eighty-nine (1,089) were denied and one hundred and sixteen (116) were pending at the end of the year. Most plans are not approved on the first submittal, and these numbers reflect multiple plan submittals for the same project.

1.2.2 Variance and Fee-in-lieu Reviews

A variance in accordance with Council Bill 51-01 may be approved for a project when exceptional circumstances are applicable to the site. A variance is only granted when the result is more beneficial for the watershed and it is accompanied by a fee-in-lieu. This option is only acceptable to Baltimore County if it is proven to be infeasible to provide SWM on site and a suitable outfall has been identified for the project. The fee-in-lieu money is used by DEPRM's Capital Program and Operations section for water quality restoration projects. Table 1-1 indicates the fee-in-lieu money received by watershed for the calendar year 2006.

Table 1-1: Fee-in-lieu money received in 2006

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Watershed	# of Projects	Fee-in-lieu
Upper Western Shore		
Deer Creek	2	\$10,600
Prettyboy Reservoir	4	\$18,200
Loch Raven Reservoir	29	\$206,836
Lower Gunpowder	8	\$55,127
Little Gunpowder Falls	2	\$15,096
Bird River	5	\$7,998
Gunpowder River	4	\$25,590
Middle River	1	\$3,900
Upper Western Shore Total	55	\$343,347.00
Patapsco/Back River		
Liberty Reservoir	2	\$28,160
Patapsco	11	\$54,671
Gwynns Falls	10	\$54,969
Jones Falls	10	\$54,690
Back River	16	\$51,580
Baltimore Harbor	3	\$7,880
Patapsco/Back River Total	52	\$251,950.00
County Totals	107	\$595,297.00

1.3 Approved Stormwater Management Facility Analysis

The database of approved stormwater management facilities indicates that 3,074 facilities have been approved through the end of 2006. Of the 3,074 approved facilities 1,871 have been built (728 public and 1,143 private). There are 19 facilities that have missing information and are not included in Table 1-2 for further analysis. Table 1-2 lists approved facilities, but not necessarily built, by watershed, type and ownership. The last two sections of the table include both the total approved facilities by watershed and the number of built facilities by watershed.

The 3,074 approved facilities listed in Table 1-2 will if built serve 33,969 acres of urban land. Sixty-two (62%) percent of all approved facilities are privately owned and operated. The private facilities represent forty-five (45%) percent of the drainage area served by stormwater management facilities. The 1,871 built facilities serve 25,180 acres of urban land, with forty-three (43%) percent of the drainage area served by private facilities.

Stormwater management facilities classified as detention ponds provide minimal water quality. Of the 626 dry detention pond facilities serving 13,191 acres of urban land the database indicates that 473 facilities serving 11,000 acres have been built. These facilities present an opportunity for conversion in the future to other facility types with greater pollutant removal potential. An assessment of the existing stormwater management facilities and possibilities for conversion is a component of each watershed management plan. Conversions are typically cost effective only for facilities with greater than ten acres of drainage. Preparation of Small Watershed Action Plans (see Section 7) will result in assessing each built stormwater management facility for conversion possibilities.

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Table 1-2: Approved Stormwater Management Facilities by Watershed Through 2006

Watershed	Detention Ponds (DP)				Extended Detention (ED, EDSD, EDSW)			
	Private		Public		Private		Public	
	N	D.A.	N	D.A.	N	D.A.	N	D.A.
Upper Western Shore								
Deer Creek	0	0	0	0	0	0	0	0
Prettyboy Res.	0	0	0	0	1	2	7	76
Loch Raven Res.	69	1,331	32	1,162	61	688	51	1,200
Lower Gunpowder	16	175	39	1,140	24	173	55	710
Little Gunpowder	3	3	0	0	5	16	10	109
Bird River	37	612	29	642	55	398	55	601
Gunpowder River	1	14	3	115	2	4	3	9
Middle River	11	96	3	138	3	5	4	26
UWS Totals	137	2,231	106	3,197	151	1,286	185	2,731
Patapsco/Back River								
Liberty Res.	0	0	1	8	7	40	11	201
Patapsco River	36	489	37	1,357	53	732	53	565
Gwynns Falls	79	1,157	70	2,278	127	1,288	125	1,821
Jones Falls	34	831	20	704	57	633	23	497
Back River	60	396	18	145	66	454	37	361
Baltimore Harbor	7	144	2	86	7	22	1	14
Patapsco/Back R. Tot	216	3,017	148	4,578	317	3,169	250	3,459
County Totals	353	5,248	254	7,775	468	4,455	435	6,190
Watershed	Retention Pond (WP & SM)				Infiltration Basins, Trenches, Dry Wells, Porous Paving (DW, PP, IT, TTWQE & IB)			
	Private		Public		Private		Public	
	N	D.A.	N	D.A.	N	D.A.	N	D.A.
Upper Western Shore								
Deer Creek	0	0	0	0	0	0	0	0
Prettyboy Res.	0	0	0	0	1	13	0	0
Loch Raven Res.	10	289	5	94	45	186	14	111
Lower Gunpowder	2	300	5	96	4	11	5	28
Little Gunpowder	1	50	1	7	3	55	3	35
Bird River	19	691	8	176	9	18	11	54
Gunpowder River	4	0	7	84	2	12	8	13
Middle River	15	258	9	59	6	4	4	8
UWS Totals	51	1588	35	516	70	299	45	249
Patapsco/Back River								
Liberty Res.	1	22	0	0	10	22	0	0
Patapsco River	11	136	7	141	40	79	14	232
Gwynns Falls	15	284	6	167	54	60	22	46
Jones Falls	5	879	2	31	20	43	4	8
Back River	13	138	8	860	17	19	1	8
Baltimore Harbor	5	50	3	261	11	16	1	2
Patapsco/Back R. Tot	50	1509	26	1460	152	239	42	296
County Totals	101	3,097	61	1,976	222	538	87	545

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Table 1-2: Approved Stormwater Management Facilities by Watershed Through 2006 (continued)

Watershed	Sand Filter and Bioretention (SF)				Underground Storage & Oil/Grit Separator (UGS, OGS, SC)			
	Private		Public		Private		Public	
	N	D.A.	N	D.A.	N	D.A.	N	D.A.
Upper Western Shore								
Deer Creek	0	0	0	0	0	0	0	0
Prettyboy Res.	0	0	3	18	0	0	0	0
Loch Raven Res.	58	186	62	563	80	193	1	25
Lower Gunpowder	19	89	19	114	18	50	1	2
Little Gunpowder	3	4	3	37	2	1	0	0
Bird River	27	72	32	147	28	66	3	24
Gunpowder River	2	2	4	16	0	0	0	0
Middle River	12	32	5	57	6	16	2	2
UWS Totals	121	385	128	952	134	326	7	53
Patapsco/Back River								
Liberty Res.	10	13	5	30	4	2	0	0
Patapsco River	28	45	21	120	36	146	8	17
Gwynns Falls	70	209	47	220	101	278	4	32
Jones Falls	45	96	23	133	53	168	8	107
Back River	41	98	25	97	40	88	1	1
Baltimore Harbor	4	20	0	0	10	12	4	3
Patapsco/Back R. Tot	198	481	121	600	244	694	25	160
County Totals	319	866	249	1,552	378	1,020	32	213
Other (CD, GS, LS, O)								
Watershed	Private		Public					
	N	D.A.	N	D.A.				
Upper Western Shore								
Deer Creek	0	0	0	0				
Prettyboy Res.	0	0	1	1				
Loch Raven Res.	1	3	16	58				
Lower Gunpowder	3	7	1	2				
Little Gunpowder	2	2	2	10				
Bird River	2	20	0	0				
Gunpowder River	0	0	0	0				
Middle River	2	6	1	66				
UWS Totals	10	38	21	137				
Patapsco/Back River								
Liberty Res.	1	1	1	1				
Patapsco River	1	2	0	0				
Gwynns Falls	4	8	6	205				
Jones Falls	3	6	5	9				
Back River	3	9	3	8				
Baltimore Harbor	1	1	0	0				
Patapsco/Back R. Tot	13	27	15	223				
County Totals	23	65	36	360				

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Table 1-2: Approved Stormwater Management Facilities by Watershed Through 2006 (continued)

Watershed	Total Approved SWM				Total Constructed SWM			
	Private		Public		Private		Public	
	N	D.A.	N	D.A.	N	D.A.	N	D.A.
Upper Western Shore								
Deer Creek	0	0	0	0	0	0	0	0
Prettyboy Res.	1	2	12	108	0	0	2	25
Loch Raven Res.	326	2,883	185	3,215	220	2,272	125	2,434
Lower Gunpowder	86	807	126	2,091	58	699	91	1,796
Little Gunpowder	19	132	19	198	7	117	13	132
Bird River	177	1,877	140	1,644	107	1,260	81	1,303
Gunpowder River	11	32	26	239	1	0	15	189
Middle River	55	417	29	355	26	270	12	150
UWS Totals	675	6,150	537	7,850	419	4,618	339	6,029
Patapsco/Back River								
Liberty Res.	33	100	19	240	14	66	9	141
Patapsco River	208	1,634	140	2,431	118	1,078	87	1,960
Gwynns Falls	458	3,315	281	4,770	297	2,507	175	3,822
Jones Falls	222	2,665	86	1,489	136	1,485	53	1,256
Back River	245	1,208	95	1,488	147	843	58	863
Baltimore Harbor	45	263	11	366	30	238	7	274
Patapsco/Back R. Tot	1211	9,185	632	10,784	742	6,217	389	8,316
County Totals	1,886	15,335	1,169	18,634	1,143	10,835	728	14,345

Figure 1-1 displays the number of approved facilities, both private and public, by watershed. The Gwynns Falls watershed continues to have the greatest total number of existing and newly approved facilities. The large number of facilities in the Gwynns Falls watershed can be attributed to the fact that Owings Mills has been designated as a growth area. Deer Creek, Prettyboy Reservoir, Liberty Reservoir, the Little Gunpowder Falls and the Gunpowder River watersheds have only a few facilities, which is reflective of fewer development projects in those watersheds. This pattern has not changed from past reports.

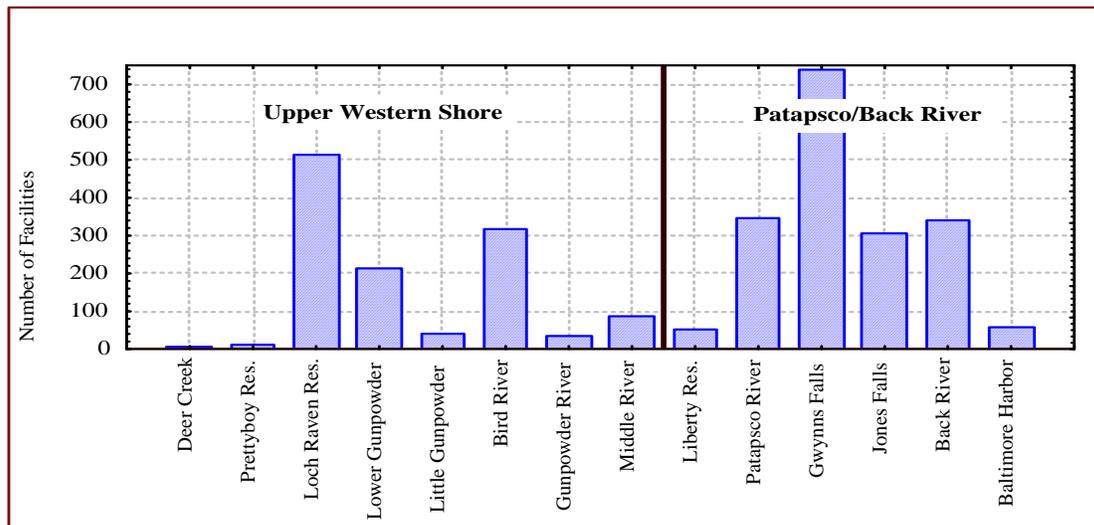


Figure 1-1: Number of Approved SWM Facilities by Watershed – Through Calendar Year 2006.

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Figure 1-2 displays acreage to be served by approved private stormwater management facilities by watershed, and Figure 1-3 displays the same information for public facilities.

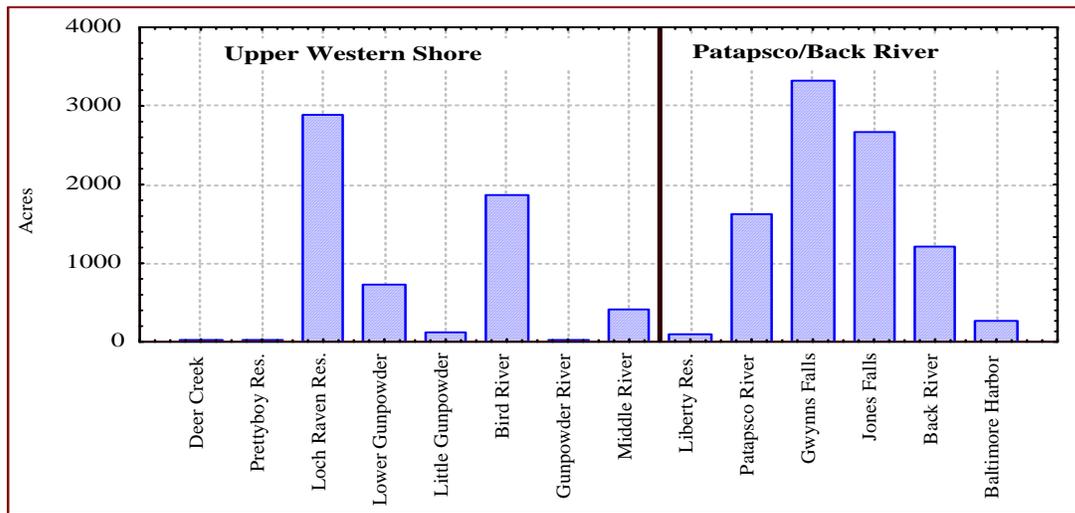


Figure 1-2: Acreage Served by Approved Private SWM Facilities by Watershed Through Calendar Year 2006.

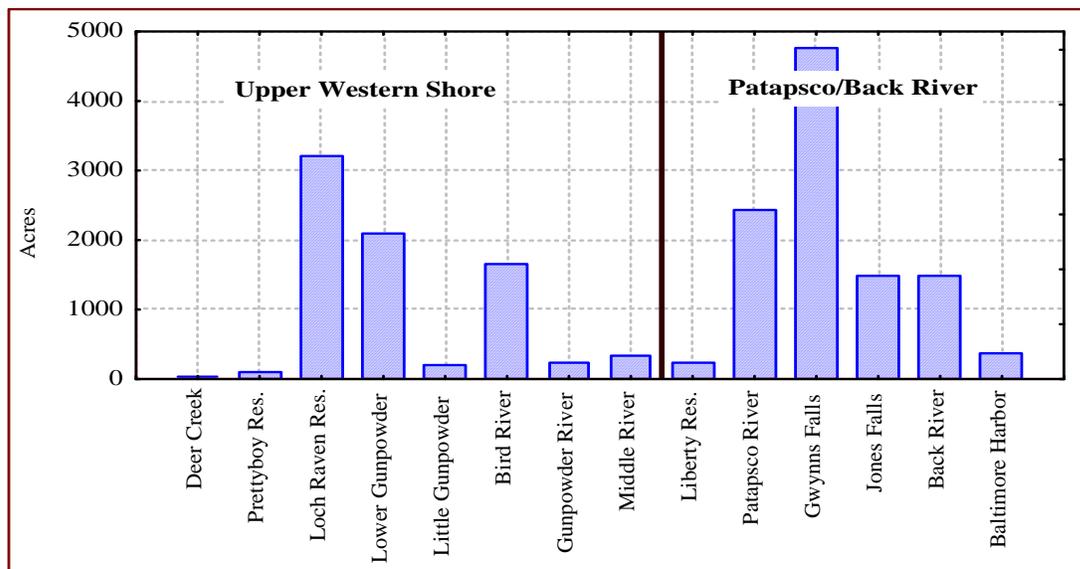


Figure 1-3: Acreage Served by Approved Public SWM Facilities by Watershed Through Calendar Year 2006.

1.4 Inspections

Inspections of stormwater management facilities are conducted by the Stormwater Engineering Section for private facilities and by the Capital Programs and Operations Section for public facilities. The Stormwater Engineering Section added two Engineering Associates III to conduct three-year inspections of private stormwater facilities in 2005. In addition, an existing Engineering Associate IV was reassigned as a supervisor to the private facility three-year inspection program. An Engineer III was added to the Stormwater Engineering Section to provide added staff for review of stormwater management designs for new development and redevelopment.

Table 1-3 presents the SWM facility inspections conducted by DEPRM during the calendar year 2006.

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Table 1-3: SWM Inspections 2006

	As Built	One year	Three year	Totals
Stormwater Engineering Section	205	112	996	1313
Capital Program and Operation Section	0	0	131	131
Totals	205	112	1127	1444

All as-built inspections and one-year inspections are completed by the Stormwater Engineering Section. A total of one hundred and thirty-five (135) as-built inspections were completed in calendar year 2006. A total of one hundred and thirty-four (134) one-year inspections were completed. Approval of the one-year maintenance inspection initiates the three-year maintenance inspection cycle. The Stormwater Engineering Section also completes three-year inspections of private facilities. A total of 996 three-year inspections of private stormwater facilities were conducted on 428 facilities.

The three-year inspection of public facilities is completed by the Capital Program and Operations Section. A total of one hundred and thirty-one (131) three-year inspections were completed for public ponds. This results in a total of five hundred and fifty-nine (559) three-year inspections of all stormwater management facilities by DEPRM for the calendar year 2006. This represents 30% of the built facilities in Baltimore County and indicates that the program as currently structured will be able to inspect all built facilities every three years.

1.5 Stormwater Management Facility Maintenance

The Baltimore County Department of Environmental Protection and Resource Management has an operations crew in the Capital Program and Operations Section. This crew consists of six environmental maintenance specialists and one supervisor. The crews are divided geographically into central, eastern and western districts. A database has been developed to track all routine maintenance and responses to complaints. Table 1-4 summarizes the number of maintenance visits due to complaints versus routine maintenance. There were one hundred and sixty-four (164) routine maintenance visits and seventy (70) complaint driven site visits during the calendar year 2006.

Table 1-4: Stormwater Facility Maintenance Visits by Type

Watershed	# of Routine Maintenance Visits	# of Complaint Maintenance Visits
Loch Raven Reservoir	23	8
Lower Gunpowder	52	13
Little Gunpowder	3	0
Bird River	27	7
Gunpowder River	5	2
Middle River	10	2
Liberty Reservoir	0	1
Patapsco River	23	13
Gwynns Falls	22	27
Jones Falls	9	1
Back River	27	6
Total	201	80

A summary of the maintenance activities for the time period by watershed and drainage basin is presented in Table 1-5. One hundred and ninety-six (196) facilities were

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maintained during the reporting time period. The total number of site visits was two hundred and eighty-five (285), indicating that some ponds required repeat visits. The most frequent activities are debris removal, cleaning of the riser, and cleaning the low flow channel. Appendix 1-1 contains the SWM maintenance data for the time period of January 1, 2006 through December 31, 2006. The data are arranged by watershed, with pond number, and by type of maintenance activity.

Table 1-5: SWM Pond Maintenance Activities (January 1, 2006 through December 31, 2006)

Watershed	# Ponds Maintained	Total # inspections	Tar- Riser	Repair Fence	Secure Gate	Clean Riser	Clean Low Flow	Remove Debris	Trim Fence	Clear Berm
Upper Western Shore										
Prettyboy	0	0	0	0	0	0	0	0	0	0
Loch Raven	24	34	2	10	16	18	12	22	16	9
Lower Gunpowder	43	65	4	5	35	40	39	41	32	15
Little Gunpowder	2	3	0	0	1	1	2	1	1	1
Bird River	23	34	3	7	14	13	19	23	16	6
Gunpowder River	5	7	0	1	2	4	4	6	3	0
Middle River	4	12	0	2	3	1	4	7	4	2
Upper West Shore. Total	101	155	9	25	71	77	80	100	72	33
Patapsco/Back River										
Liberty	1	1	0	1	0	1	1	0	1	0
Patapsco	28	37	1	7	11	18	27	26	15	21
Gwynns Falls	39	49	1	19	29	37	38	41	32	30
Jones Falls	8	10	1	2	5	7	9	9	6	0
Back River	19	33	2	6	15	14	14	23	16	5
Baltimore Harbor	0	0	0	0	0	0	0	0	0	0
Patapsco/Back River Total	95	130	5	35	60	77	89	99	70	56
County Totals	196	285	14	60	131	154	169	199	142	89

1.6 Constructed Stormwater Management Facility Data Analysis

An analysis of the databases related to stormwater management facilities indicated that a total of 1,871 facilities have been built to date. The 1,871 built facilities have a combined drainage area of 25,180 acres. The drainage areas of 1,011 built facilities were delineated and digitized into the County GIS. The drainage area for the 1,011 facilities that have been delineated is 19,960 acres or approximately 79% of the area served by SWM. The remaining 860 built facilities have a combined drainage area of 5,220 acres (21% of the area served by stormwater management). As new facilities are built their drainage areas will also be added to the GIS data layer. Overall, built stormwater management facilities serve 16.7% of the designated urban acreage (150,643 acres). The total urban acreage is based on the Maryland Department of Planning 2002 land use data.

The drainage areas were overlaid on the Maryland Department of Planning 2002 land use data to determine the specific land use draining to each facility. The land use results for each facility are provided in an accompanying spreadsheet (see Section 6). The pollutant

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loads draining to stormwater management facilities were calculated according to the following formula:

$$P_w = \sum_i DA_{i-j} * Pl_{i-j}, \text{ where}$$

P_w = Pollutant load by watershed draining to SWM facilities for a particular pollutant

DA_{i-j} = Drainage area to facility land use types i through j

Pl_{i-j} = Pollutant load in pounds/acre/year for each land use i through j.

This formula results in a calculation of the pollutant load in a watershed that is potentially controllable with 1,011 existing SWM facilities represented in the GIS data layer. The pollutant load, in pounds/acre/year, for each constituent considered was derived from Table 3-8 and 3-9 Volume 2, Section 3 of the NPDES 1997 Annual Report. Data from the Baltimore County monitoring program along with the SWMM models ran for Loch Raven, Jones Falls and Back River watersheds allowed an average load to be determined for TSS, TP, TN, Pb, and Zn for each land use. The mean pollutant loads/acre/year used in the analysis are shown in Table 1-6.

Table 1-6: Mean Load/Acre/Year by Land Use

Pollutant	Pounds per Acre								
	11	12	13	14	15	16-18	21	22	41-43
(TSS)	118.7	150.0	189.4	412.8	392.5	101.9	175.6	195.7	50.5
(TP)	.53	.57	.73	1.01	1.40	.14	.71	.48	.09
(TN)	5.7	5.9	7.6	7.7	8.2	2.3	6.7	5.9	1.5
(Pb)	.029	.053	.108	.239	.323	.021	.007	.007	.007
(Zn)	.132	.219	.772	1.260	.610	.049	.024	.029	.004

Table 1-7 presents a summary of the land use served by built SWM facilities by watershed. It should be noted that the date of the creation of the MDP GIS data layer may precede the building of a number of the stormwater management facilities. This fact will result in some error in the determination of land use draining to those facilities.

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Table 1-7: Constructed SWM Facility Land Use (Acres) by Watershed

Watershed	LDR	MDR	HDR	Comm.	Industrial	Institutional	Open Urban	Cropland	Pasture	Forest	Brush	Bare Ground	Total
Upper Western Shore													
PR	20	0	0	0	0	0	0	1	0	1	0	0	22
LR	873	435	745	481	261	275	117	224	66	498	20	42	4037
GU	239	746	314	43	58	34	12	118	43	158	0	14	1779
LG	71	10	1	5	0	3	0	31	8	19	0	0	148
BI	37	573	480	184	155	67	52	50	1	261	54	13	1927
GR	0	95	29	4	0	7	0	0	0	20	0	0	155
MR	0	34	140	25	3	4	0	0	0	41	0	53	300
UWS	1240	1893	1709	742	477	390	181	424	118	998	74	122	8368
Patapsco/Back River													
LI	34	38	40	3	0	1	0	6	0	54	0	0	176
PA	193	614	510	98	241	75	89	44	39	328	13	7	2251
GW	654	1,560	939	475	363	192	99	88	27	412	62	54	4,925
JF	713	489	391	128	5	112	62	96	19	248	0	32	2295
BR	263	152	111	214	262	70	49	10	0	147	28	15	1321
BH	0	53	4	53	31	40	47	0	0	15	5	0	248
P/B	1857	2,906	1995	971	902	490	346	244	85	1204	108	108	11,216
County	3,097	4,799	3,704	1,713	1,379	880	527	668	203	2,202	182	230	19,584

LR = Loch Raven Reservoir PR = Prettyboy Reservoir LDR = Low Density Residential
 GU = Lower Gunpowder LG = Little Gunpowder Falls MDR = Medium Density Residential
 BI = Bird River GR = Gunpowder River HDR = High Density Residential
 PA = Patapsco River LI = Liberty Reservoir
 GW = Gwynns Falls JF = Jones Falls
 MR = Middle River BH = Baltimore Harbor
 BR = Back River

The pollutant loads determined by the formula above for the 1,011 facilities that are currently built and whose drainage areas have been digitized into the GIS, are displayed in Table 1-8 by watershed for TSS, TP, TN, Pb and Zn. The table has been organized by dividing the watershed into the two Tributary Strategy groups and calculating a separate load for the Upper Western Shore and the Patapsco/Back River basins.

Table 1-8: Pollutant Loads to Constructed SWM Facilities by Watershed

Watershed	(#) TSS	(#) TP	(#) TN	(#) Pb	(#) Zn
Upper Western Shore					
Prettyboy Res.	2,704	11.9	127	0.6	2.7
Loch Raven Res.	748,190	2,646.2	23,013	357.2	1,422.1
Lower Gunpowder	289,408	1,058.6	10,550	117.5	500.2
Little Gunpowder	20,626	77.6	803	4.4	20.0
Bird River	368,397	1,223.7	11,294	192.0	753.2
Gunpowder River	23,125	82.3	860	9.4	48.5
Middle River	66,515	229.9	1,990	41.5	147.5
Total	1,518,965	5,330.2	48,637	722.6	2,894.2

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Table 1-8: Pollutant Loads to Constructed SWM Facilities by Watershed (continued)

Patapsco/Back River					
Liberty Res.	22,717	82.1	879	8.6	48.4
Patapsco	425,460	1,459.4	13,643	215.2	746.7
Gwynns Falls	954,175	3,236.9	30,058	478.4	1,833.1
Jones Falls	350,229	1,247.0	12,739	137.5	677.0
Back River	294,804	950.2	7,763	172.0	430.9
Baltimore Harbor	52,502	143.7	1,233	27.8	85.4
Total	2,099,887	7,119.3	66,315	1039.5	3,821.5
County Total	3,618,852	12,449.5	114,952	1,762.1	6,715.7

The type of stormwater management facility has an influence on the percentage of a pollutant removed. Through a series of meetings conducted by the Chesapeake Bay Program – Urban Stormwater Workgroup a consensus was reached on the pollutant removal efficiencies by categories of practice for total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN). A copy of the resulting *Draft Recommendation for Storm Water Best Management Practice Categories and Pollutant Removal Efficiencies* document was included with the 2004 NPDES report. Table 1-9 reflects the pollutant removal efficiencies based on the consensus document. Filtering practice removal efficiencies have not been determined for lead (Pb) and zinc (Zn). An additional change based on the *Draft Recommendation for Storm Water Best Management Practice Categories and Pollutant Removal Efficiencies* document is the type of facility to include in each practice category. The type of practice included in each category is indicated, along with the associated NPDES practice code, below Table 1-9. As shown in the table, there is a wide range of pollutant removal efficiencies by facility type as well as for pollutant type. Where there is a lack of data for a type of facility the removal efficiency for a particular pollutant was assumed to be zero. This will result in a conservative estimate of the actual amounts of pollutants removed.

Table 1-9: Percent Removal Efficiency of BMPs

BMP	Pollutants				
	TSS	TP	TN	Pb	Zn
Detention Facilities	10	10	5	43	26
Extended Detention Facilities	60	20	30	43	26
Wet Ponds	80	50	50	73	51
Infiltration Practices	90	70	50	71	80
Filtration Practices	85	60	40		
Detention Facilities = Detention Pond and Hydrodynamic Devices (DP, OGS, and UGS) Extended Detention Facilities = Extended Detention Ponds (EDSD, EDSW, ED) Wet Ponds and Wetlands = Wet Pond and Shallow Marsh (WP and SM) Infiltration Practices = Infiltration Trench and Infiltration Basins (IB, IT and ITWQC), Porous Paving (PP), and Dry Wells (DW) Filtration Practices = Sand filters and Bioretention Facilities (SF, BIO)					

The results of the analysis are displayed in Tables 1-10 through 1-14 for each of the five pollutants considered. The results for each of the 1,011 facilities are displayed in the same spreadsheet that contains the data for the land use served by each facility (see Section 6).

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Table 1-10: Total Suspended Solids Removal by SWM Facility Type and Watershed

Watershed	Total # To SWM	Pounds of Removal by Facility Type					Total Removed	
		DP	EDP	WP	INF.	FIL.	#	%
Upper Western Shore Watersheds								
Prettyboy Res.	2,704	0	848	0	1,162	0	2,010	74
Loch Raven Res.	748,190	42,908	132,962	12,727	48,613	23,450	260,660	35
Lower Gunpowder	289,408	13,377	44,609	55,153	2,099	8,513	123,751	43
Little Gunpowder	20,626	0	8,000	0	6,451	106	14,557	71
Bird River	368,397	16,249	46,463	78,946	18,175	8,151	167,984	46
Gunpowder River	23,125	1,515	220	6,088	0	0	7,823	34
Middle River	66,515	3,097	255	19,181	904	8,621	32,058	48
Totals	1,518,965	77,146	233,357	172,095	77,404	48,841	608,843	40
Patapsco-Back River Watersheds								
Liberty Res.	22,717	70	12,477	937	0	39	13,523	60
Patapsco	425,460	28,126	65,813	16,720	8,482	3,563	122,704	29
Gwynns Falls	954,175	46,103	222,573	78,089	8,789	12,592	368,146	39
Jones Falls	350,229	20,328	69,398	10,939	6,755	8,588	116,008	33
Back River	294,804	4,880	62,696	105,889	1,127	6,712	181,304	61
Baltimore Harbor	52,502	3,408	982	13,161	256	38	17,845	34
Totals	2,099,887	102,915	433,939	225,735	25,409	31,532	819,530	39
Balt. Co. Totals	3,618,852	180,061	667,296	397,830	102,813	80,373	1,428,373	39

Table 1-11: Total Phosphorus Removal by SWM Facility Type and Watershed

Watershed	Total # To SWM	Pounds of Removal by Facility Type					Total Removed	
		DP	EDP	WP	INF.	FIL.	#	%
Upper Western Shore Watersheds								
Prettyboy Res.	11.9	0	1.3	0	3.9	0	4.2	44
Loch Raven Res.	2,646.2	143.6	142.9	24.5	110.1	64.2	485.3	18
Lower Gunpowder	1,058.6	49.8	55.9	116.8	6.3	23.0	251.8	24
Little Gunpowder	77.6	0.3	9.7	0	19.9	0	29.9	39
Bird River	1,223.7	54.1	53.5	162.2	41.6	18.7	330.1	27
Gunpowder River	82.3	5.5	0.2	13.3	0	0	19.0	23
Middle River	229.9	11.3	0.3	43.0	2.6	15.6	72.8	32
Totals	5,330.2	264.6	263.8	359.8	184.4	121.5	1193.1	22
Patapsco/Back River Watersheds								
Liberty Res.	82.1	0.2	15.6	1.0	0	0	16.8	20
Patapsco	1,459.4	96.5	75.8	36.2	22.4	7.0	237.9	16
Gwynns Falls	3,236.9	151.6	263.5	156.6	25.9	31.8	629.4	19
Jones Falls	1,247.0	72.7	79.6	26.3	19.6	24.6	222.8	18
Back River	950.2	14.5	65.9	221.4	3.0	17.4	322.2	34
Baltimore Harbor	143.7	8.8	1.1	24.3	0.7	0.1	35.0	24
Totals	7,119.3	344.3	501.5	465.8	71.6	80.9	1464.1	21
County Total	12,449.5	608.9	765.3	825.6	412.3	202.4	2,658.2	21

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Table 1-12: Total Nitrogen Removal by SWM Facility Type and Watershed

Watershed	Total # To SWM	Pounds of Removal by Facility Type					Total Removed	
		DP	EDP	WP	INF.	FIL.	#	%
Upper Western Shore Watersheds								
Prettyboy Res.	127	0	20	0	30	0	50	39
Loch Raven Res.	23,013	668	2,012	263	659	444	4,046	18
Lower Gunpowder	10,550	257	843	1,095	47	124	2,366	22
Little Gunpowder	803	0	147	0	154	2	303	38
Bird River	11,294	251	759	1,442	276	122	2,850	25
Gunpowder River	860	29	4	133	0	0	166	19
Middle River	1,990	60	5	268	19	83	435	22
Totals	48,637	1265	3,790	3,201	1185	775	10,216	21
Patapsco/Back River Watersheds								
Liberty Res.	879	1	249	17	0	1	268	30
Patapsco	13,643	462	1,065	273	99	45	1,944	14
Gwynns Falls	30,058	715	3,734	1,216	191	201	6,057	20
Jones Falls	12,739	377	1,184	277	144	163	2,145	17
Back River	7,763	61	835	1,716	16	115	2,743	35
Baltimore Harbor	1,233	43	10	166	3	1	233	20
Totals	66,315	1659	7,077	3,665	453	526	13,390	20
County Total	114,952	2,924	10,867	6,866	1,638	1,301	23,596	21

Table 1-13: Total Lead Removal by SWM Facility Type and Watershed

Watershed	Total # To SWM	Pounds of Removal by Facility Type					Total Removed	
		DP	EDP	WP	INF.	FIL.	#	%
Upper Western Shore Watersheds								
Prettyboy Res.	0.6	0	.1	0	.2	0	.3	50
Loch Raven Res.	357.2	93.5	40.6	4.3	22.9	0	161.3	45
Lower Gunpowder	117.5	24.2	11.7	20.0	0.6	0	56.5	48
Little Gunpowder	4.4	0	1.2	0	1.2	0	2.4	55
Bird River	192.0	36.1	15.6	41.3	7.0	0	100.0	52
Gunpowder River	9.4	2.7	0	2.2	0	0	4.9	52
Middle River	41.5	6.9	.1	14.0	.2	0	21.4	51
Totals	722.6	163.4	69.3	81.8	32.1	0	346.8	48
Patapsco/Back Watersheds								
Liberty Res.	8.6	0.2	3.4	0.1	0	0	3.7	43
Patapsco	215.2	61.0	21.8	10.3	5.2	0	98.3	46
Gwynns Falls	478.4	96.6	77.2	45.4	3.3	0	222.5	47
Jones Falls	137.5	32.7	22.1	4.3	1.8	0	60.9	44
Back River	172.0	11.8	25.4	59.7	0.6	0	97.5	57
Baltimore Harbor	27.8	6.5	0.6	8.1	0.2	0	15.4	55
Totals	1039.5	208.8	150.5	127.9	11.1	0	498.3	48
County Total	1,762.1	372.2	219.8	209.7	43.2	0	844.9	48

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Table 1-14: Total Zinc Removal by SWM Facility Type and Watershed

Watershed	Total # To SWM	Pounds of Removal by Facility Type					Total Removed	
		DP	EDP	WP	INF.	FIL.	#	%
Upper Western Shore Watersheds								
Prettyboy Res.	2.7	0	.4	0	1.0	0	1.4	52
Loch Raven Res.	1,422.1	219.0	97.2	10.3	122.5	0	449.0	32
Lower Gunpowder	500.2	82.5	30.2	30.1	2.6	0	145.4	29
Little Gunpowder	20.0	0	3.3	0	5.7	0	9.0	45
Bird River	753.2	86.2	40.7	92.5	40.7	0	260.1	35
Gunpowder River	48.5	9.1	0.1	6.8	0	0	16	33
Middle River	147.5	28.5	.2	3.3	1.1	0	33.1	22
Totals	2,894.2	425.3	172.1	143.0	173.6	0	914.0	32
Patapsco/Back Watershed								
Liberty Res.	48.4	.6	12.0	0	0	0	12.6	26
Patapsco	746.7	150.2	37.6	12.0	0.3	0	200.1	27
Gwynns Falls	1,833.1	250.6	170.6	77.6	23.8	0	522.6	29
Jones Falls	677.0	97.2	64.9	17.5	9.5	0	189.1	28
Back River	430.9	19.6	53.5	71.7	.8	0	145.6	34
Baltimore Harbor	85.4	15.7	0.2	12.5	0	0	28.4	33
Totals	3,821.5	533.9	338.8	191.3	34.4	0	1098.4	29
County Total	6,715.7	959.2	510.9	334.3	379.9	0	2,012.4	30

While the load reductions are conservative numbers, it is apparent from an inspection of Table 1-11 and Table 1-12 (phosphorus and nitrogen loads) that the County has not achieved a 40% reduction of these two constituents for existing development served by stormwater management facilities. This calculation does not include the nitrogen and phosphorus loads from development without stormwater controls. The average percentage removal based on these calculations is 21% for both phosphorus and nitrogen.

In order to account for the impervious area served by state-of-the-art stormwater management, an analysis of the impervious area served by stormwater management facilities was performed. The drainage areas for facilities (635) that are considered to have higher pollutant removal efficiencies and to have little or no conversion potential were overlaid on the Baltimore County impervious cover data layer. The facility types included in this analysis are wet ponds, shallow marsh, extended detention facilities, sand filters, bioretention, and infiltration facilities. Underground facilities and dry ponds were not included. The former were excluded due to low pollution removal efficiencies and the latter due to the possibility of conversion to a type of facility that has a higher pollution removal efficiency. The impervious cover layer for Baltimore County does not include sidewalks and driveways. It does include all roadways and parking lots, as well as all buildings based on aerial photography obtained in the mid 1990s. This is the same data layer used to determine the impervious acreage needed to be addressed for NPDES permit conditions. The results of this analysis are presented in Table 1-15. The 2,044 acres of impervious cover addressed by advanced stormwater management represents ~66% of the impervious cover (3,100 acres) that the County must address during one 5-year term of the permit.

Table 1-15: Impervious Cover Addressed by Advanced Stormwater Management Facilities

Watershed	Road Impervious	Building Impervious	Total Impervious
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	Acres	Acres	Acres
Prettyboy	1.9	.8	2.7
Loch Raven	210.4	96.7	307.1
Lower Gunpowder	98.8	76.9	175.7
Little Gunpowder	11.4	6.3	17.7
Gunpowder River	7.5	3.5	11.0
Bird River	204.9	122.4	327.3
Middle River	33.1	11.0	44.1
Liberty	2.2	.9	3.1
Patapsco	94.3	37.5	131.8
Gwynns Falls	336.0	164.5	500.5
Jones Falls	86.2	60.9	147.1
Back River	195.1	142.8	337.9
Baltimore Harbor	33.5	5.2	38.7
Total	1315.3	729.4	2044.7

1.7 Summary

Baltimore County operates a comprehensive stormwater management program. DEPRM has always taken a firm stand on requiring water quality treatment even when quantity management was not required. With the implementation of the new stormwater regulations DEPRM continues to require all projects to explore and implement methods for water quality treatment. DEPRM now has the option to accept a fee-in-lieu payment if an exhaustive search has resulted in no practicable opportunities.

The operation of the public stormwater management facility maintenance program within DEPRM's Capital Program and Operations Section has continued to inspect and maintain publicly owned facilities. This group has compiled an extensive database of inspections and maintenance operations for the County's publicly owned stormwater facilities. These inspections, and the resulting actions, are improving the overall pollutant reduction efficiency of all public stormwater facilities.

With the addition of two Engineering Associates III and one Engineer III to the Stormwater Engineering Section the three-year inspections of all private facilities is on track to be completed by June 15, 2007. This new inspection program has addressed the inspection deficiency in the stormwater program.

Constructed stormwater management facilities serve ~17% of the total urban acreage in Baltimore County. For the areas served by these facilities a significant amount of pollutants are removed annually. Facilities designed and constructed for water quantity management represent an opportunity for water quality improvement through conversion to water quality facilities that will be explored through the Small Watershed Action Plan planning process (Section 7). However, many of the facilities either have no conversion potential (underground facilities) or are already designed to provide water quality. Those facilities designed for water quality are serving ~2,000 acres of impervious cover of the County's 31,000 acres of impervious area. With the issuance of the new permit on June 15, 2005 the County is now required to address ~6,200 acres of impervious cover by 2010. The 1,000 acres of impervious cover served by state of the art water quality facilities represent ~32% of this requirement.

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Appendix 1-1: Public Stormwater Facility Maintenance by Type

Date	Watershed	Pond #	Repaired Fence	Secured Gate	Cleaned Riser	Cleaned Low Flow	Removed Debris	Trimmed Fence	Cleared Berm	Tar Riser
06/06/2006	Back River	164		X	X	X	X			
09/07/2006	Back River	164	X							
04/06/2006	Back River	164	X	X	X	X	X	X		
09/07/2006	Back River	170	X		X	X	X	X		
06/06/2006	Back River	170		X	X	X	X			
11/29/2006	Back River	315					X			
02/27/2006	Back River	533		X	X	X	X		X	
02/27/2006	Back River	534		X	X	X	X		X	
02/28/2006	Back River	535					X			
02/28/2006	Back River	553		X	X		X	X	X	
09/20/2006	Back River	553		X	X	X	X	X		
10/19/2006	Back River	553								X
02/08/2006	Back River	554					X	X		
09/20/2006	Back River	554		X	X		X	X		
10/19/2006	Back River	554								X
07/25/2006	Back River	554								
03/08/2006	Back River	932				X	X		X	
07/25/2006	Back River	1007	X	X	X	X	X	X		
03/15/2006	Back River	1199					X			
05/22/2006	Back River	1200		X	X	X	X	X		
05/22/2006	Back River	1201					X			
04/06/2006	Back River	1380	X	X			X	X		
07/05/2006	Back River	1380		X			X	X		
07/25/2006	Back River	1380								
09/13/2006	Back River	1380	X							
07/05/2006	Back River	1547				X	X	X		
06/14/2006	Back River	1608						X		
05/18/2006	Back River	1608			X	X	X	X	X	
08/29/2006	Back River	1829		X	X	X	X	X		
07/05/2006	Back River	1983								
06/10/2006	Back River	2300		X				X		
06/13/2006	Back River	2300		X	X	X	X	X		
07/28/2006	Bird River	205	X	X	X		X	X		
01/27/2006	Bird River	348		X	X	X	X	X		
05/19/2006	Bird River	434				X	X			
09/20/2006	Bird River	478					X			
01/27/2006	Bird River	493		X		X	X	X		
02/23/2006	Bird River	493				X				
02/08/2006	Bird River	493								
07/06/2006	Bird River	493								
03/03/2006	Bird River	493				X				
07/31/2006	Bird River	528								

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05/21/2006	Bird River	529					X	X		
06/16/2006	Bird River	529		X		X	X	X		
12/13/2006	Bird River	572					X		X	
10/30/2006	Bird River	573			X					X
12/14/2006	Bird River	573		X	X	X	X	X		
05/03/2006	Bird River	610	X	X		X	X			
10/27/2006	Bird River	754								
10/30/2006	Bird River	929			X					X
12/11/2006	Bird River	977		X	X	X	X	X		
04/05/2006	Bird River	977			X	X	X	X		
04/05/2006	Bird River	978					X			
12/12/2006	Bird River	978		X	X	X	X	X		
12/11/2006	Bird River	979		X	X	X	X	X		
01/26/2006	Bird River	1038	X	X		X	X	X	X	
01/26/2006	Bird River	1039	X	X		X	X	X	X	
01/26/2006	Bird River	1040	X	X		X	X	X	X	
03/09/2006	Bird River	1041	X							
01/26/2006	Bird River	1041	X	X		X	X	X	X	
08/25/2006	Bird River	1330			X	X	X	X		
10/24/2006	Bird River	1863								X
08/28/2006	Bird River	1863		X	X	X	X	X		
08/09/2006	Bird River	2175			X	X	X			
12/07/2006	Bird River	2175							X	
12/13/2006	Bird River	2851			X		X			
05/19/2006	Gunpowder River	435			X	X	X			
09/19/2006	Gunpowder River	1167	X	X	X	X	X	X		
04/12/2006	Gunpowder River	1167		X	X	X	X			
02/21/2006	Gunpowder River	1422					X			
07/26/2006	Gunpowder River	1422								
05/19/2006	Gunpowder River	1584			X	X	X	X		
09/28/2006	Gunpowder River	3770					X	X		
06/05/2006	Gwynns Falls	58					X			
07/12/2006	Gwynns Falls	110		X	X	X	X	X	X	
06/10/2006	Gwynns Falls	151	X	X	X	X	X	X	X	
02/08/2006	Gwynns Falls	172		X	X	X	X			X
01/27/2006	Gwynns Falls	173	X	X	X	X	X	X	X	
08/31/2006	Gwynns Falls	173	X	X	X	X	X	X	X	
02/06/2006	Gwynns Falls	174	X	X	X	X	X			X
06/07/2006	Gwynns Falls	190			X	X	X	X	X	
09/28/2006	Gwynns Falls	231		X	X	X	X	X		
01/19/2006	Gwynns Falls	231	X	X	X	X	X	X	X	
07/28/2006	Gwynns Falls	232	X	X	X	X	X	X		
06/14/2006	Gwynns Falls	232	X		X	X	X	X	X	
07/12/2006	Gwynns Falls	238	X	X	X	X	X			X
10/04/2006	Gwynns Falls	238					X			
05/10/2006	Gwynns Falls	251		X	X	X	X	X	X	
12/29/2006	Gwynns Falls	270	X	X	X	X	X	X	X	
08/09/2006	Gwynns Falls	274	X	X	X	X	X	X	X	

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11/09/2006	Gwynns Falls	408		X	X	X	X	X	X	
06/15/2006	Gwynns Falls	424	X		X	X	X	X	X	
03/09/2006	Gwynns Falls	441								
03/08/2006	Gwynns Falls	442					X			
08/14/2006	Gwynns Falls	651	X	X	X	X	X	X		
10/02/2006	Gwynns Falls	651								X
08/24/2006	Gwynns Falls	664		X	X	X	X	X	X	
12/04/2006	Gwynns Falls	759			X	X	X			X
01/10/2006	Gwynns Falls	840			X	X	X	X	X	
10/13/2006	Gwynns Falls	840		X	X	X	X	X	X	X
07/24/2006	Gwynns Falls	849						X		
05/31/2006	Gwynns Falls	849		X	X	X	X	X	X	
06/14/2006	Gwynns Falls	925		X	X	X	X	X		
07/11/2006	Gwynns Falls	967		X	X	X		X		
02/23/2006	Gwynns Falls	1112	X	X	X	X	X			X
10/05/2006	Gwynns Falls	1115		X	X	X	X	X	X	
01/06/2006	Gwynns Falls	1115		X	X	X	X	X	X	
06/21/2006	Gwynns Falls	1144	X	X	X	X	X	X	X	
06/22/2006	Gwynns Falls	1145		X	X	X	X	X	X	
08/14/2006	Gwynns Falls	1146		X	X	X		X	X	
05/23/2006	Gwynns Falls	1188			X		X			
11/02/2006	Gwynns Falls	1191			X	X		X		
05/04/2006	Gwynns Falls	1601	X							
04/26/2006	Gwynns Falls	1687	X			X				
04/24/2006	Gwynns Falls	1754	X			X	X	X		
08/02/2006	Gwynns Falls	2198		X	X	X	X	X	X	
07/12/2006	Gwynns Falls	2203	X	X	X	X	X	X	X	
07/18/2006	Gwynns Falls	3269	X	X	X	X	X	X	X	
05/25/2006	Gwynns Falls	3501			X	X	X			
05/01/2006	Gwynns Falls	3501					X			
10/02/2006	Gwynns Falls	3646					X			
03/13/2006	Gwynns Falls	3646					X			
10/11/2006	Jones Falls	111			X	X	X	X		
06/09/2006	Jones Falls	111		X	X	X	X	X		
10/03/2006	Jones Falls	112		X		X	X	X		
10/03/2006	Jones Falls	113		X		X	X	X		
01/10/2006	Jones Falls	200	X		X	X	X			X
06/21/2006	Jones Falls	332	X							
03/16/2006	Jones Falls	332		X	X	X	X			
03/16/2006	Jones Falls	333		X	X	X	X			
12/03/2006	Jones Falls	547			X	X	X	X		
12/03/2006	Jones Falls	548			X	X	X	X		
12/12/2006	Liberty	1456	X		X	X		X		
03/30/2006	Little Gunpowder	683			X	X				X
05/08/2006	Little Gunpowder	683								
06/15/2006	Little Gunpowder	1970		X		X	X	X		
02/07/2006	Loch Raven	69			X		X			
07/07/2006	Loch Raven	83								

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03/01/2006	Loch Raven	83								
06/23/2006	Loch Raven	83								
11/30/2006	Loch Raven	83					X			
06/09/2006	Loch Raven	86		X	X	X	X	X		
02/02/2006	Loch Raven	106				X	X	X		
05/31/2006	Loch Raven	115		X	X	X	X		X	
09/26/2006	Loch Raven	115			X	X	X	X		
02/02/2006	Loch Raven	119			X	X	X		X	
03/17/2006	Loch Raven	134			X	X				
05/08/2006	Loch Raven	134				X				
03/01/2006	Loch Raven	134		X	X		X			
06/23/2006	Loch Raven	134		X	X	X				
02/07/2006	Loch Raven	648		X	X		X	X	X	
02/07/2006	Loch Raven	649		X	X		X	X	X	
05/17/2006	Loch Raven	699								
12/03/2006	Loch Raven	699							X	
01/10/2006	Loch Raven	765	X		X					X
03/01/2006	Loch Raven	765							X	
05/30/2006	Loch Raven	1050				X	X		X	
02/08/2006	Loch Raven	1064	X							
02/07/2006	Loch Raven	1676		X	X	X	X	X	X	
06/13/2006	Loch Raven	1682		X		X	X	X		X
02/08/2006	Loch Raven	1825	X	X			X			
05/31/2006	Loch Raven	1868				X	X	X	X	
05/04/2006	Loch Raven	2095	X	X	X		X	X		
05/04/2006	Loch Raven	2096	X	X	X		X	X		
05/04/2006	Loch Raven	2097	X	X	X		X	X		
05/04/2006	Loch Raven	2098	X	X	X		X	X		
05/04/2006	Loch Raven	2099	X	X	X		X	X		
08/07/2006	Loch Raven	2879					X	X		
04/18/2006	Loch Raven	2879	X	X	X		X	X		
06/15/2006	Loch Raven	2903		X				X		
03/08/2006	Lower Gunpowder	216	X	X		X	X		X	X
10/03/2006	Lower Gunpowder	279		X	X	X	X			
12/07/2006	Lower Gunpowder	279				X				
06/21/2006	Lower Gunpowder	339		X	X	X	X	X		
06/21/2006	Lower Gunpowder	340		X	X	X	X	X		
10/30/2006	Lower Gunpowder	354						X		
01/18/2006	Lower Gunpowder	393	X		X	X	X			
04/12/2006	Lower Gunpowder	393		X			X		X	
01/19/2006	Lower Gunpowder	406		X				X		
02/01/2006	Lower Gunpowder	452			X	X	X			
02/01/2006	Lower Gunpowder	453			X	X	X			
10/25/2006	Lower Gunpowder	473			X					
06/21/2006	Lower Gunpowder	473		X	X	X		X		
10/11/2006	Lower Gunpowder	473	X	X	X	X	X	X		
11/29/2006	Lower Gunpowder	517		X			X	X		
05/08/2006	Lower Gunpowder	524								

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08/11/2006	Lower Gunpowder	524			X					
09/20/2006	Lower Gunpowder	524								
03/07/2006	Lower Gunpowder	524								
07/20/2006	Lower Gunpowder	524								
05/09/2006	Lower Gunpowder	525			X	X	X	X		
08/21/2006	Lower Gunpowder	571		X	X	X	X	X		
05/09/2006	Lower Gunpowder	729					X			
01/19/2006	Lower Gunpowder	729			X	X				
03/10/2006	Lower Gunpowder	730	X	X	X	X	X	X	X	
04/05/2006	Lower Gunpowder	733	X	X			X			
08/10/2006	Lower Gunpowder	733			X			X	X	
10/24/2006	Lower Gunpowder	734								X
03/30/2006	Lower Gunpowder	734		X		X	X	X		
08/22/2006	Lower Gunpowder	734		X	X	X	X	X		
03/31/2006	Lower Gunpowder	741					X	X	X	
08/22/2006	Lower Gunpowder	741		X	X	X	X	X		
11/28/2006	Lower Gunpowder	811			X	X	X			
08/15/2006	Lower Gunpowder	815		X	X	X	X	X		
07/21/2006	Lower Gunpowder	845		X	X	X	X	X		
03/06/2006	Lower Gunpowder	846		X	X	X	X		X	
04/05/2006	Lower Gunpowder	915								
01/19/2006	Lower Gunpowder	915		X	X	X	X	X		
08/22/2006	Lower Gunpowder	954			X		X			
06/21/2006	Lower Gunpowder	1003		X	X	X	X	X		
01/20/2006	Lower Gunpowder	1155		X	X	X	X	X		
02/03/2006	Lower Gunpowder	1156	X							
01/19/2006	Lower Gunpowder	1156	X	X	X	X	X	X		
08/30/2006	Lower Gunpowder	1233	X							
12/07/2006	Lower Gunpowder	1233	X							X
09/20/2006	Lower Gunpowder	1233		X	X	X	X	X		
05/08/2006	Lower Gunpowder	1406	X	X	X	X		X		
01/17/2006	Lower Gunpowder	1406	X	X	X	X	X	X	X	
01/17/2006	Lower Gunpowder	1407	X	X	X	X	X	X	X	
01/17/2006	Lower Gunpowder	1408	X	X	X	X	X	X	X	
05/09/2006	Lower Gunpowder	1473			X	X	X			
07/07/2006	Lower Gunpowder	1473			X					
09/05/2006	Lower Gunpowder	1473								
04/11/2006	Lower Gunpowder	1476		X	X	X	X		X	
10/23/2006	Lower Gunpowder	1476								X
04/11/2006	Lower Gunpowder	1746		X		X	X		X	
08/14/2006	Lower Gunpowder	1764		X	X	X	X	X	X	
01/20/2006	Lower Gunpowder	1790		X					X	
02/01/2006	Lower Gunpowder	1790								
01/20/2006	Lower Gunpowder	1791		X					X	
07/27/2006	Lower Gunpowder	1838	X	X	X	X	X	X		
05/09/2006	Lower Gunpowder	1842			X	X	X	X		
08/14/2006	Lower Gunpowder	2028	X	X	X	X	X	X	X	
06/21/2006	Lower Gunpowder	2032		X	X	X	X	X		

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11/29/2006	Lower Gunpowder	3390			X	X	X	X		
03/29/2006	Middle River	711					X			
02/08/2006	Middle River	950								
05/30/2006	Middle River	950				X	X			X
01/30/2006	Middle River	950	X		X				X	
02/23/2006	Middle River	950				X	X			
03/29/2006	Middle River	950				X				
03/15/2006	Middle River	950	X	X			X			X
05/25/2006	Middle River	950				X	X	X		
11/09/2006	Middle River	4208		X			X	X		
01/18/2006	Middle River	4254								
12/18/2006	Middle River	4254								
12/06/2006	Middle River	4254		X			X	X		
01/03/2006	Patapsco	211	X	X		X	X	X	X	
01/04/2006	Patapsco	255					X			
04/28/2006	Patapsco	358				X	X			X
12/11/2006	Patapsco	359								X
09/06/2006	Patapsco	359				X				
12/18/2006	Patapsco	359				X				
03/03/2006	Patapsco	417				X				
03/07/2006	Patapsco	421		X	X	X	X			X
07/26/2006	Patapsco	421	X		X	X	X	X	X	
09/06/2006	Patapsco	454					X			
08/18/2006	Patapsco	454			X	X	X			
03/14/2006	Patapsco	495					X			
03/03/2006	Patapsco	521				X				
05/26/2006	Patapsco	521		X	X	X	X	X	X	
12/12/2006	Patapsco	521				X	X			X
03/20/2006	Patapsco	594			X	X	X			
05/17/2006	Patapsco	596		X	X	X	X			
03/21/2006	Patapsco	785					X			
03/14/2006	Patapsco	837					X			
08/16/2006	Patapsco	994			X	X	X	X	X	
08/28/2006	Patapsco	1132		X	X	X	X	X	X	
05/09/2006	Patapsco	1204								
08/28/2006	Patapsco	1335			X	X	X	X	X	
09/15/2006	Patapsco	1430			X	X	X			X
09/11/2006	Patapsco	1431		X	X	X	X	X	X	
04/18/2006	Patapsco	1555	X							
09/20/2006	Patapsco	1560			X			X	X	
07/21/2006	Patapsco	1560			X	X	X	X	X	
02/28/2006	Patapsco	1700	X	X		X	X			X
07/06/2006	Patapsco	1875			X	X	X	X	X	
07/10/2006	Patapsco	1876		X		X	X	X	X	
07/10/2006	Patapsco	1877	X		X	X	X	X	X	
02/23/2006	Patapsco	2228		X	X	X	X	X	X	
12/18/2006	Patapsco	3003		X	X	X	X			X
04/06/2006	Patapsco	3575	X	X				X		

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09/13/2006	Patapsco	3575	X							
11/06/2006	Patapsco	3575			X			X	X	X