Permit Modification Fact Sheet

Changes from the previous permit fact sheet are highlighted in grey.

General Information

Permit Number:	WI-0063053-04-2	
Permittee Name:	GREATER BAYFIELD WWTP COMMISSION	
Address:	P O Box 1170 125 S. First Street	
City/State/Zip:	Bayfield WI 54814	
Discharge Location:	SE1/4, SE1/4 of Section 22; T50N-R4W (N46°47.406', W090°50.729')	
Receiving Water:	A dry run tributary to Lake Superior within the Bayfield Peninsula Southeast Watershed in the Lake Superior Drainage Basin in Bayfield County.	
StreamFlow ($Q_{7,10}$):	The dry run 0 cfs, downstream impacts for a lake discharge (10:1 dilution) were considered.	
Stream Classification:	The dry run is a limited aquatic life water currently listed in ch. NR 104, Wis. Adm. Code (#16 listed under Pureair). After plunging 250 feet through a steep ravine, the effluent discharges to Lake Superior classified as a cold water community and public drinking water supply.	
Wild Rice Impacts:	No impacts identified. No wild rice waters inventoried near the outfall.	
Design Flow(s)	Annual Average	0.30 MGD
Significant Industrial Loading?	No	
Operator at Proper Grade?	Yes	
Approved Pretreatment Program?	N/A	

Facility Description

The Greater Bayfield Wastewater Treatment Plant Commission (GBWTPC) owns and operates the Greater Bayfield Wastewater Treatment Plant. The plant serves the City of Bayfield and Pikes Bay Sanitary District and is designed to perform at a level which exceeds state and federal standards. Minnesota, Wisconsin, Michigan and Ontario identified Lake Superior as a zero discharge demonstration zone. The GBWTPC has agreed to provide a higher level of treatment to protect the water quality of Lake Superior.

The Greater Bayfield WWTP Commission plant designed to treat 300,000 gallons per day, currently treats an average of 125,000 gallons per day (2018-2022 data). Effluent is discharged year-round. The facility includes a mechanical bar screen followed by an anaerobic tank and oxidation ditches. Organic material in the wastewater is treated aerobically in the oxidation ditches through the activated sludge process. The system is also designed for biological phosphorous removal (BPR) and denitrification. BPR is a process that uses alternating anaerobic and aerobic zones to provide an environment that encourages uptake of phosphorous by specialized microorganisms which are eventually removed with waste activated sludge (WAS). Chemical (alum) addition is also used as needed to ensure compliance with phosphorous limits. The oxidation ditches include mixed anoxic zones to promote denitrification. Final clarifiers allow solids to settle out of the wastewater prior to additional filtration. Cloth disk filtration further polishes the wastewater, allowing the plant to reach its goals of <2mg/L BOD and TSS and further reduce particulate phosphorous concentrations. Effluent is treated

seasonally (May 1st to October 31st annually) by an ultraviolet disinfection system before entering a dry run to Lake Superior.

The majority of settled sludge from the final clarifiers is returned to the beginning of the oxidation ditches as return activated sludge (RAS) and a portion of the sludge is sent to aerobic digesters as WAS. The digested solids are pumped to the Biosolids Native Reed Beds, where natural transpiration through the reeds allows the solids to dry in an energy efficient manner. Sludge management and storage provides for approximately 7 years or more of storage.

Substantial Compliance Determination

Enforcement During Last Permit: All conditions and standard requirements of the current permit are being met.

After a desk top review by Eric de Venecia, WDNR, of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 7/13/2022 this facility has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
701	INFLUENT An average of 0.125 MGD (2018-2022 data)	Representative samples shall be taken at the Preliminary Treatment Building.
001	EFFLUENT An average of 0.120 MGD (2018-2022 data)	All representative samples shall be collected in the Filtration Building except for dissolved oxygen which may be collected at the end of the outfall pipe. The permittee is authorized to discharge to a dry run tributary to Lake Superior within the Bayfield Peninsula Southeast watershed in the Lake Superior drainage basin.
002	SLUDGE – CAKE Sludge was last removed in 2018 when the reed beds were replanted. 91,400 gallons were land applied and 1,270 tons were land filled.	Representative samples shall be taken from the reed beds at various locations and depths that are composited for analysis.
003	SLUDGE – LIQUID This is a new outfall this permit term to be used in the case of emergency.	Representative samples shall be taken after the activated sludge plant and composited for analysis. This outfall was created in the case of an emergency.

1 Influent - Proposed Monitoring

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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Flow sampling frequency changed to reflect electronic reporting standard.

Explanation of Limits and Monitoring Requirements

The parameters are standard for minor municipalities, as are monitoring and frequency requirements for municipal wastewater treatment plant. Tracking of BOD5, and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code.

2 Surface Water - Proposed Monitoring and Limitations

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	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limits and monitoring are effective May through October.
E. coli	% Exceedance	10 #/100 ml	Weekly	Grab	Limits and monitoring are effective May through October. See the "E. coli Percent Limit" section. Enter the result in the DMR

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					on the last day of the month.
Phosphorus, Total	Monthly Avg	1.0 mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.6 mg/L	Weekly	24-Hr Flow Prop Comp	Compliance is evaluated every six-months on April 30 and October 31.
Dissolved Oxygen	Daily Min	4.0 mg/L	3/Week	Grab	
Zinc, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	
Hardness, Total as CaCO3		mg/L	Quarterly	24-Hr Flow Prop Comp	Sampling should coincide with the zinc monitoring.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monthly monitoring is required during the 2026 calendar year.
PFOS		ng/L	Annual	Grab	Monitoring only. See "PFOS/PFOA Minimization Plan Determination of Need" schedule.
PFOA		ng/L	Annual	Grab	Monitoring only. See "PFOS/PFOA Minimization Plan Determination of Need" schedule.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the listed quarters sampling is required in the "Nitrogen Series Monitoring" section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the listed quarters sampling is required in the "Nitrogen Series Monitoring" section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite +Nitrate Nitrogen (mg/L). See the listed quarters sampling is required in the "Nitrogen Series Monitoring" section.

Changes from Previous Permit

- Flow sampling frequency changed to reflect electronic reporting standard.
- **Fecal Coliform** monitoring and limits have been replaced by **Escherichia coli (E. coli)** based on revisions to multiple rules.
- A **Phosphorus** six-month average limit based on Best Available Technology has been added this permit term.
- **Zinc** and **Hardness** monitoring has been included to prepare for the next permit reissuance.
- Monthly **Chloride** monitoring during the 2026 calendar year was included to prepare for the next permit reissuance.
- **PFOS** and **PFOA** ~~monitoring once every two months has been included based on sample results.~~ monitoring frequency has been reduced from 1/ 2 Months to Annual.
- Annual monitoring for the **Nitrogen Series** (nitrate +nitrite, total Kjeldahl nitrogen and total nitrogen) has been added to the permit.

Explanation of Limits and Monitoring Requirements

The monitoring frequency and limits for **Flow**, **BOD5**, **Suspended Solids**, **DO** and **pH** have not changed from the previous permit term. More information on categorical and water quality-based limits (WQBEL) is found in the "Water Quality-Based Effluent Limitations for the Greater Bayfield Wastewater Treatment Plant Commission (WI- 0063053-04-0)" memo dated March 10, 2023.

BOD and **Total Suspended Solids** - Categorical limits for BOD and TSS are required per s. NR 210.05, Wis. Adm. Code.

Fecal Coliform and **E. Coli -** Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits. E. coli limits of 126 #/100 ml as a monthly geometric mean that it may never be exceeded and 410 #/100 ml as a daily maximum may not be exceeded more than 10 percent of the time in any calendar month limits apply.

The following equation should be used to calculate percent exceedances.

$$\frac{\text{\# of Samples greater than 410\#/100}}{\text{Total \# of samples}} \times 100 = \% \text{ Exceedance}$$

Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

pH - Categorical limits for pH are required per ch. NR 210 (Subchapter II) Wis. Adm. Code.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in chs. NR 102 (water quality standards) and NR 217, Wis. Adm. Code (effluent standards and limitations for phosphorus). Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a water quality-based effluent limit (WQBEL) determined by stream criteria and a WQBEL based on a Total Daily Maximum Daily Load (TMDL) allocation.

In the case of Greater Bayfield Wastewater Treatment Plant Commission:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 150 pounds per month (s. NR 217.04(1)(a)1 Wis. Adm. Code). A limit of **1 mg/L monthly average** has been a requirement at the facility over

the previous permit term. Based on anti-backsliding rules (NR 207 Wis. Adm. Code) the limitation remains in effect this permit term.

- For discharges directly to the Great Lakes, s. NR 217.13(4), Wis. Adm. Code, says that the Department shall set effluent limits consistent with nearshore or whole lake models approved by the Department. The studies to complete these models are not finished and it is currently unknown when they will be final. According to phosphorus implementation guidance, an interim limit should be set equal to levels provided by the best readily available treatment technology (BAT). For many types of treatment facilities BAT phosphorus levels to 0.6 mg/L is achievable and makes progress toward phosphorus reductions without the investment of temporary treatment. In the absence of an approved model, an **interim limit of 0.6 mg/L as a six-month average is included**.

  It is unknown if the existing treatment plant can achieve the final water quality based effluent limits once the model results are known. If future modeling shows loading allocations lower than the current discharges are needed to protect water quality, the facility may need to consider other control methods. Upon completion of the nearshore or whole lake model, the Department has the authority to modify the WPDES permit to include established WQBELs.

Dissolved Oxygen - Categorical limits for Dissolved Oxygen in a Limited Aquatic Life (marginal surface waters) are found in ss. NR 104.02(3)(b) and 210.05(3) Wis. Adm. Code.

Zinc and **Hardness –** Based on NR 106 Wis. Adm Code, a zinc effluent limit is not required this permit term. Quarterly monitoring will be used to continue to track concentrations and determine if limits are needed for the next permit reissuance.

Chloride - Based on ch. NR 105 and Subchapter VII of NR 106 Wis. Adm Code, a chloride effluent limit is not required this permit term. Monthly monitoring during the 2026 calendar year will be used to determine if limits are needed for the next permit reissuance.

PFOS and **PFOA** - NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), 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, it was identified that previous PFOS/PFOA sample results were within 1/5 of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Therefore, monitoring once every two months is included. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling.

After a review of the data submitted with the Year 2 Report on Effluent Discharges, the department has determined that it is warranted to reduce the sampling frequency in this case. The department is requiring continued monitoring of these compounds to complete the permit term to ensure that the current effluent quality is maintained. At the next permit reissuance, the department will make another determination as to whether further reduction or removal of monitoring is warranted, based on the continued sampling results.

Nitrogen Series - (nitrate +nitrite, total Kjeldahl nitrogen and total nitrogen) **–** In 2011, the Upper Mississippi River Basin Association (UMRBA) completed the report "Upper Mississippi River Nutrient Monitoring, Occurrence, and Local Impacts: A Clean Water Act Perspective". Among the many recommendations of this report was that the states should expand their NPDES discharge monitoring requirements to include both phosphorus and nitrogen as they have important impacts on the mainstem upper Mississippi River as well as in the Gulf of Mexico. Consequently, the department developed the "Guidance for Total Nitrogen Monitoring in WPDES Permits" document dated October 2019, where annaul effluent monitoring for total nitrogen (total nitrogen = total Kjeldahl + (nitrite+nitrate)) is required for municipal and industrial facilities discharging to surface waters. Section 283.55(1)(e) Wis. Stats. allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and s. NR 200.065 (1)(h) Wis. Adm. Code allows for this monitoring to be collected during the permit term. The schedule for this facility is as follows:

- July – September 2023
- April – June 2024
- January – March 2025
- October – December 2026
- July – September 2027

Testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the requirements for 2027. For example, the next test would be required July – September 2028.

Sampling Frequencies - The "Monitoring Frequencies for Individual Wastewater Permits" guidance document (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 fairness and 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. The department has determined at this time that the facility meets the guidance and no changes in the monitoring frequency is required this permit term.

3 Land Application - Proposed Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
002	B	Cake	Drying with stabilized solids	Aerobic digestion	Land application or Land Fill	Estimate 23 dry tons
003		Liquid				
Does sludge management demonstrate compliance? The facility has followed the reed bed requirements found in the last permit and is currently in compliance.						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No, the most recent set of samples (Oct 2020) were below levels of detection. If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

Sample Point Number: 002- NATIVE REED BED CAKE and 003- SLUDGE PRIOR TO REED BEDS

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Occurrence	Composite	Monitoring is required when land application is planned or occurs in the calendar year. See the "List 2 Analysis" section for more information.
Nitrogen, Ammonium (NH4-N) Total		Percent	Per Occurrence	Composite	Monitoring is required when land application is planned or occurs in the calendar year. See the "List 2 Analysis" section for more information.
Phosphorus, Total		Percent	Per Occurrence	Composite	Monitoring is required when land application is

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					planned or occurs in the calendar year. See the "List 2 Analysis" section for more information.
Phosphorus, Water Extractable		% of Tot P	Per Occurrence	Composite	Monitoring is required when land application is planned or occurs in the calendar year. See the "List 2 Analysis" section for more information.
Potassium, Total Recoverable		Percent	Per Occurrence	Composite	Monitoring is required when land application is planned or occurs in the calendar year. See the "List 2 Analysis" section for more information.

Changes from Previous Permit:

- List 1 (Metals) monitoring is required during the second full year of the permit term (2025).
- It is recommended that List 2 (Nutrients) monitoring occur with the List 1 monitoring.
- Due to changes within the land application forms, the 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") will need to be submitted each year.
- In 2018 the facility replaced the non-native *Phragmites australis australis* in the Biosolids Reed Beds with the native *Phragmites australis americanus*.

Explanation of Limits and Monitoring Requirements

The facility is not expected to remove sludge during the permit term. Because sludge is not expected to be removed PCB monitoring is not required. Sampling for solids and metals is required during the (2025) calendar year. Requirements for land application of municipal sludge are determined in accordance with ch. NR 204 Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5) Wis. Adm. Code.

List 2 Nutrient monitoring – Monitoring for list 2 (nutrients) is highly recommended at the same time as the monitoring of List 1 (metals) in year 2 of the permit (2025). Results will assist in the determination of the acres needed for land application of sludge should it be necessary. The number of acres needed is also required for the Sludge Management Schedule (see schedules for more information).

PCB monitoring – PCB monitoring is not required this permit term but will be included in the next reissuance. The facility stated in their application they don't have plans to remove sludge during the permit term, there are no potential industrial sources and a review of historic PCB data was well below high quality and ceiling limitations. s. NR 204.07, Wis. Adm. Code.

Change in form submittal – In prior permit reissuances when it has been noted in the application that sludge would not be removed during the permit term, the department required sampling during the second year of the permit term and the sludge characteristic report (3400-049) would be generated only during that year. Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") will now be generated by the department and the permittee will be required to

submit all three reports each year of the permit term. This change was adopted to provide the permittee flexibility because many lagoon desludging projects can be unexpected, are delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section.

Sludge analysis during the second year of the permit term has been included. There are check boxes available on the electronic forms to identify if desludging didn't occur.

- Sludge characteristics report (3400-049) – at the top of the form check "yes" or "no" in the box identifying if any land application occurred that year. Complete the form if required or identify the year samples will be or have been taken in the comments section.
- 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") - The reports are technically 2 separate forms that are now combined in one location but separated onto two different tabs. If you answer "No" to both listed questions the forms are complete. If you need to answer "Yes" to either question the corresponding form tabs will go from gray to blue indicting information can be entered on the report.

Reed Bed Requirements - This facility utilizes a reed bed system for biosolids treatment, dewatering and storage. In 2018 the permittee replaced the non-native, invasive reed grass *Phragmites australis australis* with the native species *Phragmites australis americanus.* The non-native variety of Phragmites is highly invasive in natural wetland habitats if the seeds or rhizomes escape to the environment but NR 40 Wis. Adm. Code specifically allows this use of non-native species for biosolids treatment.

There are approximately 20 facilities in Wisconsin that use the reed bed biosolids treatment option. In the eastern portion of the state, the invasive form of Phragmites is widespread in roadside ditches and wetlands. In the northern and western parts of the state, it is less common and more of a concern to natural wetland plant communities. Because of this, the GBWTPC worked toward finding a better solution.

The recommendations from the last permit have been carried forward into the current permit. The department is reviewing requirements for facilities that convert to or initially plant the native variety phragmites species (australis americanus). However, this review is not expected to be completed for several months. Once the review is complete and if the requirements and recommendations have changed, the permittee may request a waiver from some or all of the reed bed requirements through a written request submitted to their compliance engineer.

4 Schedules

4.1 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	08/31/2024
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	06/30/2025

The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	

4.2 Reed Bed Phragmites Survey

An annual survey of adjacent lands for phragmites is required. See section 3.2.1 of the permit for additional details.

Required Action	Due Date
Submit an Annual Phragmites Survey: Survey the treatment plant site and adjacent lands for new non-native Phragmites (Phragmites australis australis) and native (Phragmites australis americanus) growth. Surveys should be done when Phragmites are actively growing. The surveys shall contain The name and qualifications of the person(s) completing the inspection; survey date; maps and descriptions of the area(s) inspected (land use(s), dominant plant community, and geo-spatial locations of existing or newly native and non-native Phragmites stands); follow-up inspection of any infestations discovered in previous surveys; follow-up inspection of any locations in the survey area where eradication efforts were conducted by the permittee in past years; Photographic documentation of the survey area(s) is also recommended. The survey area should be expanded by an additional 1-mile radius from any infestations discovered outside of facility boundaries, up to an outside radius of 6 miles from the wastewater treatment plant site. It should also include any areas where past eradication efforts occurred.	10/31/2023
Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2024
Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2025
Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2026
Annual Phragmites Survey: Report results of the survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	10/31/2027

Annual Phragmites Survey: Continue to report results of the final survey to your department wastewater compliance engineer by October 31st or within 60 days of survey completion, whichever is sooner. NOTE: Department notification is required within 24 hours whenever new growths of non-native Phragmites are discovered.	

4.3 Sludge Management Plan

Required Action	Due Date
Submit a Sludge Management Plan: The permittee shall submit an update to the management plan for approval. The plan shall demonstrate compliance with ch. NR 204, Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3)How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites, site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any pretreatment processes Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. No desludging may occur unless approval from the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due at least 60 days prior to desludging.	

Explanation of Schedules

PFOS/PFOA Minimization Plan Determination of Need - As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the Department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

Due to an error in coding of the discharge monitoring reports by the department, PFOS and PFOA monitoring was not included on a July – August shortform discharge monitoring report. This has been corrected.

In the first action it is expected that 12 representative results have been submitted. That is the limit required to request a reduction in monitoring. The end date of the first action was extended two months so that 12 samples can be collected.

Reed Bed Phragmites Survey - The beds were planted with the non-native reed grass *Phragmites australis australis*, which can be highly invasive in natural wetland habitats if the seeds or rhizomes escape to the natural environment. A Compliance Schedule has been included requiring an annual survey of the wastewater treatment facility and surrounding area. See the Reed Bed Requirements found in section 3 of the permit for more information.

Sludge Management Plan – With the changes to the reed beds an updated management plan is needed to show compliance with ch NR 204, Wis. Adm. Code by clearly explaining how the sludge will be safely removed, what contingencies are in place, the type of equipment that will be used and how the sludge will be land applied to ensure the proper precautions are in place to prevent any negative impacts to surface water or groundwater.

There are outlines available to assist in plan development.

Attachments:

~~Water Flow Schematic(s)~~

PFOS and PFOA Water Quality-Based Effluent Limitations for the Great Bayfield Wastewater Treatment Plant Commission -WPDES Permit No. (WI-0063053) in Bayfield County, by Amy Garbe, PE, Wastewater Engineer, dated July 11, 2025

Proposed Expiration Date:

June 30, 2028

Justification Of Any Waivers From Permit Application Requirements

N/A

Prepared By:

Sheri A. Snowbank Wastewater Specialist

Date: March 28, 2023

Date updated based on Factcheck comments: May 8, 2023 (the phosphorus optimization schedule has been removed)

Date updated based on public notice comments: June 19, 2023 – N/A

Modification (WI-0063053-04-1) Prepared By: Sheri A. Snowbank, Wastewater Specialist

Date: September 15, 2023

Modification (WI-0063053-04-2) Prepared By: Sarah Donoughe, Wastewater Specialist-Adv

Date Revised: July 11, 2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: July 11, 2025

TO: Sarah Donoughe – NER

FROM: Kari Fleming – WY/3

SUBJECT: PFOS and PFOA Water Quality-Based Effluent Limitations for the Greater Bayfield Wastewater Treatment Plant Commission -WPDES Permit No. (WI-0063053) in Bayfield County

This is in response to your request for an evaluation of the need for PFOS and PFOA limitations for the Greater Bayfield Wastewater Treatment Plant Commission. This municipal wastewater treatment facility (WWTF) discharges to a dry run tributary to Lake Superior, located in the Bayfield Peninsula Southeast Watershed in the Lake Superior Basin.

The current permit, effective since October 2023, has monitoring only for PFOS and PFOA. The following review is based on new regulations which are now in effect throughout the state of Wisconsin and recommendations are made in accordance with chapters NR 102, 104, 105, 106, 207, and 217 of the Wisconsin Administrative Code, where applicable.

Receiving Water Information

- Name: Dry run tributary to Lake Superior (approx. 400 ft downstream of Outfall 001)
- Classification:
  - Dry run tributary: Limited aquatic life (LAL) community, non-public water supply. (Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.)
  - Lake Superior: Cold Water (CW) community, public water supply, and outstanding resource water (ORW)
- Flow: Low flows for dry run tributary are zero. A ten-to-one dilution ratio will be used for calculating effluent limitations for Lake Superior based on chronic or long-term impacts, in accordance with s. NR 106.06(4)(b)2, Wis. Adm. Code, because Lake Superior does not exhibit a unidirectional flow at the point where it confluences with the dry run tributary.
- % of Flow used to calculate limits: 0%

Effluent Information

- Flow: Average Design Flow = 0.30 MGD (million gallons per day)
  For reference, the actual average flow from January 2023 to May 2025 was 0.118 MGD.
- Effluent characterization: This facility is categorized as a minor municipality.

The following table lists the statistics for effluent PFOS and PFOA levels from September 2023 through May 2025.

	PFOS ng/L	PFOA ng/L
1-day P_{99}	8.14	16.22
4-day P_{99}	5.73	11.46
30-day P_{99}	4.47	8.97

Mean	3.85	7.73
Std	1.38	2.74
Sample Size	12	12
Range	2.3-6.6	4.0-10

Water Quality Based Limit – PFOS and PFOA

Administrative rules for PFOS and PFOA took effect on August 1, 2022. These rule revisions include additions to ch. NR 102 (s. NR 102.05), Wis. Adm. Code, which establish PFOS and PFOA standards for surface waters. Revisions to ch. NR 106 (s. NR 106, Subchapter VIII), Wis. Adm. Code establish procedures for determining water quality based effluent limits for PFOS and PFOA, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

PFOS

Due to PFOS being a bioaccumulating compound of concern (BCC), no mixing zone is allowed pursuant to s. NR 106.98(4), Wis. Adm. Code. Therefore, the effluent limit for PFOS is set equal to criterion (8 ng/L).

PFOA

The conservation of mass equation is described in s. NR 106.06(4)(b)1. Wis. Adm. Code, and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream PFOA concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-f\ Qe)\ (Cs)]/Qe$$

Where:

WQC = 95 ng/L for the dry run tributary
Qs = 0% of the harmonic mean pursuant s. NR 106.06(4)(c)10., Wis. Adm. Code = 0 cfs
Cs = background concentration of PFOA in the receiving water pursuant to s. NR 106.06(4)(e), Wis. Adm. Code
Qe = effluent flow rate = 2.18 MGD = 3.37 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

After substituting the appropriate variables, the calculated PFOA limit for the dry run is 95 ng/L.

Due to the dry run tributary discharging to Lake Superior 400 ft downstream and being a public water supply, a calculation of the PFOA limit based upon Lake Superior is also warranted. The conservation of mass equation is described in s. NR 106.06(4)(b)1. Wis. Adm. Code, and includes variables of water quality criterion (WQC) and upstream PFOA concentrations (Cs) provided below.

$$\text{Limitation} = 11(WQC) - 10(Cs)$$

Where:

WQC = 20 ng/L for Lake Superior
Cs = background concentration of PFOA in the receiving water pursuant to s. NR 106.06(4)(e), Wis. Adm. Code

After substituting the appropriate variables, the calculated PFOA limit for Lake Superior is 220 ng/L.

The PFOA limitation calculated based upon the dry run tributary is most protective and would apply in this situation.

Reasonable Potential Determination
In accordance with s. NR 106.98(4)(a), Wis. Adm. Code, **, the discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS** because the 30-day P99 of reported effluent PFOS data is less than the calculated WQBEL (8 ng/L). Therefore, **a WQBEL is not required.**

The discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOA because the 30-day P_{99} of reported effluent PFOA data is less than the calculated WQBEL (95 ng/L). Therefore, **a WQBEL is not required.**

Conclusions
The discharge has no reasonable potential to cause or contribute to an exceedance of the water quality criterion for PFOS nor PFOA. Therefore, no WQBELs are required.

Pursuant to s. NR 205.066, Wis. Adm. Code, the department may specify the monitoring frequency for PFOS and PFOA on a case-by-case basis after the initial 24 months of sampling. **After a review of the available data, the department has determined that it is warranted to reduce the sampling frequency in this case to annually**.

If there are any questions or comments on these recommendations, please contact Amy Garbe by telephone at (608) 716-9968 or by email at Amy.Garbe@wisconsin.gov.

Attachments (2) – P99 Calculations

PREPARED BY: Digitally signed by Amy Garbe, P.E. Date: 2025.07.11 10:30:59 -05'00' date: __07/11/2025____
Amy Garbe, P.E., Wastewater Engineer

cc: Eric DeVencia, Basin Engineer – NOR/Superior
Nate Willis, P.E., PFAS Implementation Coordinator – CO

EFFLUENT VARIABILITY ANALYSIS -					
=	=	=	=	=	
SUBSTANCE:					
NUMBER OF VALUES:	------				Data Summary
TOTAL	12				Sep-23 3.15
DETECTED	12				Nov-23 2.8
NON-DETECTED					Jan-24 2.6
					Mar-24 2.3
d	0				May-24 3.2
					Jul-24 4.5
m	3.845833				Sep-24 6.6
					Oct-24 5.4
mean of all data	3.845833				Nov-24 5.7
					Feb-25 3.3
s	1.382267				Apr-25 2.9
					May-25 3.7
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n	1	4	30		
d^n	0	0	0		
p	0.99	0.99	0.99		
Z_p	2.326785	2.326785	2.326785		
1+(s/m)^2	1.129182	1.129182	1.129182		
(sigma_d)^2	0.121494	0.121494	0.121494		
mu_d	1.286243	1.286243	1.286243		
(sigma_dn)^2	0.121494	0.031785	0.004297		
mu_dn	1.286243	1.331098	1.344842		
P_99 exponent	2.097267	1.745925	1.497363		
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P_99	8.14	5.73	4.47		
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EFFLUENT VARIABILITY ANALYSIS -					
=	=	=	=	=	
SUBSTANCE:					
NUMBER OF VALUES:	------				Data Summary
TOTAL	12				Sep-23 9.08
DETECTED	12				Nov-23 5.13
NON-DETECTED	0				Jan-24 7.8
					Mar-24 7.9
d	0				May-24 14
					Jul-24 9.4
m	7.734167				Sep-24 10
					Oct-24 8.1
mean of all data	7.734167				Nov-24 6.6
					Feb-25 4.9
s	2.73953				Apr-25 5.9
					May-25 4
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n	1	4	30		
d^n	0	0	0		
p	0.99	0.99	0.99		
Z_p	2.326785	2.326785	2.326785		
1+(s/m)^2	1.125466	1.125466	1.125466		
(sigma_d)^2	0.118197	0.118197	0.118197		
mu_d	1.986549	1.986549	1.986549		
(sigma_dn)^2	0.118197	0.030885	0.004173		
mu_dn	1.986549	2.030205	2.043561		
P_99 exponent	2.786493	2.439115	2.193877		
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P_99	16.22	11.46	8.97		
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