AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, DAVIS BUILDING, 3rd FLOOR
MONTPELIER, VT 05620-3522

Permit Number: 3-0361
PIN: RU96-0030
NPDES Number: VT0120098

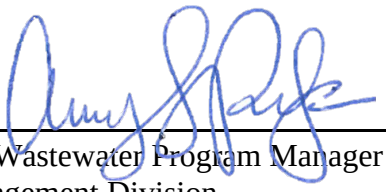
Facility Name: VT Fish & Wildlife-Salisbury Fish Culture Station
Facility Address: 646 Lake Dunmore Road
Salisbury, VT 05769
Facility Coordinates: Lat: 43.92578 Long: -73.09855
Facility Classification: Industrial, Certified Operator not Required

Expiration Date: December 31, 2027
Reapplication Date: June 30, 2027

In compliance with the provisions of the Vermont Water Pollution Control Act as amended (10 V.S.A., Chapter 47), the Vermont Water Pollution Control Permit Regulations as amended (Environmental Protection Rules, Chapter 13), the federal Clean Water Act as amended (33 U.S.C. § 1251 *et seq.*), and implementing federal regulations, the Vermont Department of Fish & Wildlife (hereinafter referred to as the "Permittee") is authorized by the Secretary of the Agency of Natural Resources (hereinafter referred to as the "Secretary") to discharge from the Salisbury Fish Culture Station (hereinafter referred to as the "WWTF") to Tributary 10 of Halnon Brook in accordance with the following conditions.

This permit shall be effective on January 1, 2023

Julia S. Moore, Secretary
Agency of Natural Resources

By:  Date: 12/8/2022

Amy Polaczyk, Wastewater Program Manager
Watershed Management Division

I. PERMIT SPECIAL CONDITIONS

A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS

1. Discharge Point S/N 001, Lat. 43.92561, Long. -73.10086: During the term of this permit, the Permittee is authorized to discharge from outfall S/N 001 of the Salisbury Fish Culture Station to Tributary 10 of Halnon Brook, an effluent for which the characteristics shall not exceed the values listed below:

Discharge Monitoring						
Constituent; Sampling Point and Sample Type	**Season and Sampling Frequency**	**Limit 1**	**Limit 2**	**Limit 3**	**Limit 4**	**Limit 5**
Flow; Annual Average; Calculated	**12/01 - 12/31** Annual	**1.31 MGD** Annual Avg				
Flow; Effluent; Continuous	**Year Round** Daily	**Monitor MGD** Monthly Avg	**Monitor MGD** Daily Max			
BOD, 5-Day; Effluent; 24 Hour Comp	**09/01 - 09/30** Annual					**Monitor mg/l** Daily Max
Chlorine, Total Residual; Effluent; Grab	**Year Round** 2 per Month			**0.02 mg/l** Monthly Avg		**0.02 mg/l** Daily Max
Formalin; Effluent; Grab	**Year Round** 2 per Month			**3.6 mg/l** Monthly Avg		**7.2 mg/l** Daily Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	**Year Round** Monthly					**Monitor mg/l** Daily Max
Nitrogen, Ammonia Total; Effluent; Grab	**Year Round** Monthly					**Monitor mg/l** Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	**Year Round** Monthly					**Monitor mg/l** Daily Max
Nitrogen, Total; Effluent; Calculated	**Year Round** Monthly		**Monitor lbs/day** Daily Max			**Monitor mg/l** Daily Max
pH; Effluent; Grab	**04/01 - 10/31** Monthly			**6.5 s.u.** Min		**8.5 s.u.** Max
Suspended Solids, Total; Effluent; 24 Hour Comp	**04/01 - 10/31** Monthly			**5 mg/l** Monthly Avg		**15 mg/l** Daily Max
Phosphorus, Total; Effluent; 24 Hour Comp	**11/01 - 05/31** Monthly			**0.8 mg/l** Monthly Avg		
Phosphorus, Total; Effluent; 24 Hour Comp	**06/01 - 10/31** 2 per Month			**0.8 mg/l** Monthly Avg		

Phosphorus, Total; Annual Average; Calculated	**12/01 - 12/31** Annual	**152 lbs/yr** Annual Total				
Phosphorus, Total; Effluent; Calculated	**Year Round** Monthly	**Monitor lbs** Annual Total	**Monitor lbs** Monthly Total	**Monitor %** Monthly Total		

Discharge Monitoring with WET Testing

Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Limit 1	Limit 2	Limit 3	Limit 4	Limit 5
Dissolved Organic Carbon Effluent; 24 Hour Comp	**01/01-02/28** Annual					**Monitor mg/l** Daily Max
Dissolved Organic Carbon Effluent; 24 Hour Comp	**08/01-10/31** Annual					**Monitor mg/l** Daily Max
Hardness Effluent; 24 Hour Comp	**01/01-02/28** Annual					**Monitor mg/l** Daily Max
Hardness Effluent; 24 Hour Comp	**08/01-10/31** Annual					**Monitor mg/l** Daily Max
Nitrogen, Ammonia Total; Effluent; Grab	**01/01-02/28** Annual					**Monitor mg/l** Daily Max
Nitrogen, Ammonia Total; Effluent; Grab	**08/01-10/31** Annual					**Monitor mg/l** Daily Max

Instream Monitoring

Constituent; Sampling Point and Sample Type	Season and Sampling Frequency	Limit 1	Limit 2	Limit 3	Limit 4	Limit 5
Phosphorus, Total; RM 0.1 Downstream Monitoring; Grab	**11/01 - 05/31** Monthly			**Monitor mg/l** Monthly Avg		
Phosphorus, Total; RM 0.2 Downstream Monitoring; Grab	**11/01 - 05/31** Monthly			**Monitor mg/l** Monthly Avg		
Phosphorus, Total; RM 0.5 Downstream Monitoring; Grab	**11/01 - 05/31** Monthly			**Monitor mg/l** Monthly Avg		
Phosphorus, Dissolved; RM 0.1 Downstream Monitoring; Grab	**11/01 - 05/31** Monthly			**Monitor mg/l** Monthly Avg		

Phosphorus, Dissolved; RM 0.2 Downstream Monitoring; Grab	**11/01 - 05/31 Monthly**			**Monitor mg/l Monthly Avg**		
Phosphorus, Dissolved; RM 0.5 Downstream Monitoring; Grab	**11/01 - 05/31 Monthly**			**Monitor mg/l Monthly Avg**		
Phosphorus, Total; RM 0.1 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		
Phosphorus, Total; RM 0.2 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		
Phosphorus, Total; RM 0.5 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		
Phosphorus, Dissolved; RM 0.1 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		
Phosphorus, Dissolved; RM 0.2 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		
Phosphorus, Dissolved; RM 0.5 Downstream Monitoring; Grab	**06/01 - 10/31 2 per Month**			**Monitor mg/l Monthly Avg**		

2. Discharge Sampling Point

a. Effluent sampling: The Permittee shall collect samples from a representative point following the raceways.

3. Discharge Special Conditions

a. TSS and pH sampling shall be conducted monthly from **April to October**.

b. Annual BOD_5 sampling shall be conducted in **September**.

c. Raceways shall be cleaned at the maximum frequency practical during **May and October**. The dates of all cleanings shall be included on the Discharge Monitoring Report (DMR) form WR-43.

d. In **May and October,** monthly sample collection of Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Ammonia Nitrogen (TAN) shall coincide with raceway cleaning.

e. Dissolved Organic Carbon, Hardness and Total Ammonia Nitrogen shall coincide with WET testing. For the months not sampled, the Permittee shall enter NODI code “Conditional Monitoring-Not Required This Period” in the eDMR. See Section I.E for the WET testing sample schedule.

f. Monthly average flow shall be calculated by summing the daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.

g. Formalin monitoring shall consist of a single grab sample twice a month when the chemical is in use. Grab samples shall be collected to account for detention time throughout the system. The Permittee shall report the monitoring results, the dates the product is used, and quantities of product used on the WR-43 reporting form.

h. Total Residual Chlorine monitoring shall consist of a single grab twice a month when Chloramine-T is in use. Grab samples shall be collected to account for detention time throughout the system. The Permittee shall report the monitoring results, the dates the product is used, and quantities of product used on the WR-43 reporting form. TRC analysis must be completed using a test method in 40 C.F.R. § 136 that achieves a minimum level no greater than 0.02 mg/L. The compliance level for TRC is 0.02 mg/L.

i. 24-hour composite sampling shall be performed on all parameters listed that require composite sample collection.

j. Total Nitrogen (TN) shall be reported as pounds TN and calculated as:
TN (mg/L) × Total Daily Flow (MGD) × 8.34; where TN (mg/L) = TKN (mg/L) + NOx (mg/L).

k. The Permittee shall report the name of the drugs(s), dates, masses, and calculated effluent concentration for each drug treatment used in the monthly WR-43 form.

l. The Permittee shall report the quantities, dates and calculated effluent concentrations for any other chemicals used to control and prevent fish disease and pathogens in the monthly WR-43 form. The chemicals shall be used in accordance with the U.S. Food and Drug Administration for the prevention and control of fish pathogens and disease.

m. The effluent shall not cause visible discoloration of the receiving waters.

n. The discharge shall be free from substances in kind or quantity that settle to form harmful benthic deposits; float as foam, debris, scum or other visible substances; produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses; result in the dominance of nuisance species; or interfere with recreational activities; or which would cause a violation of the Vermont Water Quality Standards.

o. Any action on the part of the Secretary in reviewing, commenting upon or approving plans and specifications for the construction of WWTFs shall not relieve the Permittee from the responsibility to achieve effluent limitations set forth in this permit and shall not constitute a waiver of, or act of estoppel against any remedy available to the Secretary, the State of Vermont or the federal government for failure to meet any requirement set forth in this permit or imposed by state or federal law.

4. Technology-Based Effluent Limitations

a. The Permittee shall employ efficient feed management and feeding strategies that limit feed input to the minimum amount reasonably necessary to achieve production goals and sustain targeted rates of aquatic animal growth in order to minimize potential discharges of uneaten feed and waste products to waters of the state.

b. To minimize the discharge of accumulated solids from the raceways, start tanks and polishing pond, the Permittee shall identify and implement procedures for routine cleaning and procedures to minimize any discharge

of accumulated solids during the inventorying, grading, and harvesting of aquatic animals in the production system.

c. The Permittee shall remove and dispose of aquatic animal mortalities properly on a regular basis to prevent discharge to waters of the state, except in cases where the Secretary authorizes such discharge in order to benefit the aquatic environment.

d. The Permittee shall ensure proper storage of drugs, pesticides, and feed in a manner designed to prevent spills that may result in the discharge of drugs, pesticides, or feed to waters of the state.

e. The Permittee shall implement procedures for properly containing, cleaning, and disposing of any spilled material.

f. The Permittee shall inspect the production system on a routine basis in order to identify and promptly repair any damage.

g. The Permittee shall conduct regular maintenance of the production system in order to ensure that all components are properly functioning.

h. In order to calculate representative feed conversion ratios, the Permittee shall maintain records for aquatic animal rearing units documenting the feed amounts and estimates of the numbers and weight of aquatic animals.

i. The Permittee shall keep records documenting the frequency of cleaning, inspections, maintenance, and repairs.

j. In order to ensure the proper clean-up and disposal of spilled material, the Permittee shall adequately train all relevant facility personnel in spill prevention and how to respond in the event of a spill.

k. The Permittee shall train staff on the proper operation and cleaning of production systems including training in feeding procedures and proper use of equipment.

B. FISH HATCHERY CHEMICALS

1. Use of the following chemicals shall be in accordance with the U.S. Food and Drug Administration for the prevention and control of fish pathogens and disease. Concentrations and treatment durations shall not exceed the specified product label, or Investigative New Animal Drug (INAD) authorization, or the terms and conditions of this permit. Results of specified monitoring shall be reported on the monthly WR-43 form.

2. A substantial change in the chemicals used must be reviewed by the Secretary to ensure that no adverse impact will occur in the receiving water. A substantial change in chemicals shall be defined as those chemicals that are not similar in composition, concentration, and toxicity to those identified in the application.

3. Chloramine T – Use is authorized in concentrations of up to 20 ppm for up to 60 minutes on fish in the start tanks and raceways. **Treatment shall be limited such that no more than one half of the facility's design flow of 1.31 MGD receives treatment at any one time.** Treatments may be made for up to three consecutive days for bacteria control or up to 21 days for parasite control.

Chloramine-T is the only chlorine containing product in use at the facility. It is used on a very limited basis and only when approved by the fish hatchery pathologist to treat potential disease outbreaks. Monitoring shall consist of a single grab twice a month when the chemical is in use. Grab samples shall be collected to

account for detention time throughout the system. The Permittee shall report the monitoring results, the dates the product is used, and quantities of product used on the WR-43 reporting form.

The Monthly Average and Daily Maximum Total Residual Chlorine compliance limit is 0.02 mg/l. The compliance limit for TRC is 0.02 mg/L because the reasonable potential determination (RPD) established effluent limits of 0.019 mg/L daily maximum and 0.011 mg/L monthly average that are below the minimum level (ML) for analysis of TRC using Method 4500-Cl G, N, N-diethyl-p-phenylenediamine (DPD) colorimetric, of 0.02 mg/L. This approach is consistent with EPA's Technical Support Document for Water Quality-based Toxics Control (EPA-505-2-90-001, March 1991), page 111, which recommends, "the compliance level be defined in the permit as the minimum level (ML)." See Standard Methods for the Examination of Water and Wastewater for the full text of these test methods.

In accordance with 40 CFR § 122.44(i)(1)(iv), the Permittee shall monitor according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O, for the analysis of pollutants or pollutant parameters (except WET). A method is "sufficiently sensitive" when: 1) The method minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter; or 2) The method has the lowest ML of the analytical methods approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O for the measured pollutant or pollutant parameter. The term "minimum level" refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (MDL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the MDL in a method, or the MDL determined by a laboratory, by a factor.

Analysis of TRC using Method 4500-Cl G, N, N-diethyl-p-phenylenediamine (DPD) colorimetric is appropriate for this facility given the magnitude, frequency, and duration of chlorine use. The minimum level (ML) is between 0.02 and 0.05 mg/L, and therefore can be used for compliance without modification.

4. Formalin (Parasite S) – Formalin shall be used in accordance with Condition I.B.1. such that effluent concentrations do not exceed the effluent limitations specified in Condition I.A.1. Monitoring shall consist of a single grab sample each day Formalin is in use and each day that Formalin is released from the polishing pond.

Monitoring shall consist of a single grab twice a month when the chemical is in use. Grab samples shall be collected to account for detention time throughout the system. Formalin grab samples shall be analyzed for Formaldehyde using EPA Method 1667, Revision A. Formaldehyde concentrations shall be converted to Formalin using the following equation:

$$Formalin, mg/L = \frac{Formaldehyde, mg/L}{(37\ mg\ Formaldehyde/100\ mg\ Formalin)}$$

The Permittee shall report Formaldehyde concentrations, calculated effluent Formalin concentrations, the date the product is used, and quantities of product used on the WR-43 reporting form.

C. PHOSPHORUS OPTIMIZATION PLAN (POP) / BEST MANAGEMENT PRACTICES (BMP) PLAN

1. Wasteload Allocation for Phosphorus

A total phosphorus (TP) water quality based effluent limitation (WQBEL) of 399 lbs./year was established by the U.S. Environmental Protection Agency (U.S. EPA) in the 2016 "Phosphorus TMDLs for Vermont Segments of Lake Champlain (LC TMDL). Since the facility has reasonable potential to violate Vermont Water Quality Standards (VWQS) in Tributary 10 of Halnon Brook (the immediate receiving water), a revised annual WQBEL of 152 lbs./year is included in the permit. The Secretary reserves the right to reopen and amend this permit to include an alternate TP limitation or additional monitoring requirements based on the monitoring data, the results of phosphorus optimization activities, or a reallocation of phosphorus wasteload allocations between the Permittee and another WWTF pursuant to the requirements of the TMDL and Vermont's "Wasteload Allocation Process" Rule (Environmental Protection Rule, Chapter 17).

2. Total Phosphorus Calculations and Reporting

Total Phosphorus shall be reported monthly, via electronic Discharge Monitoring Report, in the following ways:

a. Monthly Average Phosphorus Concentration = The average concentration of phosphorus discharged this monitoring period. (sum of all daily discharges (mg/l) measured during the month divided by the number of daily discharges measured during the month)

b. Total Monthly Pounds Phosphorus = The total pounds of phosphorus discharged this monitoring period. ((Monthly Average Phosphorus Concentration) × (Total Monthly Flows) × 8.34)

c. Running Total Annual Pounds = The 12-month running annual TP load. (Sum the Total Monthly Pounds results for the immediately preceding 12 months)

d. Comparison (%) of Running Total Annual Pounds to Annual Permit Limitation = The percentage of the Running Total Annual Pounds to the Annual TP Limitation. The comparison shall be calculated as:
% = Running Total Annual Pounds / Annual TP Permit Limit × 100

3. Phosphorus Optimization Plan (POP)/ Best Management Practices (BMP) Plan

a. The Permittee shall develop and submit to the Secretary a Phosphorus Optimization Plan (POP)/Best Management Practices (BMP) Plan to increase the facility's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The POP/BMP Plan shall:

i. Be developed by a qualified professional with experience in the operation and/or design of WWTFs in consultation with the facility;

ii. Evaluate alternative methods of operating the existing facility, including operational, process, and equipment changes designed to enhance phosphorus removal;

iii. Determine which alternative methods of operating the existing facility, including operational, process,

and equipment changes will be most effective at increasing phosphorus removal;

iv. Include a proposed implementation schedule for those methods of operating the facility determined to be most effective at increasing phosphorus removal; and

v. Describe how the Permittee will use BMPs to comply with each of the technology-based effluent limitations under Condition I.A.4 of this permit.

b. The Secretary shall review the POP/BMP Plan. The Permittee shall commence implementation of the POP/BMP Plan 60 days after submittal to the Secretary unless the Secretary rejects the POP/BMP Plan prior to that date.

c. The Permittee shall **annually** submit a report to the Secretary as an attachment to the monthly electronic Discharge Monitoring Reporting (DMR) form WR-43 that documents:

i. The optimization techniques/BMPs implemented under the POP/BMP Plan during the previous year.

ii. Whether the techniques are performing as expected.

iii. The phosphorus discharge trends relative to the previous year.

d. The POP/BMP Plan shall be amended as necessary and appropriate during the life of the permit.

e. The Permittee shall report according to the following table:

Due Date	Event Description
5/1/2023	The Permittee shall submit a POP/BMP Plan.
6/30/2023	The Permittee shall commence implementation of the POP/BMP Plan 60 days after submittal.
7/31/2024	The Permittee shall submit an annual report that documents TP trends and optimization techniques/BMPs implemented.
7/31/2025	The Permittee shall submit an annual report that documents TP trends and optimization techniques/BMPs implemented.
7/31/2026	The Permittee shall submit an annual report that documents TP trends and optimization techniques/BMPs implemented.
7/31/2027	The Permittee shall submit an annual report that documents TP trends and optimization techniques/BMPs implemented.

D. METALS SCAN

1. The Permittee shall conduct an effluent analysis of outfall serial number S/N 001 for the metals included in Appendix J, Table 2 of 40 CFR Part 122 and Aluminum (see Attachment A) and submit the results to the Secretary.

2. The Metals Scan shall be conducted concurrently with the WET tests, during the summer in odd years, and during the winter in even years.

3. Based upon the results of these tests, the Secretary reserves the right to reopen and amend this permit to require additional monitoring.

4. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall conduct and include the results of the Metals Scan with each WET test conducted during continuance.

5. The Permittee shall sample and report according to the following table:

Due Date	Event Description
12/31/2023	The Permittee shall submit test results for August-October 2023 sampling.
6/30/2024	The Permittee shall submit test results for January-February 2024 sampling.
12/31/2025	The Permittee shall submit test results for August-October 2025 sampling.
6/30/2026	The Permittee shall submit test results for January-February 2026 sampling.

E. WHOLE EFFLUENT TOXICITY (WET) TESTING ACUTE/CHRONIC

1. The Permittee shall conduct four, one-species (*Ceriodaphnia dubia*) modified acute/chronic WET tests (48-hour static renewal acute endpoints within a 7-day sub-lethal chronic test) on a 24-hour composite effluent sample collected from outfall serial number S/N 001. This sampling shall be done concurrently with the required Metals Scan sampling, during the summer in odd years, and during the winter in even years.

2. Total Ammonia shall be measured in the highest concentration of test solution at the beginning of the test and shall be reported with the eDMR for the month WET testing was conducted.

3. Hardness shall be measured in the highest concentration of test solution at the beginning of the test and shall be reported with the eDMR for the month WET testing was conducted.

4. Dissolved Organic Carbon shall be measured in the highest concentration of test solution at the beginning of the test and shall be reported with the eDMR for the month WET testing was conducted.

5. If a chlorine product is being used, Total Residual Chlorine shall be measured in the highest concentration of test solution at the beginning of the test and shall be reported with the eDMR for the month WET testing was conducted.

6. The WET tests shall be conducted according to the procedures and guidelines specified in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" and "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (both documents U.S. EPA October 2002 or, if a newer edition is available, the most recent edition).

7. Permittees may request the use of lab water for controls and dilution if:

a) acquiring receiving water is hazardous due to weather or topography

b) previous WET tests have shown that receiving water has had poor performance in the lab controls or dilution

c) requested by the Permittee and approved by the Secretary.

8. Based upon the results of these tests or any other toxicity tests conducted, the Secretary reserves the right to reopen and amend this permit to change the WET testing frequency, or require a Toxicity Identification Evaluation, and/or a Toxicity Reduction Evaluation.

9. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall maintain the WET testing frequency established in Condition I.E.10. during such continuance.

10. The Permittee shall sample and report according to the following table:

Due Date	Event Description
12/31/2023	The Permittee shall submit the WET test results for the sample taken during August-October 2023.
6/30/2024	The Permittee shall submit the WET test results for the sample taken during January-February 2024.
12/31/2025	The Permittee shall submit the WET test results for the sample taken during August-October 2025.
6/30/2026	The Permittee shall submit the WET test results for the sample taken during January-February 2026.

F. INSTREAM MONITORING

1. Instream sampling shall be conducted following approval of the sampling plan and updated Quality Assurance Project Plan (QAPP). Instream sampling for Total Phosphorus and Dissolved Phosphorus should coincide with effluent monitoring. Monthly sampling in Halnon Brook Tributary at 10 RM 0.1, 0.2, and 0.5 should occur between November 1 and May 31; twice a month sampling should occur between June 1 and October 31. Should the Wainwright Dam downstream of the facility be removed, the permit shall be reopened to assess instream Total and Dissolved Phosphorus sampling locations.

2. If snow, ice, or flooding preclude instream sampling, that information shall be included in that month's eDMR.

3. Macroinvertebrate sampling shall be conducted following approval of the sampling plan and updated QAPP. Sampling shall occur between the months of August-October in 2024 and 2026. Samples shall be collected in Halnon Brook Tributary 10 at RM 0.1 and RM 2.5.

4. The Permittee shall sample and report according to the following table:

Due Date	Event Description
3/31/2023	The Permittee shall submit a sampling plan and updated QAPP.
2/1/2025	The Permittee shall submit macroinvertebrate monitoring results for the samples taken during August-October 2024.
2/1/2027	The Permittee shall submit macroinvertebrate monitoring results for the samples taken during August-October 2026.

G. QUALITY ASSURANCE REPORT / PROFICIENCY TESTING

1. In accordance with 10 V.S.A. § 1263.d.2, the Secretary may require a laboratory quality assurance sample program to ensure qualification of laboratory analysts. For purposes of demonstrating compliance with the requirements of this permit regarding adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct and pass an annual laboratory proficiency test, via an accredited

laboratory, for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by this permit. This can be carried out as part of an EPA DMR-QA study.

2. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall continue to complete annual proficiency tests and report by December 31 each year.

3. The Permittee shall report on quality assurance according to the following table:

Due Date	Event Description
12/31/2023	The Permittee shall submit passing 2023 proficiency test results.
12/31/2024	The Permittee shall submit passing 2024 proficiency test results.
12/31/2025	The Permittee shall submit passing 2025 proficiency test results.
12/31/2026	The Permittee shall submit passing 2026 proficiency test results.
12/31/2027	The Permittee shall submit passing 2027 proficiency test results.

II. GENERAL CONDITIONS

A. GENERAL REQUIREMENTS

1. Authority

This permit is issued under authority of 10 V.S.A. §§ 1258 and 1259 of the Vermont Water Pollution Control Act, the Vermont Water Pollution Control Permit Regulation (Environmental Protection Rule, Chapter 13), and § 402 of the Clean Water Act, as amended.

2. Operating Fees

This discharge is subject to operating fees as required by 3 V.S.A. § 2822.

3. Duty to Comply

The Permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Except as provided in "Bypass" (Condition II.B.5.) and "Emergency Pollution Permits" (Condition II.B.8.), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.

4. Civil and Criminal Liability

Civil and criminal penalties for non-compliance are provided for in 40 C.F.R. § 122.41(a)(2)-(3) and 10 V.S.A. Chapters 47, 201, and 211. As of the effective date of this permit, the Vermont statutory penalties, which are subject to change, are as follows:

a. Pursuant to 10 V.S.A. Chapter 47, a civil penalty not to exceed $10,000.00 a day for each day of violation.

b. Pursuant to 10 V.S.A. Chapter 47, a fine not to exceed $25,000.00 or imprisonment for not more than six months, or both.

c. Pursuant to 10 V.S.A. Chapter 47, any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained by this permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained by this permit, shall upon conviction, be punished by a fine of not more than $10,000.00 or by imprisonment for not more than six months, or by both.

d. Pursuant to 10 V.S.A. Chapter 201, a penalty of not more than $42,500.00 for each determination of a separate violation. In addition, if the Secretary determines that a violation is continuing, the Secretary may assess a penalty of not more than $17,000.00 for each day the violation continues. The maximum amount of penalty assessed under this provision shall not exceed $170,000.00.

e. Pursuant to 10 V.S.A. Chapter 211, a civil penalty of not more than $85,000.00 for each violation. In addition, in the case of a continuing violation, a penalty of not more than $42,500.00 may be imposed for each day the violation continues.

5. Reopener Clause

In accordance with 40 C.F.R. § 122.44(c), this permit may be reopened and modified during the life of the permit to incorporate any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the Clean Water Act. The Secretary may promptly modify or revoke and reissue this permit if the

standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in the permit.

6. Permit Modification and Revocation

Pursuant to 40 C.F.R. § 124.5, the Secretary may modify, revoke and reissue, or terminate for cause, in whole or in part, the authorization to discharge under this permit. These actions may be taken for the reasons specified in 40 C.F.R. § 122.62 (modification or revocation and reissuance) and § 122.64 (termination), including:

a. There are material and substantial alterations or additions to the permitted facility or activity;

b. New information is received that was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and would have justified the application of different permit conditions at the time of issuance;

c. To correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions;

d. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

e. Reallocation of WLA under the LC TMDL;

f. Development of an integrated WWTF and stormwater runoff NPDES permit;

g. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge; or

h. Correction of any permit violation, including violations of Vermont Water Quality Standards.

The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance shall not stay any permit condition.

7. Toxic Effluent Standards

If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under § 307(a) of the Clean Water Act for a toxic pollutant which is present in the Permittee's discharge and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, then this permit shall be modified or revoked and reissued, pursuant to Condition II.A.6 of this permit, in accordance with the toxic effluent standard or prohibition and the Permittee so notified.

8. Other Materials

Other materials ordinarily produced or used in the operation of this facility, which have been specifically identified in the application, may be discharged at the maximum frequency and maximum level identified in the application, provided:

a. They are not:

i. Designated as toxic or hazardous under provisions of Sections 307 and 311, respectively, of the Clean Water Act, or

ii. Known to be hazardous or toxic by the Permittee, except that such materials indicated in (i) and (ii) above may be discharged in certain limited amounts with the written approval of, and under special conditions established by, the Secretary or their designated representative, if the substances will not pose any imminent hazard to the public health or safety;

b. The discharge of such materials will not violate the Vermont Water Quality Standards; and

c. The Permittee is not notified by the Secretary to eliminate or reduce the quantity of such materials entering the water.

9. Removed Substances

Collected screenings, sludges, and other solids removed in the course of treatment and control of wastewaters shall be stored, treated, and disposed of in accordance with 10 V.S.A. Chapter 159 and with the terms and conditions of any certification, interim or final, transitional operation authorization, or order issued pursuant to 10 V.S.A. Chapter 159 that is in effect on the effective date of this permit or is issued during the term of this permit.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Duty to Provide Information

The Permittee shall provide to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee shall also furnish to the Secretary upon request, copies of records required to be kept by this permit.

12. Other Information

If the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Secretary, it shall promptly submit such facts or information.

13. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject under 10 V.S.A. § 1281.

14. Confidentiality

Pursuant to 10 V.S.A. § 1259(b):

Any records or information obtained under this permit program that constitutes trade secrets under 1 V.S.A. § 317(c)(9) shall be kept confidential, except that such records or information may be disclosed to authorized representatives of the State and the United States when relevant to any proceedings under 10 V.S.A. Chapter 47.

Claims for confidentiality for the following information will be denied:

a. The name and address of any permit applicant or Permittee.

b. Permit applications, permits, and effluent data.

c. Information required by application forms, including information submitted on the forms themselves and any attachments used to supply information required by the forms.

15. Navigable Waters

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

16. Property Rights

Issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

17. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The Permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Director. The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.

18. Other State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

All waste collection, control, treatment, and disposal facilities shall be operated in a manner consistent with the following:

a. The Permittee shall at all times properly operate and maintain in good working order all facilities and systems of treatment and control (and related appurtenances) installed or used by the Permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The Permittee shall provide an adequate operating staff, consistent with the Operator Rule (Environmental Protection Rule, Chapter 4), which is duly qualified to carry out the operation, maintenance, and testing functions required to ensure compliance with the conditions of this permit.

2. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The Permittee shall also take all reasonable steps to minimize or prevent any adverse impact to waters of the State, the environment, or human health resulting from non-compliance with any condition specified in this permit, including accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

4. Dry Weather Flows

Dry weather flows of untreated municipal wastewater from any sanitary or combined sewers are not authorized by this permit and are specifically prohibited by state and federal laws and regulations. If for any reason there is a discharge to waters of the State of dry weather flows of untreated municipal wastewater from any sanitary or combined sewer, the operator of the WWTF or the operator's delegate shall comply with the notice requirements outlined in this permit.

5. Bypass

The bypass of facilities (including pump stations) is prohibited, except where authorized under the terms and conditions of an Emergency Pollution Permit issued pursuant to 10 V.S.A. § 1268.

In addition to § 1268 findings, such bypass must meet the following three conditions:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. The Permittee submitted notices as required under 40 C.F.R. § 122.41(m)(3):

i. Anticipated bypass. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

ii. Unanticipated bypass. The Permittee shall submit notice of an unanticipated bypass as required in Condition II.D.3 (24–hour notice).

6. Upset

a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Condition II.B.6.b. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. Conditions necessary for a demonstration of upset. A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the Permittee can identify the cause(s) of the upset;

ii. The permitted facility was at the time being properly operated; and

iii. The Permittee submitted notice of the upset as required in condition II.D.3 (24-hour notice).

iv. The Permittee complied with any remedial measures required under Condition II.B.3.

c. Burden of proof. In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

7. Sewer Ordinance

The Permittee shall have in effect a sewer use ordinance acceptable to the Secretary which, at a minimum, shall:

a. prohibit the introduction by any person into the Permittee's sewerage system or WWTF of any pollutant which:

i. Is a toxic pollutant in toxic amounts as defined in standards issued from time to time under § 307(a) of the Clean Water Act;

ii. Creates a fire or explosion hazard in the Permittee's treatment works;

iii. Causes corrosive structural damage to the Permittee's treatment works, including all wastes with a pH lower than 5.0;

iv. Contains solid or viscous substances in amounts which would cause obstruction to the flow in sewers or other interference with proper operation of the Permittee's treatment works; or

v. In the case of a major contributing industry, as defined in this permit, contains an incompatible substance, as defined in this permit, in an amount or concentration in excess of that allowed under standards or guidelines issued from time to time pursuant to Sections 304, 306, and/or 307 of the Clean Water Act.

b. Require 45 days prior notification to the Permittee by any person or persons of a:

i. Proposed substantial change in volume or character of pollutants over that being discharged into the Permittee's treatment works at the time of issuance of this permit;

ii. Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be a new source as defined in § 306 of the Clean Water Act if such source were discharging pollutants; or

iii. Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be subject to § 301 of the Clean Water Act if it were discharging such pollutants.

c. Require any industry discharging into the Permittee's treatment works to perform such monitoring of its discharge as the Permittee may reasonably require, including the installation, use, and maintenance of monitoring equipment and monitoring methods, keeping records of the results of such monitoring, and reporting the results of such monitoring to the Permittee. Such records shall be made available by the Permittee to the Secretary upon request.

d. Authorize the Permittee's authorized representatives to enter into, upon, or through the premises of any industry discharging into the Permittee's treatment works to have access to and copy any records, to inspect any monitoring equipment or method required by this permit, and to sample any discharge into the Permittee's treatment works.

8. Emergency Pollution Permits

a. Maintenance activities, or emergencies resulting from equipment failure or malfunction, including power outages, which result in an effluent which exceeds the effluent limitations specified herein, shall be considered a violation of the conditions of this permit, unless the Permittee's discharge is covered under an emergency pollution permit under the provisions of 10 V.S.A. § 1268. The Permittee shall notify the Secretary of the emergency situation by the next working day, unless notice is required sooner under Condition II.D.3.

10 V.S.A. § 1268 reads as follows:

When a discharge permit holder finds that pollution abatement facilities require repairs, replacement, or other corrective action in order for them to continue to meet standards specified in the permit, the holder may apply in the manner specified by the Secretary for an emergency pollution permit for a term sufficient to effect repairs, replacements or other corrective action. The Secretary shall proceed in accordance with Chapter 170 of this title. No emergency pollution permit shall be issued unless the applicant certifies and the Secretary finds that:

i. there is no present, reasonable alternative means of disposing of the waste other than by discharging it into the waters of the State during the limited period of time of the emergency;

ii. the denial of an emergency pollution permit would work an extreme hardship upon the applicant;

iii. the granting of an emergency pollution permit will result in some public benefit;

iv. the discharge will not be unreasonably harmful to the quality of the receiving waters; and

v. the cause or reason for the emergency is not due to willful or intended acts or omissions of the applicant.

b. Application shall be made to the Secretary at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Davis 3 Montpelier, VT 05620-3522.

C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the Permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 C.F.R. § 503), the Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period shall be extended during the course of unresolved litigation and may be extended by request of the Secretary at any time.

c. Records of monitoring information shall include:

i. The date, exact place, and time of sampling or measurements;

ii. The individual(s) who performed the sampling or measurements;

iii. The date(s) analyses were performed;

iv. The individual(s) who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

vii. The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;

viii. The original calculation and data bench sheets of the operator who performed analysis of the influent or effluent pursuant to requirements of this permit; and

ix. For analyses performed by contract laboratories:

a. The detection level reported by the laboratory for each sample; and

b. The laboratory analytical report including documentation of the QA/QC and analytical procedures.

x. When "non-detects" are recorded, the method detection limit shall be reported and used in calculating any time-period averaging for reporting on DMRs.

d. In accordance with 40 CFR § 122.44(i)(1)(iv), the Permittee shall monitor according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O, for the analysis of pollutants or pollutant parameters (except WET). A method is "sufficiently sensitive" when:

1. The method minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter; or

2. The method has the lowest ML of the analytical methods approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O for the measured pollutant or pollutant parameter. The term "minimum level" refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (MDL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the MDL in a method, or the MDL determined by a laboratory, by a factor.

2. Quality Control

a. The Permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at regular intervals to ensure accuracy of measurements, or shall ensure that both activities will be conducted.

b. The Permittee shall keep records of these activities and shall provide such records upon request of the Secretary.

3. Right of Entry

The Permittee shall allow the Secretary, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. To enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. To have access to and copy, at reasonable times, any records required to be kept under the terms and conditions of this permit;

c. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. To sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

D. REPORTING REQUIREMENTS

1. Facility Modification / Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties pursuant to 10 V.S.A. Chapters 47, 201, and/or 211. Any anticipated facility alterations or expansions or process modifications which will result in new, different, or increased discharges of any pollutants must be reported by submission of a new permit application or, if such changes will not violate the effluent limitations specified in this permit, by advance notice to the Secretary of such changes. This notification applies to pollutants which are subject neither to effluent limitations in this permit, nor to notification requirements for toxic pollutants under 40 C.F.R. § 122.42(a)(1). Following such notice, the permit may be modified, pursuant to Condition II.A.6 of this permit, to specify and limit any pollutants not previously limited.

2. Change in Introduction of Pollutants to the WWTF

a. The Permittee, within 30 days of the date on which the Permittee is notified of such discharge, shall provide notice to the Secretary of the following:

i. Any new introduction of pollutants into the treatment works from a source which would be a new source as defined in § 306 of the Clean Water Act if such source were discharging pollutants;

ii. Except for such categories and classes of point sources or discharges specified by the Secretary, any new introduction of pollutants into the treatment works from a source which would be subject to § 301 of the Clean Water Act if such source were discharging pollutants; and

iii. Any substantial change in volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into such works at the time of issuance of the permit.

b. The notice shall include:

i. The quality and quantity of the discharge to be introduced into the system, and

ii. The anticipated impact of such change in the quality or quantity of the effluent to be discharged from the WWTF.

3. Noncompliance Notification

a. The Permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

b. In the event the Permittee is unable to comply with any of the conditions of this permit due, among other reasons, to:

i. Breakdown or maintenance of waste treatment equipment (biological and physical-chemical systems including all pipes, transfer pumps, compressors, collection ponds or tanks for the segregation of treated or untreated wastes, ion exchange columns, or carbon absorption units);

ii. Accidents caused by human error or negligence;

iii. Any unanticipated bypass or upset which exceeds any effluent limitation in the permit;

iv. Violation of a maximum day discharge limitation for any of the pollutants listed by the Secretary in this permit; or

v. Other causes such as acts of nature, the Permittee shall provide notice as specified in subdivisions c and d of this subsection.

c. Pursuant to 10 V.S.A. § 1295, notice for "untreated discharges," as defined in section III.

i. Public notice. For "untreated discharges" an operator of the WWTF or the operator's delegate shall as soon as possible, but no longer than one hour from discovery of an untreated discharge from the WWTF, post on a publicly accessible electronic network, mobile application, or other electronic media designated by the Secretary an alert informing the public of the untreated discharge and its location, except that if the operator or his or her delegate does not have telephone or Internet service at the location where he or she is working to control or stop the untreated discharge, the operator or his or her delegate may delay posting the alert until the time that the untreated discharge is controlled or stopped, provided that the alert shall be posted no later than four hours from discovery of the untreated discharge.

ii. Secretary notification. For "untreated discharges" an operator of the WWTF shall within 12 hours from discovery of an untreated discharge from the WWTF notify the Secretary and the local health officer of the municipality where the facility is located of the untreated discharge. The operator shall notify the Secretary through use of the Department of Environmental Conservation's online event reporting system. If, for any reason, the online event reporting system is not operable, the operator shall notify the Secretary via telephone or e-mail. The notification shall include:

> **a.** The specific location of each untreated discharge, including the body of water affected. For combined sewer overflows, the specific location of each untreated discharge means each outfall that has discharges during the wet weather storm event.
>
> **b.** Except for discharges from the WWTF to a separate storm sewer system, the date and approximate time the untreated discharge began.
>
> **c.** The date and approximate time the untreated discharge ended. If the untreated discharge is still ongoing at the time of reporting, the entity reporting the untreated discharge shall amend the report with the date and approximate time the untreated discharge ended within three business days of the untreated discharge ending.
>
> **d.** Except for discharges from the WWTF to a separate storm sewer system, the approximate total volume of sewage and, if applicable, stormwater that was released. If the approximate total volume is

unknown at the time of reporting, the entity reporting the untreated discharge shall amend the report with the approximate total volume within three business days.

e. The cause of the untreated discharge and a brief description of the noncompliance, including the type of event and the type of sewer structure involved.

f. The person reporting the untreated discharge.

d. For any non-compliance not covered under Condition II.D.3. of this permit, an operator of the WWTF or the operator's delegate shall notify the Secretary within 24 hours of becoming aware of such condition and shall provide the Secretary with the following information, in writing, within five days of becoming aware of such condition:

i. Cause of non-compliance;

ii. A description of the non-complying discharge including its impact upon the receiving water;

iii. Anticipated time the condition of non-compliance is expected to continue or, if such condition has been corrected, the duration of the period of non-compliance;

iv. Steps taken by the Permittee to reduce and eliminate the non-complying discharge; and

v. Steps to be taken by the Permittee to prevent recurrence of the condition of non-compliance.

e. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (combined sewer overflows, sanitary sewer overflows, or bypass events), type of sewer overflow structure (e.g., manhole, combined sewer overflow outfall), discharge volumes untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the sewer overflow event, and whether the noncompliance was related to wet weather.

4. Planned Changes

a. The Permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. § 122.29(b); or

ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements at 40 C.F.R. § 122.42(a)(1).

iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

5. Transfer of Ownership or Control

This permit is not transferable without prior written approval of the Secretary. All application and operating fees must be paid in full prior to transfer of this permit. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the Permittee shall provide a copy of this permit to

the succeeding owner or controller and shall send written notification of the change in ownership or control to the Secretary **at least 30 days in advance of the proposed transfer date**. The notice to the Secretary shall include a written agreement between the existing and new Permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them. The Permittee shall also inform the prospective owner or operator of their responsibility to make an application for transfer of this permit.

This request for transfer application must include as a minimum:

a. A properly completed application form provided by the Secretary and the applicable processing fee.

b. A written statement from the prospective owner or operator certifying:

i. The conditions of the operation that contribute to, or affect, the discharge will not be materially different under the new ownership;

ii. The prospective owner or operator has read and is familiar with the terms of the permit and agrees to comply with all terms and conditions of the permit; and

iii. The prospective owner or operator has adequate funding to operate and maintain the treatment system and remain in compliance with the terms and conditions of the permit.

c. The date of the sale or transfer.

The Secretary may require additional information dependent upon the current status of the facility operation, maintenance, and permit compliance.

6. Monthly Reporting

a. The Permittee is required to submit monthly reports of monitoring results and operational parameters on Discharge Monitoring Report (DMR) form WR-43 or through an electronic reporting system made available by the Secretary. Reports are due on the 15th day of each month, beginning with the month following the effective date of this permit.

b. Unless waived by the Secretary, the Permittee shall electronically submit its DMRs via Vermont's online electronic reporting system. The Permittee shall electronically submit additional compliance monitoring data and reports specified by the Secretary. When the Permittee submits DMRs using an electronic system designated by the Secretary, which requires attachment of scanned DMRs in PDF format, it is not required to submit hard copies of DMRs. The electronic submittals are submitted through the State of Vermont Agency of Natural Resources' Online Services Portal, or its replacement.

c. If, in any reporting period, there has been no discharge, the Permittee must submit that information by the report due date.

7. Signature Requirements

a. All reports shall be signed:

i. For a corporation. By a responsible corporate officer or a duly authorized representative of that person. For the purpose of this section, a responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures

to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

ii. For a partnership or sole proprietorship. By a general partner or the proprietor, respectively; or

iii. For a municipality, state, or other public agency. By either a principal executive officer or ranking elected official, or a duly authorized representative of that person.

b. For the purposes of subdivision (d) of this subsection, a person is a duly authorized representative only if:

i. The authorization is made in writing by a person described in subdivision (d) of this subsection;

ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, or an individual or position having overall responsibility for environmental matters for the company; and

iii. The written authorization is submitted to the Secretary.

c. Changes to authorization. If an authorization under subdivision (b) of this subsection is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subdivision (b) of this subsection must be submitted to the Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under subdivisions (a) or (b) of this subsection shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

8. Additional Monitoring

If the Permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form WR-43. Such increased frequency shall also be indicated.

III. DEFINITIONS

For purposes of this permit, the following definitions shall apply.

Agency – means the Vermont Agency of Natural Resources.

Annual Average – means the highest allowable average of daily discharges calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar year divided by the number of daily discharges measured during that year.

Average – means the arithmetic means of values taken at the frequency required for each parameter over the specified period.

Bypass – means the intentional diversion of waste streams from any portion of the treatment facility.

The Clean Water Act – means the federal Clean Water Act, as amended (33 U.S.C. § 1251, et seq.).

Composite Sample – A composite of at least twenty-four (24) grab samples taken during one consecutive 24-hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportional to flow.

Daily Discharge – means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.

For pollutants with limitations expressed in pounds the daily discharge is calculated as the total pounds of pollutants discharged over the day.

For pollutants with limitations expressed in mg/L the daily discharge is calculated as the average measurement of the pollutant over the day.

Discharge – means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State.

Grab Sample – means an individual sample collected in a period of less than 15 minutes.

Incompatible Substance – means any waste being discharged into the treatment works which interferes with, passes through without treatment, or is otherwise incompatible with said works or would have a substantial adverse effect on the works or on water quality. This includes all pollutants required to be regulated under the Clean Water Act.

Instantaneous Maximum – means a value not to be exceeded in any grab sample.

Major Contributing Industry – means one that: (1) has a flow of 50,000 gallons or more per average work day; (2) has a flow greater than five percent of the flow carried by the municipal system receiving the waste; (3) has in its wastes a toxic pollutant in toxic amounts as defined in standards issued under § 307(a) of the Clean Water Act; or (4) has a significant impact, either singly or in combination with other contributing industries, on a treatment works or on the quality of effluent from that treatment works.

Maximum Day or Maximum Daily Discharge Limitation – means the highest allowable "daily discharge" (mg/L, lbs or gallons).

Mean – means the arithmetic mean.

Method Detection Limit (MDL) – The method detection limit (MDL) is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. (https://www.epa.gov/sites/default/files/2016-12/documents/mdl-procedure_rev2_12-13-2016.pdf).

Minimum Level (ML) – The term ''minimum level'' refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (MDL). Minimum levels may be obtained in several ways: They may be published in a method; they may be sample concentrations equivalent to the lowest acceptable calibration point used by a laboratory; or they may be calculated by

multiplying the MDL in a method, or the MDL determined by a lab, by a factor. (https://www.govinfo.gov/content/pkg/FR-2014-08-19/pdf/2014-19265.pdf, p. 3 footnote 5).

Monthly Average or Average Monthly Discharge Limitation – means the highest allowable average of daily discharges (mg/L, lbs or gallons) over a calendar month, calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar month divided by the number of daily discharges measured during that month.

Monthly Average Flow – Monthly average flow shall be calculated by summing the daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.

NPDES – means the National Pollutant Discharge Elimination System.

Pollutant – means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Secretary – means the Secretary of the Agency of Natural Resources or the Secretary's duly authorized representative.

Septage – means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Total Nitrogen – Total Nitrogen (TN) shall be reported as pounds TN and calculated as: TN (mg/L) × Total Daily Flow (MGD) × 8.34; where TN (mg/L) = TKN (mg/L) + NOx (mg/L).

Ultimate Oxygen Demand (UOD) – UOD shall be reported in pounds and calculated with the following formula: UOD (lbs/day) = [(BOD5 (lbs/day) × 1.43) + (TKN (lbs/day) × 4.57)]

Untreated Discharge – means (1) combined sewer overflows from a WWTF; (2) overflows from sanitary sewers and combined sewer systems that are part of a WWTF during dry weather flows, which result in a discharge to waters of the State; (3) upsets or bypasses around or within a WWTF during dry or wet weather conditions that are due to factors unrelated to a wet weather storm event and that result in a discharge of sewage that has not been fully treated to waters of the State; and (4) discharges from a WWTF to separate storm sewer systems.

Upset – means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Waste – means effluent, sewage or any substance or material, liquid, gaseous, solid, or radioactive, including heated liquids, whether or not harmful or deleterious to waters.

Waste Management Zone – means a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist in a waste management zone due to the authorized discharge.

Waters – means all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs, and all bodies of surface waters, artificial or natural, which are contained within, flow through, or border upon the State or any portion of it.

Weekly Average or Average Weekly Discharge Limitation – means the highest allowable average of daily discharges (mg/L, lbs or gallons) over a calendar week, calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar week divided by the number of daily discharges measured during that week.

Whole Effluent Toxicity (WET) – means the aggregate toxic effect of an effluent measured directly by a toxicity test.

Wastewater Treatment Facility (WWTF) – means a treatment plant, collection system, pump station, and attendant facilities permitted by the Secretary for the purpose of treating domestic, commercial, or industrial wastewater.

IV. TABLE OF PERMITTED DISCHARGE POINTS

Discharge ID	Discharge Activity	Discharge Status	Receiving Water	Latitude	Longitude
001	Fish Hatchery	A	Tributary 10 of Halnon Brook	43.92561	-73.10086

Attachment A.
Metals Scan Parameters

1	Aluminum
2	Antimony
3	Arsenic
4	Beryllium
5	Cadmium
6	Chromium
7	Copper
8	Lead
9	Mercury
10	Nickel
11	Selenium
12	Silver
13	Thallium
14	Zinc

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, DAVIS BUILDING, 3RD FLOOR
MONTPELIER, VT 05620-3522

FACT SHEET FOR PERMIT
December 2022

Permit Number: 3-0361
PIN: RU96-0030
NPDES Number: VT0120098

Facility Name: VT Fish & Wildlife
Salisbury Fish Culture Station

Facility Address: 646 Lake Dunmore Road
Salisbury, VT 05769

Facility Coordinates: Lat: 43.92578 Long: -73.09855

Facility Classification: Industrial, Certified Operator Not Required

Receiving Water: Tributary 10 of Halnon Brook

I. Facility and Proposed Action

The Secretary of the Vermont Agency of Natural Resources (hereinafter referred to as "the Secretary") received a renewal application for the permit to discharge into the designated receiving water from the above-named applicant on November 7, 2011. The facility's previous permit was issued on November 28, 2006 with an effective date of April 1, 2007. The previous permit (hereinafter referred to as the "current permit") has been administratively continued, pursuant to 3 V.S.A. § 814, as the applicant filed a complete application for permit reissuance within the prescribed time period per the Vermont Water Pollution Control Permit Regulations Section 13.5(b). At this time, the Secretary has made a tentative decision to reissue the discharge permit.

The facility is engaged in the production of fish and is classified as a Non-Major NPDES Wastewater Treatment Facility (WWTF).

A map showing the location of the facility, outfalls, and the receiving water is provided in the Reasonable Potential Determination (Attachment A).

II. Statutory and Regulatory Authority

Congress enacted the Clean Water Act (CWA or Act), "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA § 101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specified permitting sections of the Act, one of which is § 402. CWA §§ 301(a), 402(a). Section 402 establishes one of the CWA's principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section of the Act, the U.S. Environmental Protection Agency (EPA) may "issue a permit for the discharge of any pollutant, or combination of pollutants" in accordance with certain conditions. CWA § 402(a). The State of Vermont has been approved by the EPA to administer the NPDES Program in Vermont. NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. CWA § 402(a)(1) - (2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: "technology-based" limitations and "water quality-based" limitations. CWA §§ 301, 303, 304(b); 40 C.F.R. Parts 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant-reducing technology available and economically achievable for the type of facility being permitted. CWA § 301(b). As a class, WWTFs must meet performance-based requirements based on available wastewater treatment technology. CWA § 301(b)(1)(B). The performance level for WWTFs is referred to as "secondary treatment." Secondary treatment is comprised of technology-based requirements expressed in terms of BOD_5, TSS, and pH; 40 C.F.R. Part 133.

Water quality-based effluent limits, on the other hand, are designed to ensure that state water quality standards are achieved, irrespective of the technological or economic considerations that inform technology-based limits. Under the CWA, states must develop water quality standards for all water bodies within the state. CWA § 303. These standards have three parts: (1) one or more "designated uses" for each water body or water body segment in the state; (2) water quality "criteria," consisting of numerical concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an antidegradation provision, focused on protecting high quality waters and protecting and maintaining water quality necessary to protect existing uses. CWA § 303(c)(2)(A); 40 C.F.R. § 131.12.

A permit must include limits for any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water quality standard, including narrative water quality criteria. See 40 C.F.R. § 122.44(d)(1). An excursion occurs if the projected or actual instream concentration exceeds the applicable criterion. A NPDES permit must contain effluent limitations and conditions in order to ensure that the discharge does not cause or contribute to water quality standard violations.

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable instream pollutant concentrations. Acute aquatic life criteria are generally implemented through maximum daily limits and chronic aquatic life criteria are generally implemented through average monthly limits.

Where a state has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a "calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use"; on a "case-by-case basis" using CWA § 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an "indicator parameter." 40 C.F.R. § 122.44(d)(1)(vi)(A-C).

The state rules governing Vermont's NPDES permit program are found in the Vermont Water Pollution Control Permit Regulations (Environmental Protection Rule, Chapter 13).

III. Permit Limit and Condition Formulation

A. Reasonable Potential Determination

In determining whether this permit has the reasonable potential to cause or contribute to an impairment, the Secretary has considered:

1) Existing controls on point and non-point sources of pollution as evidenced by the Vermont surface water assessment database;

2) Pollutant concentration and variability in the effluent as determined from the permit application materials, monthly discharge monitoring reports (DMRs), or other facility reports;

3) Receiving water quality based on targeted water quality and biological assessments of receiving waters, as applicable, or other State or Federal water quality reports;

4) Toxicity testing results based on the Vermont Toxic Discharge Control Strategy, and compelled as a condition of prior permits;

5) Available dilution of the effluent in the receiving water, expressed as the instream waste concentration. In accordance with the applicable Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29A), available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10) for aquatic life and human health criteria for non-carcinogens, or at all flows for human health (carcinogens only) in the receiving water. For nutrients, available dilution for stream and river discharges is assessed using the low median monthly flow computed as the median flow of the month containing the lowest annual flow. Available dilution for lakes is based on mixing zones of no more than 200 feet in diameter, in any direction, from the effluent discharge point, including as applicable the length of a diffuser apparatus; and

6) All effluent limitations, monitoring requirements, and other conditions of the draft permit.

The Reasonable Potential Determination for this facility is attached to this Fact Sheet as Attachment A.

B. Anti-Backsliding

Section 402(o) of the CWA provides that certain effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the current permit. EPA has also promulgated anti-backsliding regulations which are found at 40 C.F.R. § 122.44(l). Unless applicable anti-backsliding exemptions are met, the limits and conditions in the reissued permit must be at least as stringent as those in the current permit.

C. Receiving Water Classification

All uses Class B with a waste management zone. Class B waters are suitable for swimming and other primary contact recreation; irrigation and agricultural uses; aquatic biota and aquatic habitat; good aesthetic value; boating, fishing, and other recreational uses; and suitable for public water source with filtration and disinfection or other required treatment. A waste management zone is a specific reach of Class B(1) or B(2) waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings.

The receiving water for this discharge is Tributary 10 of Halnon Brook, a designated Cold Water Fish Habitat. At the point of discharge, the stream has a contributing drainage area of 0.28 square miles. The summer 7Q10 flow of the river is estimated to be 0.026 cubic feet per second (CFS), and the summer Low Median Monthly flow is estimated to be 0.092 CFS. The instream waste concentration at the summer 7Q10 flow is 0.987 (98.7%) and the instream waste concentration at the summer Low Median Monthly flow is 0.957 (95.7%).

In addition, Halnon Brook drains into Lake Champlain, which is impaired for phosphorus and is subject to a Total Maximum Daily Load (TMDL) for phosphorus. This is discussed further in Section V.C.5. of this Fact Sheet.

D. Waste Management and Mixing Zones

A Waste Management Zone (WMZ) is a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that contained organisms pathogenic to human beings prior to treatment. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist in a WMZ due to the authorized discharge.

The Secretary may establish a WMZ as part of the issuance of a discharge permit as described in 10 V.S.A. § 1252. The model used to determine the WMZ is based upon three precepts of domestic wastewater treatment facility discharges: 1) the use of coliform bacteria as an indicator of pathogenic organisms; 2) despite proper operation and maintenance disinfection failures may occur; and 3) a reasonably sized waste management segment provides a "buffer zone" downstream of the wastewater discharge in which contact recreation is not recommended. If a disinfection failure should occur at the WWTF, the time of travel through this zone will provide time during which some pathogen die-off will occur and may also allow time for public notification. A WMZ is not a Mixing Zone. The facility currently does not have a WMZ.

A Mixing Zone is a length or area within Class B waters required for the dispersion and dilution of waste discharges adequately treated to meet federal and state treatment requirements and within which it is recognized that specific water uses or water quality criteria associated with the assigned classification for such waters may not be realized. A mixing zone shall not extend more than 200 feet from the point of discharge and must meet the terms of 10 V.S.A. § 29A-204. For a mixing zone to be applicable to a discharge it must be authorized within the discharge permit. The Secretary has made the determination that conditions due to discharges of waste within any mixing zone shall:

a. not result in a significant increase in public health risk when evaluated using reasonable assumptions about exposure pathways;

b. not constitute a barrier to the passage or movement of fish or prevent the full support of aquatic biota, wildlife, and aquatic habitat uses in the receiving waters outside the mixing zone;

c. not kill organisms passing through;

d. protect and maintain the existing uses of the waters;

e. be free from materials in concentrations that settle to form objectionable deposits;

f. be free from floating debris, oil, scum, and other material in concentrations that form nuisances;

g. be free from substances in concentrations that produce objectionable color, odor, taste, or turbidity; and

h. be free from substances in concentrations that produce undesirable aquatic life or result in a dominance of nuisance species. (Vermont Water Quality Standards § 29A-204(a)).

This facility currently does not have a mixing zone.

IV. Facility History and Background

The Vermont Department of Fish and Wildlife owns and operates the Salisbury Fish Culture Station. The facility is a primary salmonid egg supplier for the Vermont Fish and Wildlife fish culture program. The following species are at the facility at various life stages from egg to adult: Brook trout, Brown trout, Rainbow trout, Steelhead trout (rainbow), and Lake trout. Approximately three million eggs are distributed annually to other fish culture stations for rearing and stocking. In addition to the eggs, approximately 30,000-40,000 adult fish are produced annually for stocking directly into streams and waterways. Most fish are stocked as one year olds with a small portion of two year olds.

The source of process water for the station consists of groundwater from two, on-site, gravel packed wells. There are 19 outdoor raceways and 16 indoor start tanks at the facility. Most of these raceways are supplied with serially reused water. Some of the outdoor raceways also utilize partial recirculation loops to increase flows and conserve water. After leaving the raceways, the process wastewater enters a polishing pond, where it mixes with stormwater and runoff from an adjacent parcel. Effluent is discharged to Tributary 10 of Halnon Brook, which flows for approximately ½ mile until it reaches the confluence with Halnon Brook.

V. Monitoring

A. Flow – The draft permit maintains the annual average flow limitation of 1.31 MGD. This facility maintains a constant discharge and continuous flow monitoring is required.

B. Conventional Pollutants

1. Biochemical Oxygen Demand (BOD_5) – The annual "monitor only" sampling requirement for BOD_5 is unchanged from the current permit. Sampling shall be conducted in **September**.

2. Total Residual Chlorine (TRC) – The Total Residual Chlorine (TRC) limitation is 0.02 mg/L monthly average and 0.02 mg/L daily maximum. The RPD established effluent limits of 0.019 mg/L daily maximum and 0.011 mg/L monthly average, which is equal to the Vermont Water Quality Standards (VWQS) acute and chronic criteria for protection of aquatic biota. These calculated limits are less than the detection limit of the currently approved version of Standard Methods for the Examination of Water and Wastewater (Method 4500 CL-E and G).

The draft permit specifies a compliance level of 0.02 mg/L for TRC. A compliance level is specified because the limitations for TRC are below the minimum level (ML) for analysis of TRC using Method 4500-Cl G, N, N-diethyl-p-phenylenediamine (DPD) colorimetric, of 0.02 mg/L. This approach is consistent with EPA's Technical Support Document for Water Quality-based Toxics Control (EPA-505-2-90-001, March 1991), page 111, which recommends, "the compliance level be defined in the permit as the minimum level (ML)." See Standard Methods for the Examination of Water and Wastewater for the full text of these test methods.

The only chlorine containing product the facility uses is Chloramine-T, which is used rarely and only when approved by the fish hatchery pathologist to treat potential disease outbreaks. Chloramine-T has only been used by the facility once in the last five years. Due to this information, the previous narrative permit requirements established for use of Chloramine-T remains in the permit and a compliance level of 0.02 mg/L for TRC was added with the requirement of monitoring twice a month when the chemical is in use, with the grab samples accounting for detention time throughout the system. The Permittee shall report the monitoring results, the dates the product is used, and quantities of product used on the WR-43 reporting form.

3. pH – The monthly "monitor only" pH sampling requirement from **April to October** is unchanged from the current permit.

4. Total Suspended Solids (TSS) – The effluent limitations (5 mg/L monthly average and 15 mg/L daily maximum) remain unchanged from the current permit. Monthly sampling shall be conducted from **April to October.**

C. Nutrients Monitoring

1. Total Nitrogen (TN) – A monthly "monitor only" requirement for TN has been included in the draft permit. TN is acalculated value based on the sum of NO_x and TKN, and, shall be reported as pounds, calculated as:

TN (mg/L) x Total Daily Flow x 8.34

where, TN (mg/L) = TKN (mg/L) + NO_x (mg/L)

Per EPA, excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically, nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management ofboth phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs, some are P dependent, others N dependent and others are co-dependent on these two nutrients.

Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community. Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds).

Facilities with a design flow greater than 1 MGD will complete monthly monitoring unless more frequent sampling is already required by the current permit. The current permit does not require TN sampling; therefore, a new monthly monitoring requirement is included in the draft permit.

2. Nitrate/Nitrite (NO_x) – Nitrite Plus Nitrate as Nitrogen (NO_x) – Nitrite (NO2-) and Nitrate (NO3-) are oxidized forms of Nitrogen. NO_x is needed to calculate Total Nitrogen (TN). To gather data on the amount of Total Nitrogen in this discharge, Nitrite (NO2-) plus Nitrate (NO3-) monitoring is proposed in the renewed permit. The sum of Nitrite (NO2-) and Nitrate (NO3-) is represented as NO_x to simplify the notation in wastewater chemistry. The x represents the number of Oxygen atoms (2 or 3) and the negative charge notation (-) is dropped. This notation is also used in atmospheric chemistry where other oxidation states are possible.

$$NO2^- + NO3^- = NO_x$$

Test results are reported in terms of Nitrogen (N) because water quality standards are generally expressed in terms of Nitrogen for simplicity and consistency. This constituent (NO_x) is sometimes also shown as (NO2/NO3), NO_x, Nitrate/Nitrite Nitrogen, and Nitrite Plus Nitrate Total 1 Det. (As N). To gather data on the amount of NO_x in this discharge and its potential impact on the receiving water, a monthly “monitor only” sampling requirement is included in the permit.

3. Total Kjeldahl Nitrogen (TKN) – TKN is the sum of nitrogen in the forms of ammonia (un-ionized (NH3) and ionized ($NH4^+$)), soluble organic nitrogen, and particulate organic nitrogen. To gather data on the amount of TKN in this discharge and its potential impact on the receiving water, a monthly “monitor only” sampling requirement has been included in the draft permit.

4. Total Ammonia Nitrogen (TAN) – Total Ammonia Nitrogen (TAN) (NH3-N) is the sum of the free ammonia-nitrogen plus the amount of nitrogen from ammonia that has combined with chlorine. To gather data on the amount of TAN in this discharge and its potential impact on the receiving water, a monthly "monitor only" sampling requirement has been included in the draft permit.

5. Total Phosphorus (TP) – Excess phosphorus entering Lake Champlain from a variety of sources has impaired the lake's water quality. The Lake Champlain Total Maximum Daily Load (LC TMDL), issued June 17, 2016, places a cap on the maximum amount of phosphorus from point and non-point sources that is allowed to flow into the lake while still meeting Vermont's water quality standards. The EPA developed phosphorus TMDLs for the twelve Vermont segments of Lake Champlain in collaboration with the Vermont Agency of Natural Resources, Department of Environmental Conservation and the Vermont Agency of Agriculture, Food, and Markets, and released the document titled "Phosphorus TMDLs for Vermont Segments of Lake Champlain" (June 2016). The 2016 LC TMDL specifies allowable phosphorus loads, or waste load allocations (WLA), expressed as metric tons per year (mt/yr), for each of the 59 WWTFs that discharge to the Lake Champlain watershed. The Secretary will issue discharge (NPDES) permits in accordance with the permit issuance schedule in the Lake Champlain TMDL Phase 1 Implementation Plan (Chapter 3, page 46). The Secretary will follow this schedule unless special circumstances are raised by the facility that warrant the issuance of the permit sooner (e.g., planned facility upgrades), and the Wastewater Management Program has sufficient staff capacity to handle the request.

Reductions in WLAs are targeted only to WWTFs in those lake segment watersheds where the currently permitted wastewater load represents a 10% or greater portion of the total phosphorus load to that segment from all sources (Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay) or where wastewater upgrades would meaningfully reduce the phosphorus reduction burden placed on non-wastewater (non-point) sources (Missisquoi Bay). Therefore, WWTFs discharging to the Port Henry, Otter Creek, Mallets Bay, Northeast Arm, Isle LaMotte, and the South Lake A/B lake segments were not assigned a new waste load allocation. The EPA also determined that wastewater facilities with a design flow of < 0.1 million gallons per day (MGD) would be given the same allocations as in the 2002 TMDLs due their minor contribution of phosphorus loading.

The LC TMDL establishes new annual WLAs for WWTFs with a design flow capacity above 0.1 MGD that discharge to the Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay, and Missisquoi Bay lake segments. Specifically, WWTFs with a design flow capacity of 0.1 to 0.2 MGD were assigned WLAs based on a 0.8 mg/L effluent phosphorus concentration at permitted flow while WWTFs with design capacity of > 0.2 MGD were assigned WLAs based on a 0.2 mg/L effluent phosphorus concentration at permitted flow.

In the LC TMDL, EPA acknowledged and supported the Secretary's commitment to employ flexible approaches to implementing the WWTF WLAs including "providing a period of time for optimization to be pursued and the corresponding load reduction results to be realized, and then commencement of the process to upgrade phosphorus treatment facilities will be required when actual phosphorus loads reach 80% of the LC TMDL limits." The Wastewater Management Program maintains a tracking system for phosphorus loading from Vermont WWTFs so facilities approaching or over the 80% threshold can be identified. The 80% phosphorus load threshold is calculated by comparing the

individual WWTF phosphorus WLA established in the LC TMDL to the actual phosphorus discharge load from the WWTF over last 12 months:

WWTF Annual TP Load / LC TMDL WLA × 100

There are currently WWTFs in the Lake Champlain watershed with existing discharged loads of phosphorus already at, or above, 80% of allowable loads. To ensure facilities are operating as efficiently as possible, all reissued wastewater discharge (NPDES) permits under the LC TMDL will specify a period of 12 months for optimization to be pursued and the corresponding load reduction results to be realized, prior to evaluating where a facility ranks relative to the 80% trigger. Discharge permits will specify that after the optimization period, when an existing facility reaches 80% of its WLA for phosphorus (evaluated as a rolling, 12-month load), the Permittee will have to develop and submit a projection of whether the facility will exceed its WLA during the permit term and if it is projected to do so, then the facility will be required to develop a Phosphorus Elimination/Reduction Plan (PERP) that will ensure the facility continues to comply with its WLA.

Effluent TP limits in permits are expressed as:

(1) total annual mass loads, and

(2) for facilities that currently have an existing monthly effluent concentration limit for TP in their NPDES permit, as monthly effluent concentration limits.

Phosphorus Limit in Draft Permit:

The current discharge permit for this facility includes a mass-based, effluent limit of 399 pounds of TP per year. This annual mass limitation was based on an allocation of 0.181 metric tons established in the 2002 Lake Champlain Phosphorus TMDL.

The proposed draft permit contains a phosphorous mass effluent limit of 152 total pounds, annual limitation (0.0689 metric tons per year). Tributary 10 of Halnon Brook is on the State of Vermont 2016 303(d) list of impaired waters due to elevated nutrients affecting aquatic biota. Since there is reasonable potential to contribute to this impairment, the Clean Water Act requires the imposition of effluent limitations necessary to address the facility's portion of the impairment. The draft permit includes a mass based effluent limitation of 152 pounds of TP per year. The annual mass limitation was based on an allocation of 0.0689 metric tons and was established in the Reasonable Potential Determination (RPD) for the facility (Attachment A). The proposed annual mass limitation will cap the facility's contribution to the impairment of Tributary 10 of Halnon Brook and is well within the LC TMDL allocation of 0.181 metric tons (399 lbs./year) that was established in the 2016 LC TMDL.

This new, annual WLA represents an 89% reduction (247 pounds) from the current permit and is equivalent to setting the effluent TP limit at 0.04 mg/L at the design capacity of the WWTF (1.31 MGD). To convert units of the WLA from metric tons to pounds for the annual, mass-based TP permit limit, the following equation was used and the resulting WLA rounded down to the nearest

pound:

(0.0689 mt/yr) (2204.62 lbs/mt) = 152 lbs/yr

The LC TMDL includes WLAs for WWTFs expressed as total annual mass loads. Compliance with the annual limit will be calculated each month using the Running Total Annual Pounds Calculation (Condition I.C.2.c. of the permit), rather than once at the end of the calendar year. The LC TMDL does not include monthly average concentration effluent limits for WWTFs. State law (10 V.S.A. 1266a) requires that, "No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams per liter on a monthly average basis." While the WLA in the TMDL was calculated based on a TP effluent monthly average limit concentration of 0.04 mg/L, the permit does not include 0.04 mg/L as the concentration effluent limitation because a Permittee may not need to consistently achieve 0.04 mg/L to ensure compliance with the WLA established in the TMDL. However, a 0.8 mg/L monthly average concentration limit for TP is included as required by 10 V.S.A. § 1266a.

Monthly sampling for total phosphorus is required from November to May. Sampling is required twice per month from June to October.

Condition I.C.3.c. of this draft permit requires the submission of monitoring reports to the Secretary specific to tracking TP in the discharge. A report that documents the annual TP discharged from the facility, summarizes phosphorus removal optimization and efficiencies, and tracks trends relative to the previous year shall be attached to the applicable WR-43 form. The annual and monthly TP loads discharged from the facility shall also be reported electronically with other required parameters.

Analysis in Support of Phosphorus Limit:

The numeric criteria for TP to protect Aquatic Biota Use in Small High Gradient stream types are exceeded when calculated at this facility's full design flow and with the receiving water at low-medium monthly (LMM) flow conditions. This facility has reasonable potential to violate VWQS due to exceeding the narrative and numeric criteria for TP. Therefore, a revised annual WQBEL load of 152 lbs./year was developed for this permit.

The load was reduced to a value that would represent a 20 µg/L average TP effluent reduction, based on the facility's operating conditions in the last 5 years, that will result in measurable improvements to the biological community. This was based on the best professional judgement from the VT DEC Monitoring and Assessment Program biologists.

Phosphorus Optimization Plan (POP) / Best Management Practices (BMP) Plan:

To ensure that the facility is operating as efficiently as possible for purposes of phosphorus removal, Condition I.C.3. of the draft permit requires that within 120 days of the permit effective date, the Permittee shall develop and submit to the Secretary a POP/BMP Plan to increase the facility's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities

and equipment and describes how the Permittee will comply with each of the technology-based effluent limitations under Condition I.A.4. of the draft permit.

Phosphorus Elimination and Reduction Plan (PERP):

Since the new annual WLA of 152 lbs./year is less than 80% of the LC TMDL WLA of 399 lbs./year, the Permit does not contain a requirement to submit a PERP detailing projected future phosphorus loadings and permit compliance if 80% of the LC TMDL WLA is exceeded.

6. Total Phosphorus (TP) and Dissolved Phosphorus (DP) Instream Monitoring

To evaluate the effectiveness of the adaptive management strategy being developed to reduce total phosphorus concentrations discharged, instream water quality monitoring shall be conducted. Monthly instream sampling for TP and DP at Halnon Tributary 10 River Mile (RM) 0.1, RM 0.2, and RM 0.5 shall occur between November 1 and May 31. Twice monthly sampling shall occur between June 1 and October 31. Sampling shall be conducted following approval of the sampling plan and updated Quality Assurance Project Plan (QAPP).

If snow, ice, or flooding preclude instream sampling, that information shall be included in that month's eDMR.

Should the Wainwright dam downstream of the facility be removed, the permit shall be reopened to assess the instream monitoring locations.

7. Formalin – A new daily maximum effluent limit of 7.2 mg/L and monthly average effluent limit of 3.6 mg/L is included in the draft permit. Monitoring shall occur twice a month when the chemical is in use, with the grab samples accounting for detention time throughout the system. The amount of formalin used, treatment concentrations, duration of treatments, dates, masses, and calculated effluent concentration of formalin for each treatment shall be included as an attachment of the monthly Discharge Monitoring Report (DMR) form WR-43.

This limit and monitoring frequency does not apply to formalin treatments at the Hatch House, which is sectioned off from the rest of the facility and when mixed with the facility flow, does not have reasonable potential to violate water quality standards for formalin.

3. <u>Discharge Special Conditions</u>

Permit Schedule Items

A. Macroinvertebrate Monitoring

To evaluate the effectiveness of the adaptive management strategy being developed to reduce total phosphorus concentrations discharged, instream biological monitoring shall be conducted. Macroinvertebrate monitoring shall be conducted between the months of August-October in 2024 and 2026. Sampling locations include

Tributary 10 of Halnon Brook RM 0.1 and RM 2.5. Sampling shall be conducted following approval of the sampling plan and updated Quality Assurance Project Plan (QAPP).

B. Whole Effluent Toxicity (WET) Testing Acute/Chronic

40 C.F.R. Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria. Per these federal requirements, the Permittee shall conduct WET testing and toxic pollutant analyses according to Condition I.E. outlined in the draft permit. If the results of these tests indicate a reasonable potential to cause an instreamtoxic impact, the Secretary may require additional WET testing, establish a WET limit, or require a Toxicity Reduction Evaluation.

In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall maintain the WET testing frequency established in Condition I.E.10. during such continuance, starting with WET test sampling during August-October 2027 with results due by 12/31/2027.

C. Metals Scan

Due to the lack of monitoring data for metals, it was not possible to assess reasonable potential for metals (Al, Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, and Zn). Metals monitoring concurrently with WET tests is required to support future assessments. The Metals Scan shall be conducted concurrently with the WET tests outlined in Condition I.E. of the draft permit.

In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall conduct and include the results of the Metals Scan with each WET test conducted during continuance.

D. Quality Assurance Report / Proficiency Testing

To ensure there are adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct an annual laboratory proficiency test for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by their NPDES permit. Proficiency Test samples must be obtained from an accredited laboratory or as part of an EPA DMR-QA study. Results shall besubmitted to the Secretary by December 31, annually, beginning in **2023.**

VI. General Conditions

A. Electronic Reporting

The National Pollution Discharge Elimination System (NPDES) Electronic Reporting Rule (eRule) modernized Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The eRule requires the inclusion of electronic reporting requirements in NPDES permits that become effective after December 21, 2015. The rule requires that NPDES regulated entities that are required to submit discharge monitoring reports (DMRs), including majors and nonmajors, individually permitted or covered by a general permit, must do so electronically after December 21, 2016. The Secretary has created an electronic reporting system for DMRs and has trained facilities in its use. As of December 21, 2020, these NPDES facilities must also submit additional information electronically as specified in Appendix A in 40 C.F.R. Part 127.

B. Noncompliance Notification

As required by 10 V.S.A. § 1295, a Noncompliance Notification has been included in the draft permit. Section 1295 requires the Permittee to provide public notification of untreated discharges from wastewater facilities. The Permittee is required to post a public alert within one hour of discovery and submit to the Secretary specified information regarding the discharge within 12 hours of discovery.

C. Reopener - The draft permit includes a reopener clause whereby the Secretary reserves the right to reopen and amend the permit to implement an integrated plan to address multiple Clean Water Act obligations.

VII. Final Determinations

The public comment period for receiving comments on this draft permit was from October 28, 2022 to November 28, 2022, during which time interested persons could submit their written views on the draft permit. No comments were received during the public comment period.

ATTACHMENT A.

REASONABLE POTENTIAL DETERMINATION

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive Davis 3
802-828-1535

MEMORANDUM

Prepared by: Michelle Kolb, Wastewater Program (WWP)

Cc: Amy Polaczyk, Manager, WWP
Bethany Sargent, Manager, Monitoring and Assessment Program (MAP)

Date: October 14, 2022

Subject: WQBEL Permit Limit Review and Calculations for the Vermont Fish and Wildlife Salisbury Fish Hatchery (3-0361)

I. Introduction

This memo serves as a record of the review and calculation of Water Quality Based Effluent Limits (WQBEL) and is intended to supplement the Reasonable Potential Determination memo prepared for the subject facility. The memo is broken into the following parts:

- An introduction
- A description of new or revised permit limit requirements.
- A description of the methodology used to develop WQBEL permit limits
- Narrative justifications for any new permit limits

The spreadsheet used to perform these calculations is available upon request.

II. New Permit Limits

	WQBEL Discharge Limitations									
	Annual Average	Annual Limit	Monthly Average	Weekly Average	Maximum Day	Monthly Average	Weekly Average	Maximum Day	Instanteous Maximum	Sampling Frequency
Effluent Characteristics (Constituents)		lbs/year	Mass (lbs/day)			Concentration (mg/L)				(per month)
Total Phosphorus		152				MO				Monthly November 1 - May 31; 2x per month June 1 - October 31
Total Phosphorus (Instream)						MO				Monthly November 1 - May 31; 2x per month June 1 - October 31; Concurrently with Effluent TP sampling; Location: downstream at RM 0.1, 0.2 and 0.5
Dissolved Phosphorus (Instream)						MO				Monthly November 1 - May 31; 2x per month June 1 - October 31; Concurrently with Effluent TP sampling; Location: downstream at RM 0.1, 0.2 and 0.5
Formalin					3.6			7.2		2x per month when formalin is used in raceways
Total Residual Chlorine						0.02		0.02		2x per month when Chloramine-T is used
Total Nitrogen			MO			MO				Monthly
Total Kjeldahl Nitrogen			MO			MO				Monthly
Nitrate/Nitrite Nitrogen			MO			MO				Monthly
Total Ammonia Nitrogen			MO			MO				Monthly
Metals Scan									MO	4x in permit term with WET test
Acute and Chronic WET Test									MO	4x in permit term (2x in summer months and 2x in winter months)

The constituents shown above in Table 1 were developed in order to ensure that the proposed discharge is protective of Vermont Water Quality Standards (VWQS) in the receiving water.

The following constituents were not analyzed as WQBELs: Flow, BOD, TSS, and pH. These constituents are subject to TBELs.

III. WQBEL calculation methodology

The Water-Quality Based Effluent Limitations (WQBELs) for pollutants of concern were assessed via the mass balance steady state model method outlined in the Chapter 4 of the EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD) (page 86). Results were then compared to the current permit limit. The recommended permit limit was selected by comparing applicable Technology-Based Effluent Limits (TBELs), current WQBELs, and WQBELs calculated based on 2017 VWQS acute and chronic criteria.

The steady-state mass balance method produces a Waste Load Allocation (WLA), the critical effluent pollutant concentration based on the VWQS acute and chronic critical thresholds for the constituent(s) of concern. The method assumes complete mixing of the pollutant within the receiving water. The resulting WLA is the WQBEL for each acute and chronic VWQS criteria dilution assessed.

Per the TSD method, WLA results were used to calculate the Long-Term Average (LTA) for each criteria type using methods provided in Table 5-1 (TSD page 102). WLA multipliers are picked from the 99th percentile column. The most conservative LTA is then used to determine the Maximum Daily Limit (MDL) or Average Monthly Limit (AML) using the calculation shown in Table 5-2 (TSD page 103). The 99th percentile column is used for the MDL calculation and the 95th percentile columns are used for the AML calculation.

In this process, data for the facility and receiving waters is used. When necessary, values for VWQS were calculated based upon the methods described in their appendices and footnotes. Monitoring frequency are taken from the existing permit or assigned for new pollutants based upon similar facilities. In the absence of ambient receiving water data, a value of 5% of the VWQS has been generally assumed for the upstream concentration. Please see the individual calculation tabs for specific analyses.

The resulting MDL and AML are compared with the existing permit limits, any applicable TBELs including TMDLs, and any legislated limits to determine the final effluent limits that are protective of quality standards. The proposed limits are entered into the spreadsheet and Table 1 (above) and a short narrative is prepared justifying the limits. Those narratives are presented in the next section.

IV. Justification of Proposed WQBELs

1. Total Phosphorus

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document states the facility's Annual Waste Load Allocation is 399 lbs./year. The numeric criteria for TP to protect Aquatic Biota Use in Small High Gradient stream types are exceeded when calculated at this facility's full design flow with and without the TSD method, and with the receiving water at LMM conditions. This facility has reasonable potential to violate VWQS due to exceeding the narrative and numeric criteria for TP. Therefore, a revised annual WQBEL load of 152 lbs./year was developed for this permit. The monthly

average of 0.8 mg/L applies per 10 V.S.A. § 1266a. This permit includes monthly sampling for TP between November 1 and May 31 and sampling twice a month for TP between June 1 and October 31.

The load was reduced to a value that would represent a 20 µg/L average TP effluent reduction, based on the facility's operating conditions in the last 5 years, that will result in measurable improvements to the biological community in the receiving water. This was based on the best professional judgement from the VT DEC Monitoring and Assessment Program biologists. The load calculation was performed as follows:

Annual Load (152 lbs) = (Allowable TP from WWTF (0.038 mg/l)) x (Facility Design Flow (1.31 MGD)) x 8.34 x 365.25

1) The RPD limit calculation used a reduced flow of 1.0 MGD to calculate the annual load based on a monthly average concentration limit of 0.05 mg/L. In order to maintain the design flow that is included in the facility's application and apply the recommended annual load, the monthly concentration limit was reduced to 0.038 mg/L.
2) 8.34 is the conversion from pounds to gallons of water.
3) 365.25 days/year were used to account for leap years. Leap years were not accounted for in the RPD calculation.

To evaluate the effectiveness of the adaptive management strategy being developed to reduce total phosphorus concentrations discharged, instream biological and water quality monitoring shall be conducted. A sampling plan shall be developed and submitted to DEC for approval. Once the sampling plan is approved, a QAPP shall be submitted to DEC for approval.

Instream sampling for Total Phosphorus and Dissolved Phosphorus shall coincide with effluent Total Phosphorus monitoring. Sampling shall occur downstream at Halnon Trib 10 RM 0.1, 0.2, and 0.5.

Macroinvertebrate monitoring shall be conducted during the months of August-October in 2024 and 2026 at Halnon Trib 10 at RM 0.1 and Halnon RM 2.5.

2. Formalin

The previous permit did not include a formalin monitoring frequency or limit and only required reporting of dates and quantities of all chemicals used in the WR-43. Based on the WR-43s, and confirmed by the facility, formalin is the main chemical used at the hatchery for control of pathogens and disease. A new Maximum Day limit of 7.2 mg/l and new Monthly Average limit of 3.6 mg/l has been added to this permit.

Currently there are no acute and chronic aquatic life criteria for either formalin or formaldehyde in the state water quality standards for Massachusetts, New Hampshire, or Vermont. Hohreiter and Rigg derived acute and chronic aquatic life formaldehyde criteria of 4.58 mg/L and 1.61 mg/L, respectively, in Draft AQUAGP 2020 Fact Sheet Page 26 in accordance with EPA's Guidelines for Deriving Numerical

National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. For the limit calculation, these values were converted to acute and chronic formalin criteria (assuming formalin is 37% formaldehyde) by multiplying by 2.7; resulting in 12.36 mg/L formalin (acute) and 4.34 mg/L formalin (chronic).

It was clarified by the facility in a July 26, 2022 letter that more frequent formalin treatments occur in an area of the facility, the Hatch House, that is sectioned off from the rest of the facility. More sporadic treatment of formalin occurs in the raceways, as clarified in a September 21, 2022 letter from the facility.

An RPD for the Hatch House formalin use calculated the resultant formalin concentration in the facility's 1.31 MGD flow before discharge and after mixing with the Hatch House's 40 gallon/day maximum formalin treated water. The resultant concentration was 0.05 mg/L, well below the acute and chronic formalin criteria. Therefore, there is no reasonable potential for formalin from the Hatch House to violate water quality standards based on the method of formalin use described by the facility. The limits and monitoring requirements do not apply to formalin use in the Hatch House.

The RPD for formalin use in the raceways determined reasonable potential and assigned limits based on multiplying the acute and chronic formalin criteria by the facility's instream waste concentration (IWC) of 0.98. The RPD calculation does not follow TSD method described in the WQBEL calculation methodology section above. When applying the TSD method, the resulting limits are a Maximum Day limit of 7.2 mg/l and a Monthly Average limit of 3.6 mg/l, and these are included in the permit. These limits apply only to formalin use in the raceways.

This permit contains a requirement to report Formaldehyde concentrations, calculated effluent Formalin concentrations, the date the product is used, and quantities of product used for each treatment. Monitoring shall consist of a single grab sample twice a month when the chemical is in use in the raceways. Grab samples shall be collected to account for detention time throughout the system.

3. Total Residual Chlorine

The RPD stated limits for total residual chlorine should be established as 0.019 mg/L daily maximum and 0.011 mg/L monthly average. These limits are equal to the VWQS acute and chronic criteria for protection of aquatic biota. The suggested sampling was twice per month during months when chlorine products are used.

The facility clarified that the only chlorine containing product they use is Chloramine-T, which is used very rarely and only when approved by the fish hatchery pathologist to treat potential disease outbreaks. Chloramine-T has only been used by the facility once in the last five years. Due to this updated information, the previous narrative permit requirements established for use of Chloramine-T shall remain in the permit and a compliance level of 0.02 mg/L for TRC will be included in this permit.

The previous permit authorizes use of Chloramine-T in concentrations up to 20ppm for up to 60 minutes on the fish in the start tank and raceways and treatment shall be limited such that no more than one half of the facility's design flow receives treatment at any one time. Treatments may be made for up to three consecutive days for bacteria control or up to 21 days for parasite control.

The compliance level of 0.02 mg/L is specified because the limitations of 0.019 and 0.011 mg/L for TRC are below the minimum level (ML) for analysis of TRC using Method 4500-Cl G, N, N-diethyl-p-phenylenediamine (DPD) colorimetric, of 0.02 mg/L. This approach is consistent with EPA's Technical Support Document for Water Quality-based Toxics Control (EPA-505-2-90-001, March 1991), page 111, which recommends, "the compliance level be defined in the permit as the minimum level (ML)." See Standard Methods for the Examination of Water and Wastewater for the full text of these test methods.

Given the magnitude, frequency and duration of Chloramine-T use and the detention time of the polishing pond, TRC measurements of 0.02 mg/L and less will be considered in compliance.

4. Total Ammonia Nitrogen

This facility has an IWC great enough to have potential Total Ammonia Nitrogen toxic effects in the receiving water. The previous permit included an annual monitor only requirement and there is insufficient data available to determine RP for summer and winter. In order to collect data to calculate the reasonable potential for this facility to violate VWQS for Total Ammonia Nitrogen this permit has increased from an annual to a monthly monitor only requirement. Both concentrations and loads should be monitored.

5. Total Nitrogen, Kjeldahl Nitrogen and Nitrate/Nitrite Nitrogen

Total Nitrogen monitoring should be conducted in support of the 2016 Lake Champlain Total Phosphorus TMDL. A monthly monitor only condition has been added to this permit. The monthly monitoring frequency has been chosen based upon the high IWC. Both concentrations and loads shall be monitored. Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN) and Nitrate/Nitrite Nitrogen (NOx) should each be reported using an appropriate combination of CWA approved methods and arithmetic (TN = TKN +NOx).

Historically, nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence indicates management of both phosphorus and nitrogen is necessary to protect water quality.

6. Whole Effluent Toxicity (WET)

In order to provide additional data for future assessments of WET reasonable potential, this permit requires four 1-species (*Ceriodaphnia dubia)* 48 hour acute/ 7-day chronic tests be conducted during

the permit term, two during the summer (August-October 2022 and 2024) and two during the winter (January-February 2023 and 2025). Concurrent sampling for TAN and the Metals Scan shall be conducted with each of these tests.

7. Metals

This facility has an IWC of 0.987 at 7Q10. This value exceeds the IWC described in the Reasonable Potential Determination Decisions Trees prepared by the VT DEC Wastewater Program in conjunction with the Monitoring and Assessment Program for facilities to have potential RP for Metals toxicity.

This permit includes a requirement for conducting a Metals Scan four times during the permit term, concurrently with each WET test. The Metals Scan includes those metals listed in Appendix J, Table 2 of 40 CFR Part 122 and Aluminum.

Vermont Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Davis 3
802-828-1535

MEMORANDUM

Prepared by: MAP Staff

Cc: Pete LaFlamme, Director, WSMD
Katie Parrish, WWP
Amy Polaczyk, Manager, WWP
Bethany Sargent, Manager, MAP

Date: May 18, 2022

Subject: Reasonable Potential Determination for the VT Fish & Wildlife - Salisbury Fish Culture Station

I. Facility Information

VT Fish & Wildlife - Salisbury Fish Culture Station (FCS)
646 Lake Dunmore Rd, Salisbury, VT 05769
Permit No. 3-0361
NPDES No. VT0120098
Facility Location: 43.92643, -73.0999 (NAD 83)
Approximate Outfall Location: 43.9256, -73.1008 (NAD 83)

II. Hydrology

Receiving water: Halnon Brook Trib 10
Facility Design Flow: 1.310 MGD = 2.027 CFS
Estimated 7Q10[1] = 0.026 CFS
Estimated LMM[2] = 0.092 CFS
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.987 (>10%)
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.957 (>10%)

The Vermont Department of Fish and Wildlife owns and operates the VT Fish & Wildlife - Salisbury Fish Culture Station (FCS). The Salisbury FCS treats the water used to rear fish by applying baffles to capture solid wastes which are then removed with a vaccuum before the flows enter a settling pond.

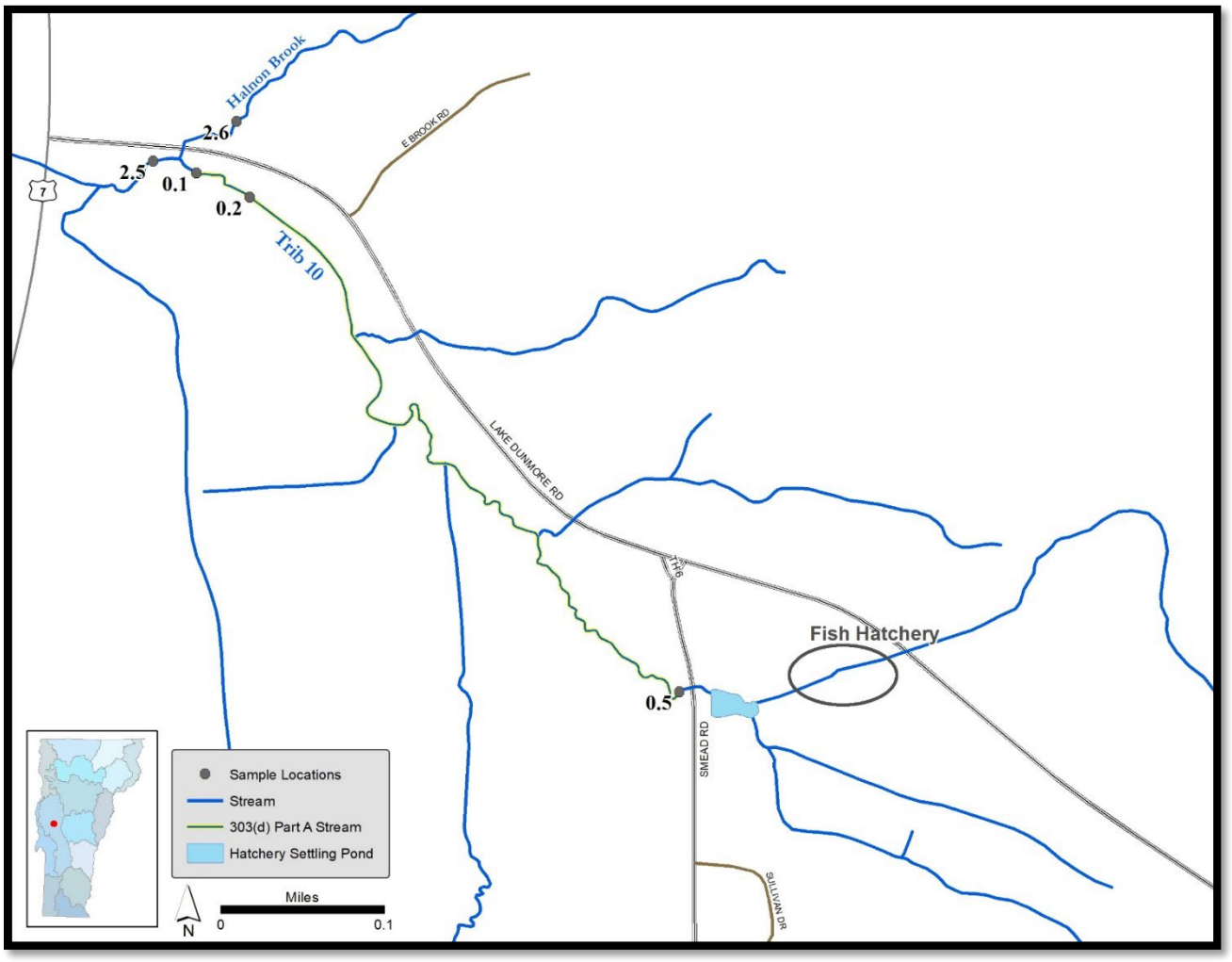
The VT Fish & Wildlife - Salisbury FCS discharges to Halnon Brook Trib 10, a Class B (2) water which is designated as Cold Water Fish Habitat. B(2) streams "shall be managed to achieve and maintain good biological

[1] Using daily mean stream flows, the flow of the receiving water equal to the minimum mean flow for seven consecutive days, that has a 10% probability of occurring in any given year.

[2] "Low Median Monthly Flow". Using daily mean stream flows, the median monthly flow of the receiving water for that month having the lowest median monthly flow.

integrity" (VWQS, 2017, § 29A-306 (a)(3)(c)). At the point of discharge, the stream has a contributing drainage area of 0.28 square miles. There is no existing permitted waste management zone or mixing zone. See Figure 1 for site monitoring locations.

Figure 1. Map of Halnon Brook and Trib 10 sampling sites



This memo is organized into the following sections:

- Summary of Effluent Data for the VT Fish & Wildlife - Salisbury FCS
- Biological Assessments Downstream of the VT Fish & Wildlife - Salisbury FCS
- Summary of Instream Ambient Chemistry Data for Trib 10 to Halnon Brook
- Assessment of Reasonable Potential of the VT Fish & Wildlife - Salisbury FCS Discharge to Exceed Vermont Water Quality Standards (VWQS)
- Summary of Reasonable Potential Determinations

III. Effluent Data for the VT Fish & Wildlife - Salisbury FCS

A. Effluent Data Summary

Table 1a. Effluent Data for the VT Fish & Wildlife - Salisbury FCS from 2/28/2017 to 12/31/2021.

Parameter Name	Limit	Units	Min	Average	Max	Count	Violations
BOD, 5-DAY (20 DEG. C) - Effluent Gross Value Monthly Average	MO	mg/l	1.1	2.4	4.7	5	N/A
TOTAL SUSPENDED SOLIDS (TSS) - Effluent Gross Value Daily Maximum	15	mg/l	0.9	1.4	4	35	0
TOTAL SUSPENDED SOLIDS (TSS) - Effluent Gross Value Average	5	mg/l	0.9	1.4	4	35	0
pH - Effluent Gross Value Maximum	8.5	SU	7.3	7.7	8	35	0
pH - Effluent Gross Value Minimum	6.5	SU	7.3	7.7	8	35	0
PHOSPHORUS, TOTAL (AS P) - Effluent Gross Value Monthly Average	MO	mg/l	0.037	0.07	0.17	20	N/A
PHOSPHORUS, TOTAL (AS P) - See Comments (annual total, prev #) Annual Average	399	lbs/day	104.2	191.8	257.9	5	0
FLOW, IN CONDUIT OR THRU TREATMENT PLANT - Effluent Gross Value Monthly Average	1.31	MGD	0.75	0.88	1.24	58	0
NITROGEN, AMMONIA TOTAL (AS N) - Effluent Gross Value	MO	mg/l	0.40	0.48	0.50	5	N/A

B. Whole Effluent Toxicity (WET) Data Summary

This facility does not have any Whole Effluent Toxicity (WET) data on record. No WET limits were included in the previous permit.

This facility has a 7Q10 IWC of 0.987 (>10%). This value exceeds the IWC described in the RPD Decision Trees for facilities to have potential RP for Total Ammonia Nitrogen (TAN) toxicity and for Priority Pollutant Metals toxicity. These tables were developed for domestic WWTFs, but due to the very high IWC it is appropriate to monitor for these toxic substances.

40 CFR Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria. This facility has a high instream waste concentration and therefore has the potential to contribute significant toxicity to the receiving water. However, there is a lack of sufficient WET testing data or toxicological pollutant data. In order to provide additional data for future assessments of WET reasonable potential, it is recommended that four 1-species (*Ceriodaphnia dubia)* 48 hour acute/ 7-day chronic tests be included in the draft permit, two during the

summer (August/October 2022 and 2024) and two during the winter (January/February 2023 and 2025). It is also suggested that concurrent sampling for TAN and the priority metals be conducted with each of these tests.

WET testing of *Pimephales promelas* or other fish has been determined to be unnecessary due to the nature of the facility; this facility hatches and raises salmonids; therefore no reasonable potential exists for fish toxicity under ordinary operational conditions.

IV. Biological Assessments for the Trib 10 to Halnon Brook Downstream of the VT Fish & Wildlife - Salisbury Fish Culture Station

The 2017 Vermont Water Quality Standards (VWQS) § 29A-306 outlines Use-specific Management Objectives and Criteria by Class for Aquatic Biota. Halnon Brook and Halnon Brook Trib 10 in Salisbury, Vermont are designated as Class B(2) streams. B(2) streams "shall be managed to achieve and maintain good biological integrity" (VWQS, 2017, § 29A-306 (a)(3)(c)).

In 2012, Halnon Brook Trib 10 was added to the 303(d) List of Impaired Waters based on 2009 and 2010 biological assessments conducted at Trib 10 River Mile (RM) 0.1, which indicated failure to meet B(2) Aquatic Biota criteria. The principal pollutant of concern was identified as phosphorus and the dominant source of nutrients was determined to originate at the outfall of the Salisbury FCS.

Subsequent bioassessments at Trib 10 RM 0.1 conducted in 2012, 2019, 2020 and 2021 continued to indicated failure to meet Class B(2) VWQS for Aquatic Biota Use criteria in the receiving water, Halnon Brook Trib 10.

The potential impacts of the phosphorus discharge from the Salisbury FCS to the receiving water have been assessed in relation to the nutrient criteria in §29A-302(2)(A) of the 2017 VWQS and the combined numeric nutrient criteria in §29A-306(a)(3)(c). The combined numeric nutrient criteria rely on numeric phosphorus concentrations in combination with response criteria related to eutrophication and aquatic biota use criteria.

To interpret current and future attainment with these criteria, the Watershed Management Division (WSMD) examines TP concentrations in relation to all available information for the response criteria in §29A-306(a)(3)(c) of the VWQS for streams that can be assessed using macroinvertebrate biocriteria. Using these criteria, the WSMD can make a positive finding of compliance with the criteria when numeric nutrient criteria are attained, or when specific nutrient response variables: pH, turbidity, dissolved oxygen, and aquatic biota use, all display compliance with their respective criteria in §29A-306(a)(3)(c). If total phosphorus concentrations are exceeded but response variables are met, the VWQS nutrient criteria are met. If phosphorus concentrations are exceeded and response variables are not met, it is a violation of the VWQS.

Halnon Brook Trib 10 RM 0.1 was evaluated using the Small High Gradient (SHG) Stream Type for Class B(2) streams. To apply nutrient criteria, nutrient concentrations for the applicable Class and Stream Type must be met, or all Nutrient Response Variables must be met. In-stream total phosphorus concentration is the nutrient criteria identified by the VWQS for the three stream types.

MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. For the Halnon Brook Trib 10 segment to which this facility discharges, the database indicates the receiving water does not support all designated uses. This segment is on Part A of the 303(d) List of Impaired Waters, with Halnon Brook Trib 10 impaired use of aquatic life support due to elevated nutrients affecting aquatic biota.

Applying the combined nutrient criteria for aquatic biota, Halnon Brook Trib 10 does not meet VWQS. The total phosphorus concentration of <12 ug/l for Class B(2) SHG streams is greatly exceeded and macroinvertebrate assessments conducted in 2009, 2010, 2012, 2019, 2020 and 2021 have not met VWQS (Figure 2).

In 2006 the Wastewater Management Division established the compliance point for the Salisbury FCS at Trib 10, RM 0.5, immediately downstream from the hatchery settling pond. Wastewater discharge permit conditions apply at the identified compliance point (Trib 10 RM 0.5). As such, water quality assessments conducted at Trib 10 (RM 0.1 & RM 0.2) are appropriate locations and representative of well mixed flow. Trib 10 (RM 0.1) is just above the confluence with the mainstem of Halnon Brook, 0.4 miles below the compliance point (RM 0.5).

Biological Assessments:

Biomonitoring locations are presented in Table 2 and Figure 1. Within the receiving water of Halnon Brook Trib 10, macroinvertebrate samples have been collected at RM 0.2 and 0.1. These sample locations represent two stream types, transitioning from slow low gradient to small high gradient, allowing for assessments of both communities.

Trib 10 at RM 0.1 is a Small High Gradient (SHG) stream type, and biological assessments were conducted at this site in 2009, 2010, 2012, 2019, 2020 and 2021. As previously described these assessments did not meet VWQS. Results for sampling at Trib 10 RM 0.1 are presented in Figure 2.

Trib 10 RM 0.2 is a Slow Low Gradient (SLG) stream type, with biological assessments conducted in 2012 and 2019. These assessments also indicated failure to meet Class B(2) Aquatic Biota Use as specified in VWQS Appendix G for SLG stream types. Results are presented in Figure 3.

The mainstem of Halnon Brook is a SHG stream type and was sampled at RM 2.5 & RM 2.6 in 2001, 2009, 2019, 2020 and 2021. Halnon Brook RM 2.5 is approximately 100 meters below the confluence with Trib 10 and RM 2.6 is approximately 75 meters upstream of the confluence.

Halnon Brook RM 2.6 consistently received passing assessments using the scoring guidelines for Stream Type SHG and WQ Class B(2) from 2001-2019. Samples collected in 2020 and 2021 at Halnon Brook RM 2.6 indicated degradation and do not meet VWQS. Since there is no upstream location on Halnon Brook Trib 10, Halnon Brook RM 2.6 was used as a control for Trib 10 until the recent degradation of the biological community. The average phosphorus concentration during base flow from 2009-2020 at Halnon Brook RM 2.6 was 7.5 ug/L, well below nutrient criteria for the SHG stream type. The recent degradation of the aquatic community is due to the recruitment of nutrient tolerant amphipods from Halnon Trib 10 to the Halnon Brook upstream (RM 2.6) and downstream (RM 2.5) sites.

Halnon Brook RM 2.5 has been steadily degrading since 2001 when it received a passing assessment. Halnon Brook RM 2.5 met B(2) VWQS for Aquatic Biota Use in 2020, but failed to meet in 2019 and 2021. Results for Halnon Brook RM 2.5 & RM 2.6 are presented in Figures 4 & 5 respectively.

Table 2. Biomonitoring sample location information

Location Name	River Mile	Location Description	Stream Type	Drainage Area (km2)	Latitude	Longitude	Elevation (ft)
Halnon Brook	2.6	Located above Halnon Brook Trib 10 and Route 53 bridge 50m.	SHG	8.76	43.9306	-73.1066	390
Halnon Brook	2.5	Located below Halnon Brook Trib 10 confluence approximately 100m.	SHG	12.05	43.9302	-73.1076	385
Halnon Brook Trib 10	0.2	Located approximately 50m upstream from breached dam. This tributary was previously known as Trib 1, changed to a more accurate description of Trib 10 in Dec 2016.	SLG	3.26	43.9299	-73.1064	395
Halnon Brook Trib 10	0.1	Located immediately above confluence with Halnon Brook below old dam. This tributary was previously known as Trib 1, changed to a more accurate description of Trib 10 in Dec 2016.	SHG	3.25	43.9301	-73.1071	390

Macroinvertebrate Community Metrics:
Bioassessments conducted at Trib 10 (RM 0.1 & 0.2) and Halnon Brook (RM 2.5) show a typical fingerprint of nutrient enrichment as the primary stressor. This is represented by an elevated Biotic Index (BI) and the proliferation of nutrient tolerant taxa causing a departure from the streams natural condition, shown by the Percent Model Affinity of Orders (PMA-O) metric. In addition, the functional feeding groups shifted to collector gatherers instead of scrapers, predators, and leaf shredders, which are more typical of a Small High Gradient stream as shown in the PPCS-F metric (Figure 2 and Figure 3).

The macroinvertebrate community assessments on Trib 10 (RM 0.1 & RM 0.2) represent a significant alteration to the biological community and exceed "moderate change: to the aquatic community", thereby violating Vermont Water Quality Standards. The Salisbury FCS discharge to Trib 10 is significant; at low median monthly flow conditions, the hatchery effluent comprises more than 95 percent of the stream flow.

Because Halnon Brook Trib 10 does not meet Vermont Water Quality Standards (VWQS), it has been on Part A of the Federal Clean Water Act 303 (d) list of impaired waters since 2012. Any waterbody on Part A is "assessed as impaired due to one or more pollutants for which a TMDL is required to be developed." The pollutant is described as nutrients impairing aquatic life support (ALS). The surface water quality problems are described as "elevated nutrients affecting aquatic biota". The most recent permit for the hatchery discharge expired on March 31, 2012, however the facility has continued operation with a Title 3 Section 814 administrative continuation since that date.

Figure 2. Macroinvertebrate site summary for Halnon Brook Trib 10 RM 0.1 using Small High Gradient (SHG) criteria

Macroinvertebrate Site Summary

Location: Halnon Brook Trib 10, 0.1
Town: Salisbury
Description: Located immediately above confluence with Halnon Brook below old dam. Previous coordinates: 43.929722, 73.10778. This site previously known as Trib 1, changed to Trib 10 in Dec 2016.
Stream Type: Small High Gradient

Date	Density	Richness	EPT Richness	PMA O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS F	Community Assessment
10/2/2009	3202	24.5	9.5	31.4	5.37	0.00	0.58	0.32	Does not Meet WQS
9/29/2010	4992	32.0	13.0	47.4	4.99	0.00	0.58	0.35	Does not Meet WQS
10/2/2012	2748	25.0	10.0	53.1	4.74	0.00	0.80	0.31	Does not Meet WQS
10/11/2019	3592	24.0	7.0	39.7	4.81	0.45	0.27	0.35	Does not Meet WQS
10/06/2020	3860	28.0	12.0	37.0	5.25	0.31	0.80	0.35	Does not Meet WQS
10/1/2021	2748	27.0	14.0	47.0	4.65	0.44	0.99	0.39	Does not Meet WQS
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤ 4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	> 4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

Figure 3. Macroinvertebrate site summary for Halnon Brook Trib 10 RM 0.2 using Slow Low Gradient (SLG) criteria

Macroinvertebrate Site Summary

Location: Halnon Brook Trib 10, 0.2
Town: Salisbury
Description: Located approximately 50yds upstream from breached dam.
Stream Type: Slow Low Gradient

Date	Density	EOT Richness	BCG Intolerant Richness	PMA O	B.I.	Amphipod + Isopod Hyallela	EOT/ EOT+C	PPCS F	Sensitive COTE %	EOT Density	Community Assessment
10/2/2012	14392	3.0	4.0	19.4	5.81	90.4	0.003	0.065	0.056	4.0	Does Not Meet WQS
10/11/2019	4664	3.0	2.0	18.8	5.88	91.3	0.148	0.121	0.086	52.0	Does Not Meet WQS
IBI 5	≥ 500	≥ 15	≥ 10	≥ 65	≤ 5.5	0	≥ 0.5	≥ 0.5	≥ 20	≥ 500	
IBI 4	≥ 400	≥ 11	≥ 7	≥ 57	≤ 6	≤ 1	≥ 0.36	≥ 0.42	≥ 14	≥ 350	
IBI 3	≥ 300	≥ 8	≥ 5	≥ 50	≤ 6.5	≤ 5	≥ 0.23	≥ 0.34	≥ 9	≥ 200	
IBI 2	≥ 200	≥ 5	≥ 2	≥ 40	≤ 7	≤ 25	≥ 0.11	≥ 0.29	≥ 3	≥ 100	
IBI 1	≥ 0	≥ 0	≥ 0	≥ 0	>7	>25	≥ 0	≥ 0	≥ 0	≥ 0	

Figure 4. Macroinvertebrate site summary for Halnon Brook River Mile 2.5 using Small High Gradient (SHG) criteria

Macroinvertebrate Site Summary									
Location:	Halnon Brook, 2.5								
Town:	Salisbury								
Description:	Located below Salisbury Fish Hatchery tributary 200m.								
Stream Type:	Small High Gradient								
Date	**Density**	**Richness**	**EPT Richness**	**PMA O**	**B.I.**	**Oligo.**	**EPT/EPT + Chiro**	**PPCS F**	**Community Assessment**
10/4/2001	4270	43.5	23.0	75.3	3.28	0.04	0.94	0.58	Meets WQS
10/2/2009	2932	42.5	21.0	69.3	3.74	0.14	0.94	0.54	Meets WQS
10/11/2019	2380	39.0	17.0	37.9	4.00	0.34	0.77	0.43	Does Not Meet WQS
10/6/2020	3188	36.0	19.0	56.4	3.97	0.13	0.96	0.58	Meets WQS
10/1/2021	1402	25.5	13.0	50.5	3.59	0.28	0.95	0.45	Does Not Meet WQS
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	>4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

Figure 5. Macroinvertebrate site summary for Halnon Brook River Mile 2.6 using Small High Gradient (SHG) criteria

Macroinvertebrate Site Summary									
Location:	Halnon Brook 2.6								
Town:	Salisbury								
Description:	Located above Trib 10 (Salisbury Fish Hatchery receiving water) and Route 53 bridge 50m.								
Stream Type:	Small High Gradient								
Date	**Density**	**Richness**	**EPT Richness**	**PMA O**	**B.I.**	**Oligo.**	**EPT/EPT + Chiro**	**PPCS F**	**Community Assessment**
6/14/1990	1930	43.0	23.0	75.5	3.40	0.10	0.79	0.54	Meets WQS
10/4/2001	4052	44.0	21.0	66.3	2.59	0.69	0.94	0.55	Meets WQS
10/2/2009	1134	44.0	23.5	62.7	2.98	0.52	0.93	0.54	Meets WQS
10/11/2019	1000	41.0	22.0	61.6	3.24	2.67	0.91	0.49	Meets WQS
10/6/2020	700	29.0	14.0	39.2	3.52	0.62	0.97	0.33	Does Not Meet WQS
10/1/2021	1073	24.5	12.0	31.6	4.59	0.45	0.97	0.39	Does Not Meet WQS
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤ 4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	> 4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

V. Ambient Chemistry Data

Water chemistry measures of relevant parameters for this assessment are summarized in Tables 3a and 3b. The most recent ambient chemistry data available for Halnon Brook Trib 10 is from 10/16/2021, downstream of the hatchery outfall at RM 0.1. The most recent data available from Halnon Trib 10 RM 0.5 is from 10/06/2020, which is approximately 0.05 miles or 250 feet below the discharge. No upstream data is available because Trib 10 is created by wells pumping groundwater into the fish hatchery.

Data representativeness are assessed by evaluating the observed flow conditions from field sheets, whether measured or qualitatively described, when samples were collected. Other contemporaneous streamflow data, such as the U.S. Geological Survey stream gage network, are also taken into consideration where proximal and representative of the hydrologic conditions at the time (e.g., unimpacted by artificial flow regulation). The RM 0.1 downstream sampling location at this site is the most sensitive location, and the sampling results are determined to be representative of low flow based on a review of available streamflow observations. Thus, the data presented below are relevant for inclusion in this analysis.

Data used to evaluate in-stream chemistry is collected under low flow conditions (typically August or September) when turbidity is generally low, and no precipitation has been observed for three days. Low flow conditions are indicated by a flow type of base and a flow level of low or moderate. Freshet flow type or high flow levels are not appropriate for determining compliance with VWQS.

Table 3a. Surface-water quality sampling results at the VT Fish & Wildlife - Salisbury FCS.

Visit Date	Location Name	RM	Flow Level	Flow Type	Total Aluminum (ug/l)	Total Antimony (ug/l)	Total Arsenic (ug/l)	Total Barium (ug/l)	Total Beryllium (ug/l)	Total Cadmium (ug/l)	Total Calcium (mg/l)	Total Chromium (ug/l)	Total Cobalt (ug/l)	Total Copper (ug/l)	Total Iron (ug/l)	Total Lead (ug/l)	Total Magnesium (mg/l)	Total Manganese (ug/l)	Total Molybdenum (ug/l)	Total Nickel (ug/l)	Total Potassium (mg/l)	Total Selenium (ug/l)	Total Silver (ug/l)	Total Sodium (mg/l)	Total Strontium (ug/l)	Total Sulfate (mg/l)	Total Thallium (ug/l)	Total Uranium (ug/L)	Total Vanadium (ug/l)	Total Zinc (ug/l)
10/2/2012	Halnon Brook Trib 10	0.5	Moderate	Freshet	--	--	--	--	--	--	43.3	--	--	--	--	--	21.0	--	--	--	1.29	--	--	19.3	--	11.0	--	--	--	--
10/2/2012	Halnon Brook Trib 10	0.2	Moderate	Freshet	--	--	--	--	--	--	45.7	--	--	--	--	--	22.0	--	--	--	1.49	--	--	18.6	--	11.3	--	--	--	--
10/2/2012	Halnon Brook Trib 10	0.1	Moderate	Freshet	--	--	--	--	--	--	45.2	--	--	--	--	--	21.8	--	--	--	1.49	--	--	18.4	--	11.1	--	--	--	--
8/8/2016	Halnon Brook Trib 10	0.2	Low	Base	841	<10	<1	24.8	<1	<1	44.2	<5	<1	<10	934.7	<1	21.0	33.6	<5	<5	1.36	<5	<1	17.9	89.0	--	<1	<1	<25	<50
8/15/2019	Halnon Brook	2.6	Low	Base	20	--	--	--	--	--	37.0	--	--	--	130.0	--	15.8	26.3	--	--	1.01	--	--	17.0	--	5.8	--	--	--	--
8/15/2019	Halnon Brook	2.5	Moderate	Base	152	--	--	--	--	--	43.3	--	--	--	238.0	--	20.0	21.4	--	--	1.20	--	--	19.1	--	7.9	--	--	--	--
8/15/2019	Halnon Brook Trib 10	0.5	Moderate	Base	<20	--	--	--	--	--	48.1	--	--	--	<50	--	22.6	<5	--	--	1.27	--	--	21.1	--	9.0	--	--	--	--
8/15/2019	Halnon Brook Trib 10	0.1	Moderate	Base	194	--	--	--	--	--	45.2	--	--	--	251.0	--	21.4	14.5	--	--	1.23	--	--	19.2	--	8.9	--	--	--	--
10/11/2019	Halnon Brook	2.6	Moderate	Base	20	--	--	--	--	--	33.9	--	--	--	133.0	--	15.0	28.0	--	--	1.18	--	--	16.6	--	6.2	--	--	--	--
10/11/2019	Halnon Brook	2.5	Moderate	Base	92	--	--	--	--	--	37.7	--	--	--	193.0	--	17.1	24.2	--	--	1.21	--	--	17.7	--	7.5	--	--	--	--
10/11/2019	Halnon Brook Trib 10	0.5	Moderate	Base	29	--	--	--	--	--	45.1	--	--	--	51.5	--	21.5	7.9	--	--	1.22	--	--	20.6	--	9.2	--	--	--	--
10/11/2019	Halnon Brook Trib 10	0.1	Moderate	Base	263	--	--	--	--	--	46.3	--	--	--	385.0	--	22.0	27.7	--	--	1.33	--	--	21.0	--	9.9	--	--	--	--
10/6/2020	Halnon Brook	2.6	Moderate	Base	25	--	--	--	--	--	40.0	--	--	--	134.0	--	17.7	25.6	--	--	1.27	--	--	19.2	--	6.0	--	--	--	--
10/6/2020	Halnon Brook	2.5	Moderate	Base	111	--	--	--	--	--	44.4	--	--	--	236.0	--	20.3	24.6	--	--	1.39	--	--	20.2	--	7.3	--	--	--	--
10/6/2020	Halnon Brook Trib 10	0.5	Moderate	Base	<20	--	--	--	--	--	43.5	--	--	--	<50	--	20.5	<5	--	--	1.21	--	--	19.7	--	8.8	--	--	--	--
10/6/2020	Halnon Brook Trib 10	0.1	Moderate	Base	273	--	--	--	--	--	43.1	--	--	--	449.0	--	20.5	37.5	--	--	1.38	--	--	18.9	--	8.7	--	--	--	--

Table 3b. Surface-water quality sampling results at the VT Fish & Wildlife - Salisbury FCS.

Visit Date	Location Name	RM	Flow Level	Flow Type	Alkalinity (mg/l)	Conductivity (umho/cm)	Dissolved Inorganic Carbon (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Oxygen (mg/l)	Dissolved Oxygen Saturation (%)	pH (None)	Temp (deg C)	Total Chloride (mg/l)	Total Color measured using the visual method (PCU)	Total Hardness (mg/l)	Total Ammonia Nitrogen (mg/l)	Total Nitrate Nitrogen (mg/l)	Total Nitrate/Nitrite Nitrogen (mg/l)	Total Nitrite Nitrogen (mg/l)	Total Nitrogen (mg/l)	Dissolved Phosphorus (ug/l)	Total Phosphorus (ug/l)	Total Suspended Solids (mg/l)	Turbidity (NTU)
10/2/2012	Halnon Brook Trib 10	0.5	Moderate	Freshet	175	442	--	--	8.8	79	7.8	9	38.8	--	--	--	--	--	--	0.91	--	84.9	--	1.2
10/2/2012	Halnon Brook Trib 10	0.2	Moderate	Freshet	176	432	--	--	9.3	85	7.8	11	41.9	30	205.0	--	--	--	--	0.86	--	116.0	--	23.0
10/2/2012	Halnon Brook Trib 10	0.1	Moderate	Freshet	174	432	--	--	7.6	69	7.9	10	28.8	20	204.0	--	--	--	--	0.81	--	89.5	--	9.2
8/8/2016	Halnon Brook Trib 10	0.2	Low	Base	--	451	--	--	9.4	98	7.6	17	30.6	--	196.9	0.22	--	--	--	1.03	--	129.0	--	26.1
8/15/2019	Halnon Brook	2.6	Low	Base	141	371	31.4	3.2	--	--	8.0	12	31.3	20	157.3	0.05	--	0.62	--	0.71	6.0	5.0	--	0.3
8/15/2019	Halnon Brook	2.5	Moderate	Base	161	417	39.0	2.6	--	--	7.4	11	32.9	20	190.5	0.05	--	0.61	--	0.78	25.0	30.0	--	6.4
8/15/2019	Halnon Brook Trib 10	0.5	Moderate	Base	180	467	42.4	2.3	--	--	7.4	10	35.9	15	213.3	0.09	--	0.59	--	0.80	37.0	41.0	--	1.0
8/15/2019	Halnon Brook Trib 10	0.1	Moderate	Base	181	466	43.0	3.2	--	--	7.9	10	35.2	30	201.0	0.07	--	0.60	--	0.82	37.0	54.0	--	9.1
10/11/2019	Halnon Brook	2.6	Moderate	Base	129	340	29.5	4.2	10.5	97	7.8	9	27.4	15	146.6	0.05	--	0.49	--	0.61	5.0	7.0	--	1.7
10/11/2019	Halnon Brook	2.5	Moderate	Base	147	386	33.3	4.4	10.0	92	6.8	9	30.8	15	164.6	0.10	--	0.54	--	0.77	19.0	31.0	--	3.6
10/11/2019	Halnon Brook Trib 10	0.5	Moderate	Base	180	464	42.4	5.1	10.1	95	7.8	10	36.5	12.5	201.1	0.31	--	0.61	--	1.14	61.0	82.0	--	2.3
10/11/2019	Halnon Brook Trib 10	0.1	Moderate	Base	178	465	41.9	5.0	9.9	94	7.7	10	36.6	20	206.3	0.21	--	0.61	--	1.03	51.0	77.0	--	9.4
9/17/2020	Halnon Brook	2.6	--	Base	134	358	--	--	--	91	8.3	12	32.0	--	--	0.08	0.72	--	<0.02	--	12.0	6.0	<2	0.0
9/17/2020	Halnon Brook	2.5	--	Base	139	381	--	--	--	86	7.9	12	32.0	--	--	0.08	0.75	--	0.03	--	32.0	39.0	3.0	4.4
9/17/2020	Halnon Brook Trib 10	0.1	--	Base	155	403	--	--	--	77	8.1	11	33.0	--	--	0.08	0.77	--	0.04	--	58.0	74.0	8.0	5.5
10/2/2020	Halnon Brook	2.6	--	Freshet	143	334	--	--	--	96	7.9	11	30.0	--	--	0.08	0.59	--	<0.02	--	6.0	11.0	4.0	0.0
10/2/2020	Halnon Brook	2.5	--	Freshet	155	351	--	--	--	92	8.1	11	31.0	--	--	0.08	0.60	--	<0.02	--	24.0	36.0	5.0	2.4
10/2/2020	Halnon Brook Trib 10	0.1	--	Freshet	158	382	--	--	--	91	7.8	10	33.0	--	--	0.12	0.63	--	<0.02	--	60.0	86.0	12.0	17.5
10/6/2020	Halnon Brook	2.6	Moderate	Base	162	420	39.2	4.1	10.4	102	8.3	12	32.3	18	173.0	0.05	--	0.73	--	0.68	6.6	7.6	6.2	0.6
10/6/2020	Halnon Brook	2.6	Moderate	Base	162	341	--	--	--	96	8.0	12	31.0	--	--	0.08	0.64	--	<0.02	--	5.0	12.0	<1.9	--
10/6/2020	Halnon Brook	2.5	Moderate	Base	175	445	41.2	5.8	10.3	99	7.8	11	32.8	29	194.0	0.08	0.69	0.75	<0.02	0.90	30.4	47.7	5.4	5.9
10/6/2020	Halnon Brook Trib 10	0.5	Moderate	Base	181	468	21.0	2.2	10.8	102	7.9	10	34.2	20	193.0	0.25	--	0.80	--	1.25	75.3	92.9	<2.5	0.8
10/6/2020	Halnon Brook Trib 10	0.1	Moderate	Base	186	474	48.7	7.3	9.5	91	8.1	11	33.9	18	192.0	0.14	--	0.94	--	1.15	57.0	97.4	13.5	15.3
10/6/2020	Halnon Brook Trib 10	0.1	Moderate	Base	171	385	--	--	--	89	7.5	11	33.0	--	--	0.21	0.73	--	<0.02	--	50.0	89.0	15.0	15.3
10/13/2020	Halnon Brook	2.6	--	Freshet	141	391	--	--	--	98	8.0	10	29.0	--	--	0.08	0.56	--	<0.02	--	17.0	20.0	<1.9	0.5
10/13/2020	Halnon Brook	2.5	--	Freshet	147	420	--	--	--	97	7.9	10	31.0	--	--	0.09	0.59	--	<0.02	--	35.0	54.0	11.0	6.6
10/13/2020	Halnon Brook Trib 10	0.1	--	Freshet	153	458	--	--	--	92	7.6	10	33.0	--	--	0.14	0.63	--	<0.02	--	62.0	91.0	13.0	12.2
9/3/2021	Halnon Brook	2.6	--	Base	112	435	--	--	--	103	8.0	13	21.0	--	--	0.08	0.51	--	<0.02	--	5.0	8.0	3.0	0.0
9/3/2021	Halnon Brook	2.5	--	Base	139	498	--	--	--	92	8.1	12	25.0	--	--	0.08	0.55	--	0.02	--	25.0	41.0	6.0	3.7
9/3/2021	Halnon Brook Trib 10	0.1	--	Base	162	596	--	--	--	92	8.0	12	31.0	--	--	0.12	0.60	--	0.05	--	52.0	90.0	27.0	12.1
9/13/2021	Halnon Brook	2.6	--	Base	117	617	--	--	--	102	7.9	15	21.0	--	--	0.08	0.49	--	<0.02	--	11.0	12.0	<2	0.0
9/13/2021	Halnon Brook	2.5	--	Base	155	707	--	--	--	100	8.1	14	25.0	--	--	0.08	0.51	--	<0.02	--	26.0	38.0	<2	1.1
9/13/2021	Halnon Brook Trib 10	0.2	--	Base	165	--	--	--	--	--	--	--	31.0	--	--	<0.08	0.54	--	0.03	--	59.0	78.0	7.0	--
9/13/2021	Halnon Brook Trib 10	0.1	--	Base	--	841	--	--	--	98	7.9	14	--	--	--	--	--	--	--	--	--	--	--	13.7
9/24/2021	Halnon Brook	2.6	--	Freshet	101	257	--	--	--	94	7.8	16	17.0	--	--	0.12	0.24	--	<0.02	--	12.0	27.0	159.0	38.0
9/24/2021	Halnon Brook	2.5	--	Freshet	108	288	--	--	--	93	7.8	15	21.0	--	--	0.14	0.36	--	<0.02	--	60.0	250.0	117.0	41.0
9/24/2021	Halnon Brook Trib 10	0.1	--	Freshet	114	308	--	--	--	89	7.6	15	26.0	--	--	0.24	0.56	--	0.04	--	140.0	260.0	60.0	55.0
10/16/2021	Halnon Brook	2.6	--	Freshet	115	324	--	--	--	91	7.9	15	20.0	--	--	0.08	0.32	--	<0.02	--	9.0	53.0	20.0	7.6
10/16/2021	Halnon Brook	2.5	--	Freshet	128	359	--	--	--	90	7.8	15	23.0	--	--	0.08	0.37	--	<0.02	--	35.0	150.0	53.0	57.6
10/16/2021	Halnon Brook Trib 10	0.1	--	Freshet	144	421	--	--	--	89	7.7	15	28.0	--	--	<0.08	0.45	--	0.02	--	75.0	170.0	23.0	17.5

VI. Fish Hatchery

The hatchery uses well water to raise fish for distribution across the state. The wells provide a large supply of consistently cold, clean water that has a relatively high amount of carbonate in it. The well water provides over 95 percent of the flow in the Trib. 10 to Halnon Brook, and this continuous flow from the facility has the potential to impact the fluvial morphology of the stream.

Assessment of Reasonable Potential of the VT Fish & Wildlife - Salisbury FishCulture Station (FCS) discharge to exceed Vermont Water Quality Standards

A. Methodology and Assumptions

A steady-state mass balance approach was used to assess reasonable potential for the potential pollutants of concern based on the methods described in the Technical Support Document for Water Quality-based Toxics Control (TSD; EPA/505/2-90-001). The expected receiving water concentrations (RWC; C_r) of pollutants were calculated according to Equation 1 at critical conditions. If the expected receiving water concentration determined exceeds the applicable Vermont Water Quality Standard, limits must be included in the permit. Tables 4 and 5 present this analysis for TAN and total phosphorus for the VT Fish & Wildlife - Salisbury FCS .

$$\text{Equation 1.} \quad C_r = \frac{(Q_e)(C_e)+(Q_s)(C_s)}{Q_r}$$

Where:
C_r = resultant expected receiving water pollutant concentration (mg/L or ug/L)
Q_e = maximum permitted effluent flow (cfs).
C_e = critical effluent pollutant concentration (mg/L or ug/L)
Q_s = stream flow upstream of the point of discharge (cfs). Low Median Monthly flow for nutrients, 7Q10 for applying toxics criteria. When applicable, 30Q10 is used for chronic Total Ammonia Nitrogen assessments.
C_s = upstream pollutant concentration (units dependent on parameter, typically mg/L or ug/L).
$Q_r = (Q_s + Q_e)$ = resultant in-stream flow, after discharge (cfs)

NPDES regulations at §122.44(d)(1)(ii) require that permit writers consider the variability of the pollutant in the effluent when determining the need for Water Quality-Based Effluent Limits (WQBELs). EPA guidance for permit writers on how to characterize effluent concentrations of certain types of pollutants using a limited data set and accounting for variability is detailed in the TSD. The current analysis uses the TSD procedure to project a critical effluent concentration (C_{etsd}) of the 95th percentile of a lognormal distribution of observed effluent concentrations over 5 years. The 95th percentile is calculated from the effluent data set using the number of available effluent data points (n) for the measured concentration of the pollutant and the coefficient of variation (CV) of the data set to predict the critical pollutant concentration in the effluent. When less than 10 data points are available, the CV is set to 0.6. For less than 10 items of data, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence (TSD). The CV and n are used to determine the factor (TSD pg 54) that is multiplied by the maximum observed effluent concentration (C_e) to determine C_{etsd}.

$$\text{Equation 2.} \quad C_{etsd} = TSD_{factor} \times C_e$$

Where:
C_{etsd} = Effluent concentration adjusted to 95th percentile value (mg/L or ug/L)
TSD_{factor} = Factor based upon EPA TSD Table 3-2, pg 54
C_e = critical (maximum observed) effluent pollutant concentration (mg/L or ug/L)

The Instream Waste Concentration (IWC) is a measure of the effluent dilution and is also used as an estimate of the facility's potential to cause or contribute to an excursion of the VWQS. The IWC equation is the

simplification of the flow portion of the mass balance equation (Equation 1) and is shown below in Equation 3:

Equation 3. $$IWC = \frac{(Q_e)}{(Q_r)}$$

The critical effluent pollutant concentration (C_e) can be multiplied by the IWC to approximate the resultant receiving water concentrations (C_r).

The equations above are generally used to prepare Reasonable Potential Determinations. In some cases, there may not be sufficient data to utilize all the equations.

This analysis of reasonable potential used the following data and assumptions:

- Average values of observed in-stream chemical data were used for most calculations; exceptions are described below.
- In-stream pollutant concentrations (C_s) and effluent concentrations (C_e) were set equal to one half the method detection limit when data were censored at the detection limit.
- Effluent pollutant concentrations (C_{etsd}) were set to the maximum observed effluent concentrations * TSD 95th percentile multiplier over the last 5 years of data collected.
- TAN analyses were divided into summer (June 1- October 31) and winter (November 1 – May 31). Five data points were used to characterize the effluent under winter conditions and 5 during summer (see Table 4). Summer defaults of 20 ºC for coldwater fish habitat streams and 25 ºC for warmwater fish habitat streams were used in summer months while winter water temperature was assumed to be 5 ºC. The highest observed downstream values were used for both winter and summer pH. Oncorhynchus spp. are assumed to be present.
- Hardness, used for determining hardness-dependent metal criteria, is based upon the lowest observed downstream concentration.

The spreadsheet used for these calculations is part of the permit record and available upon request.

A. Metals

This facility does not have any priority metals data available for the effluent. Calculations are not performed in the absence of effluent data.

This facility has an IWC of 0.987 at 7Q10. This value exceeds the IWC described in the Reasonable Potential Determination Decisions Trees prepared by the VT DEC Wastewater Program in conjunction with the Monitoring and Assessment Program for facilities to have potential RP for Metals toxicity.

It is suggested the permit include a requirement for testing priority metals three times. Testing should be conducted concurrently with any WET testing.

B. Total Nitrogen

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen.
TN is a calculated value based on the sum of NOx and TKN, and shall be reported as pounds, calculated as:

Average TN (mg/L) x Total Daily Flow (MGD) x 8.34 = Pounds TN/day where, TN (mg/L) = TKN (mg/L) + NOx (mg/L)

Due to the lack of effluent data and upstream monitoring data it was impossible to perform a mass balance of Total Nitrogen around the facility.

Per EPA excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically, nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management of both phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs, some are P dependent, others N dependent and others are co-dependent on these two nutrients.

Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community. Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds).

To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, monthly “monitor only” requirements for Total Nitrogen (TN), Nitrate/Nitrite (NOx), and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. The monthly monitoring frequency has been chosen based upon the high IWC.

Total Ammonia Nitrogen (TAN):
The mass balance for summer and winter TAN downstream of the VT Fish & Wildlife - Salisbury FCS is presented below in Table 4.

Table 4. Mass balance of TAN downstream of the VT Fish & Wildlife - Salisbury FCS.

	TAN - Summer (mg/L)	**TAN - Winter (mg/L)**	**Notes**
Qs (cfs)	0.03		*Estimated 7Q10 flow*
Qe (cfs)	2.031		*permitted effluent discharge*
Qr = Qs + Qe (cfs)	2.06		*Qs+Qe*
7Q10 IWC	0.987		*Qe/(Qs+Qe)*
Cs	0.00	0.00	*upstream pollutant concentration*
Max Observed Ce	0.500	0.500	*effluent pollutant concentration without adjustment by TSD factor*
Cetsd	2.30	2.30	*effluent pollutant concentration adjusted by TSD factor*
Number of Observations	5.00	5.00	*Only 5 values are available and comparison made to both Summer and Winter conditions.*
Min. No. of Observations for RP	10.00	10.00	
Cr = (CsQs+CeQe)/Qr	0.49	0.49	*resultant pollutant concentration in receiving water without TSD adjustment*
Cr = (CsQs+CetsdQe)/Qr	2.27	2.27	*resultant pollutant concentration in receiving water with TSD method*
VWQS TAN Criteria (2017) @ pH 8.1			
Protection of Aquatic Biota - Acute	3.2	4.6	
Protection of Aquatic Biota - Chronic	1.67	3.75	
Exceedance Calculated?			
Protection of Aquatic Biota - Acute without TSD adjustment	NO	NO	
Protection of Aquatic Biota - Chronic without TSD adjustment	NO	NO	
Protection of Aquatic Biota - Acute with TSD adjustment	NO	NO	
Protection of Aquatic Biota - Chronic with TSD adjustment	YES	NO	
Sufficient Data to Determine RP?	NO	NO	

This facility has a 7Q10 IWC of 0.987 (>10%). This value exceeds the IWC described in the RPD Decision Trees for facilities to have potential RP for TAN toxicity. Insufficient data is available to determine RP for either summer (June 1 to October 31) or winter (November 1 to May 30) TAN. The available data suggests that summer TAN may be exceeded, but a minimum of 10 data points are needed to determine RP for this parameter.

40 CFR Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria.

To provide additional data for future assessments of TAN reasonable potential, it is recommended that monthly TAN monitoring with a monitor only condition be included in the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.

C. Total Phosphorus

The potential impacts of phosphorus discharges from this facility to the receiving water have been assessed in relation to the narrative criteria in §29A-302(2)(A) of the 2017 VWQS, which states:

In all waters, total phosphorous loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses.

To interpret this standard, the Secretary relies on a framework which examines TP concentrations in relation to existing numeric phosphorus criteria and response criteria in §29A-306(a)(3)(c) of the VWQS, for streams that can be assessed using macroinvertebrate biocriteria. Under this framework, a positive finding of compliance with the narrative standard can be made when nutrient criteria are attained, or when specific nutrient response variables: pH, Turbidity, Dissolved Oxygen, and aquatic biota use, all display compliance with their respective criteria in the Water Quality Standards.

The results of mass balance calculations for Total Phosphorus using Equation 1 are presented in Table 5.

Table 5. Mass Balance of Phosphorus below the VT Fish & Wildlife - Salisbury FCS.

	Total Phosphorus (ug/l)	**Notes**
Qs (cfs)	0.09	*Estimated LMM flow*
Qe (cfs)	2.031	*permitted effluent discharge*
Qr = Qs + Qe (cfs)	2.12	*Qs+Qe*
LMM IWC	0.9567	*Qe/(Qs+Qe)*
Cs	No Data	*upstream pollutant concentration (average)*
Ce	170	*maximum effluent pollutant concentration observed*
Cetsd	221	*effluent pollutant concentration adjusted by TSD method.*
Cr = (CsQs+CeQe)/Qr	NA- Calculation not possible.	*calculated resultant downstream pollutant concentration without TSD factor of safety*
Cr = (CsQs+CetsdQe)/Qr	NA - Calculation not possible	*calculated resultant downstream pollutant concentration*
Stream Type	B(2) Small High Gradient	
Calculated Instream Contribution from Effluent without TSD method	163	*calculated resultant downstream concentration attributable to discharge . Without TSD method*
Calculated Instream Contribution from Effluent with TSD method	211	*calculated resultant downstream concentration attributable to discharge. With TSD Method*
VWQS Criteria (2017)		
Threshold Criteria	12	
Threshold Exceeded without TSD method?	YES	
Threshold Exceeded with TSD method?	YES	

Total Phosphorus Numeric Analysis:

The 2017 VWQS present Combined Nutrient Criteria for Aquatic Biota and Wildlife in Rivers and Streams in Table 2 of § 29A-306. To interpret this standard, MAP examines nutrient concentrations in relation to existing numeric phosphorus criteria and response criteria in §29A-306(a)(3)(c) of the VWQS for streams that can be assessed using macroinvertebrate biocriteria.

Halnon Brook Trib 10

The VWQS combined nutrient criteria for SHG stream types such as Trib 10 (RM 0.1) is 12 µg/L-TP. Surface water chemistry monitoring conducted at Trib 10 (RM 0.1) during base flow conditions from 2019-2021 indicate that the average instream total phosphorus (TP) concentration was 80 µg/L-TP and

values ranged from 54 µg/L – 97.4 µg/L-TP. (TP values recorded before 2019 were collected under either unknown or freshet flows). During freshet flows from 2012-2020, the average TP was 139.3 µg/L-TP, with a range of 86-260 µg/L-TP. See Table 3 for Trib 10 water quality sampling results. The total phosphorus values clearly exceed Vermont's numeric nutrient standard of 12 µg/L for Class B(2) SHG streams under base flow conditions to represent low median monthly flows from June-October.

The instream TP concentrations at Trib 10 (RM 0.1) are consistent with Salisbury FCS effluent TP monitoring data. Recent effluent TP monitoring data for the period of 2017 – 2021 indicate the average concentration was 70 µg/L and ranged from 37 µg/L – 170 µg/L-TP. The instream waste concentration of Trib 10 at low median monthly flows is 95.7 percent, indicating that the receiving water is effluent dominated (available dilution is extremely limited). As such, the receiving water concentrations of TP are very similar to the effluent concentrations of TP at these flow conditions.

The expired permit for Salisbury FCS relies on the 2002 Lake Champlain Maximum Daily Load established mass loading allocation which utilized an effluent concentration of 0.1 mg/L-TP (100 µg/L) at the design flow of 1.31 MGD. The phosphorus loading relates to 399 pounds per year, and compliance relies on quarterly TP effluent monitoring. As discussed above, the TP effluent monitoring and permit conditions illustrate the ongoing operating discharge conditions, and the permit limit for TP effluent concentrations (100 µg/L) greatly exceeds thresholds established to protect Aquatic Biota Use in SHG stream types.

Halnon Brook

Total phosphorus concentrations at Halnon 2.5 (downstream of the confluence with Trib 10) ranged from 30 µg/L to 49 µg/L between 2009-2021 under base flow conditions (Table 3). These concentrations exceed the VWQS of 12 µg/L for SHG streams. The most recent water quality data from 09/03/2021 indicates TP concentrations greatly exceeded nutrient criteria thresholds in Halnon Trib 10 at RM 0.1 (90 µg/L-TP) and Halnon Brook RM 2.5 (41 µg/L-TP). On average TP values in Halnon Brook increased by 31 µg/L-TP between RM 2.6 and 2.5 (average base flow concentration of 8 and 39 µg/L-TP respectively from 2019-2021) downstream from the confluence of Halnon Brook Trib 10. Upstream of the confluence with Trib 10, at Halnon RM 2.6, the TP levels were very low (average of 8 µg/L-TP), well below the TP threshold for SHG stream types, clearly illustrating Trib 10 and the Salisbury FCS effluent as the source of the elevated phosphorus.

Surface water monitoring above and below the confluence with Trib 10, at Halnon Brook RM 2.6 & 2.5, clearly illustrate that Trib 10 is contributing excess phosphorus to Halnon Brook RM 2.5. However, up until 2019, the macroinvertebrate community passed at Halnon 2.5, therefore the combined VWQS nutrient criteria were met. In 2019, the macroinvertebrate community declined, receiving a non-attainment assessment. The elevated phosphorous concentrations from Halnon Trib 10 are degrading the biological community, resulting in nonattainment of VWQS at Halnon Brook RM 2.5 for combined nutrient criteria when most recently sampled in 2021.

The calculated in-stream TP concentration attributable to the Salsibury FCS is 212 ug/L using the TSD method adjusted effluent data and is 162.6 ug/L without the TSD adjustment. This calculation is presented above in Table 5.

Total Phosphorus Nutrient Response Conditions Analysis:

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at Halnon Trib 10 RM 0.1 below the hatchery on 09/13/2021 are summarized in Table 6. The compliance point for this facility is at RM 0.5.

Table 6. Assessment of Phosphorus Response Variables Halnon Brook and Halnon Trib. 10 below the VT Fish & Wildlife - Salisbury FCS

Response variable (VWQS reference)	Target Value for Cold Water Fish Habitat	Halnon RM 2.5 (Downstream of confluence with Trib 10) 10/01/2021	Halnon Trib 10, RM 0.1 (Downstream of Salisbury FCS) 10/01/2021
pH (§3-01.B.9)	6.5-8.5 s.u.	*8.1*	*7.9*
Turbidity (§3-04.B.1)	< 10 NTU at low mean annual flow	*1.1*	***12.1***
Dissolved Oxygen (min) (§3-04.B.2)	>6 mg/L and 70% saturation	*10.3 mg/L / 99%*	*9.5 mg/L / 91% (10/6/2020)*
Aquatic biota, based on macroinvertebrates.	Attaining an assessment of good, or better.	*Fails to Meet WQS*	***Fails to Meet WQS***

Total Phosphorus Reasonable Potential Determination:

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document maintains the facility's Annual Waste Load Allocation of 0.181 mt/year or 399 lbs./year. The numeric criteria for TP are exceeded when calculated at this facility's full design flow using the TSD method, and with the receiving water at LMM conditions. The numeric criteria are also exceeded (163 µg/L vs 12 µg/L) without using the TSD method. This facility has reasonable potential to violate VWQS due to exceeding the narrative and numeric criteria for TP.

The existing TP monthly average concentration limit of 0.1 mg/L should be reduced to 0.05 mg/L. Based on best professional judgment, DEC biologists feel that this reduction in total phosphorus from the Salisbury FCS will result in measurable improvements to the biological community. Ongoing biological monitoring will determine if these TP reductions result in Halnon Trib. 10 meeting the WQS or if additional TP reductions through adaptive management are necessary. In order to achieve a lower average TP concentration, the Salisbury FCS could lower their DF from 1.31 MGD to 1.0 MGD. Compared to facility operations during 2017 -2021, as reported in effluent data and flows (Table 1a), this would result in a 35 lb/year reduction in TP.

Recommended TP Limit for Salisbury:
1.0 MGD X 0.05 mg/L X 8.34 = 0.417 lbs /day X 365 = 152 lbs/year.

This recommended limit represents a 20 µg/L-TP effluent reduction (average) based on how the Salisbury FCS has operated for last 5 years. Maximum flow reported during 2017 – 2021 was 1.24 MGD. Permit conditions described above would result in an average monthly TP concentration of 50 µg/L and average monthly flow of 1.0 MGD.

Monthly effluent and in-stream sampling for TP and DP should occur between November 1 and May 31. Effluent and in-stream sampling for TP between June 1 and October 31 should be conducted twice a month.

Additional data is also required to evaluate Total Phosphorus in Trib. 10 to Halnon Brook, including additional macroinvertebrate sampling in 2024 and 2026. This sampling frequency will allow the biological community time to respond to reductions in nutrient loading and inform the adaptive management approach.

Following the continuance of the permit issued in 2006, Vermont Department of Fish and Wildlife hired VHB to conduct monitoring downstream of the hatchery and to develop an adaptive management strategy to better identify and address the potential for water quality impacts related to the discharge of hatchery effluent. This monitoring includes macroinvertebrate and chemical sampling at an increased frequency compared to historical monitoring efforts. The monitoring efforts and development of nutrient control strategies including changes to food formulations and the capture and diversion of solid fish wastes away from the settling pond are ongoing efforts, and the permit should incorporate a requirement to follow the management strategies developed.

D. Fishery Chemicals for the Prevention and Control of Pathogens and Disease

The use of fishery chemicals has been reviewed as part of this analysis, and when used as the draft permit conditions and limits described should not pose any potential risk to receiving waters. The fishery chemicals will be used in accordance with the U.S. Food and Drug Administration for the prevention and control of fish pathogens and disease. Concentrations and treatment durations shall not exceed specific product label, or Investigative New Animal Drug (INAD) authorization, or the terms and conditions of this permit. Results of specified monitoring will be reported on the monthly Discharge Monitoring Report (DMR).

Formalin:
Aquaculture facilities commonly use biocides, the most common of which are formalin products such as Paracide-F, Formalin-F or Parasite-S, which contain approximately 37 percent by weight of formaldehyde gas. Formalin is used for the therapeutic treatment of fungal infections on the eggs of finfish and to control certain external protozoa and monogenetic trematodes on all finfish species. Because it is formulated to selectively kill or remove certain attached organisms, but not the finfish themselves when properly applied, formalin is more toxic to invertebrate species than to vertebrates.

When setting the necessary permit limits to protect the receiving water's aquatic environment from the effects of formalin in a discharge, it is more important to develop limits to protect invertebrate species because they are more sensitive to the effects of formaldehyde. In the receiving waters, these invertebrates are an integral part of the food chain for finfish. Formalin use must be consistent with U.S. Food and Drug Administration (USFDA) labeling instructions as per 21 CFR §529.1030. While the prophylactic use of formalin (i.e., drugs and chemicals used to prevent specific disease(s) in the absence of their symptoms) is not mentioned in those USFDA regulations, EPA allows its use only under the extra-label provisions of the Federal Food, Drug and Cosmetic Act as a BMP to control the excessive use of drugs.

The Salisbury Fish Hatchery has a reasonable potential to cause or contribute to an exceedance of the narrative toxicity criterion for formaldehyde based on the historic use of formalin at this facility and WQBELs for formaldehyde (expressed as formalin) should be developed.

Currently there are no acute and chronic aquatic life criteria for either formalin or formaldehyde in the state water quality standards for Massachusetts, New Hampshire, or Vermont. Hohreiter and Rigg derived acute and chronic aquatic life formaldehyde criteria of 4.58 mg/L and 1.61 mg/L, respectively, in Draft AQUAGP 2020 Fact Sheet Page 26 of 50 accordance with EPA's Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. These criteria were developed based on data for at least one species in eight different taxonomic families, including 12 species of fish. These criteria are appropriate for the purpose of establishing effluent limitations for formaldehyde during formalin use at CAAP facilities.

The acute and chronic formaldehyde criteria described above were converted to acute and chronic formalin criteria (37% formaldehyde) by multiplying by 2.7; resulting in 12.36 mg/L formalin (acute) and 4.34 mg/L formalin (chronic).
Applying these formalin criteria at 7Q10 flow conditions (IWC=0.98) will result in Maximum Daily concentration limit for formalin to be 12.1 mg/l. The monthly average concentration limit for formalin should be 4.28 mg/l. Formalin also reduces dissolved oxygen, at a ratio of 1 mg/l DO per 5 mg/l Formalin, and extra care should be taken to remain in compliance with the VWQS Dissolved Oxygen criteria and the BOD limitation on days with formalin use.

The permit should contain a requirement to describe how formalin will be used, reporting the treatment concentrations, duration of treatments, dates, masses and calculated effluent concentration of formalin for each treatment. Additionally, a minimum of two samples should be collected and analyzed during treatments each month formalin is used.

If the formalin limits described are problematic for the facility to meet, chemical effluent detention ponds should be considered. Holding the formalin effluent waste for 36 hours before discharging to surface waters will allow for formalin concentrations to be reduced significantly.

E. Total Residual Chlorine (TRC)

The use of any chlorine containing product should be limited such that the effluent concentration is equal to or less than the VWQS for chlorine. A daily maximum value of 0.019 mg/l and a monthly average value of 0.011 mg/l should be included in the permit. Sampling should occur a minimum of twice per month during months when chlorine containing products are used. The permit should contain a requirement to report the dates, masses and calculated effluent concentration of TRC for each chlorine containing treatment. A sufficiently sensitive test method should be used to perform the analysis.

F. Chloramine-T

Chloramine-T contains chlorine and is subject to the limitation for TRC described above. The permit should contain a requirement to report the dates, masses and calculated effluent concentration of TRC for each chlorine containing treatment. A sufficiently sensitive test method should be used to perform the analysis.

G. Chloride

Chloride can be toxic to aquatic biota and numeric water quality criteria exist. Monitoring data indicates that the receiving water in the Trib. 10 to Halnon Brook has a maximum observed chloride concentration of 41.9 mg/l. This is less than 20% of the chronic water quality standard of 230 mg/l.

Hatchery staff indicate that chloride is used infrequently at the facility. There isn't adequate data to properly characterize the frequency or mass of chloride used to determine reasonable potential more formally. Due to the nature of the facility, it is considered unlikely that chloride will be used in a manner detrimental to aquatic biota. The permit should contain a requirement to report the dates, masses and calculated effluent concentration of chloride for each chloride treatment.

Other fishery drugs

There is insufficient information about the need for, use of or toxicity of other chemicals used to control and prevent fish disease and pathogens at this facility. However, a variety of products have been approved by the Food and Drug Administration for use in treating and controlling pathogens and disease and are generally considered safe when used as directed. The use of any necessary chemical should reported to DEC and be in accordance with the manufacturer's directions, in accordance with an Investigative New Animal Drug (INAD) authorization and/or under the direction of a veterinarian if necessary. A non-exhaustive list of these chemicals

includes:– Sulfadimethoxine + Ormetoprim (Romet-30®) ,Florfenicol (AQUAFLOR®) , Oxytetracycline Dihydrate (Terramycin®200), and Oxytetracycline Hydrochloride (Pennox 343). The permit should contain a requirement to report the name of the drugs(s), dates, masses and calculated effluent concentration for each drug treatment.

VII. Summary of Reasonable Potential Determinations

A. Recommended In-Stream Biological and Water Quality Monitoring

In-stream biological and water quality monitoring should continue to be conducted. A sampling plan will be developed and submitted to DEC for approval. Once the sampling plan is approved, a QAPP will be submitted to DEC for approval. The data collected under the updated QAPP will be used to evaluate the effectiveness of the adaptive management strategy being developed by VHB for reducing total phosphorus concentrations discharged from the Salisbury FCS.

- Macroinvertebrate monitoring in 2024 and 2026 at Halnon Trib 10 at RM 0.1 and Halnon RM 2.5 following a DEC approved QAPP. VHB will submit a sampling plan and update their current QAPP with suggested revisions by VTDEC.
- In-stream sampling for TP and DP should coincide with effluent monitoring. A minimum of monthly sampling at Halnon Trib 10 RM 0.1, 0.2, and 0.5 should occur between November 1 and May 31; twice a month sampling should occur between June 1 and October 31.

B. Recommended Effluent Monitoring

The most recent permit for the hatchery discharge expired on March 31, 2012, however the facility has continued operation with a Title 3 Section 814 administrative continuation since that date. In addition to the monitoring required in that expired permit, the following monitoring is suggested for inclusion in the renewed permit to provide additional data to support future Reasonable Potential Determinations:

- To provide additional data for future assessments of WET reasonable potential, it is recommended that four 1-species (*Ceriodaphnia dubia)* 48 hour acute/ 7-day chronic tests be included in the draft permit, two during the summer (August/October 2022 and 2024) and two during the winter (January/February 2023 and 2025). It is also suggested that concurrent sampling for TAN and the priority metals be conducted with each of these tests.
- The draft permit shall include a requirement for sampling for priority metals scans three times. These scans should be conducted concurrently with any WET testing.
- To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, monthly "monitor only" requirements for Total Nitrogen (TN), Nitrate/Nitrite (Nox), and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. The monitoring frequency has been chosen based on the high IWC.
- To provide additional data for future assessments of TAN reasonable potential, it is recommended that monthly monitoring with a monitor only condition be included in the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.
- This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document maintains the facility's Annual Waste Load Allocation of 0.181 mt/year or 399 lbs/year of TP.
- The existing TP monthly average concentration limit of 0.1 mg/L should be reduced to 0.05 mg/L.
- Monthly sampling for TP in effluent should occur between November 1 and May 31. Sampling for TP between June 1 and October 31 should be conducted twice a month.
- Practices identified by VHB in their adaptive management strategy should be undertaken by the permittee and reported to DEC.

- Additional information is required for future determinations of reasonable potential for chemicals used to treat and control pathogens and disease. Any chemical used to do so should be in compliance with FDA and manufacturer's directions and/or requirements. The permit should contain a requirement to report the name of the drugs(s), dates, masses, and calculated effluent concentration for each drug treatment.
- Formalin sampling should occur twice a month each month Formalin is used. The Maximum Day concentration limit for formalin should be 12.1 mg/l. The monthly average concentration limit for formalin should be 4.28 mg/l. Quantities, dates, and calculated effluent concentrations should be recorded each time formalin is used.
- The Salisbury FCS shall report the quantities, dates and calculated effluent concentrations for any other chemicals used to control and prevent fish disease and pathogens at this facility.
- The use of any chlorine containing products should be limited to a daily maximum effluent concentration of 19 ug/l and a monthly average effluent concentration of 11 ug/l. Sampling should occur twice a month.

C. Conclusion

After review of all available information, it has been determined that there is a reasonable potential for the Salisbury FCS to cause or contribute to a water quality violation. The Salisbury FCS discharge with an average effluent TP concentration of 70 µg/L is the source of elevated phosphorus in Halnon Trib. 10. This discharge overwhelms Trib 10, creating an effluent dominated stream, comprised of 95.7% effluent at LMM flow and 98.7% effluent at 7Q10 flow.

Halnon Trib. 10 does not have the capacity to assimilate the current Salisbury FCS discharge without exceeding VWQS, the current mass loading TP limit is equivalent to an effluent concentration of 100 µg/L. Recommend lowering this TP limit by 40 percent to mitigate the significant nutrient enrichment and resulting water quality violations.

PERMITTEE: **VT Fish and Wildlife** PERMIT No.: **3-0361**

Address: **646 Lake Dunmore Road**
Salisbury, VT 05769
Phone: **802-352-4371**

S/N: **Salisbury Fish Culture Station** MONTH: _____ **YEAR:** ____ Page _____ of _____

PERMIT MONITORING INFORMATION

DATE	EFFLUENT																	
	Clean (X=date raceways cleaned) 1	Flow MGD 2	pH 3	TSS mg/L 4	BOD mg/L 5	TP mg/L 6	NOx mg/L 7	TKN mg/L 8	TN mg/L 9	TN lbs. 10	TAN mg/L 11	Formalin mg/L 12	TRC mg/L 13	14	15	16	17	18
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Max																		
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SIZE AND TYPE OF PRIMARY FLOW DEVICE:

FLOW CHECKS: Influent ☐ Effluent ☐

Date 19	Head in Inches 20	Actual Flow in MGD 21	Chart Flow in MGD 22	(Actual-Chart) / Actual X 100 = % ERROR 23

Factory Calibration Date: Calibrated By:

COMMENTS AND EXPLANATIONS OF ANY VIOLATIONS:
(Reference all attachments here)

I certify under penalty of law that I have personally examined, and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

PREPARED BY: _____

APPROVED BY: _____
Authorized Agent for the Permittee

PERMITTEE: **VT Fish and Wildlife** PERMIT No.: **3-0361**

Address: **646 Lake Dunmore Road**
Salisbury, VT 05769
Phone: **802-352-4371**

S/N: **Salisbury Fish Culture Station** MONTH: _____ **YEAR:** ____ Page _____ of _____

PERMIT MONITORING INFORMATION

DATE	RM 0.1		RM 0.2		RM 0.5														
	TP (1)	Dissolved Phosphorus (2)	TP (3)	Dissolved Phosphorus (4)	TP (5)	Dissolved Phosphorus (6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
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TOTAL																			
Average																			
Max																			
Min																			

SIZE AND TYPE OF PRIMARY FLOW DEVICE:

FLOW CHECKS: Influent ☐ Effluent ☐

Date (19)	Head in Inches (20)	Actual Flow in MGD (21)	Chart Flow in MGD (22)	(Actual-Chart)/Actual X 100 = % ERROR (23)

Factory Calibration Date: Calibrated By:

COMMENTS AND EXPLANATIONS OF ANY VIOLATIONS:
(Reference all attachments here)

I certify under penalty of law that I have personally examined, and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

PREPARED BY: _____

APPROVED BY: _____
Authorized Agent for the Permittee

WR-43-0 REVISED 1987 (WR-43-0.xls)

WRforms

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive,Davis 3
Montpelier, VT 05620-3522

Permittee:	
NPDES Permit No.	
Preparer/Contact:	
Telephone:	
Email:	
Month/Year:	

Total Phosphorus Waste Load Allocation from Lake Champlain Phosphorus TMDL:		metric tons/year lbs/year	Select your facility in the pulldown list next to Permittee above.
Monthly Average TP concentration		mg/L	Enter this value from WR-43.
Monthly Average Daily Flow Rate		MGD	Enter this value from WR-43.
Number of days with discharge		days	Enter the number of days with discharge.
Average TP Concentration * Average Flow Rate * Days of Discharge * 8.34	0.00	lbs	Pounds of Phosphorus discharged this month.
12 Month Running Total Pounds of Phosphorus		lbs/year	Enter the 12 Month Running Total Pounds of Phosphorus.
12 Month Running Total / Waste Load Allocation * 100		%	Percentage of Annual Phosphorus Load from TMDL

This form should be submitted monthly by facilities that have a Total Phosphorus Waste Load Allocation under the Lake Champlain Phosphorus TMDL. If you have a permit issued before 2017 DO NOT USE this form.

Notes:

Table 9. Vermont Individual WWTF Phosphorus Wasteload Allocations
(*Facilities with allocations different from the 2002 TMDLs are shown in italics.*)

Facility	Lake Segment	Design Flow (mgd)	Current Permit Load (mt/yr)	TMDL Wasteload Allocation (mt/yr)	Change in Permitted Load (mt/yr)
Alburgh	13 Isle LaMotte	0.130	0.108	0.108	0.000
Barre City	*05 Main Lake*	4.000	3.314	1.105	-2.209
Barton				0.246	
Benson	01 South Lake B	0.018	0.122	0.122	0.000
Brandon	04 Otter Creek	0.700	0.580	0.580	0.000
Brighton				0.695	
Burlington Electric McNeil Generating Station	05 Main Lake	0.365	0.017	0.017	0.000
Burlington Main	*07 Burlington Bay*	5.300	4.392	1.464	-2.928
Burlington North	*05 Main Lake*	2.000	1.657	0.552	-1.105
Burlington River (East)	*05 Main Lake*	1.200	0.994	0.331	-0.663
Cabot	05 Main Lake	0.050	0.041	0.041	0.000
Castleton	01 South Lake B	0.480	0.397	0.397	0.000
Enosburg Falls	*12 Missisquoi Bay*	0.450	0.373	0.124	-0.249
Essex Junction	*05 Main Lake*	3.300	2.569	0.911	-1.658
Fair Haven	01 South Lake B	0.500	0.414	0.414	0.000
Fairfax	09 Malletts Bay	0.078	0.539	0.539	0.000
Global Foundries (I B M Corp)	*05 Main Lake*	8.000	5.531	2.210	-3.321

Hardwick	09 Malletts Bay	0.371	0.410	0.410	0.000
Hinesburg	*06 Shelburne Bay*	*0.250*	*0.276*	*0.069*	*-0.207*
Jeffersonville	09 Malletts Bay	0.077	0.532	0.532	0.000
Johnson	09 Malletts Bay	0.270	0.224	0.224	0.000
Marshfield	05 Main Lake	0.045	0.311	0.311	0.000
Middlebury	04 Otter Creek	2.200	1.823	1.823	0.000
Milton	09 Malletts Bay	1.000	0.829	0.829	0.000
Montpelier	*05 Main Lake*	3.970	3.290	1.097	-2.193
Morrisville	09 Malletts Bay	0.550	0.352	0.352	0.000
Newport City				0.964	
Newport Town (Newport Center)	*12 Missisquoi Bay*	0.042	0.006	0.116	0.110
North Troy	*12 Missisquoi Bay*	0.110	0.760	0.122	-0.638
Northfield	*05 Main Lake*	1.000	0.829	0.276	-0.553
Orleans				0.176	
Orwell	02 South Lake A	0.033	0.228	0.228	0.000
Otter Valley Union High School	04 Otter Creek	0.025	0.173	0.173	0.000
P B M Nutritionals Inc	09 Malletts Bay	0.425	0.352	0.352	0.000
Pawlet (West Pawlet)	01 South Lake B	0.040	0.276	0.276	0.000
Pittsford	04 Otter Creek	0.085	0.483	0.483	0.000

Pittsford Fish Hatchery (US Dept of Interior-DEisenhower NFH)	04 Otter Creek	2.600	0.691	0.691	0.000
Plainfield	*05 Main Lake*	0.125	0.691	0.138	-0.553
Poultney	01 South Lake B	0.500	0.414	0.414	0.000
Proctor	04 Otter Creek	0.325	0.359	0.359	0.000
Richford	*12 Missisquoi Bay*	0.380	0.420	0.105	-0.315
Richmond	*05 Main Lake*	0.222	0.184	0.061	-0.123
Rutland City	04 Otter Creek	8.100	5.634	5.634	0.000
Shelburne #1 (Crown Road)	*06 Shelburne Bay*	0.440	0.348	0.122	-0.226
Shelburne #2 (Harbor Road)	*06 Shelburne Bay*	0.660	0.497	0.182	-0.315
Sheldon Springs	12 Missisquoi Bay	0.054	0.373	0.373	0.000
Shoreham	04 Otter Creek	0.035	0.242	0.242	0.000
South Burlington Airport Parkway	*05 Main Lake*	3.300	1.906	0.911	-0.995
South Burlington Bartlett Bay	*06 Shelburne Bay*	1.250	0.878	0.345	-0.533
St Albans Northwest Correctional	11 St. Albans Bay	0.040	0.028	0.028	0.000
St. Albans City	*11 St. Albans Bay*	4.000	2.762	1.105	-1.657
Stowe	*05 Main Lake*	1.000	0.282	0.276	-0.006
Swanton	*12 Missisquoi Bay*	0.900	0.746	0.249	-0.497
Troy/Jay	*12 Missisquoi Bay*	0.800	0.221	0.221	0.000

Vergennes	04 Otter Creek	0.750	0.621	0.621	0.000
VT Fish & Wildlife - Ed Weed Fish Culture Station	05 Main Lake	11.500	0.914	0.914	0.000
VT Fish & Wildlife - Salisbury Fish Hatchery	04 Otter Creek	1.310	0.181	0.181	0.000
Wallingford FD 1	04 Otter Creek	0.120	0.829	0.829	0.000
Waterbury	*05 Main Lake*	0.510	0.563	0.141	-0.422
West Rutland	04 Otter Creek	0.450	0.364	0.364	0.000
WestRock Converting (Rock Tenn)	*12 Missisquoi Bay*	2.500	1.260	0.691	-0.569
Williamstown	*05 Main Lake*	0.150	1.036	0.166	-0.870
Winooski	*05 Main Lake*	1.400	1.160	0.387	-0.773
Total			55.802	32.336	-23.465

The yellow column contains the P loads for each facility in mt/year (metric ton per year).

Alburgh	3-1180
Barre City	3-1272 3-1202
Benson	3-1166
Brandon	3-1196 3-1213
Burlington Electric McNeil Generating Station	3-1219
Burlington Main	3-1331
Burlington North	3-1245
Burlington River	3-1247
Cabot	3-1440
Castleton	3-1238
Enosburg Falls	3-1234
Essex Junction	3-1254
Fair Haven	3-1307
Fairfax	3-1194
I B M Corp	3-1295

Hardwick	3-1143
Hinesburg	3-1172
Jeffersonville	3-1323
Johnson	3-1149
Marshfield	3-1195
Middlebury	3-1210
Milton	3-1203
Montpelier	3-1207
Morrisville	3-1155 3-1241
Newport Town	3-1236
North Troy	3-1139
Northfield	3-1158 3-1201
Orwell	3-1214
Otter Valley Union High School	3-0293
P B M Nutritionals Inc	3-1209
Pawlet	3-1220
Pittsford	3-1189

US Dept of Interior-DEisenhower NFH	3-1188
Plainfield	3-0381
Poultney	3-1231
Proctor	3-1298
Richford	3-1147
Richmond	3-1173
Rutland	3-1285
Shelburne 1 (Crown Rd)	3-1289
Shelburne 2 (Harbor Rd)	3-1304
Sheldon Springs	3-1108
Shoreham	3-1459
South Burlington - Airport Parkway	3-1278
South Burlington - Bartlett Bay	3-1284
St Albans Northwest Correctional	3-1260
St Albans City	3-1279
Stowe	3-1232
Swanton	3-1292
Troy & Jay	3-1311

Vergennes	3-0368
VT Fish & Wildlife - Ed Weed Fish Culture Station	3-1312
VT Fish & Wildlife - Salisbury Fish Hatchery	3-0361
Wallingford FD 1	3-0365
Waterbury	3-1160
West Rutland	3-1237
WestRock Converting Company	3-1118
Williamstown	3-1176
Winooski	3-1248