

MASSACHUSETTS MOSQUITO CONTROL

ANNUAL OPERATIONS REPORT



Year Report Covers: 2017 Date of Report: 01/31/2018

Project/District Name: **Northeast Mass. Wetlands Mgmt. Mosquito Control**

Address: 118 Tenney Street

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Report prepared by: *Kimberly A. Foss, Robyn Januszewski, William Mehaffey and Emily Sullivan*

NPDES permit no. **MAG87A028**

If you have a mission statement, please include it here: The Northeast Massachusetts Mosquito Control and Wetlands Management District represents the mosquito control and wetland management interests of those communities that choose to subscribe to its services. The prime directive of the District is to protect its citizens from mosquito-borne diseases by targeting precise, measured, and preemptive responses to specific risks as prescribed by the District's annually-revised "Integrated Pest & Vector Management Plan" (IPVMP). To ensure that our citizens quality of life and regional economy is not severely impacted by abundant pestiferous mosquito outbreaks; strategies targeted to reduce dominant mosquito populations are implemented as prescribed by the District's annually-revised "Best Management Practice" (BMP) plans. BMPs are designed to incorporate the District's environmentally sensitive and cost effective mosquito control strategies with the specific needs and concerns of each member community.

ORGANIZATION SETUP:

Commissioner names:

John W. Morris, CHO; Chairman

Vincent J. Russo, MD, MPH; Vice Chairman

Joseph Giarrusso, Conservation Officer

Paul Sevigny, RS, CHO

Rosemary Decie, RS

Superintendent/Director name: Jan to Nov - John Moak (Interim Director) / Nov to Dec - Roy Melnick (Executive Director)

Superintendent/Director contact phone number: 978-352-2800

Asst. Superintendent/Director name:

District/Project website: <http://www.nemassmosquito.org>

Twitter handle: @

Facebook page: <http://www.facebook.com/>

Staffing levels for the year of this report:

Full time: 8

Part time: 1

Seasonal: 4

Other: 1 (please describe) Interim Director

Of the above, how many are:

(Please check off all that apply, and list employee name(s) next to each category)

- ☒ Administrative Maureen Douglas, Bettijane Morgan
- ☒ Biologist Robyn Januszewski
- ☒ Educator Emily Sullivan, Kimberly Foss
- ☒ Entomologist Kimberly Foss
- ☒ Facilities William Mehaffey, John Moak
- ☒ Information technology Robyn Januszewski, Kelsey Evans (Website Design/Management)
- ☒ Laboratory Kimberly Foss
- ☒ Operations Maureen Douglas, Kelsey Evans, Kimberly Foss, Timothy Hay, Robyn Januszewski, Ross Mehaffey, William Mehaffey, John Moak, Barry Noone, Emily Sullivan and Seasonal Employees: Daniel Gurlitz, William Montgomery, Bettijane Morgan, Andrew Sheehan
- ☒ Public relations John Moak, Emily Sullivan, William Mehaffey, Kimberly Foss
- ☒ Wetland scientist Emily Sullivan (Wetlands Project Coordinator)
- ☒ Other (please describe) John Moak (Interim Director)

For the year of this report, the following were maintained (enter number in the column to the left):

- ☐ 13 Modified wetland equipment (list type) Kassbohrer PB270D "PistenBully" Flail Mower/Grader; Kassbohrer PB270DS "PistenBully" Flail Mower/Grader; Kassbohrer PB270DS "PistenBully" Flail Mower/Grader/Rotary Ditcher; Kassbohrer PB260DW "PistenBully" Dump Body/Grader; Kassbohrer "PistenBully" 100 All-Season Flail Mower; 1987 Bombadier "Muskeg" Backhoe/Dump Body; 1999 LinkBelt 1600 Excavator; 1996 Hudson Spray Trailer; 1996 Rokon all-terrain Motorcycle; 1987 ARGO 8 wheel Amphibious ATV; 2012 EZ-Loader Boat Trailer; 2012 Starcraft 14' Aluminum Boat; 2012 Mercury 20hp Outboard Motor
 - ☐ 1 Larval control equipment (list type) Birchmeyer Backpack Sprayer
 - ☐ 7 ULV sprayers (list type) Clarke "Promist" and Clarke "Dura Pro" sprayers
 - ☐ 22 Vehicles
- Other (please be specific): 2 Barrier Sprayers for mosquito control: Leco HD Series D 70001047 Barrier Sprayer (Blower Model 26-3210) and Leco 1100 Barrier Sprayer (Blower Model RAI 89D)
- 1 Invasive Vegetation Sprayer: Roots ID # 865-105-20) Rears Ag Sprayer S-95-1044
- 3 Hand operated Solo Backpack Sprayers for Invasive Vegetation Control

Comments: _____

How many cities and towns are in your service area?* 33

Alphabetical list: Amesbury, Andover, Beverly, Boxford, Danvers, Essex*, Georgetown, Groveland, Hamilton, Haverhill, Ipswich, Lynn, Lynnfield, Manchester-by-the-Sea, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Revere, Rowley, Salem, Salisbury, Saugus, Swampscott, Topsfield, Wenham, West Newbury and Winthrop

*Subscribes to Northshore Greenhead Fly Program only

Were there any changes to your service area this year? No

Cities/towns added: None
Cities/towns removed: None

***Please attach a map of your service area (or a website link to that map).**

INTEGRATED PEST MANAGEMENT (IPM):

Check off all services that your district/project currently provides to member cities and towns as part of an IPM program (details will be provided in the sections below):

- ☒ **Adult mosquito control**
- ☒ **Adult mosquito surveillance**
- ☒ **Ditch maintenance**
- ☒ **Education, Outreach & Public education**
- ☒ **Larval mosquito control**
- ☒ **Larval mosquito surveillance**
- ☐ **Open Marsh Water Management**
- ☒ **Research**
- ☒ **Source reduction (tire removals)**
- ☒ **Other (please list): Inspectional Services, Development Plan Reviews, Wastewater and Water Treatment Facility inspections and treatments, Site Reviews, Greenhead Fly Control, Source Reduction Services such as Wetland Management Activities: Predator Habitat Improvement, Restoration, Problem Beaver Management, Aquatic Invasive Vegetation Control, and Breeding container removal**

Comments: The primary vector species of West Nile Virus, Culex pipiens usually breeds in artificial containers, catch basins, storm water control structures, and other highly organic and polluted water. Therefore the District will routinely inspect areas in and around industrial facilities, office parks, and agricultural based operations because of the potential for Culex species proliferation and its correlation to West Nile Virus by request of the Board of Health. The District may review proposed new development site plans upon request and/or inspect sites where storm water control structures are located or are in the process of being constructed. Upon inspection of a site the District makes written recommendations and submits them to the Board of Health, cc-ing the land owner. The District works with local boards of health to assist in abating mosquito issues related to abandoned/neglected properties.

LARVAL MOSQUITO CONTROL:

If you have a larval mosquito control program, please fill out the section below, else skip ahead to the next section.

Describe the purpose of this program: The District implements aerial and ground applications as a pre-emptive measure to control mosquito populations before they become adults.

The District's aerial salt water larviciding program was developed to control salt marsh mosquitoes in approximately 30,000 acres of salt marsh stretching from Boston north to the New Hampshire border. Two species of salt marsh mosquitoes lay their eggs in moist muddy areas like salt pannes, depressions and overgrown ditches along the upper edges of the salt marsh. Flooding of the marsh, the result of monthly high run tides, storms or rain events,

triggers the hatching of dormant mosquito eggs into mosquito larvae. The larvae then progress through a series of instars, pupating and then eventually emerging as adult mosquitoes. Under optimal conditions the whole process from egg to adult can occur in as little as four days. Salt marsh mosquitoes are known for their aggressive biting behavior even in the heat of daylight hours. If not controlled salt marsh mosquitoes can be present in large numbers from April through September.

Ground larviciding is a site specific application of an insecticide by hand to potential and/or realized mosquito larval habitat (i.e., wetland) also designed to control mosquitoes in their aquatic stages before they emerge as adult mosquitoes. The Operations Manager assigns Field Technicians to specific areas within District territory. Field Technicians inspect and treat known larval development sites from the District's data base within their assigned area.

What months is this program active? March - October

Describe the types of areas where you use this program: Fresh water and brackish wetlands, salt marsh and artificial structures.

Do you use:

- ☒ **Ground application (hand, portable and/or backpack, etc.)**
- ☒ **Aerial applications**
- ☒ **Other (please list): Source Reduction such as Wetland Management Activities**

(see "IPM" above for highlights)

Comments: N/A

List all products that you use for larval mosquito control in the table below (leave blank if not applicable):

Product Name	EPA #	Application Rate(s)	Application Method	Targeted life stage	Habitat Type	Total finished product applied
Fourstar Bti-CRG	85685-4	7.5-10.0 lbs./acre	Hand	Larvae	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Other (please list): saltmarsh	523 lbs.
VectoBac G	73049-10	2.5-10.0 lbs./acre	Hand	Larvae	<input type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	1,522.9 lbs.
VectoBac 12AS	73049-38	0.25 gals/acre	Aerial	Larvae	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Other (please list): saltmarsh	2,370 gals.
Altosid WSP	2724-448	1 WSP/catch basin = 7 gm.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	34,238 pouches = 239,666 gm. (528.3 lbs.)
Altosid XR Briquet	2724-421	1 briquet/catch basin = 1.28 oz.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	14 briquets = 17.92 ozs. (1.12 lbs.)
Fourstar 90-day Briquet	83362-3	1 briquet/catch basin = 20.85 gm.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	1,357 briquets = 28,293.45 gm. (62.37 lbs.)
VectoMax WSP	73049-429	1 WSP/catch basin = 10 gm.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	18,375 pouches = 183,750 gm. (405.05 lbs.)

List all products that you use for larval mosquito control in the table below (leave blank if not applicable):

Product Name	EPA #	Application Rate(s)	Application Method	Targeted life stage	Habitat Type	Total finished product applied
Cocobear	8329-93	3 - 5 gals/acre	Hand	Larvae/pupae	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	2.38 gals.
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	

What is your trigger for larviciding operations? (check all that apply)

☒ Best professional judgment

☒ Historical records

☒ Larval dip counts – please list trigger for application: one or more per dip depending on type of mosquito, type of habitat, type of conditions, anticipated weather trends.

☐ Other (please describe):

Comments: n/a

Please attach a map of your service area (or a website link to that map).

<http://www.mass.gov/eea/docs/agr/boards-commissions/mcps-map.pdf>

ADULT MOSQUITO CONTROL:

If you have a larval mosquito control program, please fill out the section below, else skip ahead to the next section.

Describe the purpose of this program: To limit mosquito population size, control species specific for vectoring West Nile Virus and Eastern Equine Encephalitis (EEE) and to reduce nuisance mosquito populations in response to resident complaints.

What is the time frame for this program? Adult mosquito control occurs as outlined in the individual municipality Best Management Practice Plans (BMPs), and as advised by the NEMMCWMD based on surveillance data and/or MA Department of Public Health (MDPH) information or other applicable conditions. June through September. One half hour after sunset to one half hour before sunrise as weather conditions permit.

Describe the types of areas where you use this program: Outdoors (streets, private residences, schools, parks and recreation areas) and only in communities that participate in the NEMMCWMD's program per city/town and resident request.

Do you use:

☐ Aerial applications

☐ Portable applications

☒ Truck applications

☐ Other (please list):

Comments: _____

For each product used, please list the name, EPA #, and application rate(s):

Product Name	EPA #	Application Rate(s)	Application Method	Total finished product applied
Suspend SC	432-763	1.0 fl.oz / 1.0 gal water. 1.0 gal / min.	truck mounted barrier sprayer	43 fl. oz.
Zenivex E4RTU	2724-807	1.0 fl.oz/acre	truck mounted ULV sprayer	82 gals.

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Please describe the maximum amounts or frequency used in a particular time frame such as season and areas

Zenivex E4 RTU: Selective adulticiding of specific areas will be provided at the request of the Board of Health or residents, as outlined in each town's annual Best Management Practice Plan (BMP) and as circumstances warrant and conditions allow. Applications to schools must be in compliance with MGL ch85.

Suspend SC: Barrier applications, requested by local Boards of Health or school officials, are applied to public use areas such as playgrounds, parks, athletic fields and school grounds, etc. Applications to schools must also be in compliance with MGL ch85.

What is your trigger for adulticiding operations? (check all that apply)

- ☒ Arbovirus data
- ☒ Best professional judgment
- ☒ Complaint calls (Describe trigger for application: 1 or more on street or in neighborhood and/or BOH requests)
- ☐ Landing rates (Describe trigger for application)
- ☒ Light trap data (Describe trigger for application increasing amount of disease carrying vectors)

Comments: ADULTICIDING - Ultra Low Volume

Ultra Low Volume Applications (ULV) applications are done in response to surveillance data, multiple resident requests, municipal Health Department or other approved board requests in accordance with the individual municipality BMP. The District uses truck mounted ULV non-thermal aerosol sprayers for selective, targeted and wide area applications. A computerized variable flow control system automatically calibrates the correct amount of material to be applied, depending on truck speed and dispenses a mist like swath. All ULV machines are independently calibrated and certified for accuracy on an annual basis.

Timing of Application: ULV applications will be conducted during evening hours, one half hour after sunset to one half hour before sunrise as weather conditions permit.

ADULTICIDING - Ground Barrier

Pesticides used in barrier applications have a longer residual effect and thereby reduce the need for repeated ULV applications. Barrier applications are used on public use areas such as parks, play grounds, athletic fields and school grounds in response to requests from school officials and municipal health departments or other approved boards in accordance with individual municipality BMP or the District's VMP. Since barrier applications may be performed within areas that children frequent, all applications are conducted in strict accordance with the MA Children's Protection Act. The District only uses EPA registered pesticides approved by the MA Pesticide Bureau and in compliance with federal and state regulations.

Application: Barrier applications will be done by means of truck mounted barrier spray equipment. Applications will be conducted during evening hours, one half hour after sunset to one half hour before sunrise and as weather conditions permit.

Applications on School Property: All applications on school property must be in compliance with MGL ch85.

Please attach a map of your service area (or a website link to that map).

<http://www.mass.gov/eea/docs/agr/boards-commissions/mcps-map.pdf>

SOURCE REDUCTION (Tire Removals)

If you practice source reduction methods, such as tire removal, please fill out the section below, else skip ahead to the next section.

Please describe your program: SOURCE REDUCTION: The District conducts source reduction activities typically by hand and as necessary during inspections, treatments, ditch maintenance, or in conjunction with organized wetland management projects and clean ups.

SANITATION: CONTAINER AND DEBRIS CLEAN-UP/DISPOSAL: Emptying, tipping over, draining or removal of containers, plastic and other debris prone to attract oviposition by mosquitoes has long been a practice of the District. This service should not be confused with broad area trash removal.

Total Container (plastics and other debris) Removal

26.5 Contractor Bags

TIRE REMOVAL/RECYCLING

The District's tire removal program provides for the proper disposal of dumped tires through service requests, petitioned wetland management projects, coordinated clean-ups and in some cases participation in Household Hazardous Waste Day Events. A maximum number of tires slated for removal and proper disposal as agreed upon by the District and member municipality may be specified for in each municipality's Best Management Practice Plan (reviewed annually). Curbside collection, "drop off days", and/or household hazardous waste day collections up to a maximum specified annual amount may be considered on an individual municipality basis. The Tire Program is an important part of the District's integrated pest management (IPM) approach and has become a valuable mosquito habitat source reduction tool.

Tire Removal

1245

What time frame during the year is this method employed? year round

Comments: N/A

WATER MANAGEMENT/DITCH MAINTENANCE

If you have a water management or ditch maintenance program, please fill out the section below, else skip ahead to the next section.

Please check all that apply:

☒ Inland/freshwater

☒ Saltmarsh

Please describe your program: **MANUAL DITCH CLEARING:** The District clears residential and municipal drainage i.e. roadside, agricultural, fresh water and salt marsh grid ditches, stormwater ditches and swales, as well as outfall and inlet grates by hand using the following tools: hooks, loppers, rakes, hand saws and chainsaws with intent to remove obstructions, debris and vegetation that block flow. Manual ditch maintenance helps to decrease stagnant water, improve flow, unclog catch basin drains, reconnect floodplain and restore potential predator access to mosquito habitat.

MECHANIZED WETLAND MANAGEMENT:

The primary goal of mosquito control remains the central component to the District's mechanized "wetland" management projects but, and whenever possible plans are developed to minimize ecosystem cost while maximizing ecosystem benefits. The objectives of the District's Wetlands Management Program remain the same; abate mosquito populations; decrease potential mosquito larval habitat; improve conditions for predator access to mosquito habitat; improve native flora and fauna; and reduce insecticide applications as part of the District's comprehensive integrated pest management, (IPM) strategy.

The District has found a way to balance these objectives with mechanized and manual strategies applied in both fresh and salt water habitats. District projects are designed to consider solutions to historic, ongoing and future environmental stressors. These projects are developed in partnership with local municipal officials and local stake holders. The District strives to integrate sustainable practices that promote ecological integrity and resilience of the habitat.

A wide range of wetland management activities are offered by the District and are implemented in accordance with Massachusetts General Laws Chapter 252, and in compliance with established federal guidelines as well as in coordination with local Conservation Commissions and municipal officials. All projects are reviewed by the appropriate state and federal agencies. Previous District projects include: ditch maintenance, floodplain reconnection, marsh restoration, fill removal, stream bank stabilization wetland tire dump removal, and general clean-ups.

For **inland/freshwater water management**, check off all that apply.

Maintenance Type	Estimate of cumulative length of culverts, ditches, swales, etc. maintained (ft)
<input checked="" type="checkbox"/> Culvert cleaning	115
<input checked="" type="checkbox"/> Hand cleaning	22,584

<input checked="" type="checkbox"/> Mechanized cleaning	3,760
<input type="checkbox"/> Stream flow improvement	
<input type="checkbox"/> Other (please list):	

Comments: _____

For **saltmarsh ditch maintenance**, check off all that apply:

Maintenance Type	Estimate of cumulative length of ditches maintained (ft)
<input checked="" type="checkbox"/> Hand cleaning	877
<input checked="" type="checkbox"/> Mechanized cleaning	200
<input checked="" type="checkbox"/> Other (please list): Invasive Species Control (<i>Lepidium latifolium</i> - "perennial pepperweed" herbicide treatment and hand pulling Phragmites australis - "phragmites" mowing for safe and efficient surveillance of mosquito habitat, enhancement of predator access, release cutting for native species and fire suppression	Perennial pepperweed treatments along ditches and high marsh- upland edges Targeted areas - high marsh

Comments: N/A

What time frame during the year is this method employed? The District conducts water management work throughout the year based upon resources and seasonally scheduled routine control efforts. Manual work (implemented by means of hooks, loppers and other hand tools) occurs year-round and typically coincides with regularly scheduled operations. Typically mechanized projects (larger scale) occur during the late fall through early spring. This enables the District to take advantage of low-flow opportunities, firmer ground conditions and to be respectful of time of year restrictions.

Comments: N/A

Please attach a map of ditch maintenance areas (or a website link to that map). maps available upon request

OPEN MARSH WATER MANAGEMENT

If you have an Open Marsh Water Management program, please fill out the section below, else skip ahead to the next section.

Describe the purpose of this program: Mosquito control through improved hydrology and creation of predator fish access and habitat.

What months is this program active? Previously constructed/permitted OMWM sites will be reviewed May-September and maintained October through May provided recommendations for maintenance are cleared through the Advisory Committee and regulatory process.

Please give an estimate of total square feet or acreage: No new acreage. Acreage of old sites (prior to 2008) available upon request.

Comments: The District no longer retains an OMWM permit. The District will continue to evaluate and repair previously constructed sites based on maintenance needs.

Please attach a map of OMWM areas (or a website link to that map).

http://maps.massgis.state.ma.us/map_ol/oliver.php

Select "available data layers" (right side), open "Coastal and Marine Features", open "Northeast Salt Marsh Projects" and then add layer.

MONITORING (Measures of Efficacy)

Describe monitoring efforts for each of the following:

Aerial Larvicide – wetlands: See Note 1

Ground ULV Adulticide: Efficacy measures for adulticiding include adult light trapping, public reporting and personnel observations

Larvicide – catch basins: See Note 2

Larvicide-hand/small area See Note 3

Open Marsh Water Management: OMWM sites may be reviewed by petition, service request or as observed by field personnel in the course of routine operations.

Source Reduction: For mechanized fresh water - in accordance with the State's fresh water BMPs. Otherwise sites are often inspected by field personnel in the course of routine operations.

Other (please list): none

Provide or list standard steps, criterion, or protocols regarding the documentation of efficacy (pre and post data), and resistance testing (if any):

Note 1- Aerial Larvicide- wetlands

Field Technicians establish 10 fully recoverable dip stations (RDS) for their designated area. Prior to application each RDS is sampled. Larval stage and number are recorded on the Aerial Larviciding Survey – Pre Treatment form. Post Treatment Surveillance: Field Technicians will survey sprayed sites after 24 hours post application. Field Technicians randomly dip as needed to determine the overall efficacy of the application. The 10 pre-selected RDS are sampled. Larval stages and number of dead/live/moribund are recorded on the Aerial Larviciding Survey – Post Treatment Form for efficacy comparisons.

Note 2- Larvicide-catch basins

Field Technicians inspect and treat each basin with a larvicide that provides the best efficacy for the longest period of time. Treatments are made early in the season before WNV vector species can reach their peak densities. The type of larvicide is dependant on whether the municipal DPW has a basin cleaning schedule and if so, when the cleaning may occur. After treatments are made, regular inspections are made on a bi-monthly basis or if temperatures and rain events dictate more frequent inspections. For Bt based products: efficacy is based on absence of egg rafts, larvae and pupae. For methoprene based products: efficacy is based on collecting a sample of larvae and pupae from a random basin and rearing that sample in the lab for ratio of unaffected to affected adults.

Note 3- Larvicide-hand/small area:

Field Technicians sample for immature aquatic mosquito stages by taking 10 dips of water with a standard white 250 – 300 ml dipper. Field Technicians are trained to identify and select the most suitable mosquito habitat for each dip location. All immature mosquito stages are counted for each dip and recorded on a Larviciding Report (including location). Field Technicians use their best professional judgment to determine whether or not a site will be treated.

Check the boxes below, indicating if your program has performed any of the following:

Research Project	Details
Bottle assays	
Efficacy testing	See above
Other:	
Other:	

ADULT MOSQUITO SURVEILLANCE

If you have an adult mosquito surveillance program, please fill out the section below, else skip ahead to the next section.

Describe the purpose of this program: To monitor species, especially vector species for management of populations and testing for arboviruses. From Introduction to "Best Management Plans" and as outlined in our Integrated Pest and Vector Management Plan (IPVMP): The District focus is to collect a representative sample of mosquitoes in a city or town on a regular basis. Historical collection stations are in areas where substantial portions of municipality residents reside to determine arboviral risk. Supplemental trapping is initiated after WNV/EEE positives are detected from historical surveillance trap sites.

What months is this program active? May-October

Check off all trap types currently in use by your program:

- | | |
|--|---------------------------------|
| <input type="checkbox"/> ABC light traps | <input type="checkbox"/> Canopy |
| <input type="checkbox"/> ABC light traps w/CO ₂ | <input type="checkbox"/> Canopy |
| <input type="checkbox"/> CDC light traps | <input type="checkbox"/> Canopy |

- ☒ CDC light traps w/CO₂
☐ Canopy
☒ Gravid traps
☐ Landing rate tests
☐ NJ light traps
 ☐ Canopy
☐ NJ light traps w/CO₂
☐ Canopy
☒ Ovitrap
☒ Resting boxes
☒ Other (please describe): CDC Autocidal Gravid Ovitrap (CDC-AGO) & MDPH Ae. albopictus Ovitrap Program

Do you maintain long-term trap sites in any of your areas? Yes

If yes, please describe how you chose these long-term sites:

Historical Sites, proximity to population centers; access to electrical power, & security of trap sites

Please check off the species of concern in your service area:

- ☐ *Ae. albopictus*
☒ *Oc. abserratus*
☒ *Ae. cinereus*
☒ *Oc. canadensis*
☒ *Ae. vexans*
☒ *Oc. cantator*
☒ *An. punctipennis*
☒ *Oc. j. japonicus*
☒ *An. quadrimaculatus*
☒ *Oc. sollicitans*
☒ *Cq. perturbans*
☒ *Oc. taeniorhynchus*
☒ *Cx. pipiens*
☒ *Oc. triseriatus*
☒ *Cx. restuans*
☐ *Oc. trivittatus*
☒ *Cx. salinarius*
☒ *Ps. ferox*
☒ *Cs. melanura*
☐ *Ur. sapphirina*
☒ Other (please list): **Spring pest species: Oc. excrucians/stimulans/fitchii complex. No Ae. albopictus collected as of yet in the district for 2017**

Do you participate in the MDPH Arboviral Surveillance program? Yes

How many pools do you submit weekly on average? 31 (2017=596 pools sent over 19 EPI week season)

Number of traps in your service area **placed by MDPH: 0**

Were these long-term trap sites or supplemental trapping sites? Choose one

Which arboviruses were found in your area during the previous mosquito season? Enter the number of pools/cases below:

Arbovirus	Positive Mosquito Pools	Equine Cases	Human Cases
<input type="checkbox"/> Eastern Equine Encephalitis (EEE)			
<input checked="" type="checkbox"/> West Nile Virus (WNV)	28	0	0
<input type="checkbox"/> Other (please list):			

Comments: 2017 Data

For each arbovirus listed below, please list the risk levels in your project area at both the start and end of the season (if more than one, please list all):

Arbovirus	Start of Season	End of Season
EEE	low-remote	low-remote
WNV	low	moderate (see comments)

Comments: WNV: MODERATE RISK: Methuen, Haverhill, Amesbury, Merrimac, Beverly, Peabody, Lynn, Middleton, Danvers, Salem, Marblehead, Swampscott, Nahant, Lynnfield, Saugus, Revere, Winthrop

EDUCATION, OUTREACH & PUBLIC RELATIONS

If you have an education/outreach program, please fill out the section below, else skip ahead to the next section.

Describe the purpose of this program: The District provides educational outreach on vector-borne disease, personal protection, residential source reduction, storm water management, habitat restoration, invasive species, and environmental science primarily relevant to mosquitoes but also including ticks and wetlands. This information is made available to schools, civic organizations, not for profit organizations, public access TV, the general public, as well as state, federal and municipal officials upon request or during the course of routine operations. District personnel are available to meet at municipal government community meetings (i.e. Conservation Commission, Board of Health, Board of Selectmen or other) to provide information related to all of the above.

The District's new website (www.nemassmosquito.org) went online in February 2017. It provides information about operational strategies, procedures, equipment and materials, links to others including state DPH sites regarding disease/virus information and prevention as well as seasonal activity summaries.

Other Media: The District has various hand-outs, posters, presentations and DVDs which are available to the public upon request.

Outreach Programs: The District's Entomologist, Wetlands Project Coordinator and /or Biologist present educational programs tailored to the specific needs of schools, civic organization and public officials. The Wetlands Project Coordinator has attended science fairs and the Coastal Science Conference.

What time frame during the year is this method employed? year round

Check off all education/outreach methods that were performed by your program this year:

- ☒ Development/distribution of brochures, handouts, etc.
- ☒ Door-to-door canvassing (door hangers, speaking to property owners, etc.)
- ☐ Facebook page, Twitter, or other social media

- ☒ Mailings (Describe target audience(s): Municipal government and educational institutions.)
- ☐ Media outreach (interviews for print or online media sources, press releases, etc.)
- ☒ Presentations at meetings
- ☐ School-based programs, science fairs, etc.
- ☒ Tabling at events (local events, annual meetings, etc.)
- ☒ Website
- ☒ Other (please describe): Great Marsh Restoration Task Force Member Updates, MA-NH-ME Invasives Group Member Updates, participation in Coastal Science Conference and numerous networking opportunities with local and regional students, interns and wetland scientists to promote and advocate for mosquito control efforts and personal protection.

Estimate the audience reached this year using the education/outreach methods above:
Comments:

List your program's top 3 education/outreach activities for this year:

1. Website
2. Property owner outreach
3. Meeting presentations

Were you involved in any collaborations with the following partners this year? Provide details below, including a list of technical reports, white/grey papers, journal publications, trade magazine articles, etc:

- ☐ Academia
- ☐ Another mosquito control district/project
- ☒ Another state agency (DCR, DPH, etc.) The District has been working in partnership with the Department of Conservation and Recreation(DCR) in the Rumney Marsh. The District will be making recommendations for repairs to the wetland and its surroundings caused by a private contractor to reduce isolated mosquito habitat and perform maintenance of selected ditches at the site.

MADOT: as requested and appropriate for clearing blockages associated with catch basin drainage

- ☒ Environmental groupsThe District's Wetlands Project Coordinator as a member of the Great Marsh Restoration Task Force has been fortunate to share mosquito control concerns relative to current and future planned projects occurring in and around the Great Marsh.

The District's Wetlands Project Coordinator participated in the MA-NH-ME Invasives work group.

- ☒ Industry Annual ULV equipment calibration.

List any training/education your staff received this year: TRAINING:

All District employees are trained annually in accordance with the Commonwealth's PACE Program. Additionally some of the District's staff have attended the following: ESRI courses, M.U.S.T. Excavation Safety Seminar, Northeastern Mosquito Control Association (NMCA) Annual Meeting, NMCA's Field Day (Safe Pesticide Handling, Personal Protection Equipment,

Spill Response, and Understanding the Label and vendor overview of a variety of current mosquito control products and equipment).

Please list the certifications and degrees held by your staff: Various scientific and environmental degrees including: Associates, Bachelors and Masters Degrees and Doctoral level education. District certifications and licensing include: MA Pesticide Core License; Commercial Certification Category 47 (Mosquito and Biting Fly), Category 39 (Aquatic Pests) and Category 40 (Right of Way); MA Hoisting Engineer Class 2A and 1C; MA Commercial Driver's license - Class A & B; Massachusetts Trappers Certification; NPDES MS4 Compliance & Enforcement Inspector Certification.

Comments: N/A

INFORMATION TECHNOLOGY (IT)

Does your program use (check all that apply):

- ☒ Aerial Photography
- ☒ Databases
- ☐ Dataloggers (monitoring for temperature, etc.)
- ☒ GIS mapping (Describe: ArcGis 10.5.1)
- ☒ GPS equipment
- ☒ Smartphones
- ☒ Tablets/Toughbooks
- ☐ Other (please describe):

Describe any changes/enhancements in IT from the previous year: The District purchased the Field Seeker Data Collection program from Frontier Precision this year. This allows us a more efficient means to collect and analyze data on our operations. The program is built on the ESRI ArcGIS platform, increasing the capabilities of the existing ArcGIS program, and utilizes the iOS and Windows platforms. The program is deployed on smartphones allowing data collection to be accomplished using existing equipment.

Describe any difficulties your program had with IT software/equipment this year: The District lost productivity numerous times due to network issues in Boston. The District also lost data within the Field Seeker program due to the state mandate that smartphones hibernate if not in use after a given amount of time. The tracking program within Field Seeker requires the phone to remain active to capture data.

Comments: N/A

REVENUES & EXPENDITURES

Please provide the amounts for your approved budgets for the current, previous, and future fiscal years. Please note if the budget for the next fiscal year is an estimate, or put "n/a" if it is not yet available.

Fiscal Year	Approved Budget
FY17	1,589,966.00
FY18	1,637,226.20
FY19	1,751,183.00 (estimate)

List each member municipality, along with the corresponding (cherry sheet) funding assessment dollar amount, for the current fiscal year (or provide a web link to this information):

Municipality Total Assessment

Amesbury	43,395.90
Andover	119,976.93
Beverly	72,837.05
Boxford	74,709.04
Danvers	56,499.77
Georgetown	41,694.71
Groveland	28,760.42
Hamilton	47,139.87
Haverhill	117,934.68
Ipswich	102,958.93
Lynn	56,499.77
Lynnfield	39,992.31
Manchester	36,588.70
Marblehead	37,269.42
Merrimac	27,228.81
Methuen	84,239.12
Middleton	47,139.87
Nahant	7,147.56
Newbury	74,028.32
Newburyport	39,992.31
N. Andover	94,960.46
Peabody	76,240.65
Revere	35,737.81
Rowley	56,670.15
Salem	42,374.83
Salisbury	50,032.93
Saugus	48,331.13
Swampscott	19,570.70
Topsfield	41,523.93
Wenham	25,016.47
W. Newbury	41,694.11
Winthrop	13,614.40

Comments: N/A

SERVICE REQUESTS

How many service requests did you receive this season? 1187

How many were for larviciding? 25

How many were for adulticiding? 1160

Was this an increase or decrease over last season? Increase

Comments: The District received 1 service request for tire removal and 1 service request for wetlands

EXCLUSIONS

How many exclusion requests did you receive this season? 368

Was this an increase or decrease over last season? Decrease

Do you have large areas of pesticide exclusion, such as estimated or priority habitats? Yes

If yes, please explain, and attach maps or a web link if possible. US Fish & Wildlife/Parker River Refuge (Newbury, Rowley, Ipswich), The Trustees of Reservations and MA Audubon

http://www.fws.gov/uploadedFiles/Region_5/NWRS/North_Zone/Parker_River_Complex/Parker_River/ParkerRiverMap.pdf

SPECIAL PROJECTS

Did your program perform any of the following special projects? Check all that apply.

- ☒ Inspectional services (inspections at sewage treatment facilities, review of subdivision plans, etc.)
Describe:
- ☒ Work with DPW departments or other local or state officials to address stormwater systems, clogged culverts, or other areas identified as man-made mosquito problem areas

Describe: Annual catch basin cleaning/treatment coordination. Roadside drainage maintenance, ditch maintenance, planning for detention pond(s) maintenance, tire removal on public and private lands in member communities, Boards of Health - Household Hazardous Waste Days, consulting and site review on potential and constructed wetland maintenance and restoration work with local Conservation Commissions, Planning Boards, DPWs, other Mosquito Control Districts, Department of Conservation and Recreation, Division of Fish and Game, MA Department of Transportation, US Fish and Wildlife Service, US Army Corps of Engineers and US Environmental Protection Agency.

- ☒ Work with groups as described above on long term solutions?

Describe: Marblehead Conservation Commission - Marsh Restoration Project. On-going partnerships with Department of Conservation and Recreation, Division of Ecological Restoration, Division of Fish and Game, MA Department of Transportation, US Fish and Wildlife Service and US EPA - Salt Marsh Restoration Projects - ongoing.

- ☒ Conduct or participate in any cooperative research or restoration projects?

Describe: Invasives Control partnership with Great Marsh Restoration Task Force and MA-NH-ME Invasives Workgroup including but not limited to: USFWS, MA Audubon, MA Bays - 8 Towns, the Great Marsh and the Bay, Gulf of Maine Institute, the Trustees of Reservations, Essex County Greenbelt, MA DOT, New England Wildflower Society, University of New Hampshire - Jackson Estuarine Laboratory, and assistance on marsh mitigation-restoration project with the City of Revere.

- ☒ Participate in any state/regional/national workgroups or panels, or attend any meeting pertaining to the above?

Describe: MA-NH-ME Invasives Workgroup, Great Marsh Restoration Task Force

- ☒ Work on any biological control projects, such as enhancement of habitat for native predators, release of predatory fish or invertebrates, etc.?

Describe: Much of the District's water management work focuses on improving mosquito predator access, refugia, and habitat. Whenever possible both manual and mechanized ditch maintenance and stream cleaning is done in consideration of preserving shade and in stream refugia for predators (fish etc.). Large branches / root wads that do not impair a waterways ability to flow are left intact. Personnel also avoid pools and riffles focusing more effort on significantly decreasing stagnant, shallow sections or reconnecting isolated floodplains.

The District's work controlling invasive phragmites is another example of restoring native habitat and improving predator habitat. Mowing operations (particularly in conjunction with chemical treatment) help to reduce phragmites stand density. Mowing reduces light competition for native species colonization. Native vegetation plays an essential role in predator species health. Controlling invasive phragmites also significantly improves predatory fish access to isolated pockets of mosquito habitat on the marsh. (Reduction in phragmites stand density and extent allows District personnel safe and efficient access to inspect and treat for mosquitoes too).

CHILDREN AND FAMILIES PROTECTION ACT (CFPA)

Is your program impacted by the CFPA? Yes

If yes, please explain: Pesticide materials used by the District are required to be listed on a school's IPM plan to allow the District to treat the property. In recent years, the District has been asked by local Boards of Health to spray town fields including school

properties for adult mosquitoes, particularly in the event of virus outbreaks.

If you have data on compliance rates with the CFPA within your program area, please list here: The District contains 219 public schools, 123 private schools, 369 day care programs and 801 family day care programs. Our data shows no schools/day cares in the District have an IPM plan that includes all of the materials used by the District and 12.7% have some mention of mosquito control in their IPM plans. Looking at schools with current IPM plans (updated in 2015, 2016 and/or 2017), the data shows 59.3% of public schools, 18.6% of private schools and 10.8% of day cares have some mention of mosquito control in their IPM plans (family day cares were not included in the compliance figures as they are not required to file a plan). These figures include plans that declare no pesticide use on the school property.

Describe any difficulties you have had with the implementation of your program due to the CFPA, please elaborate here: The District is often asked by local Boards of Health to spray town properties, including schools, for adult mosquitoes, particularly during times of virus outbreaks. Schools that do not include mosquito control as part of their IPM plan reduce the District's ability to provide proactive and emergency mosquito control in those municipalities. This may lead to the possibility of increased virus for the surrounding towns and increased costs to the District.

Comments: Comments received from schools include:

- 1) Schools are unaware of the requirements
- 2) Online forms are challenging for individual school IPM coordinators to complete
- 3) Many schools do not have a dedicated IPM coordinator

The District will continue to reach out and work with the schools in member municipalities to increase the number of schools that include mosquito control as part of their IPM plan.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT PROGRAM

Did your program report any adverse incidents during this reporting period? No

If yes, please list any corrective actions here: _____

GENERAL COMMENTS

Please add any comments here for topics not covered elsewhere in this report: _____