



**Commonwealth of Massachusetts**  
STATE RECLAMATION AND MOSQUITO CONTROL BOARD

**NORTHEAST MASSACHUSETTS MOSQUITO CONTROL  
AND WETLANDS MANAGEMENT DISTRICT**

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[www.nemassmosquito.org](http://www.nemassmosquito.org)



Operations

Barry Noone: *District Director*  
Kimberly A. Foss.: *Entomologist*  
Robyn A. Januszewski: *GIS/Biologist*  
Katelynn E. King: *Wetlands Project Coordinator*

Commissioners

John W. Morris, CHO: *Chair*  
Vincent J. Russo, MD, MPH: *Vice Chair*  
Paul Sevigny, RS, CHO  
Joseph T. Giarrusso, Conservation Officer  
Rosemary Decie, RS

**2022 Best Management Practice Plan  
Boxford**

**FY23 Percentage of assessment allocated to specific measures as prescribed by individual municipalities  
Best Management Practice (BMP) in the Town of Boxford**

NEMMC is requesting a 3% increase above the FY2022 certified assessment for a FY2023 operational budget. During FY2022 the District reorganized allowing more technicians in the field while maintaining our current staffing level. FY2022 allowed the district the opportunity to replace one of our frontline heavy equipment pieces which was 23 years old. Due to ongoing pandemic challenges, the district was unable to make the vehicle purchases it had intended to keep on schedule with our vehicle and equipment replacement plan. Our FY2023 budget addresses funding for staffing changes, allowing for two vehicle replacements, and to adapt with increased costs of materials, energy, fuel, and pesticides. With the region experiencing environmental changes, it remains challenging to plan for a “normal” year of mosquito control. Often dictated by the weather, mosquito populations, additional treatment for viruses and requests from member municipalities, NEMMC will work diligently to deal with exceptional mosquito nuisance and health issues.

Assessment: As estimated by the Massachusetts Department of Revenue, Division of Local Services, in accordance with Chapter 516 of the General Laws of the Commonwealth. The assessment formula is based on a regional concept, which considers square miles and evaluation. The district offers this breakdown as a general guide to how funds are allocated specific to your community.

FY23 Estimated District Budget for the Town of Boxford	\$ 86,800.00
FY23 State Reclamation and Mosquito Control Board	\$ 3,720.00
FY23 Total Estimated Assessment for the Town of Boxford	\$ 90,520.00

**District Control Measures specific to Boxford**

General Operational Cost Share

Regional Adult Mosquito Surveillance Program

Regional Vector / Virus Intervention

Surveillance

Ground Larviciding

Catch Basin Treatments

Manual Ditch Maintenance

Adulticiding (**Virus Intervention ONLY with Board of Health approval - Zenivex® only**)

Barrier Treatment (**By Board of Health and School Department request only- Suspend SC® only**)

Ditch Maintenance / Wetlands Management

Tire Recycling Program

Property Inspections

Mosquito Habitat Mitigation

Research and Development

Education and Outreach

Social Media

**NOTE:** Any adulticiding, larviciding or treatment of catch basins for mosquito control on public school property requires a current IPM (Integrated Pest Management) Plan. We are often asked by local Boards of Health and/or athletic directors to treat ball fields and/or parks that may be owned/used by the school departments, and without an IPM plan that includes our materials we may not be able to assist.

## Board of Health Checklist for 2022

**Schedule an annual Board of Health meeting/ presentation with NEMMC**

Note: meetings will only be scheduled between the dates of October 1st - June 1st

**Review login information for Municipal Toolbox on NEMMC website**

Our Liaison, Kelsey will e-mail you the password and login (see contact below)

**Update School IPMs to have all current and recently added NEMMC pesticide products**

Recently added pesticide products include Metalarv XRP and Merus 3.0

**Schedule Barrier Treatment for schools, parks, and/or public areas for peak mosquito season**

Note: scheduled barrier treatments are recommended between July 15th – August 25th

**Check with Department of Public Works for field access for barrier treatments once scheduled**

**Notify NEMMC with Board of Health contact changes**

Work phone, cell phone, and email are required of primary and secondary contacts

**Review District Phased Response to WNV/EEE Virus Isolations in Integrated Pest and Vector Management Plan (IPVMP)**

For any questions on where to find this information, scheduling, and/or how to complete these tasks, please reach out to our Board of Health Liaison:

Kelsey Liakos, Board of Health Liaison

Cell: (978) 992- 6974

Office: (978) 352- 2800 Email: Kelsey.liakos@mass.gov

## Updated 2022 NEMMC Protocols for District Arboviral Events

Climate change is expected to affect the geographic and seasonal patterns of mosquito-borne diseases in the United States. The northeast is experiencing an increase in precipitation and unusually hot temperatures. Since EEE is more prevalent in wetter years and WNV in hotter years the likeness of the district experiencing EEE and/or WNV events in any given year is possible, in some years both viruses can present substantial risk. The district feels that it is beneficial to our subscribing municipalities to set prevention and response criteria preparing for both mosquito-borne viruses.

### District Prevention for WNV and EEE

- Adult mosquito surveillance and DPH virus testing
- Larviciding areas that can promote mosquito breeding including municipal catch basins
- Public notification to use personal protective measures from spring to first hard frost
- Wetlands management and stormwater maintenance
- Property inspections to larvicide standing water and remove containers holding water
- Early barrier treatments for public parks, recreation areas and schools
- Tire disposal program

### District Response for WNV and EEE

If *risk level increases* for municipality but no virus in municipality:

- Public notification to use personal protective measures
- Additional larviciding of freshwater wetlands and flooded areas
- Recommendation for municipality to complete barrier treatments

If *bird biting mosquitoes* in municipality test positive for virus:

- Public notification to use personal protective measures
- Supplemental adult mosquito trapping and additional DPH virus testing in risk areas
- Additional larviciding of freshwater wetlands and flooded areas
- Retreatment of catch basins (if WNV) in focal area
- Retreatment of hummock swamps (if EEE) in focal area

If *human biting mosquitoes* in municipality test positive for virus:

- Public notification to use personal protective measures Supplemental adult mosquito trapping and additional DPH virus testing in risk areas
- Additional larviciding of freshwater wetlands and flooded areas
- Recommendation for municipality to complete a block adulticide of focal area
- Recommendation for municipality to complete barrier treatments

If *mammal or human case* of WNV or EEE in municipality:

- Public notification to use personal protective measures
- Supplemental adult mosquito trapping and additional DPH virus testing in risk areas
- Additional larviciding of freshwater wetlands and flooded areas
- Recommendation for municipality to complete a block adulticide of focal area
- Recommendation for municipality to complete barrier treatments

## Summary of NEMMC District Operations Completed in Boxford during 2021

Date	Activity Completed
1/11/2021	2021 Integrated Pest and Vector Management Plan published to NEMMC website
1/12/2021	Residential Pesticide Exclusion Received (1)
2/4/2021	2021 Draft Best Management Plans (BMP) e-mailed to BOH for review
2/8/2021	Residential Pesticide Exclusion Received (1)
2/21/2021	Residential Pesticide Exclusion Received (1)
2/25/2021	Residential Pesticide Exclusion Received (2)
3/6/2021	Residential Pesticide Exclusion Received (1)
3/18/2021	Residential Pesticide Exclusion Received (1)
3/21/2021	Residential Pesticide Exclusion Received (3)
3/24/2021	Residential Pesticide Exclusion Received (2)
4/6/2021	Habitat Site Inspections (4)
4/13/2021	Contacted DPW for catch basin cleaning schedule and treatment notification
4/14/2021	Residential Pesticide Exclusion Received (7)
4/16/2021	Residential Pesticide Exclusion Received (2)
4/20/2021	Residential Pesticide Exclusion Received (3)
4/21/2021	Habitat Site Inspections (1)
4/21/2021	Larviciding- Cahoon Park (33.93 lbs. Vectobac-G)
4/29/2021	Resident Request Site Inspection - Main Street
4/29/2021	Residential Pesticide Exclusion Received (2)
4/30/2021	Hand Ditch Maintenance- Porter Road 125 ft + 2 culverts cleaned
4/30/2021	Hand Ditch Maintenance- Valley Road 75 ft + 1 culvert cleaned
4/30/2021	Habitat Site Inspections (4)
5/3/2021	Residential Pesticide Exclusion Received (1)
5/4/2021	Hand Ditch Maintenance- Porter Road 444 ft + 1 culvert cleaned
5/9/2021	Residential Pesticide Exclusion Received (1)
5/23/2021	Residential Pesticide Exclusions Received (11)
5/24/2021	Residential Pesticide Exclusions Received (5)
6/1/2021	Catch basin larviciding (137 VectoMax WSP) and Spofford Pond School (3 VectoMax WSP)
6/2/2021	Catch basin larviciding (142 VectoMax WSP)
6/7/2021	Catch basin larviciding (424 VectoMax WSP) and Harry Lee Cole School (7 VectoMax WSP)
6/7/2021	Catch basin larviciding completed in Boxford- 703 basins and 10 school basins= 713
6/15/2021	Resident Request Site Inspection - Lakewood Lane
6/22/2021	NEMMC attendance @ BOH zoom meeting 6:30pm
7/3/2021	Residential Pesticide Exclusion Received (1)
7/13/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- Negative

2022 Best Management Practice Plan: Boxford

7/14/2021	Residential Pesticide Exclusions Received (1)
7/20/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- Negative
7/28/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- Negative
8/3/2021	(2) Mosquito batch sent to DPH for EEE/WNV testing- Negative
8/10/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- Negative
8/17/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- Negative
8/24/2021	(2) Mosquito batch sent to DPH for EEE/WNV testing- Negative
8/31/2021	(1) Mosquito batch sent to DPH for EEE/WNV testing- 1 batch <b>WNV</b> positive (Cs. melanura)
9/3/2021	Residential Pesticide Exclusions Received (1)
9/6/2021	Supplemental mosquito trap placed
9/8/2021	(4) Mosquito batch sent to DPH for EEE/WNV testing- Negative
9/14/2021	Notified BOH- WNV risk raised by DPH to MODERATE
9/14/2021	(3) Mosquito batch sent to DPH for EEE/WNV testing- Negative
9/21/2021	(2) Mosquito batch sent to DPH for EEE/WNV testing- Negative
9/28/2021	(2) Mosquito batch sent to DPH for EEE/WNV testing- Negative
10/1/2021	Adult mosquito surveillance and DPH testing concluded for season
12/17/2021	Hand Ditch Maintenance- Porter Road 450 ft + 2 culverts cleaned
12/27/2021	Tire collected for disposal (1) Killam Hill Road

- **2 Residential property inspection service requests, up from 0 in 2020**

Informing residents that they can contact the district to inspect for standing water and help identify new breeding areas can help reduce mosquito populations.

- **9 mosquito habitat site inspections**
- **Catch basin larviciding was completed on 6/7/2021: 713 total basins were treated (703 municipal + 10 school)**
- **47 Residential pesticide exclusions were filed with the district this year from Boxford**
- **1,094 feet of stormwater ditches and 6 culverts were cleared of debris**
- **Collected and disposed of 1 abandoned tire**

## 2021 Boxford Mosquito & Arbovirus Surveillance Summary

There was 1 WNV mosquito isolation. There were no EEE mosquito isolations or WNV/EEE human or animal cases in Boxford in 2021. At the end of 2021, the arboviral risk level for Boxford remained at LOW for EEE and was raised to MODERATE for WNV. Risk Categories are described on pages 13, 22, 25 of the 2021 Massachusetts State Arbovirus Surveillance and Response Plan.

Massachusetts DPH assesses arboviral risk levels based on many factors including but not limited to mosquito isolations, locations of acquired veterinary and human infections, virus history locally and in bordering states, weather conditions present and predictions, and current mosquito populations and future trends.

- 21 mosquito pools/batches were sent from Boxford to the MDPH lab for testing in 2021, 1 batch of *Cs. melanura* tested positive for WNV on 8/30/2021. No mosquito batches tested positive for EEE.

2022 Best Management Practice Plan: Boxford

- Supplemental traps were placed around the positive WNV isolation on 9/7/2021. 3 additional mosquito batches were sent for WNV/EEE testing and returned with negative results.
- Possible new Massachusetts state species record. Collected in Boxford on 9/21/2021 from CDC light trap- *Psorophora ciliata*. This is a very large, aggressive, southern US mammal biter that can be present in our area after tropical storm and excessive rain/flood events.

Mosquito virus isolation history (WNV/EEE) in Boxford:

Collection Date	Species	Test Type	Result
8/30/2021	<u><i>Culiseta melanura</i></u>	WNV	Positive
8/19/2019	<u><i>Culiseta melanura</i></u>	EEE	Positive
8/29/2012	<u><i>Culex pipiens/restuans complex</i></u>	WNV	Positive
8/03/2011	<u><i>Culex pipiens/restuans complex</i></u>	WNV	Positive
8/31/2011	<u><i>Culiseta melanura</i></u>	WNV	Positive
9/14/2011	<u><i>Culiseta melanura</i></u>	WNV	Positive
9/13/2006	<u><i>Culiseta melanura</i></u>	EEE	Positive

<u>Total Mosquito Collected in Boxford</u>	<u>2020</u>	<u>2021</u>	<u>% Change</u>
Resting Boxes (16)- Bird feeders/EEE primary vectors	53	297	460%
CDC CO2/Light Traps (1) - Mammal feeders/bridge vectors	1101	182	-83%
Gravid Traps (1)- WNV primary vectors	60	25	-58%
<b>Totals</b>	<b>1,214</b>	<b>504</b>	<b>-58%</b>

<u>Mosquito Species- pest/disease list- Boxford*</u>	<u>2020</u>	<u>2021</u>	<u>% Change</u>	<u>WNV/EEE +</u>	<u>District Total % Change 2020 to 2021</u>
<i>Culiseta melanura</i> (red maple swamp/acid bog)	14	63	350%	WNV	11%
<i>Culex pipiens</i> (container/catch basins/heavy organics)	3	5	67%	NO	64%
<i>Culex restuans</i> (container/catch basins)	12	1	-92%	NO	75%
<i>Culex salinarius</i> (brackish water/phragmites/roadside ditches)	129	11	-91%	NO	747%
<i>Coquillitidia perturbans</i> (cattail)	622	41	-93%	NO	-20%
<i>Aedes vexans</i> (rainwater/fresh floodwater)	1	53	5200%	NO	1781%
<i>Aedes japonicus</i> (tree hole/container breeder)	3	4	33%	NO	52%
<i>Aedes sollicitans</i> (salt marsh)	0	0	-	NO	824%
<i>Aedes cantator</i> (salt marsh)	1	0	-100%	NO	266%
<i>Aedes canadensis</i> (snowmelt/woodland pool)	0	10	1000%	NO	588%

\*Note: Boxford had a trap location change in the spring of 2021. This new trap location is approximately 2 miles from the historic trap and there may be slight differences due to habitat changes when comparing data between years. Red denotes there were positive mosquito batches in the total collections during 2021

**WNV/EEE bridge vectors/human biters**

- Although excessive and prolonged rain events during 2021 caused these species to increase district-wide, there was a decrease in multiple fresh floodwater species in Boxford; *Ae. vexans*, *Ae. canadensis* and *Cx. salinarius*, a brackish water mosquito, decreased by a total of 43%. The cattail species *Cq. perturbans* have still not recovered from the drought conditions of 2020 and populations continued to decrease in Boxford by 93% in 2021. Decreases in these species could be a result of a trap location change. Informing residents that they can contact the district to inspect for standing water and help identify new breeding areas can also reduce these populations.

**WNV primary vectors/bird biters (*Cx. pipiens/restuans*)**

- There was a 60% decrease in collections of WNV primary vectors from 2020 to 2021 in Boxford. Timely catch basin cleaning and treatments helped keep *Culex* mosquito populations in check. Informing residents that they can contact the district to inspect for standing water and help identify new breeding areas can also reduce these populations.

**EEE primary vectors/bird biters (*Cs. melanura*)**

- While 2019 was an unprecedented year for EEE statewide, due to early and sustained drought conditions and anticipatory targeted larviciding activities in the Northeast during 2020 the district saw an 81% decrease in *Cs. melanura* populations from 2019. In 2021 the average precipitation increased, and the district saw a slight 11% increase from 2020. However, there remains a decrease of 48% from the 10-year mean and 50% from the 5-year. It will take several years for these populations to recover from the droughts. Boxford did see a 350% increase in *Cs. melanura* this year. Only 1 batch of *Cs. melanura* tested positive for WNV in Boxford during 2021. There were no EEE isolates in this species during 2021.

**Pest Status salt marsh mosquitoes (*Ae. sollicitans*)**

- *Ae. sollicitans*, a summer-fall salt marsh species, decreased by 824% district-wide. However, despite consistent larviciding and adulticiding, tides, high temperatures, prevailing wind direction, frequent rain and heavy thunderstorm activity caused this mosquito species to become a serious weekly nuisance for the district and its residents throughout 2021.

With Boxford and nearby communities possessing large stretches of forested wetlands which could serve as a local focus of EEE, there will always be concern of transmission and human infection by this virus in Boxford and all surrounding municipalities. From July to the first hard frost, Boxford residents should take necessary precautions to reduce the risk of infection from these viruses, regardless of low mosquito populations and/or aggressiveness of control.

A hard, or killing frost, is defined meteorologically as two consecutive hours of temperatures below 28 degrees Fahrenheit or three hours below 32 degrees. This will occur at different times for different communities, and there may even be variation within communities based on local geography. Although mosquitoes are not killed until a hard frost occurs, they are extremely unlikely to be active when temperatures fall below 50 degrees in the evening (Page 15 of the 2021 MA Arbovirus Plan listed below).

*2022 Best Management Practice Plan: Boxford*

Refer to the 2021 Massachusetts State Arbovirus Surveillance and Response Plan viewed online at:  
<https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data>