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Vermont Fish and Wildlife Board

Meeting Minutes from Wednesday, October 24, 2018

The Vermont Fish and Wildlife Board held a meeting at 6:15 p.m. on October 24, 2018 at 1 National Life Drive, Montpelier VT 05620 in the Dewey Building.

Members of the Board in attendance: Kevin Lawrence (Board Chair), Theresa Elmer (Vice Chair), Johanna Laggis, Wendy Butler, Tim Biebel, Dennis Mewes, Bryan McCarthy, Mike Kolsun, Bill Pickens, Pete Allard, Cheryl Frank Sullivan, and David Robillard.

Fish and Wildlife Department Staff: Louis Porter (Commissioner), Mark Scott (Director of Wildlife), Col. Jason Batchelder (Director of Law Enforcement), Susan Warner (Director of Outreach) Catherine Gjessing (General Counsel), Will Duane (Executive Assistant), Chris Bernier (Wildlife Biologist), Kim Royar (Furbearer Project Leader), Lt Dennis Amsden, Adam Miller (Fish Culture Operations Manager), Scott Darling (Wildlife Species Program Manager), Nick Fortin (Deer Project Leader), Katy Gieder (Research Coordinator/Biometrician), Nathan Lafront (Hunter Education Specialist), and Bradley Tomkins (VT Dept of Health)

Members of the Public in Attendance: Barry Londeree, Annie Smith, Shannon Ritter, Dawn Bradshaw, Kimberley DiNofrio, Hannah Davie, Brenna Galdenzi, Judith Macdonald, Anne Jameson, Kristen Cameron, Lisa Jablow, and Walt Cottrell.

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The Board meeting was called to order at 6:20 PM by board Chair Kevin Lawrence

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1. Approval of September 19th, 2018 Meeting Minutes

Motion: Vice Chair Theresa Elmer moved that the minutes of the September 19th, 2018 Board meeting be approved as drafted. Dennis Mewes seconded the motion.

Vote: 12-0 voice vote in favor of the motion. The Meeting Minutes from September 19th, 2018 were approved as written.

2. Public Comments (2 Minutes per Speaker)

Barry Londeree- Representing the Humane Society of the United States. Here to support the two petitions on the agenda. HSUS was involved in the legislative process that resulted in H170. The HSUS appreciates the work that the Department did to prepare its report on Lyme disease, and asks that the Board accept the petition that was tabled from earlier in the year.

Brenna Galdenzi – Representing Protect Our Wildlife. Protect Our wildlife supports the fox petition before the Board. It is clear that foxes prey heavily on mice, and the presence of foxes on landscapes does cause mice to be less active. In short, more foxes are a good thing. Why are foxes hunted and trapped in the first place? The pelts do not sell for high prices. People do not eat foxes. Fish and Wildlife data suggests that the fox populations might be trending downward. New Hampshire recently considered a proposal to put bag limits on foxes. NH Fish and Game also supports a comprehensive nuisance trapping program. Why aren't furbearer hunters required to report what they take?

Judy Macdonald – Foxes are a natural solution to Lyme disease. More red foxes are a better thing. No one eats foxes. Lyme disease is a terrible disease. I support the banning of hunting and killing of foxes.

Anne Jameson – Fox offer many benefits other than their inherent beauty. Rodent control is a huge plus. In 2017 Vermont had the second highest level of Lyme infection nationwide. The rodent population was the primary carrier of the infection. Foxes kill lots of mice. An increase in fox population is the best way to control the white-footed mice population. Currently in Vermont there are no bag limits on foxes that are hunted. Besides hunting and trapping, foxes face other dangers from humans and other wildlife. A decline in fox population equals an increase in the mouse population. Please vote to approve the petition.

Kristen Cameron – I'd like to reiterate that I have concerns regarding conflicts of interest. The Board's duty is to avoid conflicts of interest whether that is actual or perceived. I am concerned that there is a conflict as there are, to my knowledge, nuisance trappers on this Board. We are not allowed to see Board Members' CVs or applications to verify that there are no conflicts. It would be responsible for people who might have conflicts to recuse themselves from voting on nuisance trapping matters.

Lisa Jablow - The nuisance trapping petition currently in front of the Board is a great proposal. Please pay attention to the provisions it contains regarding the training and reporting of nuisance wildlife control officers. Why do wildlife rehabilitators have to go through extensive training but the killing of wildlife for compensation has been flying under the radar for some time? Some clients are dissatisfied with the brutality of the measures used by the trappers. Under the current system there is needless killing and it creates bad optics for the Department.

3. Department Lyme Disease Presentation and Tabled Petition Action

The Department, in conjunction with Vermont Department of Health, presented to Board on the impacts of foxes on white-footed mice populations and the spread of Lyme disease in Vermont. After the presentation, the Board asked questions of the presenters and voted on the petition on this topic which was tabled after its submission in January. The petition and Department report are attached in the Appendix to these minutes.

Motion: Tim Biebel motioned that the petition be denied. Bryan McCarthy seconded the motion.

Vote: Unanimous roll call vote 12-0 to deny the petition. The petition was denied.

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4. Nuisance Trapping Proposal Resubmission Discussion and Department Proposal Amendment

At the previous meeting of the Fish and Wildlife Board, the Board voted to decline a petition from Protect Our Wildlife concerning a regulation on nuisance trapping. Protect Our Wildlife modified their proposal and presented it to Board for its consideration at this October meeting. Prior to discussion of the revised proposal, the Board Chair noted that because the Board had declined to accept the previous petition, and instead approved the Department's proposal to initiate rulemaking, the proposal from Protect Our Wildlife would be discussed as an amendment to the regulatory change approved at the September meeting. In addition to the revised proposal from Protect Our Wildlife, the Department presented the Board with a modification to the previously approved regulatory change.

Motion: Vice Chair Theresa Elmer motioned to amend the previously approved proposal as recommended by the Department by adding the prohibitions contained in Section 4.12, except mechanical devices that are allowable traps.

Vote: Unanimous roll Call vote to approve the Department's amendment as written.

The revised proposal from Protect Our Wildlife and the full Department proposal are attached in the appendix to these minutes. The pertinent section approved by the Board is as follows:

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6.1 In accordance with Sec. 11 of Act 170 from the 2017-2018 Adj Session, the following sections and subsections of Board rules set forth in Title 10, Appendix §44 are applicable to trapping nuisance rabbits and fur-bearing animals for compensation: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6 (except that snares shall not be prohibited) 4.10, 4.11, 4.12 (except that mechanical devices that are allowable traps under this rule shall not be prohibited), 4.14 (e), 4.16 (b), 4.17 (a) and (b).

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6. Comprehensive Deer Management Review

Scott Darling and Nick Fortin presented to the Board on current state of Vermont's deer population. No votes were taken as part of this presentation.

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7. Baitfish Regulatory Update

As an update, Adam Miller reminded the Board that at the previous meeting the Board approved a geographic zonation approach to baitfish rules. The Department has filed that annotated rulemaking language with the Interagency Committee on Administrative Rules. The ICAR meeting will be on November 19th. The annotated proposal submitted to ICAR is attached to the appendix of these minutes. The schedule for public hearing is as follows:

Monday January 7

St. Albans Education Center

169 S Main St, St Albans City, VT 05478

Wednesday January 9

Brattleboro Union High School

131 Fairground Rd, Brattleboro, VT 05301

Monday January 14

Rutland High School

22 Stratton Rd, Rutland, VT 05701

Tuesday January 15

Lakes Region Union High School

317 Lake Region Rd, Orleans, VT 05860

January 16th

Montpelier High School

5 High School Dr, Montpelier, VT 05602

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8. Commissioner's Update

- Commissioner Porter updated the Board on an elk hunting trip to Colorado. The elk were plentiful but the Commissioner and other staff members on the trip did not take an elk. A good time was had by all.
- The Roxbury Hatchery groundbreaking occurred on Wednesday the 24th. Adam Miller was instrumental in pushing this project along. He has been tenacious, and the budget is been skin tight. The Department of Buildings and General Services was helpful in securing funding.
- Approximately 2000 deer harvested so far in the deer archery season. This figure is slightly higher than last year.
- Fall turkey harvest is also high, approximately 600 hundred have been taken so far in the fall season. This is an increase over this same period from 2017
- 460 bear have been taken to date. The heaviest being a 400 lb bear from Newbery.

- 10 hunters out of the 13 issued permits have harvested a moose so far. This includes all of the special opportunity hunters.
- Department biologist Steve Parren is hosting a beach cleanup for spiny soft-shelled turtles this coming Saturday, details are available .
- Three items on the upcoming Legislative session:
    - The Department is going to propose adjusting the moose permit statutes so that we have more flexibility in the years when moose hunting permit numbers are low. When the number of permits issued is low, the statutory requirements are difficult to work with.
        - Additionally the Department will recommend a system to allow moose permit applicants to keep lottery preference points when the permit numbers are low.
    - The Department is contemplating some changes in the mentored hunting statutes to encourage more mentored hunting. Mentoring is critical to recruitment. The proposal would allow for a deer taken on a mentored hunt by a mentee to not impact the bag limit of the mentor. Currently, mentored hunting utilizes the tag of the mentor.
    - The legislature asked the Department to look at the division of criminal and civil laws and penalties. The Department is looking to determine if there are any minor offenses that could be moved from the criminal to the civil realm so that we can prosecute them ourselves and/or have more robust prosecutions. This could free up court time and lead to more robust prosecutions even if they are under civil not criminal law. Like the mentored hunting pieces we have outreach to do.
- The next meeting of the Board is planned for January 23, 2019.

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9. Board Member Roundtable Discussion

Motion: Vice Chair Theresa Elmer motioned for the meeting to adjourn. Tim Biebel seconded the motion.

Vote: The Board voted to adjourn by a unanimous voice vote.

The Board Meeting was adjourned by the Chair at 9:45 PM

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The mission of the Vermont Fish and Wildlife Department is the conservation of all species of fish, wildlife and plants and their habitat for the people of Vermont.

APPENDIX

Date: January 29,2018

FOX/LYME DISEASE PETITION

Memo to: FWB

From: Lindzey Beal, Vermont

Re: Moratorium on the sport killing of Red and Gray Fox in Vermont to help protect public health from Lyme Disease and other tick borne diseases.

Based upon my review of Vermont's steady rise in Lyme Disease and other tick borne illnesses and new research regarding the increase of mice population in connection to the decrease of key rodent predators, such as foxes, I request that the Fish & Wildlife Board halt the sport killing (hunting and trapping) of foxes. This proposed moratorium will not impact landowners' rights to kill foxes in defense of property under 10 V.S.A 4828.

Vermont is experiencing a Lyme epidemic and the state should be employing all measures possible to stop the spread of Lyme and other dangerous tick borne diseases. Supported by evidence, this proposed moratorium has strong potential to help reduce human exposure to the diseases contracted by ticks who feed heavily on white-footed mice, a major host. In addition to the comments in my petition, you will find letters from Vermont residents who are suffering from Lyme Disease and are in support of the petition.

As little as 10 years ago the words "Lyme Disease" and "Tick Borne Diseases" were rarely uttered in the Green Mountain State and presented minimal risk to people and animals. Fast forward to 2018 and the threat of Lyme Disease and other tick borne diseases is a completely different story. According to the Vermont Department of Health , in 2015, Vermont had the highest rate of reported Lyme Disease cases in the United States and new cases are steadily rising. In 2017, Vermont was one of the top two states with the highest incidences of Lyme Disease (1). In addition, according to the CDC, Vermont is currently listed #1 in the U.S for confirmed cases of Lyme and is designated as an "Endemic State" (2).

Lyme Disease has spread at an alarming rate in our state, growing from 60 cases of people contracting the disease in 2003 to 500 in 2015. According to The Tickborne Disease Program in Vermont, 763 cases of Lyme Disease were reported in 2016. It is predicted that upwards of 600-700 cases will happen again in 2017 (3). In March of 2017 it was reported that over 50 percent of ticks that were surveyed in Vermont tested positive for Lyme Disease, which means that the majority of tick bites could lead to an illness (4 & 5). According to another study by Doctor Marie J. George of the Infectious Disease Department at Southwestern Vermont Medical Center, upwards of 63 percent of ticks are infected statewide with at least one tick borne illness, with some carrying two at the same time. To put it simply, in the words of Trevor Szymanowski, a Vermont Game Warden since 1999: "The pests used to be of little concern; now they've become a huge problem" (6).

Ticks and Lyme Disease are an enormous public health concern that must be addressed immediately. An efficient and cost effective solution is to work with mother nature rather than against. That means stopping the recreational and commercial killing of foxes, who are the main predator of mice.

According to wildlife specialists, expanded habitats for tick- carrying mice and deer are "mostly to blame for more Lyme infested ticks" (7). There is evidence to suggest that there is a link between the increase of mice populations and activity and the decline of predators that hunt mice, such as, foxes. Although ticks can get infected with Lyme Disease and other tick borne diseases from other animals, the bulk are infected by mice. In fact, mice infect up to 95 percent of ticks that feed on them and "are responsible for infecting the majority of ticks carrying Lyme Disease in the Northeast" (8). There is a high likelihood based on evidence that if we place a moratorium on the recreational/commercial killing of foxes, that we will see a decline in the spread of Lyme Disease and tick borne illnesses. Worried mice tend to stay in hiding and wander less when there is a larger presence of predators, such as, foxes. This increased level of predator activity means the mice will not supply food for the next generation of ticks and the ticks will not become infected.

Foxes not only kill what they will immediately eat, but they kill and cache large quantities of mice for future consumption. What is even more interesting is that a recent study revealed that the very presence of foxes on the landscapes may impede mice mobility. Studies performed by a variety of research groups found that increased predator activity caused mice to spend more time hiding, which means less time roaming and becoming key hosts for ticks. The researchers noted: *"The results suggest that predators can indeed lower the number of ticks feeding on reservoir-competent hosts, which implies that changes in predator abundance may have cascading effects on tick-borne disease risk … Many prey species show decreased movement and increased refuging behavior in the presence of a predator". In addition " A growing body of evidence suggests that Lyme disease risk may now be more dynamically linked to fluctuations in the abundance of small-mammal hosts that are thought to infect the majority of ticks. The continuing and rapid increase in Lyme disease over the past two decades, long after the recolonization of deer, suggests that other factors, including changes in the ecology of small-mammal hosts may be responsible for the continuing emergence of Lyme disease."*(9).

In addition, areas with the highest occurrence of predator activity had one fifth as many ticks and one eighth as many infected ticks (10). The New York Times stresses this fact by stating that locations where there were less red foxes and other small mammal predators saw an increased number of Lyme Disease cases (11). Predators can drastically lower the number of ticks feeding on mice, which calls for the much deserved appreciation and protection of predator species, such as, foxes. This simple solution of halting the sport killing of foxes may have tremendous and lifesaving results for the health and safety of Vermont residents.

Lyme Disease is a serious health threat. Initial signs can include flu like symptoms, such as, fever, fatigue, stiffness and swelling in joints. According to VT Lyme some people can experience long term, debilitating side effects and that includes individuals who have received treatment. Some of these life changing implications include memory loss or the ability to concentrate, mood swings, joint and muscle pain, speech problems and complications with the brain, heart and nervous system. A study by the National Institutes of Health showed that life for people living with Lyme Disease can be similar to living with type 2 Diabetes or a recent heart attack: "There is considerable impairment of health related quality of life" (12). For instance, there have been cases where Vermonters who have contracted Lyme find their daily routine very challenging and must drastically alter their life, such as, leaving their job or school and receiving help with raising their children. Some individuals also become isolated because they have difficulty partaking in social gatherings. Adults are not the only population that face challenges, children with Lyme may display changes that affect their " learning abilities, social interactions, and overall development" (13).

Lyme Disease not only impacts humans, but animals, especially dogs and horses, are also at risk of contracting the illness. Dogs show similar symptoms that people display who have Lyme Disease and the list includes fever, swelling in the joints, swollen lymph nodes, lethargy and loss of appetite. In severe scenarios, dogs may also develop heart disease, central nervous system disorders, or kidney disease. The importance of small mammal predators working to reduce Lyme Disease and other tick borne diseases that stem from mice is irreplaceable.

Unfortunately, Lyme Disease is not the only tick borne disease that affects our state. There are a handful more illnesses that are emerging and spreading fast. One of these tick borne diseases is known as the Powassan virus. While the virus remains rare (but widely untested), experts are concerned it will only grow: “Powassan virus is most definitely here in Vermont,” said Bradley Tompkins, vector-borne epidemiologist with the Vermont Department of Health. Most patients will show signs of a fever and headache, with slightly more serious symptoms including vomiting, weakness and confusion. More serious symptoms can include loss of coordination, speech difficulties, seizures, and eventually meningitis and encephalitis (14).

Anaplasmosis and Babesiosis are two more tick borne illnesses that are being monitored closely and are of great concern. Anaplasmosis is a bacterial illness that can lead to high fever and low white blood cell counts. The rising trend of the illness is troubling: "While the rate of Lyme disease statewide was 394 per 100,000 in

population in 2015, Anaplasmosis is catching up with a rate of 217 cases per 100,000" (15). In fact, the number of anaplasmosis incidences in 2016 was up 45 percent compared to 2015 (The Tickborne Disease Program). Patients who contract Anaplasmosis can have more serious side effects compared to Lyme Disease. For instance, people in Vermont have had brain inflammation and symptoms similar to septic shock; more patients are hospitalized with Anaplasmosis than with Lyme disease because of the severity of illness. Reported in 2016 by The Tickborne Disease Program, 24 percent of all anaplasmosis cases in the state were hospitalized.

To further explain Anaplasmosis and Babesiosis research explains: " Statistics show that the rate of anaplasmosis is steadily rising in Vermont, with significant growth in Bennington County specifically. In 2014 there were 69 reported cases of anaplasmosis in Vermont, with 43 percent of cases in Bennington County. In 2015 the number of reported cases rose to 139 statewide, 63 percent of which were in Bennington County. The Vermont Department of Health estimates that approximately 7 percent of all ticks in the state are currently infected with anaplasmosis.

Also rising in incidence is babesiosis, which has become more prevalent in neighboring states including Massachusetts and Connecticut. Because rates of tick borne illness tend to rise from south to north, experts worry that babesiosis may soon become more severe in Bennington County as well. “More southern states are seeing their numbers increase over the past few years, so we are concerned that Bennington and Windham county may see an increase in the coming years as well,” said Tompkins. “Babesiosis is particularly nasty, and it hospitalizes just about half of the Vermonters that get it. In comparison, about 3 percent of the people that get Lyme are hospitalized, and about a third for anaplasmosis.” Babesiosis is caused by a parasite which targets the red blood cells, and requires a different treatment than Lyme or anaplasmosis, which can often be treated in conjunction" (15). Yearly cases have been low but are slowing increasing- nine cases in 2015 and 15 cases in 2016 (The Tickborne Disease Program).

Recreational killing of foxes, that only serves a small portion of people living in the state, must not take priority over the health and the interests of the general public. According to the North American Fur Auctions 2017 fur sale, red foxes prices are down, with 100 percent of the offering selling for averages of $13.00 to $17.00**.** In addition to red fox fur sales, very few grey fox furs were sold at all. Wearing fur is becoming less popular, which means there is less of a demand. Also, it must be noted that foxes are not killed for food. Hunters and trappers are not intending to feed themselves and their family. Allowing foxes to be killed for "tradition" or "recreation", when they offer the potential to help fight Vermont's Lyme epidemic is not a defensible policy.

A moratorium on the sport killing of foxes is one of the most safe, sensible and effective policies that could be adopted to combat the rise in tick illnesses for several reasons:

- There would be no use of harmful chemicals, which is an immense bonus for everyone's health and safety, including the environment. According to the New York Department of Health, children can often have adverse reactions to tick repellent chemicals. Jay Feldman, executive director of Beyond Pesticides, explains that tick repelling chemicals, such as, bifenthrin and permethrin work by attacking the nervous system of insects. According to Mr. Feldman "the problem is that they also attack the nervous system of species you are not trying to kill-including people, pets and fish. Exposure to these chemicals can result in neurological problems." According to Beyond Pesticides bifenthrin and permethrin cause "acute and chronic health problems, kill bees and harm wildlife. Bifenthrin damages surface water and permethrin damages groundwater."

- We would be allowing nature to create healthy ecosystems by balancing predator to prey numbers, which is vital for all animals and their habitat. Foxes are a key species that help to maintain a healthy ecosystem by managing prey populations, which means their presence is much more valuable alive than

dead. While human intervention can solve some of these issues, it is much better to let predators perform the task they were designed to do.

- Foxes already face numerous threats, ranging from human caused mortality, either due to Vermont's lenient "nuisance" wildlife provision, to cars and domestic dogs. Foxes also have a host of predators from fishers to eagles who prey on fox kits. It does not make sense to add another threat to the fox population that only stands to benefit a small minority of less than one percent of Vermont's total population: " The Department and the Board do a great injustice to the residents of the state as well as future generations, when they manage most wildlife in terms of sustainable "harvest" levels, rather than for the abundant populations that contribute to dynamic, vigorous, and resilient ecosystems", Mollie Matterson, a senior scientist, with the Center for Biological Diversity, based in Richmond, Vermont.

- In addition, our world and state is rapidly changing; habitat loss, warmer temperatures, unpredictable weather patterns, less food sources, and the department continually depends on outdated data and trends to justify their management policies: Dr. Tom Serfass, " I do have a different viewpoint with regards to the validity of current scientific data on *harvesting* animals and the sustainability of specific species. Yes, probabilities of a species' survival will most likely not be affected by the status quo of trapping or hunting. *However*, all information we have at this moment in time about the effects of past animal behaviors and the effects of humankind on wildlife is based on the past 150 plus years of evidence. The planet was very, very different in the past. Even just fifteen years ago, the temperatures of the globe were very different. We had more ice caps, more bees, fewer ticks, fewer humans, etc. Policies of any kind, including trapping and hunting policies, cannot be based strictly on evidence gathered from decades past because that data, quite simply, is becoming irrelevant" (PH.D in Wildlife & Fisheries, Professor of Wildlife Ecology). For example, killing 100 foxes today does not have the same impact as killing 100 foxes fifty years ago primarily because "regeneration possibilities are now clouded and uncertain".

- Vermont Fish & Wildlife has incomplete data on the number of foxes who are hunted or trapped each year. For instance, foxes killed under the nuisance wildlife provision go entirely unreported and those numbers could be significant. When the Vermont Fish and Wildlife Department was asked about the current population of foxes several times they continually refused to answer and could not provide <u>any</u> data: "We believe that the population of red fox has stabilized over the past 10 years, except when diseases such as distemper may influence them in the short term. Gray fox, which are at the northern edge of their range, may actually do better as the climate warms up". The majority of population estimates rely on harvest data from trappers and hunters, which is undependable data. Only 20 percent of hunters and trappers return their surveys. Wildlife populations need to be centered on concrete evidence and data, not based on a *belief*, which is just another way to say a *guess.*

- Overall, interventions, such as, culling the deer population, coating lawns or using body sprays that contain tick killing pesticides have made minimal differences in lessening the spread of ticks and ultimately end up being a short term solution. Interventions like protecting foxes or factoring the habitat needs of particular predators into land use decisions to advance their population is getting to the root of the problem, as opposed to quick fixes.

In conclusion, the health benefits of establishing a moratorium on the sport killing of foxes to the entire population of Vermont far outweigh any recreational benefits experienced by a small fraction of Vermonters. No one can equate the price of a fox pelt with the cost of bearing Lyme Disease or other tick borne illness. Taking a modest, evidenced-based step to assist our state in arresting the rapidly rising rate of tick borne diseases is well worth the time and effort of the Board.

Sources:

1. 24/7 Wall Street: Samuel Slebbins, July 2 2016

2. VT Digger: Bradley Tompkins- Infectious Disease Epidemiologist at the Vermont Department of Health, August 24, 2017 and Vermont Lyme: Rebecca Zelis, March 16, 2017-"Report for the Legislature"

3. State epidemiologist Erica Berl, D.V.M., M.P.H. from the University of Vermont and Burlington Free Press: Carly Dawson, March 13, 2017

4.My Champlain Valley: Alan Graham- Entomologist in Vermont, March 31, 2017

5. VT Digger: Bradley Tompkins- Infectious Disease Epidemiologist at the Vermont Department of Health, April 24, 2017

6. Burlington Free Press: Trevor Szymanowski- Vermont Game Warden with the VT Fish & Wildlife Department, May 15, 2017

7. North Country Public Radio: a state infectious disease specialist, March 13, 2017

8. NPR: Rick Ostfeld and Felicia Keesing- both studying Lyme Disease for over 20 years and Keesing is an Ecologist at Bard College, March 6, 2017

9. Royal Society Publishing (Biological Sciences): Tim R. Hofmeester and many additional experts on the "Cascading effects of predator activity on tick-borne disease risk", June 16, 2017

10. Times Herald: Michael Eckert, August 17, 2017

11. New York Times: Dr. Levi- Ecologist at Oregon State University and Richard S. Ostfeld- Senior Scientist at the Cary Institute of Ecosystem Studies , June 8, 2012

12. VT Lyme: National Institutes of Health (NIH), 2016

13. VT Lyme: 2016

14. VT Digger: Konstance Knox- a virologist, microbiologist and founder of Coppe Laboratories in Waukesha, Wisconsin, May 7, 2017

15. Bennington Banner: Doctor Marie J. George of the Infectious Disease Department at Southwestern Vermont Medical Center, April 24, 2017

DEPARTMENT OF FISH AND WILDLIFE LYME DISEASE PRESENTATION

Red Fox and Lyme Disease – Is there a Connection in Vermont?

October 2018

Background

In January 2018 the Vermont Fish and Wildlife Board received a petition to eliminate the hunting and trapping of fox "to help protect public health from Lyme disease and other tick- borne diseases." The petitioner was driven by the belief that the current level of harvest impacts the fox population and, consequently, that of small mammals, in particular, the white-footed mouse, one of the reservoirs of Lyme disease. The Board asked the Vermont Fish and Wildlife Department (VFWD)to review the current literature on the subject and report back to them at the October 2018 Board meeting.

Recommendation

After a thorough review regarding the influence of Vermont's red fox harvest on the prevalence of Lyme disease in the state, the VFWD finds no compelling evidence that the current rate of harvest of red fox is influencing the presence, distribution, or prevalence of infected black-legged tick (deer tick) on nymphs, the primary driver of Lyme disease. There are however, other meaningful strategies that may lesson the effects of Lyme disease which are listed at the close of the report.

Introduction

The petition required a thorough analysis of numerous complex interacting environmental relationships. In response, the Vermont Fish and Wildlife Department convened a team of scientists to work with the Vermont Department of Health in evaluating the breadth of factors influencing Lyme disease in Vermont. Department staff involved in the evaluation included Dr. Katherina Gieder, biometrician and research scientist, Kim Royar, furbearer biologist, Chris Bernier, assistant on the furbearer project, Nick Fortin, deer biologist, and Scott Darling, wildlife program manager. In addition, Dr. Bradley Thompkins, Epidemiologist and Program Chief, of the Vermont Department of Health provided expertise on the disease in Vermont.

Lyme disease, and the increasing trends in tick-borne illnesses, are a significant concern to all Vermonters, and therefore the VFWD recognized the value of an in-depth evaluation of those species under its purview and their relationship to these diseases. There are likely many interacting factors made more challenging to identify due to the number of predators on small mammals in Vermont including, but not limited to, bobcat, fisher, coyote, red and gray fox, weasels, hawks, owls, and snakes. This evaluation included a thorough literature review of the factors influencing Lyme disease in the state, collection of other VFWD data on related factors, analyses of fox harvest data and densities in Vermont, and recommendations on how the VFWD's management programs can contribute to State of Vermont efforts to address the disease.

The dynamics influencing the increase of the black-legged tick (*Ixodes sacpularis*) and subsequently Lyme disease in the region are incredibly complex. To date, it is difficult to speculate which of the many potential variables have had the greatest influence on the spread of the disease in New England. It is more likely that a combination of some, or all, of the multiple factors listed below

(and perhaps some that have yet to be identified) have fueled the spread of the disease in Vermont. Following a description of the epidemiology (i.e., incidence, distribution, and possible control of diseases) of Lyme disease, this report evaluates the environmental factors below that could play a role in the presence and prevalence of Lyme disease in Vermont. They include:

1. Climate change
2. Habitat fragmentation
3. Invasive plants
4. Mouse population dynamics
5. Predators (including terrestrial and avian)
6. White-tailed deer densities

Lyme disease across Vermont Health Department Assessment

Lyme disease is becoming increasingly common in Vermont. When the state first started tracking the disease in 1990, fewer than 20 cases a year were reported to the Health Department. In 2017, the Health Department investigated over 1,000 reported cases. This increase has been driven by two general trends. One, a greater number of cases have been reported in parts of the state where Lyme disease has been common for several years. Two, cases have generally spread northward into parts of the state where Lyme disease was once rare.

Lyme disease is caused by an infection with bacteria called *Borrelia burgdorferi*, which is spread to humans through the bite of an infected blacklegged tick (*Ixodes scapularis*). These tick vectors are not born carrying *Borrelia burgdorferi*, instead they get infected early in their life cycle while feeding on animals that have the bacteria circulating in their blood. Small mammals that are common to Vermont, like the white-footed mouse (*Peromyscus leucopus*) and eastern chipmunk (*Tamias striatus*), are particularly well-suited to having the bacteria circulate this way, making them important reservoirs for Lyme disease. Because this interaction between reservoirs and vectors is crucial to maintaining Lyme disease in nature, factors that impact these animals, like habitat change, weather and food availability, can have an impact on human Lyme disease trends.

The potential influences on the spread of Lyme disease

A. *Climate Change:*

Climate change in the Northeast is predicted to result in rising temperatures and increased precipitation both of which could have a positive influence on tick nymph densities. It is believed that tick developmental phases will shorten with increasing temperatures (Ogdon 2006). In addition, warmer winters could increase the survivability of ticks, thus affecting the number of Lyme disease cases. Although, Brunner et al. in New York (2012) found that more than 80% of ticks survived the winter regardless of conditions. Werner et al. (2014) found that the warming climate was influencing the expansion of ticks into southern Ontario where they found higher than average minimum summer temperatures at ground level positively correlated to tick abundance.

The VFWD has collected winter severity data (WSI) for the last 30 years (number of days the temperature is below 0 degrees and snow depths are deeper than 18 inches). Figure 1 shows the declining trend in the overall statewide winter severity index since 1970.

Many other human pathogens such as malaria, yellow fever, dengue fever, and tick-borne encephalitis have also increased in either numbers or range (Harvell et al, 2002) over the same period. Although climate change has yet to be scientifically implicated, field and laboratory studies suggest a link based on the fact that (1) lower temperatures tend to increase the mortality of some vectors, (2) higher temperatures could increase vector reproduction and biting and (3) infection rates may also increase as temperature rises (Patz et al., 1998).

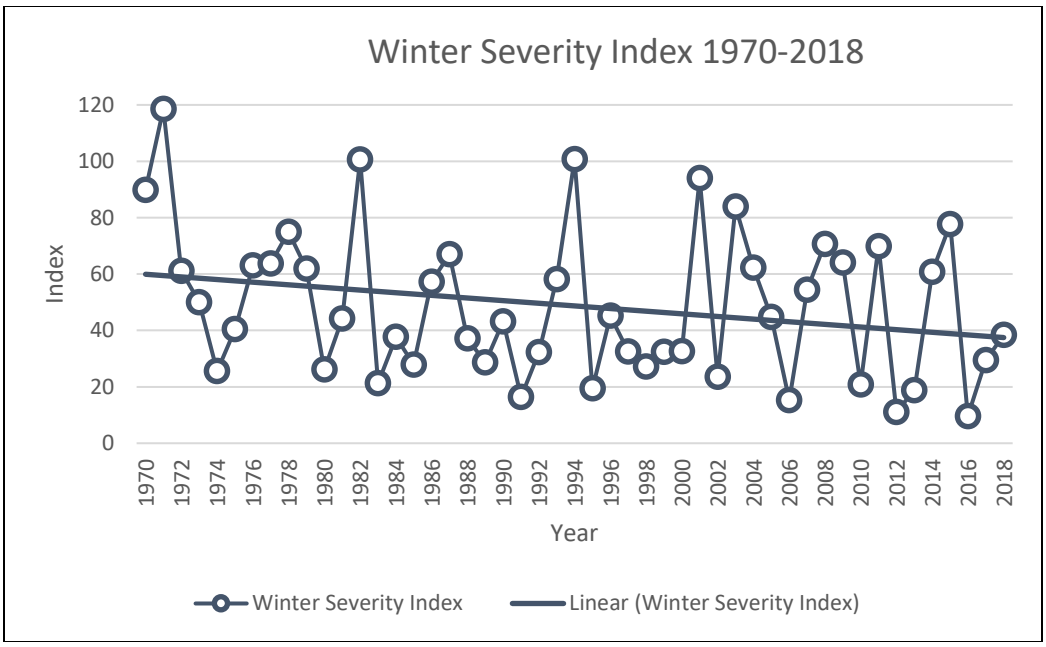


Figure 1. Vermont winter severity index 1970-2018.

B. *Habitat Fragmentation:*

Lyme disease has been found to be most prevalent in areas where "suburban and exurban development encroaches on deciduous forest ecosystems" in the northeastern U.S. (Ostfeld 2006). This could be linked to the fact that studies have found that both white-footed mice and deer mice populations are more abundant at the edges of woodlots than in interior forests suggesting that the parcelization, fragmentation, and development of our core forests could have a significant impact on the number of mice and ultimately the number of Lyme disease cases. Vessey (2007) found that smaller, isolated, forest patches often supported higher densities of small mammals. These smaller patches tend to concentrate mouse populations because dispersal is more difficult than between larger and/or interconnected patches (Nupp and Swihart, 1996).

These findings are in line with what has been found in other states around the country. Schmidt and Ostfeld have created the computer simulated graph (Figure 2) which suggests that as vertebrate diversity and species richness increases, the risk of Lyme disease decreases. Large,

intact forest blocks tend to support a much healthier and diverse number of native species and a limited number of invasive plants. Allen et al. (2003) concluded that "the incidence of Lyme disease is particularly high in regions where dense human habitation is juxtaposed with forest habitat that supports tick vectors and their hosts (Barbour & Fish 1993). Results suggest that efforts to reduce the risk of Lyme disease should be directed toward decreasing fragmentation of the deciduous forests of the northeastern United States into small patches, particularly in areas with a high incidence of Lyme disease. The creation of forest fragments of 2.5 to 5 acres (1–2 ha) should especially be avoided, given that these patches are particularly prone to high densities of white footed mice, a low diversity of vertebrate hosts, and thus higher densities of infected nymphal blacklegged tick." Researchers (Allan et al 2003) speculate that the loss of biological diversity world- wide is related to an increase in the risk of infectious disease in humans.

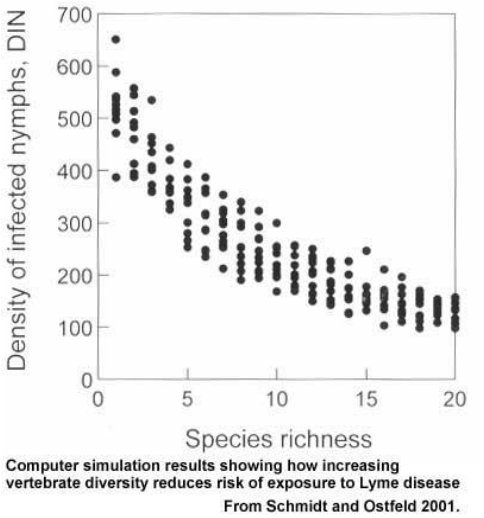


Figure 2. The relationship between species richness and the density of infected nymphs.

C. *Invasive Plants*:

Two non-native barberry species, Japanese barberry (*Berberis thunbergii*) and common barberry (*Berberis vulgaris*) have been implicated in the increase of black-legged ticks in forest environments. Barberry was introduced into the United States in the late 1800s as an ornamental and landscaping plant. It has adapted to the forests of New England and in recent years has become naturalized in many of our wooded environments. It is now a noxious invasive that can, with the help of deer who do not find it palatable, out-compete native regeneration. In addition, stands of barberry create perfect, humid environments for ticks. Dr. Scott Williams (2009) a professor at the University of Connecticut, has studied tick densities in barberry and has found that in areas where barberry is not controlled there can be upwards of 120 ticks per acre infected with the Lyme spirochete *(Borrelia burgdorferi)*. In areas where barberry has been contained, there were 40 infected ticks per acre, and only 10 infected ticks per acre where there was no barberry.

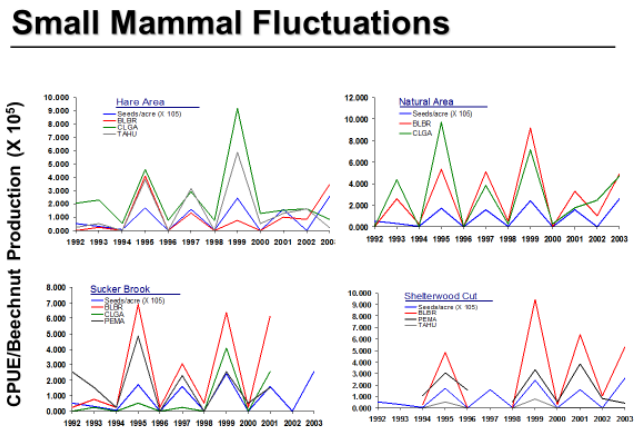
Barberry also provides excellent habitat for the white-footed mouse which efficiently distributes immature ticks over a wide area. The dense impenetrable stands of thorny plants protect mice from predators and provide excellent nesting areas.

Midwestern researchers (Allen et al. 2010) have studied the relationships among invasive honey suckle, white-tailed deer, and the abundance of lone star ticks. This study found that deer seek out dense stands of honey suckle to bed in because of their dense structure. In fact, they found stands of honeysuckle to be 18 times denser than native vegetation. In addition, honeysuckle is the first to leaf out in early spring and the last to lose its leaves in the fall which may create a unique microclimate for both deer and ticks. In his study, Allen (2010) removed honeysuckle and found that in the habitats restored to native vegetation the risk of exposure to tick pathogens was 10 times less than in those stands of dense honeysuckle. There are four invasive species of honeysuckle in Vermont and anecdotal information suggests that they also support high densities of the black-legged tick. The increase in non-native invasive plants has very likely influenced both the increase in small mammals, as well as, the increase in Lyme disease, at least in localized areas.

D. *Mouse Population Dynamics:*

Populations of small mammals fluctuate cyclically (Oli 2001). Although the driving forces behind these cycles is still not completely understood, it is believed that factors such as food, qualitative changes in individual animals, and/or predation can play a role in some species (voles, lemmings, and snowshoe hare). Many studies point to mast production as the driving factor in determining small mammal population densities. Krebs (1994) found that the exclusion of predators, although improving the adult survival of lemmings, was not sufficient to mitigate population declines due to the loss of juveniles. Several researchers have experimentally removed predators from islands in the Baltics and Finland and found "no significant effect on the abundance of voles during two cycles" (Krebs 1994).

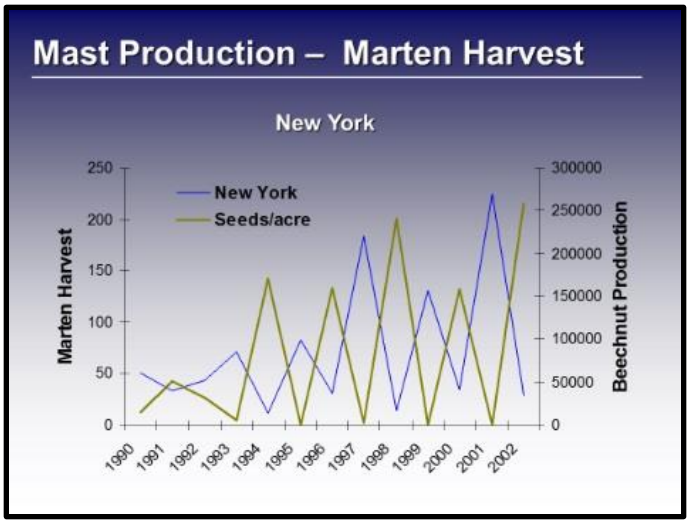
Ostfeld et al. (2006) also found that the strongest predictors of Lyme disease risk were the previous year's abundance of mice and chipmunks and the abundance of acorns 2 years previously. In other words, mast crops influence the density of small mammals one year later and the incidence of Lyme disease two years following that. **Ostfeld did not, however, advocate "cutting all the beech and oak to control rodent populations and minimize the risks of Lyme disease nor based on the evidence would he advocate to curtail all hunting and trapping of predators."** The graph below (Figure 3) demonstrates the influence of mast on small mammal populations. It is clear from this work done in New York, New Brunswick, and Maine (Jensen et al 2012), that small mammal populations are driven by the production of mast including acorns and beechnuts.



Paul Jensen (unpublished)

Figure 3. Small mammal densities and beechnut production.

Jensen et al (2012) found that between 1994 and 2006, beech mast production in New York, Maine, and New Brunswick was highly synchronized in an alternate year pattern. The resulting large pulses of available food every other year influenced the following summer small mammal populations of deer mice, red-backed vole, red squirrel, northern flying squirrel, and short-tailed shrew creating large fluctuations in their populations and resulting in a "bottom-up effect on the community." In addition, they found that marten and fisher experienced similar population fluctuations that were both immediate and time-lagged (Figure 4).



Paul Jensen (unpublished)

Figure 4. Mast production and harvest of pine martens in New York.

Some studies are available that provide density estimates of mice of the Peromyscus genus, or specifically its species most closely associated with Lyme disease, the white-footed mouse. A study in an isolated woodlot in Ohio concluded that female white-footed mice are territorial and defend a home range of approximately 500 m^2 (Vessey et al 2007) which, in appropriate habitat,

could allow for 20 breeding females every 2.5 acres (1 ha) or 8 per acre. Vessey estimated that peak mid-summer populations of white-footed mice in this woodlot reached upwards of 40 mice per acre (100/ha). One other study estimated that summer population densities may reach 15 mice/acre (37/ha) (Timm and Howard, 2005).

As stated above, Peromyscus population cycles tend to be influenced by mast production. Vessey (2007) found that in years of low mast production (less than 5 nuts per m^2) the spring Peromyscus population was never more than 20 per 5 acres (2 ha; 4/acre) and summer not more than 100 per 5 acres (2 ha; 20/acre). If we assume a summer average of 15 mice/acre (likely a low estimate as numbers could be exponentially higher following high mast years) and we accept that the average town in Vermont is 30 mi^2, then we could theoretically (and conservatively) extrapolate the summer mouse population for each town to be upwards of 288,000 mice. If one fox eats an average of 5,500 mice/year than the removal of 2 to 4 foxes/town (likely a higher harvest than what we experience in Vermont) would have a negligible effect on the mouse population leaving upwards of 277,000 to 266,000 mice/town. The impact would be even less in fragmented landscapes as Peromyscus densities go up as forest patch size goes down (Nupp and Swihart 1996) adding credence to the hypothesis that fragmentation increases the potential for Lyme disease (see below).

E. *Predators:*

It is likely that as the wolf and puma were extirpated and Vermont's forests were cleared, the numbers of the more adaptable bobcat and red fox increased. Therefore, it is very possible that throughout the late 1800s and first half of the 1900s we had more red fox and bobcats than we have today. It has become accepted that competition and/or avoidance behavior exists between the various canid species (Voight in Novak, 1987) both for territory and food. Therefore, larger predators (coyotes, wolves, pumas) can functionally limit the population of meso predators such as red fox and bobcat. In Vermont, most of the predator species that currently live here eat a variety of small mammals including coyotes as confirmed by a food habits study conducted by Dr. David Persons in the 1980s. (Figure 5)

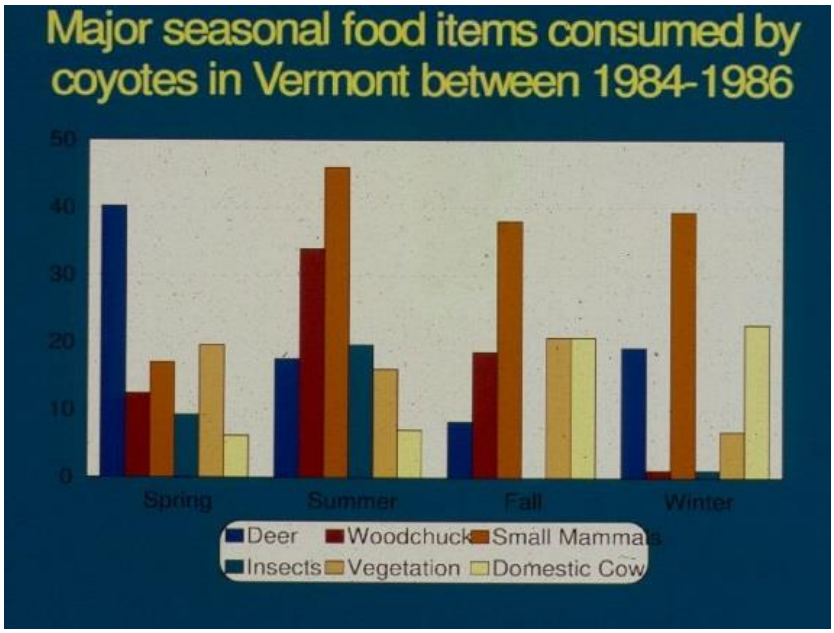


Figure 5. Coyote foods by season in Vermont (left to right spring, summer, fall, winter).

Hofmeester (2017) has postulated that predators can influence the rates of Lyme disease either by reducing the density of hosts or by influencing the behavior of prey (i.e. reduction in small mammal activity reduces the encounter rate with ticks). In addition, he speculates that small mammals that move more frequently and further, are likely to have a higher number of ticks and also an increased risk of predation thus essentially eliminating animals that are highly infested. He speculates that changes in predator abundance can have a cascading effect on tick-borne disease risk (Hofmeester et al. 2017).

Levi et al. (2012) also suggests that the increase in the incidence of Lyme disease in the Northeast is related to the "rarity" of red fox due to the expansion of coyotes into the region. Way and White (2012) disputes this hypothesis based on a variety of criteria including that coyotes also eat small mammals and that both red fox and rodent populations fluctuate due to outside factors (e.g., weather, disease, mast). In addition, the potential effects of fragmentation, climate change, and invasive plants, as well as, the fact that predator species have shifted over time from the original inhabitants: eastern Canadian wolf and the gray fox to coyote and the red fox are also factors that point to a much more complex relationship here in the Northeast, than what has been outlined by both Levi and Hofmeester.

Red fox are generalist predators although in Ontario meadow voles constituted up to 50% of the fox's diet. Mice, woodchucks, rabbits and snowshoe hare can also be important prey species along with a variety of birds, eggs, fruits, and insects. Captive fox pups have been known to require 3 to 4 pounds of prey/week (60-80 mice/week; 3,159-4,212/year), older pups 5.5 pounds (111 mice/week; 5,792/year), and adults 5 pounds/week (100/week; 5,265/year). (Sargeant, 1978).

As wildlife managers it is important to understand the factors that can influence predator populations and the role that hunting and/or trapping might play in altering those populations,

if at all. Recognizing the value of predators and managing for sustainable populations is the responsibility of the Department and one we take very seriously. Maintaining healthy, intact ecosystems in the face of increasing development, fragmentation, habitat loss, and climate change has been a focus of many of the Department's efforts for the last 30 years. The result, thankfully, has been a healthy and intact system in Vermont. In fact, many of our predator populations are more common today than they were prior to European settlement (coyote, gray fox, bobcat, fisher) and many hawks and owls have recovered from the significant mid-20th century decline as a result of the wide-spread application of DDT.

F. *White-tailed deer populations:*

White-tailed deer are an important host of adult blacklegged ticks, and several studies have suggested a correlation between deer abundance and tick abundance (e.g, Kilpatrick et al. 2014, Werden et al. 2014). However, deer themselves are not susceptible to Lyme disease and are not a competent reservoir of the disease (i.e., a tick cannot become infected by feeding on a deer). Efforts to control deer abundance to reduce tick abundance have shown mixed results, but evidence linking deer reduction to reduced human Lyme disease risk is lacking (Kugeler et al. 2015). Most of these studies reduced deer abundance from extremely high densities (50->200/mi^2) to the higher end of densities currently found in Vermont (20-30/mi^2). Additionally, Ostfeld et al. (2006) found that once deer densities met a relatively low threshold, further increases in abundance had little, if any, effect on the densities of the nymphal stage of ticks. Rather, Ostfeld, suggests that as stated above, productive mast crops drive increases in rodent populations which then gives rise to an increased density of nymphs the following year. Importantly, the rapid increase in Lyme disease over the past two decades has not coincided with any substantial change in deer abundance in Vermont.

Fox Population Dynamics

Fox Life History

There are currently two species of fox inhabiting Vermont, the red fox (*Vulpes vulpes*) and the gray fox (*Urocyon cinereoargenteus*). The red fox is the larger of the two species and is found in a variety of habitats but in the Northeast are generally associated with agricultural habitats. The gray fox, on the other hand, is more often found in wooded, brushy, or rocky areas (Fritzell in Novak 1987).

The original European settlers arriving on the eastern shores of the United States may not have encountered the red fox as it was absent from much of the area (possibly including most of Vermont). The native gray fox inhabited the deciduous forests of the eastern states north to Vermont and New Hampshire. Some speculate that prior to European settlement, the southern limit of the red fox was the Vermont/Massachusetts border while others suggest that red fox were not found south of the Canada/Vermont border.

As the forests of Vermont were cleared in the 1800's; however, Zadock Thompson writes in his book: **The Natural History of Vermont** in 1853 that red fox were the most common fox and that "*the gray fox Canis virginianus', is said to have been taken in this state, but as I have seen no Vermont specimen, it is here omitted."* It is likely that the agriculturally adapted red fox spread southward and became more common in the early and mid- 1800s likely as a result of the drastic human-caused shift in habitat

from forest to farm, and the consequent elimination of other competing predators such as wolves and mountain lions. Zadock Thompson's 1853 assessment may have been, at least in part, due to the drastic changes that occurred on the landscape in the 50-60 years prior to his assessment. In fact, there was a bounty on fox in Vermont on and off between 1832 and 1904 with little effect on the population.

To complicate matters further, European red foxes were introduced by settlers and, until relatively recently, some believed that the current eastern fox population was the result of interbreeding with these introduced animals. However, recent genetics analysis of the mid-Atlantic fox population suggests that the matrilineal ancestry of the east coast population is related to those in Eastern Canada and the Northeast (Stratham, et al. 2012) and not to the old- world red fox. Although red fox are also native to the high elevation boreal regions of the western United States, they were not found in the lowland areas there prior to European settlement. Genetics work by Stratham (2012) found that some of the fox populations in the northwestern United States are related to the native fox. However, they also found that populations in western Washington and southern California both contained haplotypes from other continents, perhaps a remnant of the fur farms that once existed there. These potentially non-native animals threaten many native species, particularly ground nesting birds. In response there have been long-term attempts in parts of the west to eradicate them (Kamler and Ballard 2002).

Today, the red fox is the most widely distributed carnivore in the world and exists throughout most of North America, Europe, Asia, and Australia where it was also introduced (Voigt in Novak et al. 1987). The species is regarded both as a nuisance and as a valuable predator by disparate publics around the world. It is an extremely adaptable species that is resilient to both human changes to the landscape, as well as to intense harvesting and, in cases where they have been introduced, eradication attempts. Like other canids, red fox populations subject to high losses (e.g., hunting, trapping, rabies, gassing, road kills) experience an increase in fecundity rates. The Province of Ontario has documented as many as 14 to 17 pups in a litter in areas where populations are impacted by rabies and high harvests. This is much higher than the average litter size of 3 to 6 pups.

Predators are an important part of the ecosystem for the many complicated roles they play in maintaining landscape diversity. It is likely that in Vermont, fox populations, along with bobcats increased after European settlement resulted in the elimination of wolves, mountain lions, and lynx and the clearing of 65%-70% of Vermont's forest habitats. The more resilient red fox and bobcat increased in number in response to the elimination of these top predators. For many years we had an unusually high number of these two meso carnivores in Vermont. Reduction in deer numbers, the maturation of the forest, and the immigration of coyotes all contributed to a realignment of these species more in line with what might have existed prior to European settlement.

The Department does not dispute that a severe reduction of predator populations to the point of "rarity" could influence small mammal populations and potentially other competing predators. However, today, species that are legally trapped and hunted are common and abundant and it is the Department's mission to maintain populations at levels that allow them to be enjoyed by all Vermonters. Many predator species have increased in the last 30 to 40 years including coyote, fisher, marten, and bobcat in the face of hunting and trapping pressure. In addition, many other predators such as hawks, owls, snakes, weasels, red and gray foxes, and mink, are well distributed and common across the landscape.

How many fox do we have in Vermont and how are they distributed?

In 2017, the USDA Wildlife Services estimated Vermont's red fox population to be slightly more than 5,000 animals. This is a very conservative estimate as it is based on the assumption that only 50% of the landscape (agricultural regions) functions as fox habitat. It is true that these areas may support the highest density of red fox in the state. However, we know from lynx and marten camera studies conducted in recent years by a PhD candidate (Alexej Siren, unpublished) on the Green Mountain National Forest (USFS) and in the Northeast Kingdom, that fox are not "rare" but are well distributed and common throughout these areas as well (Figure 6).

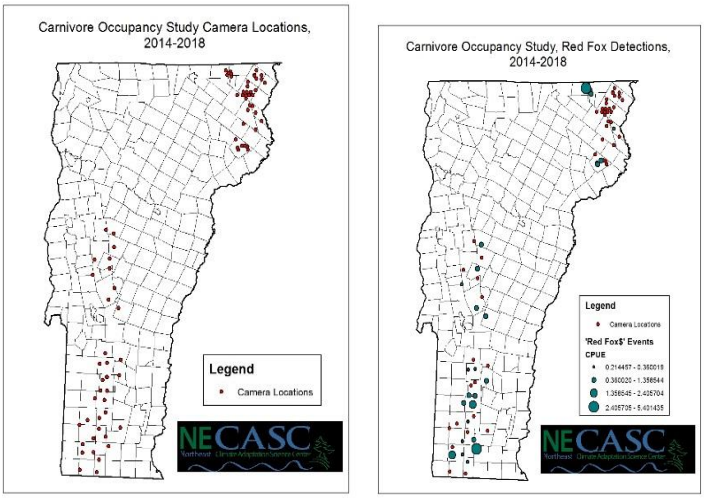


Figure 6. Camera (left) and Fox (right) distribution within the Green Mountain National Forest and the Northeast kingdom of Vermont.

Voight (Novak 1987), a leading researcher of red fox in Ontario, acknowledges that "accurate estimates of fox population size are not feasible for most areas". He did however, after 6 years of intensive research into fox family numbers, estimate the population in the southern part of the Quebec Province to be around 2.6 fox/mi^2 during the spring (Voight in Novak, 1987). In areas of good habitat, he observed up to 3 times this estimate. If we apply the same densities in Vermont, an average town could potentially support approximately 78 red fox in average habitat and upwards of 234 in pockets of high-quality habitats. If we extrapolate these average town densities to determine a statewide population estimate, we could expect close to 3 times the Wildlife Services estimate of 5,000 red fox. However, competition from coyotes likely limits these reported densities in most areas of the state and therefore the statewide population is likely somewhere between 5,000 and 10,000 animals.

<u>Factors Affecting Fox Populations:</u>

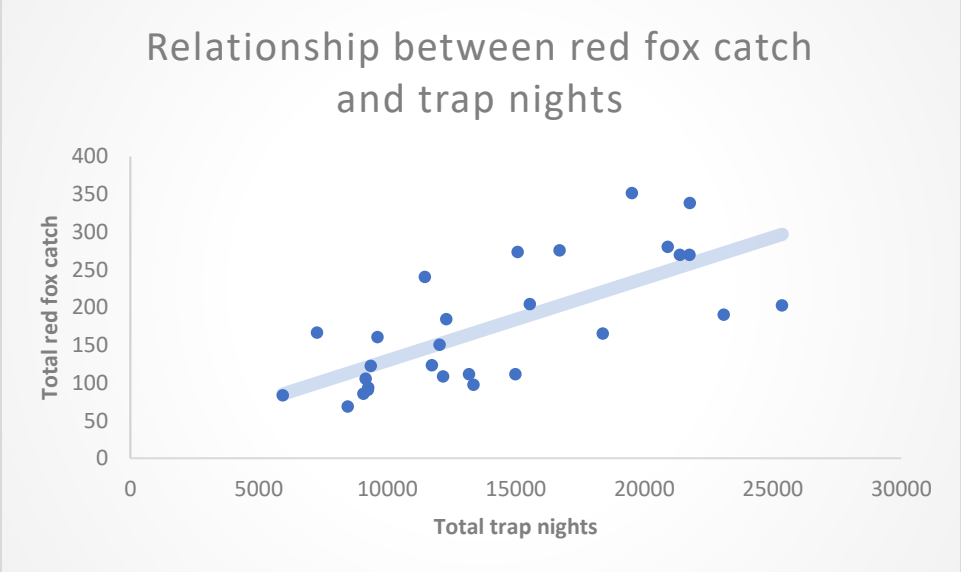
A. Trapping and Hunting in Vermont

The large variety of habitats that red fox can thrive in and the wide range of different sizes of habitats they call home (Walton et al. 2017) make it impossible to accurately estimate red fox populations without exorbitant funds and time investment. State agencies have limited capacity and must be strategic as to where to focus their time and effort. The best and only indicator of red fox populations that currently falls within the limited resources of Vermont

Fish and Wildlife is catch per unit of effort (or CPUE) data collected from an annual trapper mail survey. CPUE trends over the long term can inform our knowledge of general population patterns that we can analyze in conjunction with trends in trapping activity. From this information, we can infer the following: 1) long-term sustained population changes; 2) short-term population changes associated with changes in food sources or disease outbreaks; and, 3) large scale changes across multiple states and regions.

Analysis of CPUE patterns thus far indicate that the red fox population in Vermont likely fluctuates widely from one year to another, which is not surprising given that the main food source for red fox, small rodents, tend to be characterized by cyclic population changes (periods of population booms followed by busts and back again). CPUE values also do not show any linear trend over time. In other words, the population as indicated by CPUE trends is not experiencing any sustained population increase or decrease that can be detected by any statistical model. A linear regression of CPUE trend over time reveals a statistically valid decline over time of approximately 0.00023 red fox per trap night every year. However, the variation in these CPUE values, and the small sample sizes from a low number of trappers, makes a linear regression analysis completely invalid for assessing red fox population trends. Tests of model assumptions, including values of R^2 (0.20) and residual plots (clear grouping pattern), clearly indicate that CPUE do not follow any sort of linear trend over time. Instead, they appear to undulate over the long term, increasing and decreasing due to a variety of large-scale factors, such as small rodent populations, disease, and competition with other predators, most notably coyotes as recent research has highlighted.

Correlation analyses between trap nights and red fox catch indicates a strong relationship (correlation coefficient of 0.71), meaning that as trap nights increase, red fox catch also increases proportionally.



If trapping were affecting red fox populations, you would expect a weaker or even negative correlation because catch may go down or at least not increase as proportionally as trap nights increase. Presumably, this correlation is strong because there are plenty of red fox

available for trapping every year, even though their populations may fluctuate in a non-linear fashion. These results align with long- and well-established understanding that red foxes are an incredibly flexible species that have highly adaptable diets, habitat needs, behavior, and socialization, as described below.

There appears to be no particular trend over time in CPUE for gray fox. In addition, statewide harvest numbers are so low (59 in 2017; 21 in 2016) that the influence of harvest on population densities is likely insignificant. Perhaps as importantly, there is no evidence in the literature connecting gray fox to white-footed mouse populations or Lyme disease.

A. *How does the harvest of fox influence the population*?;

Red fox are an incredibly resilient species. They are among the most flexible of species when it comes to where they live, what they eat, how they behave, and how they socialize (Cavallini 1996, Baker et al. 2000). This flexibility has enabled red foxes to inhabit the entire northern hemisphere from arctic to temperate climes, in a wide range of different habitats from thick forests to dense cities (St-Georges et al. 1995, Contesse et al. 2004). Their ability to modify their diets, behaviors, and social structures also makes them very resilient to large sustained changes in their populations. Previous efforts to reduce red fox populations in places where they have been introduced and are considered a non-native invasive species have found that multiple year efforts to control or eliminate the species have been unsuccessful.

For example, efforts to control the non-native red fox in Australia were unsuccessful even in the face of an annual removal of 50% of the population through trapping. These researchers (Harding 2001) found that "trapping did not cause the collapse of local fox populations and was unlikely to result in long-term declines."

Another study conducted in Western Australia found that density reduction in fox populations resulted in increased reproductive rates (Marlow et al., 2016) which is in keeping with what has been found by other researchers. Layne and McKeon (1956) found that even after a reduction of 64-76%, red fox populations were able to achieve full recovery in one year through changes in reproductive rates and increased immigration both of which are thought to undermine attempts to control or limit non-native fox populations. Lieury et al (2015) also found that harvesting fox during the pre-dispersal period, resulted in a return to the original population density by the following February. The removal of an average of almost 2 foxes/.38 mi^2 (km^2)/year over a 5-year period, did not result in a significant reduction in density over time. This is the equivalent of removing 158 fox in each town in Vermont each year for 5 years and a total statewide harvest of 39,632 animals.

Voight (Novak 1987) summarizes the resiliency of native red fox in the following statement:

> "The high fecundity and dispersal potential of foxes enable populations to withstand a high level of mortality. Even if the use of poisons and gas (illegal in Vermont) concurrent with a rabies outbreak decimated numbers, ingress and high reproduction would soon follow. Habitat destruction that reduces prey numbers will lower fox numbers to a greater extent than a short-term overharvest will. Gassing efforts have been widespread and persistent in

> Europe, but they have had few long-term effects on fox numbers (Wandeler et al. 1974). …. the adaptability of red fox overrides the relatively small manipulation of populations through [harvest] management. In local areas, competitors such as coyotes or gray foxes, or diseases such as rabies, can have a great impact and are relatively uncontrolled."

B. *What other factors affect fox populations*?

Wildlife managers and researchers have all documented the cyclic nature of red fox populations even in the absence of intensive harvest or aggressive control efforts. While a clear understanding of all of the factors involved in influencing these cycles is still uncertain, many suspect that diseases such as mange, canine distemper, canine parvovirus, and rabies often play a role (Albmurg et al. 2009 in Way and White). In places where rabies is a factor, mortality of 60-80% has been documented during outbreaks (Voight et al. 1985). Although it is speculative, it is also possible that fox populations, like other predators such as marten and fisher, respond to the cyclic nature of mast crops and the subsequent boom and bust cycle of small mammals.

In the last half century, Vermont's red fox populations have been significantly influenced by the immigration of coyotes into the state. Many studies have documented competition and/or avoidance behavior between the various canid species (Voight in Novak, 1987, Ingalls, 1990). Research done in Vermont in the 1980s on coyote, red and gray fox, found the home range of red fox to average .77 mi^2 (Ingalls, 1990) smaller than what was reported in mid-western and eastern states at that time. Ingalls also found that "Red fox and coyote home ranges were largely mutually exclusive". Coexistence with coyotes appeared to be the result of two different avoidance strategies. Both red and gray fox maintained similar separation distances from coyote core areas. In addition, red fox home ranges were located in boundary areas between coyote group home ranges, thereby maintaining spatial separation from coyotes. According to Ingalls: "Gray fox, on the other hand, overlapped coyotes to a greater degree on a spatial basis, but avoided coyote core activity areas and avoided coyotes on a temporal basis, probably through behavioral means." It is unclear whether the fact that gray fox can climb trees plays a role in the overlap. In addition, there has been some evidence that gray fox, though smaller, actually out-compete or dominate the red fox in some parts of its range (Follman, 1973).

Factors affecting red fox mortality have shifted in the last 30 years in the Midwest as a result of changes in interactions with coyotes, humans, and habitats. During this time, trapping and hunting furbearers decreased two-fold nationwide (International Association of Fish and Wildlife Agencies 1992). During that same period coyotes have expanded their range and agricultural practices in the Midwest have resulted in increasing degradation of quality fox habitat. Gosselink (2007) hypothesized "that red fox survival and sources of mortality have changed over the past decades due to changes in coyote prevalence, hunting and trapping pressure, and habitat alterations." Fox mortality studies done in both urban and rural Illinois, found that of 335 radio telemetered rural foxes, 40% were killed by coyotes, 40% by vehicles, 7% from hunting, 2% from mange. Conversely, 45% of urban foxes died from mange and 31% from vehicles (Gosselink, 2007).

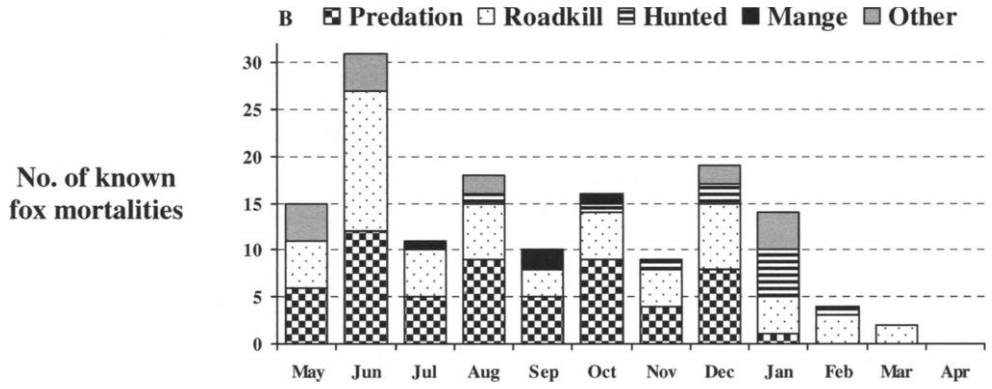


Figure 8: Mortality sources and timing for rural foxes in east central Illinois (Gosselink 2007).

Gosselink (2007) concluded that coyote predation had essentially replaced hunting mortality since the 1970s. In addition, vehicle mortality was higher in rural fox populations than in urban areas. The researchers speculated that coyotes pushed foxes into using denning sites closer to the human interface (e.g., road culverts) where they were more vulnerable to vehicle mortality.

In regions where mortality is high (i.e., from hunting, trapping, disease, road kills), reproductive rates are correspondingly high as well, while some urban areas in Great Britain with extremely high densities and lower mortality (78 fox/mi^2) have much lower fecundity rates (Voight and MacDonald, 1984 as sited in Novak).

Recommendations

The VFWD manages and conserves Vermont's wildlife species in trust for the people of Vermont. This includes the varied public interests in Vermont's wildlife, as well as, ways to address public health, safety, and quality of life. For this reason, the VFWD has conducted this in-depth evaluation of the various environmental factors influencing the presence and prevalence of Lyme disease in the state.

After a thorough review of the petition's concern regarding the influence of Vermont's fox harvest on the prevalence of Lyme disease in the state, the VFWD can find no compelling evidence that the current rate of harvest of foxes is influencing the presence, distribution, or prevalence of infected black-legged tick nymphs, the primary driver of Lyme disease.

This evaluation does however, underscores the importance of continuing the ongoing Department work, along with other state agencies and partners, to address the key factors below that likely affect the prevalence of Lyme disease and other tick-borne illnesses.

1. *Maintain large blocks of intact forest and connectivity between them (implement VCD)*

   Because black-legged ticks and subsequently the incidence of Lyme disease could be tied to landscape fragmentation in the face of development and parcelization, as well as, the corresponding increase in invasive plants such as barberry and honeysuckle, we should work together to minimize these practices on the Vermont landscape. The implementation of the

Vermont Conservation Design (VCD) through a variety of approaches (education, acquisition, legislation, regulation, management, etc.) would result in many benefits for wildlife, forestry, and the working landscape and will also help to minimize the effects of Lyme disease.

2. *Work to mitigate climate change and increase resiliency.*

   Climate change is probably the biggest challenge facing humans in the next 10 to 15 years, not only because of its potential influence on black-legged tick populations but also because of the myriad and, to date, potentially unknown impacts to humans, wildlife, and our functioning ecosystem as we know it. Vermont citizens need to work together to address landscape resiliency, and the implementation of climate adaptations and mitigation strategies.

3. *Continue to work with partners and private landowners to reduce the spread of non-native invasive plant species.*

   Many programs currently exist to educate and work with landowners to reduce the number of invasive plants in our forests and fields. The Department participates in USDA Natural Resources Conservation Service (NRCS) cost-share programs to work with landowners and foresters to reduce species such as barberry, buckthorn, and honey suckle on both state and private lands. However, this will take a multitude of complex actions to effect real change on the landscape.

4. *Ensure that our valuable predator populations are managed sustainably.*

   Continue to monitor predator populations to ensure that they remain common and abundant on the landscape. This may include ramping up monitoring efforts for coyote and fox, given that the VFWD is already collecting in-depth information on our other furbearer predators. Recently, the VFWD has made some changes to its Point of Sale (POS) system to assist in collecting better information on the level of hunting of coyotes and bobcats and are considering options for reaching out to collect data related to numbers and effort.

5. *Manage Deer Populations to maintain densities within carrying capacity*:
   Continue to manage deer populations to ensure that densities are in line with carrying capacity. Where higher human population densities (i.e., exurban parts of Vermont) present obstacles to managing deer under state or regional regulations, consider establishing special management zones to better control deer populations. Additionally, focus on areas where non-native invasive plants are prevalent and in Wildlife Management Units where deer densities could increase due to warming winters and declining hunter numbers.

Compiled by Kim Royar, Furbearer Project Leader, Vermont Fish and Wildlife Department, October 2018

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Red Fox and Lyme Disease – Is There a Connection in Vermont?

Summary Document

Potential influences on the spread of Lyme disease

The factors influencing the increase of the black-legged tick (Ixodes sacpularis) and subsequently Lyme disease in the region are incredibly complex. It is likely that a combination of some, or all, of the multiple factors listed below (and perhaps some that have yet to be identified) have fueled the spread of the disease:

- **Climate change:** Likely results in increased ticks due to changes to the landscape that favor ticks.[1,2]
- **Habitat fragmentation:** Lyme disease is most prevalent in the northeast where "suburban and exurban development encroaches on deciduous forest ecosystems,"[3] the likely result of increases in white-footed and deer mice along the edges of smaller forest patches. The consensus among researchers is that the most effective means of limiting Lyme is to reduce forest fragmentation from development.[4]
- **Invasive plants:** Ticks exist in higher densities near invasive plants such as barberry and honeysuckle. Barberry patches can increase infected tick densities twelve-fold, from 10/acre to 120/acre.[5]
- **Mast cycles:** Mouse populations are driven by high production of mast (acorns and beechnuts), which influences the harvest of marten and fisher in subsequent years, creating a "bottom up" rather than a "top down" effect.[6]
- **Predators:** While it is likely that coyotes have influenced red fox and possibly gray fox populations in the state, it is unlikely that the currently low levels of trapping and hunting in Vermont are affecting fox beyond the natural population fluctuations that occur from changes in habitat quality, mast crops, small mammal cycles, and competition from other predators.
- **Deer:** White-tailed deer are an important host of adult blacklegged ticks, and deer abundance and tick abundance are correlated.[7,8] However, above a relatively low threshold, further increases in deer abundance have little effect on tick densities[3] and the rapid increase in Lyme disease over the past two decades in Vermont has not coincided with a change in deer abundance.

Red fox in Vermont

- Predators such as red fox are an important part of the ecosystem for the many complicated roles they play in maintaining landscape diversity and should be conserved at healthy and abundant levels.
- The red fox is the most widely distributed carnivore in the world and exists throughout North America, Europe, Asia, and Australia, where it was introduced. It is extremely adaptable and resilient to human development and intense harvest pressure, increasing their reproduction rates when populations experience high losses.[9]
- Vermont's red fox population is estimated to be between 5,000 and 10,000, likely fluctuating locally based on food availability and habitat quality.[10] A 2017 estimate of 5,000 by USDA Wildlife Services conservatively assumed that only 50 percent of the state is fox habitat, but camera surveys by a PhD researcher showed that fox are in fact distributed in areas Wildlife Services considered non-habitat.
- Efforts to control foxes in Australia were unsuccessful even with the removal of up to

76 percent of the population. "The high fecundity and dispersal potential of foxes enable populations to withstand a high level of mortality. The adaptability of red fox overrides the relatively small manipulation of populations through [harvest] management. In local areas, competitors such as coyotes or gray foxes, or diseases such as rabies, can have a great impact and are relatively uncontrolled."[9]

- In Illinois, sources of red fox mortality have shifted in the last 30 years and coyote predation has essentially replaced harvest mortality, which has declined in recent years. Of 335 radio-collared rural foxes, 40 percent were killed by coyotes, 40 percent by vehicles, 7 percent from hunting, and 2 percent from mange.[10]
- VT Fish & Wildlife can find no compelling evidence that the current rate of harvest of red fox is influencing the distribution, or prevalence of infected black-legged tick nymphs, the primary driver of Lyme disease.

What can be done to combat Lyme disease?

- Maintain large blocks of intact forest habitat and the corridors that connect them and increase the resiliency of our forests in the face of climate change. Continue to work with partners to reduce invasive plants.
- Ensure that our valuable predator populations are not impacted by habitat loss, climate change, disease, pesticides, or harvest. Continue to work with VTrans and other conservation partners to create wildlife underpasses that decrease rates of road mortality of red foxes and other predators.
- Continue to manage deer densities within carrying capacity.

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[1]Odgon 2006; [2]Brunner et al. 2012; [3]Ostfeld 2006; [4]Allan et al. 2003; [5]Williams et al. 2009; [6]Jensen et al. 2012; [7]Kilpatrick et al. 2014; [8]Werden et al. 2014; [9]Novak et al. 1987; [10]Gosselink 2007

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PROTECT OUR WILDLIFE NUISANCE TRAPPING RESUBMISSION

October 11, 2018

Re: Revised NWCO Petition per FWB Request on 9/19/2018

Dear Members of the Vermont Fish & Wildlife Board:

As a result of Act 170 that was passed in 2018, the Board now has the authority to promulgate rules to regulate killing wildlife for compensation performed by Nuisance Wildlife Control Operators (NWCOs). Currently, NWCOs - also known as Animal Damage Control (ADC) operators - are not required to undergo any training specific to NWCO work, including instruction in killing methods that are less inhumane than those typically used in Vermont, safety protocols, or non-lethal conflict resolution options. Vermont lags behind New Hampshire, and other states that have successfully implemented NWCO training and licensing requirements. The furbearer biologist from New Hampshire Fish & Game provided testimony to the Vermont legislature on H.636 last January, speaking favorably of their state's NWCO program. While Commissioner Porter and Kim Royar mentioned interest in a *voluntary* NWCO program, mandatory training is in the best interest of public safety, consumer protection, and animal welfare. It also provides consistency in the line of work. NWCOs would also benefit by being trained to provide the non-lethal options and more permanent solutions that many customers are seeking.

We petition the Board to apply the following four conditions to NWCOs:

1. **Require a NWCO license**
2. **Require NWCO specific training**
3. **Mandatory reporting of NWCO activities**
4. **Application of current trapping regulations *(see bullet 4)* that do not currently apply to NWCOs**

Protect Our Wildlife
PO BOX 3024
Stowe, VT 05672
www.ProtectOurWildlifeVT.org

We see this petition as a great opportunity for both wildlife advocates and the Board to work together to ensure NWCOs are well trained, offer sustainable solutions, and operate in the most humane manner possible.

NWCOs have operated with little to no regulations or oversight, which leads to numerous problems:

- Trapping and killing "nuisance" wildlife is a band-aid solution. It does not address the source of the problem; it merely creates a vacuum for other animals to inhabit. When the original attractant isn't addressed (den site sealed, food sources removed), then the homeowner is wasting their money and left with a recurring problem.
- Trapping and killing "nuisance" wildlife out of season increases the likelihood of orphaned wildlife, further burdening volunteer wildlife rehabilitators and creating future problems for the customer.
- Trapping and killing "nuisance" wildlife results in killing of non-targeted animals, including protected species.
- Trapping and killing "nuisance" wildlife undermines the Department's priority for the "utilization" of wildlife. For example, a fox trapped and killed in the summer has zero "utilization" because the fur is not marketable. And if fox kits starve to death as a result of the mother being killed, that further contributes to the waste of wildlife "resources".

There are many incidents where non-targeted animals were injured or killed due to what appears to be gross negligence or a lack of training:

- Turtle: This turtle (see attached Fairfax Turtle) was trapped in a body gripping "kill" trap by a Fairfax, VT NWCO who was attempting to trap beaver in the summer.
- Canada Goose: A Canada goose was seen by a turkey hunter in May 2017 flapping her wings with a body gripping "kill" trap attached to her leg. The hunter ended up putting the goose out of her misery. The NWCO had been hired to trap muskrats at a culvert in Hubbardton.
- Blue Heron: A blue heron was caught in a beaver trap set by a NWCO in Proctorsville in August 2017.
- Opossum: In Bennington, a NWCO routinely kills opossums because he believes they are a rabies vector species (RVS). With proper training, he would have known that opossums are not RVS and that it is extremely rare for them to contract rabies due to their low body temperature.

- Two summers ago in Windsor, traps were set for beaver by a NWCO, but he trapped a mother raccoon and her baby instead. The raccoon kit chewed through her leg to free herself, but ultimately both the kit and the mother died. You can view the photo attached that was taken by a by-stander - see: Windsor_raccoon.

There are many examples of NWCOs acting unethically in their business practices with the consequence of extreme animal suffering. Here are just a few:

- A NWCO was hired to trap skunks and groundhogs in White River Junction in July 2017. A mail carrier reported that an animal had been caught in a cage trap and was left in the trap in the hot sun for days – the animal ultimately died, likely due to heat stress and dehydration.
- A woman hired a NWCO to trap a skunk in her yard in August 2018 and the NWCO ended up trapping an opossum. The woman was afraid to release the opossum from the cage trap and tried unsuccessfully to reach the NWCO, at which point the animal had been in the cage for 36 hours with no water and subject to the elements. The woman frantically called veterinarians, wildlife rehabbers, and finally someone – not the NWCO – released the animal.

We would like the Board to use its rulemaking authority to ensure that animal welfare is a priority; that non-target species are reduced; and that public safety and consumer protection issues are addressed.

Our four requests are as follows:

1. Required NWCO License

To obtain a NWCO license, an individual must first:
- Attend an approved NWCO training course;
- Pass the NWCO licensing exam and;
- Submit an application for a NWCO license

Upon completion, the Commissioner may issue a NWCO license that will allow the party to kill wildlife for compensation.

2. Required NWCO Training Course

Our neighbor states of NH, NY and CT all require NWCO training/ certification and so should Vermont. In Connecticut, wildlife advocates (from the state wildlife rehabilitator association and the state NWCO association) worked

directly with their CT Department of Environmental Protection to create a robust NWCO training/certification program.

The Commissioner of Fish and Wildlife should establish a <u>mandatory</u> NWCO training course.

The course shall provide training or instruction that addresses:

- Site evaluation;
- Wildlife biology and behavior;
- Rabies policies;
- Methods of nonlethal conflict resolution including training that covers: frightening and hazing devices; repellants; one-way door and other eviction methods; exclusion methods (home-proofing strategies, etc); habitat modification; preventing orphaning; release and relocation considerations/protocols; and live trapping;
- Methods to maintain family units using humane eviction to avoid abandoning dependent, young wildlife;
- Methods to address unnecessary discomfort, behavioral stress, or physical harm, including providing protections against weather extremes;
- <u>AVMA-approved</u> approved methods for killing wildlife;
- Techniques to prevent problem recurrence;
- Public education. The public should be given a "Client Notification" flier that outlines the types of non-lethal and lethal methods available for resolving wildlife conflicts so that the client can make an informed choice.

*See pages 81-83
http://www.avma.org/KB/Policies/Documents/euthanasia.pdf

The most effective wildlife conflict control strategies involve evicting and excluding wild animals as a family unit, then sealing their entry holes to solve the problem. Unfortunately, there is no assurance that NWCOs are trained in exclusion techniques nor is there an obligation to practice them. In fact, recently POW learned of an elderly man who had a raccoon in his garage. He hired a NWCO who charged him $75 to trap and kill the raccoon. Not until the man's caregiver saw seven separate checks payable to this NWCO for $75 each did she realize that the NWCO never took the time to determine the root cause of the problem, a broken gable. The caregiver fixed the gable for $40 and there were no more problems with raccoons.

Trapping during the regulated trapping season is different from NWCO trapping, and training should reflect this. Training specific to NWCO work

should address out-of-season trapping scenarios that wouldn't necessarily be covered in a regular trapper-training course. For example, NWCOs trapping "nuisance" beaver in the spring or summer need to know the Best Management Practices (BMPs) to avoid non-target otter or turtle capture. More importantly, they should know how to install water flow control devices or to wrap trees, so that landowners or municipalities who prefer long-lasting solutions can opt for these highly effective methods.

3. Mandatory Reporting Requirements

NWCOs kill untold numbers of wildlife each year, including some species whose populations may be on the decline, such as muskrats, grey fox, and otter. Trappers are required to report what they kill each year (as of 2017) and NWCOs, who are now required to hold a trapping license, will be required to as well. However, not all of the killing performed by NWCOs will be performed through the use of traps, but should still be collected by the Department. *Of course, this reporting is only as good as the data the trappers/NWCOs choose to submit.*

Vermont's licensed volunteer wildlife rehabilitators, who incur all of the costs of the services they provide to the Department, are required to submit detailed monthly reports to Fish & Wildlife on the animals in their care. People who profit from killing wildlife should not be exempt from detailed reporting on the animals they come in contact with and/or kill.

NWCOs shall maintain records of all wildlife control services, documenting the following information at each service call:

- Name of the licensed wildlife control operator who performed the service;
- Client's name and address;
- Date of services;
- Nature of the complaint about wildlife;
- What non-lethal options were offered;
- Methods employed to alleviate problem;
- Number and species of wildlife handled and;
- Method and location of disposition of wildlife.

On or before February 1st of each year, NWCOs shall submit an accurate summary of activities of the preceding calendar year to the Department. Failure to submit reports results in loss of NWCO license for that year. License may be reinstated the following year if report is submitted.

The summary shall contain the following information:

- Total number of complaints about wildlife;
- Total number of repeat services to the same client for the same/similar problem.
- Number and kinds of wildlife handled and their disposition;
- Number of wildlife killed and method of killing employed;
- Time period covered and;
- Name, phone number, and employment address of the wildlife control operator.

4: Consistency in Trapping Regulations

NWCOs should not be exempt from sections 4.6 and 4.12 of the furbearer rules.

> 4.6: Prohibit the use of toothed traps AND snares.
> 4.12: Prohibit NWCOs from removing an animal from its den by: cutting, digging, smoking or by the use of chemicals, or by the use of mechanical devices.

Fish & Wildlife routinely talks about Best Management Practices and their desire to improve "animal welfare" with traps. It is a contradiction to still allow the use of toothed legholds and snares in their proposal to the Board. These devices cause tremendous suffering and make it even more difficult, if not impossible, to release a non-target animal. For those who are unaware, toothed legholds have teeth projecting from the jaws of the trap that can penetrate the animal's paw. **We appreciate the Board's interest in prohibiting the use of toothed leghold traps, but for all of the reasons mentioned above, you should also prohibit the use of snares, since those are likely more common in NWCO work.**

Snares are the most primitive and inhumane methods of capture. While small victims of neck snares may become unconscious in five to ten minutes from strangulation, larger animals may suffer for days. In one study by the Wildlife Society, researchers recommended neck snares not be used in areas with livestock or deer after snares set for coyotes killed 50% of deer accidentally captured.

The Department has claimed that it does not want to prohibit snares for NWCOs because the Department supports the use of a type of snaring device called a cable restraint. These devices operate very similarly to

snares and despite the Department's support of these traps, they present obvious animal welfare concerns. Additionally, since they are inexpensive and easy to operate, there is potential for these traps to saturate an area, placing not only furbearers at risk, but also bears, moose, deer, and other non-targeted species. Attached you will find photos of bloodied coyotes who self mutilated while restrained in cable restraints; even the trapper acknowledges that cable restraints causes animals to chew at the trap/paw to free themselves. Foxes and raccoons are also at risk of this behavior as are domestic dogs and cats. We've also attached a photo of a bear and a domestic dog who were ensnared in these devices. Video of a moose who was caught can be viewed here: https://youtu.be/0LMizPrMMdE Video of a deer who was caught can be viewed here: https://youtu.be/AAASk-gbczg

And what happens if a warden finds a toothed leghold trap or snare set in October, during legal trapping season? How does that warden know if it belongs to a NWCO? The concern goes for someone smoking out an animal den that's prohibited under 4.12; how will a warden know if this is legal (performed by a NWCO) or illegal activity? These inconsistencies make zero sense and make enforcement difficult if not impossible. NWCOs should be able to perform their job using the same implements that are otherwise legal in Vermont.

Contradictions with regard to current Fish & Wildlife policy

- Under the current regulatory regime, when a Good Samaritan finds an orphaned raccoon, for example, the Department requires, for good reason, the person follow very strict protocols to get the animal to a rehabber who is licensed to handle RVS. At the same time, NWCOs currently have no apparent restrictions with respect to the handling of RVS or required training in their care. **Unlike volunteer wildlife rehabbers, NWCOs don't even have to be rabies vaccinated.**

Other considerations

- Since most of the nuisance trapping occurs in the spring/summer months when animals have dependent young and seek out dens in and around homes, it results in an additional burden on wildlife rehabilitators. This happens when animals become unnecessarily orphaned as a result of NWCOs' commercial activities. This can also leave the consumer with unintended consequences.
- NWCOs should be authorized to live transport wildlife, including RVS, for limited purpose of offsite killing in areas where guns are not allowed per municipal ordinances.

We are hopeful that we can use this rulemaking process as an opportunity to come together to ensure that wild animals who are handled for profit by NWCOs are not killed and orphaned unnecessarily; that the most sustainable, non-lethal methods will be used when possible; that customers are informed about their options (both lethal and non-lethal), so that they can make an informed choice; and that if a wild animal must be killed, it is done in the least inhumane and most professional manner possible.

This petition does not seek to ban, or even limit trapping. It simply seeks to put long-overdue controls in place that will benefit wildlife, the general public, the Fish & Wildlife Department (through data collection on animals handled, released or killed), and the NWCOs themselves by:

- Professionalizing the industry;
- Expanding business opportunities by offering non-lethal and sustainable solutions.

Sincerely,

Brenna Galdenzi
President and Founder

Protect Our Wildlife
PO BOX 3024
Stowe, VT 05672
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§ 44. Furbearing species

1.0 Authority

1.1 This rule is promulgated pursuant to 10 V.S.A. §§ 4081, 4082, 4084, 4828, and 4861. In promulgating this rule, the Fish and Wildlife Board is following the policy established by the General Assembly that the protection, propagation, control, management, and conservation of fish, wildlife, and fur-bearing animals in this State is in the interest of the public welfare and that the safeguarding of these valuable resources for the people of the State requires a constant and continual vigilance.

1.2 In accordance with 10 V.S.A. §§ 4082 and 4084, this rule is designed to maintain the best health, population, and utilization levels of the regulated species.

1.3 This rule shall apply to all persons who take or attempt to take fur-bearing animals by trapping or hunting.

2.0 Purpose

The purpose of this rule is to regulate the taking of fur-bearing animals.

3.0 Definitions

3.1 "Commissioner" means the Commissioner of the Vermont Department of Fish and Wildlife.

3.2 "Department" means the Vermont Department of Fish and Wildlife.

3.3 "Board" means the Vermont Fish and Wildlife Board.

3.4 "Fur-bearing animal" means beaver, otter, marten, mink, raccoon, fisher, fox, skunk, coyote, bobcat, weasel, opossum, lynx, wolf, and muskrat or as amended pursuant to 10 V.S.A. § 4001.

3.5 "Trapping" means to take or attempt to take fur-bearing animals with traps including the dispatching of such lawfully trapped fur-bearing animals.

3.6 A "trap" means a mechanical device used to capture, kill and/or restrain fur-bearing animals excluding firearms, muzzleloaders and archery equipment.

3.7 A "tanned" pelt is one that has been treated to turn the skin into leather.

4.0 Restrictions

4.1 A person trapping for fur-bearing animals under this rule shall visit his/her traps at least once every calendar day, except as provided in paragraph 4.2, and dispatch or release any animal caught therein.

4.2 A person who sets body gripping traps in the water or under the ice, colony/cage traps underwater or foothold traps under the ice shall visit his/her traps at least once every three calendar days and remove any animal caught therein.

4.3 A person shall not set a trap on lands other than his/her own which does not have his/her name and address permanently and legibly stamped or engraved thereon, or on a tag of rustless material securely attached thereto.

4.4 All traps under ice will be marked with a tag visible above the ice.

4.5 A person shall not set a body gripping trap with a jaw spread over eight inches measured inside the jaws unless the trap is set five feet or more above the ground, or in the water.

4.6 A person shall not use toothed foothold traps or snares when trapping under this section.

4.7 A person shall not set a trap between December 31 and the following fourth Saturday in October unless the trap is in the water, under the ice, or on a float in the water.

4.8 A person shall not possess a living fur-bearing animal, except as provided by rules of the board or 10 V.S.A. part 4.

4.9 A person shall not possess a fur-bearing animal trapped outside of its legal season without the written authorization of the Department, not to include animals taken pursuant to 10 V.S.A. § 4828.

4.10 A person shall not possess fur or skin of a fur-bearing animal unlawfully taken.

4.11 A person shall not take a fur-bearing animal by use of any poisonous mixture.

4.12 A person shall not take a fur-bearing animal from dens by cutting, digging, smoking, by the use of chemicals, or by the use of mechanical devices.

4.13 Beaver Muskrat

a.) When trapping muskrat between March 1 and March 31, body gripping traps are restricted to 5 inches or less.

b.) A person shall not disturb or destroy a beaver or muskrat house or den or place a trap therein, thereon, or in the entrance thereof.

c.) A person may set a trap within 10 feet of the nearest point, above the water, of a beaver house or dam only from the 4th Saturday in October through the last day of February, all dates inclusive.

d.) Except for the setting of traps as provided under 4.13b and 4.13c, a person shall not interfere in any manner with dams, dens, or houses of beaver except upon prior written approval from the Commissioner.

4.14 Bobcat; Otter; Fisher.

a.) From December 17 to December 31, both dates inclusive, in order to minimize incidental bobcat harvest during the remainder of the fisher season, a person shall not set a body gripping trap with a jaw spread over 6 inches measured inside the jaws unless the trap is set 5 or more feet above the ground, or in the water.

b.) The skins of bobcat, otter, and fisher legally taken may be possessed, transported, bought and sold only when tagged and marked as hereinafter provided.

c.) A person who takes bobcats, otter, or fisher during these seasons shall notify authorized Department staff within 48 hours of the close of the season. Pelts shall be presented to authorized Department staff for tagging. Such tags shall remain affixed to the pelts until tanned. Carcasses shall be surrendered to authorized Department staff at the time of tagging.

d.) No bobcat, otter, or fisher pelts or carcasses taken during these seasons shall be transported out of the State of Vermont prior to being tagged by authorized Department staff.

e.) A person who takes bobcat, fisher, and otter pursuant to 10 V.S.A. § 4828 and who desires to keep the pelt shall notify authorized Department staff with 84 hours of the taking. Pelts shall be presented to authorized Department staff for tagging. Such tags shall remain affixed to the pelts until tanned. Carcasses shall be surrendered to authorized Department staff at the time of tagging.

4.15 Raccoons

a.) A person shooting raccoons during the raccoon hunting season shall use a 0.22 caliber rimfire firearm or a shotgun with #2 shot or smaller.

b.) A light may be used to illuminate and shoot a raccoon once treed by a dog, or dogs, during the raccoon hunting season. A light may also be used to illuminate a raccoon once treed by a dog, or dogs, during the training season.

4.16 Lynx

(a) This subsection shall be effective on January 1, 2014.

(b) Any person who incidentally captures a lynx shall notify the Department immediately.

(c) The following regulations on traps and trapping shall apply within the Wildlife Management Unit E.

(1) Foothold traps set on land must be anchored using a chain or cable no longer than 18” that is center-mounted to the trap using a swivel connection and must have at least one in-line swivel along the chain or cable.

(2) From the fourth Saturday in October to December 31, both dates inclusive, all body gripping traps must be set:

i. In the water, or;

ii. Within a Canada lynx exclusion device as described below and as depicted in Diagram 1:

a. the trap jaws shall be completely within the device;

b. the trap springs may extend outside of device through openings no larger than 7.5” wide by 1.5” high;

c. the device shall not have an opening greater than 6” by 8”;

d. the opening shall not be directly in front of the trap but shall instead be either on the top or side of the device;

e. the trap set within the device shall be a minimum of 18” from the closest edge of the opening to the trap;

f. there shall be at least two attachment points for each side of the device where there is a joint or where panels come together;

g. the device shall be constructed of wood or of wire mesh of 16 gauge or less wire (.05” diameter wire or greater) and having a mesh size with openings no greater than 1.5” X 1.5” or 1” X 2”; and,

h. the trap shall be anchored outside of the device; or

iii. Off the ground as described below and as depicted in Diagram 2:

a. at least 5’ above the ground or if snow is on the ground at least 5 feet above snow level with the exception of the 24-hour period immediately following a snowstorm;

b. affixed to a standing tree which is free of branches below the trap or to a leaning section of pole that has not been planed or otherwise altered except for the removal of branches and is less than 4” in

diameter at the trap and is angled at least 45° along its entire length from the ground to the trap; and

c. in an area that is free of any object within 4’ of the trap.

(3) From the fourth Saturday in October to December 31, both dates inclusive, body gripping traps no larger than a typical 160 (inside jaw spread up to 6.5”) may also be set on the ground if placed:

i. Under overhanging stream banks, or;

ii. In blind sets without the aid of bait, lure or visual attractants, or;

iii. Within a cubby constructed of artificial materials with the trap inserted at least 7” from the front and with an opening no greater than 50 square inches as depicted in Diagram 3.

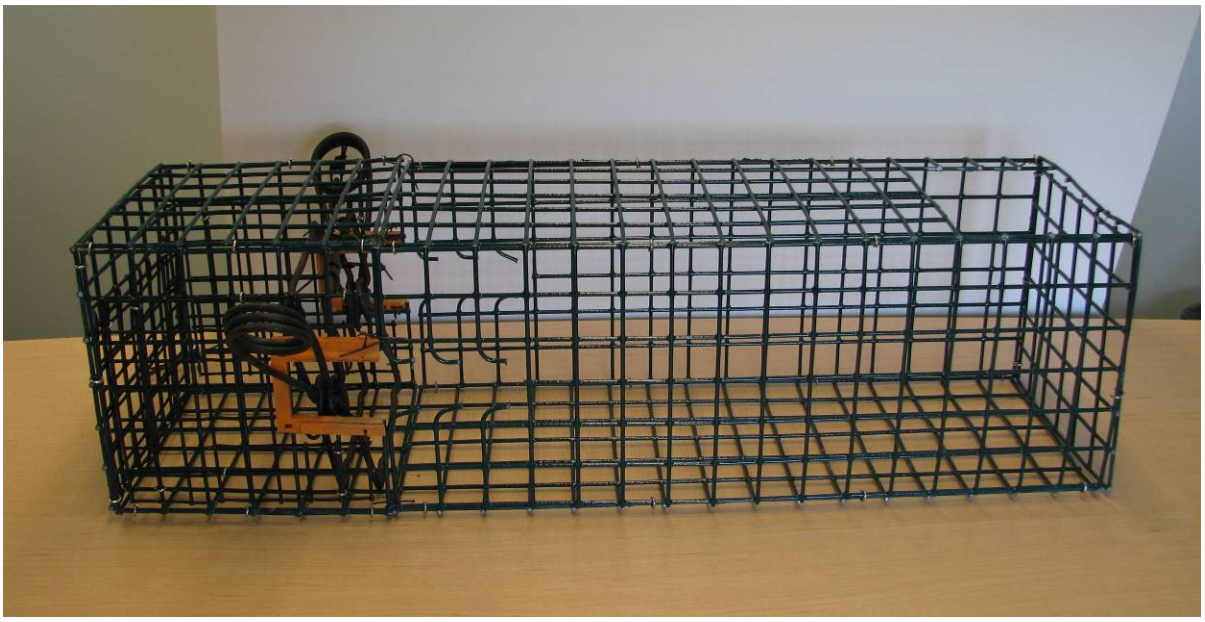
(d) The establishment of a ten-year “Lynx Study Period” shall commence on the effective date of this subsection. The Department will assess the status of lynx in Vermont, identify and evaluate additional techniques and devices for avoiding incidental capture of lynx, and develop revisions to these rules in accordance with the findings of such studies and all current information. The rules set forth in this subsection 4.16 shall expire on January 1, 2024 unless such rules are either extended or amended by the Fish and Wildlife Board. The decision to extend or amend these rules shall be based on an evaluation of the following key criteria:

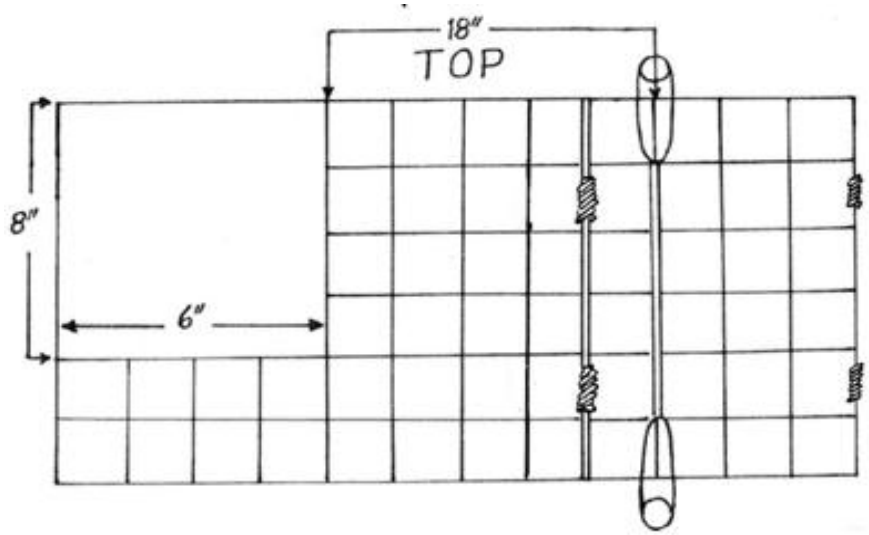
(1) Reliable evidence of the presence or absence of a resident, breeding population of Canada lynx;

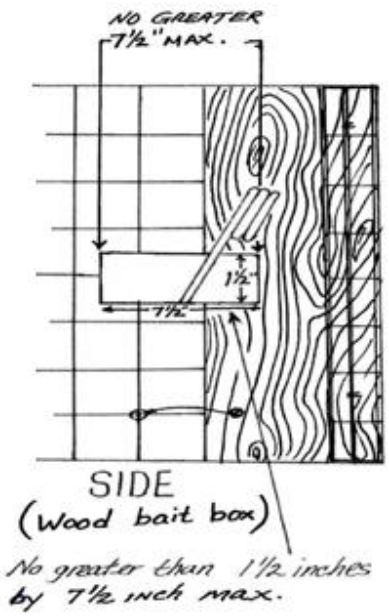
(2) The availability of more effective and/or practical alternatives for avoiding the incidental capture of lynx; and

(3) The outcome of Maine’s Incidental Take Permit application process.

Diagram 1. Canada lynx exclusion device for body gripping traps.




18"
TOP
8"
6"



e

Diagram 2. Off the ground sets for body gripping traps.

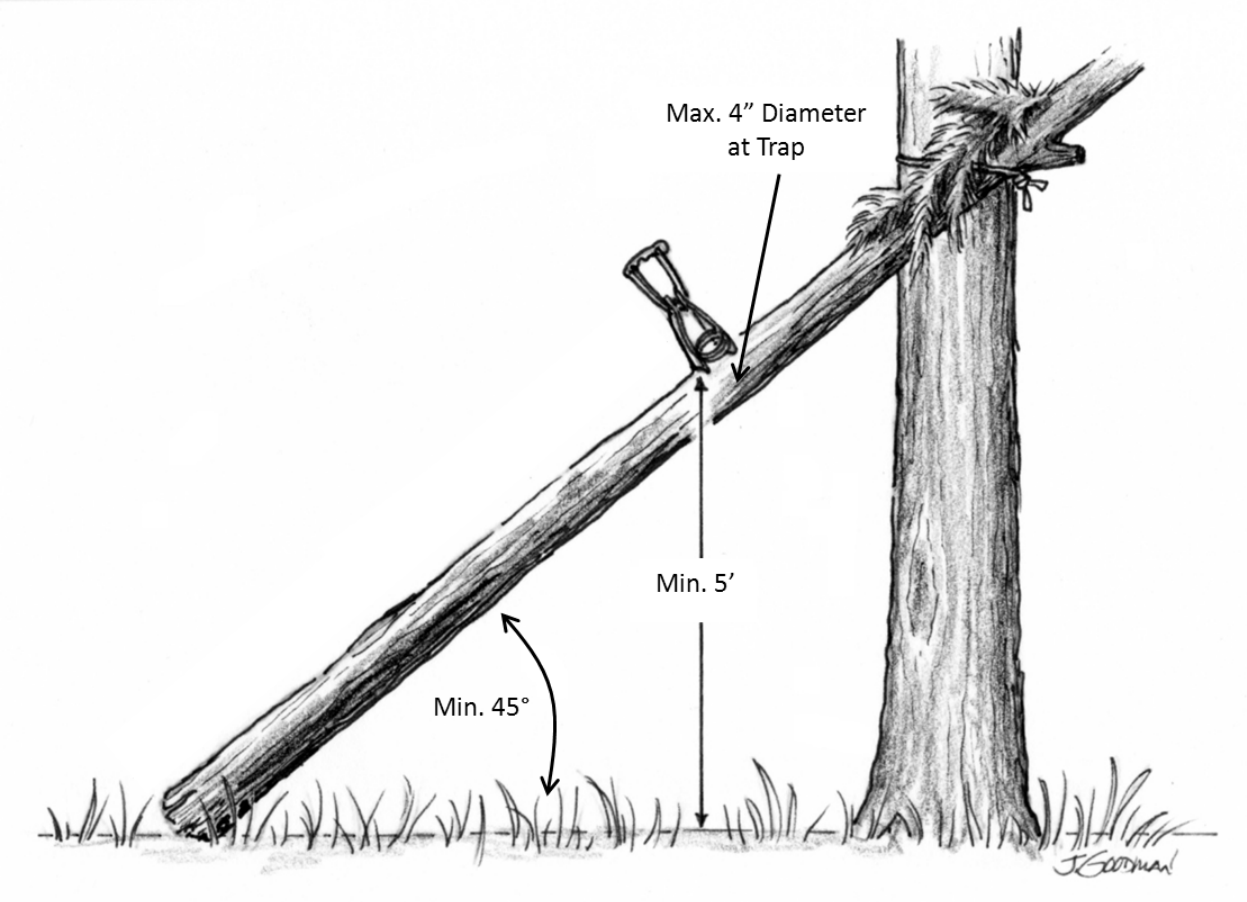
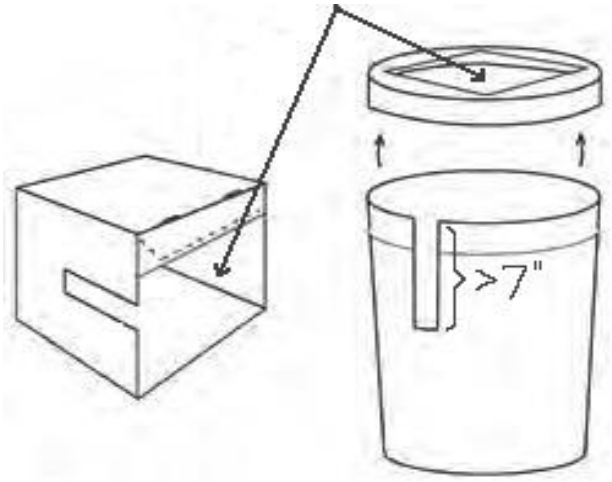


Diagram 3. Cubby sets for body gripping traps no larger than a typical 160.



4.17 Biological Collection

a) Any person who obtains a trapping license shall complete and submit an annual biological collection trapper survey for the license season to the Department, within the timeline specified by the Commissioner.

b) The failure to complete and submit a biological collection survey to the Department shall be a nonpoint violation under 10 V.S.A. § 4502.

5.0 Seasons, Bag Limits

The following seasons, methods and bag limits are hereby established for the species listed. All hunting seasons will be with or without dogs, except as otherwise provided. Below is the exclusive, exhaustive list of season and means of take of fur-bearing animals. The taking of fur-bearing animals at other times or by other means, except where otherwise provided by law, is prohibited. All dates are inclusive.

Seasons	Dates	Bag Limit
5.1 Beaver		
By trapping	Fourth Sat. in Oct. through March 31	No Limit
By hunting	No open season	Zero

5.2	Otter		
	By trapping	Fourth Sat. in Oct.- last day of March	No limit
	By hunting	No open season	Zero
5.3	Marten	No open season	Zero
5.4	Mink		
	By trapping	Fourth Sat in Oct.-Dec. 31	No limit
	By hunting	No open season	Zero
5.5	Raccoon		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	Second Sat. in Oct.-Dec. 31	No limit
5.6	Bobcat		
	By trapping	December 1-December 16	No limit
	By hunting	January 10-February 7	No limit
5.7	Fox (red or grey)		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	Fourth Sat. in Oct. through the second Sun. in Feb.	No limit
5.8	Skunk		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	No closed Season	No limit
5.9	Muskrat		
	By trapping	Fourth Sat. in Oct.-March 31	No limit
	By hunting	March 20-April 19	No limit
5.10	Coyote		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	No closed season	No limit
5.14	Fisher		
	By trapping	December 1-December 31	No limit
	By hunting	No open season	Zero
5.15	Weasel		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	No closed season	No limit
5.16	Opossum		
	By trapping	Fourth Sat. in Oct.-Dec. 31	No limit
	By hunting	No closed season	No limit

5.17 Wolf	No open season	Zero
5.18 Lynx	No open season	Zero

6.0 Taking Rabbits and furbearers in Defense of Property for a Fee

6.1 In accordance with Sec. 11 of Act 170 from the 2017-2018 Adj Session, the following sections and subsections of Board rules set forth in Title 10, Appendix §44 are applicable to trapping nuisance rabbits and fur-bearing animals for compensation: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6 (except that snares shall not be prohibited) 4.10, 4.11, 4.12 (except that mechanical devices that are allowable traps under this rule shall not be prohibited), 4.14 (e), 4.16 (b), 4.17 (a) and (b).

APPENDIX 122
ANNOTATED

TITLE 10 Conservation and Development APPENDIX
CHAPTER 2. FISH
Subchapter 2. Seasons, Waters, and Limits

§ 122. Fish Management Regulation.

1.0 Authority

This rule is adopted pursuant to 10 V.S.A. §4081(b). In adopting this rule, the Fish and Wildlife Board is following the policy established by the General Assembly that the protection, propagation, control, management, and conservation of fish, wildlife and fur-bearing animals in this state is in the interest of the public welfare and that the safeguarding of this valuable resource for the people of the state requires a constant and continual vigilance.

In accordance with 10 V.S.A. §4082, this rule is designed to maintain the best health, population and utilization levels of Vermont's fisheries.

In accordance with 10 V.S.A. §4083, this rule establishes open seasons; establishes daily, season, possession limits and size limits; prescribes the manner and means of taking fish; and prescribes the manner of transportation and exportation of fish.

2.0 Purpose

It is the policy of the state that the protection, propagation control, management and conservation of fish, wildlife, and fur-bearing animals in this state is in the interest of the public welfare, and that safeguarding of this valuable resource for the people of the state requires a constant and continual vigilance.

~~3.0~~ Open-Water Fishing, legal methods of taking fish

~~3.1~~ Definitions
~~3.1.1~~ Department – Vermont Department of Fish and Wildlife.
~~3.1.2~~ Commissioner –Vermont Department of Fish and Wildlife Commissioner.
~~3.1.3~~ Open-water fishing –Fishing by means of hook and line in hand or attached to a rod or other device in open water. Fishing by casting or trolling baited hooks, artificial flies or lures is considered open-water fishing.
~~3.1.4~~ Baited Hook – A single shank hook with 1, 2 or 3 points which may be baited with natural or artificial bait or both.

~~3.1.5~~ Lure – A man-made device designed to catch only 1 fish at a time, to include a spoon, plug, spinner, bait harness, tandem hook streamer or lead head jig.

~~3.1.6~~ Fly – A single pointed hook dressed with feathers, hair, thread, tinsel, or any similar material wound on or about the hook to which no hooks, spinners, spoons, or similar devices have been added.

~~3.1.7~~ Handheld Spear - A manually powered spear used from above the water's surface.

~~3.1.8~~ Speargun – A pneumatic or rubber band powered device, with a line not to exceed 20 feet attached to a spear, used from below the water's surface.

~~3.1.9~~ Cull Fish - Carp, tench, rudd, shad (alewife and gizzard shad), and goldfish. Additional invasive/exotic fish species may be designated by the Commissioner as "cull fish."

~~3.1.10~~ Immediate Control – Such constant control as would enable the angler to respond forthwith to a fish taking their bait, lure or fly promptly and without any delay.

3.1.11 Snagging – Snagging shall mean the intentional hooking of a fish in a place other than the inside of the fish's mouth. No person shall pull, jerk or otherwise purposefully and/or repeatedly manipulate a hook, or hooks and line to snag or hook a fish in any method other than to entice a fish into taking, by mouth, a hook, lure or fly. Repeated and/or exaggerated jerking or pulling of the fishing line and/or hooks in any attempt to snag fish, whether it results in physically snagging a fish or not, shall be prima facie evidence that snagging has taken place. This shall not apply to the use of a gaff to land a fish that has been legally hooked.

~~3.2~~ Whether still fishing, casting, or trolling in Vermont waters, a person may take fish only by using not more than two lines over which he or she has immediate control and to each of which lines is attached not more than two baited hooks, or more than three artificial flies, or more than two lures with or without bait, except that at Seymour Lake and Little Averill Lake a person may take fish only by using not more than one line.

~~3.3~~ A person open-water fishing shall not take fish through the ice, from the ice, or from an object supported by the ice.

~~3.4~~ A person shall not take any fish pursuant to subsection (3.2) unless it is hooked in the mouth. Any fish taken under subsection (3.2) that is not hooked in the mouth shall be immediately released pursuant to 10 V.S.A. § 4602. A fish hooked in any part of the body other than in the mouth shall be considered to be foul hooked, and shall be prima facie evidence of foul hooking.

~~3.5~~ Taking or attempting to take fish by snagging is prohibited in all Vermont Waters.

~~4.0~~ Ice Fishing

~~4.1~~ Definitions

~~4.1.1~~ Ice Fishing - Ice fishing is defined as fishing by means of hook and line in hand or attached to a rod, tip-up, jack or bob, where the angler is fishing through a hole in the ice, from the ice or on an object supported by the ice. Fishing by casting or trolling baited hooks, artificial flies or lures shall not be considered ice fishing.

~~4.2~~ Fish may be taken through the ice with not more than two baited hooks or three artificial flies or two lures on each line. A person shall not operate more than eight lines, except on Lake Champlain where no more than fifteen lines may be operated, and except on Seymour and Little Averill Lakes, where not more than four lines may be operated.

~~4.3~~ A person ice fishing shall ~~have~~ at all times, have immediate control over all lines they operate. A person ice fishing shall be able to visually observe lines they operate. Any line that indicates a fish shall be tended within 30 minutes.

~~4.4~~ A person shall not take any fish pursuant to subsection (4.2) unless it is hooked in the mouth. Any fish taken under subsection (4.2) that is not hooked in the mouth shall be immediately released pursuant to 10 V.S.A. § 4602. A fish hooked in any part of the body other than in the mouth shall be considered to be foul hooked, and shall be prima facie evidence of foul hooking.

~~4.5~~ The definitions of section 3 are applicable to this section.

~~4.6~~ Taking or attempting to take fish by snagging is prohibited in all Vermont Waters.

~~5.0 The taking, possessing, transporting, use and selling of baitfish.~~

~~5.1 Purpose~~

~~5.1.1 This rule applies to fish used as bait. This rule shall apply to all persons who take, possess, transport, use, or deal with baitfish.~~

~~5.1.2 The purpose of this paragraph is to: a) protect the fish, and fisheries in the state, b) ensure the conservation of the fish and fisheries in the state, c) maintain the best health of species of the state, d) prevent the introduction or spread of a disease or parasite harmful to humans and wild species, and e) prevent the escape or release of non-native species or species injurious to or competitive with natural ecological systems and processes.~~

~~5.2 Definitions~~

~~5.2.1 "Application" means a specific form provided by the Department of Fish and Wildlife.~~

5.2.2 “Baitbox” means a receptacle used for holding or keeping baitfish alive for personal use. A legal baitbox shall not exceed 25 cubic feet in volume.

5.2.3 "Baitfish" means fish species and parts thereof, living or dead, used for the purpose of attracting and catching fish.

5.2.4 "Commercial Dealing, dealing, or deal" means to sell as defined in Title 10, § 4001, subsection 22.

5.2.5 “Fish Hatchery” refers to any fish culture station, hatchery, or artificial rearing pond which grows or maintains baitfish for sale in Vermont.

5.2.6 "Permit" is a document from the Commissioner granting a Commercial Bait Dealers Permit.

5.2.7 "Waterbody" means any lake, pond, river, or stream including all tributaries upstream to the first barrier impassable to upstream fish movement.

5.2.8 “Commercially Preserved Baitfish” means baitfish which are chemically treated in a manner approved by the Department, and then packaged for retail sale.

5.2.9 “Personal Baitfish Harvest” means baitfish taken for non-commercial use.

5.3 Personal Baitfish Harvest

5.3.1 Personally harvested baitfish may be used only on the same waterbody from which they were collected.

5.3.2 A person may harvest for use as bait only those fish species listed under paragraphs 5.6.1, 5.6.2, and 5.6.3.

5.3.3 It is unlawful to take baitfish for personal use other than by the following methods: a) minnow traps no longer than eighteen inches with an entrance for fish not exceeding one inch in diameter, b) dip nets, cast nets, and umbrella nets not exceeding a total of 51 square feet of mesh, or a seine net not exceeding 25 feet in length, c) Open-water/ice fishing by hook and line.

5.3.4 The personal harvest of baitfish is unlawful in Seasonally Closed Waters as listed in Section 9.0 of this regulation, except during the open season for trout, and is prohibited in streams as specified in Section 9.2. Baitfish

~~harvest shall be conducted only by Open-water/ice fishing or the use of minnow traps no longer than eighteen inches with an entrance for fish not exceeding one inch in diameter.~~

~~5.3.5 All traps, nets, baitboxes or other holding receptacles capable of taking, holding or keeping live baitfish in public waters must be marked with the name and address of the owner and user.~~

~~5.3.6 Personally harvested baitfish shall not be transported by motorized vehicle away from the waterbody from which they were collected.~~

~~5.3.7 Baitfish may be held on the water in a pen or baitbox as defined in paragraph 5.2.2.~~

~~5.3.8 Personally harvested baitfish may be collected from a waterbody's tributaries upstream to the first impassable barrier for use on such waterbody. Personally harvested baitfish shall not be transported upstream beyond the first impassable barrier.~~

~~5.3.9 The personal harvest of baitfish is prohibited on any waterbody of the state that is defined as closed to baitfish harvest. The Department will maintain and make available a list of closed waters.~~

~~5.3.10 Fish eggs may be collected from legally harvested fish from Vermont waters, and used immediately as bait on the same water where taken unless that waterbody has been closed to baitfish collection. It is illegal to move personally harvested fish eggs to any other waterbody. It is illegal to transport fish eggs away from and return them to the same waterbody for use as bait unless they have been processed in a manner approved by the Department as described on the Department website.~~

~~5.4~~ ~~Commercially Purchased Baitfish~~

~~5.4.1 It is unlawful to import baitfish into the State of Vermont without a Fish Importation Permit, except as provided for in paragraphs 5.4.7 and 5.4.8.~~

~~5.4.2 A person purchasing baitfish shall retain and show upon request a transportation receipt issued by a state-approved commercial bait dealer, authorizing transportation of baitfish overland by motorized vehicle. The receipt shall contain the following information: 1) A unique receipt identification number, 2) The name and telephone number of the bait dealer, 3) time and date of sale, 4) species purchased, 5) quantity purchased, 6) waterbody (limited to one) on which the baitfish will be used, 7) signature of purchaser.~~

~~5.4.3 A transportation receipt shall be valid for 96 hours from time and date of sale.~~

~~5.4.4 A person may transport unused commercially purchased baitfish away from waters of the state by motorized vehicle, and retain for later use on the same waterbody as indicated on the baitfish transportation receipt, within 96 hours from time and date of sale.~~

~~5.4.5 A person transporting unused commercially purchased baitfish away from the waterbody indicated on the baitfish transportation receipt for later use on said waterbody shall not hold them in any other water of the state. These baitfish must be kept in a closed container isolated from any inflow of lake, pond or stream water, or outflow to such waters of the state.~~

~~5.4.6 Baitfish may be held beyond the 96 hour period on the water in a pen or baitbox as per paragraph 5.2.2.~~

~~5.4.7 A person may purchase baitfish from a New York baitshop for use on Lake Champlain only, provided the baitshop is Vermont-licensed, and the baitfish are accompanied by a Vermont-issued baitfish transportation receipt.~~

~~5.4.8 A person may purchase baitfish from a New Hampshire baitshop for use on the Connecticut River and its setbacks only, provided the baitshop is Vermont-licensed, and the baitfish are accompanied by a Vermont-issued baitfish transportation receipt. For the purposes of this paragraph, the Connecticut River is defined as all waters of the river including the bays, setbacks, and tributaries, only to the first highway bridge crossing said tributaries on the Vermont side.~~

~~5.4.9 Commercially prepared and preserved baitfish and fish eggs available from retail stores may be purchased and used as bait, and may be taken home and kept for later use, provided they are retained in the original packaging at all times.~~

~~5.5 Commercial Bait Dealers~~

~~5.5.1 Any person who buys baitfish for resale or sells baitfish is required to obtain a Commercial Bait Dealers Permit from the Commissioner. Only persons operating a place of business and offering baitfish for sale to the public may apply for and hold a Commercial Bait Dealers permit.~~

~~5.5.2 Commercial Bait Dealers may sell as bait only those species of fish listed under section 5.6.1. Commercial Bait Dealers may also sell rainbow smelt as bait, provided they are obtained from a fish hatchery approved by the Commissioner as per paragraph 5.5.4 and its subsections below, or harvested by Open-water/ice fishing and sold for use on the same waterbody on which the Bait Dealer is located as per paragraph 5.5.5 and its subsections below.~~

~~5.5.3 Commercial Bait Dealers must declare in their permit application if they will be a Statewide baitfish dealer, or a Waterbody-Specific baitfish dealer.~~

~~5.5.4 Statewide baitfish dealers are prohibited from possessing, buying or selling wild-caught baitfish.~~

~~5.5.4.1 Baitfish sold by Statewide baitfish dealers must originate from a fish hatchery approved by the Commissioner.~~

~~5.5.4.2 Statewide baitfish dealers must hold or keep baitfish in waters drawn from a secure well or municipal water source, or other water source as approved by the Department of Fish and Wildlife.~~

~~5.5.4.3 Baitfish sold by Statewide baitfish dealers may be used in waters throughout the state, except those waters as described in Section 6.0 of this regulation.~~

~~5.5.5 Waterbody-specific baitfish dealers must declare on their permit application the waterbody on which they are located.~~

~~5.5.5.1 Waterbody-specific baitfish dealers may harvest wild baitfish only from the declared waterbody, and offer them for sale and use only on the declared waterbody.~~

~~5.5.5.2 Waterbody-specific baitfish dealers must have baitfish holding facilities that discharge directly to their declared waterbody. Holding facilities must not discharge to other waters of the state.~~

~~5.5.5.3 Waterbody-specific baitfish dealers shall not operate dip nets, cast nets, or umbrella nets exceeding 51 square feet of mesh, or a seine net exceeding 125 feet in length, for the purposes of taking fish for bait, unless otherwise provided for on a Commercial Bait Dealers Permit. Baitfish netting is prohibited in all Seasonally Closed Waters as listed in Section 9.0 of this regulation, unless otherwise provided for on a Commercial Bait Dealers Permit.~~

5.5.5.4 All traps, nets, baitboxes or other holding receptacles capable of taking, holding or keeping live baitfish in public waters must be marked with the name and address of the owner and user.

5.5.5.5 The commercial harvest of baitfish is prohibited on any waterbody of the state that is defined as closed to baitfish harvest. The Department will maintain and make available a list of closed waters.

5.5.6 A Commercial Bait Dealer shall provide to each customer at the point of sale a copy of a transportation receipt containing the following information: 1) A unique receipt identification number, 2) The name and telephone number of the bait dealer, 3) time and date of sale, 4) species purchased, 5) quantity purchased, 6) waterbody (limited to one) on which the baitfish will be used, 7) signature of purchaser.

5.5.7 A transportation receipt shall be valid for 96 hours from time and date of sale.

5.5.8 Receipt books shall be provided to Commercial Bait Dealers by the Department.

5.5.9 Any holder of a Commercial Bait Dealers Permit shall maintain receipts or records for each lot of wholesaled hatchery-raised or wild-caught baitfish introduced into their shop. The receipts or records shall include: name, address and telephone number of seller (for wholesaled baitfish), and date received, species identification, and quantity purchased or harvested, for wholesaled and wild-caught baitfish. The permit holder shall retain the receipts and records for at least one year after the date of sale or harvest. Receipts or records must be provided to the Department immediately upon request.

5.6 Approved Species of Fish for use as Bait

5.6.1 Banded killifish *Fundulus diaphanus*
Blacknose dace *Rhinichthys atratulus*
Bluntnose minnow *Pimephales notatus*
Common shiner *Luxilus cornutus*
Creek chub *Semotilus atromaculatus*
Eastern silvery minnow *Hybognathus regius*
Emerald shiner *Notropis atherinoides*
Fallfish *Semotilus corporalis*
Fathead minnow *Pimephales promelas*
Golden shiner *Notemigonus crysoleucas*
Longnose dace *Rhinichthys cataractae*

~~Longnose sucker *Catostomus catostomus*~~
~~Mimic shiner *Notropis volucellus*~~
~~Northern redbelly dace *Phoxinus eos*~~
~~Spottail shiner *Notropis hudsonius*~~
~~White sucker *Catostomus commersoni*~~

~~5.6.2~~ ~~The following additional fish species, or parts thereof, may be taken only by Open-water/ice fishing and used for bait only in those waters where taken and shall not be transported alive from those waters; only Rainbow smelt may be commercially sold as bait:~~

~~Bluegill *Lepomis macrochirus*~~
~~Pumpkinseed *Lepomis gibbosus*~~
~~Rainbow smelt *Osmerus mordax*~~
~~Rock bass *Ambloplites rupestris*~~
~~Yellow perch *Perca flavescens*~~

~~5.6.3~~ ~~Lake Champlain – In addition to 5.6.2, the following fish species, or parts thereof, may be taken only by Open-water/ice fishing in Lake Champlain and used as bait in Lake Champlain, as described in Section 7.0 of this regulation, and may not be commercially harvested or sold as bait; Alewife may only be used/possessed if dead:~~

~~Alewife *Alosa pseudoharengus*~~
~~White perch *Morone americana*~~

~~5.6.4~~ ~~All other species of fish are prohibited for use as bait.~~

~~5.7~~ ~~Commercial Bait Dealer Application Process~~

~~5.7.1~~ ~~A party who wishes to obtain a Commercial Bait Dealers Permit shall apply to the Commissioner in writing on a form provided by the Department. The Department may require the applicant to submit such additional information as is necessary to determine that the permitted activities comply with the purposes of this rule, including but not limited to fish health testing, and the impact to Vermont's fish and fisheries.~~

~~5.7.2~~ ~~If the application is deficient, the Department shall inform the applicant of the deficiencies and return the application within 30 days of receipt, along with any associated fee, to the applicant for revision and re-submission.~~

~~5.7.3~~ ~~If the application is denied, the Commissioner shall, within 30 days of receipt of application, send the applicant a written denial providing the reasons for the denied.~~

~~5.8 Permit Compliance~~

~~5.8.1 The Permittee shall make the permit available upon request by an agent of the Department. Premises and equipment used by persons to take, store, or deal in baitfish shall be accessible for inspection by the Commissioner and his or her agents. Samples for species determination or disease examination shall be made available immediately upon request.~~

~~5.8.2 Permittees shall provide the Department with additional information as requested on an annual basis or prior to the re-issuance of a new permit.~~

~~5.9 Permit Revocation~~

~~5.9.1 The Commissioner may revoke any permit issued in order to protect regulated species: for any violation of a permit; failure to comply with this rule; a violation of any rules of the Board; or a violation of the provisions of Part 4, Title 10, Vermont Statutes Annotated; if the Commissioner determines it is in the best interest of the fish or fisheries of Vermont.~~

~~5.9.2 Prior to permit revocation, the Commissioner shall provide a proceeding consistent with 3 V.S.A. § 814(c).~~

~~5.9.3 Appeals of the decisions of the Commissioner are subject to the Vermont Rules of Civil Procedure.~~

~~6.0 Use of fish as bait~~

~~The use of fish in any form whether alive or dead for bait in fishing is prohibited in:~~

~~Adams Reservoir, Woodford;~~
~~Beaver Pond, Holland;~~
~~Beebe Pond, Sunderland;~~
~~Big Mud Pond, Mt. Tabor;~~
~~Blake Pond, Sutton;~~
~~Bourn Pond, Sunderland;~~
~~Branch Pond, Sunderland;~~
~~Cow Mountain Pond, Granby;~~
~~Griffith Lake, Mt. Tabor;~~
~~Jobs Pond, Westmore;~~
~~Lewis Pond, Lewis;~~

~~Little Rock Pond, Wallingford;~~
~~Martins Pond, Peacham;~~
~~McIntosh Pond, Royalton;~~
~~North Pond, Chittenden;~~
~~Notch Pond, Ferdinand;~~
~~Red Mill Pond, Woodford;~~
~~Sterling Pond, Cambridge;~~
~~South America Pond, Ferdinand;~~
~~Stratton Pond, Stratton;~~
~~Unknown Pond, Averys Gore;~~
~~Unknown Pond, Ferdinand~~

~~and any ponds as may be created or reclaimed by the Department of Fish and Wildlife. This regulation shall be posted at all waters affected.~~

~~7.0~~ 5.0 Lake Champlain Boundaries

Lake Champlain proper shall be considered to include the setback at the same level and the major tributaries to the lake to the following boundaries:

Dead Creek to Panton Road bridge in Panton;
East Creek to the falls in Orwell (downstream of Mount Independence Road);
Lamoille River to the top of first dam (Peterson Dam) in Milton;
LaPlatte River to the falls in Shelburne (under Falls Road bridge);
Lewis Creek to falls in North Ferrisburgh (just upstream of Old Hollow Road);
Little Otter Creek to falls in Ferrisburgh Center (downstream of Little Chicago Road);
Malletts Creek to the first falls upstream of Roosevelt Highway (US 2 and US 7) in Colchester;
Mill River in Georgia to the falls in Georgia (just upstream of Georgia Shore Road bridge);
Missisquoi River to the top of Swanton Dam in the Village of Swanton;
Mud Creek to the dam in Alburg (just upstream of Route 78 bridge);
Otter Creek to the top of the dam in the city of Vergennes;
Poultney River to Central Vermont Power Dam at Carver Falls in West Haven.
Rock River to first Canadian border crossing;
Winooski River to the Winooski One hydropower dam west of Main Street (US 7) in Winooski and Burlington;

~~8.0~~ 6.0 Clyde River: Catch and Release

Between September 1 and October 31, on the Clyde River from Lake Memphremagog upstream to Charleston Dam (Lubber Lake), West Charleston, a person may fish with artificial flies and lures only, and all salmon caught must be released.

~~9.0~~ 7.0 Seasonally Closed Waters

~~9.1~~ 7.1 The following lakes and ponds or portions thereof are hereby designated Seasonally Closed Waters and shall be closed to all fishing except during the open season for trout as provided in section 8 of these regulations:

Adams Reservoir, Woodford
Ansel Pond, Bethel
Baker Pond, Barton
Bald Hill Pond, Westmore
Bean Pond, Sutton
Beaver Pond, Holland
Beck Pond, Newark
Beebe Pond, Sunderland
Big Averill Lake, Norton and Averill
Big Mud Pond, Mt. Tabor
Blake Pond, Sutton
Bourn Pond, Sunderland
Branch Pond, Sunderland
Brown Pond, Westmore
Caspian Lake, Greensboro
Center Pond, Newark
Colby Pond, Plymouth
Cow Mountain Pond, Granby
Crystal Lake, Barton
Duck Pond, Sutton
Dufresne Pond, Manchester
East Long Pond, Woodbury
Echo Lake, Charleston
Ewell Pond, Peacham
Forest Lake, Averill
Goshen Dam (Sugar Hill Reservoir),Goshen
Griffith Lake, Mt. Tabor
Hapgood Pond, Peru
Hartwell Pond, Albany
Holland Pond, Holland
Jobs Pond, Westmore

Knapp Brook Pond No. 1, Reading and Cavendish
Knapp Brook Pond No. 2, Reading and Cavendish
Lake Dunmore-Salisbury and Leicester - Except from Sucker Brook to the island south, which shall be open.
Levi Pond, Groton
Lewis Pond, Lewis
Little Averill Lake, Averill
Little Elmore Pond, Elmore
Little Rocky Pond, Wallingford
Long Pond, Newbury
Long Pond, Westmore
Maidstone Lake, Maidstone
Marl Pond, Sutton
Martins Pond, Peacham
May Pond, Barton
McIntosh Pond, Royalton
Mud Pond, Hyde Park
Nelson Pond (Forest Lake), Calais and Woodbury
Nichols Pond, Woodbury
North Pond, Chittenden
Norton Pond, Norton
Notch Pond, Ferdinand
Noyes (Seyon) Pond, Groton
Peacham Pond, Peacham
Perch Pond (Zack Woods Pond), Hyde Park
Pigeon Pond, Groton
Red Mill Pond, Woodford
Seymour Lake, Morgan
Shadow Lake, Glover
Silver Lake, Leicester
South America Pond, Ferdinand
South Pond, Marlboro
Spring Lake, Shrewsbury
Stannard Pond, Stannard
Sterling Pond, Cambridge
Stoughton Pond, Weathersfield
Stratton Pond, Stratton
Sunset Lake, Benson
Unknown Pond, Averys Gore
Unknown Pond, Ferdinand
Vail Pond, Sutton
Vernon Hatchery Pond, Vernon
West Mountain Pond, Maidstone
Wheeler Pond, Barton and Sutton
Willoughby Lake, Westmore

Zack Woods (Perch Pond), Hyde Park

~~9.2~~ 7.2 All streams are hereby designated Seasonally Closed Waters and shall be closed to all fishing, except during the open season for trout as provided in section ~~10~~8 of these regulations; and

~~9.2.1~~ 7.2.1 except that the following streams shall be open to trout fishing only, and no fishing for other species shall be allowed, from November 1 to the Friday before the second Saturday in April, as set forth in Table ~~9~~7.2.2.

~~9~~7.2.2: STREAMS OPEN TO FISHING FOR TROUT ONLY FROM NOVEMBER 1 TO THE FRIDAY BEFORE THE SECOND WEEK IN APRIL

1. Waters	2. Methods	3.Season	Size Restrictions	5.Daily Bag Limit
Listed Below	Artificial fly or lure only	November 1 to the Friday before the 2nd Saturday in April:	Catch and release only	Zero-All trout must be immediately released to the water where taken:
Black River – From the top of the Lovejoy Dam in Springfield upstream to the Howard Hill Road Bridge in Cavendish. **Deerfield River –** From the Woods Road (Medburyville) bridge in Wilmington upstream approximately 2 miles to the VT Route 9W bridge in Searsburg. **East Creek (Rutland City) –** From the confluence with Otter Creek upstream (approximately 2.7 miles) to the top of the Patch Dam in Rutland City. **Hoosic River –** From the Vermont/New York border upstream to the Vermont/Massachusetts border. **Lamoille River** – From the top of the hydroelectric dam at Fairfax Falls upstream to the top of the Cady's Falls Dam in Morristown. **Moose River –** From the confluence with Passumpsic River upstream to the downstream edge of the Concord Avenue bridge in St. Johnsbury. **Otter Creek** – From the top of the Center Rutland Falls in Rutland upstream to the Danby-Mt. Tabor Forest Road Bridge (Forest Road #10) in Mt. Tabor. **Passumpsic River –** From the Connecticut River boundary upstream to the top of Arnolds Falls Dam in St. Johnsbury. **Walloomsac River**– From the Vermont/New York border in Bennington upstream to the top of the former Vermont Tissue Plant Dam (downstream of Murphy Road) in Bennington. **Winooski River** – From the top of the Bolton Dam in Waterbury and Duxbury upstream to the VT Route 2/100 in Duxbury and Waterbury.				

~~10.0~~ 8.0 Fish – Open Seasons, Size Restrictions and Daily Bag Limits.

Fish of the species named or described in the tables set forth below may be taken:

In the waters specified in column 1, by the method specified in column 2., during the open season specified in column 3.

Provided they meet any size restrictions specified in column 4., and only in numbers listed under daily bag limits specified in column 5., under no circumstances may a person take in one day, more than the daily bag or weight limit from a listed body of water. No person may take in aggregate more than the daily State-wide aggregate limit for any species listed.

Businesses may buy lawfully taken fish, with the approval of the Commissioner, pursuant to the Commercial angling rules set forth in 10 V.S.A App. 123.

~~10.1~~ 8.1 Possession limits are equal to twice the daily bag limits. Fish species with limit restrictions may not be possessed in excess of the possession limits at any time.

~~10.1.1~~ 8.1.1 No person shall have live fish in their possession that are transported in a manner which attempts to keep them alive when leaving waters of the state (10 V.S.A. §1251(13)), except as follows:

~~10.1.1.1~~ 8.1.1.1 the person has been issued a Commercial Bait Dealers Permit by the Commissioner,

~~10.1.1.2~~ 8.1.1.2 the person has been issued a scientific collection permit by the Commissioner which specifically approves of the activity,

~~10.1.1.3~~ 8.1.1.3 the person has been issued a fish transportation permit by the Commissioner which specifically approves of the activity,

~~10.1.1.4~~ 8.1.1.4 the person has been issued a fish breeders permit or fish importation permit by the Commissioner which specifically approves of the activity.

~~10.2~~ 8.2 The daily bag limit for a fish species on a water body with a closed season for that fish species is zero.

~~10.3~~ 8.3 “General waters" restrictions are the provisions applicable to all waters of the state, except the waters specifically named or described.

~~10.4~~ 8.4 Unless otherwise specifically provided, fish not listed in this regulation may be taken at any time and without size or catch limit, in

waters not listed as Seasonally Closed Waters in Section 7 of these regulations.

~~10.5~~ 8.5 Open Seasons, Size Restrictions and Daily Bag Limits Tables

~~10.5.1~~ 8.5.1 STATEWIDE AGGREGRATE DAILY BAG LIMITS *(Maximum number of a fish species that may be taken in one day)*

FISH SPECIES	DAILY AGGREGRATE LIMITS
Brook Trout	12 fish
Brown and Rainbow Trout	Maximum Combination of 6 fish
Lake Trout	2 fish, (3 if taken from Lake Champlain)
Salmon	2 fish
Largemouth and Smallmouth Bass	Maximum combination of 5 fish
Northern Pike	5 fish
Chain Pickerel	10 fish
Muskellunge	0 fish
Walleye	3 fish
Black and White Crappie	25 fish
American Shad	0 fish
Yellow Perch	50 fish
Yellow Perch exception	Lake Champlain – no daily limit
Sauger	0 fish

~~10.5.2~~ 8.5.2 BROOK, BROWN AND RAINBOW TROUT

1.Waters	2. Methods	3. Season	4.Size Restrictions	5.Daily Bag Limit
General waters. *(except as listed below)*	Open-water fishing	Second Saturday in April through October 31	No restriction	6 trout
Lake Champlain	Open-water and ice fishing	No closed season	Minimum length of 12 inches	3 trout
Rivers and Streams	Open-water fishing	Second Saturday in April through October 31	No restriction	12 trout, of which not more than 6 can be brown and/or rainbow

APPENDIX 122
ANNOTATED

~~10~~8.5.3 TROPHY TROUT STREAMS

1.Waters	**2. Methods**	**3. Season**	**4.Size Restrictions**	**5.Daily Bag Limit**
Listed Below**:**	Open-water fishing	Second Saturday in April through October 31	No restriction	2 trout in aggregate

Black River along Rt. 131 in Weathersfield and Cavendish, - from Downers covered bridge upstream (approximately 4 miles) to the next bridge across the river, the Howard Hill Bridge.

East Creek in Rutland City -- From the confluence with Otter Creek upstream (approximately 2.7 miles) to the top of the Patch Dam in Rutland City

Lamoille River – From the downstream edge of the bridge on Route 104 in the Village of Fairfax upstream (approximately 1.6 miles) to the top of the Fairfax Falls Dam in Fairfax.

Little River – From the confluence with Winooski River in Waterbury upstream to the top of the Waterbury Reservoir Dam in Waterbury.

Missisquoi River in Enosburg and Sheldon -- From the downstream edge of Kane Road (TH-3) bridge upstream(approximately 5.7 miles) to the top of the Enosburg Falls Dam in Enosburg Falls.

Otter Creek in Danby and Mt. Tabor - From the Vermont Railway Bridge north of the fishing access upstream (approximately 2 miles) to the Danby- Mt. Tabor Forest Rd. Bridge (Forest Road # 10).

Passumpsic River in the Village of St. Johnsbury – From the top of the Gage Dam in St,. Johnsbury upstream (approximately 2.4 miles) to the top of the Arnold Falls Dam.

Moose River-- From the confluence with the Passumpsic River upstream (approximately 350 feet) to the downstream edge of the Concord Avenue bridge in the Village of St. Johnsbury

Walloomsac River in Shaftsbury and Bennington – From the Vermont/New York border in Shaftsbury upstream to the top of the former Vermont Tissue Plant Dam (downstream of Murphy Road) in Bennington.

Winooski River in Duxbury and Waterbury, - From the top of the Bolton Dam in Duxbury and Waterbury upstream to the Route 2 Bridge (east side of Waterbury Village).

~~10~~8.5.4 RAINBOW TROUT (Including STEELHEAD) / BROWN TROUT

1.WATERS	2. Methods	3. Season	4.Size Restrictions	5.Daily Bag Limit
Listed Below:	Open-water fishing	Second Saturday in April through October 31	Minimum length of 10 inches	2 trout

Lakes and Ponds:

Caspian Lake, Greensboro
Echo Lake, Charleston
Lake Memphremagog (including South Bay), Coventry, Derby, Newport City and Newport;
Willoughby Lake, Westmore

Rivers and Streams:

Orleans County:

Barton River - From Lake Memphremagog upstream to the downstream side of the US Route 5 bridge southernmost and closest to the Village of Barton in Barton.
Black River - From Lake Memphremagog upstream to the downstream side of the VT Route 14 / 58 bridge in Irasburg**.**
Johns River-From the downstream edge of the first bridge (culvert) upstream of Lake Memphremagog on North Derby Road (TH #6) upstream to U.S. 5, in Derby.
Willoughby River - The entire Willoughby River, from confluence with Barton River in Barton upstream to the Willoughby Lake outlet in Westmore.

APPENDIX 122
ANNOTATED

~~10~~8.5.5 BROOK, BROWN, RAINBOW, LAKE TROUT AND SALMON – 2 FISH AGGREGATE LIMITS

1.Waters	2.Methods	3.Season	4. Size Restrictions	5. Daily Bag Limit
Listed below:	Open-water Fishing	Second Saturday in April through October 31	See regulations for specific bodies of water	Two fish in aggregate
Big Averill Lake, Norton and Averill Caspian Lake, Greensboro Center Pond, Newark Crystal Lake, Barton East Long Pond, Woodbury Echo Lake, Charleston Elligo Lake, Craftsbury and Greensboro Forest Lake (Nelson Pond), Calais and Woodbury Harveys Lake, Barnet <u>Jobs Pond, Westmore</u> Lake Dunmore, Salisbury Lake Memphremagog (including South Bay ~~and the connecting waters~~), Coventry, Derby, Newport City and Newport; Little Averill Lake, Averill Long Pond, Westmore Maidstone Lake, Maidstone <u>Martins Pond, Peacham</u> Nelson Pond (Forest Lake), Calais and Woodbury Nichols Pond, Woodbury Seymour Lake, Morgan Shadow Lake, Glover Spring Lake, Shrewsbury Sunset Lake, Benson Willoughby Lake, Westmore				

APPENDIX 122
ANNOTATED

~~10~~8.5.6 STREAMS OPEN TO YEAR ROUND TROUT FISHING

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag Limit
The following portions of the specified rivers shall be open to fishing for trout year round**:** *(Listed below)*	Artificial fly or lure only, except during the open season for trout.	No closed season for catch and release only Open season; from the 2nd Saturday in April through October 31	Catch and release only During the open season follow any species restrictions for the selected river	Zero-All trout must be immediately returned to the waters where taken, except during the open season, limits apply in accordance with the river selected.

Black River – From the Connecticut River boundary upstream to the top of the Lovejoy Dam in Springfield.

Lamoille River – From the Lake Champlain boundary (top of Peterson Dam in Milton) upstream to the top of the hydroelectric Dam at Fairfax Falls.

Lewis Creek – From the Lake Champlain boundary upstream to the State Prison Hollow Road (TH #3) bridge in Starksboro.

Missisquoi River – From Lake Champlain boundary upstream to the top of the Enosburg Falls Dam in Enosburg Falls.

Ompompanoosuc River – From the Connecticut River boundary upstream to the Union Village Dam in Thetford.

Otter Creek – From the Lake Champlain boundary upstream to top of Center Rutland Falls in Rutland.

Waits River – From the Connecticut River boundary upstream to the top of the Central Vermont Power Dam in Bradford.

West River – From the Connecticut River boundary upstream to the Townshend Dam in Townshend.

White River – From the Connecticut River boundary upstream to the bridge on Route 107 in Bethel.

Williams River – From the Connecticut River boundary upstream to the top of the dam at Brockway Mills Falls in Rockingham.

Winooski River – From the Lake Champlain boundary upstream to the Bolton Dam in Duxbury and Waterbury.

APPENDIX 122
ANNOTATED

~~10~~8.5.7 LAKE TROUT AND SALMON

1. Waters	2.Methods	3.Season	4. Size Restrictions	5. Daily Bag Limit
General Waters (*except as listed below*)	Open-water fishing	Second Saturday in April through October 31	Salmon- Minimum length of 15 inches Lake Trout- Minimum length of 18 inches	2 Lake Trout or 2 Salmon or 1 of each
Lake Champlain	Open-water and ice fishing	No closed season	Lake Trout and Salmon – Minimum length of 15 inches	3 Lake Trout and 2 Salmon
Little Averill Lake and Seymour Lake	Open-water fishing, with not more than 1 line	Angling: second Saturday in April through October 31	Lake Trout- Minimum length of 20 inches Salmon- Minimum length of 15 inches	1 Lake Trout and 1 Salmon or 2 Salmon
	Ice fishing with not more than 4 lines	Ice fishing: third Saturday in January through March 15		
Clyde Pond, Salem Lake, Little Salem Lake, and Clyde River from Lake Memphremagog upstream to Citizen's Charleston Dam (Lubber Lake), West Charleston	Open-water fishing	Second Saturday in April through August 31	Lake Trout- Minimum length of 18 inches Salmon- Minimum length of 17 inches	2 Lake Trout or 2 Salmon or 1 of each
	Open-water fishing;Clyde River from Lake Memphremagog to Charleston	September 1 through October 31	Lake Trout- Minimum length of 18 inches	2 Lake Trout, 0 Salmon (all salmon must be

	Dam – Artificial flies and lures only			immediately released)
Lake Memphremagog (including South Bay)	Open-water fishing	Second Saturday in April through October 31	Lake Trout-Minimum length of 18 inches Salmon-Minimum length of 17 inches	2 Lake Trout or 2 Salmon or 1 of each
	Ice fishing	Third Saturday in January through March 15		
Listed Below:	Open-water fishing	Second Saturday in April through October 31	Lake Trout-Minimum length of 18 inches Salmon-Minimum length of 17 inches	2 Lake Trout or 2 Salmon or 1 of each
Orleans County: Barton River - From Lake Memphremagog upstream to the downstream side of the US Route 5 bridge southernmost and closest to the Village of Barton in Barton. Black River - From Lake Memphremagog upstream to the downstream side of the VT Route 14 / 58 bridge in Irasburg**.** Johns River-From the downstream edge of the first bridge (culvert) upstream of Lake Memphremagog on North Derby Road (TH #6) upstream to U.S. 5, in Derby. Willoughby River - The entire Willoughby River, from confluence with Barton River in Barton upstream to the Willoughby Lake outlet in Westmore.				

APPENDIX 122
ANNOTATED

~~10~~8.5.8 SPECIAL ICE FISHING PROVISION FOR BROOK, BROWN, RAINBOW, LAKE TROUT, SALMON AND BASS

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag Limit
Listed below:	Ice fishing	Third Saturday in January through March 15	See species restriction for individual body of water	See species restriction for individual body of water
Big Averill Lake, Norton and Averill; Big Salem Lake, Derby Caspian Lake, Greensboro; Chittenden Dam, Chittenden. Crystal Lake, Barton; Echo Lake, Charleston; Echo Lake, Plymouth; Eden Lake, Eden; Elligo Lake, Craftsbury and Greensboro Glen Lake, Castleton, Fair Haven, and Benson; Harriman Reservoir, Whitingham and Wilmington; Harveys Lake, Barnet; Island Pond, Brighton; Joes Pond, Cabot, Danville; Lake Bomoseen, Castleton and Hubbardton; Lake Dunmore, Leicester and, Salisbury; Lake Fairlee, Thetford, West Fairlee, Fairlee; Lake Hortonia, Sudbury, Hubbardton; Lake Memphremagog (including South Bay), Coventry, Derby, Newport City and Newport; Lake Morey, Fairlee; Lake Rescue, Ludlow; Lake St. Catherine, Wells, Poultney; Little Averill Lake, Averill; Little Salem Lake Derby; Maidstone Lake, Maidstone; Marshfield Dam (Mollys Falls Reservoir), Cabot; Miles Pond, Concord; Nelson Pond (Forest Lake), Calais and Woodbury; Newark Pond, Newark; Norton Pond, Norton; Parker Pond, Glover; Peacham Pond, Peacham; Pensioner Pond, Charleston; Seymour Lake, Morgan; Shadow Lake, Glover; Somerset Reservoir, Somerset; Sunset Lake, Benson; Wallace Pond, Canaan; Waterbury Reservoir, Waterbury; Willoughby Lake, Westmore; Woodbury Lake (Sabin Pond), Calais and Woodbury				

APPENDIX 122
ANNOTATED

~~10~~8.5.9 SPECIAL REGULATION TROUT STREAMS

1. Waters	2. Method	3. Season	4. Size Restrictions	5. Daily Bag Limit
~~**Lamoille River** From the downstream edge of the railroad bridge in Johnson upstream (approximately 3.7 miles) to the downstream edge of the Ten Bends Drive bridge in Hyde Park.~~	~~Open-water fishing, with artificial lures and flies only.~~	~~Second Saturday in April through October 31.~~	~~Minimum length of 16 inches.~~	~~2 trout~~
White River From the confluence with Lilliesville Brook in Stockbridge downstream 3.3 miles to 220 ft. downstream of the confluence with Cleveland Brook in Bethel.	Open-water fishing, with artificial lures and flies only.	Second Saturday in April through October 31.	Minimum length of 18 inches	1 trout
Mettawee River – From the downstream edge of the Route 153 bridge in Pawlet upstream (approximately 16 miles) to the downstream edge of first bridge on Dorset Hollow Road and including tributary: Flower Brook upstream (approximately 1000ft) to the downstream edge of the Route 30 bridge in Pawlet.	Open-water fishing	Second Saturday in April through October 31	10 to 14 inches protected slot: (*all trout 10 to 14 inches must be released*)	2 trout, only 1 greater than 14 inches
Winooski River Tributaries – Listed Below	Open-water fishing	June 1 through October 31	10 to 16 inches protected slot: (*all fish 10 to 16 inches must be released)*	2 trout, only 1 greater than 16 inches
Winooski River Tributaries: Joiner Brook, Bolton - From the confluence of the Winooski River upstream approximately 1900 feet to the first falls. Pinneo Brook, Bolton – From the confluence of the Winooski River upstream approximately 100 feet to the railroad crossing.				

Preston Brook, Bolton - From the confluence of the Winooski River upstream approximately 2600 feet to the first falls. Ridley Brook, Duxbury – From the confluence of the Winooski River upstream approximately 1700 feet to the first falls.				
Listed Below:	Open-water fishing	Second Saturday in April through October 31	10 to 16 inches protected slot: (*all fish 10 to 16 inches must be released)*	2 trout, only 1 greater than 16 inches
New Haven River – From Munger Street Bridge in New Haven upstream (approximately 4.1 miles) to the South Street bridge in Bristol. **Winooski River –** From Preston Brook mouth upstream (approximately 4.4 miles) to the Ridley Brook mouth.				
Batten Kill – From the New York State line upstream (approximately 20.6 miles) to downstream side of Depot Street Bridge (Route 11/30) in Manchester.	Open-water fishing	Second Saturday in April through October 31	All trout must be immediately released.	Zero, all trout must be immediately released.
Dog River – From the downstream edge of the Junction Road Bridge in Berlin/Montpelier upstream to the top of the Northfield Falls Dam in Northfield.	Open-water fishing with artificial lures and flies only for anglers 15 years of age and older	Second Saturday in April through October 31	All trout must be immediately released.	Zero, all trout must be immediately released.
Listed below:	Open-water fishing	Second Saturday in April through September 30	No size restriction.	12 trout of which not more than 6 can be brown and/or rainbow trout in aggregate.
	Open-water fishing	October 1 through October 31	All trout must be immediately released.	Zero, all trout must be immediately released.

Batten Kill (East Branch) – In towns of Manchester and Dorset from the downstream side of Depot Street Bridge (Route 11/30) in Manchester upstream (approximately 5.0 miles) to the downstream side of the US Route 7 Bridge south of East Dorset.
Green River – In the towns of Arlington and Sandgate from its confluence with Batten Kill upstream (approximately 8.5 miles) to the confluence with Moffitt Hollow Brook in Beartown.
Roaring Branch – In the towns of Arlington and Sunderland from its confluence with the Batten Kill upstream (approximately 3.0 miles) to the downstream side of the Bridge #14 on Sunderland TH# 3 in East Kansas.
Warm Brook – In the town of Arlington from its Confluence with the Roaring Branch upstream (approximately 0.8 miles) to the base of the so-called Hale Company Dam in East Arlington.

APPENDIX 122
ANNOTATED

~~10~~8.5.10 ANADROMOUS ALANTIC SALMON

1. Waters	2. Method	3. Season	4. Size Restrictions	5. Daily Bag Limit
Connecticut River and tributaries	No person shall take or attempt to take an anadromous Atlantic salmon, any salmon unintentionally taken shall be immediately released in accordance with section 4602	No open season	All fish must be immediately released	Zero - All Anadromous Atlantic salmon must be immediately released

~~10~~8.5.11 AMERICAN SHAD

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
Connecticut River, including Vermont river tributaries	Open-water fishing	No closed season	All shad must be released	Zero – All shad must be immediately released.

APPENDIX 122
ANNOTATED

~~10~~8.5.12 BOWFIN, REDHORSE SUCKER (MULLET), LONGNOSE GAR.

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters *and as listed below)*	Open-water and ice fishing	No closed season	No restriction	No more than 5 fish of any one species
General Waters *(Except seasonally closed waters and as listed below)*	Speargun, bow and crossbow all with line attached to arrow	No Closed Season	No restriction	No more than 5 fish of any one species
Lake Champlain, not to include tributaries	Open-water and ice fishing, speargun, bow and crossbow all with line attached to arrow	No closed season	No restriction	No more than 5 fish of any one species
Lake Champlain, not to include tributaries	Shooting and Handheld Spear	March 25 through May 25, Title 10 (4606e)	No restriction	No more than 5 fish of any one species

~~10~~ 8.5.13 SUCKER (LONGNOSE AND WHITE), and CULL FISH

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters *(and as listed below)*	Open-water and ice fishing	No closed season	No restriction	No Limit
General Waters *(Except seasonally closed waters and as listed below)*	Speargun, ~~and~~ bow and crossbow all with line attached to arrow	No Closed Season	No restriction	No Limit
Lake Champlain, not to include tributaries	Open-water and ice fishing, speargun, ~~and~~ bow and crossbow all with line attached to arrow	No closed season	No restriction	No Limit
Lake Champlain, not to include tributaries	Shooting and Handheld Spear	March 25 through May 25, Title 10 (4606e)	No restriction	No Limit

~~10~~ 8.5.14 BULLHEAD

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters *(and as listed below)*	Open-water and ice fishing	No closed season	No restriction	No Limit
Lake Champlain, not to include tributaries	Open-water and ice fishing	No closed season	No restriction	No Limit
Lake Champlain, not to include tributaries	Shooting and handheld Spear	March 25 through May 25, Title 10 (4606e)	No restriction	No Limit

APPENDIX 122
ANNOTATED

~~10~~ 8.5.15 NORTHERN PIKE

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters *(except as listed below)*	Open-water and ice fishing	No closed season	Minimum length of 20 inches	5 Fish
Lake Champlain	Open-water and ice fishing,	No closed season	Minimum length of 20 inches	5 Fish
	Shooting and handheld spearing	March 25 through May 25, 10 VSA 4606)	Minimum length of 20 inches	5 Fish

APPENDIX 122
ANNOTATED

~~10~~ 8.5.16 CHAIN AND REDFIN PICKEREL

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters (*except as listed below*)	Open-water and ice fishing	No closed season	No restriction	No limit
Lake Champlain	Open-water and ice fishing	No closed season	No restriction	10 fish
	Shooting and handheld spearing	March 25 through May 25	No restriction	10 ish

~~10~~ 8.5.17 MUSKELLUNGE

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters (*except as listed below)*	Open-water and ice fishing; Catch and release with artificial lures and flies only	No closed season	All muskellunge must be released	Zero - All muskellunge must be immediately released
Lake Champlain	Open-water and ice fishing; Catch and release with artificial lures and flies only	No closed season	All muskellunge must be released	Zero - All muskellunge must be immediately released
	Shooting and handheld spearing	March 25 through May 25, 10 VSA 4606)		Zero Fish

~~10~~ 8.5.18 SMELT

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag Limit
All waters	Open-water and ice fishing	No closed season	No restriction	No limit

~~10~~ 8.5.19 BLACK AND WHITE CRAPPIE

1.Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
All waters	Open-water and ice fishing	No closed season	Minimum length of 8 inches	25 ish, Combined

~~10~~ 8.5.20 YELLOW PERCH

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag Limit
General Waters *(except as listed below)*	Open-water and ice fishing	No closed season	No restriction	50 fish,
Lake Champlain	Open-water and ice fishing	No closed season	No restriction	No Limit
Businesses may buy lawfully taken fish, with the approval of the Commissioner, pursuant to the Commercial angling rule set forth in 10 V.S.A. APP § 123.				

APPENDIX 122
ANNOTATED

~~10~~ 8.5.21 LARGEMOUTH AND SMALLMOUTH BASS

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters *(except as listed below)*	Open-water fishing	No closed season	No restriction	5 fish
Lakes, Ponds and reservoirs	Open-water fishing (Ice fishing - see special provisions)	Second Saturday in June through Nov. 30th.	Minimum length of 10 inches	5 Fish
Lakes, Ponds and reservoirs (seasonally closed)	Open-water fishing: Catch and release with artificial lures and flies only	Second Saturday in April through the Friday before the Second Saturday in June, both dates inclusive.	All bass must be released	Zero - All bass must be immediately released
Lakes, Ponds and reservoirs (not seasonally closed)	Open-water fishing: Catch and release with artificial lures and flies only	Dec. 1 through the Friday before the Second Saturday in June, both dates inclusive.	All bass must be released	Zero - All bass must be immediately released
Seasonally Closed Waters - streams	Open-water fishing	Only when such rivers and streams are open to trout fishing except as prohibited by Section 9.2	No restriction	5 fish
Lake Morey, Fairlee	Open-water fishing (Ice fishing - see special provisions)	Second Saturday in June through Nov. 30.	Largemouth bass – Minimum length of 14 inches	5 Fish
Lake Morey, Fairlee	Open-water fishing: Catch and release	Dec. 1 through the Friday before the	All bass must be released	Zero - All bass must be

	with artificial lures and flies only	Second Saturday in June, both dates inclusive.		immediately released
Kent Pond, Killington And Baker Pond, Brookfield	Open-water fishing	Second Saturday in June through Nov. 30.	Largemouth Bass - protected slot: 10- 12 inches (all fish between 10 & 12 inches must be released)	10 fish, only 1 fish greater than 12 inches.
Kent Pond, Killington And Baker Pond, Brookfield	Open-water fishing: Catch and release with artificial lures and flies only	Dec. 1 through the Friday before the Second Saturday in June, both dates inclusive.	All bass must be released	Zero - All bass must be immediately released

APPENDIX 122
ANNOTATED

~~10~~ 8.5.22 WALLEYE

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters and Lake Champlain (*except as listed below*)	Open-water and ice fishing	First Saturday in May through March 15.	Minimum length of 18 inches	3 Fish
Lake Carmi, Franklin	Open-water and ice fishing	First Saturday in May through March 15	Minimum length of 15 inches Protected lengths- 17 to 19 inches (all fish between 17 & 19 inches must be released	5 fish, provided only 1 is over 19 inches
Chittenden Reservoir, Chittenden	Open-water and ice fishing	June 1 through March 15	Minimum length of 22 inches	2 fish

~~10~~ 8.5.23 SAUGER

1. Waters	2. Methods	3. Season	4. Size Restrictions	5. Daily Bag limits
General Waters and Lake Champlain	Open-water and ice fishing	No open season	Any fish taken must be immediately released	Zero – All Sauger taken must be immediately released

Spawning grounds for game fish-Generally

~~10~~ 8.6 The below listed waters are declared spawning grounds for game fish and are hereby closed to the taking of fish from second Saturday in April through May 31 annually.

Chittenden County

Joiner Brook, Bolton - From the confluence of the Winooski River upstream approximately 1900 feet to the first falls.

Pinneo Brook, Bolton – From the confluence of the Winooski River upstream approximately 100 feet to the railroad crossing.

Preston Brook, Bolton - From the confluence of the Winooski River upstream approximately 2600 feet to the first falls.

Orleans County

Black River - From 600 feet below the falls at Old Harman Mill in Coventry upstream to the top of falls at Old Harman Mill in Coventry.

Ware Brook - From the downstream edge of the furthest downstream bridge / culvert on Back Coventry Road (TH #8 in Irasburg) upstream approximately one mile to top of the first major natural falls on Ware Brook.

Alder (Stony) Brook - From its confluence with the Black River upstream 3 1/2 miles to the outlet of Sargent Pond, in Coventry.

Willoughby River - From the confluence of the Brownington Branch of the Willoughby River in Brownington upstream to the downstream edge of the bridge on Vermont Route 58 in the village of Evansville (Brownington); and from the downstream edge of bridge on Tarbox Hill Road in Orleans Village upstream to the top of the natural falls upstream of the bridge on Tarbox Hill Road in Orleans Village.

Dorin, Wells, Myers, Schoolhouse and Mill Brooks - From mouth of brooks at Lake Willoughby upstream approximately 3/4 mile in Dorin Brook, all of Wells Brook, 1/2 mile in Myers Brook, 1/4 mile in the Schoolhouse Brook and, and 1/4 mile in Mill Brook and tributaries, all in Westmore. For identification purpose these brooks are arranged in order from north to south, and flow through Vermont Agency of Transportation structures on Route 5A number 10, 9, 8, 7 and 6, respectively.

Brownington Branch of the Willoughby River in Brownington - From its confluence at the Willoughby River extending upstream to the second road crossing on Brownington Chilafoux Road (TH #15). Said crossing is located approximately 2.4 miles from Brownington Center on Chilafoux Road (TH #15).

Country Club Brook - From its confluence with the Willoughby River extending upstream to Hollow Road (TH #14) in Barton.

Porter Brook, Greensboro – From Caspian Lake upstream to its headwaters. (1987, Fish and Wildlife Commissioner's Reg. No. 970, eff. April 1, 1987.)

Johns River-From the downstream edge of the bridge on Beebe Road (TH #3) upstream approximately two tenths of a mile to the downstream edge of bridge on Elm Street (TH #2) in Derby.

Outlet Brook- From the highway bridge near Echo Lake in Charleston upstream to the top of dam at outlet of Seymour Lake

Washington County

Chase Brook – From its confluence with the Dog River upstream approximately ½ mile to the top of the natural falls in Berlin.

Ridley Brook, Duxbury – From the confluence of the Winooski River upstream approximately 1700 feet to the first falls.

Windsor County

Lilliesville Brook in the Town of Stockbridge from its confluence with the White River upstream to the 2nd bridge on the Lilliesville Brook Road.

Locust Creek in Bethel from its confluence with the White River upstream to the 2nd bridge on Rt. 12.

~~10~~ 8.7 The below named waters are closed from March 16 through May 31.

Chittenden County

Lamoille River - From the downstream edge of the bridge on Bear Trap Road in Milton (referred to as the West Milton Bridge upstream to the top of first dam (Peterson Dam) in Milton.

Winooski River - From the Winooski One Hydro dam west of Main Street (US 7) in Winooski and Burlington and extending downstream to the downstream side of the first railroad bridge.

Franklin County

Missisquoi River - From the top of the Swanton dam in the Village of Swanton downstream approximately 850 feet to the water treatment plant on the west side of the river, and downstream approximately 850 feet to the upstream end of the cement breakwater on the east side of the river. (1988, Fish and Wildlife Board Reg. No. 975, eff. April 7, 1988.)

~~10~~ 8.8 The below named waters are closed from March 16 to the Friday before the 1st Saturday in May, both dates inclusive:

Franklin County

Missisquoi River - From the top of the Swanton Dam in the Village of Swanton extending downstream 5,120 feet to the Northwest corner (downstream) of the Riverside Cemetery and across the river to a pole on the Northeast bank.

~~10~~ 8.9 The below named waters are closed to fishing year-round:

Orleans County

Clyde River - From 260 feet below the top of the abandoned Mill Dam immediately upstream of the Number 1, 2, 3 hydroelectric powerhouse in Newport City, upstream to the top of the abandoned Mill Dam immediately upstream of the Number 1, 2, 3 hydroelectric powerhouse in Newport City.

~~10~~ 8.10 The below named waters are closed from October 1 through October 31:

Orleans County

Johns River-From the downstream edge of the first bridge (culvert) upstream of Lake Memphremagog on North Derby Road (TH #6) upstream to U.S. 5, in Derby.

APPENDIX 141
ANNOTATED

TITLE 10 Conservation and Development APPENDIX
CHAPTER 2. FISH
Subchapter 2. Seasons, Waters, and Limits

§ 141. Baitfish Regulation

1.0 Authority

This regulation is adopted pursuant to 10 V.S.A. §4081(b). In adopting this regulation, the Fish and Wildlife Board is implementing the policy that the protection, propagation, control, management, and conservation of fish, wildlife and fur-bearing animals in this state is in the interest of the public welfare and that the safeguarding of this valuable resource for the people of the state requires a constant and continual vigilance.

In accordance with 10 V.S.A. §4082, this regulation is designed to maintain the best health, population and utilization levels of Vermont's fisheries.

In accordance with 10 V.S.A. §4083, this regulation establishes open seasons; establishes daily, season, possession limits and size limits; prescribes the manner and means of taking fish; and prescribes the purchase, sale, and use of baitfish.

2.0 Purpose

2.1 This regulation applies to fish used as bait. This regulation shall apply to all persons who take, possess, transport, use, purchase, or sell baitfish.

2.2 The purpose of this paragraph is to: a) conserve and protect the fish, and fisheries in the state, b) maintain the best health of species and natural ecological systems in the state, c) prevent the introduction or spread of diseases or parasites harmful to humans and wild species, and d) prevent the escape or release of non-native species or species that injure or compete with natural ecological systems and processes.

3.0 Definitions

3.1 "Application" means a specific form provided by the Department of Fish and Wildlife.

3.2 "Baitbox" means a receptacle used for holding or keeping baitfish alive for personal use. A legal baitbox shall not exceed 25 cubic feet in volume.

3.3 "Baitfish" means fish species and parts thereof, living or dead, used for the purpose of attracting and catching fish.

3.4 "Baitfish Zone" means a specific geographic area, where it is permissible to use baitfish in accordance with this regulation, and the area is described and depicted on a map by the Commissioner and posted on the Department website.

3.5 "Black-list Water" means a specific waterbody and any listed tributaries where the use of baitfish is restricted in accordance with this regulation, and the waterbody is described and depicted on a map by the Commissioner and posted on the Department website.

3.6 "Commissioner" means the Commissioner of the Vermont Department of Fish and Wildlife.

3.7 "Department" means the Vermont Department of Fish and Wildlife.

3.8 "Fish Hatchery" refers to any fish culture station, hatchery, or artificial rearing pond which grows or maintains baitfish for sale in Vermont.

3.9 "Ice Fishing" means a manner of fishing as described in 10 V.S.A App. §122 Subsection 4.0.

3.10 "Open-water Fishing" means a manner of fishing as described in 10 V.S.A. App. § 122 Subsection 3.0.

3.11 "Permit" is a document from the Commissioner granting a Commercial Bait Dealers Permit.

3.12 "Waterbody" means any lake, pond, river, or stream including all tributaries upstream to the first barrier impassable to upstream fish movement.

3.13 "Commercially Preserved Baitfish" means baitfish which are chemically treated in a manner approved by the Department, and then packaged for retail sale.

3.14 "Personal Baitfish Harvest" and "Personally Harvested Baitfish" means baitfish taken for non-commercial use.

4.0 Personal Baitfish Harvest

4.1 Personally harvested baitfish from black-list waters shall not be used on any other waters or transported away from the black-list water from which they were harvested.

4.2 Personally harvested baitfish may be used on multiple waterbodies and may be transported away from the waterbody from which they were collected and retained for later use, provided that all of the following criteria are met:

4.2.1 The Personally harvested baitfish shall not be harvested from or have been previously used on a black-list water;

4.2.2 Personally harvested baitfish shall only be used in the same baitfish zone they were harvested in; and

4.2.3 A person using personally harvested baitfish on any waterbody that is different from the waterbody where the baitfish was harvested shall possess a wild baitfish endorsement in accordance with Subsection 6.0 of this regulation.

4.3 A person shall only harvest for use as bait those fish species listed under Subsection 8.1, 8.2 and 8.3 of this regulation.

4.4 Personally Harvested Baitfish shall only be taken by the following methods: a) minnow traps no longer than eighteen inches with an entrance for fish not exceeding one inch in diameter, b) dip nets, cast nets, and umbrella nets not exceeding a total of 51 square feet of mesh, or a seine net not exceeding 25 feet in length, c) Open-water/ice fishing by hook and line.

4.5 No person shall personally harvest baitfish in Seasonally Closed Waters for trout as listed in 10 V.S.A. App. § 122, Subsection 7.0, except during the open season for trout. Personal baitfish harvest in seasonally Closed Waters during open seasons for trout shall only be conducted by Open-water/ice fishing or the use of minnow traps no longer than eighteen inches with an entrance for fish not exceeding one inch in diameter.

4.6 All traps, nets, baitboxes or other holding receptacles capable of taking, holding or keeping live baitfish in public waters shall be marked with the name, address, and telephone number of the owner and user.

4.7 Baitfish may be held on the water in a baitbox as defined in Subsection 3.2 of this regulation.

4.8 A person transporting unused personally harvested baitfish away from waters of the state for later use shall hold the baitfish in a closed container

that does not contain surface waters of the state, and is isolated from any lake, pond or stream water, including any inflow or outflow to such waters of the state. This paragraph applies to all personally harvested baitfish with the following exception:

4.8.1 A person transporting personally harvested baitfish away from the waterbody where the baitfish was harvested may hold the baitfish in waters of the baitfish zone where they were harvested provided that water is not a black-list water or waters described in Subsection 12.0 of this regulation; and

4.8.2 The person transporting and holding the baitfish has a wild baitfish endorsement in accordance with subsection 6.0 of this regulation.

4.9 No person shall personally harvest baitfish from any waterbody of the state that is defined as closed to baitfish harvest. The Department will maintain and make available a list of closed waters.

4.10 Fish eggs may be collected from legally harvested fish from Vermont waters, and used immediately as bait on the same water where taken unless that waterbody has been closed to baitfish collection. Personally harvested fish eggs shall not be transported and used in any waterbody other than the waterbody where the fish eggs were harvested. No person shall transport fish eggs away from a waterbody and return them to the same waterbody for use as bait unless they have been processed in a manner approved by the Department as described on the Department website.

5.0 Commercially Purchased Baitfish

5.1 No person shall import baitfish into the State of Vermont without a Fish Importation Permit, except as provided for in Subsections 5.8 and 5.9 of this regulation.

5.2 A person purchasing commercial baitfish shall retain a transportation receipt issued by a state-approved commercial bait dealer, authorizing transportation of baitfish overland. The receipt shall contain the following information: 1) A unique receipt identification number, 2) The name and telephone number of the bait dealer, 3) time and date of sale, 4) species purchased, 5) quantity purchased, 6) baitfish zone or black-list water (limited to one) in which the baitfish will be used, and 7) the signature of purchaser.

5.3 A person in possession of commercially purchased baitfish shall only use those baitfish in the baitfish zone or black-list water recorded on the

transportation receipt and shall retain and exhibit the receipt upon request of the Commissioner or the Commissioner's designee(s).

5.4 A transportation receipt shall be valid for 10 days from time and date of sale.

5.5 A person may transport unused commercially purchased baitfish away from waters of the state, and retain for later use in the same baitfish zone or black-list water as indicated on the baitfish transportation receipt, within 10 days from time and date of sale.

5.6 A person transporting unused commercially purchased baitfish away from waters of the state for later use shall hold the baitfish in a closed container that does not contain surface waters of the state, and is isolated from any lake, pond or stream water, including any inflow or outflow to such waters of the state. This paragraph applies to all commercially purchased baitfish with the following exception:

5.6.1 A person transporting unused commercially purchased bait away from waters of the state may hold them in waters of the baitfish zone listed on the transportation receipt provided that the water is not a black-list water and the holding waters are not listed in subsection 12.0 of this regulation.

5.7 Baitfish may be held beyond the 10 days period in a baitfish zone or black-list water provided they remain in the same waterbody in a baitbox in accordance with Subsection 3.2 of this regulation.

5.8 A person may purchase baitfish from a New York baitshop for use in the Lake Champlain black-list water, provided the baitshop is Vermont-licensed, and the baitfish are accompanied by a Vermont-issued baitfish transportation receipt. For the purposes of this regulation, the Lake Champlain black-list water are defined in 10 V.S.A. Appendix § 122 Subsection 5.

5.9 A person may purchase baitfish from a New Hampshire baitshop for use in the Connecticut River black-list water, provided the baitshop is Vermont-licensed, and the baitfish are accompanied by a Vermont-issued baitfish transportation receipt. For the purposes of this regulation, the Connecticut River is defined as all waters of the river including the bays, setbacks, and tributaries, but only to the first highway bridge crossing said tributaries on the Vermont side.

5.10 Commercially prepared and preserved baitfish and fish eggs available from retail stores may be purchased and used as bait, taken home, and kept

for later use provided they are retained in the original packaging at all times.

6.0 Wild Baitfish Endorsement

6.1 Any person who wishes to use, sell, or transport personally harvested baitfish outside of the waterbody in which they were harvested must possess and exhibit upon request of the Commissioner or the Commissioner's designee(s) an annual wild baitfish endorsement in addition to their regular fishing or hunting/fishing combination license.

6.2 A person who wishes to obtain an annual wild baitfish endorsement to their regular fishing or hunting/fishing combination license shall satisfactorily complete a wild baitfish certification course. Upon completion of the course, the person shall receive a special notation to their regular fishing or hunting/fishing combination license that indicates an annual wild baitfish endorsement.

6.3 An annual wild baitfish endorsement shall only be valid for the license year when the course was completed.

6.4 The annual wild baitfish certification course shall instruct participants regarding the requirements of the baitfish regulations and the vectors and risks associated with aquatic nuisance species and pathogens.

7.0 Commercial Bait Dealers

7.1 Any person who buys baitfish for resale or sells baitfish shall obtain a Commercial Bait Dealers Permit from the Commissioner except as provided for in Subsection 7.2. Only persons operating a place of business and offering baitfish for sale to the public may apply for and hold a Commercial Bait Dealers permit.

7.2 A Commercial Bait Dealers Permit is not required when:

7.2.1 A person only sells commercially preserved baitfish as defined in Subsection 3.14 of this regulation.

7.2.2 A person sells personally harvested rainbow smelt and meets the following criteria:

7.2.2.1 The personally harvested rainbow smelt shall be harvested, transported, and possessed in accordance with subsection 4.0 of this regulation.

7.2.2.2 The buyer shall possess a valid Zone-specific Commercial Bait Dealers permit.

7.2.2.3 The Commercial Bait Dealer's zone designation shall be the same zone from which the personally harvested rainbow smelt were harvested.

7.2.2.4 The seller shall possess a valid annual wild baitfish endorsement in accordance with subsection 6.0 of this regulation.

7.3 Commercial Bait Dealers shall only purchase and sell the baitfish species listed under Subsection 8.1 of this regulation. Commercial Bait Dealers may also sell rainbow smelt as bait, provided one of the following criteria are met:

7.3.1 Rainbow smelt are obtained from a fish hatchery approved by the Commissioner as set forth in Subsection 7.5 of this regulation and its subsections: or

7.3.2 Rainbow smelt are harvested by Open-water/ice fishing and sold for use on the same waterbody on which the Bait Dealer is located in accordance with Subsection 7.6 of this regulation and its subsections; or

7.3.3 Rainbow smelt are commercially purchased or harvested in accordance with Subsection 7.7 and its subsections.

7.4 Commercial Bait Dealers must declare in their permit application if they will be a Statewide baitfish dealer, Waterbody-Specific baitfish dealer, or a Zone-Specific baitfish dealer (limited to one).

7.5 Statewide baitfish dealers are prohibited from possessing, buying or selling wild-caught baitfish.

7.5.1 Baitfish sold by Statewide baitfish dealers shall originate from a fish hatchery approved by the Commissioner.

7.5.2 Statewide baitfish dealers shall hold or keep baitfish in waters drawn from a secure well, a municipal water source, or other water source approved by the Department.

7.5.3 Baitfish sold by Statewide baitfish dealers may be used in waters throughout the state, except those waters listed in Subsection 12.0 of this regulation.

7.6 Waterbody specific baitfish dealers shall declare on their permit application the waterbody on which they are located.

7.6.1 Waterbody-specific baitfish dealers may harvest wild baitfish only from the declared waterbody and offer them for sale and use only on the declared waterbody.

7.6.2 The baitfish facilities of waterbody specific bait fish dealers shall discharge to their declared waterbody. The discharge treatment infrastructure shall adequately filter and disinfect water to the satisfaction of the Department. Note that this does not relieve the baitfish dealer from compliance with all other applicable requirements.

7.6.3 No Waterbody-specific baitfish dealer shall harvest baitfish by netting in or on seasonally closed waters for trout as listed in 10 V.S.A. Appendix § 122 Subsection 7.0 unless otherwise permitted by their Commercial Bait Dealers Permit. Waterbody specific baitfish dealers shall not operate dip nets, cast nets, or umbrella nets exceeding 51 square feet of mesh, or a seine net exceeding 125 feet in length, for the purposes of taking fish for bait, unless otherwise permitted by their Commercial Bait Dealers Permit.

7.6.4 All traps, nets, baitboxes or other holding receptacles capable of taking, holding or keeping live baitfish in public waters shall be marked with the name, address, and telephone number of the owner and user.

7.6.5 No person shall commercially harvest baitfish on any waterbody of the state that is listed as closed to baitfish harvest. The Department will maintain and make available a list of closed waters.

7.7 Zone-specific baitfish dealers shall declare on their permit application the waterbody on which they are located, the baitfish zone in which they are located, the baitfish zone from which they intend to harvest, and purchase wild baitfish (limited to one) and the baitfish zone where the baitfish they sell may be used (limited to one).

7.7.1 Zone-specific baitfish dealers shall be located in the baitfish zone which they intend to harvest, purchase, hold, and sell baitfish in, with the following exceptions:

7.7.1.1 Baitfish may be purchased from a fish hatchery approved by the Commissioner outside of the Zone-specific dealer's baitfish zone and sold as Zone-specific baitfish.

7.7.1.2 A Zone-specific baitfish dealer can be physically located outside of the baitfish zone in which they intend to sell baitfish for provided they hold or keep baitfish in water drawn from a secure water source as approved by the Department.

7.7.2 Zone-specific baitfish dealers shall harvest and purchase wild baitfish only from the declared baitfish zone where the baitfish they sell may be used, and such baitfish shall be offered for sale and use only in the declared baitfish zone or black-list water within the declared baitfish zone.

7.7.3 Zone-specific baitfish dealers may purchase wild rainbow smelt provided they meet the provisions of subsection 7.2.2 of this regulation.

7.7.4 Zone-specific baitfish dealers shall not harvest or purchase wild baitfish which are from or have been used previously on a black-list water nor shall they hold or keep baitfish in waters drawn from a black-list water.

7.7.5 The baitfish holding facilities of zone-specific baitfish dealers shall discharge to the declared baitfish zone or to a water treatment infrastructure which adequately filters and disinfects water to the satisfaction of the Department. Note that this does not relieve the baitfish dealer from compliance with all other applicable requirements.

7.7.6 No zone-specific baitfish dealer shall harvest baitfish by netting in Seasonally Closed Waters for trout as listed in 10 V.S.A App § 122 Subsection 7.0, unless otherwise permitted by their Commercial Bait Fish Dealers Permit. No zone-specific baitfish dealer shall operate dip nets, cast nets, or umbrella nets that exceed 51 square feet of mesh, or a seine net that exceeds 125 feet in length, for the purposes of taking fish for bait, unless otherwise permitted by their Commercial Bait Dealers Permit.

7.7.7 All traps, nets, baitboxes, or other holding receptacles capable of taking, holding, or keeping live baitfish in public waters shall be marked with the name, address, and telephone number of the owner and user.

7.7.8 No person shall commercially harvest baitfish on any waterbody of the state that is defined as closed to baitfish harvest. The

Department will maintain and make available a list of closed waters.

7.8 A Commercial Bait Dealer shall provide to each customer at the point of sale a copy of a transportation receipt containing the following information: 1) A unique receipt identification number, 2) The name and telephone number of the bait dealer, 3) time and date of sale, 4) species purchased, 5) quantity purchased, 6) baitfish zone or black-list water (limited to one) in which the baitfish will be used, and 7) the signature of purchaser.

7.9 A transportation receipt shall be valid for 10 days from time and date of sale.

7.10 Receipt books shall be provided to Commercial Bait Dealers by the Department.

7.11 Any holder of a Commercial Bait Dealers Permit shall maintain receipts or records for each lot of wholesaled hatchery-raised or wild-caught baitfish introduced into their shop. The receipts or records shall include: name, address and telephone number of seller (for wholesaled baitfish), and date received, species identification, and quantity purchased or harvested, for wholesaled and wild-caught baitfish. The permit holder shall retain the receipts and records for at least one year after the date of sale or harvest. Receipts or records shall be provided to the Department immediately upon request.

8.0 Approved Species of Fish for use as Bait

8.1
Banded killifish *Fundulus diaphanus*
Blacknose dace *Rhinichthys atratulus*
Bluntnose minnow *Pimephales notatus*
Common shiner *Luxilus cornutus*
Creek chub *Semotilus atromaculatus*
Eastern silvery minnow *Hybognathus regius*
Emerald shiner *Notropis atherinoides*
Fallfish *Semotilus corporalis*
Fathead minnow *Pimephales promelas*
Golden shiner *Notemigonus crysoleucas*
Longnose dace *Rhinichthys cataractae*
Longnose sucker *Catostomus catostomus*
Mimic shiner *Notropis volucellus*
Northern redbelly dace *Phoxinus eos*
Spottail shiner *Notropis hudsonius*
White sucker *Catostomus commersoni*

8.2 The following additional fish species, or parts thereof, may be taken only by Open-water/ice fishing and used for bait only in those waters where taken and shall not be transported alive from those waters; only Rainbow smelt may be commercially sold as bait:

Bluegill *Lepomis macrochirus*
Pumpkinseed *Lepomis gibbosus*
Rainbow smelt *Osmerus mordax*
Rock bass *Ambloplites rupestris*
Yellow perch *Perca flavescens*

8.3 Lake Champlain – In addition to Subsection 8.2, the following fish species, or parts thereof, may be taken only by Open-water/ice fishing in Lake Champlain and used as bait in Lake Champlain, as described in 10 V.S.A. App §122 Subsection 5.0, and may not be commercially harvested or sold as bait; Alewife may only be used/possessed if dead:

Alewife *Alosa pseudoharengus*
White perch *Morone americana*

8.4 All other species of fish are prohibited for use as bait.

9.0 Commercial Bait Dealer Application Process

9.1 A person who wishes to obtain a Commercial Bait Dealers Permit shall apply to the Commissioner in writing on a form provided by the Department. The Department may require the applicant to submit such additional information as is necessary to determine that the permitted activities comply with the purposes of this regulation, including but not limited to fish health testing, and an analysis of the impact of the sale of baitfish on Vermont's fish species, fisheries, and natural ecosystems and processes.

9.2 If the application is deficient, the Department shall inform the applicant of the deficiencies and return the application within 30 days of receipt, along with any associated fee, to the applicant for revision and re-submission.

9.3 If the application is denied, the Commissioner shall, within 30 days of receipt of application, send the applicant a written denial setting forth the reasons for the denial.

10.0 Permit Compliance

10.1 The Permittee shall make the permit available upon request by Commissioner or Commissioner's designee. Premises and equipment used by persons to take, harvest, purchase, store, or sell in baitfish shall be accessible for inspection by the Commissioner and his or her designee. Samples for species determination or disease examination shall be provided immediately upon request.

10.2 Permittees shall provide the Department with additional information as requested on an annual basis or prior to the re-issuance of a new permit.

11.0 Permit Revocation

11.1 The Commissioner may revoke any permit for: any violation of a permit; failure to comply with this regulation; a violation of any regulations of the Board; a violation of the provisions of Part 4, Title 10, Vermont Statutes Annotated; or if the Commissioner determines that the revocation is necessary to protect fish or fisheries of Vermont.

11.2 The Commissioner shall comply with all applicable requirements of 3 V.S.A. Chapter 25, related to any permit revocation.

11.3 Appeals of the decisions of the Commissioner are subject to the Vermont Regulations of Civil Procedure.

12.0 Use of fish as bait

The use of fish in any form whether alive or dead for bait in fishing is prohibited in:

Adams Reservoir, Woodford;
Beaver Pond, Holland;
Beebe Pond, Sunderland;
Big Mud Pond, Mt. Tabor;
Blake Pond, Sutton;
Bourn Pond, Sunderland;
Branch Pond, Sunderland;
Cow Mountain Pond, Granby;
Griffith Lake, Mt. Tabor;
Jobs Pond, Westmore;
Lewis Pond, Lewis;
Little Rock Pond, Wallingford;
Martins Pond, Peacham;
McIntosh Pond, Royalton;
North Pond, Chittenden;

Notch Pond, Ferdinand;
Red Mill Pond, Woodford;
Sterling Pond, Cambridge;
South America Pond, Ferdinand;
Stratton Pond, Stratton;
Unknown Pond, Averys Gore;
Unknown Pond, Ferdinand

and any additional waters created or reclaimed by the Department. This regulation shall be posted at all waters affected.