

State Reclamation and Mosquito Control Board 2014 Annual Report

STATE AGENCY MEMBERS:

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The State Reclamation and Mosquito Control Board (SRMCB) oversees mosquito control in the Commonwealth of Massachusetts and establishes administrative and technical policy, guidelines, and best management practices to insure that mosquito control programs are effective and safe. The SRMCB also appoints the Commissioners of each of the regional mosquito control districts/projects. The SRMCB is led by a three-member board comprised of representatives from the Massachusetts Department of Agricultural Resources (MDAR), the Department of Conservation and Recreation (DCR), and the Department of Environmental Protection (DEP).

Although the SRMCB is an independent board, MDAR's Division of Crop and Pest Services (CPS) provides support to the SRMCB through staff time and resources. In addition to the time devoted to SRMCB activities by the Division Director, who serves as the Chairman of the SRMCB, the following MDAR staff dedicate significant time to the SRMCB and to the administration of the mosquito control districts: the SRMCB Executive Director, the department's Environmental Biologist, and Legal and Financial staff. Additional CPS staff provides technical support for pesticide operations by providing meteorological data or enforcement support during wide-area aerial treatments, reviewing mosquito pesticide products, and performing health and environmental assessments. MDAR staff also provides GIS and IT support. These support activities are not charged to mosquito district budgets.

SRMCB and Mosquito Control

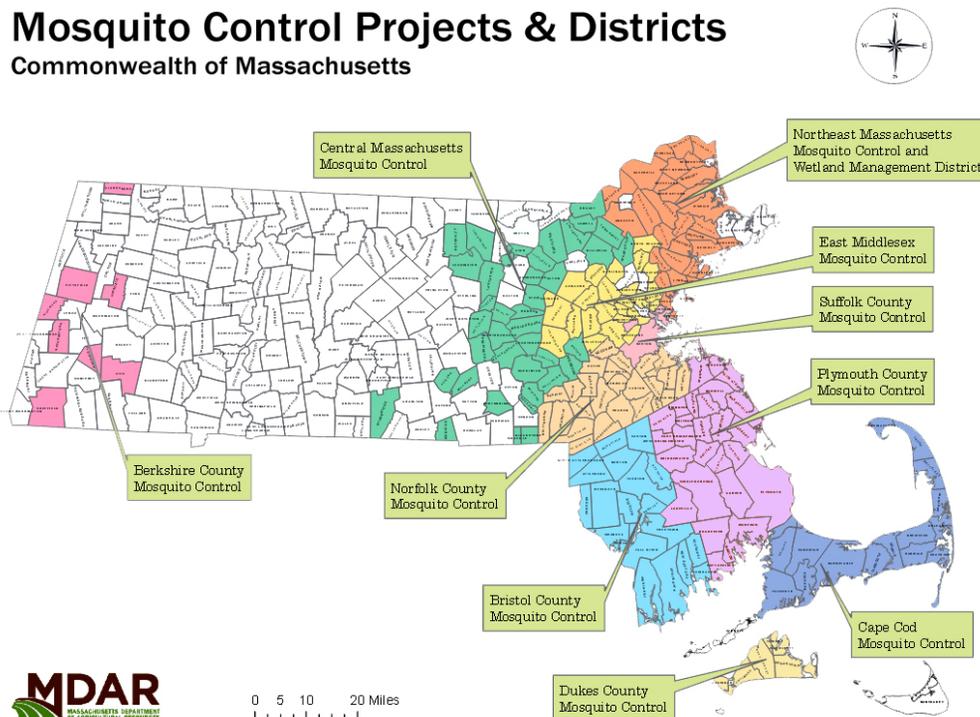
Mosquito control activities serve a vital public health function. Of the 51 species of mosquitoes found in Massachusetts, several species (*Aedes vexans*, *Coquilleltidia perturbans*, *Ochlerotatus canadensis*, *Culex pipiens*, and *Ochlerotatus japonicus*) are capable of carrying dangerous arthropod-borne viruses (arboviruses) such as West Nile virus (WNV) and Eastern Equine Encephalitis virus (EEEV). The Asian tiger mosquito (*Aedes albopictus* or ATM) has also been documented repeatedly over the past few years in Bristol County. While this container-breeding species is not currently thought to be established in our state, its ability to carry EEEV and WNV in addition to many other diseases including Dengue Fever and Chikungunya Virus is a cause of concern.

Each year, regional mosquito programs worked closely with DPH to collect and submit mosquito samples for laboratory testing for the purpose of detecting arbovirus, identifying areas at risk of mosquito-borne disease, and to guide decision making regarding the most effective response to arbovirus detection. Today's mosquito control programs also bear the challenge and responsibility to conduct a balanced approach to control mosquitoes through Integrated Pest Management (IPM), a strategy that can control mosquitoes effectively and at the same time minimize environmental impacts through monitoring and management techniques that include application of acceptable pesticide products.

Mosquito Control Districts/Projects, and Member Municipalities

In the Commonwealth, there are 9 regional districts/projects providing mosquito control services to municipalities. The areas covered by mosquito control services coincide with major population areas, well-known tourist areas, and areas where mosquito-borne diseases such as EEEV and WNV are known to have occurred.

No additional municipalities voted to join an established mosquito control program during 2014. The town of Groton, which had just joined the Central Mass. Mosquito Control Project in 2013, opted out again in 2014. This resulted in a slight decrease in total membership to 196 (56% of the state's 351 municipalities). A map of all mosquito control districts/projects is below.



Each regional mosquito control project employs a director or superintendent to manage the day-to-day operations, employ staff and retain equipment, or contract out for those services. The scope and type of tactic used to control mosquitoes varies between projects/districts due to differences in geographic location, topography, budgets, and mosquito species. For example, management strategies for inland fresh water mosquitoes typically includes source reduction (freshwater water management, elimination of used tires), larviciding or adulticiding, while strategies for salt marsh or coastal site management would typically rely heavily on larviciding to thwart emergence of mosquitoes that can migrate inland. Wetland/water management may be employed as a way of reducing the shallow, non-flowing or stagnant water mosquitoes need to complete their life cycle from egg to adult. Mosquito control also involves maintenance of ditches, culverts and man-made ponds to improve water quality and increase water flow, in order to reduce the potential for mosquito development. Surveillance remains the cornerstone of Massachusetts mosquito control programs. Programs set traps and collect mosquitoes for arbovirus testing, an effort that supplements the long-term trapping program led by DPH.

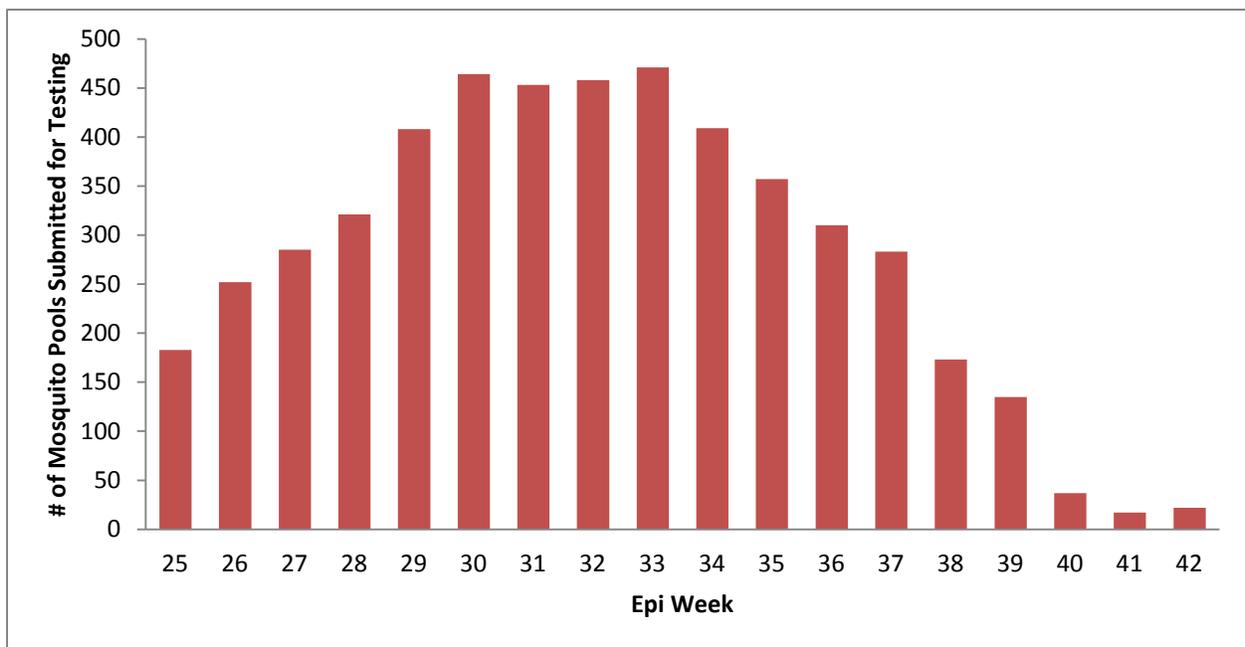
Public education is also a key part of mosquito control activities. Mosquito control programs educate the public about mosquitoes and their biology. School-aged children are given information about how to reduce mosquitoes in and around their homes and how to use personal protection. Informational brochures are distributed to town Boards of Health or directly to homeowners. Mosquito control staff

meet with civic organizations, town/city boards, and participate in other events such as Health Fairs and media interviews. Alerts, positive mosquito pool confirmations and reports, and mosquito prevention fact sheets are posted on the DPH website. DPH also uses an alert system to notify pertinent officials, including local Boards of Health, about confirmed mosquito positives.

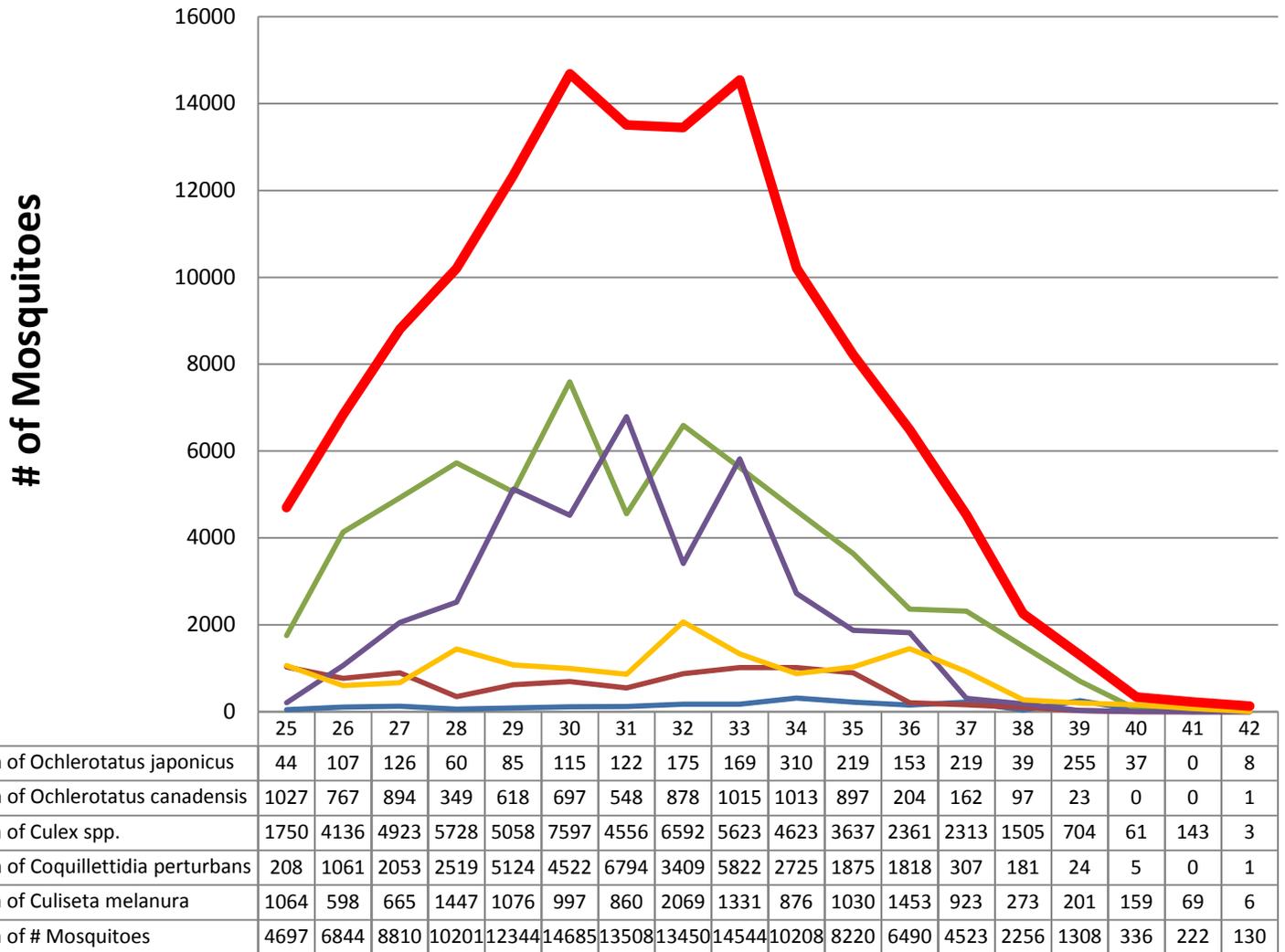
2014 Mosquito Control Season

Weather and Mosquito Populations

Cool spring temperatures and a general lack of precipitation throughout the season led to lower than average mosquito populations in 2014 compared to previous years. It is likely that these factors led to populations of *Culiseta melanura* from long-term DPH trapping sites starting out at levels far below normal, peaking at Epi Week 32, and then dropping back below normal for the remainder of the season. Localized significant rain events continued to occur across the state throughout the entire mosquito season, with repeated rainfall events releasing several inches of rain at a time, but only in isolated areas. Mosquito populations finally approached long-term weekly average levels during Epi Week 27, and several rain events around that time led to the districts predicting floodwater mosquito emergence (*Aedes vexans*, *Ochlerotatus trivittatus*). However, significant floodwater emergence never developed except in Berkshire County, which received significant rain (including events in excess of 11 inches) through Epi Week 31. Many districts/projects reported that precipitation levels were low enough that population levels were suppressed due to a lack of breeding habitat. By Epi Week 40, trap collections for most districts/projects had dropped off enough that it became difficult to collect enough mosquitoes to submit pools for testing. A chart showing mosquito pools submitted by Epi Week is below:



The graph below shows the top 6 mosquito species (or species complexes) submitted for testing, Epi Weeks 25-42. *Coquillettidia perturbans* collections (purple line) were record-breaking in Plymouth County during EPI weeks 30-31, with the Project's CDC traps collecting over 1,000 mosquitoes over the course of just 2 days. The Northeast also reported collecting fresh specimens of *C. perturbans* in traps into Epi Week 34, which they noted was unusual.



Asian tiger mosquito (*Aedes albopictus* or ATM) also remained in the spotlight in 2014, with the first ATM collected in New Bedford right at the start of the season (Epi Week 25). Numbers collected in Bristol County reached a peak of 49 in Epi Week 36. Then, during Epi Week 38, a single male *Aedes albopictus* was discovered in a gravid trap in Charlestown (Boston, Suffolk County). Supplemental trapping in the area by both DPH and the Suffolk County Mosquito Control Project did not turn up any additional specimens. That same week, the Central Middlesex Mosquito Control Project announced that DPH had confirmed 3 egg collections of *Aedes albopictus* from ovitraps set up in mid-August in the town of Ayer. Given these new finds, this species will continue to be under close scrutiny next season.

Mosquito Management

Aerial adult mosquito control operations by aircraft were not necessary during 2014. The districts/projects were able to keep mosquito populations suppressed (and arbovirus load low) using standard techniques of larviciding (either aerial operations or by hand) accompanied by ULV spraying of adulticides in response to finds of arbovirus-positive mosquitoes. Bristol and Plymouth County performed focused-area or area-wide applications of adulticide following finds of arbovirus-positive mosquitoes or infected animals in known arbovirus hotspots. Several districts/projects also provided ULV-spraying to property owners by request. Some districts/projects also performed ditch maintenance and other water body management techniques (managing stormwater systems, clearing clogged culverts) that reduce mosquito-breeding habitat. By mid-September (Epi Week 36 and beyond), cool temperatures led to some districts/projects suspending ULV spraying operations.

The arbovirus response reporting form, developed by MDAR in 2013, was updated following feedback from the districts/projects, and converted to a Google form in order to more easily collect and access the data. That data has continued to be helpful to the SRMCB, DPH, the Governor's office, and EOEAA in addressing questions about where and when treatments are taking place. The SRMCB also requires each district/project to submit an annual operations report. The 2014 reports can be found at <http://www.mass.gov/eea/agencies/agr/pesticides/mosquito/annual-operation-reports.html>

Arbovirus Detections

The first arbovirus detections of the season did not occur until Epi Week 28 (WNV) and Epi Week 29 (EEEV), several weeks later than what is typical. The first WNV positive mosquito pool of the season was detected in Clinton, MA in *Culex* sp., while the first EEEV positive mosquito pools were detected in Bridgewater, MA in *Coquillettidia perturbans*. This was an unusual find, since *C. perturbans* is a mammal biter, and EEEV is typically found first in bird-biting species like *Culiseta melanura*. Arbovirus-positive mosquito pools remained at less than 20% of typical levels throughout the season.

Out of the 5038 total pools submitted for testing, there were a total of 56 WNV-positive mosquito pools (1.1%) and 33 EEEV-positive mosquito pools (.66%). Again, these numbers are far below arbovirus levels in past years. A table with 2013 and 2012 for comparison is provided below:

Year	# Pools Submitted	# WNV+	# EEEV+	Total Mosquitoes Submitted	% WNV+	% EEEV+
2014	5038	56	33	132776	1.1%	.66%
2013	6090	335	61	154324	5.5%	1%
2012	6746	305	262	150565	4.52%	3.88%

Approximately 93% of mosquitoes testing positive for WNV were *Culex pipiens/restuans* or other *Culex* spp., while 76% of EEEV+ mosquitoes were *Culiseta melanura*. A summary table of arbovirus positives by species is below:

WNV+	56	
<i>Coquillettidia perturbans</i>	1	2%
<i>Culex pipiens/restuans</i> complex and other <i>Culex</i> spp.	52	93%
<i>Culiseta melanura</i>	2	4%
<i>Ochlerotatus triseriatus</i>	1	2%
EEEV+	33	
<i>Coquillettidia perturbans</i>	5	15%
<i>Culex pipiens/restuans</i> complex and other <i>Culex</i> spp.	2	6%
<i>Culiseta melanura</i>	25	76%
<i>Uranotaenia sapphirina</i>	1	3%

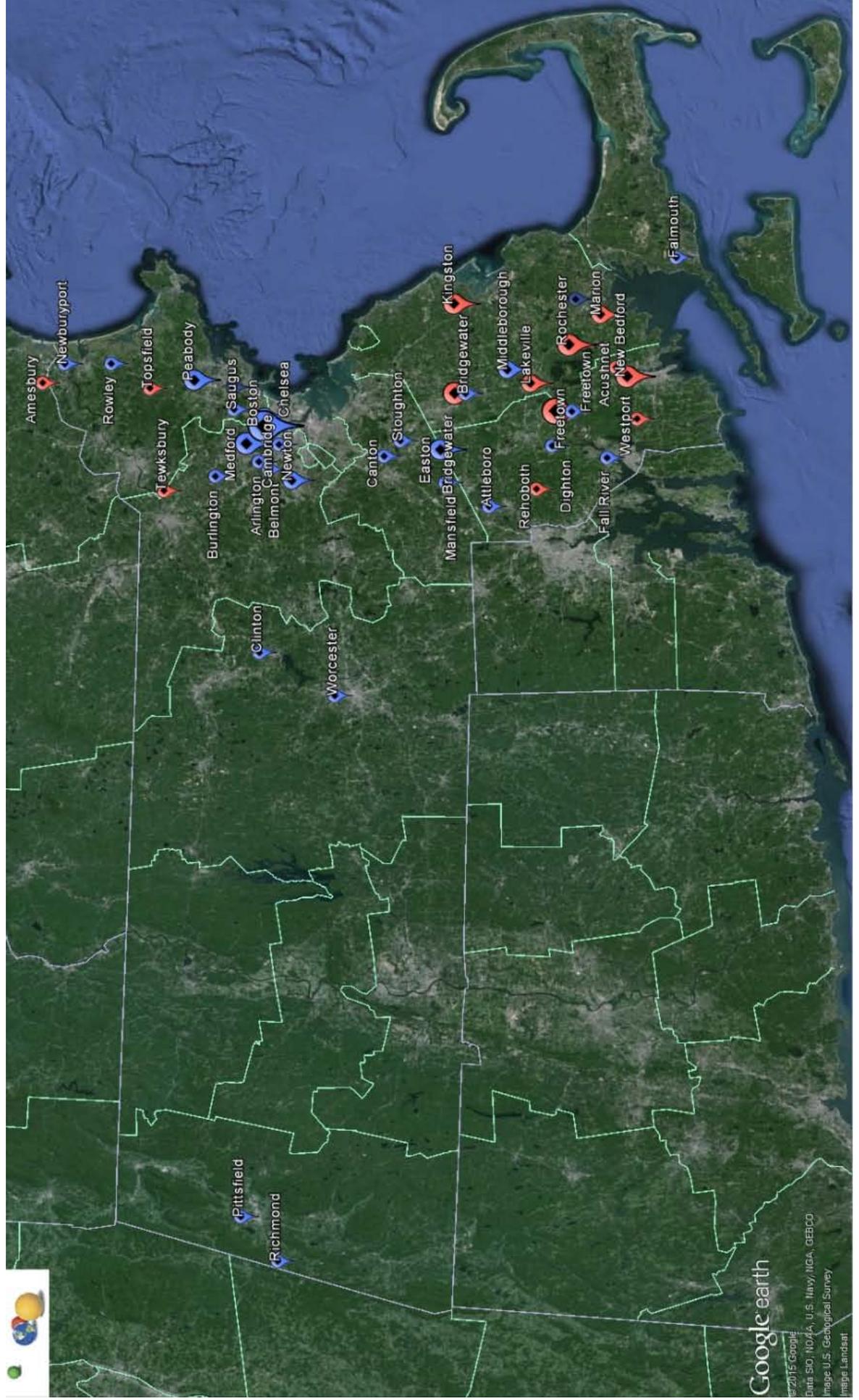
The first animal case of EEEv for 2014 occurred in Epi Week 33, when an infected deer was found in Freetown (Bristol County). This was a non-standard find, but in an area known to consistently harbor EEEv. A second case of EEEv occurred in a horse from Westminster (Worcester County) and was confirmed during Epi Week 42. There were no other confirmed cases of EEEv in animals or humans during the 2014 season.

The first human case of WNV occurred during Epi Week 34, in a man from Middlesex County. A second case was confirmed during Epi Week 37, in a woman from Middlesex County. There were a total of five human WNV cases for the 2014 season. There were no cases of WNV confirmed in animals.

The map on the next page shows all arbovirus-positive mosquito pools confirmed during the 2014 season, with EEEv+ pools in red, WNV+ pools in blue. A larger map tack indicates multiple positive pools found in that municipality over the course of the season. Note that geolocation is centered on each municipality and should not be interpreted as an exact location of mosquito collections.

Chikungunya Virus (CHIKv), a disease formerly relegated to tropical climates, received significant national news coverage during the summer of 2014 after travelers to the Caribbean began presenting with symptoms upon their return to the USA. While Massachusetts announced its first human cases in Epi Week 27, all cases were contracted overseas.

Map of 2014 arbovirus-positive mosquito pools (EEEV+ pools in red, WNV+ pools in blue). A larger pin in the map indicates multiple positive pools found in that municipality. Geolocation is centered on each municipality and should not be interpreted as an exact location of mosquito collections.



Legislative Updates

In July 2014, legislation was passed to allow Nantucket to form a Mosquito Control Project, with the process expected to be completed in 2015. Initial talks also began with Board of Health officials from several municipalities in Franklin, Hampden and Hampshire County regarding the potential interest of forming a Mosquito Control District in the Pioneer Valley region.

FY15 Budget

Mosquito control budgets are derived from state funding in the form of local aid distributions, which are intercepted for the purpose of funding mosquito control assessments and other charge programs. The Department of Revenue (DOR) provides municipalities with estimates of cherry sheet receipts and assessments for mosquito control services.

The SRMCB receives proposed budgets from the projects/districts, including year to date spending, prior year estimated balance forward (funds rolling over), past and present salary increases, and local municipal feedback of mosquito control services. The feedback from member municipalities is obtained via a standard form required as part of the SRMCB Budget Notification and Compliance Policy, to document whether or not communities support the proposed budgets. The mosquito control districts/projects send the standard form to their local member communities. The SRMCB typically requires two-thirds of the member communities in any mosquito control service area to support a budget, particularly a budget with a large increase, as an indication that local communities support this spending.

The FY15 budgets for the 9 regional programs plus the SRB Administrative Fund totaled \$11,608,459, an increase of about 3% vs. FY14 (\$11,270,235). FY15 budget increases for the districts/projects ranged from 0% to 3.4%. The following breakdown highlights FY15 budget amounts approved and certified by the SRMCB during 2014:

District	FY2015 SRMCB Certified Budget
Berkshire	\$240,606
Bristol	\$1,322,814
Cape Cod	\$1,884,537
Central Mass	\$1,986,933
East Middlesex	\$688,414
Norfolk	\$1,628,967
Northeast	\$1,589,540
Plymouth	\$1,652,322
Suffolk	\$265,264
SRB Admin	\$349,062
Total:	\$10,920,045