Permit Fact Sheet

General Information

Permit Number	WI-0026255-10-0
Permittee Name and Address	Wisconsin Department of Natural Resources W7825 Cty Rd S, Adell, WI 53001
Permitted Facility Name and Address	WI DNR Kettle Moraine Springs Fish Hatchery W7825 Cty Rd S, Adell, WI 53001
Permit Term	January 01, 2027 to December 31, 2031
Discharge Location	Outfall 001 discharges to the "Big Pond" before discharge to Melius Creek (Lat: 43.60783° Long: -88.08334°)
Receiving Water	Melius Creek in North Branch Milwaukee River Watershed of Milwaukee River River Basin in Sheboygan County
Stream Flow ($Q_{7,10}$)	0 cfs
Stream Classification	Coldwater, Class II trout stream; non-public water supply.
Discharge Type	Existing and Continuous

Facility Description

Water treated at the wastewater treatment facility includes flow from the aquaculture system's sump pump overflow, filter backwash and radial flow settler flushing, and egg incubation and broodstock tanks. Treatment includes a splitter box, filter bypass tank, rapid mix tank, coagulation tank, flocculation tank, two-disc filter units, a belt press filter, and two UV disinfection units. The facility also includes a bypass system where wastewater may be discharged directly to the receiving water without treatment, providing it meets permit requirements.

Domestic wastewater generated onsite is pumped to a fixed film treatment system which includes a settling zone and aeration zone. The domestic wastewater is sampled to ensure compliance with BOD and TSS removal as required per ch. NR 210 Wis. Adm. Code, and then is pumped to the wastewater treatment facility.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on May 8, 2025, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Curt Nickels on May 20, 2025.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
703	0.002 MGD (2025)	INFLUENT: 24-hour flow proportional composite samples shall be collected just prior to the Fixed Activated Sludge Treatment (FAST) system. Influent consists of sanitary drainage and domestic

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
		wastewater. Flow is measured prior to the FAST system.
101	0.002 MGD (2025)	IN-PLANT: 24-hour flow proportional samples shall be collected just after the Fixed Activated Sludge Treatment (FAST) system and before the unit splitter box in the industrial wastewater treatment system. Flow is measured after the FAST system.
005	0.189 MGD (2025)	EFFLUENT: 24-hour flow proportional composite samples shall be collected prior to UV disinfection. Grab samples shall be collected after UV disinfection prior to the Big Pond. Flow is monitored via magnetic flow meters after treatment, prior to the outfall.
006	N/A	Septage generated by the FAST system is removed and hauled off site for disposal by a licensed septic hauler.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 703- FAST Influent

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	Weekly	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 101- Post FAST System

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	Weekly	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	24-Hr Flow Prop Comp	

Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

Explanation of Limits and Monitoring Requirements

Aquaculture best management practices to be conducted by the facility is included in the permit, per s. 283.31 (5m) Wis. Stats, and 40 CFR 451.11. BMP includes actions required to control solids, store materials, maintain the aquatic animal containment structures, perform record-keeping, train employees, closely monitor feeding, collect and dispose of waste, address transport or harvest discharge, and remove dead aquatic animals.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 005- Effluent

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Daily Max	10 mg/L	Monthly	24-Hr Flow Prop Comp	November-April
BOD5, Total	Daily Max	5.0 mg/L	Monthly	24-Hr Flow Prop Comp	May-October
BOD5, Total	Weekly Avg	10 mg/L	Monthly	24-Hr Flow Prop Comp	November-April
BOD5, Total	Weekly Avg	5.0 mg/L	Monthly	24-Hr Flow Prop Comp	May-October
BOD5, Total	Monthly Avg	10 mg/L	Monthly	24-Hr Flow	November-April

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
				Prop Comp	
BOD5, Total	Monthly Avg	5.0 mg/L	Monthly	24-Hr Flow Prop Comp	May-October
Suspended Solids, Total	Daily Max	12 mg/L	Monthly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	10 mg/L	Monthly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Daily Max	126 lbs/day	Monthly	Calculated	January
Suspended Solids, Total	Daily Max	101 lbs/day	Monthly	Calculated	February
Suspended Solids, Total	Daily Max	87.5 lbs/day	Monthly	Calculated	March
Suspended Solids, Total	Daily Max	84.5 lbs/day	Monthly	Calculated	April
Suspended Solids, Total	Daily Max	128 lbs/day	Monthly	Calculated	May
Suspended Solids, Total	Daily Max	147 lbs/day	Monthly	Calculated	June
Suspended Solids, Total	Daily Max	135 lbs/day	Monthly	Calculated	July
Suspended Solids, Total	Daily Max	124 lbs/day	Monthly	Calculated	August
Suspended Solids, Total	Daily Max	146 lbs/day	Monthly	Calculated	September
Suspended Solids, Total	Daily Max	151 lbs/day	Monthly	Calculated	October
Suspended Solids, Total	Daily Max	196 lbs/day	Monthly	Calculated	November
Suspended Solids, Total	Daily Max	141 lbs/day	Monthly	Calculated	December
Suspended Solids, Total	Monthly Avg	52.9 lbs/day	Monthly	Calculated	January
Suspended Solids, Total	Monthly Avg	53.5 lbs/day	Monthly	Calculated	May
Suspended Solids,	Monthly Avg	61.6 lbs/day	Monthly	Calculated	June

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Total					
Suspended Solids, Total	Monthly Avg	56.7 lbs/day	Monthly	Calculated	July
Suspended Solids, Total	Monthly Avg	51.9 lbs/day	Monthly	Calculated	August
Suspended Solids, Total	Monthly Avg	61.2 lbs/day	Monthly	Calculated	September
Suspended Solids, Total	Monthly Avg	63.2 lbs/day	Monthly	Calculated	October
Suspended Solids, Total	Monthly Avg	82 lbs/day	Monthly	Calculated	November
Suspended Solids, Total	Monthly Avg	59.1 lbs/day	Monthly	Calculated	December
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	2.6 mg/L	Monthly	24-Hr Flow Prop Comp	Limit effective year round
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.5 mg/L	Monthly	24-Hr Flow Prop Comp	November-April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.7 mg/L	Monthly	24-Hr Flow Prop Comp	May-October
E. coli	Geometric Mean - Monthly	126 #/100 ml	Monthly	Grab	May-September
E. coli	% Exceedance	10 Percent	Monthly	Calculated	May - September. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Chlorine, Total Residual		ug/L	Monthly	Grab	Monitoring Only in 2028. Monitor on days chlorine is used for disinfection.
Arsenic, Total Recoverable		ug/L	Once	Grab	Once in 2028. The sample shall be analyzed with a limit of detection of at most 2.6 µg/L.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Cadmium, Total Recoverable		ug/L	Once	Grab	Once in 2028. The sample shall be analyzed with a limit of detection of at most 0.76 µg/L.
Phosphorus, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	0.75 lbs/day	Monthly	Calculated	
Temperature		deg F	Weekly	Grab	
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Two tests required during the permit term. See the Whole Effluent Toxicity (WET) Section.

Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

- **TSS –** TMDL mass limits were recalculated using average flow.
- **pH –** Sample frequency updated.
- **Chlorine –** Monitoring in 2028 added to the permit.
- **Arsenic and Cadmium –** One sample event added to the permit.
- **Chronic WET –** Two tests added to the permit.

3.1.1 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated 9/22/2026.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. pH's sample frequency has been updated to match Dissolved Oxygen.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as daily maximum and monthly average limits whenever practicable.

Total Suspended Solids - The previous calculations for effluent limits for TSS for the Milwaukee River TMDL used a different maximum annual average flow. The actual maximum annual average flow has been used in this permit reissuance rather than the design capabilities of the upgraded plant.

Total Residual Chlorine – Kettle Moraine uses chlorine to disinfect systems in the aquaculture building twice per year. Kettle Moraine ensures the chlorine is completely neutralized by UV prior to the water being sent to the wastewater treatment plant. Therefore, it is unlikely that chlorine is in the effluent. Chlorine shall be monitored for one year, including on days that water is discharged that was used for disinfection.

Arsenic and Cadmium- Data provided by the permit application determined nondetectable levels of these contaminants; however, the limit of detections were higher than $1/5^{th}$ of the calculated limits so reasonable potential cannot be determined. One-time samples of these parameters with a more sensitive approved analytical method is required.

Chronic WET – Whole effluent toxicity (WET) testing requirements are determined in accordance with ss. NR 106.08 and NR 106.09, Wis. Adm. Code**.** Considering DNR's Whole Effluent Toxicity Program Guidance Document and checklist, 2 chronic WET tests are required.

4 Land Application - Sludge/By-Product Solids (industrial only)

4.1 Sample Point Number: 006- FAST SYSTEM SEPTAGE

Changes from Previous Permit:

Sludge limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

Explanation of Limits and Monitoring Requirements

Requirements for land application of septage are determined in accordance with ch. NR 113 Wis. Adm. Code. Septage is hauled offsite by a licensed septage hauler.

Attachments

Water Quality Based Effluent Limits dated 9/22/2026.

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Marissa Fleege Wastewater Specialist **Date: 10/28/2026**

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 09/22/2026

TO: Marissa Fleege – SER

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for WI DNR Kettle Moraine Spring Fish Hatchery
WPDES Permit No. WI-0026255-10

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from the WI DNR Kettle Moraine Springs Fish Hatchery in Sheboygan County. This industrial facility discharges to Melius Creek, located in the North Branch Milwaukee River Watershed in the Milwaukee River Basin. This discharge is included in the Milwaukee River Basin (MRB) Total Maximum Daily Load (TMDL) as approved by EPA on 03/09/2018. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 005:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD_5 May – Oct Nov – April	 **5.0 mg/L** **10 mg/L**		 5.0 mg/L 10 mg/L	 **5.0 mg/L** **10 mg/L**	1,3
TSS TMDL	12 mg/L See table			10 mg/L See table	4
pH	9.0 s.u.	6.0 s.u.			1
Dissolved Oxygen		7.0 mg/L			1
Ammonia Nitrogen May – Oct Nov – April	 2.6 mg/L 2.6 mg/L			 1.7 mg/L 2.5 mg/L	1
Bacteria					1,5
E. coli				126 #/100 mL geometric mean	
Residual Chlorine					2,6
Arsenic					7
Cadmium					7
Phosphorus				0.75 lbs/day	1,4
Temperature					1,2
Chronic WET					8,9

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL

Printed on Recycled Paper

area. The TMDL was approved by EPA on 03/09/2018. The TSS mass limits are shown in the following table.

Month	Monthly Ave TSS Effluent Limit (lbs/day)	Daily Max TSS Effluent Limit (lbs/day)
Jan	52.9	126
Feb		101
March		87.5
April		84.5
May	53.5	128
June	61.6	147
July	56.7	135
Aug	51.9	124
Sept	61.2	146
Oct	63.2	151
Nov	82.0	196
Dec	59.1	141

5. Bacteria limits apply during the disinfection season of May through September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. Chlorine sampling is recommended to be completed during the times that Kettle Moraine is discharging water that may contain chlorine.
7. One sample is recommended. A more sensitive approved analytical method is recommended for arsenic and cadmium samples so that the LODs are stringent enough to determine reasonable potential per s. NR 200.027(1), Wis. Adm. Code. The LODs should be: 2.6 µg/L for arsenic and 0.76 µg/L for cadmium, or lower.
8. 2 tests/permit term is recommended for chronic WET. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5%. The primary control water used in chronic WET tests conducted on Outfall 005 shall be a grab sample collected from Melius Creek, upstream of the discharge.
9. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Outfall Map, & Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Curt Nickels, Wastewater Engineer – SER
Justin Meyers, Regional Wastewater Supervisor – SER
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
WI DNR Kettle Moraine Springs Fish Hatchery

WPDES Permit No. WI-0026255-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Wisconsin Department of Natural Resources recently replaced and upgraded the existing facilities at the Kettle Moraine Springs Fish Hatchery. The upgrade included replacements and improvements to address coldwater stocking needs. The process water that is treated at the wastewater treatment facility includes flow from the aquaculture system's sump pump overflow, filter backwash and radial flow settler flushing, and egg incubation and broodstock tanks.

The wastewater treatment facility includes a splitter box, a filter bypass tank, a rapid mix tank, a coagulation tank, a flocculation tank, two-disc filter units, a belt press filter, and two UV disinfection units. The facility also includes a bypass system where wastewater may be discharged directly to the receiving water without treatment, providing it meets permit requirements.

Domestic wastewater generated onsite is pumped to a fixed film treatment system which includes a settling zone and aeration zone. The domestic wastewater is sampled to ensure compliance with BOD and TSS removal as required per ch. NR 210 Wis. Adm. Code, and then is pumped to the wastewater treatment facility.

Attachment #2 is a map of the area showing the approximate location of Outfall 005.

Existing Permit Limitations

The current permit, which expired on June 30, 2026, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD_5 May – Oct Nov – April	 **5.0 mg/L** **10 mg/L**		 5.0 mg/L 10 mg/L	 **5.0 mg/L** **10 mg/L**	2,3
TSS	12 mg/L			10 mg/L	
pH	9.0 s.u.	6.0 s.u.			2
Dissolved Oxygen		7.0 mg/L			2
Ammonia Nitrogen May – Oct Nov – April	 2.6 mg/L 2.6 mg/L			 1.7 mg/L 2.5 mg/L	
Bacteria					4
E. coli				126 #/100 mL geometric mean	
Phosphorus				0.75 lbs/day	5

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Temperature					1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time. These limits were calculated in the 2021 WQBEL memo.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. Bacteria limits apply during the disinfection season of May through September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. The phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area.

Receiving Water Information

- Name: Melius Creek
- Waterbody Identification Code (WBIC): 32100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Coldwater, Class II trout stream. Note: Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: Due to the nature of Melius Creek, the low flows are estimated to be close to zero:
  $7\text{-}Q_{10}$ = 0 cubic feet per second (cfs)
  $7\text{-}Q_2$ = 0 cfs
- Hardness = 359 mg/L as $CaCO_3$. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: None
- Impaired water status: The immediate receiving water is not 303(d) listed as impaired. The North Branch of the Milwaukee River approximately 2 miles downstream of Outfall 005 is on the 303(d) list as impaired for total phosphorus.

Effluent Information

- Flow rate(s):
  Maximum annual average = 0.52 million gallons per day (MGD)
  For reference, the actual average flow from 07/01/2021 – 03/31/2026 was 0.32 MGD.
- Hardness = 359 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in November and December 2025 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Aquaculture wastewater and sanitary waste.

- Water supply: Private wells.
- Additives: Kettle Moraine has included 6 additives in the permit application that have the potential to be present in Outfall 005. These additives are listed in the additives section of the memo.
- Effluent characterization: This facility is categorized as a secondary industry, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)
11/25/2025	3.06
11/28/2025	<3.0
12/02/2025	<3.0
12/05/2025	<3.0
Average	0.765

"<" means that the pollutant was not detected at the indicated limit of detection. The mean concentration was calculated using zero in place of the non-detected results.

The following table presents the average concentrations and loadings at Outfall 005 from 07/01/2021 – 03/31/2026 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

	Average Measurement	Average Mass Discharged
BOD_5	5.36 mg/L*	
TSS	4.83 mg/L*	
pH field	7.87 s.u.	
Dissolved Oxygen	9.9 mg/L	
Ammonia Nitrogen	0.10 mg/L*	
E. coli	13.6 #/100 mL**	
Phosphorus		0.42 lbs/day

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.
** The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)

3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Adm. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Kettle Moraine.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chlorine		19.0	19.0	3.81	<20
Arsenic		340	340	68.0	<7
Cadmium	359	18.9	18.9	3.8	<1
Chromium	301	4446	4446	889	<1
Copper	359	51.8	51.8	10.4	0.77
Lead	356	365	365	72.9	<4
Nickel	268	1080	1080	216	<2
Zinc	333	345	345	68.9	4.90

Attachment #1

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chloride (mg/L)		757	757	151	60.7

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.
* * Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)
RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chlorine		7.28	7.28	1.46	<20
Arsenic		148	148	29.6	<7
Cadmium	175	3.82	3.82	0.76	<1
Chromium	301	213	213	42.5	<1
Copper	359	30.9	30.9	6.18	0.77
Lead	356	95.5	95.5	19.1	<4
Nickel	268	120	120	24.0	<2
Zinc	333	345	345	68.9	4.9
Chloride (mg/L)		395	395	79.0	60.7

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)
The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)
RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	370	74.0	<1
Chromium (+3)	3818000	3818000	763600	<1
Lead	140	140	28.0	<4
Nickel	43000	43000	8600	<2

Attachment #1

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		13.3	2.66	<7

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for toxic substances evaluated in this section. Monitoring recommendations are made in the paragraphs below:

Total Residual Chlorine – Kettle Moraine uses chlorine to disinfect systems in the aquaculture building twice per year. Kettle Moraine ensures the chlorine is completely neutralized by UV prior to the water being sent to the wastewater treatment plant. Therefore, it is unlikely that chlorine is in the effluent. **It is recommended that chlorine be monitored for one year, including on days that water is discharged that was used for disinfection.**

Arsenic & Cadmium – Considering available effluent data from the permit application, the effluent concentrations were nondetectable; however, the limit of detections (LOD) were higher than 1/5th of the calculated limits so reasonable potential cannot be determined at this time. Per s. NR 200.027(1), Wis. Adm. Code, **one sample for each parameter with a more sensitive approved analytical method is recommended for these parameters, with LODs at least as stringent as shown below to determine reasonable potential:**

Minimum LODs for Resampling

Parameter	LOD µg/L
Arsenic	2.6
Cadmium	0.76

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code.

Based on the type of discharge (fish hatchery), **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic

toxicity to aquatic life. The current permit has daily maximum and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- The maximum expected effluent pH has changed.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - pH)})] + [B \div (1 + 10^{(pH - 7.204)})]$$

Where:

A = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 57 sample results were reported from 07/13/2021 – 03/02/2026. The maximum reported value was 8.4 s.u. (Standard pH Units). The effluent pH was 8.4 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.4 s.u. The mean plus the standard deviation multiplied by a factor of 2.326, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.4 s.u. Therefore, a value of 8.4 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.4 s.u. into the equation above yields an ATC = 2.6 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method
In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	5.2
1-Q_{10}	2.6

The 1-Q_{10} method yields the most stringent limits for Kettle Moraine.

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified for a Cold-Water Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$,
T = the temperature (ºC) of the receiving water

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

Since minimal ambient data is available, the "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations based on the full assimilative capacity.

		May – Oct	Nov – April
Effluent Flow	Qe (MGD)	0.52	0.52
Background Information	7-Q_{10} (cfs)	0	0
	7-Q_2 (cfs)	0	0
	Maximum Temperature (°C)	18	8
	pH (s.u.)	8.08	7.99
	% of Flow used	NA	NA
	Reference Weekly Flow (cfs)	0	0
	Reference Monthly Flow (cfs)	0	0
Criteria mg/L	4-day Chronic	4.32	6.17
	30-day Chronic	1.73	2.47
Effluent Limitations mg/L	Weekly Average	4.32	6.17
	Monthly Average	1.73	2.47

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 07/13/2021 – 03/02/2026.

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L
1-day P_{99}	0.39
4-day P_{99}	0.23
30-day P_{99}	0.14
Mean*	0.10
Std	0.08
Sample size	57
Range	<0.012 - 0.407

*Values lower than the limit of detection were substituted with a zero

Reasonable Potential

The need to include ammonia limits in Kettle Moraine's permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia year-round and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. However, since the permit currently has weekly and monthly average limits year-round, **the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Monthly Average mg/L
May – October	2.6	1.7
November – April	2.6	2.5

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial treatment facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Kettle Moraine does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 60 lbs/month, which is the threshold for industrial facilities in accordance to s. NR 217.04(1)(a)2, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Apr 2025	0.20	8.03	13.3
May 2025	0.23	8.65	16.4
Jun 2025	0.09	7.73	5.51
Jul 2025	0.12	7.38	7.18
Aug 2025	0.36	3.65	11.0
Sep 2025	0.84	3.53	24.8
Oct 2025	0.74	3.40	20.9
Nov 2025	0.56	8.85	41.0
Dec 2025	0.50	5.72	23.9
Jan 2026	0.71	5.71	33.9
Feb 2026	0.88	5.15	37.9

Attachment #1

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Mar 2026	0.31	5.49	14.0
Average			20.8

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
Where total flow is the sum of the actual (not design) flow (in MGD) for that month

Milwaukee Basin Total Maximum Daily Load (TMDL)
The TMDL report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. Effluent limitations based on these WLAs must be included in WPDES permits according to s. NR 217.16, Wis. Adm. Code.

The monthly average total phosphorus (TP) effluent limits in lbs/day are calculated based on the maximum monthly phosphorus WLA given in pounds per month as suggested in the TMDL report and implementation guidance. The monthly maximum TP WLAs for this facility are found in Appendix A of the Milwaukee River Basin TMDL report. **The monthly average limits shown in the table below are recommended in place of the s. NR 217.13, Wis. Adm. Code, limit, and should be expressed in pounds per day.**

Total Phosphorus Wasteload Allocations and Effluent Limits

Month	Monthly Maximum TP WLA[1] (lbs/month)	Days Per Month	Monthly Average TP Effluent Limit[2] (lbs/day)
Jan	23.27	31	0.75
Feb	21.02	28	0.75
Mar	23.27	31	0.75
Apr	22.52	30	0.75
May	23.27	31	0.75
Jun	22.52	30	0.75
Jul	23.27	31	0.75
Aug	23.27	31	0.75
Sep	22.52	30	0.75
Oct	23.27	31	0.75
Nov	22.52	30	0.75
Dec	23.27	31	0.75

Footnotes:
1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.17 for the Milwaukee River Basin
2- Monthly Average Total P effluent limit (lbs/day) = monthly Total P WLA (lbs/month) ÷ days per month

The 0.75 lbs/day limit has been effective for the full permit term, and no changes are recommended in the reissued permit. Kettle Moraine is exploring different phosphorus removing additives to utilize.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from 09/07/2021 – 03/30/2026.

Attachment #1

Total Phosphorus Effluent Data

	Concentration mg/L	Mass lbs/day
1-day P_{99}	1.39	3.19
4-day P_{99}	0.75	1.76
30-day P_{99}	0.36	0.81
Mean*	0.21	0.42
Std	0.30	0.71
Sample size	223	223
Range	<0.00914 - 1.61	0 - 8.38

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.

PART 5 – TOTAL SUSPENDED SOLIDS

The Milwaukee River TMDL also has wasteload allocations (WLA) for total suspended solids (TSS). The current permit includes a daily maximum limit of 12 mg/L and a monthly average limit of 10 mg/L, year round.

In reference to TSS conditions in the Milwaukee River Basin, a target concentration of 12 mg/L expressed as a median of monthly samples collected between May and October was established by the WDNR TMDL technical team for the analysis. A summary of basis for this target is provided in 3.2.2 of the TMDL report available here: http://dnr.wi.gov/topic/TMDLs/Milwaukee/. The wasteload allocations for the existing facility are a product of the calculated baseline loading (permit limit or average concentration × maximum 12-month flow) and the specified reduction necessary to meet the water quality target in the near and downstream waters.

Monthly average and daily maximum mass effluent limitations are shown in the table below. Consistent with Section 6.4.1 of the Milwaukee River TMDL Report, in cases where the equivalent TSS concentration limit is < 12 mg/L, the effluent limit will be expressed as a concentration of 12 mg/L.

Total Suspended Solids Wasteload Allocations

Month	Monthly TSS WLA[1] (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit[2] (lbs/day)	Equivalent Monthly Average TSS Effluent Conc. at 0.52 MGD[3] (mg/L)	Daily TSS WLA[4] (lbs/day)	Daily Max TSS Effluent Limit[5] (lbs/day)	Equivalent Daily Max TSS Effluent Conc. at 0.52 MGD[3] (mg/L)
Jan	1640	31	52.9	12.2	126	126	29.1
Feb	1189	28	42.5	9.79	101	101	23.4
March	1135	31	36.6	8.44	87.5	87.5	20.2
April	1061	30	35.4	8.15	84.5	84.5	19.5
May	1659	31	53.5	12.3	128	128	29.5
June	1848	30	61.6	14.2	147	147	33.9
July	1757	31	56.7	13.1	135	135	31.2
Aug	1609	31	51.9	12.0	124	124	28.6
Sept	1837	30	61.2	14.1	146	146	33.7
Oct	1960	31	63.2	14.6	151	151	34.8
Nov	2461	30	82.0	18.9	196	196	45.2

Attachment #1

Month	Monthly TSS WLA[1] (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit[2] (lbs/day)	Equivalent Monthly Average TSS Effluent Conc. at 0.52 MGD[3] (mg/L)	Daily TSS WLA[4] (lbs/day)	Daily Max TSS Effluent Limit[5] (lbs/day)	Equivalent Daily Max TSS Effluent Conc. at 0.52 MGD[3] (mg/L)
Dec	1832	31	59.1	13.6	141	141	32.6

Footnotes:
1- Milwaukee River TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.19
2- Monthly average TSS effluent limit (lbs/day) = maximum monthly TSS WLA (lbs/month) ÷ days per month
3- The equivalent concentrations shown were calculated by the following: mass limit / (maximum annual average flow (0.52 MGD) * 8.34)
4- Milwaukee River TMDL Appendix A. Daily Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.18
5- Daily maximum TSS effluent limit (lbs/day) = daily TSS WLA (lbs/month)

Consistent with Section 6.4.1 of the Milwaukee River TMDL Report, a concentration limit of 12 mg/L is recommended if the equivalent calculated concentration to the mass limit is less than 12 mg/L. Equivalent concentration for monthly average mass limits for February, March, and April are less than 12 mg/L, so **12 mg/L is recommended for these months rather than the TMDL-based mass limits.**

Equivalent concentration for daily maximum mass limits year-round are greater than 12 mg/L, **the TMDL-based mass daily maximum limits are recommended year round.**

The current permit has a daily maximum limit of 12 mg/L as a daily maximum limit and 10 mg/L as a monthly average limit. Therefore, these concentrations are recommended to continue year-round with the addition of the required TMDL-based mass limits. The recommended limits in the reissued permit are shown in the table below.

Total Suspended Solids Effluent Limits

Month	Monthly Ave TSS Effluent Limit (lbs/day)	Monthly Average TSS Limit (mg/L)	Daily Max TSS Effluent Limit (lbs/day)	Daily Max TSS Limit (mg/L)
Jan	52.9	12	126	10
Feb		12	101	10
March		12	87.5	10
April		12	84.5	10
May	53.5	12	128	10
June	61.6	12	147	10
July	56.7	12	135	10
Aug	51.9	12	124	10
Sept	61.2	12	146	10
Oct	63.2	12	151	10
Nov	82.0	12	196	10
Dec	59.1	12	141	10

These recommendations are different than the limits in the current permit due to a different maximum annual average flow used to calculate the equivalent concentration limits. The actual maximum annual average flow is used in this evaluation rather than the design capabilities of the upgraded treatment

facility that was used in the previous evaluation. This is due to the actual flow being significantly less than the anticipated design flow with no plans to increase the flow.

Limits based on the WLAs should be given in a permit regardless of reasonable potential. However, for informational purposes, the following table lists the statistics for total suspended solids from 07/13/2021 – 03/02/2026.

Total Suspended Solids Effluent Data

	Concentration mg/L	Mass lbs/day
1-day P_{99}	34.6	95.4
4-day P_{99}	18.9	51.8
30-day P_{99}	8.92	23.8
Mean*	4.83	12.3
Std	8.32	23.5
Sample size	58	58
Range	<2 - 39.8	0 - 118

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 07/13/2021 – 03/31/2026.

A heat loss equation is used to adjust the calculated limit based upon the length of the storm sewer/storm water conveyance channel before discharge to waters of the state, because the discharge is to a storm sewer. The discharge from permit Outfall 005 travels through at least 2,640 feet of storm sewer/storm water conveyance channel before reaching Melius Creek. Under s. NR 106.55(5), Wis. Adm. Code, the default cooling rate is estimated as 1º F for every 400 feet of storm sewer/storm water conveyance channel. The adjusted limits are shown in the table.

The table below summarizes the maximum temperatures reported during monitoring from 07/13/2021 – 03/30/2026.

Attachment #1

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	52	52	54	75
FEB	52	52	54	75
MAR	52	52	58	76
APR	50	50	64	77
MAY	52	52	70	79
JUN	52	52	74	79
JUL	52	56	74	80
AUG	55	55	72	80
SEP	56	56	67	79
OCT	54	54	60	77
NOV	53	53	55	76
DEC	54	54	54	76

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Based on the available effluent data no effluent limits are recommended for temperature. The complete thermal table used for the limit calculation is attached. **Monitoring is recommended to continue in the reissued permit.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET

limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 100%,** shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.52 MGD = 0.805 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0 cfs ÷ 4 = 0 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 005 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 005. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead Minnow	Algae (IC_{50}%)	Pass or Fail?	Use in RP?	
05/01/2001	>100	>100		Pass	Yes	
11/05/2002	>100	>100	>100	Pass	Yes	
03/09/2004		>100			No	1
03/15/2005	>100	>100	>100	Pass	Yes	

Attachment #1

Date Test Initiated	Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead Minnow	Algae (IC_{50}%)	Pass or Fail?	Use in RP?	
03/29/2005	>100	>100	>100	Pass	Yes	
05/26/2008	>100	>100	>100	Pass	Yes	

Footnote:

1. *Qualified or Inconclusive Data.* Data quality concerns were noted during testing which calls into question the reliability of the test results.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Chronic Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 100%. **15 Points**
Historical Data	No data available. **0 Points**	5 tests used to calculate RP – older than 5 years. No tests failed. **5 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**

Attachment #1

	Acute	Chronic
Receiving Water Classification	Coldwater **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Copper, zinc, chloride, and ammonia detected. Additional Compounds of Concern: None. **3 Points**	Reasonable potential for limits based on CTC; Ammonia nitrogen limit carried over from the current permit. Copper, zinc, chloride, and ammonia detected. Additional Compounds of Concern: None. **3 Points**
Additives	1 biocide (chlorine) used. 1 water quality conditioner (hydrogen peroxide) is used. Fish drugs are used at the aquaculture building intermittently when needed, but are not expected to make it into the wastewater treatment plant. **4 Points**	Additives are used less than once per 4 days. **0 Points**
Discharge Category	Fish Hatchery **0 Points**	Same as Acute. **0 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**17 Points**	**28 Points**
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term	3 tests during permit term
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- Kettle Moraine uses chlorine occasionally to disinfect systems in the aquaculture building, which adds 3 points to the acute checklist. The permittee ensures that chlorine is completely neutralized by UV prior to the water being sent to the wastewater treatment plant. Therefore, it is unlikely that chlorine is in the effluent and likely not causing toxicity in the discharge. The checklist also adds 5 points to the chronic total due to not having chronic tests within the previous 5 years. However, there is little risk of chronic toxicity due to the low levels of toxic substances detected and additives are not expected in the discharge.
- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, no acute and 2x/permit term chronic WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge.
- If a phosphorus-removing additive is used for phosphorus removal in the future, it is recommended that Kettle Moraine develop a standard operating procedure (SOP). If there is not an SOP in place, it may result in more frequent WET testing.

PART 8 – ADDITIVE REVIEW

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2022)
https://dnr.wisconsin.gov/topic/Wastewater/Additives.html

Additive Parameters

Additive Name	Manufacturer	Purpose of Additive including where added	Intermittent or Continuous Feed	Frequency of Use		Estimated Effluent Concentration mg/L	Potential Use Restriction mg/L[1]
				Months per/yr.	Days/ week		
Hydrogen peroxide	Peox-Aid 35%	Treating fish	I	6	2-3	0	0.29
Chloramine-T[2]	Halamid	Treating fish	I			0	Chlorine WQBEL
Florfenicol	BioOregon	Treating fish	I			0	Not available
Terramycin 200	Syndel	Treating fish	I			0	210.55
Chlorine[2]	Hawkins	Disinfection	I	2	1	0	Chlorine WQBEL

1. Calculated based on toxicity data provided.
2. Evaluation is not necessary for additives that have active ingredients consisting only of chlorine, caustic soda (sodium hydroxide), hypochlorite, sulfuric acid, hydrochloric acid.

Florfenicol and Terramycin 200 – These are drugs for treating fish when there is disease and expected to be used very infrequently. The drugs are expected to be consumed by the fish, added prior to wastewater treatment, and not expected to be in the discharge. Therefore, they are approved for use.

Chlorine & Chloramine-T – Kettle Moraine uses chlorine to disinfect each system in the aquaculture building approximately twice per year. UV light is used to neutralize the chlorine and the facility confirms chlorine is not detected before the water is sent to wastewater treatment. Due to the treatment to neutralize chlorine ahead of the wastewater treatment, it is likely the effluent concentration is not detected. Chloramine-T is intermittently used to control fish disease and is also added before wastewater treatment. Therefore, monitoring for chlorine is recommended to assess if WQBELs are needed to control the toxicity from the use of these two additives.

Attachment #2

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

WI DNR Kettle Moraine Outfall



Legend:

- Surface Water Outfalls
- Rivers and Streams
- Intermittent Streams
- Open Water
- Rivers and Streams
- Intermittent Streams
- Open Water
- 24K Intermittent Streams
- 24K Lakes and Open Water
- Latest Leaf Off Index
- Latest Leaf Off Imagery

Notes:



Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 1,000 2,000 Feet

0 450 900 Meters

Service Layer Credits:
DNR Basic Feature VTL (WTM): Wisconsin Department of Natural Resources, GIS Section, Latest Leaf Off , Output & Determinations^: WI DNR Bureau of Watershed Management, Surface Water: WIDNR, UDGD, and other data

This map is a product generated by a DNR web mapping application.

This map is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The user is solely responsible for verifying the accuracy of information before using for any purpose. By using this product for any purpose user agrees to be bound by all disclaimers found here: https://dnr.wisconsin.gov/legal

Date Printed: 5/6/2026 12:59 PM

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Kettle Moraine Fish Hatchery		**7-Q_{10}:**	0.00	cfs		
Outfall(s):	005		**Dilution:**	25%		**Start:**	07/13/21	07/13/21
Date Prepared:	8/7/2026		**f:**	0		**End:**	03/30/26	03/31/26
Design Flow (Qe):	0.52	MGD	**Stream type:**	Cold water community			
Storm Sewer Dist.	2640	ft	**Qs:Qe ratio:**	0.0	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit		**Adjusted Thermal Limits**	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation	**Weekly Average**	**Daily Maximum**
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
JAN	35	47	68	0.00	0.634	0.675	0	52	52	47	68	54	75
FEB	36	47	68	0.00	0.754	0.881	0	52	52	47	68	54	75
MAR	39	51	69	0.00	0.460	0.575	0	52	52	51	69	58	76
APR	47	57	70	0.00	0.658	0.713	0	50	50	57	70	64	77
MAY	56	63	72	0.00	0.648	0.710	0	52	52	63	72	70	79
JUN	62	67	72	0.00	0.637	0.673	0	52	52	67	72	74	79
JUL	64	67	73	0.00	0.560	0.603	0	52	56	67	73	74	80
AUG	63	65	73	0.00	0.530	0.616	0	55	55	65	73	72	80
SEP	57	60	72	0.00	0.627	0.821	0	56	56	60	72	67	79
OCT	49	53	70	0.00	0.574	0.603	0	54	54	53	70	60	77
NOV	41	48	69	0.00	0.487	0.637	0	53	53	48	69	55	76
DEC	37	47	69	0.00	0.445	0.458	0	54	54	47	69	54	76