

NPDES Permit Application Workshop

Total Maximum Daily Loads

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What is a TMDL?



A Total Maximum Daily Load or TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards.

TMDLs can cover a wide variety of pollutants, e.g. *E. coli*, phosphorus, PCBs.

What are Water Quality Standards?

The Michigan WQS are a set of rules developed to protect designated uses:

Rule 100. (1) At a minimum, all surface waters of the state are designated for, and shall be protected for, all of the following uses:

- (a) Agriculture;
 - (b) Navigation;
 - (c) Industrial water supply;
 - (d) Public water supply at the point of water intake;
 - (e) Warmwater fishery;
 - (f) Other indigenous aquatic life and wildlife;
 - (g) Partial body contact recreation;
 - (h) Fish consumption
- Also coldwater fishery and total body contact



What are Water Quality Standards?

The WQS include rules for:

- Designated uses (Rule 100)
- Physical characteristics (Rule 50)
- Dissolved solids (Rule 51)
- pH (Rule 53)
- Taste and Odor (Rule 55)
- Toxic Substances (Rule 57)
- Microorganisms (Rule 62)
- Nutrients (Rule 60)
- Dissolved oxygen (Rule 64 and 65)
- Temperature (Rule 69-75)



Why do we develop TMDLs?

- The Clean Water Act Section 303(d) requires each state to develop a list of water bodies not meeting Water Quality Standards, i.e. the 303(d) or TMDL list.
- List must be updated every 2 years
 - The list is public noticed
- List must identify the year the TMDL will be developed
- A TMDL must be produced for each impaired water body on the list

Why do we develop TMDLs?

- TMDLs generally must be developed within 13 years of listing
- Water bodies may be delisted based on new information that show WQS attained
- Restoration actions may preclude the need for TMDL development, e.g. Superfund cleanup

How does a water body get on the list?

- The MDNRE considers data and information collected and submitted by the MDNRE, its grantees and contractors, other agencies, and the public (including volunteer monitoring groups).
- Information considered includes data on fish contaminants, water chemistry, sediment chemistry, biological integrity, wildlife contaminants, bathing beach monitoring and inland lakes monitoring.



Aquatic Life – Designated Use

Causes

- Phosphorus – excess algal growth
- Sedimentation/siltation
- Dissolved Oxygen
- Alteration of flow regimes



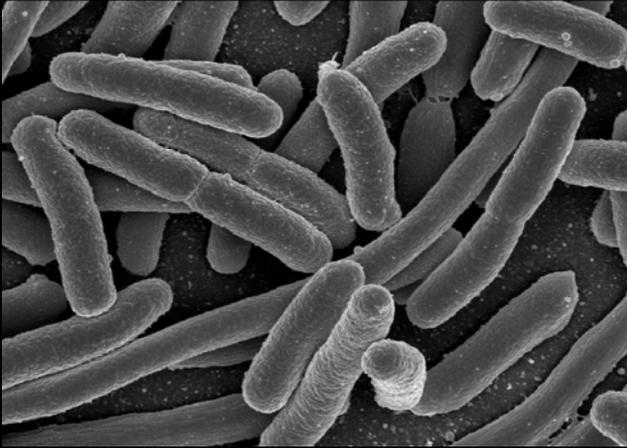
Waterbodies

- Belle and North Branch Belle Rivers (St. Clair)
- Brownstone Creek (Wayne)
- Ford/Belleville Lakes (Wayne)
- Frank and Poet Drain (Wayne)
- Johnson Creek (Wayne and Wash)
- Kent Lake (Oakland)
- Lapointe Drain (Monroe)
- Mallets Creek (Washtenaw)
- Norton Creek (Oakland)
- River Rouge (Wayne, Wash, Oak)
- Strawberry Lake (Livingston)

Partial and Total Body Contact – Designated Uses

Causes

- *Escherichia coli* (*E. coli*)



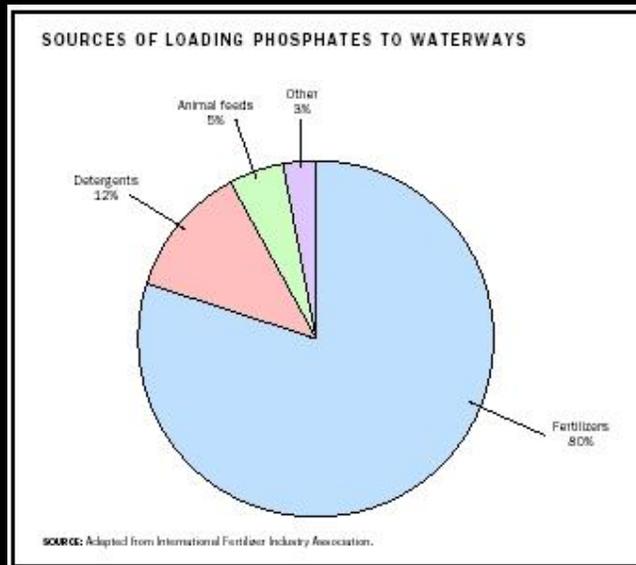
Waterbodies

- Coon Creek (Macomb)
- Crapaud Creek (Macomb)
- Deer Creek (Macomb)
- Detroit River (Wayne, Oak, Wash)
- East Pond Creek (Macomb)
- Ecorse River (Wayne)
- Geddes Pond (Washtenaw)

Waterbodies

- Honey Creek (Washtenaw)
- Lake Erie Luna Pier Beach (Monroe)
- Lake St. Clair Beach (Macomb)
- Mill Creek (St. Clair)
- Paint Creek (Washtenaw)
- Red Run Drain and Bear Creek (Macomb and Oakland)
- River Raisin (Monroe)
- Rouge River (Wayne and Oakland)
- Saline River (Washtenaw)
- Salt River (Macomb)
- Smith's Creek (St. Clair)
- Wagner-Pink Drain (Monroe)

Sources of Pollutant Loadings



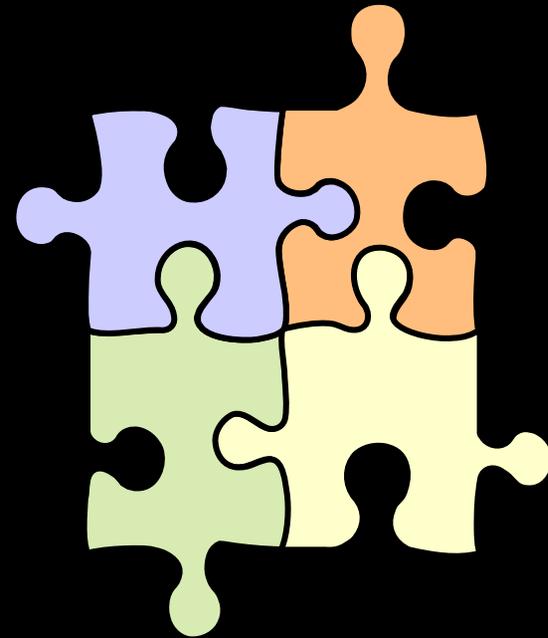
- Overuse of Pesticides
- Overuse of Fertilizers
- Runoff from parking lots and roads
- Runoff from livestock and poultry production areas
- Silt washed into streams
- Thermal pollution

Steps to TMDL Development

- Begins with 303(d) listing
- Collect data in preparation, usually 2 years preceding TMDL development. Purpose:
 - Confirm problem exists
 - Data used to determine extent of impairment and necessary pollutant reductions
- Develop draft TMDL
- Public comment
- Respond to public comments
- Finalize TMDL and submit to EPA for approval

Parts of a TMDL Document

- Introduction
- Problem Statement
- Numeric Target
- Data Discussion
- Source Assessment
- Linkage Analysis
- TMDL Development (LC)
- Allocations
 - WLAs
 - LAs
 - MOS
- Seasonality
- Monitoring
- Reasonable Assurance Activities
- Tables and Figures
- References



Numeric Target

- Based on a numeric or narrative WQS, e.g.
 - *E. coli* numeric WQS = 130 counts/100 mL as a monthly average
 - Phosphorus narrative WQS requires that nutrients be limited to prevent stimulation of aquatic plants/algae which are injurious to the designated uses (i.e., may choose a numeric target to protect water body)

Loading Capacity (TMDL) Development

- Maximum loading (usually pounds) per day of a pollutant that a water body can handle and still meet water quality standards
- The load is “divied up” among point source and nonpoint sources of the pollutant, represented as:

$$LC \text{ (or TMDL)} = \sum WLA_s + \sum LA_s + MOS$$

- WLA = Wasteload Allocation (for point sources)
- LA = Load Allocation (for non-point sources)
- MOS = Margin of Safety



Point Sources (WLA)



Nonpoint sources (LA)



Reasonable Assurance

- Identification of actions that have occurred or will occur that will help meet the pollutant reductions and ultimately the TMDL goal
- A few examples:
 - development and implementation of a watershed management plan,
 - removal of contaminated sediments,
 - elimination of illicit discharges

Steps to water body restoration

- TMDL **development**
 - establishes the pollutant goals to be met
 - may describe some implementation measures
- TMDL **implementation**
 - Actions to achieve the goals, e.g. NPDES permit limitations, best management practices



What happens once a TMDL is approved?

- Point sources –
 - National Pollutant Discharge Elimination System (NPDES) permit limits must be *consistent with* (not necessarily identical to) the TMDL WLAs.
- Nonpoint sources –
 - Regulatory authority to address some issues is available under Michigan's Natural Resources and Environmental Protection Act (Act 451).
 - Voluntary implementation of best management practices.

TMDL Implementation

- The **BEST** results are achieved through cooperation of all stakeholders within the impaired watershed.



What happens during and following implementation?

- MDNRE or its contractors will periodically assess the water body to determine if conditions are improving or if WQS are met.
- If WQS are met, the water body will be removed from the 303(d) list.
- If improvements are not observed, the TMDL may need to be reevaluated.



Questions?

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