

**SPECIAL PERMIT APPLICATION  
TOWN OF RAYMOND  
2021**

- 1. DRAGON MOSQUITO CONTROL, INC.**  
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SARAH MACGREGOR, President

- 2. Same as Line 1**

- 3. TOWN OF RAYMOND**  
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- 4. PREVIOUS PESTICIDE APPLICATIONS**

In 2020, the Town of Raymond received Special Permit SP-114 to conduct a mosquito control program. Areas treated for mosquito larvae include swamps, cattail marshes, roadside ditches, retention areas, ponds, depressions, woodland pools, tires, containers and catch basins. No adulticide treatments occurred this season.

- 5. REASON FOR PESTICIDE APPLICATION**

A. The threat of Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV) is the main reason Raymond funds a mosquito control program. Jamestown Canyon Virus (JCV) and West Nile Virus were detected in NH last season. Two batches of mosquitoes tested positive for West Nile Virus in New Hampshire. One batch was from Manchester and one from Nashua. No arboviral activity was detected in Raymond in 2020.

This Special Permit Application details Raymond's plan to combat the mosquito population and reduce the threat of mosquito borne disease.

## **Eastern Equine Encephalitis**

The primary vector of EEE is *Culiseta melanura*. Largely a bird biter, this species plays a critical role in the bird-mosquito transmission cycle helping to amplify the disease in the environment. Research in Connecticut indicates that *Cs. melanura* could be the primary vector as well as a bridge vector. *Culex salinarius* is the stronger bridge vector of the six species listed above since it bites birds 30% of the time and mammals 30+ percent of the time. There are 11 species that have tested positive for EEE at the State Lab in Concord. All eleven have been trapped in Raymond. No EEE was detected in the state in 2020.

## **West Nile Virus**

West Nile Virus was detected in two mosquito pools trapped in Nashua and Manchester in 2020. There were no human cases of WNV in the state this season.

*Culex pipiens* is the primary vector of West Nile Virus and in NH is also known to carry EEE. *Culex pipiens* prefers to bite birds. There are 14 species that have tested positive for WNV in NH.

Dry conditions in July and August favored larval development in catch basins. These species are known to carry WNV.

## **Jamestown Canyon Virus**

In 2020, New Hampshire had five human cases of Jamestown Canyon Virus. JCV is a disease carried by mosquitoes that circulates primarily between deer and a wide variety of mosquito species. JCV detection in humans has been increasing over the last several years. New Hampshire has identified 15 cases of Jamestown Canyon Virus since 2013 including the death of a Derry man. The NH Department of Health and Human Services plans to start testing mosquito pools for JCV.

## **ZIKA Virus**

We continue to look for the Asian tiger mosquito, *Aedes albopictus*, known to transmit ZIKA in southern states and other countries. This mosquito has been found in Massachusetts and Connecticut. Fortunately, no species of mosquitoes capable of transmitting the ZIKA virus have been found in New Hampshire yet. It is expected to make its way into the state eventually as the climate warms. We set BG Sentinel traps to catch and identify adult *Aedes albopictus* mosquitoes.

## **B. DETERMINATION TO SPRAY**

Integrated Mosquito Management (IMM) guides all treatment decisions. IMM is a knowledge-based, surveillance driven control strategy designed to employ all available control methods emphasizing human, animal, and environmental health, rational use of pesticides, and proper timing of applications. This technique has been in use for decades and is the foundation of a successful control program.

Field crews decide to treat mosquito larvae in wetlands when the action threshold has been met. The survey information also helps determine which insecticide is appropriate for the situation.

Larval surveys are done in areas where stagnant water collects such as red maple and cedar swamps, roadside ditches, woodland depressions, and marshes. Larviciding must be well timed to provide good control.

The need for emergency spraying is determined by the Town Health Officer after reviewing trap data and disease test results, and in consultation with Dragon and other officials involved with the schools, athletic teams, and recreation facilities. Weather monitoring will determine the best spray schedule. Adulticiding is conducted when concerns of disease arise or when surveillance data depicts alarming vector species or numbers of mosquitoes. In 2020, Raymond was placed in Low Risk Category 2, based on the State DHHS Arboviral Illness Surveillance, Prevention and Response Plan. Spot adulticiding may be done along the perimeter of schools and athletic fields in response to disease activity or during severe mosquito outbreaks to protect residents.

## 6. DESCRIPTION OF APPLICATION

### A. TARGET ORGANISMS: Mosquitoes

*Anopheles species*  
*Aedes species*  
*Culex species*  
*Culiseta species*  
*Coquillettidia perturbans*  
*Ochlerotatus species*  
*Psorophora species*

### B. APPLICATION EQUIPMENT

FREQUENCY OF CALIBRATION: Larvicide equipment

Each backpack sprayer is calibrated for a particular applicator's use. Calibration is checked at the beginning of the season, after adjustment or repair to the spray system, and when switching insecticides.

FREQUENCY OF CALIBRATION: Adulticide equipment

The sprayers are calibrated at the start of the spray season. Recalibration is done when changes are made to the insecticide discharge system or when the flow rate appears light or heavy.

### D. PESTICIDE TO BE USED: Larvicides

Altosid Pellets WSP  
AI Methoprene 4.25%  
EPA Reg # 2724-448

BVA 2 Mosquito Larvicide Oil  
AI Highly refined petroleum distillate 97%  
EPA Reg # 70589-1

CocoBear Mosquito Larvicide Oil  
AI Mineral Oil 10%  
EPA Reg # 8329-93

Fourstar Bti CRG  
AI *Bacillus thuringiensis israelensis* 10%  
EPA Reg #85685-4

Fourstar MBG  
AI *Bacillus sphaericus*, strain 2362, 3%  
AI *Bacillus thuringiensis israelensis*, strain BMP, 3%  
EPA Reg# 85685-3

Natular G30 WSP  
AI Spinosad (A mixture of spinosyn A and spinosyn D) 2.5%  
EPA Reg # 8329-91

VectoBac GS Biological Larvicide  
AI *Bacillus thuringiensis israelensis*, strain AM 65-52, 2.80%  
EPA Reg # 73049-10

VectoBac GR Biological Larvicide  
AI *Bacillus thuringiensis israelensis*, strain AM 65-52, 2.80%  
EPA Reg # 73049-486

VectoMax FG Biological Larvicide  
AI *Bacillus thuringiensis israelensis*, strain AM 65-52, 4.5%  
AI *Bacillus sphaericus* 2362, strain ABTS 1743, 2.7%  
EPA Reg # 73049-429

VectoPrime FG Biological Larvicide  
AI *Bacillus thuringiensis israelensis*, strain AM 65-52, 6.07%  
(S) -methoprene 0.10%  
EPA Reg # 73049-501

#### PESTICIDES TO BE USED: Adulticides

Essentria IC<sup>3</sup>  
AI Rosemary Oil 10.0%, Geraniol 5.0%, Peppermint Oil 2.0%  
EPA Reg # - FIFRA 25(b) exemption

Merus 3.0  
AI Pyrethrins 5.0%  
EPA Reg # 8329-108

Copies of the insecticide labels are located in a separate publication kept on file at the Division of Pesticide Control.

## RATE OF APPLICATION

All insecticides will be used according to the label. The listed rates of application have been found to yield the best results with the minimum amount of insecticide. When a range is listed, the higher flow rate is used to control larger instars, heavier populations, or deeper or more polluted water. All larvicide formulations are ready to use with no mixing. Adulticide formulations can be diluted with a dormant spray oil or water according to the label.

## E. APPLICATION SCHEDULE

### (1) NUMBER OF APPLICATIONS AND DATES

Larval habitats are checked for mosquito activity after melting snow and spring rains fill swamps, ditches, marshes and woodland pools with stagnant water. Adult mosquitoes hatch by early May. Catch basins surveys are conducted throughout the season and treatment may begin in May or June.

Once adult mosquitoes have emerged, monitoring is the next line of defense. Adult mosquito population monitoring begins in July and continues into October. Surveillance is done every week using BG Sentinel traps and light traps baited with dry ice and white light. Traps run from 24 hours at fixed sites in Raymond. Results indicate peaks in the population and changes in density or species. Specimens are tested for EEE and WNV at the State Lab in Concord.

When EEE or WNV becomes a public health threat adulticide treatments may be recommended to include spot treatments at high use areas. This may be implemented if disease positive mosquitoes, birds, horses or humans are found in or near Raymond.

### (2) POTENTIAL APPLICATION AREAS

Raymond is an inland, rural community, with a total size of 29.3 sq. miles. Dragon has identified and mapped 89 larval habitats. Last season, 580 catch basins were treated to combat WNV and EEE mosquitoes. Raymond Town Officials have identified eight sites considered high use areas.

## ADULTICIDE SITES

Site	Location	Acreage
High School	Harriman Hill Rd	66.3 acres
Middle School	School St	14.0 acres
Elementary School	Old Manchester Rd	14.0 acres
Welch Field	Fremont Rd	15.0 acres
Cammett Fields	Cider Ferry Rd	18.0 acres
Riverside Park	Sundeen Parkway	20.0 acres
Liberty Skateboard park	Scribner Rd	0.75 acres
Town Common	Epping St	0.5 acres

These areas have been chosen for spot adulticiding. The locations of the adulticide sites can be found on the town maps in Appendix D with an accompanying site list.

## F. ENVIRONMENTAL CONSIDERATIONS

(1) The Shoreland Protection Act prohibits the application of pesticides within 50' of the reference line of any Public Waters except where granted under Special Permit. **We are requesting a waiver from this setback requirement for the Town of Raymond.** The following is a list of public waters for the waiver:

Lamprey River, Pawtuckaway River  
Dead Pond, Norton Pond,  
Governor's Lake, Onway Lake

Integrated mosquito management techniques employed to reduce risk to the environment while enhancing control of mosquitoes include insecticide selection, formulation preference, weather analysis and population monitoring.

Population monitoring establishes the best time and location of treatment. Meteorological information is used to track development cycles, and timing of treatment.

Insecticides with low toxicity, low persistence, low nontarget impact and acceptable mortality rates for target insects are important components for choosing the best product. Three organic products have been added to our list of control options.

A product we have used with continued success is the biological insecticide, *Bacillus thuringiensis israelensis* (Bti), which is a great choice for sensitive habitats where many species coexist. Bti is very specific to mosquito larvae, breaks down rapidly in sunlight, has low toxicity to non-target organisms and effectively controls mosquito larvae when applied properly. Bti is the insecticide of choice for larviciding.

The active ingredients of VectoMax FG and Fourstar MBG are *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bsph). VectoMax FG is an organic product that provides residual control, optimal vegetation penetration and helps prevent resistance development. The non-organic brand is Fourstar MBG but has the same residual and vegetation penetration benefits.

Natular G30 WSP is organic, effective on all four instars of larvae and break down quickly into the soil. Spinosad is in its own chemical class and has a different mode of action that helps fight resistance. Natular will be used in catch basins.

(2) Periodically, evaluating and rotating the pesticides we use is an important practice for effective Integrated Mosquito Management.

We may use an adulticide made of essential plant oils called Essentria IC<sup>3</sup>. This minimum risk pesticide was used as a spot spray to control adult mosquitoes.

We have the option to use Merus 3.0, an organic ULV product that breaks down quickly in the environment, is non-persistent and does not bioaccumulate

The synthetic pyrethroids have label precautions to safeguard bees, water, and applicators. Drift is of constant concern to an applicator. Adult mosquitoes are killed when they encounter the adulticide.

However, off target drift may endanger surface waters, apiaries, or other sensitive species, so we pay close attention to wind and buffer zones in sensitive areas. These pyrethroids would be applied via backpack sprayers to control severe outbreaks of mosquitoes at recreation areas and athletic fields.

All available mosquito adulticides have label restrictions regarding drift and toxicity to bees, water and associated organisms. They will photodegrade quickly in the environment. They do not leach through the soil but bind to it and are broken down by microorganisms and sunlight. Adulticiding is done at night to avoid foraging bees.

(3) Each winter we submit a request to the New Hampshire Natural Heritage Bureau (NHB) to search their databases for endangered and threatened wildlife species that could be impacted by mosquito control pesticides. In 2020, there were one or more occurrences of those species in Raymond. Before any pesticide application occurs within the identified area, we will contact Fish & Game as instructed.

## 7. TREATMENT AND MONITORING AREAS

A. ArcGIS software has greatly improved our efficiency and accuracy in map production. The maps include adulticide sites, trap locations, conservation lands, wells, locations of EEE activity and the 250' setback from public water supplies and tributaries.

### B. DESCRIPTION OF TREATMENT AREAS

(1) Raymond Town Officials have identified eight sites considered high use areas. These sites may be sprayed when EEE or WNV become a public health threat. If a disease case occurs in mosquitoes, horses, humans, birds, or other animals, then spraying may be utilized in these high use areas. **Dragon requests an exception from the 250-foot well setback (as provided for in PES 502.5) at these sites.** A setback of 75 feet would allow a more complete treatment of two sites (A1 and A2) and the protection of ground water. They can be found on the town maps in Appendix D.

### ADULTICIDE SITES

Site	Location
High School	Harriman Hill Rd
Middle School	School St
Elementary School	Old Manchester Rd
Welch Fields	Fremont Rd
Cammett Fields	Cider Ferry Rd
Riverside Park	Sundeen Parkway
Liberty Skateboard park	Scribner Rd
Town Common	Epping St

(2) Currently, no potential treatment sites are located on state-owned lands in the Town of Raymond. If any potential treatment sites are found, we will follow the specifications laid out in the “*Policy for Mosquito Control on State Lands.*” DHHS issued a Public Health Threat Declaration for WNV and EEE for Raymond in 2018.

(3) The use of larvicides poses little threat to people in the treatment areas. According to label warnings, adulticides may harm bees therefore a large buffer zone is in place around all known apiaries. State registered beekeepers are notified of the spray operations through certified mail in the spring. A large buffer is also set up for organic farms. Spraying public parks and schools is done at night to avoid people and foraging bees.

(4) There are several public water supply wells and surface waters in Raymond as delineated on the town maps in Appendix D, which is accompanied by a list of wells. Wells are located prior to any insecticide treatments, including those at the designated adulticide sites. No spraying, larviciding or adulticiding will be conducted near any water source. Source Water Protection Areas have been reviewed with insecticide treatments in mind.

### C. LOCATION OF SURVEY SITES

Larval site surveys are conducted from April into October. Larval habitats are checked after snow and ice melt or after heavy rains. Catch basins are also checked throughout the season, and treatment can begin in late May or early June.

## 8. NOTIFICATIONS

A. Residents are notified of pending spray operations via public notices published in the local newspapers, as well as posted at the Town Hall, town website, Dragon website, Dragon’s Twitter account, Library, Post Office, Recreation Dept, Highway Dept, Schools and the local cable channel. The Selectmen and Town Manager will also receive a notice. The Annual Town Report, available to all residents, contains the report on mosquito control. Both the notices and town report tell the residents what to do if they do not want their property treated and where to get more information about the control program. They are given a telephone number to call and an email and mailing address to write. Residents are encouraged to call the office every year to reestablish any no spray requests since towns may switch contractors year to year. Anyone who does not want their property sprayed for mosquitoes will be excluded from any spray operations.

We understand the importance of protecting all species of bees. State registered beekeepers receive a notice of mosquito spray activity each spring via certified mail. A list of known active apiaries can be found in Appendix E.

B. The final version of the 2021 public notice will be written in March when the start date for the season has been determined.

C. Each community has a handful of residents who call or write requesting their property be excluded from any mosquito spraying. Reasons range from medical concerns, suspicions about insecticides, organic gardeners, and odor sensitivity. There are residents that support larval control on their property but want to be excluded from potential adulticide treatments.

**9.** The proposed control program has not yet been voted on. Funding for the program will be voted on at Raymond's town meeting in March. Permit applications are submitted prior to this vote to ensure special permits are issued in time to begin larviciding in April.

**10.** The proposed control program will be conducted in accordance with the current *New Hampshire Arboviral Illness, Surveillance, Prevention and Response Plan* guidelines. The phased response plan is very similar to the response Dragon has recommended to its municipalities for decades. Residents are interested in disease control along with improved quality of life through mosquito control

The above text outlines control of mosquitoes using insecticides, however, conventional and alternative methods for control are integrated into this program. Dragon Mosquito Control, Inc. continues to work with individuals using non-chemical methods such as birdhouses, bat houses, mechanical control (eliminating artificial containers) and cultural control (source reduction) since chemical control is inappropriate in some situations.

## **11. SIGNATURES**

Refer back to application for original signatures.

