

Ottawa County Road Commission
MS4 NPDES Application
Total Maximum Daily Load Implementation Plan
Lake Macatawa - Phosphorus

I. Procedure to identify and prioritize BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

BMPs that address the Phosphorus TMDL for Lake Macatawa were identified and prioritized in the Macatawa Watershed Management Plan, approved by the DEQ in 2012. Identification and prioritization exercises were completed by a Watershed Planning Committee, comprised of representatives from the local MS4 communities and other local stakeholders, with guidance from Macatawa Area Coordinating Council staff. BMPs were categorized into two groups, highly critical and moderately critical. The BMPs were then prioritized based on monitoring data that focused on pollutant sources and their causes within the watershed. Some of the top causes of nutrient loading identified in the management plan include loss of wetlands, lack of riparian buffers, improper use or over application of fertilizers, and poor storm water management. To insure that the BMPs established in the management plan are still prioritized in a way that ensures the greatest amount of progress towards meeting the TMDL, the Macatawa Watershed Project's Watershed Advisory Committee, which meets every other month, has been tasked with conducting periodic reviews of the management plan. The Watershed Advisory Committee includes representatives from the MS4 communities, local Board of Public Works, local townships, MDEQ, Hope College, non-profits, and citizens.

II. List of prioritized BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

The Macatawa Watershed Management Plan includes a list of prioritized BMPs that will reduce nutrient loads into Lake Macatawa (Table 1). Many of these BMPs have been implemented since 2012 when the management plan was approved. The MACC will continue to work with local landowners and other stakeholders to implement these BMPs with the goal of meeting the phosphorus TMDL and restoring water quality in Lake Macatawa.

Multiple initiatives in the watershed have been making progress towards achieving phosphorus load reductions for Lake Macatawa. From 2015-2018, agricultural BMPs were implemented using grant funding from the Great Lakes Commission and Great Lakes Restoration Initiative as well as funding from a private source. In this time period, over 2,900 acres of residue management, 8,400 acres of cover crops and 10,000 acres of gypsum application were implemented. Additional practices including water and sediment control basins, two-stage ditches, grassed waterways, and wetland restorations were also implemented. It is estimated that during this timeframe, annual phosphorus inputs to Lake Macatawa were reduced by over 21,000 pounds.

Table 1. BMP recommendations to reduce nutrient loading to Lake Macatawa. Red indicates high priority and orange indicates moderate priority actions.

Source	Cause	Recommendations	
		Structural	Non-Structural
Agricultural Runoff	Loss of Wetlands	Wetland restoration	Wetland protection ordinances
	Lack of riparian buffers	Increase and improve buffers	Riparian Overlays/ Zoning
	Lack of BMPs	Cover crops, reduced tillage, gypsum amendments, grassed waterways, grade stabilization structures, drainage water management, two stage ditch design	Verification in MAEAP program
	Improper use of over application of manure		Nutrient management plans, manure management plans, refraining from winter applications
Urban Residential Runoff	Loss of wetlands		Wetland protection ordinances
	Improper use or over application of fertilizers		Homeowners use Lawn Care Seal of Approval Companies
	Lack of riparian buffers	Increase and improve buffers	Riparian Overlays/ Zoning
	Poor Storm Water Management	Rain gardens, native vegetation, rain barrels, porous pavement, buffer strips, storm water retrofits	Storm water ordinances, improved site plan review
	Erosion (loss of vegetation and logjams)	Streambank stabilization, buffer zones, native vegetation, removal of log jams	Revised maintenance procedures at county drain offices

Excerpt from Table 23, Section 4.3, Macatawa Watershed Management Plan. Available online at www.the-macc.org/watershed/watershedproject/

Many of the BMPs that MS4 communities implement result in nutrient load reductions, including street sweeping, catch basin cleaning and other pollution prevention and good housekeeping practices. Dry weather screening is conducted once during the permit cycle, which helps identify and remove nutrient rich illicit discharges.

The Ottawa County Road Commission actively seeks ways to incorporate water quality improvements into their storm sewer system projects, such as the use of proprietary devices or green infrastructure, when possible.

III. Monitoring plan to assess the effectiveness of BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

Multiple ongoing efforts help monitor the effectiveness of BMPs in the Macatawa Watershed. They include:

Secchi Disk Monitoring

- A small group of local volunteers has been taking secchi disk readings at several locations in Lake Macatawa, including the channel to Lake Michigan and the main branch of the Macatawa River, weekly during the growing season since 2002
- Summary of secchi data through 2018: www.the-macc.org/watershed/water-quality/

Aquatic Macroinvertebrate Monitoring

- The MACC, in partnership with the Outdoor Discovery Center Network (ODCN), started a macroinvertebrate monitoring program in the fall of 2012 following MiCorps protocol. Twice a year in the fall and spring, staff and volunteers collect and count the insects from seven different stream locations in the Macatawa Watershed.
- Data is available through the MiCorps data exchange: <https://micorps.net/data/view/stream/>

Water Quality Monitoring - Michigan Department of Environmental Quality (MDEQ)

- Annual monitoring of phosphorus in Lake Macatawa (five locations) and its tributaries occurred from 1999 through 2006. Since then, monitoring has been conducted biennially.
- The most recent results available are from 2012: http://www.the-macc.org/wp-content/uploads/2012_DEQ_monitoring_report.pdf
- Monitoring was conducted in 2014 and 2016, but final reports have not yet been provided by MDEQ
- Biological and bacterial monitoring was conducted in 2015. These reports are available on the MACC's website: <http://www.the-macc.org/watershed/water-quality/>

Water Quality Monitoring - Project Clarity Monitoring by the Grand Valley State University (GVSU) Annis Water Resources Institute (AWRI)

- AWRI samples the same locations in the lake that are sampled by the MDEQ. Additional sites in tributaries are sampled to monitor specific restoration projects, including up and down stream of wetland restorations completed as part of Project Clarity. GVSU-AWRI students are also conducting research related to phosphorus movement and algae growth in the watershed.
- 2018 AWRI Report: <http://www.the-macc.org/wp-content/uploads/Project-Clarity-final-report-2018.pdf>

Dry weather monitoring - MS4 Permit Holders

- Dry weather screening of outfalls have been occurring as part of the Illicit Discharge Elimination Program (IDEP).
- The Ottawa County Road Commission completes screening at least once every 5 years.

Sediment Monitoring

- Sediment monitoring was initially conducted in 2009 and funded by a MDEQ grant with private funding support from the local community
- The monitoring is conducted in partnership between the ODCN and Hope College
- Sediment is collected in PVC tubes placed in the stream designed to capture sediment during high flow events. Tubes are deployed from spring through fall.
- Monitoring has continued annually at key locations to monitor long term trends and effectiveness of BMPs
- Sediment contribution to Lake Macatawa is primarily an agricultural/rural concern
- All data collected is maintained by the ODCN

Urban Monitoring

- At least twice during the 5 year permit cycle, the MACC will coordinate with the Ottawa County Road Commission and the five (5) other permittees in the Macatawa Watershed to conduct urban water quality monitoring.
- Monitoring will include samples collected in key urban waterways and/or storm sewer systems up and down stream of urban areas
- Water samples will be tested at a minimum for total suspended solids and total phosphorus
- Processing of samples will be completed in partnership with a local university or at a private lab
- Additional field analyses may be completed using field test kits (pH, ammonia, temperature, etc.)

Ottawa County Road Commission
MS4 NPDES Application

Total Maximum Daily Load Implementation Plan
Grand River Watershed: Bass River (biota, *E. coli*) and Sand Creek (biota)

I. Procedure to identify and prioritize BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

The Lower Grand River Watershed Management Plan (LGRWMP) includes recommendations of best management practices to address the TMDLs in Ottawa County. The procedure started with identifying and prioritizing the sources and causes of each pollutant (Section 4.0 in the Management plan). Sources of *E. coli* were identified as cropland, livestock, septic tanks, ducks and geese, and sanitary sewer. Based on the sources and causes of the pollutants, appropriate BMPs were identified. The management plan also includes detailed information about the individual practices including their effectiveness at reducing pollutant loads. BMPs were selected from an existing list of recommended practices compiled by the MDEQ in 1998.

The Lower Grand River Watershed Management Plan is available at: <https://www.gvsu.edu/wri/isc/lower-grand-river-watershed-management-plan-312.htm>

II. List of prioritized BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

Table 1 provides a summary of BMPs from the LGRWMP that address the TMDLs for biota and *E. coli*.

In addition to the BMPs recommended in the LGRWMP, the Ottawa County Road Commission will also be conducting activities as part of pollution prevention and good housekeeping and illicit discharge elimination that will impact the TMDL pollutants of concern. Street sweeping, catch basin cleaning and unpaved road and shoulder maintenance will help reduce sediment pollution. Dry weather screenings can assist in the detection and elimination of illicit septic and sanitary discharges.

III. Monitoring plan to assess the effectiveness of BMPs being implemented or to be implemented during the permit cycle to achieve TMDL load reductions

Dry weather screening conducted by the Ottawa County Road Commission is one way that *E. coli* pollution will be monitored. In addition, the Ottawa Conservation District is currently working on a project in the Bass River watershed to identify failing septic systems and provide financial assistance to landowners to conduct maintenance and repairs. The Ottawa County Real Estate Evaluation Program also helps to monitor and correct failing septic systems thereby reducing *E. coli* contamination. The MDEQ monitors all TMDL water bodies every other year in order to track progress toward meeting TMDL goals.

Table 1. BMPs to reduce bacteria and sediment pollution in the Lower Grand River Watershed

Pollutant of concern	Source of pollution (by priority)	Cause of pollution (by priority)	Recommended BMPs	
Pathogens and bacteria (<i>E. coli</i>)	1. Cropland	Over or improper application of manure	Waste storage facilities, Comprehensive Nutrient Management Plans promote incorporation	
	2. Livestock	1. Uncontrolled access	Cattle exclusion or controlled access	
		2. Lack of buffer or setback at holding facilities adjacent channel	Plant buffer/filter strips	
	3. Septic tanks	1. Aging systems	Repair or replace, identify and correct illicit discharge connections	
		2. Lack of septic system regulation	Septic codes and ordinances	
	4. Ducks and geese	1. Maintained lawn to edge of water	Buffer strips	
		2. Overpopulation of waterfowl	Egg shaking, birth control	
	5. Sanitary sewer	Again/leaking sanitary sewer	Maintain and repair, increase capacity of waste water treatment plant	
	Sediment	1. Cropland	1. Tillage practices	Residue management, cover crop, critical area planting
			2. Lack of buffers	Plant buffer/filter strips
3. Dense drainage network				
2. Urban landscapes		1. Impervious surfaces	LID practices: bioretention, capture/reuse, vegetated roof, vegetated swale, infiltration practices, pervious pavement	
		2. Dense drainage network		
		3. Construction sites	Implement proper SESC measures	
3. Streambanks		1. Altered morphology and hydrology	LID for storm water management, streambank stabilization, plan buffer/filter strips	
		2. uncontrolled livestock access	Cattle exclusion or controlled access	
		3. Removal of vegetation	Riparian restoration	
4. Rill and gully erosion		1. Agricultural practices	Slope stabilization, grassed waterways	
		2. Concentrated flow from roadside ditch		
5. Lakeshore erosion		Boat traffic/seawalls/wave action	Shoreline stabilization	