

# ROUGE RIVER COLLABORATIVE

## TOTAL MAXIMUM DAILY LOAD (TMDL) IMPLEMENTATION PLAN

### FOR MUNICIPAL STORMWATER PERMITTEES (2024 – 2031)



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# Table of Contents

A.	Introduction .....	1
B.	Background.....	2
	B.1. <i>E. coli</i> Conditions .....	3
	B.2. Suspended Solids Conditions .....	3
	B.3. Dissolved Oxygen Conditions .....	4
	B.4. Pollutant Sources.....	4
	B.5. Summary.....	5
C.	BMP Prioritization Procedure.....	5
D.	Selected BMPs.....	6
E.	Evaluating Effectiveness.....	6
	E.1. Evaluation Metrics and Goals.....	6
	E.2. Monitoring Plan.....	7
	E.3. Reporting.....	8
	E.4. Delisting Criteria .....	9
F.	References.....	10

## **List of Tables**

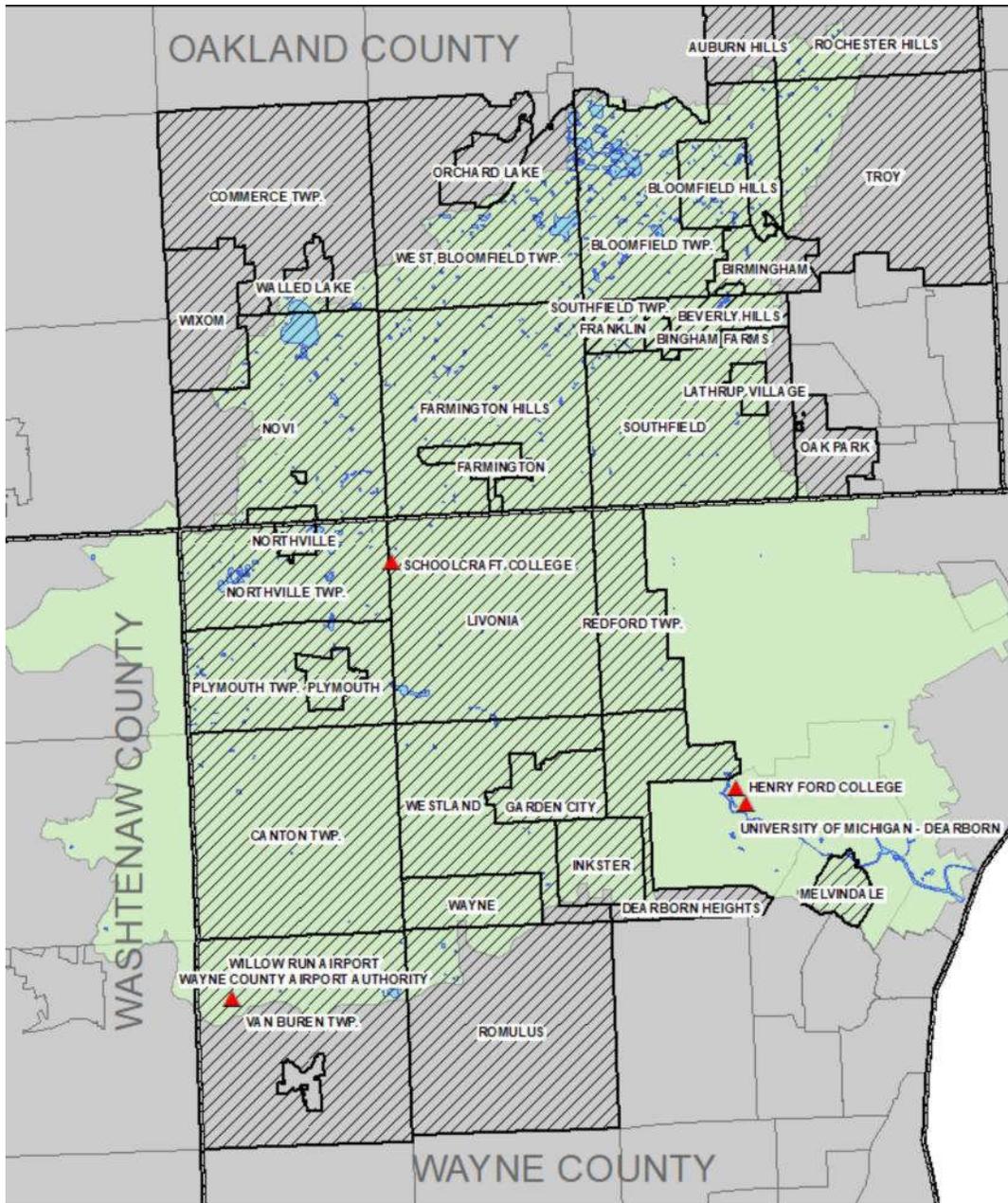
Table 1 - TMDL Targets for Municipal Stormwater Permittees .....	3
Table 2 - Summary of Outfall <i>E. coli</i> Data from 2022 .....	3
Table 3 - 2017 and 2022 Wet Weather Suspended Solids Concentrations by Subwatershed.....	3
Table 4 - Current and Previous Johnson Creek Dissolved Oxygen Statistics .....	4
Table 5 - Sources and Causes of <i>E. coli</i> .....	4
Table 6 - Sources and Causes of Sediment.....	5
Table 7 - Indicators Addressed in this Plan.....	5
Table 8 - Best Management Practices to be Implemented .....	6
Table 9 - Tracking Metrics for Evaluating Effectiveness.....	6
Table 10 - Monitoring Plan .....	7

## **List of Attachments**

Attachment A	Participating ARC Members
Attachment B	BMP Selection Criteria and Ranking

## A. Introduction

The Alliance of Rouge Communities (ARC), a 501(c)(3) organization, is a voluntary public watershed entity currently comprised of municipal governments, counties, schools, and cooperating partners as authorized by Part 312 (Watershed Alliances) of the Michigan Natural Resources and Environmental Protection Act (MCL 324.101 to 324.90106) as amended by Act No. 517, Public Acts of 2004. The purpose of the ARC is to provide an institutional mechanism to encourage watershed-wide cooperation and mutual support to meet water quality permit requirements and to restore beneficial uses of the Rouge River to the area residents.



This Collaborative Total Maximum Daily Load Plan (Plan) presents the watershed-wide approach to effectively and efficiently address the pollutants contained within approved Total Maximum Daily Load (TMDL) Assessments for the Rouge River watershed. This Plan was developed by the Technical Committee of the ARC in response to the requirements of Michigan’s NPDES permit for Municipal Separate Storm Sewer Systems (MS4s). The Plan is intended to meet the TMDL elements of the permit which are as follows:

- Provide a procedure for identifying and prioritizing BMPs to reduce the TMDL pollutants,
- Provide a list of BMPs that will be implemented to reduce the TMDL pollutants, and
- Provide a monitoring plan to assess the effectiveness of the BMPs.

The U.S. Environmental Protection Agency (EPA) requires a TMDL Assessment for waterbodies identified on the state’s impaired waters list. EPA has approved three TMDL Assessments within the Rouge River watershed as listed below. The *E. coli* and biota assessments apply to the entire watershed, while the dissolved oxygen (DO) assessment only applies to the City of Northville, Northville Township and the City of Novi.

- *Escherichia coli* (*E. coli*) (EGLE, 2019)
- Biota (MDEQ, 2007a)
- Dissolved Oxygen for Johnson Creek (up to 6 Mile Road) (MDEQ, 2007b)

This Plan will address each of these parameters within the limits of the MS4 permit. As such, this should not be considered an implementation plan to address all sources, only those regulated under the MS4 permit.

This Plan will be implemented by the participating communities and members from 2024 through 2031. The list of permittees participating in this Plan can be found in **Attachment A**.

## B. Background

Within the TMDL Assessments, the Michigan Department of Environment, Great Lakes and Energy (EGLE) (formerly the Michigan Department of Environmental Quality), established primary and secondary targets for municipal stormwater permittees as shown in **Table 1**<sup>1</sup>. When the primary target is met, the waterbody has achieved the goals of the TMDL and the waterbody would be eligible for removal from the state’s impaired waters list. The secondary target parameters can be thought of as surrogates that will be useful in determining the success of the selected best management practices that are needed to reduce pollutant loads. In all three assessments, EGLE opted to assign collective targets to the MS4 permittees rather than individual targets. This seems to indicate that the EGLE recognizes that demonstration of progress can be shown on a watershed-basis rather than within jurisdictional boundaries. It should be noted that the *E. coli* target is equivalent to the state’s full body contact standards for recreational waters which will be very difficult to achieve in urban stormwater runoff.

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<sup>1</sup> For ease of understanding, this document refers to concentration-based, rather than load-based targets. The pollutant load targets listed in the TMDLs are based on these concentrations.

**Table 1 - TMDL Targets for Municipal Stormwater Permittees**

Parameter	TMDL Targets for MS4 Permittees Primary (1°) and Secondary (2°)	Notes
<i>E. coli</i>	300 cfu/100 ml 130 cfu/100 ml 1,000 cfu/100 ml	Daily geometric mean value (May 1 – Oct 31) 30 day geometric mean value (May 1 – Oct 31) Daily maximum (Nov 1 – Apr 30)
Biota	1°: Procedure 51 scores $\geq$ Acceptable 2°: Suspended solids $\leq$ 80 mg/l	1°: For 2 successive years 2°: Annual average during wet weather
Dissolved Oxygen	1°: 7 mg/L 2°: Suspended solids $\leq$ 80 mg/l*	Johnson Creek is considered a cold water stream, thus has a target of 7 mg/L; all other reaches of the Rouge River have a target of 5 mg/L.

\*This concentration is presumed for the purposes of this document, but it was not explicitly listed in the DO TMDL.

### B.1. *E. coli* Conditions

In 2018, the ARC evaluated *E. coli* conditions during dry weather conditions at 471 stormwater outfalls. In 2022, the ARC repeated *E. coli* sampling at 84 of the 471 stormwater outfalls. These 84 outfalls included those with the highest concentrations in 2018. The 2022 results showed significant reductions in the mean *E. coli* concentrations at the Category A and B outfalls (**Table 2**). These reductions are likely due to the illicit discharges discovered and eliminated between 2018 and 2022 (ARC, 2022).

**Table 2 - Summary of Outfall *E. coli* Data from 2022**

Outfall Groupings based on 2018 <i>E. coli</i> (MPN/100 ml)	Number of Outfalls	Geometric Means (MPN/100 ml)		Difference (%)
		2018/2019	2022	
Category A ( $\geq$ 10,000)	12	20,316	3,199	84% reduction
Category B (5,000 – 10,000)	13	7,323	693	91% reduction
Category D (< 5,000)	59	214	339	58% increase*

\*Despite an increase, the average is below the partial body contact standard (1,000 cfu/100 ml) and many of the individual values were below the full body contact standard (300 cfu/100 ml)..

### B.2. Suspended Solids Conditions

In 2017, the ARC evaluated TSS conditions at 90 instream locations. Only the average wet weather concentration for the Main Subwatershed was above the target value of 80 mg/l (**Table 3**) (ARC, 2018). In 2022, TSS was resampled once at the 2017 sites that had concentrations over 80 mg/l. In 2022, most of the individual samples were less than the 2017 samples, but the average wet weather concentrations in the Lower and Upper subwatersheds were above the target value of 80 mg/l (**Table 3**) (ARC, 2022).

**Table 3 - 2017 and 2022 Wet Weather Suspended Solids Concentrations by Subwatershed**

Subwatershed	2017		2022	
	Number of Samples	Average TSS Concentration (mg/l)	Number of Samples	Average TSS Concentration (mg/l)
Lower	168	50	6	119
Main	298	96	16	44

Subwatershed	2017		2022	
	Number of Samples	Average TSS Concentration (mg/l)	Number of Samples	Average TSS Concentration (mg/l)
Middle	145	34	3	33
Upper	102	26	3	103

### B.3. Dissolved Oxygen Conditions

In 2022, the ARC conducted DO monitoring in Johnson Creek at 7 Mile Rd/Hines Drive, east of Sheldon Rd. Most (97%) of the values were above the water quality standard of 7 mg/l. This is consistent with data from previous years (Table 4).

**Table 4 - Current and Previous Johnson Creek Dissolved Oxygen Statistics**

Year	Number of observations (n)	Min DO (mg/l)	Max DO (mg/l)	Mean DO (mg/l)	Portion of Measurements >7 mg/l
1994-2001	43,895	6.0		9.0	97%
2017	17,637	6.2	12.0	8.9	100%
2022	5,986	6.7	9.6	8.1	97%

### B.4. Pollutant Sources

The ARC determined the suspected sources and causes associated with each of the TMDL parameters as shown in Tables 5 and 6. Only those sources potentially regulated under the MS4 permit are included in these tables.

**Table 5 - Sources and Causes of *E. coli***

Suspected Sources*	Suspected Causes
Urban Animal Waste/Pet Waste	<ul style="list-style-type: none"> <li>• Little knowledge of the importance of pet waste management.</li> <li>• Lack of understanding of impacts of feeding wildlife and waterfowl such as geese.</li> <li>• Loss of pervious areas via urban development.</li> </ul>
Failing Septic Systems (OSDS)	<ul style="list-style-type: none"> <li>• Historical lack of septic system maintenance, education, inspection and correction.</li> <li>• Unknown or uncorrected illicit discharges.</li> </ul>
Illicit Sanitary Connections to a Storm System	<ul style="list-style-type: none"> <li>• Unknown or uncorrected illicit discharges.</li> </ul>
Re-suspended Sediment	<ul style="list-style-type: none"> <li>• Excessive peak discharges</li> <li>• Unsatisfactory infrastructure maintenance.</li> </ul>

\*Additional sources not regulated under the MS4 permit but contributing to the pollutant are uncontrolled combined sewer overflows, sanitary sewer overflows, sanitary sewer maintenance, wastewater treatment plant flows, and runoff impacted by animal waste from agricultural lands.

**Table 6 - Sources and Causes of Sediment**

Suspected Sources*	Suspected Causes
Roads/Highways/Bridges and Related Infrastructure on Municipal Properties	<ul style="list-style-type: none"> <li>Loss of pervious areas via urban development.</li> <li>Insufficient stormwater infrastructure maintenance.</li> </ul>
Infrastructure on commercial & industrial properties	<ul style="list-style-type: none"> <li>Poor housekeeping.</li> <li>Insufficient stormwater infrastructure maintenance.</li> </ul>

\*Additional pollutant sources not regulated under the MS4 permit but likely contributing to the pollutant are eroding streambanks, and runoff from agricultural lands and communities not regulated to discharge stormwater.

### B.5. Summary

Based on the information discussed above, addressing the indicator pollutants/parameters shown in **Table 7** will make progress toward addressing the impairments identified in the TMDLs.

**Table 7 - Indicators Addressed in this Plan**

Indicators	Associated TMDLs
<i>E. coli</i>	<i>E. coli</i>
Suspended Solids	Biota Dissolved Oxygen <i>E. coli</i>
Stream flow	Biota Dissolved Oxygen <i>E. coli</i>

### C. BMP Prioritization Procedure

Several criteria were used to prioritize the best management practices (BMPs) that should be implemented to address the impairments. These criteria are as follows:

- A. Ability of the BMP to affect human health impacts caused by direct contact with the river.
  - Low, moderate, high
- B. Ability of the BMP to impact the concentrations of *E. coli* and suspended solids in the river and/or reduce peak stream flows.
  - Low, moderate, high
- C. Ability of the BMP to impact multiple TMDL parameters
  - Low, moderate, high
- D. Anticipated level of impact of the BMP as compared to added cost to implement it.
  - Low, moderate, high
- E. Legal authority to implement the BMP.
  - Yes or no
- F. Are there prerequisite projects that need to be completed before the BMP can be implemented?
  - Yes or no

This process will be reviewed and updated, if necessary, by the ARC within 90 days of the end of the permit term. The review will be based on the results of monitoring data and other measurables provided in Section E.

## D. Selected BMPs

Using the criteria listed above, several BMPs were evaluated for implementation as shown in Attachment B. Those BMPs with the highest scores are listed in **Table 8** along with the associated TMDL pollutant. These BMPs will be implemented by ARC members on an ongoing basis or according to the frequencies/schedules listed in the collaborative plans and stormwater management plans (SWMP).

**Table 8 - Best Management Practices to be Implemented**

Best Management Practice		Associated TMDL Parameter
TMDL #1:	Activities listed in the Rouge River Watershed Collaborative Illicit Discharge Elimination Plan	<i>E. coli</i>
TMDL #2:	Review and approval of developer stormwater plans meeting the calculated Post-Construction Stormwater Standards	SS and Stream Flow
TMDL #3:	Construction of stormwater management measures for permittee- owned projects on public property meeting the calculated Post- Construction Stormwater Standards	SS and Stream Flow
TMDL #4:	Activities listed in the Rouge River Watershed Collaborative Public Education Plan including education on septic system maintenance, the impacts of improperly disposed of pet waste, the impacts of feeding waterfowl, and the pollution complaint line	<i>E. coli</i> and SS
TMDL #5:	Conduct catch basin cleaning as listed in each permittee’s SWMP	SS and <i>E. coli</i>
TMDL #6:	Conduct street sweeping as listed in each permittee’s SWMP	SS and <i>E. coli</i>
TMDL #7:	Proper management of materials stockpiles as listed in each permittee’s SWMP	SS

Note: SS=Suspended solids

## E. Evaluating Effectiveness

### E.1. Evaluation Metrics and Goals

The effectiveness of this Plan will be measured using the tracking metrics indicated in **Table 9**. The goals included below are based on each permittee’s commitment in their SWMP. This information will be included in the permittees’ biennial report to EGLE.

**Table 9 - Tracking Metrics for Evaluating Effectiveness**

Metric	Goals	BMP*
A. Success of Collaborative IDEP Plan	See plan	TMDL #1
B. Percentage of stormwater plans approved that meet the calculated standards for private sites	100%	TMDL #2

Metric	Goals	BMP*
C. Percentage of permittee projects constructed that meet the calculated standards	100%	TMDL #3
D. Success of Collaborative PEP Plan	See plan	TMDL #4
E. Percentage of permittees achieving their catch basin inspection/maintenance targets	100%	TMDL #5
F. Percentage of permittees sweeping two times annually at a minimum (spring and fall)	100%	TMDL #6
G. Percentage of permittees' achieving their targets for stockpile management to minimize impact to stormwater runoff	100%	TMDL #7

\*As described in Table 8.

## E.2. Monitoring Plan

Effectiveness will also be determined by monitoring results as described below and outlined in **Table 10**. TMDL monitoring must take place during a qualifying storm event. A qualifying storm event means a precipitation event that results in a measurable amount of precipitation (i.e., a storm event that results in an actual discharge), and that follows the preceding storm event by at least 72 hours (i.e., three days).

**Table 10 - Monitoring Plan**

Parameter	Anticipated Monitoring Sites	Frequency	Schedule
<i>E. coli</i>	Event 1:	Event 1: 1 time	Event 1: 2025-2027
	Outfalls without flow from the 2018		
	IDEP (dry weather) screening plus priority Category C outfalls from 2025-		
	2026 IDEP screening with a target to wet weather screen* 400 outfalls.		
	Event 2:	Event 2:	Event 2:
	Repeat wet weather screening at	1 time	2028-2030
	Event 1 outfalls that required follow-up investigations plus priority		
	Category C outfalls from 2027-2030		
	IDEP screening with a target to wet weather screen* up to 400 outfalls.		
Suspended solids	TSS monitoring will occur at the 28 previously monitored TSS sites from 2022 with TSS values exceeding 80 mg/L. OR Use of current data available in the region such as data from SEMCOG, Friends of the Rouge, EGLE, MDNR to demonstrate improvements in biota communities.	1 time	2028

\* Due to the limitations of laboratory hours (M-F 8am – 5pm) and weather conditions, it may not be possible to collect all the required samples. However, to the maximum extent practicable ARC staff will perform and/or document efforts to perform wet weather screening of ARC member outfalls within the first 30-60 minutes of wet weather events that occur after a 72-hour period of dry weather and make deliver of the samples to a qualified contract laboratory within the 8-hour hold time.

*E. coli*, Event 1 sampling will take place at the outfalls that did not have any flow (i.e. no flow) during the 2018 ARC Collaborative IDEP Plan investigation. Additionally, Category C and D outfalls identified during the previous year's IDEP screening will be prioritized for wet weather screening with the target to wet weather screen 400 outfalls over the three-year period (2025-2027). Outfall screening priority will be determined in the late fall/early winter each year utilizing available instream *E. coli* sampling or other local knowledge.

Based on the screening results, the outfalls will be divided into four categories as follows:

- Category A. - Outfalls with *E. coli* >10,000 cfu/100 mL
- Category B. - Outfalls with *E. coli* between 5,001 and 10,000 cfu/100 mL
- Category C. - Outfalls with *E. coli* between 1,001 and 5,000 cfu/100 mL
- Category D. - Outfalls with *E. coli* ≤1,000 cfu/100 mL

Category A and B outfalls will be subject to source investigations as described in IDEP# 3. Category C outfalls will be identified for targeted public education.

Event 2, *E. coli* wet weather sampling will be repeated at Event 1 outfalls that required follow-up investigations (i.e. outfalls with *E. coli* concentration >1,000 cfu/100 mL) plus priority Category C outfalls from 2027-2030 IDEP screening with a target to wet weather screen 400 outfalls over the three-year period (2028-2030). The Event 1 samples will be compared to the Event 2 samples to evaluate the effectiveness of reducing *E. coli* levels.

The 28 previously sampled TSS sites will be resampled in 2028. These sites were selected based on the comprehensive water quality assessment that was completed at 90 sites by the ARC in 2017. The 28 sites had the highest TSS concentrations with average wet weather TSS values exceeding 80 mg/L, or where single values exceeded 120 mg/L. Event 1 and Event 2 data will be compared to determine if progress has been made in achieving the wet weather suspended sediment target of 80 mg/L. OR Use of current data available in the region such as data from SEMCOG, Friends of the Rouge, EGLE, MDNR to demonstrate improvements in biota communities.

### E.3. Reporting

A TMDL effectiveness report will be prepared that summarizes the monitoring data outlined in **Table 10**. This report will compare the most recent data to the previously collected data to determine if the permittees are making progress toward meeting the pollutant reduction goals established in the *E. coli*, Biota and DO TMDL Assessment reports.

Schedule: TMDL Monitoring Report Due: Due in accordance with the MS4 progress reporting schedule

#### ARC Member Responsibilities:

- ARC (as contracted by the permittees)
  - Prioritize outfalls for wet weather screening
  - Document collection efforts and collect *E. coli* samples at priority outfalls.
  - Evaluate Metrics A and D and report to EGLE in the Collaborative IDEP and PEP plan progress reports.
  - Prepare the TMDL Monitoring reports.
- Cities and Villages
  - Support prioritization efforts
  - Keep records of Metrics B, C, E, F and G as listed in **Table 9** and include in the annual reports to the EGLE.
- Townships
  - Support prioritization efforts

- Keep records of Metrics B, C, E and G as listed in **Table 9** and include in the annual reports to the EGLE.
- Schools and Other Permittees
  - Support prioritization efforts
  - Keep records of Metrics C, E and G as listed in **Table 9** and include in the annual reports to the EGLE.

#### E.4. Delisting Criteria

Certain conditions must be met in order to remove the Rouge River from Categories 4a and 5 of the impaired waters list<sup>2</sup>. Conditions that may apply to the Rouge watershed and would justify delisting or recategorization of a waterbody include (MDEQ 2017, Chapter 4.13):

- The source of impairment for the initial designated use support determination was an untreated combined sewer overflow (CSO) and updated information reveals that it has been eliminated or control plan elements have been implemented but data are not yet available to document restoration (recategorized to 4b);
- Reassessment of the waterbody using updated monitoring data or information, techniques, or water quality standards, indicates that the waterbody now supports the designated use (move to Category 1 or 2), or that additional monitoring or information is needed to determine whether the designated use is supported (move to Category 3);
- Reexamination of the monitoring data or information used to make the initial designated use support determination reveals that the decision was either incorrect or inconsistent with the current assessment methodology; and
- Reassessment of a waterbody indicates that the cause of impairment is not a pollutant (recategorized to 4c).

Sampling data must be collected that are at least as rigorous as was originally used to list the waterbody. The sampling requirements and other criteria needed to delist or recategorize waterbodies for an impairment are described below.

**E. coli** – To be delisted, any known raw sewage discharges must be eliminated (such as untreated CSOs or sanitary sewer overflows (SSOs) and monitoring must prove attainment of water quality standards. This monitoring must be conducted a minimum of 5 weeks with a minimum of 3 samples collected at each location. A 10% exceedance threshold exists for the standards - meaning that up to 10% of the samples can exceed the standard but still meet water quality standards. Both partial and total body contact standards must be met in order for the waterbody to be removed. Additionally, weather conditions must be similar to those used in the original assessment (MDEQ 2017, Chapter 4.7.1.1).

**Biota** – To be delisted per the Biota TMDL, fish and macroinvertebrate communities must be reestablished so that they receive an ‘acceptable’ or ‘excellent’ rating based on a minimum of two Procedure 51 biological assessments conducted in successive years (MDEQ 2007a). However, the 2016 Integrated Report states that one bioassessment result is generally considered sufficient to make this determination (MDEQ 2017, Chapter 4.6.2.1).

<sup>2</sup> Waterbodies in Categories 4a and 5 are impaired, but TMDL assessments are complete on 4a waterbodies while TMDL assessment are still needed on Category 5 waterbodies. Once a TMDL assessment is approved by EPA, the impairment is addressed in the next issuance of a MS4’s stormwater permit.

**Dissolved Oxygen** – To be delisted, time-series samples need to be collected over a period of time that represent wet and dry weather conditions so as to capture environmental variability. As with *E. coli*, a 10% exceedance threshold is applied (MDEQ 2017, Chapter 4.5.1.1).

For any impairment, once a data set is collected that demonstrates that the river is attaining water quality standards, the final decision for delisting is made by EGLE.

## F. References

Alliance of Rouge Communities. *2022 Rouge River Water Quality Assessment Final Report*. December 31, 2022.

Michigan Department of Environment, Great Lakes and Energy. *Michigan’s Statewide E. coli Total Maximum Daily Load*. July 2019.

Michigan Department of Environmental Quality. *Total Maximum Daily Load for Biota in the Rouge River Watershed including Bishop and Tonquish Creeks, Washtenaw, Wayne and Oakland Counties, Michigan*. August 2007a.

Michigan Department of Environmental Quality. *Total Maximum Daily Load for Dissolved Oxygen in Johnson Creek, Wayne and Washtenaw Counties, Michigan*. June 2007b.

Michigan Department of Environmental Quality. *Water Quality and Pollution Control in Michigan 2016 Sections 303(d), 305(b), and 314 Integrated Report*. January 2017.

## Attachment A

### Participating ARC Members

<b>Participants</b>	
<b>Communities</b>	
Beverly Hills, Village of	Northville, City of
Bingham Farms, Village of	Northville Township
Birmingham, City of	Novi, City of
Bloomfield Hills, City of	Oak Park, City of
Bloomfield Township	Plymouth, City of
Canton Township	Plymouth Township
Dearborn Heights, City of	Redford Township
Farmington, City of	Southfield, City of
Farmington Hills, City of	Troy, City of
Franklin, Village of	Walled Lake, City of
Garden City, City of	Wayne, City of
Inkster, City of	Westland, City of
Lathrup Village, City of	West Bloomfield Township
Livonia, City of	
Melvindale, City of	
<b>Schools</b>	
Henry Ford College	Schoolcraft College
<b>Other Permittees</b>	
Wayne County Airport Authority – Willow Run Airport	
<b>Collaborators*</b>	
Oakland County	
Washtenaw County	
Wayne County	

*\* Collaborators are coordinating with the ARC to implement the Plan, but their permit commitments are outlined in their individual stormwater management plan. Collaborators are responsible for their own progress reports to the State.*

**Attachment B**  
**BMP Selection Criteria and Ranking**

	Ability of the BMP to affect human health impacts caused by direct contact with the river	Ability of the BMP to impact the concentrations of <i>E. coli</i> , suspended solids and/or reduce peak stream flows	Anticipated level of impact of the BMP as compared to added cost to implement it	Ability to impact multiple TMDL pollutants	Legal authority to implement the BMP?	Are there prerequisite projects that need to be completed?	Total score
<b>BMP</b>	0=low, 1=moderate, 2=high			Yes, No		Yes, No	
Illicit discharge source identification and abatement	2	2	2	2	Y	N	8
New Stormwater Ordinance Implementation	0	2	2	2	Y	N	6
Green Infrastructure Installation on Public Property	0	1	2	2	Y	Y [2]	5
PEP Activities: Education on Pollution Complaint Line	1	1	1	2	Y	N	5
PEP Activities: Education on the impact of wildlife	1	1	1	1	Y	N	4
PEP Activities: Septic System Maintenance Education	1	1	1	0	Y	N	3
PEP Activities: Education on the impacts of Pet Waste	1	1	1	0	Y	N	3
Good Housekeeping Measures - stockpile management at DPW yards	0	1	2	1	Y	N	4
Good Housekeeping Measures - catch basin maintenance and street sweeping	0	1	1	1	Y	N	3
Contractor Education	0	1	1	0	Y	N	2
Adopt Buffer/Set back ordinances	0	0	1	1	Y	N	2
PEP Activities: Riparian Corridor Education	0	0	1	1	Y	N	2
Streambank Stabilization	0	0	1	0	Y (on public property)	Y [3]	1
Woody Debris Management	0	0	0	0	Y (on public property)	Y [3]	0

Notes:

BMPs that will be implemented to address TMDL parameters.

[2] Pending ordinance trigger or funding to implement the standards on permittee properties.

[3] Pending reduction in stream flows and funding to implement.