

MASSACHUSETTS MOSQUITO CONTROL

ANNUAL OPERATIONS REPORT



Year Report Covers: 2018 Date of Report: 1/22/2019

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

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City/Town: Attleboro

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Report prepared by: *Priscilla Matton*

NPDES permit no. **MAG87B207**

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:

Robert Davis

Gregory Dorrance

Joseph Barile

Christine Fagan

Aaron Caswell

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, Todd Duval
- ☒ Entomologist Todd Duval
- ☒ Facilities Priscilla Matton, John Moniz, Drew Bushee, John Pereira, Matthew Gavaza, Larry Goss, Anthony Souza, Joshua Nickerson, Peter Bilodeau, Todd Duval
- ☒ Information technology Diana Brennan, Priscilla Matton
- ☒ Laboratory Todd Duval, Priscilla Matton
- ☒ Operations Priscilla Matton, John Moniz, Drew Bushee, John Pereira, Matthew Gavaza, Larry Goss, Anthony Souza, Joshua Nickerson, Peter Bilodeau, Todd Duval, Diana Brennan
- ☒ Public relations Priscilla Matton, Todd Duval
- ☒ Wetland scientist Diana Brennan
- ☒ Other (please describe) Seasonal Mosquito Surveillance Technician- Amanda Cadieux, Seasonal Office Assitant- Theresa Beale

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

- Modified wetland equipment (list type) Low- ground pressure excavators
 - Larval control equipment (list type) Backpack Sprayers
 - ULV sprayers (list type) 4 London Fog (GPS), 3 Guardian (GPS), 1 Curtis DynaJet (GPS), 1 Beecomist, 1 London Air
 - 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 larviciding 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 artificial 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	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	3,058 lbs
VectoLex WSP	73049-20	1 per 50 sq. ft.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	572 lbs
VectoMax WSP	73049-429	1 per 50 sq. ft.	Hand	Larvae	<input checked="" type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	217 lbs
VectoBac 12AS	73049-38	1 pint per acre	Aerial	Larvae	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	379 gallons
VectoBac WDG	73049-56	7- 14 oz per acre	Backpack	Larvae	<input type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	4 gallons
Altosid XR Briquets	2724-421	1 per 100 sq. ft.	Hand	Larvae	<input type="checkbox"/> Catch basins <input checked="" type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> Other (please list):	0.16 lbs
				Choose one	<input type="checkbox"/> Catch basins <input type="checkbox"/> Containers <input type="checkbox"/> Wetland <input type="checkbox"/> 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	<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):	
				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: 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, Pine and Dead Swamps at the end of April 2018. Approximately 3,035 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). Figure 2 & Figure 3

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 2018 season, Bristol County had two human cases of WNV. In 2011, one human death was reported from EEE. There were no human cases in Bristol County in 2013 through 2018 for EEE.

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: Mavrik was used solely to treat tires and containers for Ae. albopictus and associated species.

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	1,416 gallons
Mavrik	2724-478	0.5 fl. oz/ 5 gallons water	Backpack	2 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). Figure 4

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, sediment 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 stabilize 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)
<input checked="" type="checkbox"/> Culvert cleaning	
<input checked="" type="checkbox"/> Hand cleaning	68,890 ft
<input checked="" type="checkbox"/> Mechanized cleaning	14,186 ft
<input checked="" type="checkbox"/> Stream flow improvement	
<input checked="" type="checkbox"/> Other (please list): Reclaim	68,890

Comments: Culvert cleaning and stream flow improvement cumulative length are included in mechanized and hand cleaning. Cumulative mechanized brush mowing 13 acres.

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	6,685 ft
<input checked="" type="checkbox"/> Mechanized cleaning	4,270 ft
<input checked="" type="checkbox"/> Other (please list): Reclaim	6,685 ft

Comments: _____

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

Comments: Monitored 39,926 ft of previously maintained ditches to confirm site stabilization and work efficacy. Completed 22 mechanized water management projects.

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 and easier passage for small fish which eat mosquito larvae present in the marsh habitat easier. This can reduce 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?

Please give an estimate of total square feet or acreage:

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 relevant 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 management sites multiple times per season to check for blockages or debris that may obstruct the flow of water and to meet any additional 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: Ae. albopictus	Pre- and post treatment larval surveillance
Other: Aerial larvicide	Pre- and post treatment larval surveillance

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- early November

Check off all trap types used this past season by your program:

Trap Type	Canopy? (check box for yes)	Number of traps (leave blank if zero)
<input type="checkbox"/> ABC light trap	<input type="checkbox"/>	
<input type="checkbox"/> ABC light trap w/CO ₂	<input type="checkbox"/>	
<input checked="" type="checkbox"/> CDC light trap	<input type="checkbox"/>	variable
<input checked="" type="checkbox"/> CDC light trap w/CO ₂	<input type="checkbox"/>	11 per week
<input checked="" type="checkbox"/> Gravid trap		64 per week
<input checked="" type="checkbox"/> Landing rate test		2 locations
<input type="checkbox"/> NJ light trap	<input type="checkbox"/>	
<input type="checkbox"/> NJ light trap w/CO ₂	<input type="checkbox"/>	
<input checked="" type="checkbox"/> Ovitraps		48 per week
<input checked="" type="checkbox"/> Resting box		20 per week
<input checked="" type="checkbox"/> Other (please describe): BG Sentinel traps		4 per week
<input checked="" type="checkbox"/> Other (please describe): GAT traps		3 per week
<input type="checkbox"/> Other (please describe):		

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

If yes, how many:

23

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*
☐ Others (please list):

- ☐ *Oc. cantator*
☒ *Oc. j. japonicus*
☒ *Oc. sollicitans*
☒ *Oc. taeniorhynchus*
☐ *Oc. triseriatus*
☐ *Oc. trivittatus*
☐ *Ps. ferox*
☐ *Ur. sapphirina*

Number of adult mosquitoes collected this season (whether submitted to DPH or not): 58,746

Number of adult mosquito pools collected this season (submitted and unsubmitted): 2,295

Number of ovitrap collections this season, if any: 446

Any other trap collections of note (please describe): 71 pools from GAT traps

Do you participate in the MDPH Arboviral Surveillance program? Yes

Total number of adult mosquito pools submitted to DPH this past season: 508

How many pools do you submit weekly on average? 26.7

Number of traps in your service area **placed by MDPH**: 12

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
<input type="checkbox"/> Eastern Equine Encephalitis (EEE)	0	0	0
<input checked="" type="checkbox"/> West Nile Virus (WNV)	62	0	2
<input type="checkbox"/> Other (please list):			

Comments: West Nile virus detections were 45% higher than 10-year average, 60% higher than 5-year average.

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	Moderate- All towns

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

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, School, library, councils on aging and housing authority presentations, local Board of Health fairs, local farmer's markets. Filmed PSA for local communities on mosquito control and prevention.

Estimate the audience reached this year using the education/outreach methods above: ~6500

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. Taunton River Fest, June
3. Spring Show with Bristol County Agricultural High School, May

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 Agricultural High School 's Natural Resource Management Advisory Board and the Taunton High School's Science Curriculum working group. Todd participated in a STEM program and student group discussion at Seekonk High School.
- ☒ Another mosquito control district/project Continuation of Cs. melanura surveillance at the Bolton Cedar swamp in Freetown in conjunction with Plymouth Co. MCP. Provided mosquito teaching collections and ongoing support for Ae. albopictus programs at other MCDs.

- ☒ Another state agency (DCR, DPH, etc.) Steady cooperation with DPH on Ae. albopictus concerns, including meeting with local town officials in Bristol County. Provided ovitrap protocols to MA DPH.
- ☒ Environmental groups Save the Bay (STB) and Dartmouth Natural Resources Trust (DNRT) on water management projects. Diana is a member of the Buzzards Bay Coalition (BBC) Restoration Advisory Committee.
- ☐ Industry

List any training/education your staff received this year: AMCA Annual meeting, NMCA Annual Meeting, NMCA Field Day, Dig Safe training seminar (in Taunton), continuing education for those with MA Hoisting License. Multiple state required training through PACE. Entomologist Todd Duval participated in the CDC/AMCA Certified Trainer for Integrated Mosquito Management and attended the regional EEE conference.

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, CDC/AMCA Certified Trainer for Integrated Mosquito Management, Red Cross CPR certification.
 Joshua Nickerson: Licensed MA Pesticide Applicator, CDL license, Hoisting license.
 Matthew Gavaza: Licensed MA Pesticide Certification (47)
 Anthony Souza: Licensed MA Pesticide Certification (47)
 Larry Goss: Licensed MA Pesticide Certification (43)
 John Pereira: Licensed MA Pesticide Applicator
 Peter Bilodeau: Licensed MA Pesticide Applicator
 Diana Brennan: B.S. Environmental Science and Management, Licensed MA Pesticide Applicator

Comments: _____

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. Utilizing ArcGis Online to quickly share data in-house.)
- ☒ 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:

Describe any difficulties your program had with IT software/equipment this year:

Comments: No updates were made in 2018.

REVENUES & EXPENDITURES

Please enter your approved budgets for the current, previous, and future fiscal years.

	Date of Fiscal Year	Approved Budget	Notes
Previous	FY 18	\$1,416,734.00	
Current	FY 19	\$1,473,403.00	
Future	FY 20	\$1,532,339.00	estimated

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 19 Cherry Sheet Assessment, figure 5

Comments: _____

SERVICE REQUESTS

How many service requests did you receive this season? 10,548

How many were for larviciding? 104

How many were for adulticiding? 10,444

Was this an increase or decrease over last season? Decrease

Comments: This represented a 14% decrease in adult spray requests compared to 2017. However, spray request may not represent actual number of properties treated. Often entire neighborhoods of 20-75 households will be recorded as a single request with directions for the applicator. BCMCP is also representing larvicide request differently this year. These are requests new to the Project and not currently on our historical larvicide maps.

EXCLUSIONS

How many exclusion requests did you receive this season? 130

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, Figure 6.

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 2 separate tire facilities and an abandoned lot located in New Bedford where the invasive Ae. albopictus has been collected. The plan includes reducing the amount of time tires remain before being processed, cleaning up the work site and pesticide interventions. Worked in residential yards in response to request. This is a long term plan to reduce the spread and abundance of Ae. albopictus in the area. Also responded to unique detections as they occurred.

- ☒ 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 and respond to requests from 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 and responded to requests from Mass DOT, DCR, and DER. Coordinate with these agencies to provide dump trucks to remove spoil and debris from work sites and clear culverts using specialized equipment. Some provide material in areas we are working in. Coordinated with North Attleborough to review options for managing a beaver dam.

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

Describe: Working with local airports on long term vegetation plans for greater visibility. Working with the Bristol County House of Corrections on stormwater management. Work with the City and the Fall River Industrial Park to address their extensive drainage ditch system. Work with DNRT and the Dartmouth Conservation Commission to discuss long term solutions at the Cowyard Salt Marsh in Dartmouth and to discuss property ownership of the culvert at Knowles Marsh.

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

Describe: BCMCP conducted cooperative research with Plymouth MCP on aerial droplet testing, Cs. melanura control. Worked with Mass MCPs on Ae. albopictus surveillance. Worked with Save the Bay, town of Dighton and DFW on a salt marsh restoration project on Broad Cove. Worked with DNRT, town of Dartmouth, and Buzzards Bay Coalition on a salt marsh restoration project at the Cowyard salt marsh.

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

Describe: NMCA, NMCA Field Day, NMCA annual meeting, Regional EEE meeting. Attended the NERRS / NEERS Salt Marsh Workshop. Attended Buzzards Bay Coalition

Restoration Advisory Committee meetings. Participated in MA DPH's ongoing surveillance meetings.

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

Describe: 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. Completed water management projects at the Cowyard salt marsh and Broad Cove salt marsh to remove blockages to fish passage and to enhance native predator habitat.

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: MDAR's compliance rates for IPM development and submissions has not been updated since 2011.

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: Figure 7 is a map of schools, daycares, certified organic farms and residential exclusions.

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: _____

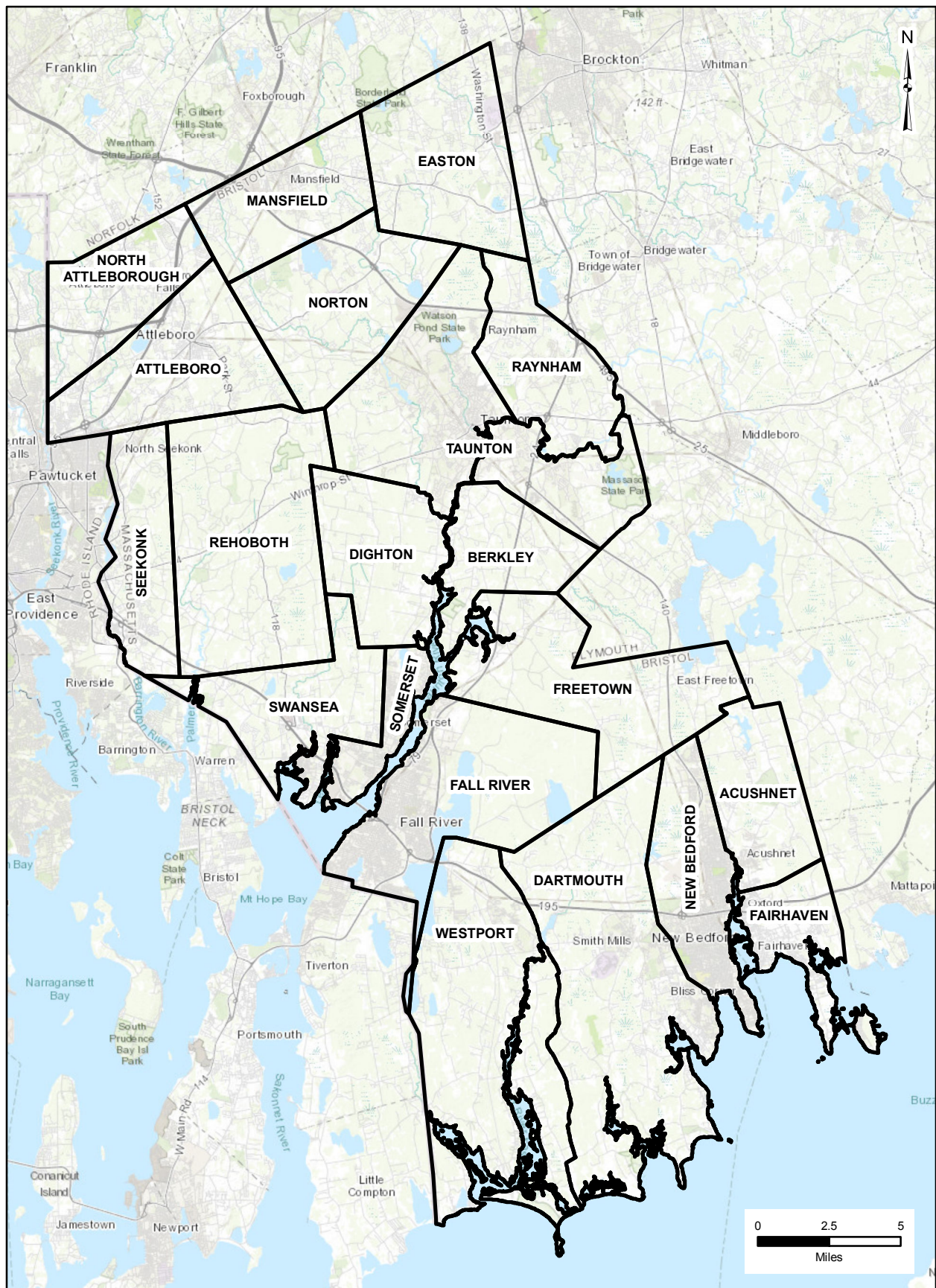


Figure 1. Bristol County

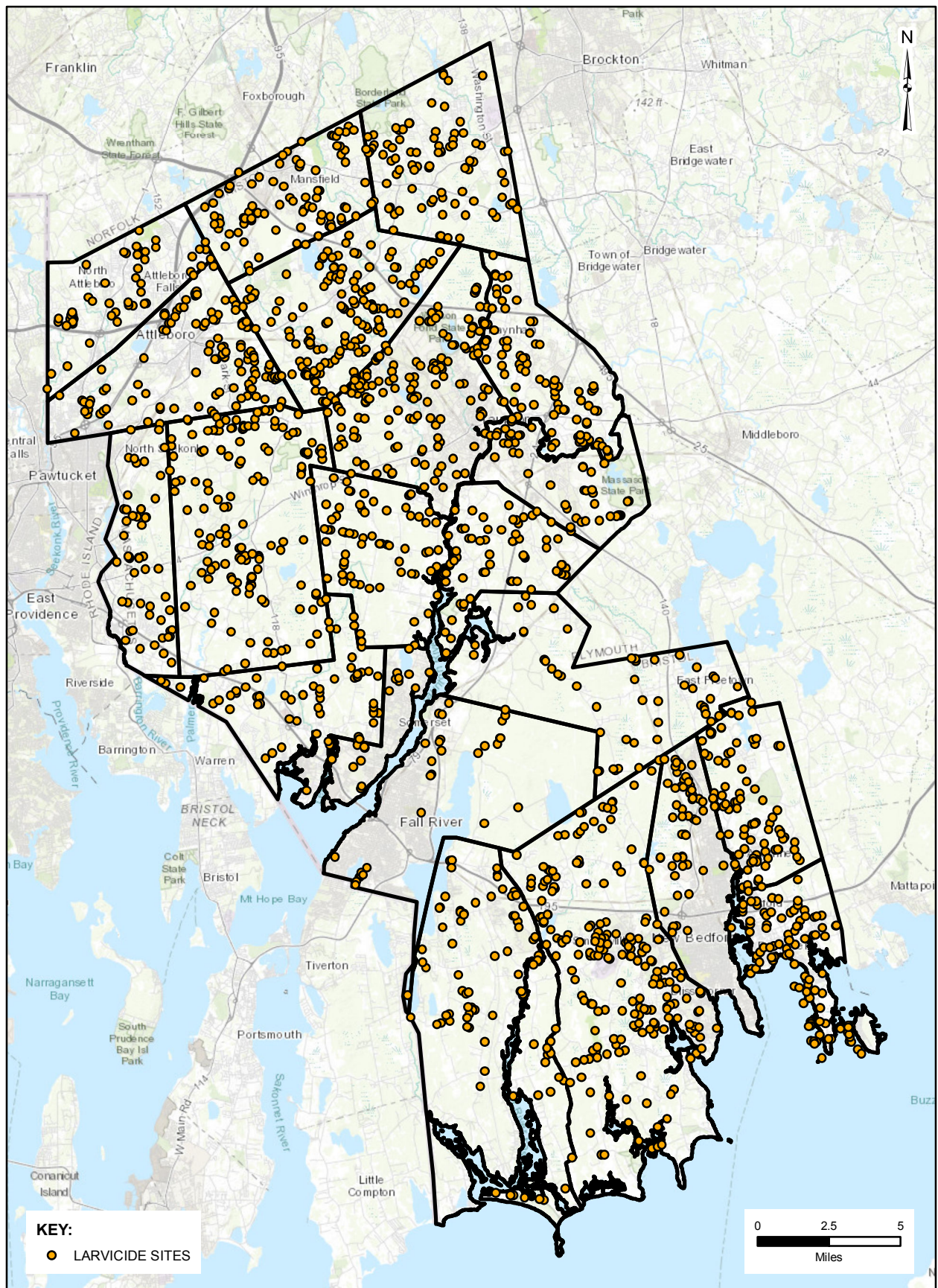


Figure 2. 2018 Larvicide Sites

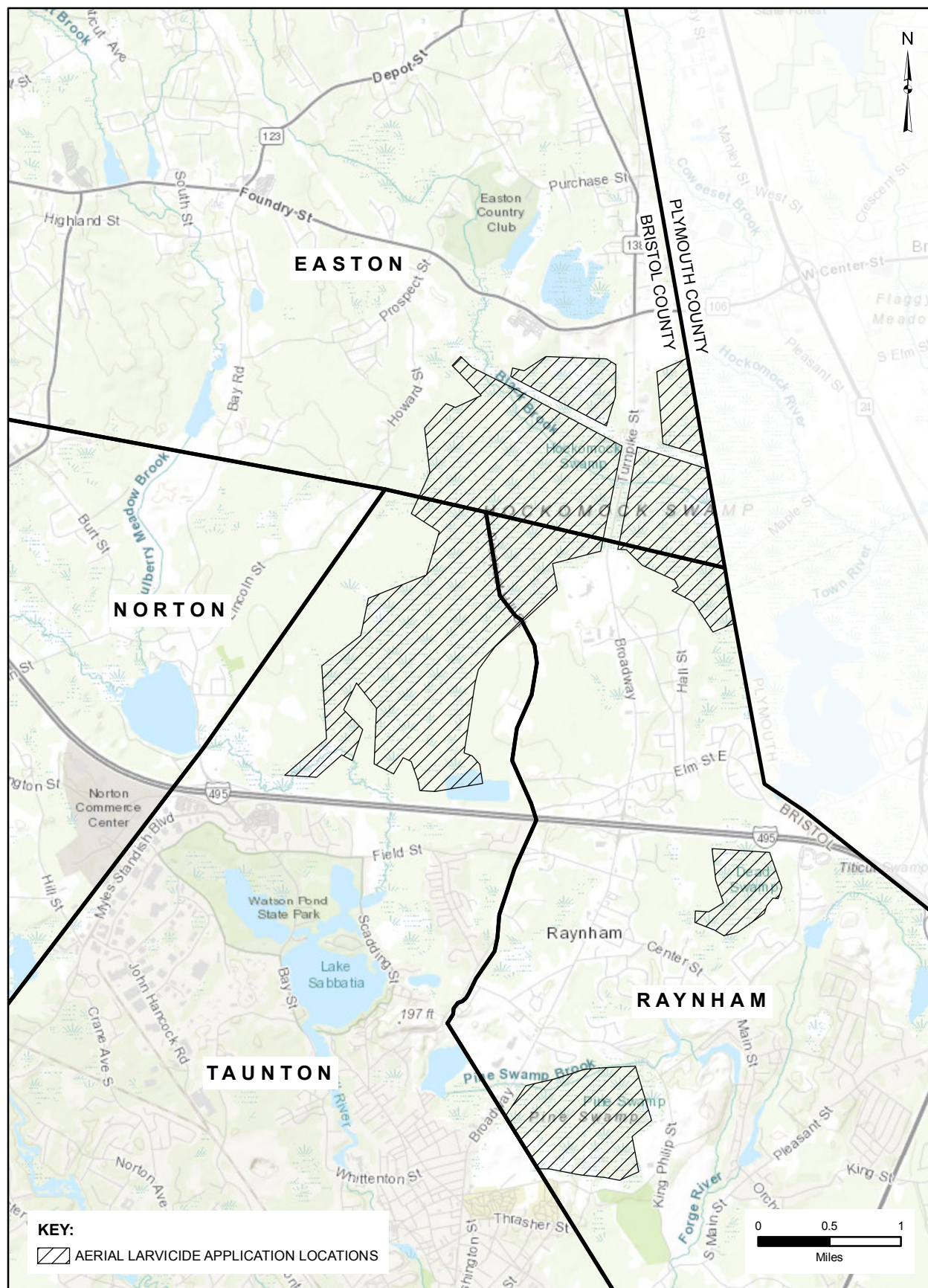


Figure 3. Aerial Larvicide Application Locations within Bristol County

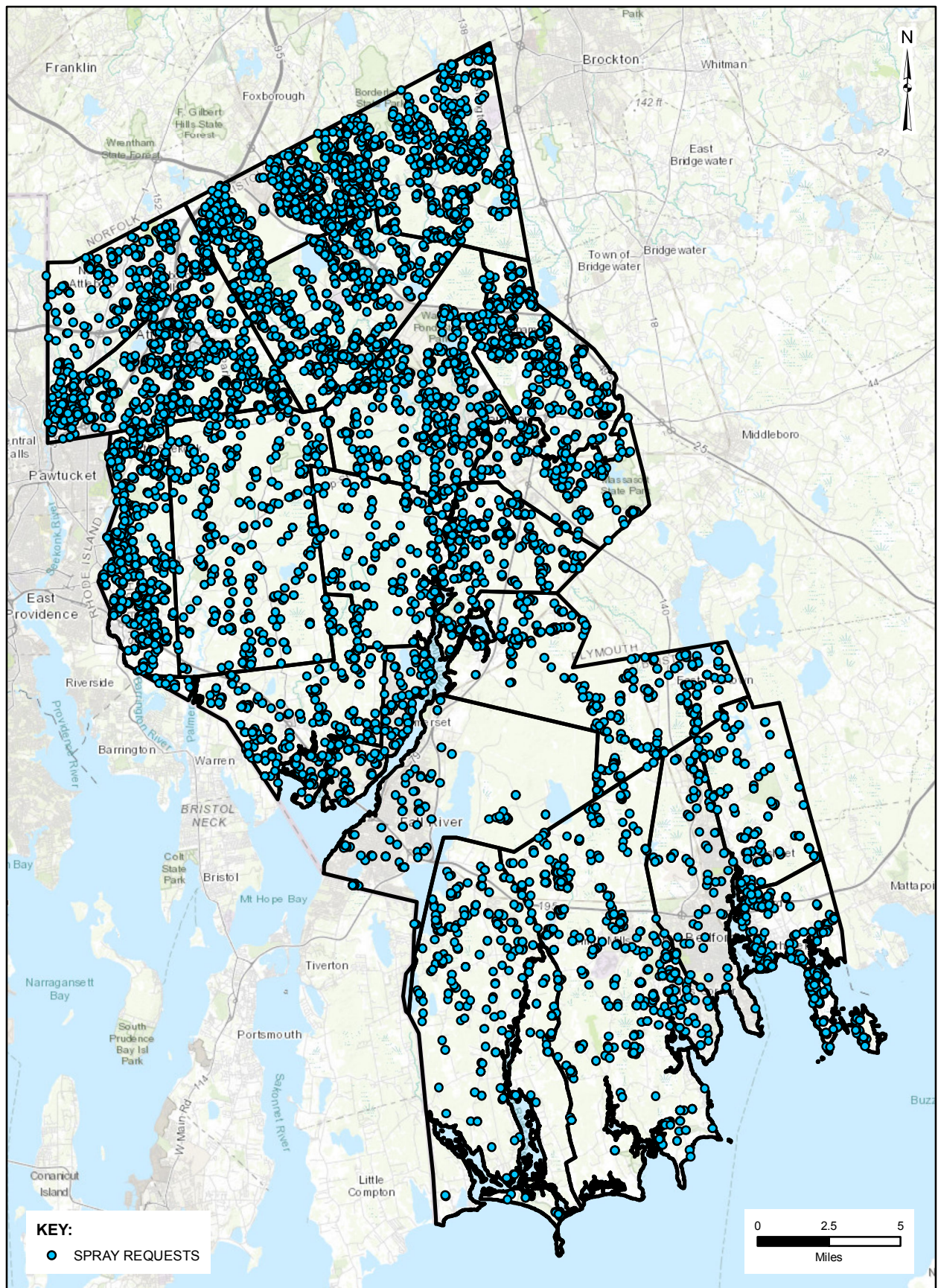


Figure 4. 2018 Spray Requests



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

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JOSEPH BARILE
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SUPERINTENDENT
PRISCILLA MATTON, MS

Thursday, January 03, 2019

Bristol County Mosquito Control Project (BCMCP) End of the 2018 Season Report

This report is based on data collected from CO₂-baited CDC traps, resting boxes, gravid traps, ovitraps and BG Sentinel™ Traps.

- **Total Samples Submitted for Testing 2018: 865**
 - + 7.6% change from 2017
 - Total Samples Submitted for Testing 2017: 804
- **Total Samples Submitted from Bristol Co. by MA DPH in 2018: 357**
 - + 26.1% change from 2017
 - Total Samples Submitted for Testing 2017: 283
- **Total Samples Submitted from Bristol Co. MCP in 2018: 508**
 - -2.5% change from 2017
 - Total Samples Submitted for Testing 2017: 521

- **Total Number of Mosquitoes Tested from Bristol Co. by MA DPH in 2018: 13,259**
 - + 53.5% change from 2017
 - Total Number of Mosquitoes Tested in 2017: 8,635

- **Total Number of Mosquitoes Tested from Bristol Co. MCP in 2018: 13,701**
 - -7.6% change from 2017
 - Total Number of Mosquitoes Tested in 2017: 14,822
 - Total Number of Mosquitoes Tested in 2016: 5,954

- **Total Number of Non-submitted Mosquitoes in 2018: 31,786**
 - + 35.4% change from 2017
 - Total Number of Non-submitted Mosquitoes 2017: 23,478
 - Total Number of Non-submitted Mosquitoes 2016: 20,699

- **Total Number of Non-submitted Mosquitoes from Bristol Co. by MA DPH, 2018: 9,417**
 - + 38.5% change from 2017
 - Total Number of Non-submitted Mosquitoes 2017: 6,799
 - Total Number of Non-submitted Mosquitoes 2016: 3,909

2018 Combined Data:

Total Samples Tested: 865

Total Mosquitoes Tested: 26,960

Total Non-Submitted: 31,786

Total Collected: 58,746

2017 Combined Data:

Total Samples Tested: 804

Total Mosquitoes Tested: 23,187

Total Non-Submitted: 23,518

Total Collected: 46,705

2016 Combined Data:

Total Samples Tested: 604

Total Mosquitoes Tested: 15,877

Total Non-Submitted: 20,699

Total Collected: 35,576

West Nile virus isolations 2018: 62

- **45% higher than 10-year average, 60% higher than 5-year average**
- **38 samples of *Culex pipiens/restuans* complex collected from gravid traps**
- **23 samples of *Culiseta melanura*; 15 collected from CDC light traps, 5 samples from canopy traps and 3 samples from resting boxes**
- **1 sample of *Ochlerotatus canadensis* collected from CDC light trap**
- **2 human cases of West Nile reported by MA DPH in Bristol County**

- WNV 2017:15 Samples
 - 11 samples of *Cx pipiens/restuans* complex
 - 1 sample *Oc canadensis*
 - 3 samples of *Cs melanura*

- WNV 2016: 8 Samples
 - 7 samples of *Cx pipiens/restuans* complex
 - 1 sample of *Oc japonicus*

- WNV 2015: 14 Samples
 - 12 samples of *Cx pipiens/restuans* complex
 - 1 sample of *Cs melanura*
 - 1 sample of *Cx salinarius*

- WNV 2014: 8 Samples
 - 6 samples of *Cx pipiens/restuans* complex

- 2 samples of *Cs melanura*

Eastern equine encephalitis (EEE) virus isolations 2018: 0

- **10-year average: 24.1 samples. 5-year average: 34 samples**
- EEE 2017: 1 sample of *Cs melanura*
- EEE 2016: 0 samples
- EEE 2015: 0 samples
- EEE 2014: 15 samples
 - 14 samples of *Cs melanura*
 - 1 sample of *Cx pipiens/restuans* complex
- EEE 2013: 29 samples
- EEE 2012: 100 samples (highest year for EEEv)

Mosquito activity/trends for the 2018 Season

In some areas, Bristol received up to 29% more snowfall than the 1981-2010 average during the winter of 2017-18. Overall, this wet trend continued throughout the year, with 55.7 inches of total rainfall in New Bedford, 62.0 in Taunton and 63.0 in Providence. This is an average increase over the previous years of 24.6% (Table 3). Bristol experienced a brief drought in August, compared to full seasons of moderate dry to drought conditions in the past few years.

High precipitation continued into the spring, resulting in flooded wetlands and woodland pools. Our technicians reported large numbers of mosquito larva in woodland pools and other habitat, these findings continued until the beginning of the spray season. The water in the woodland pools typically draws down as the trees begin to leaf out, this was not the case in 2018. Figure 1 shows our population counts per trap-night for the season to minimize mean trapping effort effects. Total mosquito populations were up 25.2% from 2017 and 9.1% from the 10-year average.

The high water table persisted into early summer; as a result we saw higher than normal numbers of the spring species *Oc provocans* and *Oc abserratus*. The wet weather also brought back large populations of the emergent vegetation dependent *Coquillettidia perturbans*, which had been

low for several years. This season showed a 40% decline in *Culex pipiens/restuans* and a 35% decline in *Cx salinarius*, but an increase of 28% in *Cx territans*. After disappearing for a few years, the abundance of *Cx territans* have been increasing for two years in a row.

Figure 2 shows five-year population trends at the genus level, averaged for each trap-night. Most genera show population decrease since 2014. Figure 2 shows changes in the composition of the top 5 *Aedes/Ochlerotatus* species per trap-night.

All of our Eastern white cedar swamps were filled throughout the early season. The white cedar crypt habitat for *Cs melanura* showed high abundance of larvae, which led to a 73% increase in abundance this year. This high population will probably impact our upcoming season, possibly increasing the likelihood of increased EEEV detections in 2019.

Aerial larvicide, spring 2018

BCMCP and Plymouth County MCP conducted another joint aerial larvicide operation in the Hockomock Swamp area in spring 2018. For Bristol County, this represented a treatment of our half of the Hockomock Swamp (~2500 acres) in the towns of Easton, Raynham and Taunton; the Pine Swamp (~440 acres) in Taunton; and the Dead Swamp (~180 acres) in Raynham. In these swamps, 3,120 acres were treated with VectoBac 12AS by Plymouth MCP's aircraft. Pre- and post-treatment larval surveillance was conducted at 6 sites (5 treated, 1 control). Despite weather delays and a late start, significant reductions in larval populations were observed at all treatment sites (Table 2; Figure 4). It should be noted that pupating mosquitoes were observed in the Pine swamp, indicating a failure to treat the area before the larvae developed past the 4th instar.

Asian tiger mosquito (ATM) surveillance and treatment

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 Bristol County were set by both BCMCP and MA DPH.

Continuing from 2016, ovitrap papers from all 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.

BCMCP and MA DPH set 446 ovitraps over the 15 week season across the South Coast in potential *Ae albopictus* habitat. 171 papers from sites with presence of mosquito eggs were sent to the MA DPH insectary; of these, only 11 had viable *Ae albopictus* eggs. Figure 4 shows ovitrap detections of viable *Ae albopictus* eggs collected and hatched in the MA DPH insectary. One new detection in Freetown was recorded near an industrial garage; the site was inspected and treated, no further detections from that site were obtained. High levels of early spring activity in Acushnet centered on a junkyard with a small tire pile which was treated throughout the season. This junkyard is scheduled to be closed and cleaned by July 2019. All detections of viable eggs from ovitraps were followed up with BG Sentinel™ trap efforts, adults were only found in New Bedford and Fairhaven.

Routine BG trap surveillance in New Bedford points to an established population along the waterfront area and around Acushnet Avenue, as well as low-level occurrences in nearby areas. The data shown in Figure 6 has been averaged by trap-night to correct for the increased trapping effort that BCMCP has undertaken. The dotted line in Figure 6 shows an R^2 value of 0.64, indicating exponential correlation (an R^2 value of 0.1 represents a low correlation, while a value of 1.0 is a perfect correlation). This correlation has decreased from last year's R^2 of 0.78 and 2016's 0.89, showing that we are moving away from an exponential population increase in this area.

This year, several larvicidal and barrier treatments were conducted at the two major infestations, the tire facilities on Washburn Street and Acushnet Avenue. A 27% overall reduction in *Ae albopictus* populations was observed, on top of last year's 65% reduction. We seem to be making some progress with this problem. BCMCP continued to hold meetings with the Board of Health in New Bedford over the past year and their level of engagement remains high.

Virus Interventions

For the second year in a row, the first reported activity for 2018 occurred in Fairhaven where mosquitoes tested positive for WNV in early July (Epi-week 27). By week 30, we had exceeded 10 positive samples per week, and we did not drop below that number until late October. *Cx pipiens/restuans* collected from gravid traps were again the most common carrier for WNV, followed by *Cs melanura* and one sample of *Oc canadensis* from Rehoboth.

Positive WNV samples occurred in every town except Acushnet, Berkley and Westport (Table 1). Each positive sample site was treated with large-scale (2-3 mile radius) truck-based ULV pesticide applications. All other Massachusetts counties have been very active with human cases of the virus, with the highest overall percentage of positive samples (12%) and highest number of human cases (48) since the introduction of the virus. In addition to our routine service, we added special spray events for two city parks in Mansfield, weekly spraying of parks in New Bedford and pre-treatment of areas used for outdoor festivals in Attleboro, Fall River and New Bedford.

In a very similar occurrence to 2017, neighboring Rhode Island had reported early detections of EEEv in mosquitoes sampled along our western border. In response, BCMCP increased trapping efforts in towns adjacent to that state. No further evidence of EEEv infected mosquitoes were detected from the RI sites or from our towns along the border. Bristol County had no positive detections of EEEv in 2018.

At the end of the 2018 surveillance season, all 20 cities and towns in Bristol County are reported by MA DPH to be in the Low Risk category for EEE. For WNV, all 20 cities and towns of Bristol County have been placed at moderate risk (Figure 7).

Requests for service

Bristol County MCP received 10,444 calls for service in 2018. 99.9% of all requests were completed, the uncompleted requests were generally too close to pesticide exclusion areas to treat safely. BCMCP stopped taking residential requests as of 9/4/18. Despite the increase in mosquito abundance, spray requests fell by 14.7% from 2017 levels and 26.3% from the ten-year average. Some of this decrease can be explained by changes in request types and request accounting. In the

past 5 years, Bristol has received 12,971 calls for service in 2014, 15,133 in 2015, 12,237 calls in 2016 and 11,150 calls in 2017.

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. We participated in at least 15 different varieties of public outreach projects including presentations and information lectures, tables at events, science fairs and radio, newspaper and television interviews.

Coordination between BCMCP and the local Boards of Health was ongoing relative to control/surveillance options in the vicinity of WNV positive mosquito samples and high mosquito collections. Even though Labor Day is the unofficial end of summer, BCMCP continues to alert the public that the seasonality of WNV continues until the first frost in fall. Of the two human cases of WNV in Bristol this year, both occurred after mid-August. One case in a nearby county had a very late onset, coming at epi-week 44 in November. In response, we released several public reminders that although the majority of WNV cases occur in September and early October, the risk is present as long as the mosquitoes are biting. Educational materials have been provided to public and private entities as well as local Boards of Health. Twitter was used extensively to make the public aware of upcoming activities, mosquito news and public health notices, you can find us at @BCMCPMOSQ.

Tables and Figures

Table 1- Towns and number of West Nile virus positive samples in 2018.

Town	WNV+ Samples
Attleboro	1
Dartmouth	3
Dighton	3
Easton	8
Fairhaven	1
Fall River	10
Freetown	5
Mansfield	3
New Bedford	10
North Attleborough	3
Norton	1
Raynham	4
Rehoboth	3
Seekonk	3
Swansea	3
Taunton	1
Grand Total	62

Table 2- Aerial larvicide sampling results 2018. Although they are not statistical tests, both Abbot's and Henderson-Tilton formulae show significant population decline. These results match t-test for significance.

Location	Abbot's	Henderson-Tilton	t-Test (P<0.05)
Harvey St. (Control)	0.00	0.00	0.42
Hockomock East	94.59	95.65	0.00
Hockomock West	67.57	86.37	0.03
Dead Swamp West	86.49	79.37	0.02
Dead Swamp East	70.27	84.03	0.00
Pine Swamp	78.38	76.78	0.00

Table 3- Bristol county area precipitation totals in inches and deviation from norm as of 12/31/18 (NOAA 2018)

	<i>New Bedford</i>	<i>Providence</i>	<i>Taunton</i>	<i>Area average</i>
<i>Precipitation total</i>	55.67	63.02	61.98	60.22
<i>Deviation from normal</i>	+15.4	+33.9	+24.6	+24.63%

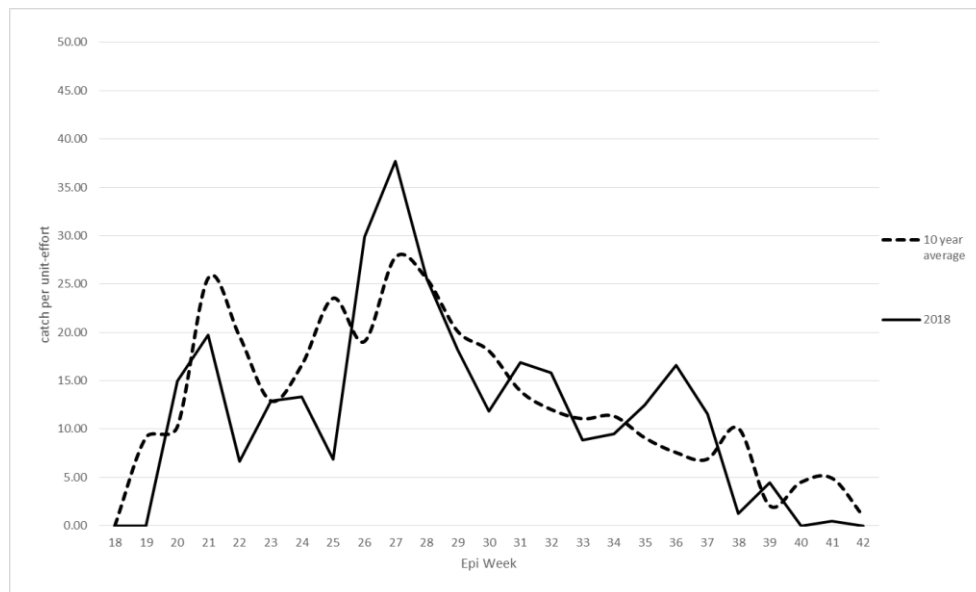


Figure 1- 2018 population totals per trap-night by epi week compared to 10-year average. The population dip at week 25 is an artifact of reduced trapping due to the July 4th holiday week.

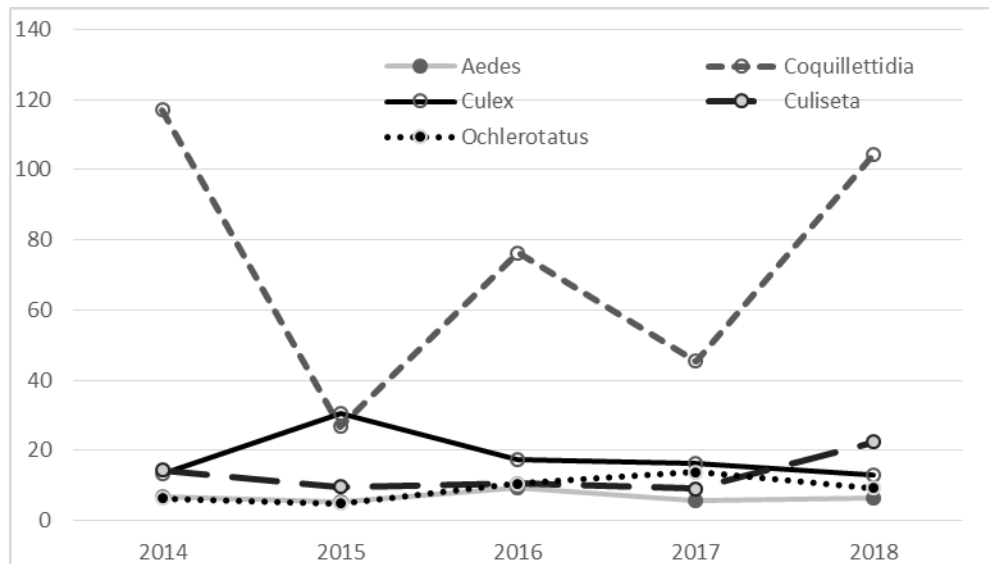


Figure 2- Mean number of observed mosquitoes by genus captured per trap-night by BCMCP and MA DPH in Bristol County, MA 2014 to 2018.

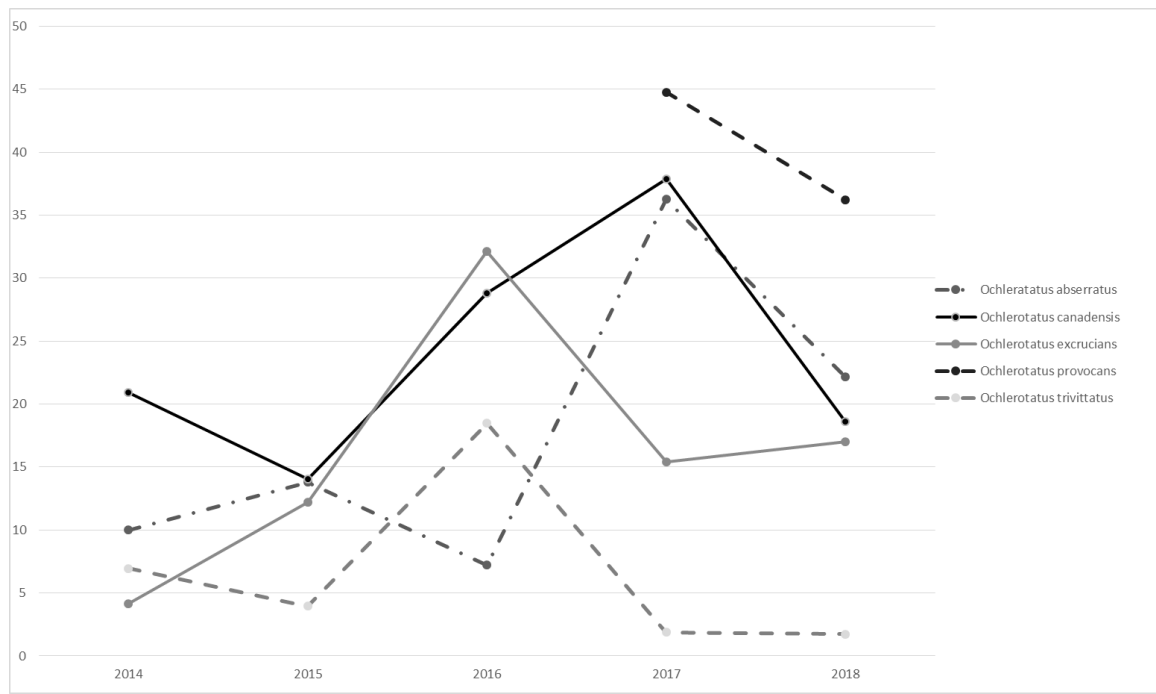


Figure 3- Mean number of top 5 observed *Aedes/Ochlerotatus* mosquitoes captured per trap-night by BCMCP and Mass DPH in Bristol County, MA 2014 to 2018.

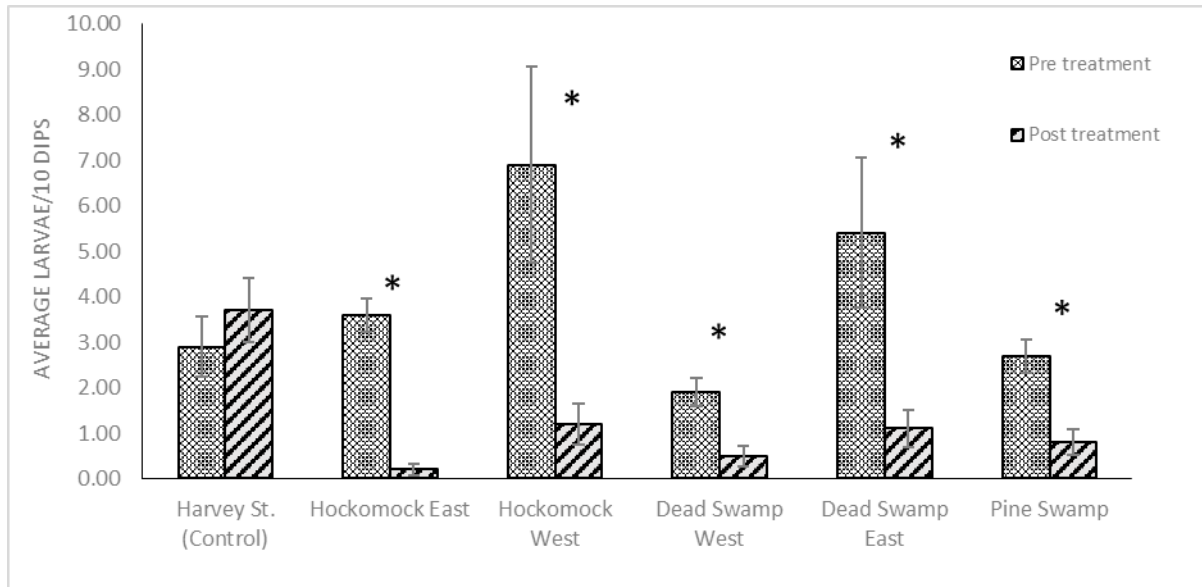


Figure 4- Pre- and post-treatment larval populations in the Hockomock, Pine and Dead Swamps, April-May 2018. Error bars represent standard error, asterisks denote statistical significance (t-test, $P < 0.05$).

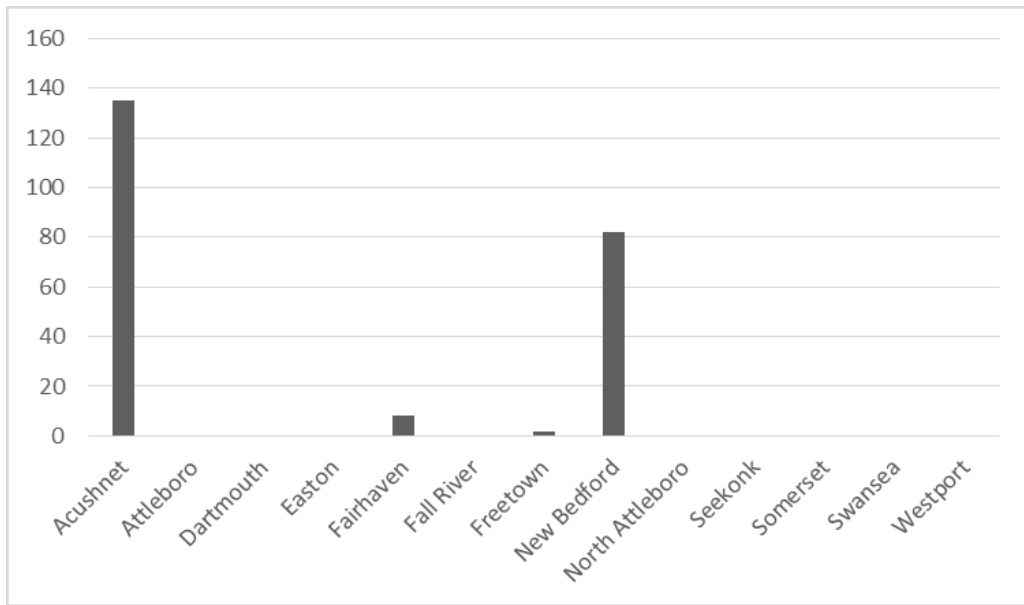


Figure 5- Location and number of 2018 ovitrap detections of Asian tiger mosquitoes in Bristol County.

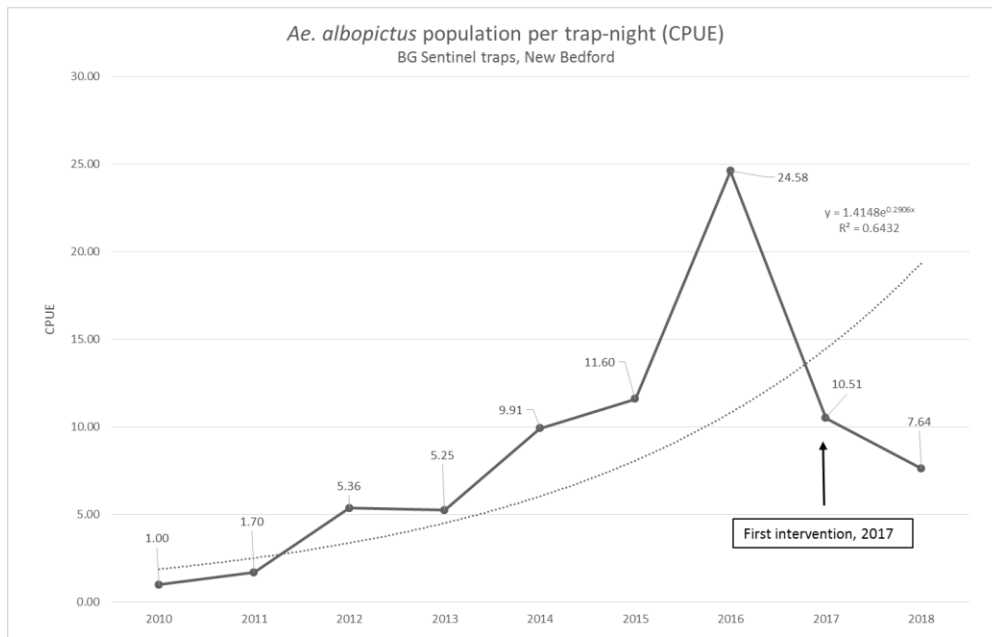


Figure 6- Population increase for Asian tiger mosquitoes in all traps in New Bedford, 2009-2018. Data normalized to decrease effects of increased trap effort. Dotted trendline represents exponential growth curve.

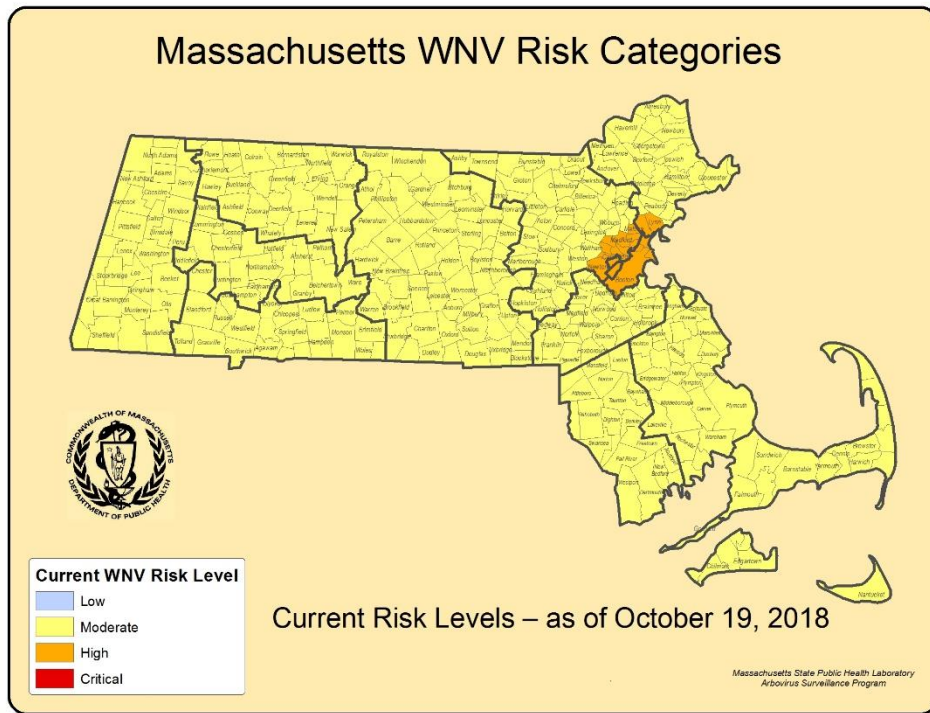


Figure 7- Massachusetts Dept. of Public Health West Nile virus risk map for the end of the 2018 season.

Prepared by Todd B Duval, Entomologist

Timestamp	Name	Phone Number	District/Project Name	Town/City	Sections Completed:	Control Actions:	Reason for Control	Notes
8/13/2018 13:38	Priscilla Matton	508-823-5253	Bristol County	Mansfield	Center	Catch Basin Treatment, Ground ULV Treatment, Supplemental Trapping	WNV Positive Pool	
8/22/2018 7:30	Priscilla Matton	508-823-5253	Bristol County	Fall River	Center	Ground ULV Treatment, Public Outreach (including social media)	WNV Positive Pool, Request	A request from the Health Department to spray in response to WNV and the upcoming Holy Ghost Feast held each year in the City. The City expects over 2,000 visitors from 8/23- 8/26. A map of the location was included in the City's press release.
8/22/2018 7:34	Priscilla Matton	508-823-5253	Bristol County	New Bedford	East, Northwest	Barrier Treatment, Catch Basin Treatment, Ground ULV Treatment, Public Outreach (including social media), Supplemental Trapping	WNV Positive Pool, Ae. albopictus	In response to WNV located in the City and neighboring Dartmouth increased locations were treated via ULV and catch basins in conjunction with the City's weekly parks request. Also in the area where Ae. albopictus has been detected at higher populations, a barrier treatment around the tire facility was conducted.
8/29/2018 10:28	Priscilla Matton	508-823-5253	Bristol County	Rehoboth	Northwest	Ground ULV Treatment, Public Outreach (including social media)	WNV Positive Pool	WNV detected in human biting Ae. canadensis from DPH's trap located in Rehoboth. Area around trap was treated on Monday 8/27 after weather prohibited us from making an application on Friday 8/24.

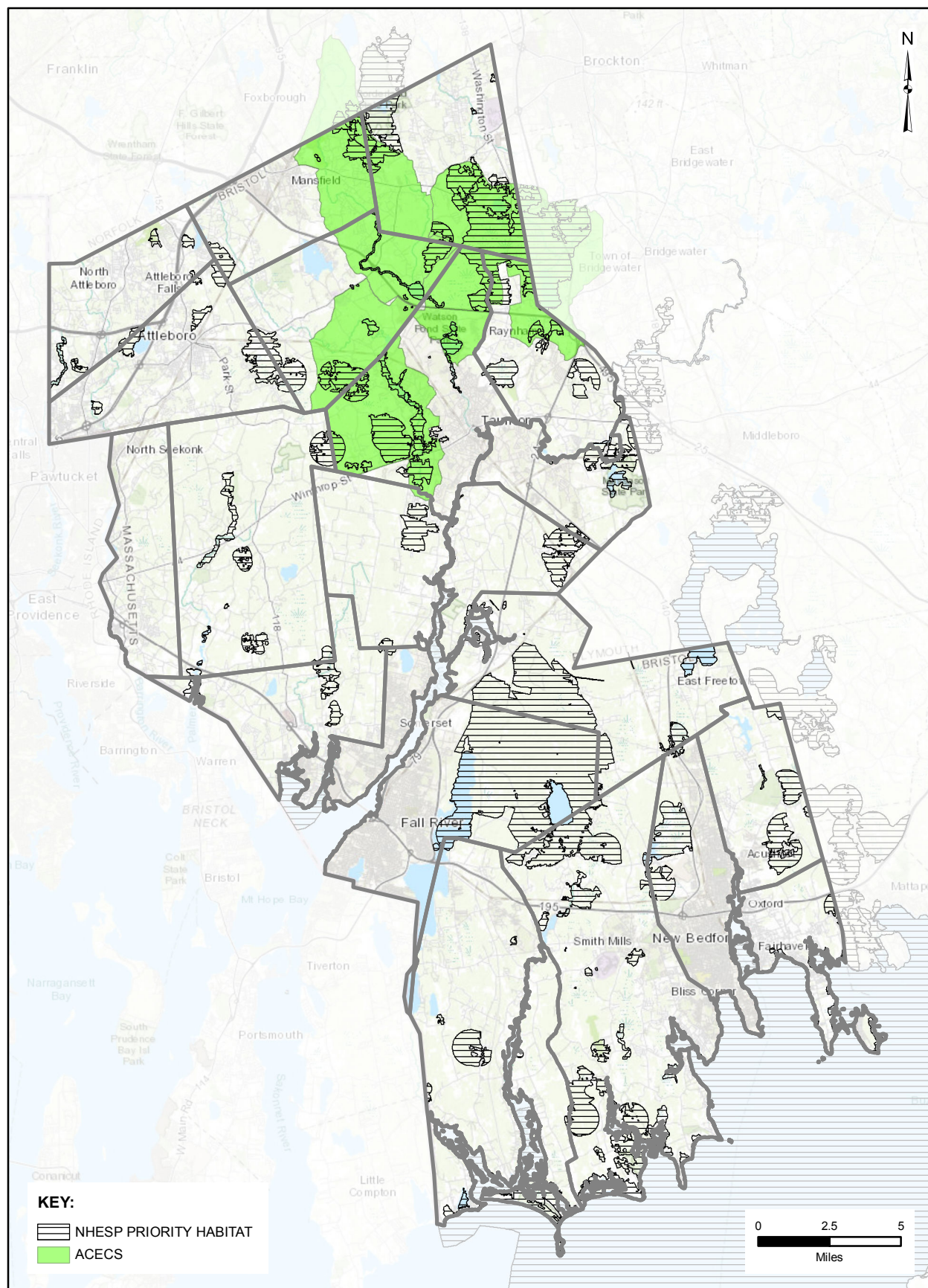
Sample Form SRB-1
Page 3 of 3

Project Name: Bristol County Mosquito Control Project
FY2019 Proposed Cherry Sheet Assessments Estimates
Based on the preliminary proposed Project budget

Name of Municipality	% of Total Budget	Project Share Amount*	State Reclamation Mosquito Control Board Share Amount*	Total Assessment Estimate*
ACUSHNET	2.61%	\$38,505.00	\$1601.00	\$40,106.00
ATTLEBORO	6.05%	\$90,701.00	\$3772.00	\$94,473.00
BERKLEY	2.18%	\$31,739.00	\$1320.00	\$33,059.00
DARTMOUTH	10.11%	\$151,079.00	\$6283.00	\$157,362.00
DIGHTON	2.79%	\$41,011.00	\$1706.00	\$42,717.00
EASTON	5.26%	\$80,242.00	\$3337.00	\$83,579.00
FAIRHAVEN	2.87%	\$42,036.00	\$1748.00	\$43,784.00
FALL RIVER	7.73%	\$110,039.00	\$4576.00	\$114,615.00
FREETOWN	4.36%	\$64,801.00	\$2695.00	\$67,496.00
MANSFIELD	4.73%	\$71,892.00	\$2990.00	\$74,881.00
NEW BEDFORD	6.84%	\$98,096.00	\$4080.00	\$102,176.00
NORTH ATTLEBORO	4.83%	\$73,423.00	\$3053.00	\$76,476.00
NORTON	4.49%	\$65,909.00	\$2741.00	\$68,650.00
RAYNHAM	3.50%	\$52,742.00	\$2193.00	\$54,935.00
REHOBOTH	5.63%	\$83,970.00	\$3492.00	\$87,462.00
SEEKONK	3.48%	\$52,773.00	\$2195.00	\$54,968.00
SOMERSET	3.04%	\$37,554.00	\$1562.00	\$39,116.00
SWANSEA	3.79%	\$57,461.00	\$2390.00	\$59,851.00
TAUNTON	8.49%	\$123,058.00	\$5118.00	\$128,176.00
WESTPORT	7.22%	\$106,370.00	\$4424.00	\$110,794.00
		\$1,473,403.00	\$61,275.00	\$1,534,678.00

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

(2018 Equalized Valuations)



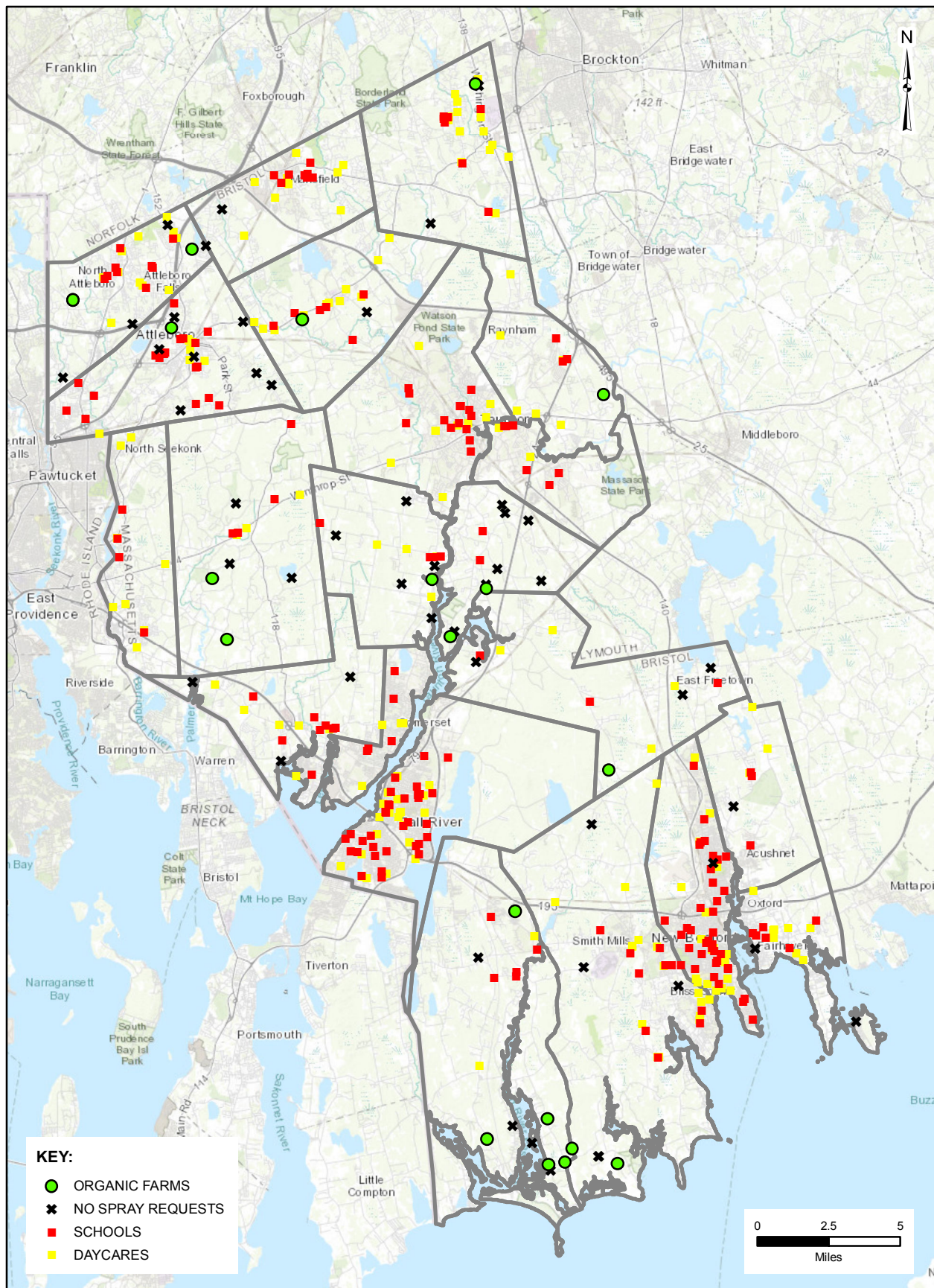


Figure 7. No Sprays