MASSACHUSETTS MOSQUITO CONTROL

ANNUAL OPERATIONS REPORT

Year Report Covers: 2016 Date of Report: 00/31/2017

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

Address: 118 Tenney Street

City/Town: Georgetown Zip: 01833

Phone: 978-352-2800 Fax:

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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 "Vector Management Plan" (VMP). 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: Mary Duggan
Superintendent/Director contact phone number: 978-352-2800
Asst. Superintendent/Director name:

District/Project website: http://www.northeastmassmosquito.com - currently under construction
Twitter handle: @
Facebook page: http://www.facebook.com/Northeast-Massachusetts-Mosquito-Control-and-Wetlands-Management-District-1537587256465785/?ref=bookmarks

Staffing levels for the year of this report:
Full time: 10
Part time: 1
Seasonal: 6
Other: 1 (please describe) Management Analyst

Of the above, how many are:
(Please check off all that apply, and list employee name(s) next to each category)

☒ Administrative Maureen Douglas
☒ Biologist Robyn Januszewski
☒ Educator Emily Sullivan
☒ Entomologist Kimberly A. Foss
☒ Facilities William Mehaffey & John Moak
☐ Information technology
☒ Laboratory Kimberly A. Foss & Anthony Corricelli
☒ Operations Anthony Corricelli, Maureen Douglas, Mary Duggan, Kelsey Evans, Kimberly Foss, Timothy Hay, Robyn Januszewski, Ross Mehaffey, William Mehaffey, John Moak, Barry Noone, Emily Sullivan and Seasonal Employees: Richard Caron, Daniel Gurlitz, William Montgomery, Bettijane Morgan, Andrew Sheehan, Thaddeus Tatarczuk
☒ Public relations John Moak, Emily Sullivan
☒ Wetland scientist Emily Sullivan (Wetlands Project Coordinator)
☒ Other (please describe) Management Analyst: John Moak

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"
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

Were there any changes to your service area this year? No
Cities/towns added:
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, and Source Reduction Services such as Wetland Management Activities: Predator Habitat Improvement, Restoration, Problem Beaver Management, Aquatic Invasive Vegetation Control, Breeding container/trash removal and Existing Open Marsh Water Management project maintenance.**

Comments: POLICY, PROCEDURE AND FACTS: INSPECTIONAL SERVICES

Existing and potential mosquito development habitats can often be readily corrected without treatment of an insecticide if early intervention actions are conducted. The District is authorized under the provisions of Chapter 252: Section 4 of the General Laws of the Commonwealth to enter upon lands for the purpose of inspection. The District carries no regulatory authority nor is it our intention to impose upon any citizen or business but to rather be a source of information to help people prevent or abate mosquitoes to the mutual benefit of the community. The District may act as technical advisor as requested by local boards of health to represent the municipalities' public and animal health as well as human annoyance concerns relative to factors effecting mosquito populations (potential and realized).

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	☐ Catch basins ☐ Containers ☒ Wetland ☒ Other (please list): saltmarsh	905.5 lbs.
VectoBac G	73049-10	2.5-10.0 lbs/acre	Hand	Larvae	☐ Catch basins ☒ Containers ☒ Wetland ☐ Other (please list):	623.0 lbs.
VectoBac 12AS	73049-38	0.25 gals/acre	Aerial	Larvae	☐ Catch basins ☐ Containers ☐ Wetland ☒ Other (please list): Saltmarsh	3,180 gals.
Altosid WSP	2724-448	1 WSP/catch basin = 7 gr.	Hand	Larvae	☒ Catch basins ☒ Containers ☐ Wetland ☐ Other (please list):	29,840 pouches = 208,880 gr.
Altosid XR Briquet	2724-421	1 briquet/catch basin	Hand	Larvae	☒ Catch basins ☒ Containers ☐ Wetland ☐ Other (please list):	42 briquets
Fourstar 90-day Briquet	83362-3	1 briquet/catch basin =20.85 gr.	Hand	Larvae	☒ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	9,794 briquets = 204,204.9 gr.
VectoMax WSP	73049-429	1 WSP/catch basin = 10 gr.	Hand	Larvae	☒ Catch basins ☒ Containers ☐ Wetland ☐ Other (please list):	14,686 pouches = 146,860 gr.

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
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ 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, anticpated 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 Encephilitis (EEE) and to reduce nuisance mosquito populations in response to resident complaints.

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.

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.

Describe the types of areas where you use this program: June through October. One half hour after sunset to one half hour before sunrise (as conditions warrant and allow).

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**
Duet	1021-1795-8329	0.41 fl oz/acre	truck mounted ULV sprayer	33.11 gals.
Suspend SC	432-763	1 oz Suspend /1 gal water mix / min.	truck mounted barrier sprayer	75 ozs.

Zenivex E4RTU	2724-807	1.0 oz/acre	Truck mounted ULV sprayer	34.51 gals.

Please describe the maximum amounts or frequency used in a particular time frame such as season and areas
Duet and Zenivex: 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 and as weather conditions permit. If any circumstances prevent a safe or effective evening application then a predawn application may be considered.

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).

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 ovipositon 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 23 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 Type	# of tires
Wetland Management Project	516

HHWD	152
Service requests	104
TOTAL TIRES	772

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 acces 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 often in harmony with local stake holders, state and federal agencies. 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. Previous District projects include: ditch maintenance, floodplain reconnection, marsh restoration, fill removal, clean-ups, 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)
☒ Culvert cleaning	37 +
☒ Hand cleaning	10,051
☒ Mechanized cleaning	470
☒ Stream flow improvement	
☒ Other (please list):	

Comments:

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

Maintenance Type	Estimate of cumulative length of ditches maintained (ft)
☒ Hand cleaning	4,167
☒ Mechanized cleaning	987
☒ Other (please list): Invasive Species Control (Lepidium latifolium - "perennial pepperweed" herbicide treatment and hand pulling	Perennial pepperweed treatments along ditches and high marsh- upland edges
Phragmites australis - "phragmites" mowing for safe and efficient surveillance of mosquito habitat, enhancement of predator access, release cutting for native species and fire suppression	Targeted areas - high marsh

Comments:

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: _____

Please attach a map of ditch maintenance areas (or a website link to that map). maps provided 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 and maintained January through December.

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 audlticiding 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 very 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 ispections 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. Supplemetal trapping may be 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:

☐ ABC light traps
☐ ABC light traps w/CO_2
☐ CDC light traps
☒ CDC light traps w/CO_2
☒ Gravid traps
☐ Landing rate tests
☐ NJ light traps
☐ NJ light traps w/CO_2
☒ Ovitraps
☒ Resting boxes
☐ Canopy
☐ Canopy
☐ Canopy
☐ Canopy
☐ Canopy
☐ Canopy
☒ 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*
☒ *Ae. cinereus*
☒ *Ae. vexans*
☒ *An. punctipennis*
☒ *An. quadrimaculatus*
☒ *Cq. perturbans*
☒ *Cx. pipiens*
☒ *Cx. restuans*
☒ *Cx. salinarius*
☒ *Cs. melanura*
☒ *Cs. morsitans*
☐ *Oc. abserratus*
☒ *Oc. canadensis*
☒ *Oc. cantator*
☒ *Oc. j. japonicus*
☒ *Oc. sollicitans*
☒ *Oc. taeniorhynchus*
☒ *Oc. triseriatus*
☐ *Oc. trivittatus*
☒ *Ps. ferox*
☐ *Ur. sapphirina*
☒ Other (please list): **Spring pest species: Oc. excrucians, stimulans, fitchii complex, no Ae. albopictus collected as of yet in the district for 2016**

Do you participate in the MDPH Arboviral Surveillance program? Yes
How many pools do you submit weekly on average? 70 (2016=1,324 pools sent over 19 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
☒ Eastern Equine Encephalitis (EEE)	0	0	0
☒ West Nile Virus (WNV)	39	0	1
☐ Other (please list):			

Comments: 2016 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-high (see comments)

Comments: WNV: MODERATE RISK: Marblehead, Revere, Winthrop, Saugus, Lynn, Nahant, Swampscott, Lynnfield, Peabody, Salem WNV: HIGH RISK: Winthrop, Revere

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, Select Board or other) to provide information related to all of the above.

The District's website (www.northeastmassmosquito.com) is currently under construction and will be online by February 2017. When back on-line it will provide information about operational strategies, procedures, equipment and materials, links to other 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, particpation 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. Hurricane Sandy Resiliency Grant Partner
2. Property Owner Outreach
3. Press Release

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
USFWS "ditch plug remediation project" - ongoing pilot project looking at the effects of relieving impounded water on the saltmarsh.

☒ Another mosquito control district/project New Jersey Mosquito Control Annual Meeting Presentations. Bristol County Mosquito Control District aerial larvicide swath characterization trial.
☒ Another state agency (DCR, DPH, etc.)

The District has been working in partnerhsip 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.

The District also worked with DCR at Breakheart Reservation collecting data and monitoring mosquito populations in the park.

☒ Environmental groups
The 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 occuring in and around the Great Marsh. The District's efforts to make the Great Marsh a sustainable environment do not stop with annual phragmites mowing treatments coordinated by MA Bays - 8 Towns, the Great Marsh and the Bay. The District's contributions to the Hurricane Sandy Resiliency Grant for the third year have been substantial, making larger scale watershed assessment (for infrastructure improvements and much needed modeling of rising sea level impacts) feasible for many District communities.

The District's Wetlands Project Coordinator has also been an active participant of the MA-NH-ME Invasives group since its inception and along with numerous state and local stakeholders. The District particpates annually in treatments (hand pulling and chemical) to control "perennial pepperweed" (Lepidium latifolium) in District member muncipalities.

☒ 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 course: Introduction to ArcGIS; MA Impacts of Pest Management on Pollinators training, M.U.S.T. Excavation Safety Seminar, New Jersey Mosquito Control Association Annual Meeting, and 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) , Northeastern University Symposium-"Reproductive Health and the Environment", Clarke Mosquito Control's-"Annual Community Mosquito Control Update". WPC completed hoisting recertification training.

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 License: Core, 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 B, Massachusetts Trappers Certification, NPDES MS4 Compliance & Enforcement Inspector Certification.

Comments: _____

INFORMATION TECHNOLOGY (IT)

Does your program use (check all that apply):

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

Describe any changes/enhancements in IT from the previous year:

Describe any difficulties your program had with IT software/equipment this year: The District lost productivity numerous times due to network issues in Boston. We were unable to download and map data through our Sentinel program during the season due to network issues and upgrades in Boston's network that impacted our files.

Comments: _____

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
FY16	1,589,966.00
FY17	1,589,966.00
FY18	1,637,226.20 (3% increase)

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 Estimate*
Amesbury	42,181.00
Andover	116,017.00
Beverly	70,377.00
Boxford	72,349.00
Danvers	54,099.00
Georgetown	40,230.00
Groveland	27,945.00
Hamilton	45,455.00
Haverhill	114,209.00
Ipswich	99,072.00

Lynn	54,532.00
Lynnfield	38,465.00
Manchester	35,012.00
Marblehead	35,887.00
Merrimac	26,142.00
Methuen	81,373.00
Middleton	45,066.00
Nahant	6,690.00
Newbury	71,315.00
Newburyport	38,118.00
N. Andover	91,677.00
Peabody	73,171.00
Revere	33,671.00
Rowley	54,657.00
Salem	40,670.00
Salisbury	48,325.00
Saugus	46,355.00
Swampscott	18,699.00
Topsfield	39,781.00
Wenham	23,999.00
W. Newbury	39,924.00
Winthrop	13,351.00

Comments: _____

SERVICE REQUESTS

How many service requests did you receive this season? 1170
How many were for larviciding? 42

How many were for adulticiding? 1128

Was this an increase or decrease over last season? Increase

Comments:

EXCLUSIONS

How many exclusion requests did you receive this season? 387

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 cooridnation. Roadside drainage maintenance, ditch maintenance, planning 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 Ecological Restoration, Division of Fish and Game, MA Department of Transportation, US Fish and Wildlife Service, US Army Coprs 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 partnerhsips 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 phrgamites stand density. Mowing reduces light competition for native species colonization. Native vegetation plays an essential role in predator species health. Controlling invaisve 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 398 public/private schools and 1102 day care programs (806 of which are family day cares). Our data shows 10.6% of all schools/day cares in the District have an IPM plan that includes all of the materials used by the District and 1.4% have some mention of mosquito control in their IPM plans. Separating public/private schools from day cares with current IPM plans (updated in 2015 and/or 2016), the data shows 32.4% of schools and 10.1% of day cares have an IPM plan that includes all of the materials used by the District, while 2.8% of public/private schools and 2.8% 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). Our data shows 18% public/private school and 14.6% of day cares have IPM plans that were updated in 2015 and 2016. 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: _____