TRASH STORMWATER PERMIT COMPENDIUM

A compendium of excerpted permit language from municipal separate storm sewer system (MS4) permits and other resources that can be used and/or tailored for trash-specific MS4 permits.

Office of Wetlands, Oceans and Watersheds

Office of Wastewater Management

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CHAPTER 1. INTRODUCTION

This compendium is one in a series of documents developed by EPA as a resource for stormwater permit writers.[1] The purpose of this compendium is to provide Phase I and Phase II Municipal Separate Storm Sewer System (MS4) permit writers with tools and information they can use in developing trash-related provisions for MS4 permits.

Trash that is improperly disposed of – either intentionally or inadvertently – can enter fresh water and coastal ecosystems. This "aquatic trash" may eventually make its way to the ocean. Up to 80 percent of trash in the world's oceans comes from land-based sources.[2] This trash has become a pervasive problem, presenting a challenge to water quality and habitat protection, in addition to causing aesthetic blight, ecological effects, economic impacts, and possible human health risks. Effective stormwater management implemented through MS4 permits is an important tool for preventing trash from entering or accumulating in inland and coastal waters and keeping it out of the ocean.

In the following three chapters, this compendium provides examples of provisions in existing permits that can serve as models for addressing trash reduction in MS4 permits; presents information on best management practices (BMPs) in trash reduction; and presents two MS4 permit case studies showcasing clear, specific and measurable trash-related provisions and the related municipal floatables programs.

Overall, the compendium is intended to illustrate opportunities for permit writers to address trash through MS4 permits. It is a snapshot of existing permit provisions and information on available BMPs. Permit writers can use this document as a guide for developing MS4 permit provisions related to trash in multiple ways, including:

i. Utilizing the example trash provisions included in existing MS4 permits as a starting point from which to develop similar requirements.

ii. Learning more about BMPs and identifying information about BMPs that can be shared with permit holders, including information on cost, maintenance, and effectiveness.

iii. Applying lessons learned from case studies of past successes in developing strong trash-related MS4 permit provisions towards the development of new permits and comprehensive floatables programs.

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[1] See Municipal Separate Storm Sewer System Permits, Compendium of Clear, Specific & Measurable Permitting Examples, Office of Wastewater Management, Water Permits Division, November 2018. https://www.epa.gov/sites/production/files/2018-11/documents/final_compendium_intro_document_rev-11-15-18.pdf

[2] Eunomia, *Plastics in the Marine Environment* (June 2016), http://www.eunomia.co.uk/reports-tools/plastics-in-themarine-environment/.

EPA anticipates that as permits are reissued in the coming months and years and BMPs evolve, the information in this compendium will need to be updated to include new examples or modified information. EPA has an interest in ensuring the accuracy of the information contained in this document, and therefore welcomes input on any aspect of this compendium at any time.

The Agency expects to update the compendium as needed based on comments received and new information. EPA notes that the inclusion of any particular permit example should not be read as an Agency endorsement of the entire approach taken in that permit, nor should it be read as EPA's independent determination that the permit terms meet the Phase I and/or Phase II MS4 requirements. This includes the permit standard for regulated small MS4s "to reduce the discharge of pollutants from [the] MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act."

In addition, this document does not contain or impose any legally binding requirements on EPA, states, or the regulated community, and does not confer legal rights or impose legal obligations upon any member of the public. EPA made every attempt to ensure the accuracy of the examples included in this document. In the event of a conflict or inconsistency between this compendium and any statute, regulation, or permit, it is the statute, regulation, or permit that governs, not the compendium.

For more information about the National Pollutant Discharge Elimination System (NDPES) Stormwater Program visit: www.epa.gov/npdes/stormwater.

CHAPTER 2. EXAMPLE TRASH PROVISION LANGUAGE FROM MS4 PERMITS

The main objective of this chapter is to provide excerpts of MS4 trash-related permit provisions that can be used as a resource for EPA and state permitting authorities. It illustrates how MS4 permits can be used to reduce trash loads in stormwater in many ways. This chapter presents permit language related to trash from 21 Phase I and Phase II MS4 permits (see Exhibit 1). The first five sections of the chapter present example language organized by the following minimum control measures (see text box): Public Education and Outreach, Public Participation and Involvement, Illicit Discharge Detection and Elimination (IDDE), Construction Site Runoff Control, and Pollution Prevention and Good Housekeeping. The final section highlights example language from permits that include details on floatables management programs and the associated monitoring and reporting strategies for trash reductions.

The EPA regulations specify that permit provisions must be expressed in "clear, specific, and measurable" terms. See 40 CFR 122.34(a). In essence, each permit provision must include sufficient detail so that the permittee, the permitting authority, and the public have a common understanding of what is expected of the permittee so that compliance can be determined. For instance, requirements that are sufficiently clear, specific, and measurable should establish, among other things, what specific actions the permittees are required to take, the dates by which such actions should be taken or other quantitative component of the requirement (e.g., minimum number of inspections conducted, or outfalls surveyed), and possibly the method for assessing effectiveness.

All permit language in this document is presented in *italics*. For emphasis, yellow highlighting indicates permit language that appears to meet this standard of "clear, specific, and measurable." Additional language in italics that is intended to reduce the amount of trash entering stormwater, but that may not be considered "clear, specific, or measurable," is also included to provide more context for the requirement. Those considering using any of these latter examples in their respective permits should therefore be aware that modifications may be necessary for them to meet the regulation's "clear, specific, and measurable" requirement.

Each Phase II MS4 permit requires the inclusion of terms and conditions that address six minimum control measures (MCMs) for stormwater management: Public Education and Outreach, Public Participation and Involvement, Illicit Discharge Detection and Elimination (IDDE), Construction Site Runoff Control, Post-Construction Site Runoff Control, and Pollution Prevention and Good Housekeeping. See 40 CFR 122.34(b). These measures are also often incorporated into Phase I MS4 permits. Research into trash-related provisions in MS4 permits (both Phase I and Phase II) found that they frequently appear in the Public Education and Outreach and the Pollution Prevention and Good Housekeeping sections of MS4 permits as these measures are well-suited for addressing trash reduction through BMP maintenance and through targeted behavior change aimed at litter prevention.

No trash-related provisions were found in Post-Construction Site Runoff Control sections of MS4 permits. In cases where trash is of particular concern for state and local waterways, however, post-construction control measure provisions may represent an opportunity for permit writers to evaluate the potential for enhanced trash control at land development projects.

Exhibit 1. List of Permits Reviewed and Included in Chapter 2

EPA REGION	PERMITTING AUTHORITY	MS4 PERMIT NAME	PHASE*	PERMIT TYPE**	PERMIT EXPIRATION***	PUBLIC EDUCATION & OUTREACH	PUBLIC PARTICIPATION	IDDE	CONSTRUCTION	POLLUTION PREVENTION & GOOD HOUSEKEEPING	PROGRAMS, MONITORING & REPORTING
1	RI DEM	Phase II General Permit	II	G	12/19/08	X		X		X	
1	CT DEP	Phase II General Permit	II	G	06/30/22	X		X		X	
1	US EPA R1	MA MS4 General Permit	II	G	6/30/22				X		
2	NJ DEP	Tier A Municipal Stormwater General Permit	II	G	12/31/22					X	
2	NY DEC	New York City	I	I	07/31/20		X				X
2	PR EPA Reg 2	Commonwealth wide Small MS4s	II	G	06/30/21					X	
3	VA DEQ	Fairfax County	I	I	03/31/20	X	X	X			X
3	MD DOE	Baltimore City	I	I	12/26/18						X
4	GA DNR	Statewide Small MS4s	II	G	12/05/22				X		
4	ADEM	City of Mobile	I	I	9/30/19	X				X	X
6	TX CEQ	Statewide Small MS4s	II	G	1/23/24			X		X	
9	CA SWRCB****	Statewide Small MS4s	II	G	06/30/18					X	X
9	CA SWRCB	Coastal Watersheds of Los Angeles County	I	I	12/28/17					X	
9	CA SWRCB	Caltrans State-wide Permit	I	I	06/30/18						X
9	CA SWRCB	San Francisco Bay Municipal Regional Stormwater Permit	I	I	12/31/20		X				X
9	HI DOH	City and County of Honolulu	II	G	1/15/20						X
10	OR DEQ	Oregon State-Wide Permit	II	G	02/29/24	X					
10	WA DOE	Western Washington Municipal Stormwater Permit	II	G	07/31/24	X					
10	US EPA R10	Boise/Garden City Area MS4 Permit	I	I	01/31/18	X				X	
10	US EPA R10	City of Coeur d'Alene	II	I	1/31/14		X				
10	US EPA R10	Joint Base Lewis-McChord MS4	II	I	09/30/18					X	

*I=Phase I, II=Phase II

**G=General, I=Individual

***Permit examples are included in this document from both current permits and those that have been administratively continued.

****The CA Phase II General Permit was amended in December 2017 to include TMDLs. The SWRCB hasn't posted the final order, although it is in effect. The 2017 amendment did not affect the permit language cited in this document. See: https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/phase_ii_municipal/conformed_order_2013_0001_dwq_unofficial_draft.pdf

The EPA reiterates that the agency does not make an independent determination here about whether any permit provision included in the document meets the 40 CFR 122.34(a) requirement to establish "clear, specific, and measurable" permit terms. The EPA reminds permit writers to independently evaluate whether the language meets the 40 CFR 122.34(a) requirement, and to make adjustments as needed if it does not. For further assistance in determining whether permit

language meets the clear, specific, and measurable requirement, permitting authorities may consider consulting the related discussion in the final "MS4 General Permit Remand Rule" (specifically, 81 FR 89335, December 9, 2016) and more generally the EPA's *National Pollutant Discharge Elimination System: Compilation of Writing Tips and Best Practices*."

Moreover, the "clear, specific, and measurable" requirement must be included within the permit provision as opposed to being developed and established by the permit holder without permitting authority approval.

The summary sentence at the beginning of each permit provision serves as a short description of what the permit provision includes. The purpose of this summary is to allow readers to more easily digest and parse through the relevant material.

Note that numeric effluent limitations have been used in some MS4 permits to control trash. Part 3 of EPA's Compendium of MS4 Permitting Approaches series, *Water Quality-Based Requirements*, presents examples where permits have adopted numeric or quantitative requirements. Permits developed in the context of these numeric limits tend to have more specific language for controlling trash. Examples of language from two permits that include numeric limits in the form of Total Maximum Daily Loads (TMDLs) are included below – the LA Individual MS4 Permit language on Pollution Prevention and Good Housekeeping and the Baltimore City Individual MS4 Permit language requiring inventorying trash reduction strategies.

PUBLIC EDUCATION AND OUTREACH

Trash provisions that have been included in the Public Education and Outreach sections of MS4 permits aim to increase awareness of nexus between trash and stormwater. The goal is to encourage proper disposal of trash and behavior change by the general public. Less litter will lead to less trash in the waterways. To accomplish this objective, one effective strategy is to start by targeting the source by engaging the public and encouraging stewardship of their waterways.

The Phase II regulations require small MS4 permits to identify and implement the minimum elements of a public education program about the impacts of stormwater discharges on local waterways and the steps that citizens, businesses, and other organizations can take to reduce the contamination of stormwater (40 CFR 122.34(b)(1),(2)). Phase I MS4 permittees are also required to describe their proposed public education programs as part of their initial permit application, and it is common for individual Phase I permits to include specific requirements for addressing public education and outreach (40 CFR 122.26(d)(2)(iv)(B)(6) and (D)(4)). While neither the Phase I or Phase II regulations specifically mandate trash-related public education and outreach, a number of states have included requirements for trash education and outreach in their MS4 permits.

Education and awareness programs are intended to help change human behavior in ways that can reduce the amount of trash-related pollution that is introduced into the MS4 system. In addition to education, encouraging public participation in local stormwater events, like town meetings and stream cleanups, can lead to program improvements as well as enabling people to identify and report a pollution-causing activity, such as spotting an illicit discharge. Public education efforts specifically targeted at trash control represent opportunities to enhance the public's understanding

of how trash control efforts can benefit water quality and to improve compliance with the applicable regulatory requirements.

EPA has highlighted examples from existing MS4 permits that focus on public education and outreach in its *Compendium of MS4 Permitting Approaches – Part 1: Six Minimum Control Measures* (EPA, 2016), and has provided sample permit language in the *MS4 Permit Improvement Guide* (EPA, 2010). Although trash control is not the sole focus of the example permit provisions in these publications, they illustrate how public education and outreach can be effectively employed for trash control. The following types of requirements are among the elements included in examples from these publications. **Bold** text is added to identify specific opportunities for addressing trash and litter control.

- Select a minimum number of focus areas **that are known trash hot spots** for the MS4's education program and identify the target audience that will be the focus of the education (e.g., general public, commercial and industrial facilities, developers, general contractors, engineers, and landscapers). For example, New Jersey's small MS4 general permit requires that each permittee achieve a certain number of public education points annually by conducting specific activities that are each assigned a point value. See Part IV.F.4 and Attachment E.
- Select a minimum number of specific **trash/litter control related** BMPs to target for focused outreach and set a fixed percentage of the available audience as a target for adopting those BMP(s).
- Specify the number of outreach events to conduct and/or the specific number and type of materials **related to trash control** to be distributed to the general public, or to specific target groups.
- Conduct a public awareness survey a minimum number of times during the permit term to gauge the awareness of **litter control** themes or concepts in the public or in specific target groups.
- Measure the adoption of **trash/litter reduction** behaviors or practices that are part of the education and outreach program through direct evaluations, surveys, interviews, etc.
- Target a stormwater awareness campaign around **trash/litter reduction** and measure success tied to the environmental outcome (e.g. **less trash** in catch basins following an education campaign).

The following examples of MS4 permit provisions show how some of the above permit approaches have been applied to make trash control an area of emphasis for public education programs.

Rhode Island General MS4 Permit: Section IV.B.1.

Summary:

Permittee shall implement a litter disposal public education program within the first year of the permit period.

Excerpt from permit:

a. *Permit Requirement. The operator must implement an ongoing public education program to distribute education material to the community over the term of the permit…*

b. *Decision Process/Milestones. The operator must document the decision process for the development of a storm water public education and outreach program. If documented strategies are not in place… the operator must include development of the strategies within the first year of the program as a measurable goal…*

    5. *Outreach strategy, including the mechanism(s) (e.g., printed brochures, newspapers, media, workshops, etc.) that will be used to target audiences. Materials for outreach/education may include, but are not limited to, pamphlets; fact sheets; brochures; public service announcements; storm drain stenciling and newspaper advertisements. Topics should include, but are not limited to, litter disposal, pet waste, …*

Connecticut General MS4 Permit: Section 6.A.1.A

Summary:

Existing permittees shall implement a public education program within the first year of permit period that addresses impacts of illicit discharges and improper disposal of waste in the MS4. Newly authorized permittees shall implement a public education program within the second year of the permit period.

Excerpt from permit:

Implement a public education program to distribute educational materials to the permittee's community (i.e. residents, business and commerce, students, staff, contractors, etc.) or conduct equivalent outreach activities about the sources and impacts of stormwater discharges on waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff. The education program shall include, but not be limited to, information on … impacts of illicit discharges and improper disposal of waste into the MS4…

(i) Permittees previously authorized … shall begin implementation of this measure within the first year following the effective date of this permit and continue until permit expiration. …

(ii) Permittees not previously authorized …shall begin implementation of this measure within the second year following the effective date of this permit and continue until permit expiration. Permittees shall utilize the one year period following the effective date of this permit to acquire and/or develop the content of the outreach materials.

Western Washington General MS4 Permit: S5.C.2

Summary:

Permittees shall implement a public education campaign focusing on a specific behavior change for a targeted audience and provide stewardship opportunities related to trash reduction.

Excerpt from permit:

The SWMP shall include an education and outreach program designed to:

- *Build general awareness about methods to address and reduce impacts from stormwater runoff.*
- *Effect behavior change to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts.*
- *Create stewardship opportunities that encourages community engagement in addressing the impacts from stormwater runoff...*

The minimum performance measures are:

a. Each Permittee shall provide an education and outreach program for the area served by the MS4. The program design shall be based on local water quality information and target audience characteristics to identify high priority target audiences, subject areas, and/or BMPs.…

ii. Behavior change. To effect behavior change, Permittees shall select, at a minimum, one target audience and one BMPs:…

(a) Target Audiences: Residents, landscapers and property managers/owners, developers, school age children, or businesses.

BMPs:…

- *Dumpster and trash compactor maintenance*
- *Litter and debris prevention. …*

(b) No later than July 1, 2020, each Permittee shall conduct a new evaluation of the effectiveness of an ongoing behavior change campaign (required under S5.C.1.a.ii and S5.C.1.c of the 2013 Permit). Permittees shall document lessons learned and recommendations for which option to select from S5.C.2.a.ii.(c).

Permittees that select option S5.C.2.a.ii.(c)3, below, may forgo this evaluation if it will not add value to the overall behavior change program.

(c) Based on the recommendation from S5.C.2.a.ii.(b), by February 1, 2021, each Permittee shall follow social marketing practices and methods, similar to community-based social marketing, and develop a campaign that is tailored to the community, including development of a program evaluation plan. Each Permittee shall:

1. Develop a strategy and schedule to more effectively implement the existing campaign; or

2. Develop a strategy and schedule to expand the existing campaign to a new target audience or BMPs; or

3. *Develop a strategy and schedule for a new target audience and BMP behavior change campaign.*

(d) No later than April 1, 2021, begin to implement the strategy developed in S5.C.2.a.ii.(c).6

(e) No later than March 31, 2024, evaluate and report on:

1. *The changes in understanding and adoption of targeted behaviors resulting from the implementation of the strategy; and*
2. *Any planned or recommended changes to the campaign in order to be more effective; describe the strategies and process to achieve the results.*

(f) Permittees shall use results of the evaluation to continue to direct effective methods and implementation of the ongoing behavior change program. Stewardship. Each Permittee shall provide and advertise stewardship opportunities and/or partner with existing organizations (including nonpermittees) to encourage residents to participate in activities or events planned and organized within the community, such as: stream teams, storm drain marking, volunteer monitoring, riparian plantings, and education activities.

City of Mobile Individual MS4 Permit: Part II.B.2

Summary:

Permittee shall label storm drains, post signage about litter ordinances, and educate the public on stormwater activities. Permittee shall include a description of the events in the annual report.

Excerpt from permit:

b. The Permittee shall include within the SWMPP the following information:…

3) Plans to specifically address the reduction of litter, floatables and debris from entering the MS4, to include at a minimum;

a. Labeling storm drain inlets and catch basins with "no dumping" message;

b. Posting signs referencing local codes that prohibit littering and illegal dumping at designated public access points to open channels, creeks and other relevant waterbodies; …

5) Plans to inform individuals and groups on how to become involved in the storm water program…The target audiences and subject areas for the education program …should include the following…:

a. General Public:

i. On a quarterly basis, at a minimum, the general public shall be educated on the general impacts litter has on water bodies and ways to reduce the litter…

6) Evaluate the effectiveness of the public education program

7) Organize and participate in activities that target the removal of litter, floatables and debris from area waterways. The minimum number and the waterways these activities will target will be addressed in the SWMPP.

c. The Permittee shall report each year in the annual report the following information:

1) A description of the activities used to involve groups and/or individuals in the development and implementation of the SWMPP;

2) A description of the individuals and groups targeted and how many groups and/or individuals participated;

3) A description of the communication mechanisms or advertisements used to inform the public and the number of applications that were distributed i.e. number of printed brochures, copies of newspapers, workshops, public service announcements, etc.

4) Results of the evaluation plan as required in Part II.B.2.b.6.; and

5) A list of the activities required in Part II.B.2.b.7 and the amount of litter, floatables and debris removed during each activity.

d. The current SWMPP and latest annual report should be posted on the Permittee's website.

Due date: with annual reporting requirement

Fairfax County Individual MS4 Permit: Part I,B.2.J.1.F

Summary:

Permittee shall include outreach programs, activities, and the effectiveness of litter prevention program in annual report.

Excerpt from permit:

Promote and publicize the use of the permittee's litter prevention program

Specific Reporting Requirements:

Beginning with the annual report due October 1, 2016, each annual report shall include a list of permittee public outreach and education activities and the estimated number of individuals reached through the activities. An evaluation of program effectiveness, as outlined in the MS4 Program Plan with recommendations for future changes shall also be included.

Boise/Garden City Individual MS4 Permit: Section II.B.6.B

Summary:

Permittees shall implement a public education campaign focusing on a specific behavior change for a targeted audience and assess the effectiveness of the campaign.

Excerpt from permit:

(i) No later than September 30, 2014, the Permittees must implement or participate in an education, outreach and public involvement program using a variety of methods to target each of the audiences and at least one or more of the topics listed below:

1) General Public…

- *Source control best management practices and environmental stewardship, actions and opportunities for pet waste control/disposal, vehicle maintenance, landscaping and vegetative buffers…*

3) Homeowners, homeowner's associations, landscapers, and property managers…

- *Litter and trash control and recycling programs*

(ii) The Permittees must assess or participate in an effort to assess understanding and adoption of behaviors by the target audiences. The resulting assessments must be used to direct storm water education and outreach resources most effectively.

(iii) The Permittees must track and maintain records of public education, outreach and public involvement activities.

Oregon General MS4 Permit: Schedule A - Section 3.A.

Summary:

Permittee shall develop and implement public education campaign targeting three audiences and addressing significant stormwater issues.

Excerpt from permit:

i. Implementation Dates

(A) Existing Registrants

No later than February 28, 2020, Existing Registrants must implement the required components described in Schedule A.3.a.ii-vi. [see below]

(B) New Registrants

Upon the effective date of this permit, New Registrants must begin to develop[and] implement the required components described in Schedule A.3.a.ii-vi; required components must be fully implemented by September 1, 2023.

ii. Education and Outreach Program

The permit registrant's public education and outreach program must include educational efforts targeting the three audiences listed in Schedule A.3.a.iv…

ii. Stormwater Education Activities

The permit registrant must distribute or offer at least two (2) educational messages or activities per year…

iv. Target Audiences and Topics

The permit registrant must at minimum, conduct education and outreach to each target audience identified below at least once during the permit term, construction site operators must be targeted at least twice. The permit registrant must focus its efforts on conveying relevant messages using the Target Topics identified below or stormwater issues of significance in their community:

(A) Target Audience:

1. *General public, homeowners, homeowner association, schoolchildren, and businesses (including home-based and mobile business).*
2. *Local elected officials, land use planners and engineers.*
3. *Construction site operators (See Schedule A.3.v below).*

(B) Target Topics:…

4. *Best management practices for litter and trash control…*

vi. Tracking and Assessment

The permit registrant must track implementation of the Public Education and Outreach requirements. In each corresponding Annual Report, the permit registrant must assess their progress toward implementation of the program, including the evaluation of at least one education and outreach activity corresponding to the reporting timeframe for the associated Annual Report.

PUBLIC PARTICIPATION AND INVOLVEMENT

Permit provisions that address Public Participation and Involvement include such actions as storm drain stenciling, Adopt-A-Stream or Highway programs, and cleanups. Public participation and involvement provisions are inherently linked to public education and outreach in their objectives – to create a heightened awareness of stormwater issues and engage the community in taking ownership of stormwater issues through programs, activities, and education. It is possible to increase the effectiveness of public education and awareness by coupling them with tangible actions and behavior changes that local communities implement to reduce litter, either at the source or within the waterways.

Public involvement provisions also encourage the public to comment on stormwater management plans and ensure that the public has adequate access to stormwater management information online or in print.

Coeur D'Alene Individual MS4 Permit: Section II.B.2.

Summary:

Permittee shall establish Adopt-A-Street programs, cleanups, stormwater pollution concerns hotline, and storm drain stenciling.

Excerpt from permit:

c) At least once per year, the permittee must organize and promote citizen participation in each of its Adopt a Street and Annual Litter Pick-up programs…

e) Within three years of the permit effective date, the permittee will create, maintain, and promote a "hotline" telephone number to receive, track, and respond as necessary to information submitted by the public regarding storm water pollution concerns.

f) The permittee must organize promote and conduct a storm drain stenciling program. Within two years of the effective date of this permit, at least 100 storm drains, catch basins or inlets throughout the permittee's jurisdiction must be stenciled per year.

San Francisco Bay Individual MS4 Permit: Section C.7.D

Summary:

Permittee shall host stream cleanups, storm drain stenciling, and Adopt-A-Stream programs, and report activities in annual report.

Excerpt from permit:

i. Task Description: Public outreach shall include a variety of pollution prevention messages such as…trash. Public outreach events may include venues such as fairs, shows, and workshops. Citizen involvement events may include venues such as creek/shore clean-ups, adopt-an-inlet/creek/beach programs, volunteer monitoring, storm drain inlet marking, riparian restoration activities, community grants.

ii. Implementation Level: Each Permittee shall annually participate and/or host a mix of public outreach and citizen involvement events according to its population, as shown in the table below:

PERMITTEE POPULATION	NUMBER OF EVENTS
< 10,000	2
10,001 - 40,000	4
40,001 - 100,000	5
100,001 - 175,000	7
175,001 – 250,000	8
> 250,000	10
Non-population based Permittees	6

iii. Reporting: In each Annual Report, each Permittee shall list the events (name of event, event location, and event date) participated in; identify whether the event is public outreach or citizen involvement; and assess the effectiveness of efforts with appropriate measures. (e.g., success at reaching a broad spectrum of the community, number of participants compared to previous years, post-event effectiveness assessment/evaluation results, quantity/volume of materials cleaned up and comparisons to previous efforts).

Fairfax County Individual MS4 Permit: Part I.B.2.J.1.B

Summary:

Permittee shall promote public involvement in clean up events.

Excerpt from permit:

Continue to promote individual and group involvement in local water quality improvement initiatives including the promotion of local restoration and clean-up projects, programs, groups, meetings and other opportunities for public involvement

New York City Individual MS4 Permit: Section IV.B.2.C

Summary:

Permittee shall create and implement a public involvement strategy and stewardship opportunities related to trash reduction.

Excerpt from permit:

Develop and implement a public involvement/participation program that: Describes the public involvement/participation activities…Such activities may include, but are not limited to, a water quality hotline (report spills, dumping, construction sites of concern, etc.), stewardship activities like beach cleanups, wetland restorations and volunteer water quality monitoring.

The permit provision above, while not explicitly related to trash reduction does touch on trash-related activities, such as beach cleanups and a hotline to report illegal dumping. New York City's MS4 permit dedicates an entire section to outlining and describing a floatables management program, which provides more stringent and relevant trash reduction strategies. [See example language in Floatables Management Programs, Monitoring and Reporting section of this Chapter.]

ILLICIT DISCHARGE DETECTION AND ELIMINATION

Illicit Discharge Detection and Elimination (IDDE) provisions must include a plan to identify and remove any sources of non-stormwater[3] from entering the system, a map of the storm sewer system, and training programs for the public and businesses on the hazards of illegal discharges, among other required actions (40 CFR 122.34(b)(3)). Often, these provisions target the detection and elimination of illegal discharges to the MS4 system and illegal dumping through hotlines, mapping of the storm sewer system, outfall inspection and screening, and ordinances. According to Phase II regulations, "… a short list of parameters may include conductivity, ammonia, surfactant and pH. Some MS4s have found it useful to measure for fecal coliform or E. coli in

[3] The term "illicit discharge" is defined in the regulations as "any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from firefighting activities." (140 CFR 122.26(b)(2)

their testing program. Observations of physical characteristics of the discharge are also helpful such as flow rate, temperature, odor, color, turbidity, **floatable matter**, deposits and stains, and vegetation" (64 FR 68757 December 8, 1999). Persistent trash sources would also be considered an illicit discharge to the MS4 system requiring correction.

Although it is not common for IDDE provisions to explicitly identify trash as an area of emphasis, targeting sources of trash and litter introduction in the sewer system is within the broad scope of the definition of "illicit discharge," which focuses on the discharge of all non-stormwater into the sewer system. As such, the IDDE section of MS4 permits represents an opportunity for permitting authorities to address trash where it is of particular concern for state and local waterways.

Rhode Island General MS4 Permit: Section IV.B.3.A.2

Summary:

Permittee shall create and implement an ordinance or other regulatory mechanism addressing litter.

Excerpt from permit:

The operator must effectively prohibit and enforce, through an ordinance or other regulatory mechanism available to the operator, non-storm water discharges into the system…and must also address … litter… The mechanism must include sanctions for non-compliance. The ordinance or other regulatory mechanism must provide for appropriate enforcement procedures and actions. If a regulatory mechanism does not exist by the time an application is required, development and adoption of such a mechanism must be included as part of the SWMPP.

Connecticut MS4 General Permit: Section 6.A.3.B

Summary:

Permittee shall create and implement a regulation addressing litter in the first year of the permit period for existing permittees and within the first two years for new permittees.

Excerpt from permit:

Establish the necessary and enforceable legal authority by statute, ordinance, rules and regulations, permit, easement, contract, order or any other means, to eliminate illicit discharges.

(i) The legal authority shall:

- *a. prohibit illicit discharges to its storm sewer system and require removal of such discharges consistent with subsection (3)(A), above; and*
- *b. Control the discharge of spills and prohibit the dumping or disposal of materials including… trash…*
- *c. authorize fines or penalties and/or recoup costs incurred by the permittee from anyone creating an illicit discharge or spilling or dumping as specified in subsection (3)(A), above. For state and federal institutions, where this provision may conflict with existing*

rules, regulations, policies, chain of command or other circumstances, alternate provisions for enforcement may be utilized.

d. provide any additional legal authorities specified in Section (A)(7)(a) of Appendix B.

(ii) Existing 2004 MS4 permittees must establish and implement this legal authority within one year of the effective date of this permit. New MS4 permittees must establish and implement this legal authority on or before two (2) years of the effective date of this permit.

(iii) New MS4 permittees must establish and implement this legal authority on or before two (2) years of the effective date of this permit.

Texas General MS4 Permit: PART III. Section B.2.A.

Summary:

Permittee shall develop a strategy for detecting and eliminating illegal dumping.

Excerpt from permit:

(1) All permittees shall develop, implement and enforce a program to detect, investigate, and eliminate illicit discharges into the small MS4. The program must include a plan to detect and address non-stormwater discharges, including illegal dumping to the MS4 system.

Existing permittees must assess program elements that were described in the previous permit, modify as necessary, and develop and implement new elements, as necessary, to continue reducing the discharge of pollutants from the MS4 to the MEP. New elements must be fully implemented by the end of this permit term and newly regulated permittee shall have the program fully implemented by the end of this permit term.

Fairfax County Individual MS4 Permit: Part I.B.2.E.3

Summary:

Permittee shall remove floatables from stormwater management facilities as part of the prohibition of discharges to the MS4 not authorized by this permit.

Excerpt from permit:

The permittee shall continue to implement a program to reduce the discharge of floatables (e.g. litter and other human-generated solid refuse) in accordance with Part I.C.3… [See *Floatables Management Programs, Monitoring and Reporting Section* below]

CONSTRUCTION SITE RUNOFF CONTROL

Construction Site Runoff Control provisions include requirements for sediment and erosion control, minimizing the discharge of other pollutants, and site plan review for construction sites. The prevention and cleanup of trash and debris from construction sites that discharge stormwater into a regulated MS4 can be addressed as part of the construction site runoff provisions in MS4 permits

Massachusetts General MS4 Permit: Section 2.3.5.C

Summary:

Permittee shall include litter control in construction site runoff control program and report tracking information in annual report.

Excerpt from permit:

The permittee shall develop and implement a construction site runoff control program that includes…:

i. …In addition to addressing sediment and erosion control, the ordinance must include controls for other wastes on constructions sites such as demolition debris, litter and sanitary wastes…

iv. Requirements for construction site operators within the MS4 jurisdiction to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. These wastes may not be discharged to the MS4.

v. …The procedures for site inspections conducted by the permittee shall include the requirement that inspections occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans…This tracking information shall be included as part of each annual report required by part 4.4.

Georgia General MS4 Permit: Part 4.2.4

Summary:

Permittee shall develop and evaluate construction ordinances that include litter control.

Excerpt from permit:

3. Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse water quality impacts;…

Table 4.2.4(a) 1. Legal Authority (Best Management Practices for Existing Permittees): Evaluate, and if necessary, modify the existing E&S ordinance. Ensure either the E&S or litter ordinance requires construction site operators to control waste at the construction site, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste….

Table 4.2.4(b) 1. Legal Authority (Best Management Practices for New Permittees): Develop an ordinance(s) that requires construction site operators to implement E&S controls and control waste at the construction site, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste.

POLLUTION PREVENTION AND GOOD HOUSEKEEPING

Pollution Prevention and Good Housekeeping provisions are commonly used in MS4 permits to address trash in waterways. Permits are required to include pollution prevention and good housekeeping provisions for municipally-owned facilities, which includes training programs for employees, and operation and maintenance procedures. Pollution Prevention and Good Housekeeping measures also focus on the proper maintenance and operation of controls so that they are operating at their full effectiveness. Standard operating procedures, or SOPs, may be written in association with the permit to further detail operation and maintenance of BMPs.

Trash-related permit provisions typically include structural and non-structural controls that prevent trash from either entering the storm sewer system or moving further downstream once in the waterways. Non-structural controls (also called institutional controls) include BMPs intended to either prevent trash from entering the system or remove it from the system, such as street sweeping, plastic bag bans, and stream cleanups. Structural controls include litter traps, outfall netting, catch basins and other physical devices designed to capture trash either before it enters the system or once it has already entered it. More information on BMPs can be found on EPA's website (see National Menu of Best Management Practices (BMPs) for Stormwater Documents). The trash provisions included below all relate to BMPs used to address trash.

Rhode Island General MS4 Permit: Section IV.B.6.1

Summary:

Permittee shall implement an operation and maintenance program for catch basin cleaning and street sweeping as well as establishing litter reduction structural controls.

Excerpt from permit:

iii. Procedures for implementation of a regular catch basin inspection and cleaning program to inspect all catch basins annually commencing by the third year of the program, document the results of the inspection, and clean structures as necessary. …

vi. Procedures for the development and implementation of a regular street and road sweeping program that includes sweeping of all streets and roads within the regulated area annually, to be fully implemented by the third year of the program. The operator is required to sweep all streets and roads within the regulated area annually unless a lesser frequency can be justified based on at least two consecutive years of data indicating the street or road does not require annual sweeping…

vii. Description of maintenance activities, maintenance schedules, and long-term inspection procedures for controls to reduce floatables and other pollutants from the MS4 must include one or more floatable control options which could include, but are not limited to storm sewer

grate retrofits, increased number of litter receptacles in areas frequented by pedestrian traffic, trash netting and/or other equivalent technologies.

viii. *Procedures for the proper disposal of waste removed from MS4s and waste from other municipal operations, including accumulated sediments, floatables and other debris.*

Puerto Rico General MS4 Permit: Section 2.4.7.1

Summary: Permittee shall develop procedures for management of trash containers, dumpsters, and other waste management.

Excerpt from permit:

Within one (1) year from the authorization under this permit, the permittee shall develop, if not already developed, written operations and maintenance procedures for the municipal activities listed below… These written O & M procedures shall be included as part of the SWMP as specified in Section 1.11.

The permittee shall ensure staff training to meet developed procedures.

a. *Parks and open space: …Establish procedures for management of trash containers at parks (i.e., scheduled cleanings; sufficient number).*

b. *Buildings and facilities where pollutants are exposed to stormwater runoff: …Develop management procedures for dumpsters and other waste management equipment.*

Puerto Rico General MS4 Permit: Section 2.4.7.1.D

Summary:

Permittees shall establish a schedule for cleaning and inspecting catch basins and report in the annual report number of catch basins cleaned and inspected.

Excerpt from permit:

1. *The permittee shall establish within one (1) year of the authorization under this permit a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4...*
2. *The permittee shall optimize routine inspections, cleaning and maintenance of catch basins such that the following conditions are met:…*

   ii. *Prioritize inspection and maintenance for catch basins located near construction activities. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings…*

   iii. *Establish, for other catch basins, a schedule for the frequency of routine cleaning that will ensure that no catch basin at any time will be more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin…*

vi. *The permittee shall document in the SWMP and in the first annual report its plan for optimizing catch basin cleaning, inspection plans, or its schedule for gathering information to develop the optimization plan. Documentation shall include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4. The permittee shall keep a log of catch basins cleaned or inspected.*

vii. *The permittee shall report in each annual report the total number of catch basins, number inspected, number cleaned, and the volume or mass of material removed from each catch basin draining to impaired waters and the total volume or mass of material removed from all catch basins…*

6. *The permittee shall report in the annual report on the status of the inventory required by this section and any subsequent updates; the status of the O&M programs for the permittee-owned facilities and activities… and the maintenance activities associated with each.*

Los Angeles Individual MS4 Permit: Section VI.D.4.C.VII

Summary:

Permittee shall map, inspect, and label catch basins.

Excerpt from permit:

(3) Catch Basin Cleaning:

(a) In areas that are not subject to a trash TMDL, the LACFCD shall determine priority areas and shall update its map or list of catch basins with their GPS coordinates and priority:

Priority A: Catch basins that are designated as consistently generating the highest volumes of trash and/or debris.

Priority B: Catch basins that are designated as consistently generating moderate volumes of trash and/or debris.

Priority C: Catch basins that are designated as generating low volumes of trash and/or debris. The map or list shall contain the rationale or data to support priority designations.

(b) In areas not subject to a trash TMDL, the LACFCD shall inspect its catch basins according to the following schedule:

Priority A: A minimum of 3 times during the wet season (October 1 through April 15) and once during the dry season every year.

Priority B: A minimum of once during the wet season and once during the dry season every year.

Priority C: A minimum of once per year. Catch basins shall be cleaned as necessary on the basis of inspections. At a minimum, LACFCD shall ensure that any catch basin that is determined to be at least 25% full of trash shall be cleaned out. LACFCD shall maintain inspection and cleaning records for Regional Water Board review...

(4) Catch Basin Labels and Open Channel Signage

(a) LACFCD shall label all catch basin inlets that they own with a legible "no dumping" message.

(b) The LACFCD shall inspect the legibility of the catch basin stencil or label nearest the inlet prior to the wet season every year.

(c) The LACFCD shall record all catch basins with illegible stencils and re-stencil or re-label within 180 days of inspection.

(d) The LACFCD shall post signs, referencing local code(s) that prohibit littering and illegal dumping, at designated public access points to open channels, creeks, urban lakes, and other relevant waterbodies.

Connecticut General MS4 Permit: Section 6.A.6. C. I

Summary:

Permittee shall establish procedures for trash management in parks.

Excerpt from permit:

Permittee-owned or -operated properties, parks, and other facilities that are owned, operated, or otherwise the legal responsibility of the permittee shall be maintained so as to minimize the discharge of pollutants to its MS4,…[including establishing] procedures for management of trash containers at parks (scheduled cleanings; sufficient number).

City of Mobile Individual MS4 Permit: Section II.B.7.A

Summary:

Permittee shall implement trash BMPs and develop a plan to reduce trash from the MS4.

Excerpt from permit:

2) Develop strategies for the implementation of BMPs to reduce litter, floatables and debris from entering the MS4 and evaluate these BMPs annually to determine their effectiveness. If a BMP is determined to be ineffective or infeasible, then the BMP must be modified. The Permittee shall also develop a plan to remove litter, floatable and debris material from the MS4, including proper disposal of waste removed from the system.

Although this permit provision does not include any specific BMPs, the City of Mobile permit includes an extensive description of a floatables program and the necessary components. More information on BMPs and which to implement are included in the floatables program provision.

City of Mobile Individual MS4 Permit: Section II.B.7

Summary:

Permittee shall report amount of trash collected from the MS4 in the annual report.

Excerpt from permit:

c. *The Permittee shall report each year in the annual report the following information:*

1. *Any updates to the municipal facility inventory;*
2. *An estimated amount of floatable material collected from the MS4 as required by Part II. B.7.a.(2);*
3. *Any updates to the inspection plan; and*
4. *Any updates to the SOP of good housekeeping practices.*

Joint Base Lewis-McChord Individual MS4 Permit: Section II.B.6

Summary:

Permittee shall inspect and maintain catch basins and report progress in the second year of the permit period.

Excerpt from permit:

Within two years from the effective date of this permit, the Permittee must update and implement its operations and maintenance (O&M) program to prevent or reduce pollutants in runoff from the Permittee's MS4 and from ongoing municipal operations. The written description of the program must be included in the SWMP document. At a minimum…:

d) Inspection of Catch Basins. The Permittee must inspect all catch basins and inlets owned or operated by the Permittee at least once before the end of the permit term. The Permittee must clean catch basins if inspection indicates cleaning is needed.

- *As part of the 2nd Year Annual Report, the Permittee must report the total number of Permittee-owned or operated catch basins to be inspected annually in compliance with this Part; subsequent Annual Reports must document the Permittee's progress toward inspecting and maintaining all catch basins prior to the permit expiration date...*

f) Maintenance Practices. The Permittee must document and implement maintenance practices to reduce stormwater impacts associated with runoff from streets, parking lots, roads or highways, parks, open space …The Permittee must ensure that the following activities are conducted in a manner that is protective of receiving water quality:…

- *Street cleaning…*
- *Trash management…*

New Jersey Tier A General MS4 Permit: Section IV.B.5

Summary:

Permittee shall adopt and enforce litter ordinance and certify in annual report.

Excerpt from permit:

a. Community Wide Ordinances: The Tier A Municipality shall adopt and enforce the following community wide ordinances to address improper disposal of waste:…

iii. Adopt and enforce a litter ordinance or enforce the existing State litter statute at N.J.S.A 13:1E-99.3. See the Tier A Municipal Guidance document (www.nj.gov/dep/dwq/tier_a_guidance.htm) for a sample ordinance…

Attachment A - Associated Measurable Goal: Certify in each annual report the date the ordinance was adopted and that it is being enforced. A log of enforcement actions shall be kept in the SPPP.

New Jersey Tier A General MS4 Permit: Section IV.B.5.B

Summary:

Permittee shall report in the annual report catch basin cleaning schedule and amount of material removed during cleanings.

Excerpt from permit:

ii. Catch Basin and Storm Drain Inlet Inspection and Cleaning: The Tier A Municipality shall inspect storm drain inlets and any associated catch basins that it owns or operates and remove sediment, trash, or debris when present. Each catch basin and inlet shall be inspected at least once every five years. The Tier A Municipality shall clean any municipally owned or operated storm drain inlet or catch basin as frequently as necessary to eliminate recurring problems and restore proper function.

Attachment A - Associated Measurable Goal: Certify in each annual report that a catch basin and storm drain inlet inspection and cleaning schedule is being maintained, and a log indicating the number of municipally owned and operated catch basins and inlets within the municipality, the number of catch basins and inlets inspected, and the number cleaned is being maintained. Maintain records documenting the amount of materials collected in wet tons during cleaning activities in the SPPP. Include totals in the Annual Report.

California General Small MS4 Permit: Section E.11.F and E.11.G

Summary:

Permittee shall assess priority catch basins based on amount of trash collected in the second year of the permit period and begin maintenance of all high priority storm drain systems on an ongoing schedule within the third year of the permit period.

Excerpt from permit:

E.11.f. Storm Drain System Assessment and Prioritization

(i) Task Description: Within the second year of the effective date of the permit, the Permittee shall develop and implement procedures to assess and prioritize MS4 storm drain system maintenance, including but not limited to, catch basins, pipe and pump infrastructure, above-ground conveyances, including receiving water bodies within the Permittee's urbanized area and detention basins.

(ii) Implementation Level: The Permittee shall assess/prioritize storm drain system facilities for cleanout – Assign a priority to MS4 storm drain facilities within the Permittee's urbanized areas based on accumulation of sediment, trash and/or debris. In particular, assign high priority to catch basin meeting any of the following criteria:

1) Catch basins known to accumulate a significant amount of sediment, trash, and/or debris;…

3) Catch basin collecting runoff from area that do not receive regular sweet sweeping…

E.11.G. Maintenance of Storm Drain System

(i) Task Description: Within the third year of the effective date of the permit, the Permittee shall begin maintenance of all high priority storm drain systems on an ongoing schedule.

(ii) Implementation Level: The Permittee shall begin maintenance of storm drain systems according to the procedures and priorities developed according to this Section. At a minimum the Permittee shall:

(a) Inspect storm drain systems – Based on the priorities assigned, develop and implement a strategy to inspect storm drain systems within the Permittee's jurisdiction. At a minimum, inspect all high priority catch basins and systems annually.

(b) Clean storm drains – Develop and implement a schedule to clean high priority catch basins and other systems. Cleaning frequencies shall be based on priority areas, with higher priority areas receiving more frequent maintenance.

(c) Labeling catch basins – Ensure that each catch basin in high foot traffic areas includes a legible storm water awareness message (e.g., a label, stencil, marker, or pre-cast message such as "drains to the creek" or "only rain in the drain"). Catch basins with illegible or missing labels shall be recorded and relabeled within one month of inspection.

(d) Maintain surface drainage structures – High priority facilities shall be reviewed and maintained annually as needed. Non-priority facilities shall be reviewed as needed. Removal of trash and debris from high priority areas shall occur annually prior to the rainy season.

Texas General MS4 Permit: Part III.B.5.C

Summary:

Permittee shall conduct street sweeping or implement trash reduction strategies.

Excerpt from permit:

(2) Operation and Maintenance Program to Reduce Discharges of Pollutants from Roads

Permittees who operate level 3 or 4 small MS4s shall implement an O&M program that includes at least one of the following: a street sweeping and cleaning program, or an equivalent BMP such as an inlet protection program, which must include an implementation schedule and a waste disposal procedure…If a street sweeping and cleaning program is implemented, the permittee shall evaluate the following permittee-owned and operated areas for the program: streets, road segments, and public parking lots including, but not limited to, high traffic zones, commercial and industrial districts, sport and event venues, and plazas, as well as areas that consistently accumulate high volumes of trash, debris, and other stormwater pollutants.

a. Implementation schedules – If a sweeping program is implemented, the permittee shall sweep the areas in the program (for example, the streets, roads, and public parking lots) in accordance with a frequency and schedule determined in the permittee's O&M program.

b. For areas where street sweeping is technically infeasible (for example, streets without curbs), the permittee shall focus implementation of other trash and litter control procedures or provide inlet protection measures to minimize pollutant discharges to storm drains and creeks.

Boise/Garden City Individual MS4 Permit: Section II.B.4.D.

Summary:

Permittee shall conduct and evaluate effectiveness of street sweeping activities or implement trash reduction strategies.

Excerpt from permit:

(iv) For areas where sweeping is technically infeasible, the Permittees with street, road, and/or public parking lot maintenance responsibilities must document in the 1st Year Annual Report each area and indicate why sweeping is infeasible. The Permittee must document what alternative sweeping schedule will be used, or how the Permittee will increase implementation of other trash/litter control procedures to minimize pollutant discharges to the MS4 and to receiving waters.

(v) The Permittees with street, road, and/or public parking lot maintenance responsibilities must estimate the effectiveness of their street sweeping activities to minimize pollutant discharges to the MS4 and receiving waters, and document the following in each Annual Report:

- *Identify any significant changes to the designated road/street/parking lot inventory and map, and the basis for those changes;*

- *Report annually on types of sweepers used, swept curb and/or lane miles, dates of sweeping by general location and frequency category, volume or weight of materials removed and a representative sample of the particle size distribution of swept material;*
- *Report annually on any public outreach efforts or other means to address excess leaves and other material as well as areas that are infeasible to sweep.*

FLOATABLES MANAGEMENT PROGRAMS, MONITORING AND REPORTING

As shown in the example language above, there are a variety of strategies that can be used to prevent trash from entering the storm sewer system. While some permits incorporate trash provisions in sections of the permit devoted to addressing one of the six minimum control measures, others include a separate section entirely dedicated to a floatables management program. This section highlights permits that require specific floatables management programs within the permit and sections that detail reporting and monitoring requirements for all permit conditions, which would include trash provisions.

While the permit requirements are presented as stand-alone sections, they may also be adapted and incorporated into clear, specific, and measurable provisions and included in permit sections addressing the six minimum control measures in lieu of a comprehensive floatables program.

Caltrans Individual MS4 Permit: Section E.2.H.4.C

Summary:

Permittee shall include in the annual report status updates on trash reduction strategies including estimated annual volumes of trash and litter removed as a result of street sweeping, public education campaigns, and Adopt-A-Highway programs.

Excerpt from permit:

The Department shall report on the trash and litter removal activities that are currently underway or are initiated after adoption of this Order. Activities include, but are not limited to, storm drain maintenance, road sweeping, public education and the Adopt-A-Highway program. Reporting and assessment of these or future activities shall follow protocols established by the Department 2012-0011-DWQ 51 September 19, 2012 and shall include estimated annual volumes of the trash and litter removed. Results shall be submitted as part of the Annual Report in a summary format by District. Prior year's data shall be included to facilitate an analysis of trends.

The Caltrans MS4 permit covers all highways and roads maintained by the California Department of Transportation. Departments of Transportation are considered non-traditional small MS4 permit holders. EPA published a Transportation Stormwater Compendium, which provides additional permit language and resources tailored for transportation-specific MS4 permits.

City of Mobile Individual MS4 Permit: Part II.B.1

Summary:

Permittee shall report annually on the maintenance, inspection, and amount of trash removed by structural controls, including catch basins and litter traps.

Excerpt from permit:

a. Structural Controls…

iii. The Permittee shall maintain an inventory of structural controls and maintain a tracking system for inspections and maintenance of the control structures

iv. The Permittee shall report each year in the annual report the following structural control information:…

3. The estimated amount of floatable, litter, sediment, and debris that is removed…

b. Catch Basins…

ii. The Permittee shall include in the SWMPP and implement the following catch basin maintenance activities:…

2. Inspection and maintenance of a minimum of five percent of the catch basins annually…

4. Track the estimated amount of debris/litter removal…

iv. The Permittee shall report each year in the annual report the following catch basin information:

1. The number of inspections performed on catch basins, to include follow-up inspections and the inspection documentation…

3. The estimated amount of debris/litter removed

c. Litter Traps

i. The litter traps shall be operated in a manner to retain the discharge of floatables/debris, to the maximum extent possible;

ii. The Permittee shall include in the SWMPP and implement the following litter trap maintenance activities:

1. Maintain a map of the location of the litter' traps;

2. Inspection and maintenance of litter traps shall be performed on a weekly basis, at a minimum, and after a significant rainfall, as defined in the SWMPP

3. Develop and implement a litter trap inspection checklist; and

4. Track the estimated amount of debris/litter removal.

iii. The Permittee shall maintain an internal record keeping system to track the inventory of litter traps, inspections and maintenance of the litter traps, and

iv. *The Permittee shall report each year in the annual report the following litter trap information:*

1. *The number of inspections performed on litter traps, to include follow-up inspections and the inspection documentation (i.e. checklist);*
2. *A summary of the maintenance activities performed on litter traps, as well as the frequency;*
3. *The estimated amount of floatables/debris removed;*
4. *Copies of any contractual agreements for maintenance activities if not performed by the permittee. The contractual agreement should specific maintenance activities performed and schedule; and 5. Updated litter trap map.*

d. *Additional Measures for the Control of Trash (to include Floatables and Debris)*

i. *The Permittee shall develop and implement a short and long term strategy and program to attain the effective removal of trash from the City of Mobile waterways and tributaries in such a manner to quantify the effective removal of trash per year, which shall be included in the annual report. These strategies shall be included in the permittee's SWMP Plan and shall be updated as necessary. This program shall address the following, at a minimum:*

1. *Direct removal of trash from waterbodies;*
2. *Direct removal of trash from the MS4;*
3. *Direct removal of trash prior to entry to the MS4;*
4. *Prevention through disposal alternatives; and*
5. *Prevention through waste reduction practices, additional enforcement, and/or initiatives.*

ii. *The Permittee shall require the following measures to be implemented in the public right of way for any event or wherever it is anticipated that substantial quantities of trash or litter may be generated:*

1. *Arrangement for temporary protection of preventive measures to the catch basins, where feasible; and*
2. *Provide proper disposal of trash receptacles, clean up of catch basins, as needed, and grounds of the event area within one business day subsequent to the event.*

iii. *The Permittee shall ensure that trash receptacles, or similar trash capturing devices are provided and maintained in areas identified as high trash generated areas*

Baltimore City Individual MS4 Permit: Part IV.D.4.

Summary:

Permittee shall inventory trash reduction strategies, implement a public education campaign about litter prevention, and report on these activities.

Excerpt from permit:

a. *Within one year of permit issuance, the City shall inventory and evaluate all current trash and recyclable pick-up operations, litter control programs, and public outreach efforts. The analysis shall identify opportunities for improving overall efficiency, especially in the Middle Branch and Northwest Branch of the Patapsco River.*

b. *Within one year of permit issuance, develop and implement a public education and outreach strategy with specific performance goals, and corresponding deadlines to initiate or increase residential and commercial recycling rates, improve trash management, and reduce littering. The strategy shall include:*

   i. *Educating the public on the importance of reducing, reusing, and recycling;*

   ii. *Disseminating information by using signs, articles, and other media outlets;*

   iii. *Promoting educational programs in schools, businesses, community associations, etc.; and*

   iv. *Providing the strategy to interested parties upon request.*

c. *Evaluating annually the effectiveness of the education program.*

d. *Within one year of the Environmental Protection Agency's (EPA) approval of a trash TMDL for the Middle Branch and Northwest Branch of the Patapsco River, implement those program improvements identified in PART IV.D.4.a above and any additional programs needed to address the TMDL.*

e. *Submit annually, a report which details progress toward implementing the trash reduction strategies. The report shall describe the status of trash elimination efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.*

New York City Individual MS4 Permit: Section IV.I

Summary:

Permittee shall determine loading rate of trash discharged into waterways, operate and maintain structural controls, and implement a public education campaign.

Excerpt from permit:

The Permittee shall develop a floatable and settleable trash and debris management program as part of the Stormwater Management Program Plan. The objectives of the floatable and settleable trash and debris management program shall be to develop a methodology to determine the loading rate of floatable and settleable trash and debris, including land-based sources, from the MS4 to waterbodies listed as impaired for floatables in the MS4 areas, and to assess and

implement strategies to reduce floatable and settleable trash and debris to waterbodies listed as impaired for floatables in the MS4 areas. The program may prioritize waterbodies and/or drainage areas for floatable and settleable trash and debris control strategies based on the relative significance of the MS4 contribution to floatable and settleable trash and debris loads. The program included in the SWMP in the first permit cycle shall be designed to accomplish the following:

1. *Evaluate the Permittee's existing programs including best management practices and structural and non-structural control measures for floatable and settleable trash and debris, and their efficacy, based on existing information, and compare them with the best available technologies identified for control of floatable and settleable trash and debris to waterbodies listed as impaired for floatables in the MS4 areas;*
2. *Identify technological advancements and best available technologies for floatable and settleable trash and debris capture employed in other municipalities and assess their applicability to New York City; and*
3. *Propose a methodology for selecting, sizing and siting the best management practices and controls that will be implemented to reduce floatable and settleable trash and debris for Department review and approval.*

Within two (2) years of effective date of permit (EDP), the Permittee shall submit a draft workplan to determine the loading rate of floatable and settleable trash and debris discharged, including land-based sources, from the MS4 to waterbodies listed as impaired for floatables for Department review and approval. The draft workplan shall include a literature search of methods employed by other municipalities, as well as a discussion as to why the selected method is best for conditions in New York City. The final workplan to determine the loading rate of floatable and settleable trash and debris discharged, including land-based sources, from the MS4 to waterbodies listed as impaired for floatables shall be included in the SWMP plan to be submitted to the Department within three (3) years of EDP.

Within three (3) months of the Department's approval of the final workplan, the Permittee shall propose a schedule to determine the loading rate of floatable and settleable trash and debris from the MS4 to waterbodies listed as impaired for floatables in the MS4 areas with a completion date from commencement of study not to exceed three (3) years. If the Permittee is unable to complete the floatable and settleable trash and debris loading rate study in three (3) years from commencement, the Permittee shall request an extension from the Department and provide justification for the extension.

Within two (2) years of the Department's approval of the final workplan, the Permittee shall commence a study to determine the loading rate of floatable and settleable trash and debris from the MS4 to waterbodies listed as impaired for floatables in the MS4 areas, using the approved workplan. The Permittee shall continue to implement existing or improved controls to reduce floatable and settleable trash and debris from the MS4 areas to waterbodies with the goal of achieving elimination of trash, debris, and floatables in the receiving waters.

The Permittee shall continue to inspect each catch basin in the NYCDEP MS4 system a minimum of once every 36 months. Catch basins in the NYCDEP MS4 system will be cleaned as required based on these inspections and in accordance with the Permittee's criteria for catch basin

cleaning. The Permittee shall replace missing or damaged catch basin hoods in the NYCDEP MS4 system within 90 days after the date of inspection for basins known to be hooded upon completion of the catch basin hooding program. For all future catch basins in the NYCDEP MS4 system found by inspection to require extensive repairs before a hood can be installed, the Permittee shall repair and install a hood within 24 months.

The Permittee shall implement an interim floatable and settleable trash and debris reduction media campaign to further educate the public on trash and debris control issues. Within three (3) months of EDP, the Permittee shall develop a campaign theme and an implementation schedule. Within six (6) months of EDP, the Permittee shall begin implementation of the campaign. The campaign shall run from six (6) months of EDP to submission of the SWMP plan, which is due within three (3) years of EDP. The Permittee may incorporate elements of the media campaign into the SWMP, as warranted.

The New York City MS4 permit requires specific activities related to floatables management and reduction to be included in the permittee's stormwater management plan (SWMP).

The NYC draft work plan determining the floatables rate into the MS4 was published in August of 2017. The work plan summarizes a literature review of other municipalities' methods, including Los Angeles, San Francisco, Washington D.C., Baltimore City, and Baltimore County. The plan then details the proposed methodology using field monitoring, land use, catchment characteristics, and catch basin attributes to estimate loading rate of floatables.

Fairfax County Individual MS4 Permit: Part I.C.3

Summary:

Permittee shall implement a floatables monitoring program, which includes the development of assessment protocol for trash, data analysis of monitoring results, and annual reporting.

Excerpt from permit:

No later than 24 months after the effective date of the permit, the permittee shall develop and implement a floatables monitoring program. The intent of the monitoring program is to determine the loading of floatables from the MS4 to streams within Fairfax County. The permittee will implement the floatables monitoring program as follows:

a) Monitoring shall be conducted at five (5) monitoring sites located at MS4 outfalls and/or streams receiving discharges from the MS4.

b) Monitoring shall be conducted once per quarter after program implementation.

c) The monitoring program shall include the count of floatables visually observed and length or area of sites assessed

Specific Reporting Requirements

- *The annual report due October 1, 2016 shall include an update on the development of the floatables monitoring program.*

- *The annual report due October 1, 2017 shall include the monitoring protocols for the floatables monitoring program.*
- *Beginning with the annual report due October 1, 2018, each following annual report shall include a list of sites monitored, a summary of the monitoring protocols used, and a summary of the monitoring results and analyses*

Standard Operating Procedures (SOP) provide further detail on how the permit holders must implement certain permit provisions, such as street sweeping. The Fairfax MS4 Program Plan and Annual Report has an accompanying SOP developed by the permittee that details Fairfax County's floatables monitoring program.

California General MS4 Permit: Section E.14.A

Summary:

Permittee shall operate and maintain BMPs as well as evaluate effectiveness of BMPs using assessment protocols. The Program Effectiveness Assessment and Improvement Plan included in the permit provides a minimum standard for the evaluation of BMP performance.

Excerpt from permit:

(i) Prioritized BMPs include BMPs implemented based on pollutants of concern. Where pollutants of concern are unidentified, prioritized BMPs are based on common urban pollutants (i.e., sediment, bacteria, trash, nutrients). The annual effectiveness assessments will help identify potential modifications to the program to ensure long-term effectiveness.

(ii) Implementation Level -

(a) The Program Effectiveness Assessment and Improvement Plan shall include the following elements, at a minimum as applicable:

1) Identification of overall program goals including pollutants of concern and prioritized BMPs

2) Documentation of the level of implementation of storm water program elements

3) Identification and targeting of target audience(s)

4) Assessment of BMP performance at achieving outcome levels

5) Assessment of pollutant source reductions achieved by individual BMPs

6) Quantification of pollutant loads and pollutant load reductions achieved by the program as a whole

7) MS4 discharge quality, where available, including analysis of the data

8) Receiving water quality data, including analysis of the data

9) Identification of long-term effectiveness assessment, to be implemented beyond the permit term

(b) *The Program Effectiveness Assessment and Improvement Plan shall assess BMP and program effectiveness in terms of the following Outcome Levels:*

1) *Storm water program activities*
2) *Awareness*
3) *Behavior*
4) *Pollutant load reductions*
5) *MS4 discharge quality (where assessment is supported by MS4 discharge quality data)*

(c) *The Program Effectiveness Assessment and Improvement Plan shall identify assessment methods for privately owned BMPs.*

(d) *The Program Effectiveness Assessment and Improvement Plan shall identify assessment methods the Permittee will use to quantitatively assess BMP performance at reducing pollutant loads wherever feasible, using the following or equivalent methods:*

1) *Direct quantitative measurement of pollutant load removal for BMPs that lend themselves to such measurement (e.g., measuring sediment collected through street-sweeping activities);*
2) *Science-based estimates of pollutant load removal for BMPs where direct measurement of pollutant removal is overly challenging (e.g., removal of heavy metals through a bioswale);*
3) *Direct quantitative measurement of behaviors that serve as proxies of pollutant removal or reduction (e.g., the percentage of construction sites demonstrated by inspection to be in compliance with permit conditions); or*
4) *Visual comparison (e.g., using photographs to compare the amount of trash in a creek between one year and the next).*

The Program Effectiveness Assessment and Improvement Plan is an approach for assessing the effectiveness of the required BMPs for the prioritized pollutants of concern (POC). The Plan is essential in ensuring that relevant BMPs are installed and maintained and in tracking of their effectiveness over time. Although trash is explicitly mentioned only once in the Effectiveness Plan, it applies to all permit provisions addressing POCs in the California MS4 permit, including several trash provisions detailed in this compendium (Section E.11.F and Section E.11.G). Specifically, permittees who have prioritized trash as a POC would apply this approach to the assessment of the effectiveness of the required BMPs.

San Francisco Individual MS4 Permit: Provision C.10

Summary:

Permittees shall demonstrate compliance with trash discharge prohibitions and trash-related Receiving Water Limitations through the timely implementation of control measures and other actions to reduce trash loads from municipal separate storm sewer systems.

Excerpt from permit:

C.10.a. Trash Reduction Requirements

Permittees shall implement trash load reduction control actions in accordance with the following schedule and trash generation area management requirements, including mandatory minimum full trash capture systems, to meet the goal of 100 percent trash load reduction or no adverse impact to receiving waters from trash by July 1, 2022.

i. Schedule – Permittees shall reduce trash discharges from 2009 levels, described below, to receiving waters in accordance with the following schedule:

a. 70 percent by July 1, 2017; and

b. 80 percent by July 1, 2019.

In addition, Permittees should achieve 60 percent reduction by July 1, 2016. This is not a mandatory deadline; rather, it shall be used as a performance guideline to meet the mandatory July 1, 2017 deadline. Permittees that do not attain the 60 percent performance guideline shall submit documentation of a plan and schedule of implementation of additional trash load reduction control actions that will attain the July 1, 2017 deadline. …

ii. Trash Generation Area Management – Permittees shall demonstrate attainment of the C.10.a.i trash discharges percentage-reduction requirements by management of mapped trash generation areas within their jurisdictions delineated on Trash Generation Area Maps included with their Long Term Trash Reduction Plans, submitted in February 2014, in accordance with the requirements and accounting set forth in this provision. …

a. Permittees shall implement trash prevention and control actions, including full trash capture systems or other trash management actions, or combinations of actions, with trash discharge control equivalent to or better than full trash capture systems, to reduce trash generation to a Low trash generation rate or better. Actions equivalent to full trash capture means actions that send no more trash down the storm drain system than a full trash capture device would allow, which is essentially no trash discharge except in very large storm flows. The C.10.a.i percent reductions shall be demonstrated by percent of 2009 Very High, High, and Moderate trash generation areas reduced to lower trash generation categories or Low trash generation by the C.10.a.i mandatory deadlines.

b. Permittees shall ensure that lands that they do not own or operate, but that are plumbed directly to their storm drain systems in Very High, High, and Moderate trash generation areas are equipped with full trash capture systems or are managed with trash discharge control actions equivalent to or better than full trash capture systems. The efficacy of the latter shall be assessed with visual assessments in accordance with C.10.b.ii. If there is a full trash capture device downstream of these lands, no other trash control is required. Permittees shall map the location, or otherwise record the location, of all such lands greater than 10,000 ft^2 that are plumbed directly to their storm drain systems by July 1, 2018, including the trash control status of these areas. This information shall be retained by the Permittees for inspection upon request.

iii. *Mandatory Minimum Full Trash Capture Systems - Permittees shall install and maintain a mandatory minimum number of full trash capture devices, to treat runoff from an area equivalent to 30 percent of retail/wholesale land area, as documented by the Association of Bay Area Governments, which drains to the storm drain system within their jurisdictions. A city Permittee with a population less than 12,000 and retail/wholesale land less than 40 acres, or a population less than 2,000, is exempt from this full trash capture requirement. Table 2 in Attachment E contains the minimum amount of drainage areas that must be treated with full trash capture devices by each city or county Permittee, and the minimum number of trash capture devices required to be installed and maintained by flood management agency Permittees.*

A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate resulting from a one-year, one-hour, storm in the sub-drainage area or designed to carry at least the same flow as the storm drain connected to the inlet. The device(s) must also have a trash reservoir large enough to contain a reasonable amount of trash safely without overflowing trash into the overflow outlet between maintenance events… Types of systems certified by the State Water Resources Control Board are deemed full capture systems. A stormwater treatment facility implemented in accordance with Provision C.3 is also deemed a full capture system if the facility, including its maintenance prevents the discharge of trash to the downstream MS4 and receiving waters and discharge points from the facility, including overflows, are appropriately screened or otherwise configured to meet the full trash capture screening specification for storm flows up to the full trash capture one year, one hour storm hydraulic specification (C.10.a.iii.).

C.10.b. Demonstration of Trash Reduction Outcomes

i. *Full Trash Capture Systems – Permittees shall maintain, and provide for inspection and review upon request, documentation of the design, operation, and maintenance of each of their full trash capture systems, including the mapped location and drainage area served by each system.*

ii. *Other Trash Management Actions – Permittees shall maintain, and provide for inspection and review upon request, documentation of non-full trash capture system trash control actions that verifies implementation of each action. Permittees shall also conduct assessment of the action that verifies effectiveness of the action or combination of actions and maintain, and provide for inspection and review upon request, documentation of assessments. …*

iv. *Source Control – Permittee jurisdiction-wide actions to reduce trash at the source, particularly persistent trash items, may be valued toward trash load reduction compliance by up to ten percent load reduction total for all such actions. …*

v. *Receiving Water Monitoring – Permittees shall conduct receiving water monitoring and develop receiving water monitoring tools and protocols and a monitoring program designed, to the extent possible, to answer the following questions:*

- *Have a Permittee's trash control actions effectively prevented trash within a Permittee's jurisdiction from discharging into receiving water(s)?*

- *Is trash present in receiving water(s), including transport from one receiving water to another, e.g., from a creek to a San Francisco Bay segment, at levels that may cause adverse water quality impacts?*
- *Are trash discharges from a Permittee's jurisdiction causing or contributing to adverse trash impacts in receiving water(s)?*
- *Are there sources outside of a Permittee's jurisdiction that are causing or contributing to adverse trash impacts in receiving water(s)? …*

b. Report and Proposed Monitoring Program – Permittees shall report progress in the 2018 Annual Report, and submit a preliminary report by July 1, 2019 and a final report by July 1, 2020 on the proposed trash receiving water monitoring program. The progress report is not required if the Permittees conduct this work through an independent third party, approved by the Executive Officer, that provides input and participation by interested parties and scientific peer review of the tools and protocols and testing results and proposed receiving monitoring program.
…

C.10.c. Trash Hot Spot Selection and Cleanup

Trash Hot Spots in receiving waters shall be cleaned annually to achieve the multiple benefits of abatement of impacts and to learn more about the sources and transport routes of trash loading.
…

C.10.d. Trash Load Reduction Plans

Each Permittee shall maintain, and provide for inspection and review upon request, a Trash Load Reduction Plan, including an implementation schedule to meet the C.10.a Trash Load Reduction requirements. A summary of any new revisions to the Plan shall be included in the Annual Report. The Plan shall describe trash load reduction control actions being implemented or planned and the trash generation areas or trash management areas where the actions are or will be implemented, including jurisdiction-wide actions, such as source control ordinances.

C.10.f. Reporting

Each Permittee shall provide the following in each Annual Report:

i. A summary of trash control actions within each trash management area, including the types of actions, levels of implementation, areal extent of implementation, and whether the actions are ongoing or new, including initiation date.

ii. Upon request by the Executive Officer, an updated trash generation area map or maps, which include trash management areas, including the locations and associated drainage areas and of full trash capture systems and other trash control actions, and the location of Trash Hot Spots, with highlight or other indication of any revisions or changes from the previous year map(s). These maps can be used to illustrate progress toward achieving the trash reduction requirements in C.10.a.i. …

iv. *An accounting of its non-full trash capture system trash control actions assessments by providing a summary description of assessments in each of its trash management areas, including the number and dates of observations.*

v. *An accounting of progress toward or attainment of C.10.a.i trash discharge reduction performance guidelines and mandatory deadlines using the C.10.a.ii trash generation area mapping methodology and formula.*

   a. *If a Permittee cannot demonstrate attainment of the 2016 performance guideline, it shall submit a detailed plan and schedule of implementation of additional trash load reduction control actions that will attain the 2017 mandatory deadline.*

   b. *If a Permittee cannot demonstrate attainment of the 2017 or 2019 mandatory trash load reduction deadline, it shall submit a report of non-compliance with the associated Annual Report, or in advance of the Annual Report, that describes actions to comply with the mandatory reduction deadline in a timely manner. The report shall include a plan and schedule for implementation of full trash capture systems sufficient to attain the required reduction. A Permittee may submit a plan and schedule for implementation of other trash management actions to attain the required reduction in an area where implementation of a full trash capture system is not feasible. In such cases, the report shall include identification of the area and documentation of the basis of the Permittee's determination that implementation of a full trash capture system is not feasible.*

vi. *In the 2018 Annual Report, progress on development and testing of the receiving water monitoring program.*

vi. *The volume removed for the most recent five years of hot spot cleanup for each of its trash hot spots, or for the years of cleanup if a new trash hot spot location has been selected.* …

City and County of Honolulu MS4 Permit: Section D.1.F.VII

Summary:

Permittee shall implement its Trash Reduction Plan including conducting a trash hotspots assessment to determine baseline loading, identify and implement control measures to meet quantitative trash reduction goals, and report on its actions.

Excerpt from permit:

Trash Reduction Plan. The Permittee shall continue to implement its Trash Reduction Plan, dated June 2012 unless required to be revised by DOH. The Trash Reduction Plan shall be included within the SWMP and any revisions reported in the Annual Report. Trash means all improperly discarded waste material, excluding vegetation, except for yard/landscaping waste that is illegally disposed of in the storm drain system.

Examples of trash include, but are not limited to, convenience food, beverage, and other product packages or containers constructed of aluminum, steel, glass, paper, plastic, and other natural and synthetic materials. The Trash Reduction Plan shall assess the issues and identify control

measures to be implemented and monitoring activities to determine compliance with this permit, including, at a minimum the following:

- *Plan to determine a quantitative estimate of the debris currently being discharged (baseline load) from the MS4, including methodology used to determine the load.*
- *Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets.*
- *A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load.*
- *A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero.*
- *Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list.*
- *Trash reduction-related education activities as a component of Part D.1.a.*
- *Integration of control measures, education and monitoring to measure progress toward reducing trash discharges.*
- *An implementation schedule for compliance with the short-term and long-term discharge limits in the shortest practicable timeframe.*
- *Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4.*
- *The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action.*

The Permittee shall comply with the following implementation schedule as provided in its Trash Reduction Plan:

TASK	COMPLETION DATE
Short-Term Plan	
Trash Hotspot Assessment (THA)	
Phase 1 Surveys	6/30/2014
Phase 2 Surveys/Complete Baseline Load Study	6/30/2016
Phase 3 Surveys	6/30/2018
THA Report	6/30/2019
Short-Term Reductions (meet 50% of baseline load)	6/30/2023
Long-Term Plan	
Implementation & Monitoring Strategy	6/30/2024
Long-Term Reductions (zero discharge/100% reduction of the baseline load)	6/30/2034

CHAPTER 3. BEST MANAGEMENT PRACTICES FOR REDUCING TRASH IN STORMWATER

This chapter of the compendium provides a tabular summary of a variety of available BMPs for reducing trash in stormwater. For each BMP, Exhibit 2 provides a general description; information on costs, both capital and operations and maintenance (O&M) costs; effectiveness in reducing trash in stormwater; and sources for this information. This summary is not a comprehensive review of all BMPs, however, it is included in this compendium as a resource to assist permit writers by serving as an overview of the wide range of BMPs available, as well as an indication of their costs and effectiveness. Where EPA becomes aware of BMPs that may have been left out, or that emerge in the coming years, this chapter will be modified accordingly to address these BMPs.

BMPs can be implemented at all stages of the trash life cycle. They can reduce trash by preventing litter through source control or by collecting trash, either before it enters the stormwater system by establishing upstream maintenance routines or once it is in the waterway by installing in-stream structures that remove trash loads. Although BMPs are functionally diverse, all BMPs can generally be categorized as a structural control or non-structural control.

Booms can capture large amounts of trash in river but fail to address root cause of problem.

Structural controls:

Physical barriers that collect trash before it enters the waterway or remove trash from within a waterway.

Non-Structural controls:

Non-structural BMPs include services and maintenance that will reduce litter and source control through legislative actions such as bag bans and litter fees, and education and public outreach.

New Jersey's "Stop the Drop" program is one of many creative anti-litter campaigns.

Each type of trash control has its associated advantages and disadvantages. Structural controls result in high load reductions but may fail to address the root cause of trash in waterways and can be costly to install and maintain. They are usually designed for specific flow rates and bypass at higher flows. On the other hand, non-structural controls focus on preventing trash from entering waterways but do not remove trash that is already in a waterway. Implementing both structural and non-structural controls across the full trash life cycle is a strategy that can maximize the impact of trash reduction efforts. The specific nature of the

trash problem within a locality should determine the most effective combination of trash reduction interventions.

Capital cost, BMP effectiveness, maintenance needs and associated costs, and location are all important factors to consider when selecting BMPs. Capital costs, maintenance, and effectiveness for BMPs are all described in Exhibit 2 below. The frequency and cost of maintenance are particularly important to consider for structural BMPs, as failing to properly maintain them can cause serious problems, namely flooding. Large capital investments, such as vacuum trucks or street sweepers, may also be necessary to clean and maintain devices. The costs and effectiveness of BMPs are site specific, and the amount of rainfall, quantity of trash and debris, population density, and other local needs are all factors to consider when choosing what strategies are best suited to meeting the particular needs of the community. Other considerations include conducting land-use and litter studies to map trash hot-spots and optimize placement and ensuring that structural BMPs that require frequent cleaning and other maintenance are installed in places accessible to crews and equipment.

Exhibit 2. Best Management Practices

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
Structural Controls				
Catch Basin Inserts	Category of devices that filter runoff entering a catch basin. A filter medium (such as a basket or net) is suspended in the catch basin and captures leaves, sediment, and trash as it enters the water system. Numerous devices are designed not only to capture trash and debris, but also fine sediment and soluble contaminants. Two types of inserts, Connector Pipe and Basin insert devices, are detailed in the following two rows.	The costs associated with different modifications vary. Simple trash buckets can cost as little as $200, while installing vortex valves in catch basins can cost as much as $1,400 per basin. Cost per cleaning event is $300-$440. Specific frequency of maintenance depends on location, device and season. Weekly maintenance can be necessary.	Effectiveness of catch basins is dependent on keeping the units cleaned out; a clogged catch basin can cause flooding and reintroduce captured trash into the stormwater system. Inserts should be placed in catch basins that are easy for maintenance crews to access with a vacuum tuck. Travel distance and parking availability should be considered.	LA High Trash-Generation Areas and Control Measures 2002[1] Duke Environmental Law and Policy Clinic 2018[2] Orange County Catch Basin Technical Appendix[3]
Connector Pipe Screen (type of catch basin insert)	Metal screen assembly installed inside a catch basin in front of the outlet pipe. The unit is designed to retain all trash and gross solids larger than 5 mm (0.197 in) inside the catch basin and retains large volumes of sediment as well.	$250-$500 depending on size. Regular maintenance required. Inspection necessary after every significant storm. Cleaning takes 5-10 min per basin. Vacuum truck required for cleaning screen costs approximately $400,000.	The San Francisco Estuary Partnership found that "all screens collected trash effectively. Some minor problems with mud getting into the catch basins but otherwise the screens performed well."	Bay Area-Wide Trash Capture Demonstration Project[4] SF Trash Capture Control Devices Appendix[5] Duke Environmental Law and Policy Clinic Structural Controls 2018[6] Commercial Truck Trader[7]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
Curb Inlet Basket (type of catch basin insert)	Rectangular or round catch basin inserts fabricated in stainless steel or fiberglass with screens fabricated with similar materials. The inserts filter water as it passes through various levels of increasingly fine pore opening screens and collects trash, leaves, and sediment. Some baskets include media filters that may treat water for other pollutants of concern.	$500 to $1,000 depending on inlet material of construction, size and geometry. Cleanouts typically cost between $30 and $50 per catch basin. Vacuum truck required for cleaning screens costs between $135,000 and $165,000.	Bay area project reported the device was effective at capturing trash but required frequent maintenance. Regular maintenance, necessary to maintain effectiveness. Cleaning recommended when basin is 40% full. Necessary to replace inserted media every 3-5 years.	SF Trash Capture Control Devices Appendix[5] Commercial Truck Trader[8]
Catch Basin Hoods	Device attached to the inside of a catch basin or manhole designed to prevent the outflow of floating debris and oil.	$400 to $7,000 depending on size. Regular cleaning required.	A New York City (NYC) study found that hooded catch basins capture approximately 85 percent of the litter, while unhooded catch basins capture only 30 percent of litter. Effectiveness is dependent on being properly maintained; hoods are ineffective when they become clogged with debris.	NYC Stormwater Management Plan[9] USGS Catch Basin Hood Study 2009[10] Stormwater Snout Price List[11]
In-stream Booms and Nets	Floating in-stream barriers that capture floatable trash in slow-moving rivers. Trash must be removed manually using skimmer vessel or boom truck.	Price varies significantly with site conditions. In NYC, the one-time capital costs for an installed litter boom ranged from $200,000 to $300,000. Oakland and Los Angeles reported much lower initial capital costs ranging from $50,000 to $90,000. The Los Angeles system cost $620,00 annually for operation, maintenance, and monitoring. Trash harvested cost $1,500 per ton. Oakland reported $75,000 in annual O&M costs.	The Los Angeles Public Works Department tested the effectiveness of the litter boom and estimated performance of the technology to be 80%. A study of a four-boom containment system in NYC estimated that the boom captured 75% of floatable material.	Santa Clara BMP Toolbox[12]
Skimmer	Skimmer vessels are used to collect floating trash. Used in conjunction with a containment boom or other equipment.	Boston purchased a custom trash skimmer for roughly $260,000.	Ease of maneuvering through waterways and customizable features makes this BMP flexible and effective. Almost always operated in conjunction with other equipment (see in-stream booms and nets).	Santa Clara BMP Toolbox[12] Boston Herald[13]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
End-of-Pipe Net	Mesh bags located at outfalls of municipal sewer systems to collect debris that has traveled through the stormwater system.	Prices vary depending on net size and the flow it must withstand One town in Australia installed nets on 750mm and 450mm pipes for $21,000. O&M costs are dependent on the capacity of the system and frequency of storm events. Greensboro Hampton, VA found that cleaning was necessary every three months and cost $2,000 per cleaning event.	NYC study found floatables-capture efficiency is 90% to 95%, depending on weather conditions and operational considerations. Effective in capturing large volumes of trash. Some users report issues with nets coming loose or breaking while others reported they did not have issues even during large storm events	NYC Stormwater Management Plan[9] Machado Lake CA - Trash TMDL[14] Kwinana, Australia[15] Duke Environmental Law and Policy Clinic 2018[2]
Fixed Inlet Screen	Fixed inlet screen over storm drains made of stainless steel. Stops large debris from entering storm drain system.	$100 to $400 depending on size. Requires regular clearing either manually or by street sweeper truck.	Tracking of California's Trash Project found that 67 percent to 69 percent less trash entered inlets with inlet screens in San Jose and Oakland. The possibility of increased ponding is a potential concern.	SF Trash Capture Control Devices Appendix[5] LA Assessment of Screen Covers[16] Duke Environmental Law and Policy Clinic Structural Controls 2018[17]
Automatic Retractable Screen	Device mounted inside curb inlet openings. It remains closed during dry season and low water flow but opens automatically during continuous heavy water flow. Can be calibrated to open automatically for specific water flow levels to avoid flooding.	$500-$2,300 depending on size. Requires regular clearing either manually or by street sweeper truck.	Works as an upgraded version of the fixed inlet screen that avoids ponding issues. Regular maintenance required to remain effective.	SF Trash Capture Control Devices Appendix[5]
Hydrodynamic Separators	Also known as a "vortex separator" or "swirl concentrator." Contains large cylindrical separation chambers in which storm water enters, creating a vortex to separate trash, debris, oil, and other pollutants from storm water. Heavier material settles to the bottom of the storage sump, and floatables remain on the surface of the water.	Price varies significantly based on site specific conditions. Estimates range from $5,000 to $65,000. Annual maintenance costs vary. Charlotte, NC clean theirs 1-2 times per years, at a cost of $2,000 per cleaning event.	Effective in capturing large volumes of trash. Maintenance needed – recommended at least annually. Care must be taken in selecting a hydro-dynamic separator as not all are designed to capture floating trash.	Duke Environmental Law and Policy Clinic 2019[2] Duke Environmental Law and Policy Clinic Structural Controls 20181[18]
Increased Trash Can Accessibility	Increase the number and density of trash cans within a municipality. Distance to the nearest trash	Capital cost per can is approximately $120 and the O&M cost per can annually is $1,100.	Keep America Beautiful reports that people observed littering were on average about 29 feet from a trash receptacle,	LA High Trash-Generation Areas and Control Measures 2002[1]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
	receptacles affects degree of littering.	Philadelphia spent $5.6 million servicing wire wastebaskets in 2018.	the rate of littering decreased to 12% when people were within about 10 feet. A Philadelphia study showed that when the number of trash receptacles decreased, more staff time had to be spent collecting litter, driving up costs.	Philadelphia Trash Receptacle Placement Study[18] KAB National Study on Littering Behavior in America[19] Philadelphia PlanPhilly[20]
Increased Cigarette Receptacles	Increase number and density of cigarette receptacles in public areas. Cigarette butts are one of the largest sources of litter. Cigarette receptacles are most effective close to parking lots and rest areas.	A review of available vendors shows capital cost of cigarette receptacles is about $30-$200 each. Cigarette receptacle maintenance costs are generally rolled in with trash can maintenance costs.	Oceanside, San Diego found a 5.5% increase in proper cigarette disposal at sites with ash receptacles and collected 170 pounds of cigarette butts in four years.	LDDA/KAB Cigarette Litter Prevention Program[21]
Solar Smart Waste and Recycling System	Solar powered trash cans/recycling bins (smart cans) that act as trash compactors can hold 5x more than regular trash cans and can send notifications when they are full to optimize trash collecting resources. The software platform, with collection notifications and smart can fleet metrics, is a key part of this intervention.	Solar power rubbish compacting bins cost $4,600 including notification software and ashtray features. Philadelphia has a fleet of 975 bins. Capital cost for the system was $7 million. The city initially anticipated saving $13.5 million in personnel costs over 10 years, but the actual savings has been roughly half that – $6.6 million – because of the high maintenance costs. Seattle conducted an in-depth benefit-cost analysis and decided against the system.	Positive: Smart cans hold 180 gallons of trash and therefore reduce collections by 70% to 80%. Somerville, MA went from emptying bins three times a day to twice a week in highly trafficked areas. Negative: Philadelphia reported the technology often failed to alert staff when the trash compactors were near capacity. The city also incurred an unforeseen expense in the form of a five-person squad dedicated to repairing the compactors.	Seattle Benefit-Cost Analysis of Solar Trash Compactors[22] Philadelphia High-Tech Trash Cans Review[23]
Full Capture Vortex Separation System (VSS)	Diverts the incoming flow of storm water and pollutants into a pollutant separation and containment chamber. Solids within the separation chamber are kept in continuous motion and are prevented from blocking the screen so that water can pass through the screen and flow downstream.	Three different capacities in cubic feet per second (cfs): $17,400 for 1-2 cfs $60,000 for 6-8 cfs $120,000 for 19-24 cfs Maintenance costs decrease significantly as the size of the system	Studies have shown that VSS systems remove virtually all trash deposited into a storm drain system.	Machado Lake CA - Trash TMDL[12]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
		increases, but the annual servicing costs of a unit are roughly $2,500.		
Inclined Screen and Linear Gross Solids Removal Devices	Trash is retained in a storage area of the vault located at the bottom of the inclined screen or linear screen cage. Flows enter the device through a trough and weir that distribute inflow across the top of the inclined screen. The trough captures the heavier solids such as gravel and sand. Flows exit the device by passing through the inclined screen or linear cage.	One CA study analyzed three inclined screens where construction costs ranged from $150,000-$240,000. The same California study looked at three linear devices which ranged in cost from $85,000-$280,000. Should be cleaned once a year.	The inclined screen device was found to remove 66% to 100% of litter by weight (and by volume). Capacity is scaled to accommodate a once-per-year removal cycle. The linear radial device was found to remove 90% to 98% of litter by weight (and 75% to 92% of litter by volume). Capacity is scaled to hold one year's estimated accumulation of trash.	CA - Design and Performance of Highway Runoff Litter Devices[24]
Baffle Box	Concrete or fiberglass structures that use a two-chamber design to remove pollutants, primarily trash and suspended solids, by slowing the flow velocity through the box, thereby allowing solids and associated pollutants to settle to the bottom of the box. They are best suited for retrofitting into existing storm pipes.	Prices vary widely around about $20,000-$30,000. Sewers that are retrofitted with baffles can cost less than $20,000 to install. Must be cleaned out every two to three months in the dry season, and every month in the wet season. The average cleaning cost for a baffle box is $450. An average vacuum truck can clean two baffle boxes per day.	A California study found that baffle boxes remove 87% to 98% of litter. Regular maintenance required.	CA - Design and Performance of Highway Runoff Litter Devices[24] Machado Lake CA - Trash TMDL[12]
Non-structural Controls				
Single-Use Product Bans (e.g. Plastic Bag, Plastic Straw or Styrofoam Food Container Bans)	Ban single-use products such as plastic bags (SUPB), plastic straws, or styrofoam food containers. Plastic bag bans are the most widespread and studied. Stores charge a fee (typically 5-10 cents) for multi-use plastic bags (thicker, more durable, and often made of recycled materials) or paper bags.	San Francisco saved roughly $845,000 in avoided plastic bag cleanup and single-use plastic bag (SUPB) waste processing. New York City estimated a cost savings of $11.5 million associated with its PBB.	San Jose's PBB generated an 89% decrease in plastic bag litter in storm drains, 60% decrease in creeks and river, and 59% decrease in streets. San Diego achieved 86% reduction of single-use plastic bags.	San Jose Plastic Bag Ban Implementation Results Report[25] Equinox Plastic Bag Ban Impacts Study[26]
Container Deposit Legislation (CDL) aka "Bottle Bills"	When a retailer buys beverages, a deposit is paid to the distributor for each container. Consumers pay the deposit to retailers when buying the beverage and receive refunds when empty containers are returned. Distributors	Typically, CDLs involve a 5- or 10-cent charge to consumers on glass, aluminum, and plastic beverage bottles. Consumers receive this deposit back when the bottle is returned.	Studies conducted pre- and post-bottle bill in seven states showed reductions in beverage container litter ranging from 69% to 84%, and reductions in total litter ranging from 30% to 65%.	Reducing Plastic Pollution through Economic Incentives[27] BottleBill.org[28]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
	reimburse the retailer or redemption center the deposit amount for each container, plus a handling fee.	Unredeemed deposits are either returned to the state, retained by distributors, or used for program administration.		
Street Sweeping	Street sweeping trucks are deployed to clean street curbs on a set schedule. There are various types of street sweepers, including mechanical sweepers and air sweepers.	Capital cost of street sweepers: $200,000-$350,000 depending on type of sweeper. O&M costs of $15 to $75 per curb mile with a median cost of $25. A pilot study in Seattle estimated $44 per curb mile.	A California study found that the median street trash reduction from sweeping was 90% and that in 18 quantitative events virtually no trash was observed in storm drain outlets after street sweeping. NYC estimated that existing street sweeping practices remove approximately 55% of litter from the streets. Effectiveness is dependent on parking restrictions in sweeping areas (ability to sweep to curb).	CA Stormwater Cost Survey[29] Seattle Street Sweeping Study[30] MN DOT Street Sweeping Best Practices[31] NYC Stormwater Management Plan[8]
Public Education Campaigns	Public education campaigns aim to inform the public about the effects of littering and improper disposal of waste. Information is shared through many avenues, including the Internet, billboards, and public transit posters. Effective campaigns often promote recycling and reuse. Cities and states often use a memorable catchphrase in a variety of communication vehicles like advertisements, school curriculum materials, and events.	Average reported cost varies widely by activities included and location. California communities spend, on average, $85,000 annually ($0.65 per resident) on public education relating to litter and waste disposal.	Public education campaigns have been shown to lead to significant increases in recognition of litter as a major problem. “Don’t Mess with Texas” Anti-Litter campaign tied to 34% reduction in visible roadside litter since 2009. Other examples of programs include “Stop the Drop” campaign in New Jersey and a “Litter Free School Zones” program in Nebraska.	NRDC CA Cost of Litter Reduction Study[32] 7 Top Litter Prevention Campaigns Around the World[33] Keep Nebraska Beautiful[34] Cities Use Creative Campaigns to Stop Littering[35]
Community Cleanup Events	Shoreline cleanups, park cleanups, etc. Officially sponsored events that encourage individuals, schools, businesses, and other organizations to get involved in cleaning up targeted areas. These also include efforts organized to facilitate cleanup after specific community activities such as festivals or sporting events.	Varies based on size, location, and specifics of event. Main costs are associated with publicizing the event and staff time spent organizing and facilitating volunteer labor.	Cities and states report cleanup events to be important and large-impact contributors to trash control. The 2018 California Coastal Cleanup Day resulted in collection of nearly 820,000 pounds of debris.	CA Coast Cleanup Commission[36]

BMP	DESCRIPTION	COST*	EFFECTIVENESS	SOURCES**
Adopt-A-Highway, Adopt-A-Stream, etc.	Volunteer programs for people or organizations through which they commit to picking up litter a certain number of times a year (usually 2 to 4), along a designated section of road, highway, stream, or other locations.	In 2014, the Michigan DOT estimated the value of the volunteer time spent picking up litter on state highways at $6.2 million with an estimated DOT cost to administer the program of $270,000 (excluding staff costs).	Despite the lack of consistent data on the costs and benefits of these programs research has shown that areas with Adopt a Highway Programs have 13% to 31% less litter than areas without programs.	VT Program Evaluation[37]
Storm drain Stencils	Stencils are painted onto storm drains, reminding people that litter and pollutants that enter the storm drain often go directly into waterways. In some cases, stencils identify which body of water the storm drain leads to.	A review of available vendors showed that stencils cost between $5 to $45 depending on complexity and vendor. Pre-made markers cost $150-$450 (depending on size, quality, and if a custom message is added).	A study in Washington found that 71 percent of people who saw a stenciled storm drain knew that storm drainpipes lead directly to the nearest water body, compared to only 40 percent of those who had not seen storm drain stencils. Stencils must be regularly repainted/ refreshed to remain effective.	WI Storm Drain Stenciling Impacts[38]
Uncovered Load Ordinances	Ordinances requiring that trucks and other vehicles cover their loads to prevent items from falling or blowing onto the road. Sometimes called “tarp laws.”	Municipalities charge uncovered or unsecure load fees. Walker County charges $25 per vehicle for violations. Could save money by reducing time needed to clean up litter on roads and highways.	Items originating from uncovered trucks are the single largest source of roadside litter.	Ohio Litter Study[39] Walker County News Update[40]

*Unless otherwise noted, all costs have been adjusted to 2019 dollars. Capital costs were adjusted using the RS means index and O&M costs were adjusted using the US price index.

**Sources are listed in the BMP references section at the end of this document. In addition, the California Statewide Trash Amendments include a list of certified trash full capture systems. While the “full-capture” designation is specific to California, this BMP list is a helpful resource that can be accessed here.

CHAPTER 4. CASE STUDIES

This chapter of the compendium presents two case studies of municipal floatables and trash programs that were developed to address clear, specific, and measurable trash provisions in MS4 permits. These case studies are intended to provide insights on how trash provisions can influence the development of floatables and trash programs, including how permit holders have implemented the provisions in developing trash reduction programs.

The case studies included in this chapter – New York City, NY and Fairfax County, VA – represent examples of municipal floatables and trash programs developed under differing circumstances. The NYC MS4 permit and program are driven in part by New York State's narrative water quality goal of zero trash and the listing of multiple water segments as impaired by trash. By contrast, the Fairfax County MS4 permit and program were developed outside of specific regulatory forcing agents, such as a water quality goal or the presence of impaired water segments. Public awareness of the problem of trash in waterways was an important driver in both the NYC and Fairfax County case studies.

Each case study summarizes the MS4 permit history and context and the related key elements of the MS4 floatables and trash program and provides links to the full permit language relevant to floatables and trash in Chapter 2.

EPA may update this chapter of the compendium with additional case studies in the future.

NEW YORK CITY (NYC) CASE STUDY [4]

The NYC Phase I MS4 permit contains a wide breadth of floatable and settleable trash and debris-related stormwater provisions (see Chapter 2 for permit language). The tasks associated with the provisions have specific objectives, however, they are flexible in terms of their implementation and execution.

The NYC permit addresses trash through the requirement for the MS4 to develop and implement an independent floatables and debris control program and dictates specific actions the permittee must include in its SWMP. The main objective of the floatables control program in the 2015-2020

[4] Sources:

Personal communication, Pinar Balci and Kristin Ricigliano, New York City Department of Environmental Protection. March 14, 2019.

Personal communication, Selvin Southwell, New York State Department of Environmental Conservation. June 4, 2019.

NYC SWMP Plan, Chapter 9, Section 9.2, Evaluation of Existing Programs, Section 9.4, Review of Available Technologies and Controls, Municipal Separate Storm Sewer Systems of New York City. August 2018.

Work Plan to Determine the Loading Rate of Floatable and Settleable Trash and Debris Discharged from the MS4. NYC Stormwater Management Program, Appendix 9.1. August 2018.

NYC MS4 Permit, Appendix 2, Impaired Water Segments and Pollutants of Concern.

permit cycle is to take a series of steps in order to determine and understand the magnitude and characteristics of the trash load from the MS4 areas draining to floatables-impaired waterbodies. During future permit cycles, the City will use the information gathered in the current permit term to implement targeted BMPs to reduce the discharge of floatables and debris caused by storm events.

Permit History and Context

The NYC permit's focus on stormwater pollution from trash follows previous, successful efforts to require reductions in trash through the city's combined sewer overflow (CSO) program. The CSO program works toward achieving New York State's narrative water quality standard of zero trash in all waterways. An additional factor driving the focus on trash in both the City's MS4 and combined sewer areas is the fact that New York State has designated 23 water segments in NYC as impaired for floatables (Appendix 2, NYC MS4 Permit).

The CSO floatables control program initiated the ongoing conversation in NYC about trash in discharges to waterways. The program developed targeted structural and non-structural floatables controls, paving the way for the provisions on controls included in the MS4 permit. Requirements in the MS4 permit target source control and complement the floatables control efforts happening citywide. Through implementation of programmatic strategies such as street sweeping, catch basin hooding, end-of-pipe netting/booming/skimming operations, and combined sewage treatment at Wastewater Resource Recovery Facilities, NYC captures or removes citywide approximately 96 percent of floatables originating as street litter. (See Section 9.2 of the SWMP Plan). NYC also implements a host of education, outreach, and stewardship programs, which seek to reduce the generation of litter.

Permit Provisions and Floatable and Settleable Trash Program

The NYC permit primarily addresses trash in stormwater through requirements for the SWMP, including a dedicated section on the control of floatables and marine debris. For the 2015-2020 permit cycle, the permittee is required to monitor and evaluate trash-related programmatic efforts, identify technological improvements and opportunities relevant to NYC, and develop a methodology for selecting effective trash-related BMPs.

The program, as outlined in the permit and further detailed in the NYC SWMP, lays out the main trash control actions that the City will implement within the permit cycle. These actions include two main initiatives:

1. Calculating the quantitative loading rate; and
2. Carrying out an interim public education campaign.

Calculating Quantitative Load

NYC is developing a study to estimate the loading rate of floatables from MS4 outfalls to waterbodies listed as impaired for floatables. The results of the study will include a characterization of the type of trash entering the MS4 and an estimate of the loading rate. The City will use this information to guide BMP selection and siting in the future.

During the 2015-2020 permit cycle, the City has focused on the development of the loading rate calculation methodology. In developing this methodology, the City relied on its own institutional knowledge about trash-reduction strategies, industry experts (including staff from the NYC department of sanitation, an engineering firm with experience with floatables and a robust knowledge of past stormwater work in NYC, and other municipalities with floatables experience), and past studies of trash loadings completed in NYC and other similar municipalities. Stakeholders, including a group of active environmental NGOs and passionate citizens, shared their observations on the loadings of floatables for specific waterbodies and their knowledge of methodologies implemented elsewhere helped develop a contextual methodology for NYC.

The selected methodology combines field measurements and model analyses. NYC presented a draft work plan to the public for input, and after incorporating public feedback, submitted the final work plan to the state of NY. In the upcoming years, NYC plans to collect field measurements of trash loadings.

NYC also collected information on the BMPs used in municipalities nationwide and assessed their applicability. NYC currently implements, or has previously evaluated, nearly all of the types of floatables controls that are in use in other similar municipalities (See Section 9.4 of the SWMP Plan).

Using the loading rate results and review of BMPs, it is NYC's objective to then be able to make evidence-based decisions on what BMPs the City should implement, and where the City should site them, for the most effective floatables control. The current permit does not require specific BMPs, but instead allows NYC the flexibility to decide which ones would be most advantageous based on its research.

Interim public education campaign

While the City worked on developing the loading rate study, it conducted a short-term public awareness campaign that allowed for interim progress in addressing trash on the streets. With the support of local partners, including the New York Aquarium, the City implemented the *Don't Trash Our Waters* campaign in two neighborhoods. The EPA Region 2 Trash Free Waters program provided additional support by convening a stakeholder working group of academics, consultants, and designers to provide input on the media campaign.

Implementation of the public awareness campaign has resulted in some noteworthy accomplishments. The social media portion of the campaign generated over 4 million impressions and resulted in over 54,000 visits to NYC's educational webpage on the topic of trash free waters. To better understand the effectiveness of the campaign, NYC conducted a post-campaign survey of 1,000 New Yorkers that asked questions about littering attitude and behavior, as well as their awareness and understanding of the *Don't Trash Our Waters Campaign*. According to the survey, citywide, 31% of New Yorkers recalled seeing the campaign images. Based on responses to open- and close-ended questions, the public generally understood the campaign messages highlighting the negative impact of litter on marine animals and the call to dispose of trash properly. When asked whether the images made them (or would make them) less likely to litter, a majority responded yes (58% citywide).

Next Steps and Future Developments

With the current permit cycle ending on July 31, 2020, NYC is preparing for the next phase of requirements that will be proposed in its MS4 permit renewal application, which is due in February 2020. For the next permit cycle, NYC is planning to propose implementing the approved loading rate study and continue implementing the existing programs that have resulted in high capture rates of floatables (96% cited above). The study will provide information on the loading rate from MS4 areas draining to floatables-impaired waterbodies that will enable NYC to make data-driven decisions about future BMP selection and implementation.

FAIRFAX COUNTY, VA CASE STUDY [5]

Fairfax County is a growing, urban/suburban area that faces many of the same litter and trash problems as other cities and counties in the country. The County's individual MS4 permit contains trash-related provisions that identify several clear, specific, and measurable requirements focusing on monitoring, annual reporting, and public education and participation. These permit provisions, along with public interest in reducing trash on land and in local waterways, are important drivers behind the County's floatables program. Fairfax County does not have any waters listed as impaired for trash and believes it can continue to implement a successful floatables program without a regulatory forcing agent.

The implementation of the Fairfax County floatables program has been enhanced and facilitated by cooperation from other entities within the County government, particularly the Stormwater and Solid Waste business areas in the Department of Public Works and Environmental Services, and a partnership with a local non-profit organization, Clean Fairfax Council. These cooperative partners have provided expertise to augment the resources available through the stormwater program. (See Exhibit 3)

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[5] Sources:

Fairfax County Individual MS4 Permit 2015

Fairfax County 2018 MS4 Program Plan and Annual Report: Appendix P13 Floatables Monitoring SOP

Fairfax County 2018 Program Plan and Annual Report: List of County's Public Outreach and Education Activities and the Estimated Number of Individuals Reached Through the Activities

Personal Communication, Heather Ambrose and Emily Burton, MS4 Program Fairfax County Department of Public Works and Environmental Services. 6/28/2019.

Personal Communication, Kate Bennet, former manager of Fairfax County's MS4 program. 7/19/2019.

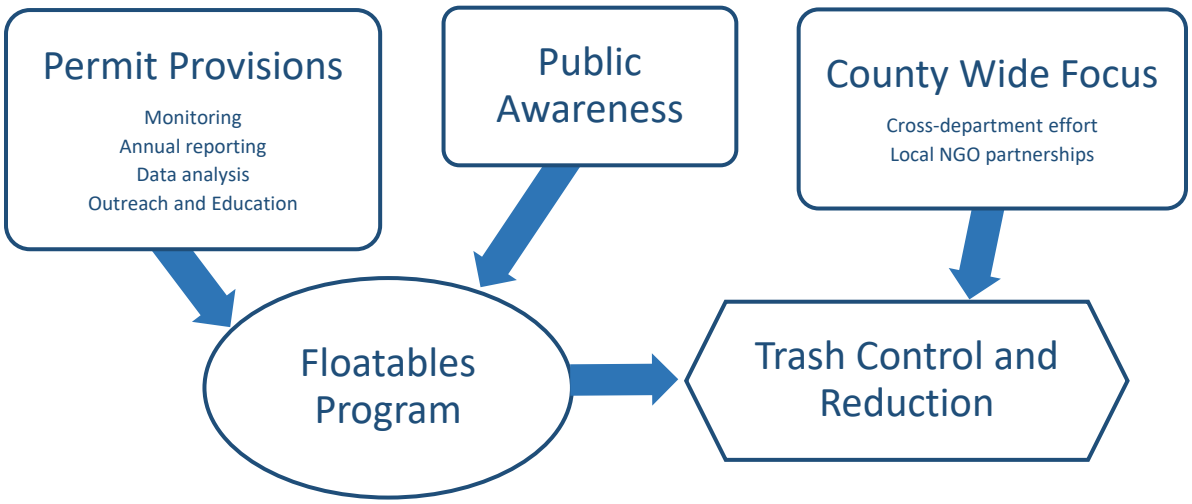

Exhibit 3: The MS4 permit provisions, along with public awareness of the trash problem and support for trash reduction, have combined to establish an atmosphere in which the floatables program can be implemented effectively. The floatables program, supported by cross-departmental efforts in the county and partnerships with local NGOs, has helped control litter and trash in Fairfax County.

Permit History and Context

Compared to the previous MS4 permit, the Fairfax County 2015 permit marked a significant shift towards the regulation of trash as a source of stormwater pollution. The County's previous permit included a requirement "*to document the effectiveness of the litter control programs*," but allowed this documentation to "*be accomplished through the "Adopt a Stream" program" (Fairfax Permit 2000 Part I.B.1.k.2 (C.3.c*). Therefore, the County had been using the Adopt a Stream program to document litter control instead of instituting a stand-alone trash monitoring program. However, as the Adopt a Stream program was no longer being implemented, new permit provisions were needed in the 2015 permit to address trash control. These provisions included requirements to develop a floatables monitoring program to determine the loadings of floatables, and to promote and publicize the County's litter prevention program. There is significant public awareness of trash and litter issues in the County and Fairfax County is currently continuing to implement the floatables monitoring program as it begins the application process for its next MS4 permit.

Elements of the Fairfax County Floatables Program

Annual Report

The County develops an annual report that describes the ongoing activities performed to satisfy the County's MS4 permit requirements. The annual report is presented as a table in which an MS4 Action ID is assigned to each permit requirement. There is a row for each requirement that shows the party responsible for the action, the County's program plan elements for complying with each requirement, specific reporting requirements, and a report on the activities performed.

As shown below, the 2018 report includes four action IDs for floatables monitoring.

MS4 Action ID	Permit Requirement	Responsible Party	2018 Program Plan Elements (July 1, 2017 through June 30, 2018)	Due Date / Annual Timeline (Permit Year 1)	(Permit Year 2)	(Permit Year 3)	(Permit Year 4)	(Permit Year 5)	Specific Reporting Requirement
	C.3. Floatables Monitoring								
C.3.	*No later than 24 months after the effective date of the permit, the permittee shall develop and implement a floatables monitoring program. The intent of the monitoring program is to determine the loading of floatables from the MS4 to streams within Fairfax County. The permittee will implement the floatables monitoring program as follows:*	SWPD	Fairfax County developed and implemented a floatables monitoring program by March 31, 2017.		March 31, 2017 ★	►	►	►	
C.3.a.	*Monitoring shall be conducted at five (5) monitoring sites located at MS4 outfalls and/or streams receiving discharges from the MS4.*	SWPD	Monitoring sites were selected to allow determination of the loading of floatables from the MS4 to streams within Fairfax County.		October 1, 2016 ★	►	►	►	*The annual report due October 1, 2016 shall include an update on the development of the floatables monitoring program.*
C.3.b.	*Monitoring shall be conducted once per quarter after program implementation.*	SWPD	Floatables monitoring is be conducted once per quarter in accordance with the protocols provided in Appendix P13.			October 1, 2017 ★	►	►	*The annual report due October 1, 2017 shall include the monitoring protocols for the floatables monitoring program.*
C.3.c.	*The monitoring program shall include the count of floatables visually observed and length or area of sites assessed.*	SWPD	Floatables monitoring includes the count of floatables visually observed and the length or area of sites assessed.				October 1, 2018 ★	►	*Beginning with the annual report due October 1, 2018, each following annual report shall include a list of sites monitored, a summary of the monitoring protocols used, and a summary of the monitoring results and analyses.*

Floatables Program Standard Operating Procedures

The permit requires that "*no later than 24 months after the effective date of the permit, the permittee shall develop and implement a floatables monitoring program. The intent of the monitoring program is to determine the loading of floatables from the MS4 to streams within Fairfax County" (Fairfax MS4 Permit 2015 Part I.C.3).* The monitoring and reporting requirements are significant parts of the SOP and the most substantial trash-related change from the previous permit.

The floatables SOP "describes Fairfax County's site selection, field reconnaissance, and floatables monitoring protocols for evaluating the loading of floatables from the County's MS4 and provides a framework for full compliance with the above MS4 permit requirements" (Fairfax County SOP 2018). Fairfax County is updating its SOP to include language to address trash removal following the trash monitoring events.

Monitoring and Reporting

The permit specifies that "*monitoring shall be conducted at five (5) monitoring sites located at MS4 outfalls and/or streams receiving discharges from the MS4… once per quarter…[and] shall include the count of floatables visually observed and length or area of sites assessed" (Fairfax MS4 Permit 2015 Part I.C.3).* The permit gave Fairfax County two years after the permit effective date to select five monitoring sites. In order to obtain a representative sample of the

level of trash, the County started by using a land use survey to identify the most common land uses in Fairfax County and selected sites from five of the top land use categories to "characterize the loading rate of floatables from the County's MS4" (Fairfax County SOP 2018).[6]

As mentioned earlier, the County partnered with a local NGO, the Clean Fairfax Council, to satisfy the monitoring requirement because of the Council's expertise and experience with litter advocacy throughout the County. In exchange, the County provided funding for a portion of a full-time job at the Council to support the floatables monitoring program.

The permit requires quarterly monitoring of five sites in years three through five of the permit. The Clean Fairfax Council uses the regional monitoring protocol, developed by the Metropolitan Washington Council of Governments (MWCOG), to assess the amount of trash at each site. The protocol calls for counting each piece of trash in a 100-foot stretch in the designated area.

The County oversees the data analysis of the accumulated monitoring information. The goal is to identify trends and draw conclusions about how to reduce sources of trash in the County. The County plans to continue implementing the floatables program in upcoming years in order to obtain sufficient data to allow for the development of long-term trends.

Education and Public Participation

The permit requires that the County "*continue to promote individual and group involvement in local water quality improvement initiatives including the promotion of local restoration and clean-up projects, programs, groups, meetings and other opportunities for public involvement" (Fairfax MS4 Permit Part I.B.2.J.1).* One change from the previous permit to the 2015 permit was an increased focus on changing behavior to prevent littering; the permit specifies that the County must "*promote and publicize the use of the permittee's litter prevention program" (Fairfax MS4 Permit Part I.B.2.J.1).* The Virginia Litter Tax, a 1976 law that raises roughly $2 million per year (Clean Virginia Waterways, 2014) helps provide money for community clean-ups, recycling, and litter education. Clean Fairfax Council, Northern Virginia Soil and Water Conservation District, and Fairfax County Park Authority conduct community clean-up events throughout the year.

The County uses a number of strategies to educate citizens and businesses, encourage changes in their behavior, and involve them in efforts to decrease trash and litter in the County. Some of these include outreach at local events like farmers markets, meetings with social and civil organizations, participation in radio and TV messages, presentations at schools and environmental conferences, and advertising campaigns. The permit specifies that "*beginning with the annual report due October 1, 2016, each annual report shall include a list of permittee public outreach and education activities and the estimated number of individuals reached through the activities" (Fairfax MS4 Permit Part I.B.2.J.1).* Examples from the 2018 report include:

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[6] The categories selected were low density residential, commercial, institutional, medium density residential, and high density residential. Open land was in the top five land use categories, but Fairfax County did not select this category for monitoring because there is no trash found in open space and there is no target audience to direct outreach efforts to for this category.

- Storm drain marking: 1,306 storm drains were labeled, with 150 project leaders and volunteers and 5,361 households educated
- Conservation Currents Newsletter: Over 2,100 recipients
- Enviroscape© watershed model presentations: 58 presentations to 1,520 students and
- Green Breakfast seminars: 5 seminars to 256 attendees

Pilot Testing of Best Management Practices

As part of a pilot program, the County has installed two end-of-pipe trash nets and is in the design phase of installing one in-stream floating trash collector. Because these devices are not being implemented in response to any permit provisions, information on their effectiveness is not included in the County's annual report. Both BMPs are in their pilot phases and the County has indicated that they intend to evaluate how well they perform and how difficult they are to maintain before considering broader implementation. While the County views these technologies as promising techniques for removing trash from waterways, it is unsure of the degree of maintenance that may be required to prevent unintended consequences, such as flooding and collection of large amounts of leaf debris in the fall. These pilots are examples of how Fairfax County is attempting to address litter through means beyond specific regulatory requirements.

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