

Aquatic Nuisance Control Individual Permit

Under 10 V.S.A. § 1455



VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
**WATERSHED
MANAGEMENT DIVISION**
LAKES & PONDS PROGRAM

Permittee: United States Fish & Wildlife Service
Control Activity: Pesticide (Lampricide)

Permit Number: 2016-C12
Waterbody: Stone Bridge Brook, Milton

Based upon the Findings contained in this permit, the Secretary of the Agency of Natural Resources has determined that the proposed aquatic nuisance control activity will comply with 10 V.S.A. § 1455, and is hereby approved under the following conditions and specifications.

a. Specific Conditions

1. **Pesticide Use.** The Permittee is authorized to use lampricide, 3-Trifluoromethyl-4-Nitrophenol Sodium Salt (TFM), TFM-HP and TFM-BAR (EPA Registration Nos. 6704-45 and No. 6704-86, respectively) in Stone Bridge Brook. These pesticides shall be registered with the U.S. Environmental Protection Agency and the Vermont Agency of Agriculture, Food and Markets at the time of use and handled, applied, and disposed of in conformance with all state and federal regulations. The lampricide products used must be produced using the same manufacturing process as those batches previously examined by the Vermont Department of Health, and noted in the Analytic Perspectives report dated August 28, 2009, or its replacement.
2. **Certified Applicator.** All applicators of the authorized pesticide shall be certified by the Vermont Agency of Agriculture, Food and Markets (VT AAFM) in Category Five – Aquatic Pest Control. All applicators shall conform to the restrictions established in 6 V.S.A. Chapter 87 Vermont Regulations for Control of Pesticides, and shall report the amount of each pesticide used to the VT AAFM Pesticide Management Program.
3. **Procedure.** The Permittee shall apply lampricide in accordance with the following:
 - A. [Standard Operating Procedures](#) for Application of Lampricides in the Great Lakes Fishery Commission Integrated Management of Sea Lamprey (*Petromyzon marinus*) Control Program, Marquette Michigan. Control Report 04-001.6 (Adair and Sullivan 2014).
 - B. Contingency Plan for Accidental Spillage of Lampricides during Lake Champlain Sea Lamprey Control Operations (Smith 2015).
 - C. Water Use Advisory Zone Monitoring Plan for Lampricide Treatments in Lake Champlain, May 2016, or its approved replacement.
 - D. Prior Notification, Posting and Water Supply Plan for Lake Champlain Lampricide Applications, May 2016, or its approved replacement.
4. **Concentration & Duration.** As determined by an on-site toxicity test conducted on or after September 1 of the year of the treatment, the Permittee shall apply lampricide to maintain a 9-hr lethal concentration (1.0 x MLC or greater) in all downstream areas from the primary application point. The lampricide application rate at the Primary Application Point (concentration measured at site 1), the boost application Point (concentration measured at site 3B), and any supplemental application points (SAP 1-5) shall not exceed 1.5 x MLC to sea lamprey. The Permittee shall not apply TFM into Stone Bridge Brook at a single location for longer than 14 consecutive hours.
5. **Treatment Dates.** The Permittee is authorized two applications of lampricide under this permit; the first between Labor Day and December 1 of 2016 and the second between Labor Day and December 1 of 2020 unless authorized otherwise by the Secretary during the effective period of this permit. If the 2016 treatment must be postponed until 2017 or the 2020 treatment postponed until 2021, that rescheduled treatment must occur during the same date range. In the case of a postponement, the next treatment shall remain on its original schedule. The second treatment shall not occur if the Permittee has not fulfilled condition a.15. of this permit.
6. **Location.** The Permittee is authorized to apply TFM only in the authorized areas of Stone Bridge Brook as shown on Attachment 1 of the Approved Application and identified as follows:

- A. The primary application location is immediately downstream of where Lake Road intersects Stone Bridge Brook in the Town of Milton.
 - B. A supplemental TFM boost application will be located at Beebe Hill Road and used to raise the concentration if it is determined that the chemical block has deteriorated to a point that could result in an ineffective treatment.
 - C. TFM-Bar may be used in up to 5 tributaries within the Stone Bridge Brook watershed for the purpose of negating the effects of incoming freshwater. TFM-Bar shall be placed no further than 100 meters upstream of a tributary's confluence with Stone Bridge Brook.
7. Water Temperature. The Permittee shall ensure the water temperature at the primary application point (prior to application) during the day of scheduled treatment is at or above 2° C.
 8. Stream Flow. The Permittee shall monitor stream flow hourly during the time period when application is taking place. Treatment shall only occur in Stone Bridge Brook when the measured flow rate on the day of treatment is between 2 cubic feet per second (CFS) and 12 CFS.
 9. Lake Level. No TFM use shall occur unless the surface elevation of Lake Champlain is at or below 98.0 feet National Geodetic Vertical Datum (NGVD) as measured at the permanent USGS gauging station located at Burlington, Vermont.
 10. Secretary Notification. The Secretary shall be notified one week in advance of any pesticide use.
 11. Treatment Monitoring. The Permittee shall monitor for pH, alkalinity, and adjust TFM application concentrations accordingly during the treatment duration in order to ensure the 1.5 x MLC is not exceeded in accordance with the *Treatment Strategy and Methodology* (as indicated in Attachment 1 of the Approved Application) and in accordance with the following:
 - A. The Permittee shall collect and analyze (for pH and Lampricide concentration) water samples every ½ hour from the following sample stations during treatment by hand or pH logger. Samples shall be analyzed for alkalinity at least every 2 hours at:
 - i. Station 1: Downstream of Lake Road Application Point
 - ii. Station 3b: Downstream of Beebe Hill boost application
 - B. The Permittee shall collect and analyze (for pH and Lampricide concentration) water samples every hour from the following stations during treatment by hand or pH logger:
 - i. Station 2: Midpoint between Lake Road and Beebe Hill Road
 - ii. Station 3a: Above Beebe Hill Road maintenance application point
 - iii. Station 4: Approximate midpoint between Beebe Hill Road and the mouth
 - iv. Station 5: At the mouth near Eagle Mountain Harbor Road
 - C. The Permittee shall take samples from Stations 1 and 3b at three locations in transect at one-quarter, one-half, and three-quarters across Stone Bridge Brook if:
 - i. TFM concentration measurements along this transect are within 0.1 MLC of each other and at or below the 1.5 MLC target, then sampling may be reduced to the midstream (one-half) location only.
 - ii. TFM concentration measurements along this transect are NOT within 0.1 MLC of each other and at or below the 1.5 MLC target, then sampling shall continue at all three locations until subsequent measurements along this transect are within 0.1 MLC and at or below the 1.5 MLC target.
 - D. The Permittee shall conduct all monitoring, surveys and reporting of the water use advisory zone in accordance with the *Water Use Advisory Zone Monitoring Plan for Lampricide Treatments in Lake Champlain* (Smith 2016).
 - E. Except for samples collected for water use advisory purposes, the Permittee shall determine TFM concentrations with a photospectrometer accurate to within 0.1 parts per million (ppm) and shall have a minimum detection limit of 50 parts per billion (ppb) or less.
 12. Public Water Use Advisories and Recommendations. To minimize unnecessary exposure, the following conditions to all water use advisories apply:
 - A. For the use of TFM, the public uses of the waterbody downstream of the primary application location shall proceed as follows:

- i. Public Water Supplies: The water should not be used for drinking or food or beverage preparation until measurements of TFM are below the reporting limit of 3.0 parts per billion (ppb) in any public water supply finished water sample.
 - ii. Private Water Supplies: The water should not be used for drinking or food or beverage preparation until measurements of TFM are below the reporting limit of 3.0 ppb in areas where there may be private water supplies.
 - iii. The water should not be used for swimming or bathing until measurements of TFM are below 35 ppb.
 - iv. The water should not be used for recreation other than for swimming until measurements of TFM are below 100 ppb.
- B. The Permittee shall inform the public of the aforementioned public water use advisories and recommendation contained in this section in accordance with the plans as identified under Specific Conditions a.3.C. and a.3.D. of this permit.
- C. All laboratory analyses for TFM regarding public use advisories and notifications shall be conducted with a minimum detection limit of 5 parts per billion (ppb) or less.
- D. The Permittee shall maintain a website (<http://www.fws.gov/lcfwro/landowner.html>) and a toll-free phone line (1-888-596-0611) for the public to check on the current status of the public water use advisories and recommendations.

13. Post-Treatment Surveys.

- A. The Permittee shall conduct post-treatment nontarget mortality surveys in the 5 zones between the following Survey transects: 3-4, 8-9, 13-14, 18-19, and 23-AP in Stone Bridge Brook as identified in Attachment 1 of the Approved Application. This survey shall be conducted in accordance with the following and shall include the following information:
- i. Post-treatment nontarget mortality survey shall be conducted within 24 hours of the lampricide clearing each zone;
 - ii. All visible bottom sections will be inspected and observations of nontarget organism mortalities, except lampreys, shall be recorded;
 - iii. At each survey zone, the first 30 lampreys (all species) encountered will be collected and brought back to the lab for identification;
 - iv. Preliminary results shall be made available to the Aquatic Nuisance Control Program within 24 hours of completion;
 - v. If preliminary results indicate a significant level of impact on nontarget organisms, then a full reach survey may be requested by the Secretary;
 - vi. All mudpuppy (*Necturus maculosus*) mortalities shall be recorded and reported to the Secretary. All specimens shall be collected and preserved in a manner to ensure continued study, such as for ongoing environmental DNA (eDNA) research. The Permittee shall participate in developing standardized methodologies to assess and monitor mudpuppy population distribution in Vermont; and
 - vii. Final results shall be submitted to the Secretary by May 1st of the year following the treatment.
- B. The Permittee shall conduct a post-treatment survey to estimate the relative abundance of sea lamprey and other lamprey species in the LaPlatte River using the standard Larval Assessment Sampling Protocol, or an approved equivalent, within one year after treatment. The results of this survey shall be submitted to the Secretary by December 31st of the year following the year of treatment.

14. Annual Treatment Report. A final report shall be submitted to the Secretary by May 1st of the following year and shall include at a minimum:

- A. Batch numbers and the quantity used of TFM HP and TFM Bar;
- B. Results from the on-site toxicity test and MLC determination;
- C. Total treatment duration;
- D. Summary of water chemistry monitoring data;
- E. Summary of stream flow data;

- F. All nontarget, non-lamprey post-treatment mortality survey data;
 - G. A proportional representation of each lamprey species in post treatment collections; and,
 - H. Other observations, corrective actions taken; and recommendations (if any).
15. TFM Toxicity Study. The Permittee shall collaborate with the Vermont Department of Health to ensure that a peer-reviewed TFM toxicity study is conducted to determine an action level for drinking water sources. The results of the TFM toxicity study shall be provided to the Secretary prior to the scheduled second treatment of the Stone Bridge Brook.
 16. Annual Meeting. The Permittee shall meet with the Secretary annually during the life of this permit to discuss the surveys, annual reports, level of control achieved, long-term management plans, a summary of alternatives to chemical treatments and the feasibility of implementing them, and provide updates pertaining to the TFM toxicity study.
 17. Approved Application. The project shall be completed as shown on the application, plans, and support documents as submitted by the Permittee, and approved by this permit.

b. Standard Conditions

1. Reporting & Correspondence. All aforementioned, requisite correspondence directed to the Secretary pertaining to this permit, including notifications, surveys and reports, shall be (preferably) submitted via email to ANR.WSMDSshoreland@vermont.gov or mailed to the following address:

Lake & Shoreland Permitting
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522
2. Aquatic Invasive Species Spread Prevention. Prior to any control activity occurring, all equipment, including but not limited to boats, trailers, vehicle, and gear, that has been in or on any other waterbody, shall be decontaminated in accordance with the [Voluntary Guidelines to Prevent the Spread of Aquatic Invasive Species through Recreational Activities](#), Aquatic Nuisance Species Task Force, November 2013, or its approved replacement.
3. Decision-makers & Operators as Permittees. A Permittee is defined to mean any person associated with aquatic nuisance control activities (activity) (1) who performs the activity or who has day-to-day control of the activity; or, (2) any person with control over the decision to perform the activity including the ability to modify those decisions. Permittees identified as (1) are referred to in this permit as Operators while Permittees identified as (2) are referred to in this permit as Decision-makers. More than one Operator may be responsible for complying with this permit. Permittees are defined as a Decision-maker, as an Operator, or as both. When a Permittee is both a Decision-maker and an Operator, the Permittee must comply with all applicable requirements.
4. Authorization Modification or Amendment. This permit may be modified or amended upon request by the Permittee or by the Secretary. Any modification under this condition shall be performed in accordance with the [Public Review and Comment Procedures for Aquatic Nuisance Control Permit Applications and General Permits](#), January 30, 2003, or its approved replacement.
5. Rare, Threatened, or Endangered Species. Encounters with any rare, threatened, or endangered species shall be reported to the Secretary immediately. If determined necessary by the Secretary, an Endangered & Threatened Species Taking Permit, per 10 V.S.A. § 5408, shall be obtained prior to commencement or continuance of activity.
6. Compliance with Other Regulations. This permit does not relieve the Permittee from obtaining all other approvals and permits prior to commencement of activity, or the responsibility to comply with any other applicable federal, state, and local laws or regulations.
7. Access to Property. By acceptance of this permit, the Permittee agrees to allow representatives of the state of Vermont access to the property covered by the permit, at reasonable times, for the purpose of ascertaining compliance with Vermont's statutes, regulations, and permit conditions.

8. Legal Responsibilities for Damages. The Secretary, by issuing this individual permit, accepts no legal responsibility for any damage direct or indirect of whatever nature and by whoever suffered arising out of the approved activity.
9. Rights & Privileges. 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 public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.
10. Duty to Comply & Enforcement. The Permittee shall comply with all terms and conditions of this permit. Any permit noncompliance shall constitute a violation of 10 V.S.A. § 1455 and may be cause for any enforcement action and revocation, modification, or suspension of the permit. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.
11. Duty to Reapply. If the authorized activity is anticipated to continue after the expiration date of this permit, the Permittee shall reapply for coverage under a new permit sixty (60) days prior to the expiration date of this permit.
12. Twenty-four Hour Non-compliance Reporting. Unless provided otherwise by this permit, the Permittee shall report any noncompliance which may endanger public health or the environment. Any such information shall be provided within 24 hours from the time the Permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance, its cause; the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; as well as steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
13. Official Duties. This permit shall not restrict law enforcement of emergency operations or the performance of official duties by a government agency.
14. Public Access Areas. In accordance with Fish and Wildlife Board Rule 641, pursuant to 10 V.S.A. § 4145(a), Vermont Department of Fish & Wildlife Access Areas shall not be used for this activity without proper authorization.
15. Reopener. If after granting this permit the Secretary determines, at his or her discretion, that there is evidence indicating that an authorized activity does not comply with the requirements of 10 V.S.A. Chapter 50, the Secretary may reopen and modify this permit to include different limitations and requirements.
16. Appeals. Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant's attorney. The appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings available at www.vermontjudiciary.org. The address for the Environmental Division is: 32 Cherry Street; 2nd Floor, Suite 303; Burlington, VT 05401 Telephone: 802-951-1740.

c. Findings

1. Jurisdiction - 10 V.S.A. § 1455(a). Within waters of the state, no person may use pesticides, chemicals other than pesticides, biological controls, bottom barriers, structural barriers, structural controls, or powered mechanical devices to control nuisance aquatic plants, insects, or other aquatic nuisances, including lamprey, unless that person has been issued a permit by the secretary. The project involves the use of a pesticide within Stone Bridge Brook located in Milton. Therefore, the Department has jurisdiction under 10 V.S.A. Chapter 50.
2. Application Receipt & Review. An application, prepared and submitted by the United States Department of Interior, Fish and Wildlife Service (USFWS), Western New England Complex, Lake Champlain Fish and Wildlife

Resources Office was received on May 13, 2016 for an Aquatic Nuisance Control Permit for the use of lampricide (TFM-HP and TFM-BAR) to control sea lamprey, *Petromyzon marinus*, under 10 V.S.A. 1455(d). It was reviewed in accordance with the Department of Environmental Conservation's Permit Application Review Procedure, adopted May 22, 1996.

3. Background; Aquatic Nuisance Control Permit History.

ANC 1990-C01: Authorization to chemically control sea lamprey.

ANC 2013-C01: Authorization to chemically control sea lamprey.

ANC 2014-S01: Authorization to install a structural barrier for sea lamprey control.

4. Project Description. The USFWS proposes the use of two aquatic pesticides TFM HP and TFM Bar (EPA Registration Nos. 6704-45 and No. 6704-86, respectively) in Stone Bridge Brook. The aquatic pesticides are generally referred to as lampricide, formulated to control sea lamprey. Sea lamprey (*Petromyzon marinus*), as well as silver lamprey (*Ichthyomyzon unicuspis*), are fish that parasitize other fish, scarring or killing them. At nuisance levels, lamprey depress coldwater and some warm water fisheries within Lake Champlain. An eight-year experimental sea lamprey control program cosponsored by the USFWS, the Vermont Department of Fish and Wildlife (VT DFW) and the New York State Department of Environmental Conservation (NYSDEC), was conducted on Lake Champlain between 1990 and 1997. This program illustrated the efficacy of TFM at effectively reducing numbers of sea lamprey to levels resulting in an enhancement of the Lake Champlain fishery, particularly Atlantic salmon (*Salmo salar*) and lake trout (*Salvelinus namaycush*).

Pretreatment surveys are made to determine the presence of sea lamprey larvae. Sea lamprey larval population assessments, conducted by the USFWS using protocols developed by the Great Lakes Fisheries Commission, are used to select streams that warrant lampricide control. By increasing the survival and condition of Atlantic salmon and lake trout, this aquatic nuisance control program results in economic benefits derived from increased angling, recreational activity, and water-based expenditures stimulated by an improved fishery in Lake Champlain.

As required by federal law, all waters selected for treatment must first be analyzed on site to determine both the minimum concentration of lampricide required to kill sea lamprey larvae and the maximum concentration that can be applied without causing undue mortality of nontarget organisms. The proposed target in-stream TFM concentration during the 12 to 14-hour treatment period of no greater than 1.5 times the minimum lethal concentration (MLC) to sea lamprey as determined by on-site toxicity tests. The MLC is defined as the minimum concentration of TFM required to kill 99.9 percent of sea lamprey ammocoetes (larvae) during a 9-hour exposure time. The USFWS proposes to conduct two treatments over the five-year duration of this permit.

5. No Reasonable Nonchemical Alternative Available – 10 V.S.A. 1455(d)(1). The USFWS uses an integrated pest management approach to determine appropriate long-term control strategies on a stream-specific basis ([FSEIS](#) pp. 41-47). A current list of research funded by the Great Lakes Fisheries Commission on non-chemical alternative control methods can be found at this website: <http://www.glfc.org/research/scr.php#ac>. Interest in the use of pheromone attractants as a potential non-chemical alternative has received considerable attention; however, pheromones related control methodologies have not yet progressed beyond the point of limited experimental usage (Johnson et al. 2015).

The Status Report for the Lake Champlain Sea Lamprey Alternatives Workgroup (USFWS 2006) summarizes nine studies conducted from 2002 through 2006 which assess potential alternatives to lampricide. Since then, projects such as Pheromone-assisted trapping, Microelemental natal stream statolith signatures, and identifying cross-sectional flow patterns in streams to target the trapping of out-migrating transformers have been undertaken. To date, these efforts have not resulted in development of additional, feasible alternative control methods. In addition, recent studies conducted in Lake Champlain and the Great Lakes, focusing on the use of pheromones as attractants to manipulate spawning runs, have not progressed to the point of an applicable management technique. Despite the completed and ongoing research on non-chemical controls methods, the use of barriers and traps to block and intercept spawning-phase sea lamprey remains the only currently feasible, non-pesticide control alternative in the Lake Champlain Basin. The use of barriers

(both seasonal and permanent) is limited to streams where suitable sites are available and where significant adverse impacts of barriers on other aquatic organisms can be mitigated.

Trapping or lampricide application (TFM) are both technically feasible control methods for Stone Bridge Brook (FSEIS pp. 302-306). Temporary barriers and trapping have been used on Stone Bridge Brook since the end of the first lampricide treatment in 1991. Trapping was successful for many years in preventing the colonization of a sea lamprey population that would warrant lampricide treatment. The conclusion that trapping was effective is based on negative detection surveys that were performed in 1992, 1993, 1995, 1997, and 2001 when USFWS personnel failed to collect a single sea lamprey. However, floods have compromised the temporary barriers and high lake levels have impeded the establishment of effective barriers in recent years. This resulted in the detection of a population of sea lamprey ammocoetes in 2012, by QAS surveys methods, which warranted lampricide treatment to prevent transformation of the ammocoetes into lake parasites. The FSEIS discusses unacceptable methods (pp. 50-52) for removing the population such as electrofishing, parasites and pathogens, and stream habitat alteration; all of which will not be considered using here.

The USFWS investigated building a permanent barrier on Stone Bridge Brook in 1992. The conclusion of this study was that building a permanent barrier was not cost effective. The cost of building a barrier with a lip equivalent to a lake level of 103.5 NGVD feet was estimated to be \$100,576.25 in 1992 dollars. The cost was expected to be considerably greater than treating it with lampricide or operating a temporary barrier. The environmental effects of using a permanent barrier are different than those resulting from the use of temporary barriers with trapping and lampricide application. The potential negative effects to nontarget species may be greater in some circumstances. In trapping operations, captured nontarget species are removed and released upstream of the temporary barrier. Additionally, the temporary barrier uses 1/2- inch mesh screen that effectively blocks lamprey, but will allow smaller fish to pass unimpeded. A permanent barrier would not have this feature. The USFWS believes that the large runs of nontarget fish (mostly cyprinids and catostomids) that have been documented in Stone Bridge Brook would suffer a greater impact if a permanent barrier was installed instead of relying on the proposed lampricide application. The occurrence of spring spawning-run fish has been documented by trapping and is detailed in Appendix 1 of the Approved Application. Appendix 1 also documents the number of lampreys captured each year for the past 6 years.

Another issue with installation of a permanent barrier is the availability of suitable spawning habitat below the barrier. A lip at 103.5 NGVD lake level will not provide an 18-inch clearance above the 103.2 NGVD lake level observed in 2011. However, locating a barrier upstream would expose more spawning habitat to lamprey downstream of the barrier. Other permanent barriers have proven to be less effective at trapping migrating adults and in these instances sea lampreys tend to spawn below the barrier. An example of this situation is the Great Chazy River permanent barrier and sea lamprey trap. If a similar permanent barrier was installed on Stone Bridge Brook, was effective at blocking sea lamprey, but was ineffective at trapping sea lamprey, it could result in a larval population below the barrier where spawning habitat is available. This would potentially result in fewer stream miles exposed to lampricide, but the same volume of pesticide would still be necessary if it was determined that the lower stretch of the stream harbored enough lamprey to warrant treatment.

Due to 1) the information contained in the barrier feasibility study (Staats 1992), 2) the nontarget information contained in Appendix 1 of the Approved Application, 3) the previous effectiveness of temporary barriers, 4) the potentially adverse effects of permanent barriers, 5) the comparison of the cost between building a permanent barrier and implementing the proposed temporary barrier and lampricide application plan, and 6) the inability to construct a barrier that would be high enough to block lamprey, not impound a large area, and prevent access to the available spawning habitat the barrier/trapping option was determined infeasible. The USFWS and Secretary routinely reassess the need for continued lampricide treatments as advancements in nonchemical control technologies are made. The USFWS has expressed a commitment to regularly review the feasibility of nonchemical control methods and implement those types of methods where reasonably possible.

The Secretary finds that there are no reasonable nonchemical alternatives.

6. Nontarget Environment – 10 V.S.A. 1455(d)(2). The USFWS relies upon the most recent scientific information to ensure effective lamprey control while limiting adverse effects to the nontarget environment. Determined by on-site toxicity testing, all lampricide treatments permitted in Vermont tributaries to Lake Champlain from the period 1990-2015 were administered at levels between 0.8 and 1.5 x Maximum Lethal Concentration (MLC). While providing a margin of safety for sensitive nontarget species, except other lamprey species, the recommended treatment concentration maximum of 1.5 x MLC allows for a sufficient margin of error to ensure 1.0 times MLC through sea lamprey inhabited reaches of Stone Bridge Brook for at least 9 hours. Optimum control of TFM toxicity to sea lamprey is achieved when the river water temperature is above 2° C and the surface elevation of Lake Champlain is at or below 98.0 feet as identified at [the United States Geological Survey \(USGS\) Gauge No. 04294500 Burlington](#). Monitoring fluctuations in pH and alkalinity is necessary to determine corresponding changes in lampricide toxicity. As required by the EPA pesticide label, the pH and alkalinity will be monitored, along with the results of the pre-treatment toxicity test, to determine and maintain the target in stream MLC during treatment. Diurnal pH fluctuations will be monitored for at least 24 hours prior to treatment. Total alkalinity will also be measured periodically over the same time frame. TFM photodegrades to one-half strength in a period of three to four days.

Mortality of nontarget organisms has been observed during prior treatments. Based on post treatment mortality surveys, the majority of mussel and fish species suffer little or no acute mortality during a TFM treatment.

There is one confirmed State-listed endangered species, the cylindrical papershell (*Anodontoidea ferussacianus*), which is known to occur within the reach of Stone Bridge Brook proposed for lampricide treatment. An Endangered and Threatened Species Takings Permit (Takings Permit) will be obtained for cylindrical papershell by the USFWS from the VT Agency of Natural Resources prior to any use of lampricide. Generally, toxicity of TFM to mussels in the FSEIS suggests that mussels suffer little or no mortality during TFM treatments.

There are no known populations of State-listed threatened or endangered fish species in Stone Bridge Brook. An interdepartmental workgroup will be established during fall 2016 to plan long-term monitoring and reporting of threatened and endangered species population levels in the rivers for which USFWS has been issued permits to use lampricide. It is expected that representatives from the USFWS will be invited to participate in this workgroup for which the goal is to provide assessments of how nontarget impacts affect Threatened & Endangered species population levels.

The mudpuppy (*Necturus maculosus*) is a species of special concern in Vermont. This species has a state natural heritage rank of S2 (rare) and has been designated a Species of Greatest Conservation Need (high priority) in Vermont's Wildlife Action Plan. While there are scattered records throughout Vermont, what is known of the distribution of the mudpuppy within the Lake Champlain Basin is largely due to observed mortalities from lampricide treatments. Mortalities have been reported from lampricide treatments conducted in the Poultney, Winooski, Lamoille, and Missisquoi rivers and in Lewis Creek. Since only one pre and post-treatment population study has been conducted to date, little is known about the size of existing mudpuppy populations and the effects of repeated lampricide treatments on those populations.

With a treatment concentration of 1.5 times MLC, losses of Silver Lamprey (*Ichthyomyzon unicuspis*) larvae are expected. Nonetheless, despite repeated treatments of rivers in Vermont containing populations of silver lamprey, post-treatment assessment surveys show that they continue to persist at acceptable population levels.

The mottled sculpin (*Cottus bairdii*) is considered to be a rare fish in the State of Vermont and is known to occur in Stone Bridge Brook. Bioassays have not been performed on the Cottidae family of fish because they have not been observed frequently during post treatment mortality collections. During the lampricide treatments that have occurred since 1990 in the Lake Champlain basin, 22 slimy sculpins have been reported as mortalities, all of which occurred in New York. In this same time, no mottled sculpin mortalities were reported from either state. Studies indicate that sculpins are very tolerant of TFM exposure. The FSEIS details these cage studies in a table (pp.138-139). Ninety-nine mottled sculpin, 20 slimy sculpin (*Cottus cognatus*),

and 73 unidentified sculpin were tested in cages during lampricide treatments. Only one mottled sculpin, one slimy sculpin, and none of the unidentified sculpin were observed to succumb to mortality during the exposure period. The data presented above indicate that mottled sculpin are relatively resistant to TFM exposure at usual treatment levels. This indicates that there is an acceptable risk to this species based on the proposed treatment plan.

The brassy minnow (*Hybognathus hankinsoni*) is considered to be a rare fish in the State of Vermont and is known to occur in Stone Bridge Brook. One mortality of the brassy minnow has been documented during post-treatment surveys in waterbodies treated with lampricide. This species has not been tested in cage studies because it is considered to not be at significant risk of mortality during typical lampricide applications. In general, the Cyprinidae family is considered to have a relatively high tolerance to lampricide. Therefore, the proposed lampricide treatment poses an acceptable level of risk to the brassy minnow.

The blacknose shiner (*Notropis heterolepis*) is considered to be a rare species in the State of Vermont. It is known in Stone Bridge Brook from only a single individual captured in a sea lamprey trap in 2011 by USFWS personnel. It also was not documented in the 1991 post treatment mortality collection of Stone Bridge Brook. There have only been three documented mortalities of this species in lampricide treatments in the Lake Champlain Basin and none of these mortalities occurred in Vermont. This species has not been tested in cage studies because it is considered to not be at significant risk of mortality during typical lampricide applications. Therefore, the proposed lampricide treatment poses an acceptable level of risk to the blacknose shiner.

To mitigate the risk of introduction or transport of non-native, aquatic invasive species proper spread prevention measures must be taken. Thus, prior to any control activity occurring, all equipment (such as a boat, trailer, vehicle, and gear) that has been in or on any other waterbody, will be decontaminated in accordance with the [Voluntary Guidelines to Prevent the Spread of Aquatic Invasive Species through Recreational Activities](#), Aquatic Nuisance Species Task Force, November 2013, or its approved replacement. Having reviewed all of the potential negative impacts of the proposed pesticide treatment on the nontarget environment, the proposed activity poses an acceptable risk if it is conducted in accordance with this permit and the all other applicable regulations.

The Secretary has determined that there is acceptable risk to the nontarget environment.

7. Public Health – 10 V.S.A. 1455(d)(3). At the request of the Secretary, the Vermont Department of Health (VDH) has reviewed and provided recommendations pertaining to the risk of the proposed activity to public health. The VDH provided recommendations via memorandum dated July 18, 2016. The VDH review included, but was not limited to: Data relative to impurities contained in specific batches of TFM HP; Results of environmental fate studies of potential TFM HP impurities; Consideration of the 2008 Confidential Statement of Formulation for TFM HP (the most recent statement available to the VDH); Consideration of the June 4, 2012 Confidential Statement of Formulation for TFM BAR (the most recent statement available to the VDH); and Consideration of information in the United States Environmental Protection Agency (EPA) docket established for registration review of TFM and niclosamide. Specifically, the 2013 EPA Scoping Document states that “there is no expectation that people would be exposed through consuming drinking the water.” The document further describes the types of toxicity studies that the EPA waived for TFM, noting that the decision to waive the studies were based on “an extensive level of risk mitigation for each application event, which is intended to protect... the public from exposure through drinking water sources.” Based on the recommendations from the VDH, specific conditions pertaining to concentrations of TFM and water uses were identified as a means to minimize unnecessary exposure to the chemical.

The TFM HP product used must be produced using the same manufacturing process as those batches previously examined and noted in the Analytic Perspectives report dated August 28, 2009. By law the EPA label mandates that municipalities using streams requiring treatment as potable water sources must be notified of the impending treatment at least 24 hours prior to application. To this end, the USFWS has developed and will adhere to all applicable public notification, spill containment, and other plans. USFWS will post all public access points with a notification signs and provide a press release for local broadcast media to notify the public.

By not applying lampricide until after Labor Day, the USFWS also avoids major recreation periods at public access points.

The Secretary has determined that there is negligible risk to public health.

8. Long-range Management Plan – 10 V.S.A. 1455(d)(4). The USFWS’s FSEIS constitutes a long-range management plan for sea lamprey control that incorporates a schedule of pesticide minimization, combining the use of chemical and some non-chemical methods to manage sea lamprey. Funding for implementation of the Long-Term Sea Lamprey Control Program is provided by federal appropriations through the USFWS and the Great Lakes Fisheries Commission and in-kind support from VT DFW and NYSDEC staff. A commitment to pesticide minimization over time through an integrated pest management approach is also detailed in the FSEIS. Current proposed long-term control strategies include use of non-chemical methods in 4 of the 13 Vermont streams inhabited by sea lamprey. The USFWS has stated that it will continue to minimize lampricide use applied through an adaptive management process as well as explore and implement new non-chemical control technologies as they become feasible, safe, and effective. This long-range management plan will achieve its goal provided that the pesticide treatment is conducted in accordance with the conditions of this permit; the components of the plan are implemented and updated routinely; adequate, stable funding is maintained; and, a strong framework exists for continuing the ongoing management efforts indefinitely. Based on the permit application and other supporting documents on file, the Secretary finds that a long-range management plan has been developed which incorporates a schedule of pesticide minimization. The Secretary has determined that a long-range management plan has been developed.
9. Public Benefit – 10 V.S.A. 1455(d)(5). Public benefits that may be attributed to the long-range management of sea lamprey include various benefits to the Lake Champlain fishery as well as economic benefits as a result of an improved fishery. The treatment of Stone Bridge Brook furthers the effort taking place on Lake Champlain to reduce sea lamprey populations. Additional public benefits arise from reduced parasitism on the State-endangered lake sturgeon (*Acipenser fulvescens*), resulting in better condition and survival of this rare species. Detailed public benefits may be found on pp. 198-202 of the [Final Supplemental Environmental Impact Statement](#). The Secretary has determined that there is a public benefit to be achieved from this application of pesticide.
10. Public Notification – 10 V.S.A. 1455(h). An opportunity for the public to review and comment on this application was provided in accordance with the Department of Environmental Conservation’s [Public Review and Comment Procedures for Aquatic Nuisance Control Permit Applications and General Permits](#), adopted per 3 V.S.A. Chapter 25, on January 30, 2003. The draft decision will be placed on public notice for 30 days.

d. Authorization

By delegation from the Secretary, the Vermont Department of Environmental Conservation has made a determination that the above activity qualifies for an individual aquatic nuisance control permit. The Permittees are authorized per 10 V.S.A. § 1455(i) subject to the conditions herein specified.

This permit shall be effective on October 9, 2015, and expire five years thereafter.

Deb Markowitz, Secretary
Agency of Natural Resources

By: _____

Perry Thomas, Manager
Lakes & Ponds Management and Protection Program
Watershed Management Division