

Permit Fact Sheet

General Information

Permit Number:	WI-0044334-09-0
Permittee Name:	IRON RIVER NATIONAL FISH HATCHERY
Address:	10325 Fairview Rd
City/State/Zip:	Iron River WI 54847
Discharge Location:	NW¼, NW¼ of section 15; T48N-R8W. 100 yards upstream from Weidenaar Road
Receiving Water:	Schacte Creek (WBIC 2873700) in Bayfield County within the Iron River Watershed and Lake Superior Drainage Basin
StreamFlow (Q _{7,10}):	8.82 cfs
Stream Classification:	Class 1 trout stream, Outstanding Resource Water (ORW), non-public water supply and within the ceded territory
Wild Rice Impacts: <i>(no specified wild rice standards exist at this time)</i>	No impacts identified. The conclusion of no impact is based on no wild rice waters inventoried on the surface water. (Evaluation completed March 2017).
Discharge Type:	Existing continuous discharger

Facility Description

The U.S. Fish and Wildlife Service owns and operates the Iron River National Fish Hatchery. The hatchery's primary purpose is to produce lake and coaster brook trout for restoration purposes in the Great Lakes watershed. The hatchery located in Iron River raises approximately 100,000 pounds of stocking size fish.

Water for the hatchery is obtained through Schacte Creek (an average of 4,000 gallons per minute) at four draw-off points then diverted through the broodstock and production raceways and indoor nursery tanks. Water leaving the raceways and tanks is treated in two settling lagoons (operated in parallel) prior to discharge back to Schacte Creek. The stream flow originating from headwater springs and bogs is not dependent on precipitation in the drainage area providing a constant volume of water regardless of the season.

Schacte Creek is classified as a Class 1 trout stream and as such the discharges are required to meet water quality standards specified in Wisconsin Administrative Code NR 102.02(3). The stream is also classified as an Outstanding Resource Water (ORW) under NR 102. As an ORW, Schacte Creek is subject to antidegradation rules under Wisconsin Administrative Code NR 207.

Substantial Compliance Determination

All conditions and standard requirements of the current permit are being met. There was one late report due to changes in staffing, but not a chronic issue.

After a desk top review by Eric de Venecia, WDNR, of all discharge monitoring reports, land application reports, compliance schedule items and follow up actions from previous (2018) compliance inspection, and a site visit on 6/29/2023 the Iron River National Fish Hatchery has been found to be in substantial compliance with their current permit.

Compliance determination entered by Eric de Venecia on July 6, 2023.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
001	EFFLUENT An average of 4.84 MGD (2019-2023 data)	Discharges from Outfall 001 shall be limited to the effluent from the settling basins. Representative samples shall be collected at the effluent monitoring building prior to discharge to Schacte Creek within the Iron River watershed and Lake Superior drainage basin.
002	SLUDGE 950 cubic yards was last removed in 2021.	Annual monitoring is required during years that solids are removed from the settling ponds and rearing areas. All removed solids shall be managed in accordance with Wis. Admin. Code NR 214 and the approved land application management plan.
003	LIQUID WASTE Waste has not been land applied.	Wastewater collected from miscellaneous equipment cleaning performed in the disinfection bay is discharged via the floor drain and stored in an underground tank. This is removed as needed and hauled to a local permitted wastewater facility for treatment or land applied. All removed wastewater shall be managed in accordance with Wis. Admin. Code NR 214 and the approved land application management plan.

1 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT SCHACTE CREEK

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Monthly	Estimated	
BOD5, Total	Weekly Avg	10.4 mg/L	Quarterly	24-Hr Comp	Limit in effect May through September.
BOD5, Total	Weekly Avg	8.8 mg/L	Quarterly	24-Hr Comp	Limit in effect October through April.
BOD5, Total	Weekly Avg	490 lbs/day	Quarterly	Calculated	Limit in effect May through September.
BOD5, Total	Weekly Avg	420 lbs/day	Quarterly	Calculated	Limit in effect October through April.
Suspended Solids, Total		mg/L	Quarterly	24-Hr Comp	
Settleable Solids		mg/L	Quarterly	24-Hr Comp	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Quarterly	24-Hr Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
pH Field	Daily Max	9.0 su	Quarterly	Grab	
pH Field	Daily Min	6.0 su	Quarterly	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	Quarterly	Grab	Limit in effect May through September.
Dissolved Oxygen	Daily Min	7.0 mg/L	Quarterly	Grab	Limit in effect October through April.
Phosphorus, Total	Rolling 12 Month Avg	1.0 mg/L	Monthly	24-Hr Comp	Measuring compliance with the limit will begin July 2025.
Halogen, Total Residual as Cl ₂	Daily Max	19 ug/L	Quarterly	Grab	Monitoring and limit is required only during periods of halogen use. Halogens include the additives chloramine-T, iodine, sodium hypochlorite, and sodium thiosulfate. See section 2.1.3.1 "Additives" in the permit.
Halogen, Total Residual as Cl ₂	Weekly Avg	7.3 ug/L	Quarterly	Grab	Monitoring and limit is required only during periods of halogen use. Halogens include the additives chloramine-T, iodine, sodium hypochlorite, and sodium thiosulfate. See section 2.1.3.1 "Additives" in the permit.
Halogen, Total Residual as Cl ₂	Monthly Avg	7.3 ug/L	Quarterly	Grab	Monitoring and limit is required only during periods of halogen use. Halogens include the additives chloramine-T, iodine, sodium hypochlorite, and sodium thiosulfate. See section 2.1.3.1 "Additives" in the permit.
Chloride	Daily Max	2.2 mg/L	Quarterly	Grab	Monitoring and limit is required only during periods of salt use, except if the use restriction is adhered to. See section 2.1.3.1 "Additives" in the permit.
Additive - Hydrogen Peroxide	Daily Max	0.214 mg/L	Quarterly	Grab	Monitoring and limit is required only during periods of hydrogen peroxide use, except if the use restriction is adhered to. See section 2.1.3.1 "Additives" in the permit.
Additive -	Weekly Avg	0.047 mg/L	Quarterly	Grab	Monitoring and limit is required

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Hydrogen Peroxide					only during periods of hydrogen peroxide use, except if the use restriction is adhered to. See section 2.1.3.1 "Additives" in the permit.
Additive - Formalin	Daily Max	1.7 mg/L	Quarterly	Grab	Monitoring and limit is required only during periods of formalin (Parasite-S) use, except if the use restriction is adhered to. See section 2.1.3.1 "Additives" in the permit.
Additive - Formalin	Weekly Avg	0.094 mg/L	Quarterly	Grab	Monitoring and limit is required only during periods of formalin (Parasite-S) use, except if the use restriction is adhered to. See section 2.1.3.1 "Additives" in the permit.
Temperature		deg F	Monthly	Continuous	Monthly monitoring is required during the 2027 calendar year.
Chronic WET		TUc	Annual	24-Hr Comp	Chronic WET testing is required annually through the permit term. See the "WET Testing" section for more information below or in the permit.

Changes from Previous Permit

Effluent limitations and monitoring requirements were re-evaluated for the proposed 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.

- During previous terms, the permits for permitted hatcheries were formatted to follow ss. 283.31(5m) Wis. Stats which emphasized best management practices. This involved changing technology-based limits (TBELs) into narrative limits embedded into best management language. This change led to a great deal of confusion among permittees. It was decided all limits (TBEL and Water Quality Based Effluent Limits (WQBEL)) will be shown in one location, the parameter table. Additive use restrictions will remain in the Best Management Section of the permit. Best Management practices will still be emphasized when determining compliance.
- The **flow** sample frequency was changed from quarterly to monthly.
- **Phosphorus** now has a 12-month rolling average limit of 1 mg/L
- The WQBEL limits for the additives **halogen**, **peroxide** and **formalin** have changed.
- **Temperature** monitoring is required monthly during the 2027 calendar year.
- **Annual Chronic Whole Effluent Toxicity (WET)** tests are required during additive use.

Explanation of Limits and Monitoring Requirements

More information on categorical and water quality-based limits (WQBEL) is found in the “Water Quality-Based Effluent Limitations for the Iron River National Fish Hatchery (WI-0044334)” memo dated February 22, 2024.

Flow – The sampling frequency was changed from quarterly to monthly to better assist with calculating mass limits and the phosphorus rolling average limit. The sample type of “continuous” has also been updated to “estimated”. Estimated better catches the method used to calculate the flow rate.

BOD5, DO, Total Suspended Solids, Settable Solids and pH – Previously, limits were listed as narrative limits in the Best Management Plan Requirements section of the permit. These limits were returned to the effluent parameter table in Section 1.2.1 of the permit for consistency and clarity. Monitoring frequency and limits remain the same as the last permit term. Compliance with limits is controlled through practices identified in the Best Management Plan.

Ammonia - Using current acute and chronic ammonia toxicity criteria found in Tables 2C and 4B of NR 105 Wis. Adm. Code and limit calculating procedures (Subchapter IV of 106, Wis. Adm. Code ammonia limitations were calculated for the facility. Limits are not required this permit term because effluent ammonia concentrations are significantly less than any calculated limit. It has been determined that there is not a reasonable potential for ammonia to create toxic conditions in the receiving water.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in 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 the Iron River National Fish Hatchery:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 60 pounds per month (NR 217 Wis. Adm. Code). The limit memo determined that the facility discharges more than the threshold; therefore, **the TBEL of 1.0 mg/L as a 12-month rolling average is applicable this permit term.**

Your eDMR will automatically calculate the rolling twelve-month average for you by:

Determine the pounds of phosphorus for a month by multiplying the average of all the concentration values for phosphorus (in mg/L) for that month by the total flow for the month in Million Gallons times the conversion factor of 8.34.

Then, the monthly pounds of phosphorus are summed for the most recent 12 months and inserted into the numerator of the following equation.

$$\text{Average concentration of P in mg/L} = \frac{\text{Total lbs of P discharged (most recent 12 months)}}{\text{Total flow in MG (most recent 12 months)} \times 8.34}$$

A calculated value more than the limit, 1 mg/L, will be considered a violation of a monthly average.

- Based on the size and classification of the stream, the categorical water quality criterion for the Schacte Creek is 100 ug/L. This criterion and instream background phosphorus data are used to calculate the stream criteria-based WQBELs. The calculated WQBELs are .10 mg/L (monthly average). The 30-day p99 value (0.05 mg/L) is lower than the calculated WQBEL, therefore it has been determined that there is not a reasonable potential for phosphorus to create toxic conditions in the receiving water. A water quality-based limit for phosphorus is not required.
- The facility does not lie within the boundaries of any approved total maximum daily load (TMDL) area, thus a phosphorus WQBEL based on a TMDL allocation is likewise not required during this permit term.

Additives – Halogens – Monitoring and the limitation for halogens including Chloramine-T, Iodine, Sodium Hypochlorite and Sodium Thiosulfate are required during periods of use. *Salt (sodium chloride), Hydrogen Peroxide and Formalin (formaldehyde)* - Monitoring and limits are required if the use restrictions are not followed. More information on additives can be found in section 2.1.3.1 of the permit and 2.1.1 of this document.

Temperature - Requirements for temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. Effluent thermal limits were calculated using the administrative rules for thermal discharges. The calculated thermal limits for Schacte Creek indicate variable daily maximum temperature limit and weekly average limits based on the month. Analysis of effluent data from the facility show limits are not required this permit term. Monthly monitoring is required during 2027 to provide data for the next permit reissuance.

WET Testing - 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. (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>).

Based on historical WET test data and reasonable potential factor (RPF) calculations WET tests are required this permit term, but limits are not needed. A WET Checklist was prepared to determine the number of WET tests that are needed. As toxicity potential increases, more points accumulate, and more monitoring is required to assure toxicity is not occurring over the short (acute) and long (chronic) term. Based on the total points accumulated and Chapter 1.3 of the WET Guidance Document annual chronic WET Tests are required this permit term during periods of additive use.

PFOS and PFOA – NR 106 Subchapter VIII – 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.

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.

2 Best Management Plan Requirements

Effluent Limitations Guidelines – Concentrated Aquatic Animal Production

On June 30, 2004, the U.S. Environmental Protection Agency (USEPA) completed regulations under the Clean Water Act establishing effluent limitations guidelines (ELGs), and new source performance standards for the concentrated aquatic animal production (CAAP) point source category. The ELGs require management practices and record-keeping activities, rather than numerical discharge limitations. The ELGs were promulgated on August 23, 2004 in 40 CFR 451.

The requirements in 40 CFR 451.11 can be found in the USEPA Compliance Guide for the Concentrated Aquatic Animal Production Point Source Category. http://water.epa.gov/scitech/wastetech/guide/aquaculture/guidance_index.cfm

2017 Wisconsin Act 21 was enacted on June 23, 2017. Section 24 of 2017 Wisconsin Act 21 modified 283.31 (5m) Wis. Stats. to read:

283.31 (5m) The department shall include the requirements of [40 CFR 451.11](#) in permits issued under this section for concentrated aquatic animal production facilities described in [40 CFR 451.10](#). The department may not include additional conditions in a permit for a fish farm except as necessary for the farm to meet the applicable limitations, standards, and other provisions described in sub. (3) (a) to (f). Any conditions included in a permit issued under this section for a fish farm, shall be limited to site-specific best management practices to the greatest extent allowed under federal law.
<http://docs.legis.wisconsin.gov/statutes/statutes/283>

40 CFR 451.10 applies to the discharge of pollutants from a CAAP facility that produces 20,000 pounds or more per year of aquatic animals in a flow-through or recirculating system. The Iron River National Fish Hatchery discharges exceeds the production and feeding thresholds. The proposed permit includes the requirements in 40 CFR 451.1.

2.1 Best Management Practices Requirements

A Best Management Practices (BMP) Plan is a description of the standard operating procedures and actions required to maintain or improve effluent quality, control solids, store materials, maintain the aquatic animal containment structures, perform recordkeeping, train employees, closely monitoring feeding, collect and dispose of waste, address the transport or harvest discharge of aquatic animals, and remove dead aquatic animals.

- A BMP Plan shall be developed and submitted to the Department for approval by January 31, 2025 (See the Schedules section herein); and
- Annual reports documenting the implementation of BMPs and any additional BMPs that will be implemented in the following year shall be submitted to the Department by January 31st of each year.
- The concentrated aquatic animal production (CAAP) effluent limitations guidelines (ELGs) and associated BMP plan ([Compliance Guide for the Concentrated Aquatic Animal Production Point Source Category - 2006 \(epa.gov\)](#)) will maintain performance levels retaining effluent quality.

2.1.1 Additive Use

The requested additives listed below were evaluated by the department for use by the facility. Additives may be changed during the term of the permit following procedures in the 'Additives' subsection of the Standard Requirements and sections 2.1.3.1 and 2.1.3.2 of the permit. All additive use is to be recorded on a log that shall be kept onsite and made available upon request. If any other additives are needed, written authorization from the wastewater program basin engineer is needed prior to use.

- **Chloride** (*Sodium Chloride, aka Salt*) - Salt is used as a fish therapeutic. Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 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 chloride. A daily maximum limit of 2.2 mg/L is effective if the use restriction of 150 pounds per day is not followed. Compliance is shown through quarterly monitoring during periods of sodium chloride use.
- **Hydrogen Peroxide** (*Arkema Hydrogen Peroxide 35%*) – This is a microbicide that aids in the control of fungus during the egg stage and after fin clipping. Using secondary acute toxicity test data from department records an acute limitation of 0.214 mg/L (214 ug/L) daily maximum limit and 0.047 mg/L (47 ug/L) weekly average limit is necessary to protect water quality. Compliance may be shown by quarterly monitoring with the daily maximum limit enforced during periods of hydrogen peroxide use or a use restriction of 0.042 gal/day per million gallons per day (MGD) of effluent flow must be follow.

Monitoring for hydrogen peroxide may be completed using test strips with a limit of detection (LOD) below 0.2 mg/L. If there is detection above the limit, a second more sensitive titration-based test is required to confirm if an exceedance has occurred. The permittee may also develop a hydrogen peroxide standard operating procedure that

includes best management practices that can be used to consistently meet the WQBEL limit. Contact your department compliance staff for further assistance. Upon completion, this permit may be modified to adjust monitoring and/or reporting requirements. (See *Hydrogen peroxide use in WPDES permitted hatcheries handout for more information*)

- **Formalin (Parasite-S)** - This is a microbicide that aids in the control of fungus during the egg stage and after fin clipping. Using secondary acute toxicity test data from department records an acute limitation of 1.7 mg/L (1,700 ug/L) daily maximum and 0.094 mg/L (94 ug/L) weekly average limit is necessary to protect water quality. Compliance may be shown by quarterly monitoring with the daily maximum limit enforced during periods of formalin use or a use restriction of 0.087 gallons per day per million gallons of effluent flow. Either approach may be used.

The use restriction is conservative to cover all flow situations, measuring compliance using the daily maximum limit allows for the highest use allowable. Finding a laboratory that can perform a formalin/formaldehyde test (EPA Method 1667) may prove difficult. The use restriction is more limiting but would eliminate the cost of the tests and staff time needed to perform the monitoring.

- **Halogens** – A daily maximum limit of 19 ug/L and 7.3 ug/L weekly average and monthly average limits are required during periods when any chlorine/halogen based additives are used in the process waste stream.
 - *Chloramine-T (Halmid Aqua)* is used as a biocide and therapeutant. The permittee shall follow the product label instructions for authorization and dosage.
 - *Ovadine (Iodine)* is used as an egg disinfectant to control bacteria. The permittee shall follow the product label instructions for authorization and dosage.
 - *Sodium hypochlorite (chlorine)* is used for truck and equipment disinfection. The permittee shall follow product label instructions for authorization and dosage.
 - *Sodium thiosulfate* is used to neutralize chlorine. The permittee shall follow product label instructions for authorization and dosage.
- **Diquat (REWARD)** – A biocide/therapeutant has a use restriction of 10 mg/L static tank concentration at a maximum volume of 21,600 L (12 – 1,800 L tanks) at a frequency of 3 times per week.
- **Additives not approved** - Use of *Terramycin 200 (Oxytetracycline)* (antibiotic), *Syncaine (Tricaine Methanesulfonate)* (anesthetic), copper sulfate (biocide), peracetic acid (biocide) and Florfenicol (Aquaflor) (antibiotic) was requested but toxicity information from the manufacture was unavailable, therefore the use of the additives is denied. If the facility wishes to continue to use these additives additional information or testing is needed.

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

Sample Point Number: 002- Settling Pond Solids

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Grab	
Nitrogen, Total Kjeldahl		Percent	Annual	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Ammonium (NH4-N) Total		mg/kg	Annual	Grab	
Chloride		Percent	Annual	Grab	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab	
Phosphorus, Total		Percent	Annual	Grab	
Potassium, Total Recoverable		mg/kg	Annual	Grab	
pH Field		su	Annual	Grab	
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

Effluent limitations and monitoring requirements were re-evaluated for the proposed 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.

- The sample frequencies for the parameters have been changed from “once” to “annual”.
- 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.

Explanation of Limits and Monitoring Requirements

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code. All land spreading must follow the Land Application Management plan.

Sample Frequency – Removal of solids is not expected during the upcoming permit term. The previous frequency of “Once” is not accurate for this situation. A maximum of one set of samples per year is required only prior to solids removal. If there are multiple years of solids removal during the permit term, only one set of PFOA+PFOS samples is required.

Change in form submittal –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,

delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of solids has occurred, and annual submittal of the forms is required per the standard requirements section.

There are check boxes available on the electronic forms to identify if removal 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 indicating information can be entered on the report.

Sample Point Number: 003- Landsread Liquid

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Grab	
Nitrogen, Total Kjeldahl		mg/L	Annual	Grab	
Chloride		mg/L	Annual	Grab	
Phosphorus, Total		mg/L	Annual	Grab	
Phosphorus, Water Extractable		% of Tot P	Annual	Grab	

Changes from Previous Permit:

Effluent limitations and monitoring requirements were re-evaluated for the proposed 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.

- The monitoring requirements for this sample point have been included in the permit but are only applicable if waste is land applied.

Explanation of Limits and Monitoring Requirements

This sample point is limited to land spreading of waste from the underground holding tank. The main contributor of the waste stream is equipment wash water. When the wastewater is removed from the underground holding tank, it is hauled to a local permitted wastewater facility for treatment as described in the BMP. Land application of this waste stream would require an update to the land application management plan then department approval before being performed.

Requirements for land application of industrial sludge are determined in accordance with ch. NR 214 Wis. Adm. Code. All land spreading must follow the Land Application Management plan.

Please see the “Explanation of Limits and Monitoring Requirements” for sample point 002 for more information.

4 Schedules

4.1 Best Management Practices (BMP) Plan

Required Action	Due Date
Submit Updated BMP Plan: Submit an updated BMP plan describing the standard operating procedures and actions required to maintain or improve effluent quality, control solids, store materials, maintain the aquatic animal containment structures, perform recordkeeping, train employees, closely monitoring feeding, collect and dispose of waste, address the transport or harvest discharge of aquatic animals, and remove dead aquatic animals.	01/31/2025
Annual Update: Document the implementation of BMPs and any additional BMPs that will be implemented in the following year.	01/31/2026
Annual Update: Document the implementation of BMPs and any additional BMPs that will be implemented in the following year.	01/31/2027
Annual Update: Document the implementation of BMPs and any additional BMPs that will be implemented in the following year.	01/31/2028
Annual Update: Document the implementation of BMPs and any additional BMPs that will be implemented in the following year. In the event that this permit is not reissued by the date the permit expires, the permittee shall continue to submit annual updates by January 31st.	01/31/2029

4.2 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with Wisconsin Administrative Code NR 214.	01/31/2025

Explanation of Schedules

Best Management Practices (BMP) Plan - A plan describing the standard operating procedures and actions outlined in the EPA CAAP compliance guide (<https://www.epa.gov/eg/concentrated-aquatic-animal-production-compliance-guide-and-reporting-forms>) is required to be submitted.

Land Application Management Plan - Any solids that are removed shall follow ch NR 214 Wis. Adm. Code. Any changes to the Land Application Management Plan shall be identified.

Other Comments:

The facility is situated between Schacte and Middle Creeks, both of which are classified as Class I Outstanding Resource Waters. An intake structure was installed on Middle Creek in 1980, but intake from or discharge to this creek is not authorized in this permit. Based on criteria in 40 CFR 122.24(c) a discharge to Middle Creek would need a permit. This would include an antidegradation review and the discharge would need to meet background levels to be permitted.

Attachments:

Water Flow Schematic(s)

“Water Quality-Based Effluent Limitations for the Iron River National Fish Hatchery (WI-0044334)” memo dated February 22, 2024

Hydrogen peroxide use in WPDES permitted hatcheries handout

Expiration Date:

March 31, 2029

Justification Of Any Waivers From Permit Application Requirements

The sampling of metals was waived. Hatcheries are considered a secondary industry, but representative data from other CAAP facilities show their processes don't include the addition of any substance that would introduce detectable metals into the wastewater.

Prepared By: Sheri A. Snowbank Wastewater Specialist

Date: April 3, 2024

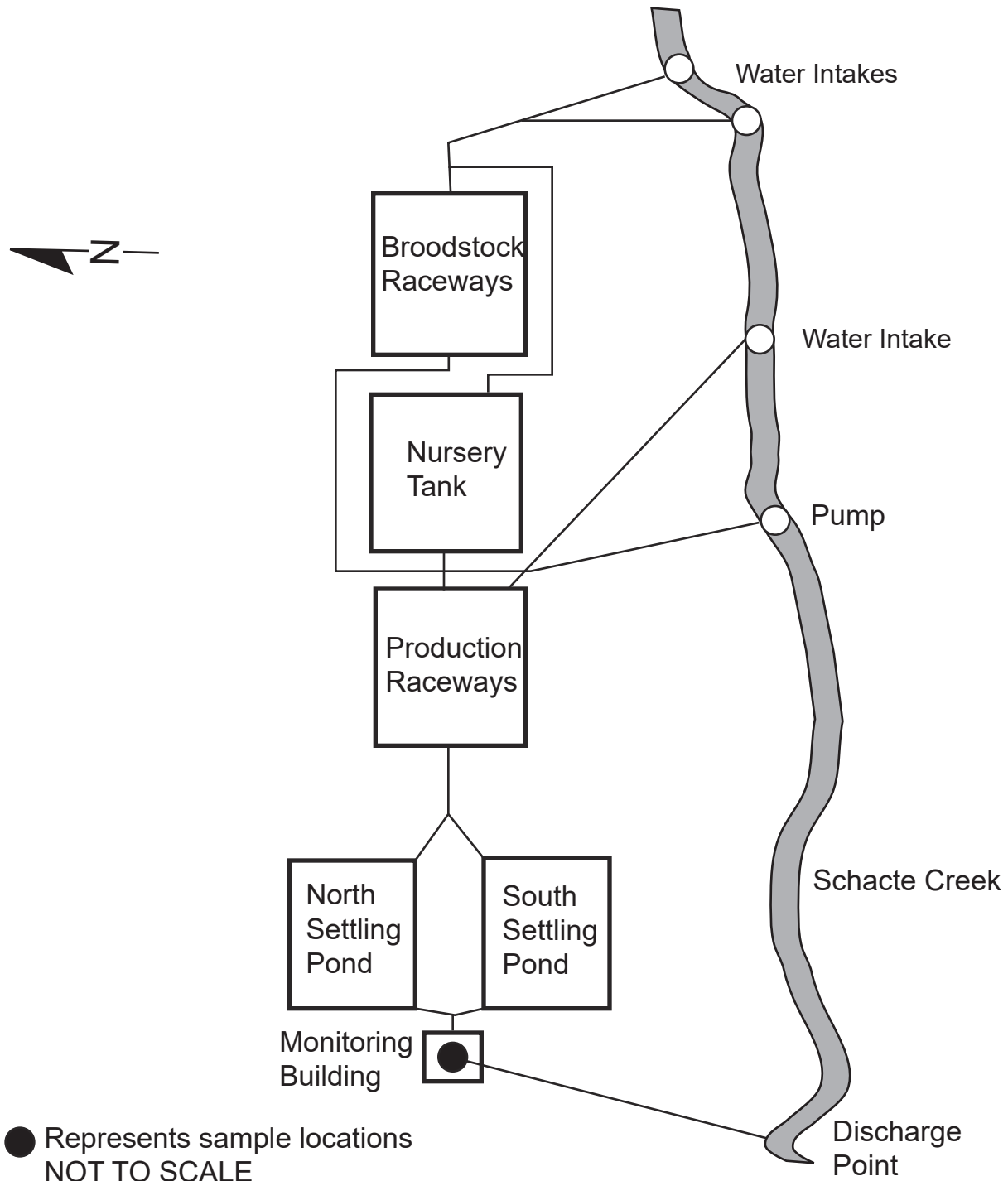
Date updated based on Factcheck comments: No comments received (5/14/24) Due to issues with publishing the public notice the effective date of the permit has changed to August 1, 2024. The expiration date stays the same.

Date updated based on public notice comments:

Notice of reissuance was published in the Superior Telegram, 1226 Ogden Ave., Superior, WI 54880-1584.

Iron River National Fish Hatchery Schacte Creek Flow Diagram

The US Fish and Wildlife Service operates a lake trout hatchery north of Iron River. Water is taken from Schacte Creek and used in the raceways and rearing tanks. The water is treated in two settling basins (operated in parallel) before being returned to the creek. The discharge rate for this facility is 5.7 MGD. The diagram below shows the treatment units and sampling locations.




CORRESPONDENCE/MEMORANDUM

DATE: February 22, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center



SUBJECT: Water Quality-Based Effluent Limitations for the Iron River National Fish Hatchery
 WPDES Permit No. WI-0044334-09-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Iron River National Fish Hatchery in Bayfield County. This secondary industrial facility discharges to Schacte Creek, located in the Iron River Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	12-month Rolling Average	Footnotes
Flow Rate						1
BOD ₅ May – September October – April			10.4 mg/L 490 lbs/day 8.8 mg/L 420 lbs/day			2, 3
TSS						2, 3
Settleable Solids						2, 3
pH	9.0 s.u.	6.0 s.u.				2, 3
Dissolved Oxygen May – September October – April		6.0 mg/L 7.0 mg/L				2, 3
Phosphorus					1.0 mg/L	4
Halogens (Total Residual)	19 µg/L		7.3 µg/L	7.3 µg/L		5, 6
Chloride	2.2 mg/L 150 lbs/day					2
Additive – Parasite-S (Formalin)	1,700 µg/L or use restriction		94 µg/L or use restriction			7
Additive – Hydrogen Peroxide (35%)	0.214 mg/L		47 µg/L or use restriction			2, 8
Additive – REWARD Landscape and Aquatic (Diquat)						9
Florfenicol (Aquaflor)						10

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	12-month Rolling Average	Footnotes
Additive – Syncaïne (Tricaine-S/MS-222/Tricaine Methanesulfonate)						10
Additive – Terramycin 200 Fish (Oxytetracycline Hydrochloride)						10
Additive – Copper Sulfate						10
Additive – Peracetic Acid						10
Ammonia Nitrogen						2
Temperature						11
Chronic WET						12

Footnotes:

1. Monitor whenever the discharge occurs.
2. No changes from the current permit.
3. Limits associated with these parameters are maintained by the Best Management Practices (BMP) Plan for the facility.
4. This is a technology-based limit as described in subch. II of Chapter NR 217, Wis. Adm. Code.
5. These limits are required to control the discharge of the chloramine-T, iodine, sodium hypochlorite, and sodium thiosulfate additives.
6. 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.
7. If the Iron River FH wants to use Parasite-S (Formalin) in the process waste stream of Outfall 001, the daily maximum limit of 1,700 µg/L and the weekly average limit of 94 µg/L would be required. If there is not a reliable analytical method to measure the concentration of the additive in the effluent, an equivalent use restriction of 0.087 gal/day per MGD of effluent flow can be used instead.
8. If the Iron River FH wants to use hydrogen peroxide in the process waste stream of Outfall 001, the weekly average limit of 47 µg/L would be required. If there is not a reliable analytical method to measure the concentration of the additive in the effluent, an equivalent use restriction of 0.042 gal/day per MGD of effluent flow can be used instead.
9. This additive may continue to be used at the same dosage during the reissued permit term at Outfall 001. This dosage/use restriction is an 18 mg/L static tank concentration at a maximum volume of 21,600 L (12 – 1,800 L tanks) at a frequency of 3x/wk.
10. These additives are denied use in the process waste stream of Outfall 001 because the acute or chronic toxicity data available in section 12 of the chemical manufacturer’s MSDS does not meet the minimum toxicity information requirements to calculate any potential limits or use restrictions to control the discharge of this additive.
11. Monthly monitoring for 1 year is recommended during the reissued permit term to have updated temperature data to determine the need for temperature limits at the next permit reissuance.
12. Annual chronic WET tests are recommended during the reissued permit term. The Instream Waste Concentration (IWC) to assess chronic test results is 100%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic

testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Schacte Creek upstream of the confluence of Outfall 001 or any intakes. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done during the quarter of highest additive use and should continue after the permit expiration date (until the permit is reissued).

If Iron River FH 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 should be continued in the reissued permit.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, discharge area map, & thermal table.

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**Water Quality-Based Effluent Limitations for
Iron River National Fish Hatchery**

WPDES Permit No. WI-0044334-09-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

The U.S. Fish and Wildlife Service owns and operates a lake and brook trout hatchery at Iron River, Wisconsin. Approximately 100,000 pounds of stocking size fish are raised at this facility each year and then are used to enhance trout populations in the Great Lakes. Water for the hatchery is obtained through Schacte Creek and a private well. Over 99% of the facilities water is taken from Schacte Creek (an average of 4,000 gal/min) at four draw-off points then diverted through the brood stock and production raceways and indoor nursery tanks. The stream flow originating from headwater springs and bogs is not dependent on precipitation in the drainage area providing a fairly constant volume of water regardless of the season. Water leaving the raceways and tanks is treated in two settling lagoons operated in parallel. Effluent is discharged on a continuous basis via Outfall 001 to Schacte Creek.

Attachment #2 is a discharge area map of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 12/31/2023, includes the following effluent limitations and monitoring requirements. All limits for parameters are included in the “Best Management Practices and Reporting” section of the current permit and not from the “Surface Water Requirements” section.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Footnotes
Flow Rate				1
BOD ₅ May – September			10.4 mg/L 490 lbs/day	2
October – April			8.8 mg/L 420 lbs/day	
pH	9.0 s.u.	6.0 s.u.		2, 3
Dissolved Oxygen May – September		6.0 mg/L		2
October – April		7.0 mg/L		
Halogens (Total Residual)	38 µg/L			4, 5
Sodium Chloride	2.2 mg/L			4
Hydrogen Peroxide 35%	0.214 mg/L			4
Formalin	2.1 mg/L			4

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Footnotes
MS-222	0.03 mg/L			4
Oxytetracycline Hydrochloride	5 lbs/day			4
Aquaflor	33 mg/L		0.57 mg/L	4
Copper Sulfate 25.4%				4
TSS				1, 2
Settleable Solids				1, 2
Ammonia Nitrogen				1
Phosphorus				1
Temperature				1
Acute WET				6
Chronic WET				6

Footnotes:

1. Monitoring only.
2. Limits and monitoring associated with these parameters are included in the Best Management Practices (BMP) Plan as described in 40 CFR 451.11 and ss. 283.13(2) and 283.31(3)(d)2, Wis. Stats, for the facility.
3. These limits are required to control the discharge of peracetic acid additive.
4. These additives were approved, with limits (shown) or use restrictions, using the provisions previously found under s. NR 106.10, Wis. Adm. Code. This code has been updated in 2015 and no longer applies to these previously approved additives. The need for any limits or use restrictions for these additives are reevaluated in this evaluation.
5. This limit is required to control the discharge of chloramine-T and iodine additives.
6. Two acute and chronic whole effluent toxicity (WET) tests were required during the current permit. The IWC for chronic WET was 88%.

Receiving Water Information

- Name: Schacte Creek
- Waterbody Identification Code (WBIC): 2873700
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Cold Water (CW) community, Class 1 Trout Water, Outstanding Resource Water (ORW), 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.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values were used historically in Iron River FH’s permit for Outfall 001’s location.
 $7-Q_{10} = 8.82$ cubic feet per second (cfs)
 $7-Q_2 = 13.2$ cfs
- Hardness = 66 mg/L as CaCO₃. This value represents the geometric mean of data (n = 2, April 2020 – November 2022) from WET testing.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: The previous limit evaluation (September 2018) utilized 100% mixing of the receiving water flow for limit calculations based on the facility’s near 100% intake of the Schacte Creek’s low flow for their

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water supply and discharge. Due to the lack of a mixing zone study or other information supporting this level of mixing, the 100% mixing will not be utilized in this evaluation, and the default 25% mixing will take its place in limit calculations. If the facility is interested in an alternate mixing percentage contact with the Department should be made to discuss a mixing zone study plan.

- Source of background concentration data: Chloride data from the Bark River is used for this evaluation because there is no data available for the Schacte Creek. The Bark River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables in Part 2 below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen and phosphorus are described later in this evaluation.
- Multiple dischargers: None.
- Impaired water status: There are no known impacts to the Schacte Creek. Lake Superior is on the Clean Water Act Section 303(d) list for mercury, polychlorinated biphenols (PCBs), and perfluorooctane sulfonic acid (PFOS) contamination in fish tissue. These pollutants do not impact the WQBELs due to the concerned concentrations being limited to the fish tissue.

Effluent Information

- Flow rate(s):
 - Peak daily = 6.18 million gallons per day (MGD)
 - For reference, the actual average flow from January 2019 – October 2023 was 4.80 MGD excluding days discharge did not occur. A peak daily flow is used for limit calculation instead of a maximum annual average flow due to the limited effluent flow dataset.
- Hardness = 65 mg/L as CaCO₃. This value represents the geometric mean of data (n = 6, April 2020 – November 2022) from WET testing.
- 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 supply: Schacte Creek intakes (4,000 gal/min = 5.76 MGD), private well (45 gal/min), and Middle Creek intake (2,000 gal/min). The Middle Creek intake was not used during the current permit term and does not plan to be used during the reissued permit term.
- Fraction of the effluent flow withdrawn from receiving water (“f” as described in s. NR 106.06, Wis. Adm. Code): A “f” value will be used for applicable limit calculations because the Iron River FH intakes water from the same surface water of which Outfall 001 discharges. Therefore, an “f” value of $100 \times \frac{5.76 \text{ MGD}}{6.18 \text{ MGD}} = 93\%$ will be utilized in this evaluation.
- Additives: Iron River FH utilizes 13 additives in the process waste stream for Outfall 001 from the permit application and the provided additive information. These additives are listed below:
 - o Sodium Chloride (salt) – Therapeutant/stress relief
 - o Syndel Halmid Aqua (Chloramine-T) – Biocide/therapeutant
 - o Syndel Syncaine (Tricaine-S (MS-222)/ Tricaine Methanesulfonate) – Anesthetic
 - o Syndel Parasite-S (Formalin) – Fungicide/paracide
 - o Arkema Hydrogen Peroxide – Biocide/paracide/therapeutant
 - o Western Chemical – Ovadine (Iodine) – Biocide/disinfectant
 - o Phibro Terramycin 200 Fish (Oxytetracycline Hydrochloride) – Biocide/fish marking
 - o Sodium Hypochlorite (bleach) – Disinfectant
 - o Sodium Thiosulfate – Dechlorination
 - o Copper Sulfate – Biocide

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- o Western Chemical Paracitic Acid – Biocide
- o Thermo Fisher Scientific Chemicals Florfenicol (Aquaflor) – Antibiotic
- o Syngenta Crop REWARD Landscape and Aquatic (Diquat) – Biocide/therapeutant
- o D-256 (Vedco) – Disinfectant for offsite gear such as distribution trucks from other facilities in a disinfectant bay. The runoff is collected in a holding tank, pumped by a contracted waste hauler, and disposed offsite in a treatment plant. This additive is not present in Outfall 001 but is included here for informational purposes.
- o The need for any limits or use restrictions for these additives are reevaluated in Part 8 of this evaluation.
- Effluent characterization: This facility is categorized as a concentrated aquatic animal production (CAAP) facility and has received instructions in the application notification letter that exempt it from standard monitoring requirements, except zinc. The permit required monitoring for ammonia nitrogen and phosphorus during the current permit term.
- 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.
- Additional effluent phosphorus samples (n = 2, November 2018 – December 2018) are utilized to better determine the need for phosphorus limits during the reissued permit term.

**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 P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

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

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

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Q_e = 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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Iron River FH and the limits are set based on the 1-Q₁₀ method.

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 = 7.06 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day MAX. CONC.
Chlorine		19.0		19			
Zinc	65	82		82	16	8	8
Chloride (mg/L)		757	2.67	757	151	2	2

* Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q₁₀ 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 = 2.21 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Chlorine		7.28		7.3		
Zinc	66	84		84	17	8
Chloride (mg/L)		395	2.67	395	19	2

Monthly Average Limits based on Wildlife Criteria (WC)

The effluent characterization did not include any effluent sampling results for substances for which WC exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)

The effluent characterization did not include any effluent sampling results for substances for which HTC exist.

Monthly Average Limits based on Human Cancer Criteria (HCC)

The effluent characterization did not include any effluent sampling results for substances for which HCC exist. 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 recommended for total halogens**. Monitoring recommendations are made in the paragraphs below:

Halogens (Total Residual) – The current permit has the daily maximum total residual halogen limit of 38 µg/L as a daily maximum and was originally implemented to control the discharge of the chloramine-T and iodine additives. Total Halogens WQBELs are typically used to control the discharge of any additives that are chlorine-based, halogen-based, or any additives that remove them from the discharge. Subsequently, they will also control the discharge of sodium hypochlorite and sodium thiosulfate. Because chlorine/halogens are added in the process waste stream of Outfall 001, effluent limitations are recommended to assure proper operation of the de-chlorination system. **Therefore, the daily maximum limit of 19 µg/L and the weekly average limit of 7.3 µg/L are recommended during the reissued permit term. The monthly average limit of 7.3 µg/L is required during the reissued permit term to satisfy the expression of limits requirements as described in s. NR 106.07, Wis. Adm. Code. The existing use restriction of 2.5 lbs/MGD of effluent flow and 15 lbs/day may be removed during the reissued permit term.**

Chloride – Considering available effluent data from the current permit term (April 2023), the mean effluent concentration is 2.0 mg/L. This effluent concentration is below the calculated chloride WQBELs; **therefore, limits or monitoring are not recommended during the reissued permit term.**

The current permit has the daily maximum limits of 2.2 mg/L and 150 lbs/day. **These limits are recommended to continue during the reissued permit term unless the antidegradation and antibacksliding requirements of ch. NR 207, Wis. Adm. Code, are satisfied.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. **Based on the type of discharge, PFOS and PFOA monitoring is not recommended during the reissued permit term.** 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 – LIMITATIONS FOR BOD₅, TSS, PH, & DO

Title 40 CFR Part 451 applies to dischargers from CAAP facilities as described in 40 CFR Part 122.24 and appendix C of 40 CFR Part 122. Because the Iron River National Fish Hatchery produces more than 20,000 lbs/yr of cold water aquatic fish species and feeds 5,000 lbs/month or more food via a flow-through system, the effluent limit guidelines (ELGs) as described in subpart A of 40 CFR Part 451 for a flow-through/recirculating system are applicable. The applicable ELGs are best management practices (BMPs) to be implemented at the facility and meet effluent limits based on best practicable control technology achievable, best available technology economically achievable, best conventional technology, and new source performance standards. This BMP plan pursuant to 40 CFR 451.11 and ss. 283.13(2) and 283.31(3)(d)2, Wis. Stats, is implemented in the current permit.

Iron River Nation Fish Hatchery has the prior stated requirements in the current permit for the submittal, approval, and annual implementation of the BMP plan which should describe actions the facility will take to meet applicable limits for BOD₅, DO, TSS, and pH:

Conventional Pollutants Limits

Parameter	Daily Maximum	Daily Minimum	Weekly Average
BOD ₅ May – September			10.4 mg/L 490 lbs/day
October – April			8.8 mg/L 420 lbs/day
pH	9.0 s.u.	6.0 s.u.	
Dissolved Oxygen May – September		6.0 mg/L	
October – April		7.0 mg/L	

BOD₅ & DO

There are no ELGs based on BOD₅ specific to CAAP facilities so only BOD₅ WQBELs based on the protection of the Schacte Creek water quality are applicable. The concentration based BOD₅ limits of 5.0 mg/L during May – October and 10 mg/L during November – April are the most stringent BOD₅ limits given to any facility per Department policy. Mass BOD₅ limits are typically not given during any time period the minimum BOD₅ limits are implemented. In addition, a daily minimum DO limit of 7.0 mg/L would be needed when the minimum BOD₅ limits are implemented.

BOD₅ samples (n = 20, January 2019 – October 2023) for Outfall 001 range between nondetectable to 2 mg/L with a limit of detection of <2 mg/L. Based on this effluent data, **the current BOD₅ and DO limits are required to continue in the permit. The mass BOD₅ limits are also required to remain in the permit unless the limit continuation and antibacksliding requirements in sections NR 205.067(5), and NR 207.12, Wis. Adm. Code, are satisfied.**

Total Suspended Solids (TSS)

Total suspended solids (TSS) effluent limits are regulated via narrative standards described in NR 102.04(1), Wis. Adm. Code. TSS effluent limits are included whenever BOD₅ WQBELs are needed and are set equal to the BOD₅ limits but no lower than 10 mg/L per Department policy. Because BOD₅ WQBELs are implemented in the current permit, the weekly average TSS limits would be recommended. However, the BMP plan includes components designed to minimize the discharge of solids and other pollutants in addition to these TSS limits. **Therefore, TSS limits are not recommended during the reissued permit term.**

WQBELs related to pH recommended to continue during the reissued permit term because they are related to the Schacte Creek water quality. Any BMP requirements related to the prior stated substances should be implemented in addition to any limits.

**PART 4 – 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. Given the fact that the Iron River FH does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time. The table below shows the results of effluent ammonia nitrogen sampling at Outfall 001 during April 2019 – October 2023

Ammonia Nitrogen Effluent Data

Sample Date	Conc. (mg/L)
01/15/2019	<0.1
04/02/2019	0.2
07/09/2019	<0.1
10/08/2019	0.1
01/07/2020	<0.1
04/28/2020	<0.1
08/18/2020	<0.1
10/06/2020	0.1
01/26/2021	<0.1
04/20/2021	<0.1
07/13/2021	0.1
10/19/2021	<0.1
01/19/2022	0.1
04/12/2022	<0.1
07/20/2022	0.3
10/11/2022	0.5
01/24/2023	0.1
04/04/2023	0.1
07/11/2023	0.2
10/24/2023	0.3
1-day P ₉₉	0.6
4-day P ₉₉	0.3
30-day P ₉₉	0.2
Mean*	0.1
Std	0.13
Sample size	20
Range	<0.1 - 0.5

* Nondetectable values (<) are treated as zero in the average calculation.

Based on this effluent data, there is no reasonable potential for the discharge to exceed the most stringent ammonia nitrogen limits that would be calculated. **Therefore, ammonia nitrogen limits are not recommended during the reissued permit term. Monitoring is recommended to continue during the reissued permit term to determine the need for ammonia nitrogen limits at the next permit reissuance.**

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires industrial facilities that discharge greater than 60 pounds of total phosphorus per month to comply with a 12-month rolling average limit of 1.0 mg/L, or an approved alternative concentration limit.

The current permit does not have a technology-based limit but the limit was effective in the previous permit issuance # 07. In this case the limit was inadvertently removed during drafting of the current permit issuance # 08. **Therefore, the 12-month rolling average limit of 1.0 mg/L is required to be reimplemented during the reissued permit term.**

Water Quality-Based Effluent Limits (WQBEL)

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Schacte Creek.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

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

Where:

WQC = 0.075 mg/L for Schacte Creek.

Qs = 100% of the 7-Q₂ of 13.2 cfs

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate = 6.18 MGD = 9.56 cfs

f = the fraction of effluent withdrawn from the receiving water = 0.93

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

The previous limit evaluation (September 2018) resulted in a WQBEL of 0.11 mg/L using a background concentration of 0.030 mg/L. This value is an estimate of the background phosphorus concentration based on the median phosphorus concentration (n = 4, June 2012 – September 2013) of the East Fork Iron River (SWIMS ID: 10038132) 110 ft downstream of Airport Rd Bridge. Section NR 217.13(2)(d), Wis. Adm.

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Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System database shows there is no updated background phosphorus data for Schacte Creek upstream of Outfall 001 or for the East Fork Iron River. Therefore, the previous background concentration of 0.030 mg/L will be utilized in this evaluation. Substituting this value into the limit calculation equation above, the calculated limit is 0.10 mg/L.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from January 2019 – October 2023.

Total Phosphorus Effluent Data

Sample Date	Conc. (mg/L)
11/27/2018	0.06
12/11/2018	0.05
01/15/2019	0.05
04/02/2019	0.08
07/09/2019	<0.05
10/08/2019	0.05
01/07/2020	0.07
04/28/2020	<0.05
08/18/2020	<0.05
10/06/2020	<0.05
01/26/2021	0.07
04/20/2021	<0.05
07/13/2021	<0.05
10/19/2021	<0.05
01/19/2022	<0.05
04/12/2022	0.1
07/20/2022	0.08
10/11/2022	<0.05
01/24/2023	0.06
04/04/2023	0.09
07/11/2023	<0.05
10/24/2023	<0.05
1-day P ₉₉	0.11
4-day P ₉₉	0.09
30-day P ₉₉	0.05
Mean*	0.035
Std	0.02
Sample size	22
Range	<0.05 – 0.1

* Nondetectable values (<) are treated as zero in the average calculation.

Reasonable Potential Determination

The discharge does not have reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is less than the calculated WQBEL. **Therefore, a phosphorus WQBEL is not recommended during the reissued permit term. Phosphorus monitoring is recommended to continue during the reissued permit term to determine compliance with the phosphorus technology-based limit and to determine the need for a phosphorus WQBEL at the next permit reissuance.**

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 2019 – October 2023. There are multiple months effluent flow was not monitored because the current permit only required quarterly monitoring. Therefore, the maximum 7-day rolling average and daily maximum effluent flows for these months will be set equal to the overall average and daily maximum effluent flows of 4.80 and 6.18 MGD respectively.

During previous permit terms the facility had the daily maximum temperature limits of 60 °F during May – September and 50 °F during October – April. These limits were not based on water quality criteria but were developed through inter-agency negotiations taking effect prior to 1993. The intent of these limits was to restrict the hydraulic residence time of supply waters within the hatchery to avoid significant temperature changes in the return water discharged to Schacte Creek. These limits were removed from the current permit because the facility consistently met the limits and strived through the BMP plan to maintain thermal quality. Removal of an effective limit from a permit is subject to any applicable antibacksliding and antidegradation requirements in ch. NR 207, Wis. Adm. Code. In this case the Iron River FH does not have any treatment or pollutant control measures that directly affect the temperature of their discharge, so the level or loading of temperature is not expected to change if the prior stated limits are effective in the permit or not. Therefore, the facility is not considered a new or increased discharge as described in s. NR 207.02, Wis. Adm. Code, so antidegradation is not applicable. In addition these limits were removed from the facility's permit before the state implemented antibacksliding regulations in April 2018. Therefore, ch. NR 207, Wis. Adm. Code, does not need to be addressed at this time.

Effluent temperature monitoring was not required during the current permit term so data from the previous permit term (April 2013 – December 2018) is utilized to determine the need for temperature WQBELs. The table below summarizes those maximum temperatures along with the calculated limits.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	42	43	47	68
FEB	42	43	47	68
MAR	43	44	51	69
APR	47	48	57	70
MAY	50	52	63	72
JUN	53	57	67	72
JUL	52	55	67	73
AUG	52	54	65	73
SEP	50	55	60	72
OCT	48	49	53	70
NOV	46	47	48	69
DEC	44	45	47	69

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The complete temperature limit calculation table is included as attachment #3. **Based on this analysis, temperature limits are not recommended during the reissued permit term. Monthly monitoring for 1 year is recommended during the reissued permit term to have updated temperature data to determine the need for temperature limits at the next permit reissuance.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (2022)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (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 IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 100% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 6.18 MGD = 9.56 cfs.

f = fraction of the Q_e withdrawn from the receiving water = 0.93

Q_s = $\frac{1}{4}$ of the 7- Q_{10} = 8.82 cfs \div 4 = 2.21 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. Significant changes were made to WET test methods in 2004

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and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, WET tests conducted from June 2005 to present are shown in the table below:

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
08/16/2005	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/16/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/16/2010	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/10/2010	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/07/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/28/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
11/28/2022	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

- 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.

$$\text{Acute Reasonable Potential} = [(TUa \text{ effluent}) (B)(AMZ)]$$

$$\text{Chronic Reasonable Potential} = [(TUc \text{ effluent}) (B)(IWC)]$$

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 LC₅₀, IC₂₅ or IC₅₀ ≥ 100%).

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

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

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

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WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not applicable. 0 Points	IWC = 100%. 15 Points
Historical Data	Seven tests used to calculate RP. No tests failed. 0 Points	Seven tests used to calculate RP. No tests failed. 0 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as acute. 0 Points
Receiving Water Classification	ORW. 15 Points	Same as acute. 15 Points
Chemical-Specific Data	No reasonable potential for limits for based on ATC; chloride detected. No additional compounds of concern. 1 Point	No reasonable potential for limits for based on CTC; chloride detected. No additional compounds of concern. 1 Point
Additives	10 biocides and 3 water quality conditioners added. Permittee has proper P chemical SOPs in place: Not in use. 20 Points	All additives except 3 biocides used more than once per 4 days. 20 Points
Discharge Category	Fish hatchery. 0 Points	Same as acute. 0 Points
Wastewater Treatment	Primary treatment only. 8 Points	Same as acute. 8 Points
Downstream Impacts	No impacts known. 0 Points	Same as acute. 0 Points
Total Checklist Points:	44 Points	59 Points
Recommended Monitoring Frequency (from Checklist):	Annual acute tests recommended.	2x annual chronic tests recommended.
Limit Required?	No.	No.
TRE Recommended? (from Checklist)	No.	No.

- The WET Checklist completed in SWAMP (and summarized above) recommends annual acute tests and 2x annual chronic tests during the reissued permit term. Those recommendations are driven primarily by the IWC, the ORW classification of the receiving water, the number of additives used, and partial lack of wastewater treatment. The number of WET tests recommended during the reissued permit term have been adjusted accordingly based on the following reason(s):
 - The effluent characterization of fish hatchery discharges are typically not complex or high strength and traditional wastewater treatment is not typically necessary.
 - The facility listed a total of 13 additives that have the potential to be present in Outfall 001. The dosage and/or use frequency of multiple additives are controlled by total halogen WQBELs or WQBELs/use restrictions based on secondary values from toxicity data for additive-specific use. The monthly use of some additives appear to be distributed over the calendar year or used on an as needed basis. Some additives requested for use in the facility have not been needed to be used such as copper sulfate, peracetic acid, and diquat.

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- WET history shows a lack of effluent toxicity during the current permit term for Outfall 001 and during previous terms when similar additive use was occurring.
- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **1x annual chronic WET tests are recommended in the reissued permit.** Tests should be done during quarters of highest additive use. WET testing should continue after the permit expiration date (until the permit is reissued).

PART 8 – ADDITIVE REVIEW

Unlike the metals and toxic substances evaluated in Part 2, most additives have not undergone the amount of toxicity testing needed to calculate water quality criteria. Instead, in cases where the minimum data requirements necessary to calculate a WQC are not met, a secondary value can be used to regulate the substance, according to s. NR 105.05, Wis. Adm. Code. Whenever an additive is discharged directly into a surface water without receiving treatment or an additive is used in the treatment process and is not expected to be removed before discharge, a review of the additive is needed. Secondary values should be derived according to s. NR 105.05, Wis. Adm. Code. Guidance related to conducting an additive review can be found in *Water Quality Review Procedures for Additives* (2019) (<http://dnr.wi.gov/topic/wastewater/Guidance.html>).

All additives listed (except diquat) have existing limits and/or use restrictions approved using the provisions previously found under s. NR 106.10, Wis. Adm. Code. This code has been updated in 2015 and no longer applies to these previously approved additives. Therefore, the need for any limits or use restrictions for these additives will be reevaluated for the reissued permit term.

Additive Parameters

Additive Name	Manufacturer	Purpose of Additive including where added	Use Frequency (days/wk)	Max Quantity Used	Equivalent Effluent Conc. (mg/L)	Potential Use Restriction (mg/L unless noted otherwise) ¹
Sodium Chloride ¹	Multiple	Therapeutant/stress relief	5	150 lbs/day	NA	Chloride WQBEL
Halmid Aqua (Chloramine-T) ¹	Syndel	Biocide/therapeutant	5	0.87 lbs/day	NA	Total Halogens WQBEL
Syncaine (Tricaine-S (MS-222)/ Tricaine Methanesulfonate)	Syndel	Anesthetic	5	0.33 lbs/day	NA	NA
Parasite-S (Formalin) ²	Syndel	Disinfectant/biocide	7	20.9 gal/day	2.8	DM = 1,700 µg/L WA = 94 µg/L or 0.087 gal/day/MGD
Hydrogen Peroxide (35%) ²	Arkema	Biocide/paracide/therapeutant	5	0.83 gal/day	0.15	WA = 47 µg/L or 0.042 gal/day/MGD
Ovadine (Iodine) ¹	Western Chemical	Disinfectant/biocide	5	NA	NA	Total Halogens WQBEL

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Additive Name	Manufacturer	Purpose of Additive including where added	Use Frequency (days/wk)	Max Quantity Used	Equivalent Effluent Conc. (mg/L)	Potential Use Restriction (mg/L unless noted otherwise) ¹
Terramycin 200 Fish (Oxytetracycline Hydrochloride)	Phibro	Fish marking/biocide	7	1.16 lbs/day	NA	NA
Sodium Hypochlorite (bleach) ¹	Multiple	Disinfectant	5	NA	NA	Total Halogens WQBEL
Sodium Thiosulfate ¹	Multiple	Dechlorination	5	NA	NA	Total Halogens WQBEL
Copper Sulfate	NA	Biocide	NA	NA	NA	NA
Peracetic Acid	Western Chemical	Biocide	NA	NA	NA	NA
Florfenicol (Aquaflor)	Thermo Fisher Scientific Chemicals	Antibiotic	7	0.19 lbs/day	NA	NA
REWARD Landscape and Aquatic (Diquat) ²	Syngenta Crop	Biocide/therapeutant	3	NA	NA	DM = 0.080 mg/L

1. An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge.
2. Calculated based on toxicity data provided.

Syncaïne (Tricaine-S (MS-222)/ Tricaine Methanesulfonate) – This additive was previously authorized at the daily maximum limit of 0.03 mg/L prior to the settling pond and a use restriction of 0.33 lbs/day and is used as an anesthetic. In this case the acute or chronic toxicity data available in section 12 of the chemical manufacturer’s material safety data sheet (MSDS) does not meet the minimum toxicity information requirements to calculate any potential limits or use restrictions to control the discharge of this additive. **Because the minimum toxicity information is unavailable, use of this additive is denied in the process waste stream to Outfall 001.**

Parasite-S (Formalin) – This additive was previously authorized at daily maximum limit of 2.1 mg/L and the use restriction of 5.7 gal/MGD of effluent flow and is used as disinfectant/biocide. Secondary acute and chronic values are determined based on acute toxicity test data from Department records. The secondary acute value is 1,700.73 µg/L based on the use of 100% formalin and is set directly as a daily maximum limit of 1,700 µg/L using two significant figures. The secondary chronic value is 94.49 µg/L based on the default secondary acute to chronic ratio of 18 and the use of 100% formalin. The weekly average limit is 94 µg/L rounded to two significant figures using the same conservation of mass equation as with toxic substances in Part 2 of this evaluation.

Iron River FH has requested the use of this additive at a daily maximum dosage rate of 16 gal/day up to 7x/wk. Assuming none of the additive is lost to the environment from the application point to Outfall 001, an additive density of 1.09 g/cm³, and an effluent flow of 6.18 MGD, the equivalent effluent concentration is approximately 2.8 mg/L. **This concentration exceeds the calculated daily maximum and weekly average limits; therefore, this additive is denied for use at the requested dosage during the reissued permit term at Outfall 001. If the Iron River FH wants to use Parasite-S (Formalin) in the process waste stream of Outfall 001, the daily maximum limit of 1,700 µg/L and the weekly average limit of 94 µg/L would be required. If there is not a reliable analytical method to measure**

the concentration of the additive in the effluent, an equivalent use restriction of 0.087 gal/day per MGD of effluent flow can be used instead.

Arkema Hydrogen Peroxide – This additive was previously authorized at the daily maximum limit of 0.214 mg/L and the use restriction of 0.625 gal/MGD and is used as a biocide/paracide/therapeutant. Secondary acute and chronic values are determined based on acute toxicity test data from Department records. The secondary acute value is 295 µg/L based on the use of 100% hydrogen peroxide. The hydrogen peroxide concentration in the requested additive is 35% so the secondary acute value is adjusted to 843 µg/L and is set directly as a daily maximum limit of 840 µg/L using two significant figures. The secondary chronic value is 16.4 µg/L based on the default secondary acute to chronic ratio of 18 and the use of 100% hydrogen peroxide. This value is also adjusted to 46.9 µg/L. The weekly average limit is 47 µg/L rounded to two significant figures using the same conservation of mass equation as with toxic substances in Part 2 of this evaluation.

Iron River FH has requested the use of this additive at a daily maximum dosage rate of 0.83 gal/day up to 5x/wk. Assuming none of the additive is lost to the environment from the application point to Outfall 001, an additive density of 1.13 g/cm³, and an effluent flow of 6.18 MGD, the equivalent effluent concentration is approximately 0.15 mg/L. **This concentration exceeds the calculated weekly average limit; therefore, this additive is denied for use at the requested dosage during the reissued permit term at Outfall 001. If the Iron River FH wants to use hydrogen peroxide in the process waste stream of Outfall 001, the weekly average limit of 47 µg/L would be required. If there is not a reliable analytical method to measure the concentration of the additive in the effluent, an equivalent use restriction of 0.042 gal/day per MGD of effluent flow can be used instead.**

The current permit has the daily maximum limit of 0.214 mg/L. **This limit is recommended to continue during the reissued permit term unless the antidegradation and antibacksliding requirements of ch. NR 207, Wis. Adm. Code, are satisfied.**

Terramycin 200 Fish (Oxytetracycline Hydrochloride) – This additive was previously authorized at the use restriction of 5 lbs/day and is used as a fish marker and biocide. In this case the acute or chronic toxicity data available in section 12 of the chemical manufacturer's material safety data sheet (MSDS) does not meet the minimum toxicity information requirements to calculate any potential limits or use restrictions to control the discharge of this additive. **Because the minimum toxicity information is unavailable, use of this additive is initially denied in the process waste stream to Outfall 001.**

This additive is included on an additive list submitted to the Department by Dr. Nicole Nietlisbach from Fisheries Management/Fish Wildlife and Parks for potential approval across multiple Department owned and operated fish hatcheries. Additive approval is on a facility-specific basis but secondary acute and chronic values will be calculated based on toxicity information generated in this effort. Therefore, a reevaluation of this additive in the Iron River FH's permit will be conducted in the future.

Copper Sulfate – This additive was previously authorized at the use restrictions of 447 mL/day or 0.12 gal/day and is used as a biocide. In this case the acute or chronic toxicity data available in section 12 of the chemical manufacturer's material safety data sheet (MSDS) does not meet the minimum toxicity information requirements to calculate any potential limits or use restrictions to control the discharge of this additive. **Because the minimum toxicity information is unavailable, use of this additive is initially denied in the process waste stream to Outfall 001.**

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This additive is included on an additive list submitted to the Department by Dr. Nicole Nietlisbach from Fisheries Management/Fish Wildlife and Parks for potential approval across multiple Department owned and operated fish hatcheries. Additive approval is on a facility-specific basis but secondary acute and chronic values will be calculated based on toxicity information generated in this effort. Therefore, a reevaluation of this additive in the Iron River FH's permit will be conducted in the future.

Peracetic Acid – This additive was previously authorized with the pH WQBELs of 6.0 s.u. as a daily minimum and 9.0 s.u. as a daily maximum and is used as a biocide. pH WQBELs can be used to control the discharge of additives that are acids, bases, or whose purpose is to influence the pH of the discharge. After consultation with the Department environmental toxicologist, it is believed the pH WQBELs cannot adequately account for the toxicity of peracetic acid because it is an organic peroxide. Therefore, WQBELs based on secondary values calculated from toxicity data are needed to control the discharge of peracetic acid. In this case the minimum toxicity information is not available to calculate any potential limits or use restrictions to control the discharge of this additive. **Because the minimum toxicity information is unavailable, use of this additive is initially denied in the process waste stream to Outfall 001.**

Florfenicol (Aquaflor) – This additive was previously authorized at the daily maximum limit of 33 mg/L and the weekly average limit of 0.57 mg/L and is used antibiotic. In this case the acute or chronic toxicity data available in section 12 of the chemical manufacturer's material safety data sheet (MSDS) does not meet the minimum toxicity information requirements to calculate any potential limits or use restrictions to control the discharge of this additive. **Because the minimum toxicity information is unavailable, use of this additive is initially denied in the process waste stream to Outfall 001.**

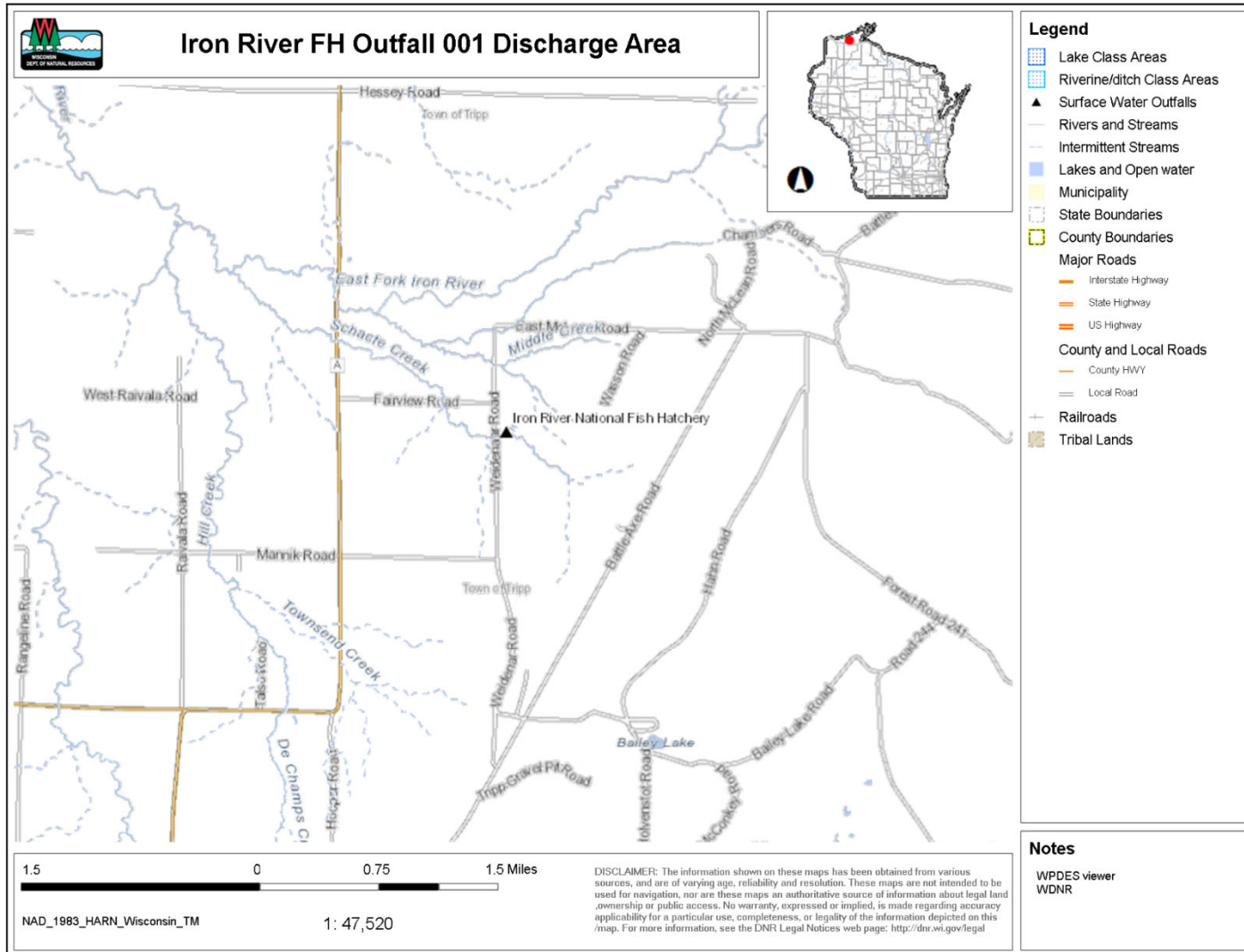
This additive is included on an additive list submitted to the Department by Dr. Nicole Nietlisbach from Fisheries Management/Fish Wildlife and Parks for potential approval across multiple Department owned and operated fish hatcheries. Additive approval is on a facility-specific basis but secondary acute and chronic values will be calculated based on toxicity information generated in this effort. Therefore, a reevaluation of this additive in the Iron River FH's permit will be conducted in the future.

REWARD Landscape and Aquatic (Diquat) – This additive is authorized during the current permit term via an Additive Approval Letter (August 2022) at the requested dosage/use restriction of an 18 mg/L static tank concentration at a maximum volume of 21,600 L (12 – 1,800 L tanks) at a frequency of 3x/wk. The additive review found limits or use restrictions were not needed at this requested dosage and the permit application did not request to increase this dosage. **Therefore, an additive review is not needed and this additive may continue to be used at the same dosage during the reissued permit term at Outfall 001.**

If an additive was denied use based on missing minimum toxicity information, the facility may contact the chemical manufacturer for the additive and request that information. Toxicity information may also be acquired by performing toxicity testing at a Department-certified laboratory (preferred) or in-house given Department-approved testing methods are used. The minimum toxicity information needed is 1 acute test performed with the whole commercial product formulation on a water flea species using Department-approved testing methods reported as an LC₅₀, EC₅₀, or a “no observable adverse effect level”. Toxicity test parameters such as duration, endpoint, method, exposure format, and control response are also needed for every test to conduct an additive review evaluation.

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The Department should be notified if the facility wishes to use any new additive, any approved additive at a greater dosage rate(s) or use frequency(ies) than currently approved, or if updated toxicity information for an additive is available from the chemical manufacturer. An additional additive review evaluation will be needed in any case.



Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	Iron River Fish Hatchery	7-Q₁₀:	8.82 cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%	Start:	NA	Flow Dates	NA
Date Prepared:	1/9/2024	f:	0.93	End:	NA	Flow Dates	NA
Design Flow (Q_e):	6.18 MGD	Stream type:	Cold water community				
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	0.2 :1				
		Calculation Needed?	YES				

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	35	47	68	8.82	4.80	6.18	0.93	42	43	47	68
FEB	36	47	68	8.82	4.80	6.18	0.93	42	43	47	68
MAR	39	51	69	8.82	4.80	6.18	0.93	43	44	51	69
APR	47	57	70	8.82	4.80	6.18	0.93	47	48	57	70
MAY	56	63	72	8.82	4.80	6.18	0.93	50	52	63	72
JUN	62	67	72	8.82	4.80	6.18	0.93	53	57	67	72
JUL	64	67	73	8.82	4.80	6.18	0.93	52	55	67	73
AUG	63	65	73	8.82	4.80	6.18	0.93	52	54	65	73
SEP	57	60	72	8.82	4.80	6.18	0.93	50	55	60	72
OCT	49	53	70	8.82	4.80	6.18	0.93	48	49	53	70
NOV	41	48	69	8.82	4.80	6.18	0.93	46	47	48	69
DEC	37	47	69	8.82	4.80	6.18	0.93	44	45	47	69

Hydrogen peroxide use in WPDES permitted hatcheries.

Hydrogen peroxide (H₂O₂) is an effective additive used to manage hatchery health issues such as external parasites, bacteria, and fungi on eggs and various life-stages of fish. There are other effective additives, but human health concerns make hydrogen peroxide a safer choice for those that are handling the products.

To protect fish and other aquatic life it is necessary to review scientific information and place limits in WPDES permits. Most additives do not have enough toxicity information to calculate a water quality criterion that, if exceeded, would cause harm to aquatic life. Instead, a secondary value based on available data is used to regulate the substance, (s. NR 105.05, Wis. Adm. Code). These calculated secondary values result in water quality based effluent limits that protect aquatic life from adverse short and long-term effects.

Common WPDES limits for hydrogen peroxide:

- Daily max limit 840 ug/L (0.84 mg/L)
- or use restriction of 0.74 gal/day per MGD

Assuming that there is no degradation of the additive, the limit and use restriction for H₂O₂ are more stringent than recommended therapeutic levels (see table below for examples).

Recommended Hydrogen Peroxide Dosage*

(Per the “Quick Desk Reference Guide to: Approved Drugs for use in Aquaculture” published by the FWS)

Species	Type	Stage	Issue	Recommended Dose	Treatment Cycle
Salmonids		All stages	External Bacteria	100 mg/L 30 min or 50-100 mg/L 60 min	Once daily on alternate days for 3 treatments.
			Fungus	100 mg/L 30 min or 50 mg/L 60 min	
Finfish	Coldwater Coolwater	Eggs	Fungus	500-1,000 mg/L 15 min	Continuous flow system once daily on consecutive or alternate days until hatching.
	Warmwater	Eggs	Fungus	750-1,000 mg/L 15 min	
	Coolwater Warmwater	Fry Fingerlings Adults	External Bacteria	50 mg/L 60 min 50-75 mg/L 60 min	Once daily on alternate days for 3 treatments.
	Coldwater Coolwater Warmwater	All life stages except fry	Fungus	75 mg/L 60 min	

*For informational purposes. Always consult your veterinarian to determine appropriate dosages for your situation.

Potential Practices – After hydrogen peroxide is used to medicate specific areas in a hatchery, the procedures listed below are considered the most feasible to be used alone or together to meet effluent limits.

- Dilution** – Add enough water to the system after treatment to dilute the medicated water to meet the effluent limit. To calculate the amount of water needed:

$$\text{Total Dilution Volume} = \frac{\text{Medicated water concentration (mg/L)} \times \text{Medicated water volume}}{\text{Limit (mg/L)}}$$

- Bleed medicated water slowly into the receiving water** – For success the medicated water must be segregated and held as the volume is discharged. To calculate the rate of medicated water that can be bled into the effluent:

$$\text{Medicated water bleeding rate} = \frac{\text{Limit (mg/L)} \times \text{Receiving water flow rate}}{\text{Medicated water concentration (mg/L)}}$$

- Aeration** is identified as one of the most effective ways to accelerate the degradation of hydrogen peroxide. Success will be dependent on many factors including aerator output, aerator location, duration, and hold time. Trials and monitoring will be needed to identify optimal procedures. See “Develop a Standard Operating Procedure” below.
- Holding time** is the most passive method and will likely take the longest. Some studies show it can take up to 10 days for hydrogen peroxide in water to become undetectable. Treated water will need to be segregated

for success. Other factors that will influence the breakdown will be UV exposure (sunlight), water temperature and total suspended solids. Trials and monitoring will be necessary to identify the time needed to adequately reduce hydrogen peroxide. See “Develop a Standard Operating Procedure” below.

- **Chemical addition** to neutralize hydrogen peroxide is another choice. Bio catalase, ascorbic acid, ferric chloride, sodium thiosulfate, oxalic acid, as well as other chemicals have been studied and are effective in neutralizing hydrogen peroxide. Any chemical addition will need approval from the department before use. Bench tests as well as trials and monitoring will be needed to identify optimal procedures. See “Develop a Standard Operating Procedure” below.

Monitoring – Due to the decay properties of hydrogen peroxide, samples cannot be submitted to a laboratory for analysis, the monitoring must be completed soon after sampling. There are titration-based chemical tests or test strips produced by many manufacturers available for sale. To simplify sampling for hatchery staff, monitoring using test strips is acceptable. The test strips must have a limit of detection (LOD) below the applicable limit. If there is detection above the limit, a second more sensitive titration-based test is required to confirm if an exceedance has occurred.

Develop a Standard Operating Procedure (SOP) – A facility may develop a hydrogen peroxide SOP that will be incorporated into their best management plan (BMP). Once approved by the department, this plan may replace required monitoring.

1. Contact your wastewater compliance staff and let them know the hatchery will undertake a study.
2. Develop a practice(s) study plan and submit to the department for review and approval – Identify the practice(s) trials, optimization methods and monitoring protocols that will last at least one year.
3. Complete the study, summarize the results, create the SOP, and submit to the department for review and approval – Submit a draft SOP that identifies and proves the optimized practices will meet the daily maximum limit. Once approved the SOP will be adopted into the current BMP plan.
4. Modification of WPDES permit – based on the approved SOP the permit may be modified or reissued to adjust monitoring and reporting requirements.

Additional resources

Calculation for volume of hydrogen peroxide needed for treatments.

$$\frac{\text{Treatment concentration (mg/L)} \times \text{system volume (L)} \times 1,000 \text{ mL/L}}{396,100 \text{ mg/L}^*} = 35\% \text{ hydrogen peroxide needed in mL}$$

*35% hydrogen peroxide in one liter

Guidance related to conducting an additive review can be found in Water Quality Review Procedures for Additives (2019) (<https://dnr.wisconsin.gov/topic/Wastewater/Additives.html>).

Quick Desk Reference Guide to: Approved Drugs for use in Aquaculture <https://www.fws.gov/media/quick-desk-reference-guide-approved-drugs-use-aquaculture>