MASSACHUSETTS MOSQUITO CONTROL
ANNUAL OPERATIONS REPORT

2011 Year of Report Date of Report: January 13, 2012

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

Address: 140 North Walker Street

City/Town: Taunton Zip: 02780

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

E-mail: brismosqmt@comcast.net, for spray requests only-

requestbristolmcp@comcast.net

Report prepared by: ***Priscilla Matton, M.Sc., Wayne Andrews, M.Sc., & Stephen Burns, B.A.***

If you have a mission statement, please include it here: 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:

Please list your Commissioner's names:

Arthur F. Tobin- Chairman
Gregory D. Dorrance
Christine A. Fagan
Joseph Barile
Robert F. Davis

Please list the Supt./Director's name: Wayne N. Andrews, M.Sc.
Please list the Supt./Director's contact phone number: 508-823-5253

Please list your Asst. Supt./Asst. Director's name: Stephen Burns, B.A.

Do you have a website? No

If yes, please list the web address here: http://

Please list your staffing levels for the year of this report:

Full time: 9
Part time:
Seasonal: 2
Other: (please describe)

Please break these down into the following areas:

Administrative staff: 1.5
Field staff: 7.5

Please check off all that apply, and list employee name(s) next to each category:
☒ Public relations Wayne Andrews, Priscilla Matton
☒ Information technology Priscilla Matton, Wayne Andrews
☒ Entomologist Priscilla Matton, Wayne Andrews
☒ Wetland Scientist Priscilla Matton
☒ Biologist Wayne Andrews, Priscilla Matton
☒ Education Priscilla Matton, Wayne Andrews
☒ Laboratory Wayne Andrews, Priscilla Matton
☒ Operations Stephen Burns
☒ Facilities Stephen Burns
☒ Other (please list) GIS- Priscilla Matton; Administrative Assistant- Barbara Johnson; Twitter account- Priscilla Matton, Wayne Andrews

For the year of this report, we maintained:
11 vehicles
2 modified wetland equipment (list type) (2) low ground pressure excavators, (1) low ground pressure mower, (1) Truck and trailer to transport , (1) Bulldozer, (1) Brushcutter attachment
11 ULV sprayers (list type) (4) London Fog (GPS), (1) Curtis DynaJet (GPS), (2) Guardian (GPS), (4) Beecomist
Larval control equipment (list type)
Other (please be specific):

Comments: _____

How many cities & towns in your service area? 20

Please list: North Attleborough, Attleboro, Seekonk, Rehoboth, Mansfield, Norton, Dighton, Somerset, Swansea, Easton, Taunton, Raynham, Berkley, Freetown, Fall River, Westport, Dartmouth, New Bedford, Acushnet, Fairhaven

***Please attach a link to a map of your service area if possible. Attached**

INTEGRATED PEST MANAGEMENT (IPM):

DEFINITION: a comprehensive strategy of pest control whose major objective is to achieve desired levels of pest control in an environmentally responsible manner by combining multiple pest control measures to reduce the need for reliance on chemical pesticides; more specifically, a combination of pest controls which addresses conditions that support pests and may include, but is not limited to, the use of monitoring techniques to determine immediate and ongoing need for pest control, increased sanitation, physical barrier methods, the use of natural pest enemies and a judicious use of lowest risk pesticides when necessary.

Please check off all of the services that you currently provide to your member cities and towns as part of your IPM program; details of these services are in the next sections.

☒ **Larval mosquito control**
☒ **Adult mosquito control**
☒ **Source reduction**
☒ **Ditch maintenance**
☒ **Open Marsh Water Management**
☒ **Adult mosquito surveillance**
☒ **Education, Outreach & Public education**
☒ **Research**
☒ **Other (please list): GIS and Mapping**

Comments: _____

LARVAL MOSQUITO CONTROL:

Do you have a larval mosquito suppression program? Yes

If yes, please describe the purpose of this program: To reduce the emergence of adult mosquitoes in areas where larval mosquitoes are present, using biorational techniques. This includes applications to catch basins and storm water structures, primarily to control Culex mosquitoes, a vector of WNV in the area. A database of mosquito larval development sites are checked, treated as necessary, and recorded for historical information.

Please give the time frame for this program: See Timeline at the end of the document

Describe the areas that this program is used: Throughout Bristol County in wetlands, salt marshes, catch basins, storm water structures, containers, tires, and any other areas holding water.

Do you use:
☒ **Ground applied (includes hand, portable and/or backpack)**
☐ **Helicopter applications**
☐ **Other (please list):**
Comments: _____

What products do you use in – (please use product name and EPA#)

Wetlands: Vectobac G #73049-10
Catch basins: VectoLex WSP #73049-20
Containers: VectoLex WSP #73049-20
Other (please list):

Please list the rates of application for the areas listed above:

Wetlands: 2.5 lbs/acre
Catch basins: 1 pouch per catch basin
Containers: 1 pouch per 50 sq ft
Other:

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

☒ Larval dip counts – please list trigger for application: 1+ per 5 dips
☒ Historical records
☒ Best professional judgment

Comments: All of the approximately 2,000 larval monitoring sites have GPS coordinates and are mapped for use in the truck computers. Some mosquitoes, like Cq. perturbans are difficult to sample and applicators use other indicators when making applications.

***Please attach a link to maps of treatment areas if possible. Attached**

ADULT MOSQUITO CONTROL:

Do you have an adult mosquito suppression program? Yes

If yes, please describe the purpose of this program: Vector Control 95%; Nusiance 5% Each year Bristol County experiences both West Nile virus and Eastern Equine Encephalitis throughout its 20 cities and towns.

Please give the time frame for this program: See Timeline at the end of the document

Describe the areas that this program is used: Area wide and targeted adulticide throughout the 20 cities and towns.

Do you use:
☒ **Truck applications**
☐ **Portable applications**
☐ **Aerial applications**
☐ **Other (please list):**
Comments: _____

Please list the names of the products used with EPA #:
1). Anvil 10+10 ULV, EPA Reg # 1021-1688-8329
2).
3).
4).
5).
6).

Please list your application rates for each product:
1). 0.21fluid oz per acre - 0.62 fluid oz per acre
2).
3).
4).
5).
6).

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

The application rate would be dependent upon vector control activities, physical characteristics of the area and/or environmental issues. Anvil 10+10 is only applied every other day in the same area per label directions.

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

☐ Landing rates - please list trigger for application
☒ Light trap data - please list trigger for application 5 per trap
☒ Complaint calls - please list trigger for application 2 per square mile
☒ Arbovirus data
☒ Best professional judgment

Comments: The Project received 14,323 adulticiding spray request in 2011, 17,508 in 2010 and 15,964 in 2009.

***Please attach a link to maps of treatment areas if possible. Please see attached**

SOURCE REDUCTION

Do you perform source reduction methods such as tire/container removal? Yes

If yes, please describe your program: Containers and tire removal from problem areas, sometimes in conjuction with town programs. Property inspections are an important component in source reduction. Educate home and business owners how to reduce and remove standing water on their property conducive to larval habitat.

What time frame during the year is this method employed? See Timeline at the end of the document

Comments: Source reduction is an important component of an IPM plan, however source reduction does not equal permenant control.

DITCH MAINTENANCE

Do you have a ditch maintenance program? Yes

Please check all that apply:
☒ Inland/freshwater
☒ Saltmarsh

If yes, please describe: Our goal is to remove debris, silt and vegetation from drainage ditches throughout our service area, to improve water flow through the areas. This includes both hand and mechanized work. Proper water flow will eliminate standing water conducive to larval mosquito development.

Please check off all that apply INLAND DITCH MAINTENANCE:

☒ **Hand tools**
☒ **Mechanized equipment**
☒ **Other (please list): Erosion Control Materials**
Comments: The Project has contiuned to implement the use of environmentally sensitive silt and erosion control materials to stabilizes soils disturbed by our operations. This includes but not limited to: straw and coconut blankets, straw bales, jute mats, conservation seed and sedi-stop rolls within the waterway.

Please check off all that apply SALTMARSH DITCH MAINTENANCE:

☒ **Hand cleaning**
☒ **Mechanized cleaning**
☒ **Other (please list): Erosion Control Materials**
Comments: The Project has contiuned to implement the use of environmentally sensitive silt and erosion control materials to stabilizes soils disturbed by our operations. This includes but not limited to: straw and coconut blankets, straw bales, jute mats, conservation seed and sedi-stop rolls within the waterway.

Please give an estimate of cumulative length of ditches maintained from the list above **INLAND**:

Hand cleaning 44,078 feet
Mechanized cleaning 5,540 feet
Other (please list): Brush cut- 26,977 feet and mechanized brush mowed- 3.5 acres

Comments: _____

Please give an estimate of cumulative length of ditches maintained from the list above **SALTMARSH**:

Hand cleaning 5,070 feet
Mechanized cleaning 3,385 feet
Other (please list): Brush cut- 1,680 feet and mechanized brush mowed- 3 acres

What time frame during the year is this method employed? See Timeline at the end of the document

Comments: Bristol County Mosquito Control Project completed 23 mechanized ditch maintenance projects within our member communities. We have created a Best Management Practice document to better explain how and why we perform water management. We work closely with the member towns to find sites that will benefit the communities. MA MCDs wetlands coordinators meet regularly to discuss issues and techniques used in our water management projects.

***Please attach a link to maps of ditch maintenance areas if possible.**

MONITORING (Measures of Efficacy)

Please describe monitoring efforts for each of the following:

Aerial Larvicide – wetlands: **We do not conduct aerial larvicide applications in Bristol County.**

Larvicide – catch basins: **Same as for hand/small area larviciding.**

Larvicide-hand/small area **Larvicide monitoring is done at approximately 10% of treatment locations. Before and after an application, a standard issue white 350 ml "dipper" is used to dip for immature mosquitoes. A dip is typically one smooth motion into the water / submerged vegetation and out keeping the dipper level upon exiting so that the sample does not spill. If there is no available water to sample at the site it is considered dry. The observer specifically notes dip samples that contain mosquito pupae. The observer will count and may indicate developmental stages of the larvae (instar – 1st, 2nd, 3rd, or 4th) or indicate "pupae". The observer may indicate condition of the sample i.e., live, moribund or dead as applicable.**

Ground ULV Adulticide: **The Project places mosquito traps in locations where an application will take place, to check if the pesticide is coming into contact with the mosquitoes. When the trap is collected, the number of dead or dying mosquitoes are noted on the collection form. We conduct pre and post traps collections in certain ecological areas to assess efficacy.**

Source Reduction: **Massachusetts Best Management Practices and Guidance for Freshwater Mosquito Control document is attached. On water management projects, 100% of the locations are monitored for efficacy. At approximately 10% of our source reduction locations, the Project applicators will return to a site to look for temporary and permenant containers that have returned.**

Open Marsh Water Management: **Please see the May 2010 OMWM Standards attached to the 2010 Annual report.**

Other (please list): **Please see the SRMCB Massachusetts Mosquito Control Surveillance Protocol for Evaluation of Efficacy of Aerial Adulticide Application(s) Regarding Mosquito-Borne Disease attached to the 2010 Annual report.**

Provide or list standard steps, criterion, or protocols regarding the documentation of efficacy, (pre and post data) and resistance testing (if any): **Resistance testing was conducted this season at the BCMCP office, please see the attached Bottle Bio-assay protocol and results.**

OPEN MARSH WATER MANAGEMENT

Do you have an OMWM program? Yes

If yes, please describe: No projects were completed in 2011. However the goal of the program is to create greater access for mosquito-eating fish to areas on the marsh that support mosquito larval development.

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

What time frame during the year is this method employed? See Timeline at the end of the document. Activities may take place based on time restrictions for endangered species or other environmental factors.

Comments: Participatied with MA Coastal Zone Management and other MCDs with OMWM programs along with many other state agencies to establish new standards. Please see the OMWM standards attached to the 2010 Annual report.

***Please attach a link to maps of OMWM areas if possible.**

ADULT MOSQUITO SURVEILLANCE

Do you have an adult mosquito surveillance program? Yes

Please list the number (not location) of MDPH traps in your service area: 10

Please check off all the types of surveillance that apply to your program:

☒ Gravid traps
☒ Resting boxes
☒ CDC light traps ☐ Canopy
☒ CDC light traps w/CO_2 ☐ Canopy
☐ ABC light traps ☐ Canopy
☐ ABC light traps w/CO_2 ☐ Canopy
☒ NJ light traps ☐ Canopy
☐ NJ light traps w/CO_2 ☐ Canopy

Other (please describe): UV light trap with and without CO2

Please describe the purpose of this program: There are two reasons to do surveillance: to monitor the mosquito population and virus levels in these mosquitoes. We work in conjunction with the MA Department of Public Health for testing of samples that are collected. This helps us monitor the EEE and WNV activity in the local mosquito populations. With this information we make pesticide applications, public outreach and water management decisions. We participated in the annual collection survey for Cs. melanura with MA DPH, to estimate the population and risk of EEE.

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

If yes, please describe how you chose these long-term sites. Originally based on EEE human cases in these areas.

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. excrucians*
☐ *Oc. fitchii*
☒ *Oc. j. japonicus*
☐ *Oc. punctor*
☒ *Oc. sollicitans*
☐ *Oc. stimulans*
☒ *Oc. taeniorhynchus*
☒ *Oc. triseriatus*
☐ *Oc. trivittatus*
☐ *Ps. ferox*
☐ *Ur. sapphirina*

☐ Other (please list):

Do you participate in the MDPH Arboviral Surveillance program? Yes

How many pools do you submit weekly on average? 25

Please check off the arboviruses found in your area in the past 5 years:

☒ West Nile Virus
☒ Eastern Equine Encephalitis
☒ Other Please list: Highlands J

Did the above listed diseases cause human or horse illnesses? Yes

Please explain: There were 2 reported EEE human cases in the town of Raynham.
In the last 10 years, BCMCP has isolated 133 and 195 positive mosquito pools for WNV and EEE respectively. We had 6 reported WNV human cases and 4 EEE human cases during the same time frame.
2008 Horse case- Freetown

At what arbovirus risk level did the year begin in your area? (If more than one please list)

WNV: New Bedford is in the Moderate-risk category. Remaining towns are in the Low-risk category.
EEE: All towns are in a Low-risk category.

At what arbovirus risk level did the year end in your area? (If more than one please list)

WNV: New Bedford is in High-risk category. Dartmouth, Freetown, Acushnet and Fairhaven are in the Moderate-risk category. Remaining towns are in the Low-risk category.

EEE: Raynham is in Critical-risk category. Easton is in High-risk category. Dighton, Taunton, Berkley, Freetown, Norton and Mansfield are in Moderate-risk category.

What time frame during the year is this method employed? See Timeline at the end of the document

Comments: A total of 336 square miles (215,134 acres) were at a Critcal/ Moderate/ High risk for EEE and WNV in 2011. This is 49% of our service area, including a very localized area that resulted in Raynham being the first in the state to be raised to Critial Risk for EEE. There were 2 human EEE cases reported in the state, both located in the town of Raynham. One case resulted in a death and the second was an out of state resident visiting the Raynham area, who has survived. The highly invasive Asian Tiger Mosquito (Aedes albopictus) was collected in New Bedford throughout 2011, including the earliest collection on June 8th. It now has been found in the same area three years in a row. Expansion has now been documented in Westport at two separate locations. Weekly reports are submitted to the State Reclamation and Mosquito Control Board and MA DPH. The 2011 end of the season report and MA DPH Mosquito-Borne Illness Risk map is attached.

***Please attach a link to maps of surveillance areas if possible. Attached**

EDUCATION, OUTREACH & PUBLIC RELATIONS

Do you have an education/public outreach program program? Yes

If yes, please describe: Numerous radio, TV, newspaper and public events. Our Twitter account is used to make brief statements to the public regarding risk, repellents, mosquito activity and upcoming events and meetings.

Please check off all that apply:

☒ School based program
☐ Website
☒ PR brochures/handouts
☒ Community events
☒ Science fairs
☒ Meeting presentations
☒ Other (please describe): Meetings at the request of organizations, Boards of Health, schools and Town/City officials. Press Releases. Twitter account-@bcmcpmosq

Please give an estimate of attendance/participants in this program: 5,000+

Please list some events you participated in for the year of this report:

American Mosquito Control Association Annual Meeting, Anaheim, CA, March 2011 (presented and attended) "Aerial application for the control of Eastern Equine Encephalitis in Massachusetts". Attached
Clarke Mosquito Training Central, MA, April 2011 for CEUs
Washington Day Conference, Washington, D.C., May 2011
Attended and presented "Aerial Spray for EEE in MA" and moderated an open discussion at the Northeastern EEE Conference in Concord, NH in May 2011
Attended and presented an EEE informational session at the request of Representative Angelo D'Emilia in Raynham with MA DPH following the EEE human case, September 2011.
Attended and presented an EEE informational session at the request of Representative Angelo D'Emilia in Plymouth with MA DPH following the EEE human case, September 2011.
Northeastern Mosquito Control Association, Carver, MA, October 2011. The day long training was arranged by staff at the Bristol County Mosquito Control Project on Spill response and safe pesticide handling presented by Taryn LaScola- MA Pesticide Bureau- MDAR
Bristol County Mosquito Control Project's Budget Meeting for cities and towns Novemeber 7, 2011.
Northeastern Mosquito Control Association Annual Meeting, Plymouth, MA, December 2011 (presented and attended) "2011 Season in Review".
Mutiple MA DPH meetings, conference calls and site visits throughout the season
Radio Talk Show with residental call in, covering several towns within our membership area.
Roadway workers protection/ On-track safety program certification allowing us to to work on/ around Mass Coastal Railroads
Beekeepers Association
Taunton High School Intership
Water Management meeting with Mosquito Control Districts and Army Corp of Engineers.
Open Marsh Water Management meeting with Coastal Zone Management and MA DEP.
Best Management Practices for Inland Freshwater Maintenance working group.
High School Science Fairs- mentor and judge
Presentation to Taunton High School's science classes about mosquitoes, diseases and management plans.
Board of Health meetings and site visits
Health Fairs in member cities and towns.

What time frame during the year is this method employed? See Timeline at the end of the document.

Have you performed any research projects, efficacy, bottle assays, etc.? Yes

If yes, please elaborate on your research projects: Bottle bio-assay testing was conducted during the 2011 season, results are attached. Aedes albopictus survey in member towns to check for new introduction and establishment.

Are you involved in any collaboration with academia, industry, environmental groups, etc.? Yes

If yes, please elaborate on your collaborations this past year: Submitted Ae. vexans to be sequenced in a nationwide population genetics study conducted by the USDA.

Please provide a list of technical reports, white/grey papers, publication in journal or trade magazines, etc. None

Does your staff participate in educational opportunities? Yes

If yes, please list the training and education your staff received this year:
Clarke Mosquito Training Central, MA, April 2011 for CEUs
American Mosquito Control Association Annual Meeting, Anaheim, CA, March 2011 (presented and attended)
Washington Day Conference, Washington, D.C., May 2011
Attended and presented "Aerial Spray for EEE in MA" and moderated an open discussion at the Northeastern EEE Conference in Concord, NH in May 2011
AMCA webinar "Advice for the public on biting pest control" July 2011
Federal EPA sponsored Clean Water Act and NPDES permit training webinar in November and December 2011
Roadway workers protection/ On-track safety program certification allowing us to to work on/ around Mass Coastal Railroads
Northeastern Mosquito Control Association, Carver, MA, October 2011. The day long training was arranged by staff at the Bristol County Mosquito Control Project on Spill response and safe pesticide handling presented by Taryn LaScola- MA Pesticide Bureau- MDAR
Northeastern Mosquito Control Association Annual Meeting, Plymouth, MA, December 2011

Please list the certifications and degrees held by your staff:
Wayne Andrews- B.S in Biology, M.Sc. in Entomology, Certified Pesticide Applicator
Stephen Burns- B.S. in Business Management, Certified Pesticide Applicator, CDL license, Hoisting Engineer license, FEMA certified, Chainsaw Certification, 2011 Annual Contractor Certification
Priscilla Matton- B.S in Zoology, M.Sc. in Entomology, Certified Pesticide Applicator
Jonathan Gibbs- Certified Pesticide Applicator, CDL license, Hoisting Engineer license, Chainsaw Certification, 2011 Annual Contractor Certification
Drew Bushee-Certified Pesticide Applicator, CDL license, Hoisting Engineer license, Chainsaw Certification, 2011 Annual Contractor Certification

John Moniz- Licensed Pesticide Applicator, CDL license, Hoisting Engineer license, Chainsaw Certification, 2011 Annual Contractor Certification
John Raposo- Licensed Pesticide Applicator, Chainsaw Certification, 2011 Annual Contractor Certification
Joshua Nickerson- Licensed Pesticide Applicator, CDL license, Hoisting Engineer license, Chainsaw Certification, 2011 Annual Contractor Certification

Comments: Participated in science fairs in member towns as judges and mentors. Provide annual Town Reports to member communities outlining the activities that have taken place within their towns. Hold monthly public commission meetings at the Project's headquaters and residents are encouraged to participate and comment.

BIOLOGICAL CONTROL EFFORTS

Do you have a biological control program? Yes

If yes, please describe: Ditch maintenance to remove blockages that restrict the movement of fish, allowing them to reach mosquito larvae.

Is this program the introduction of mosquito predators or the enhancement of habitat for native predators? Enhancement of habitat for native predators.

Please check off all that apply:

☒ Predatory fish
☒ Predatory invertebrates
☐ Other (please describe):

What time frame during the year is this method employed? See Timeline at the end of the document.

Comments: _____

INFORMATION TECHNOLOGY

Does your program use (check all that applies):

☒ Computers
☒ GIS mapping
☒ GPS equipment
☒ Computer databases
☒ Aerial Photography
☒ Other (please describe): Create maps and posters

Please describe your capabilities in these areas: Handheld and ULV based GPS for pesticide applications. MapPoint is used in the truck mounted computers to guide applicators when making pesticide applications.

Please describe your current GIS abilities: Advanced

Give details if possible on your GIS abilities: ArcMap and MapPoint are used to create maps, application locations and provide guidance. A Tremble with meter accuracy and the Pathfinder program are used to record locations.

Please describe any changes/enhancements in this area from the previous year: Field technicians learned new updates on GIS and GPS training through True North Mapping.

Comments: This was the second year our new residental spray request database was used. The system helps to streamline the time and effort need to handle the amount of calls that we receive. Also a new email address- requestbristolmcp@comcast.net was created to accept requests. The system received 2653 request in 2011, plus multiple comments and questions which then needed to be entered into the database. This is a very time consuming process. A bounceback was placed on emails confirming acceptance and explaining all other questions need to answered by the office staff. There contiunes to be a need to streamline the email request system will be continued.

REVENUES & EXPENDITURES

Please give a concise statement of revenues & expenditures for the prior fiscal year ending June 30.

See Fiscal Year Spreadsheet and corresponding cherry sheet at the end of the document.

List each **member municipality along with the corresponding (cherry sheet) funding assessment** dollar amount for the prior fiscal year.

Comments: A new State Reclamation and Mosquito Control Board policy required a public meeting with member cities and towns to discuss proposed budget requests. The Bristol County Mosquito Control Project's Budget Meeting for cities and towns was held on November 7, 2011. Meeting minutes and PowerPoint presentation made at the meeting is included in the Appendix of this document.

PESTICIDE USAGE

Please total your pesticide usage with information from your Mass. Pesticide Use Report, WNV Larvicide Use records and contracted pesticide applications. Applications methods include; hand/backpack, aerial, ULV, mistblower, other (please explain)

Product Name: Anvil 10+10 ULV
EPA Reg. #: 1021-1688-8329
Application method: Truck-based GPS guided ULV
Targeted life stage: Adult
Total amount of concentrate applied: 440.32 gallons
Comments: A similar amount of product was used this season as in 2010, representing a substantial increase in virus isolations, human cases and residential request.

Product Name: VectoBac G
EPA Reg. #: 73049-10
Application method: Hand
Targeted life stage: Larvae
Total amount of concentrate applied: 3,069.75 lbs
Comments: Due to a rainy early season, more larvicide was applied this season then in the past.

Product Name: VectoLex WSP
EPA Reg. #: 73049-20
Application method: Hand
Targeted life stage: Larvae
Total amount of concentrate applied: 489.71 lbs
Comments: A total of 22,213 pouches were used in catch basins, retention/ detention ponds and abandoned swimming pools.

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one
Total amount of concentrate applied:
Comments: _____

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one
Total amount of concentrate applied:
Comments: _____

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one

Total amount of concentrate applied:
Comments: _____

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one
Total amount of concentrate applied:
Comments: _____

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one
Total amount of concentrate applied:
Comments: _____

Product Name:
EPA Reg. #:
Application method:
Targeted life stage: Choose one
Total amount of concentrate applied:
Comments: _____

LARGE AREA EXCLUSIONS

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. Map of Canoe River and Hockomock ACEC's and areas of Priority Habitat.

SPECIAL PROJECTS

Do you perform any inspectional services such as inspections at sewage treatment facilities or review sub division plans? Yes

If yes, please elaborate Perform entomological work when requested by member towns. Review, inspect and treat detention/ retention ponds in sub divisions.

Do you work with DPW departments or other local or state officials to address stormwater systems, clogged culverts or other areas that you have identified as man-made mosquito problem areas? Yes

If yes, please elaborate: Monitored the completed 3-year stormwater system project at UMass Dartmouth for success and stability. Completed ditch maintanence projects at the New Bedford and Mansfield Airports. Extensive work is done with member towns and local governmental agencies such as the DPW, Boards of Health, Conservation Commissions, Engineering departments and Mass Highway District 5. We are often contacted to clean drainage ditched that are clogged with sand and debirs before it is discharged into the adjacent wetland.

Have you worked with these departments on long term solutions? Yes

If yes, please elaborate: Worked with Mass Highway District 5 and DEP on a stormwater management plan in the town of Easton, to releave flooding in the area. Worked with Mass Highway District 5 in New Bedford on cleaning ditches along the roadway that is causing flooding on the highway.

Did you conduct or participate in any cooperative research or restoration projects?

If yes, please elaborate: A habitat restoration project of Marsh Island in Fairhaven, in conjunction with NOAA, New Bedford Harbor Trustee Council and the Fairhaven Board of Public Works, is currently in the monitoring stages. The plan is to remove fill that was placed on the site between 1935-1955 and excavate marsh creeks and pools/pannes along with planting of marsh grasses. Bristol County Mosquito Control Project has commented and made site visits to the area to help develop the plan. Also consulted on a West Island Beach culvert replacement and marsh restoration project with NOAA in the town of Fairhaven. Worked with Mass Division of Ecological Restoration on a saltmarsh project and Phragmites control at Dublin Street in Somerset. This project aims to increase salt water into the area to reduce Phragmites and increase natural predatory fish movement. The project is complete but the site is being monitored for success.

Did you or participate on any **State/Regional/National workgroups or panels or attend any meeting pertaining to the above**?

If yes, please elaborate: Wayne Andrews is a member of the American Mosquito Control Association's Public Relations Committee. CDC's EEE Regional Working group. Priscilla Matton is a member of the Northeastern Mosquito Control Association's Executive Board and the American Mosquito Control Association's Training and Member Education Committee.
Joshua Nickerson is the vendor coordinator for the Northeastern Mosquito Control Association.
We currently sit on a variety of workgroups within the state including but not limited to: Open Marsh Water Management working group with Coastal Zone Management, Mass Audubon, Mosquito Controls and other State organizations; Water Management meeting with Mosquito Control Districts and Army Corp of Engineers; Best Management Practices for Inland Freshwater Maintenance working group; Aquatic Restoration Task Force and MA DPH joint workgroups.

CHILDREN AND FAMILIES PROTECTION ACT

Is your program impacted by the Children and Families Protection Act? Yes

If yes, please explain: We have approximately 265 day cares and 150 locations of private, parochial and public school properties.

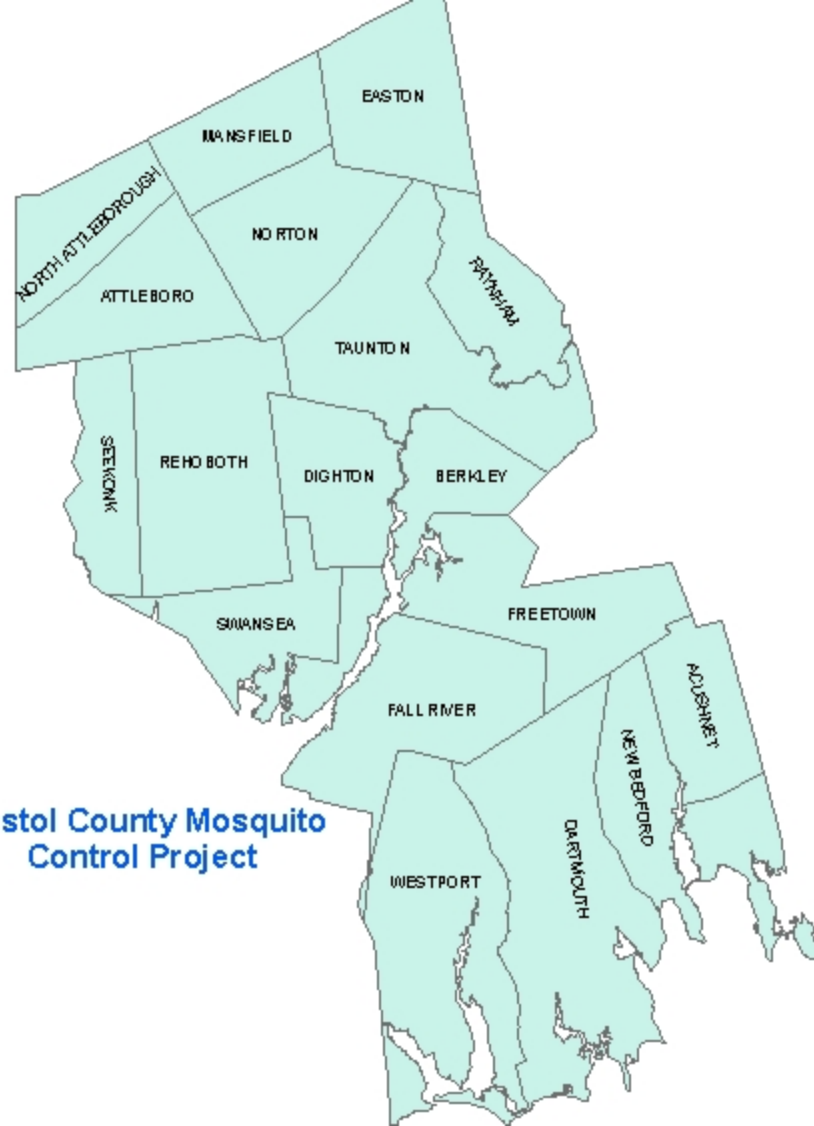
If you have data on compliance with this Act and your program, please list here: There are currently 7 daycares down from 16 and 7 schools down from 9 in Bristol County that are not in compliances with the Act. This does not mean that all the other locations have mosquito control listed in their outdoor plans.

If you had difficulties with implementation of your program due to this law, please elaborate here: Avoiding this many locations at night makes adulticiding applications very difficult. With the addition of computers in the trucks, applicators are better able to locate these areas.

Comments: Map included at end of document with schools and no-sprays. The amendments to the Children and Families Protection Act on notification has grealty reduced the paper work required by the schools. This has allowed for applications in areas of high viral activity, to be made on school property in a more timely and cost efficient manner. Due to human biting activity in the town of Easton, multiple meetings and conference calls with the Board of Health were completed to discuss reducing risk to the students.

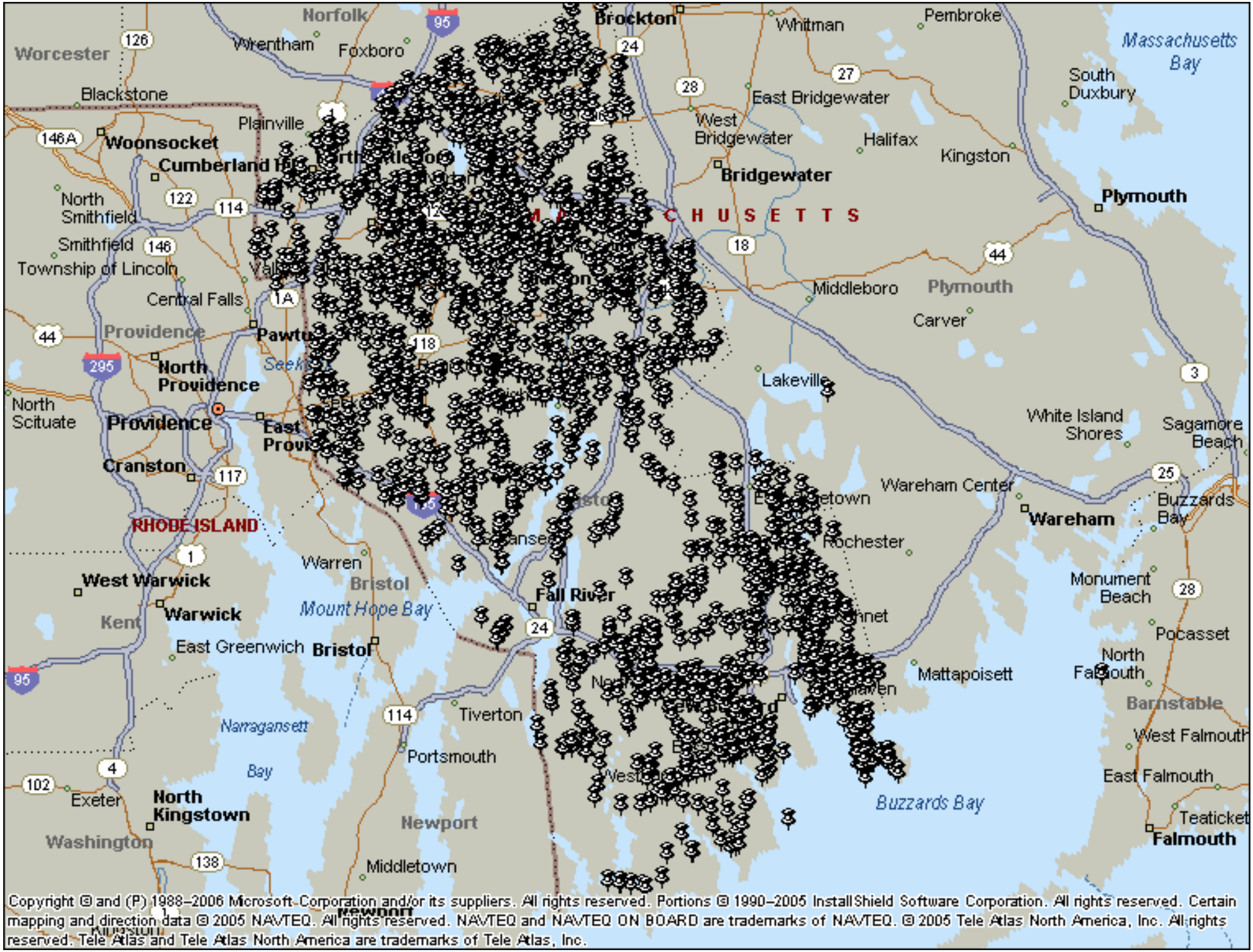
GENERAL COMMENTS

Please list any comments not covered in this report: Bristol County has 691 sq miles. It has 556 sq miles of land and 135 sq miles of water. It also has 74,000 acres of DEP wetlands plus an additional 25,000 acres of re-flood that supports Aedes vexans. In 2011, 336 sq miles were in a Critical/High/ Moderate risk for WNV and EEE. This is 49% of our service area. In accordance with the Clean Water Act and the NPDES permit requirements, no pesticide were applied by the Bristol County Mosquito Control Project to waters of the US from November 30 to December 31, 2011. A PDMP plan is in effect at the BCMCP office.

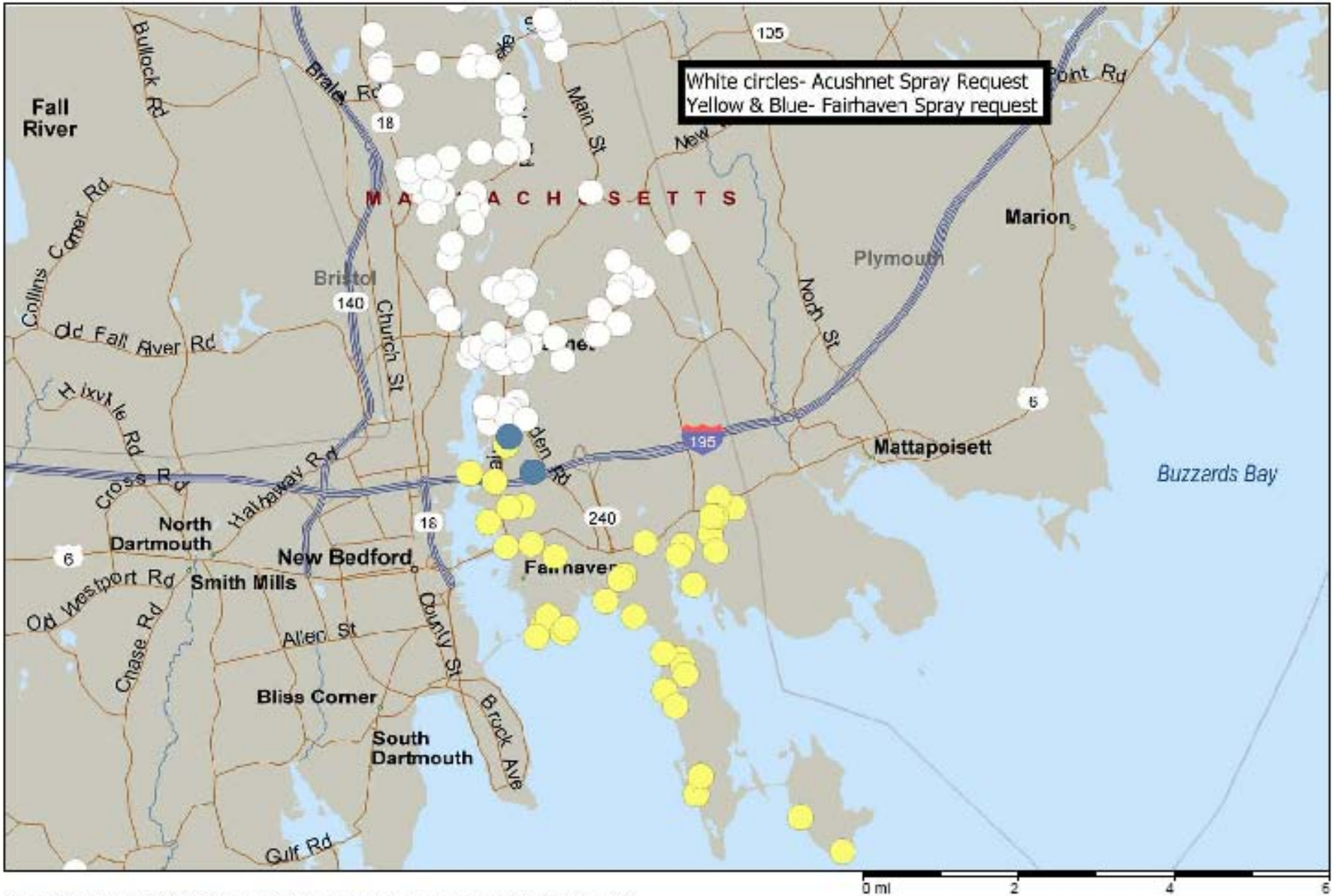


Bristol County Mosquito Control Project

BCMCP's Computerized GPS Larval Sites

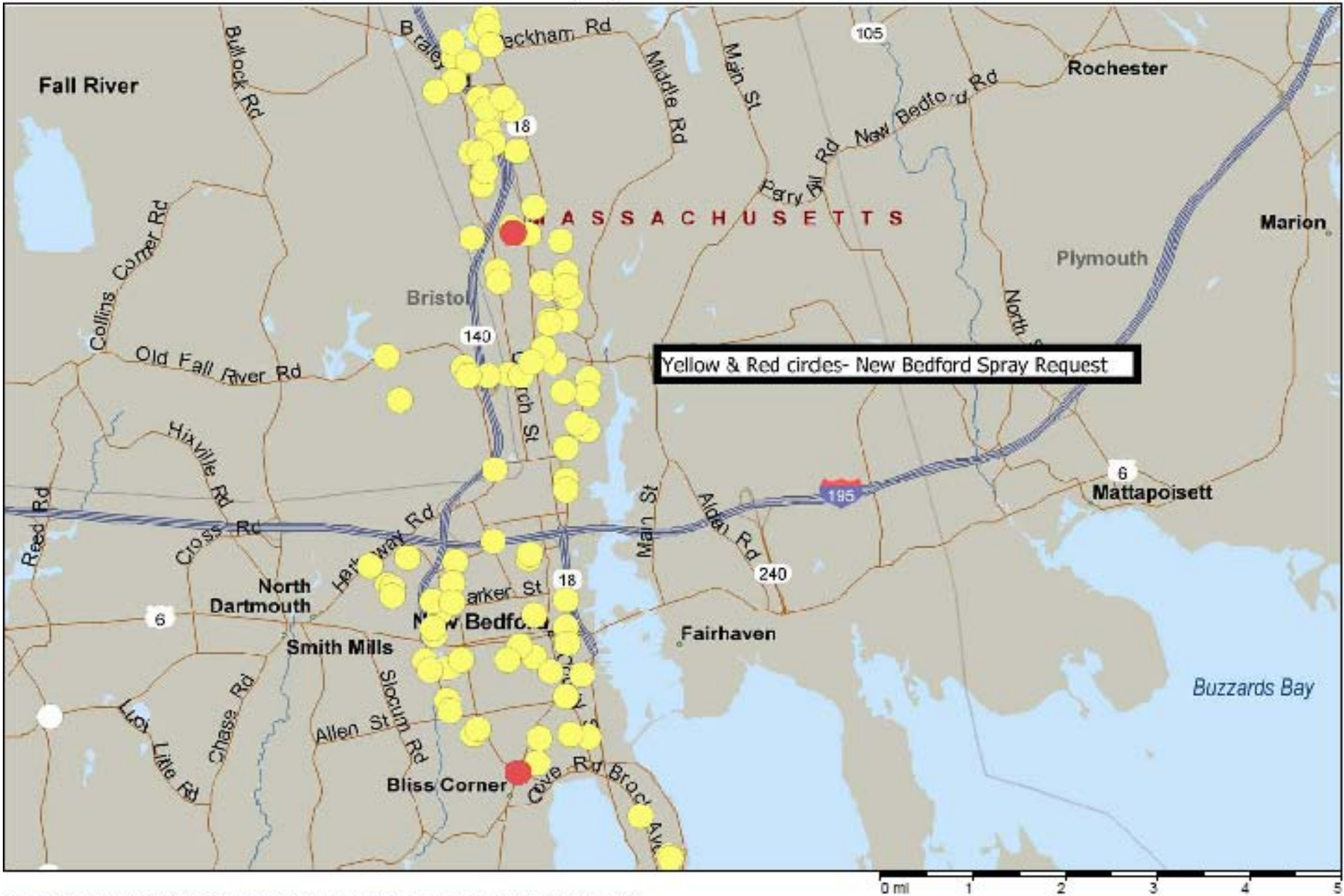


Spray Requests 2011



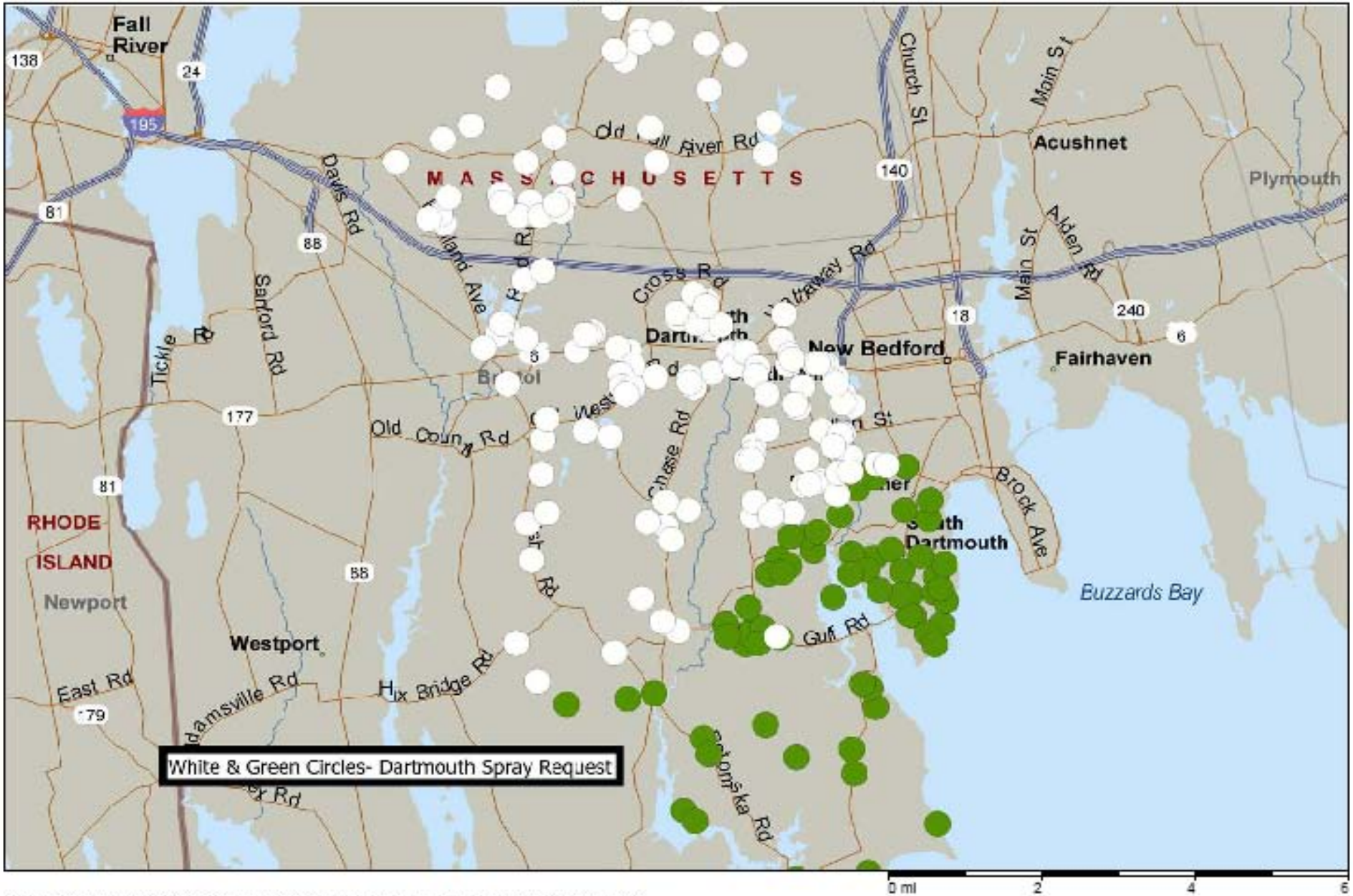
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



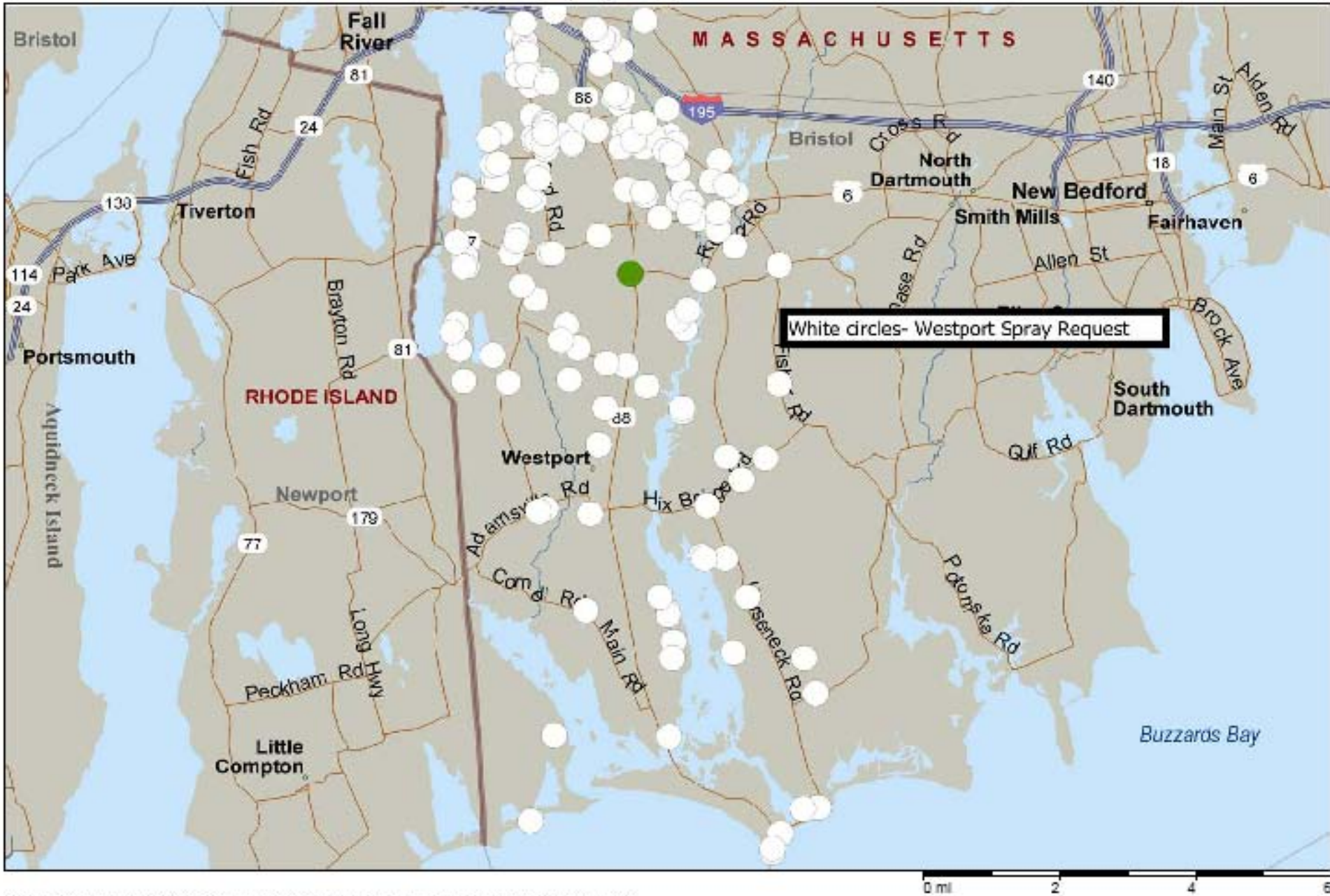
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2005 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2005 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011

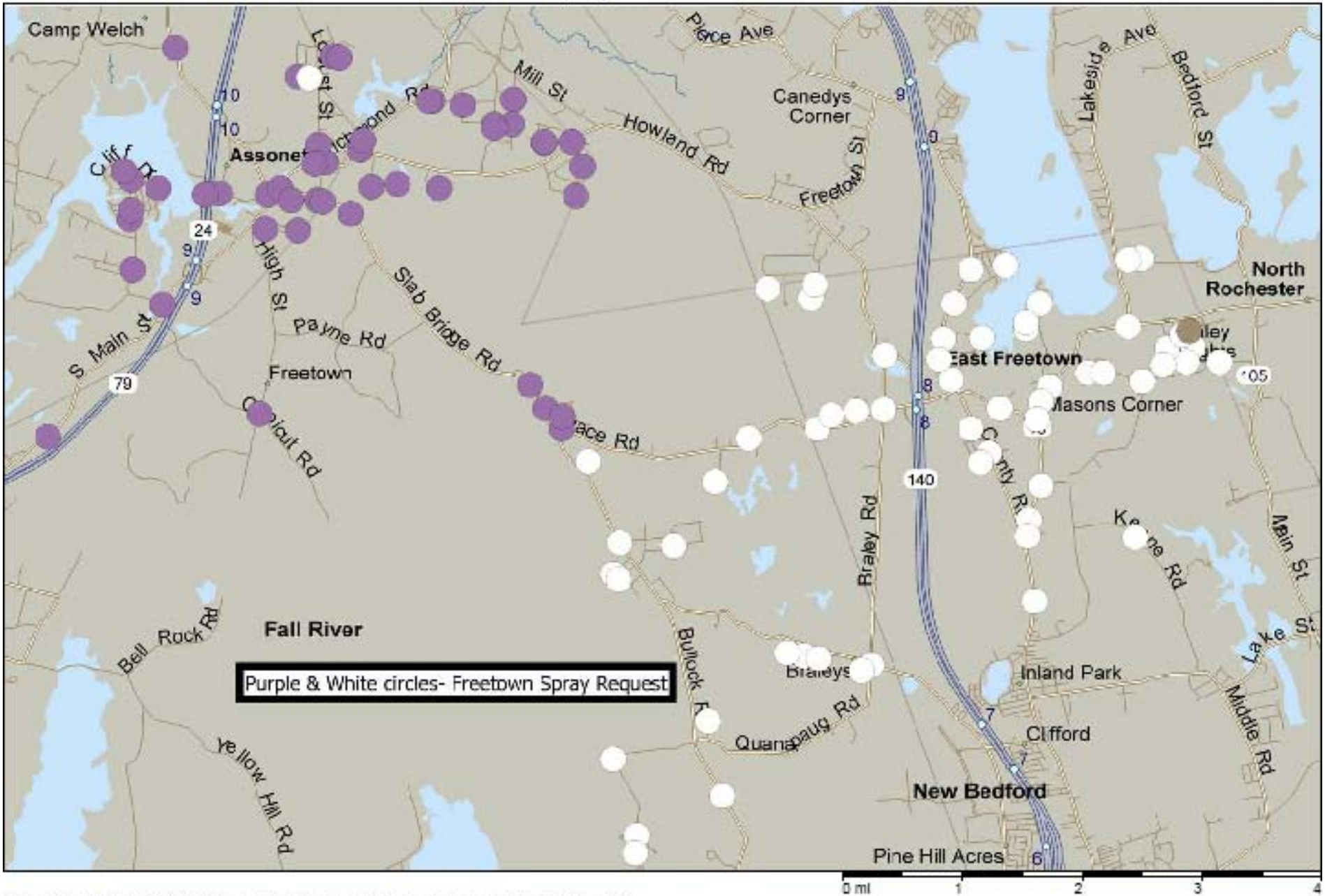


Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011

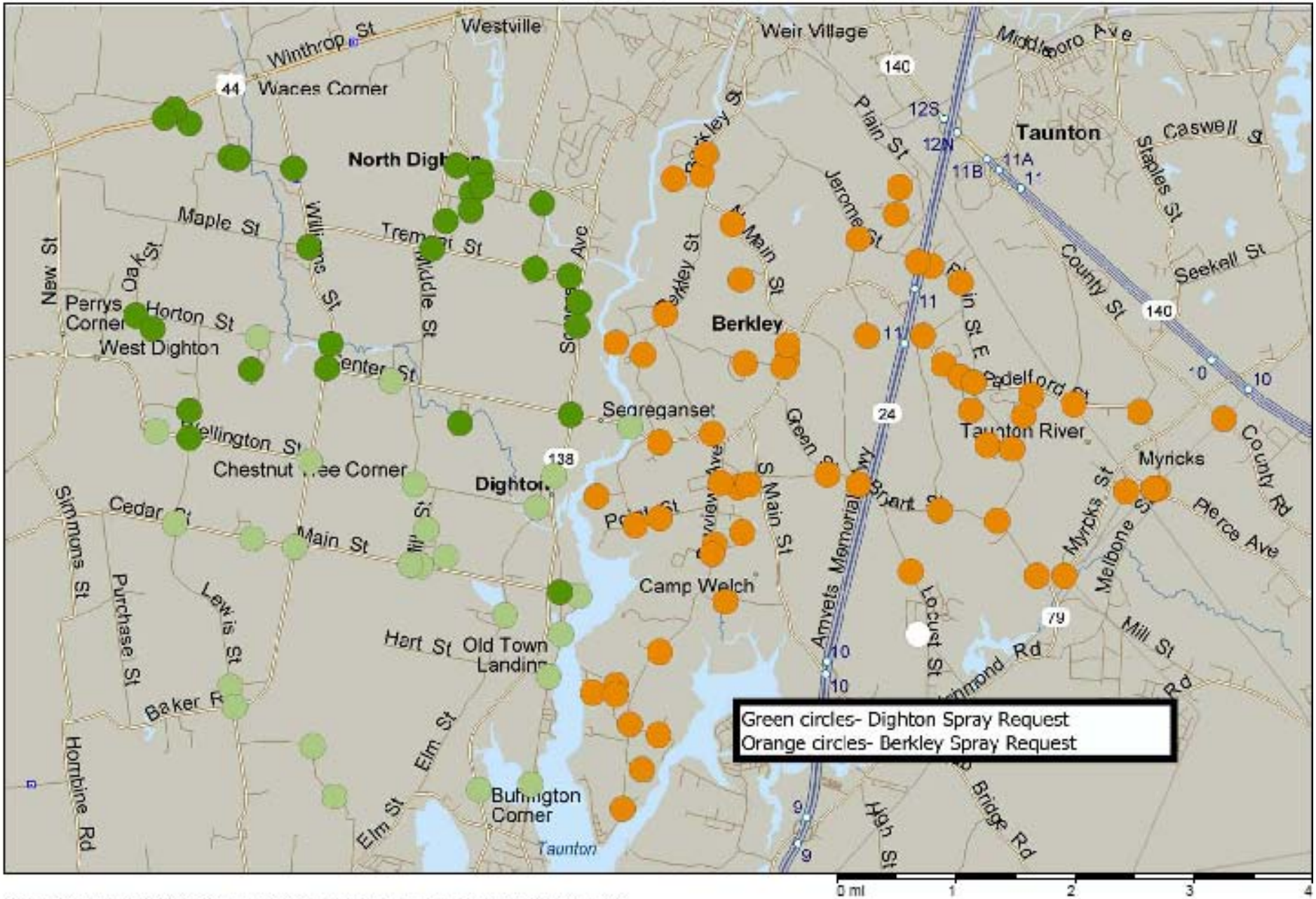
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2005 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



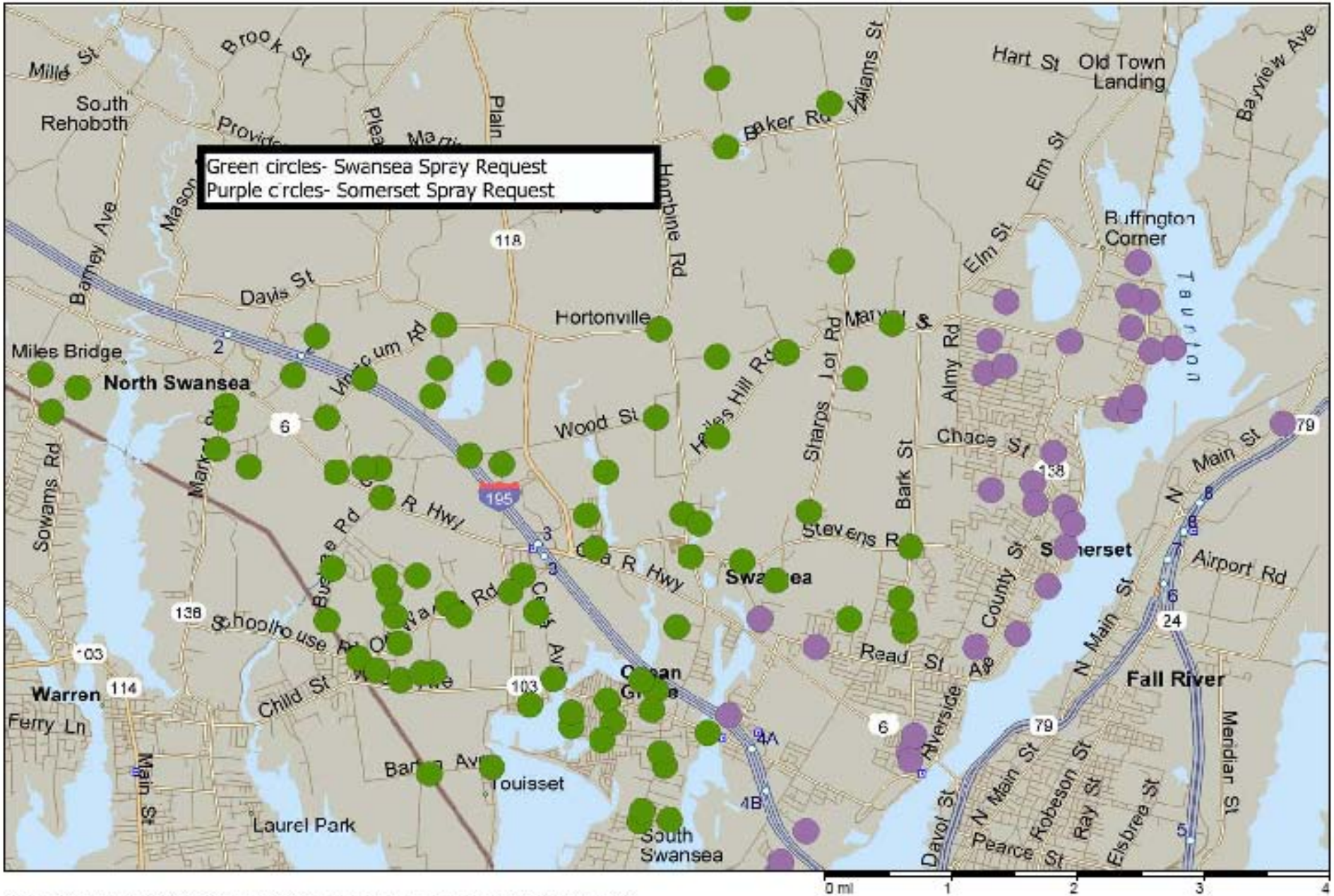
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



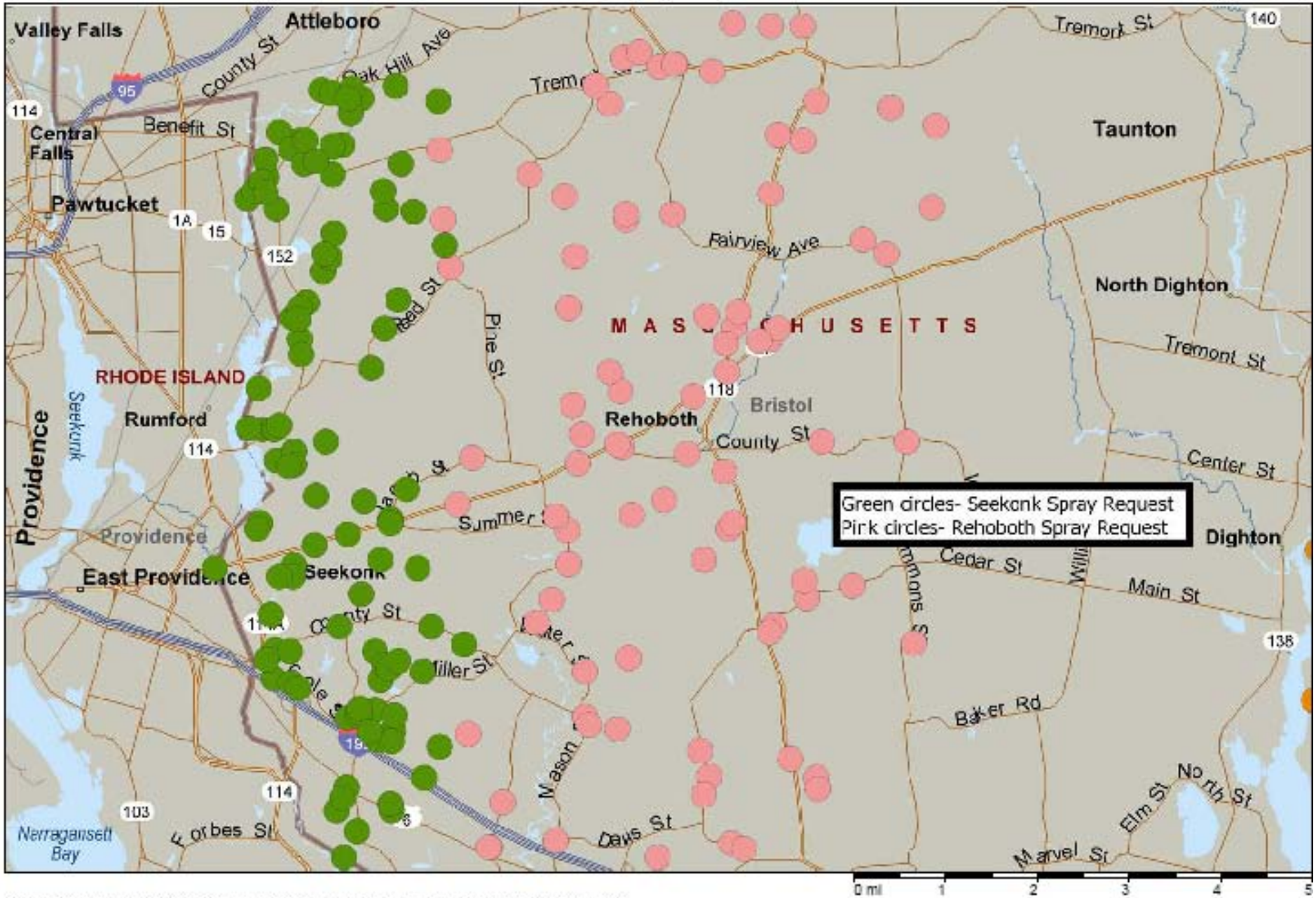
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



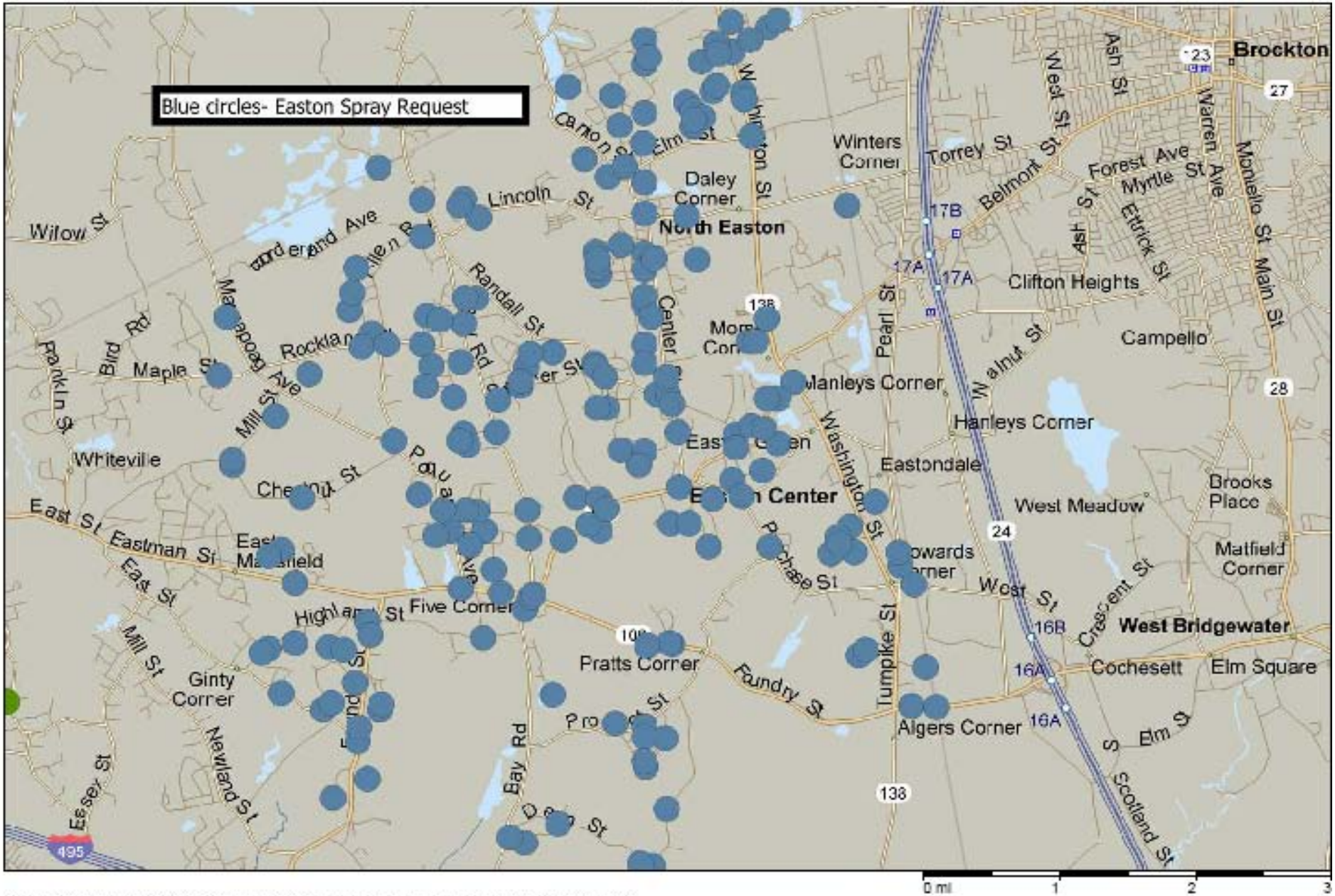
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



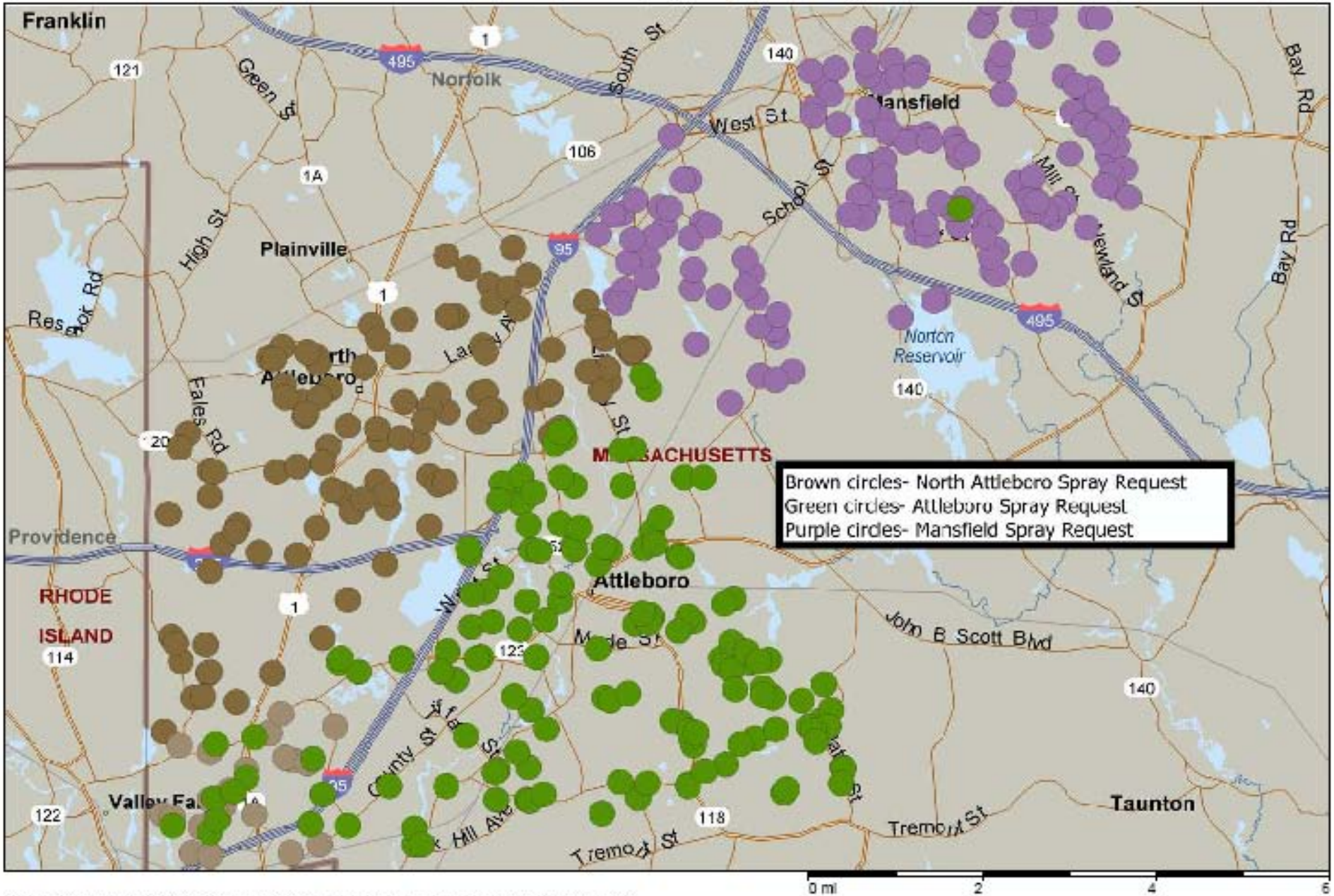
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



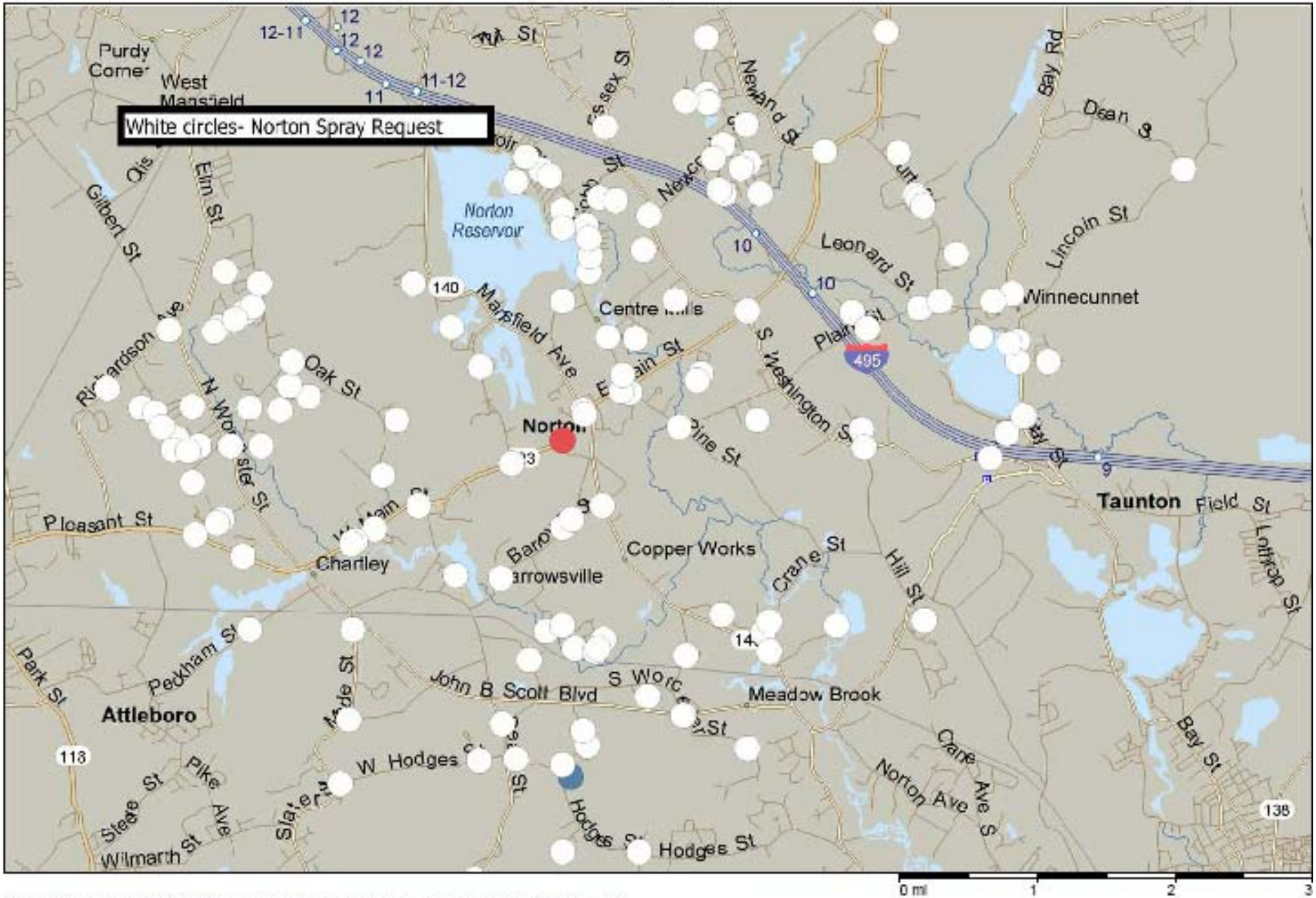
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



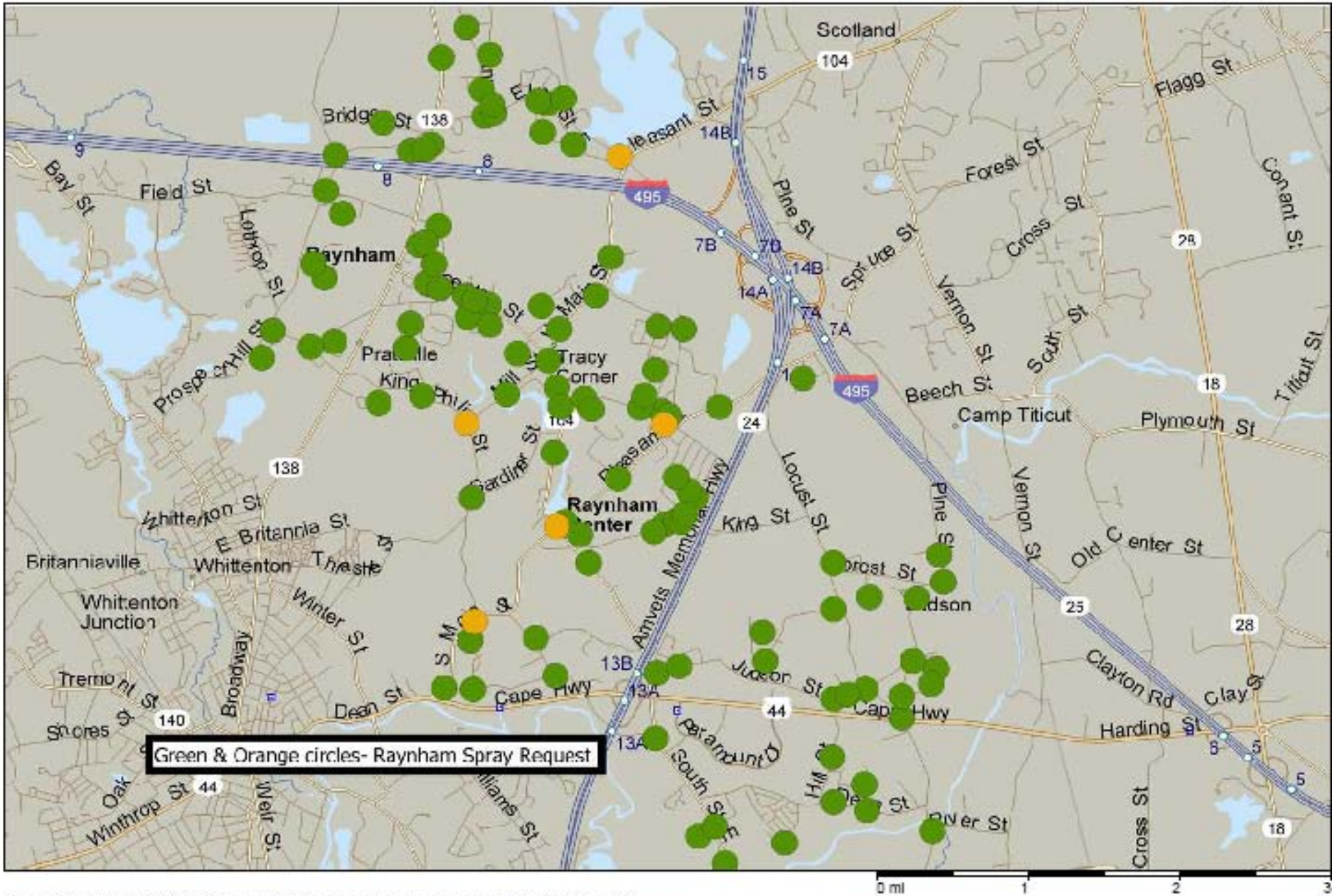
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



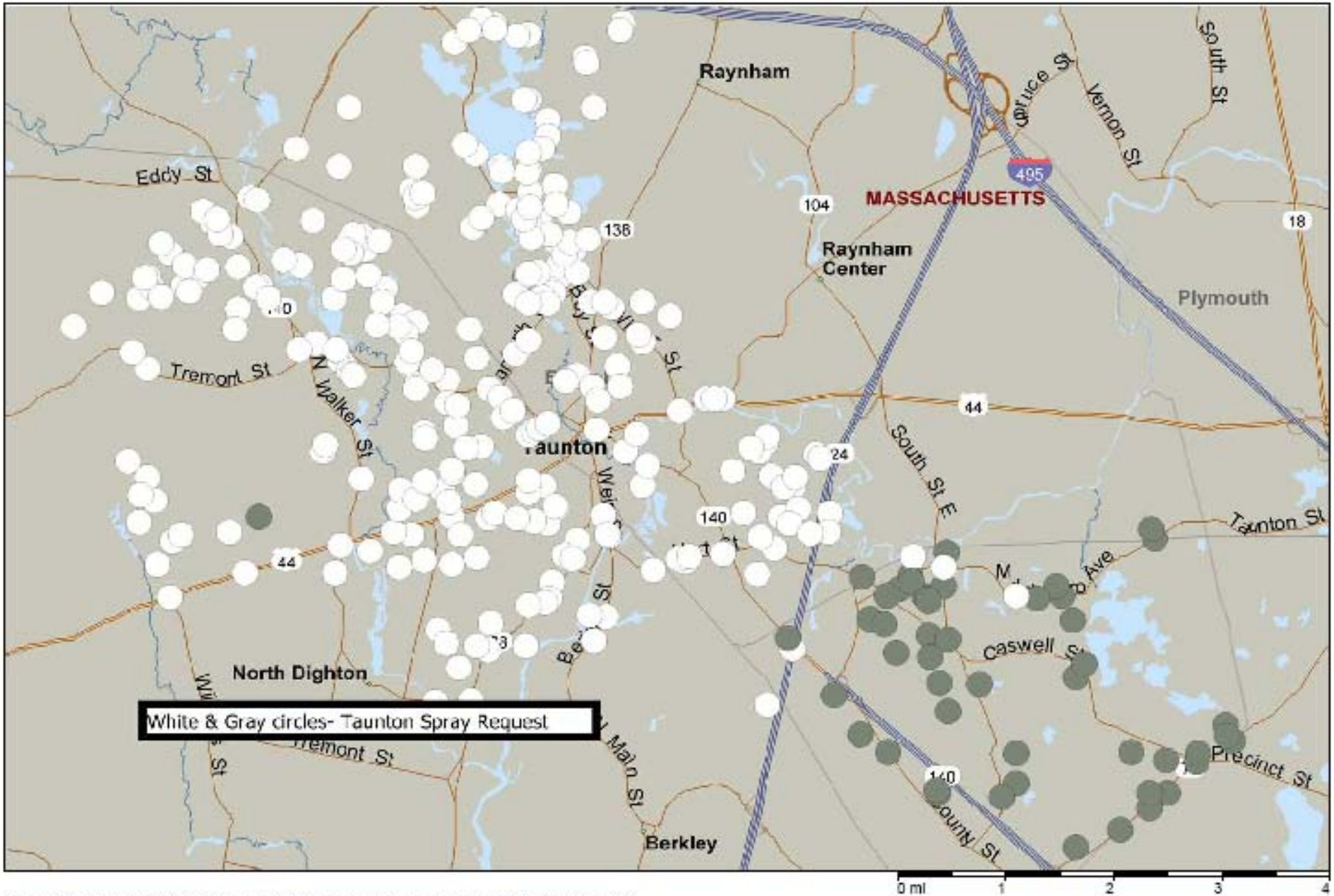
Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2006 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

Spray Requests 2011



Copyright © and (P) 1988–2006 Microsoft Corporation and/or its suppliers. All rights reserved. http://www.microsoft.com/mappoint/
Portions © 1990–2006 InstallShield Software Corporation. All rights reserved. Certain mapping and direction data © 2005 NAVTEQ. All rights reserved. The Data for areas of Canada includes information taken with permission from Canadian authorities, including: © Her Majesty the Queen in Right of Canada, © Queen's Printer for Ontario. NAVTEQ and NAVTEQ ON BOARD are trademarks of NAVTEQ. © 2005 Tele Atlas North America, Inc. All rights reserved. Tele Atlas and Tele Atlas North America are trademarks of Tele Atlas, Inc.

PROCEDURE FOR CALCULATING TIME-MORTALITY CURVES BY THE BOTTLE BIOASSAY

By James Dukes, Mike Greer and Jack Petersen

Introduction.

Insecticide resistance is a threat to the success of any mosquito control program. Early detection and proper management decisions are essential to keeping this problem in check. One method of determining the response of adult mosquitoes to a given pesticide is the bottle bioassay.

Brief Overview.

A standard dose is used to discriminate between insects susceptible to an insecticide and those that are resistant. The bottle bioassay is used as an indicator of the insect's response to that dose, specifically, how many minutes it takes to kill all the test mosquitoes.

Materials Needed

250 ml Wheaton bottles
Pipettes, glass, 1 ml calibrated in hundreths
A.C.S. Acetone
Chemical(s) to be tested
Aspirator
Timer
Mosquitoes

Getting Started.

1. Start with clean, dry bottles. If possible, heat bottles to 350 degrees F in an oven for 15-20 min. before use. Allow the bottles to return to room temperature.
2. Prepare the stock solutions. If stock solutions are already made and have been refrigerated, make sure you allow enough time for them to come to room temperature before use.
3. Formulations of insecticides are given as appendices in another part of this procedural guide. Once the stock solution is prepared, it can be stored in the refrigerator in light-proof bottles until needed.
4. Mark your bottles. Make sure you mark the cap as well so you can keep individual bottles and their caps together. This is important because you will be coating the entire bottle, including the inside of the cap. To ensure the bottle has the proper dosage you must keep the cap with its respective bottle.

Preparing the Bottle.

1. Pipette into the bottle 1 ml of A.C.S. acetone plus the active ingredient (A.I.) to be tested. The precise amount of A. I. to be added to each bottle depends on the chemical. See Table 1.
2. Also prepare one or more control bottles that contain 1 ml of acetone, but no active ingredient. These bottles are an important test of proper preparation.
3. Make sure the bottle cap is secure so that no acetone evaporates until you are ready for it to do so.
4. Swirl the bottle gently so that the acetone evenly coats the bottom.
5. Continue turning the bottle while inclining the bottle so that the sides are evenly coated. Do this slowly and carefully, looking for streaks. The interior of the bottle must be evenly coated.
6. Incline the bottle so that the acetone puddles in the "shoulder." Rotate the bottle several times to distribute the acetone evenly.
7. Turn the bottle completely up side down. Did any acetone escape? If it did, reject that bottle and start over again with another bottle.
8. Coat the inside of the cap.
9. Turn the bottle on its side and lay it on a flat surface.
10. Gently vent the bottle by unscrewing the cap. You should hear an audible "pssst!"
11. Now roll the bottle to keep the insecticide evenly distributed on the walls while the acetone evaporates.
12. Follow this procedure with all the bottles until no liquid acetone is visible.
13. Allow the bottles to dry with lids off for at least two (2) hours before proceeding.
14. Store the bottles in a dark, cool, dry place

The Bioassay.

1. Aspirate 10-15 mosquitoes into each bottle. Use a number you can easily count with accuracy as the mosquitoes fly about. It works best to collect all of the mosquitoes for one bottle in a mouth aspirator and introduce them all at once with a gentle puff of air. Try to avoid adding excessive moisture from your breath. A mechanical aspirator works best.
2. Examine the bottle to be sure all mosquitoes survived the transfer process. If you find any dead mosquitoes, record the number. You will need to substract this number from each timed reading.
3. Start a timer and record every 15 minutes how many mosquitoes are dead or alive (whichever is easier to count). Continue until all mosquitoes are dead. In some cases, when mosquitoes are resistant to the pesticide, it may be necessary to set an arbitrary maximum time limit such as five hours.
4. Record your counts on the data sheet that accompanies this procedure.
5. Continue until all mosquitoes are dead or a pre-determined time has expired.

6. Count the total number of mosquitoes in each bottle and calculate the percent mortality for each 15 minute interval.
7. Plot the percent mortality (y axis) against time (x axis) using a logarithmic scale for the percent mortality.
8. Compare the test mosquitoes with baseline date established for susceptible mosquitoes of the same species.

Clean up.

1. When you are finished with your bottles or the pesticide is too degraded to use any longer, triple rinse them with acetone, wash them with warm soapy water and rinse. Place them in an oven to thoroughly dry before using them again.
2. If you are uncertain whether the bottles are completely clean, introduce some susceptible mosquitoes into the bottles after you dry them. The mosquitoes should not die in three hours or less. If they do, clean the bottles again.

Table 1. Recommended bottle dosages.

Active Ingredient	**Final concentration/bottle**
Malathion	474 µg/bottle
Naled	25 µg/bottle
Permethrin	43 µg/bottle
Resmethrin	30 µg/bottle
d-Phenothrin	22 µg/bottle
DEF	125 µg/bottle
TPP	125 µg/bottle
PBO	400 µg/bottle

Revised: 25 January 2002; Revised: 26 April 2002; Revised 10 February 2003; Revised 12 November 2004
drjack3@hotmail.com
http://www.pherec.org/

DILUTION of ANVIL 10+10® for the BOTTLE BIOASSAY

PHEREC Technical Memorandum # 1

During September 2001, three Florida Mosquito Control Programs requested assistance in evaluating ANVIL 10+10® as a mosquito adulticide. Workshops were conducted focusing on carrying out serial dilutions of ANVIL 10+10® to determine the diagnostic concentration to be applied to the interior surface of each 250 ml Wheaton bottle following the CDC protocol as modified by Dukes and Greer that is posted to the PHEREC Web site http://pherec.org/bottleassay/bottlebioassay.html
This brief technical memorandum reports the results of those workshops.

OBJECTIVE: Determine the diagnostic dose of ANVIL 10+10® for the bottle bioassay.

1. **START with the LABEL.** ANVIL 10+10® contains 0.74 pounds of Technical SUMITHRIN® per gallon.
2. 0.74 lbs/gal. X 1 gal./3.785 liters X 453.6 grams/ 1 lb = 88.68 grams/liter
3. 88.68 grams/liter X 1 liter/1000 ml = 0.08868 grams/ml.
4. There are 0.08868 grams of SUMITHRIN® in each ml of ANVIL 10+10® from the tank.
5. Convert grams to milligrams. 0.08868 g/ml X 1000 mg/gram = 88.68 mg/ml
6. PREPARE the STOCK solution by pipetting 1 ml of ANVIL 10+10® into a 100 ml volumetric flask and filling to the 100 ml mark with A.C.S. acetone.
7. The STOCK solution contains 0.8868 mg SUMITHRIN®/ 1 ml.
8. Convert milligrams to micrograms. 0.8868 mg/ml X 1000 ug/1 mg = 886.8 ug/ml
9. We used 1 ml, 2.5 ml, 5 ml and 10 ml of the STOCK solution to prepare TEST solutions.
10. TEST solutions were prepared by pipetting the STOCK solution into a volumetric flask and filling to the 100 ml mark.
11. One ml of TEST solution was pipetted into each Wheaton bottle for the bottle bioassay.

BOTTLE TEST RESULTS SHEET

DATE OF COLLECTION 10-5-11 SPECIES Multiple

COLLECTION LOCATION Berkley - Mill St. COLLECTION METHOD SCCC CDC

ANY ADDITIONAL COLLECTION INFORMATION

TEMPERATURE RELATIVE HUMIDITY

NOTE: ATTACH A MAP OF COLLECTION SITE, IF POSSIBLE

INSECTICIDE & STOCK DATE April 10+10 INSECTICIDE CONCENTRATION

SYNERGIST & STOCK DATE PBO SYNERGIST CONCENTRATION

DATE BOTTLES MADE 10-5-11 TIME BOTTLES MADE 9:45 am

DATE OF TESTING 10-5-11 TIME OF TESTING 11:35 am

PERSON DOING TESTING P Mattoon; W. Andrews (Wayne L. Andrews)

LITERATURE REFERENCE: Brogdon, WG, and JC McAllister. 1998. Simplification of Adult Mosquito Bioassays through use of time-mortality determinations in glass bottles. J. Am. Mosq. Control Assoc. 14(2):159-164.

REFERENCE TO ANY OTHER TEST

GENERAL RESULTS (ie. Very susceptible; highly resistant; portion of population resistance; possible cross resistance to ; resistance mechanism(s)

Time	Bottle 1		Bottle 2		Bottle 3		Bottle 4		Total		Control	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Dead	%	Alive	Dead
0	4	Ø	4	Ø					0	######		
5	4	Ø	4	Ø					0	######		
10	4	Ø	4	Ø					0	######		
15	Ø	4	Ø	4					0	######		
30	Ø	4	Ø	4					0	######		
45									0	######		
60									0	######		
75									0	######		
90									0	######		
105									0	######		
120									0	######		

COMMENTS 3 Ae. vexans, 1 Ae. triseriatus, 4 Ae. canadensis

DRAW GRAPH ON BACK

BOTTLE TEST RESULTS SHEET

DATE OF COLLECTION 10-5-11 SPECIES multiple

COLLECTION LOCATION Freetown - Ross Ave COLLECTION METHOD 50 cc CDC

ANY ADDITIONAL COLLECTION INFORMATION

TEMPERATURE RELATIVE HUMIDITY

NOTE: ATTACH A MAP OF COLLECTION SITE, IF POSSIBLE

INSECTICIDE & STOCK DATE Anvil 10+10 INSECTICIDE CONCENTRATION

SYNERGIST & STOCK DATE PBC SYNERGIST CONCENTRATION

DATE BOTTLES MADE 10-5-11 TIME BOTTLES MADE 9:45 am

DATE OF TESTING 10-5-11 TIME OF TESTING 11:15 AM

PERSON DOING TESTING P Mattson & W. Andrews (Wayne H. Andrews)

LITERATURE REFERENCE: Brogdon, WG, and JC McAllister. 1998. Simplification of Adult Mosquito Bioassays through use of time-mortality determinations in glass bottles. J. Am. Mosq. Control Assoc. 14(2):159-164.

REFERENCE TO ANY OTHER TEST

GENERAL RESULTS (ie. Very susceptible; highly resistant; portion of population resistance; possible cross resistance to ; resistance mechanism(s)

Time	Bottle 1		Bottle 2		Bottle 3		Bottle 4		Total		Control	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Dead	%	Alive	Dead
0	5	Ø	9	Ø	5	Ø			0	######		
5	5	Ø	9	Ø	5	Ø			0	######		
10	4	1	8	1	3	2			0	######		
15	Ø	5	Ø	9	Ø	5			0	######		
30	Ø	5	Ø	9	Ø	5			0	######		
45									0	######		
60									0	######		
75									0	######		
90									0	######		
105									0	######		
120									0	######		

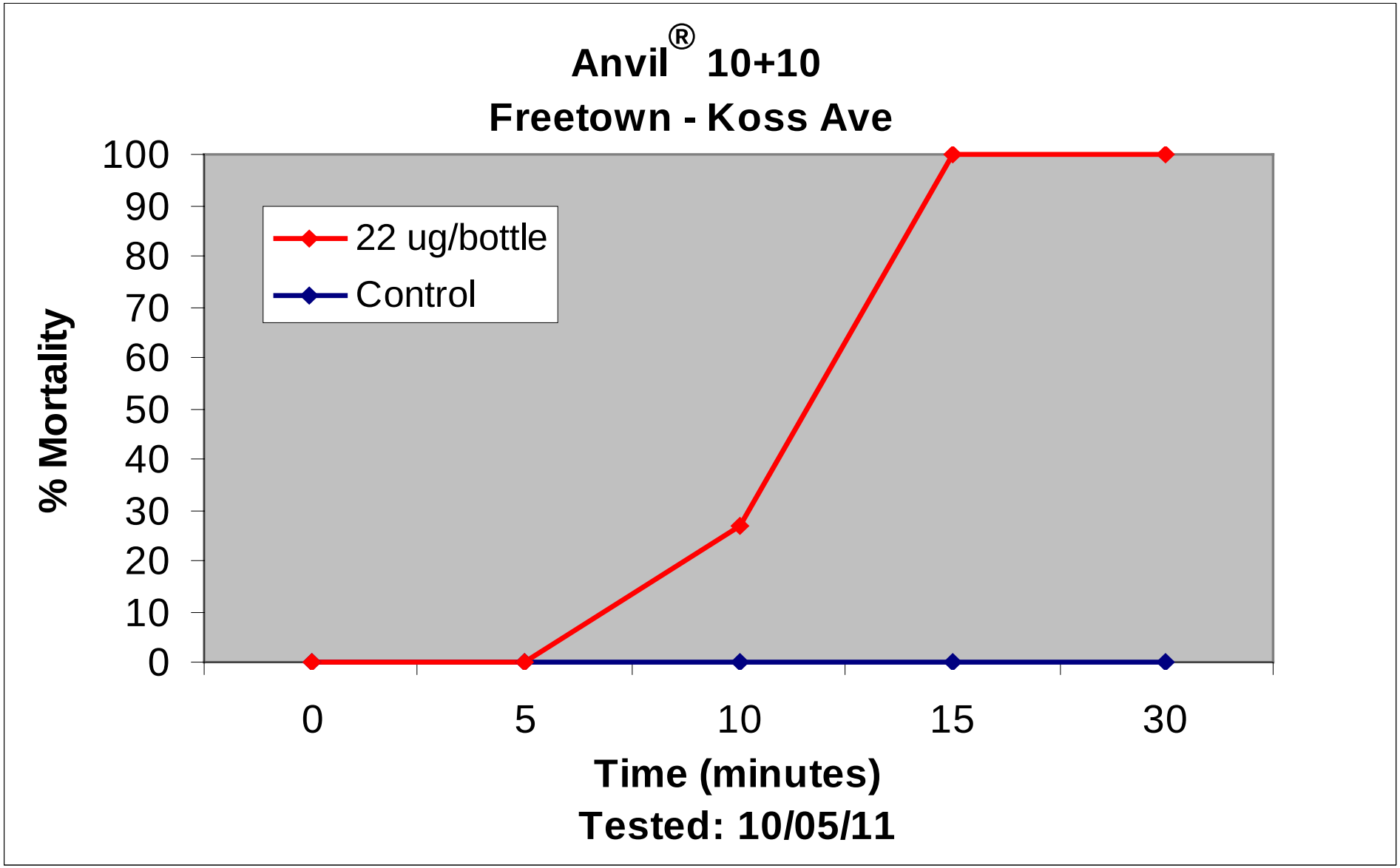
COMMENTS 7 Cs melanura, 4 Ae. cinereus, 6 Ae. canadensis, 2 Cx. salinarius

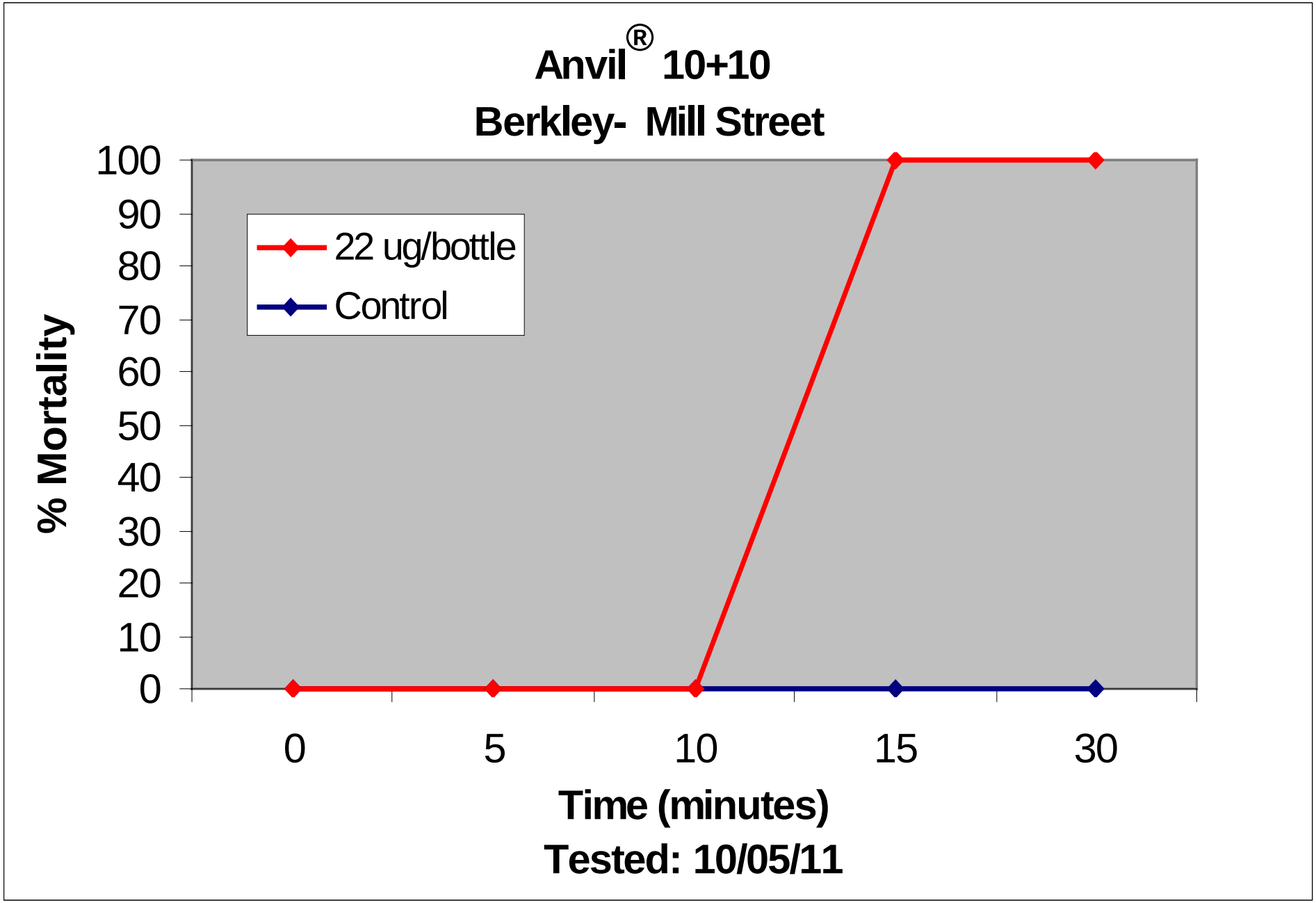
DRAW GRAPH ON BACK

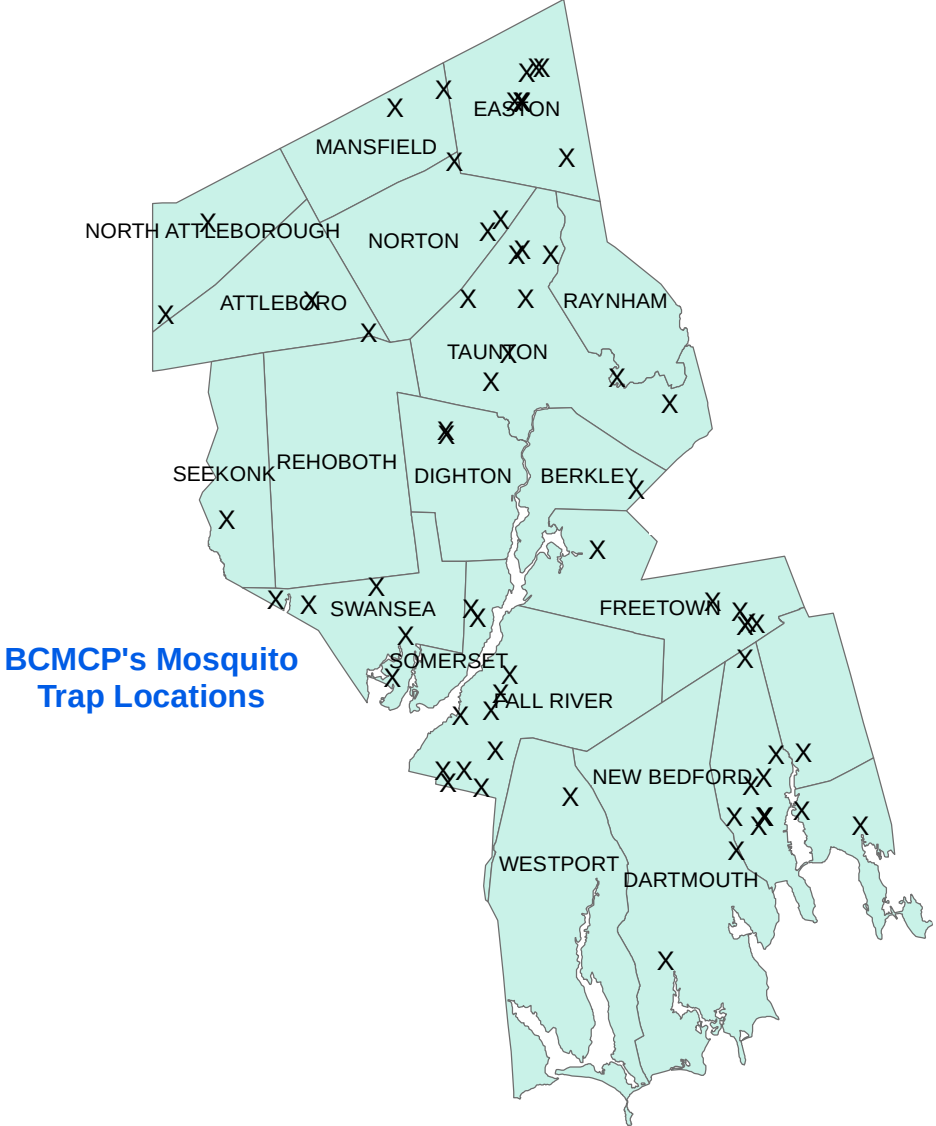
2011 Bottle Bio-assay Narrative
Prepared by: Priscilla Matton

On October 5, 2011 mosquito samples were collected from two sites within Bristol County following an active adulticiding season. CDC traps augmented with 500cc of CO_2 were set at season long trap locations, both collecting WNV and EEE positive mosquitoes during the season. One trap location was located on Mill Street in Berkley and the other at Koss Avenue in Freetown. Mosquitoes were transported back to the BCMCP office alive in the trap's net surrounded by a plastic bag with an ice pack for moisture. Mosquitoes were aspirated out randomly from the net, keeping each location separate. The bottle bio-assay was conducted on the same day the collections were made. The following species were tested against Anvil 10+ 10 (22µg/bottle): *Cs. melanura*, *Ae. cinereus*, *Oc. canadensis*, *Ae. vexans*, Oc. *trivittatus*, *Cx. salinarius*.

All species died within the bottles used within 15 minutes. The specimens were removed from the bottles following the 30-minute test period. Mosquitoes were identified to species and observed for any recovery for the next 3 hours. No recovery was detected.


Anvil® 10+10
Freetown - Koss Ave
% Mortality
100
90
80
70
60
50
40
30
20
10
0
22 ug/bottle
Control
0
5
10
15
30
Time (minutes)
Tested: 10/05/11


Anvil® 10+10
Berkley- Mill Street
100
90
80
70
60
50
40
30
20
10
0
% Mortality
22 ug/bottle
Control
0
5
10
15
30
Time (minutes)
Tested: 10/05/11



BCMCP's Mosquito Trap Locations

THE COMMONWEALTH OF MASSACHUSETTS
STATE RECLAMATION AND MOSQUITO CONTROL BOARD

BRISTOL COUNTY MOSQUITO CONTROL PROJECT

140 NORTH WALKER STREET, TAUNTON, MA 02780
TEL:(508)823-5253 FAX: (508)828-1868

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

SUPERINTENDENT
WAYNE N. ANDREWS M.S.

Bristol County Mosquito Control Project (BCMCP)
End of the 2011 Season Report

This report is based on data collected from CO_2-baited CDC traps, UV light traps, resting boxes and gravid traps.

Total Pools Submitted for Testing 2011: 444 Pools
- Total Pools Submitted for Testing 2010: 221 Pools

Total Pools Submitted from Bristol Co. by MA DPH in 2011: 217 Pools
- Total Pools Submitted for Testing 2010: 161 Pools

Total Number of Mosquitoes Tested in 2011: 15,575
- Total Number of Mosquitoes Tested in 2010: 7,391

Total Number of Mosquitoes Tested from Bristol Co. by MA DPH in 2011: 6,804
- Total Number of Mosquitoes Tested in 2010: 4,662
- Total Number of Mosquitoes Tested in 2009: 18,961

Total Number of Non-submitted Mosquitoes 2011: 14,164
- Total Number of Non-submitted Mosquitoes 2010: 6,010

Total Number of Non-submitted Mosquitoes from Bristol Co. by MA DPH 2011: 9,624
- Total Number of Non-submitted Mosquitoes 2010: 10,548

2011 Combined Data:
Total Pools Tested: 661
Total Mosquitoes Tested: 22,379
Total Non-Submitted: 23,788
Total Collected: 46,167

2010 Combined Data:
Total Pools Tested: 382
Total Mosquitoes Tested: 12,053
Total Non-Submitted: 16,558
Total Collected: 28,611

Virus Isolations:

- **WNV 2011: 28 Pools**
  - 10 pools of *Cs. melanura*
  - 15 pools of *Cx. pipiens/ restuans* complex
  - 2 pools of *Culex* species, including *Cx. salinarius*
  - 1 pool of *Ae. vexans*

- **WNV 2010: 14 Pools**
  - 3 pools of *Cs. melanura*
  - 11 pools of *Cx. pipiens/ restuans* complex

- **EEE 2011: 31 Pools**
  - 27 pools of *Cs. melanura*
  - 1 pool of *Cx. pipiens/ restuans*
  - 2 pool of *Cq. perturbans*
  - 1 pool of *Ae. vexans*
  - Most EEE positive mosquitoes were collected from CO_2 – baited traps, with 1 pool collected from a gravid trap and 5 from resting boxes.

- **EEE 2010: 10 Pools**
  - 8 pools of *Cs. melanura*
  - 1 pools of *Cx. pipiens/ restuans*
  - 1 pool of *Cq. perturbans*
  - Most EEE positive mosquitoes were collected from CO_2 – baited traps, with 1 pool collected from a gravid trap.

Mosquito activity/trends for the 2011 Season?

Surveillance for Eastern Equine Encephalitis (EEE) in 2011 began at normal levels in Bristol County. High numbers of *Cs. melanura* were being collected from our traps in areas of past EEE isolations and high late season populations. The 2011 season showed temperatures above normal in May, near normal in June, well above normal in July, near normal in August, and above normal in September. Overall rainfall was above average region wide, with some localized areas receiving well above average.

Resting boxes collected low numbers for the beginning of the season with an increase in late-July through September. Some collections during August collected over 1,000 *Cs. melanura* from the 10 resting boxes placed on the Freetown/ New Bedford line. BCMCP did not collect any EEE positive *Cs. melanura* from resting boxes in 2010. In 2011, 5 pools tested positive including one pool that tested positive for both EEE and WNV on August 19th. Despite the resting box activity, EEE was scarce in New Bedford and the surrounding areas.

The first EEE isolation was from Raynham on August 1st from *Cs. melanura*. Activity in the Raynham/ Easton Hockomock Swamp complex continued throughout the season, playing a major role in EEE activity. The first human biting mosquito isolation for Bristol County occurred on August

15th in *Cq. perturbans* in Raynham, followed by a second on August 22nd. This was 15 days later than the first 2010 human biting EEE positive on August 1st in Freetown. Bristol County's activity was comparable to the activity in Plymouth County this season. Following multiple positives in human biting mosquitoes from the Raynham/ Bridgewater area, human and horse cases became a real concern. The first human case with a reported onset of August 27th occurred in Raynham resulting in the state's first death from EEE in 2011. A second case was confirmed in an out of state woman who visited the Raynham area during the same time. Her onset date was determined to be August 25th but confirmation did not occur until October 7th. This is believed to be the first confirmed human case from the town of Raynham based on the records of the past EEE outbreaks dating back to the 1930's.

The swamp complex in Rehoboth, which is a historical site for EEE, tested positive in *Cs. melanura* on August 22nd. This is the first time since 2007 this location had activity, demonstrating a possible expansion from the Hockomock complex. Human biting *Ae. vexans* were collected from neighboring Dighton on August 26th. This isolation followed a few major rain events that produced a significant amount of floodwater mosquitoes. Following the isolation, Tropical Storm Irene struck causing wide spread power outages in the area. BCMCP was concerned about the possibility of human cases in this area because of the unique situation. No cases were reported from these areas.

Surveillance for West Nile virus was more comparable to an active WNV season. Gravid trap collections compared to 2010 were up by 50% in most of our trapping locations. High populations were collected from Fall River in June but significantly decreased throughout the season. Fall River did not have any mosquitoes test positive for WNV in 2009 and 2011, however in 2010, 2 pools were positive. New Bedford had an active season with WNV at multiple trap locations within the city. This continued from early August till mid-September. Epi-week 37 (week ending September 16) was a very active time for WNV with positives found in New Bedford (2 sites), Swansea, Seekonk, and Berkley. This was 2 weeks later than in 2010 when Epi-week 34 was our most active time. The Berkley site was the only reported human biting mosquito, *Ae. vexans*, to test positive in the County. However, on two occasions, *Cx. salinarius* was included in samples that tested positive for WNV in Swansea and Seekonk.

We collected 34 Asian Tiger Mosquitoes- *Ae. albopictus* from the New Bedford site located in close proximity to a tire recycling plant, compared to the 2 collected in 2010. This was the third year in a row that *Ae. albopictus* was collected from this site. Additional traps were placed in the area but no further specimens were collected. We began asking residents of Bristol County to call if they believed they have *Ae. albopictus* in their area. We responded to many calls from Fairhaven, New Bedford and Acushnet but did not collect any further specimens. On August 25, we received a call from a resident in Westport, near a steel and scrap facility and placed a BG Sentinel trap. We collected 1 female *Ae. albopictus* from the location. We moved further south in Westport based on another claim, away from businesses and industry. On September 13th, using a BG Sentinel trap, we collected 10 *Ae. albopictus* from this site. Further investigation is necessary to determine location and movement of this species.

Virus Interventions:

There was modest WNV activity this season in Bristol County; however it has been detected every year since 2001. There were limited interventions for the virus except in New Bedford, sometimes in conjunction was EEE isolations. During Epi-weeks 30-40, truck-based interventions around trap sites

continued in an attempt to reduce the *Culex* populations in the areas. This worked extremely well in the New Bedford and Fall River areas. Following the *Ae. vexans* and *Cx. salinarius* isolations, truck-based interventions were conducted around the trap sites.

Truck-based EEE interventions were completed in response to high mosquito populations, virus isolations and human cases. This was especially important in areas of Raynham and Easton where the potential for positive EEE mosquito activity along the Plymouth border. Unlike the 2006 outbreak, *Cq. perturbans* was the main epizootic vector in 2011 and 2010. There were high levels of *Ae. vexans* and *Oc. canadensis* but they did not play a role in EEE human cases this season.

To date the town of Raynham is in the Critical Risk category for EEE, the first such distinction since the addition of risk maps. The town of Easton is in the High-risk category for EEE. The towns of Dighton, Taunton, Berkley, Freetown, Norton, and Mansfield are in the Moderate-risk category for EEE. To date New Bedford is in the High-risk category for WNV. The towns of Freetown, Dartmouth, Acushnet, and Fairhaven are in the Moderate-risk category for WNV. There were no horse cases for WNV or EEE reported in the County. There were no human cases of WNV but there were 2 cases of EEE.

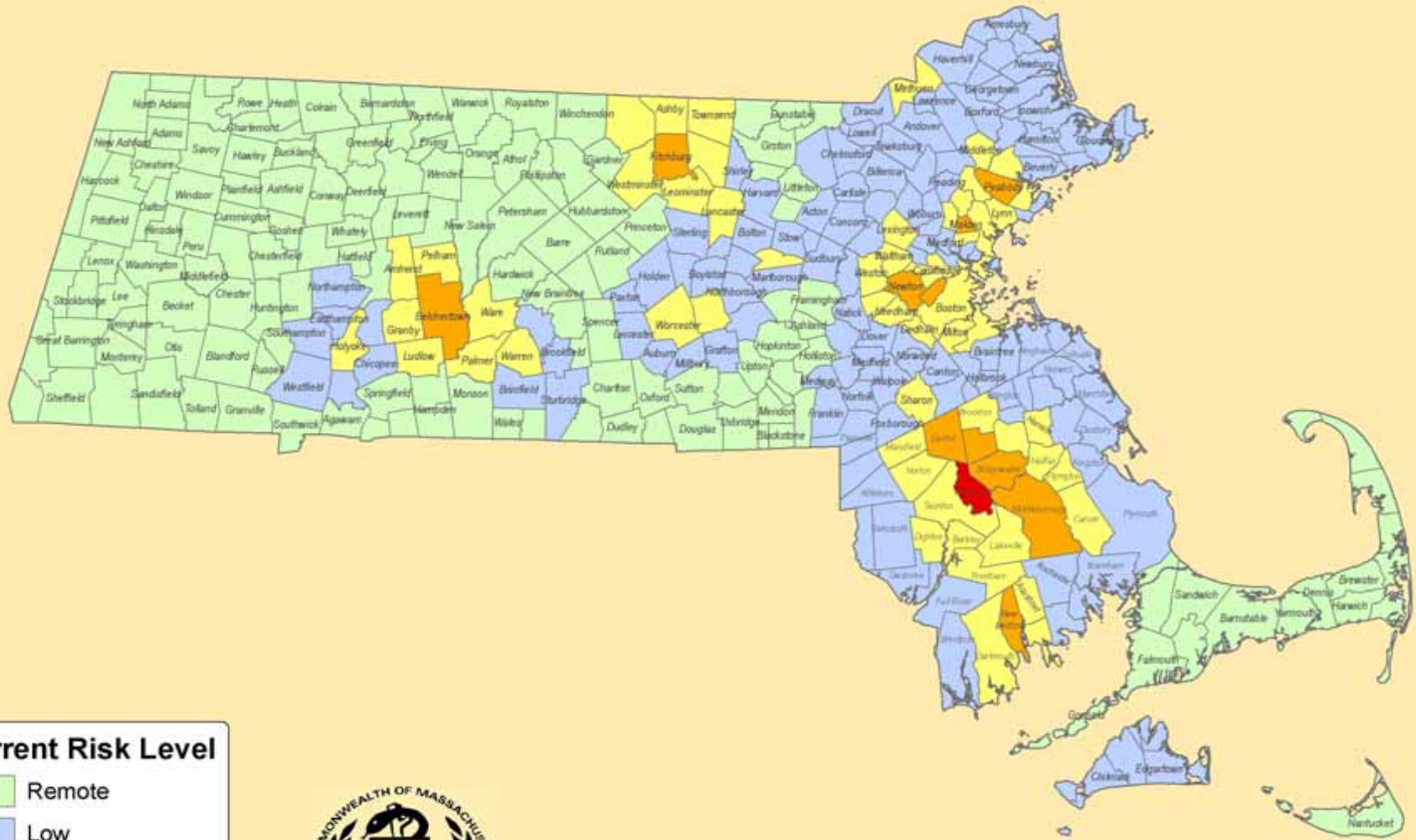
Number of requests for service, is up, down etc:

Year to date Bristol has received 14,323 calls for service as of 10/18/11 and we had stopped taking residential requests as of 9/30/11. In 2008, Bristol had received 11,985 calls for service as of 10/17/08 and 15,964 calls for service as of 10/28/09, 17,508 calls for service as of 10/18/10.

Bristol County Mosquito Control Project's Outreach:

Coordination between BCMCP and the local Boards of Health was ongoing relative to control/surveillance options in the vicinity of WNV and EEE positive mosquito pools. We participated in a variety of public outreach projects including radio, newspaper, and television interviews. Multiple meetings took place between school officials and BCMCP as the concern of EEE increased, especially in Easton and Raynham. We appeared before Board of Health Commissions in many of our towns to explain the importance of mosquito control, surveillance and adulticide applications. We attended and presented information along side Dr. Alfred DeMaria from MA DPH following the confirmation of the human case in Raynham.

Mosquito-Borne Illness Risk Map



Current Risk Level

- Remote
- Low
- Moderate
- High
- Critical

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

2011 End of Season

State Laboratory Institute
Arbovirus Surveillance Program

Aerial application of Anvil® 10+10 for the control of Eastern Equine Encephalitis in Southeastern Massachusetts

Priscilla Matton M.S. & Wayne Andrews M.S.

Bristol County Mosquito Control Project

140 North Walker Street

Taunton, MA 02780

508-823-5253

Acknowledgments

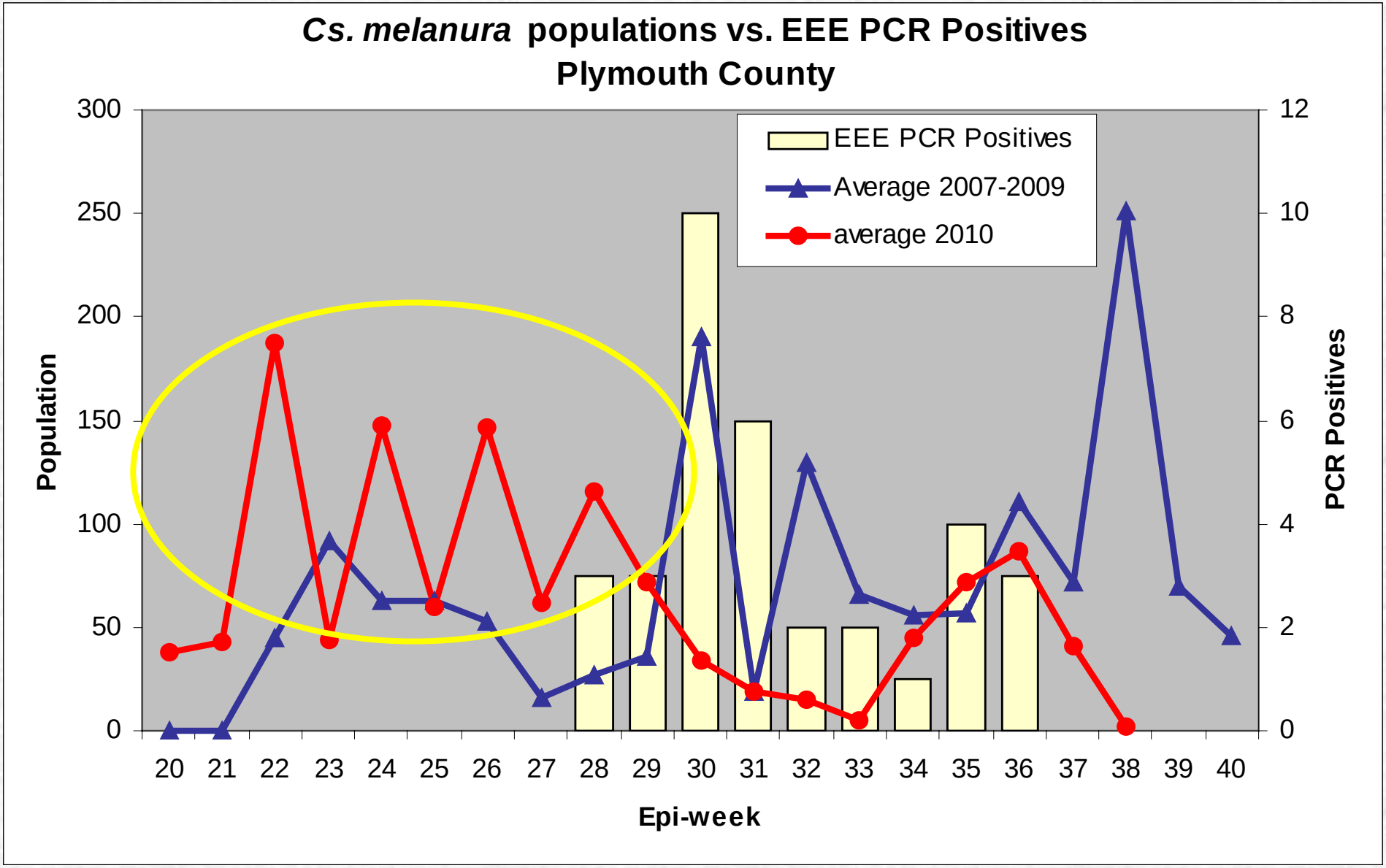
- Clarke- Data and Travel Support

- Ellen Bidlack- Plymouth Co. MCP
- Dynamic Aviation
- Matthew Osborne- MA DPH-SLI Arbovirus
- Mark Buffone- MDAR & SRMCB

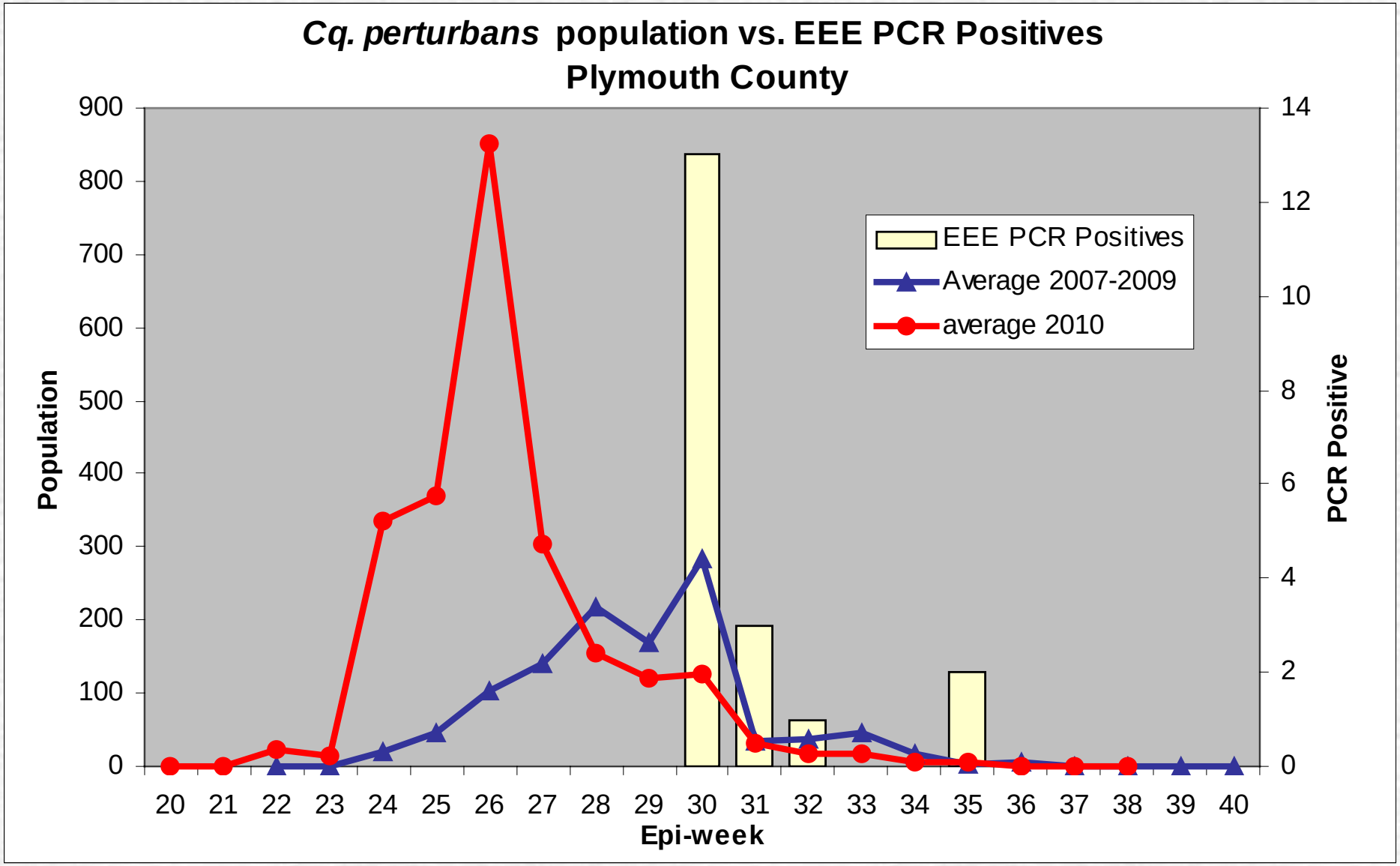
Aerial Adulticiding Justification 2010

- Unprecedented precipitation in March followed by a Hot & Dry summer
- Early equine case- July 20 & August 2
- Risk level *High* close to *Critical*
- Previous Outbreak in 1983- similar conditions
- Intensified truck-based ground spraying not enough (~8% of land area)

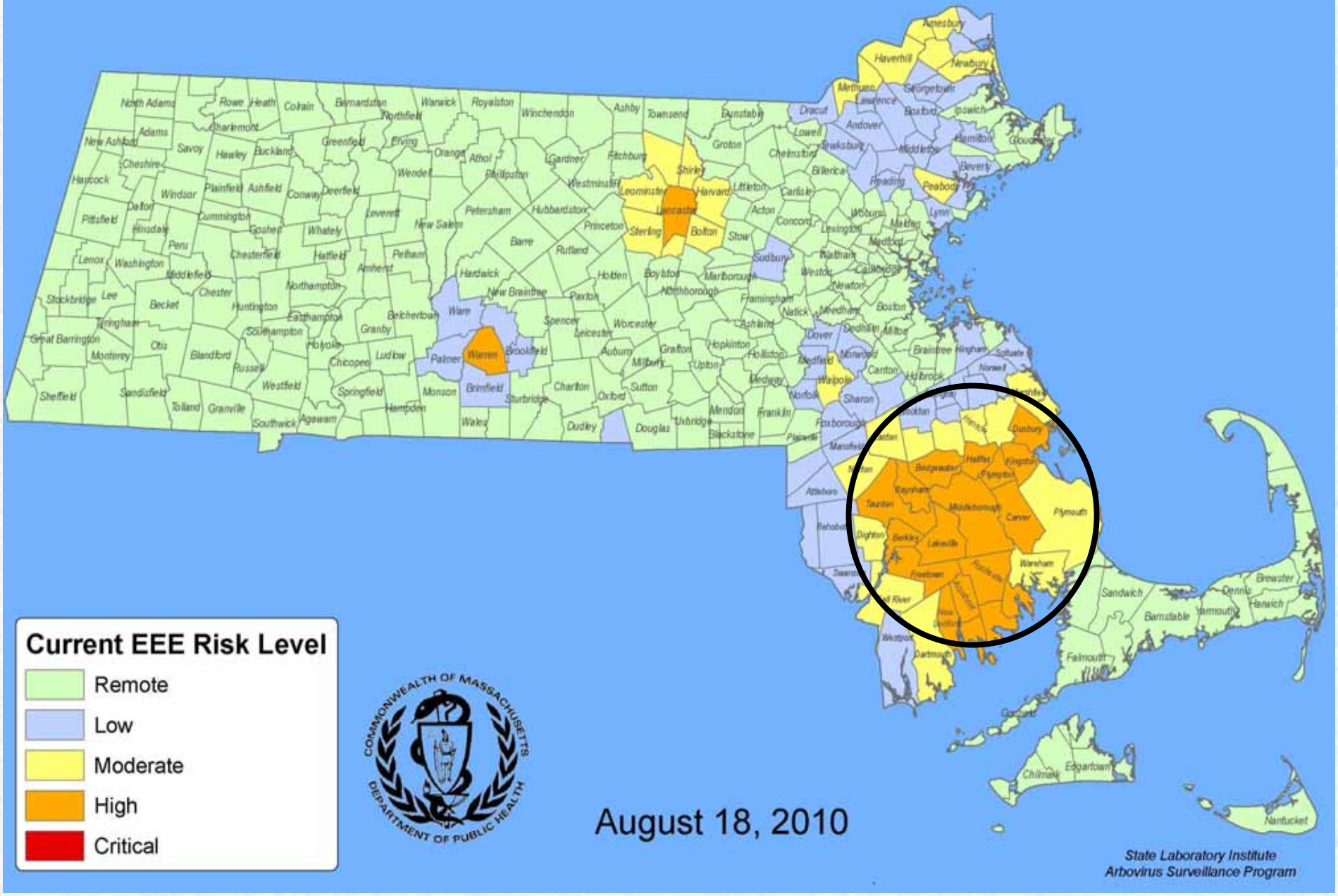
Mosquito density of enzootic vector, *Cs. melanura* higher than normal and above 5-10yr means

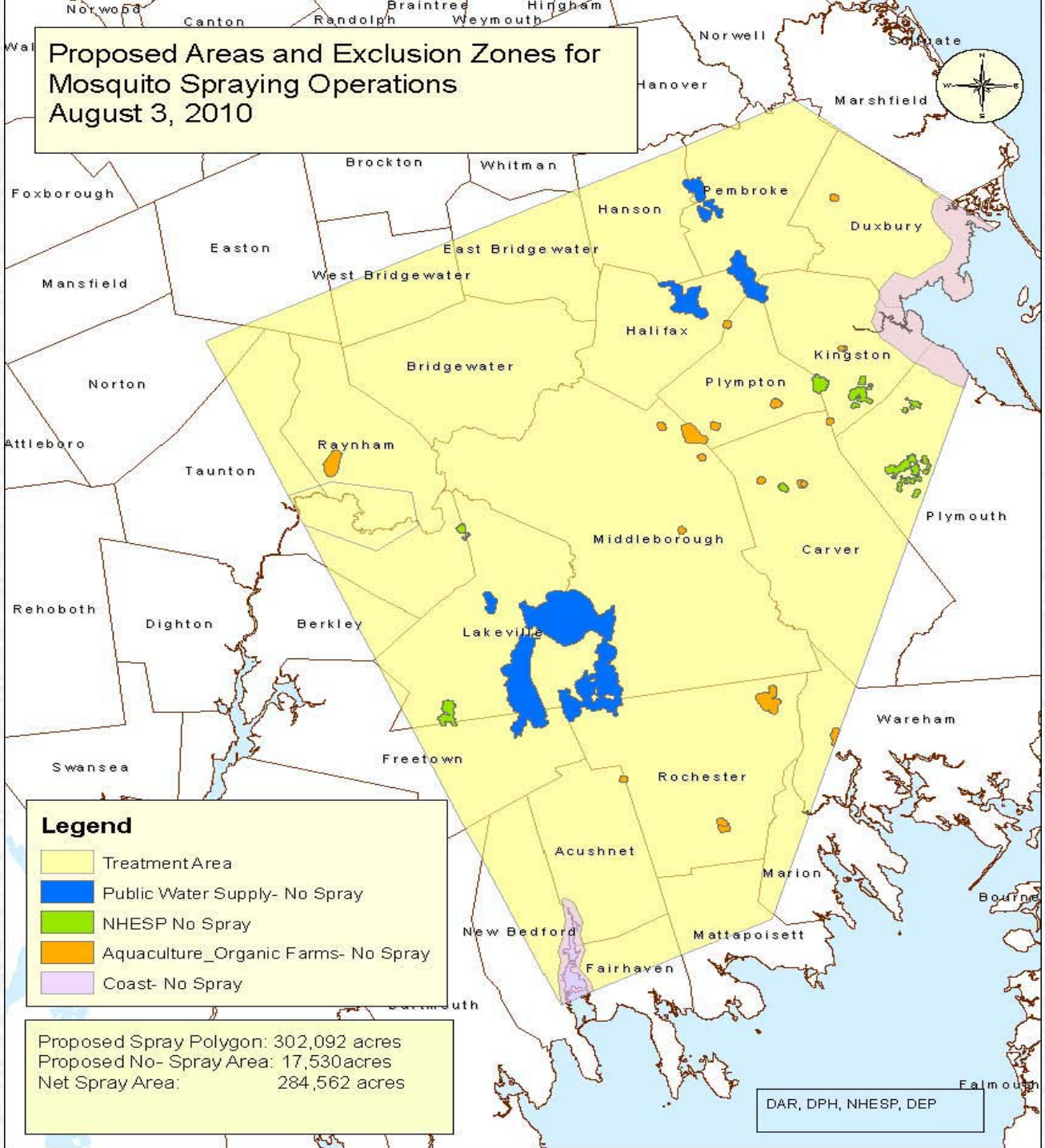


Early, persistent emergence of *Cq. perturbans*
First positive- week of July 25 (13 pools)



Massachusetts EEE Risk Categories




Proposed Areas and Exclusion Zones for
Mosquito Spraying Operations
August 3, 2010
Norwood
Canton
Randolph
Braintree
Weymouth
Hingham
Norwell
Scituate
Hanover
Marshfield
Brockton
Whitman
Foxborough
Hanson
Pembroke
Duxbury
Easton
East Bridgewater
West Bridgewater
Mansfield
Halifax
Kingston
Bridgewater
Plympton
Norton
Attleboro
Raynham
Taunton
Plymouth
Middleborough
Carver
Rehoboth
Dighton
Berkley
Lakeville
Wareham
Swansea
Freetown
Rochester
Acushnet
Marion
Bourne
New Bedford
Mattapoisett
Fairhaven
Falmouth
Legend
Treatment Area
Public Water Supply- No Spray
NHESP No Spray
Aquaculture_Organic Farms- No Spray
Coast- No Spray
Proposed Spray Polygon: 302,092 acres
Proposed No- Spray Area: 17,530acres
Net Spray Area: 284,562 acres
DAR, DPH, NHESP, DEP

Aerial Adulticiding Equipment

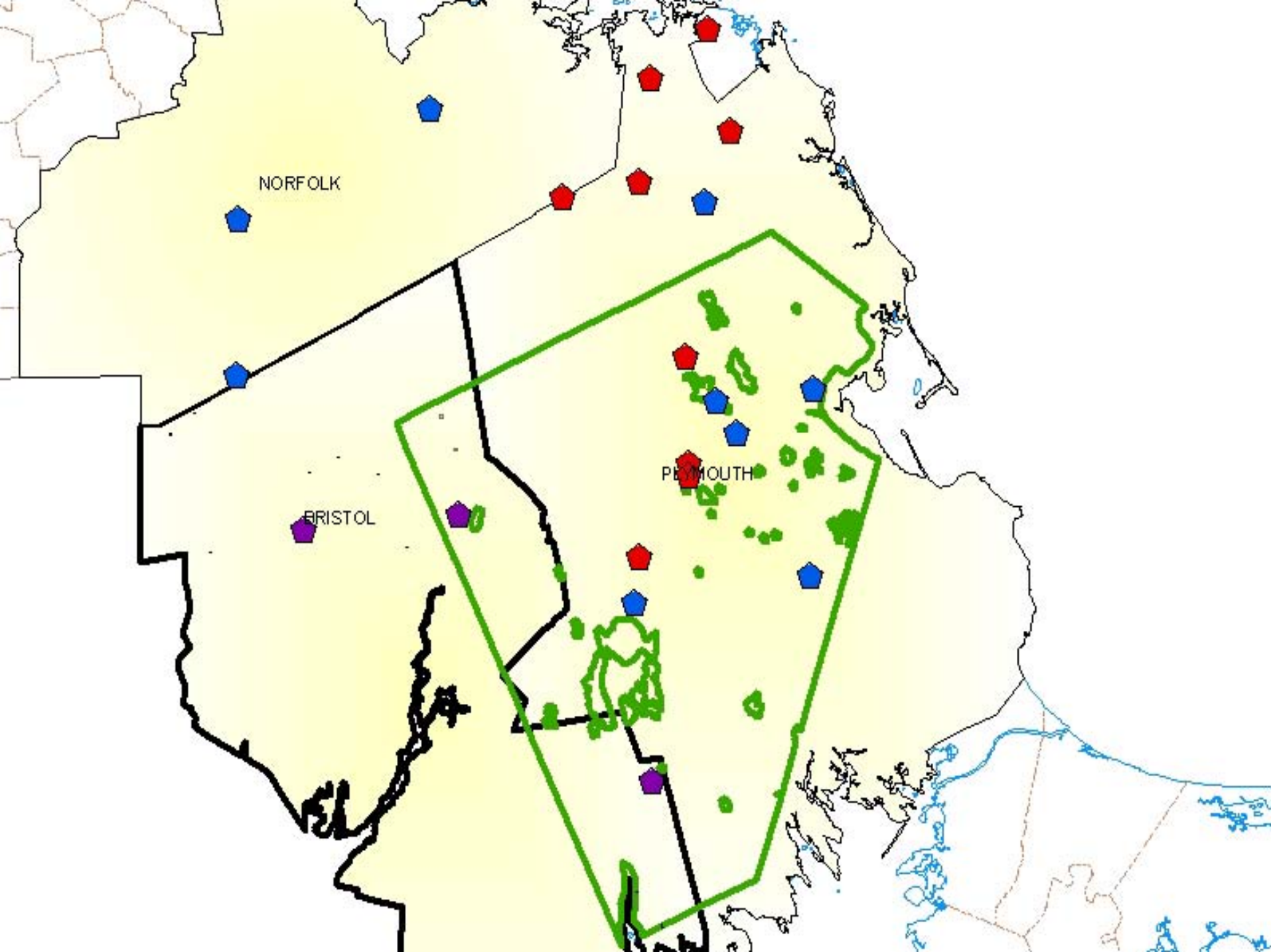
Dynamic Aviation

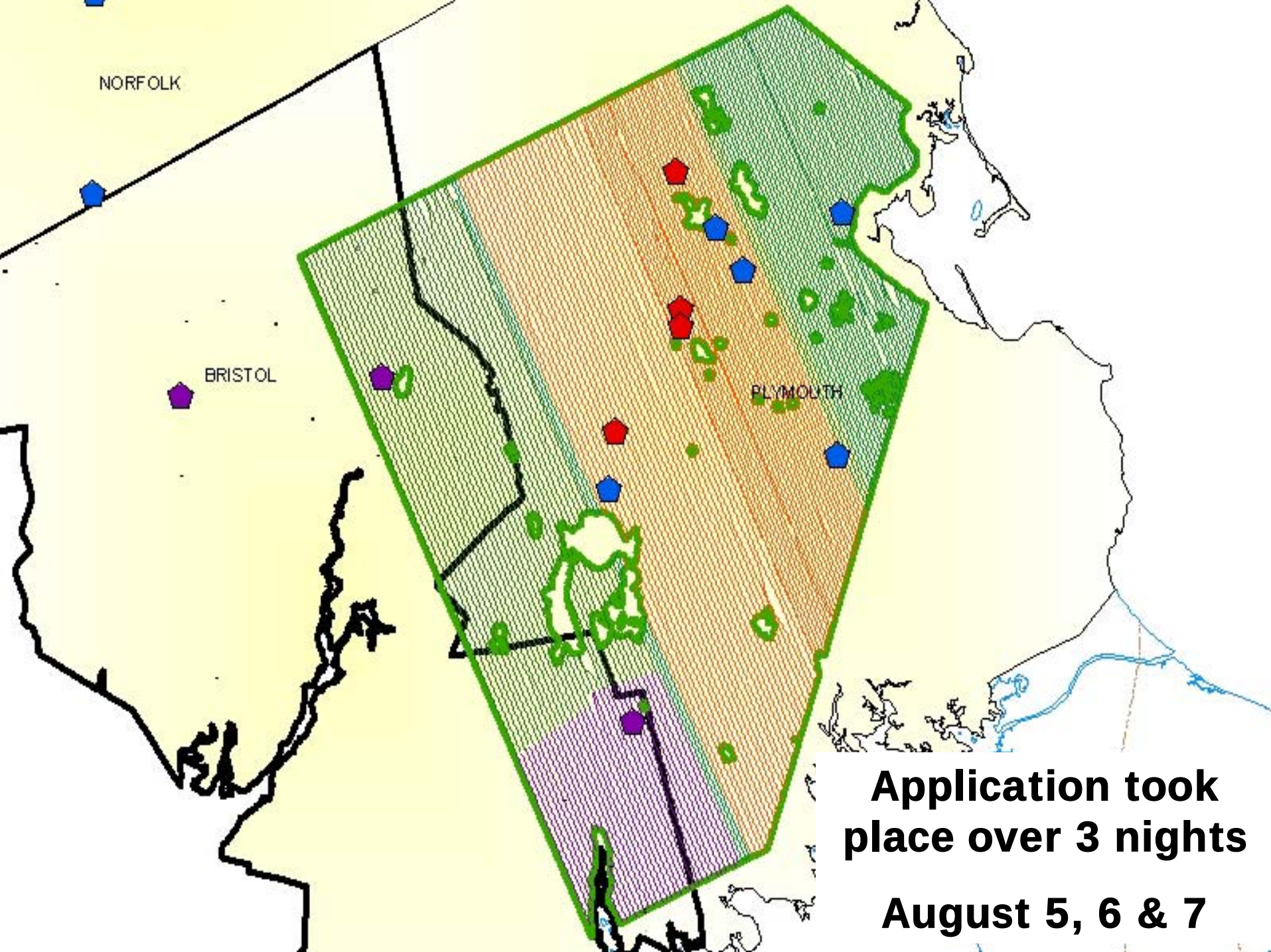
- Specially Equipped Twin Engine, Turbine Powered King Air 90
- Quiet

Anvil® 10 + 10 ULV

- Product pre-approved by MA working group
- Same product used in 2006

- A.I.- Sumithrin 10.00% & Piperonyl Butoxide 10.00%
- Max Rate of 0.62 fluid oz./acre


NORFOLK
BRISTOL
PLYMOUTH



Application took place over 3 nights

August 5, 6 & 7

Results

- Immediate and significant reduction in EEE positive pools in both epizootic and enzootic species
- Only 3 new positive EEE samples were detected within the spray zone from August 10-24
  - *Cs. melanura*
- 1 human case with onset 8/21/10

Plymouth Co. Efficacy

- (5 controls : 4 treatments)
  - August 5-6

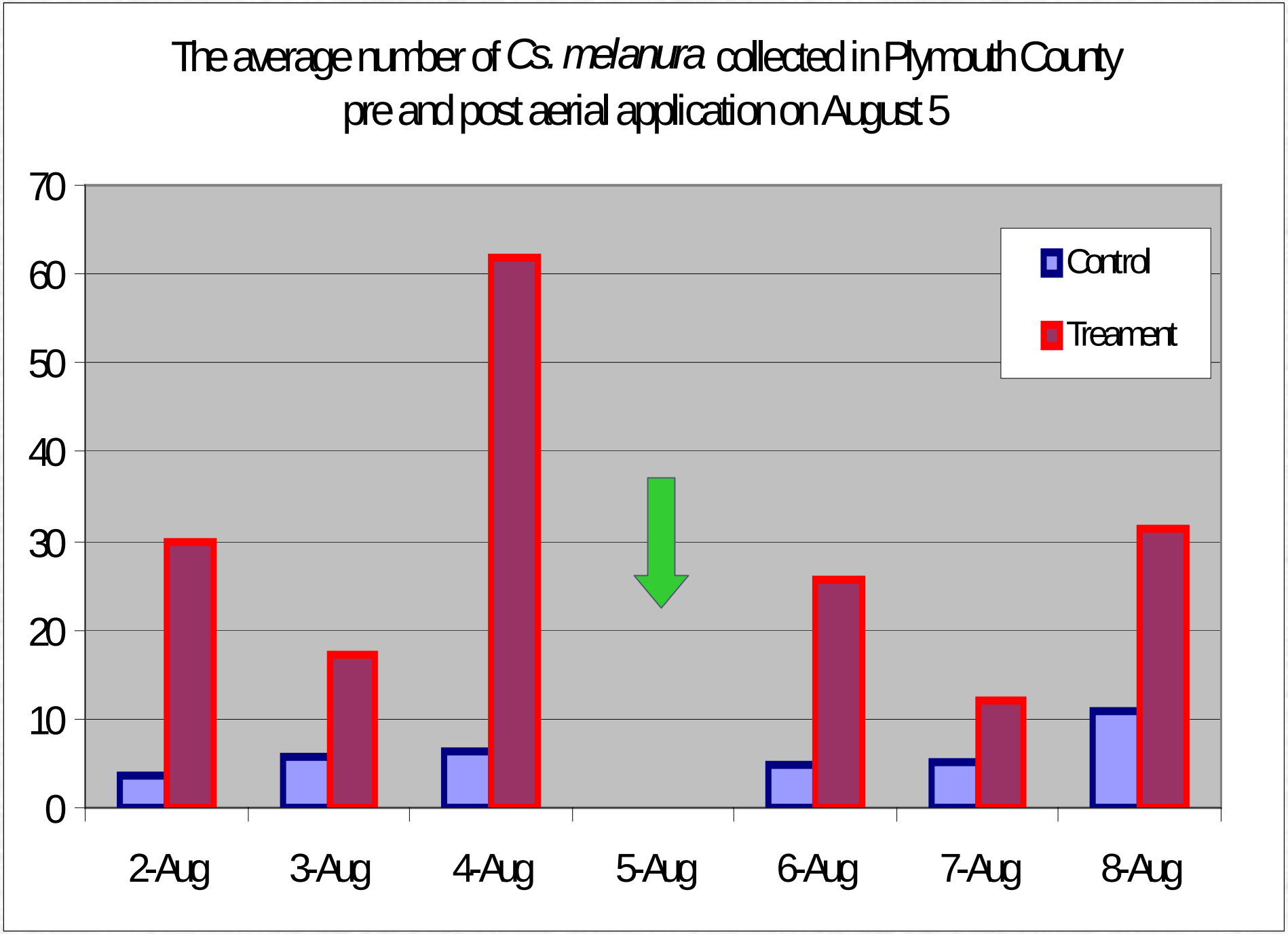
Cs. melanura - 69%

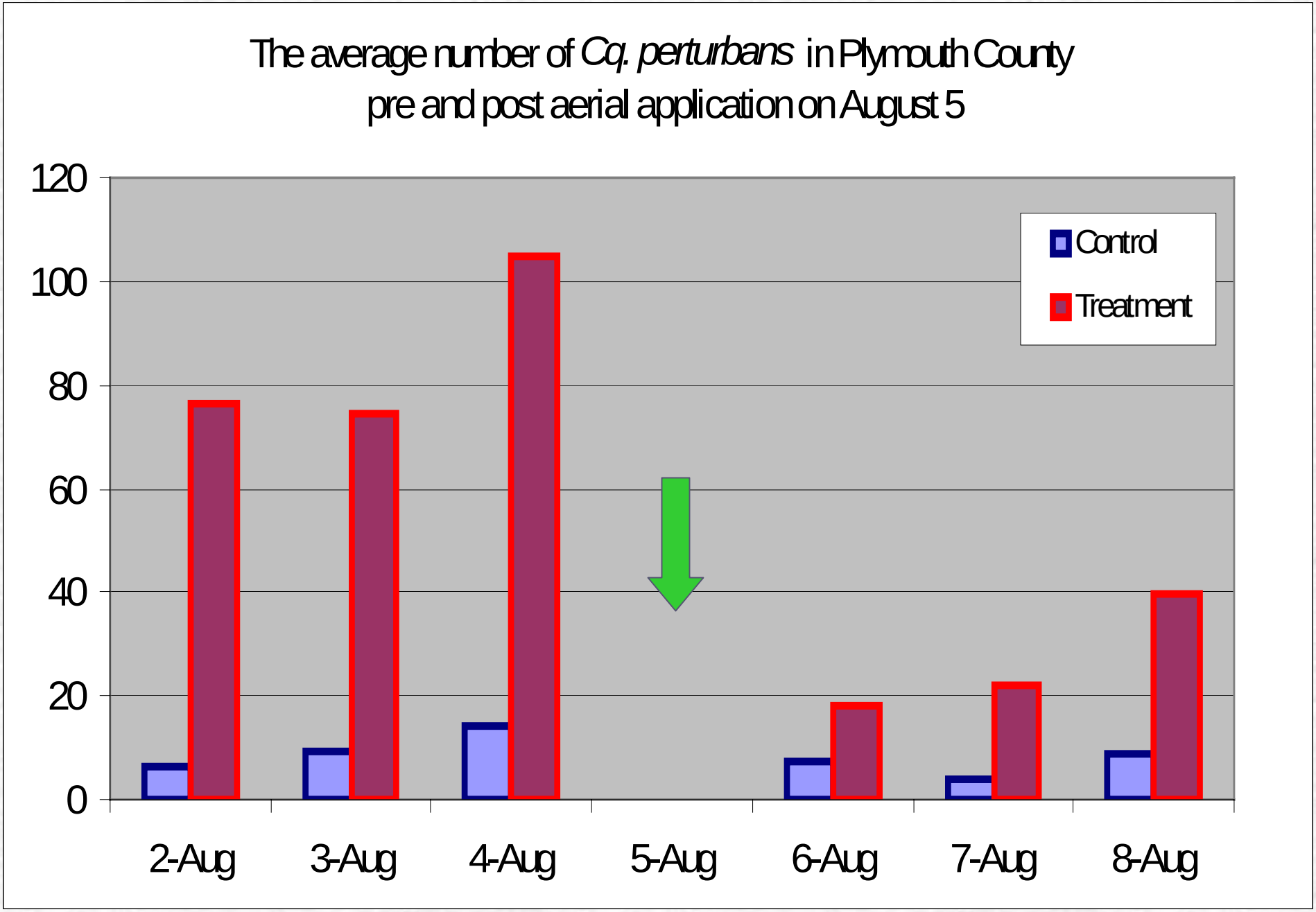
Cq. perturbans - 88%

Ae. vexans - N/A

Oc. canadensis - N/A

OVERALL- 81%


The average number of Cs. *melanura* collected in Plymouth County pre and post aerial application on August 5
70
60
50
40
30
20
10
0
Control
Treament
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug


The average number of *Cq. perturbans* in Plymouth County
pre and post aerial application on August 5
120
100
80
60
40
20
0
Control
Treatment
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug

Bristol Co. Efficacy

- Raynham- Attleboro
  (1 control : 1 treatment)
  - August 6-7

  Cs. melanura - 96%

  Cq. perturbans - 87%

  Ae. vexans - 100%

  Oc. canadensis - 100%

  OVERALL- 88%

- Acushnet- Attleboro
  (1 control : 1 treatment)
  - August 7

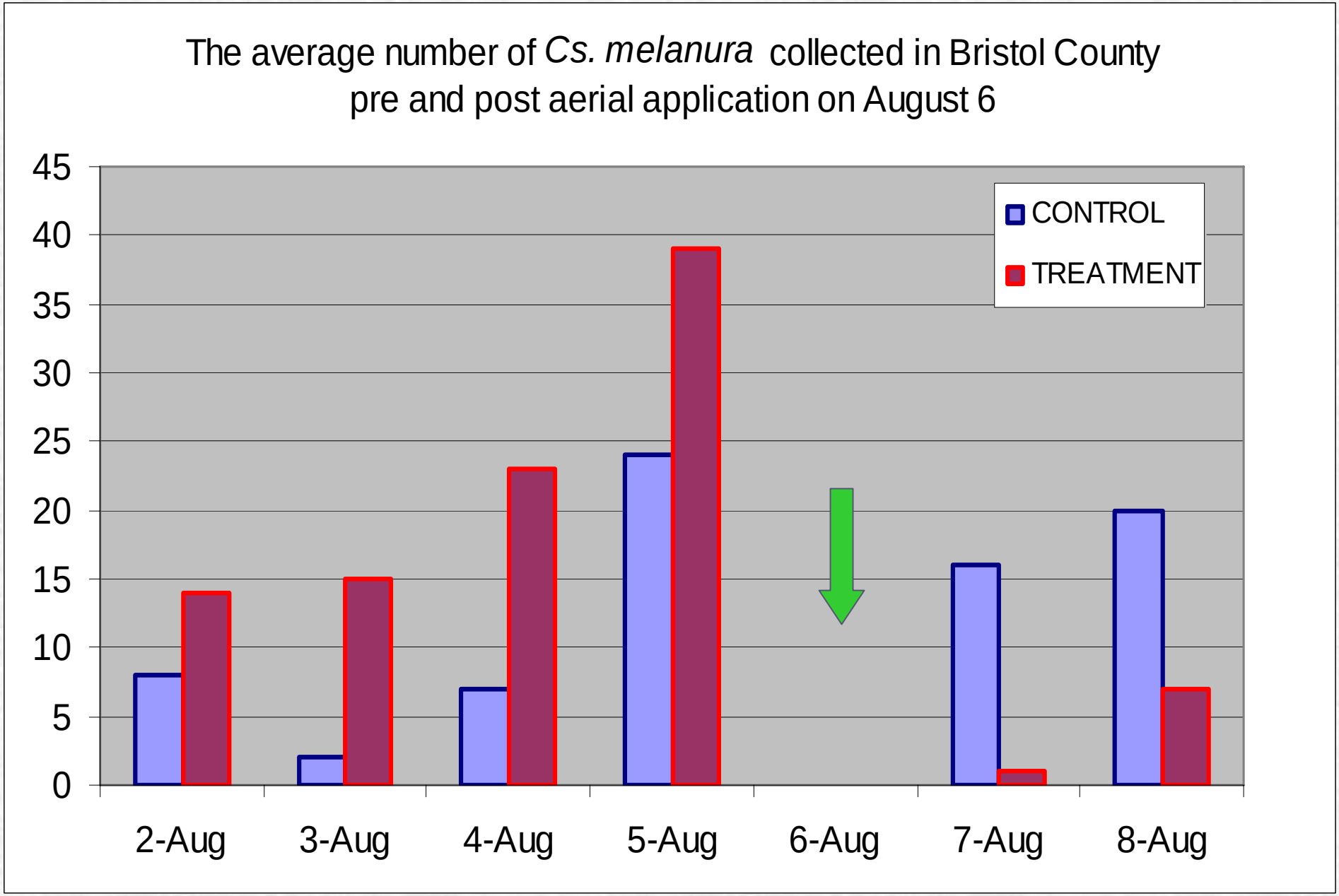
  Cs. melanura - 97%

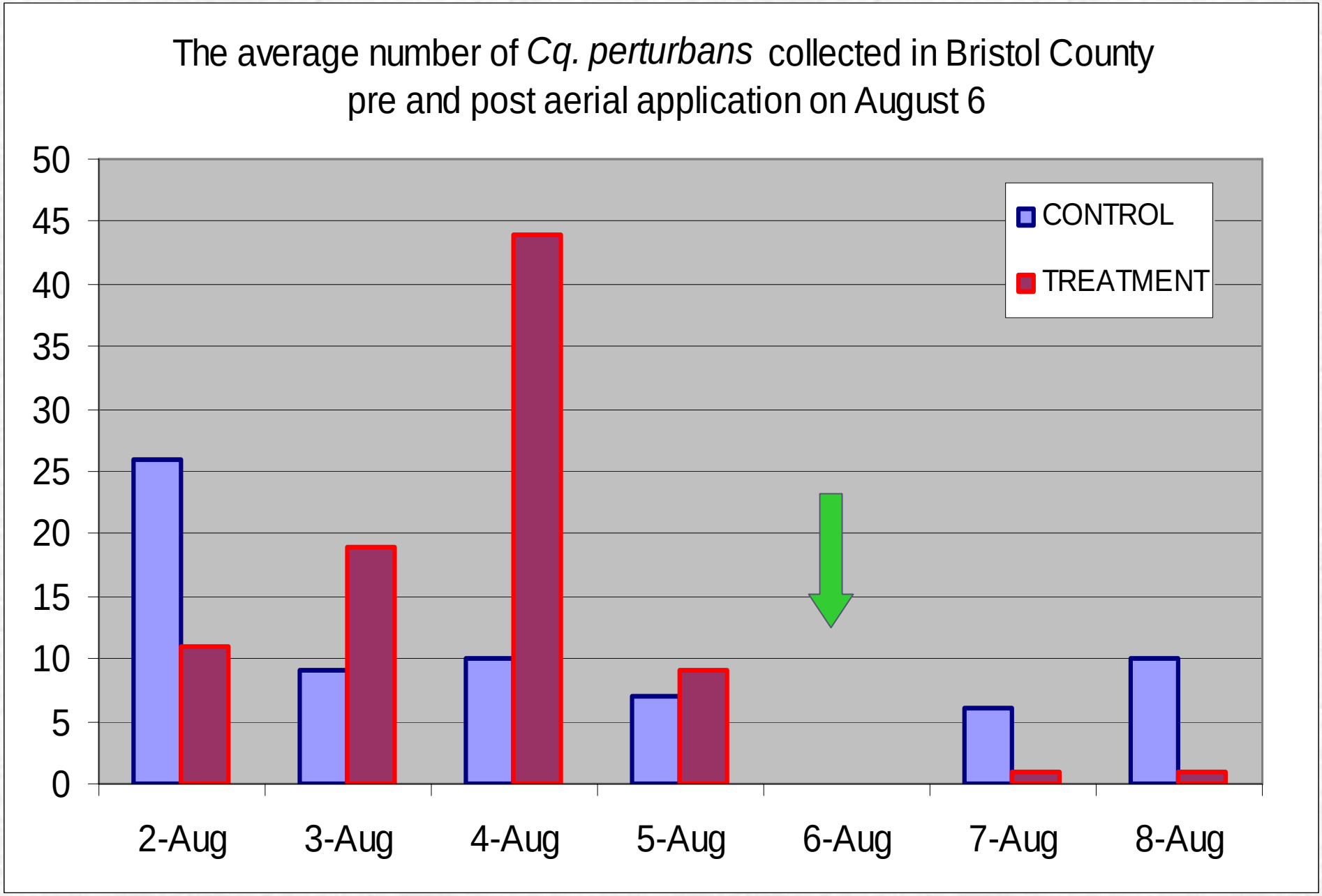
  Cq. perturbans - 80%

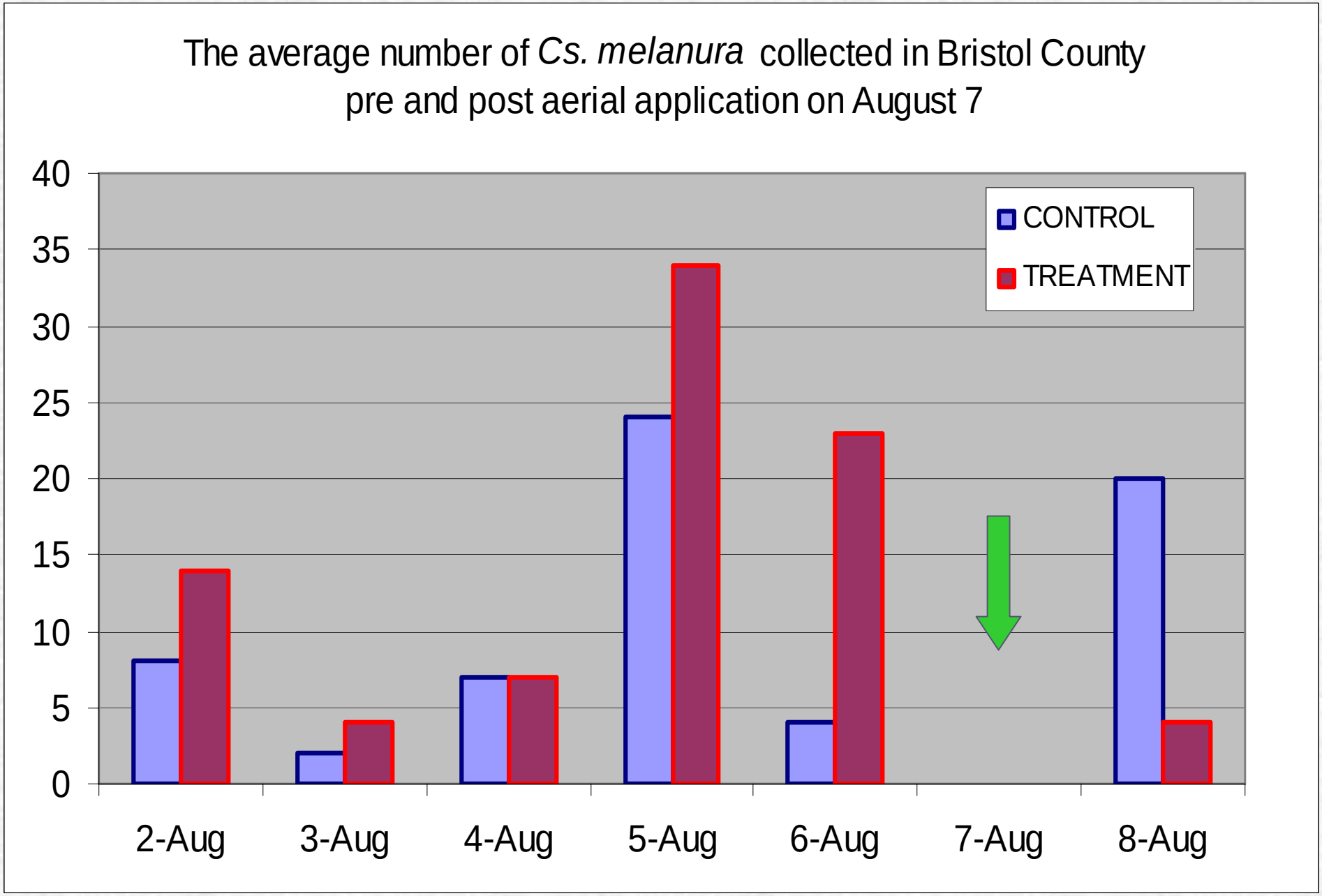
  Ae. vexans - 61%

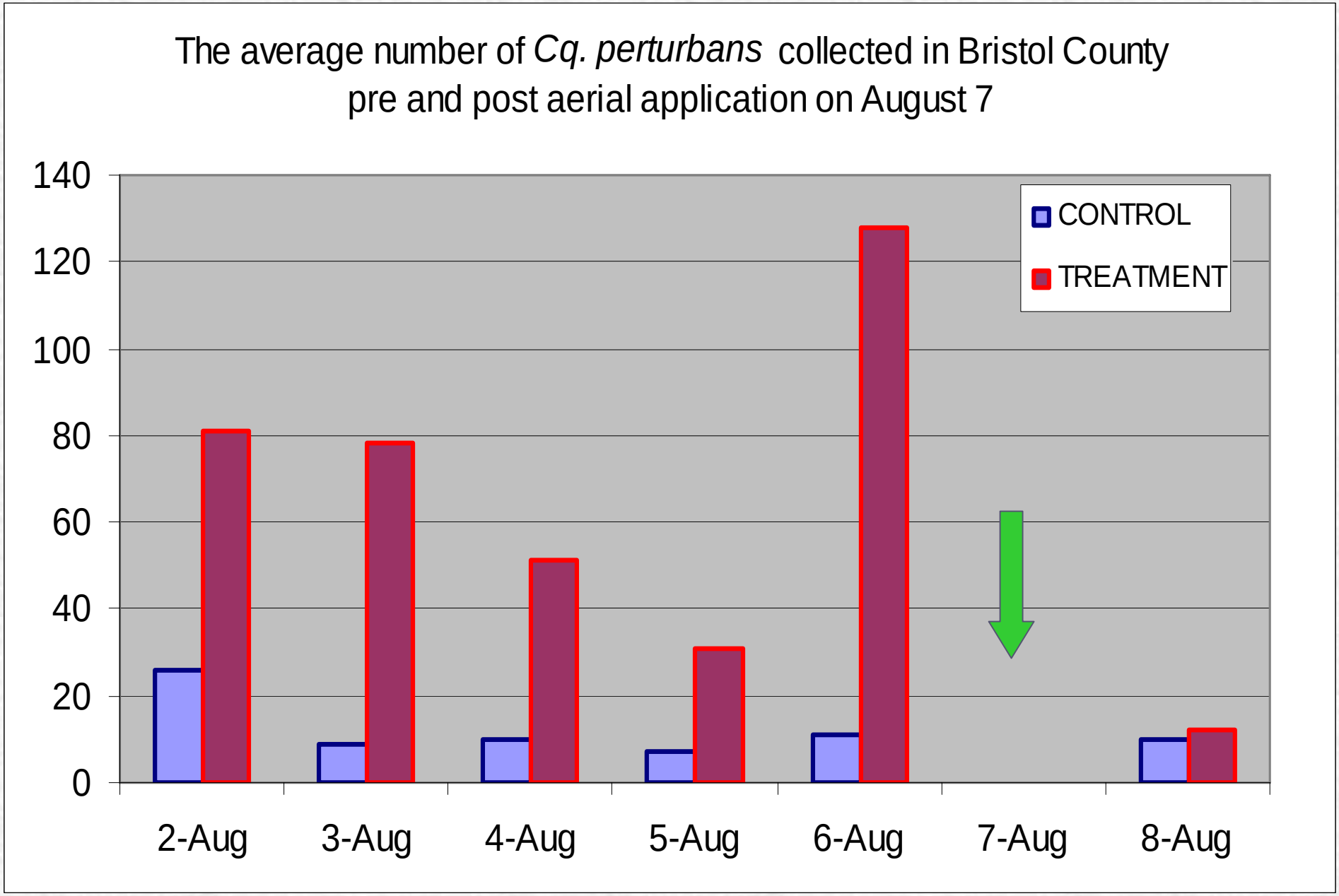
  Oc. canadensis - 58%

  OVERALL- 91%


The average number of *Cs. melanura* collected in Bristol County pre and post aerial application on August 6
45
40
35
30
25
20
15
10
5
0
CONTROL
TREATMENT
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug


The average number of *Cq. perturbans* collected in Bristol County pre and post aerial application on August 6
50
45
40
35
30
25
20
15
10
5
0
CONTROL
TREATMENT
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug


The average number of *Cs. melanura* collected in Bristol County pre and post aerial application on August 7
40
35
30
25
20
15
10
5
0
CONTROL
TREATMENT
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug


The average number of *Cq. perturbans* collected in Bristol County pre and post aerial application on August 7
140
120
100
80
60
40
20
0
CONTROL
TREATMENT
2-Aug
3-Aug
4-Aug
5-Aug
6-Aug
7-Aug
8-Aug

Environmental Monitoring

- Bees - MDAR
- Water Supplies - DEP
- Cranberries - DPH
- Macro invertebrates - DEP
- Non-Target Species - DFW

Thank You

Contact Information:

Bristol County Mosquito Control Project

140 North Walker St.

Taunton, MA 02780

508-823-5253

Priscilla Matton: brismosqpc@comcast.net

Wayne Andrews: brismosqwa@comcast.net

THE COMMONWEALTH OF MASSACHUSETTS
STATE RECLAMATION AND MOSQUITO CONTROL BOARD

BRISTOL COUNTY MOSQUITO CONTROL PROJECT

140 NORTH WALKER STREET, TAUNTON, MA 02780
TEL:(508) 823-5253 FAX: (508) 828-1868

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

SUPERINTENDENT
WAYNE N. ANDREWS M.S.

October 8, 2011

NOTICE OF PUBLIC MEETING TO PRESENT AND DISCUSS
ITS PRELIMINARY PROPOSED BUDGET FOR F/Y 2013

Notice is hereby given that the Bristol County Mosquito Control Project (the "District") will hold an informational public meeting at the time and place indicated below in order to present and discuss the District's preliminary proposed budget for F/Y 2013, and to receive comments and answer questions from the public and local public officials in connection therewith.

Date: November 7, 2011
Time: 7:00 p.m. – 9:00 p.m.
Location: Bristol County Agricultural High School
135 Center St.
Dighton, MA 02715

A copy of the District's preliminary proposed budget is available for inspection during regular business hours at the following location:

Bristol County Mosquito Control Project
140 North Walker Street
Taunton, MA 02780

The total dollar amount of the District's preliminary proposed budget for F/Y 2013 and for the fiscal year immediately proceeding are as follows:

F/Y 2012 = $1,170,535.00
F/Y 2013 = $1,445,023.00

The member municipalities within the District together with each municipality's estimated proportionate share thereof, expressed both as a percentage and as a dollar amount, is as set forth on Form SRB-1, Page 2. As of the date of this notice, the District is comprised of 20 municipalities as listed on Form SRB-1, Page 2. If the composition of the District changes because one or more municipalities join or withdraw from the District, the total preliminary budget will be adjusted pro rata.

Copies of the preliminary proposed budget will be available for inspection at the meeting, at which reasonable time will be accorded to those in attendance to ask questions and to offer comments. Comments may also be sent directly to the State Reclamation and Mosquito Control Board via the Executive Director or Project Administrator by April 15th.

BRISTOL COUNTY MOSQUITO CONTROL PROJECT
BUDGETS FY2011 - FY2013

SPENDING CATAGORIES	BUDGET APPROP. FY2011	BUDGET APPROP. FY2012	BUDGET APPROP. FY2013
SUB AA			
PAYROLL	$595,868.00	$569,430.00	$744,430.00
		$16,222.00	$16,444.00
SUB BB			
EXPENSES, TRAVEL	$3,750.00	$5,600.00	$5,600.00
SUB DD	$220,000.00	$291,817.00	$320,016.00
RET.; INS.; TAXES			
SUB EE	$29,575.00	$26,770.00	$26,369.00
OFFICE EXPENSES,LICENSE,VEH.INS.			
SUB FF	$25,000.00	$26,300.00	$28,800.00
VEHICLE MAINT-REPAIR			
SUB GG	$70,800.00	$64,900.00	$73,068.00
RENT,HEATING & VEH. FUEL, UTILITIES			
SUB JJ	$5,000.00	$0.00	$5,000.00
TEMP. HELP, AUXILIARY SVCS.			
SUB KK	$65,000.00	$17,946.00	$57,146.00
EQUIPMENT PURCHASE			
SUB LL	$6,500.00	$8,600.00	$13,700.00
EQUIP. LEASE-MAINTENANCE-REPAIR			
SUB NN	$79,948.00	$108,000.00	$109,500.00
INSECTICIDES			
FACILITY-MAINT & REPAIR			
SUB UU	$35,000.00	$34,950.00	$44,950.00
INFORMATION TECH			
TOTAL BUDGETS	**$1,136,441.00**	**$1,170,535.00**	**$1,445,023.00**

The below chart lists the estimated cherry sheet assessments for FY2013 based on the preliminary proposed Budget of Bristol County Mosquito Control District

Form SRB-1

FISCAL YEAR 2013		ASSESSMENTS
Name of Municipality		Dollar amount to be deducted from
		Local Aid Distribution
ACUSHNET		$37,860
ATTLEBORO		$86,557
BERKLEY		$31,212
DARTMOUTH		$146,914
DIGHTON		$39,883
EASTON		$73,696
FAIRHAVEN		$40,316
FALL RIVER		$114,357
FREETOWN		$62,859
MANSFIELD		$67,194
NEW BEDFORD		$98,984
NORTH ATTLEBORO		$70,473
NORTON		$64,737
RAYNHAM		$50,175
REHOBOTH		$80,199
SEEKONK		$48,408
SOMERSET		$42,917
SWANSEA		$55,922
TAUNTON		$130,342
WESTPORT		$102,019

Bristol County Mosquito Control FY 2013 Budget Request

See: FY13 Maintenance Estimate

2011 Mosquito Season

- Cold, Wet Spring
- Reduced Surveillance Program continues
- High Viral Activity (WNv and EEE)
  - Continuing early detection, late activity
  - 2 Human EEE cases (1 death)
  - Disease Trend
- No State Mandated Aerial Adulticide
- Fiscal Crisis continues

BCMCP 2011 Work Report

Water Management Projects not Included

Open: Annual_Adulticide_Work_Report

BCMCP 2013 Budget Assessments

By Member Municipality

See:budget_assessments

BCMCP Budget History

FISCAL YEAR	TOWN/CITY APPROPRIATED	TRUST FUND	TOTAL BUDGET
FY 2002	N/A	$137,163.45	$1,200,076.00
FY 2003	N/A	$157,675.07	$1,294,076.00
FY 2004	$972,643.00	$321,433.36	$1,294,076.36
FY 2005	$919,573.00	$321,433.36	$1,241,006.36
FY 2006	$1,037,123.00	$407,915.00	$1,445,038.00
FY 2007	$1,037,123.00	$444,450.00	$1,481,573.00
FY 2008	$1,089,627.00	$486,931.00	$1,576,558.00
FY 2009	$1,116,868.00	$595,151.66	$1,712,019.00
FY 2010	$794,609.00	$645,347.00	$1,439,956.00
FY 2011	$794,609.00	$347,000.00	$1,141,609.00
FY 2012	$1,170,535.00	$0.00	$1,170,535.00
FY 2013	REQUEST	-----	$1,445,023.00

BCMCP Justification

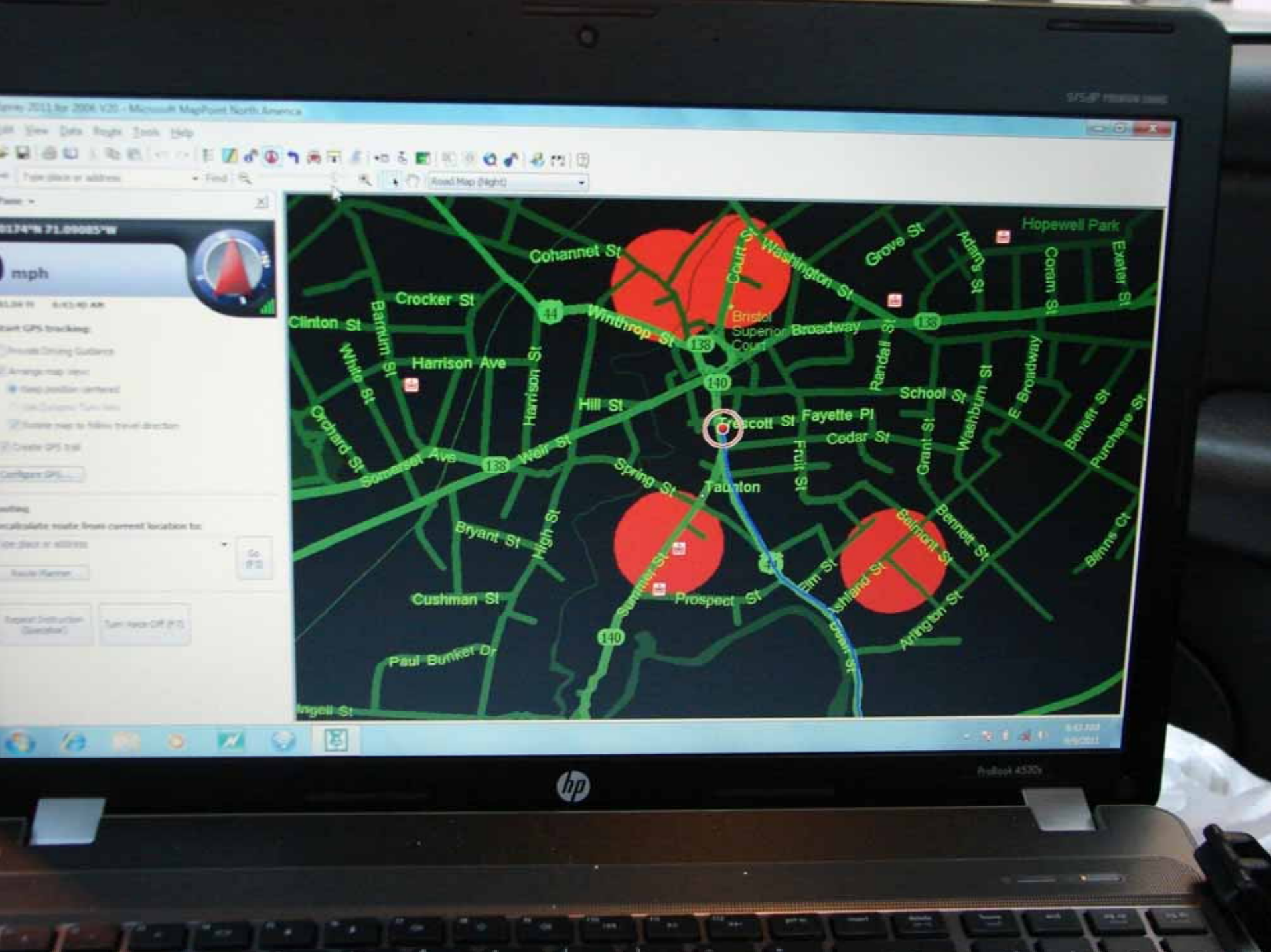
- Currently short 3 f/t employees
- Compliance with NPDES regulation
  - Permitting
  - Monitoring
  - Reporting
  - Qualified Personnel for compliance
  - Liability
- Invasive species/WNv vector

Bristol County Mosquito Control

Operations Overview

MOSQUITO CONTROL
4x4
3
SILVERADO

ADAPCO


Hopewell Park
Cohannet St
Crocker St
Clinton St
Barnum St
White St
Harrison Ave
Harrison St
Winthrop St
Court St
Washington St
Grove St
Adams St
Coram St
Exeter St
Bristol
Superior Court
Broadway
Randall St
School St
Washburn St
E Broadway
Benefit St
Purchase St
Hill St
Orchard St
Somerset Ave
Weir St
Trescott St
Fayette Pl
Cedar St
Fruit St
Grant St
Spring St
Taunton
Bryant St
High St
Belmont St
Bennett St
Blinns Ct
Summer St
Prospect St
Elm St
Ashland St
Arlington St
Cushman St
Paul Bunker Dr
Angell St
14
138
140

F-250
5
BRISTOL
COUNTY
MOSQUITO
CONTROL

zero

Freedom
Koss Ave
9-6-11

BELMONT

DA-04-006 C4

Link-Belt

BRISTOL COUNTY
MOSQUITO CONTROL
Spin Ace
75
k-Belt

Link-Belt
1600

MA-10-003 C3

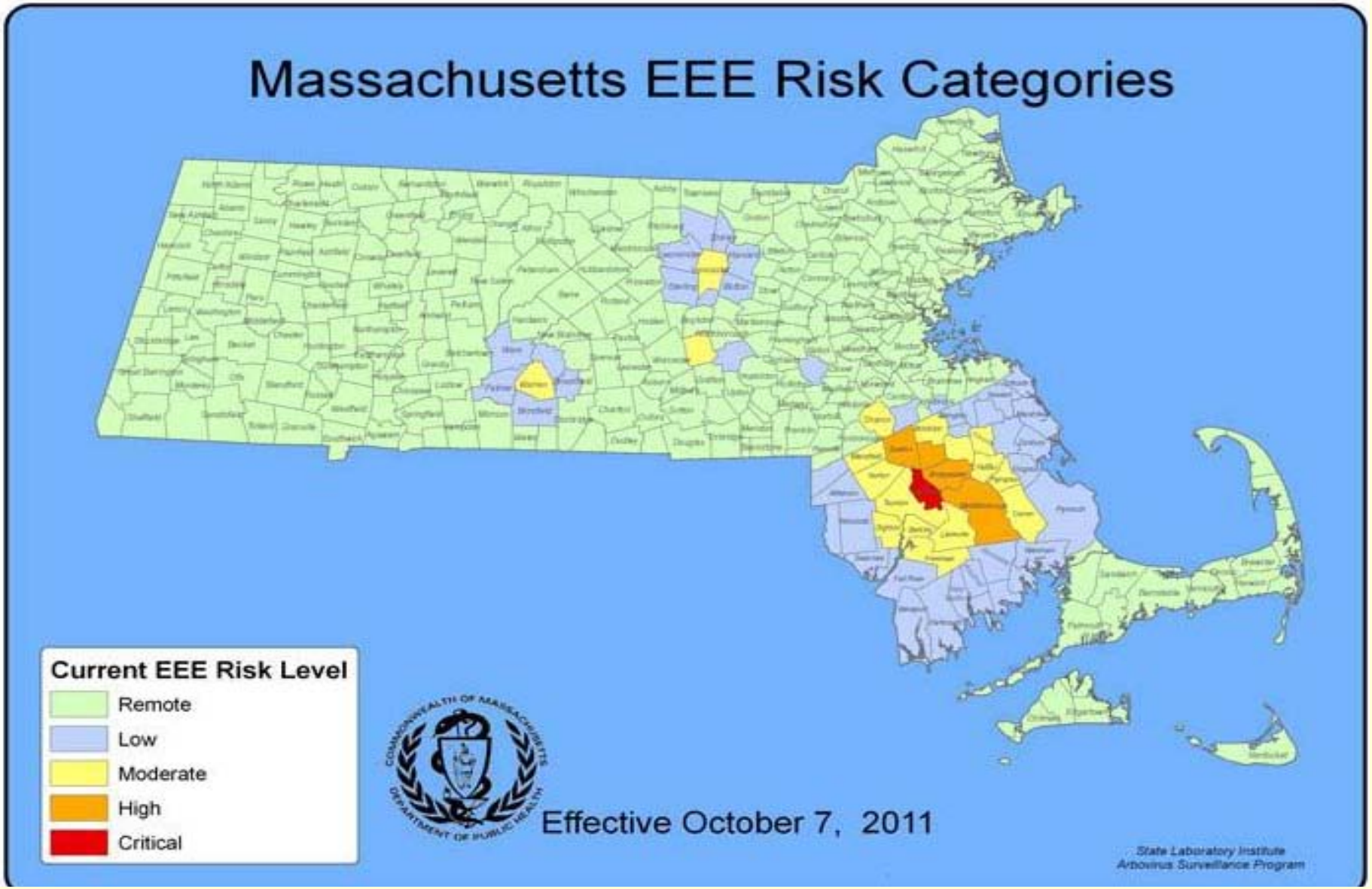
Link-Belt

Link-Belt
1600

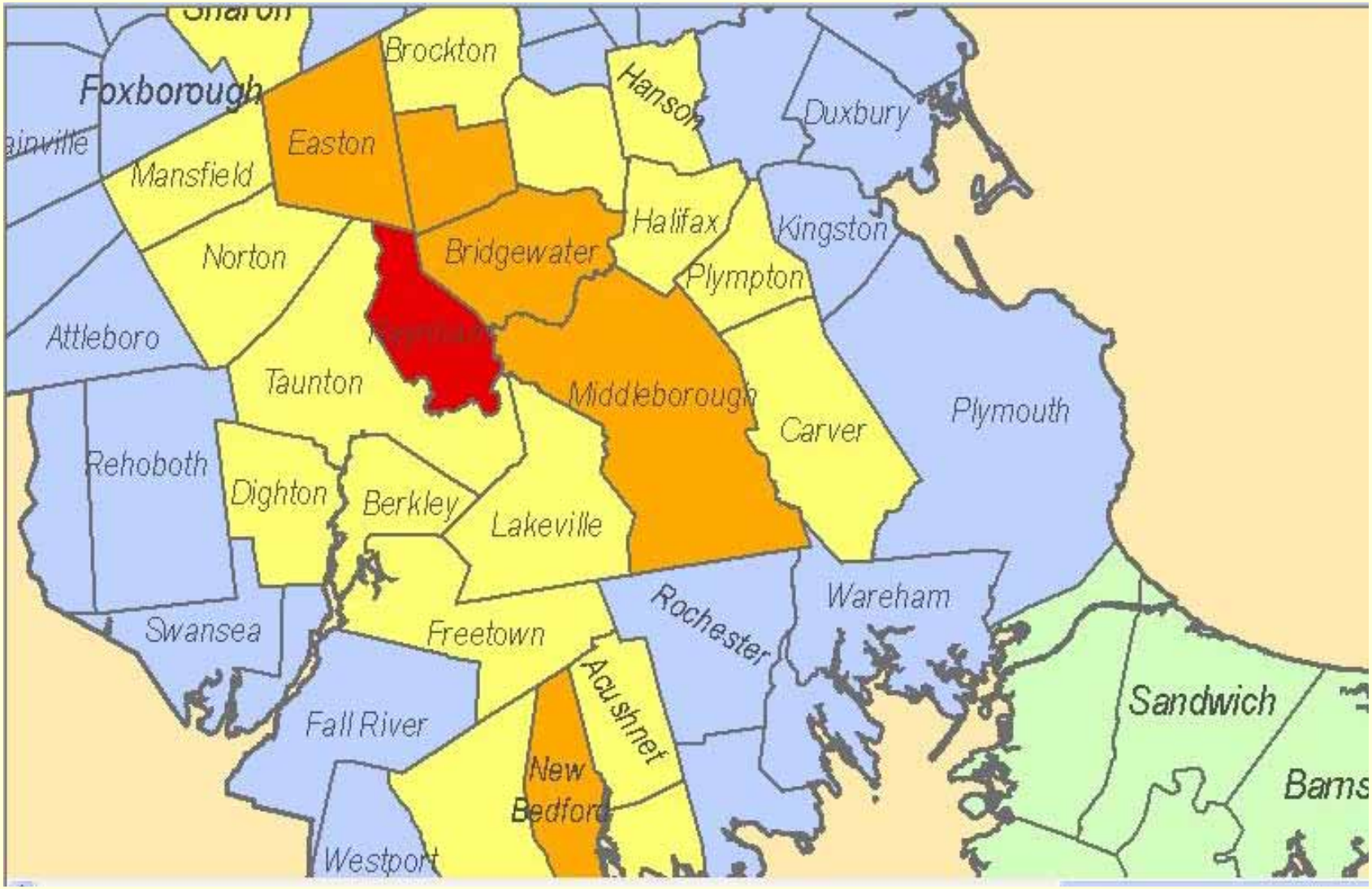
Link-Belt

Link-Belt

Why Raynham?


Massachusetts EEE Risk Categories
Current EEE Risk Level
Remote
Low
Moderate
High
Critical
Effective October 7, 2011
State Laboratory Institute
Arbovirus Surveillance Program

Why Raynham?


Brockton
Foxborough
Hanson
Duxbury
Easton
Mansfield
Halifax
Kingston
Norton
Bridgewater
Plympton
Attleboro
Taunton
Middleborough
Carver
Plymouth
Rehoboth
Dighton
Berkley
Lakeville
Wareham
Rochester
Swansea
Freetown
Acushnet
Sandwich
Fall River
New Bedford
Westport

Why do we have EEE?

Culiseta melanura

- Atlantic White Cedar swamps provide larval habitat
  - Crypts under tree roots
  - Hockomock, Bolton and Pine Swamp
- Historically feeds primarily on birds, with recent evidence of human, cow and horse blood- The Connecticut Agricultural Experiment Station
- Overwinters in the larval stage

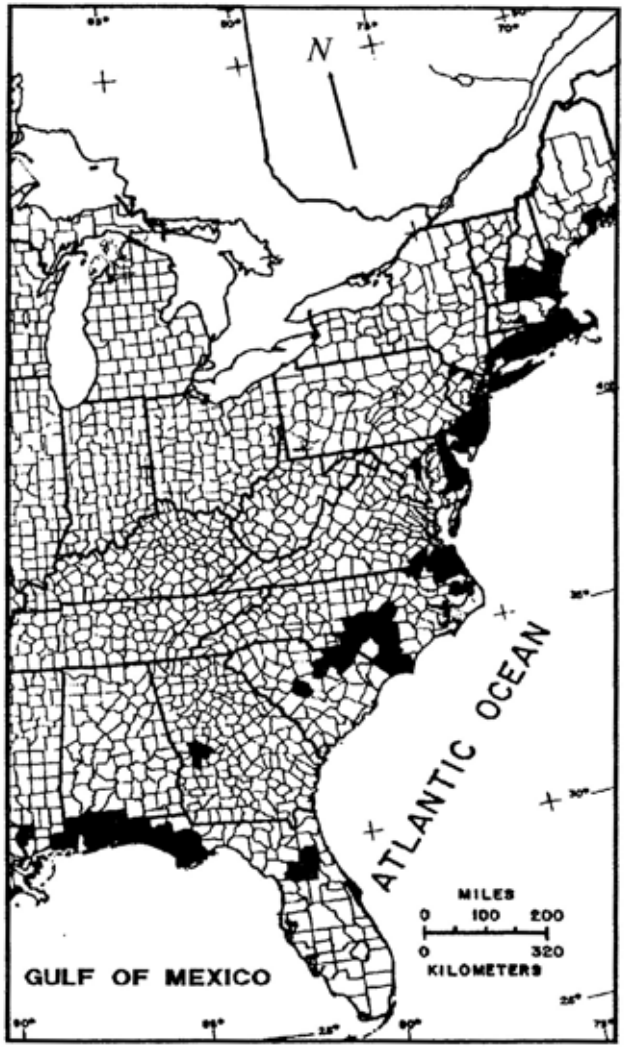
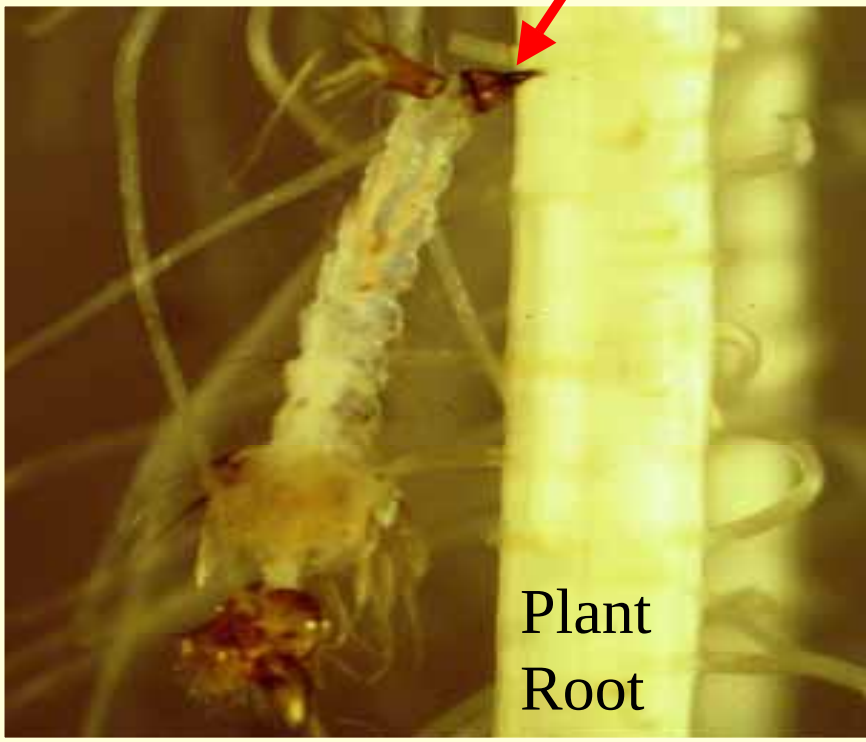


Figure 1. Distribution of *Chamaecyparis thyoides*. Records were compiled from field observations, herbarium records, published sources, and personal communications. Counties in which Atlantic white cedar has been found are inked in black (from Laderman 1982).

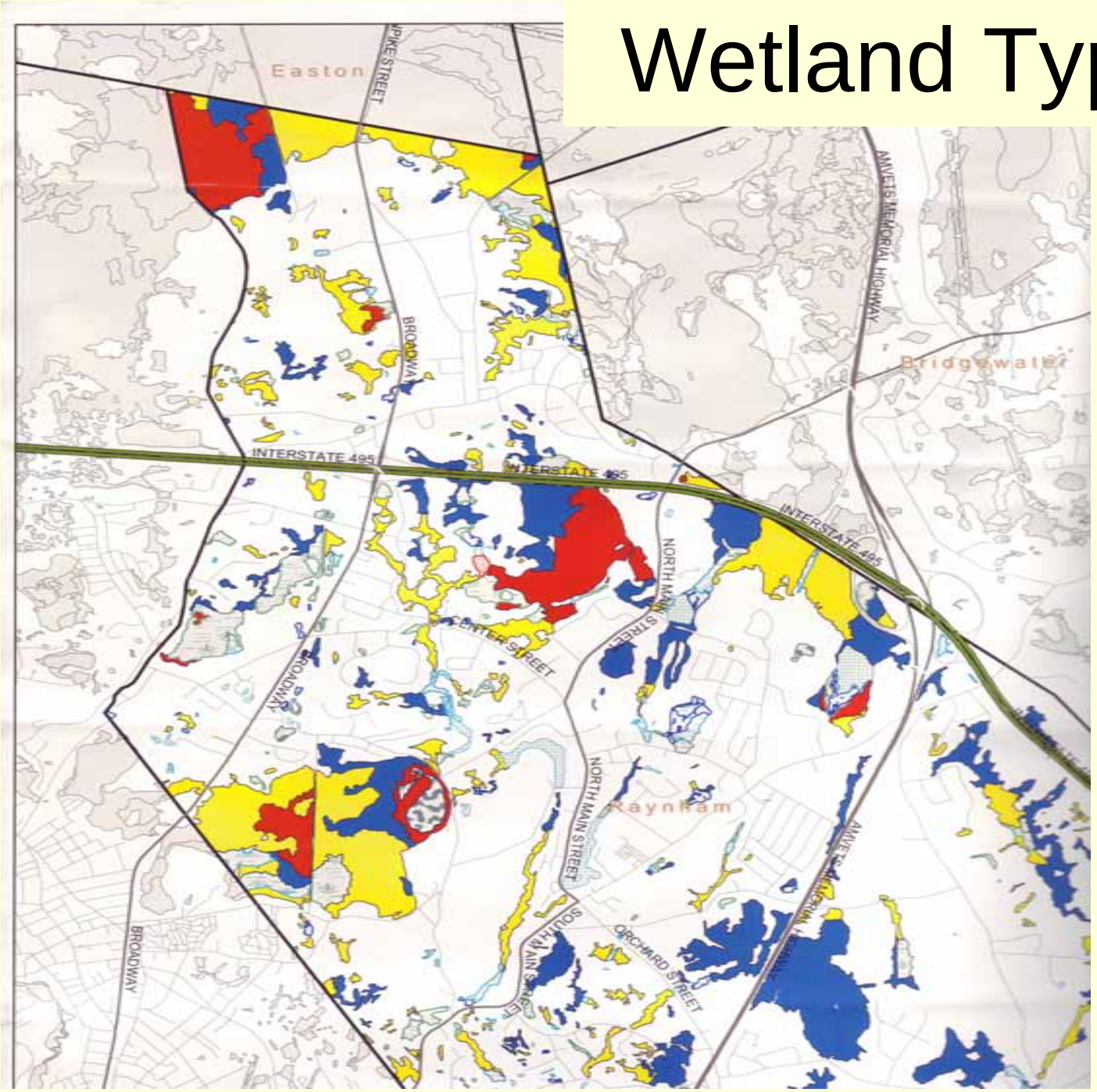
Why do we have EEE?

Cq. perturbans

- Common name: *Cattail Mosquito*
- Important Bridge Vector
- Cattail plants provide larval habitat
- Opportunistic feeder (adult)
- Overwinters in the larval stage

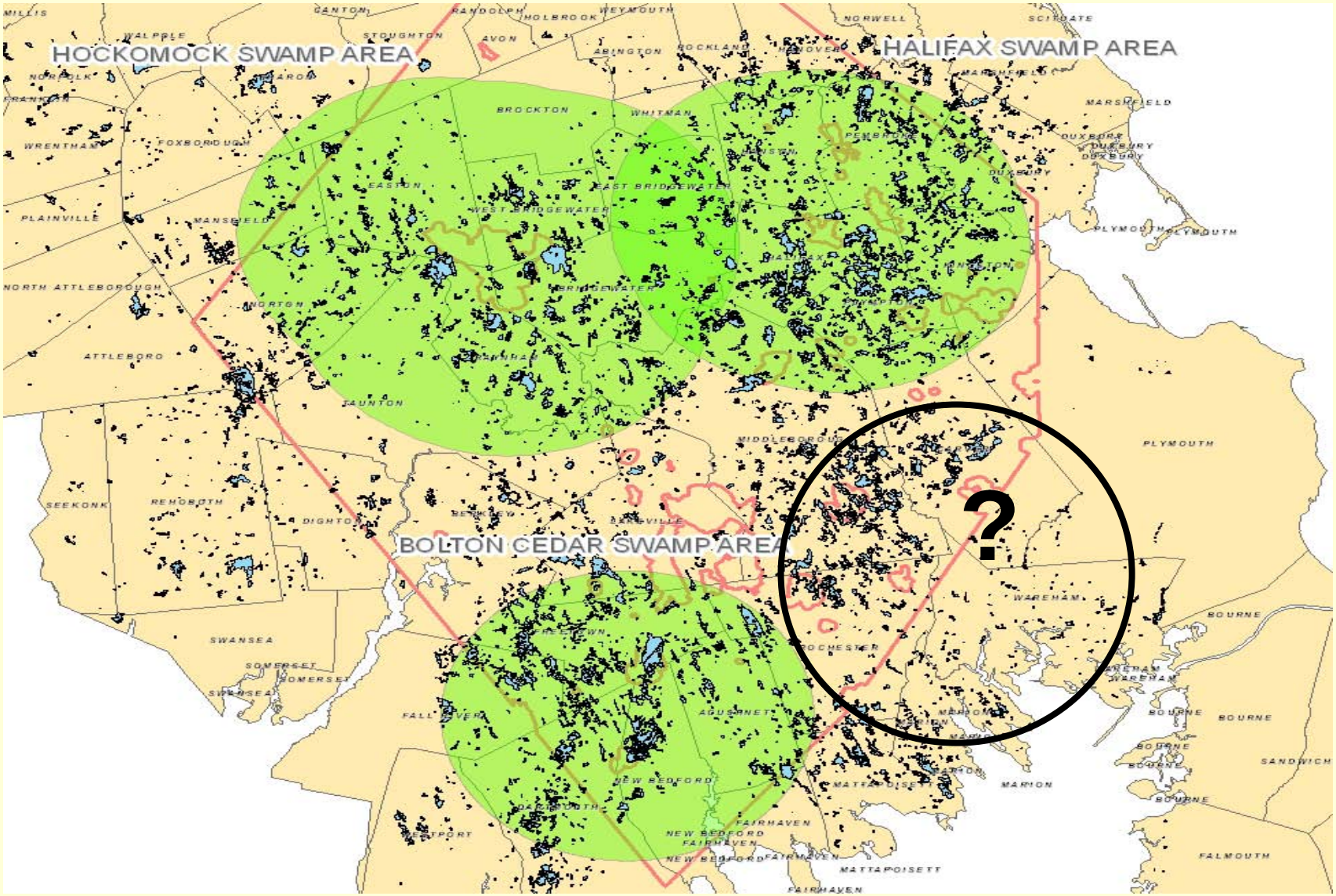


Wetland Types



Enhanced Surveillance

Wooded Swamps (WS2 & WS3)



Aerial Applications in Southeast MA for EEE

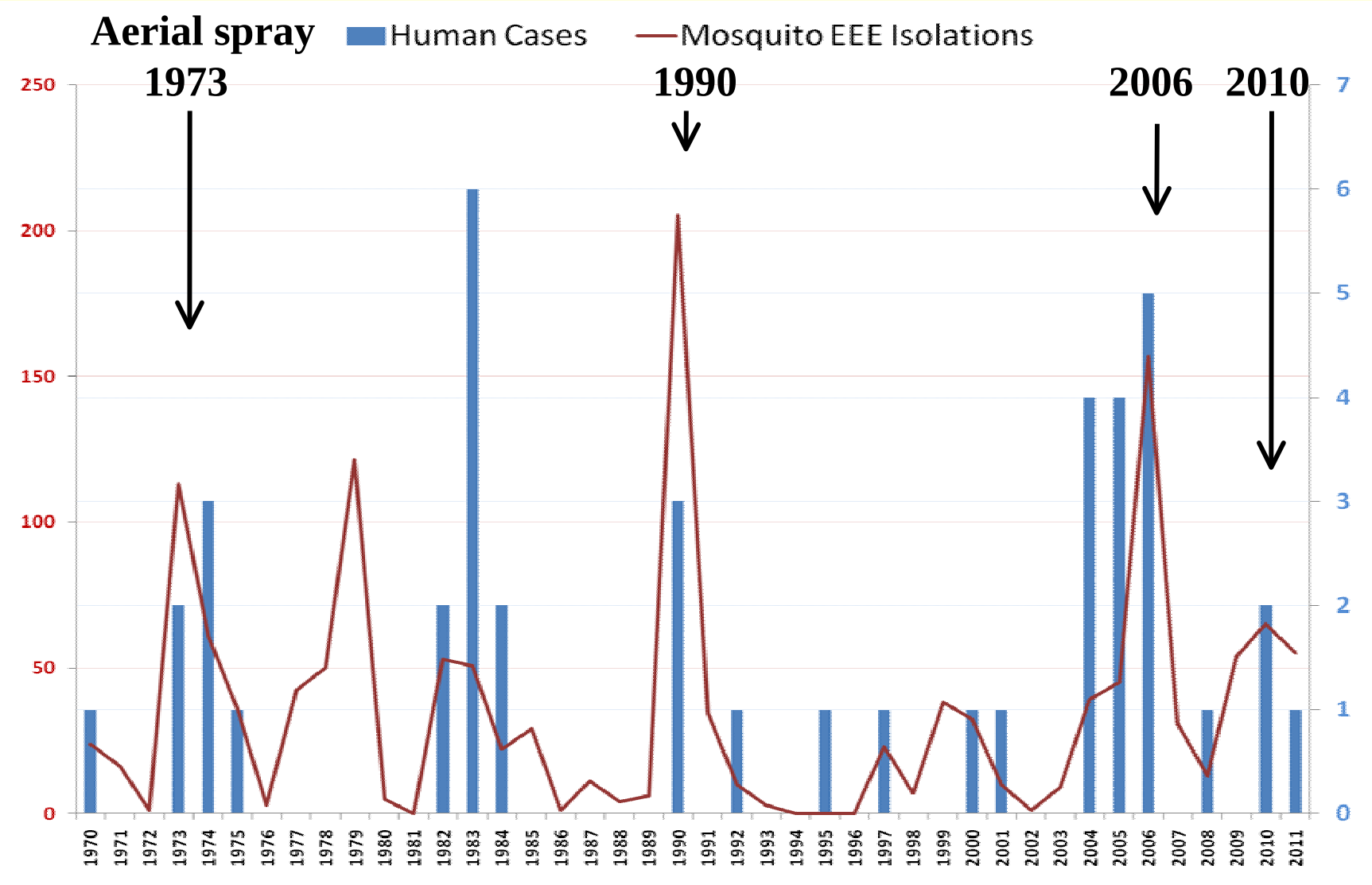
- 1955(?), 1956, 1957 - DDT
  - Plymouth MCP est. 1957, Bristol MCP est. 1956
- 1973, 1974, 1975- Malathion
- 1990- Malathion
- 2006- Anvil (2X) (Night)
- 2010- Anvil (Night)

Eastern Equine Encephalitis

1831	Epidemic of brain disease in horses in Massachusetts
1931	Differentiated from other equine encephalitides
1933	Virus isolated
1933-36	Birds implicated as reservoir of virus
1938	Outbreak of “brain disease” in horses in Massachusetts (~ 300 cases)
1938-39	Outbreak of human EEE in Massachusetts (35 cases)
1947	Louisiana and Texas outbreaks
1955-56	Second Massachusetts outbreak (16 cases), aerial spraying, DDT
1957	Taunton Field Station of the USPHS
1969	Taunton Field Station closed, State Laboratory continues surveillance
1973	Equine vaccine
1973-75	Outbreak (7 cases), aerial spraying, malathion
1982-84	Outbreak (10 cases)
1990	Outbreak (3 cases), aerial spraying, malathion
2004-06	Outbreak (13 cases), aerial spraying, sumithrin
2010	Record mosquito EEE isolations, (2 cases), aerial spraying, sumithrin

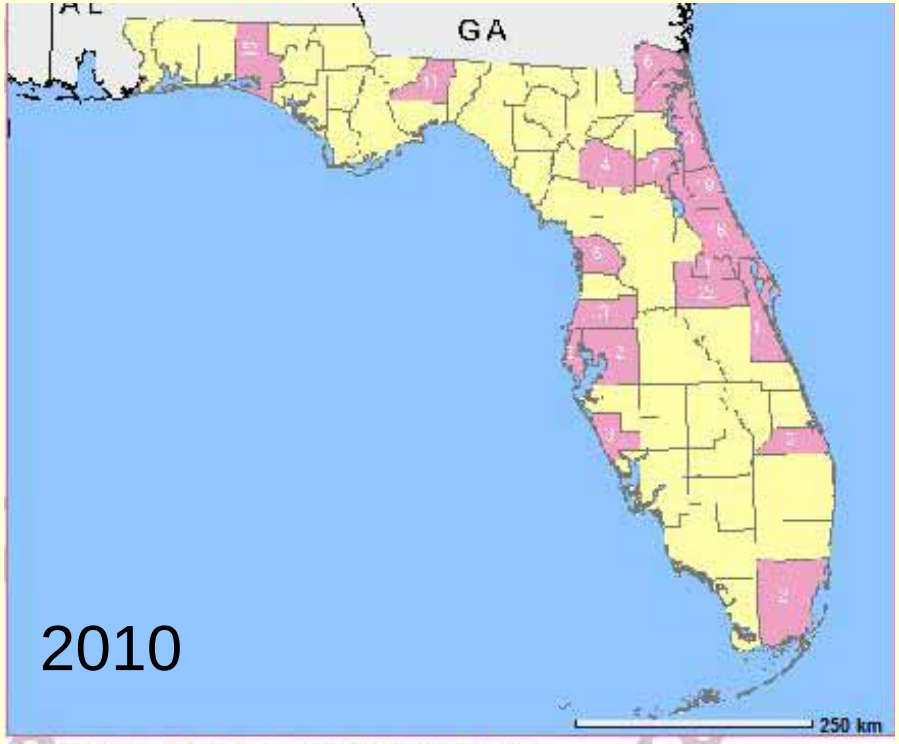
Massachusetts 1970-2011 (as of 9/9/11) Human EEE and EEEV Mosquito Isolates

Human Outbreak Cycle 1938-2006 13 years (7-19)

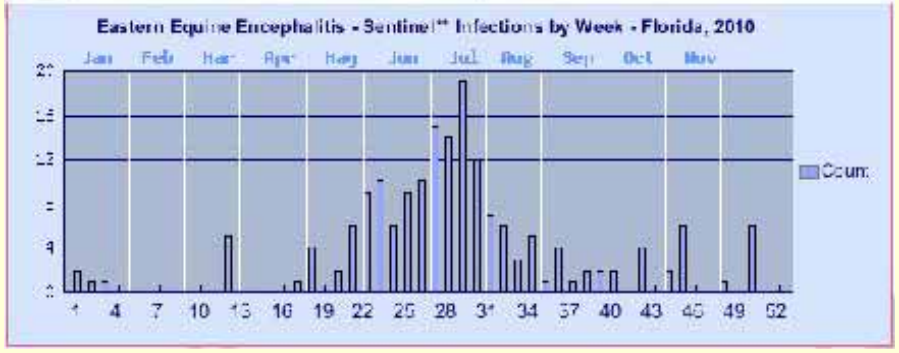


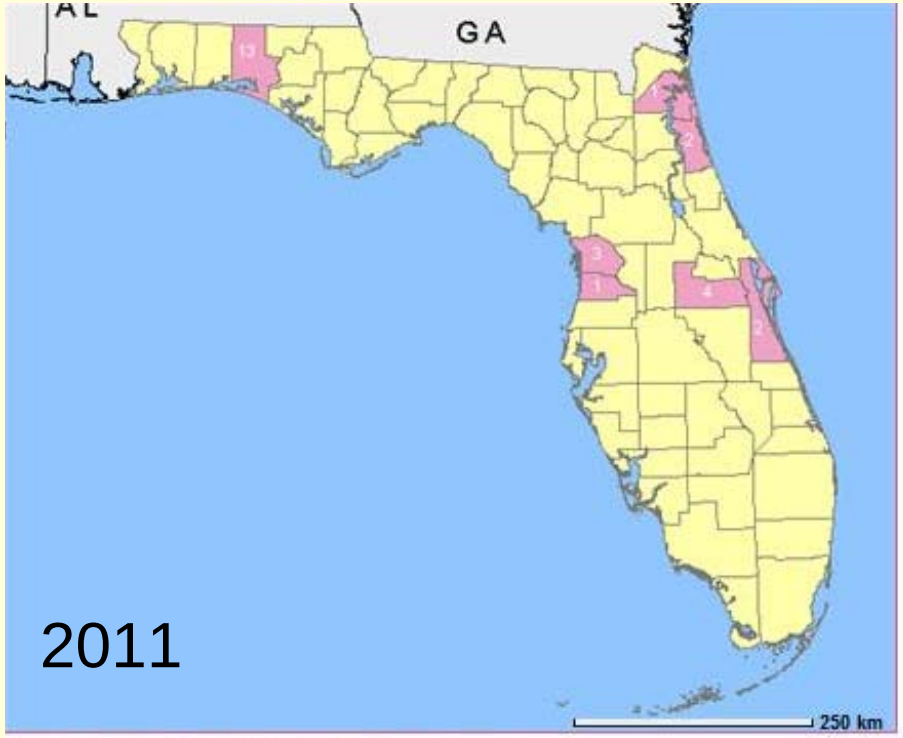
	WNV Human	EEE Human	EEE / WNV Mosquito	Horses
2011	0	Raynham death Raynham	**30 / 29** **2+ EEE Cq perturbans**	0
2010	0	1 SE Mass ?	**10 /14** **1+ EEE Cq perturbans**	0
2009	0	0	23 / 9	0
2008	0	0	11 / 23	Freetown (EEE)
2007	0	0	12 / 9	0
2006	0	Acushnet Fairhaven	**77 / 11** **3+EEE Cq perturbans**	Easton (EEE) Swansea 2 (EEE)
2005	Fall River (death)	0	21 / 9	0
2004	0	0	17 / 1	0
2003	Swansea (Blood Bank) Somerset	0	2 / 13	Dartmouth 2 (EEE) Rehoboth 1/1 WNV/ EEE
2002	0	0	0 / 0	0
2001	Dartmouth Acushnet	0	4 / 4	Acushnet 2 (WNV) Dartmouth 1 (WNV) Fairhaven 1

Florida Connection

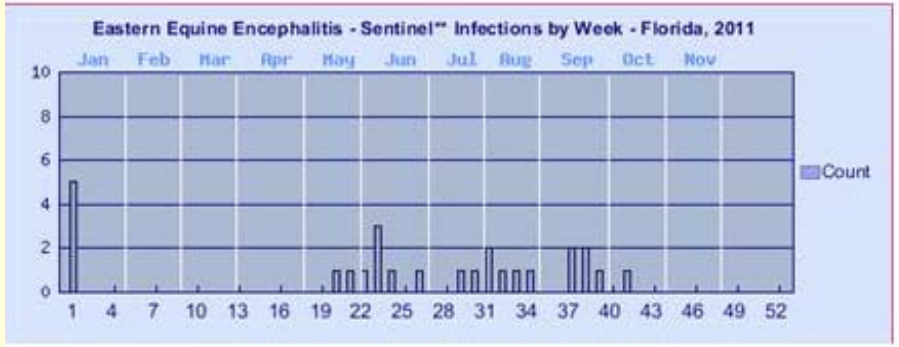


Cumulative 2010 Data as of 3 am, May 09, 2011
These data are considered the final 2010 data as of May 9,2011.

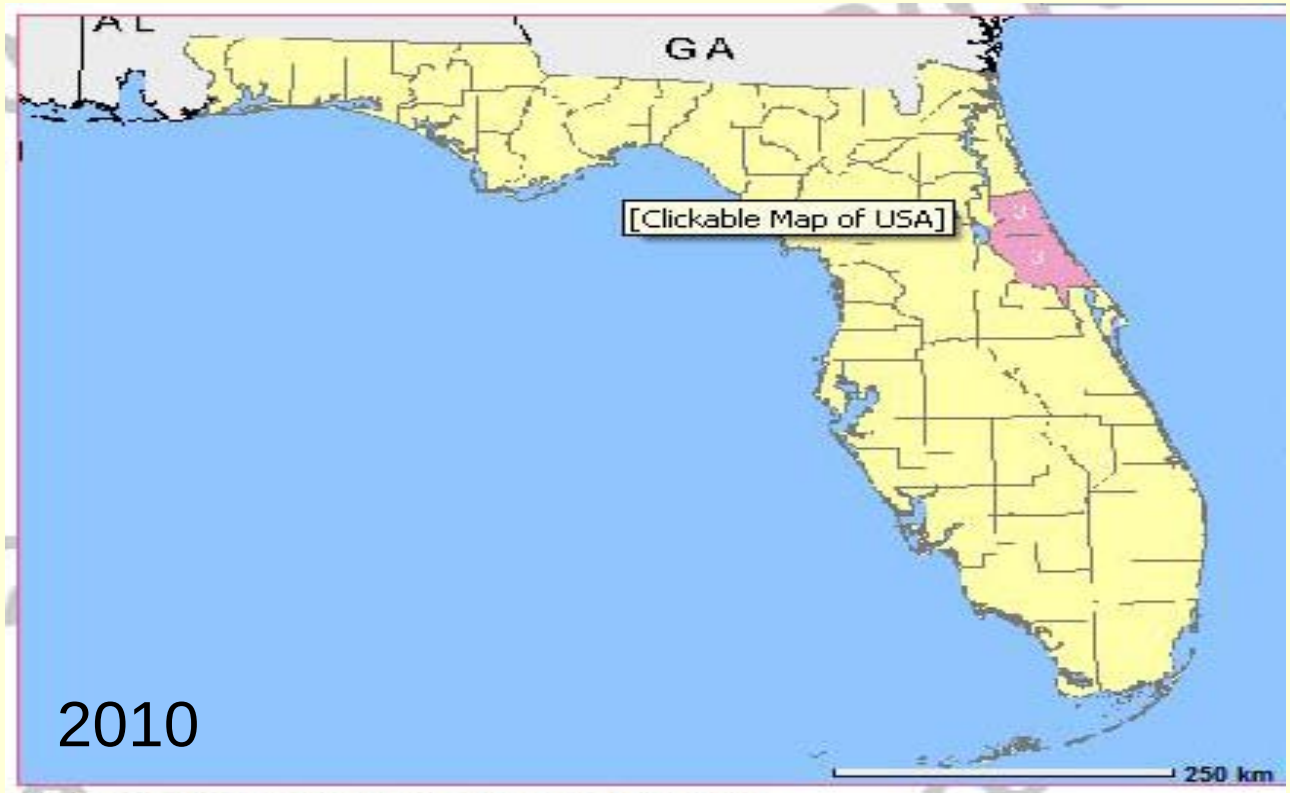




Cumulative 2011 Data as of 3 am, Nov 01, 2011
These data are provisional and may be revised or adjusted in the future.

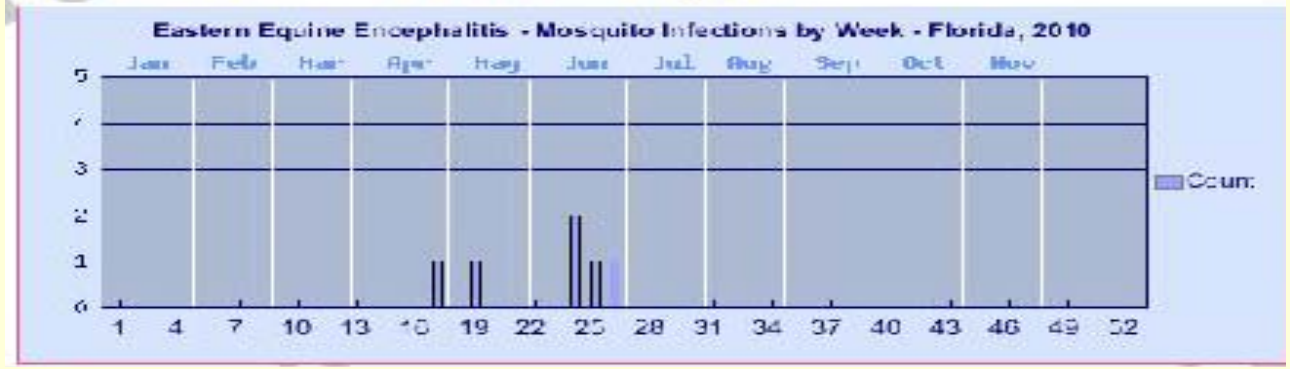


Volusia County Connection



Cumulative 2010 Data as of 3 am, May 09, 2011

These data are considered the final 2010 data as of May 9,2011.



Contact Information

- **Address: Bristol County Mosquito Control Project**

140 North Walker St.

Taunton, MA 02780

508-823-5253

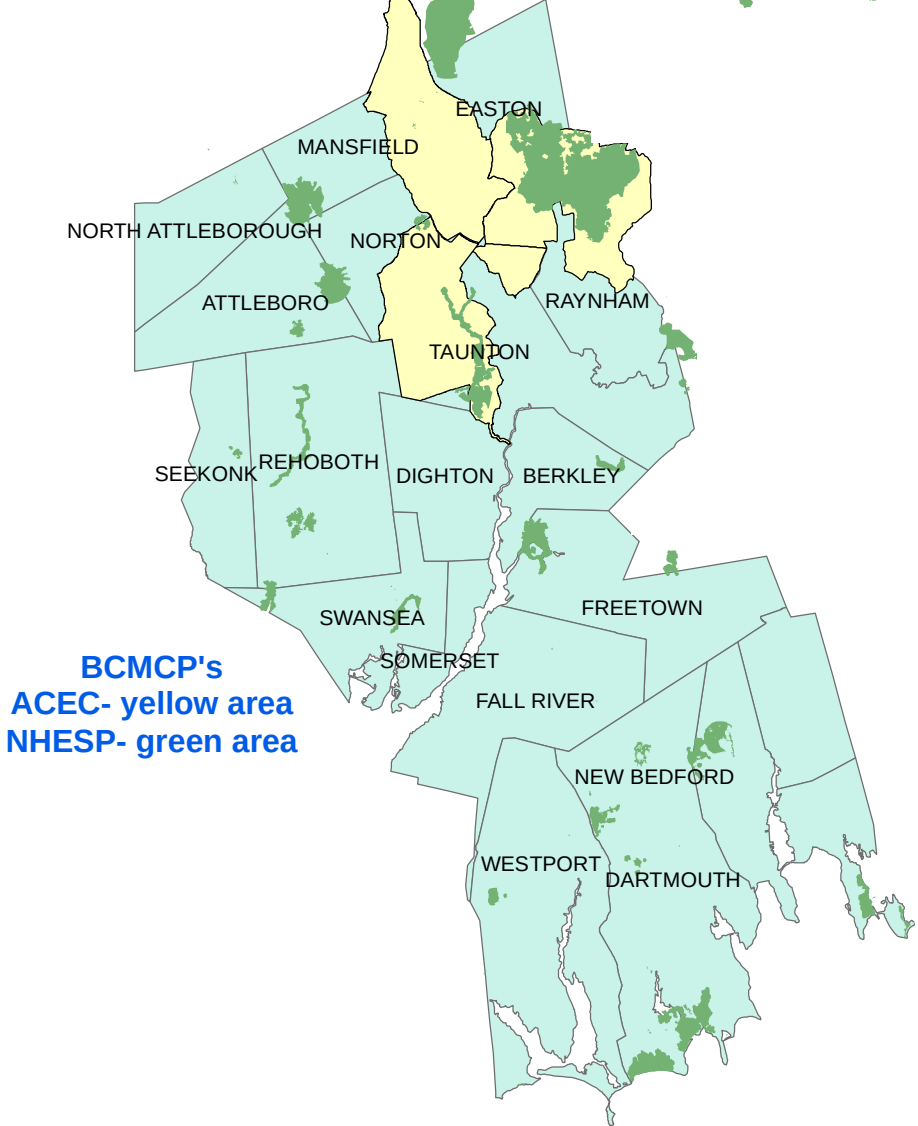
RequestBristolMCP@comcast.net

Follow us on Twitter: @BCMCPMOSQ

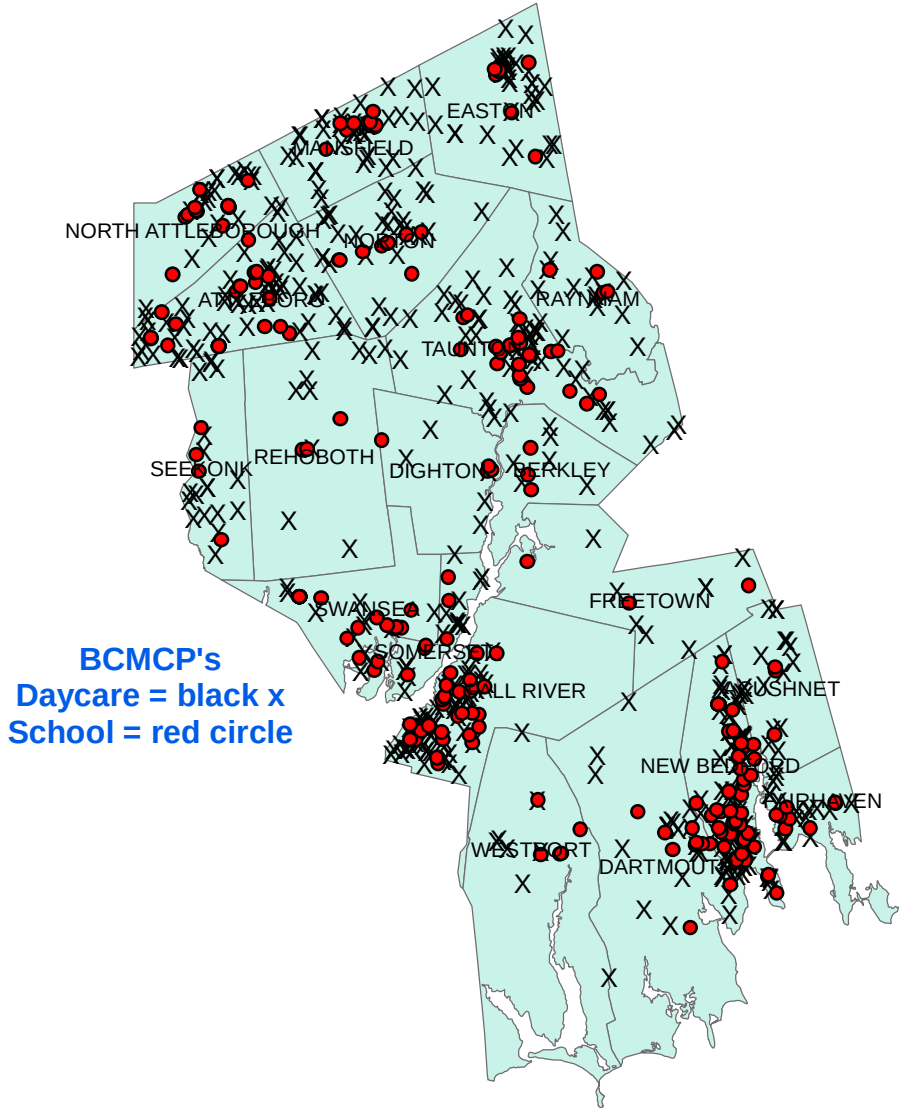
- **Email Questions:**

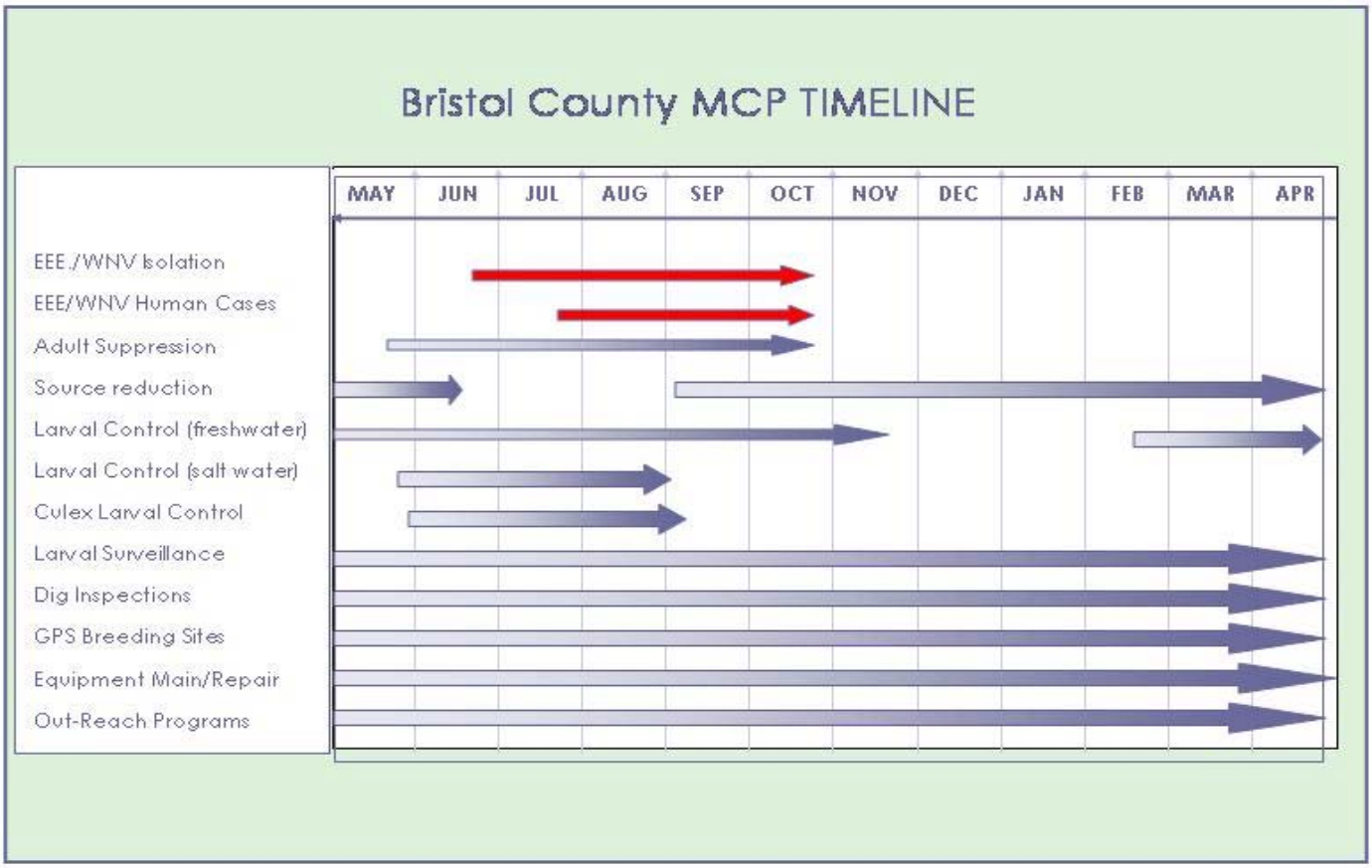
Wayne Andrews: brismosqwa@comcast.net

Priscilla Matton: brismosqpc@comcast.net



BCMCP's
ACEC- yellow area
NHESP- green area


EASTON
MANSFIELD
NORTH ATTLEBOROUGH
NORTON
ATTLEBORO
RAYNHAM
TAUNTON
SEEKONK
REHOBOTH
DIGHTON
BERKLEY
FREETOWN
SWANSEA
SOMERSET
FALL RIVER
DUXBURY
NEW BEDFORD
FAIRHAVEN
WESTPORT
DARTMOUTH
BCMCP's
Daycare = black x
School = red circle


Bristol County MCP TIMELINE
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
EEE./WNV Isolation
EEE/WNV Human Cases
Adult Suppression
Source reduction
Larval Control (freshwater)
Larval Control (salt water)
Culex Larval Control
Larval Surveillance
Dig Inspections
GPS Breeding Sites
Equipment Main/Repair
Out-Reach Programs

Bristol County Mosquito Control Pesticide Discharge Management Plan

Bristol County Mosquito Control Project
140 North Walker Street
Taunton, MA 02780
(O) 508-823-5253
(F) 508-828-1868

Pesticide Discharge Management Team: Wayne Andrews, M.S. – Superintendent, Stephen Burns, B.A. – Assistant Superintendent, Priscilla Matton, M.S.- Entomologist

All persons may be contacted at: Bristol County Mosquito Control Project, 140 North Walker Street, Taunton, MA 02780, (O) 508-823-5253 (F) 508-828-1868, email- brismosqwa@comcast.net or brismosqpc@comcast.net

A. Person(s) responsible for managing pests in relation to the pest management area.

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent

2. Person(s) responsible for developing and revising the PDMP.

   a. Priscilla Matton, M.S. – Entomologist
   b. Stephen Burns, B.A.– Assistant Superintendent
   c. Wayne Andrews, M.S. – Superintendent

3. Person(s) responsible for developing, revising, and implementing corrective actions and other effluent limitation requirements.

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent

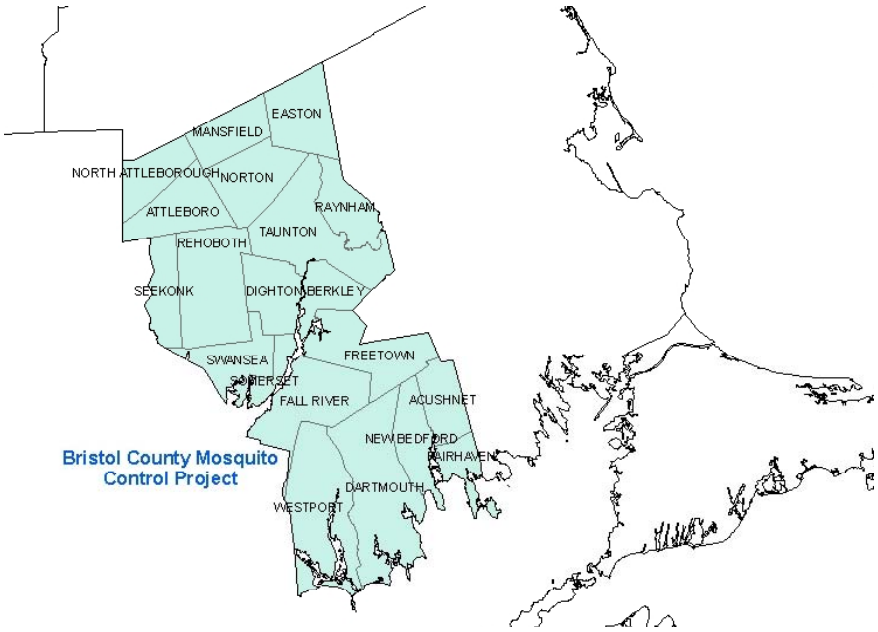
4. Person(s) responsible for pesticide applications (mix, load, apply).

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent
   c. Drew Bushee - Field Technician
   d. Jonathan Gibbs - Field Technician
   e. Priscilla Matton, M.S. – Entomologist
   f. John Moniz - Field Technician
   g. Joshua Nickerson – Field Technician
   h. John Raposo – Field Technician

2. Pest Management Area Description

A. Pest Problem Area Description: Bristol County Mosquito Control Project is charged with managing mosquito populations in Bristol County, Massachusetts. Bristol County is located

in the southeastern corner of Massachusetts with a western border with Rhode Island. Bristol County has a land area of 691 square miles, or 442,240 acres. Pest problem areas can best be separated into 2 broad types within our service area that can be further divided into more specific groups based on habitat type.



i. Natural Environments

1. Atlantic White Cedar and wooded coniferous/deciduous swamps which are prime habitat for the enzootic vector of Eastern Equine Encephalitis (EEE), *Culiseta melanura*. There are several of these large swamp complexes located within Bristol County.

2. Coastal and intercoastal islands, hammocks, and high marsh areas are dispersed throughout our coastal region. These areas are affected by high river stages in the spring, rains, and tides. *Ochlerotatus taeniorhynchus, Oc. cantator* and *Oc. sollicitans* are major problems in these areas, although *Culex salinarius* is also common to such sites.

3. Woodland ponds, pools, and depressions are isolated wetlands occurring throughout the county within forested uplands and pasture areas. Examples of these habitats include bogs, shrub swamps, fens, and depressions caused by uprooted trees. Many of these sites only contain water during the wet seasons of the year, and serve as excellent larval habitat for most species of mosquitoes found in our region.

4. Other natural environments include springs, seeps, tree holes, tree cavities, and burrows made by various species of wildlife.

ii. Man-made Environments

1. The general public frequently suggests ditches and canals as sources of mosquito problems. However, these structures usually have flowing water and/or contain fish, and are seldom the primary source of a mosquito infestation, especially if these systems tend to hold water on a permanent basis. On the other hand, shallow, roadside ditches do contribute to mosquito populations at times. Such sites often remain dry throughout much of the year or because of temperature, oxygen content, or other factors do not support fish life. Mosquito species encountered in such sites include *Aedes vexans*, *Culex salinarius*, *Cx. restuans*, and many species of *Ochlerotatus*.

2. Artificial containers come in all sorts of shapes and sizes. These may be represented by something as small as a bottle top to something as large as a discarded or unkempt boat. Containers serve as the primary larval site for *Culex pipiens*, which is frequently associated with mosquito problems in our more urban and suburban areas of the county. *Oc. triseriatus*, *Oc. japonicus* and *Ae. albopictus* are also human biters associated with containers.

3. Storm drains and catch basins are found throughout areas of the county, and provide a pristine environment for *Culex pipiens*, our primary West Nile Virus (WNV) vector.

4. Fallow cranberry bogs serve as habitat for a number of species of mosquitoes in our area. These shallow acidic wetlands can produce high numbers of mosquitoes.

5. Other man-made sites include retention and detention ponds. These areas generally cause problems during drought conditions when water is not flowing or when the structures are not properly constructed and hold water for longer then their prescribed time.

B. Pest Problem Description

Bristol County has 691 sq miles. It has 556 sq miles of land and 135 sq miles of water. It also has 74,000 acres of MA DEP wetlands plus an additional 25,000 acres of re-flood that supports *Ae. vexans*. In 2010, 477 sq miles were in a High/ Moderate risk for WNV and EEE. This is 69% of our service area.

Mosquito species are broadly separated into two groups according to where they lay eggs: floodwater/transient mosquitoes and permanent water mosquitoes. Adult female floodwater mosquitoes lay eggs on mud or previously submerged vegetation, and require a dry down period before hatching may occur. The eggs may remain dormant for days, months, or even years until they are flooded, at which time larvae hatch. Permanent water mosquitoes lay eggs on the water surface, and cannot dry down before hatching. The eggs float on the surface for a few hours to a

few days until the larvae hatch into the water. Floodwater/ transient mosquito larval developmental sites include irrigated pastures, rice fields, seasonally flooded duck clubs and other managed wetlands, tidal wetlands, riparian corridors, and snowmelt pools. These intermittent or seasonally flooded habitats can be among the most productive sources of mosquitoes because they are often free of natural predators. Permanent water mosquito larval sites include artificial containers, tree holes, catch basins, open ditches, retention/detention ponds, natural or constructed ponds and wetlands, storm water management devices, and along the edges of flowing streams. Sources are found everywhere from highly urban areas to natural wetlands and often produce multiple generations of mosquitoes each season.

The county is known to contain 25 species of mosquitoes, although the Bristol County Mosquito Control Project actively surveys and conducts control efforts primarily on 13 species.

i. *Culiseta melanura* and *Cs. morsitans* are swamp mosquitoes that occur in Atlantic White Cedar Swamps, hardwood floodplains and other aquatic habitats characterized by low pH. The larvae often are found within subterranean pockets that are difficult to treat with conventional larvicide agents. The larval stage become quiescent during the winter months and burrow into the bottom sediment to overwinter. Multiple generations per season are likely, however it may be staggered emergence from differing overwintering larval stages. *Cs. melanura* frequently obtains its blood meals from birds, and is our primary vector in the amplification of EEE in our area. It has also been found to carry WNV.

ii. *Coquillettidia perturbans* is a fairly large mosquito that is often associated with aquatic habitats containing cattails, *Typha* spp. Larvae attach to the roots of aquatic vegetation in freshwater swamps and overwinter in this stage. This makes them difficult to treat with conventional larvicide agents. Adult emergence appears to occur in broods over the course of the summer but actually represents cohorts of larvae that passed the winter in different instars. It commonly takes blood meals from both bird and mammal species (including humans). It is generally considered a bridge vector of EEE to mammals, but has also tested positive for WNV.

iii. *Ochlerotatus canadensis* is an important epizootic vector of EEE in our region. Larvae develop in temporary or semi-permanent woodland freshwater pools. The majority of the generation emerges in early spring followed by sporadic egg hatch later in the season. Females will bite any time of day, but are most active in the evening. They are aggressive and long-lived. Overwinters in the egg stage.

iv. *Aedes vexans* is a common woodland mosquito that has the potential to fly up to 5 miles. It relies on summer rains to flood eggs that are deposited in low lying ground depressions and are commonly referred to as floodwater mosquitoes. Flood plains where rivers overflow their banks generate the highest populations but significant numbers can be produced from virtually any area where fresh ground water accumulates on an intermittent basis. The

entire group undergoes accelerated larval development and can pupate 4-5 days after egg hatch when ambient temperatures are favorable. This species has been implicated as a vector of EEE, WNV, and dog heartworm. Overwinters in the egg stage.

v. *Culex pipiens*, the Northern house mosquito, is our region's primary WNV vector but has also tested positive for EEE. It prefers somewhat stagnant or polluted water conditions as larval habitat, and can be a common species in storm drain systems, especially in drainage lines equipped with sumps in the catch basins that tend to hold water on a permanent basis. Both natural and artificial containers are used by this species. Larval populations are typically sparse in late spring, build progressively during the summer and do not peak until mid-summer or early fall. Multiple generations per season. Overwinters as mated females.

vi. *Culex restuans* is an early season mosquito and very similar to *Cx. pipiens*. Larval habitat for this species typically includes a variety of semi-permanent waterways, including roadside ditches and woodland pools. It has been reported to carry both EEE and WNV, and may be an important vector in the initial amplification of these viruses in bird populations, as birds appear to be its primary blood hosts.

vii. *Culex salinarius* larvae are found in both freshwater and somewhat saline environments. Most reach greatest abundance in areas adjacent to salt marshes where fresh water from the upland drains on to coastal habitats producing a brackish water environment. Multiple generations per season and they overwinter as mated females. This species has been recorded to carry dog heartworm, EEE, St. Louis Encephalitis, and WNV. It appears to be an opportunistic feeder of birds, mammals, and even reptiles, and may serve as an important bridge vector in the transmission of arbovirus.

viii. *Ochlerotatus sollicitans*, the brown salt-marsh mosquito, is a fairly large mosquito that can be a serious pest along the immediate coast. Salt tolerance allows these mosquitoes to utilize vast expanses of salt marsh wetlands as larval habitat unsuitable to other floodwater species. The eggs are normally deposited in ground depression on marshland that is high enough to exclude daily tide cycles. The positioning allows eggs to be flooded by lunar tides producing 2 broods at roughly 2-week intervals during the summer months. Additional broods can be triggered by storm tides or heavy summer rains. Overwinters in the egg stage. It is active during both daytime and nighttime periods, and can fly great distances from its original source. It has been reported to carry EEE in the northeastern US.

ix. *Ochlerotatus taeniorhynchus*, the black salt-marsh mosquito, is a nuisance mosquito species that is capable of producing tremendous numbers of adults after coastal flooding events caused by rains or extreme high tides. Similar behavioral and habitat locations as *Oc. sollicitans*.

x. *Ochlerotatus cantator* is a fairly large mosquito that can be a serious pest along the immediate coast. It is active during both daytime and nighttime periods, and can fly great distances from its original source. Similar behavioral and habitat locations as *Oc. sollicitans* and *Oc. taeniorhynchus*.

xi. *Ochlerotatus japonicus* is a newly introduced species to the area and an aggressive nighttime human biter. Larval habitat includes natural tree holes and similar natural containers. Discarded tires and a wide array of artificial containers provide additional habitat if the containers hold enough decomposing plant material to mimic natural sites. Overwinters in the egg stage. Multiple generations per season have fully established in all areas of Bristol County. Positive WNV mosquitoes have been detected throughout the County and a WNV human case was found in very close proximity to positives.

xii. *Aedes albopictus* is a newly introduced species into the northeastern US and recently found in Bristol County. It is an aggressive daytime human biter and is a competent vector of several arboviruses in the US. Discarded tires and a wide array of artificial containers provide larval habitat. Overwinters in the egg stage.

2. Action Threshold

a. The following thresholds were established to trigger larviciding missions within our service area as described in the Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009:

i. Treatments of larval mosquito habitat may be conducted in areas that are found to contain an average of at least 1 larva per 5 dips (using a standard 400mL dipper). Actual treatments will be based on local demographics, mosquito species present, and other historic and current conditions.

ii. The storm water systems may be treated in selected areas of the county where vector species have been found or there is a history of arbovirus activity.

iii. Best professional judgment based on historical records, weather conditions and local knowledge.

General Larvicide information: Service request inspections preformed by our Field Technicians will check for mosquito larvae. Generally, these requests for service stem from localized wetlands within someone property. Occasionally, service requests investigations uncover larger scale problems, like blocked drainage systems, leaking septic tanks, broken water lines, etc. that may require further action by either the land owner or other town departments to correct. Some requests for service stem from localized, container-breeding species of mosquitoes that are easily remedied by simply dumping water from articles such as buckets, birdbaths, tarps, and other items that are holding water. Larval surveillance entails locating the larval source (if not already known), sampling for larvae and estimating larval density, determining larval developmental

stage(s), and collecting larvae for identification purposes if applicable. Other factors considered during larval inspections include the water depth at the specific location, current extended forecast, water temperature, and if any natural predators are present.

BCMCP uses microbial larvicides, formulated to deliver a natural toxin to the intended targeted mosquito larvae. *Bacillus thuringiensis* (*Bt*), products have been available since the 1950s. In the 1960s and 1970s, the World Health Organization encouraged and subsidized scientific discovery and utilization of naturally occurring microbes. As a result of those early studies and a whole body of subsequent work, two lines of mosquito control products have been developed: crystalline toxins of two closely related grampositive, aerobic bacteria – *Bacillus thuringiensis israelensis* (*Bti*) and *Bacillus sphaericus (Bs).* Mosquito control agents based on *Bt* are the second most widely registered group of microbial pesticides.

Bacillus thuringiensis israelensis (Bti)

Bacillus thuringiensis is a bacterium that occurs naturally in soils and aquatic environments globally. The active ingredients in *Bti* formulations are delta-endotoxin (d-endotoxin) crystals separated from bacteria near the end of manufacturing processes. These toxic crystals are incorporated into various products, which allow their release into water so that they may be ingested by mosquito larvae. The alkaline environment and enzymes of the mosquito midgut activate the d-endotoxin crystals. The alkaline gut environment allows hydrolysis of the crystal's protein coating and the release of pro-toxins. Gut enzymes then activate the pro-toxins and facilitate their binding to the gut epithelium of the mosquito larva. Cells rupture and are destroyed at the binding sites, leading to a loss of body fluids which results in death. This rapid action typically controls larvae in 4-24 hours. *Bacillus thuringiensis israelensis* is listed by the EPA as a biopesticide (http://www.epa.gov/oppbppd1/biopesticides/ingredients/index.htm). *Bti* based larvicides have undergone extensive risk studies both prior to and after registration. *Bti* labels bear the "CAUTION" signal word. *Bti* products are general use pesticides and pose minimal risk for non-target organisms in the environment. The crystalline d-endotoxins are not activated in the acidic guts of humans or other animals or in the alkaline guts of animals, which do not contain the enzymes necessary for activation, and binding of released pro-toxins. This specificity accounts for the highly selective nature of *Bti* larvicides, which is limited to Dipterans, notably mosquitoes, black flies, and some midges. *Bti* controls all larval instars provided they are still feeding. It is effective on most mosquito species in a very wide variety of habitats; *Bti* formulations are thus ideally suited for IPM.

Bacillus sphaericus (Bs)

Bacillus sphaericus is a naturally occurring spore-forming bacterium found throughout the world in soil and aquatic environments. *Bs* acts in a manner similar to *Bti*, except it has been shown to recycle in intact *Culex* cadavers, thus maintaining some residual activity. Once larvae ingest these *Bs* d-endotoxins, they are partially digested (their protein envelope is dissolved) in the alkaline gut, enabling the release of pro-toxins. These pro-toxins in turn are activated by enzymes and attach to the gut wall where they begin to disrupt, paralyze, and rupture the gut. The activity of *Bs* d-endotoxins differs from that of *Bti* in several important ways. *Bs* toxins are attached to a living bacterial spore while the *Bti* toxins are not. The toxins of *Bs* and *Bti* bind to chemically different receptor cell sites. They are not related immunologically and are thought to have completely different molecular modes of action. Operationally, the most important

differences between the toxins are speed of action and persistence in the larval habitat. *Bs* toxins are much slower acting than *Bti* toxins and can be more persistent. *Bs* has a slower settling rate, and the spores can invade the body cavity of the larvae where they have the capability to germinate, grow, and produce toxins. This process is known as recycling. *Bs* is listed by the EPA (http://www.epa.gov/oppbppd1/biopesticides/ingredients/index.htm) as a biopesticide. *Bs* based larvicides are general use pesticides, the signal word "CAUTION" appears on *Bs* product labels and have undergone extensive risk studies both prior to and after registration. The crystalline d-endotoxins are not activated in the acidic guts of humans or other animals or in the alkaline guts of animals, which do not contain the enzymes necessary to activate the pro-toxins. This specificity accounts for the highly selective nature of *Bs* larvicides; they do not target as wide a range of mosquito species as do *Bti* products. Formulations containing *Bs* are most active against *Culex* and *Anopheline* larvae and less active against some *Aedes* larvae. Formulation effectiveness depends on the mosquito species and environmental conditions including water quality. In general, the best immediate results with *Bs* are obtained when applications are made to larvae in the 1st to 3rd instars. Larval mortality may be observed as soon as a few hours after ingestion, but typically it takes as long as two to three days depending upon dosage and ambient temperature. Adequate recycling of *Bs* for sustained control is dependent on the presence of dead mosquito larvae.

b. The following thresholds were established to trigger truck based ULV adulticiding missions within our service area as described in the Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009:

   i. Collections of 5 female mosquitoes from a standard light trap.

   ii. Residential requests from similar ecological habitat and location within a short time frame.

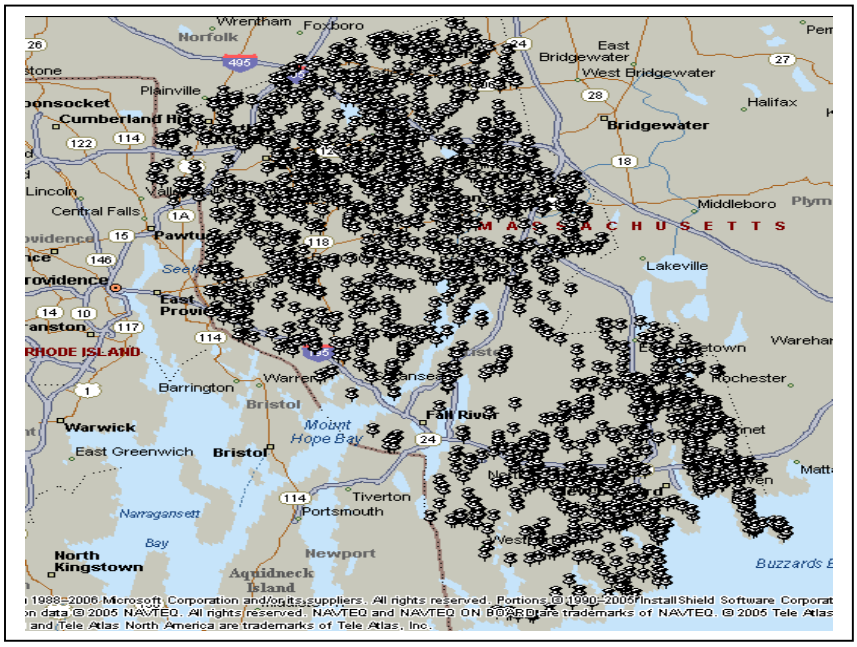
   iii. Positive WNV or EEE mosquito pools from a trapping location within Bristol County or surrounding locations.

   iv. Best professional judgment based on historical records, weather conditions and local knowledge.

General Adulticing information: There have been 51 different mosquito species identified in the Commonwealth. There are approximately 13 mosquito species, which are important to human health, nuisance and quality of life. The key to managing mosquito populations efficiently and effectively is by monitoring the interaction between mosquitoes and human populations. Adult mosquito surveillance is the means by which BCMCP gathers this information. BCMCP operations are governed by the data collected through these field surveys. Adulticiding activities are governed by surveillance for mosquito populations and virus levels. Mosquito collections from all trap types can be sent into the State Laboratory Institute in Jamaica Plains on a weekly basis for virus analysis. BCMCP coordinates all mosquito surveillance activities with the Department of Public Health in accordance with their Surveillance and Response Plan for Mosquito-borne Disease.

Surveillance is the cornerstone of integrated pest management (IPM) and BCMCP uses a variety of traps to achieve sound data. Gravid trap collections are paramount to our WNV surveillance. The Project has gravid traps strategically placed throughout the Project's service area. The Project also deploys CDC portable light traps in areas where these viruses are found in an effort to monitor human biting mosquito species, which are collected in large numbers in these traps. BCMCP may also deploy these portable traps (CDC Miniature Light Traps) at short notice in response to complaints, for efficacy testing and/or for vector surveillance. Resting boxes are used by our staff to aid in earlier detection of any possible EEE threat in the county. A resting box is a passive trap that attracts certain species of mosquitoes after they have taken a bloodmeal.

3. General Location – This is a map of the many known mosquito-breeding sites within Bristol County, Massachusetts. The thumbtacks (x=1885) indicate areas treated by hand with mosquito larvicides. BCMCP also treats a tremendous number of storm drains and catch basins (x=±25,000) during the mosquito season. These basins are located throughout the entire county, in every city and town.



ULV-truck based adulticiding operations are conducted throughout Bristol County. The action thresholds described above determines these locations. Bristol County has received the following residental request for adulticide applications over the following years respectively; 14,323-2011, 17,508-2010, 15,964-2009, and 11,985-2008. Trap based data are available from the Project for collections made throughout the mosquito season.

4. Water Quality Standards - Waterways in Bristol County are not impaired with any pesticides used by the Bristol County Mosquito Control Project.

3. Evaluation and Pest Management

A description of the control measures to demonstrate how the operators specifically plan to meet the applicable technology-based or water quality-based effluent limitations. Operators must consider impact to non-target organisms, impact to water quality, pest resistance, feasibility, and cost effectiveness when evaluating and selecting the most efficient and effective means of pest management to minimize pesticide discharge to waters of the U.S. The strategies considered included:

i. No action

ii. Prevention may refer to avoidance of mosquito bites or preventing the establishment of larval habitat via public education. Educational programming at local schools and area events allow BCMCP staff the opportunity to suggest ways that residents can assist in the prevention of mosquito problems. This may include removing containers and articles from their yards that provide larval habitat, and to be mindful that birdbaths and pet water bowls could serve as mosquito habitats when not properly maintained. Proper use of personal protection repellents and understanding the availability of alternatives. The Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009 describes a wide variety of alternatives such as bug zappers, predators and traps and the reasons why they are unsuccessful.

iii. Mechanical/physical methods are alterations made to the environment. These methods can be as basic as simply emptying water from containers, source reduction or as complex as repairing broken water lines which often require the involvement of other county departments, such as Public Works. The MA Best Management Practices and Guidance for Freshwater Mosquito Control, dated October 24, 2008 is available at the Project's headquarters. These guidelines will explain all the steps necessary to complete a freshwater management project in Bristol County. The MA Mosquito Control Open Marsh Water Management Standards, dated May 2010 is available at the Project's headquarters. These guidelines will explain all the steps necessary to complete a salt marsh water management project in Bristol County. As described in our service area, there is a significant amount of area that we would not be able to uses these methods to control mosquitoes. It is very expensive and time consuming processes and manipulating all of these natural larval habitats is not practical. However it remains an integral part of our IPM strategy.

iv. Cultural methods like the previous two methods manipulate larval habitat to prevent favorable conditions for mosquitoes to complete their aquatic development. Physical manipulation of environments such as removing blockages in ditches that serve as barriers to natural predators of

mosquitoes are sometimes quick and effective means for our Field Technicians to resolve problems on a localized level (also see above).

v. Biological control agents are used by BCMCP for the control of larval stages of mosquitoes to help prevent adult mosquitoes from emerging in identified larval sites. Formulations containing *Bacillus sphaericus* and/or *Bacillus thuringiensis israelensis* are used to treat floodwater, catch basin/storm drains and salt-marsh mosquito larval sites. Methoprene, an insect growth regulator is selectively used to control *Cq. perturbans*, a difficult mosquito to control in the larval stage. This product is used in specific areas such as detention and retention basins in the interior parts of the County. Removing blockages or obstructions allows the movement of fish, natural predators to mosquito larvae, and is used in appropriate situations.

vi. Pesticides used specifically for adulticiding, which is a term used by mosquito control to describe applications targeting adult or flying mosquitoes. There are two types of adulticiding. Ground adulticiding using truck mounted equipment conducted selectively in response to complaints from the public and the surveillance program. Also aerial adulticiding using either fixed wing aircraft or helicopters is conducted only in the event of a public health emergency declared by the Sate Department of Public Health.

Ground Adulticiding: For the most part ground adulticiding is limited to targeted applications in response to surveillance data, board of health requests, response to complaints from the public or as a disease intervention measure. Ground adulticiding is accomplished using truck mounted Ultra Low Volume (ULV) cold aerosol generators. ULV applications treat an acre with insecticide at a rate of approximately 1 ounce. The material is atomized into a "fog" which contains droplets in the ~ 20 micron size. Dispensing the material from the back of a pickup truck traveling at an average speed of 5-10 miles per hour the equipment produces approximately a 300 foot swath width (coverage area) depending on wind direction and speed. These tiny droplets impinge on mosquitoes flying through the fog effectively controlling the mosquitoes in the targeted area. In order to be effective the drops must contact an actively flying adult mosquito. Once the spray has deposited on the ground or has been intercepted by foliage, it is no longer effective because the concentration is far too small to act as contact or residual treatment. Very small droplets are necessary so that they:

1) Remain airborne for a significant period of time in order to increase the probability of encountering a flying mosquito,
2) Are large enough to have a high probability of impinging when encountering a mosquito,
3) Are not so large that they deposit out close to the vehicle in concentrations that may be harmful to non-target organisms.

Understandably, very small (aerosol) droplets rely on prevailing meteorological conditions to move to and through the target zone. As such, meteorology is one of the primary factors governing the effectiveness of a spray operation. Applications conducted in low wind and very stable inversion conditions may keep the spray cloud in the target zone for a significant period of

time, but such applications may fail to penetrate densely vegetated habitats or move the spray cloud through areas with wider than normal street separations. Applications conducted in higher wind "neutral" atmospheric conditions may be more effective at forcing the spray into densely vegetated habitats but also may move the spray cloud too quickly through open areas and may not target the mosquitoes in these areas since their flight activity behavior may be inhibited by the high winds. The operator/manager needs to understand these meteorological issues and the particular mosquito species/habitat that they are targeting.

BCMCP utilizes Anvil® 10+10, a pyrethroid, for its ground based adulticiding activities. Pyrethroids are synthetic chemicals whose structures mimic the natural insecticide pyrethrum. Pyrethrins are found in the flower heads of some plants belonging to the family Asteracae (*e.g.*, chrysanthemums). These insecticides have the ability to knockdown insects quickly. Pyrethrums can be degraded very easily by ultraviolet light, which oxidizes the compounds. In general, this phenomenon leads to lower environmental risk. Pyrethroids can pose significant hazards to aquatic organisms, and the potential for build up within sediment is a concern. Pyrethroids are highly toxic to insect pests at very low rates (often one order of magnitude less than OPs). Synthetic pyrethroids have been chemically altered to make them more stable and safer to mammals. Pyrethroids are axonic poisons; they poison the nerve fiber by binding to a protein in nerves called the voltage-gated sodium channel. Normally, this protein opens causing stimulation of the nerve and closes to terminate the nerve signal. Pyrethroids bind to this gate and prevent it from closing normally, which results in continuous nerve stimulation. Control of the nervous system is lost, producing uncoordinated movement and ultimately mortality.

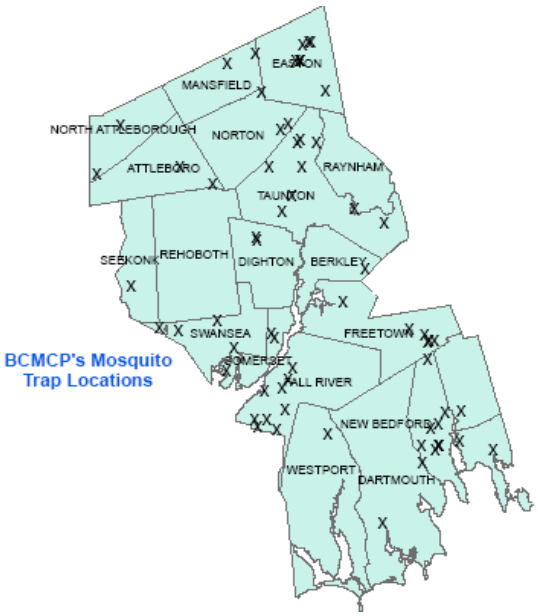
4. Pesticide Monitoring

Control measures are evaluated separately on the basis of mosquito life stage as follows:

i. Larval control efficacy is easier to evaluate. Post-treatment surveys verify successful treatments when using biological control measures, such as *Bti* products.

ii. Adulticide efficacy can be determined from pre and post treatment trap counts when a trap site is located in the vicinity of a treatment area. In addition, landing rates taken by field technicians are used to supplement this data when trap sites are not located near a treatment area or during EEE or WNV activity. Also a reduction in residential request from a location may represent a reduction in the population.

iii. Basic trapping locations for surveillance:



iv. Application Rate Determination

Application rate and frequency procedures are based on the label for the product we are using.

a. Determine species and age of target mosquito(es).

b. Evaluate environmental conditions (weather, temperature etc).

c. Consider target area flora and fauna. Heavy vegetation within a wetland can interfere with the migration of the larviciding agent through the water column. Tree canopy may deflect or otherwise prevent the penetration of pesticide from reaching the target area especially for adulticides.

d. Determine appropriate application rate based on product label recommendations, previous experience and efficacy tests.

e. All adulticide ULV equipment are Monitor 4 equipped with variable flow to change application rates based on the above criteria.

2. Frequency Determination

a. Determine target site treatment history with selected pesticide.

b. Evaluate effect of selected pesticide use on frequency and quantity thresholds for active ingredient.

c. Consider alternate treatment options.

3. Resistance Considerations

   a. Resistance is tested in our laboratory at the Bristol County Mosquito Control Project using bottle bioassay techniques. Procedures and results can be provided upon request.

   b. Consider documented resistance of target species to selected pesticide and/or any other compounds that are in the same class or exhibit similar modes of action. Also consider the possibility of cross-resistance.

   c. Consider the use of alternate control options.

5. Spill Prevention and Procedures

A. Maintenance activities are conducted to minimize potential for spills, leaks and an unintended release of pesticides.

i. Perform daily and weekly inspections of pesticide storage areas.

   1. All adulticides are placed on barrel containment pallets. The storage area has: oil absorbent pads, Speedi-Dri absorbent, emergency spill kit, heavy duty gloves, respirator, dust masks, disposable gloves, eye wash, water, fire extinguisher, soap, towels etc.

ii. Mixing or loading of pesticides at the pesticide storage area.

   1. Currently BCMCP does not mix any pesticide products. However if a new product were added then we would follow all safety precautions on the label including personal protection equipment.

iii. Containment supplies for ULV spray trucks.

   1. All trucks have plastic bed liners to contain spills as well as oil absorbent pads, emergency spill kit, respirator, dust masks, disposable gloves, water, fire extinguisher, soap, towels etc. All BCMCP vehicles are clearly marked with reflective lettering for easy identification.

iv. BCMCP rarely transports in bulk any pesticides but if necessary HazMat placards are placed on the truck and the driver has a HazMat certification with their MA CDL license and is a licensed MA pesticide applicator. Also the truck contains: oil absorbent pads, emergency spill kit, respirator, dust masks, disposable gloves, water, fire extinguisher, soap, towels etc.

v. All licensed MA pesticide applicators attend yearly training on all areas of pesticide safety to maintain their license. Also at the beginning of the mosquito season an in-house reminder session and thorough check of equipment and supplies is performed.

Equipment Security:

ULV equipment in use at BCMCP falls under strict security. The ULV spray equipment is locked up in several ways;

1. All Monitor 4 ULV machines are password protected and cannot start without one.
2. The flow control boxes are locked at all times.
3. The pesticide container is locked at all times.
4. Employees lock the trucks and any other equipment when they are away from the vehicle for any extended length of time.
5. The electronic control boxes can be removed to disable the ULV rig entirely.
6. All ULV trucks are stored in a locked garage within a gated lot with security cameras.

Pesticide Usage and Reporting:

All applicators carry in their vehicle a pesticide logbook. This logbook is used to record all pesticides loaded onto their vehicles and all pesticides used after an application. The logbook contains the following information:

1. Date
2. Type and amount of pesticide added onto vehicle
3. Type and amount of pesticide used
4. Amount of all pesticides on the truck at any given time
5. Vehicles registration number
6. Employee initials

Recording Pesticide Usage:

All truck-mounted ULV sprayers are equipped with Monitor 4 guidance systems which records amount of ULV product used and produce a map of locations of applications including the time. Hand-held PDAs are also used to record locations of applications that are downloaded into our spray request database after each application. At the end of every shift a report is filled out by every applicator for each town they worked in. These reports include the following information:

1. Date
2. City or Town
3. Applicators name
4. The applicator's Pesticide License/Certification number
5. Vehicle registration number
6. Product name
7. EPA Registration number(s)
8. Total amount applied
9. Location(s) of applications

There is also room for the applicator to make any additional comments he/she may find appropriate or necessary.

333 CMR – 68 10.14: Record Keeping Requirements
(1) All certified commercial applicators, all certified private applicators, and all licensed applicators or their employers, are required to keep true and accurate operational records containing the following information on each application of a pesticide:

(a) Place of application;
(b) Date of application;
(c) The brand or registered name of the pesticide;
(d) The EPA registration number of the pesticide;
(e) The amount of pesticide applied;
(f) The purpose for which the pesticide was applied;
(g) Method of application;
(h) The persons certified or licensed by the Department who participated in the planning and execution of the application;
(i) Accidents or incidents resulting from use of a pesticide which caused pollution;
(j) The amount of liability insurance carried and the name of the insurer;
(k) Any illnesses or injuries caused by or suspected to have been caused by pesticides and reported to the applicator.

(2) Records required by 333 CMR 10.14(1) shall be maintained for a period of at least three years from the date of application and shall be made promptly available to appropriate Department officials upon a reasonable demand.
(3) Annual reports and records may be required as deemed necessary by the Department. At a minimum, the Department will require annual submittal of all records required by 333 CMR 10.14(1)(i) and (k).
(4) The Department shall require immediate notification (in no case later than 48 hours) after coming to the attention of any applicator of all significant accidents, incidents, injuries or illnesses as recorded in 333 CMR 10.14(1)(i) and (k). The Department may also cooperate in the Federal Pesticide Monitoring System and furnish details of pesticide incidents to the United States Environmental Protection Agency to help insure safer and more effective use of pesticides.

5. Chemical Spill Response Plan:

In the event of an accident or emergency call 911.

<u>Control the Spill</u>

1. Put on appropriate PPE (if you don't already have it on)
2. Stop the source (Shut off equipment, right over spilled container etc.)
3. Protect Others (Rope off area, keep people back)
4. Stay at the site (Stay until another knowledgeable person/correctly protected person arrives on site)

<u>Contain the Spill</u>

1. Confine the Spill (once leak has been fixed, contain the spill)
2. Protect Water source

3. Absorb liquids (use speedy dry, absorb materials)
4. Dry Materials (cover with something if weather is windy). Sweep up.

Clean it up

1. Contain spill then notify the office (508) 823-5253 and/or Assistant Superintendent.
2. Call Local Fire Dept. (numbers provided)
3. Call DEP Hotline- 1-888-304-1133
4. Call MA Pesticide Bureau- Taryn LaScola- Senior Inspector 617-626-1782
5. Clean contaminated vehicles and equipment according to label instructions.
6. Dispose of contaminated material according to label

BCMCP Chemical List and PPE Requirements attached.

All applicators in the field are all equipped with direct link radio (Nextel®) and cell phones, and are given a list of the following contact names & numbers in case of an emergency situation or if any questions arise:

1. Police Dept. and Fire Dept. phone number for each town they are working in.
2. Poison Control Center phone number 1-800-222-1222
3. Cell phone numbers of the Superintendent and the Assistant Superintendent of BCMCP.
4. Cell phone numbers of other BCMCP employees on shift.
5. Phone numbers for emergency spill response for Mass. DEP 1-888-304-1133.
6. National Pesticide Information Center for general pesticide information- 1-800-858-7378

All trucks are equipped with a 3-ring binder with laminated pesticide MSDS sheets & labels, as well as other fact sheets. This information is also available at the BCMCP headquarters. All trucks are equipped with an emergency spill response kit if a pesticide spill were to occur.

6. Equipment Maintenance Schedule:

Maintenance and calibration of the ULV sprayers is an important part of our adulticide program. Maintenance reduces repair costs and equipment downtime, and frequent calibration assessments will determine that we are following label guidelines and performing ULV spray operations at the optimum settings.

As a rule, the following minimum standards apply:

- Calibration before the start of each season and after maintenance
- Droplet size testing at the start of each season
- Monthly ultrasonic cleaning of electric spray heads if applicable
- Flush of ULV sprayers after each use
- Weekly wash of sprayer
- General overall assessment of equipment
- Check filters and replace as needed per maintenance schedule based on hours of use.
- A visual inspection of spray equipment for leaks or wear in the lines, tanks and nozzle is done prior to the start up of spray equipment.

NOTE: All work done shall be recorded in the ULV Sprayer Maintenance Log and reports are on file in BCMCP's office.

7. Adverse Incident Response Procedures

An adverse incident is an unexpected or negative effect following a pesticide application. It is an Observation that may or may not be directly attributable to a specific pesticide application. The very reason for reporting it is to complete a follow-up investigation to see if in fact there was cause and effect from the application in question.

1. Operator notifies office of incident (508) 823-5253.
2. Office will notify the MA Division of Regulatory Services- Pesticide Bureau, Taryn LaScola- Senior Inspector 617-626-1782
3. Office will notify town where incident occurred to coordinate any needed remediation.

It may also cooperate in the Federal Pesticide Monitoring System and furnish details of pesticide incidents to the United States Environmental Protection Agency to help

Pesticides and Required PPE

Pesticide	EPA Registration Number	PPE Requirement
VectoLex WSP	73049-20	None
VectoBac G	73049-10	Dust Mask (N-95, R-95, P-95)
Altosid Pellets	2724-448	None
VectoLex WDG	73049-57	Dust Mask (N-95, R-95, P-95)
VectoMax WSP	73049-429	None
GB-1111	8929-IL-01	None
Anvil 10 +10 ULV	1021-1688-8329	None

8. Modifications to this PDMP

This document is to be revised/updated when any strategy, guideline, procedure is not met. The document will be updated within 20 days of the event or discovered deviation to this plan. A list of changes is logged below:

Bristol County Mosquito Control Pesticide Discharge Management Plan

Bristol County Mosquito Control Project
140 North Walker Street
Taunton, MA 02780
(O) 508-823-5253
(F) 508-828-1868

Pesticide Discharge Management Team: Wayne Andrews, M.S. – Superintendent, Stephen Burns, B.A. – Assistant Superintendent, Priscilla Matton, M.S.- Entomologist

All persons may be contacted at: Bristol County Mosquito Control Project, 140 North Walker Street, Taunton, MA 02780, (O) 508-823-5253 (F) 508-828-1868, email- brismosqwa@comcast.net or brismosqpc@comcast.net

A. Person(s) responsible for managing pests in relation to the pest management area.

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent

2. Person(s) responsible for developing and revising the PDMP.

   a. Priscilla Matton, M.S. – Entomologist
   b. Stephen Burns, B.A.– Assistant Superintendent
   c. Wayne Andrews, M.S. – Superintendent

3. Person(s) responsible for developing, revising, and implementing corrective actions and other effluent limitation requirements.

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent

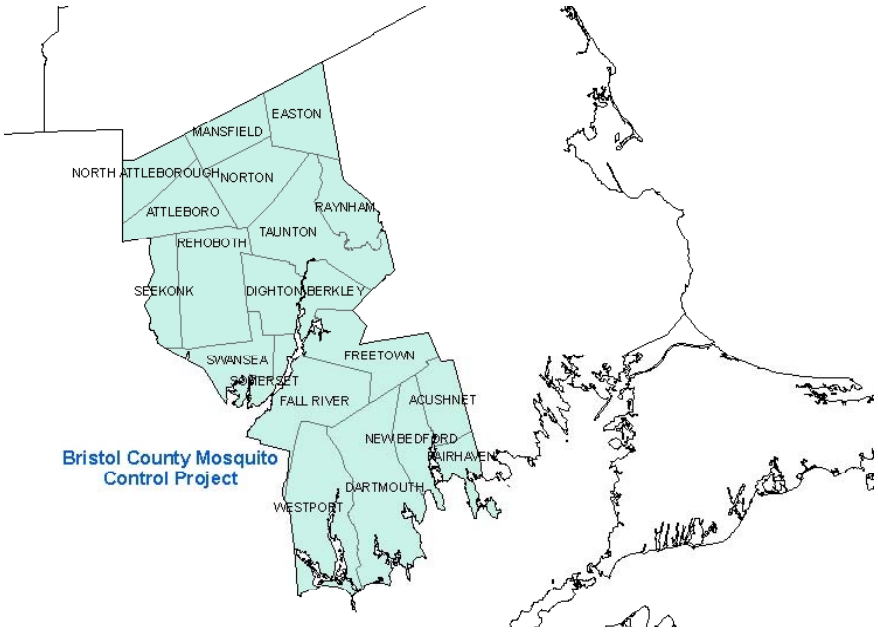
4. Person(s) responsible for pesticide applications (mix, load, apply).

   a. Wayne Andrews, M.S. – Superintendent
   b. Stephen Burns, B.A. – Assistant Superintendent
   c. Drew Bushee - Field Technician
   d. Jonathan Gibbs - Field Technician
   e. Priscilla Matton, M.S. – Entomologist
   f. John Moniz - Field Technician
   g. Joshua Nickerson – Field Technician
   h. John Raposo – Field Technician

2. Pest Management Area Description

A. Pest Problem Area Description: Bristol County Mosquito Control Project is charged with managing mosquito populations in Bristol County, Massachusetts. Bristol County is located

in the southeastern corner of Massachusetts with a western border with Rhode Island. Bristol County has a land area of 691 square miles, or 442,240 acres. Pest problem areas can best be separated into 2 broad types within our service area that can be further divided into more specific groups based on habitat type.



i. Natural Environments

1. Atlantic White Cedar and wooded coniferous/deciduous swamps which are prime habitat for the enzootic vector of Eastern Equine Encephalitis (EEE), *Culiseta melanura*. There are several of these large swamp complexes located within Bristol County.

2. Coastal and intercoastal islands, hammocks, and high marsh areas are dispersed throughout our coastal region. These areas are affected by high river stages in the spring, rains, and tides. *Ochlerotatus taeniorhynchus, Oc. cantator* and *Oc. sollicitans* are major problems in these areas, although *Culex salinarius* is also common to such sites.

3. Woodland ponds, pools, and depressions are isolated wetlands occurring throughout the county within forested uplands and pasture areas. Examples of these habitats include bogs, shrub swamps, fens, and depressions caused by uprooted trees. Many of these sites only contain water during the wet seasons of the year, and serve as excellent larval habitat for most species of mosquitoes found in our region.

4. Other natural environments include springs, seeps, tree holes, tree cavities, and burrows made by various species of wildlife.

ii. Man-made Environments

1. The general public frequently suggests ditches and canals as sources of mosquito problems. However, these structures usually have flowing water and/or contain fish, and are seldom the primary source of a mosquito infestation, especially if these systems tend to hold water on a permanent basis. On the other hand, shallow, roadside ditches do contribute to mosquito populations at times. Such sites often remain dry throughout much of the year or because of temperature, oxygen content, or other factors do not support fish life. Mosquito species encountered in such sites include *Aedes vexans*, *Culex salinarius*, *Cx. restuans*, and many species of *Ochlerotatus*.

2. Artificial containers come in all sorts of shapes and sizes. These may be represented by something as small as a bottle top to something as large as a discarded or unkempt boat. Containers serve as the primary larval site for *Culex pipiens*, which is frequently associated with mosquito problems in our more urban and suburban areas of the county. *Oc. triseriatus*, *Oc. japonicus* and *Ae. albopictus* are also human biters associated with containers.

3. Storm drains and catch basins are found throughout areas of the county, and provide a pristine environment for *Culex pipiens*, our primary West Nile Virus (WNV) vector.

4. Fallow cranberry bogs serve as habitat for a number of species of mosquitoes in our area. These shallow acidic wetlands can produce high numbers of mosquitoes.

5. Other man-made sites include retention and detention ponds. These areas generally cause problems during drought conditions when water is not flowing or when the structures are not properly constructed and hold water for longer then their prescribed time.

B. Pest Problem Description

Bristol County has 691 sq miles. It has 556 sq miles of land and 135 sq miles of water. It also has 74,000 acres of MA DEP wetlands plus an additional 25,000 acres of re-flood that supports *Ae. vexans*. In 2010, 477 sq miles were in a High/ Moderate risk for WNV and EEE. This is 69% of our service area.

Mosquito species are broadly separated into two groups according to where they lay eggs: floodwater/transient mosquitoes and permanent water mosquitoes. Adult female floodwater mosquitoes lay eggs on mud or previously submerged vegetation, and require a dry down period before hatching may occur. The eggs may remain dormant for days, months, or even years until they are flooded, at which time larvae hatch. Permanent water mosquitoes lay eggs on the water surface, and cannot dry down before hatching. The eggs float on the surface for a few hours to a

few days until the larvae hatch into the water. Floodwater/ transient mosquito larval developmental sites include irrigated pastures, rice fields, seasonally flooded duck clubs and other managed wetlands, tidal wetlands, riparian corridors, and snowmelt pools. These intermittent or seasonally flooded habitats can be among the most productive sources of mosquitoes because they are often free of natural predators. Permanent water mosquito larval sites include artificial containers, tree holes, catch basins, open ditches, retention/detention ponds, natural or constructed ponds and wetlands, storm water management devices, and along the edges of flowing streams. Sources are found everywhere from highly urban areas to natural wetlands and often produce multiple generations of mosquitoes each season.

The county is known to contain 25 species of mosquitoes, although the Bristol County Mosquito Control Project actively surveys and conducts control efforts primarily on 13 species.

i. *Culiseta melanura* and *Cs. morsitans* are swamp mosquitoes that occur in Atlantic White Cedar Swamps, hardwood floodplains and other aquatic habitats characterized by low pH. The larvae often are found within subterranean pockets that are difficult to treat with conventional larvicide agents. The larval stage become quiescent during the winter months and burrow into the bottom sediment to overwinter. Multiple generations per season are likely, however it may be staggered emergence from differing overwintering larval stages. *Cs. melanura* frequently obtains its blood meals from birds, and is our primary vector in the amplification of EEE in our area. It has also been found to carry WNV.

ii. *Coquillettidia perturbans* is a fairly large mosquito that is often associated with aquatic habitats containing cattails, *Typha* spp. Larvae attach to the roots of aquatic vegetation in freshwater swamps and overwinter in this stage. This makes them difficult to treat with conventional larvicide agents. Adult emergence appears to occur in broods over the course of the summer but actually represents cohorts of larvae that passed the winter in different instars. It commonly takes blood meals from both bird and mammal species (including humans). It is generally considered a bridge vector of EEE to mammals, but has also tested positive for WNV.

iii. *Ochlerotatus canadensis* is an important epizootic vector of EEE in our region. Larvae develop in temporary or semi-permanent woodland freshwater pools. The majority of the generation emerges in early spring followed by sporadic egg hatch later in the season. Females will bite any time of day, but are most active in the evening. They are aggressive and long-lived. Overwinters in the egg stage.

iv. *Aedes vexans* is a common woodland mosquito that has the potential to fly up to 5 miles. It relies on summer rains to flood eggs that are deposited in low lying ground depressions and are commonly referred to as floodwater mosquitoes. Flood plains where rivers overflow their banks generate the highest populations but significant numbers can be produced from virtually any area where fresh ground water accumulates on an intermittent basis. The

entire group undergoes accelerated larval development and can pupate 4-5 days after egg hatch when ambient temperatures are favorable. This species has been implicated as a vector of EEE, WNV, and dog heartworm. Overwinters in the egg stage.

v. *Culex pipiens*, the Northern house mosquito, is our region's primary WNV vector but has also tested positive for EEE. It prefers somewhat stagnant or polluted water conditions as larval habitat, and can be a common species in storm drain systems, especially in drainage lines equipped with sumps in the catch basins that tend to hold water on a permanent basis. Both natural and artificial containers are used by this species. Larval populations are typically sparse in late spring, build progressively during the summer and do not peak until mid-summer or early fall. Multiple generations per season. Overwinters as mated females.

vi. *Culex restuans* is an early season mosquito and very similar to *Cx. pipiens*. Larval habitat for this species typically includes a variety of semi-permanent waterways, including roadside ditches and woodland pools. It has been reported to carry both EEE and WNV, and may be an important vector in the initial amplification of these viruses in bird populations, as birds appear to be its primary blood hosts.

vii. *Culex salinarius* larvae are found in both freshwater and somewhat saline environments. Most reach greatest abundance in areas adjacent to salt marshes where fresh water from the upland drains on to coastal habitats producing a brackish water environment. Multiple generations per season and they overwinter as mated females. This species has been recorded to carry dog heartworm, EEE, St. Louis Encephalitis, and WNV. It appears to be an opportunistic feeder of birds, mammals, and even reptiles, and may serve as an important bridge vector in the transmission of arbovirus.

viii. *Ochlerotatus sollicitans*, the brown salt-marsh mosquito, is a fairly large mosquito that can be a serious pest along the immediate coast. Salt tolerance allows these mosquitoes to utilize vast expanses of salt marsh wetlands as larval habitat unsuitable to other floodwater species. The eggs are normally deposited in ground depression on marshland that is high enough to exclude daily tide cycles. The positioning allows eggs to be flooded by lunar tides producing 2 broods at roughly 2-week intervals during the summer months. Additional broods can be triggered by storm tides or heavy summer rains. Overwinters in the egg stage. It is active during both daytime and nighttime periods, and can fly great distances from its original source. It has been reported to carry EEE in the northeastern US.

ix. *Ochlerotatus taeniorhynchus*, the black salt-marsh mosquito, is a nuisance mosquito species that is capable of producing tremendous numbers of adults after coastal flooding events caused by rains or extreme high tides. Similar behavioral and habitat locations as *Oc. sollicitans*.

x. *Ochlerotatus cantator* is a fairly large mosquito that can be a serious pest along the immediate coast. It is active during both daytime and nighttime periods, and can fly great distances from its original source. Similar behavioral and habitat locations as *Oc. sollicitans* and *Oc. taeniorhynchus*.

xi. *Ochlerotatus japonicus* is a newly introduced species to the area and an aggressive nighttime human biter. Larval habitat includes natural tree holes and similar natural containers. Discarded tires and a wide array of artificial containers provide additional habitat if the containers hold enough decomposing plant material to mimic natural sites. Overwinters in the egg stage. Multiple generations per season have fully established in all areas of Bristol County. Positive WNV mosquitoes have been detected throughout the County and a WNV human case was found in very close proximity to positives.

xii. *Aedes albopictus* is a newly introduced species into the northeastern US and recently found in Bristol County. It is an aggressive daytime human biter and is a competent vector of several arboviruses in the US. Discarded tires and a wide array of artificial containers provide larval habitat. Overwinters in the egg stage.

2. Action Threshold

a. The following thresholds were established to trigger larviciding missions within our service area as described in the Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009:

i. Treatments of larval mosquito habitat may be conducted in areas that are found to contain an average of at least 1 larva per 5 dips (using a standard 400mL dipper). Actual treatments will be based on local demographics, mosquito species present, and other historic and current conditions.

ii. The storm water systems may be treated in selected areas of the county where vector species have been found or there is a history of arbovirus activity.

iii. Best professional judgment based on historical records, weather conditions and local knowledge.

General Larvicide information: Service request inspections preformed by our Field Technicians will check for mosquito larvae. Generally, these requests for service stem from localized wetlands within someone property. Occasionally, service requests investigations uncover larger scale problems, like blocked drainage systems, leaking septic tanks, broken water lines, etc. that may require further action by either the land owner or other town departments to correct. Some requests for service stem from localized, container-breeding species of mosquitoes that are easily remedied by simply dumping water from articles such as buckets, birdbaths, tarps, and other items that are holding water. Larval surveillance entails locating the larval source (if not already known), sampling for larvae and estimating larval density, determining larval developmental

stage(s), and collecting larvae for identification purposes if applicable. Other factors considered during larval inspections include the water depth at the specific location, current extended forecast, water temperature, and if any natural predators are present.

BCMCP uses microbial larvicides, formulated to deliver a natural toxin to the intended targeted mosquito larvae. *Bacillus thuringiensis* (*Bt*), products have been available since the 1950s. In the 1960s and 1970s, the World Health Organization encouraged and subsidized scientific discovery and utilization of naturally occurring microbes. As a result of those early studies and a whole body of subsequent work, two lines of mosquito control products have been developed: crystalline toxins of two closely related grampositive, aerobic bacteria – *Bacillus thuringiensis israelensis* (*Bti*) and *Bacillus sphaericus (Bs).* Mosquito control agents based on *Bt* are the second most widely registered group of microbial pesticides.

Bacillus thuringiensis israelensis (Bti)

Bacillus thuringiensis is a bacterium that occurs naturally in soils and aquatic environments globally. The active ingredients in *Bti* formulations are delta-endotoxin (d-endotoxin) crystals separated from bacteria near the end of manufacturing processes. These toxic crystals are incorporated into various products, which allow their release into water so that they may be ingested by mosquito larvae. The alkaline environment and enzymes of the mosquito midgut activate the d-endotoxin crystals. The alkaline gut environment allows hydrolysis of the crystal's protein coating and the release of pro-toxins. Gut enzymes then activate the pro-toxins and facilitate their binding to the gut epithelium of the mosquito larva. Cells rupture and are destroyed at the binding sites, leading to a loss of body fluids which results in death. This rapid action typically controls larvae in 4-24 hours. *Bacillus thuringiensis israelensis* is listed by the EPA as a biopesticide (http://www.epa.gov/oppbppd1/biopesticides/ingredients/index.htm). *Bti* based larvicides have undergone extensive risk studies both prior to and after registration. *Bti* labels bear the "CAUTION" signal word. *Bti* products are general use pesticides and pose minimal risk for non-target organisms in the environment. The crystalline d-endotoxins are not activated in the acidic guts of humans or other animals or in the alkaline guts of animals, which do not contain the enzymes necessary for activation, and binding of released pro-toxins. This specificity accounts for the highly selective nature of *Bti* larvicides, which is limited to Dipterans, notably mosquitoes, black flies, and some midges. *Bti* controls all larval instars provided they are still feeding. It is effective on most mosquito species in a very wide variety of habitats; *Bti* formulations are thus ideally suited for IPM.

Bacillus sphaericus (Bs)

Bacillus sphaericus is a naturally occurring spore-forming bacterium found throughout the world in soil and aquatic environments. *Bs* acts in a manner similar to *Bti*, except it has been shown to recycle in intact *Culex* cadavers, thus maintaining some residual activity. Once larvae ingest these *Bs* d-endotoxins, they are partially digested (their protein envelope is dissolved) in the alkaline gut, enabling the release of pro-toxins. These pro-toxins in turn are activated by enzymes and attach to the gut wall where they begin to disrupt, paralyze, and rupture the gut. The activity of *Bs* d-endotoxins differs from that of *Bti* in several important ways. *Bs* toxins are attached to a living bacterial spore while the *Bti* toxins are not. The toxins of *Bs* and *Bti* bind to chemically different receptor cell sites. They are not related immunologically and are thought to have completely different molecular modes of action. Operationally, the most important

differences between the toxins are speed of action and persistence in the larval habitat. *Bs* toxins are much slower acting than *Bti* toxins and can be more persistent. *Bs* has a slower settling rate, and the spores can invade the body cavity of the larvae where they have the capability to germinate, grow, and produce toxins. This process is known as recycling. *Bs* is listed by the EPA (http://www.epa.gov/oppbppd1/biopesticides/ingredients/index.htm) as a biopesticide. *Bs* based larvicides are general use pesticides, the signal word "CAUTION" appears on *Bs* product labels and have undergone extensive risk studies both prior to and after registration. The crystalline d-endotoxins are not activated in the acidic guts of humans or other animals or in the alkaline guts of animals, which do not contain the enzymes necessary to activate the pro-toxins. This specificity accounts for the highly selective nature of *Bs* larvicides; they do not target as wide a range of mosquito species as do *Bti* products. Formulations containing *Bs* are most active against *Culex* and *Anopheline* larvae and less active against some *Aedes* larvae. Formulation effectiveness depends on the mosquito species and environmental conditions including water quality. In general, the best immediate results with *Bs* are obtained when applications are made to larvae in the 1st to 3rd instars. Larval mortality may be observed as soon as a few hours after ingestion, but typically it takes as long as two to three days depending upon dosage and ambient temperature. Adequate recycling of *Bs* for sustained control is dependent on the presence of dead mosquito larvae.

b. The following thresholds were established to trigger truck based ULV adulticiding missions within our service area as described in the Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009:

   i. Collections of 5 female mosquitoes from a standard light trap.

   ii. Residential requests from similar ecological habitat and location within a short time frame.

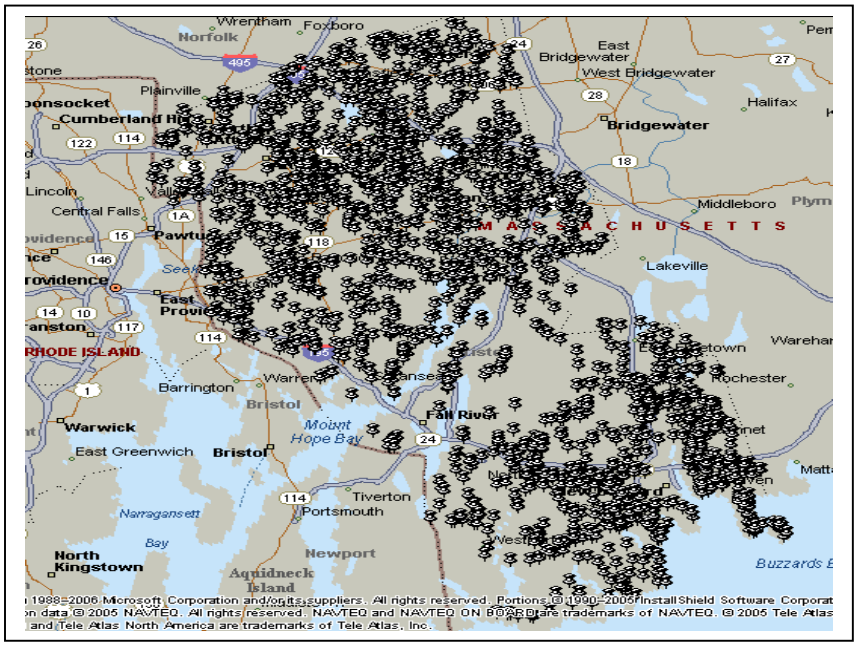
   iii. Positive WNV or EEE mosquito pools from a trapping location within Bristol County or surrounding locations.

   iv. Best professional judgment based on historical records, weather conditions and local knowledge.

General Adulticing information: There have been 51 different mosquito species identified in the Commonwealth. There are approximately 13 mosquito species, which are important to human health, nuisance and quality of life. The key to managing mosquito populations efficiently and effectively is by monitoring the interaction between mosquitoes and human populations. Adult mosquito surveillance is the means by which BCMCP gathers this information. BCMCP operations are governed by the data collected through these field surveys. Adulticiding activities are governed by surveillance for mosquito populations and virus levels. Mosquito collections from all trap types can be sent into the State Laboratory Institute in Jamaica Plains on a weekly basis for virus analysis. BCMCP coordinates all mosquito surveillance activities with the Department of Public Health in accordance with their Surveillance and Response Plan for Mosquito-borne Disease.

Surveillance is the cornerstone of integrated pest management (IPM) and BCMCP uses a variety of traps to achieve sound data. Gravid trap collections are paramount to our WNV surveillance. The Project has gravid traps strategically placed throughout the Project's service area. The Project also deploys CDC portable light traps in areas where these viruses are found in an effort to monitor human biting mosquito species, which are collected in large numbers in these traps. BCMCP may also deploy these portable traps (CDC Miniature Light Traps) at short notice in response to complaints, for efficacy testing and/or for vector surveillance. Resting boxes are used by our staff to aid in earlier detection of any possible EEE threat in the county. A resting box is a passive trap that attracts certain species of mosquitoes after they have taken a bloodmeal.

3. General Location – This is a map of the many known mosquito-breeding sites within Bristol County, Massachusetts. The thumbtacks (x=1885) indicate areas treated by hand with mosquito larvicides. BCMCP also treats a tremendous number of storm drains and catch basins (x=±25,000) during the mosquito season. These basins are located throughout the entire county, in every city and town.



ULV-truck based adulticiding operations are conducted throughout Bristol County. The action thresholds described above determines these locations. Bristol County has received the following residental request for adulticide applications over the following years respectively; 14,323-2011, 17,508-2010, 15,964-2009, and 11,985-2008. Trap based data are available from the Project for collections made throughout the mosquito season.

4. Water Quality Standards - Waterways in Bristol County are not impaired with any pesticides used by the Bristol County Mosquito Control Project.

3. Evaluation and Pest Management

A description of the control measures to demonstrate how the operators specifically plan to meet the applicable technology-based or water quality-based effluent limitations. Operators must consider impact to non-target organisms, impact to water quality, pest resistance, feasibility, and cost effectiveness when evaluating and selecting the most efficient and effective means of pest management to minimize pesticide discharge to waters of the U.S. The strategies considered included:

i. No action

ii. Prevention may refer to avoidance of mosquito bites or preventing the establishment of larval habitat via public education. Educational programming at local schools and area events allow BCMCP staff the opportunity to suggest ways that residents can assist in the prevention of mosquito problems. This may include removing containers and articles from their yards that provide larval habitat, and to be mindful that birdbaths and pet water bowls could serve as mosquito habitats when not properly maintained. Proper use of personal protection repellents and understanding the availability of alternatives. The Update to the 1998 Mosquito Control Program Generic Environmental Impact report (GEIR) EOEEA #5027- dated August 14, 2009 describes a wide variety of alternatives such as bug zappers, predators and traps and the reasons why they are unsuccessful.

iii. Mechanical/physical methods are alterations made to the environment. These methods can be as basic as simply emptying water from containers, source reduction or as complex as repairing broken water lines which often require the involvement of other county departments, such as Public Works. The MA Best Management Practices and Guidance for Freshwater Mosquito Control, dated October 24, 2008 is available at the Project's headquarters. These guidelines will explain all the steps necessary to complete a freshwater management project in Bristol County. The MA Mosquito Control Open Marsh Water Management Standards, dated May 2010 is available at the Project's headquarters. These guidelines will explain all the steps necessary to complete a salt marsh water management project in Bristol County. As described in our service area, there is a significant amount of area that we would not be able to uses these methods to control mosquitoes. It is very expensive and time consuming processes and manipulating all of these natural larval habitats is not practical. However it remains an integral part of our IPM strategy.

iv. Cultural methods like the previous two methods manipulate larval habitat to prevent favorable conditions for mosquitoes to complete their aquatic development. Physical manipulation of environments such as removing blockages in ditches that serve as barriers to natural predators of

mosquitoes are sometimes quick and effective means for our Field Technicians to resolve problems on a localized level (also see above).

v. Biological control agents are used by BCMCP for the control of larval stages of mosquitoes to help prevent adult mosquitoes from emerging in identified larval sites. Formulations containing *Bacillus sphaericus* and/or *Bacillus thuringiensis israelensis* are used to treat floodwater, catch basin/storm drains and salt-marsh mosquito larval sites. Methoprene, an insect growth regulator is selectively used to control *Cq. perturbans*, a difficult mosquito to control in the larval stage. This product is used in specific areas such as detention and retention basins in the interior parts of the County. Removing blockages or obstructions allows the movement of fish, natural predators to mosquito larvae, and is used in appropriate situations.

vi. Pesticides used specifically for adulticiding, which is a term used by mosquito control to describe applications targeting adult or flying mosquitoes. There are two types of adulticiding. Ground adulticiding using truck mounted equipment conducted selectively in response to complaints from the public and the surveillance program. Also aerial adulticiding using either fixed wing aircraft or helicopters is conducted only in the event of a public health emergency declared by the Sate Department of Public Health.

Ground Adulticiding: For the most part ground adulticiding is limited to targeted applications in response to surveillance data, board of health requests, response to complaints from the public or as a disease intervention measure. Ground adulticiding is accomplished using truck mounted Ultra Low Volume (ULV) cold aerosol generators. ULV applications treat an acre with insecticide at a rate of approximately 1 ounce. The material is atomized into a "fog" which contains droplets in the ~ 20 micron size. Dispensing the material from the back of a pickup truck traveling at an average speed of 5-10 miles per hour the equipment produces approximately a 300 foot swath width (coverage area) depending on wind direction and speed. These tiny droplets impinge on mosquitoes flying through the fog effectively controlling the mosquitoes in the targeted area. In order to be effective the drops must contact an actively flying adult mosquito. Once the spray has deposited on the ground or has been intercepted by foliage, it is no longer effective because the concentration is far too small to act as contact or residual treatment. Very small droplets are necessary so that they:

1) Remain airborne for a significant period of time in order to increase the probability of encountering a flying mosquito,
2) Are large enough to have a high probability of impinging when encountering a mosquito,
3) Are not so large that they deposit out close to the vehicle in concentrations that may be harmful to non-target organisms.

Understandably, very small (aerosol) droplets rely on prevailing meteorological conditions to move to and through the target zone. As such, meteorology is one of the primary factors governing the effectiveness of a spray operation. Applications conducted in low wind and very stable inversion conditions may keep the spray cloud in the target zone for a significant period of

time, but such applications may fail to penetrate densely vegetated habitats or move the spray cloud through areas with wider than normal street separations. Applications conducted in higher wind "neutral" atmospheric conditions may be more effective at forcing the spray into densely vegetated habitats but also may move the spray cloud too quickly through open areas and may not target the mosquitoes in these areas since their flight activity behavior may be inhibited by the high winds. The operator/manager needs to understand these meteorological issues and the particular mosquito species/habitat that they are targeting.

BCMCP utilizes Anvil® 10+10, a pyrethroid, for its ground based adulticiding activities. Pyrethroids are synthetic chemicals whose structures mimic the natural insecticide pyrethrum. Pyrethrins are found in the flower heads of some plants belonging to the family Asteracae (*e.g.*, chrysanthemums). These insecticides have the ability to knockdown insects quickly. Pyrethrums can be degraded very easily by ultraviolet light, which oxidizes the compounds. In general, this phenomenon leads to lower environmental risk. Pyrethroids can pose significant hazards to aquatic organisms, and the potential for build up within sediment is a concern. Pyrethroids are highly toxic to insect pests at very low rates (often one order of magnitude less than OPs). Synthetic pyrethroids have been chemically altered to make them more stable and safer to mammals. Pyrethroids are axonic poisons; they poison the nerve fiber by binding to a protein in nerves called the voltage-gated sodium channel. Normally, this protein opens causing stimulation of the nerve and closes to terminate the nerve signal. Pyrethroids bind to this gate and prevent it from closing normally, which results in continuous nerve stimulation. Control of the nervous system is lost, producing uncoordinated movement and ultimately mortality.

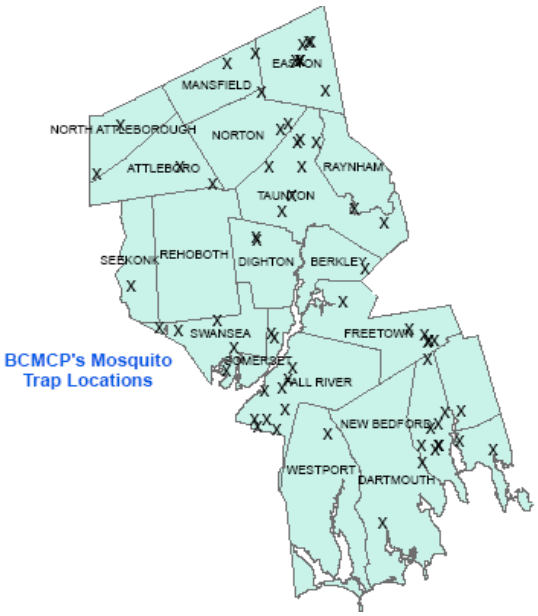
4. Pesticide Monitoring

Control measures are evaluated separately on the basis of mosquito life stage as follows:

i. Larval control efficacy is easier to evaluate. Post-treatment surveys verify successful treatments when using biological control measures, such as *Bti* products.

ii. Adulticide efficacy can be determined from pre and post treatment trap counts when a trap site is located in the vicinity of a treatment area. In addition, landing rates taken by field technicians are used to supplement this data when trap sites are not located near a treatment area or during EEE or WNV activity. Also a reduction in residential request from a location may represent a reduction in the population.

iii. Basic trapping locations for surveillance:



iv. Application Rate Determination

Application rate and frequency procedures are based on the label for the product we are using.

a. Determine species and age of target mosquito(es).

b. Evaluate environmental conditions (weather, temperature etc).

c. Consider target area flora and fauna. Heavy vegetation within a wetland can interfere with the migration of the larviciding agent through the water column. Tree canopy may deflect or otherwise prevent the penetration of pesticide from reaching the target area especially for adulticides.

d. Determine appropriate application rate based on product label recommendations, previous experience and efficacy tests.

e. All adulticide ULV equipment are Monitor 4 equipped with variable flow to change application rates based on the above criteria.

2. Frequency Determination

a. Determine target site treatment history with selected pesticide.

b. Evaluate effect of selected pesticide use on frequency and quantity thresholds for active ingredient.

c. Consider alternate treatment options.

3. Resistance Considerations

   a. Resistance is tested in our laboratory at the Bristol County Mosquito Control Project using bottle bioassay techniques. Procedures and results can be provided upon request.

   b. Consider documented resistance of target species to selected pesticide and/or any other compounds that are in the same class or exhibit similar modes of action. Also consider the possibility of cross-resistance.

   c. Consider the use of alternate control options.

5. Spill Prevention and Procedures

A. Maintenance activities are conducted to minimize potential for spills, leaks and an unintended release of pesticides.

i. Perform daily and weekly inspections of pesticide storage areas.

   1. All adulticides are placed on barrel containment pallets. The storage area has: oil absorbent pads, Speedi-Dri absorbent, emergency spill kit, heavy duty gloves, respirator, dust masks, disposable gloves, eye wash, water, fire extinguisher, soap, towels etc.

ii. Mixing or loading of pesticides at the pesticide storage area.

   1. Currently BCMCP does not mix any pesticide products. However if a new product were added then we would follow all safety precautions on the label including personal protection equipment.

iii. Containment supplies for ULV spray trucks.

   1. All trucks have plastic bed liners to contain spills as well as oil absorbent pads, emergency spill kit, respirator, dust masks, disposable gloves, water, fire extinguisher, soap, towels etc. All BCMCP vehicles are clearly marked with reflective lettering for easy identification.

iv. BCMCP rarely transports in bulk any pesticides but if necessary HazMat placards are placed on the truck and the driver has a HazMat certification with their MA CDL license and is a licensed MA pesticide applicator. Also the truck contains: oil absorbent pads, emergency spill kit, respirator, dust masks, disposable gloves, water, fire extinguisher, soap, towels etc.

v. All licensed MA pesticide applicators attend yearly training on all areas of pesticide safety to maintain their license. Also at the beginning of the mosquito season an in-house reminder session and thorough check of equipment and supplies is performed.

Equipment Security:

ULV equipment in use at BCMCP falls under strict security. The ULV spray equipment is locked up in several ways;

1. All Monitor 4 ULV machines are password protected and cannot start without one.
2. The flow control boxes are locked at all times.
3. The pesticide container is locked at all times.
4. Employees lock the trucks and any other equipment when they are away from the vehicle for any extended length of time.
5. The electronic control boxes can be removed to disable the ULV rig entirely.
6. All ULV trucks are stored in a locked garage within a gated lot with security cameras.

Pesticide Usage and Reporting:

All applicators carry in their vehicle a pesticide logbook. This logbook is used to record all pesticides loaded onto their vehicles and all pesticides used after an application. The logbook contains the following information:

1. Date
2. Type and amount of pesticide added onto vehicle
3. Type and amount of pesticide used
4. Amount of all pesticides on the truck at any given time
5. Vehicles registration number
6. Employee initials

Recording Pesticide Usage:

All truck-mounted ULV sprayers are equipped with Monitor 4 guidance systems which records amount of ULV product used and produce a map of locations of applications including the time. Hand-held PDAs are also used to record locations of applications that are downloaded into our spray request database after each application. At the end of every shift a report is filled out by every applicator for each town they worked in. These reports include the following information:

1. Date
2. City or Town
3. Applicators name
4. The applicator's Pesticide License/Certification number
5. Vehicle registration number
6. Product name
7. EPA Registration number(s)
8. Total amount applied
9. Location(s) of applications

There is also room for the applicator to make any additional comments he/she may find appropriate or necessary.

333 CMR – 68 10.14: Record Keeping Requirements
(1) All certified commercial applicators, all certified private applicators, and all licensed applicators or their employers, are required to keep true and accurate operational records containing the following information on each application of a pesticide:

(a) Place of application;
(b) Date of application;
(c) The brand or registered name of the pesticide;
(d) The EPA registration number of the pesticide;
(e) The amount of pesticide applied;
(f) The purpose for which the pesticide was applied;
(g) Method of application;
(h) The persons certified or licensed by the Department who participated in the planning and execution of the application;
(i) Accidents or incidents resulting from use of a pesticide which caused pollution;
(j) The amount of liability insurance carried and the name of the insurer;
(k) Any illnesses or injuries caused by or suspected to have been caused by pesticides and reported to the applicator.

(2) Records required by 333 CMR 10.14(1) shall be maintained for a period of at least three years from the date of application and shall be made promptly available to appropriate Department officials upon a reasonable demand.
(3) Annual reports and records may be required as deemed necessary by the Department. At a minimum, the Department will require annual submittal of all records required by 333 CMR 10.14(1)(i) and (k).
(4) The Department shall require immediate notification (in no case later than 48 hours) after coming to the attention of any applicator of all significant accidents, incidents, injuries or illnesses as recorded in 333 CMR 10.14(1)(i) and (k). The Department may also cooperate in the Federal Pesticide Monitoring System and furnish details of pesticide incidents to the United States Environmental Protection Agency to help insure safer and more effective use of pesticides.

5. Chemical Spill Response Plan:

In the event of an accident or emergency call 911.

<u>Control the Spill</u>

1. Put on appropriate PPE (if you don't already have it on)
2. Stop the source (Shut off equipment, right over spilled container etc.)
3. Protect Others (Rope off area, keep people back)
4. Stay at the site (Stay until another knowledgeable person/correctly protected person arrives on site)

<u>Contain the Spill</u>

1. Confine the Spill (once leak has been fixed, contain the spill)
2. Protect Water source

3. Absorb liquids (use speedy dry, absorb materials)
4. Dry Materials (cover with something if weather is windy). Sweep up.

Clean it up

1. Contain spill then notify the office (508) 823-5253 and/or Assistant Superintendent.
2. Call Local Fire Dept. (numbers provided)
3. Call DEP Hotline- 1-888-304-1133
4. Call MA Pesticide Bureau- Taryn LaScola- Senior Inspector 617-626-1782
5. Clean contaminated vehicles and equipment according to label instructions.
6. Dispose of contaminated material according to label

BCMCP Chemical List and PPE Requirements attached.

All applicators in the field are all equipped with direct link radio (Nextel®) and cell phones, and are given a list of the following contact names & numbers in case of an emergency situation or if any questions arise:

1. Police Dept. and Fire Dept. phone number for each town they are working in.
2. Poison Control Center phone number 1-800-222-1222
3. Cell phone numbers of the Superintendent and the Assistant Superintendent of BCMCP.
4. Cell phone numbers of other BCMCP employees on shift.
5. Phone numbers for emergency spill response for Mass. DEP 1-888-304-1133.
6. National Pesticide Information Center for general pesticide information- 1-800-858-7378

All trucks are equipped with a 3-ring binder with laminated pesticide MSDS sheets & labels, as well as other fact sheets. This information is also available at the BCMCP headquarters. All trucks are equipped with an emergency spill response kit if a pesticide spill were to occur.

6. Equipment Maintenance Schedule:

Maintenance and calibration of the ULV sprayers is an important part of our adulticide program. Maintenance reduces repair costs and equipment downtime, and frequent calibration assessments will determine that we are following label guidelines and performing ULV spray operations at the optimum settings.

As a rule, the following minimum standards apply:

- Calibration before the start of each season and after maintenance
- Droplet size testing at the start of each season
- Monthly ultrasonic cleaning of electric spray heads if applicable
- Flush of ULV sprayers after each use
- Weekly wash of sprayer
- General overall assessment of equipment
- Check filters and replace as needed per maintenance schedule based on hours of use.
- A visual inspection of spray equipment for leaks or wear in the lines, tanks and nozzle is done prior to the start up of spray equipment.

NOTE: All work done shall be recorded in the ULV Sprayer Maintenance Log and reports are on file in BCMCP's office.

7. Adverse Incident Response Procedures

An adverse incident is an unexpected or negative effect following a pesticide application. It is an Observation that may or may not be directly attributable to a specific pesticide application. The very reason for reporting it is to complete a follow-up investigation to see if in fact there was cause and effect from the application in question.

1. Operator notifies office of incident (508) 823-5253.
2. Office will notify the MA Division of Regulatory Services- Pesticide Bureau, Taryn LaScola- Senior Inspector 617-626-1782
3. Office will notify town where incident occurred to coordinate any needed remediation.

It may also cooperate in the Federal Pesticide Monitoring System and furnish details of pesticide incidents to the United States Environmental Protection Agency to help

Pesticides and Required PPE

Pesticide	EPA Registration Number	PPE Requirement
VectoLex WSP	73049-20	None
VectoBac G	73049-10	Dust Mask (N-95, R-95, P-95)
Altosid Pellets	2724-448	None
VectoLex WDG	73049-57	Dust Mask (N-95, R-95, P-95)
VectoMax WSP	73049-429	None
GB-1111	8929-IL-01	None
Anvil 10 +10 ULV	1021-1688-8329	None

8. Modifications to this PDMP

This document is to be revised/updated when any strategy, guideline, procedure is not met. The document will be updated within 20 days of the event or discovered deviation to this plan. A list of changes is logged below: