

CMMCP AERIAL LARVAL MOSQUITO CONTROL PROGRAM



SPRING 2017

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Central Mass. Mosquito Control Project

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ABSTRACT

In an effort to lessen the amount of early summer, mammal-biting mosquitoes in an area, the Central Massachusetts Mosquito Control Project conducted a concentrated aerial larvicide application of *Bacillus thuringiensis israelensis* in the towns of Billerica, Boxborough and Chelmsford. The dates of the larvicide treatment was April 19th and 20th 2017. The larvicide was released over an area of approximately two thousand acres of wetland within the three member communities. Surveys prior to the larvicide drop proved the areas to be overwhelmed with mosquito larvae. Post-treatment inspections showed an average reduction in larva of 85.43% for each surveillance site. The reduction in larvae will decrease the necessity for ultra-low volume adulticiding during the summer months.

OBJECTIVE

Each spring the beginning of our mosquito control season is marked by our aerial larviciding of seasonally flooded wetlands. The melt of the large amount of snow that Massachusetts received during the 2016/2017 winter coupled with the heavy spring rains have led to wetlands and woodland pools that are seeing water levels that have not been realized in many years. These wetlands and woodland pools provide an excellent environment for the development of early summer, mammal-biting mosquitoes. The focus of attention for this aerial spraying was three species of mosquito, one species that can found to be a vector for West Nile virus and Eastern

Equine Encephalitis (Andreadis 2005). The three species are *Ochlerotatus excrucians*, *Ochlerotatus abserratus* and *Ochlerotatus canadensis*. By reducing the population size of these mosquito species, the necessity for adulticide spraying early in the season is lessened, and we remove the potential disease vector *Oc. canadensis* from our environment.

MATERIALS AND METHODS

In order to assess the effectiveness of the aerial larvicide spraying, the Commonwealth of Massachusetts follows the recommendations in the mosquito control Generic Environmental Impact Report (GEIR). Recoverable Dip Stations (RDS)

are established with one RDS set for every 250 acres to be treated. One untreated RDS is monitored for each town to be used as a control site. Each RDS has ten flagged dip sites. Each of the dip sites are sampled for larvae, the juvenile form of the mosquito, prior to the treatment. Post-treatment surveys were done to make comparisons. Larval density changes among these observations form the basis for determining the level of control for the aerial larvicide program. Sampled larvae are always returned to the wetland to ensure that the treatment and control observations are not artificially impacted. CMMCP personnel identified the areas where the aerial drops would have the greatest impact. In addition, per 333CMR 13.04 (7)(a), a legal notification of the aerial larvicide was placed in The Boston Globe on February 3, 2017, and was posted on the CMMCP website at http://www.cmmcp.org/2017_AERIAL_LEGAL_AD.pdf.

CMMCP uses the larvicide VectoBac G® (EPA Reg. No. 73049-10). VectoBac G® contains the bacterium *Bacillus thuringiensis israelensis* (Bti). Bti is a biological or a naturally occurring bacterium found in soils. It contains spores that produce toxins that specifically target and only affect the larvae of the mosquito. The mosquitoes ingest the toxins which breakdown the cells of the digestive system. This

leads to the demise of the mosquito. Bti has no toxicity to people, so it can be applied safely to mosquito habitat without a detrimental impact on food crops or water supplies (Environmental Protection Agency 2016).

The dates of the aerial treatment were April 19th for the member towns of Billerica and Chelmsford, with Warren Farm in Chelmsford, MA being used as the loading area. Boxborough was treated on April 20th. Minute Man Airfield in Stow, MA was used as the staging area. The dates were chosen to coincide when the larvae are most actively eating and thus make the greatest impact on the population of mosquitoes. It is also done now to deliver the chemical to the targets before the leaves and canopy has fully developed.

North Fork Helicopter (Cutchogue, New York) was contracted to apply the larvicide to 840 acres in Boxborough, 600 acres in Billerica and 520 acres in Chelmsford for a total of 1,960 acres. The rate at which the larvicide was applied was five pounds per acre. CMMCP has found this rate VectoBac G® has provided proper control in these areas.

Following the application of the VectoBac G®, the CMMCP crews return to the flagged sites after 24 and 48 hours. The density of larvae are recorded and compared to the pre-treatment collection numbers and used to determine

the effectiveness of the aerial larvicide program. During the post-treatment larvicide surveys, the presence or absence of VectoBac G® is noted by the CMMCP field crews.

RESULTS

The average reduction in mosquito larvae amongst the towns of Boxborough, Billerica and Chelmsford following the 2017

spring larvicide application was 85.43%. Individually, the Billerica RDS exhibited an average reduction of 93.63% while an average reduction of 87.17% and 77.99% in Chelmsford and Boxborough respectively. This is in comparison to the untreated (control) in the three communities which saw only a decrease of 10.19% from the beginning of the program (Table 1; Figures 1-3).

Table 1: Larval Surveillance of Treatment and Control RDS

Treatment Sites	Pre-application	Post-application	Observed Change
BIL116	68	7	-89.71%
BIL112	74	1	-98.65%
BIL408	67	5	-92.54%
BOX128	24	2	-91.67%
BOX7	37	21	-43.24%
BOX92	26	3	-88.46%
BOX55	35	4	-88.57%
CHM82	38	3	-92.11%
CHM279	37	1	-97.30%
CHM236	43	12	-72.09%
Control Sites	Pre-application	Post-application	Observed Change
BIL227	64	48	-25.00%
BOX103	39	39	0.00%
CHM146	90	85	-5.56%

Figure 1: Billerica Treatment RDS Pre and Post Application

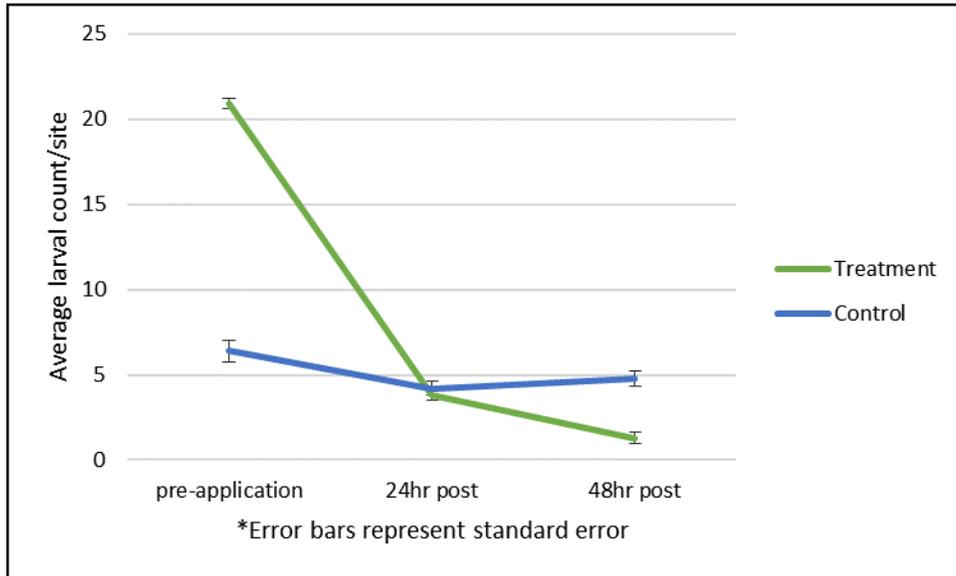


Figure 2: Chelmsford treatment RDS Pre and Post Application

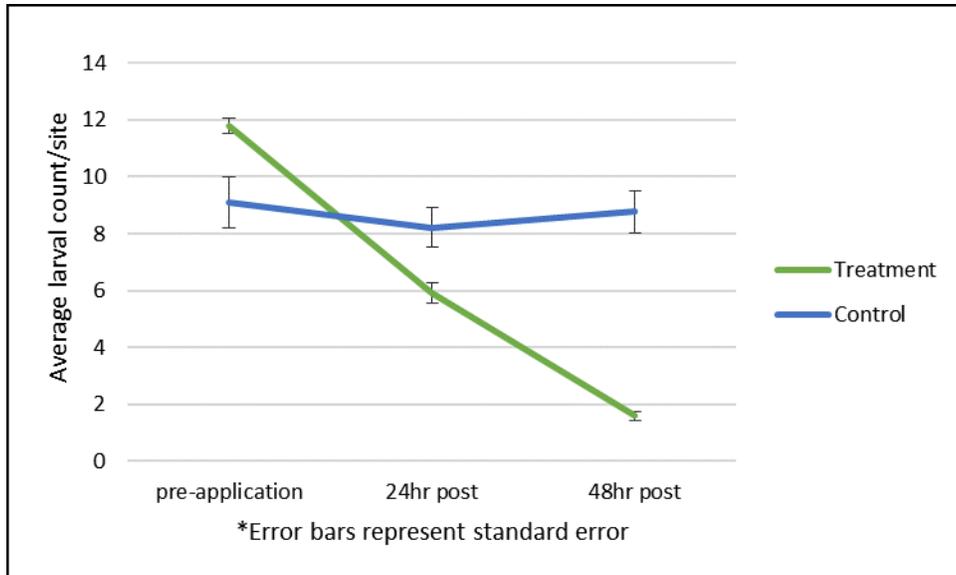
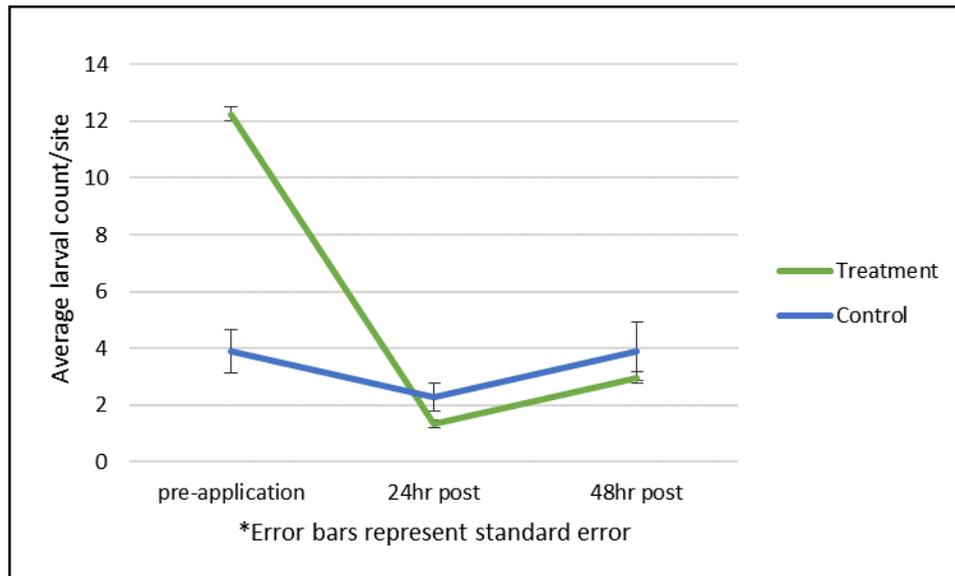


Figure 3: Boxborough Treatment RDS Pre and Post Application



DISCUSSION

As part of an Integrated Pest Management (IPM) plan to control adult mosquitoes, the juvenile larval form of the pest is targeted to reduce the size of the populations. Aerial release of the larvicide VectoBac G® allows CMMCP to reach sizeable wetland areas in Boxborough, Billerica and Chelmsford that would otherwise be too large or difficult to treat by field crews, and therefore left inundated by mosquitoes. In 2017, the larvicide application took place April 19th and 20th. Larval surveys conducted prior to the treatment and twice following the treatment showed an average reduction of 85.43%. CMMCP considers this treatment a success. Although we are pleased with the results, one site in Boxborough did not show the presence of Bti larvicide on rechecks. We feel this may have had an adverse effect on the statistical outcome of our result. The aerial maps from the helicopter flight path do show that the

areas were covered. In the future, CMMCP will work to assure the RDS are within the flight plan of the helicopter. Conversely, the untreated control sites only found an average reduction of 10.19% which is a consistent measure of reduction found in the past.

The removal of the early brood *Ochlerotatus excrucians*, *Ochlerotatus abseratus* and *Ochlerotatus canadensis* mosquitoes from the environment, the residents of Billerica, Boxborough and Chelmsford will find less of the bothersome, biting pests from May through June. Because of this success the need for adulticide spraying will be reduced early in the season in these three communities. CMMCP will incorporate this year's experience into future aerial programs. This includes the potential expansion of the program into additional CMMCP member communities.

ACKNOWLEDGMENTS

The authors would like to acknowledge the participation of the health departments in Billerica, Boxborough and Chelmsford in this supplemental program; North Fork Helicopters for providing the helicopter service; Warren Farm, Chelmsford and Minute Man Airfield, Stow for providing loading zones; the CMMCP Commission, and the CMMCP staff for larval monitoring, site selection, map development and assisting the helicopter application.

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The Boston Globe

Classified Legal Notice Proof

Central Mass Mosquito Control
111 OTIS ST
NORTHBOROUGH, MA 01532

ORDER INFORMATION:

Order Number: 240662

Title: Boston Globe
Classification: 1505 Legal - Public Notice

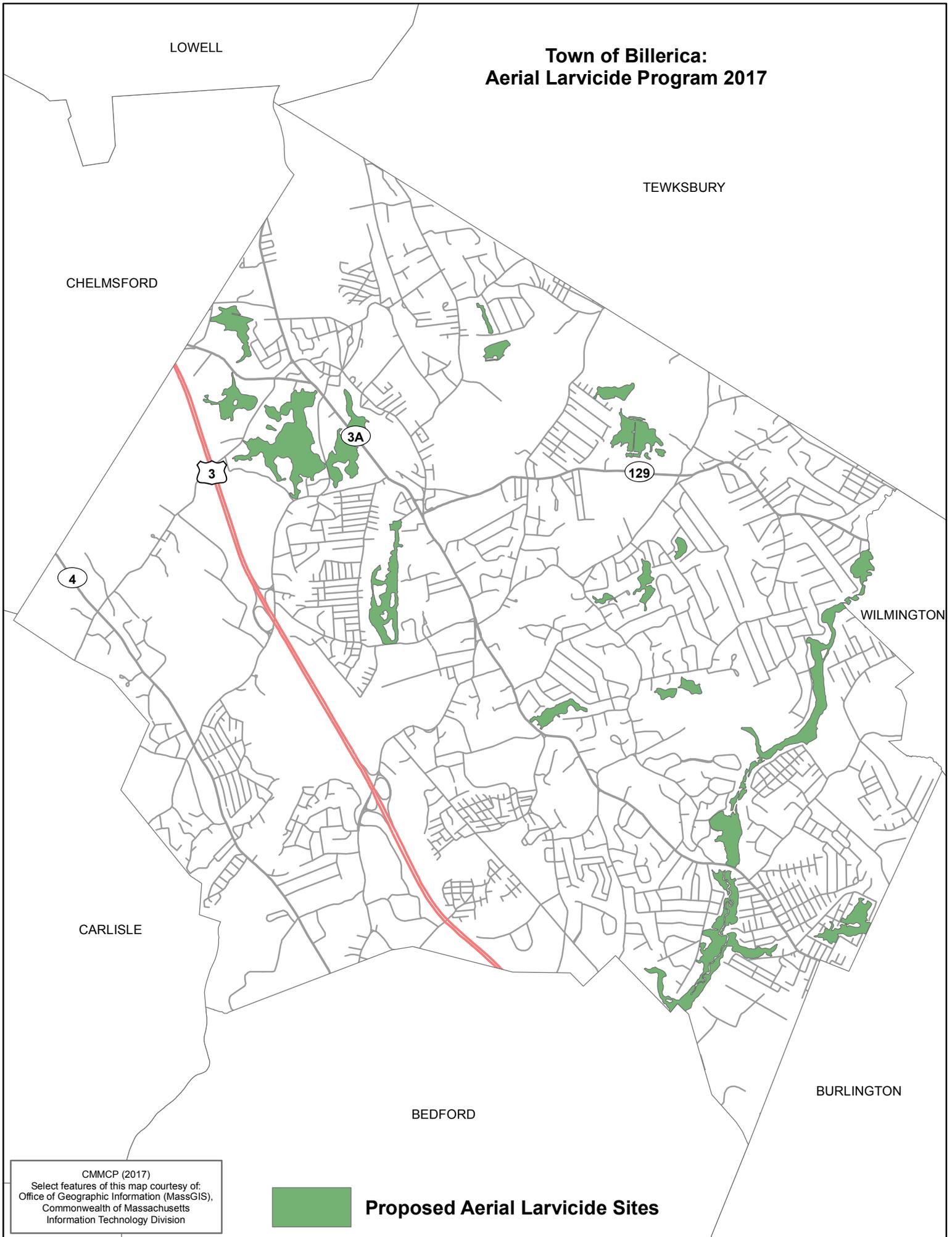
Publication date: 2/3/2017

NOTICE PREVIEW:

Legal Notice - Aerial Application to Control Mosquito Larvae

Per 333CMR 13.04(7)(a), the Central Mass. Mosquito Control Project (CMMCP) and North Fork Helicopters will be conducting helicopter applications of the biological larvicide Bti to control mosquito larvae over selected large wetlands in the CMMCP service area. The applications will be conducted during the daylight hours from March 1 to October 31, 2017 as conditions warrant. The trade name of the product to be used is Vectobac G (EPA Reg. #73049-10). For additional information please contact Tim Deschamps at (508) 393-3055.

Town of Billerica: Aerial Larvicide Program 2017

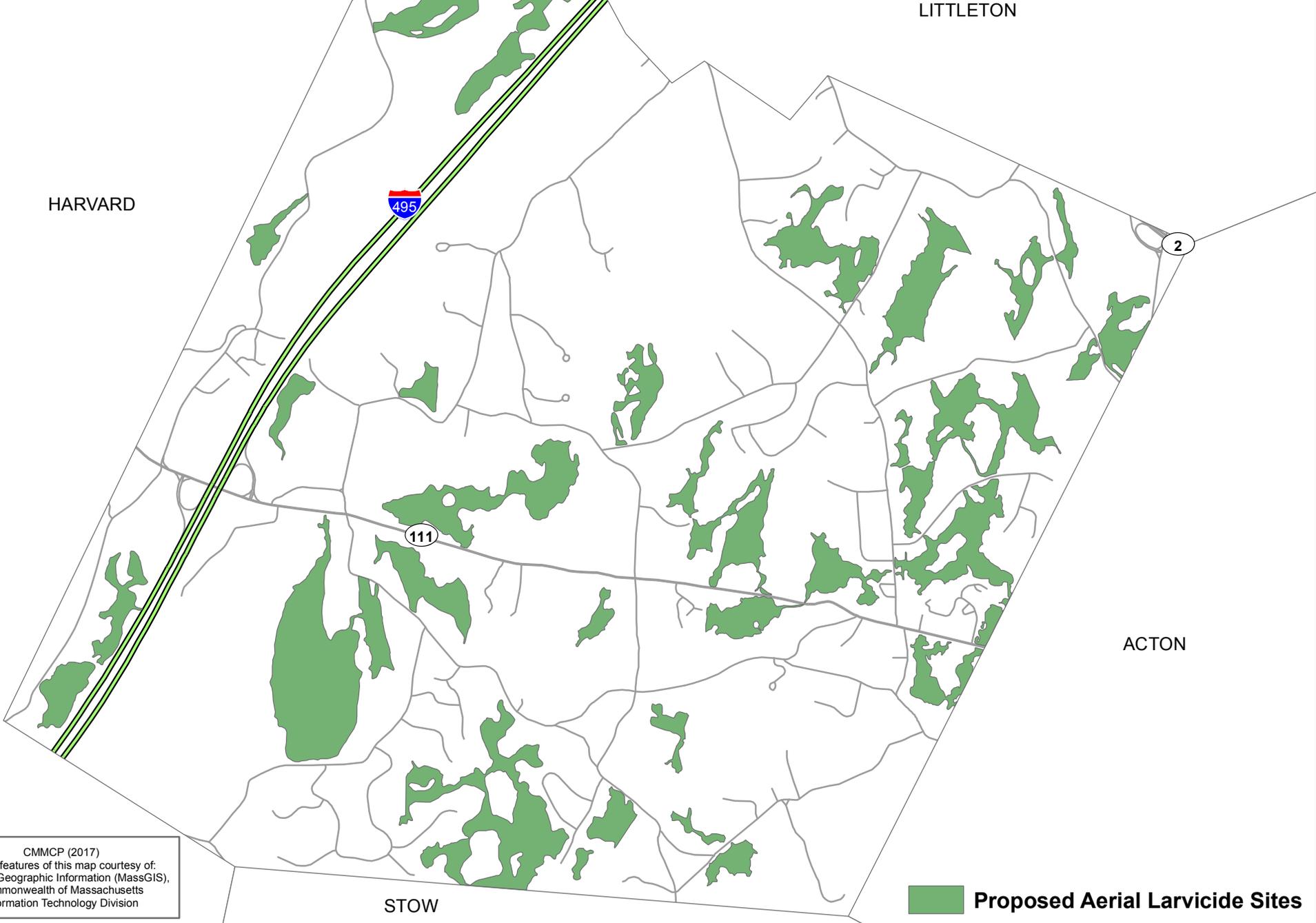


CMMCP (2017)
Select features of this map courtesy of:
Office of Geographic Information (MassGIS),
Commonwealth of Massachusetts
Information Technology Division



Proposed Aerial Larvicide Sites

Town of Boxborough: Aerial Larvicide Program 2017



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 **Proposed Aerial Larvicide Sites**

TYNGSBOROUGH

DRACUT

Town of Chelmsford: Aerial Larvicide Program 2017

LOWELL

WESTFORD

BILLERICA

CARLISLE

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Proposed Aerial Larvicide Sites

