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**Guidance
for Developing a Stormwater Wasteload Allocation
Implementation Plan for Bacteria Total Maximum Daily Loads**



**DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard, Suite 540
Baltimore MD 21230-1718**

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Introduction

This document provides Maryland's local jurisdictions with recommendations on specific management strategies and actions to include in Stormwater Wasteload Allocation (SW-WLA) implementation plans for Bacteria (e. coli, fecal coliform, and enterococci) Total Maximum Daily Loads (TMDLs). For permitted Phase I municipal separate storm sewer system (MS4) jurisdictions, SW-WLA implementation must be addressed as part of their permit required restoration plans. Although the intent of this document focuses on providing guidance for developing SW-WLA implementation plans to Phase I MS4s, most of the recommendations and strategies outlined here could also be applied in creating implementation plans for SW-WLAs and urban LAs assigned to other regulated stormwater dischargers and non-MS4 jurisdictions.

It is important to emphasize that the methods and strategies described in this document are merely recommendations. Local jurisdictions may apply different actions and strategies in their plans, as long as 1) their plan provides for physical action to achieve the required SW-WLA reductions, and 2) these actions and strategies are scientifically defensible and technically sound. The guidance does not include the full suite of actions and strategies available, but rather, it is intended to provide a general starting point when developing a SW-WLA implementation plan for bacteria TMDLs.

Source Identification

Identify sources of bacteria and estimate loads using one or more of the following:

- Local TMDL Analysis – Maryland Department of the Environment (MDE) Bacteria Source Tracking (BST) data. BST data tests microbial isolates collected from water samples. The resistance results of the isolates are recorded and compared with library isolates from known sources, which allows for the identification of the various host organisms the bacteria came from.
 - BST data currently provides the best estimate of the predominant source of bacteria pollution in assessed watersheds
(http://www.mde.maryland.gov/programs/water/tmdl/tmdlhome/pages/programs/waterprograms/tmdl/home/tmdl_bacteria_monitoring.aspx) (MDE2013)
- Watershed Treatment Model
 - Spreadsheet model that calculates annual pollutant loads and runoff volumes (Caraco 2002)
- Other scientifically defensible modeling tools
- Local Monitoring Data
- Hot Spot Identification
 - GIS or field analysis of areas where source populations are concentrated
 - Pet concentration
 - Transient human populations
 - Storm gutter/impervious surface growth
 - Illicit Connections
 - GIS or field analysis of potential failing infrastructure

Once sources have been determined and quantified locally, a comparison to the TMDL/BST data may help toward setting goals. For instance, the source distribution (monitored or modeled) should be compared to what is in the TMDL.

Load Reduction

Note: The plan should expressly state that the priority is to address human sources due to the greater health risk. Also, local jurisdictions should select initial project locations for implementation actions and strategies in locations where current baseline monitoring exists (cost saving measure).

Human Source Elimination

- The plan should indicate specific measures that will be taken to correct failing or faulty human waste collection infrastructure (e.g., combined sewer overflows, illicit connections and discharges, cross-connections, leaking pipes, or separate sewer overflows) discharging into the MS4 stormwater collection system.
- A section on addressing areas frequented by homeless populations or outdoor public areas where there are no sanitary facilities should be included in the plan. This can take the form of surveys of other units of local government including social services, police, schools, the health department, and nongovernmental organizations. Such surveys also serve the purpose of educational outreach on the health concerns of bacteria, which is also useful when seeking funding.

Domestic Pet Source Elimination

- Public Land Section
 - Using a combined effort with other local agencies, such as the park service and public works, ensure that trash collection services are properly maintained, create and enforce regulations for pet waste disposal, and provide the appropriate means for pet owners to properly dispose of waste.
- Private Land Section
 - Education programs should inform homeowners about pet waste management on their properties and its effects on local waterways. The plan should indicate which agencies are involved and their specific roles.

Wildlife Source Elimination

- The plan should address vector control (i.e., limiting animal populations that transmit disease pathogens) associated with garbage (rats), animal control issues like raccoons, resident geese populations, and where appropriate the management of deer populations. For instance, poor trash handling (i.e., not putting trash bags in cans, etc.) often attracts wildlife (e.g., rats, raccoons, and deer) and encourages these animals to stay permanently. This results in unintended population explosions in the urban/developed sector. Also, poorly vegetated or poorly maintained stormwater management ponds often attract resident geese populations. These factors lead to an increase in bacterial pollution entering nearby waterways. Even though the direct control of these sources does not necessarily fall under the purview of the MS4, bacteria from these sources is transported through the MS4 stormwater collection system to receiving waterbodies. Therefore, the stormwater program should work with the applicable local programs responsible for

controlling these kinds of sources and be on record as having communicated with those programs. The installation of stream buffers in developed areas that attract geese could also reduce bacteria loadings from wildlife sources.

Stormwater Source Elimination

- The plan should indicate that both structural and non-structural Best Management Practices (BMPs) will be constructed and implemented to treat currently untreated stormwater runoff (i.e., retrofits), in order to reduce bacteria loads. Load reductions from these BMPs should then be estimated. The BMP efficiency rates, however, need to be scientifically defensible. The plan should also account for stormwater BMPs which are expected to increase bacteria loads.

Evaluation

Carefully documented inventories of BMPs/management strategies and well developed monitoring plans of performance will be needed to demonstrate progress toward meeting SW-WLA loads established by MDE.

General Plan Guidance

Please refer to the general SW-WLA implementation plan guidance, which can be found on the MDE website at

<http://www.mde.state.md.us/programs/Water/TMDL/DataCenter/Pages/TMDLStormwaterImplementation.aspx> .

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References

Caraco, D. 2002. The Watershed Treatment Model, Version 3.1. Ellicott City, MD: Center for Watershed Protection.

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Maryland Department of the Environment (MDE). 2013. *Bacteriological Water Quality Monitoring*. Baltimore, MD: Maryland Department of the Environment