Commonwealth of Massachusetts

STATE RECLAMATION AND MOSQUITO CONTROL BOARD

NORTHEAST MASSACHUSETTS MOSQUITO CONTROL AND WETLANDS MANAGEMENT DISTRICT

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2017 Best Management Practice Plan
Amesbury

FY18 Percentage of assessment allocated to specific measures as prescribed by individual municipalities Best Management Practice (BMP) in the Town of Amesbury

For FY18 the District is asking for a 3% increase to our assessment budget. Our primary goal is to protect our subscribing communities from virus. We will do all in our power to reduce the mosquito populations on a regional and town wide basis, thus reducing the virus risk to our residents. We look for continued support and understanding from all the communities we serve if we are to be successful.

Assessment: As estimated by the Massachusetts Department of Revenue, Division of Local Services, in accordance with Chapter 516 of the General Laws of the Commonwealth. The assessment formula is based on a regional concept, which considers square miles and evaluation. The District offers this breakdown as a general guide to how funds are allocated specific to your community.

FY18 Estimated District Budget for the Town of Amesbury	$ 41,749.26
FY18 State Reclamation and Mosquito Control Board (est.)	$ 1,646.64
FY18 Total Estimated Assessment for the Town of Amesbury	$ 43,395.90

District Control Measures specific to Amesbury

General Operational Cost Share

Regional Adult Mosquito Surveillance Program

Regional Vector / Virus Intervention

Surveillance

Ground Larviciding

Catch Basin Treatments

Manual Ditch Maintenance

Adulticiding **(Resident and/or Board of Health requests)**

Barrier Treatment **(School officials and/or Board of Health requests)**

Ditch Maintenance / Wetlands Management

Tire Recycling Program

Property Inspections

Mosquito Habitat Mitigation

Research and Development

Education and Outreach

Social Media

2016 Massachusetts State Arbovirus Summary

WNV and EEE MA State Virus Surveillance Summary Results contained in this report reflect data inclusive of MMWRWeek 40 (Ending Saturday, 10/08/2016)

Mosquito Surveillance – Cumulative	
Number of Mosquito Samples Tested	6389
Number of WNV Positive Samples	189
Number of EEE Positive Samples	4
Equine/Mammal Surveillance – Cumulative	
Number of Mammal Specimens Tested	3
Number of WNV Positive Horses	0
Number of EEE Positive Horses	0
Number of other EEE Positive Mammals	0
Human Surveillance - Cumulative	
Number of Human Specimens Tested	226
Number of Human WNV Cases	15
Number of Human EEE Cases	0

	Total number of positive WNV mosquito pools (positive WNV human cases)	
Year	Statewide	NEMMC District
2000	4 (0)	0 (0)
2001	25 (3)	4 (0)
2002	68 (23)	14 (3)
2003	48 (17)	2 (0)
2004	15 (0)	4 (0)
2005	99 (6)	11 (0)
2006	43 (3)	5 (0)
2007	65 (6)	15 (0)
2008	135 (1)	10 (0)
2009	26 (0)	2 (0)
2010	121 (7)	21 (1)
2011	275 (5)	58 (1)
2012	307 (33)	48 (0)
2013	335 (8)	77 (2)
2014	56 (6)	7 (1)
2015	164 (9)	8 (1)
2016	**189 (15)**	**39 (1)**
Totals	**1975 (142)**	**325 (10)**

2016 District Mosquito & Arbovirus Surveillance Summary

39 WNV positive mosquito batches identified in the Northeast District during 2016

- 13 municipalities had WNV positives
- 1,324 total pools "batches" were sent to the MA DPH Lab, of which 39 batches were WNV positive (2.9%)
- 37 WNV positives were in primary vector bird feeder species (*Cx. pipiens/restuans*)
- 2 WNV positives were in bridge vector bird/mammal feeder species (*Cx. salinarius*)

- First positive WNV mosquito in the Northeast District: Saugus- June 27th
- Greatest number of mosquito collections occurred during the 2nd, 3rd & 4th week of August (coinciding with greatest number of resident requests received)
- 1 Human case on September 2nd in southeastern portion of the district
- Last positive WNV mosquito in the Northeast District: Saugus- September 28th

Detections of West Nile (WNV) and Eastern Equine Encephalitis (EEEV) viruses in infected mosquitoes in Northeast Massachusetts Mosquito Control District from 2002 through 2016.

	Number of pools* Submitted for	WNV Positive Pools		EEEV Positive Pools	
Year	Testing	No.	Percentage	No.	Percentage
2002	740	14	1.9	0	0.0
2003	646	2	0.3	0	0.0
2004	604	4	0.7	0	0.0
2005	870	11	1.3	2	0.3
2006	1,181	5	0.4	11	0.9
2007	850	16	1.9	0	0.0
2008	774	10	1.3	0	0.0
2009	567	2	0.4	13	2.3
2010	714	21	2.9	0	0.0
2011	1,009	58	5.7	0	0.0
2012	1,039	48	4.6	14	1.3
2013	1,315	77	5.9	4	0.3
2014	804	7	0.9	2	0.2
2015	541	9	1.7	0	0.0
2016	**1,324**	**39**	**2.9**	**0**	**0.0**

* "Pool or batch" is a sample containing from 1 to 50 mosquitoes, all of the same species collected on the same date from the same location later tested by the Massachusetts Department of Public Health.

Red highlighted area denotes years with greater percentage of positive WNV pools.

2016 switched from New Jersey CO2 traps w/no light to CDC CO2/Light traps = <u>Successful</u>

- 91,477 individual mosquitoes collected from these new traps during 2016 alone (even in this extremely dry year)
- During a 5 year average, only 57,584 mosquitoes were collected annually using old NJ traps (wet & dry years averaged)
- The new traps resulted in a 59 % increase in overall mosquito collections.
- These traps also provided greater variety of EEE/WNV bridge vector/human biting species.

Gravid Traps- WNV primary vectors/bird biters
(*Cx. pipiens/restuans*)

- There was a 23% increase in collections from these traps during 2016 over the last 5 year average. This was primarily due to drought conditions. Container species such as *Cx. pipiens* and *Cx. restuans* thrive in man-made container habitats that retain water even through a drought.

Resting Boxes- EEE primary vectors/bird biters
(*Cs. melanura*)

- Although 2016 saw a 641% increase in resting box collections, there was an 89% decrease in the primary vector for EEE, *Cs. melanura*, in these traps from the last 5 year average. The majority of mosquitoes collected in these traps during 2016 were *An. punctipennis* and *An. quadrimaculatus*. Because *An.* species can favor containers for breeding, this species population can increase during drought years. Whereas *Cs. melanura* populations decrease in drought years and increase in wet years.

<u>Total Mosquito Collected by NE Mosquito Control District</u>*

	<u>2015</u>	<u>2016</u>	<u>% change</u>
Resting Boxes (same trap type as 2015)	370	2,743	641% increase
CDC CO2/Light traps (new trap type 2016)	19,573	91,477	367% increase
Gravid Traps (same trap type as 2015)	3,480	13,921	300% increase

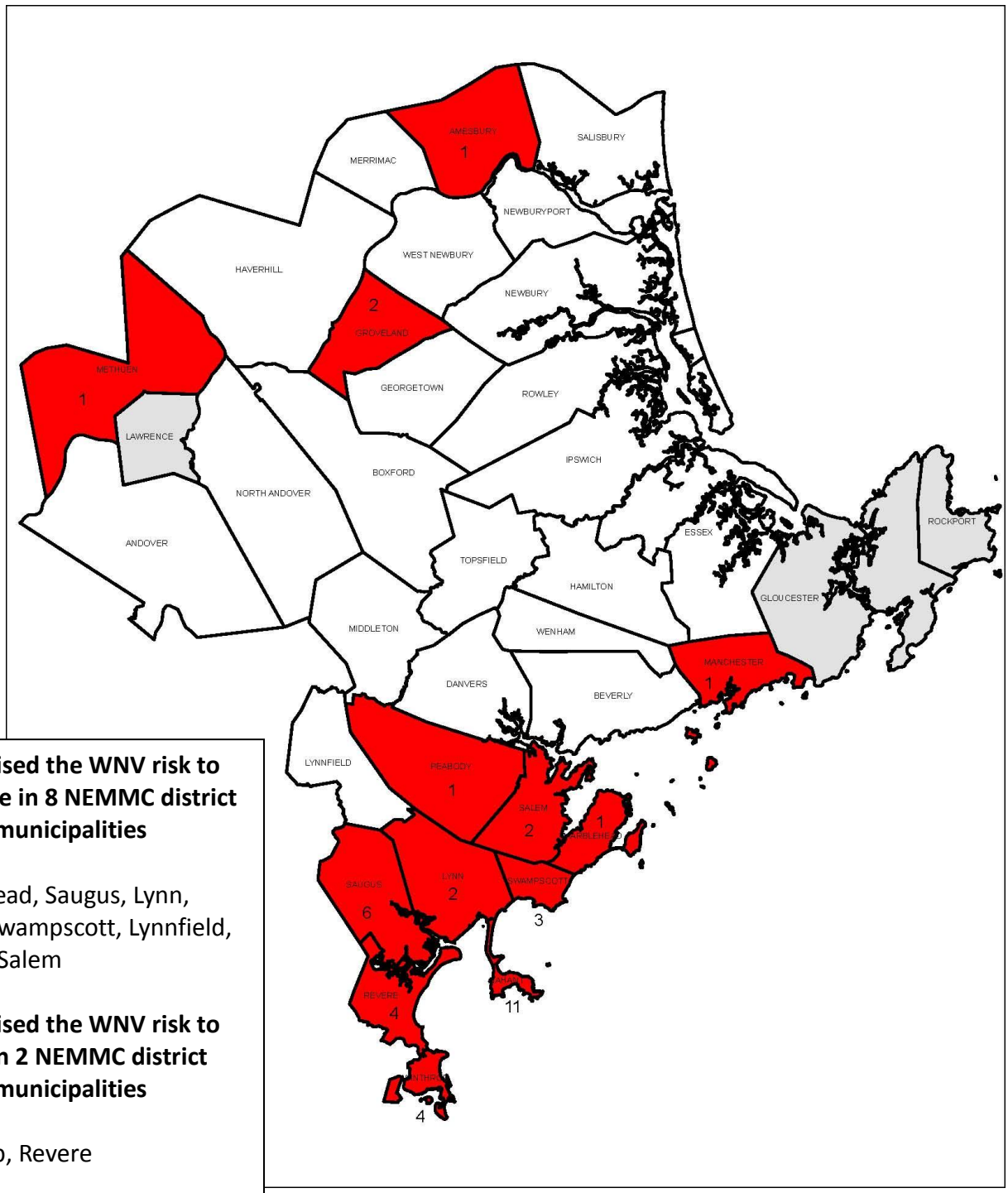
*See 2017 Integrated Pest and Vector Management Plan for trap information

<u>Pest and Medically Important Mosquito Species (habitat)*</u>

	<u>2015</u>	<u>2016**</u>
Culiseta melanura (red maple /acid bog/sphagnum swamp)	552	1,124
Culex pipiens (container/catch basins)	1,860	10,211
Culex restuans (container/catch basins)	1,108	2,485
Culex salinarius (brackish water/phragmities/roadside ditches)	1,823	4,134
Coquillitidia perturbans (cattail)	9,463	66,872
Aedes vexans (rainwater/fresh floodwater)	916	636
Ochlerotatus japonicus (tree hole/container breeder)	489	690
Ochlerotatus sollicitans (salt marsh)	114	4,001
Ochlerotatus cantator (salt marsh)	3,007	8,316
Ochlerotatus canadensis (spring/summer woodland pool)	325	1,820

*Totals include all trap types in historical locations and 2 trap nights per week
**2016 numbers inflated primarily due to changing to CDC CO/2 Light trap

NE MA Mosquito Control District Municipalities reporting WNV and EEEV infections in 2016



DPH raised the WNV risk to Moderate in 8 NEMMC district municipalities

-Marblehead, Saugus, Lynn, Nahant, Swampscott, Lynnfield, Peabody, Salem

DPH raised the WNV risk to High in 2 NEMMC district municipalities

-Winthrop, Revere

1 Human WNV case in the southeastern area of district

Municipalities with WNV positive mosquitoes
Municipalities not in the program
Number is total WNV pools "batches" in each municipality

Positive Virus Events in NE Massachusetts District- 2016

7/27/2016	Saugus	*Culex pipiens*	Essex	WNV
8/4/2016	Groveland	*Culex pipiens*	Essex	WNV
8/8/2016	Winthrop	*Culex pipiens*	Suffolk	WNV
8/8/2016	Saugus	*Culex pipiens/restuans complex*	Essex	WNV
8/8/2016	Nahant	*Culex pipiens*	Essex	WNV
8/10/2016	Nahant	*Culex pipiens*	Essex	WNV
8/10/2016	Peabody	*Culex pipiens*	Essex	WNV
8/10/2016	Revere	*Culex pipiens*	Suffolk	WNV
8/10/2016	Saugus	*Culex pipiens*	Essex	WNV
8/10/2016	Swampscott	*Culex pipiens*	Essex	WNV
8/15/2016	Lynn	*Culex pipiens*	Essex	WNV
8/15/2016	Nahant	*Culex pipiens*	Essex	WNV
8/15/2016	Saugus	*Culex pipiens/restuans complex*	Essex	WNV
8/15/2016	Winthrop	*Culex salinarius*	Suffolk	WNV
8/17/2016	Nahant	*Culex pipiens*	Essex	WNV
8/22/2016	Nahant	*Culex pipiens*	Essex	WNV
8/24/2016	Marblehead	*Culex pipiens/restuans complex*	Essex	WNV
8/24/2016	Nahant	*Culex pipiens*	Essex	WNV
8/24/2016	Revere	*Culex pipiens*	Suffolk	WNV
8/24/2016	Saugus	*Culex pipiens*	Essex	WNV
8/24/2016	Swampscott	*Culex pipiens*	Essex	WNV
8/24/2016	Winthrop	*Culex pipiens*	Suffolk	WNV
8/24/2016	Winthrop	*Culex pipiens*	Suffolk	WNV
8/25/2016	Manchester-by-the-Sea	*Culex pipiens*	Essex	WNV
8/29/2016	Nahant	*Culex pipiens*	Essex	WNV
8/31/2016	Nahant	*Culex pipiens*	Essex	WNV
8/31/2016	Salem	*Culex pipiens*	Essex	WNV
9/1/2016	Methuen	*Culex pipiens/restuans complex*	Essex	WNV
9/7/2016	Amesbury	*Culex pipiens*	Essex	WNV
9/7/2016	Nahant	*Culex pipiens*	Essex	WNV
9/8/2016	Groveland	*Culex pipiens/restuans complex*	Essex	WNV
9/12/2016	Revere	*Culex pipiens*	Suffolk	WNV
9/14/2016	Revere	*Culex pipiens*	Suffolk	WNV
9/14/2016	Salem	*Culex pipiens*	Essex	WNV
9/14/2016	Swampscott	*Culex pipiens*	Essex	WNV
9/21/2016	Nahant	*Culex pipiens*	Essex	WNV
9/21/2016	Nahant	*Culex salinarius*	Essex	WNV
9/21/2016	Lynn	*Culex pipiens/restuans complex*	Essex	WNV
9/28/2016	Saugus	*Culex pipiens/restuans complex*	Suffolk	WNV

-No Eastern Equine Encephalitis (EEE) identified in NE District in 2016

2016 Amesbury Mosquito & Arbovirus Surveillance Summary

The season-long drought and higher average temperatures caused a decrease in most mosquito populations. However, due to these same conditions; populations of container breeding mosquitoes increased significantly resulting in heightened WNV activity statewide. The mosquito collections from our gravid traps and the number of positive mosquito pools "batches" in our district and statewide reflect this increased WNV activity.

Catch basin larvicide treatments (completed on 8/29/2016) only reduced *Cx. pipiens/restuans* populations breeding in this habitat type towards the end of the season. Coordinated basin cleaning schedules with the DPW would result in much earlier catch basin treatments increasing this reduction significantly. Additional public education is needed to help further reduce *Cx. pipiens* breeding on irrigated lawns, in abandoned pools, gutters and in unattended artificial containers on residential properties.

Total Mosquito Collected in Amesbury*	**2015**	**2016**	**% change**
Resting Boxes (16)	364	497	37%
CDC CO2/Light traps (2) **NEW TRAP TYPE****	545	1,402	157%
Gravid Traps (2)	141	988	601%
Totals	**1,050**	**2,887**	**175%**

*See 2017 Integrated Pest and Vector Management Plan for trap information, () = total # traps in municipality
**2016 numbers inflated primarily due to changing to CDC CO2/Light trap

Mosquito Species- pest/disease list- Amesbury*	**2015**	**2016**	**Change**	**WNV/EEE +**	**District Total-2016**
Culiseta melanura (red maple swamp/acid bog)	13	9	-31%	NO	1,124
Culex pipiens (container/catch basins/heavy organics)	40	568	1,320%	WNV	10,211
Culex restuans (container/catch basins)	64	295	354%	NO	2,485
Culex salinarius (brackish water/phragmities/roadside ditches)	21	301	1,333%	NO	4,134
Coquillitidia perturbans (cattail)	250	765	206%	NO	66,872
Aedes vexans (rainwater/fresh floodwater)	48	2	-96%	NO	636
Ochlerotatus japonicus (tree hole/container breeder)	26	50	92%	NO	690
Ochlerotatus sollicitans (salt marsh)	0	43	100%	NO	4,001
Ochlerotatus cantator (salt marsh)	28	80	186%	NO	8,316
Ochlerotatus canadensis (snowmelt/woodland pool)	1	3	~0	NO	1,820

*Totals include all trap types in historical locations

There was **1 WNV detection in Amesbury in 2016.** There were no EEE detections. At the end of 2016, the arboviral risk level for Amesbury remained low for both EEE and WNV. Risk Categories are described in Table 2 of the 2016 MDPH Surveillance and Response Plan.

Mosquito infection history (WNV/EEE) in Amesbury:

Collection Date	Species	Test Type	Result
9/7/2016	*Culex pipiens*	WNV	Positive
9/8/2014	*Culiseta melanura*	EEE	Positive
7/31/2013	*Culex pipiens/restuans* complex	WNV	Positive
9/17/2013	*Culiseta melanura*	EEE	Positive
8/20/2012	*Culex pipiens/restuans* complex	WNV	Positive
9/2/2009	*Culiseta melanura*	WNV	Positive
9/2/2009	*Culiseta melanura*	EEE	Positive
9/9/2009	*Culiseta melanura*	EEE	Positive
9/23/2009	*Culiseta melanura*	EEE	Positive
8/9/2006	*Culiseta melanura*	EEE	Positive
8/23/2006	*Culiseta melanura*	EEE	Positive
8/24/2005	*Culiseta melanura*	EEE	Positive

EEE has been detected 5 of the 12 years of surveillance and WNV 4 of the 12 years of surveillance in Amesbury.

Very few other District communities have had an extensive record of arboviral activity as that of Amesbury. While possessing an "urban core" that provides the appropriate conditions for the development of WNV vectors, there are also extensive forest swamps that serve as breeding habitats for the EEE vector. These factors, together with the transmission focus of EEE just over the border in southeastern New Hampshire, insure that arboviruses are going to have a continual presence in Amesbury for the foreseeable future.

From mid-July to the first full heavy frost, Amesbury residents should take necessary precautions to reduce the risk of infection from these viruses, regardless of low mosquito populations and/or aggressiveness of control.

Refer to the 2016 Massachusetts State Arbovirus Surveillance and Response Plan viewed online at
http://www.mass.gov/eohhs/docs/dph/cdc/arbovirus/arbovirus-surveillance-plan.pdf

Focus of Operations for 2017

Regional control efforts will focus primarily on larval surveillance and treatment, adult mosquito surveillance, virus testing and preemptive virus intervention strategies. Specific to Amesbury the primary focus of control efforts will be on freshwater larviciding, catch basin treatments and virus intervention for WNV and EEE.

Regional Control Measures

Regional Adult Mosquito Surveillance Program: In 2016 we expanded and greatly improved our surveillance program by replacing outdated New Jersey light traps with CDC CO2/Light traps at our preexisting gravid trap/CO2 trap stations. The CDC traps are used to sample the adult mosquito population, monitor both short and long term trends and determine population density of bridge vectors (human biters) of WNV and EEE. Gravid traps are designed to collect adult female *Culex* species the primary vectors (bird biters) of WNV.

One of these dual function units is placed in a fixed location in each member municipality for a total of 32 deployed throughout the District. Mosquitoes are collected and identified from each trap once per week beginning in early May thorough early October. The MA DPH may extend testing into October. In the event mosquitoes collected from these traps test positive for EEE or WNV the District will add supplemental CDC CO2/Light traps at specific sites within the municipality.

Supplemental trapping criteria for 2017:

After the 1st positive WNV/EEE primary vector species (bird biters) in any municipality supplemental traps could be placed in locations with these parameters:

- Radius of collection
- Distance from historic trap
- Topography
- Human population density
- Bridge vector potential breeding sites
- Schools/parks/recreation areas
- Site security
- Wetland/wooded/shaded/moist areas

Supplemental mosquito collections will be sent to State Laboratory for arbovirus testing.

The District will operate 128 resting boxes at 16 sites. Resting boxes are designed to collect blood fed female *Culiseta melanura* mosquitoes relevant to EEE transmission. Eight resting boxes will be placed at each fixed location and there will be two fixed locations in communities bordering New Hampshire as well as other communities considered to be at risk. The District will collect and identify samples from each trap every week and the specimens will be tested for virus.

In the event *Cs. melanura* mosquitoes collected from resting box sites test positive for EEE the District will deploy supplemental CDC CO2/Light traps at those sites.

Virus Testing: Specimens from our trap collections will be sent to The Massachusetts Department of Public Health (MA DPH) to be tested for the presence of encephalitis viruses. Our District mosquito testing results will be available on Fridays of each week. The MA DPH will contact the municipalities BOH officers as well as our District of any positive test results.

Mosquito virus testing criteria for 2017:

Phase I

- June 15th to August 1st
- Primary vectors (Bird biters): *Cs. melanura, Cs. morsitans, Cx. pipiens* and *Cx. restuans*
- Other mosquito species may be tested on a case by case basis.

Phase II

- August 1st to October 1st (or October 15th for MA DHP extended season)
- Primary vectors (species listed above) + Bridge vectors (bird/mammal biters): *Ae. cinereus, Ae. vexans, Cq. perturbans, Cx. salinarius, Oc. candensis, Oc. japonicus, Oc. taeniorynchus, Ps. ferox* and *Oc. sollicitans*

- Other mosquito species may be tested on a case by case basis.

Regional Vector/Virus Intervention: Control efforts will focus on early intervention strategies in municipalities that have shown a greater risk to mosquito borne virus based on events of the previous seasons and surveillance data as prescribed in the District's IPVMP. This approach is in the best interest of all member municipalities as focused early intervention strategies seem to demonstrate containment of WNV, and may reduce the risk of EEE exposure to humans and the migration of virus to other municipalities.

Regional Aerial Salt Marsh Larviciding Program: Coastal salt marshes in neighboring communities from Ipswich to the New Hampshire border will be aerially larvicided by helicopter to control salt marsh mosquitoes in accordance with the respective Best Management Practice Plans. Salt marsh mosquitoes are capable of flying up to 25 miles in search of a blood meal and then return to the salt marsh in order to lay eggs. Coastal communities as well as many inland cities and towns receive direct and immediate benefit from the control of salt marsh mosquitoes.

Control Measures Specific to Amesbury

Ground Larviciding: Larviciding sites from the District's data base, including retention ponds, detention basins and areas requested by the local Board of Health will be checked and treated for mosquito larvae as necessary, beginning in March or as snow melt allows, to September 30th and beyond if circumstances warrant and conditions allow.

Catch Basins: Catch Basin treatments will be scheduled with local DPWs so that each municipality's annual cleaning of basins does not jeopardize the treatment and effectiveness of the larvicide used to control mosquito larvae in these basins. ***The timing of catch basin cleaning is very important and will dictate what type of larvicide will be used to control the mosquito breeding in these basins.*** BT/BS (bacterium) products work very well to control mosquito larvae in cleaned basins, but do not work well in uncleaned basins or ones high in organic matter. A Methoprene product would have to be used in uncleaned catch basins. Depending on the DPW's cleaning schedule, basins will be checked and treated as necessary beginning May 1st through August 31st.

Manual Ditch Maintenance: In the course of ground larviciding and catch basin treatments, roadside ditches and culverts will be manually cleared of manageable blockages and debris in order to reduce mosquito breeding habitat and / or potential habitat.

Adulticiding: The District uses a truck mounted system called Ultra Low Volume (ULV) for ground adulticiding applications. ULV is designed to dispense very small amounts of pesticides over a large area. While this is a cost effective means of reducing mosquito populations on a large scale, it only affects those mosquitoes present at the time of the application and repeated applications are sometimes necessary in some areas to sustain the initial reduction in the mosquito population.

Science based selective adulticiding of specific areas will be provided as follows: **By request of residents and/or the local Board of Health, not to exceed one day per week from June 1st to September 30th or as circumstances warrant and conditions allow**. Virus intervention will be provided with recommendations from Northeast MA Mosquito Control of specific areas to be targeted. **Applications to schools must be in compliance with MGL ch85.**

Barrier Treatment: To reduce the need for repeated ULV applications and provide more sustained relief from mosquitoes in high public use areas, the District can provide barrier treatments to public use areas such as schools, playgrounds, athletic fields, etc., at the request of the Board of health and/or school departments. **Applications to schools must be in compliance with MGL ch85**.

Ditch Maintenance / Wetlands Management: The town may petition the District to undertake larger scale ditch maintenance projects, wetlands enhancement and restoration projects requiring specialized mechanized equipment and expertise. Petitioned sites will be evaluated and a site specific proposal will be written for acceptable projects. Wetlands management projects may be beyond the scope of any municipality's assessment and may require a separate and additional appropriation.

Tire Recycling Program: Tires have historically been discarded on public and private properties, in both upland and wetland environments. Once a pile is started it can quickly grow into a substantial public health issue, not only as a source of mosquito proliferation but also as a potential fire hazard and as a source of toxic fumes, that once ignited can be extremely difficult to extinguish.

Discarded tires almost always hold water and are a prime location for artificial container breeding mosquito species, most notably *Culex pipiens*, *Culex restuans* and *Ochlerotatus japonicus*. *Cx. pipiens* and *Cx. restuans* are considered to be the key vector species of both encephalitis viruses in the District. *Oc. japonicus* is a new species to Massachusetts since 2000, and is thought to have been imported into the United States in used tires. *Oc. japonicus* has also shown to be a competent vector of West Nile virus. Invasive mosquito species are known to travel in containers like tires. As in previous seasons, the District will be maintaining a tire water sample program in order to monitor any new species coming into the district.

Property Inspection: While the District is authorized under the provisions of Chapter 252, section 4 of the General Laws of the Commonwealth to enter upon lands for the purpose of inspection, it is not a regulatory agency. It also is not our intention to impose on any resident or business, but rather to be a resource for information and technology to help property owners prevent or abate mosquitoes to the mutual benefit of the property owner and the community.

Socioeconomics often plays an important role in mosquito control and associated public health risks. Over the last few years the District has received many requests from Boards of Health to inspect abandoned properties. With the increased health risk associated with property abandonment the District will take an aggressive approach to property inspections. In the course of our routine activities in your community, if we discover such properties, we will inspect and report these properties to the Board of Health. We understand that addressing concerns related to such properties is a matter of time and process. In the long term we will offer any support that may be appropriated to resolve mosquito problems related to such properties and in the short term with the Board of Health's support we will implement the necessary control measures to mitigate the immediate mosquito problem associated with such properties.

Mosquito Habitat Mitigation: The District will represent the town's mosquito control concerns in an advisory capacity relative to proposed development and where prudent as requested by local health officials.

Research and Development: The District will evaluate the efficacy and efficiency of current control methods, investigate new methods, procedures and technologies in mosquito control and wetlands management and evaluate their implications for use in Amesbury.

Education and Outreach: The District will present educational displays and programs on mosquito control and related wetlands management programs at the request of health officials, schools or civic organizations. The District will also monitor and update local schools, daycares etc. regarding IPM plans and current child protection requirements.

Social Media: In the recent past, the District has recognized the need to provide information on our activities in a timelier manner. Social media is proving to be the go to method of disseminating information for many companies and individuals.

The District is proud to announce our new website. This site is full of resources, information and provides more timely updates of our activities. We have found that many questions can be answered through our website and we will continue to increase our web presence.

www.nemassmosquito.org