Permit Fact Sheet

General Information

Permit Number	WI-0035874-06-0	
Permittee Name and Address	Kossuth Sanitary District No 2 5808 CTH R, Manitowoc, WI 54220	
Permitted Facility Name and Address	Kossuth Sanitary District No 2 WWTF 4024 Rockwood Rd, Manitowoc, WI 54220	
Permit Term	January 01, 2026 to December 31, 2030	
Discharge Location	SW ¼ of the SW ¼ of Section 25, T20N R23E	
Receiving Water	Tributary to the West Twin River in West Twin River of Twin-Kewaunee River in Manitowoc County	
Stream Flow ($Q_{7,10}$)	0 cfs	
Stream Classification	Limited Aquatic Life (LAL)	
Discharge Type	Existing, Continuous	
Annual Average Design Flow (MGD)	Daily Maximum	0.056 MGD
	Weekly Maximum	0.055 MGD
	Annual Average	0.0175 MGD
Industrial or Commercial Contributors	None	
Plant Classification	Basic: A3 - Recirculating Media Filters; SS - Sanitary Sewage Collection System	
Approved Pretreatment Program?	N/A	

Facility Description

Kossuth Sanitary District #1 serves a population of approximately 100 people living within the Sanitary District. Kossuth SD#1 has an annual design flow of 0.0175 MGD with an actual flow rate of 0.0105 MGD. Wastewater is collected by a conventional gravity sewer system from throughout the district. A single lift station serves residents on the far northern edge of the district. At the facility site, raw wastewater first enters a manhole along the access road, where influent samples are collected. Flow is then conveyed to two parallel trains of two community septic tanks, with each tank having a capacity of 9,870 gallons. Effluent from the septic tanks is sent to a recirculating chamber, from which it is sent to one of three sand filter beds. The surface dimensions of each bed are 40 ft x 45 ft, and each bed consists of three feet of sand, six inches of pea gravel, and one foot of washed gravel. The filtered effluent is conveyed via an underdrain system to a splitter box, where an adjustable weir is used to vary the proportion of the effluent discharged relative to the amount returned to the recirculating chamber. Effluent samples are collected from the splitter box, and effluent flow is measured using an ultra-sonic level sensor over the weir. Treated effluent is then discharged to a tributary to the West Twin River. Solids removed from the septic tanks occurs occasionally and treated as septage under ch. NR 113, Wis. Adm. Code.

Substantial Compliance Determination

Enforcement During Last Permit:

- Several Notice of Violations were issued and an Enforcement Conference was held during the current permit term in response to repeated violations of ammonia nitrogen and total recoverable copper effluent limitations. To bring the facility back into compliance, a compliance schedule is included for abandoning and regionalizing the wastewater treatment facility with the City of Manitowoc.

After a desk top review of all discharge monitoring reports, compliance maintenance annual reports, land application reports, compliance schedule items, and a site visit on June 17, 2021, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Trevor Moen, Wastewater Engineer on October 10, 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)**
701	N/A – No Flow Monitoring	INFLUENT - At Sampling Point 701, the permittee shall collect representative samples of the influent from the automatic composite sampler drawing 24-hour flow proportional composite samples from the headworks manhole prior to the septic tanks. Starting on November 1, 2029, the permittee shall measure the influent flow rate with a continuous flow recording device from a sampling location prior to the septic tanks.
001	0.0105 MGD (July 2017 – Feb. 2025 Average)	EFFLUENT - At Sampling Point 001, the permittee shall collect representative samples of the final effluent from the effluent automatic composite sampler drawing 24-hour flow proportional composite samples from the splitter box except the permittee shall collect grab samples of the effluent for pH and dissolved oxygen from the splitter box prior to being discharged to the unnamed tributary to the West Twin River via Outfall 001. The permittee shall measure the effluent flow rate using a continuous flow recording device prior to the V-notched Weir in the splitter box. Starting on May 1, 2029, the permittee shall collect grab samples of the effluent for E. coli, pH, and dissolved oxygen following the disinfection system prior to being discharged to the unnamed tributary to the West Twin River via Outfall 001.
002	N/A – Outfall Removed	Liquid Sludge: Representative samples of the liquid sludge that accumulates in the septic tanks shall be collected and analyzed one time each year that sludge is land applied.
901	N/A – New Outfall	SEPTAGE - The permittee shall manage all primary solids that accumulates in the septic tanks prior the recirculating sand filters in compliance with ch. NR 113, Wis. Adm. Code.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	The Flow Rate sample type shall be reported as "Continuous" starting on November 1, 2029. See also the Install Continuous Flow Recording Device Schedule.
BOD5, Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

1.1.1 Changes from Previous Permit:

Influent 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.

Flow Rate – Flow rate added with a schedule to install a continuous flow recording device by November 1, 2029

BOD & TSS – Monitoring frequency increased from 3/month to 2/week

1.1.2 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.

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. Due to the percent removal requirements in s. NR 210.05, Wis. Adm. Code, influent sample frequencies are set equal to effluent sample frequencies.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	8.7 lbs/day	2/Week	Calculated	
Suspended Solids, Total	Weekly Avg	13 lbs/day	2/Week	Calculated	
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations section below.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of TSS discharged and report on the last day of the month on the DMR. See TMDL Calculations section below.
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	9.7 mg/L	3/Week	24-Hr Flow Prop Comp	Effective October annually until October 1, 2029.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	21 mg/L	3/Week	24-Hr Flow Prop Comp	Effective November through March annually until November 1, 2029.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	12 mg/L	3/Week	24-Hr Flow Prop Comp	Effective April through May annually until April 1, 2029.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	7.1 mg/L	3/Week	24-Hr Flow Prop Comp	Effective June through September annually.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	8.4 mg/L	3/Week	24-Hr Flow Prop Comp	Effective October through March annually starting January 1, 2029 per the compliance schedule.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	6.5 mg/L	3/Week	24-Hr Flow Prop Comp	Effective April through May annually starting April 1, 2029 per the compliance schedule.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	26 mg/L	3/Week	24-Hr Flow Prop Comp	Effective November through May annually until November 1, 2029.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	24 mg/L	3/Week	24-Hr Flow Prop Comp	Effective June through September annually.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	17 mg/L	3/Week	24-Hr Flow Prop Comp	Effective October through March annually starting January 1, 2029 per the compliance schedule.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	13 mg/L	3/Week	24-Hr Flow Prop Comp	Effective April through May annually starting April 1, 2029 per the compliance schedule.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Phosphorus, Total	Monthly Avg	6.9 mg/L	2/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	0.24 lbs/day	2/Week	Calculated	Monitoring only upon permit effective date. Final TMDL-based mass limits

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					go into effect per the compliance schedule. See Phosphorus TMDL section below.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL Calculations section below.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See TMDL Calculations section below.
Chloride	Monthly Avg	400 mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only upon permit effective date. Final limits go into effect per the compliance schedule.
Chloride	Weekly Avg	400 mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only upon permit effective date. Final limits go into effect per the compliance schedule.
Chloride	Daily Max	760 mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only upon permit effective date. Final limits go into effect per the compliance schedule.
Chloride	Daily Max	114 lbs/day	4/Month	Calculated	Monitoring only upon permit effective date. Final limits go into effect per the compliance schedule.
Chloride	Weekly Avg - Variable	lbs/day	4/Month	Calculated	Monitoring only upon permit effective date. Final limits go into effect per the compliance schedule. Report the calculated mass Chloride result in the Chloride column of the eDMR. See Chloride Mass Limit - Non-Wet Weather and Alternative Wet

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Weather Mass Limit Section.
Chloride, Variable Limit		lbs/day	4/Month	See Table	Look up the chloride mass from the 'Variable Chloride Mass' table and report the variable limit in the Chloride Variable Limit column on the eDMR.
Copper, Total Recoverable	Monthly Avg	34 ug/L	Monthly	24-Hr Flow Prop Comp	
Copper, Total Recoverable	Weekly Avg	34 ug/L	Monthly	24-Hr Flow Prop Comp	
Copper, Total Recoverable	Daily Max	58 ug/L	Monthly	24-Hr Flow Prop Comp	
Copper, Total Recoverable	Weekly Avg - Variable	lbs/day	Monthly	Calculated	Report the calculated monthly mass copper result in the copper column of the eDMR. See Copper Mass Limit - Non-Wet Weather and Alternative Wet Weather Mass Limit Section.
Copper Variable Limit		lbs/day	Monthly	See Table	Look up the copper mass limit from the 'Variable Copper Mass Limit' table and report the variable limit in the Copper Variable Limit column on the eDMR.
Hardness, Total as CaCO3		mg/L	Monthly	24-Hr Flow Prop Comp	Collect sample on the same day that Copper sample is taken.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May through September annually starting May 1, 2029.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September annually starting May 1, 2029. See the E. coli Percent Limit section below. Enter the result in

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					the DMR on the last day of the month.
Acute WET	Daily Max	1.0 TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity (WET) Testing section.
Chronic WET	Monthly Avg	2.4 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity (WET) Testing section.
Temperature Maximum		deg F	Daily	Continuous	Monitoring required in 2029 only.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section below.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section below.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section below. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

2.1.1 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.

- **BOD, DO, pH** – Monitoring frequencies have been increased.
- **Total Suspended Solids -** Addition of TMDL weekly average and monthly average final limits of 13 lbs/day and 8.7 lbs/day respectively.
- **Nitrogen, Ammonia-** Daily maximum, weekly average, and monthly average limitations have been updated.
- **Total Phosphorus** - Addition of Monthly Average Interim limit of 6.9 mg/L and TMDL monthly average final limit of 0.24 lbs/day.
- **Chloride** – Daily maximum, weekly average, and monthly average limitations have been added.
- **Copper, Total Recoverable** – Removal of the wet weather daily maximum limit

- **Disinfection & E. coli:** At the end of the compliance schedule, disinfection requirements and E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply. Monitoring is not required until the limit becomes effective and the end of the compliance schedule.
- **WET Testing**- Daily maximum and monthly average limitations have been added.
- **Temperature** – Monitoring only added for calendar year 2029.
- **Total Nitrogen Monitoring (TKN, N02+N03 and Total N)**- Annual monitoring is required in specific quarters as outlined in the permit.

2.1.2 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 6/06/2025 and prepared by Nicole Krueger.

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. All sample frequencies were increased except for copper which remains at monthly.

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 weekly average and monthly average limits whenever practicable.

BOD5, Total Suspended Solids, DO, and pH- Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code. The effluent concentration limitations for BOD5, Total Suspended Solids, DO, and pH are carried over from the previous permit and are not subject to change at this time because the receiving water characteristics have not changed.

Northeast Lakeshore Total Maximum Daily Load (TMDL): The permitted facility is located within the Northeast Lakeshore Total Maximum Daily Load (NEL TMDL), which was approved by EPA October 30, 2023. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus and total suspended solids that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLAs in the TMDL, which are 56 lbs/yr for phosphorus and 1,990 lbs/yr for TSS for the permitted facility.
The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's 2020 *TMDL Implementation Guidance for Wastewater Permits*, TMDL limits must be given in the permit that are consistent with the TMDL WLA permit limits derived from the TMDL and need to be expressed as specified by 40 CFR 122.45 (d), s. NR 212.76 (4), and s. NR 205.065 (7),Wis. Adm. Code, unless determined to be impracticable. Impracticability has already been determined for phosphorus limits as laid out in the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=167886175).

For phosphorus, continuously discharging facilities covered by the NEL TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The equivalent effluent concentration of 1.0 mg/L was calculated for the facility, thus, TMDL based mass limits are expressed only as a monthly average.

For TSS, continuously discharging municipal facilities covered by the NEL TMDL are given monthly average and weekly average mass limits.

Facilities with NEL TMDL based effluent limits for phosphorus and TSS must report the 12-month rolling sum of total monthly discharge (lbs/yr). If reported 12-month rolling sums exceed the facility's max annual WLA, the facility's mass limits (monthly average and six-month average) may be recalculated using more appropriate CVs or monitoring frequencies when the permit is reissued to bring discharge levels into compliance with the facility's given WLA.

Phosphorus TMDL Limits: An interim limit of 6.9 mg/L goes into effect upon reissuance and will remain in effect unless a more stringent limit is required at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. It is recommended that the interim limit be set equal to 6.9 mg/L as a monthly average which is equal to the 4-day P99 from 10/12/2020 – 02/24/2025. The 06/06/2025 WQBEL memo incorrectly recommended an interim limit of 6.1 mg/L which was based on the 4-day P99 of data from 10/12/2020 – 12/28/2021 and did not include updated data. Discharge effluent concentration (mg/L) shall be reported 2 times per week upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA. Final TMDL WLA-based effluent limits of 0.24 lbs/day as a monthly average will go into effect in accordance with compliance schedule 5.2.

Total Suspended Solids TMDL Limits: Mass based TSS limits of 13 lbs/day as a weekly average and 8.7 lbs/day as a monthly average have been added to the permit to comply with requirements of the Northeast Lakeshore TMDL. Effluent concentration (mg/L) shall be monitored and reported 2 times per week upon permit reissuance and will be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA.

Ammonia: Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106, Wis. Adm. Code establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia. Statistics based upon ammonia data reported from 07/11/2017 to 02/24/2025 were calculated, with those results being compared to the calculated limits to determine the need to include ammonia limits in Kossuth's permit for the respective month ranges. Based on this comparison, daily maximum, weekly average, and monthly average limits are required year-round.

Chloride: Considering available effluent data from the current permit term (2017-2025), both the 1-day P99 and 4-day P99 values were greater than the calculated chloride WQBELs; therefore, effluent limits are needed. Acute and chronic mass limits, both dry weather and wet weather where also calculated and included. Limits are effective beginning January 1, 2029 per the compliance schedule 5.2.

Copper: The wet weather daily max limit for copper is being removed since wet weather limits don't apply to limits based on acute criteria.

Disinfection & E. coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020.

Section NR 102.04(5)(a), Wis. Adm. Code, states that all surface waters shall be suitable for recreational use and meet the E. coli criteria established to protect this use. Section NR 102.04(5)(b), Wis. Adm. Code, states that exceptions to the disinfection requirement can be made if the department determines, in accordance with the procedures specified in s. NR 210.06(3), Wis. Adm. Code, that disinfection is not required to meet water quality criteria. As part of the reissuance process, the requirements for disinfection were reviewed under s. NR 210.06(3), Wis. Adm. Code.

It was determined that the permittee is required to disinfect, during the following months May – September. See WQBEL for further explanation. Limits are effective beginning May 1, 2029 per the compliance schedule 5.2.

Whole Effluent Toxicity: Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at

http://dnr.wi.gov/topic/wastewater/wet.html. Both acute and chronic WET limits were calculated for Kossuth and are effective upon permit reissuance.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)- The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under s. 283.55(1)(e), Wis. Stats. Testing is required annually in rotating quarters.

PFOS and PFOA: Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. 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.

3 Land Application - Monitoring and Limitations

3.1 Sample Point Number: 002- Liquid Sludge

3.1.1 Changes from Previous Permit:

Outfall Deleted - Sludge limitations and monitoring requirements were removed for this outfall.

3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. However, the solids generated within the septic tanks at Kossuth SD are considered septage and regulated under ch. NR 113, Wis. Adm. Code. Therefore, land application requirements for sludge under ch. NR 204 have been removed and septage requirements (Outfall 901) have been added.

4 Septage Management - Monitoring and Limitations

Septage management is required in accordance ch. NR 113, Wisconsin Administrative Code. Records must be kept and made available to the Department on request. Required record keeping includes volumes of septage pumped, dates when the septage was removed, land application site DNR number and method used to satisfy pathogen and vector control, and/or the treatment plant where septage is disposed. Annual reporting is required when the permittee land applies the septage. Annual reporting is also required when the permittee disposes of septage at a designated treatment facility.

4.1 Sample Point Number: 901- SEPTAGE

4.1.1 Changes from Previous Permit:

New Outfall Added – Outfall for septage requirements added

Explanation of Limits and Monitoring Requirements

Requirements for septage management are determined in accordance with ch. NR 113, Wis. Adm. Code.

5 Schedules

5.1 Install Continuous Flow Recording Device

The permittee shall install a continuous flow recording device at Sampling Point 701 (Influent) in accordance with the following schedule.

Required Action	Due Date
Submit Final Plans and Specifications: Submit plans and specifications per ch. NR 108, Wis. Adm. Code, for installing a continuous flow recording device at Sampling Point 701 (Influent).	06/30/2028
Complete Install: The permittee shall complete installation of the continuous flow recording device at Sampling Point 701 (Influent).	11/01/2029

5.1.1 Explanation of Schedule

The permittee currently measures effluent wastewater flow rate but not influent flow rate. However, pursuant to s. NR 210.04(2), Wis. Adm. Code, influent wastewater strengths and volumes shall be characterized at treatment facilities by monitoring for flow, BOD5 and TSS. This schedule requires the permittee to install a continuous influent flow recording device to comply with s. NR 210.04(2), Wis. Adm. Code.

5.2 Regionalization Schedule and Effluent Limit Compliance

No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement

Required Action	Due Date
Progress Report: The permittee shall submit a progress report on plan and specification development via email.	03/31/2026
Submit Final Plans and Specifications: The permittee shall submit final construction plans and specifications to the department for approval pursuant to s. 281.41, Wis. Stats., specifying actions that must be constructed to regionalize with the Manitowoc Wastewater Treatment Facility consistent with the approved facility plan, documentation of a signed Intergovernmental Agreement, and a schedule for completing construction of the upgrades by the 'Complete Construction' date specified. As condition of the facility plan approval, the permittee shall submit a 208-conformance letter from Bay Lake Regional Planning Commission stating that project is consistent with the Manitowoc-Two Rivers-Mishicot Sewer Service Area Plan.	06/30/2026
Financial Assistance Application: Provide confirmation that a Financial Assistance Application and Principal Forgiveness (PF) request, as authorized by s. 281.58, Wis. Stats., and Ch. NR 162, Wis. Adm. Code, was submitted online to the Department's Clean Water Fund Program by September 30, 2026.	10/01/2026
Initiate Construction: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.	12/31/2026
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades via email.	06/30/2027
Complete Construction: The permittee shall complete construction of system upgrades and notify the department of completion via email.	11/01/2027

Permit Discontinuation Request: The permittee shall notify the Department in writing that all regionalization actions have been completed and the individual WPDES permit can be discontinued. Additionally, coverage under the Satellite Sewage Collection Systems General Permit (WI#0047341) shall be requested by submitting the notice of intent (NOI) for coverage.	06/30/2028
Compliance with Final WQBELs: If the permittee does not complete the above listed actions to regionalize and request a discontinuation of the permit by the due date listed above, the final WQBELs for E. coli, chloride, ammonia, and total phosphorus will become effective on January 1, 2029.	12/31/2028

5.2.1 Explanation of Schedule

The permittee had currently evaluated their alternatives for complying with the final water quality based effluent limits for total phosphorus, and for bringing the wastewater treatment facility back into compliance with ammonia nitrogen, and total recoverable copper effluent limits in a Facility Plan which was approved on April 17, 2025. The approved facility plan included the final selected alternative of regionalizing the wastewater treatment facility with the City of Manitowoc. This schedule serves a reminder to complete the actions to regionalize with the City of Manitowoc as presented in the facility plan by the due dates. This schedule will allow the permittee time to prepare final plans and specifications, bid/prepare for construction, and to install and initiate the regionalization upgrades.

Other Comments

None

Attachments

Water Quality Based Effluent Limits – dated June 6, 2025 and prepared by Nicole Krueger

Justification Of Any Waivers from Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Amy Garbe, P.E. Wastewater Engineer Date: October 16, 2025

Date (post fact check): November 12, 2025

Date (post public notice):

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 03/28/2022 – 06/06/2025 for updated data and receiving water classification

TO: Amy Garbe – WY/3

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for the Kossuth Sanitary District No. 2
WPDES Permit No. WI-0035874-06

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 Kossuth Sanitary District No. 2 in Manitowoc County. This municipal wastewater treatment facility (WWTF) discharges to the unnamed tributary to the West Twin River, located in the West Twin River Watershed in the Manitowoc River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report. This discharge is included in the Northeast (NE) Lakeshore Total Maximum Daily Load (TMDL) as approved by EPA on 10/30/2023.

The following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD_5			30 mg/L	20 mg/L	1
TSS TMDL			30 mg/L 17 lbs/day	20 mg/L 10 lbs/day	1,3
pH	9.0 s.u.	6.0 s.u.			1
Dissolved Oxygen		4.0 mg/L			1
Bacteria					4
E. coli				126 #/100 mL geometric mean	
Ammonia Nitrogen October – March April – May June – September	 Variable Variable Variable		 17 mg/L 13 mg/L 24 mg/L	 8.4 mg/L 6.5 mg/L 7.1 mg/L	5
Chloride Non-wet weather Wet weather	760 mg/L 114 lbs/day		400 mg/L 59 lbs/day 460 lbs/day	**400 mg/L**	6,7
Copper Non-wet weather Wet weather	58 µg/L 0.0088 lbs/day		34 µg/L 0.0052 lbs/day 0.015 lbs/day	**34 µg/L**	6,7
Hardness					8
Phosphorus Interim TMDL				 6.1 mg/L 0.29 lbs/day	3,9
Temperature					2
TKN, Nitrate+Nitrite, and Total Nitrogen					10
Acute WET	1.0 TU_a				11,12
Chronic WET				2.4 TU_c	11,12

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Chlorine	19 µg/L		7.3 µg/L	**7.3 µg/L**	13

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the NE Lakeshore Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in October 2023. The limits in the table are based on weekly monitoring. If the monitoring is increased to 2x/week, the limits would be 13 lbs/day as a weekly average and 8.7 lbs/day as a monthly average for TSS and 0.24 lbs/day as a monthly average for phosphorus.
4. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**	**Effluent pH s.u.**	**Limit mg/L**
$6.0 \leq pH \leq 6.1$	83	$7.0 < pH \leq 7.1$	51	$8.0 < pH \leq 8.1$	11
$6.1 < pH \leq 6.2$	82	$7.1 < pH \leq 7.2$	46	$8.1 < pH \leq 8.2$	8.8
$6.2 < pH \leq 6.3$	80	$7.2 < pH \leq 7.3$	40	$8.2 < pH \leq 8.3$	7.3
$6.3 < pH \leq 6.4$	78	$7.3 < pH \leq 7.4$	35	$8.3 < pH \leq 8.4$	6.0
$6.4 < pH \leq 6.5$	75	$7.4 < pH \leq 7.5$	31	$8.4 < pH \leq 8.5$	5.0
$6.5 < pH \leq 6.6$	72	$7.5 < pH \leq 7.6$	26	$8.5 < pH \leq 8.6$	4.1
$6.6 < pH \leq 6.7$	69	$7.6 < pH \leq 7.7$	22	$8.6 < pH \leq 8.7$	3.4
$6.7 < pH \leq 6.8$	65	$7.7 < pH \leq 7.8$	19	$8.7 < pH \leq 8.8$	2.8
$6.8 < pH \leq 6.9$	60	$7.8 < pH \leq 7.9$	16	$8.8 < pH \leq 8.9$	2.4
$6.9 < pH \leq 7.0$	56	$7.9 < pH \leq 8.0$	13	$8.9 < pH \leq 9.0$	2.0

6. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.
7. 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.
8. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
9. If the phosphorus variance application that was submitted is approved by EPA, the existing interim limit of 6.1 mg/L as a monthly average may be extended beyond the end of the compliance schedule along with a requirement for total phosphorus pollutant minimization program.
10. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
11. 1x yearly acute and chronic WET tests are recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 41%. 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% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the unnamed tributary upstream of the discharge.

12. 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 and should continue after the permit expiration date (until the permit is reissued).
13. Chlorine limits shall only be effective if/when Kossuth chlorinates.

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, 2011 Ammonia Calculation, & Outfall Map

PREPARED BY: Nicole Krueger – SER

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Diane Figiel, Water Resources Engineer – WY/3
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Attachment #1

Water Quality-Based Effluent Limitations for
Kossuth Sanitary District No. 2

WPDES Permit No. WI-0035874-06

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

Wastewater is collected by a conventional gravity sewer system from throughout the district. A single lift station serves residents on the far northern edge of the district. At the facility site, raw wastewater first enters a manhole along the access road, where influent samples are collected. Flow is then conveyed to two parallel trains of two community septic tanks, with each tank having a capacity of 9,870 gallons. Effluent from the septic tanks is sent to a recirculating chamber, from which it is sent to one of three sand filter beds. The surface dimensions of each bed are 40 ft x 45 ft, and each bed consists of three feet of sand, six inches of pea gravel, and one foot of washed gravel. The filtered effluent is conveyed via an underdrain system to a splitter box, where an adjustable weir is used to vary the proportion of the effluent discharged relative to the amount returned to the recirculating chamber. Effluent samples are collected from the splitter box, and effluent flow is measured using an ultra-sonic level sensor over the weir.

Attachment #3 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, which expired on 06/30/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5			30 mg/L	20 mg/L		2,3
TSS			30 mg/L	20 mg/L		2,3
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2,3
Ammonia Nitrogen						4
Nov – March	Variable		26 mg/L	21 mg/L		
April – May	Variable		26 mg/L	12 mg/L		
June – September	Variable		24 mg/L	7.1 mg/L		
October	Variable		24 mg/L	9.7 mg/L		
Chloride						1
Copper	58 µg/L		34 µg/L	34 µg/L		
Non-wet weather	0.0088 lbs/day		0.0052 lbs/day			
Wet weather	0.039 lbs/day		0.015 lbs/day			
Hardness						1
Phosphorus						5
Interim				Narrative		
Final				0.225 mg/L	0.075 mg/L	

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
WET						6

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code.
4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit.

Effluent pH - s.u.	**NH_3-N Limit – mg/L**	**Effluent pH - s.u.**	**NH_3-N Limit – mg/L**
$pH \leq 7.5$	> 26	$8.2 < pH \leq 8.3$	7.3
$7.5 < pH \leq 7.6$	26	$8.3 < pH \leq 8.4$	6.0
$7.6 < pH \leq 7.7$	22	$8.4 < pH \leq 8.5$	4.9
$7.7 < pH \leq 7.8$	19	$8.5 < pH \leq 8.6$	4.1
$7.8 < pH \leq 7.9$	16	$8.6 < pH \leq 8.7$	3.4
$7.9 < pH \leq 8.0$	13	$8.7 < pH \leq 8.8$	2.8
$8.0 < pH \leq 8.1$	11	$8.8 < pH \leq 8.9$	2.4
$8.1 < pH \leq 8.2$	8.8	$8.9 < pH \leq 9.0$	2.0
		$9.0 < pH$	< 2.0

5. A compliance schedule is in the current permit to meet the final WQBEL by 07/01/2026.
6. Annual acute WET tests and 2/permit term chronic tests are required. The instream waste concentration (IWC) is 41%.

Receiving Water Information

- Name: Unnamed tributary to the West Twin River
- Waterbody Identification Code (WBIC): 3000160
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:

Limited aquatic life (LAL) from the outfall to a second unnamed tributary (approximately 1,000 feet), non-public water supply. The current permit limits are based on a LAL classification although this is not codified in s. NR 104 Wis. Adm. Code as a variance water. A biologist visited the site on 05/22/2023 and observed that the immediate receiving water was dry and noted that it is dry most of the year; therefore the continuation of an LAL classification for the immediate receiving water was recommended.

At approximately 1,000 feet downstream of Outfall 001, the classification changes to warmwater sport fish (WWSF) at the confluence with a second unnamed tributary (WBIC 87500).

A survey was done in the second unnamed tributary (WBIC 87500) between the confluence with WBIC 5022844 and Shoto Rd, approximately 4,500 feet downstream of Outfall 001 which concluded that this water does support a coldwater (CW) fish community.

Note: Cold Water and 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: The following 7-Q_{10} and 7-Q_2 values are estimated from USGS where Outfall 001 is located.

  At the immediate receiving water (WBIC 3000160) at the LAL classification
  7-Q_{10} = 0 cfs (cubic feet per second)
  7-Q_2 = 0 cfs

  Low flows at the unnamed tributary 1,000 feet downstream of Outfall 001 (WBIC 87500) where the classification changes to WWSF are shown below:
  7-Q_{10} = 0.16 cfs
  7-Q_2 = 0.27 cfs

  Low flows at the unnamed tributary approximately 4,500 feet downstream of Outfall 001 (WBIC 87500) where the classification changes to CW are shown below:
  7-Q_{10} = 0.16 cfs
  7-Q_2 = 0.27 cfs

- Hardness = 458 mg/L as $CaCO_3$. This represents the geomean of effluent data from 07/12/2017 to 06/06/2018. 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 don't 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 listed as impaired. The West Twin River is 303(d) listed as impaired for total phosphorus.

Effluent Information

- Design flow rate(s):
  Annual average = 0.018 MGD (Million Gallons per Day)
  Peak daily = 0.167 MGD
  Peak weekly = 0.141 MGD
  Peak monthly = 0.117 MGD
  The peak design flows were estimated from the annual average design flow and peaking factor based on data from 07/01/2017 to 02/28/2025, excluding days of unusually high flows that are not representative.

  For reference, the actual average flow from 07/01/2017 to 02/28/2025 was 0.0105 MGD.
- Hardness = 458 mg/L as $CaCO_3$. This value represents the geometric mean of data from 07/12/2017 to 06/06/2018.
- 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).
- Water source: Public well water supply with no industrial contributors.
- Additives: Aqua Hawk 530 is added for copper removal.
- Effluent characterization: This facility is categorized as a minor municipality, 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 ammonia, chloride, hardness and phosphorus.

- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, 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.

Effluent Data

	Copper µg/L	Chloride mg/L
1-day P_{99}	64.5	764
4-day P_{99}	39.7	511
30-day P_{99}	27.2	381
Mean	21.4	318
Std	12.3	137
Sample size	99	92
Range	1.3 – 67	25 – 963
Dates	07/04/2017 – 02/24/2025	07/04/2017 – 02/03/2025

The following table presents the average concentrations and loadings at Outfall 001 from 07/01/2017 to 02/28/2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Averages of Parameters with Limits

	Average Measurement	Average Mass Discharged
BOD_5	10.2 mg/L	
TSS	5.7 mg/L	
pH field	7.36 s.u.	
Dissolved Oxygen	7.2 mg/L	
Phosphorus	4.97 mg/L	
Ammonia Nitrogen	10 mg/L*	
Copper	20.2 µg/L	0.236 lbs/day

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

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)

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), limitations based on acute toxicity are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

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

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.

In this case, limits calculated based on the mass balance equation are more restrictive and this method is used to calculate the daily maximum limits shown in the table below.

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

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Chlorine		190	19.0				
Arsenic		340	340	68.0	<5		
Cadmium	457	164.9	165	33.0	<0.2		
Chromium	301	4446	4446	889	<1.7		
Copper	458	65.2	65.2			64.5	**67**
Lead	356	365	365	72.9	<5		
Nickel	268	1080	1080	216	8.0		
Zinc	333	345	345	68.9	30.2		
Chloride (mg/L)		757	757			**764**	**963**

* 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

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Chlorine		7.3	7.3			
Arsenic		152	152	30.4	<5	
Cadmium	175	3.82	3.82	0.8	<0.2	
Chromium	301	326	326	65.2	<1.7	
Copper	458	38.1	38.1			**39.7**
Lead	356	95.5	95.5	19.1	<5	
Nickel	268	169	169	33.8	8.0	
Zinc	333	345	345	68.9	30.2	
Chloride (mg/L)		395	395			**511**

* 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

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	880	880	176	<0.2
Chromium (+3)	8400000	8400000	1680000	<1.7
Lead	2240	2240	448	<5
Nickel	110000	110000	22000	8.0

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0 cfs

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40	40	8.0	<5

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 required for no toxic substances in this section.

Copper – Considering available effluent data from the current permit term (07/04/2017 to 02/24/2025), the 1-day P_{99} concentration is 64.5 µg/L, 4-day P_{99} concentration is 39.7 µg/L, with a maximum concentration of 67 µg/L so **daily maximum and weekly average limits are recommended.** The current copper limits are:

	Daily Maximum	Weekly Average	Monthly Average
	58 µg/L	34 µg/L	34 µg/L
Non-wet weather	0.0088 lbs/day	0.0052 lbs/day	
Wet weather	0.039 lbs/day	0.015 lbs/day	

The calculated daily maximum and weekly average limits are less stringent the current limits. However, the current limits should be continued in the reissued permit in accordance with s. NR 205.067(5)(a), Wis. Adm. Code because the facility uses an additive (Aqua Hawk 530) for copper removal and antibackling would apply.

If Kossuth would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit.

The mass limits are based on the current concentration limits and design flows. Because these aren't changing, the mass limits for non-wet weather and wet weather are recommended to continue. However, the daily maximum wet-weather mass limit 0.039 lbs/day shall be removed per s. NR 106.08(8), Wis. Adm. Code.

No changes are recommended in any of the permit limits for copper.

Quarterly hardness monitoring is also recommended because of the relationship between effluent hardness and daily maximum limits based on acute toxicity criteria.

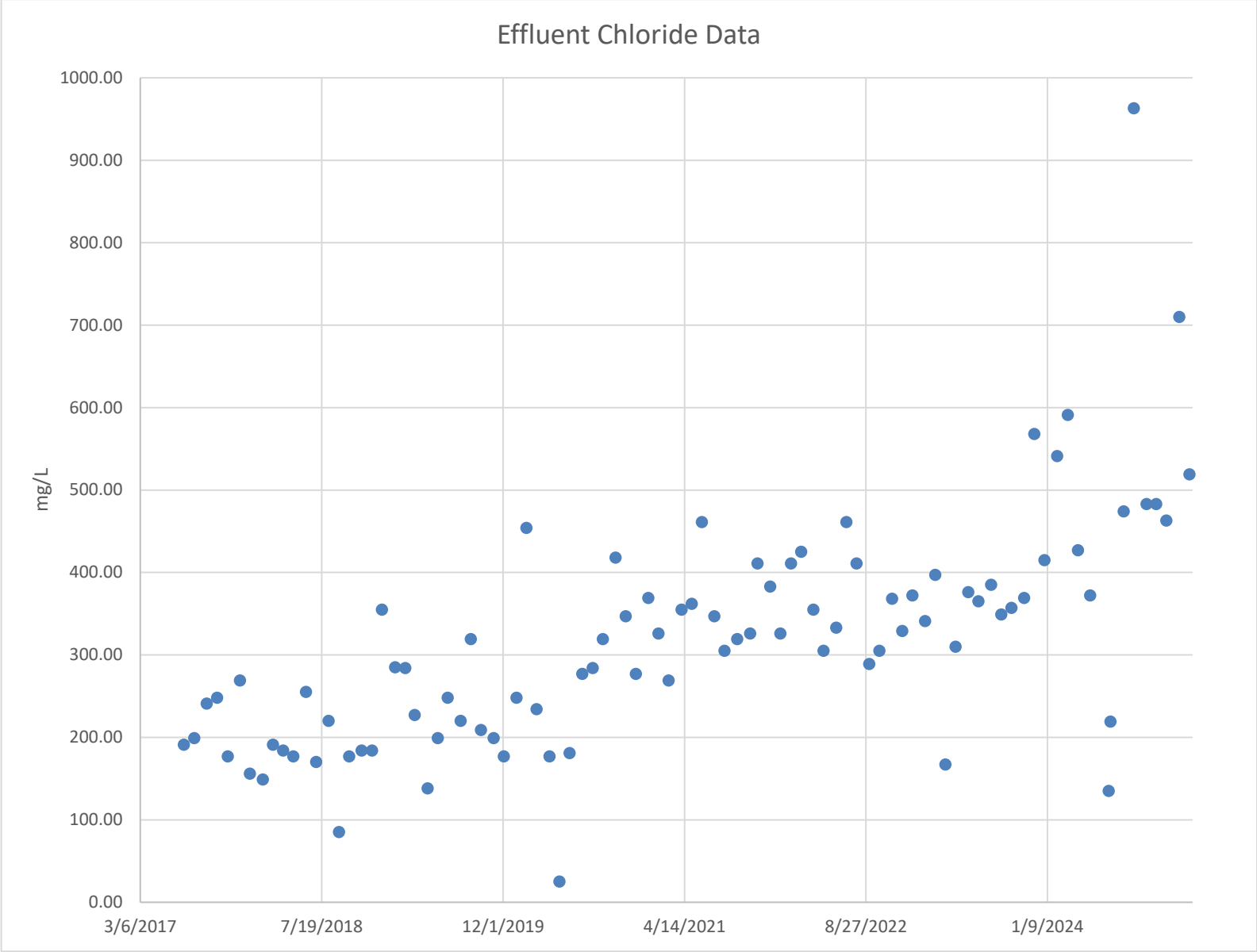
Chloride – Considering available effluent data from July 2017 – February 2025, summarized in the table below, the 1-day P_{99} and 4-day P_{99} concentrations exceed the calculated daily maximum and weekly average limits.

Chloride Effluent Data

	mg/L
1-day P_{99}	764
4-day P_{99}	511
30-day P_{99}	381
Mean	318
Std	137

Attachment #1

	mg/L
Sample size	92
Range	25 – 963



A daily maximum concentration of 760 mg/L (rounded) **and a weekly average concentration limit of 400 mg/L** (rounded) **are required** per s. NR 106.05(4)(a) and (b), Wis. Adm. Code, since the 1-day P_{99} (764 mg/L) exceeds the calculated daily maximum concentration limit and the 4-day P_{99} (511 mg/L) exceeds the calculated weekly average concentration limit. **The acute mass limitation of 114 lbs/day** (rounded) is based on the concentration limit and the design annual average flow rate of 0.018 MGD (757 mg/L × 0.018 MGD × 8.34) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code. **The chronic mass limitation of 59 lbs/day** (rounded) is based on the concentration limit and the design annual average flow

rate of 0.018 MGD (395 mg/L × 0.018 MGD × 8.34) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code.

An alternative wet weather mass limit of 460 lbs/day (395 mg/L × 0.140 MGD × 8.34) (rounded) **should also be included** in accordance with s. NR 106.07(9), Wis. Adm. Code. The peak weekly design flow was used to calculate the wet weather mass limit. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.

A **monthly average limit of 400 mg/L** should be included in the permit for expression of limit requirements per s. NR 106.07(4), Wis. Adm. Code, as follows:

> Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.

Mass limitations are not subject to the limit expression requirements if concentration limits are given.

Chloride Limits Summary

	Daily Maximum	Weekly Average	Monthly Average
Chloride			
Concentration limit	760 mg/L	400 mg/L	400 mg/L*
Mass limit	114 lbs/day	59 lbs/day	
Wet weather mass limit		460 lbs/day	

*Limit needed to meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because Kossuth is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code." Sludge was removed once in the past five years (in 2020) and the sludge characteristics data reveals the sample result is within expected analytical ranges and well below the 17 mg/kg level. The sample from 04/22/2020 was reported as 1.0 mg/kg. Therefore, no mercury monitoring is recommended at Outfall 001.

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 effluent flow rate and the lack of indirect dischargers contributing to the collection system, 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, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- 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 = 0.633 and B = 90.0 for Limited Aquatic Life, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 233 sample results were reported from 07/11/2017 to 02/24/2025. The maximum reported value was 8.2 s.u. (Standard pH Units). The effluent pH was 8.1 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 8.0 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.0 s.u. Therefore, a value of 8.0 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 8.0 s.u. into the equation above yields an ATC = 13 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	26
1-Q_{10}	13

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

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values updated using the 1-Q_{10}.

Daily Maximum Ammonia Nitrogen Limits – LAL

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

Section NR 106.33(2), Wis. Adm. Code, was updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, the table has been expanded from the table in the current permit to included ammonia nitrogen limits throughout the pH range.

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, because those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

Immediate receiving water – Unnamed tributary (LAL classification)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Limited Aquatic Life 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 = 1.0,
$C = 8.09 \times 10^{(0.028 \times (25 - T))}$
T = the temperature of the receiving (ºC)

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.

Attachment #1

Weekly and Monthly Ammonia Nitrogen Limits – LAL

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.018	0.018	0.018
Background Information	7-Q_{10} (cfs)	0	0	0
	7-Q_2 (cfs)	0	0	0
	Ammonia (mg/L)	0.04	0.05	0.105
	Average Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	7.97	8.21	7.97
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0	0	0
Criteria mg/L	4-day Chronic	42	20	56
	30-day Chronic	17	7.8	22
Effluent Limits mg/L	Weekly Average	42	20	56
	Monthly Average	17	7.8	22

Unnamed tributary (WWSF classification) approximately 1,000 feet downstream of Outfall 001

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish 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 $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the unnamed tributary based on conversations with local fisheries biologists. So "ELS Absent" criteria apply from October through March, and "ELS Present" criteria will apply from April through September for a warmwater sport fish classification.

The "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Attachment #1

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.018	0.018	0.018
Background Information	7-Q_{10} (cfs)	0.16	0.16	0.16
	7-Q_2 (cfs)	0.27	0.27	0.27
	Ammonia (mg/L)	0.04	0.05	0.105
	Average Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10
	pH (s.u.)	8.1	8.1	7.9
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	0.08	0.16	0.04
	Reference Monthly Flow (cfs)	0.11	0.23	0.057
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	5.24	3.55	
	Early Life Stages Absent			9.36
	30-day Chronic			
	Early Life Stages Present	2.10	1.42	
	Early Life Stages Absent			3.74
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	20.2	23.7	
	Early Life Stages Absent			22.7
	Monthly Average			
	Early Life Stages Present	10.6	12.7	
	Early Life Stages Absent			11.2

Unnamed tributary (Coldwater classification) approximately 0.8 miles downstream of Outfall 001

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.

Weekly and Monthly Ammonia Nitrogen Limits - Coldwater

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Qe (MGD)	0.018	0.018	0.018

Attachment #1

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Background Information	7-Q_{10} (cfs)	0.16	0.16	0.16
	7-Q_2 (cfs)	0.27	0.27	0.27
	Ammonia (mg/L)	0.04	0.05	0.105
	Average Temperature (°C)	11	16	4
	Maximum Temperature (°C)	13	18	9
	pH (s.u.)	8.1	8.1	7.9
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	0.04	0.16	0.04
	Reference Monthly Flow (cfs)	0.057	0.230	0.057
Criteria mg/L	4-day Chronic	5.2	3.6	7.0
	30-day Chronic	2.1	1.4	2.8
Effluent Limits mg/L	Weekly Average	13	24	17
	Monthly Average	6.4	13	8.3

Ammonia Decay

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32(4)(c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_{.t} = k_{20}\,\theta^{(T-20)}$). The ammonia nitrogen decay equation is provided below.

$$N_{Limit} = \left(\frac{N_{down}}{EXP(-k_t T)} \right)$$

Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
N_{down} = Ammonia limit calculated based on downstream classification and flow (mg/L)
$-k_t$ = Ammonia decay rate at background stream temperature (day^{-1})
T = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 0.2 miles to the WWSF classification and 0.8 miles to the coldwater classification. After decay, the limits are increased as shown in the following table. The more stringent limits are the ones that are recommended in the reissued permit and are shown in bold below.

Attachment #1

Ammonia Nitrogen Decay Limits Comparison

	LAL		Decay at the WWSF Classification change		Decay at the Coldwater Classification Change		Current Limits	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
April – May	72	29	20	11	**13**	**6.5**	26	12
June – Sept	48	19	24	13	25	13	**24**	**7.1**
October	95	38	23	11	**17**	**8.4**	24	9.7
Nov – March	95	38	23	11	**17**	**8.4**	26	21

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 07/11/2017 to 02/24/2025, with those results being compared to the calculated limits to determine the need to include ammonia limits in Kossuth's permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen mg/L	April - May	June - September	October	November - March
1-day P_{99}	43.4	47.1	55.0	52.6
4-day P_{99}	23.5	25.6	29.9	30.2
30-day P_{99}	12.3	12.4	14.6	18.7
Mean*	7.64	6.96	8.36	13.6
Std	9.02	10.1	11.9	10.5
Sample size	61	133	36	168
Range	0.11 – 40.2	0.11 – 46	<0.11 – 46	<0.11 – 38.1

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

Based on this comparison, **daily maximum, weekly average, and monthly average limits are required year-round.**

The permit currently has daily maximum, weekly average, and monthly average limits year-round. Where there are existing ammonia nitrogen limits in the permit, 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.

Attachment #1

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Nov – March	Variable	26	21
April – May	Variable	26	12
June – September	Variable	24	7.1
October	Variable	24	9.7

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet E. coli criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet E. coli limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

Kossuth had previously been exempted from disinfection based on the limited aquatic life classification of the receiving water. Section NR 210.06(3)(g), Wis. Adm. Code, states that disinfection decisions may be made based on the hydrologic classifications listed in s. NR 104.02(1), Wis. Adm. Code (not on the water quality classifications - i.e., limited forage fish, limited aquatic life - that are defined in s. NR 104.02(3), Wis. Adm. Code).

Discharges to noncontinuous streams with $Q_{7,10}$ values < 0.1 cfs usually result in effluent-dominated situations. The risk of illness is related to the concentration of *E. coli* and therefore dilution is an important consideration when considering risk to human health. Since little to no dilution is present in these situations, **disinfection should not be exempted based solely on this hydrological classification.**

The Department has considered the information required by s. NR 210.06(3), Wis. Adm. Code, and has determined that the discharge cannot meet bacteria limits without disinfection. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

These limits are required during May through September.

Total Residual Chlorine – **If Kossuth decides to upgrade to use chlorination for disinfection, effluent limitations would be recommended to assure proper operation of the de-chlorination system.** Section NR 210.06(2)(b), Wis. Adm. Code, states, "When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L." Because the WQBELs are more restrictive, they are recommended instead. Specifically, **a daily maximum limit of 19**

µg/L would be required if Kossuth decides to use chlorination for disinfection. Due to revisions to s. NR 106.07(2), Wis. Adm. Code, mass limitations are no longer required. The calculated **weekly average effluent limitation of 7.3 µg/L would also be included in the permit because it is more restrictive than the daily maximum limit.**

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code require WPDES permits contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. **Therefore, a weekly average and monthly average limit of 7.3 µg/L would also be required** to meet expression of limits requirements in addition to the daily max limit.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 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 Kossuth 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 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
Jan 2021	3.68	0.232	7.1
Feb 2021	3.23	0.217	5.8
Mar 2021	2.31	0.291	5.6
Apr 2021	1.56	0.191	2.5
May 2021	3.41	0.220	6.2
Jun 2021	4.53	0.158	6.0
Jul 2021	4.15	0.236	8.2
Aug 2021	3.07	0.233	6.0
Sep 2021	3.34	0.187	5.2
Oct 2021	4.10	0.209	7.1
Nov 2021	3.40	0.171	4.8
Dec 2021	2.98	0.214	5.3
Average	3.31	0.213	**5.8**

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

In addition, the need for a WQBEL for phosphorus must be considered.

Northeast Lakeshore Total Maximum Daily Load
Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs*

(April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. This WLA found in Appendix K of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Northeast Lakeshore Region* report are expressed as maximum annual loads (lbs/year).

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the Northeast Lakeshore Basin TMDL are given monthly average mass limits and, if the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

$$\text{TP Equivalent Effluent Concentration} = \text{WLA} \div (365 \text{ days/yr} * \text{Flow Rate} * \text{Conversion Factor})$$
$$= 56 \text{ lbs/yr} \div (365 \text{ days/yr} * 0.018 \text{ MGD} * 8.34)$$
$$= 1.0 \text{ mg/L}$$

Since this value is greater than 0.3 mg/L, the WLA should be expressed as a monthly average mass limit for total phosphorus and no six-month average limit is required.

If the reissued permit has weekly monitoring:

$$\text{TP Monthly Average Permit Limit} = \text{WLA} \div 365 \text{ days/yr} * \text{multiplier}$$
$$= (56 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.90$$
$$= 0.29 \text{ lbs/day}$$

If the reissued permit has 2x/week monitoring:

$$\text{TP Monthly Average Permit Limit} = \text{WLA} \div 365 \text{ days/yr} * \text{multiplier}$$
$$= (56 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.90$$
$$= 0.24 \text{ lbs/day}$$

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 0.75. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as monthly. However, it's recommended that the monitoring frequency is increased to weekly or 2x/weekly.

A monthly average mass effluent limit is recommended for this discharge. The limits are equivalent to concentrations of 1.94 mg/L (for weekly monitoring) and 1.63 mg/L (for 2x/week monitoring) at the facility design flow of 0.018 MGD.

The TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries in the Northeast Lakeshore Basin. Therefore, WLA-

based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

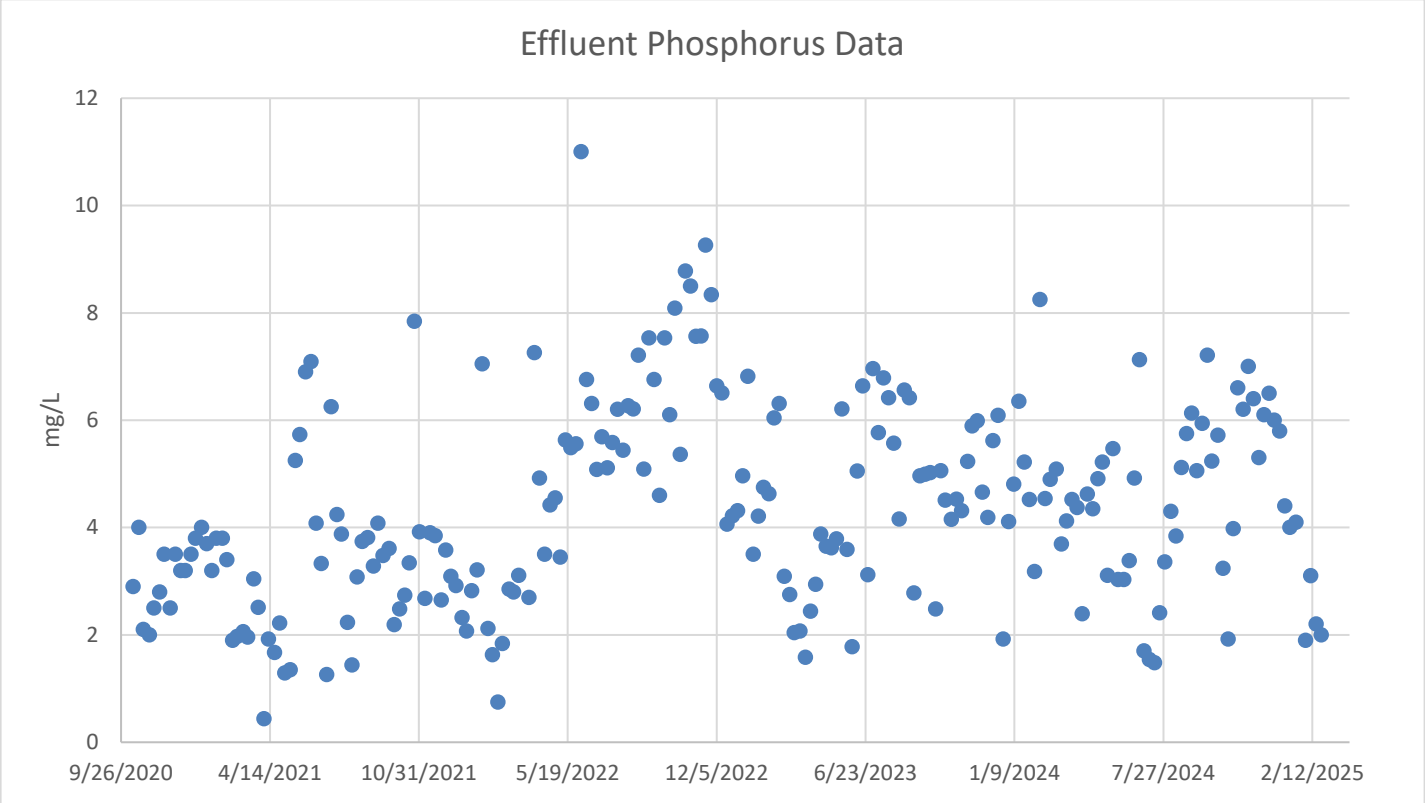
Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 10/12/2020 to 02/24/2025. The facility had issues with the filters at the plant in 2020 because of frequent plugging and new filters were installed in October 2020. The table below shows data after the new filters were installed.

Total Phosphorus Statistics

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P_{99}	10.3	0.98
4-day P_{99}	6.93	0.56
30-day P_{99}	5.20	0.35
Mean	4.36	0.26
Std	1.84	0.19
Sample Size	227	227
Range	0.44 – 11	0.011 – 1.96



Interim Limit
An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional "temporary" treatment, but also should prevent backsliding from current conditions. Therefore, **it is recommended that the interim limit be set equal to 6.1 mg/L as monthly average which is the currently effective limit.** This is continued for antibacksliding purposes.

PART 6 – TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (*April 2020). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Northeast Lakeshore Region* report are expressed as maximum annual loads (lbs/year).

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Kossuth is a municipal treatment facility and is therefore subject to weekly average and monthly average TSS limits derived from TSS annual WLAs.

If the reissued permit has weekly monitoring:

TSS Weekly Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (1,990 lbs/yr ÷ 365 days/yr) * 3.11
= 17 lbs/day

TSS Monthly Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (1,990 lbs/yr ÷ 365 days/yr) * 1.90
= 10 lbs/day

If the reissued permit has 2x/week monitoring:

TSS Weekly Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (1,990 lbs/yr ÷ 365 days/yr) * 2.37
= 13 lbs/day

TSS Monthly Average Permit Limit = WLA ÷ 365 days/yr * multiplier
= (1,990 lbs/yr ÷ 365 days/yr) * 1.59
= 8.7 lbs/day

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 0.66. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 3/month. However, it's recommended that the monitoring frequency is increased to weekly or 2x/week.

Weekly average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to concentrations of 113 mg/L and 69 mg/L (for weekly monitoring) and concentrations of 86 mg/L and 58 mg/L (for 2x/week monitoring) at the facility design flow of 0.018 MGD.

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total total suspended monitoring data from 10/12/2020 to 02/24/2025.

Total Suspended Solids Effluent Data

	Concentration mg/L	Mass lbs/day
1-day P_{99}	17.3	1.00

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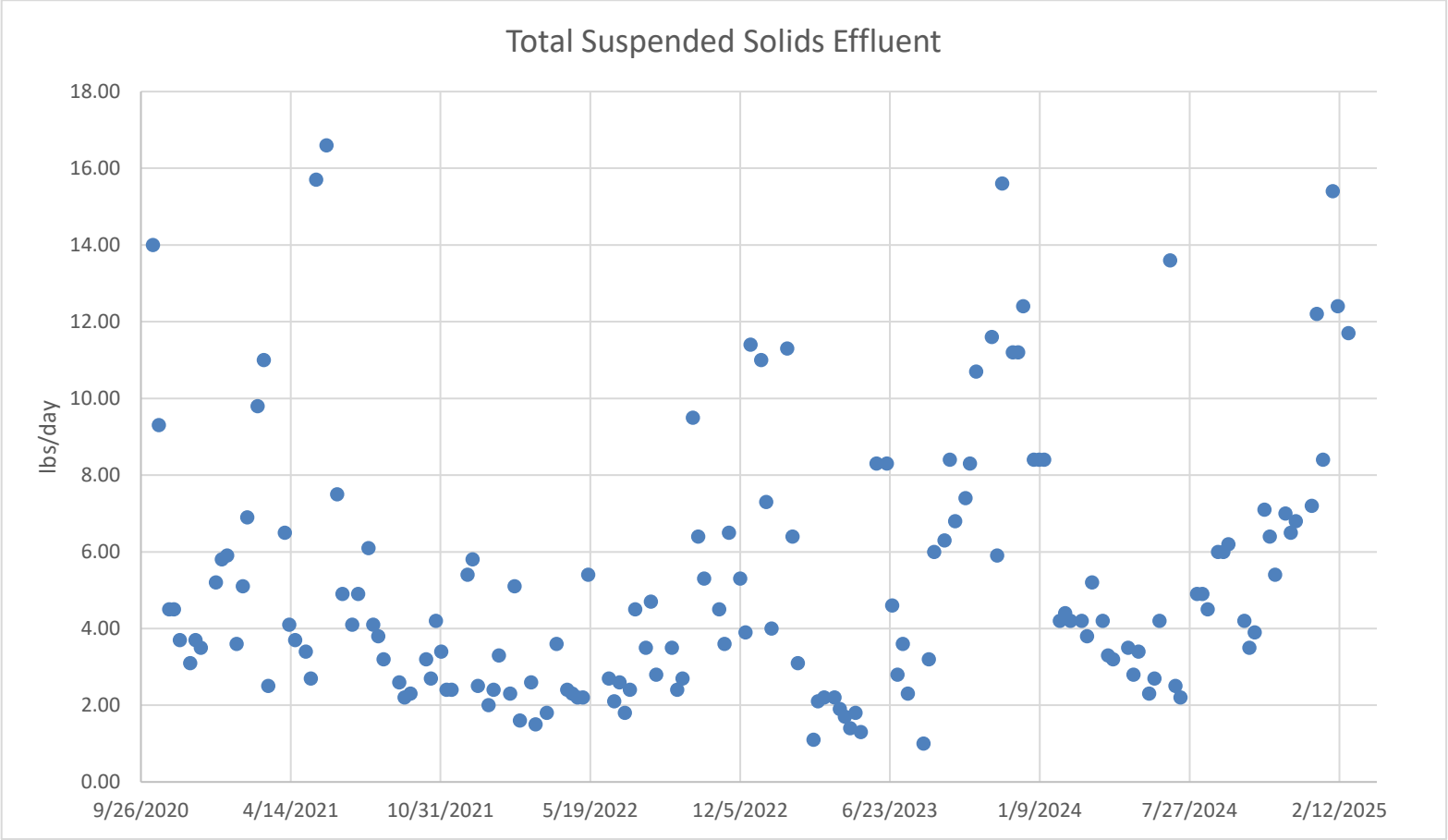
	Concentration mg/L	Mass lbs/day
4-day P_{99}	10.3	0.59
30-day P_{99}	6.84	0.39
Mean*	5.25	0.30
Std	3.36	0.20
Sample size	158	158
Range	1 - 16.6	0.0605 - 1.03



Kossuth can currently meet the TSS mass limits and a compliance schedule is not needed.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as

wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120 °F. The 86° F limit applies because the hydrologic classification is not listed as wetland in ch. NR 104, Wis. Adm. Code.

Reasonable Potential
There is not available temperature data. Section NR 106.59(2)(b), Wis. Adm. Code, allows the use of temperature effluent data, on a case-by-case basis, from at least two other POTWs within a 100-mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW. The maximum daily temperature from Whitelaw WWTF, approximately 7 miles away, was 74° F over the previous ten years. The maximum daily temperature from St Nazianz WWTF, approximately 15 miles away, was 67° over the previous ten years. **Therefore**, **no effluent limits are recommended for temperature. Monitoring for one year is recommended in the reissued permit.**

PART 8 – 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 (October 29, 2019).*

- 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 41%** 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 = 0.0175 MGD = 0.027 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0.16 cfs ÷ 4 = 0.040 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 001 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 001. 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	Acute Results LC_{50} %				Chronic Results IC_{25} %					Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC_{50}%)	Pass or Fail?	Use in RP?	
11/11/2008	>100	>100	Pass	No						1
03/04/2009	>100	>100	Pass	No						1
06/14/2016	>100	>100	Pass	Yes	93	>100	>100	Pass	Yes	
03/30/2021	39.1	>100	Fail	Yes	64.1	>100		Pass	Yes	
05/12/2021	>100	>100	Pass	Yes						
05/25/2021	>100	>100	Pass	Yes						
05/10/2022	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
05/12/2022							80.5	Pass	Yes	
03/21/2023	>100	>100	Pass	Yes	59.3	>100		Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.

- 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.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  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 $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]

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Acute WET Limit Parameters

TUa (maximum) $100/LC_{50}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)
100/39.1 = 2.56	6.2 Based on 1 detect

[(TUa effluent) (B)(AMZ)] = 15.9 > 1.0

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

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/59.3 = 1.69	2.6 Based on 4 detects	41%

[(TUc effluent) (B)(IWC)] = 1.8 > 1.0

Reasonable potential is shown for acute and chronic WET limits using the procedures in s. NR 106.08(6) and representative data from 06/14/2016 to 03/21/2023.

Expression of WET limits
Acute WET limit = 1.0 TU_a (daily maximum)
Chronic WET limit = [100/IWC] TU_c = 2.4 TU_c expressed as a monthly average

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 = 41%. **10 Points**
Historical Data	5 tests used to calculate RP. 1 test failed. **0 Points**	5 tests used to calculate RP. No tests failed. **0 Points**
Effluent Variability	History of violations.	Same as Acute.

Attachment #1

	Acute	Chronic
	15 Points	**15 Points**
Receiving Water Classification	LAL and less than 4 miles to WWSF **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for limits for chloride, ammonia, and copper based on ATC; Nickel and zinc detected. Additional Compounds of Concern: None **9 Points**	Reasonable potential limits for chloride, ammonia, and copper based on CTC; Nickel and zinc detected. Additional Compounds of Concern: None **9 Points**
Additives	0 Biocides and 1 Water Quality Conditioner added. Permittee does not use phosphorus removal chemicals. **1 Point**	Additive not used more than once per 4 days. **1 Point**
Discharge Category	0 Industrial Contributors. **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:	**30 Points**	**40 Points**
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	Yes Limit = 1.0 TU_a	Yes Limit = 2.4 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2019) and other information described above, 1x yearly acute and chronic WET tests are recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, acute and chronic WET limits are required. The acute WET limit shall be expressed as 1.0 TUa as a daily maximum in the effluent limits table of the permit. The chronic WET limit shall be expressed as 2.4 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual acute and chronic monitoring is required because acute and chronic WET limits are required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Attachment #2

2011 Ammonia Calculations

	April – May	**June – Sept.**	**Oct. – March**
7Q10 (cfs)	0	0	0
7Q2 (cfs)	0	0	0
pH (default s.u.)	7.97	8.21	7.97
Temp (deg C)	13	22	5
Ammonia criteria:			
4-day (mg/L)	45.75	17.79	76.64
30-day (mg/L)	18.30	7.12	30.65
Ammonia limits:			
Weekly ave. as rounded (mg/L)	**46 > 20, none needed**	**18**	**77 > 40, none needed**
Monthly ave. as rounded (mg/L)	**18**	**7.1**	**31**

Downstream impacts were also evaluated based on the West Twin River tributary some 1,000 feet below the outfall that is classified as a warmwater sport fish community. In at least some cases, the seasonal ammonia criteria are more stringent for warmwater sport fishery streams than for limited aquatic life waters. Because of that, it's possible the effluent limitations may need to be reduced to protect downstream uses in the tributary. In a manner similar to the above table for the tributary from the outfall, the following table summarizes the information used to generate the limits needed to protect the warmwater sport fish tributary from 1,000 feet below the outfall downstream to the West Twin River.

Attachment #2

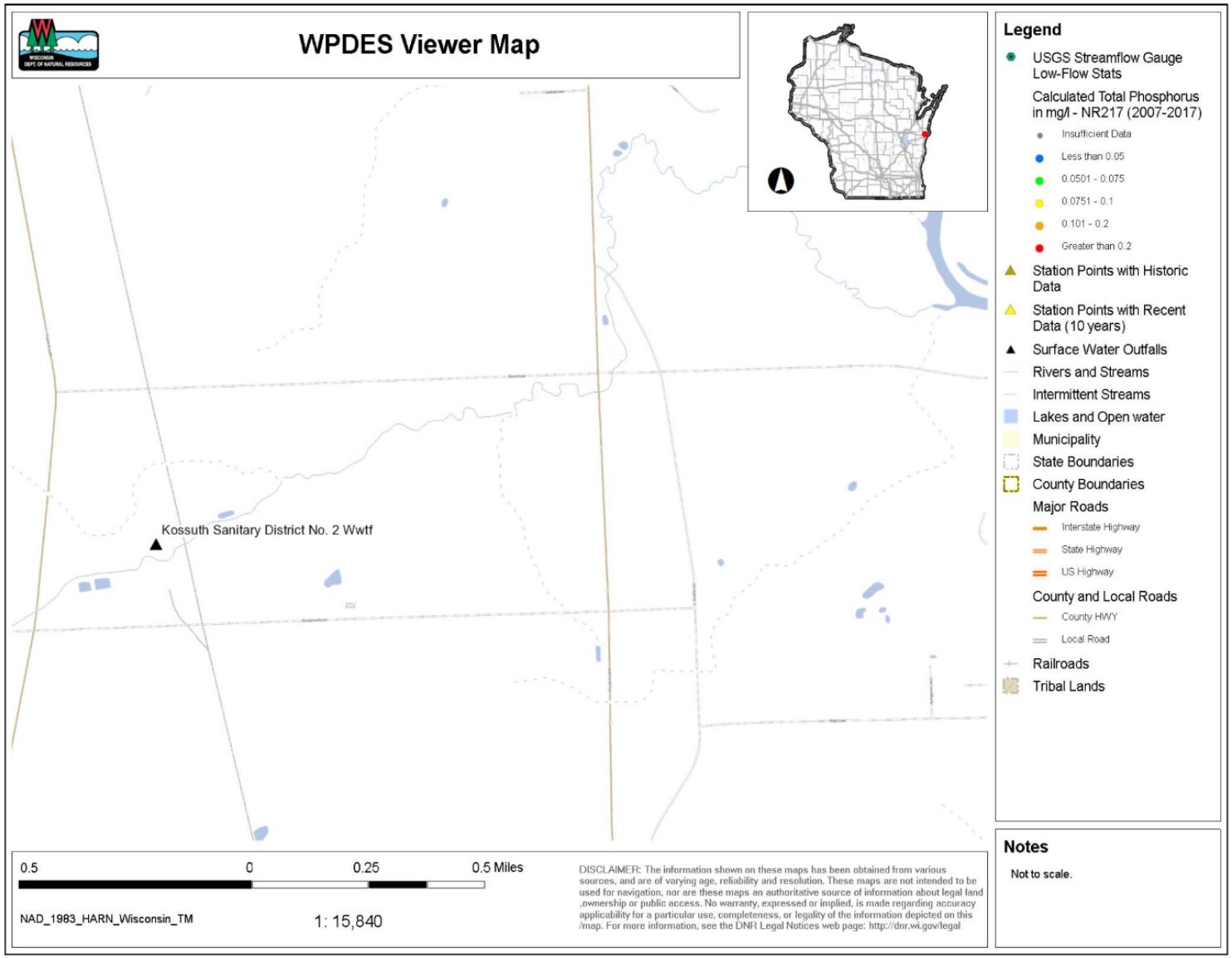
	April – June (fish early life stages {or ELS} present)	**July – Sept. (ELS present)**	**Oct. – Dec. (ELS absent)**	**Jan. – March (ELS absent)**
7Q10 (cfs)	0.16	0.16	0.16	0.16
7Q2 (cfs)	0.27	0.27	0.27	0.27
pH (default)	8.09	8.08	8.06	7.90
Temp (default)	66 F = 19 C	69 F = 21 C	50 F = 10 C	38 F = 3 C
% of streamflow used for mixing	100	100	25	25
Background ammonia (mg/L):	0.04	0.05	0.05	0.16
Ammonia criteria: (mg/L):				
4-day	3.99	3.56	7.45	11.36
30-day	1.60	1.42	2.98	4.54
Ammonia limits:				
Weekly ave. as rounded (mg/L)	**27 > 20, none needed**	**24 > 20, none needed**	**18**	**27**
Monthly ave. as rounded (mg/L)	**14**	**13**	**9**	**14**

Default pH values are new, statewide values were updated in 2010. These could be used to revise the outfall LAL numbers as well but since those limits haven't been exceeded, antidegradation prevents us from increasing those limits. Default temperatures are taken from the thermal rule NR 102 for small warmwater streams (Table 2), highest ambient temperature values from the indicated months are listed above.

The potential concerns are for the shaded cells in the preceding table where the downstream limits are lower than those at the outfall, namely the weekly and monthly average limits for October – December and January - March.

In October – December, the potential downstream concerns are reduced because the seasonal low flows are likely to be greater than the year-round 7Q10 and 7Q2 values of 0.16 and 0.27 cfs, respectively. Unfortunately, seasonal or monthly low flow estimates are not available from USGS. Based on comparison of seasonal-to-yearly low flows for other small streams in the area, it is assumed that the seasonal low flows here are, therefore, greater than the numbers indicated above. In addition, normally 25% of the streamflow is used to calculate limits during colder months, but since this stream segment is at least 1,000 feet distant of the Kossuth outfall, it is assumed that more mixing takes place (greater and more rapid) than what is assumed with 25% of the stream flow, mostly because the tributaries mix over a diffuse area rather than near a relatively small and narrow outfall pipe. Therefore, with more mixing likely than what's assumed here in the default conditions, the actual discharge limits in October – December should be greater than the 18 and 9 mg/L values estimated here. The same situation basically exists for the months of January – March as well. It is therefore assumed that the monthly average limits of 31 mg/L in October – March at the outfall will be protective of the above limits further downstream.

Note that since the West Twin River has the same designated use as the tributary, but the streamflows are higher than in the tributary, ammonia limits for the river tributary are always more protective than in the West Twin, so no further downstream evaluation is needed. Also, with the distance and the streamflows going down to the mouth of the Twin River system as well as the presence of other larger point sources, the limits recommended above are also protective of coldwater community uses in Lake Michigan at Two Rivers.


WPDES Viewer Map
Kossuth Sanitary District No. 2 Wwtf
Legend
USGS Streamflow Gauge Low-Flow Stats
Calculated Total Phosphorus in mg/l - NR217 (2007-2017)
Insufficient Data
Less than 0.05
0.0501 - 0.075
0.0751 - 0.1
0.101 - 0.2
Greater than 0.2
Station Points with Historic Data
Station Points with Recent Data (10 years)
Surface Water Outfalls
Rivers and Streams
Intermittent Streams
Lakes and Open water
Municipality
State Boundaries
County Boundaries
Major Roads
Interstate Highway
State Highway
US Highway
County and Local Roads
County HWY
Local Road
Railroads
Tribal Lands
Notes
Not to scale.
0.5
0
0.25
0.5 Miles
NAD_1983_HARN_Wisconsin_TM
1: 15,840
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