Annual Report on Financial Assurance Plans and the Watershed Protection and Restoration Program 2024

Maryland Department of the Environment

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Prepared for:
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Speaker of the House
Senate Education, Health, and Environmental Affairs Committee
House Environmental Matters Committee
Reporting Period Fiscal Year 2023

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Executive Summary

Maryland's Municipal Separate Storm Sewer System (MS4) permits and Impervious Surface Restoration Plan (ISRP) requirements are an integral part of the state's strategy to ensure that all stormwater pollution control measures are implemented to restore local waterways and the Chesapeake Bay. Anne Arundel, Baltimore, Carroll, Charles, Frederick, Harford, Howard, Montgomery, and Prince George's counties, and Baltimore City submitted comprehensive information on the implementation of best management practices (BMPs) for meeting ISRP requirements, including:

- Upland Practices: wet ponds, swales, infiltration, dry wells, rain gardens, green roofs, permeable pavement, rainwater harvesting, submerged gravel wetlands;
- In-Stream Practices: shoreline management, outfall stabilization, stream restoration; and
- Programmatic Practices: street sweeping, inlet cleaning, storm drain vacuuming.

This Annual Report on the Financial Assurance Plans (FAPs) and the Watershed Protection and Restoration Program (WPRP) consists of budget and restoration information that have been provided by each MS4 Phase I permitted jurisdiction. Each locality has held public hearings and each plan has been signed by the local governing body. Also, each MS4 is required to submit a WPRP Annual Report providing Fiscal Year 2023 (FY23) data on funding sources, expenditures, recent BMP implementation, and, if applicable, information on stormwater remediation fees. In the FY22 FAPs, all MS4s showed that they have the budgets necessary to fund at least 100% of the ISRP requirements over the next two state fiscal years (FY23 and FY24). As of FY23, the MS4s have achieved approximately 9,070 acres of restoration. This brings the MS4s closer to completing the 9,190 acres that were projected for completion during FY23 and FY24.

This Annual Report on FAPs and the WPRP fulfills the requirement of § 4-202.1(j)(7), Environment Article, Annotated Code of Maryland. The Department's summary and evaluation are included below. The citizens of Maryland, and local, state, and federal partners are commended for their efforts in developing and implementing these very important environmental programs for improving local water resources and restoring the Chesapeake Bay.

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I. Introduction

Maryland's stormwater management (SWM) program includes fiscal reporting requirements for Maryland's 10 largest urban jurisdictions, which are Baltimore City and Anne Arundel, Baltimore, Carroll, Charles, Frederick, Harford, Howard, Montgomery, and Prince George's counties. One of these reporting requirements, Financial Assurance Plans (FAPs), needs to demonstrate how stormwater restoration projects are going to be funded. These plans, submitted every 2 years, are to be completed by each National Pollutant Discharge Elimination System (NPDES) Phase I municipal separate storm sewer system (MS4) jurisdiction. The plans must include the following: all actions required to meet MS4 permit requirements; annual and projected 5-year costs and revenues necessary to meet the impervious surface restoration plan (ISRP) requirements; any and all sources of funds used toward meeting MS4 permit requirements; and all specific actions and expenditures undertaken in the previous fiscal years to meet the ISRP requirement.

The most recent FAPs submitted on the anniversary date of each jurisdiction's MS4 permit, between December 2022 and January 2023, were required to demonstrate sufficient funding for meeting 100% of the projected ISRP costs for the 2-year period immediately following the filing of the plan. Local governing bodies were required to hold public hearings and sign the plans for accuracy prior to submitting them to the Maryland Department of the Environment (MDE or the Department) for review. The law requires that the Department shall: post FAPs on its website within 14 days of receipt; make a decision regarding the adequacy of these plans within 90 days of receipt; and submit an annual evaluation of these plans to the governor and the General Assembly by September 1 each year.

A second reporting requirement for each MS4 jurisdiction, excluding Montgomery County, is to submit a Watershed Protection and Restoration Program (WPRP) Annual Report on the anniversary date of its MS4 permit. The report requires the following items:

- The number of properties, if any, subject to a stormwater remediation fee;
- Any funding structure developed, including the amount of money collected;
- The amount of money deposited into the Watershed Protection and Restoration Fund (WPRF) in the previous fiscal year by source;
- The percentage and amount of funds in the WPRF spent on purposes defined in the law; and
- All SWM projects implemented in the previous fiscal year for the ISRP requirement.

This Annual Report on FAPs and the WPRP fulfills the requirement of § 4-202.1(j)(7), Environment Article, *Annotated Code of Maryland*. The Department's summary and evaluation are included below. The citizens of Maryland, and local, state, and federal partners are commended for their effort in developing and implementing these very important environmental programs for improving local water resources and restoring the Chesapeake Bay.

II. Primary Information

Table 1: Significant Dates for FAPs and WPRP Annual Reports

MS4		FAP Submission Date	WPRP Annual Report Submission Date	Date of Public Hearing	FAP Approved by Local Governing Body (Y/N)	Department's Determination of Sufficient Funding (100%)
Large	Anne Arundel	12/22/2022	12/22/2023	10/3/2022	Y	7/20/2023
	Baltimore City	1/19/2023	12/27/2023	12/8/2022	Y	7/20/2023
	Baltimore	12/27/2022	12/28/2023	12/13/2022	Y	7/20/2023
	Montgomery	12/23/2022	N/A	2/28/2023	Y	7/20/2023
	Prince George's	12/21/2022	12/11/2023	3/14/2023	Y	7/20/2023
Medium	Carroll	12/21/2022	12/21/2023	11/3/2022	Y	7/20/2023
	Charles	12/12/2022	12/22/2023	10/26/2022	Y	7/20/2023
	Frederick	12/21/2022	12/22/2023	2/21/2023	Y	7/20/2023
	Harford	12/31/2022	8/14/2024	4/4/2023	Y	7/20/2023
	Howard	12/29/2022	12/28/2023	7/17/2023	Y	7/20/2023

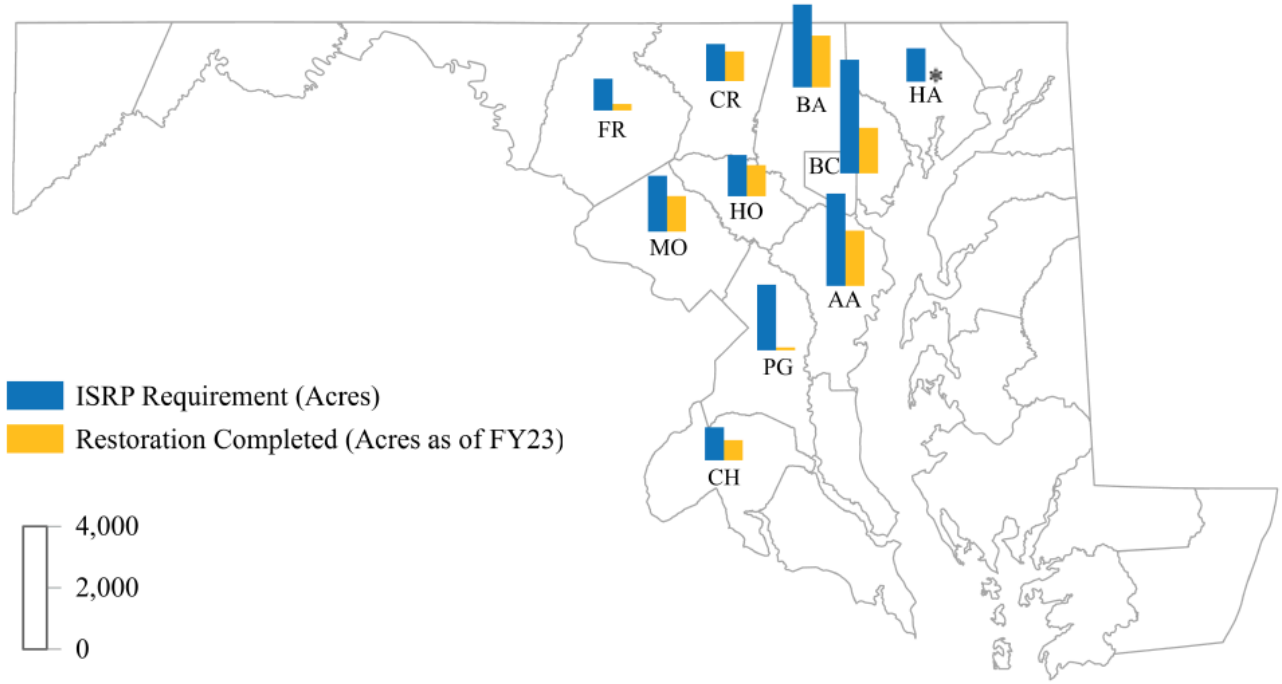

Figure 1: Restoration Completed Through FY23 to Meet New ISRP Requirements

* Harford County completed restoration since the previous permit expired, but those restored acres are being credited toward replacing the nutrient credits from the previous permit.

III. FAP Evaluations

Anne Arundel, Baltimore, Carroll, Charles, Frederick, Harford, Howard, Montgomery, and Prince George's counties, and Baltimore City submitted comprehensive information on the implementation of best management practices (BMPs) for meeting ISRP requirements, including:

- Upland Practices: wet ponds, swales, infiltration, dry wells, rain gardens, green roofs, permeable pavement, rainwater harvesting, submerged gravel wetlands;
- In-Stream Practices: shoreline management, outfall stabilization, stream restoration; and
- Programmatic Practices: street sweeping, inlet cleaning, storm drain vacuuming.

This evaluation of the FAPs consists of budget and restoration information that has been provided by each MS4 Phase I permitted jurisdiction. Each locality has held public hearings and each plan has been signed by the local governing body.

Past Implementation

The Department approved each MS4's impervious acre baseline analysis, which set the 20% level of restoration required under the previous stormwater permits, also known as the ISRP requirement. Overall, the MS4s completed 32,204 acres of restoration or 93% of the ISRP requirement by the end of their permits' 5-year terms (see Table 2).

Table 2: Completed Projects to Meet the Previous ISRP 5-Year Permit Term Requirements

MS4		Impervious Acre (IA) Baseline[1]	ISRP Requirement (Acres)[1]	Restoration Completed[1]	
Large	Anne Arundel	24,980	4,996	4,996	100%
	Baltimore City	21,455	4,291	4,530	106%
	Baltimore	30,180	6,036	6,064	100%
	Montgomery	18,891	3,778	3,779	100%
	Prince George's	30,525	6,105	2,387	39%
		126,031	25,206	21,756	86%
Medium	Carroll	8,070	1,614	1,629	101%
	Charles	7,887	1,577	1,739	110%
	Frederick	9,903	1,981	1,981	100%
	Harford	10,928	2,186	2,186	100%
	Howard	11,019	2,204	2,913	132%
		47,807	9,562	10,448	109%
	Total	173,838	34,768	32,204	93%

1. ISRP requirements, impervious acre baselines, and restoration completed from FY19 MS4 Annual Reports and data submitted for final permit restoration accounting. ISRP Requirement = impervious acre baseline * 20% MS4 permit restoration requirement. Except for Montgomery County, permits for the large MS4s expired between December 2018 - February 2019. Montgomery County's restoration amount is as of October 2019. Permits for the medium MS4s expired in December 2019.

Prince George's County did not meet the 20% ISRP requirement by the end of its 5-year permit term on January 2, 2019. The County restored 2,387 impervious acres resulting in a restoration deficit of 3,718 impervious acres. Subsequently, on December 6, 2021, the Department and Prince George's County entered into a court-sanctioned consent decree resolving issues with the County's performance pursuant to the MS4 permit. The consent decree formally establishes implementation schedules and annual milestones, for the completion of the County's remaining ISRP requirement by December 31, 2024. Additionally, the consent decree imposes a $475,000 penalty, due on December 31, 2024, for failure to complete all of the restoration work required by the 2014 permit. The penalty can be satisfied through the construction of one or more Department-approved supplemental environmental projects (SEPs) at a minimum cost of $475,000 by December 31, 2024. The SEPs completed as a result of this penalty will not count toward the County's ISRP requirement.

Current Implementation

Table 3: Specific Actions Completed Through FY23 to Meet New ISRP Requirements

MS4	IA Baseline[1]	Total Acres Restored as of FY23[2]		Reissued Permit			
				ISRP Requirement[3]		Restoration Completed[3,4]	
Anne Arundel	24,980	6,792	27%	2,998	12%	1,796	7%
Baltimore City	21,455	5,779	27%	3,696	17%	1,488	7%
Baltimore	30,180	7,716	26%	2,696	9%	1,680	6%
Montgomery	18,891	4,929	26%	1,814	10%	1,151	6%
Prince George's	30,525	5,326	17%	2,137	7%	95[5]	0%
Carroll	8,070	2,583	32%	1,217	15%	969	12%
Charles	7,887	2,234	28%	1,083	14%	657	8%
Frederick	9,903	2,196	22%	1,027	10%	215	2%
Harford	10,928	2,186	20%	1,093	10%	0[6]	0%
Howard	11,019	3,223	29%	1,345	12%	1,019	9%
Totals:	173,838	42,964	25%	19,106	11%	9,070	5%

1. Impervious Area (IA) baselines from FY19 MS4 Annual Reports and final permit restoration accounting.
2. Restoration data are from FY23 MS4 Annual Reports (covering the end of the previous permit term up to June 30, 2023). The percentage shown is the percent of impervious acre baseline restored.
3. ISRP Requirement from reissued permits. More information may be found at https://mde.maryland.gov/programs/water/StormwaterManagementProgram/pages/storm_gen_permit.aspx. Percentage shown is the percent of impervious acre baseline.
4. Restoration completed calculated by subtracting the total acres restored as of FY23 minus the ISRP requirement for the previous permit. Percent restoration completed was calculated by dividing restoration completed by impervious acre baseline.
5. Prince George's County restored 2,387 acres during the previous permit. Additional restoration has been completed since permit expiration to meet the requirements of the consent decree.
6. Harford County completed restoration since the previous permit expired, but those restored acres are being credited toward replacing the nutrient credits from the previous permit that were obtained in an amount equivalent to 1,215 impervious acres.

The specific actions implemented by these Phase I **MS4s** for meeting ISRP requirements through FY23 have **achieved 42,964 acres of restoration** or 25% of the total impervious acre baseline (see Table 3). This amount of restoration is equivalent to:

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67

square miles

32,548

football fields

Photo: MDE

Photo: "Baltimore City Right After Sunset" by Patrick Gillespie is licensed under CC BY 2.0.

12,232,104

8.5 x 18-foot parking spaces

83%

of Baltimore City's total land area (not including areas with water)

MS4 permits issued in November 2021 and December 2022 established new ISRP requirements for the next 5 years. The permits build upon and improve pollution prevention under the previous permits and require local jurisdictions to not only keep pace but do more to help Maryland meet its Chesapeake Bay total maximum daily load (TMDL) requirements. As of FY23, the MS4s have achieved approximately 9,070 acres of restoration (see Table 3). This is equivalent to 47% of the total ISRP requirement for the recently issued permits or 5% of the total impervious acre baseline.

Projected Implementation and Funding

For FY23 and FY24, the MS4s projected to complete 9,190 acres of restoration (see Table 4). The total 2-year cost reported in the All Actions worksheets equals $379.7 million. This is the cost for only BMPs without factoring in other associated ISRP costs such as debt service payments.

Table 4: Projected ISRP Implementation for FY23 and FY24 to Meet ISRP Requirements[1]

	MS4	IA Baseline	Projected Restoration to be Completed[2]		Projected Cost[1]
Large	Anne Arundel	24,980	1,184	5%	$45,100,873
	Baltimore City	21,455	2,795	13%	14,097,519
	Baltimore	30,180	1,923	6%	75,053,553
	Montgomery	18,891	324	2%	32,059,597
	Prince George's[3]	30,525	1,538	5%	79,010,869
Medium	Carroll	8,070	220	3%	11,260,244
	Charles	7,887	183	2%	6,843,123
	Frederick	9,903	557	6%	15,502,910
	Harford[4]	10,928	0	0%	0
	Howard	11,019	466	4%	100,788,496
	Total	173,838	9,190	5%	$379,717,185

1. The FY22 FAPs included projections for FY23 and FY24. The amounts of completed restoration for these FYs will be included in the next FAPs, to be submitted in December 2024.
2. Acres to be Completed during FY23 and FY24, and Cost from All Actions worksheet in FY22 FAPs.
3. Reported actions to meet the requirements of the previous permit and consent decree.
4. Reported continued obligations from the previous permit.

The 10 MS4s reported that the total ISRP cost for FY23 and FY24 was $782.4 million, while the total revenue was $838.1 million (see Table 5). All MS4s showed that they had the revenues necessary to fund 100% of the estimated costs of the ISRP requirements in their MS4 permits for FY23 and FY24.

Table 5: Fulfillment of 100% Revenue Requirement for 2-Year Costs

	MS4	Cost[1] (millions)	Revenue[1] (millions)	Percent of Cost Covered	Meets 100% Requirement (Y/N)
Large	Anne Arundel	$126.5M	$132.4M	105%	Y
	Baltimore City	65.0M	93.6M	144%	Y
	Baltimore	68.5M	68.5M	100%	Y
	Montgomery	98.5M	98.5M	100%	Y
	Prince George's	326.4M	326.6M	100%	Y
Medium	Carroll	20.0M	23.6M	118%	Y
	Charles	11.1M	25.8M	231%	Y
	Frederick	19.4M	19.4M	100%	Y
	Harford	21.7M	24.6M	113%	Y
	Howard	25.2M	25.3M	100%	Y
	Total	$782,430,456	$838,075,142		

1. Cost and Revenue data from ISRP Revenue worksheet in FY22 FAPs.

During the next few years, the MS4s will be planning and completing restoration to fulfill the ISRP requirement for permit terms that end in November 2026 and December 2027. Therefore, the next FAPs are expected to contain increased BMP implementation and funding to meet the requirements of the permits, demonstrating efforts to improve water quality and restore the Chesapeake Bay. The FAP submittals, due to the Department with FY24 MS4 annual reports, must show how each jurisdiction can fund 100% of its ISRP requirement for FY25 and FY26.

MS4s that implemented programmatic BMPs in the previous permit term are required to continue those BMPs or replace the ISRP credits that were achieved through programmatic BMPs. Also, MS4s can incorporate new BMPs found in the 2021 "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (2021 Accounting Guidance). For example, the updated 2021 Accounting Guidance incentivizes green stormwater infrastructure BMPs and BMPs with climate resiliency co-benefits.

Electronic copies of the report, submitted FAPs, and the Department's reviews may be viewed via the Department's website at: mde.maryland.gov/programs/Water/Stormwater ManagementProgram/Pages/WPRPFinancialAssurancePlans.aspx

IV. Watershed Protection and Restoration Program Annual Reports

Stormwater remediation fees are optional for MS4 jurisdictions. Six MS4 jurisdictions reported having fees (seven if including Montgomery County, which is not required to submit a WPRP Annual Report but does have a stormwater remediation fee); two obtain funds through taxes (see footnote 6 below); and one repealed its fee (see footnote 3 below). Residential fees range from $0.01 to $170. For the jurisdictions that have fees, the number of properties subject to fees ranges from 51,441 to 272,071.

Table 6: FY23 Sources of Funds for the WPRF

Jurisdiction	Properties Subject to a Stormwater Remediation Fee	% Change[1]	Total Stormwater Remediation Fees	% Change[1]	Total Additional Sources of Funds	% Change[1]	Total	% Change[1]
Anne Arundel[2]			$23,013,115	1%	$3,146,112	56%	$26,159,227	5%
Baltimore City	219,348	-8%	$42,736,661	7%	$114,579	-44%	$42,851,240	7%
Baltimore[3]	0		$0		$22,660,000	127%	$22,660,000	127%
Montgomery[4]	n/a		n/a		n/a		n/a	
Prince George's[5]	272,071	0%	$0		$77,550,400	4%	$77,550,400	4%
Carroll[6]	0	0%	$0	0%	$3,805,498	35%	$3,805,498	35%
Charles	51,441	0%	$7,623,766	29%	$3,917	-73%	$7,627,683	29%
Frederick	57,952	3%	$580	3%	$0	0%	$580	3%
Harford[6]	0		$0		$9,850,000	30%	$9,850,000	30%
Howard	99,169	0%	$10,357,909	5%	$0	0%	$10,357,909	5%
Total	699,981	-2%	$83,732,030	6%	$117,130,506	20%	$200,862,536	14%

*For further details on the WPRP, refer to the WPRP Annual Reports on the Department's website at mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/WPRPFinancialAssurancePlans.aspx.

1. Percent change from the previous FY.
2. Anne Arundel County did not report the number of properties subject to a stormwater remediation fee.
3. Baltimore County's stormwater remediation fee was repealed effective July 1, 2017.
4. Montgomery County was not required to report this information.
5. Prince George's County received funds from stormwater remediation fees in FY23. The County reported $15.7 million from the local watershed protection and restoration fund, as well as $61.9 million from the stormwater management enterprise fund.
6. Carroll and Harford counties do not collect stormwater remediation fees but do obtain funds through a dedicated property tax or recordation tax, respectively.

Table 7: FY23 Percentage and Amount of Funds Spent on Specific Purposes*

Jurisdiction	Capital Improvements for SWM	Operations & Maintenance of SWM Systems and Facilities	Public Education and Outreach[1]	SWM Planning[2]	Review of SWM Plans and Permit Application[3]	Grants to Nonprofit Organizations[4]	Administration of WPRF[5]	Total
Anne Arundel	$14,885,489	$6,848,235	$781,321	$2,887,924	$0	$86,902	$691,870	$26,181,741
Baltimore City	9,864,675	15,465,414	297,799	1,234,713	1,836,156	206,061	2,108,112	31,012,930
Baltimore	13,909,392	1,838,821	249,196	675,948	0	419,845	0	17,093,201
Montgomery[6]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Prince George's	63,443,849	29,831,200	314,510	4,175,898	16,871,000	1,743,674	470,665	116,850,795
Carroll	587,933	150,105	6,069	14,393	0	0	1,411,109	2,169,610
Charles	2,331,480	1,587,390	74,637	1,965,393	0	64,041	89,450	6,112,392
Frederick[7]	0	0	0	0	0	0	0	0
Harford	4,300,000	1,210,000	40,000	20,000	0	0	0	5,570,000
Howard[8]	3,984,506	1,898,528	312,940	0	0	796,117	302,558	29,801,665
Total	$113,307,323	$58,829,693	$2,076,472	$10,974,269	$18,707,156	$3,316,640	$5,073,763	$234,792,334

* Md. Environment Code Ann. § 4-202.1.(i)(4) states "The percentage and amount of funds in the local watershed protection and restoration fund spent on each of the purposes provided in subsection (h)(4) of this section." Descriptions for some of these purposes are listed in footnotes 1 to 5 below.

1. "Public education and outreach relating to stormwater management or stream and wetland restoration".
2. "Stormwater management planning, including: 1. Mapping and assessment of impervious surfaces; and 2. Monitoring, inspection, and enforcement activities to carry out the purposes of the watershed protection and restoration fund".
3. "To the extent that fees imposed under § 4-204 of this subtitle are deposited into the local watershed protection and restoration fund, review of stormwater management plans and permit applications for new development".
4. "Grants to nonprofit organizations for up to 100% of a project's costs for watershed restoration and rehabilitation projects relating to: 1. Planning, design, and construction of stormwater management practices; 2. Stream and wetland restoration; and 3. Public education and outreach related to stormwater management or stream and wetland restoration".
5. "Reasonable costs necessary to administer the local watershed protection and restoration fund".
6. Montgomery County was not required to report this information.
7. Frederick County reported sources of funds for the WPRF, but did not report the specific amounts spent on capital improvements, operations and maintenance, public education and outreach, etc.
8. Howard County's total spent included an additional $23M in funds not spent on one of the purposes specified in subsection (h)(4).

V. Summary

Maryland's MS4 permits and ISRP requirements are an integral part of the state's strategy to ensure that all stormwater pollution control measures are implemented to restore local waterways and the Chesapeake Bay. Maryland's 10 largest urban jurisdictions have been tasked with reducing their stormwater pollutant loads even as their communities continue to grow. Maryland's MS4s in aggregate have restored 42,964 acres.

Photo: MDE

Each jurisdiction continues to implement restoration practices, utilizing new strategies in accordance with a greater understanding of BMP efficiencies and the processes to steer BMPs through planning, procurement, and construction. The MS4s in aggregate have achieved approximately 9,070 acres of restoration under their existing permits, or 47% of the total ISRP requirement.

Photo: MDE

In the FY22 FAPs, all MS4s showed that they have the budgets necessary to fund at least 100% of the ISRP requirements over the next two state fiscal years (FY23 and FY24). The next FAP submittals to the Department, with data through FY26, must show how each jurisdiction can fund 100% of its ISRP requirement for the next two years. These FAPs will document the level of BMP implementation and funding, as well as the use of new BMPs for green stormwater infrastructure and climate resiliency co-benefits.

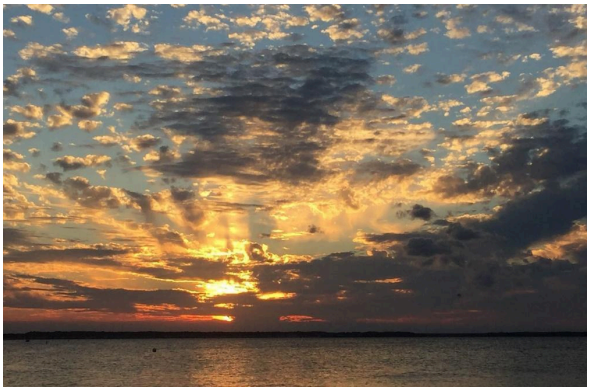

Photo: MDE

VI. Appendices

Appendix A: Abbreviations and Classifications of BMPs

Table A- 1: BMP Classes

Code	Code Description
A	Alternative BMP
E	ESD
S	Structural BMP

Table A- 2: Alternative BMPs

Code	Code Description	Category
CBC	Catch Basin Cleaning	Programmatic
CLTM	Conservation Landscaping	Upland
DGI	Elimination of Discovered Nutrient Discharges from Grey Infrastructure	Programmatic
FCO	Forest Conservation	Upland
FTW	Floating Treatment Wetlands	Upland
FPU	Forestation on Pervious Urban (i.e., Forest Planting)	Upland
IMPF	Impervious Surface to Forest (i.e., IMPP + FPU)	Upland
IMPP	Impervious Surface Reduction (i.e., impervious to pervious)	Upland
MSS	Mechanical Street Sweeping	Programmatic
OUT	Outfall Stabilization	In-Stream
RCL	Riparian Conservation Landscaping	Upland
RFP	Riparian Forest Planting	Upland
SDV	Storm Drain Vacuuming (i.e., Storm Drain Cleaning)	Programmatic
SEPC	Septic Connections to Wastewater Treatment Plant (WWTP)	Upland
SEPD	Septic Denitrification	Upland
SEPP	Septic Pumping	Programmatic
SHST	Shoreline Stabilization	In-Stream
SPSD	Dry Channel Regenerative Step Pool Stormwater Conveyance System	In-Stream
STRE	Stream Restoration	In-Stream
STCI	Street Trees	Upland
USRP	Urban Soil Restoration (Compacted Pervious Surfaces)	Upland
USRI	Urban Soil Restoration (Removed Impervious Surfaces)	Upland
UTC	Urban Tree Canopy (i.e., Pervious Turf to Tree Canopy over Turf)	Upland
VSS	Regenerative/Vacuum Street Sweeping (i.e., Advanced Street Sweeping)	Programmatic

Table A- 3: Environmental Site Design (ESD) BMPs

Code	Code Description	Category
	Alternative Surfaces	
AGRE	Green Roof – Extensive	Upland
AGRI	Green Roof – Intensive	Upland
APRP	Permeable Pavements	Upland
ARTF	Reinforced Turf	Upland
	Micro-Scale Practices	
MENF	Enhanced Filters	Upland
MIBR	Infiltration Berms	Upland
MIDW	Dry Well	Upland
MILS	Landscape infiltration	Upland
MMBR	Micro-Bioretention	Upland
MRNG	Rain Gardens	Upland
MRWH	Rainwater Harvesting	Upland
MSGW	Submerged Gravel Wetlands	Upland
MSWB	Bioswale	Upland
MSWG	Grass Swale	Upland
MSWW	Wet Swale	Upland
	Nonstructural Techniques	
NDNR	Disconnection of Non-Rooftop Runoff	Upland
NDRR	Disconnection of Rooftop Runoff	Upland
NSCA	Sheetflow to Conservation Areas	Upland

Table A- 4: Structural BMPs

Code	Code Description	Category
	Filtering Systems	
FBIO	Bioretention	Upland
FORG	Organic Filter	Upland
FPER	Perimeter Filter	Upland
FSND	Surface Sand Filter	Upland
FUND	Underground Filter	Upland
	Infiltration	
IBAS	Infiltration Basin	Upland
ITRN	Infiltration Trench	Upland
	Open Channels	
ODSW	Dry Swale	Upland
OWSW	Wet Swale	Upland
	Ponds	
PMED	Micro-Pool Extended Detention Pond	Upland
PMPS	Multiple Pond	Upland
PPKT	Pocket Pond	Upland
PWED	Wet Extended Detention Pond	Upland
PWET	Wet Pond	Upland
	Wetlands	
WEDW	Extended Detention – Shallow Wetland	Upland
WPKT	Pocket Wetland	Upland
WPWS	Pond Wetland System	Upland
WSHW	Shallow Marsh	Upland
	Other Practices	
XDED	Extended Detention Structure, Dry	Upland
XDPD	Detention Structure (Dry Pond)	Upland
XFLD	Flood Management Area	Upland
XOGS	Oil Grit separator	Upland
OTH	Other	Upland

Appendix B: Calculations

Table 2

Restoration completed was determined by dividing the total acres restored (gathered from FY19 MS4 Annual Reports and data submitted for final permit restoration accounting) by the total ISRP Requirement from the previous permit.

Table 3

Restoration completed was determined by dividing the total acres of restoration (gathered from FY23 MS4 Annual Reports) by the total updated impervious acre baseline.

Page 5 Restoration Comparisons

Square Miles: 640 square miles per acre. Divided total acreage by 640.

Football Fields: A football field is equivalent to 1.32 acres. Divided total acres by 1.32.

Parking Spaces: Converted total acres to square feet. A standard parking space is 8.5 ft x 18 ft, or 153 ft^2. Divided total square feet by area of parking space (i.e., 153 ft^2).

Baltimore City's total land area: The United States Census Bureau indicates that Baltimore City's total land area (excluding areas of water) is 80.95 square miles. https://www.census.gov/quickfacts/fact/table/baltimorecitymaryland/LND110220#LND110220
Divided total square miles by 80.95.

Table 4

Restoration projected was determined by dividing the total projected acres of restoration (gathered from the FY22 FAPs) by the total updated impervious acre baseline.

Table 5

Fulfillment of 100% Revenue Requirement for 2-Year Costs = 2-Year Revenue/ 2-Year Costs.

Table 6

Percent change from previous FY was determined by dividing the FY23 household or dollar amount by the FY23 household or dollar amount and then subtracting by 1 (i.e., (FY23 Amount/FY22 Amount) – 1).