VERMONT

# Agency of Natural Resources

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## Threatened & Endangered Species Takings Permit

Statutory Authority: 10 VSA § 5408

1. **Permittee**
   **Bradley Young**
   **USFWS, Lake Champlain Office**
   11 Lincoln Street, Essex Jct., VT 05452,

2. **Permit Period**
   **Effective Date**: 09/28/2020
   **Expiration Date**: 09/27/2025
   **Authorization #:** EH-2020-16
   **Amendment #** 0

2. **Principal Officer**: Andrew Milliken

3. **Subpermitee(s):** The trained staff of the United States Fish and Wildlife Service (USFWS) and Vermont Fish and Wildlife Department (VFWD) under the direction of the Permittee.

4. **Authorized Species**: Giant floater (Pyganodon grandis), Pink heelsplitter (Potamilus alatus), Fragile papershell (Leptodea fragilis), Pocketbook (Lampsilis ovata), Cylindrical papershell (Anodontoides ferussacianus), Fluted-shell (Lasmigona costata), Black sandshell (Ligumia rectaa), Eastern Sand Darter (Ammocrypta pellucida), Stonecat (Noturus flavus), American brook lamprey (Lethenteron appendix), Lake sturgeon (Acipenser fulvescens)

5. **Authorized Activity**: The incidental take of species listed in Section 5 during lampricide treatment in the Missisquoi River.

6. **Location of Authorized Activity**: Missisquoi River in the Town of Swanton, downstream of the Swanton Dam

7. **Findings**

   A. The Permittee applied for a Threatened & Endangered Species Takings Permit under 10 V.S.A. § 5408 to authorize the incidental take of the species listed in section 5 for the purpose of treating the Lower Missisquoi River with lampricide. The Missisquoi was previously treated in 2012.

   B. The Permittee is a government entity with expertise in the capture and handling of species listed in section 5.

   C. Said activity has been determined to be non-de minimis in nature and will have the following benefits: enhance the propagation and restoration of native lake trout, landlocked Atlantic salmon, and other Lake Champlain fish species including walleye, northern pike, and endangered lake sturgeon.

   D. The sea lamprey is a fish that parasitizes other fish, scarring or killing its host. A substantial body of information collected by the Permittee and others indicates that the sea lamprey is depressing coldwater and some warm water fisheries in Lake Champlain. The negative impacts of sea lamprey parasitism have been documented in the Great Lakes where sea lamprey control programs have been in effect for more than 50 years.

   E. The proposed lampricide treatment is part a long-term sea lamprey control program for Lake Champlain initiated by the Permittee, along with the Lake Champlain Fish and Wildlife Management Cooperative, the New York State Department of Environmental Conservation, and the U.S. Fish and Wildlife started in 2002. This program was developed in response to an eight-year experimental sea lamprey control program conducted on Lake Champlain between 1990 and 1997. The experimental program illustrated the efficacy of the lampricide TFM in effectively reducing numbers of sea lamprey to levels resulting in significant improvement in salmonid survival and fishing quality in Lake Champlain. A primary goal of the long-term sea lamprey control program is to prevent the economic harm from sea lamprey parasitism as well as to enhance the propagation of salmonid and other fisheries in Lake Champlain.

   F. Programmatic targets of 15 lamprey wounds per 100 Atlantic Salmon (*Salmo salar)* and 25 lamprey wounds per 100 lake trout (*Salvelinus namaycush)* were set in 1990 in the Final Supplemental Environmental Impact Statement (FSEIS). Targets are based on experience and historic data that indicate these species can withstand and persists at those level of lamprey wounds.

   G. November 2019 lamprey wounding data identified wounding rates of 20 per 100 Atlantic Salmon and 57 per 100 lake trout. Both rates are above the set programmatic goals and are reasons to continue to control known

sea lamprey populations.

**H.** The Missisquoi river system is one of 21 Lake Champlain tributaries in Vermont, New York and Quebec that are a source of sea lamprey production. Pretreatment surveys conducted in 2019 revealed higher concentrations of sea lamprey below the Swanton Dam. Of the 19 larvae collected in 2019, 15 were found within the first mile below the dam. 251 $m^2$ of habitat was sampled, representing 0.02% of habitat.

**Treatment Strategy and Methodology**

**I.** Treatment planning and execution will be like that of previous treatments. Two lampricide products, TFM-HP and TFM Bar, are proposed for use and will be applied in accordance with established Standard Operating Procedures (Application p. 21).

**J.** The primary TFM application point (AP) is less than 100 meters upstream of Swanton Dam (river mile 7.8). Applicators will attempt to spread the applied lampricide evenly from bank to bank in order to achieve the target TFM concentration quickly and thoroughly in the River. Applying upstream of the dam will facilitate mixing due to the uniform water depth and velocity at the head of the dam and the turbulence created on the drop.

**K.** Application rate: TFM will be applied for 12 to 14 consecutive hours to achieve a target in-stream treatment concentration of no greater than 1.2 x Minimum Lethal Concentration (MLC).

**L.** MLC will be determined by the results of an on-site toxicity test in conjunction with pH/alkalinity prediction charts. Diurnal stream pH and alkalinity analysis in the days prior to treatment will be used to calculate target TFM concentration. Concentration will be adjusted during treatment to compensate for shifts in pH or alkalinity that differ from pre-treatment conditions to maintain the MLC.

**M.** TFM Bars and/or adjustable rate pumps may be used as supplemental applications (SAP) on up to 4 small tributaries (SAP 1-4 on Application Figure 4, Table 1) near their confluences with the Missisquoi River, concurrent with passage of the mainstem lampricide block at those points, to block lamprey escapement into untreated water from these streams. Flows on the day of treatment will determine the need for these supplemental applications.

**N.** Liquid TFM may be used as supplemental (secondary) applications on up to 2 selected backwater areas (SAP 5 and SAP 6 on Application Figure 4, Table 1) of larval habitat where the primary TFM block cannot penetrate effectively. TFM will be applied to these areas to achieve a target concentration of no more than 1.0 x MLC. Flows on the day of treatment will determine the need for these supplemental applications

**Post Treatment Water Quality Monitoring**

**O.** Lampricide concentration will be measured and monitored at low levels in the lake following treatment. Monitoring will occur and advisories will remain in place until 24 hours after measured levels fall below the Vermont Department of Health's advisory threshold of 100 ppb. The low-level lake monitoring strategy and methodology are detailed in the *Water Use Advisory Zone Monitoring Plan for Lampricide Treatments of the Poultney/Hubbardton River, Lewis Creek, LaPlatte River, Winooski River, Lamoille River, Stone Bridge Brook, and the Missisquoi River"* (Smith 2019a).

**Target/Non Target Species Mortality Monitoring**

**P.** Post-treatment mortality assessment crews will systematically survey pre-defined sections of each treated stream reach within 36 hours of the lampricide block passage. All visible river-bottom in each section will be inspected. Observations of non-target organism mortalities, except lamprey, will be recorded.

**Q.** The 5 mortality survey sections are identified in Figure 5 (Application p. 26) and comprise 23% of the treated reaches.

**R.** All dead fish (excluding lampreys), amphibians, mussels, and other large invertebrates encountered will be identified band enumerated, if possible. Organisms not identified in the field will be collected, if possible, and retained for identification.

**S.** Dead lamprey larvae will not be counted during the post treatment mortality survey, but the first 30 encountered in each transect will be retained and identified.

**T.** Assessment of treatment effects on lamprey populations will occur by means of a larval survey completed within one year following the treatment. Larval surveys following treatments provide more direct and statistically sound means of comparison with the pre-treatment population surveys.

**U.** Results of non-target mortality surveys will be submitted to VFWD by May 1 of the year following the treatment. Post treatment larval survey results will be submitted by December 31 of the year following the year of treatment.

**Takings**

**V. Mussels** – Within the treatment area, there are seven known mussel species. The toxicity of TFM to mussels concludes the mussels listed in Section 5 should incur little to no mortality during the treatment. TFM toxicity tests conducted on the mussels indicate that the TFM no observed effect concentration (NOEC) for these species ranges from 1.5 to >2.0 x MLC (Table 1, Application p. 5).

**Fish**

**W. Lake Sturgeon** – Early life stages of lake sturgeon are the most sensitive to TFM of the listed non-lamprey fishes. Boogaard et. Al (2003) conducted a series of tests on early life stages of lake sturgeon from sac fry through age 1+.The study found tolerance to TFM increased with size. Average NOEC's of three young-of-year size classes averaging 107, 157, 217 mm total length were equivalent to 1.0 x MLC, 1.0 x MLC, 1.2 x MLC, respectively; average NOEC for an age 1+ group averaging 261mm total length was equivalent to 1.5 x MLC (Table 2, Application p. 6).

**X. Eastern Sand Darter –** Eastern sand darters are relatively tolerant of TFM exposure at treatment concentrations, with a NOEC of 1.4 x MLC in a laboratory toxicity test (Neuderfer 2000).

**Y. Stonecats –** USFWS Lake Champlain Fish and Wildlife Resource Office conducted a series of 3 bioassays for stonecats with the lampricide TFM during the summer and fall of 2011 (Calloway 2012), which resulted in a mean lowest observed effect concentration (LOEC) of 1.4 X MLC. Based on USFWS' bioassay data and previous treatment experience, a 1.2 X MLC treatment concentration target should result in minimal stonecat mortality.

**Z. American Brook Lamprey (ABL)**- ABL are known to be slightly more resistant to TFM than sea lamprey (King and Gabel 1985), but substantial losses of ABL larvae are unavoidable during TFM treatments. With a proposed treatment target concentration of up to 1.2 X MLC, American brook lamprey mortalities are expected in portions of the treated river where present. The lower Missisquoi River downstream of Swanton Dam would not be classified as preferred habitat for ABL, but areas of the main stem between the Swanton and Highgate Falls dams and adjacent tributaries to that reach are more consistent with ABL habitat. In total, 4 individuals have been documented in the mainstem Missisquoi below the Swanton dam – 2 collected during post treatment mortality surveys, and 2 collected during larval assessment surveys. Summer 2020 surveys of the Missisquoi (upstream of the Swanton Dam) found 55 ABL in their preferred habitat near the mouths of Kelly and Hungerford brooks.

**AA.** Toxicity of the Lampricide TFM to Vermont Threatened and Endangered Species present in the Missisquoi River is summarized in Figure 1 of the Application (p.8).

**Avoidance, Minimization and Mitigation**

**BB.** The treatment concentration was lowered to 1.2 x MLC to minimize potential impacts to stonecats based on toxicity testing by USFWS. Other rivers in Vermont are typically treated at 1.3 x MLC to minimize potential impacts to more tolerant Threated and Endangered Species. Where no sensitive threatened and endangered species are present, treatments are conducted at concentrations of 1.5 x MLC to ensure effective treatment outcomes.

**CC.** At a treatment concentration of 1.2 x MLC, there is a risk that environmental conditions may lead to areas of the river where TFM concentrations are below those lethal to sea lamprey; however, this risk is offset by the added protections to the listed species which are sensitive to TFM.

**DD. Mussels** - Mussel populations for all species except the cylindrical papershell have been documented to occur upstream and downstream of the Swanton Dam. By treating only downstream of the Swanton Dam, upstream

mussel populations will not be exposed to TFM.

**Fish**

**EE. Eastern sand darter** – No additional mitigation is proposed as eastern sand darters a relatively tolerant of TFM exposure at the proposed treatment concentrations.

**FF. Lake Sturgeon** – Treatment will occur between late September and late November to allow young-of-year sturgeon to increase in size prior to lampricide exposure.

**GG. Stonecats** – During the 2012 treatment, a station was set up downstream of the Swanton Dam for the recovery of distressed stonecats where they were held in freshwater until the chemical block cleared the first monitoring station. A recovery station for stonecats is requested again for this treatment.

**HH. American Brook Lamprey** – Treatment is not proposed for areas of preferred habitat along the Missisquoi Basin such as areas of the main stem between the Swanton and Highgate Falls dam and adjacent tributaries.

**Advice of the Endangered Species Committee**

**II.** On June 29, 2020, the Secretary received the advice of the Endangered Species Committee. That advice has been considered and outlined below:

a. The ESC remains concerned about long-term effects on populations of T&E species such as mussels and on non-target species that are not listed as threatened or endangered, but in S1 or S2 categories. The ESC urges USFWS to look for other control options that are more species-specific and continue to review literature for long-term cumulative effects on non-target species.

b. The post-treatment non-target mortality survey be conducted at each survey location no later than the next daylight period following the lampricide block passage;

c. The lampricide application point shall be located downstream from the Swanton Dam in the area directly below the hard bottom reach to avoid lampricide exposure to Stonecats residing in that area;

d. The USFWS should increase its sampling intensity to provide more precise populations in rivers that are scheduled for lampricide treatment. The Missisquoi application lacks detailed information on 2019 pre-treatment larval sampling results.

e. Treatment should occur during the latter part of the proposed period to minimize impact on young-of-the-year Lake Sturgeon.

**JJ.** On July 09, 2020, the USFWS provided responses to the Endangered Species Committee advice as outlined below:

a. Post-treatment surveys are conducted the morning following the lampricide application. The application point is surveyed less than 14 hours after the addition of the chemical concludes. The block progression is monitored and as it moves downstream, sites are sampled once the block has passed within daylight hours. The only exception is when high water conditions make surveys unsafe for staff.

b. USFWS finds pre-treatment sampling is sufficient and uses a Standardized Quantitative Assessment Sampling (QAS) protocol developed by the Great Lakes Fishery Commission. QAS estimates have wide confidence intervals. The Missisquoi larval estimate made up 14% of the surveyed basin population; however, USFWS stresses the importance of the surveys is not to develop precise population estimates, but rather to locate sources of larval lamprey production that are contributing to the lakewide parasitic population with the goal of controlling lamprey populations to achieve the management objectives. Based on USFWS' prior experience in surveys and treatments, a more precise sampling regime would be an added resource expense that would not affect decisions on which rivers should be treated.

c. The application point was selected to promote mixing of lampricide. The site maximizes mixing and serves to provide greater protection to nontarget species by eliminating "hotspots" caused by insufficient mixing, and ensure lamprey larvae that reside in their highest densities near the dam are exposed to a steady and lethal concentration of lampricide. Several factors below the dam including width of the River, slow flow downstream of the hard-bottom stretch at the base of the dam, and channel morphology, prevent even mixing of lampricide. Application of lampricide below the dam would potentially render the treatment ineffective.

d. The USFWS proposes to treat the Missisquoi between late September and late November to allow young-of-year sturgeon increased growth potential prior to Lampricide exposure. Growth rates of sturgeon slow later in the year as temperatures decline and the USWFS does not find an additional 2-4 weeks provides meaningful, additional protections. The distinction in juvenile sturgeon protection based on size is made between treating in the fall rather than in the summer.

**9. Statutory Determination**

**A.** 10 V.S.A. § 5408(b) provides that "after obtaining the advice of the Endangered Species Committee, the Secretary may permit, under such terms and conditions as necessary to carry out the purposes of this chapter, the incidental taking of a threatened or endangered species or the destruction of or adverse impact on critical habitat if: (1) the taking is necessary to conduct an otherwise lawful activity; (2) the taking is attendant or secondary to, and not the purpose of, the lawful activity; (3) the impact of the permitted incidental take is minimized; and, (4) the incidental taking will not impair the conservation or recovery of any endangered species or threatened species."

**B.** The Permittee requests an Endangered & Threatened Species Takings Permit for incidental take.

**C.** The state of Vermont recognizes the value which plants, fish and wildlife in their natural environment have for public enjoyment, ecological balance, and scientific study. *See* 1981, No. 188 (Adj. Sess.), § 1(a).

**D.** The state of Vermont recognizes the need for protection and preservation of these plants, fish, and wildlife in their natural environment. *Id*.

**E.** The General Assembly of Vermont intends that the species of wildlife and wild plants normally occurring within this state which may be found to be threatened or endangered within the state should be accorded protection as necessary to maintain and enhance their numbers. *Id.* at § 1(b).

**F.** The General Assembly of Vermont intends that the state should assist in the protection of species of wildlife and wild plants which are determined to be threatened or endangered elsewhere pursuant to the federal Endangered Species Act. *Id.*

**G.** 10 V.S.A. § 5408(i)(2) allows the Secretary to require mitigation strategies and mitigation funds, in addition to the permit fees, to mitigate the impacts of a taking or the destruction of or adverse impact on critical habitat. Mitigation may include compensation, including payment into the Threatened and Endangered Species Fund, provided that any payment is commensurate with the taking or adverse impact proposed.

**H.** The Secretary has the authority to impose mitigation to offset the takings, in accordance with 10 V.S.A. § 5408 (i)(2). Here, the Permittee is proposing a treatment concentration of 1.2 x the Maximum Lethal Concentration (MLC) for sea lamprey, treatment between late September and November, and a recovery station for distressed stonecats. The aforementioned actions reduce potential impacts to the listed species.

**I.** Pursuant to 10 V.S.A. § 5408(b), the ANR Secretary hereby determines, based upon the findings detailed above and after receiving advice from the Endangered Species Committee, that the proposed activity is consistent the purposes of the 10 V.S.A. ch. 123. An Endangered and Threatened Species Takings Permit is authorized, as conditioned below.

**10. General Conditions & Authorizations**

**A.** This permit is issued in accordance with 10 V.S.A. ch. 123. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

**B.** This permit is expressly conditioned upon compliance with all applicable federal and state laws, regulations and permits.

**C.** This permit does not confer upon the Permittee the authority to conduct research without the acquiring necessary landowner permission including, but not limited to, state lands.

**D.** By acceptance of this permit, the Permittee and its heirs, successors and assigns agree to provide the Agency of Natural Resources with unrestricted access, at reasonable times to the animal or plant specimens and/or animal or plant parts collected and possessed under this permit, collection and monitoring records, and access to the premises as necessary to ensure compliance with this permit.

**E.** The Agency maintains continuing jurisdiction over this activity, and may, at any time, order the Permittee to undertake remedial measures if necessary, to ensure the protection and conservation of listed species.

**F.** This permit is not valid for endangered and threatened species that are not listed in section 5.

**G.** The permit is valid for use by the named Permittee and subpermittees(s) only and may be revoked by the Secretary at any time for cause, or violations of any terms or conditions of this permit or state law.

**H.** The Permittee and subpermittees shall carry copies of this permit whenever performing authorized activities and shall make the permit available upon request.

**I.** Pursuant 10 V.S.A. § 5410, the locations of listed species shall be kept confidential and the sharing of such information is a violation of this permit and the law.

**11. Specific Conditions & Authorizations**

**A.** The Permittee shall follow all conditions listed in Aquatic Nuisance Control Permit #3052-ANC-C issued by the Agency's Department of Environmental Conservation

**B.** USFWS shall preserve specimens of the listed species according to protocols developed with VFWD scientists during a 2012 meeting with the Endangered Species Committee and provide specimens to the following VFWD contacts:

- Stonecats – Bernie Pientka
- Sturgeon – Margaret Murphy
- Channel Darters and American Brook Lamprey – Bernie Pientka
- Mussels – Mark Ferguson
- Turtles – Steve Parren (highly unlikely for turtles to be affected)

**C.** Six months prior to a second treatment under this permit, the Permittee shall submit a statement of intent letter to the Agency of Natural Resources. The letter shall identify any and all known research and findings, since the submission of their most recent application for a permit, regarding the effects of TFM on the species covered in this permit.

**D.** The USFWS shall set up a station for recovery of distressed stonecats where they will be held in fresh water until the chemical block has cleared the first monitoring station. The USFWS will have one person walk the accessible shoreline on either side of the river for 250 meters downstream of the Swanton Dam (along the prime stonecat habitat) at least once every 3 hours during the chemical application. The USFWS will not place its staff or operators in a situation where their safety is compromised, or where they will unnecessarily be exposed to pesticide. Any distressed stonecats will be netted and placed in freshwater to recover. After the treatment, the stonecats will be returned to the riffle section.

**E.** The USFWS will collect 30 lampreys per sampled transect (the first 30 randomly encountered, without regard for identification of species) for the purpose of determining longitudinal species composition in the river. Identification will be done at the lab at which time American brook lampreys will be preserved.

**F.** All communication and report of results required by the Aquatic Nuisance Control Permit shall be sent via USPS mail or email to:

Permits Administrator
Vermont Fish and Wildlife Department
Commissioner's Office
1 National Life Drive, Davis 2
Montpelier, VT 05620-3702
ANR.EndangeredPermit@vermont.gov

**G.** Any mortality/morbidity related to the activities authorized under this permit that was/were not specifically requested, anticipated, and/or authorized shall be reported in writing to VFWD Permits Administrator within 72 hours of each occurrence. Reports shall include species identification, date, and reason for death, along with a plan for reducing the likelihood of future occurrences. All morbid specimens shall be stored frozen until transferred to a VFWD biologist.

**H.** An annual report, due by May 1 of the year following the treatment, shall be submitted to the Permits Administrator (electronic format preferred). At a minimum, the report shall summarize project methods (including explanations for any changes/adjustments to methods proposed in the permit application), activities and species handled, tagged or with transmitters installed, any mortality/morbidity, animal status, other species encounters, tags/transmitters removed, species' behavior, dates of all activities, location of activities (description and coordinates) and locations of important sites for management and conservation. Post treatment larval survey results will be submitted by December 31 of the year following the year of treatment.

**I.** The Permittee shall accommodate requests by Agency of Natural Resources staff for additional information from collection activities (e.g., copies of original field sheets, computerized data in usable format). Reports of results of any subsequent analyses and copies of subsequent publications resulting from the collections made under this permit shall be forwarded to the VFWD within 30 days of publication.



Issued by: _____ Date: 09/28/2020

Julie Moore, Secretary
Agency of Natural Resources

**Right to Appeal to Environmental Court**

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 Court; and must be signed by the appellant or their attorney. In addition, 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 Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. # 802-828-1660).