



**Commonwealth of Massachusetts**  
STATE RECLAMATION AND MOSQUITO CONTROL BOARD  
**NORTHEAST MASSACHUSETTS MOSQUITO CONTROL  
AND WETLANDS MANAGEMENT DISTRICT**  
118 Tenney Street  
Georgetown, MA 01833  
Phone: (978) 352-2800  
[www.nemassmosquito.org](http://www.nemassmosquito.org)



**Operations**

Barry Noone: *District Director*  
Kimberly A. Foss.: *Entomologist*  
Robyn A. Januszewski: *IT Coordinator*  
Steven Przyjemski: *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

**2024 Best Management Practice Plan  
Salem**

**FY25 Percentage of assessment allocated to specific measures as prescribed by individual municipalities  
Best Management Practice (BMP) in the City of Salem.**

NEMMC is requesting a 4% increase above the FY24 certified assessment for the FY25 operational budget. During FY24 the District reorganized allowing more technicians in the field, we anticipate being at full staff this year. FY24 allowed the opportunity to replace one of our frontline heavy equipment pieces a Freightliner Equipment Hauler. The district was finally able to place an order for two front line replacement trucks. Our FY25 budget addresses funding for regional aerial larviciding treatments. Aerial larviciding cost has increased significantly over the past two years, NEMMC plans accordingly for these increases. The FY25 budget includes the increased costs of materials, energy, fuel, pesticides, full staffing and contributing to capital expenses. NEMMC's facility lease expires in FY25 where we will be responsible for portions of EV infrastructure as well as State mandated EV First policy coming with a substantial cost increase when replacing vehicles. Regional environmental changes remain 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.

|   |              |
|---|--------------|
| FY25 Estimated District Budget for the City of Salem  | \$ 56,115.00 |
| FY25 State Reclamation and Mosquito Control Board     | \$ 2,262.00  |
| FY25 Total Estimated Assessment for the City of Salem | \$ 58,377.00 |

**District Control Measures specific to Salem**

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**)

Barrier Treatment (**By Board of Health and School Department request 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.

## **BMP Reminders for 2024**

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

\*Meetings will only be scheduled between the dates of October 1st - June 1<sup>st</sup>

☐ **Notify NEMMC with Health Department /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)**

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

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

\*At the recommendation of NEMMC or request from Health Department/Board of Health, NEMMC will coordinate with schools, parks, and/or public areas for scheduling barrier treatments/adulticiding and confirm access to these areas. NEMMC will provide Standard Written Notification to be distributed.

\*Scheduled barrier treatments are recommended between July 15<sup>th</sup> – August 25<sup>th</sup>

**As a reminder school IPM Coordinators should be kept up to date. NEMMC will alert IMP Coordinators with any pesticide product changes/additions.**

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:

Jennifer Sforza/Board of Health Liaison

Cell: (978) 971-7689

Office: (978) 352- 2800

Email: [Jennifer.Sforza@mass.gov](mailto:Jennifer.Sforza@mass.gov)

## 2024 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 Salem during 2023

| Date       | Activity Completed  |
|------------|---|
| 3/2/2023   | 2023 Draft Best Management Plans (BMP) e-mailed to BOH for review, IPVMP mailed to BOH                          |
| 3/2/2023   | 2023 Integrated Pest and Vector Management Plan published to NEMMC website                                      |
| 4/6/2023   | Larviciding- East Collins Street salt marsh area (1.22 lbs Vectobac-G)  |
| 4/6/2023   | Habitat Inspections (5)   |
| 4/6/2023   | Collected and disposed of 2 tires collected on Swampscott Road  |
| 4/7/2023   | Resident request site inspection (1)- Laurier Road  |
| 4/8/2023   | Residential Pesticide Exclusion Received (1)  |
| 4/19/2023  | Habitat Inspections (5)   |
| 5/3/2023   | NEMMC Virtual Town Hall BOH District-wide meeting   |
| 5/8/2023   | Adult mosquito surveillance traps set out   |
| 5/15/2023  | Adult mosquito surveillance starts for the season   |
| 5/31/2023  | Residential Pesticide Exclusion Received (1)  |
| 6/13/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 6/21/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 6/27/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 7/4/2023   | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 7/11/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 7/11/2023  | Catch basin larviciding (1,782 VectoMax WSP) + Bently, Carlton, Saltonstall, Bates schools (15 FourStar-90 day) |
| 7/12/2023  | Catch basin larviciding (893 VectoMax WSP) + Horace Mann, Salem HS, Witchcraft Heights ES (51 FourStar-90 day)  |
| 7/13/2023  | Catch basin larviciding - Salem HS, Horace Mann, Collins MS (38 FourStar-90 day)                                |
| 7/13/2023  | Catch basins in Salem completed- 2,675 municipal basins + 104 School basins= 2,779 total                        |
| 7/24/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 8/1/2023   | Mosquito batches to PHL - 2 batches NEGATIVE  |
| 8/5/2023   | Residential Pesticide Exclusion Received (2)  |
| 8/8/2023   | Mosquito batches to PHL - 2 batches NEGATIVE  |
| 8/14/2023  | Mosquito batches to PHL - 2 batches NEGATIVE  |
| 8/19/2023  | Salem/Beverly Household Zero Waste Day- collected and disposed of 13 resident tires                             |
| 8/22/2023  | Mosquito batches to PHL - 3 batches NEGATIVE  |
| 8/29/2023  | Mosquito batches to PHL - 1 batch NEGATIVE  |
| 9/6/2023   | Mosquito batches to PHL - 3 batches NEGATIVE  |
| 9/19/2023  | Mosquito batches to PHL - 2 batches NEGATIVE  |
| 11/13/2023 | Hand Ditch Maintenance- Swampscott Road- 310 ft ditch cleared + 1 culvert cleared                               |

- **0 Board of Health adulticide service requests (combined ULV and barrier treatments), unchanged from 2022**
- **1 Residential property inspections (unchanged from 2022) and 0 BOH service request (unchanged from 2022)**  
Informing residents that they can contact the district to inspect for standing water and help identify new breeding areas can help reduce mosquito populations.
- **10 mosquito habitat site inspections were conducted.**
- **Catch basin larviciding was completed on 7/13/2023: 2,779 total basins were treated (2,675 municipal + 104 school)**

## 2024 Best Management Practice Plan: Salem

- 4 Residential pesticide exclusion was filed with the district for Salem during 2023, down from 15 during 2022
- 15 tires were collected for disposal.
- 310 feet of hand ditch maintenance was completed, and 1 culvert was cleared of debris.

## 2023 Salem Mosquito & Arbovirus Surveillance Summary

There were no WNV/EEE mosquito isolations, human, or animal cases in Salem in 2023. By the end of 2023, the arboviral risk level for Salem remained REMOTE for EEE and LOW for WNV. Risk Categories are described on pages 13, 22, 25 of the 2023 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.

State arbovirus risk updates: <https://www.mass.gov/info-details/massachusetts-arbovirus-update#risk-maps->

- 21 mosquito pools/batches were sent from Salem to the MDPH lab for testing in 2023, all batches tested negative for EEE/WNV.

### Mosquito virus isolation history (WNV/EEE) in Salem:

| Collection Date | Species                               | Test Type | Result   |
|-----------------|---------------------------------------|-----------|----------|
| 9/5/2018        | <u>Culex pipiens</u>                  | WNV       | Positive |
| 8/31/2016       | <u>Culex pipiens</u>                  | WNV       | Positive |
| 9/14/2016       | <u>Culex pipiens</u>                  | WNV       | Positive |
| 8/14/2013       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |
| 9/10/2013       | <u>Culex pipiens</u>                  | WNV       | Positive |
| 9/05/2011       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |
| 9/12/2011       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |
| 9/12/2011       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |
| 8/01/2007       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |
| 8/08/2007       | <u>Culex pipiens/restuans</u> complex | WNV       | Positive |

| <u>Total Mosquito Collected in Salem</u>                | <u>2022</u> | <u>2023</u> | <u>% Change</u> |
|---|-------------|-------------|-----------------|
| CDC CO2/Light Traps (1) - Mammal feeders/bridge vectors | 80          | 260         | 225%            |
| Gravid Traps (1)- WNV primary vectors                   | 137         | 155         | 13%             |
| <b>Totals</b>   | <b>217</b>  | <b>415</b>  | <b>91%</b>      |

| <b>Mosquito Species- pest/disease list- Salem</b>                    | <b>2022</b> | <b>2023</b> | <b>% Change</b> | <b>WNV/EEE +</b> | <b>District Total<br/>% Change<br/>2022 to 2023</b> |
|--|-------------|-------------|-----------------|------------------|---|
| <i>Culiseta melanura</i> (red maple swamp/acid bog)                  | 0           | 0           | -               | NO               | 5%  |
| <i>Culex pipiens</i> (container/catch basins/heavy organics)         | 75          | 56          | -25%            | NO               | 64%   |
| <i>Culex restuans</i> (container/catch basins)                       | 3           | 24          | 700%            | NO               | 359%  |
| <i>Culex salinarius</i> (brackish water/phragmites/roadside ditches) | 2           | 116         | 5700%           | NO               | 11154%  |
| <i>Coquillitidia perturbans</i> (cattail)                            | 49          | 24          | -51%            | NO               | -40%  |
| <i>Aedes vexans</i> (rainwater/fresh floodwater)                     | 18          | 69          | 283%            | NO               | 2256%   |
| <i>Aedes japonicus</i> (tree hole/container breeder)                 | 55          | 77          | 40%             | NO               | 1233%   |
| <i>Aedes sollicitans</i> (salt marsh)                                | 0           | 0           | -               | NO               | -39%  |
| <i>Aedes cantator</i> (salt marsh)                                   | 1           | 2           | 100%            | NO               | 89%   |
| <i>Aedes canadensis</i> (snowmelt/woodland pool)                     | 1           | 1           | 0%              | NO               | 287%  |

#### WNV/EEE bridge vectors/human biters

- Due to historic precipitation during 2023, there was an increase in Salem in the fresh floodwater species *Ae. vexans* and *Cx. salinarius*, a brackish water mosquito which also relies on seasonal precipitation. The cattail species *Cq. perturbans* populations did not fully recover due to multiple years of drought and showed a population decrease in Amesbury of 66% during 2023. There were no WNV or EEE isolates in these bridge vector species during 2023. 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 3% increase in collections of WNV primary vectors from 2022 to 2023 in Salem. There is usually an increase in these vector species during hot dry years in container habitats. However, the precipitation received this year left quite a bit of stagnant water on grassy lawns which made perfect additional habitats for *Culex*. Timely catch basin cleaning and treatments and increased floodwater treatments helped keep *Culex* larval populations in check. 6 batches of *Culex* tested positive for WNV in 2023 with all isolations identified west of the I-95 corridor (Middleton, Haverhill, Lawrence, Andover). There were no EEE isolates in these species during 2023. 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 from 2020 through 2022. In the 2022 the district saw a 30% decrease in *Cs. melanura* populations from 2021. During 2023 the replenishment of groundwater needed for this species to propagate caused a 5% increase from 2022 populations. Even with the excessive rainfall this year, it will take several years for *Cs. melanura* populations to recover from the drought years. There were no WNV or EEE isolates in this species during 2023.

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

- *Ae. sollicitans*, a summer-fall salt marsh species, was also affected by the wet conditions this year. *Ae. sollicitans* relies on higher saline salt marsh conditions than other salt marsh mosquito species such as *Ae. cantator*. The excess precipitation “watered” down the salt pools on the marsh and cooler, cloudier than normal conditions limited evaporation of this fresh water which also decreased salinity of these pools. The district also conducted 4 aerial larvicide operations in 2023 versus the usual 3. This species decreased in the district by 39% from 2022.

Salem has a largely urban setting that favors the development of the WNV vectors. Due to extensive WNV history in Salem and surrounding communities, from mid-July to the first full hard frost, residents should take necessary precautions to reduce the risk of infection from WNV and other mosquito borne 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 2023 MA Arbovirus Plan listed below).

Refer to the 2023 Massachusetts State Arbovirus Surveillance and Response Plan viewed online at:

<https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data>