MASSACHUSETTS MOSQUITO CONTROL

ANNUAL OPERATIONS REPORT

Year Report Covers: 2016 Date of Report: 1/31/2017

Project/District Name: **Bristol County Mosquito Control Project**

Address: 38R Forest Street

City/Town: Attleboro Zip: 02703

Phone: 508-823-5253 Fax: 508-828-1868

E-mail: brismosqpc@comcast.net

Report prepared by: ***Priscilla Matton***

NPDES permit no. **MAG87A147**

If you have a mission statement, please include it here:
Bristol County Mosquito Control Project's Mission Statement

In conjunction with the belief that mosquito control is an important public health issue, the Bristol County Mosquito Control Project, under the guidance of the State Reclamation and Mosquito Control Board, strives to serve their membership communities by suppressing both nuisance and disease carrying mosquito populations.

Our goal is to bring mosquito populations to tolerable levels using a variety of scientifically effective methodologies consistent with applicable laws. Surveillance, water management, biological and chemical controls are performed in an environmentally sensitive manner to minimize potential effects on people, wildlife and the environment.

It is acknowledged that commissioners live or work in the county and that all decisions be made in a fiscally responsible manner. The Project advocates public outreach and education through cooperative efforts with local officials, school departments and the news media.

ORGANIZATION SETUP:

Commissioner names:

Arthur Tobin	Gregory Dorrance
Joseph Barile	Christine Fagan
Robert Davis	_____

Superintendent/Director name: Priscilla Matton
Superintendent/Director contact phone number: 508-823-5253 X3
Asst. Superintendent/Director name:

District/Project website: http://www.mass.gov\eea\bristolcountymosquitocontrol
Twitter handle: @BCMCPMosq
Facebook page: http://www.facebook.com/

Staffing levels for the year of this report:
Full time: 12
Part time:
Seasonal: 2
Other: (please describe)

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

☒ Administrative Barbara Johnson, Priscilla Matton
☒ Biologist Todd Duval, Priscilla Matton
☒ Educator Priscilla Matton
☒ Entomologist Todd Duval
☒ Facilities Priscilla Matton, Stephen Burns, John Moniz, Drew Bushee, John Pereira, Matthew Gavaza, Larry Goss, Anthony Souza, Joshua Nickerson, Peter Bilodeau, Todd Duval
☒ Information technology Priscilla Matton
☒ Laboratory Todd Duval, Priscilla Matton
☒ Operations Priscilla Matton, Stephen Burns, John Moniz, Drew Bushee, John Pereira, Matthew Gavaza, Larry Goss, Anthony Souza, Joshua Nickerson, Peter Bilodeau, Todd Duval
☒ Public relations Priscilla Matton, Todd Duval
☒ Wetland scientist Stephen Burns
☒ Other (please describe) Seasonal Mosquito Surveillance Technician- Greg Boyd

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

3 Modified wetland equipment (list type) Low- ground pressure excavators
2 Larval control equipment (list type) Backpack Sprayers
9 ULV sprayers (list type) 4 London Fog (GPS), 2 Guardian (GPS), 1 Curtis DynaJet (GPS), 1 Beecomist, 1 London Air
11 Vehicles
Other (please be specific): 1 Dump Truck & Flatbed Trailer, 1 Utility Truck, 1 Utility Trailer, TD 7G Dresser Dozer, 2 Mower Attachments for Excavators

Comments: _____

How many cities and towns are in your service area?* 20
Alphabetical list:
Acushnet
Attleboro
Berkley
Dartmouth
Dighton
Easton
Fall River
Fairhaven
Freetown
Mansfield
New Bedford
North Attleborough
Norton
Raynham
Rehoboth

Seekonk
Somerset
Swansea
Taunton
Westport

Were there any changes to your service area this year? No
Cities/towns added:
Cities/towns removed:

***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):**

Comments: _____

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 larval suppression program is one of our most effective methods to reduce the number of biting mosquitoes by preventing mosquitoes from maturing into adults. We employ larvidicing techniques to current and historical mosquito breeding sites to protect human health and improve the quality of life of our residents.

What months is this program active? April- September

Describe the types of areas where you use this program: BCMCP targets the following areas: freshwater wetlands, saltmarshes, cedar and red maple swamps, catch basins, other permanent and temporary water bodies, and artifical containers that hold water for extended periods of time.

Do you use:
☒ **Ground application (hand, portable and/or backpack, etc.)**
☒ **Aerial applications**

☐ **Other (please list):**
Comments: _____

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 CRG	85685-2	7.5- 20 lbs per acre	Hand	Larvae	☐ Catch basins ☐ Containers ☒ Wetland ☐ Other (please list):	3758.5 lbs
VectoLex WSP	73049-20	1 per 50 Sq. ft.	Hand	Larvae	☒ Catch basins ☒ Containers ☐ Wetland ☐ Other (please list):	518.53 lbs
VectoMax WSP	73049-429	1 per 50 Sq. ft.	Hand	Larvae	☒ Catch basins ☒ Containers ☐ Wetland ☐ Other (please list):	190.36 lbs
VectoBac 12AS	73049-38	1 pint per acre	Aerial	Larvae	☐ Catch basins ☐ Containers ☒ Wetland ☐ Other (please list):	306.4 gallons
AquaBac XT	62637-1	0.5-2.0 pints per acre	Back Pack	Larvae	☐ Catch basins ☐ Containers ☐ Wetland ☒ Other (please list): saltmarsh	72 oz.
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	
				Choose one	☐ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	

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: 1+ per 5 dips
☐ Other (please describe):
Comments: Our larval monitoring sites have GPS coordinates and are mapped for use in the applicator's computer. An aerial larvicide application was conducted over the Hockomock swamp at the end of April 2016. Approximately 2,451 acres were treated to control a variety of spring species and Cs. melanura, an important EEE vector.

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

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: When larviciding is not a viable option, targeted adulticiding applications are used. BCMCP's program is designed to decrease the number of vector and nuisance mosquitoes. There has been consistent detection of West Nile virus and/or Eastern Equine Encephalitis in our county. During the 2012 season, Bristol County had one human case of WNV in Attleboro. In 2011, one human death was reported from EEE. There were no human cases in Bristol County in 2013, 2014, 2015 and 2016.

What is the time frame for this program? Late May- mid-September

Describe the types of areas where you use this program: BCMCP accepts requests for adult mosquito control applications from residents, businesses, town officials and other organizations within our 20 towns. ULV applications normally take place in residential, recreational areas and in response to WNV or EEE detections from mosquito traps or positive animal/human cases.

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**
Zenivex E4 RTU	2724-807	1.32 oz/acres	Truck mounted ULV	1409.01 gallons

Please describe the maximum amounts or frequency used in a particular time frame such as season and areas
Frequency of applications are dependent upon vector control activities, physical characteristics of the area and/or environmental issues. Applications are made in accordance with label directions.

What is your trigger for adulticiding operations? (check all that apply)
☒ Arbovirus data
☒ Best professional judgment
☒ Complaint calls (Describe trigger for application: Upon resident's request)
☒ Landing rates (Describe trigger for application Normally not conducted in Bristol County due to the risk of WNV or EEE, however with the introduction of Ae. albopictus this is a reliable tool. 2 adults within 5 minutes)
☒ Light trap data (Describe trigger for application See the EIR)
Comments: _____

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:
BCMCP removes containers and other articles that would serve as larval habitat. We often inspect properties and offer advice to landowners and businesses on how to reduce and remove standing water or any other materials that would be conducive to mosquito habitat.

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

Comments: BCMCP does not have a dedicated tire removal program, however tires are removed from areas where work is conducted on a limited basis.

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: Our goal is to remove debris, silt and vegetation from drainage ditches throughout our service area to improve water flow, thus eliminating standing water conducive to larval development. This includes both hand and mechanized work. We use erosion control materials and re-seed to stabilized soils disturbed by our operations. This is an

important part of our IPM strategy and data and records are collected in accordance with the BMP.

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	
☒ Hand cleaning	79,575
☒ Mechanized cleaning	15,910
☒ Stream flow improvement	
☒ Other (please list): Reclaim	80,025

Comments: Culvert cleaning and stream flow improvement cumulative length are included in mechanized and hand cleaning. Cumulative mechanized brush mowing 14.75 acres

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

Maintenance Type	**Estimate of cumulative length of ditches maintained (ft)**
☒ Hand cleaning	3,625
☒ Mechanized cleaning	1,480
☒ Other (please list): Reclaim	3,625

Comments: _____

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

Comments: _____

Please attach a map of ditch maintenance areas (or a website link to that map). Ditch maintenance occurred throughout our County in all 20 towns/cities. Individual maps of specific areas are available upon request but are too large to attach.

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: Open Marsh Water Management is a technique which provides greater access for small fish which eat mosquito larvae present in the marsh habitat easier passage. This can reduces the need for mosquito adulticiding in the immediate neighborhood. OMWM can also prevent the encroachment of invasive plants and provides better habitat for waterfowl and other birds.

What months is this program active? All year depending on local habitat restrictions

Please give an estimate of total square feet or acreage: None

Comments: BCMCP did not renew its federal OMWM permit following its expiration. If a project required activities not covered under the ACOE MA PGP, an individual permit with Army Corp and all other relavent permits would be obtained for a specific job.

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

MONITORING (Measures of Efficacy)

Describe monitoring efforts for each of the following:

Aerial Larvicide – wetlands: Standard protocol is to take pre- and post- dip larval counts from predetermined locations within the treatment wetlands. Non-treated locations would be used to correct for normal variation in populations.

Ground ULV Adulticide: To monitor efficacy, species targeted mosquito traps are placed in a location where ground ULV applications will take place. Pre- and post- trapping is necessary as is comparing to a non-treatment site to determine normal fluctuations due to other factors such as temperature and wind speed.

Larvicide – catch basins: Random samples of water are taken from catch basins in each town to assess larval populations.

Larvicide-hand/small area BCMCP conducts pre- and post- application dipping at numerous locations throughout the treatment site using a standard 350ml dipper.

Open Marsh Water Management: Please note the OMWM standards published in the EIR

Source Reduction: We return to all mechanized water mangement sites multiple times per season to check for blockages or debris that may obstruct the flow of water and to meet any additonal requirements in the BMP. In areas where containers or tires were removed, some sites are re-checked during the season.

Other (please list): Due to the presence of the invasive mosquito Ae. albopictus in our county, an aggressive adult monitoring effort using multiple trap types has been implemented in the affected area.

Provide or list standard steps, criterion, or protocols regarding the documentation of efficacy (pre and post data), and resistance testing (if any):
Pre and post collection of data is analyzed for all types of applications. More information is available in the EIR.

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

Research Project	Details
Bottle assays	Bottle assays were conducted using CDC protocols. These assays confirmed the efficacy of adulticides in use.
Efficacy testing	To monitor efficacy, mosquito traps, appropriate to a specific species, are placed in a location where ground ULV applications will take place. Pre- and post- trapping is

	necessary as is comparing to a non-treatment site to determine normal fluctuations due to other factors such as temperature and wind speed.
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: Surveillance is the cornerstone of IPM and an important part of the services we offer to member municipalities. The purpose of surveillance is to monitor for human health threats from mosquito-borne arboviruses, as well as to determine mosquito populations and diversity for appropriate control methods.

What months is this program active? April- 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
- ☒ Other (please describe): BG Sentinel Traps

- ☐ Canopy
- ☐ Canopy
- ☐ Canopy
- ☐ Canopy
- ☐ Canopy
- ☐ Canopy

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

If yes, please describe how you chose these long-term sites:
Locations were chosen on a varity of factors including: wetlands habitat, locations of MA DPH long-term trap sites, arbovirus surveillance data, human or animal arbovirus cases and mosquito community composition.

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*
☐ Other (please list):

☒ *Oc. taeniorhynchus*
☒ *Oc. triseriatus*
☐ *Oc. trivittatus*
☐ *Ps. ferox*
☐ *Ur. sapphirina*

Do you participate in the MDPH Arboviral Surveillance program? Yes
How many pools do you submit weekly on average? 25.9

Number of traps in your service area **placed by MDPH**: 10
Were these long-term trap sites or supplemental trapping sites? both

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)			
☒ West Nile Virus (WNV)	8	0	0
☐ Other (please list):			

Comments: _____

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	Low
WNV	Low	Low

Comments: Please see the attached end of the mosquito season report.

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: Education is an important component of the Project's objectives to reduce arbovirus risk in the County. Speaking with the public allows us the opportunity to address any questions and misunderstandings about the program and the pesticides we use. We educate our residents on ways they can protect themselves from mosquito bites and reduce their risk of illness. We also educate our residents on simple mosquito source reduction techniques for their own properties.

What time frame during the year is this method employed? All Year

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):)
☒ 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): Radio interviews, Councils on aging and housing authority presentations, local Board of Health fairs, local farmer's markets, school citizen science programs. Filmed 3 PSA's for local communities on mosquito control and prevention.

Estimate the audience reached this year using the education/outreach methods above: ~3000
Comments: We are unable to estimate the audience for our TV, radio and print media interviews.

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

1. Capron Park Zoo, Zoo Moon event, July
2. Attleboro Public Library event, recorded for multiple communities' cable television
3. Citizen science and Spring Show activities with Bristol Agricultural High School

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 Priscilla is a member of the Bristol Agricutural High School 's Natural Resource Management Advisory Board and the Taunton High School's Science Curriculum working group. Participated in a STEM program at Seekonk High School.
☒ Another mosquito control district/project Continuation of Cs. melanura surveillance at the Bolton Cedar swamp in Freetown in conjuction with Plymouth Co. MCP including aerial spray droplet application for effective control in cedar and red maple swamps. Collaboration with Central MA MCP on ongoing spring woodland pool larvicide study. Ae. albopictus coordination.
☒ Another state agency (DCR, DPH, etc.) Steady cooperation with DPH on Ae. albopictus concerns, including meeting with local town officals in Bristol County. Attended DAR's Pollinator Protection Plan meeting.
☒ Environmental groupsNOAA and Save the Bay on a Herring Run project in Westport. Presented at a Bristol and Plymouth Co. Beekeeper's Association meeting with Plymouth Co. MCP's Entomologist.
☒ Industry BCMCP participated in a Cq. perturbans emergence study with Clarke

List any training/education your staff received this year: AMCA Annual meeting, NMCA Annual Meeting, NMCA Field Day, Dig Safe training seminar (in Taunton), MA Forestry meeting, Mosquito Control training seminar sponsored by Clark (at Central MA Mosquito Control Project), continuing education for those with MA Hoisting License. Multiple state required training through PACE. Zika conference at UMass Boston and mutiple webinars on the topic.

Please list the certifications and degrees held by your staff:
Priscilla Matton: B.S. Zoology, M.S. Entomology, MA Pesticide Applicator Certification (47).
Drew Bushee: MA Pesticide Certification (47), CDL license, Hoisting license.
John Moniz: Licensed MA Pesticide Applicator, CDL license, Hoisting license.
Todd Duval: B.A. Aquatic Biology, M.A. Biology, MA Pesticide Applicator Certification (47), OSHA 10 hour certification
Joshua Nickerson: Licensed MA Pesticide Applicator, CDL license, Hoisting license.
Matthew Gavaza: MA Pesticide Certification (47)
Anthony Souza: Licensed MA Pesticide Applicator
Larry Goss: MA Pesticide Certification (43)
John Pereira: Licensed MA Pesticide Applicator
Peter Bilodeau: Licensed MA Pesticide Applicator

Comments: Priscilla was an invited speaker at Sturdy Memorial Hospital on a Zika round table discussion.

INFORMATION TECHNOLOGY (IT)

Does your program use (check all that apply):
☒ Aerial Photography
☒ Databases
☐ Dataloggers (monitoring for temperature, etc.)
☒ GIS mapping (Describe: BCMCP maps water management projects, trap locations, larval and adulticide locations.)
☒ GPS equipment
☒ Smartphones
☒ Tablets/Toughbooks
☒ Other (please describe): Web-based service request system and automatic service request closing application from truck's GPS data

Describe any changes/enhancements in IT from the previous year: BCMCP purchased from Frontier Precision a service request modular to enter in residential data. This information is then provided to the applictors for each town. On the ULV equipment, the Monitor 4 records the applicators location, date, time and pesticide usage. This information is downloaded into the service request modular and closes any outstanding request based on GPS application data.

Describe any difficulties your program had with IT software/equipment this year: We had multiple issues with the Frontier Precision service request modular and closing the open residential request following an application. This took until late August to fix and have all equipment working together correctly. This made for a very difficult time managing the many request we receive during the spray season.

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
FY 16	$1,322,814.00
FY 17	$1,388.955.00

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):
Please see attached FY 17 Cherry Sheet Assessment

Comments: _____

SERVICE REQUESTS

How many service requests did you receive this season? 13,115
How many were for larviciding? 878
How many were for adulticiding? 12,237

Was this an increase or decrease over last season? Decrease

Comments: This represented a 19% decrease in adult spray requests compared to 2015. However, 2016 was one of the driest years on record and most of the County was in drought conditions.

EXCLUSIONS

How many exclusion requests did you receive this season? 63

Was this an increase or decrease over last season? Increase

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. Large areas include the Canoe River and Hockomock ACEC and areas of priority habitat. Map of areas are attached.

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: BCMCP meet with and discussed a source reduction plan with a tire facility located in New Bedford where the invasive Ae. albopcitus has been collected. The plan includes reducing the amount of time tires remain before being processed, cleaning up the work site and pesticide interventions. This is a long term plan to reduce the spread and abundance of Ae. albopictus in the area.

- ☒ 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: Routinely work with member Cities, Towns, and local government agencies such as; local DPW's, Health Boards, and Conservation Commissions. At the State level we have worked with Mass DOT, DCR, and DER. Coordinate with these agencies to provide dump trucks to remove spoil and debris from work sites. Some provide material in areas we are working in.

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

  Describe: Working with local airports on long term vegetation plans for greater visability. Working with the Bristol County House of Corrections on stormwater management.

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

  Describe: Bristol MCP conducted cooperative research with Plymouth MCP on aerial droplet testing, Cs. melanura control and Plymouth and Cape Cod MCPs on Ae. albopictus surveillance. Woodland pool research with Central MA MCP. Worked with "Save the Bay" , NOAA, Westport Fisheries, Westport Rivershed Alliance and DFW on a salt marsh restoration project on the Herring Run to improve access for fish.

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

  Describe: NMCA Field Day, NMCA annual meeting, December 2016. MA DPH Ae. albopictus workgroup Spring 2016

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

  Describe: Worked with "Save the Bay" , NOAA, Westport Fisheries, Westport Rivershed Alliance and DFW on a salt marsh restoration project on the Herring Run to improve access for fish. Also conducted water management activities to open beach crossing in many coastal towns to allow fish access to saltmarshes that were blocked due to winter storms.

CHILDREN AND FAMILIES PROTECTION ACT (CFPA)

Is your program impacted by the CFPA? Yes

If yes, please explain: Some local schools and day cares are out of compliance regarding our current mosquito control products, despite emails to administrators. The large number of schools and daycares create no spray zones that are marked on applicator's maps.

If you have data on compliance rates with the CFPA within your program area, please list here:

Describe any difficulties you have had with the implementation of your program due to the CFPA, please elaborate here: When schools are not up to date on all the required information and notification policy, providing services to them in a timely manner, especially when virus is detected can be difficult and time consuming.

Comments:

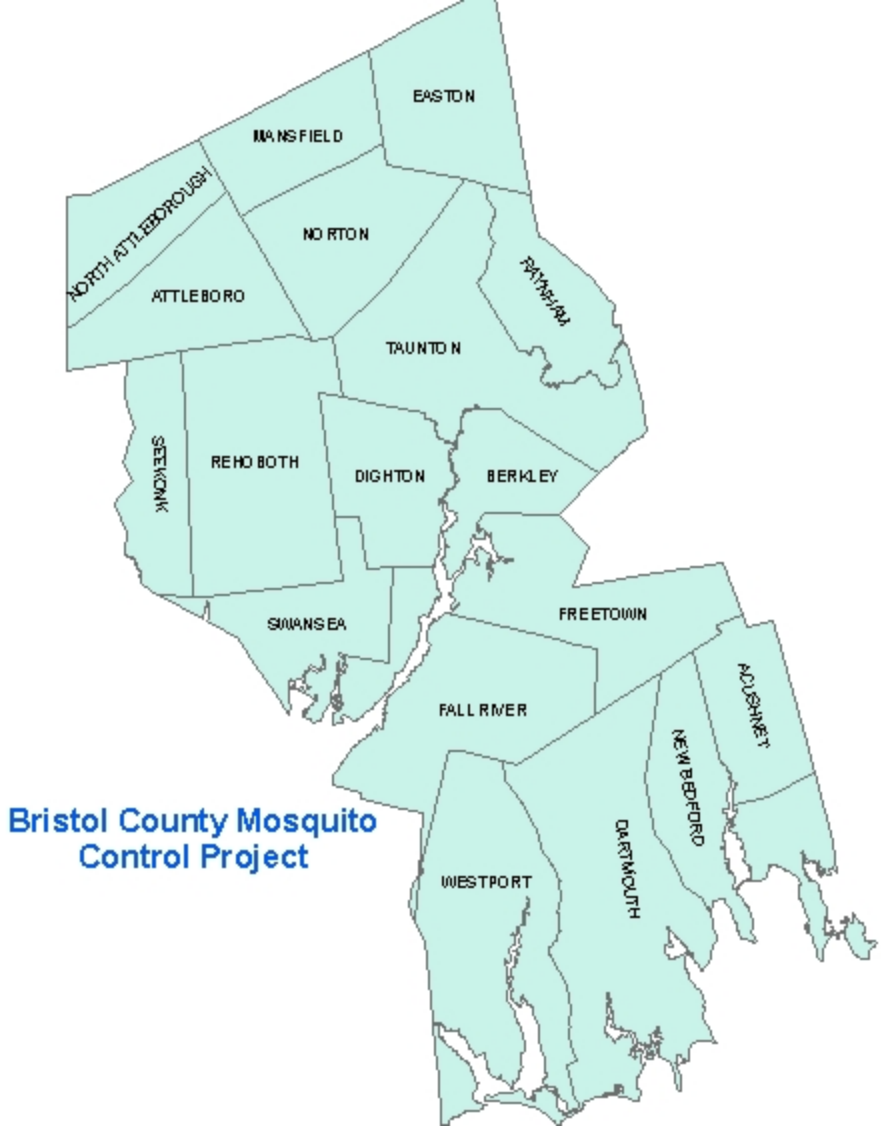
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT PROGRAM

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

If yes, please list any corrective actions here: _____

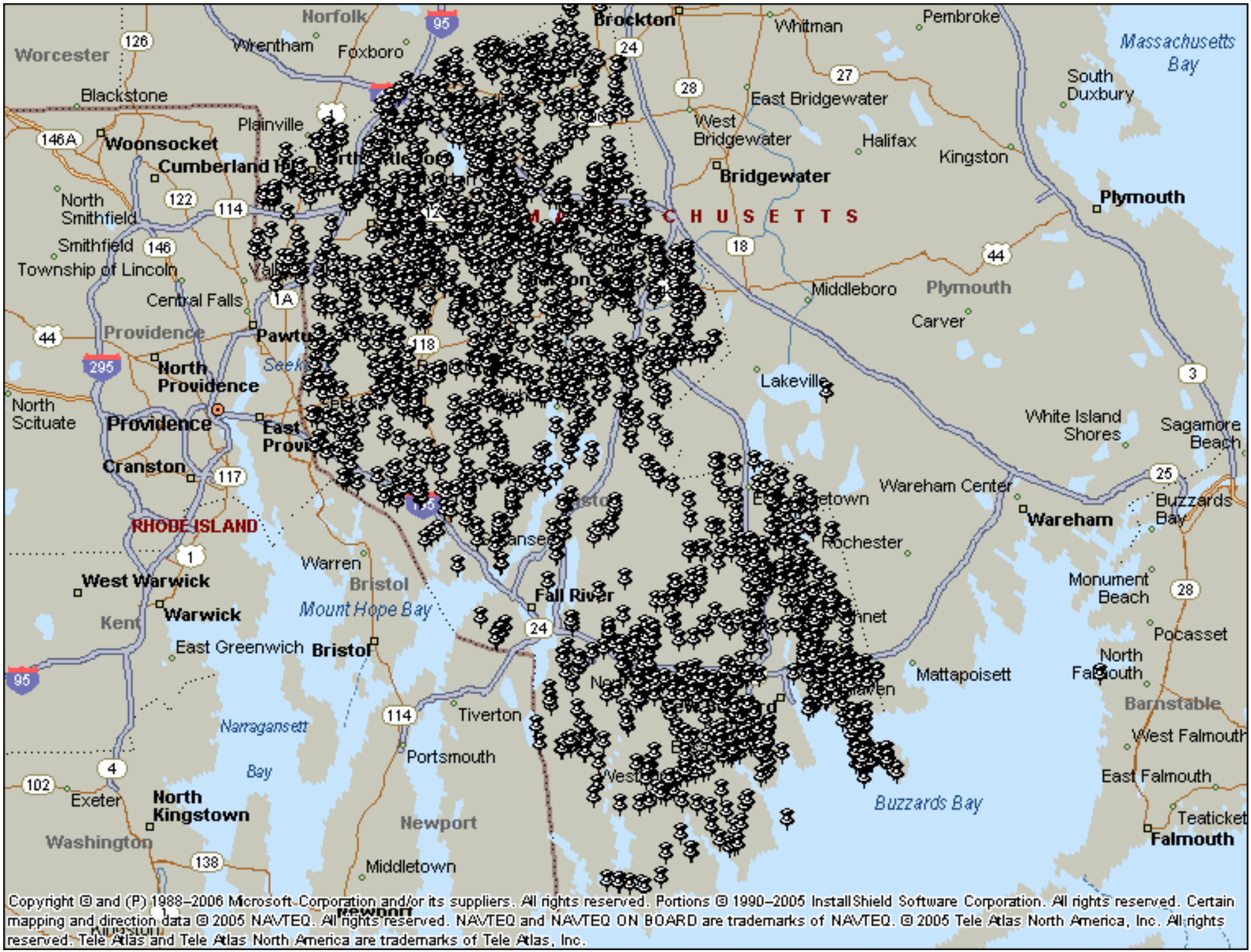
GENERAL COMMENTS

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



Bristol County Mosquito Control Project

BCMCP's Computerized GPS Larval Sites



THE COMMONWEALTH OF MASSACHUSETTS
STATE RECLAMATION AND MOSQUITO CONTROL BOARD

BRISTOL COUNTY MOSQUITO CONTROL PROJECT

38R FOREST STREET, ATTLEBORO, MA 02703
TEL:(508)823-5253 FAX: (508)828-1868

COMMISSIONERS
ARTHUR F. TOBIN, CHAIRMAN
GREGORY D. DORRANCE
CHRISTINE A. FAGAN
JOSEPH BARILE
ROBERT F. DAVIS

SUPERINTENDENT
PRISCILLA MATTON, M.S.

October 24, 2016

Bristol County Mosquito Control Project (BCMCP)
End of the 2016 Season Report

This report is based on data collected from CO_2-baited CDC traps, resting boxes, gravid traps and BG Sentinel Traps.

Total Pools Submitted for Testing 2016: 604 Pools
- +40% change from 2015
- Total Pools Submitted for Testing 2015: 432 Pools

Total Pools Submitted from Bristol Co. by MA DPH in 2016: 215 Pools
- +99% change from 2015
- Total Pools Submitted for Testing 2015: 108 Pools

Total Number of Mosquitoes Tested in 2016: 15,877
- -12% change from 2015
- Total Number of Mosquitoes Tested in 2015: 18,013

Total Number of Mosquitoes Tested from Bristol Co. by MA DPH in 2016: 5,954
- +83% change from 2015
- Total Number of Mosquitoes Tested in 2015: 3,243
- Total Number of Mosquitoes Tested in 2014: 7,342

Total Number of Non-submitted Mosquitoes 2016: 20,699
- +17% change from 2015
- Total Number of Non-submitted Mosquitoes 2015: 17,608

Total Number of Non-submitted Mosquitoes from Bristol Co. by MA DPH, 2016: 3,909
- +39% change from 2015
- Total Number of Non-submitted Mosquitoes 2015: 2,401

2016 Combined Data:
Total Pools Tested: 604
Total Mosquitoes Tested: 15,877
Total Non-Submitted: 20,699
Total Collected: **35,576**

2015 Combined Data:
Total Pools Tested: 540
Total Mosquitoes Tested: 21,256
Total Non-Submitted: 20,009
Total Collected: 41,265

Virus Isolations:

WNV 2016: 8 Pools

- 7 pools of *Cx. pipiens/ restuans* complex
- 1 pool of *Oc. japonicus*
- All WNV positive mosquitoes were collected from gravid traps.

  - WNV 2015: 14 Pools
    - 12pools of *Cx. pipiens/ restuans* complex
    - 1 pools of *Cs. melanura*
    - 1 pool of *Cx. salinarius*
    - Most WNV positive mosquitoes were collected from gravid traps.

  - WNV 2014: 8 Pools
    - 6 pools of *Cx. pipiens/ restuans* complex
    - 2 pools of *Cs. melanura*
    - Most WNV positive mosquitoes were collected from gravid traps.

  - WNV 2013: 79 Pools
    - 37 pools of *Cx. pipiens/ restuans* complex
    - 36 pools of *Cs. melanura*
    - 3 pools of *Cq. perturbans*
    - 1 pool of *Ae. vexans*
    - 1 pool of *Oc. canadensis*
    - 1 pool of *Cx. salinarius*

EEE 2016: No EEEv isolations in Bristol County

  - EEE 2015: 0 pools

- EEE 2014: 15 Pools
  - 14 pools of *Cs. melanura*
  - 1 pool of *Cx. pipiens/ restuans* complex
  - Most EEE positive mosquitoes were collected from CO_2–baited traps and resting boxes.

- EEE 2013: 29 Pools

- EEE 2012: **100 Pools**

Mosquito activity/trends for the 2016 Season

The winter of 2015-16 was relatively warm and dry, with 12% less snowfall than an average Bristol County year and 40% of the record-breaking accumulation of 2014-15. Massachusetts has remained in a drought condition, which has been consistent for the past 3 years. Subsequently, mosquito populations and residential spray requests were relatively low. Total mosquito populations were down by 12% and spray requests fell by 19% from 2015 levels.

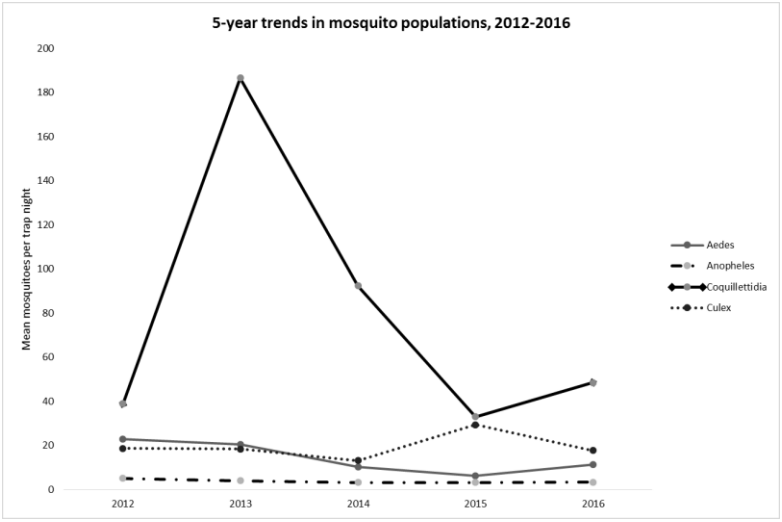


Figure 1- Mean number of observed mosquitoes by genus captured per trap-night by BCMCP and MA DPH in Bristol County, MA 2012 to 2016.

After a mild winter with little snowfall, larvicide crews reported dry conditions in traditional spring breeding grounds. Despite these dry conditions, the spring species *Oc. excrucians* and *Oc. abserratus* were trapped at ~60% higher levels than 2015, an effect not seen in other spring species. Throughout the summer, drought conditions kept most mosquito activity low. *Cx. pipiens/restuans* species decreased ~60% from the previous year while *Cs. melanura* remained at the same low levels seen in 2014-2015.

Figure 1 shows five-year population trends at the genus level, averaged for each trap-night to minimize trapping effort effects. Most genera show population declines, with the exception of *Aedes/Ochlerotatus* and *Coquillettidia* species. Most of the increase in *Cx. salinarius* and the EEEv bridge vector *Coquillettidia perturbans* are the result of high numbers coming from a single site in the Hockomock swamp drainage in Easton. Despite the area wide drought, this site had continuous water flowing into a cattail swamp allowing for emergence for most of the summer.

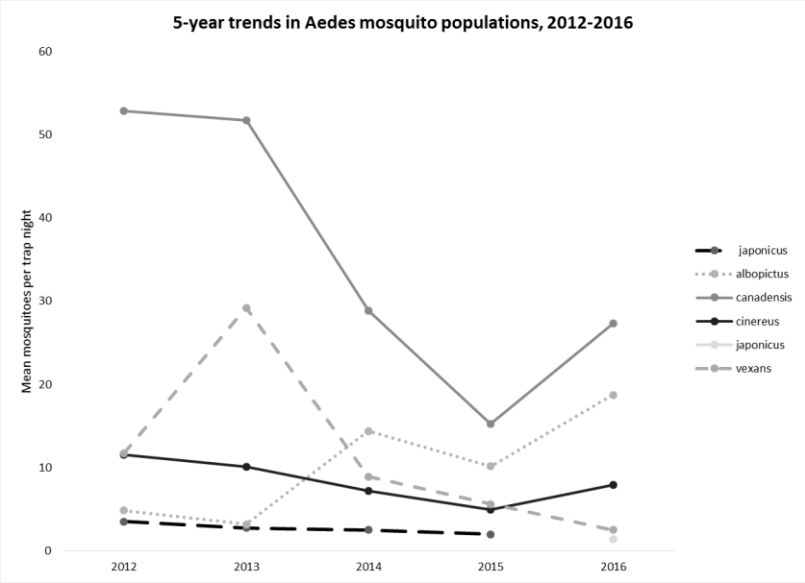


Figure 2- Mean number of observed *Aedes/Ochlerotatus* mosquitoes captured per trap-night by BCMCP and MA DPH in Bristol County, MA 2012 to 2016.

Figure 2 shows changes in the *Aedes/Ochlerotatus* species. The trends are split, with roughly half of the species in decline and half on the rise. This is probably an artifact of uneven rainfall, as the northern weather station in Taunton showed consistently lower rainfall amounts than the New Bedford weather station. For example, the EEEv bridge vector *Oc. canadensis* population shows an overall rise, but numbers remained sporadic in the county during the season with some trap sites producing above average numbers and others very low. This data will be reviewed and compared to weather data over the winter to attempt to find other possible explanations for these trends.

Aerial larvicide, Spring 2016

BCMCP and Plymouth County MCP conducted a joint aerial larvicide operation in the Hockomock Swamp area in spring 2016. For Bristol County, this represented a treatment of our half of the Hockomock Swamp in the towns of Easton, Raynham and Taunton. In these towns, 2,650 acres were treated with VectoBac 12AS by Plymouth MCP's aircraft. Pre- and post-treatment larval surveillance was conducted with variable numbers due to the extremely dry conditions from the ongoing drought.

Asian tiger mosquito (ATM) surveillance

Bristol County MCP continued monitoring the most southern towns in our region for the

invasive Asian tiger mosquito, *Ae. albopictus*. This effort was expanded in 2016 through a combined effort between BCMCP and the MA Department of Public Health. The surveillance plan contained three parts: ovitrap cups placed throughout the region to determine presence/absence, BG Sentinel™ traps used as a follow-up where presence of eggs were detected, and BG Sentinel™ traps to monitor areas with historical population data. Traps in the area were set by both BCMCP and MA DPH.

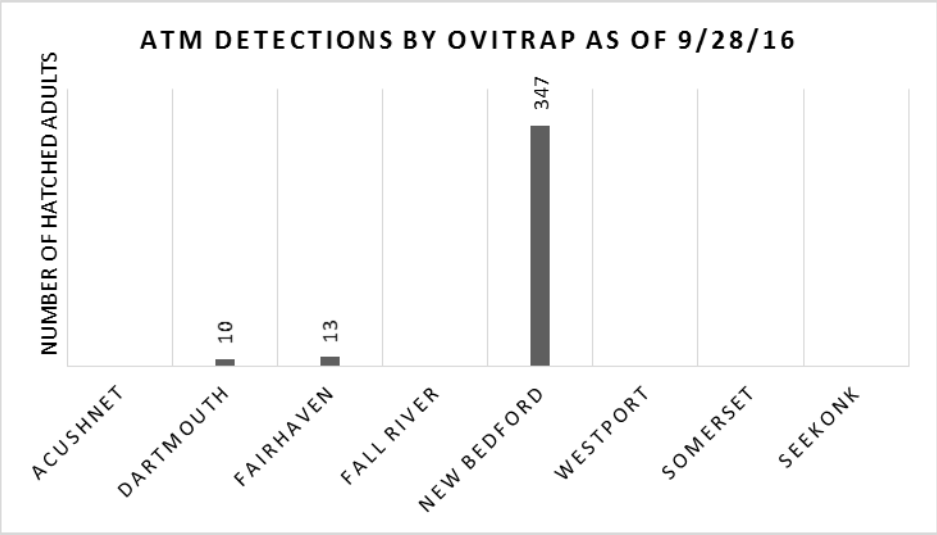


Figure 3- Location and number of 2016 ovitrap detections of Asian tiger mosquito detected by BCMCP as of 9/28/16 insectary report.

Beginning in 2016, ovitrap papers from all of the Massachusetts MCPs were collected and sent to MA DPH's Hinton State Lab for raising under controlled conditions in the lab's insectary. Ovitrap papers are attractive egg deposition sites not only for *Ae. albopictus,* but *Ae. japonicus* and *Ae. triseriatus* as well. Therefore it takes a bit of time for eggs to hatch and mosquito identification to occur. Reports from DPH of *Ae. albopictus* presence/absence were commonly delayed, as the techniques used in that lab were being refined. As of the writing of this report, only data collected from Bristol County by BCMCP has been reported.

BCMCP set over 200 ovitraps over 20 weeks across the South Coast in areas where *Ae. albopictus* was likely to be found. 88 papers from unique sites had mosquito eggs and were sent to the MA DPH insectary. Figure 3 shows ovitrap detections of viable *Ae. albopictus* eggs collected by BCMCP and hatched in the MA DPH insectary. BCMCP is aware of two additional detections by MA DPH in the towns of Acushnet and Fall River. We are awaiting this data.

All detections of viable eggs from ovitraps were followed up with BG Sentinel™ trap efforts. It should be noted that only one detection of an adult *Ae. albopictus* outside of New Bedford was made in Fairhaven. The presence of eggs shows that the adults are in these areas, but the populations are so low that adults are not found.

Routine BG trap surveillance in New Bedford points to an established and increasing population along the waterfront area and around Acushnet Avenue. The data shown in Figure 4 has been averaged by trap-night to remove effects that might be seen with the kind of increased trapping effort that BCMCP has undertaken. With that said, the increase in population follows quite closely an

exponential population increase that is often seen in the early years of invasive species introduction. The dotted line in Figure 4 shows an R^2 value of 0.889, indicating a very close correlation (an R^2 value of 0.1 represents a low correlation, while a value of 1.0 is a perfect correlation).

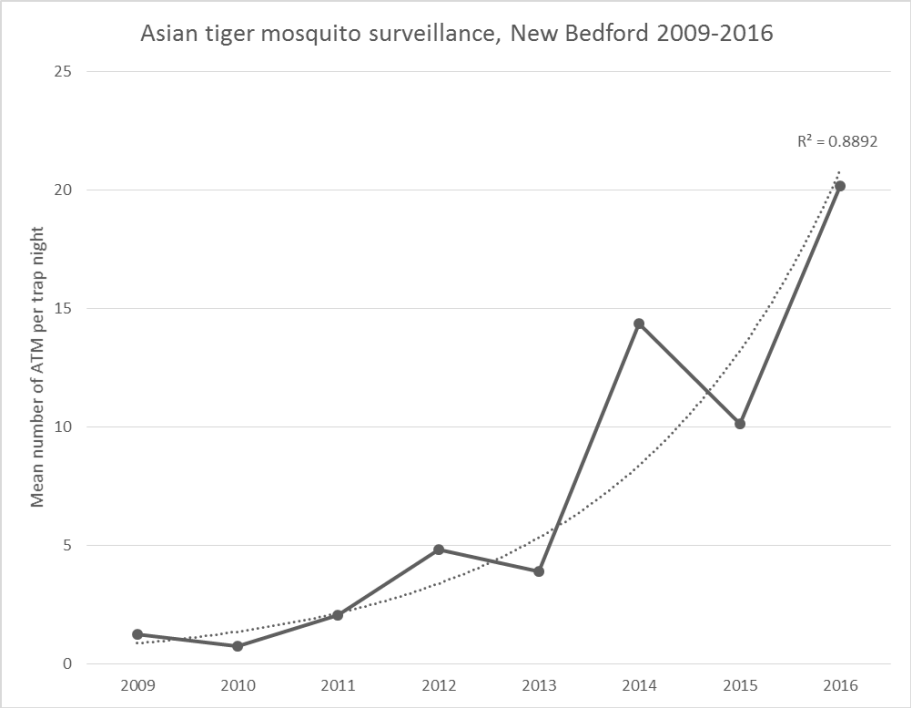


Figure 4- Population increase for Asian tiger mosquitoes in all traps in New Bedford, 2009-2016. Data normalized to decrease effects of increased trap effort. Dotted trendline represents exponential growth curve.

BCMCP, in conjunction with MA DPH have held several meetings with the Boards of Health in the area over the past year. While no conclusive control plan has yet been reached, the level of engagement is high and we intend to pursue multiple avenues to address this problem.

Virus Interventions

Overall this was a quiet mosquito virus season, mainly due to the lack of precipitation. All sites with positive pools were treated with large-scale (2-3 mile radius) pesticide applications. Some sites were treated on a weekly basis and others required applications twice per week due to sustained virus isolations. This occurred in Dartmouth, Fairhaven and New Bedford where WNV interventions were completed in response to virus isolations and residential requests. *Cx. pipiens/restuans* was the main vector this season, with one unusual pool of *Oc. japonicus* in Dartmouth. EEE in Bristol County has been detected every year since the early 1990s, with the exception of 2015 and 2016. No EEEv was detected, therefore no major interventions were necessary. No night-time interventions were conducted.

At the end of the 2016 surveillance season, all 20 cities and towns in Bristol County are reported by MA DPH to be in the Low Risk category for EEEv and WNV.

Number of requests for service

Bristol County MCP received 12,237 calls for service in 2016, a decrease of 19% from 2015. BCMCP stopped taking residential requests as of 8/26/16. In past years, Bristol has received 14,778 calls for service in 2012, 15,792 in 2013, 12,971 in 2014 and 15,133 in 2015.

Bristol County Mosquito Control Project's Outreach:

Public outreach is an important part of our program. Educating people on how they can protect themselves and reduce mosquito breeding on their property is an effective, proactive step to combat virus transmission. Some of our outreach programs included displays and information tables at area farmer's markets, events at the Capron Zoo, discussion sessions and presentations at the Attleboro Public Library and Taunton Senior Housing. We have also begun a Citizen Science project with Bristol County Agricultural High School where the students took home an ovitrap and monitored their own neighborhood. This project had a surprising 100% collection of data, with each student completing their assigned task. This is a project that we hope to continue in the spring of 2017.

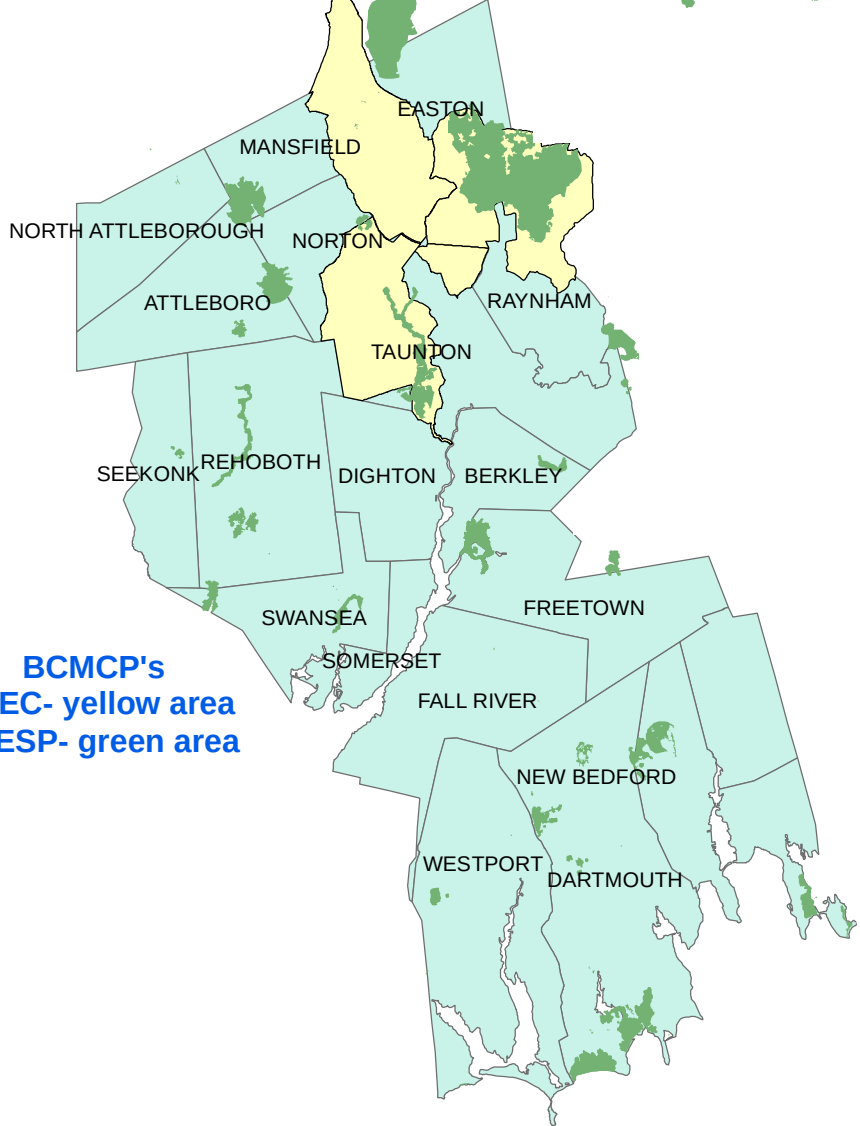
Coordination between BCMCP and the local Boards of Health was ongoing relative to control/surveillance options in the vicinity of WNV positive mosquito pools and high mosquito collections. We participated in a variety of public outreach projects including radio, newspaper, and television interviews. With Labor Day being the unofficial end of summer, a reminder to the public of the normal seasonality of the diseases is important. Bristol County had no late-season human cases of WNV or EEE, other Massachusetts counties have been very active with the virus. In response, we have released a public reminder that the majority of the cases occur in September and early October. Educational materials have been provided to public and private entities. Twitter was used extensively to make the public aware of upcoming activities and public health notices.

Bristol County has an updated website at a new address:
www.mass.gov/eea/bristolcountymosquitocontrol

District Name: BRISTOL COUNTY MOSQUITO CONTROL PROJECT
FY2017 Proposed Cherry Sheet Assessments Estimates
Based on the preliminary proposed District budget
(2016 Equalized Valuations)

Name of Municipality	% of Total Budget	BCMC PROJECT Share Amount*	State Reclamation Mosquito Control Board Share Amount*	Total Assessment Estimate*
ACUSHNET	2.61 %	$36,262	$1,324.49	$37,586
ATTLEBORO	6.05%	$84,032	$3,072.48	$87,104
BERKLEY	2.18%	$ 30,279	$1,108.58	$31,388
DARTMOUTH	10.11%	$140,423	$5,138.10	$145,561
DIGHTON	2.79%	$38,752	$1,417.91	$40,170
EASTON	5.26%	$73,059	$2,673.89	$75,733
FAIRHAVEN	2.87%	$39,863	$1,459.43	$41,322
FALL RIVER	7.73%	$107,366	$3,925.72	$111,292
FREETOWN	4.36%	$60,558	$2,213.02	$62,771
MANSFIELD	4.73%	$65,698	$2,404.01	$68,102
NEW BEDFORD	6.84%	$95,005	$3,475.22	$98,480
NORTH ATTLEBORO	4.83%	$67,087	$2,454.87	$69,542
NORTON	4.49%	$62,364	$2,279.45	$64,643
RAYNHAM	3.50%	$48,613	$1,777.06	$50,390
REHOBOTH	5.63%	$78,198	$2,860.73	$81,059
SEEKONK	3.48%	$48,336	$1,770.83	$50,107
SOMERSET	3.04%	$42,224	$1,545.58	$43,770
SWANSEA	3.79%	$52,641	$1,924.45	$54,565
TAUNTON	8.49%	$117,922	$4,311.85	$122,234
WESTPORT	7.22%	$100,273	$3,666.22	$103,939
	100%	$1,388,955	$50,804	$1,439,759

*Assessment estimates are preliminary and will only be finalized after the State Reclamation & Mosquito Control Board budget certification meeting held annually in May/June.



BCMCP's
ACEC- yellow area
NHESP- green area

BCMCP Schools, Daycares, Organic Farms and No Sprays 2016

No spray 2016

- All items

Schools 2016

- All items

Organic Farms 2016

- All items

Daycares 2016

- All items