MASSACHUSETTS MOSQUITO CONTROL

ANNUAL OPERATIONS REPORT

Year Report Covers: 2023 Date of Report: 00/31/2024

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

Address: 38R Forest Street

City/Town: Attleboro Zip: 02703

Phone: 508-523-5253 Fax: 508-828-1868

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

NPDES permit no. **MAG870009**

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:

Joseph Barile Christine Fagan

Gregory Dorrance Dr. Henry Vallaincourt

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/orgs/bristol-county-mosquito-control-project
Twitter handle: @BCMCPMosq
Facebook page: http://www.facebook.com/
Other social media accounts:

Staffing levels for the year of this report:
Full time: 11
Part time: 1 until June 2023
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, Aaron Toth, Todd Duval
☒ Information technology Priscilla Matton
☒ Laboratory Todd Duval
☒ Operations Priscilla Matton, John Moniz, Drew Bushee, John Pereira, Matthew Gavaza, Larry Goss, Anthony Souza, Joshua Nickerson, Aaron Toth, Todd Duval
☒ Public relations Priscilla Matton, Todd Duval
☒ Wetland scientist Diana Brennan (6 months)
☒ Other (please describe) Seasonal Mosquito Surveillance Technician- Christopher Beale, Seasonal Office Assitant- Theresa Beale

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
12 ULV sprayers (list type) 3 Cougars (GPS), 4 London Fog (GPS), 2 Guardian (GPS), 1 Curtis DynaJet (GPS), 1 Beecomist, 1 London Air
10 Vehicles
Other (please be specific): 1 Dump Truck & Flatbed Trailer, 1 Utility Truck, 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): Salt Marsh Runnels**

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):	5,361 lbs
VectoLex WSP	73049-20	1 per 50 sq. ft.	Hand	Larvae	☒ Catch basins ☐ Containers ☐ Wetland ☐ Other (please list):	583 lbs
VectoBac 12AS	73049-38	1 pint per acre	Aerial	Larvae	☐ Catch basins ☐ Containers ☒ Wetland ☐ Other (please list):	343.3 gallons
VectoLex FG	73049-20	14.8 lbs/acre	Aerial	Larvae	☐ Catch basins ☐ Containers ☒ Wetland ☐ Other (please list):	400 lbs
				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):	

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: An aerial larvicide application was conducted over the Hockomock and Bolton Swamps in mid-April 2023. Approximately 2,746 acres were treated to control a variety of spring species and Cs. melanura, an important EEE vector. An application was made to Cq. perturbans specific habitat in late April covering 27 acres. These maps are included in the end of the season report referenced in the adult mosquito surveillance section.

Please attach a map of your service area (or a website link to that map). Figure 2 and End of the Season report

ADULT MOSQUITO CONTROL:

If you have an adult 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.

What is the time frame for this program? June- 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 increased populations, WNV or EEE detections from mosquitoes 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**
Duet	1021-1795-8329	0.64 oz/acres	Truck mounted ULV	419.5 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 and trap data)
☒ Landing rates (Describe trigger for application Ae. albopictus- 2 adults within 5 minutes)
☒ Light trap data (Describe trigger for application See the EIR)
Comments: _____

Please attach maps of your service areas (or a website link to that map). Figure 3

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: 2019 brought the first dedicated tire removal program to BCMCP and continued into 2023. This program addresses source reduction via removal and disposal as BCMCP work crews find tires, containers and other articles that would serve as larval habitat. This tire program is limited to tires that BCMCP crews find in the course of their water management work and is not open to the public. 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: 107 tires removed by BCMCP staff in 2023

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. We also maintain previously excavated ditches. 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)**
☒ Culvert cleaning	
☒ Hand cleaning	83,980 ft
☒ Mechanized cleaning	8,590 ft
☒ Stream flow improvement	
☒ Other (please list): Reclaim	92,570 ft

Comments: Culvert cleaning and stream flow improvement cumulative length are included in mechanized and hand cleaning. Cumulative mechanized brush mowing 9.125 acres (10,505 linear feet).

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

Maintenance Type	**Estimate of cumulative length of ditches maintained (ft)**
☒ Hand cleaning	6,645 ft
☒ Mechanized cleaning	820 ft
☒ Other (please list): Reclaim	7,465 ft

Comments: _____

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

Comments: Completed 20 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:

What months is this program active?

Please give an estimate of total square feet or acreage:

Comments: _____

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:

Source Reduction: We return to mechanized water management sites regularly to check for blockages or debris that may obstruct the flow of water and to meet any additional recommendations in the BMP. In areas where containers or tires were removed, some sites are re-checked during the season.

Other (please list): Pesticide efficacy testing was completed for common species using CDC bottle bioassay protocols in August 2023 by CDC's Center of Excellence. 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. Ae. albopictus samples were sent to CDC's Center of Excellence for testing of resistance enzymes.

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. Efficacy testing for ULV pesticides is performed using CDC Bottle Bioassay methods and results are reported internally and to CDC.

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.
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 and adult 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)
☐ ABC light trap	☐	
☐ ABC light trap w/CO_2	☐	
☒ CDC light trap	☐	variable
☒ CDC light trap w/CO_2	☐	14 per week
☒ Gravid trap		64 per week
☒ Landing rate test		Early season, as needed
☐ NJ light trap	☐	
☐ NJ light trap w/CO_2	☐	
☒ Ovitrap		48 per week
☒ Resting box		30 per week
☒ Other (please describe): BG Sentinel with BG lure		5 per week
☐ Other (please describe):		
☐ Other (please describe):		

Do you maintain long-term trap sites in any of your areas? Yes
If yes, how many:
The majority of our traps are set in each town weekly. Supplemental trapping is rare.

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

☒ *Ae. albopictus*
☐ *Ae. cinereus*
☒ *Ae. vexans*
☐ *An. punctipennis*
☐ *An. quadrimaculatus*
☒ *Cq. perturbans*
☒ *Cx. pipiens*
☒ *Cx. restuans*
☒ *Cx. salinarius*
☒ *Cs. melanura*
☐ *Cs. morsitans*
☐ *Oc. abserratus*
☒ *Oc. canadensis*
☐ *Oc. cantator*
☒ *Oc. j. japonicus*
☐ *Oc. sollicitans*

☐ *Oc. taeniorhynchus*
☐ *Oc. triseriatus*
☐ *Oc. trivittatus*
☐ Others (please list):

☐ *Ps. ferox*
☐ *Ur. sapphirina*

Do you participate in the MDPH Arboviral Surveillance program? Yes
How many pools do you submit weekly on average? 19.8

Total number of adult mosquito pools submitted to DPH this past season: 497
Number of adult mosquito pools collected but not submitted to DPH ("Unsubmitted"): 2038

Total number of adult mosquitoes submitted to DPH this past season: 14,763
Number of adult mosquitoes collected this season but not submitted to DPH: 37,390

Number of ovitrap collections this season, if any: 148
Any other trap collections of note (please describe):

Number of traps in your service area **placed by MDPH**: 5
Were these long-term trap sites or supplemental trapping sites? long-term

Which arboviruses were found in your area during this past mosquito season? Enter the number of positive pools and/or cases below:

Arbovirus	Positive Mosquito Pools	Equine Cases	Human Cases
☒ Eastern Equine Encephalitis (EEE)	6	0	0
☒ West Nile Virus (WNV)	22	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	Moderate

Comments: Moderate WNV levels in 5 towns on RI border, all other towns at low level. Additional details on mosquito surveillance and activities provided in the end of the season report attached.

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? Year round

Check off all education/outreach methods that were performed by your program this year:
☒ Development/distribution of brochures, handouts, etc.
☒ Door-to-door canvassing (door hangers, speaking to property owners, etc.)
☒ Facebook page, Twitter, or other social media
☐ Mailings (Describe target audience(s):)
☒ 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 and filmed PSA for local communities on mosquito control and prevention. Met with new Board of Health agents in our County at our Project to explain our services.

Estimate the audience reached this year using the education/outreach methods above: 300+ in person, television audience unknown
Comments:

List your program's top 3 education/outreach activities for this past year:
1. New Bedford's Jim Marshall show
2. Swansea Health Fair
3. Buttonwood Zoo Party for the Planet

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 County Agricutural High School's Natural Resource Management Advisory Board. Participated in a mock job fair at Bristol County Agricutural High School about furture jobs available and qualifications. Ongoing projects with NEWVEC and NEVBD, the two CDC Centers of Excellence in our area.
☒ Another mosquito control district/project Continuation of Cs. melanura surveillance and control in conjuction with Plymouth Co. MCP. Todd helped teach a mosquito ID workshop as part of the annual NMCA Mosquito Mayhem event in May.
☒ Another state agency (DCR, DPH, etc.) Steady cooperation with DPH and MDAR about seasonal activity. Coordination with MassDOT on water management projects which incorporate state road drainage ditches. Working with OVM on fleet management. Work with DCR on water management and pesticide applications.
☒ Environmental groups Diana is a member of the Buzzards Bay Coalition (BBC) Restoration Advisory Committee. BCMCP continues to partner with BBC, Woodwell Climate Research Center, Save the Bay (STB), Buzzards Bay National Estuary Program (BBNEP), Dartmouth Natural Resources Trust (DNRT), the Town of Fairhaven, and the U.S. Geological Survey (USGS) during the monitoring phase of the SNEP Watershed Grant Salt Marsh Resilience Project at Little Bay in Fairhaven and Oceanview Farm in Dartmouth. BCMCP partnered with Mass Audubon, Save the

Bay, DNRT, and U.S. Fish and Wildlife Service (FWS) on a SNEP Watershed Grant Salt Marsh Resilience Project at Allen's Pond, implemented in 2022 and now in the montioring phase.
☒ Industry American Mosquito Control Association (AMCA) is dedicated to providing leadership, information and education leading to the enhancement of public health and quality of life through the suppression of mosquitoes and is the lead organization for mosquito control in the US. Priscilla continued as AMCA's North Atlantic regional director representing the 9 states in the region. Priscilla presented at the AMCA, New Jersey MCA, Pennsylvania Vector Control Association and Northeastern MCA conferences.

List any training/education your staff received this year: "Right to Know" and tick education was provided. Multiple state required training through PACE/Mass Achieves. Environmental Justice training. Pesticide certification credits through the Northeastern Mosquito Control Association's annual scientific conference and Field Day. MDAR "Spotted Lantern Fly Training". Frontier Precision training for FieldSeeker larviciding and adulticiding modules. Clarke training on general mosquito biology and pesticide applications. EPA's training on understaning Bulletin's Live! Two and ESA pilot program and mitigation.

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
Joshua Nickerson: Licensed MA Pesticide Applicator, CDL license, Hoisting license
Matthew Gavaza: Licensed MA Pesticide Certification (47), Hoisting license
Anthony Souza: Licensed MA Pesticide Certification (47)
Larry Goss: Licensed MA Pesticide Certification (47)
John Pereira: Licensed MA Pesticide Applicator
Aaron Toth: Licensed MA Pesticide Applicator
Diana Brennan: B.S. Environmental Science Management, Licensed MA Pesticide Certification (47)

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. ArcMap, ArcGIS Online, and QGIS have all been used for map creation and data sharing.)
☒ 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: New network access point installed. Larviciding module on Frontier Precision's FieldSeeker was used for recording pesticide applications and site visits.

Describe any difficulties your program had with IT software/equipment this year: Lack of in-house IT expertise

Comments: _____

REVENUES & EXPENDITURES

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

	Date of Fiscal Year	Approved Budget	Notes
Previous	FY 22	$1,680,932.00	
Current	FY 23	$1,680,932.00	level funded
Future	FY 24	$1,722,955.00	

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 24 Cherry Sheet Assessment

Comments: _____

SERVICE REQUESTS

How many service requests did you receive this season? 5,925
How many were for larviciding? 84
How many were for adulticiding? 5,841

Was this an increase or decrease over last season? Decrease

Comments: In the past 5 years, Bristol has received 10,444 calls for service in 2018, 12,550 calls in 2019, 12,857 calls in 2020, 8,416 calls in 2021 and 7,334 calls for service in 2022. We have looked into weather patterns and mosquito abundance as drivers of fluctuating request numbers, but there does not seem to be any relationship.

EXCLUSIONS

How many exclusion requests did you receive this season? 80

Was this an increase or decrease over last season? Decrease

Do you have large areas of pesticide exclusion, including priority habitat? No

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 continued inspections and work on 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. As a member of the BBC Restoration Advisory Committee, Diana provided review and comment on various proposed restoration projects.

- ☒ 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 DPWs, 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 the New Bedford and Mansfield Airport on water management projects.

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

  Describe: Working with local airports on long term ditch maintenance and vegetation plans. Work with the City and the Fall River Industrial Park to address their extensive drainage ditch system. Work with partners and landowners (DNRT, FALPT, BBC, Save the Bay, Mass Audubon, etc.) to evaluate long-term solutions to salt marsh ditch maintenance in a rapidly changing ecosystem.

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

  Describe: Worked alone and with partners (DNRT, FALPT, BBC, Save the Bay, Mass Audubon, and others) to plan and/or execute salt marsh restoration/ditch maintenance projects and salt marsh resilience research projects.

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

Describe: AMCA and NMCA annual meeting meetings. Cooperative research with MCPs, DPH, MDAR and NEVBD on solutions to control Cs. melanura and Cq. perturbans. Attended BBC Restoration Advisory Committee meetings. Attended project team meetings for the SNEP Salt Marsh Resilience Projects. Attended site meetings with MassDOT, member towns and cities, and salt marsh project partners. Partcipated 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, including the opening of beach crossings and the clearing of salt marsh ditches and runnels in many coastal towns to allow fish access.

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 complaince rates for IPM development and submissions is approximately 98% and 94% for schools and daycares respectively. This compliance rate does not represent appropriate mosquito control products are listed.

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: _____

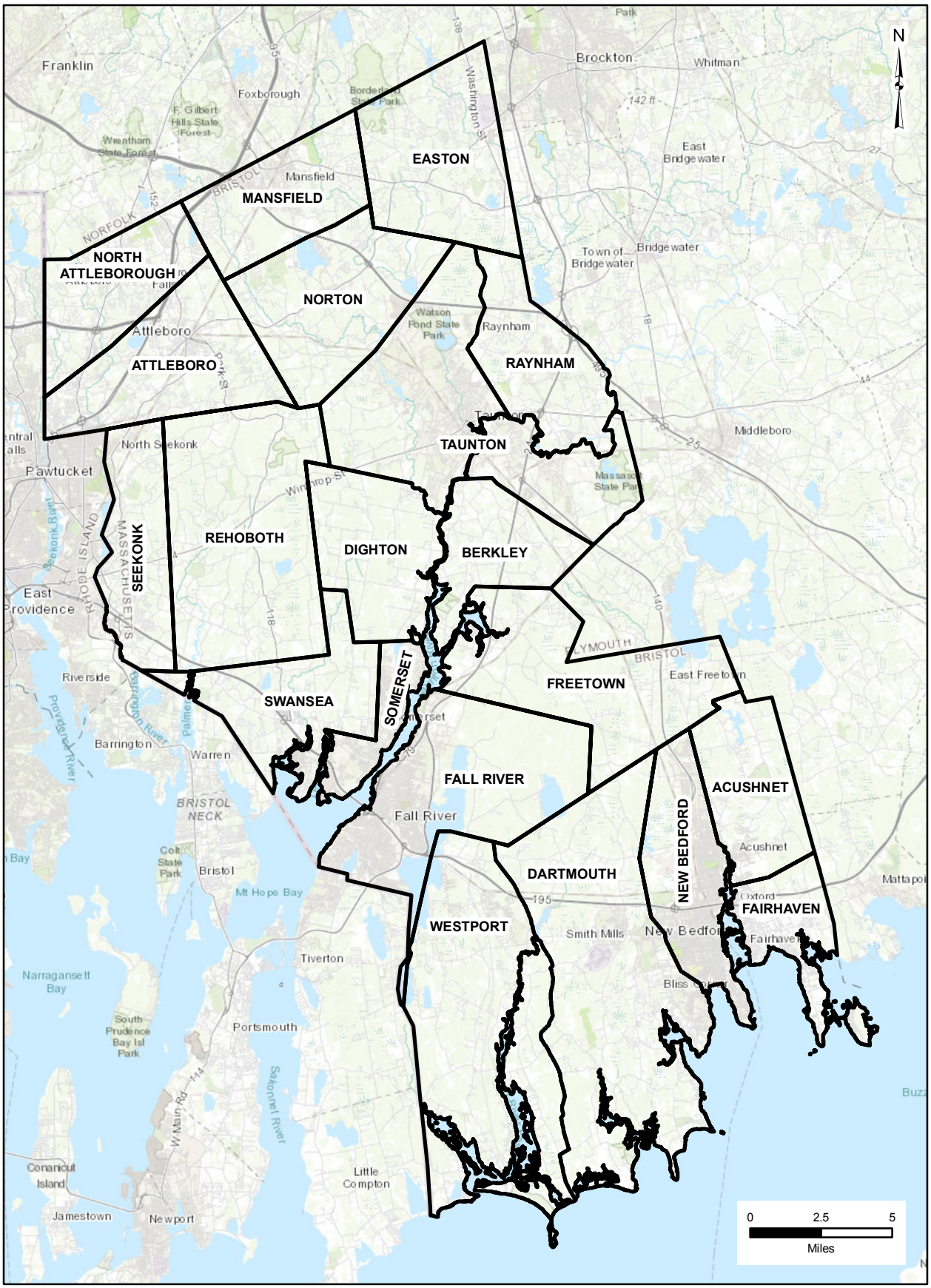
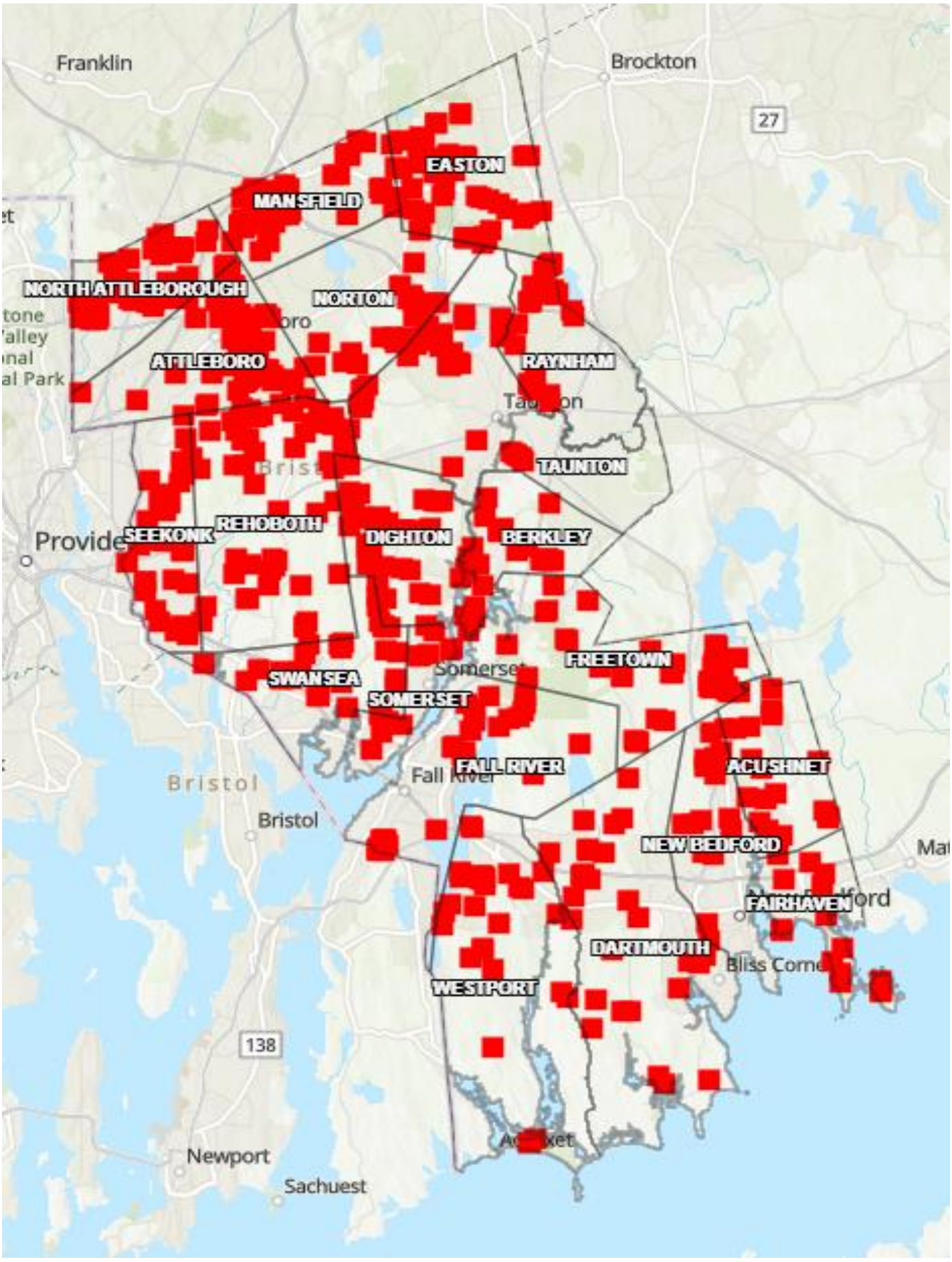
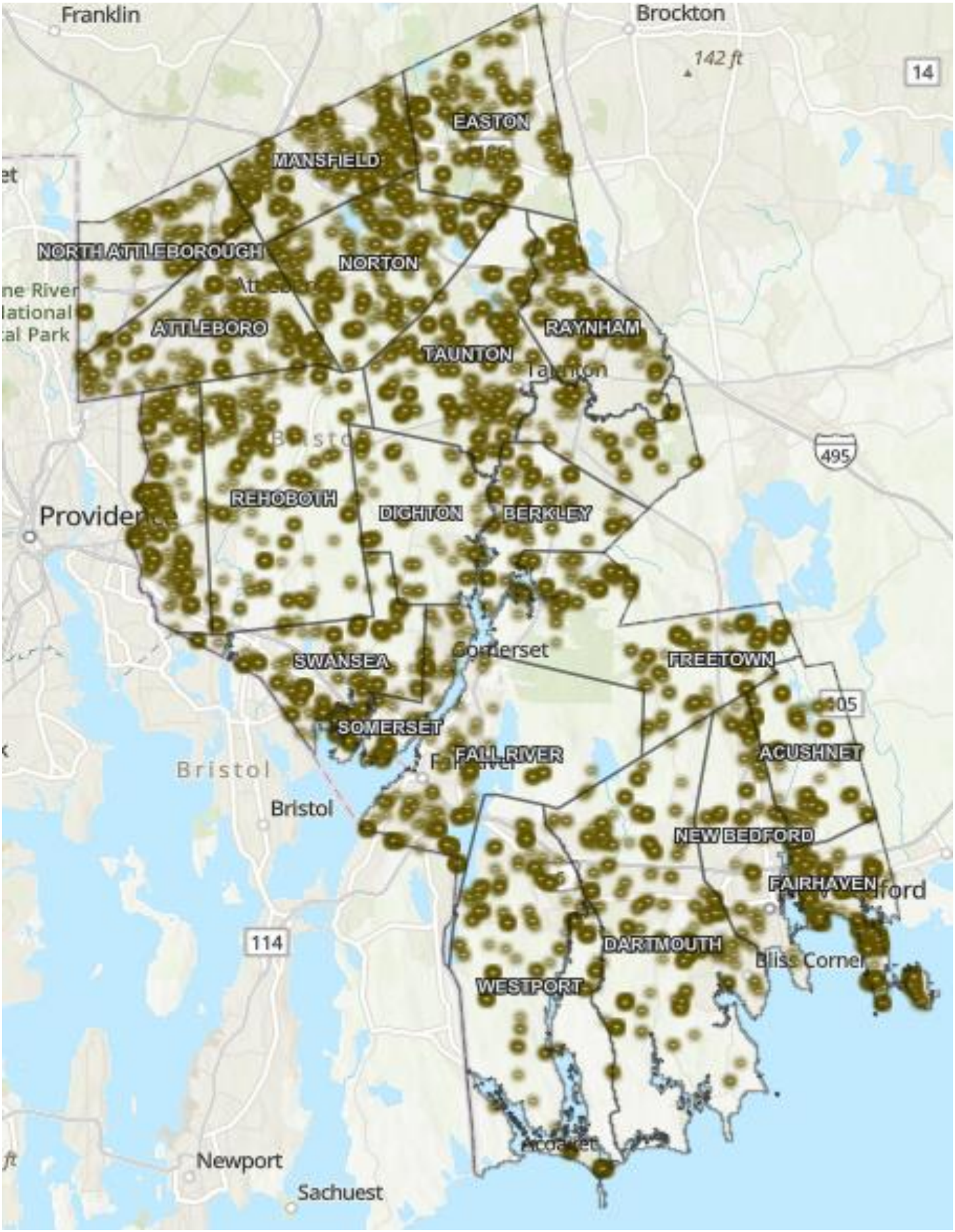


Figure 1. Bristol County



Larvicide sites- 2023



Adulticide request- 2023

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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SUPERINTENDENT
PRISCILLA MATTON, MS

Entomologist
Todd B Duval, MA

Thursday, January 04, 2024

Bristol County Mosquito Control Project (BCMCP)

2023 Entomology Season Report

Season Summary

The winter of 2022-2023 was the third La Niña year in Bristol, with average precipitation and above average temperature. Bristol saw average precipitation through May and high numbers of larvae recorded. Aerial applications occurred in April in the Hockomock and Bolton Swamps and our third year of spring helicopter treatments in Easton went on as scheduled. Reductions in larval populations were recorded. La Niña gave way to a strong El Niño by June, which shifted us to a higher-than-normal precipitation trend through the summer. The season started with below average mosquito activity, which swung to higher than normal by August and finishing the year about 20% higher than normal. High populations of *Culex salinarius* and *Culiseta melanura* were observed. There were 22 West Nile virus (WNv) and six eastern equine encephalitis (EEEv) detections. No human or animal illnesses reported. First frost continues to arrive few weeks later than normal, so surveillance trapping continues later each year. Winter 2023-24 will be our first El Niño since 2019, which could mean increased precipitation in the Northeast. This report is based on data collected from CO_2-baited CDC traps, resting boxes, gravid traps, ovitraps and BG Sentinel™ Traps. Weather data from NOAA.

Table 1. Summary of mosquito sampling, collections and positive arbovirus samples for 2023 season compared to 5-year average.

		2018	2019	2020	2021	2022	2023	5-year average	5-year change
Samples Tested	Bristol MCP	508	524	461	499	337	497	466	6.7%
	MA DPH	357	510	188	270	115	410	288	42.4%
	Total	865	1,034	649	769	452	907	754	20.3%
Mosquitoes tested	Bristol MCP	13,701	13,894	13,884	15,865	8,560	14,763	13,181	12.0%
	MA DPH	13,259	20,966	6,297	9,474	3,636	16,401	10,726	52.9%
	Total	26,960	34,860	20,181	25,339	12,196	31,164	23,907	30.4%
Mosquitoes not tested	Bristol MCP	22,369	36,931	20,992	58,056	12,498	37,390	30,169	23.9%
	MA DPH	9,417	53,051	11,205	23,640	6,335	14,477	20,730	-30.2%
	Total	31,786	89,982	32,197	81,696	18,833	51,867	50,899	1.9%
Total population	Bristol MCP	36,070	50,825	34,876	73,921	21,058	52,153	43,350	20.3%
	MA DPH	22,676	74,017	17,502	33,114	9,971	30,878	31,456	-1.8%
	Total	58,746	124,842	52,378	107,035	31,029	83,031	74,806	11.0%
Positive samples	West Nile Virus	62	16	12	16	6	22	22	-1.8%
	Eastern Equine	0	158	0	0	0	6	32	-81.0%
Trap events	Bristol MCP	614	682	597	615	651	666	632	5.4%
Service requests		10,444	12,550	12,857	8,416	7,334	5,841	10,320	-43%

Mosquito activity/trends for the 2023 Season

Bristol had normal rainfall through June 2023 and there were plenty of *Cs. melanura* and *Cq. perturbans* mosquito larvae in our monitored habitats before the spring larvicide. For several years now, the spring *Aedes* species have not occurred in their typical large numbers. *Cs. melanura* appeared early and in abundance, although the total population remained below average until near August (Figure 1) and finished the year about 20% higher than recent normal (Table 1).

2023 was a record year for the EEEv vector species *Cs. melanura* with populations 2x higher than normal (Figure 2). About halfway through the season they were showing up in every trap type and every town across the county, something I haven't seen since 2019. High precipitation and population in the fall of 2023 will likely boost the *Cs. melanura* in the 2024 season.

Typical for recent years, the EEEv vector species *Cx. salinarius* has emerged in large numbers in early August. This species is not very drought-tolerant and responds quickly when conditions are right.

Our primary WNv vector *Cx. pipiens/restuans* were just about normal, which is unusual given the high precipitation in late summer. This might indicate success in our catch basin larvicide program.

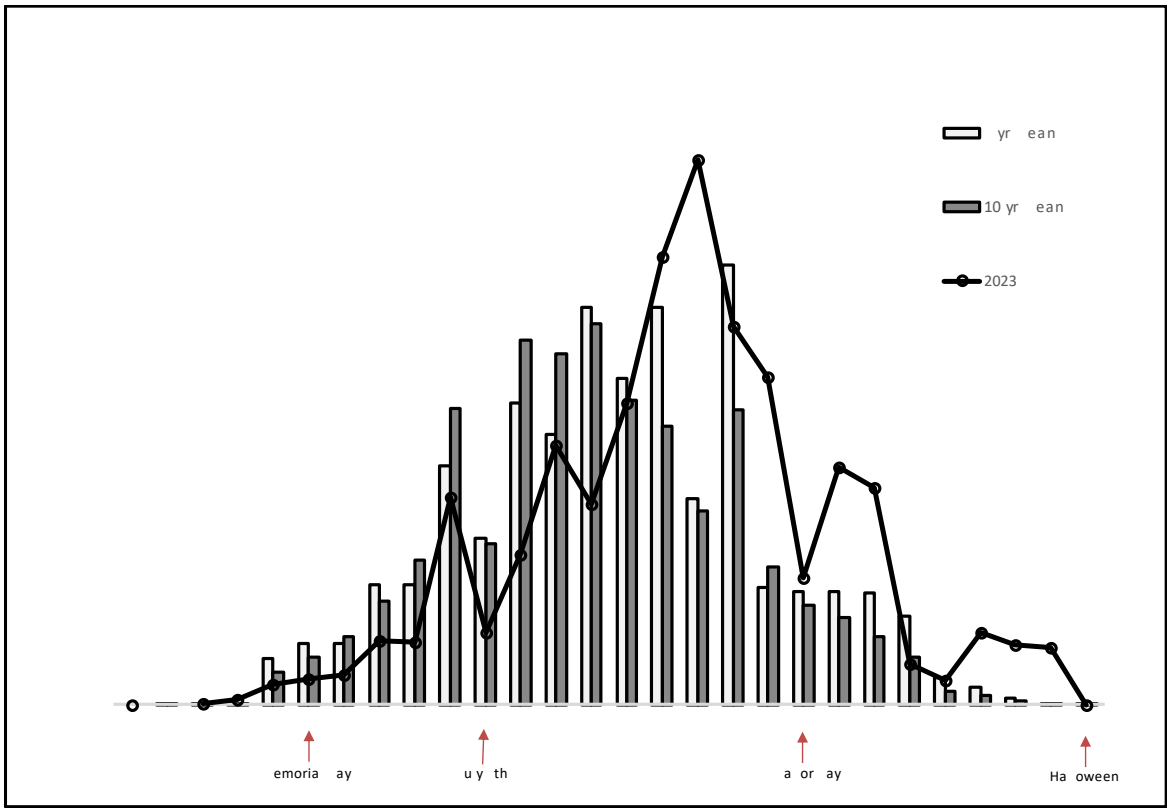

Figure 1. 2023 population totals per trap-night by epi week compared to 5- and 10-year average. The population dip at week 27 is an artifact of reduced trapping due to the July 4th holiday week.

The cattail mosquito, *Cq. perturbans,* has been responding to aerial larvicide and is down about half of typical populations. Usually appearing in large numbers around July 4th and dwindling for the rest of the year. Unusually for the species, this year they were mostly gone by mid-August (Figure 12).

Spring *Aedes* spp. were unusually quiet this year, compared to the numbers we should see during normal precipitation years. *Aedes canadensis* and *Ae. vexans* showed up in large numbers with the mid-summer increase in rainfall.

Although our mosquitoes do not seem to be hatching any earlier in the spring, we continue to see the mosquito season lasting much longer each year. This year's fall population was on par with the early summer population (Figure 1). This pattern could hold up as the climate warms.

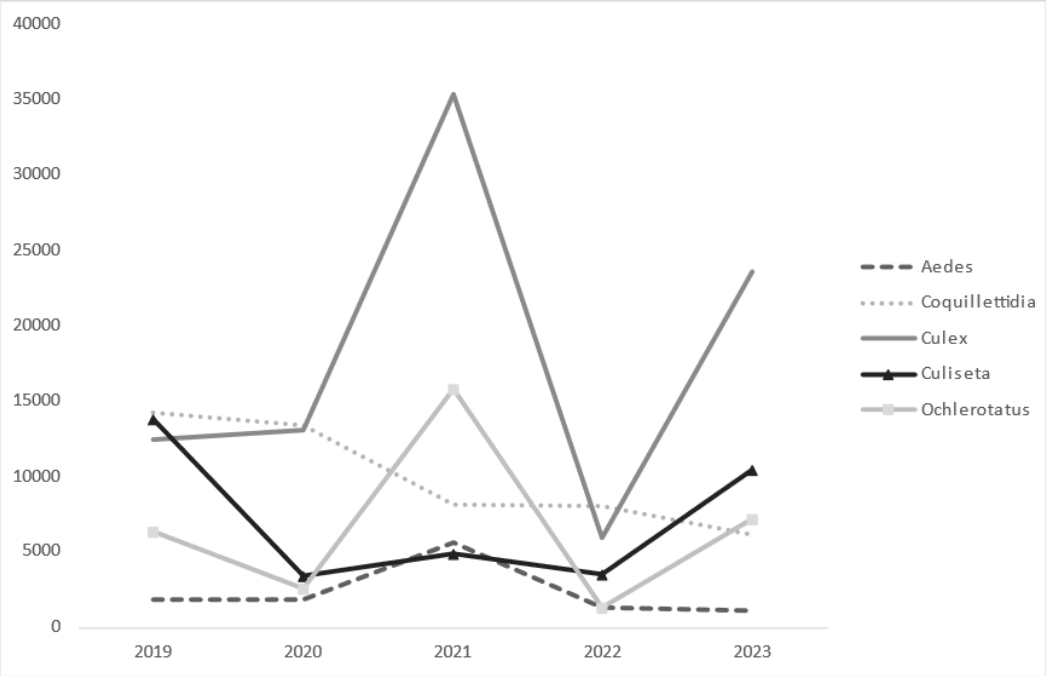

Figure 2. Total number of observed mosquitoes by genus captured by BCMCP and MA DPH in Bristol County, MA 2019 to 2023.

Annual weather

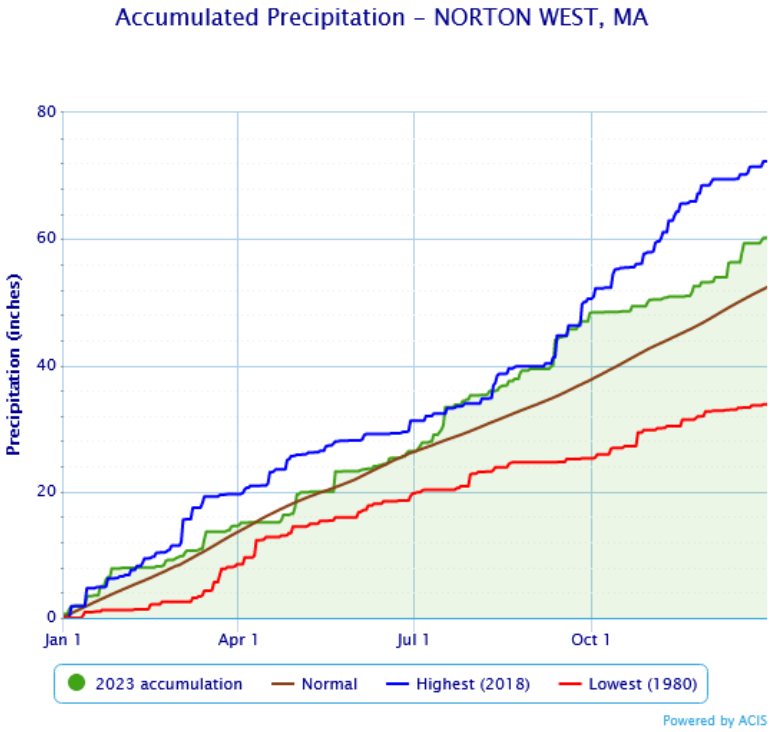

Figure 3. NOAA Annual Precipitation graph for Norton ASOS. Retrieved 1/4/24

Starting with an unusually mild winter with average precipitation, spring came a little early and crews were able to start larviciding a week or so early. There were no weather impacts on our aerial applications.

Bristol County finished the year with an average of 54.84 inches of precipitation, 6+ inches above the 10-year average (Table 2). Figure 3 shows the typical precipitation pattern for the county this year, we only experienced drier than normal conditions for a few short weeks and no droughts in our area were declared, precipitation was ~19% higher than 2022. Our average temperature was 0.9°F above the 10 -year norm, with most of the above average heat distributed throughout the year. First frost has been moving a little later in the year, this year had above seasonal temperatures right up to the first frost on 11/1/23. Last winter was the third year of the La Niña cycle, which was unusually persistent. This switched to a strong El Niño in June. Some of the effects of El Niño phases in the Northeast are higher average temperatures and higher precipitation. This indicates an active year for *Cs. melanura*, and with the EEEv detections in late 2023, this is not a good thing.

Table 2. Bristol County area average temperature, precipitation totals in inches and deviation from normal as of 1/4/2024 (NOAA 2024). *This year's data substitutes the Norton weather station for the usua Taunton data as that station was offline until March 2023.

	New Bedford	*Providence*	*Norton**	*Area average*
Precipitation total (in)	46.66	57.66	60.21	54.84
Deviation from normal	1.81%	21.62%	15.04%	12.82%
Change in inches	0.83	10.25	7.87	6.32
Change from previous year	1.81%	24.94%	30.47%	19.07%
Temperature average (°F)	52.5	53	51.6	52.37
Deviation from normal	1.74%	0.57%	2.99%	1.77%
Change from previous year (°F)	+0.9	+0.3	+1.5	+0.9

Arbovirus activity, summer 2023

Based on low precipitation in late 2022, my expectation was that we would not see any Eastern equine encephalitis virus (EEEv) activity in the county. I was wrong.

We had five detections of EEEv in Bristol County this year in both *Cs. melanura* and *Cx. salinarius.* No human or animal cases were reported. End of year risk levels for EEEv can be found in Figure 4.

Overall, the WNV detected in Bristol County was about 10% lower than the 5-year average (Table 1), with no human cases reported in the county. WNV activity occurred in low levels throughout Bristol (Table 3). All infected mosquitoes were *Ae. canadensis, Cx. pipiens/restuans*, Cx *salinarius, Cq. perturbans* or *Cs. melanura*.

Table 3. Towns and number of West Nile virus (WNV) and Eastern equine encephalitis (EEE) positive samples in 2023.

Town	*WNV positives*	*EEE positives*
Berkley	**3**	
Easton	**6**	**2**
Fall River	**1**	
Freetown	**2**	

Mansfield	**1**	
Norton	**1**	
Raynham	**7**	**3**
Rehoboth		**1**
Westport	**1**	
Total	***22***	***6***

At the end of the 2023 surveillance season, 5 cities or towns in Bristol County were reported by MA DPH to be at Moderate risk for EEEv (Figure 4) and 15 in a Moderate risk category for WNV (Figure 5).

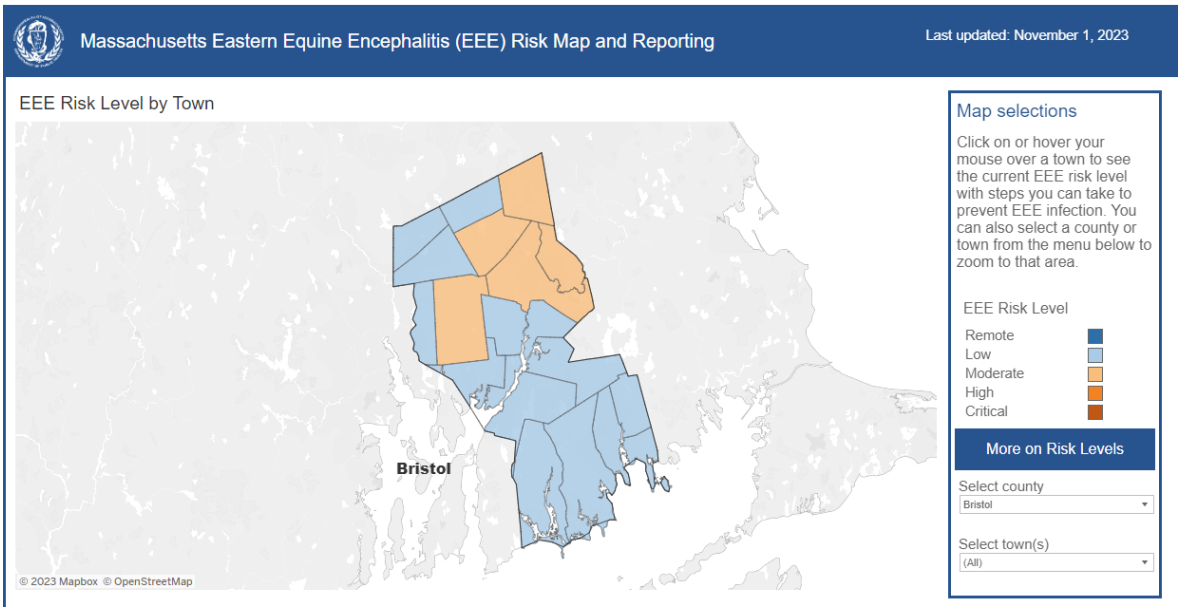

Figure 4. Massachusetts Dept. of Public Health Eastern Equine Encephalitis virus risk map for the end of the 2023 season. https://www.mass.gov/info-details/massachusetts-arbovirus-update. Retrieved 11/16/2023.

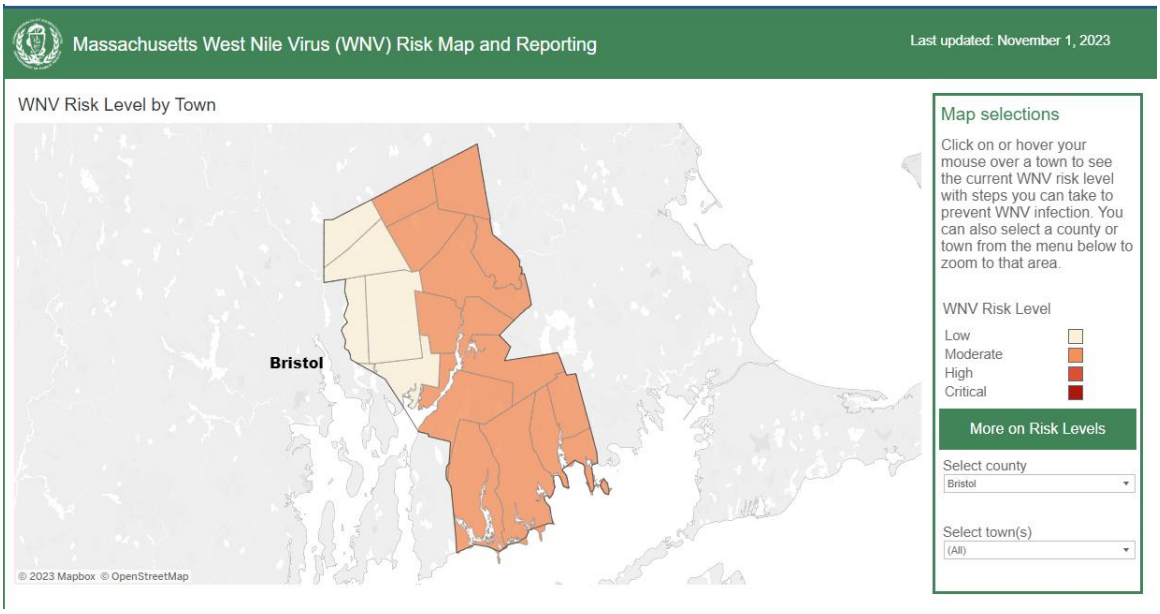

Figure 5. Massachusetts Dept. of Public Health West Nile virus risk map for the end of the 2023 season. https://www.mass.gov/info-details/massachusetts-arbovirus-update. Retrieved 11/16/23

Aerial larvicides, spring 2023

We planned for three separate aerial larvicide events and conducted three in spring 2023. Two were liquid Bti applications over large areas of mixed coniferous and hardwood swamps, the third was a small-scale pelletized *Bacillus sphaericus* (Bs) application over a small cattail swamp to control *Coquillettidia perturbans*, an important vector in Eastern Equine Encephalitis virus (EEEV) outbreaks.

The 2023 aerial Bti larvicide event in the Hockomock area was completed on 4/13/23. Plymouth County MCP aircraft deposited 292 gallons of VectoBac 12AS liquid larvicide, applied at a rate of 1.00 pint per acre over 2337 acres. In the Bolton Swamp, the larvicide took place on 4/14/23, covering 409 acres at 1.00 pint per acre using 51 gallons of VectoBac 12AS. Maps of the locations are in Figures 7 and 9. Total amount of VectoBac 12AS deposited in Bristol was 343 gallons over 2746 acres.

Table 4- Results of aerial larvicide at three areas in Bristol, April 2023

Swamp complex	Season	Location	Abbot's	Henderson-Tilton	t-Test (P<0.05)
Hockomock	***Spring***	Dead West 1- Control	-199.0	-694.1	0.91
		Dead West 2- Control			0.80
		Hockomock 1			0.03
		Hockomock 2			0.00
		Hockomock 3			0.00
		Hockomock 4			0.01
Bolton	***Spring***	Control- Bolton 1	-184.94	-1031.1	0.34
		Control- Bolton 2			0.96
		Bolton 3			0.02
		Bolton 4			0.02
		Bolton 5			0.03
		Bolton 6			0.07
Foundry Street/Hockomock	**Spring**	Maple- Control	-74.00	-474.00	0.01
		Foundry- Treatment			

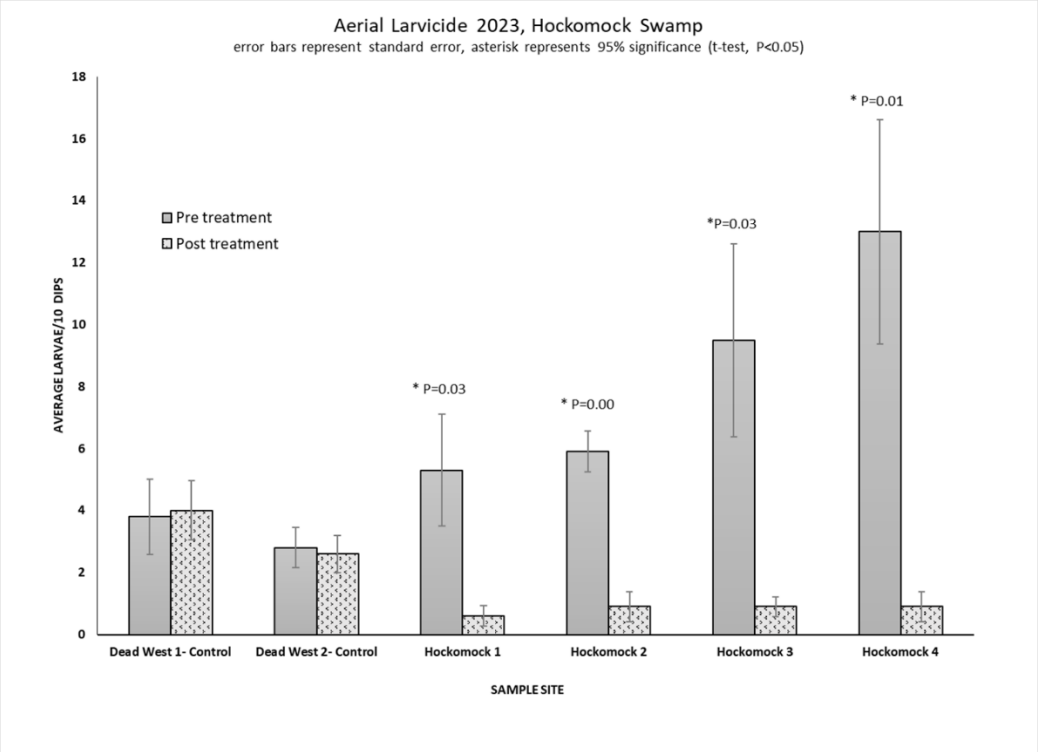

Figure 6. Pre- and post-treatment larval populations in the Hockomock and Dead Swamps April 2023.

Error bars represent standard error.

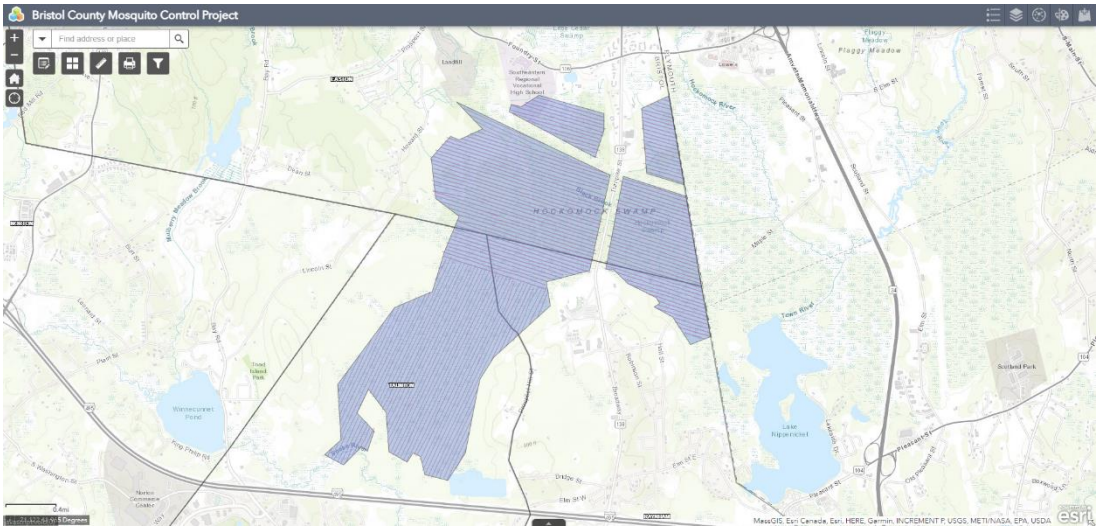

Figure 7. ArcGIS map of aerial Bti treated areas in Hockomock Swamp, April 2023.

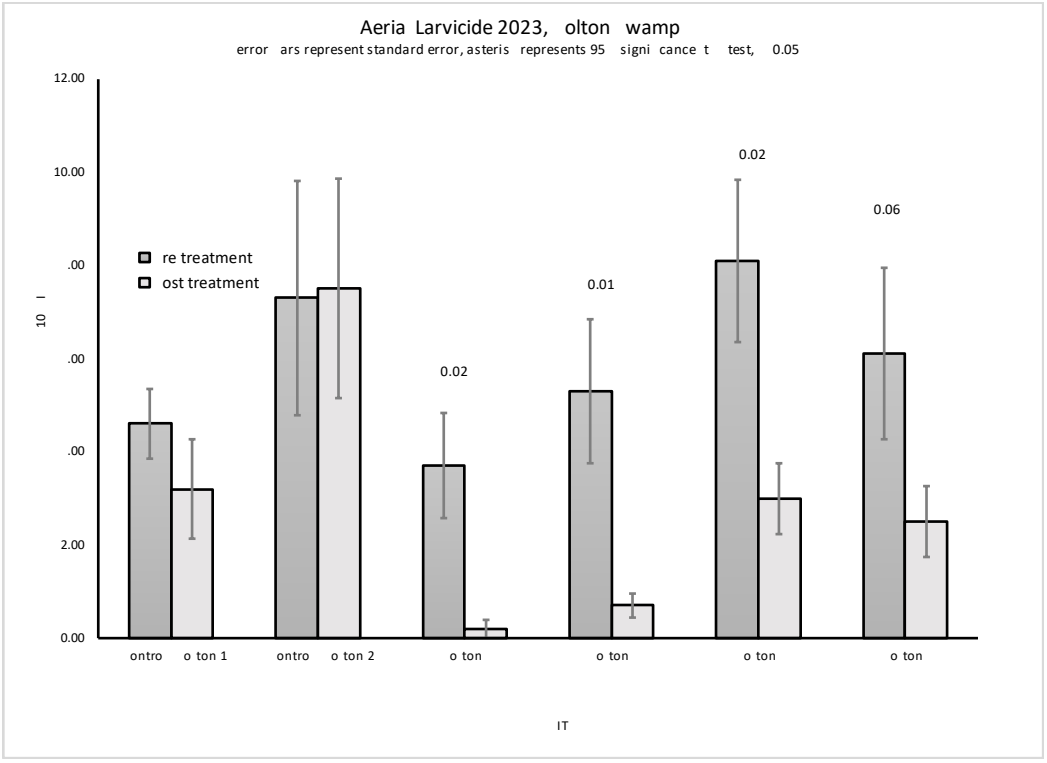

Figure 8. Pre- and post-treatment larval populations in the Bolton Swamp, April 2023. Error bars represent standard error, asterisks denote statistical significance (t-test, P<0.05).

Coquillettidia perturbans is commonly found to be a bridge vector of EEEv in Southeastern MA and are a source of concern for public health. Typically, *Cq. perturbans* emerge in large numbers

around the first of July, a perfect time to contribute to the spread of EEEv. Because *Cq. perturbans* has a larval stage that attach to the roots of emergent aquatic vegetation such as cattails, they are difficult to control with larvicide. Additionally, the dependence on emergent vegetation limits the habitat of larval *Cq. perturbans* to known areas with an abundance of the right habitat. Roughly 48% of all *Cq. perturbans* caught in Bristol County each year come from a single cattail marsh of about 29.5 acres.

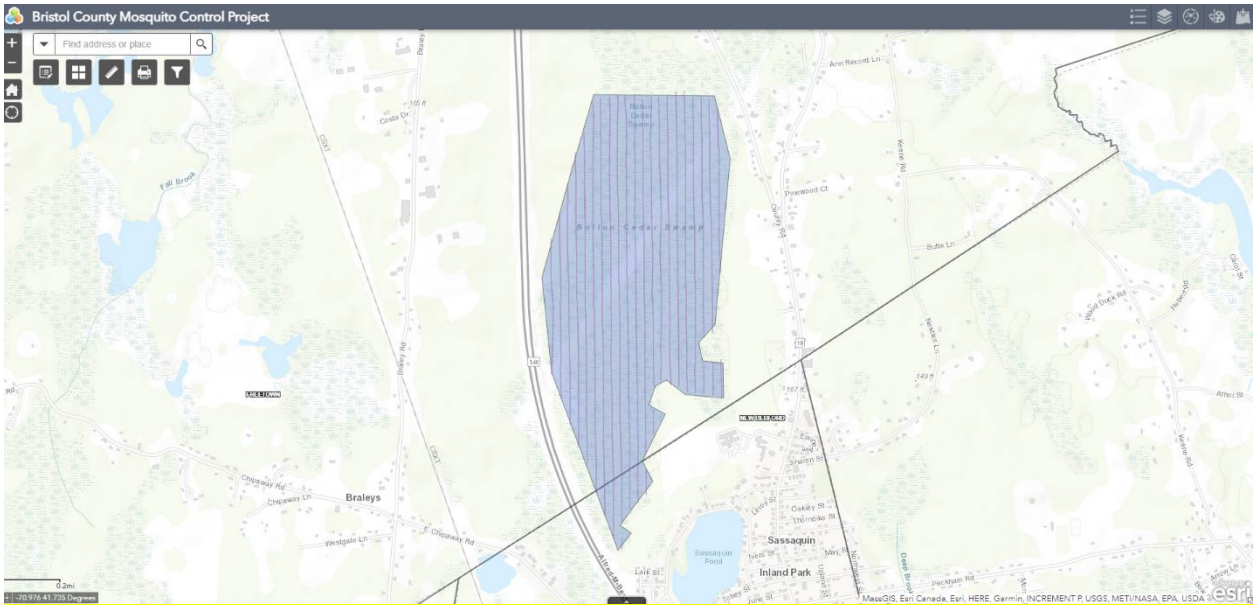

Figure 9. ArcGIS map of aerial Bti treated areas in Bolton Swamp, April 2023.

Past work in Minnesota and Norfolk County, MA suggests that an application of a larvicide with a biorational *Bacillus sphaericus* (Bs) active ingredient is capable of penetrating wetland soil and controlling *Cq. perturbans* larvae. These studies led us to use a granular formulation of Bs (VectoLex FG) to our problem cattail marsh in Easton since 2021. The resulting decrease in *Cq. perturbans* population we have seen in subsequent seasons has led us to duplicate this effort in 2023. BCMCP hired North Fork viation's helicopter to deposit VectoLex FG over 26.91 acres at a rate of 15 lbs. per acre on 4/21/2023 (Figure 10).

Pre- and post-treatment sampling of each area showed decreases in larval abundance at all sites according to A ott's and Henderson-Tilton tests. Statistically significant ($P<0.10$) population

reduction was found in all treatment areas. Data from all pre- and post-larval dipping can be found in Table 4 and Figures 6 through 12.

Figure 10. ArcGIS map of aerial *Bacillus sphaericus* (BS) treated areas in Foundry Street Swamp, May 2023.

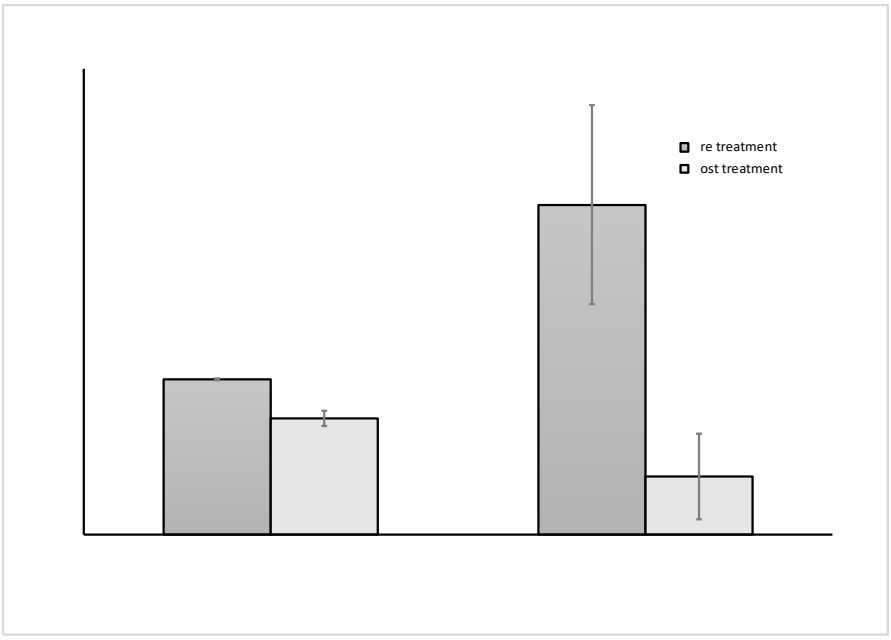

Figure 11. Pre- and post-treatment larval populations in the Foundry Street Swamp, May 2023. Error bars represent standard error.

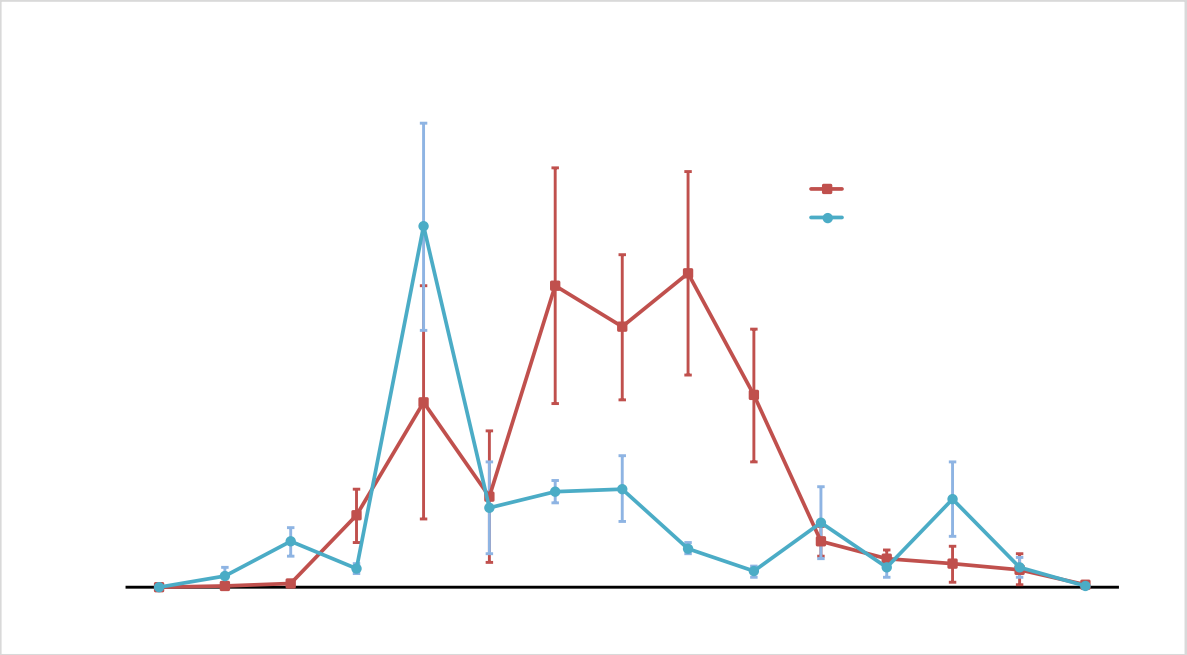

Figure 12. Difference in adult *Cq. perturbans* population at Foundry St., Easton. Historical data vs. post treatment data.

Asian tiger mosquito (ATM) surveillance and treatment

Bristol County MCP continued monitoring the most southern and western 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 routine monitoring of areas with historical population data. Larvicide treatments were conducted on a 3-week schedule at the two major infestations, the tire facilities along the waterfront as well as larvicidal treatments in other areas as detections warranted.

BCMCP set 148 ovitraps over the 20-week season across the South Coast in potential *Ae. albopictus* habitat. 33 ovitrap papers from BCMCP were collected and sent to M H's Hinton State Lab and 68 kept in house for raising under controlled conditions. Ovitrap papers are attractive egg deposition sites not only for *Ae. albopictus,* but *Ae. japonicus* and *Ae. triseriatus* as well.

Of 101 papers found with presence of mosquito eggs, 26 had viable *Ae. albopictus* eggs. These traps included repeat detections in Attleboro, Fall River and Seekonk. In most cases, detections of viable eggs from ovitraps are followed up with BG Sentinel™ trap efforts. Adults were found in Attleboro, New Bedford, Fairhaven, and Dartmouth as expected and new detections were found in Seekonk on the Rhode Island state line and near a tire pile in Somerset. We will continue to monitor all of these sites in 2024.

Routine BG trap surveillance in New Bedford continues to point 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 13 has been averaged by trap-night to correct for the increased trapping effort that BCMCP has undertaken.

Recently, the USDA has determined that most of Bristol County has moved up one zone on their Plant Hardiness scale (figure 14). This is the result of continued climate change and reflects the length of the growing season. What is most interesting to me in this new map is the degree to which the range of *Ae. albopictus* overlaps with the change from Zone 6B to Zone 7A in southern and western Bristol.

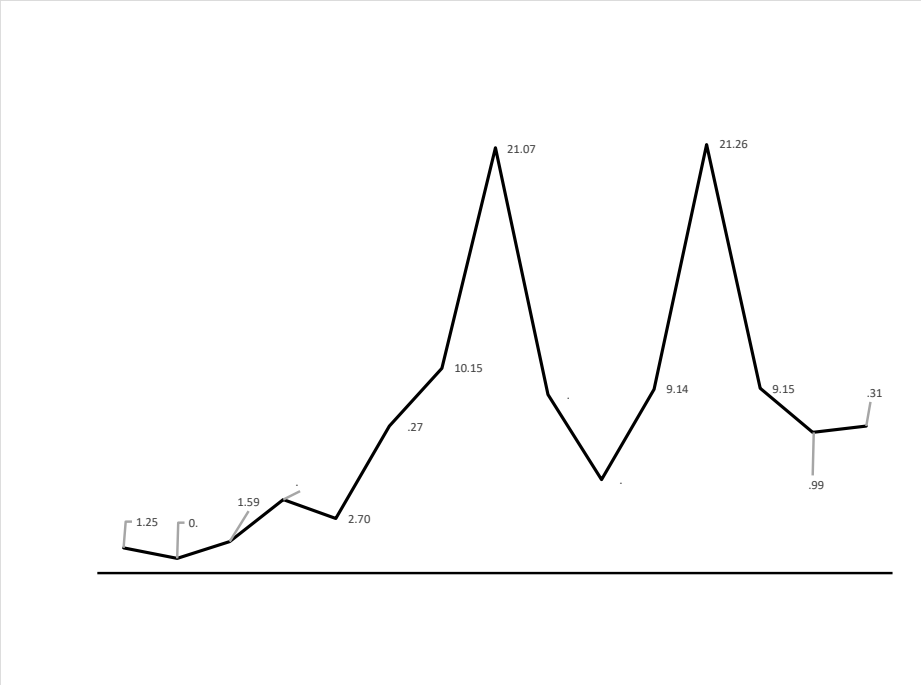

Figure 13. Historical population for Asian tiger mosquitoes in BG Sentinel traps in New Bedford, 2009-2023.

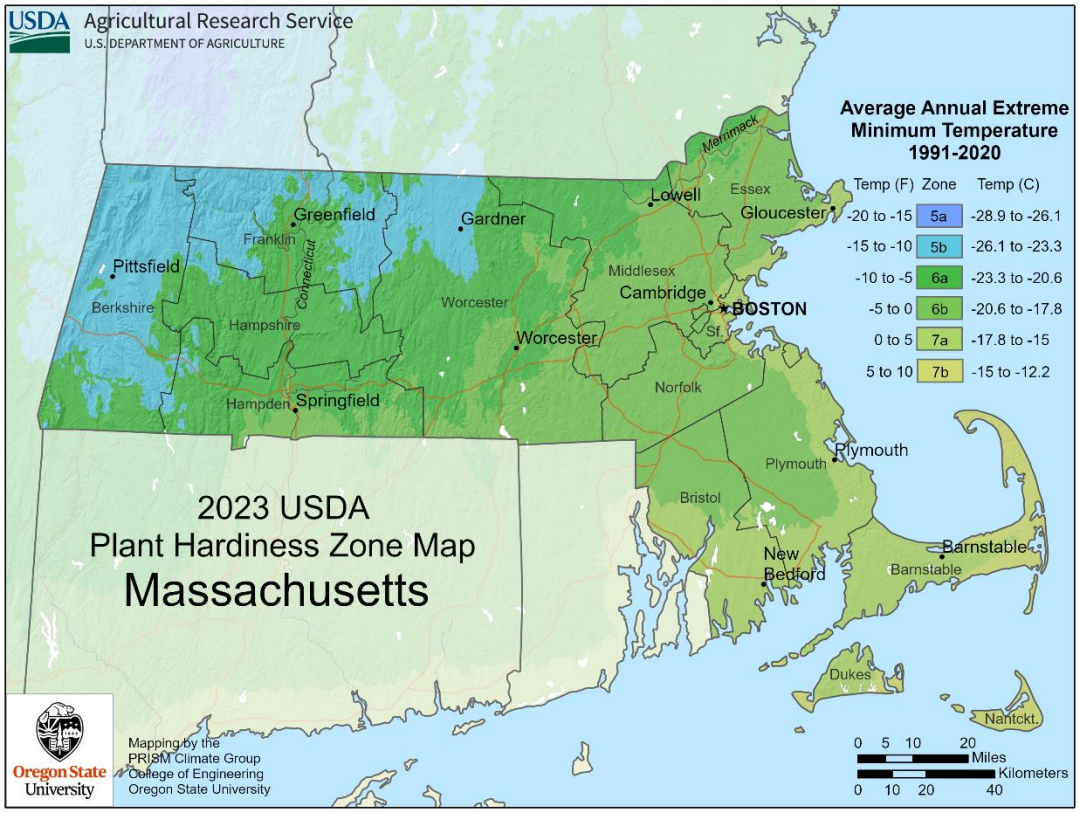

Figure 14. 2023 update to the USDA Plant Hardiness zone map (https://prism.oregonstate.edu/ accessed 11/16/23).

Tire Removal Program

Bristol MCP larvicide crews removed 107 stray and abandoned tires from Bristol County wetlands in 2023. This is the largest number of tires removed from the environment for any year since the program began in 2019. All tires were disposed of properly.

Requests for service

Bristol County MCP received 5,841 calls for service in 2023. Call numbers were 20% lower than the previous year and 43% lower than the 5-year average (Table 1). 99.6% 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 8/28/23 and stopped ULV spray activities as of 9/8/23, larviciding of *Ae. albopictus* hot spots ended 10/16.

ol Project's O

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 step to combat virus transmission.

We were able to do eight in-person presentations and information tables, with an estimated reach of over 300 people. Priscilla was interviewed for television, and we do not know the exact number of viewers.

Coordination between BCMCP and the local Boards of Health was ongoing relative to control/surveillance options in the vicinity of arbovirus positive mosquito samples and high mosquito collections. Even though Labor Day is the unofficial end of summer, BCMCP continued to alert the public that the seasonality of mosquito borne disease continues until the first frost in fall. 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.

Project Name: Bristol County Mosquito Control Project
FY2024 Proposed Cherry Sheet Assessments Estimates
Based on the preliminary proposed Project budget
(2024 Equalized Valuations)

Name of Municipality	% of Total Budget	Project Share Amount*	State Reclamation Mosquito Control Board Share Amount*	Total Assessment Estimate*
ACUSHNET	2.61%	$46,156	$1,967	48,123
ATTLEBORO	6.05%	$106,727	$4,547	111,274
BERKLEY	2.18%	$37,349	$1,591	38,940
DARTMOUTH	10.11%	$168,655	$7,186	175,841
DIGHTON	2.79%	$48,843	$2,081	50,924
EASTON	5.26%	$91,611	$3,903	95,514
FAIRHAVEN	2.87%	$50,266	$2,142	52,408
FALL RIVER	7.73%	$132,579	$5,649	138,228
FREETOWN	4.36%	$76,260	$3,249	79,509
MANSFIELD	4.73%	$83,162	$3,543	86,705
NEW BEDFORD	6.84%	$118,180	$5,035	123,215
NORTH ATTLEBORO	4.83%	$80,435	$3,427	83,862
NORTON	4.49%	$78,584	$3,348	81,932
RAYNHAM	3.50%	$61,236	$2,609	63,845
REHOBOTH	5.63%	$97,800	$4,167	101,967
SEEKONK	3.48%	$60,275	$2,568	62,843
SOMERSET	3.04%	$43,230	$1,842	45,072
SWANSEA	3.79%	$65,379	$2,786	68,165
TAUNTON	8.49%	$152,068	$6,479	158,547
WESTPORT	7.22%	$124,160	$5,290	129,450
		$1,722,955	$73,409	$1,796,364

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

(2024 Equalized Valuations)

(Updated: 3/10/22)