Application for use of **Pesticides**
under an **Aquatic Nuisance Control Permit**
Per 10 V.S.A. Chapter 50, § 1455

For Aquatic Nuisance Control Permit Program Use Only
Application Number: 2016-C12

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

Submission of this application constitutes notice that the entities listed below intend to use pesticides in waters of the State to control aquatic nuisance plants, insects, or other aquatic life; and that the entities below have demonstrated that (1) there is no reasonable nonchemical alternative available; (2) there is acceptable risk to the nontarget environment; (3) there is negligible risk to public health; (4) a long-range management plan has been developed which incorporates a schedule of pesticide minimization; and (5) there is a public benefit to be achieved from the application of a pesticide or, in the case of a pond located entirely on a landowner's property, no undue adverse effect upon the public good. Submit an application fee of $75 for a private pond or $500 for all other waterbodies, made payable to the State of Vermont. All information required on this form must be provided, and the requisite fees must be submitted to be deemed complete.

A. Applicant Information

1. Entity's Name: Bradley Young, United States Fish and Wildlife Service
2a. Mailing Address: 11 Lincoln St.
2b. Municipality: Essex Junction | 2c. State: VT | 2d. Zip: 05452
3. Phone: 802-872-0629 | 4. Email: bradley_young@fws.gov

B. Pesticide Applicator Information (Check box if same as above in Section A: ☐)

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1. Entity's Name:
2a. Mailing Address:
2b. Municipality: | 2c. State: | 2d. Zip:
3. Phone: | 4. Email:

C. Application Preparer Information (Check box if same as above: Section A ☐ and/or B ☐)

1. Preparer's Name:
2a. Mailing Address:
2b. Municipality: | 2c. State: | 2d. Zip:
3. Phone: | 4. Email:

D. Waterbody Information

1. Name of waterbody: Stone Bridge Brook 2. Georgia and Milton

3. Are there wetlands associated with the waterbody? ☐ Yes ☒ No
Contact the Vermont Wetland Program: (802) 828-1535 for additional information.

4. Are there rare, threatened or endangered species associated with the waterbody? ☒ Yes ☐ No
Contact the Vermont Fish & Wildlife Natural Heritage Inventory: (802) 241-3700 for additional information.

5a. Is this waterbody a private pond (per 10 V.S.A. 5210)? ☐ Yes ☒ No If No, skip to Question D6.

5b. Is this private pond totally contained on landowner's property? ☐ Yes ☐ No

5c. Does the private pond have an outlet? ☐ Yes ☐ No
If yes, what is the name of the receiving water from this outlet?

5d. Is the flow from this outlet controlled? ☐ Yes ☐ No
If yes, how and for how long?

6. List the uses of the waterbody – check all that apply:
☒ Water supply ☒ Irrigation ☒ Boating ☐ Swimming ☒ Fishing ☐ Other:

E. Treatment Information

1a. Proposed start date: 10/11/16

1b. Proposed end date (if known): 11/30/16

2. Aquatic nuisance(s) to be controlled:
Plant/Algae/Animal: Sea Lamprey
Submit additional information as needed.

3. Pesticide(s) to be used[1]: 3-Trifluoromethyl. 4-Nitro
Trade Name: TFM-HP and TFM-BAR
EPA Registration #: 6704-45 and 6704-15
Submit a copy of the Product Label & Material Safety Data Sheet.

4. Provide a map of control activity area.
Provide location of (each) treatment area in waterbody.

5. Application rate (ppm): see attachment 1
Explain the above application rate & provide calculations.

6. Attach a narrative description of the proposed project to include the following items:
a) Reason(s) to control the aquatic nuisance;
b) Brief history of the aquatic nuisance in the waterbody;
c) Reason why no reasonable nonchemical alternatives are available; and,
d) Description of the proposed control activity.

7. If you answered "no" to D5b above, then a Long-range Management Plan[2] (LMP) is required:
a) Describe how control of the nuisance species will be conducted for the duration of the permit (must be at least a 5 year time span and incorporate a schedule of pesticide minimization); and,
b) Explain how the LMP will be financed; include a budget and funding sources for each year.

F. Applicant/Applicator Certification

As APPLICANT, I hereby certify that the statements presented on this application are true and accurate; guarantee to hold the State of Vermont harmless from all suits, claims, or causes of action that arise from the permitted activity; and recognize that by signing this application, I agree to complete all aspects of the project as authorized. I understand that failure to comply with the foregoing may result in violation of the 10 VSA Chapter 50, § 1455, and the Vermont Agency of Natural Resources may bring an enforcement action for violations of the Act pursuant to 10 V.S.A. chapter 201.

Applicant/Applicator Signature: BRADLEY YOUNG Digitally signed by BRADLEY YOUNG Date: 2016.04.12 14:28:09 -04'00' Date: 4/12/2016

G. Application Preparer Certification (if applicable)

As APPLICATION PREPARER, I hereby 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 gathered and evaluated 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.

Application Preparer Signature: BRADLEY YOUNG Digitally signed by BRADLEY YOUNG Date: 2016.04.12 14:29:17 -04'00' Date: 4/12/2016

H. Application Fees

Print Form

Submit this form and the $75 or $500 fee to:

Vermont Department of Environmental Conservation
Watershed Management Division
Aquatic Nuisance Control Permit Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Direct all correspondence or questions to the Aquatic Nuisance Control Permit Program at:
ANR.Shoreland@vermont.gov
For additional information visit: www.watershedmanagement.vt.gov

[1] The application fee for the aquatic pesticide Aquashade® and copper compounds used as algaecides is **$50** per application.

[2] Any landowner applying to use a pesticide for aquatic nuisance control on a pond located *entirely* on the landowner's property is exempt from the Long-range Management Plan requirement, as per 10 VSA §1455(e)

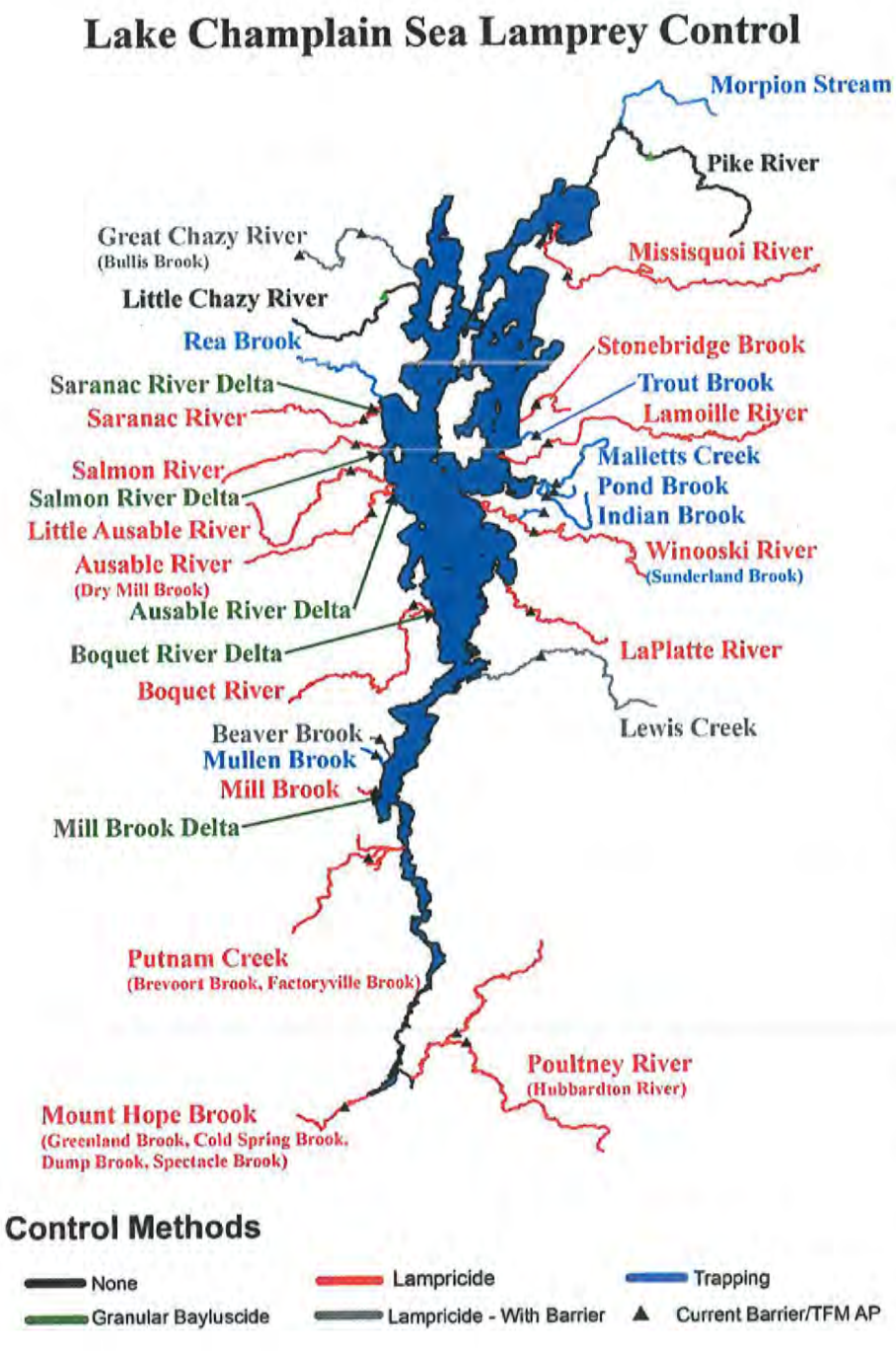
Attachment 1

Proposed Lampricide Treatment of Stone Bridge Brook in 2016 and 2020

Detailed Project Description
and
Information Supporting the Five Criteria for Aquatic Nuisance Control Permit Issuance

April 12th, 2016

Background and Rationale



The Lake Champlain Fish and Wildlife Management Cooperative (LCFWMC), made up of the Vermont Fish and Wildlife Department (VTFWD), New York State Department of Environmental Conservation (NYSDEC), and U. S. Fish and Wildlife Service (USFWS), initiated the long-term sea lamprey *(Petromyzon marinus)* control program in 2002. The Final Supplemental Environmental Impact Statement (FSEIS), *A long-term program of sea lamprey control in Lake Champlain*, details the program (purpose and need: pp. 3-10; history of the problem: pp. 27-31; summary of lampricide treatment methodologies: pp. 34-36). The long-term program was developed in response to significant improvements in salmonid survival, fishing quality, and economic impact resulting from the 1990-1997 experimental sea lamprey control program (Fisheries Technical Committee 1999). There are currently 20 tributary systems included in the long-term program, with eight in Vermont, ten in New York, the Poultney/Hubbardton River system on the New York-Vermont border and the Pike River/Morpion Stream system in Quebec (Figure 1).

Figure 1. Lake Champlain tributaries included in the sea lamprey control program.

Wounding Rates and Socio-economic Impacts

From the conclusion of the experimental program in 1997 to the initiation of the long-term program in 2002, the parasitic-phase sea lamprey population rebounded and lamprey wounding approached and exceeded pre-control levels. Current wounding rates (27) on Lake Champlain lake trout (*Salvelinus namaycush*) and landlocked Atlantic salmon (*Salmo salar*) (19) continue to remain just above targets established for the program (Table 1). The program's objectives, stated in the FSEIS, are a maximum of 15 and 25 wounds per 100 fish for salmon and lake trout respectively. The walleye (*Sander vitreum*) wounding rate monitoring program includes surveys that alternate by river and year in order to collect data that represent the wounding rate throughout the basin (Table 2). Consistent maintenance of a long-term program of sea lamprey treatments at regular intervals is necessary to achieve and sustain target wounding rates for salmon, lake trout, walleye, and other species affected by sea lamprey parasitism.

Poor fishing in the past led many anglers to seek fishing opportunities elsewhere and adversely affected the Lake Champlain charter fishing industry. In 1997, 13 Lake Champlain fishing charter businesses (based in Vermont and New York) participated in an economic study of fishing-related businesses (Gilbert 1998). This number is estimated to be less than half of the fishing charter businesses that operated at that time. Through the 2000's, about four to six fishing charter businesses remained with significant levels of operation on Lake Champlain. It has been estimated that $29.4 million (dollars in 1990 value) in annual economic benefits to businesses and residents of the Lake Champlain Basin may have been lost due to the impacts of the uncontrolled sea lamprey population (Gilbert 1999).

Substantial public benefits of sea lamprey control in Lake Champlain were demonstrated during the 8-year experimental program (Fisheries Technical Committee 1999). At the end of the experimental program, fishery benefits and angler satisfaction increased. Responses from surveyed anglers showed that they planned to spend an estimated additional 1.2 million angler days annually fishing Lake Champlain. This additional effort was estimated to generate an additional $42.2 million in fishing-related expenditures if sea lamprey control was fully implemented and its resulting benefits were to accrue and continue. This value increases to an estimated $59.2 million when all water-based recreational activity is considered (Gilbert 1999; Marsden et al. 2003).

While wounding rates are reaching all-time lows since the inception of the program, continued suppression of sea lamprey in Lake Champlain is necessary to sustain and enhance economic and environmental benefits. These benefits include improved fishing quality and related positive economic impacts, as well as enhancing restoration of native lake trout, landlocked Atlantic salmon, lake sturgeon (*Acipenser fulvescens*), and walleye populations in Lake Champlain. Reaching the LCFWMC goal of comprehensive control of all sea lamprey-producing sources in Lake Champlain will achieve and sustain these benefits in the long term (Fisheries Technical Committee 2009).

Table 1. Sea lamprey wounding rates (wounds per 100 fish) on lake trout and landlocked salmon through time. ML= Main Lake basin; IS-MB= Inland Sea-Malletts Bay. Sample sizes are in parentheses.

Species	Lake Trout[a]	Landlocked Salmon[b]		
Basin	**ML**	**Lakewide**	**ML**	**IS-MB**
Objective	**25**	**15**	**15**	**15**
Pre-control[c]	55 (1,854)	32 (646)	34 (115)	32 (531)
Experimental control[d]	38 (3,290)	31 (1,594)	27 (1,013)	39 (581)
1999	55 (318)	38 (106)	33 (76)	50 (30)
2000	61 (288)	26 (459)	25 (417)	40 (42)
2001	60 (166)	53 (209)	54 (163)	50 (46)
2002	72 (182)	56 (101)	38 (47)	72 (54)
2003	77 (203)	93 (134)	79 (66)	106 (68)
2004	62 (117)	53 (206)	47 (74)	57 (132)
2005	94 (64)	69 (159)	59 (118)	98 (41)
2006	99 (137)	70 (230)	71 (159)	69 (71)
2007	46 (26)	74 (205)	71 (180)	92 (25)
2008	31 (75)	38 (182)	35 (150)	50 (32)
2009	55 (88)	32 (513)	31 (414)	38 (99)
2010	40 (218)	15 (292)	15 (269)	22 (23)
2011	30 (168)	19 (621)	19 (543)	14 (78)
2012	40 (197)	21 (207)	21 (187)	26 (19)
2013	54 (332)	19 (331)	15 (259)	33 (72)
2014	30 (398)	15 (568)	13 (481)	29 (87)
2015	**27 (388)**	**19 (1,017)**	**18 (886)**	**25 (131)**

[a] Lake trout in the 533-633 mm (21-25 inches) length interval.
[b] Salmon in the 432-533 mm (17-21 inches) length interval.
[c] Pre-control included 1982-92 for lake trout and 1985-92 for salmon.
[d] Experimental control included 1993-98.

Table 2. Sea lamprey wounding rates on Lake Champlain walleye through time. Sample sizes are in parentheses ("ns" indicates not sampled).

Number of sea lamprey wounds per 100 walleyes[a]																	
Basin	**Objective**	**Pre-control**	**Experimental control**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Poultney & South Bay (South/Main Lake)	2	13 (831)	4 (451)	3 (122)	3 (80)	ns	0 (58)	ns	3.8 (52)	4 (50)	ns	Ns	0 (489)	ns	ns	0 (326)	ns
Winooski (Main Lake)	2	ns	3 (664)	2 (110)	7 (174)	4 (265)	ns	11 (389)	6.4 (94)	ns	4.6 (173)	Ns	ns	3.9 (362)	ns	ns	5.2 (346)
Lamoille (Mallet's Bay)	2	ns	4 (975)	16 (69)	Ns	ns	9 (68)	ns	5.5 (105)	ns	ns	Ns	5.0 (139)	ns	ns	2.7 (221)	ns
Missisquoi (Inland Sea)	2	ns	1 (877)	4 (789)	1 (140)	0 (78)	1 (267)	ns	3.8 (130)	3.3 (120)	ns	3.9 (208)	ns	ns	1.5 (133)	ns	ns

[a] Walleyes in the 534-634 mm (21.0-24.9 inches) length interval, collected in spring spawning population surveys. For walleye, pre-control included 1988-92, while eight-year control includes 1993-97. There are no pre-control data for the Winooski, Lamoille, and Missisquoi rivers.

Sea Lamprey Population and Treatment History

Sea lamprey larval population assessments conducted by the USFWS Lake Champlain Fish and Wildlife Resources Office are used to select streams that warrant treatments.

In 2012, the Stone Bridge Brook QAS estimated a larval population of 12,075 ammocoetes and 466 transformers. This population was treated in 2013 and the post-treatment survey found that it was very effective. The QAS method was discarded with respect to its estimation of population sizes in 2015. Instead, similar sampling protocols are used, but data are reported simply as number of animals caught per sampling transect (Figure 2), and a reach or river density that reflects catch per unit effort. In our case, the density is the number of lamprey caught per meter of habitat sampled (Table 3). Those data form the basis for the proposed 2016 treatment. This may seem like a relatively small number of individuals collected across the area surveyed; however, taking into account gear efficiency (we don't capture everything that is present), the sub-sample of all the available habitat we sample, and the number of young-of-year that are unsamplable, there are many more lamprey present than what our survey may seem to suggest.

Figure 2. The twelve transects where lamprey were electrofished in 2015 and the associated catch. The overall catch per unit effort (density) for sea lamprey was 0.03 lamprey/m^2 for the entire area of habitat sampled.

Table 3. Sea lamprey larval population estimates (young-of-year excluded) in Stone Bridge Brook.

		Type I Habitat			Type II Habitat			$\bar{x}$	QAS Population
	Year	N	M^2	Density	N	M^2	Density	Density	Estimate
Pre-Treatment QAS Survey	**2012**	**45**	**165**	**0.273**	**8**	**51.5**	**0.155**	**0.245**	**11,609**
2013 Treatment									
Post-Treatment QAS Survey	**2014**	**0**	**180**	**0.000**	**0**	**90**	**0.000**	**0.000**	**0**
Pre-Treatment Larval Survey	**2015**	**5**	**129**	**0.039**	**1**	**70**	**0.014**	**0.030**	
Proposed 2016 Treatment									

Stone Bridge Brook received its first TFM (3-Trifluoromethyl-4-Nitrophenol) treatment in September 1991 (Table 4.) and then was trapped for the next consecutive 22 years. It was believed that trapping might be a suitable alternative to TFM in this brook and a way to successfully control the population. Over the years, trapping resulted in variable degrees of success. One thing was consistent; despite successfully trapping spawning adult sea lamprey, some would always find a way past our barrier and manage to successfully reproduce. We consistently found larvae upstream of the barrier when surveys were conducted. Finally in 2012, the population of larvae hit an all-time high (Table 3). This led to our request and subsequent treatment of Stone Bridge Brook in 2013. Stone Bridge Brook is one of our smaller treatments as measured by amount of lampricide needed (Table 4.), but contains a relatively large number of larvae and its consistent catch of adults during trapping operations make it a brook in need of control.

Table 4. Stone Bridge Brook lampricide treatment history.

			TFM used		
Date	**River miles**	**Discharge (cfs)**	**Formulation (gal)**	**Active Ingredient (pounds)**	**Reference**
September 16, 1991	2.9	2.0	19.5	62	Steinbach 1991
October 23, 2013	3.6	3.5	14	44.6	Smith 2014

A New Approach to Controlling Sea Lamprey in Stone Bridge Brook

The USFWS has trapped sea lamprey in Stone Bridge Brook since the 1980s. We have used several different techniques and locations during that period. Our most recent trapping efforts are by far the most successful of all methodologies used. Despite our best efforts, the hydrological characteristics of Stone Bridge Brook are always going to produce watershed events that render our portable barriers and traps ineffective. The 2013 treatment of Stone Bridge Brook showed us that a treatment of that river was possible and effective.

Because of the perennial partial failure of trapping Stone Bridge Brook, we are planning to discontinue trapping of this stream and begin treating it with lampricide as the primary form of sea lamprey control. We have streams where we believe trapping is effective and will continue to trap there. This is not an abandonment of trapping as a technique. It is abandoning a marginally effective method for a very effective method on a particular stream.

There are several reasons that we believe this change in control method is justified.

1. The effectiveness of treating (measured as the difference between pre- and post- larval lamprey surveys) showed that the 2013 treatment was 100% effective. In contrast, trapping was allowing sea lamprey reproduction to occur annually, ultimately resulting in metamorphosed lamprey that become parasites. Additionally, due to its size, a treatment is relatively inexpensive.

2. The effects on the non-target environment from a lampricide treatment are less than the effects of annual trapping. While this may sound counter-intuitive, the data clearly show this distinction. If you review Attachment 3 of this document, you will see the last 6 years of trapping records. Those data show that on Stone Bridge Brook, over a 6 year period, we passed 3,900 live non-target species and tallied 449 non-target species mortalities. This results in a 10% mortality rate among trapped, non-target species. In contrast, we collected 19 mortalities following the 2013 lampricide treatment (not including 43 silver lamprey which were expected to be mortalities). This was from subsections which accounted for about 22% of the stream area. While extrapolating numbers across dissimilar habitats results in unreliable and inaccurate estimates, it is the only way to make fair comparisons in this comparative exercise. Therefore if we extrapolate the 19 mortalities found in 22% of the river, across the entire river, we would get 88 estimated mortalities for an entire treatment. Now standardizing by year, trapping produces an average of 75 mortalities per year and lampricide treatments (done once per 4 years) produce 22 estimated mortalities per year. The point being made is that not only is a lampricide treatment not going to result in increased non-target mortalities, it actually yields fewer mortalities over time. We believe that in the long term, trapping causes higher non-target mortality than quadrennial TFM treatments.

3. The cost in terms of personnel time spent tending and maintaining the trap 3 days per week, for 2.5 months, every spring is enormous. Add to that, materials and equipment costs and the cost of trapping is a significant expense annually. If we conservatively estimated labor at $75/day, materials at $10/day, and fuel at $5/day, just for Stone Bridge alone, that would equate to **$2,970 annually**. Comparatively, the cost of the 2013 lampricide treatment was $1,071 in chemical, $1,000 in materials and 2-3 days of staff time ($1,200), once every 4 years which equates to **$1,293 annually**. The cost savings by treating are apparent.

It is for these 3 key reasons that we feel the decision to treat Stone Bridge Brook on a regular 4-year cycle is justified and the best way to control the stream and provide protection to the non-target environment. Additionally, Stone Bridge Brook contains no species of special concern other than the cylindrical paper-shell mussel whose tolerance for lampricide is extremely high and has never been seen as a mortality following any treatments (NYSDEC and VTDFW 2007).

Justification for treating in 2016 after a 2013 treatment was completed

The 2013 Stone Bridge Brook lampricide treatment was completed successfully with a post-treatment larval survey yielding no surviving lamprey. Stone Bridge Brook was treated in 2013 as part of the regular treatment schedule. Normally, it would not be scheduled for treatment again until 2017 (4-year cycle is matched to life-history of sea lamprey). We are seeking to treat it in 2016 to include it in our Lake Champlain Basin geographic re-alignment plan. Previously, treatments were scheduled without attention to the various effects that geography imposes upon the sea lamprey control program. This alignment plan, its reasoning, and its justification are explained in Attachment 2.

This is a one-time request to treat 1 year early so that Vermont lampricide treatments and associated permits can be geographically and temporally aligned to create logistical, financial, and biological efficiencies for the both the applicant and the Agency. Following this one-time realignment, Stone Bridge Brook would resume a typical 4-year schedule of lampricide treatments as needed, based on survey data.

The species assemblage of Stone Bridge Brook does not contain Endangered and Threatened species that would be impacted by repeated application (1 mussel species with a relatively high tolerance for lampricide). The non-target species most impacted by this 2-in-a-row treatment would likely be silver lamprey. The effects of a repeated treatment on the population are not estimable; however, experience on rivers in New York which have silver lamprey and brook lamprey populations, and were treated 2 years in a row, showed that the populations of those non-target lampreys persisted in the following years. Silver lamprey populations have increased in number in Vermont as sea lamprey control has become more successful (larval surveys of Poultney and Missisquoi). We do not believe this one-time realignment in Stone Bridge Brook will have lasting detrimental effects to the population(s) of silver lamprey in Stone Bridge Brook or the state of Vermont (further discussion on page 15 – where silver lamprey are discussed in detail).

Our realignment proposal results in 3 possible alternatives 1) accept the proposed, 1-time realignment, treatment in 2016 to gain the previously explained benefits; 2) resume the existing schedule for Stone Bridge Brook which would place it alone, as a single treatment in a year when nothing else is being treated in Vermont (or New York); or 3) wait 7 years to treat it thereby placing it into the rotation through a delay which would allow 3 year classes of lamprey to transform and exit Stone Bridge Brook and contribute to the parasitic lamprey population of Lake Champlain.

Alternative 1 is our strong preference. We believe the benefits to this realignment are substantial and greatly exceed any risks. Alternative 2 is the status quo and reduces the benefit of the realignment already accomplished in New York and with all other lampricide-treated Vermont rivers. Alternative 3 is least preferable because Stone Bridge Brook is a producer of sea lamprey. Allowing Stone Bridge Brook to produce 3 year classes of parasites prior to realignment would be expected to have adverse consequences in the Lake Champlain fishery. The consequences of the 5-year delay on the Poultney River (2002 – 2007) were measurable (wounding rates) and an experience that taught us that "letting some go" can have considerable impacts, which take years to reverse. Delaying treatment for 3 years on Stone Bridge Brook would not have an equivalent impact to delaying 5 years on the Poultney River, but we also do not want to give up ground we have worked hard to gain.

Five Statutory Criteria [10 V.S.A. § 1455 (d)] to be met for the issuance of a VT Aquatic Nuisance Control Permit

(1) There is no reasonable non-chemical alternative available. 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 body of research has been developed on non-chemical sea lamprey control methods in the Great Lakes (Wagner et al. 2006, Sorensen and Hoye 2007, McLaughlin et al 2007, Bergstedt and Twohey 2007) and Lake Champlain (Alternatives Workgroup 2006). An entire issue of the Journal of Great Lakes Research was dedicated to current lamprey control and alternatives research (Jones et al. 2003) and 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 we will not consider using here.

The USFWS investigated building a permanent barrier on Stone Bridge Brook in 1992. Details of this study are available in Staats (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 in1992 dollars. The cost was expected to be considerably greater than treating it with lampricide or operating a temporary barrier. The USFWS considers the cost to be prohibitive at this time also.

A barrier in Quebec was put into use in 2014 which can be installed and removed annually during lamprey migration season. While this is a creative and innovative technique for blocking sea lamprey from reproducing, it can only work on the smaller streams in the Lake Champlain Basin. Additionally, the project cost over $1.3M on a stream that could have been controlled safely with TFM for $8K once every 4 years. The use of this technology is not only cost-prohibitive in most cases, it also becomes difficult to justify the expense when a safe, chemical alternative is available at a fraction of the cost. Morpion Stream is close to the same discharge and channel width as Stone Bridge Brook, so costs to build a similar structure must be assumed to be nearly the same. The high cost of the Morpion barrier was justified because the distance is too far from the office to send staff for temporary trapping and application of pesticide to flowing water is prohibited. Another factor justifying the expense of constructing a barrier on Morpion Stream is the relatively large population of sea lamprey ammocoetes, due in large part to its 17-mile length.

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 effects may be worse in some circumstances. In trapping operations, captured non-target 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 non-target fish (mostly cyprinids and catastomids) 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. Appendix 1 also documents the number of lampreys captured each year for the past 6 years
The other problem 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 less 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. It could also lead to a delta population such as the one that has been detected and controlled with Granular Bayluscide on Mill Brook's delta at Port Henry, New York. Mill Brook is of similar length and size as the area that would be below a permanent Stone Bridge Brook barrier.

The USFWS has concluded there is currently no reasonable alternative to lampricide treatments. This control plan was decided to be the most feasible approach based on: 1) the information contained in the barrier feasibility study (Staats 1992), 2) the non-target information contained in appendix 1, 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.

(2) There is acceptable risk to the non-target environment. The evidence presented in the FSEIS (pp. 104-170; 188-197; and 307-311) and the results of our previous treatments in Stone Bridge Brook (Table 5), and the rest of Vermont, demonstrate the low impact that controlled applications of lampricides have on non-target species.

One State-listed endangered or threatened mussel species (Cylindrical Papershell) is present in Stone Bridge Brook and is addressed in detail in the VT Endangered and Threatened Species Takings permit application. That application for this proposed treatment is currently under review by the Agency of Natural Resources and therefore, it will not be readdressed in this permit application. One non-listed species of concern (silver lamprey) in Stone Bridge Brook will be potentially adversely affected by the proposed treatment. Silver lamprey are effectively equal to sea lamprey in their susceptibility to the treatment. A history of all observed mortalities following Stone Bridge Brook lampricide treatments is shown in Table 5.

Table 5. History of observed non-target mortalities following the lampricide treatments of Stone Bridge Brook.

	Stone Bridge		
	1991	**2013**	
River Miles Treated	2.9	3.6	
River Miles Surveyed	2.9	0.9	
% of Survey Area Accessible	na	69	
% Sea Lamprey Reduction	100	100	
% Lamprey Spp. Comp.			
Sea Lamprey	70.9	73.5	
Silver Lamprey	29.1	26.5	
FISH (non-lamprey)			**TOTAL**
Northern pike	5		5
Common shiner	5	2	7
Bluntnose minnow	725		725
Blacknose dace	6	3	9
Longnose dace		1	1
White sucker	170	2	172
Brown bullhead	3		3
Tessellated darter*	64	10	74
Logperch	7		7
Unidentified fish		1	1
AMPHIBIANS			
Dusky salamander	14		14
Unid. frog adult	1		1
Unid. frog tadpole	364		364

Silver Lamprey

Impacts of TFM on silver lamprey are discussed in pp. 136-140 of the FSEIS. Lampreys of the genus *Ichthyomyzon* (including silver lamprey *I. unicuspis* and northern brook lamprey *I. fossor*) are known to be slightly more resistant to TFM than is the sea lamprey, but substantial losses of silver lamprey larvae are unavoidable in TFM treatments. It has been suggested that reductions in larval sea lamprey abundance may benefit silver lamprey, since invading sea lamprey are highly adaptable and have a competitive advantage (Schuldt and Goold 1980). While not part of a study, USFWS survey data suggest that silver lamprey have proportionally increased in relative abundance to sea lamprey in the Poultney River following successive TFM treatments. The important message here is that the population is persisting and we are continuing to monitor their numbers (Table 6).

Table 6. Stone Bridge Brook silver lamprey population estimates

Year	River	Population Estimate	# (N)	M^2	Density
2012 (Pre)	Stone Bridge	15,803	71	217	0.33
2013 Treatment					
2014 (Post)	Stone Bridge	0	0	270	0
2015 (Pre)	Stone Bridge	804	8	199	0.04
Proposed 2016 Treatment					

(3) There is negligible risk to public health. The risk of human exposure to TFM is discussed on pp. 101-104 in the FSEIS. The U. S. Environmental Protection Agency (EPA) stated in its 1999 *Reregistration Eligibility Decision* that "Human risks from exposures of TFM and niclosamide do not exceed levels of concern for the currently registered uses" (FSEIS Appendix C). In 2004, EPA issued risk assessment guidance that stated, "The estimate of 300 parts per billion considers the most sensitive sub-population, infants, and includes a safety factor of 1000x in accordance with agency policy." (Lindsay 2004). The USFWS considers the guidance from the EPA to be adequate, however, the USFWS recognizes and abides by Vermont's state action threshold of 35 parts per billion.

The USFWS is requesting a window for application of lampricide to run from the day after Labor Day until the 1st of December. Historically, the earliest lampricide treatment occurred in Vermont on September 16th, but delta treatments have occurred as early as September 3rd in New York and stream treatments as early as September 8th. This range of dates has been chosen to balance the concerns of different stakeholders while still allowing for a reasonable opportunity to perform lampricide treatments. As the fall season progresses, defoliation of deciduous trees and changing weather cause stream levels to rise, which limits our opportunities to perform treatments because of technical concerns and permit conditions. This becomes a particular concern when multiple treatments are scheduled in Vermont and New York each year.

We avoid spring and summer because of an increased risk of exposure for swimmers and the potential presence of susceptible life stages of lake sturgeon in some rivers which become more tolerant of lampricide as they grow larger. By not applying lampricides until after Labor Day the USFWS avoids major public recreation periods at public access points. The USFWS is committed to informing the public of the risk of exposure to lampricide at the advisory levels mentioned above. A brief description of the plan to notify the public is provided below.

In addition to product label use restrictions, the USFWS will follow the mitigation procedures that further limit human exposure to TFM described in the FSEIS (pp. 178-188) and detailed in, Vermont prior notification, and water supply plan for lampricide applications (Smith 2016a), and Contingency plan for accidental spillage of lampricides during Lake Champlain sea lamprey control operations (Smith 2015). Water use advisories dictated by these procedures advise the public of the risk of exposure from household, agricultural, and recreational swimming uses, and recommend against water use or exposure until TFM levels fall below 35 ppb. All other recreational uses have an advisory level of 100 ppb. A water user survey will be sent to all landowners and leaseholders within the treatment advisory area whose properties are located along the shoreline of the affected area during the summer prior to treatment. The affected area will encompass the length of the treated stream segment plus two miles of lake shore to the north and the south of the outlet of Stone Bridge Brook. The survey will identify surface water uses and potential water needs during the treatment (Smith 2016b). The USFWS will post public access points with a sign approved by Vermont DEC and provide a voluntary press release for local broadcast media to notify the public.

(4) Long-range Management Plan. The entire FSEIS constitutes a long-range management plan for sea lamprey control. When the need arose, an additional EA was written which incorporates the Lamoille River into the control program as well. A commitment to pesticide minimization over time through an integrated pest management approach is detailed in the FSEIS. Lampricide is applied at levels necessary to effectively kill the target organism (sea lamprey), but great care is given to use no more than is necessary thereby limiting the impacts on the non-target environment to the greatest extent possible. Our proposed long-term control strategies include non-chemical control methods in 4 of the 13 Vermont streams inhabited by sea lamprey. We will continue to support and participate in research and investigations into new technologies and methodologies that seek to develop ways to reduce the amount of lampricide needed to effectively control sea lamprey.

(5) Public Benefits. Substantial public benefits of sea lamprey control in Lake Champlain were demonstrated in the 8-year experimental program (Fisheries Technical Committee 1999). At the end of the experimental program, fishery benefits and angler satisfaction increased so dramatically that anglers planned to spend an estimated additional 1.2 million angler days annually fishing Lake Champlain, which generate an estimated additional $42.2 million in fishing related expenditures, if sea lamprey control was fully implemented, and its resulting benefits were to accrue and continue. This value increases to an estimated $59.2 million when all water-based recreational activity is considered (Gilbert, 1999; Marsden et al. 2003). Further details of public benefits can be found on pp. 198-202 of the FSEIS.

While more recent empiric data are not available, the results of the large, lake-wide fishing derbies, the numbers of participants, increased fishing in Lake Champlain, angler satisfaction, and wide-spread public support of the lamprey control program point to many increased public benefits for the citizens of Vermont.

Treatment Strategy and Methodology

Treatment Strategy

Given the need for an effective treatment while mitigating potential risks to certain listed non-target species, the specific proposed treatment strategy for the Stone Bridge Brook is as follows:

1. *USFWS will apply TFM to 3.6 stream miles of Stone Bridge Brook with the primary lampricide application point (AP) at Lake Road.*

2. *There will be one supplemental application point where the concentration of the lampricide bank will be boosted back up to the target concentration as needed. It will be located just above Beebe Hill Road.*

3. *TFM Bars and/or adjustable rate pumps may be used as supplemental applications on up to 5 small tributaries (SAP 1-5 on Figure 3) near their confluences with Stone Bridge Brook, 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.*

4. *Application rate: TFM will be applied for 12 consecutive hours to achieve a target in-stream treatment concentration of no greater than 1.5 x MLC.*

5. *MLC will be determined by the results of an on-site toxicity test and diurnal stream pH and alkalinity analysis in the days prior to treatment. The MLC may be adjusted during treatment to compensate for shifts in pH or alkalinity that differ from pre-treatment conditions.*

The proposed treatment strategy is designed to provide an effective sea lamprey control treatment while providing a margin of safety for non-target species of concern in Stone Bridge Brook. A 14-hour treatment duration may be required under certain flow and water chemistry conditions in order to achieve a minimum 9-hour lethal exposure duration in all areas of larval habitat.

Treatment Methodology

Treatment planning and execution will be similar to that of previous treatments. All applications of lampricides will be made in accordance with an Endangered and Threatened Species Takings permit, companion to this one. Two lampricide products, TFM-HP and TFM Bar are proposed for use (Safety Data Sheet = TFM-HP TFM-Bar). All lampricides will be applied according to the Standard Operating Procedures (TFM-HP TFM-Bar). The MLC will be determined by the results of an on-site toxicity test prior to treatment. The MLC may change during treatment in response to shifts in pH or alkalinity that differ from pre-treatment conditions, target concentration will be adjusted accordingly.

Lampricide(s) will be applied at concentrations equivalent to a factor of up to 1.5 x MLC for a period of 12 to 14 hours. Amount of chemical applied and application rate is based on measured stream conditions at the time of treatment (i.e. discharge, pH, and alkalinity). The toxicity of lampricides varies depending on stream water pH and total alkalinity levels. The USFWS estimates that between 22 to 164 pounds of the active ingredient in TFM-HP formulations may be applied to Stone Bridge Brook over a 12 to 14 hour period based on anticipated river discharge rates between about 2 and 12 cubic feet per second (cfs). Up to 15 TFM Bars may be used in up to 5 supplemental application points (Figure 3).

In-stream TFM Monitoring

Real-time monitoring of TFM concentration will be conducted during the treatment to precisely control the target application rate and to assess the efficacy of the application throughout the treated reach. TFM concentration in the water, during treatments, will be measured by photospectroscopy with accuracy to within 0.1 mg/l. Five water analysis stations will be used during the treatment from application point to mouth. A map of Stone Bridge Brook showing the application point and analysis station locations is provided in Figure 3 and described below:

1. Downstream of Lake Road Application
2. Midpoint between Lake Road and Beebe Hill Road
3a. Above maintenance application point
3b. Below maintenance application point
4. Approximately mid-way between Beebe Hill Road and the mouth
5. At the mouth near Eagle Mountain Harbor Road

During lampricide application, water samples will be collected and analyzed every ½ hour at the most upstream sampling station (Station 1) to monitor and allow adjustments to the lampricide application rate. Sampling will also be performed every ½ hour at the sampling station immediately below the maintenance application point to monitor and regulate the application rate. Lampricide concentrations will be monitored every hour at all downstream sampling stations, by hand or by deployment of automatic water samplers to assess concentrations and duration of the lampricide block passing each point.

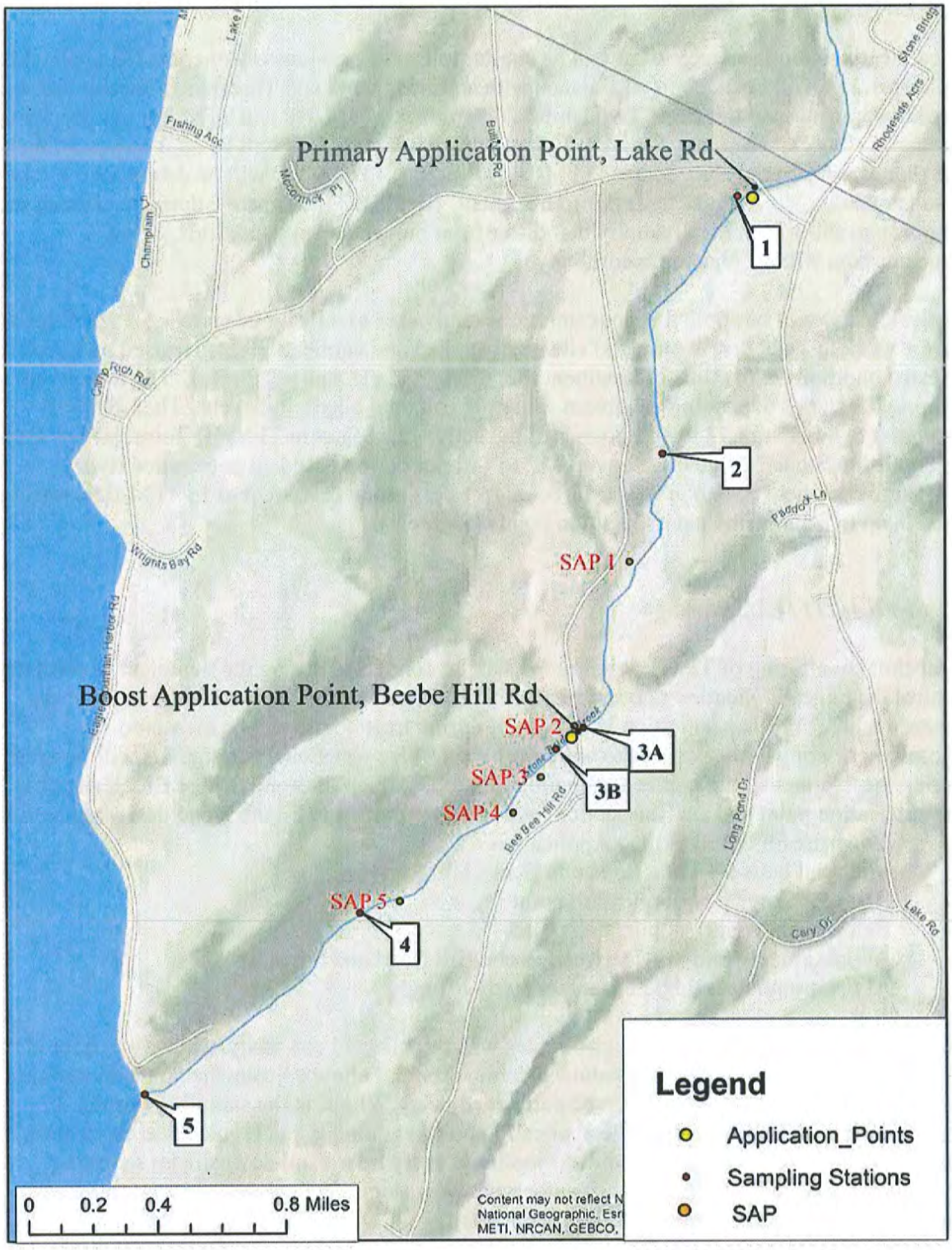


Figure 3. Map showing location of primary application point, supplemental application point, and monitoring stations 1-5.

Pre-treatment and Treatment Water Chemistry Monitoring

Pre-treatment: Monitoring the daily fluctuations in stream pH and total alkalinity is necessary to determine corresponding changes in lampricide toxicity. Diurnal pH fluctuations will be monitored for at least 24 hours prior to treatment, and usually for a longer period. Total alkalinity will also be measured periodically over the same time frame as for pH monitoring. The pH and alkalinity data will be considered with the results of the pre-treatment toxicity test to determine the stream MLC (SMLC) which is the instantaneous concentration (mg/L) of TFM needed to achieve 1.0 x MLC for lamprey at any given time or place in the river. This value fluctuates over time and space due to many factors. Water chemistry will be monitored at stations with pH/temperature data recorders, supplemented by periodic hand sampling for lab measurements; total alkalinity will be measured at least at the times of deployment and retrieval of the data recorders at these stations. Based on these data, lampricides may be applied at less than the maximum proposed treatment concentrations (but not lower than 1.0 x MLC) if conditions forewarn that the SMLC may drop (toxicity goes up), downstream of the application.

Treatment: Water chemistry samples will be collected at least once every hour at Stations 1, 2, 3a, 3b, 4, and 5 during the periods that the lampricide block passes through each point by hand sampling or pH logger (Figure 3). Adjustments will be made to the application rate and target concentration to compensate for variation in pH and/or total alkalinity at Station 1 during the treatment for the primary application, and the sample taken from below each supplemental application will be used to adjust the application rate at the respective supplemental application site. Water chemistry will be monitored at stations with automatic water samplers using pH/temperature data recorders; samples will be analyzed for total alkalinity at the times of deployment and retrieval of the samplers and data recorders.

Target/Non-target Species Mortality Monitoring

Post-treatment mortality assessment crews will walk systematically, 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 and observations of non-target organism mortalities, except lamprey, will be recorded. Non-target assessment sections comprise about 20% of the treated reaches and are defined based on the locations of USFWS sea lamprey larval survey transects as follows: One section will start immediately below each lampricide application point, equal in length to the distance between two transects. Four additional sections will be assessed on each stream reach between transects 3-4, 8-9, 13-14, 18-19, 23-AP. Transect locations and assessment sections are presented in Figure 4.

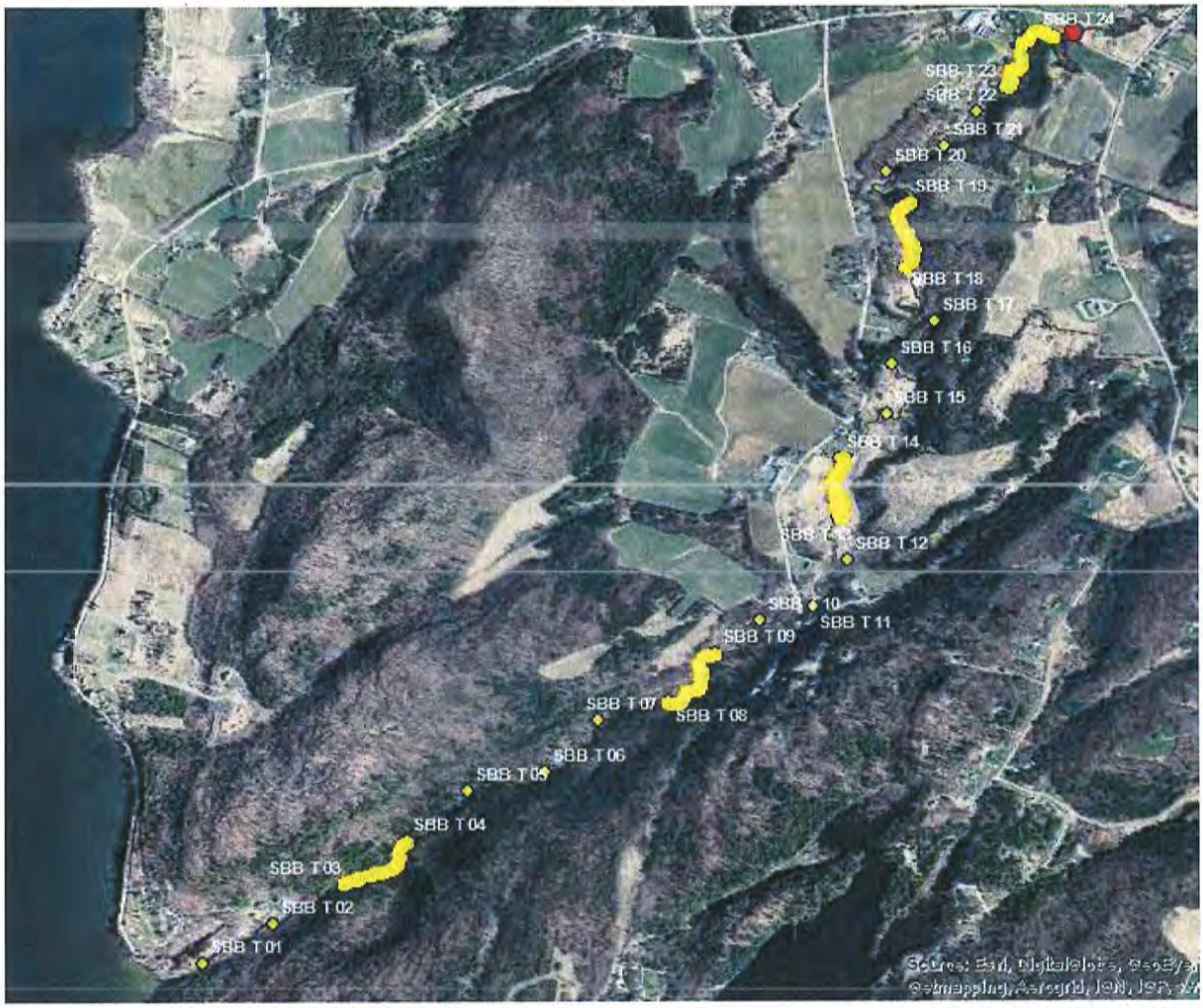


Figure 4: Stone Bridge Brook non-target survey zones highlighted in yellow. Transect numbers correspond to larval survey numbers. Spaced evenly from 1 to 24.

All dead fish (excluding lamprey), amphibians, mussels and other large invertebrates encountered will be identified and enumerated, if possible. Organisms not identified in the field will be collected, if possible, and retained for identification. As noted above, 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. Assessment of treatment effects on lamprey populations will instead be accomplished by means of a larval survey within one year of treatment. Larval surveys following treatments provide a more direct and statistically sound means of comparison with pre-treatment survey data.

Results of non-target mortality surveys will be submitted to the VT DEC by May 1 of the year following the treatment. The post-treatment larval survey results will be submitted by December 31 of the year following the year of treatment.

Conclusion

Considering the 5 Vermont statutory criteria discussed above, the USFWS has the opinion that a controlled application of TFM at a concentration of up to 1.5 X MLC will acceptably meet and fulfil the requirements necessary for obtaining an Aquatic Nuisance Control Permit for the proposed sea lamprey treatment of Stone Bridge Brook. Proposed permit conditions are presented in Attachment 4.

Permit cycle

At a meeting in Montpelier on February 24th, 2015 with Secretary Markowitz, Commissioner Porter, and other key individuals, the duration of the permits and the idea of lumping them was discussed. As a result, it was decided that the T&E permits should be made consistent in duration with the DEC's Aquatic Nuisance Control Permit which last 5 years. Therefore, we are asking for this ANC permit to become effective in the fall of 2016 and remain effective through the fall of 2021. This would allow Stone Bridge Brook to be treated twice on this one permit (2016 and 2020). If issues arise or need to be addressed, the permit can be reopened. This does not guarantee 2 treatments; instead it will allow a second treatment in 2020 assuming that nothing significant has changed during that time that would affect permit conditions. The applicant will notify the Agency of Natural Resources at least 6 months prior to a planned second treatment to allow time for any questions or concerns to be raised and addressed.

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Attachment 2

Proposed Lampricide Treatment of Stone Bridge Brook in 2016 and 2020

Lake Champlain Sea Lamprey Control Program Geographic Realignment Plan

April 12th, 2016

Lake Champlain Sea Lamprey Control Program Geographic Realignment Plan

Since the beginning of the lamprey control program many factors have resulted in the geographically-arbitrary, though regular schedule of lamprey treatments within the basin. In an attempt to follow the strategy of the Great Lakes Sea Lamprey Control Program, we seek to move our schedule to a geographically-based, systematic strategy. This realignment provides substantial time and financial savings to both the applicant and the Agency of Natural Resources. It also has a presumed biological advantage produced by concentrating the spawner-attracting larval pheromone into proximate rivers and thereby creating regionalized attracting plumes. This could focus reproductive effort and allow for more effective control by reducing the population's overall heterogeneity.

Time and costs would be reduced by only needing to apply lampricide in Vermont during 2 years of the 4-year control program cycle (based on lamprey life history of 4-year resident larvae). This also means permits would only need to be reviewed 2 out of 4 years (currently, permitting is required every year in VT because treatments are not aligned). Financially, savings would be made in staff time spent on permitting and through logistical improvements allowing for regionalized travel and centralized operations. More can be done in a shorter time. Additionally, as can be seen in the figure below, the re-alignment plan would result in treatments in the Lake Champlain Basin during only 3 of the 4 years of a treatment cycle and only 2 of 4 years of the cycle in Vermont. There are many increases in efficiency to be gained by both the State of Vermont and the applicant by adopting this realignment plan.

Biologically, the principle at work is to begin having the spawning population rotating the focus of its reproductive effort geographically, following the strongest pheromone concentration cues emitted by geographically-concentrated larval populations. When the spawning population focuses its effort in these geographic units, larval production would be focused as well. Keeping this regular geographic rotation in operation, whereby streams are treated in the fall following the presumed most intensive reproductive effort of the preceding spring, maximizes the impact of lampricide treatments on the collective larval population of the basin. In simple terms, our focused effort matches their focused effort. In contrast, arbitrarily placed geographic treatments spread our effort across areas with equally distributed lamprey reproductive effort and thus prevent the emergence of geographically distinct zones of age-class-synchronized larval production. Ultimately, we create a geographic rotational chase where in our case, the lamprey chase the pheromone, and we chase the lamprey. The results are not absolute and the lamprey will not completely ignore areas with fewer larvae, but this is one more tool in our integrated pest management plan which can help us maximize our effectiveness in reducing the lamprey population and enhancing the cost-benefit ratio of cost per kill ratio in the basin.

By treating deltas in the same year as the river they stem from, we address an issue that we only recently learned. During stream treatments, substantial numbers of lamprey swim ahead of the chemical block and can seek refuge on the delta where the concentration falls below the lethal

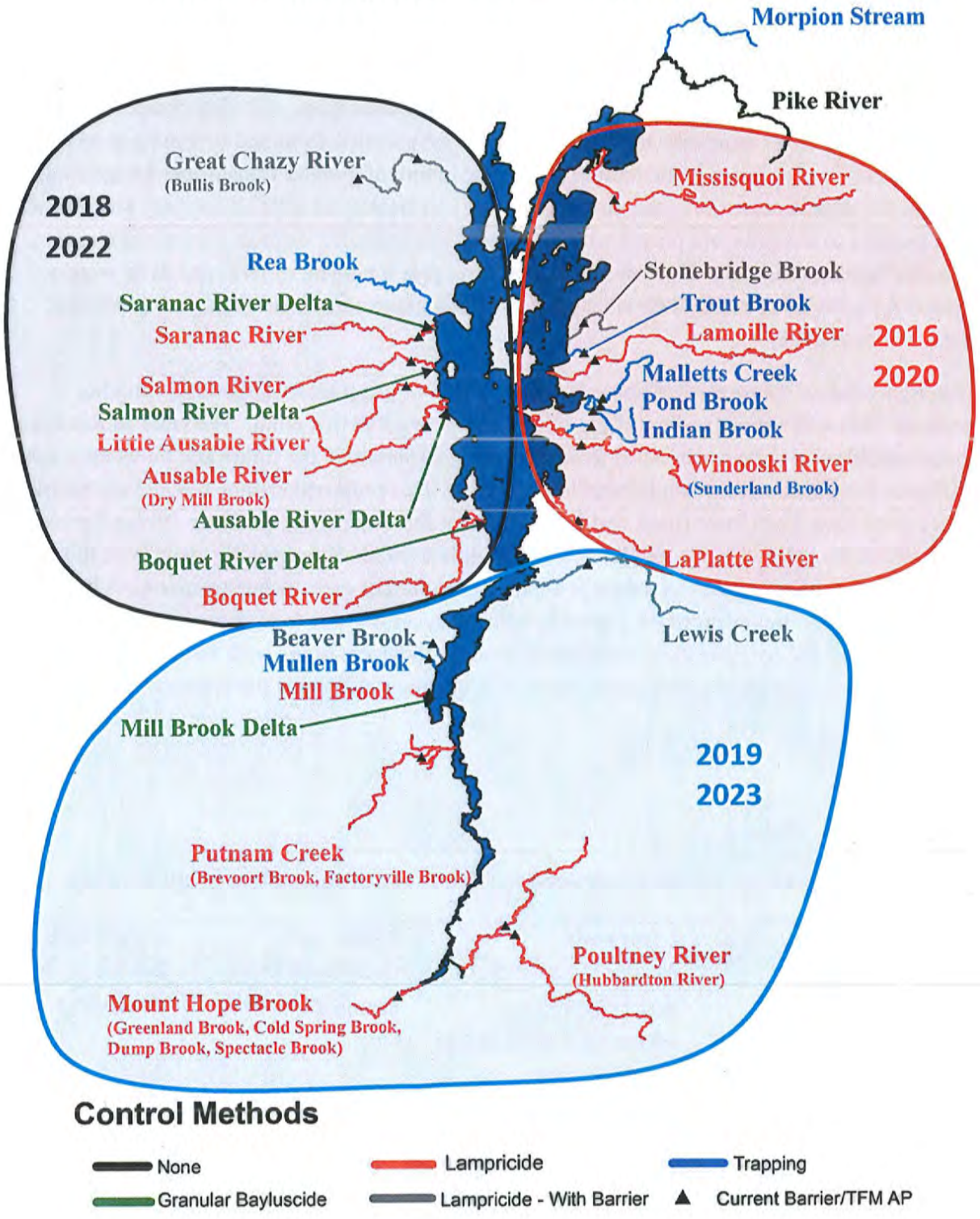
level. Treating the delta the following fall kills all non-transforming larvae that escaped the river during the treatment. However, any lamprey that were transforming and were chased onto the delta by a September treatment are free to recruit to the parasitic form and become part of the lake's parasitic population in November (this is the month of greatest transformer emigration). Scheduling delta treatments in the same fall as the river treatments kills all lamprey year classes that escaped to the delta and prevents transformers from using the delta as a refuge before they become parasites that fall. The benefits of this same year treatment of river and delta were a reason for scheduling the Mill Brook stream and delta treatments in the same year (their first treatment was 2008).

The figure below shows the 3 proposed, colored zones or geographic units we are moving toward. This will require some shifting of treatments to get to this point. The table shows which rivers would need to be rescheduled to achieve the goal shown in the figure and how many years different from present they would need to be shifted. This proposed change has already taken place in all New York State rivers and in all Vermont State rivers except Stone Bridge Brook. As a result, the colored zones will all become complete and on a geographic cycle once the Stone Bridge Brook early (1-year) treatment is approved; no further early or late treatments will be required. A 2016 treatment of the Lamoille was not necessary due to no lamprey being found in it. It therefore did not have to be considered for early treatment along with Stone Bridge Brook. The Lamoille River will be considered for a 2020 treatment following the results of its 2019 survey.

Changes to the existing schedule required to achieve the proposed treatment schedule

No Change	1 year early	2 years early	3 years early
Saranac (NY)	Ausable Delta (APA)	Great Chazy (NY)	Putnam (APA)
Salmon + Delta (APA)	Boquet (APA)	Saranac Delta (NY)	Lewis (VT)
L. Ausable + Delta (APA)	Mill Brook + Delta (APA)		
Ausable (APA)	Mt. Hope (APA)		
Boquet Delta (APA)	Lamoille (VT) [*not treated*]		
Beaver (APA)	Stone Bridge (VT)		
Poultney (NY/VT)			
Hubbardton (VT)			
Winooski (VT)			
Missisquoi (VT)			

Lake Champlain Sea Lamprey Control



Map of Lake Champlain lamprey infested streams. Legend indicates the control method(s) applied. The three colored polygons surround proposed zones in which sites designated for treatment would be treated during the same year. The years listed within the polygons are the proposed rotational treatment cycle to be used.

Attachment 3

Proposed Lampricide Treatment of Stone Bridge Brook in 2016 and 2020

2010 – 2015 Trapping Data and Summary

April12th, 2016

2010 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
White Sucker	*Catostomus commersoni*	77	16	93
Brown Bullhead	*Ameiurus nebulosus*	45	8	53
Smallmouth Bass	*Micopterus dolomieui*	41	1	42
Creek Chub	*Semotilus atromaculatus*	36	3	39
Log Perch	*Percina caprodes*	19	15	34
Pumpkinseed	*Lepomis gibbosus*	26	4	30
Common Shiner	*Luxilus cornutus*	24	1	25
Golden shiner	*Notemigonus crysoleucas*	10	11	21
Rock Bass	*Ambloplites rupestris*	20	0	20
Spottail Shiner	*Notropis hudsonius*	14	1	15
Rainbow Trout	*Oncorhynchus mykiss*	3	0	3
Silver Lamprey	*Ichthyomyzon unicuspis*	2	0	2
Sculpin	*Cottus Spp.*	1	1	2
American Eel	*Anguilla rostrata*	2	0	2
Rudd	*Scardinius erythropthalmus*	0	2	2
Bluntnose Minnow	*Pimephales notatus*	1	0	1
Northern Pike	*Esox Lucius*	1	0	1
Bluegill	*Lepomis macrochirus*	1	0	1
Eastern Silvery Minnow	*Hybognathus regius*	1	0	1
Fallfish	*Semotilus corporalis*	1	0	1
Tench	*Tinca tinca*	1	0	1
	Total Fish	**326**	**63**	**389**
Other				
Crayfish		144	2	146
American Bullfrog	*Rana catesbeiana*	1	0	1
	Total Other	**145**	**2**	**147**
	Total Capture	**471**	**65**	**536**
	87.9 % of all non-targets passed alive			

2011 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
Log Perch	*Percina caprodes*	44	73	117
Pumpkinseed	*Lepomis gibbosus*	73	23	96
White Sucker	*Catostomus commersoni*	62	16	78
Bluegill	*Lepomis macrochirus*	50	1	51
Rock Bass	*Ambloplites rupestris*	48	0	48
Brown Bullhead	*Ameiurus nebulosus*	44	1	45
Creek Chub	*Semotilus atromaculatus*	35	5	40
Golden shiner	*Notemigonus crysoleucas*	32	5	37
Smallmouth Bass	*Micopterus dolomieui*	23	0	23
Common Shiner	*Luxilus cornutus*	14	7	21
American Eel	*Anguilla rostrata*	11	1	12
Yellow Perch	*Perca flavescens*	8	4	12
Tench	*Tinca tinca*	7	0	7
Rainbow Trout	*Oncorhynchus mykiss*	6	1	7
Silver Lamprey	*Ichthyomyzon unicuspis*	3	1	4
Longnose Dace	*Rhinichthys cataractae*	2	0	2
Spottail Shiner	*Notropis hudsonius*	1	0	1
Brook Trout	*Salvelinus fontinalis*	1	0	1
Blacknose Shiner	*Notropis heterolepis*	1	0	1
	Total Fish	**465**	**138**	**603**
Other				
Crayfish		104	0	104
American Bullfrog	*Rana catesbeiana*	0	0	0
Mink	*Mustela vison*	0	1	1
	Total Other	**104**	**1**	**105**
	Total Capture	**569**	**139**	**708**
	80.4 % of all non-targets passed alive			

2012 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
White Sucker	*Catostomus commersoni*	126	21	147
Brown Bullhead	*Ameiurus nebulosus*	122	8	130
Rainbow Trout	*Oncorhynchus mykiss*	53	0	53
Rock Bass	*Ambloplites rupestris*	38	3	41
Log Perch	*Percina caprodes*	20	9	29
Golden Shiner	*Notemigonus crysoleucas*	20	3	23
Pumpkinseed	*Lepomis gibbosus*	20	2	22
Smallmouth Bass	*Micopterus dolomieui*	12	1	13
American Eel	*Anguilla rostrata*	12	0	12
Spottail Shiner	*Notropis hudsonius*	12	0	12
Brown Trout	*Salmo trutta*	11	0	11
Emerald Shiner	*Notropis atherinoides*	8	2	10
Creek Chub	*Semotilus atromaculatus*	10	0	10
Common Shiner	*Luxilus cornutus*	4	2	6
Bluegill	*Lepomis macrochirus*	6	0	6
Silver Lamprey	*Ichthyomyzon unicuspis*	3	0	3
Longnose Dace	*Rhinichthys cataractae*	2	0	2
Tench	*Tinca tinca*	1	0	1
	Total Fish	**468**	**51**	**519**
Other				
Crayfish		138	0	138
American Bullfrog	*Rana catesbeiana*	1	0	1
Mink	*Mustela vison*	0	1	1
	Total Other	**139**	**0**	**139**
	Total Capture	**619**	**51**	**670**
	92.3 % of all non-targets passed alive			

2013 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
Brown Bullhead	*Ameiurus nebulosus*	451	1	452
White Sucker	*Catostomus commersoni*	389	16	405
Bluegill	*Lepomis macrochirus*	164	12	176
Log Perch	*Percina caprodes*	52	27	79
Golden Shiner	*Notemigonus crysoleucas*	56	8	64
Smallmouth Bass	*Micopterus dolomieui*	44	3	47
Rock Bass	*Ambloplites rupestris*	38	0	38
Pumpkinseed	*Lepomis gibbosus*	25	12	37
American Eel	*Anguilla rostrata*	24	0	24
Alewife	*Alosa pseudoharengus*	0	10	10
Creek Chub	*Semotilus atromaculatus*	9	0	9
Common Shiner	*Luxilus cornutus*	7	0	7
Eastern Silvery Minnow	*Hybognathus regius*	4	3	7
Emerald Shiner	*Notropis atherinoides*	3	0	3
Rainbow Trout	*Oncorhynchus mykiss*	3	0	3
Silver Lamprey	*Ichthyomyzon unicuspis*	2	0	2
Tessellated Darter	*Etheostoma olmstedi*	1	0	1
Largemouth Bass	*Micropterus salmoides*	1	0	1
Tench	*Tinca tinca*	0	1	1
Unidentifiable Fish		1	0	1
	Total Fish	**1274**	**93**	**1367**
Other				
Crayfish		118	3	121
American Toad	Bufo americanus	4	0	4
American Bullfrog	Rana catesbeiana	1	0	1
Muskrat	Ondatra zibethicus	0	1	1
	Total Other	**123**	**4**	**127**
	Total Capture	**1397**	**97**	**1494**
	93.5 % of non-targets passed alive			

2014 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
White Sucker	*Catostomus commersoni*	138	2	140
Bluegill	*Lepomis macrochirus*	65	3	68
Brown Bullhead	*Ameiurus nebulosus*	64	3	67
Log Perch	*Percina caprodes*	27	34	61
Rock Bass	*Ambloplites rupestris*	52	6	58
Smallmouth Bass	*Micopterus dolomieui*	38	4	42
Pumpkinseed	*Lepomis gibbosus*	13	16	29
Golden Shiner	*Notemigonus crysoleucas*	11	9	20
Creek Chub	*Semotilus atromaculatus*	7	0	7
Alewife	*Alosa pseudoharengus*	1	4	5
American Eel	*Anguilla rostrata*	5	0	5
Common Shiner	*Luxilus cornutus*	3	1	4
Rainbow Trout	*Oncorhynchus mykiss*	4	0	4
Sculpin	*Cottus Spp.*	3	0	3
Atlantic Salmon	*Salmo salar*	3	0	3
Yellow Perch	*Perca flavescens*	2	0	2
Spottail Shiner	*Notropis hudsonius*	2	0	2
Tench	*Tinca tinca*	1	0	1
Silver Lamprey	*Ichthyomyzon unicuspis*	1	0	1
White Perch	*Morone americana*	0	1	1
	Total Fish	**440**	**83**	**523**
Other				
Crayfish		20	0	20
Northern Leopard Frog	*Lithobates pipiens*	2	0	2
	Total Other	**22**	**0**	**22**
	Total Capture	**462**	**83**	**545**
	84.8% of all non-targets passed alive			

2015 Non-target Survival Data
All Sites

Common Name	Scientific Name	# Alive	# Dead	Total
Stone Bridge Brook				
White Sucker	Catostomus commersoni	133	3	136
Pumpkinseed	Lepomis gibbosus	46	7	53
Brown Bullhead	Ameiurus nebulosus	43	0	43
Golden Shiner	Notemigonus crysoleucas	19	1	20
Bluegill	Lepomis macrochirus	20	0	20
Rock Bass	Ambloplites rupestris	16	1	17
Smallmouth Bass	Micopterus dolomieui	16	0	16
Creek Chub	Semotilus atromaculatus	14	1	15
Brown Trout	Salmo trutta	14	0	14
American Eel	Anguilla rostrata	10	0	10
Log Perch	Percina caprodes	2	0	2
Alewife	Alosa pseudoharengus	0	1	1
Common Shiner	Luxilus cornutus	1	0	1
Tench	Tinca tinca	1	0	1
Silver Lamprey	Ichthyomyzon unicuspis	1	0	1
Yellow Perch	Perca flavescens	1	0	1
Fallfish	Semotilus corporalis	1	0	1
	Total Fish	**338**	**14**	**352**
Other				
Crayfish		44	0	44
	Total Other	**44**	**0**	**44**
	Total Capture	**382**	**14**	**396**
	96.5% of all non-targets passed alive			

6 Year Summary of Trapping Data Mortalities

Year	# passed	# Dead	% passed alive
2010	471	65	87.9%
2011	569	139	80.4%
2012	619	51	92.4%
2013	1397	97	93.5%
2014	462	83	84.8%
2015	382	14	96.5%
Totals	3900	449	
Average	650	75	89.7%

Proposed Aquatic Nuisance Control Species Permit Specific Conditions for the 2016 and 2020 Stone Bridge Brook TFM Treatments

Attachment 4

Proposed Permit Conditions

Part II. Pesticide Application Conditions

A. Pesticide Use Conditions

1. The Permittee is authorized to use TFM-HP Sea Lamprey Larvicide (EPA Reg. No. 6704-45), and TFM Bar (EPA Reg. No. 6704-86)

2. All TFM-HP, and TFM-Bar (lampricide) products shall be registered with the U.S. Environmental Protection Agency and the Vermont Agency of Agriculture, Food and Markets for use in Vermont at the time of the treatment, and shall be handled, applied, and disposed of in full conformance with all label requirements as well as all state and federal regulations in effect at the time of the treatment.

3. All Operators (pesticide applicators) shall be certified by the Vermont Agency of Agriculture, Food and Markets in Category Five – Aquatics.

B. Date, Location and Environmental Conditions

1. The Permittee is authorized two applications of lampricide under this permit; one between September 14 and December 1 of 2016 and one between Labor Day and December 1 of 2020. 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, not pushed back one year, to maintain the basin alignment strategy for conducting lampricide treatments.

2. The Permittee shall apply TFM only in the authorized areas of Stone Bridge Brook as shown on Attachment 1, identified as follows:

a. the primary application location is immediately downstream of where Lake Road crosses 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.

3. The Permittee shall ensure the water temperature at the primary application points (prior to application) during the day of scheduled treatment is at or above 2° C.

4. Treatment shall only occur in Stone Bridge Brook when the measured flow rate on the day of treatment is between 2 cfs and 12 cfs.

5. The Permittee shall monitor stream flow hourly during the time period when application is taking place.

6. No treatment 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.

C. Pesticide Application Conditions

1. The Permittee shall apply the 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 92-001.4 (Adair and Sullivan 2014); and,
b. *Contingency Plan for Accidental Spillage of Lampricides during Lake Champlain Sea Lamprey Control Operations* (Smith 2015).

2. 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.

3 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.

4. The Permittee shall monitor TFM concentrations at the Primary Application Point (site 1), the boost application point (site 3B) and any supplemental application points (SAP 1-5) and adjust application rate to account for changes in pH, alkalinity, and discharge to ensure TFM concentration at those sites does not exceed 1.5 x MLC to sea lamprey.

5. The Permittee shall not apply TFM into Stone Bridge Brook for longer than 14 consecutive hours.

D. General Conditions

1. The Permittee shall notify the Aquatic Nuisance Control Program Coordinator, Misha Cetner, by phone 802-490-6199 or via email at misha.cetner@vermont.gov, at least five days in advance of the scheduled lampricide application taking place. In the event that any necessary treatment schedule changes are made within this 5-day period, the Permittee shall notify the Aquatic Nuisance Control Program as soon as possible to inform it of the schedule change and reasons for such change.

2. This permit may be modified or amended upon request by the Permittee or by the Department. Any modification under this condition shall be performed in accordance with the public notice requirements of the *Public Review and Comment Procedures for Aquatic Nuisance Control Permit Applications and General Permits,* dated January 30, 2003.

3. Prior to any treatment occurring with equipment (e.g. boat, trailer, vehicle, gear) that has been in or on any other waterbody, the Permittee shall comply with 10 V.S.A. §1454. All equipment shall be decontaminated in compliance with the *Draft Voluntary Guidelines to Prevent the Spread of Aquatic Invasive Species through Recreational Activities,* Aquatic Nuisance Species Task Force, November 2012. All Operators shall adhere to these guidelines.

4. Cause for permit suspension or revocation includes, but not limited to, the following:

a. violation of any of the terms or conditions by the Permittee;
b. failure to disclose relevant facts, new research, findings, or other information not previously made available by the Permittee;
c. any misrepresentation of fact or the provision of false information by the Permittee;
d. a determination that the risk to the non-target environment resulting from the activities authorized under this permit is unacceptable;
e. a determination that the risk to public health resulting from the activities authorized under this permit is more than negligible; and/or
f. a determination that there is an undue adverse effect upon the public good resulting from the activities authorized under this permit.

5. The Permittee shall obtain and conduct the treatment in accordance with an Endangered and Threatened Species Takings Permit from the Vermont Department of Fish and Wildlife.

Part III. Monitoring, Surveying & Reporting

A. Monitoring

1. The Permittee shall collect and analyze (for pH and Lampricide concentration) water samples every ½ hour from the following sample stations (as indicated in Attachment 1) during treatment by hand or pH logger. Samples shall be analyzed for alkalinity at least every 2 hours at:
a. Station 1: Downstream of Lake Road Application
b. Station 3b: Downstream of the Beebe Hill Boost application.

2. The Permittee shall collect and analyze (for pH and Lampricide concentration) water samples every hour from the following stations (as indicated in Attachment 1) during treatment by hand or pH logger:
a. Station 2: Midpoint between Lake Road and Beebe Hill Road;
b. Station 3a: Above Beebe Hill Road maintenance application point;
b. Station 4: Approximate midpoint between Beebe Hill Road and the mouth;
c. Station 5: At the mouth near Eagle Mountain Harbor Road

4. Except for samples collected for water use advisory purposes, the Permittee shall determine TFM concentrations with analytical instruments accurate to within 0.1 parts per million (ppm).

5. The Permittee shall take samples at Stations 1 and 3b at three locations in transect: at one-quarter, one-half and three-quarters across Stone Bridge Brook.
a. If 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.
b. If 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 in until subsequent measurements along this transect are within 0.1 MLC and at or below the 1.5 MLC target.

6. 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 2016b)

B. Surveying

1. The Permittee shall conduct a post-treatment survey to estimate the relative abundance of sea lamprey and other lamprey species in Stone Bridge Brook using the standard, transect-based Larval Assessment Sampling protocols within one year after treatment. The results of this survey shall be submitted to the Aquatic Nuisance Control Program within 6 months after completion of the survey.

2. The Permittee shall conduct post-treatment non-target 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. This survey shall be conducted in accordance with and shall include the following information:

a. Each post-treatment non-target mortality surveys shall be conducted within 24 hours of the lampricide clearing each zone;
b. All visible bottom sections will be inspected and observations of non-target organism mortalities, except lampreys, shall be recorded;
c. At each survey Zone the first 30 lampreys (all species) encountered will be collected and brought back to the lab for identification.
d. Preliminary results shall be made available to the Aquatic Nuisance Control Program within 24 hours of completion;
e. Final results of this survey shall be reported to the Aquatic Nuisance Control Program within 6 months after treatment; and,
f. If preliminary results, per subsection 2b above, indicate a significant level of impact on non-target organisms, then a full reach survey may be requested at any time by the Aquatic Nuisance Control Program.

C. Reporting

1. The Permittee shall submit a final report on the Stone Bridge Brook TFM treatment to the Aquatic Nuisance Control Program by May 1st of the following year.

2. The final report shall include at a minimum:
a. the batch numbers and the quantity used of TFM-HP, and TFM Bar;
b. the results from the on-site toxicity test and MLC determination;
c. the treatment duration;
d. summary of water chemistry monitoring data;
e. summary of stream flow data;
f. all non-target, non-lamprey post-treatment mortality survey data; and,
g. a summary of treatment activities.
h. proportional representation of each lamprey species in post-treatment collections

3. All required surveys and reports shall be submitted to:

Misha Cetner, Aquatic Nuisance Control Program Department of Environmental Conservation Watershed Management Division One National Life Drive, 2 Main Montpelier, VT 05620-3522

Or, preferably via email to Misha Cetner, at **misha.cetner@vermont.gov**.

Part IV. Public Use Advisories & Restriction Notifications

A. Use Advisories

1. The Permittee shall conduct all public use advisories in accordance with the approved *"Lake Champlain prior notification, and water supply plan for lampricide applications."* (Smith, 2016).

2. 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.

B. Restriction Notifications

1. The Permittee shall inform the public all surface water downstream of the primary application location should not be used for drinking, cooking, washing or other household purposes such as bathing, showering, and dish and clothes washing, as well as for swimming, irrigation or livestock watering until analytical results confirm that TFM residues are less than 35 ppb.

2. The Permittee shall inform the public that water within the use advisory area should not be used for fishing, hunting or and other water-based recreation activities until analytical results confirm that TFM residues are less than 100 parts ppb.

Part V. Compliance; Enforcement

The Permittee shall comply with all terms and conditions of this permit. Any permit noncompliance constitutes a violation of 10 V.S.A. Chapter 50, and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

VERMONT

State of Vermont
Department of Health
Commissioner's Office
108 Cherry Street • PO Box 70
Burlington, Vermont 05402
HealthVermont.gov

[phone] 802-863-7280

Agency of Human Services

TO: Alyssa Schuren, Commissioner
Department of Environmental Conservation

FROM: Harry Chen, MD, Commissioner
Department of Health

DATE: July 18, 2016

RE: Aquatic Nuisance Control Permit Applications #2016-C11 Missisquoi; River #2016-C12 Stone Bridge Brook and #2016-C14 LaPlatte River

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Per the request of the Vermont Department of Environmental Conservation (DEC), the Vermont Department of Health (Department) has conducted a review of TFM HP and TFM Bar (both with active ingredient 3-Trifluoromethyl-4-nitrophenol, henceforth referred to as TFM) in response to permit application numbers #2016-C11 Missisquoi; River #2016-C12 Stone Bridge Brook and #2016-C14 LaPlatte River.

The Department has conducted a review of TFM which included consideration of active ingredients, inerts and potential TFM HP impurities (dioxin-like impurities). This review included, but was not limited to the following:

1. Data relative to impurities contained in specific batches of TFM HP.
2. Results of environmental fate studies of potential TFM HP impurities.
3. Consideration of the 2008 Confidential Statement of Formula for TFM HP (the most recent statement available to the Department).
4. Consideration of the June 4, 2012 Confidential Statement of Formula for TFM Bar (the most recent statement available to the Department).
5. Consideration of information in the United States Environmental Protection Agency docket established for registration review of TFM and niclosamide. Specifically, the 2013 EPA Scoping Document[1] states that "there is no expectation that people would be exposed through consuming drinking 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 aforementioned information, under the following conditions, application of the requested products as proposed would not be expected to result in more than a negligible risk to human health under 10 VSA § 1455(d)(3).

1. Public Water Supplies: The water shall 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.
2. Private Water Supplies: The water shall 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.
3. The water shall not be used for swimming or bathing until measurements of TFM are below 35 ppb.
4. The water shall not be used for recreation other than for swimming until measurements of TFM are below 100 ppb.
5. The TFM HP product used must be produced using the same manufacturing process as those batches previously examined and noted in the Analytical Perspectives report dated August 28, 2009. Iofina Chemical, Inc. provided verification that no manufacturing changes have occurred in an April 11, 2016 e-mail to Bradley Young, Ph.D. (USFWS) and Razelle Hoffman-Contois, M.S. (Vermont Department of Health).
6. Treatment shall occur no earlier than the day after Labor Day of the treatment year, to reduce the possibility of exposure to swimmers. Increased messaging of the recreational use advisory should occur the closer to Labor Day treatment is conducted.

If a multi-year permit is issued, prior to treatment in any year other than 2016, the Department recommends that DEC perform, or direct that the applicant perform, a search to determine if updated toxicity and/or environmental fate data has become available on the products requested for use. DEC should provide such information to the Department for review in order to determine if the recommendations above warrant revision.

These recommendations are based on information received as of July 18, 2016.

References:

1 https://www.regulations.gov/document?D=EPA-HQ-OPP-2013-0137-0002