TMDL revision, January 2025

Willow River, Swan River, and Tamarack River *E. coli* TMDLs in Mississippi River–Grand Rapids Watershed TMDL (2019)

A review of the Mississippi River–Grand Rapids Watershed Total Maximum Daily Load (TMDL) Report¹ from September of 2019 discovered errors in three *Escherichia coli* (*E. coli*) TMDLs—Willow River (07010103-751), Swan River (07010103-753), and Tamarack River (07010103-758). The *E. coli* wasteload allocations (WLAs) were miscalculated for the Marble Wastewater Treatment Plant (WWTP), Remer WWTP, and Cromwell WWTP. The errors include transcription errors and the use of incorrect flows for WLA calculation. This TMDL revision corrects the WLAs for these WWTPs, in addition to updating WLAs for the Nashwauk WWTP and Keewatin WWTP (Table 1).

The approaches to calculating wastewater WLAs and load allocations (LAs) in the TMDL report (Section 4.2.3.5 and 4.2.2, respectively) were used to recalculate the TMDL tables presented here. Existing fecal coliform permit limits are consistent with *E. coli* WLA assumptions. The following TMDL table components did not change: loading capacity, WLAs for permitted stormwater, and margin of safety. The TMDL revisions do not change the implementation strategy in Section 8 of the approved TMDL.

The following information enhances the reasonable assurance in Section 6 of the approved TMDL: These three streams are prioritized for implementation efforts in the *Upper Mississippi Grand Rapids Watershed Comprehensive Watershed Management Plan: 2025–2035*². The goal of the "Streams & Rivers" section of the plan is to "improve and protect the riparian corridors of the streams. Improvement projects can include vegetative buffers, cedar revetments, tree planting, cattle fencing, gully stabilization, and projects to reconnect streams to the floodplain and allow for fish passage." Now that the plan is approved, funding is available for these implementation efforts which will help reduce pathogens to these streams.

A 319 implementation grant is also underway to target *E. coli* reductions in the Tamarack River Watershed: Tamarack River, Horseshoe, Island, and Minnewawa Lakes Restoration and Protection Phase 1 319. State funding from BWSR resulted in three raingardens and bioswales to capture and treat runoff from a local park and impervious parking lot before entering the Tamarack River.

An opportunity for public comment on the draft TMDL revision was provided via a public notice in the State Register from January 27, 2025, through February 26, 2025. There were xx comment letters received and responded to as a result of the public comment period.

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Minnesota Pollution Control Agency
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 ¹ MPCA 2019. Mississippi River–Grand Rapids Watershed Total Maximum Daily Load. Developed by Emmons & Olivier Resources, Inc. for the MPCA. Document #wq-iw8-58e. <u>https://www.pca.state.mn.us/sites/default/files/wq-iw8-58e.pdf</u>
² Houston Engineering. No date. Upper Mississippi Grand Rapids Watershed Comprehensive Watershed Management Plan: 2025–2035. <u>https://drive.google.com/file/d/1WX3xJndqaZmastZGFFv_Xp1ClCQ18h32/view</u>

Table 1. Revised E. coli WLAs for WWTPs

Permit name and number	Impaired water body (WID: 07010103-###)	Reason for WLA revision	WLA in 2019 TMDL (billion org/day)	Revised WLA (billion org/day)
Cromwell WWTP (MN0051101)	Tamarack R (758)	Miscalculated WLA	2.8 (Table 3-18, Table 4-13, 4-18)	3.0
Keewatin WWTP (MN0022012)	Swan R (753)	Permit in process of termination, facility no longer in operation, city connected to Nashwauk WWTP	0.9 (Table 3-18, Table 4-13) 1.5 (Table 4-17)	0
Marble WWTP (MN0020214)	Swan R (753)	Transcription error in TMDL table	1.5 (Table 3-18, Table 4-13) 0.5 (Table 4-17)	1.5
Nashwauk WWTP (MNG580184)	Swan R (753)	Permit expansion ^a , connected City of Keewatin. Converted from controlled to continuous discharge resulting in decrease of daily flow	14.8 (Table 3-18, Table 4-13 and 4- 17)	3.3
Remer WWTP (MNG585210)	Willow R (751)	Miscalculated WLA. Permit number changed from MNG580210 to MNG585210	2.1 (Table 3-18, Table 4-13) 1.7 (Table 4-16)	6.1

a. The permit authorizing the expansion was issued 6/3/2020, and final limits became effective in April 2024. Note that the December 2019 Nashwauk WWTP Statement of Basis incorrectly states that the WLA will be 5.261 b-org/day. The substantial reduction in the Nashwauk WWTP WLA is due to the conversion of the facility from controlled (i.e., pond system) to continuous discharge; the continuous discharge spreads the load over the entire year instead of being restricted to a limited discharge window. The daily flow used to calculate the WLA was reduced from 3.1 mgd to 0.695 mgd.

The following tables in the TMDL report are updated in this memo:

- Table 3-18. WWTF design flows and permitted bacteria loads
- Table 4-13. WWTP design flows and permitted bacteria loads
- Table 4-16. Willow River (07010103-751) E. coli TMDL and allocations
- Table 4-17. Swan River (07010103-753) *E. coli* TMDL and allocations
- Table 4-18. Tamarack River (07010103-758) *E. coli* TMDL and allocations

See below for the original and revised tables. <mark>Highlights in the original tables indicate text that was changed in</mark> the revised tables. **ORIGINAL Table 3-18. WWTF design flows and permitted bacteria loads**

				Permitted Bacteria Loa	d
Stream Reach	Facility Name, Permit #	Facility Type	Design Flow Rate (mgd)	as Fecal Coliform: 200 org/ 100 ml [billion org/day]	as <i>E. coli</i> : 126 org. / 100 ml ¹ [billion org/day]
	Coleraine-Bovey- Taconite Joint WWTP MN0053341	Continuous	0.499	<mark>4.3</mark>	2.4
-753	Keewatin WWTP MN0022012	Discharge	<mark>0.180</mark>	<mark>1.4</mark>	<mark>0.9</mark>
	Marble WWTP MN0020214		0.324	2.5	1.5
	Nashwauk WWTP <mark>MNG580184</mark>	<mark>Stabilization</mark> Pond ²	<mark>0.106</mark>	<mark>23.4</mark>	<mark>14.8</mark>
-751	Remer WWTP MNG580210	Stabilization Pond ²	<mark>0.353</mark>	<mark>3.3</mark>	<mark>2.1</mark>
-758	Cromwell WWTP MN0051101	Stabilization Pond ²	<mark>0.595</mark>	<mark>4.5</mark>	<mark>2.8</mark>

1 WWTF permits are regulated for fecal coliform, not *E. coli*. The MPCA surface water quality standard for *E. coli* (126 org. / 100 ml) was used in place of the fecal coliform permitted limit of 200 org. / 100 ml, which was also the MPCA surface water quality standard prior to the March 2008 revisions to Minn. R. ch. 7050.

²The permit for stabilization ponds allows discharge only during the period March 1 - June 30 and September 1 - December 31.

UPDATED Table 3-18 is the same as UPDATED Table 4-13; see below.

ORIGINAL Table 4-13. WWTF design flows and permitted bacteria loads

				Permitted Bacteria Loa	d
Stream Reach	Facility Name, Permit #	Facility Type	Design Flow Rate (mgd)	as Fecal Coliform ¹ : 200 org/ 100 ml [billion org/day]	as <i>E. coli</i> : 126 org. / 100 ml ¹ [billion org/day]
	Coleraine-Bovey- Taconite Joint WWTP MN0053341	Continuous	0.499	<mark>4.3</mark>	2.4
-753	Keewatin WWTP MN0022012	Discharge	<mark>0.180</mark>	<mark>1.4</mark>	<mark>0.9</mark>
, 33	Marble WWTP MN0020214		0.324	2.5	1.5
	Nashwauk WWTP <mark>MNG580184</mark>	<mark>Stabilization</mark> Pond ²	<mark>0.353</mark>	<mark>23.4</mark>	<mark>14.8</mark>
-751	Remer WWTP MNG580210	Stabilization Pond ²	0.1063	<mark>3.3</mark>	<mark>2.1</mark>
-758	Cromwell WWTP MN0051101	Continuous Discharge	0.052	<mark>4.5</mark>	<mark>2.8</mark>

UPDATED Table 3-18 and 4-13. WWTF design flows and permitted bacteria loads

				Permitted Bacteria L	oad
Stream Reach	Facility Name, Permit #	Facility Type	Design Flow Rate (mgd)	as Fecal Coliform ¹ : 200 org/ 100 ml [billion org/day]	as <i>E. coli</i> : 126 org. / 100 ml ¹ [billion org/day]
	Coleraine-Bovey- Taconite Joint WWTP MN0053341	Continuous Discharge	0.499	3.8	2.4
-753	Marble WWTP MN0020214	Continuous Discharge	0.324	2.5	1.5
	Nashwauk WWTP MN0053392	Continuous Discharge	0.695	5.3	3.3
-751	Remer WWTP MNG585210	Stabilization Pond ²	0.1063	9.7	6.1
-758	Cromwell WWTP MN0051101	Stabilization Pond ²	0.052	4.8	3.0

¹ WWTF permits are regulated for fecal coliform, not *E. coli*. The MPCA surface water quality standard for *E. coli* (126 org. / 100 ml) was used in place of the fecal coliform permitted limit of 200 org. / 100 ml, which was also the MPCA surface water quality standard prior to the March 2008 revisions to Minn. R. ch. 7050

²The permit for stabilization ponds allows discharge only during the period March 1 - Jun 30 and September 1 - December 31.

ORIGINAL Table 4-16. Willow River (07010103-751) E. coli TMDL and allocations

Willow River		Flow Regime						
C	007010103-751	Very High	High	Mid	Low	Very Low		
La	oad Component	Billion organisms per day						
Existing Load ¹		245.0	101.5	23.7	8.4	NA		
Wasteload	Remer WWTP (<mark>MNG580210</mark>)	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>		
Allocations	Total WLA	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>	<mark>1.7</mark>		
Load	Watershed Runoff	<mark>244.4</mark>	<mark>72.1</mark>	<mark>33.6</mark>	<mark>20.0</mark>	<mark>12.7</mark>		
Allocations	Total LA	<mark>244.4</mark>	<mark>72.1</mark>	<mark>33.6</mark>	<mark>20.0</mark>	<mark>12.7</mark>		
10% MOS		27.3	8.2	3.9	2.4	1.6		
Total Loading	Capacity ¹	273.4	82.0	39.2	24.1	16.0		
Estimated Load Reduction		NA	19.5	NA	NA	NA		
		NA	19%	NA	NA	NA		

¹The TMDL for Willow River reach -751 was calculated using data from the HSPF model area weighted to WQ station S006-257. Existing loads were estimated using observed E.coli data from WQ station S006-257 (Appendix C).

UPDATED Table 4-16. Willow River (07010103-751) <i>E. coli</i> TMDL and allocations					
	Flow Regime				
Willow Piver 007010102_751					

		Flow Regime							
Willow River 00/010103-751		Very High	High	Mid	Low	Very Low			
			Billion organisms per day						
Existing Load	1	245.0	101.5	23.7	8.4	NA			
Wasteload	Remer WWTP (MNG585210)	6.1	6.1	6.1	6.1	6.1			
Allocations	Total WLA	6.1	6.1	6.1	6.1	6.1			
Load	Watershed								
Allocations	Runoff	240.0	67.7	29.2	15.6	8.3			
	Total LA	240.0	67.7	29.2	15.6	8.3			
10% MOS		27.3	8.2	3.9	2.4	1.6			
Total Loading Capacity ¹		273.4	82.0	39.2	24.1	16.0			
		NA	19.5	NA	NA	NA			
Estimated Loa		NA	19%	NA	NA	NA			

¹The TMDL for Willow River reach -751 was calculated using data from the HSPF model area weighted to WQ station S006-257. Existing loads were estimated using observed E.coli data from WQ station S006-257 (Appendix C).

ORIGINAL Table 4-17. Swan River (07010103-753) E. coli TMDL and allocations

Swan River 07010103-753		Flow Regime					
		Very High	High	Mid	Low	Very Low	
	Load component		<i>E. coli</i> (bil	lion organism	is per day)		
Existing Load		NA	160.8	349.9	33.7	NA	
	Coleraine-Bovey WWTP (MN0053341)	2.4	2.4	2.4	2.4	2.4	
	Keewatin WWTP (MN0022012)	<mark>1.5</mark>	<mark>1.5</mark>	<mark>1.5</mark>	<mark>1.5</mark>	<mark>1.5</mark>	
Wasteload Allocations	Marble WWTP (MN0020214)	<mark>0.5</mark>	<mark>0.5</mark>	<mark>0.5</mark>	<mark>0.5</mark>	<mark>0.5</mark>	
	Nashwauk WWTP (MNG580184)	<mark>14.8</mark>	<mark>14.8</mark>	<mark>14.8</mark>	<mark>14.8</mark>	<mark>14.8</mark>	
	Hibbing, MN MS4 (MS400270)	93.7	34.1	16.3	9.0	3.5	
	Total WLA	<mark>112.9</mark>	<mark>53.3</mark>	<mark>35.5</mark>	<mark>28.2</mark>	<mark>22.7</mark>	
Load Allocations	Watershed Runoff	<mark>658.4</mark>	<mark>239.9</mark>	<mark>114.3</mark>	<mark>62.8</mark>	<mark>24.1</mark>	
	Total LA	<mark>658.4</mark>	<mark>239.9</mark>	<mark>114.3</mark>	<mark>62.8</mark>	<mark>24.1</mark>	
10% MOS		85.7	32.6	16.6	10.1	5.2	
Total Loading Capacity		857.0	325.8	166.4	101.1	52	
Federated Load Daduction		NA	NA	183.5	NA	NA	
		NA	NA	52%	NA	NA	

UPDATED Table 4-17. Swan River (07010103-753) E. coli TMDL and allocations

	Swan River	Flow Regime				
	07010103-753	Very High	High	Mid	Low	Very Low
	Load Component		<i>E. coli</i> (billio	n organisr	ns per day)	
Existing Load		NA	160.8	349.9	33.7	NA
	Coleraine-Bovey WWTP (MN0053341)	2.4	2.4	2.4	2.4	2.4
Wasteload	Marble WWTP (MN0020214)	1.5	1.5	1.5	1.5	1.5
Allocations	Nashwauk WWTP (MNG580184)	3.3	3.3	3.3	3.3	3.3
	Hibbing, MN MS4 (MS400270)	93.7	34.1	16.3	9.0	3.5
	Total WLA	100.9	41.3	23.5	16.2	10.7
Load	Watershed Runoff	670.4	251.9	126.3	74.8	36.1
Allocations	Total LA	670.4	251.9	126.3	74.8	36.1
10% MOS		85.7	32.6	16.6	10.1	5.2
Total Loading Capacity		857.0	325.8	166.4	101.1	52
		NA	NA	183.5	NA	NA
Estimated Loa		NA	NA	52%	NA	NA

ORIGINAL Table 4-18. Tamarack River (07010103-758) E. coli TMDL and allocations

Tamarack River 07010103-758			Flow Regime					
			Very High High Mid Low					
Luc		E.	<i>coli</i> (billio	n organis	ms per da	ay)		
Existing Load		189.1	122.3	NA	129.2	5.0		
Wasteload	Cromwell WWTP (MN0051101)	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>		
Allocations	Total WLA	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>	<mark>2.8</mark>		
Load Allocations	Watershed Runoff	<mark>395.6</mark>	<mark>127.1</mark>	<mark>70.2</mark>	<mark>43.3</mark>	<mark>20.8</mark>		
Load Anocations	Total LA	<mark>395.6</mark>	<mark>127.1</mark>	<mark>70.2</mark>	<mark>43.3</mark>	<mark>20.8</mark>		
10% MOS		44.3	14.4	8.1	5.1	2.6		
Total Loading Capacity			144.3	81.1	51.2	26.2		
Estimated Load Reduction		NA	NA	NA	78	NA		
		NA	NA	NA	60%	NA		

UPDATED Table 4-18. Tamarack River (07010103-758) E. coli TMDL and allocations

Tamarack River 07010103-758 Load Component		Flow Regime							
		Very High	High	Mid	Low	Very Low			
			E. coli (billion organisms per day)						
Existing Load		189.1	122.3	NA	129.2	5.0			
Wasteload	Cromwell WWTP	3.0	3.0	3.0	3.0	3.0			
Allocations	(MN0051101)								
	Total WLA	3.0	3.0	3.0	3.0	3.0			
Load Allocations	Watershed Runoff	395.4	126.9	70.0	43.1	20.6			
	Total LA	395.4	126.9	70.0	43.1	20.6			
10% MOS		44.3	14.4	8.1	5.1	2.6			
Total Loading Capacity		442.7	144.3	81.1	51.2	26.2			
Estimated Load Reduction		NA	NA	NA	78	NA			
		NA	NA	NA	60%	NA			