

MS4 Permits: Demonstrating Compliance with New Permits

Monitoring

Florida Stormwater Association
Fall Seminar – September 16, 2022

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**CITY OF
TALLAHASSEE**

Agenda

- ▶ History of MS4 Monitoring
- ▶ Anticipated Permit Changes
- ▶ Developing Monitoring Plans
- ▶ Assessment Monitoring
- ▶ TMDL Monitoring & Modeling



History of MS4 Monitoring

- ▶ Cycle 1 Permits (Late 1990's – 2003)
 - Storm Event Monitoring
 - Land Use Characterization
 - EMC Development

- ▶ Cycle 2 Permits (2004 – 2011)
 - Land Use Characterization – Storm Event Monitoring
 - Ambient Stormwater Monitoring

- ▶ Cycle 3 Permits (2012 – 2016)
 - Ambient Stormwater Monitoring
 - TMDL Implementation – Outfall Assessment

- ▶ Cycle 4 Permits (2017 – Present)
 - Ambient Stormwater Monitoring
 - TMDL Implementation – Outfall Assessment or Targeted Monitoring Plan



Anticipated Permit Changes – Part VI.

PART VI. ASSESSMENT PROGRAM.

A. Assessment Program

Each permittee, or permittees operating collaboratively, shall develop an Assessment Program to provide information used to evaluate the effectiveness of the SWMP in an iterative process of reducing the discharge of pollutants from the MS4 to the MEP, protecting water quality, and satisfying the appropriate water quality requirements of the CWA.

If multiple permittees operate under a collaborative Assessment Program, the written program shall clearly identify each permittees' roles and responsibilities in the accomplishment of the requirements below and identify how the plan will provide feedback for each permittees' SWMP.

The written Assessment Program shall be submitted to the Department within 12 months of the effective date of the permit for review and approval.

The Assessment Program shall consist of:

1. A water quality monitoring plan

The permittee(s) shall implement a water quality monitoring plan to identify local sources or areas where MS4 discharges are potentially affecting surface water quality. The monitoring plan shall be prepared in accordance with the Department's [Guidance for Preparing Stormwater Monitoring Plans as Required for Phase I Municipal Separate Storm Sewer System \(MS4\) Permits](#) (most current version).

The written plan shall provide:

- A map of monitoring locations and major outfalls
- A description of the methods of monitoring and parameters monitored at each location
- A frequency of monitoring



Anticipated Permit Changes – Part V.

A. TMDL Prioritization Plan (for waterbodies with a TMDL and without a BMAP)

Each permittee shall identify TMDL waterbodies to which its MS4 discharges and prioritize those waterbodies for the implementation of the applicable requirements in this section.

The permittee shall prioritize a new WBID(s) in each cycle, as applicable.

In lieu of a TMDL waterbody, the permittee may prioritize an impaired waterbody for the development of a Reasonable Assurance Plan (RAP) during the permit cycle under the following conditions:

- The MS4 discharges to the impaired WBID(s) and is a potential source of the pollutant(s) of concern
- The waterbody, at the time of permit issuance, is not on the DEAR 2-year work plan for TMDL development, found in the following link: <https://floridadep.gov/dear/water-quality-evaluation-tmdl/content/site-specific-tmdl-prioritization>.
- The permittee shall demonstrate, through proposed or existing MS4 pollution control measures or programs, that reasonable progress toward attainment of water quality standards, as described in Rule 62-303.600(2), F.A.C., will address MS4 loading of the pollutant of concern.
- The prioritized waterbody is, or is proposed to be, listed in the Department's assessment category 4b;



Anticipated Permit Changes – Part V.

B. MS4 Pollutant Loading Evaluation (For impairments other than bacteria)

1. MS4 Pollutant Loading Evaluation Plan

The permittee shall conduct, facilitate, or coordinate monitoring and/or modeling of the prioritized TMDL waterbody in order to evaluate the contribution of the pollutant(s) of concern by the MS4, and load reductions achieved in relation to the WLA.

The plan shall be submitted to the Department within twelve months of the effective date of the permit for review and approval, and at a minimum consist of Targeted Water Quality Monitoring, Storm Event Outfall Monitoring, or Pollutant Load Reduction Modeling, as described below.



Anticipated Permit Changes – Part V.

Targeted Water Quality Monitoring - to obtain current estimates of stormwater annual loadings, identify the major sources of the pollutant(s) of concern that are discharging into the water body, and evaluate water body health changes over time. The plan shall include monitoring within receiving waters and/or outfall locations, and biological and sediment monitoring, if appropriate.

Resultant monitoring data shall be normalized to average annual rainfall to allow calculation of the average annual stormwater pollutant loading for the parameter(s) analyzed. Normalized annual stormwater loadings shall be used along with other relevant data, such as load reduction data from BMPs that have been implemented in the MS4 drainage basins that discharge to the TMDL waterbody, to evaluate progress over time toward addressing the MS4 WLA in the TMDL waterbody.

This plan shall provide:

- A map depicting relevant drainage areas, MS4 outfalls, and monitoring locations
- A description of the methods of monitoring at each location
- The monitoring frequency
- A description of how the permittee will evaluate changes in stormwater pollutant loadings and waterbody health over the permit cycle

Storm Event and Outfall Monitoring - to obtain flow-weighted composite samples from the MS4 outfall or point of interconnection that is/are representative of the MS4 with the purpose of identifying baseline pollutant loads of the pollutant(s) of concern. A minimum of seven storm events will be monitored at the MS4 outfall or point of interconnection.

Resultant monitoring data shall be normalized to average annual rainfall to allow calculation of the average annual stormwater pollutant loading for the parameter(s) analyzed. Normalized annual



Anticipated Permit Changes – Part V.

Pollutant Load Reduction Modeling - to obtain estimates of annual pollutant loadings from stormwater runoff as influenced by land-use, stormwater management practices, and other determinants within MS4 drainage areas that discharge to a TMDL waterbody. The pollutant loading model shall, at a minimum, include the following inputs:

- The total land area of each applicable land-use types within the contributing MS4 drainage area(s)
- The estimated percent impervious area within the applicable MS4 drainage area(s) or appropriate impervious area runoff coefficients by land-use type
- The use of local mean annual rainfall data
- The use of site-specific or local EMCs
- The incorporation of BMP data and other associated pollutant removal efficiencies

This plan shall provide:

- A map depicting the relevant drainage areas and MS4 outfalls
- A description of the model used
- A description of the sources for all model input data that shall be used, including:
 - The total land area and area of associated land-use types
 - Estimated percent impervious area, estimated percent Directly Connected Impervious Area (DCIA), and/or impervious area runoff coefficients
 - Local mean annual rainfall
 - EMCs
 - Treatment BMPs/model nodes and pollutant removal efficiencies
 - Hydraulic or routing paths with associated concentration time, as applicable
 - Soil types, as applicable
- A description of how the permittee will evaluate changes in stormwater pollutant loadings over the permit cycle, including the use of data generated through the Assessment Program



Anticipated Permit Changes – Part V.

2. TMDL Implementation

The permittee shall develop a TMDL Implementation Plan that includes summary analyses of the results of the prioritized TMDL Pollutant Loading Evaluation Plan and submitted no later than the Year 4 ANNUAL REPORT.

The plan shall include:

- Identification of MS4 pollutant loadings determined by the Pollutant Loading Evaluation Plan
- A description of existing structural and non-structural BMPs currently implemented to achieve WLA reductions
- An analysis of water quality trends and/or annual pollutant loadings
- Reductions in pollutant loadings that have been achieved in relation to the WLA
- An assessment of identified areas within the MS4 where further reductions are needed
- The identification of additional structural and/or non-structural BMPs and other activities planned for implementation to achieve further reductions of the pollutant of concern, if applicable; this shall include a schedule for their implementation and a projected load reduction with the implementation of each BMP or activity.



Anticipated Permit Changes – Part V.

1. Bacteria Source Identification and Monitoring Plan

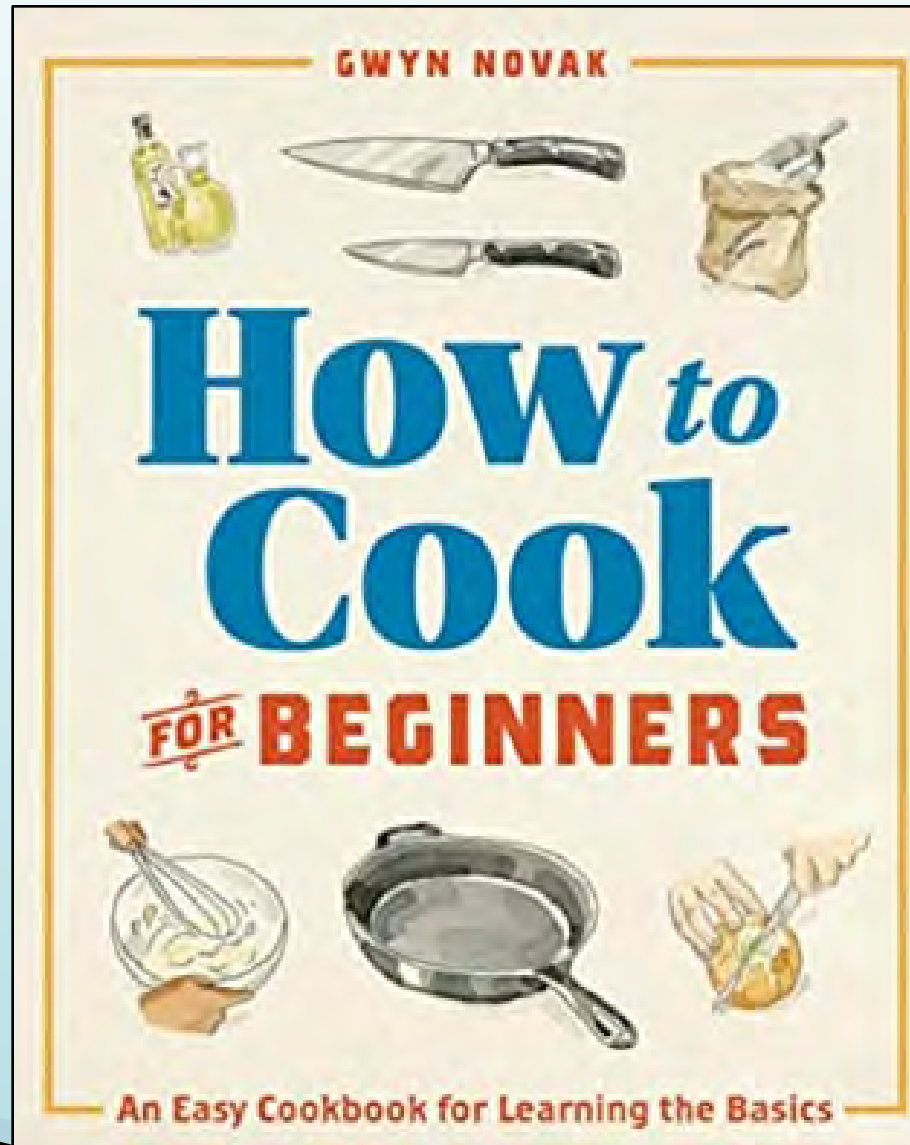
Develop a plan to identify and evaluate sources of bacteria pollution discharged from the MS4 to the prioritized TMDL waterbody. The plan shall be submitted to the Department within twelve months of the effective date of the permit for review and approval.

The plan shall include:

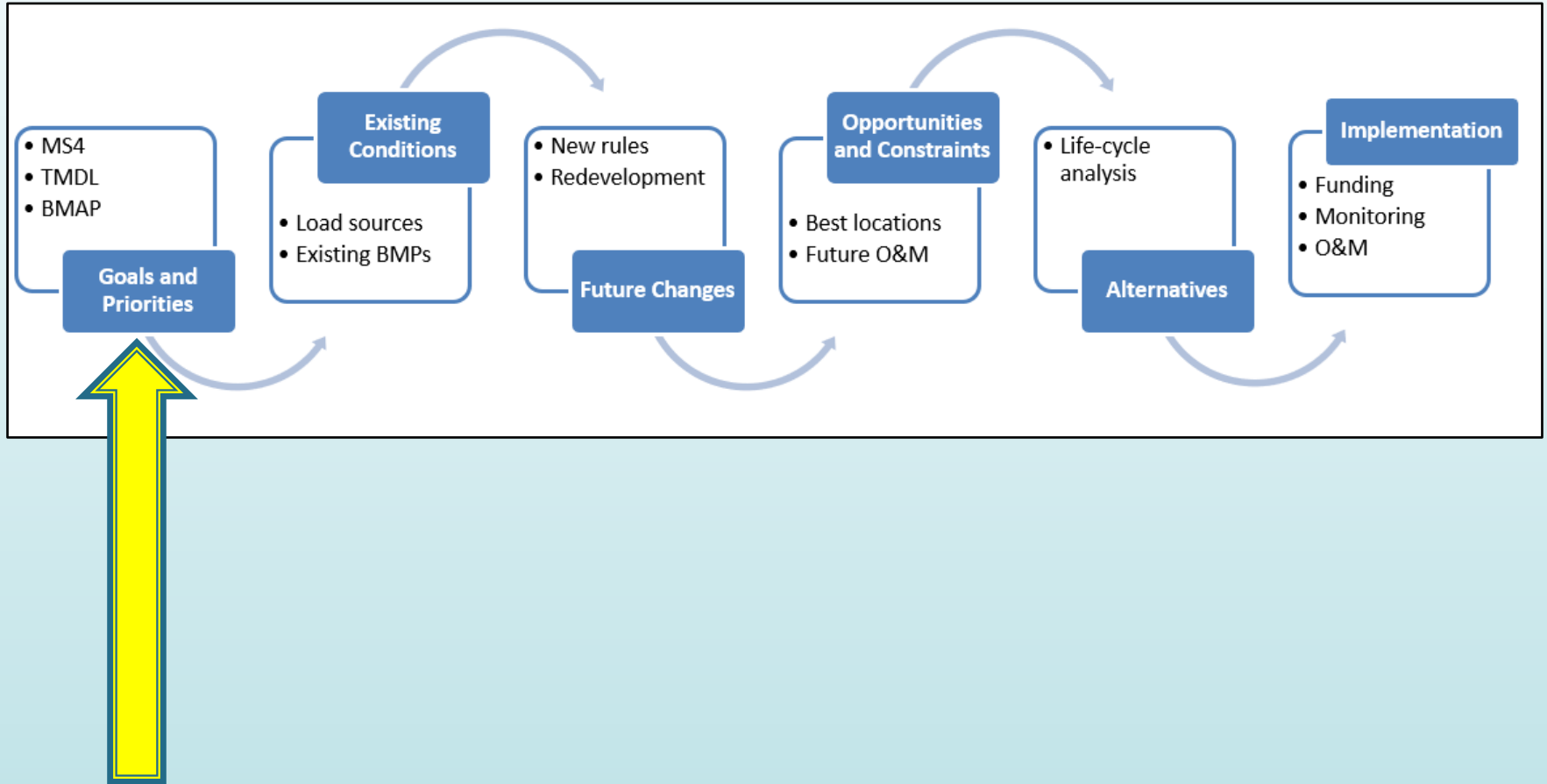
- A Walk-the-Watershed (WTW), or equivalent activity
- A water quality monitoring component that includes:
 - An identified monitoring frequency/schedule, to include sampling within the MS4 or receiving waters
 - A map depicting monitoring locations
 - The identification of exceedance thresholds that trigger source tracking, follow-up monitoring, and/or other bacteria pollution source tracking and elimination activities
- A schedule or timeline for implementing the activities listed above
- A description of existing or ongoing activities implemented to identify, eliminate, or reduce bacteria loadings from the MS4
- Procedures to evaluate changes in the magnitude and frequency of bacterial exceedances and the activities implemented to reduce bacteria pollutant loading



Developing Monitoring Plans



Developing Monitoring Plans



Developing Monitoring Plans



**City of Tallahassee MS4
As it Relates to the DEP Assessment of
Surface Waters & Strategic Monitoring**

September 2017

3. GWD – San Luis Road – Concrete Ditch



4. GWD – West Tennessee – Maintained Open Ditch



Developing Monitoring Plans

A municipal separate storm sewer system (MS4) is defined as a conveyance or system of conveyances (like roads with stormwater systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels, or storm drains) that is designed or used for collecting or conveying stormwater, that discharges to waters of the United States, and is:

- (a) Owned or operated by a State, city, town, county, special district, association, or other public body (created by or pursuant to State Law) having jurisdiction over management and discharge of stormwater and which discharges to surface waters of the state;
- (b) Designed or used for collecting or conveying stormwater;
- (c) Which is not a combined sewer; and
- (d) Which is not part of a Publicly Owned Treatment Works (POTW). POTW means any device or system used in the treatment of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality." This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment. An MS4 can be operated by municipalities, counties, drainage districts, colleges, military bases, or prisons, to name a few examples.

By definition, the components of an MS4 system do not include waters of the United States. Instead, the MS4 ultimately discharges into such waters.



Assessment Monitoring

- ▶ Develop Program Goals
- ▶ Review Existing Data/Information
 - Use IWR Database
 - Impaired Waters
 - TMDLs
 - BMAPs
- ▶ Inform Potential Capital Projects
- ▶ Inform Special Monitoring Initiatives
- ▶ Collect Useable Data!



Assessment Monitoring

- ▶ Assessment Monitoring = More Generalized Ambient Monitoring Program
- ▶ Monitoring should characterize discharges from your MS4/Stormwater Management System.
- ▶ Monitor for the constituents required as part of the “Assessment Program” & those of interest to your stormwater management program.

2. Pollutant loading estimates

Each permittee shall develop estimates of the average annual pollutant loading from each major outfall or major watershed for the following parameters:

- Biochemical Oxygen Demand (BOD₅) (mg/L)
- Total Copper (mg/L)
- Total Nitrogen (as N) (mg/L)
- Total Phosphorus (mg/L)
- Total Suspended Solids (TSS) (mg/L)
- Total Zinc (mg/L)

- ▶ Avoid storm-event monitoring.
- ▶ Input APPLICABLE data into the Watershed Information Network (WIN)



TMDL Monitoring

- ▶ BMAP = Follow BMAP Requirements
- ▶ Prioritize TMDL Water (Adopted by DEP or Established by EPA) or Impaired Water for Development of a Reasonable Assurance Plan (RAP)
- ▶ Non-Bacteria Prioritized Waters – Permit proposed to allow for:
 - Targeted Water Quality Monitoring
 - Storm Event Outfall Monitoring
 - **Pollutant Load Reduction Modeling (New)**



TMDL Monitoring/Modeling

- ▶ Targeted Water Quality Monitoring
 - Permittee defined plan – obtain estimated annual stormwater loadings; plan can also include sediment or biological monitoring. Goal = evaluate progress over time toward meeting WLA
- ▶ Storm Event Outfall Monitoring
 - Permittee defined plan – ID representative outfall, flow-weighted composite, minimum of 7 events. Goal = to evaluate progress over time toward meeting WLA.
- ▶ Pollutant Load Reduction Modeling
 - Basic approach – calculate annual loadings based on land use & associated EMCs and incorporate reductions as a result of BMP implementation.
 - Multiple tools and approaches – spreadsheet models, GIS-based (SIMPLE-Seasonal), BMPTrains.
 - “All Models are wrong but some are useful”
 - Inform your model with as much local data as possible



TMDL Monitoring

- ▶ Bacteria Impaired Waters
 - Bacteria Source ID & Monitoring Plan
 - Bacteria Pollution Control Plan (BPCP)
- ▶ Bacteria Source ID & Monitoring Plan
 - DEP defined plan – Walk-the watershed, water quality monitoring, source tracking, activities implemented to ID, eliminate or reduce loadings, procedures to evaluate changes...



Takeaways

- ▶ Applaud DEP for MS4 Permit Stakeholder Workgroup
- ▶ Monitoring Programs should be based on Stormwater Program Goals & Objectives
- ▶ No Cookbook Exists
- ▶ Use Existing Information & Build Upon
- ▶ Collect Useable Data and Perform Worthwhile Analyses to Inform your Stormwater Management Program

