

Michigan Municipal Separate Storm Sewer System (MS4) Permit Phosphorous Total Maximum Daily Loads

Addressing Phosphorous Total Maximum Daily Loads in Municipal Separate Storm Sewer System Permits

Introduction

This fact sheet is intended to provide Municipal Separate Storm Sewer System (MS4) permittees assistance in addressing phosphorus Total Maximum Daily Load (TMDL) permit requirements. TMDLs are required, under Section 303(d) of the federal Clean Water Act, when waterbodies are impaired and not meeting one or more designated uses established in Michigan's Water Quality Standards (WQS). The purpose of a TMDL is to establish allowable loadings of pollutants for a waterbody to meet WQS. TMDLs provide a basis for determining the pollutant reductions necessary from point and nonpoint sources to restore and maintain the quality of water resources.

Surface waters may be considered in "non-attainment" of WQS when nuisance plant and algal conditions exist.

What is Phosphorus?

Phosphorus is an essential nutrient for plant, algal, and animal growth, and is present in the environment in both soluble and particulate forms. There are also several types of phosphorus. Total phosphorus measures all forms. The U.S. Environmental Protection Agency recommends that nutrient standards be expressed as total phosphorus.

Eutrophication, the natural aging process of lakes, can be accelerated by additions of phosphorus. Too much can lead to unusually high growth of algae and plants, resulting in significantly reduced aesthetic and recreational use and degraded water quality.

High-quality lakes (typically lower in nutrient levels) may be sensitive to increased phosphorus. Because phosphorus can accumulate in bottom sediment, and slowly release back to the water, it is rare for a lake to move to a higher quality state once degraded by excess phosphorus.

What are the steps to achieve permit compliance?

The general MS4 Permit requirements for TMDL in the Watershed General Permit, Part I.A.b.1, pages 9-10, and in the Jurisdictional General Permit, Part I.A.4, page 6, indicate that the Storm Water Pollution Prevention Initiative (SWPPI) or Storm Water Management Program (SWMP) shall identify and prioritize actions to reduce pollutants in storm water discharges from the MS4 to make progress in meeting WQS.

Progress towards meeting WQS may be long term and take place over multiple permit cycles. This five-year permit cycle shall focus on:

- Continuing to identify sources.
- Continuing to implement activities that address phosphorus and known sources. List them in the SWPPI or SWMP.
- Evaluating the effectiveness of current activities.
- Conducting monitoring as described later.



- Developing a prioritized list of actions along with an implementation schedule targeted during the next permit cycle.
- Reporting the monitoring results, prioritized list of actions, and targeted implementation schedule to the Department of Natural Resources and Environment (Department) in the second progress report.

The following four steps provide direction on meeting these requirements:

Step 1 - Review TMDL Related Documents.

The documents listed below provide important information that will assist permittees in meeting TMDL requirements. The following questions should be considered and answered when reviewing these documents:

- Where was monitoring conducted?
- Where might monitoring be needed?
- What areas exceeded the WQS?
- What are some potential sources?
- Where are those sources located?
- What actions are suggested, if any?

TMDL Reports

These can be downloaded at www.michigan.gov/dnre. Click on Water > Water Quality Monitoring > Assessment of Michigan Waters, Total Maximum Daily Loads. Most reports identify the contributing land area percentages from municipalities, provide pollutant loading targets, and discuss potential sources of the pollutant of concern.

Permittees are responsible for implementing actions within the respective MS4 regulated area located in a TMDL watershed; both within and upstream of the TMDL reach. Further clarification on the MS4 regulated area can be found in the *Scope of SWPPI* MS4 compliance assistance document.

Watershed Management Plans (WMP)

If available, a WMP should contain some information on pollutants, their causes, and sources, as well as actions. Identify these if they are applicable.

Step 2 - Identify Potential Sources to the MS4

The following are common sources of phosphorus:

- Illicit discharges
- Lawn fertilizers
- Failed septic systems
- Illicit connections
- Bank erosion (sedimentation)
- Golf courses
- Fertilized park lands
- Greenhouses
- Waste from urban wildlife/feral cats/pets

- Residential car washing
- Wastewater treatment plants
- Industrial facilities
- Construction sites

Identification of MS4 discharge points in the TMDL watershed, and the catchment characteristics (land use, age, land cover, etc.) connected to those points, is another tool to use in identifying areas to target for additional monitoring and implementation measures.

The *Storm Water Sampling Guidance for Total Phosphorus and E. coli* provides additional information to consider when assessing certain land uses that may contribute phosphorus to the TMDL watershed.

In some cases a source may be located outside of a particular MS4 and in a jurisdiction that is not required to have a permit. In these instances, a permittee may choose to contact the respective jurisdiction to begin a dialog about addressing the source and/or may contact the Water Bureau to follow up on the potential source.

Progress toward meeting WQS may be long term. This permit cycle will focus on clear source identification and implementing actions regarding known sources.

Step 3 - Identify Actions to Implement

A list of actions that typically address phosphorus is below. Permittees may select from these for prioritization and implementation. However, it is not intended to be all-encompassing nor is it a required list. Permittees should implement actions that are directly relevant to the MS4 area and TMDL watershed.

Some actions may require collaboration across multiple jurisdictions. In those instances, identify roles and responsibilities for each respective jurisdiction.

Illicit Discharge Elimination:

- Dry weather screening
- Dye/smoke testing
- Sewer televising
- Correction of illicit discharges

Other Storm Water Controls:

Structural Best Management Practices (BMPs)

- Low Impact Development (LID) such as:
 - Bio-retention/rain gardens
 - Capture and reuse
 - Green roofs
 - Grow zones
 - Pervious pavement
 - Tree planting
 - Vegetated bio-swales
 - Buffers

- Bank protection
- Wetland restoration,
- Native plant landscaping,
- Retrofitting storm systems to exclude animals, and
- Other storm water retrofits.

Non-Structural BMPs

- Street sweeping and catch basin cleaning to remove suspended solids,
- Public education (e.g., education regarding proper fertilizer application and management),
- Requirements to maintain native plant buffers along riparian areas,
- Staff and public education for illicit discharges and good-housekeeping on municipal and residential properties,
- Pet waste management,
- Ordinances (phosphorus fertilizer use, septic system inspection).

Step 4 - Prioritize Actions

The permit requires that SWPPIs and SWMPs include prioritized actions that will be implemented to reduce pollutants in storm water discharges.

Initially, permittees may opt to prioritize actions based on existing programs and plans, a cost to benefit analysis, and addressing known sources or the “low hanging fruit.” These prioritized actions will need to be included in the SWPPI or SWMP with implementation targeted during the current permit cycle.

With additional information from the required monitoring program, as described in the next section under Option 1 or 2, a second prioritization process will be necessary. The monitoring results can be used to identify and prioritize the MS4 catchment areas and/or specific sites which are the “hot spots” for contributing phosphorus to the TMDL water body. Actions can then be strategically targeted to address these priority “hot spots.” This will allow permittees to focus limited resources on those actions which will result in the greatest reduction of phosphorus from their storm water discharges. These prioritized actions shall be reported in the second progress report, with implementation targeted for the next permit cycle that begins in 2013.

Monitoring Requirements

Permittees with MS4 discharges to waterbodies covered by a TMDL for the pollutant phosphorus, are required to conduct monitoring activities. There are three options for monitoring outlined in the Watershed General Permit and two in the Jurisdictional General Permit, each of which is briefly summarized below. The permittee need only select one option for implementation using the following information as a guideline:

1. Discharge Point Monitoring/Option 1

This option requires one representative sample of a storm water discharge taken from at least 50% of the major discharge points (≥ 36 " at the widest cross-section of a pipe or open conveyance) discharging directly to surface waters within the TMDL watershed in the urbanized area. Monitoring of the discharge points shall occur within three years of certificate of coverage (COC) issuance.

Permittees should utilize the *Storm Water Sampling Guidance for Total Phosphorus & E. coli* for proper monitoring.

All monitoring results, combined with other findings, shall be used to identify further actions targeted in the next permit cycle that begins in 2013, and shall be included in the second progress report.

2. Elective Option/Option 2 (Watershed Permit only)

In lieu of Option 1, watershed permittees may choose to implement a monitoring program developed collaboratively with their watershed partners. This could include ambient monitoring - to locate "hot spots" - or a combination of ambient and discharge point monitoring where there are known problems.

Although this option does not require approval by the Department, it shall be based on:

- Known water quality deficiencies;
- Applicable TMDLs listed in the COC.

Permittees are encouraged to notify the Department early in the process and prior to SWPPI submittal that a collaborative monitoring approach is being developed.

This monitoring program must be implemented within three years of COC issuance and must be detailed in the SWPPI. Monitoring results must be submitted with the progress reports.

All monitoring results, combined with other findings, shall be used to identify further actions targeted in the next permit that begins in 2013, and shall be included in the second progress report.

3. The Alternative Approach/ Option 3

Under Option 3 an Alternative Approach may be submitted for approval. This is applicable if the permittee already has information and a plan for prioritizing and controlling phosphorus consistent with the TMDL. This existing information may include the following:

- TMDL Implementation Plan.
- Previous monitoring data that narrows down "hot spots" for further monitoring as well as known sources.
- Identification of sources and a strategy for eliminating and/or reducing them.
- Implementation of ongoing actions designed to eliminate and/or reduce known sources.

For further information regarding development of alternative approaches, refer to the separate compliance assistance document entitled *Alternative Submittals*.