MOSQUITO CONTROL IN CENTRAL MASSACHUSETTS

TIMOTHY D. DESCHAMPS

Executive Director

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ORGANIZATIONAL STRUCTURE

- Mosquito control in Mass. is organized through M.G.L. Chapter 252
- Each district has its own enabling legislation: Chapter 583 of the Acts of 1973

- Districts operate under the authority of the State Reclamation & Mosquito Control Board (SRMCB)
- SRMCB has members from MDAR, DCR & MassDEP

MDAR
MASSACHUSETTS DEPARTMENT OF AGRICULTURAL RESOURCES

dcr
Massachusetts

MassDEP

CENTRAL MASSACHUSETTS MOSQUITO CONTROL PROJECT

- Districts have important partnerships

- Districts are overseen by a Board of Commission appointed by SRMCB
- CMMCP Board of Commission meets monthly on the 2nd Wednesday of each month

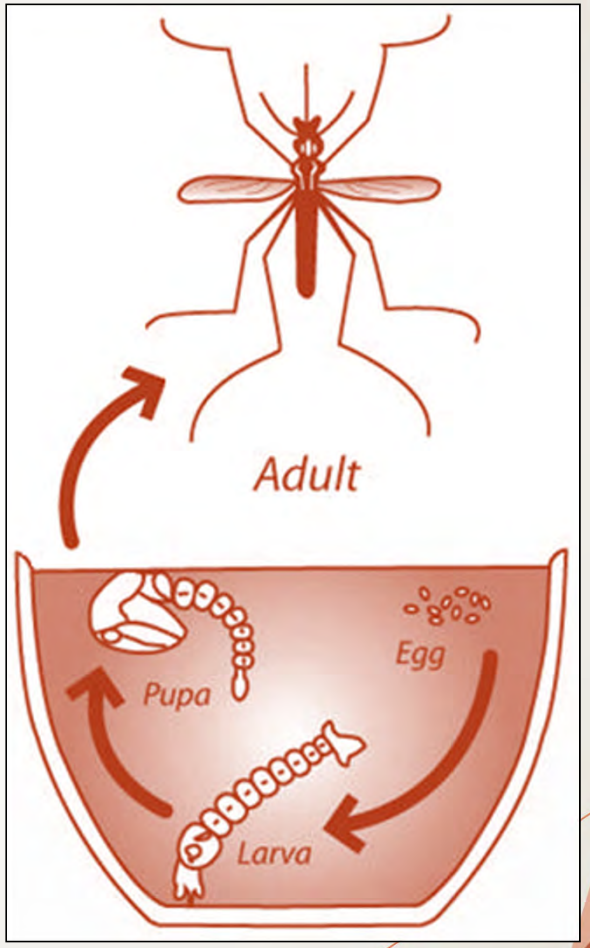
MOSQUITO BIOLOGY

4 stages of development

- Egg
- Larvae
- Pupae
- Adult

First 3 stages are aquatic

- Egg
- Larvae
- Pupae



Mosquito Eggs

- Damp soil
- Containers
- Permanent water
- Emergent vegetation
- Location dependent on species

Mosquito Larvae

- 4 stages called “instars”
- 1/8” – 1/4” long
- Breathes air
- Can develop in as few as 5 days into pupae

Mosquito Pupae

- Does not eat
- Breathes air like larvae
- Fully developed mosquito inside
- Final stage before adult

Mosquito Adult

- 2,600 species, ~162 in USA
- 52 species in Mass.
- Vector of several diseases in the Northeast
- Flight range <100 yds. to 25 miles

LARVAL MOSQUITO HABITAT IN MASSACHUSETTS

Habitat Types

- Retention/Detention areas
- Woodland pools & Reflood areas
- White cedar/Red maple swamps
- Permanent water
- Degraded ditches
- Artificial containers
- Salt marsh

Retention/Detention areas

- Mandated by Stormwater Phase II

Common Mosquito Species:

- *Cq. perturbans* (w/emergent vegetation)
- *Ae. vexans*
- *Anopheles spp.*
- *Culex spp.*

Common Woodland Pool Species:

- *Oc. excrucians**
- *Oc. abserratus**
- *Oc. canadensis*
- *Ae. vexans*

*Requires a freeze/thaw cycle (cold-conditioning)

Reflood areas

- Floodplains
- Areas with poor drainage
- Will flood after significant rain events

Cedar/Maple swamps

- Common in the Northeast
- Habitat for *Cs. melanura* – amplification vector of EEE in birds
- Difficult to sample & control as larvae due to subterranean habits

Permanent water

- Emergent vegetation – *Cq. perturbans*
- Difficult to sample & control as larvae due to unique breathing habits – will attach to roots of vegetation & breathe through the vascular system of the plant


CATTAIL MARSH - *Typha spp.*
(T. latifolia, T. ***angustifolia****, T.* ***glauca, T.*** *domingensis)*


Cq. perturbans larvae
attached to root system

Degraded Ditch systems

- *Culex spp.* if pollution evident
- *Anopheles spp.*
- Will contribute to reflood areas (*Ae. vexans* & *Ae. cinereus*)

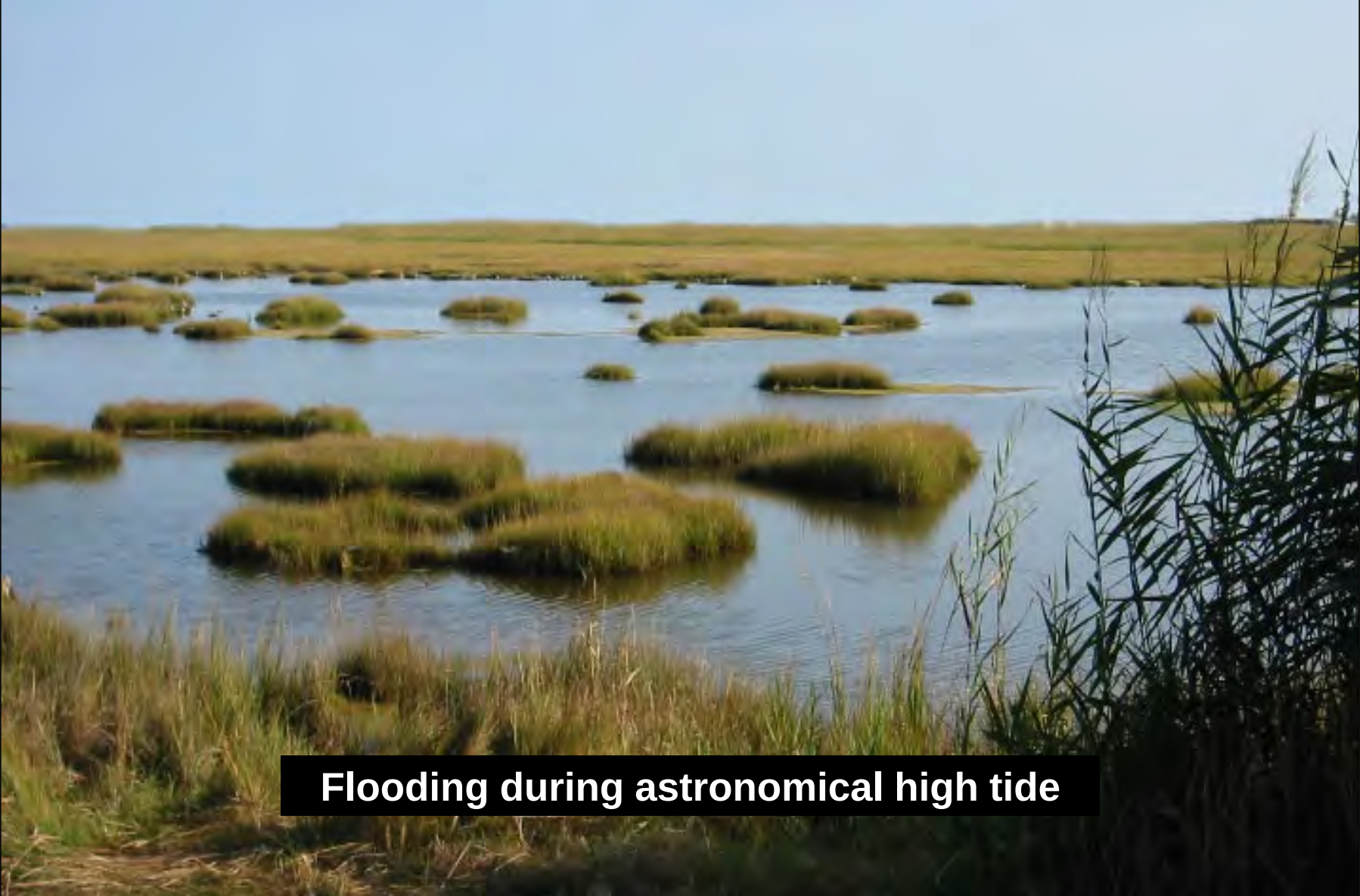
Container habitats

- Treeholes, rock holes in stream beds
- *Oc. triseriatus, Oc. japonicus & Culex spp.*


Pelican
Rubbermaid
EAGLE GTII

Salt Marsh species

- *Oc. taeniorhynchus*
- *Oc. cantator*
- *Oc. sollicitans*


Flooding during astronomical high tide

Invasive plant species

- Alter the biodiversity of a habitat
- Can introduce mosquito species to an area dependant on emergent vegetation (*Cq. perturbans*).


PURPLE LOOSTRIFE - *Lythrum salicaria*

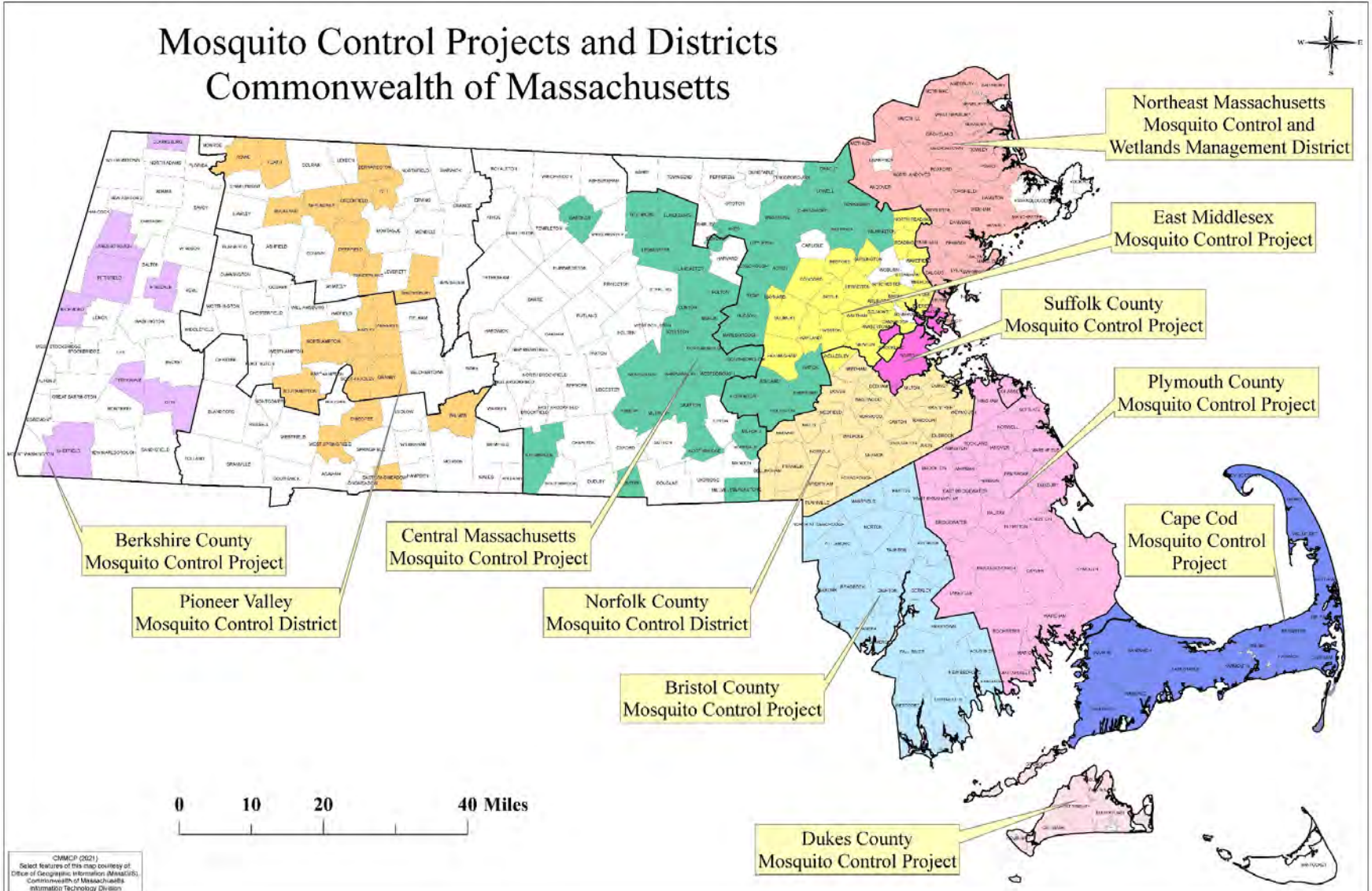

THE COMMON REED - *Phragmites australis* or *Phragmites communis*

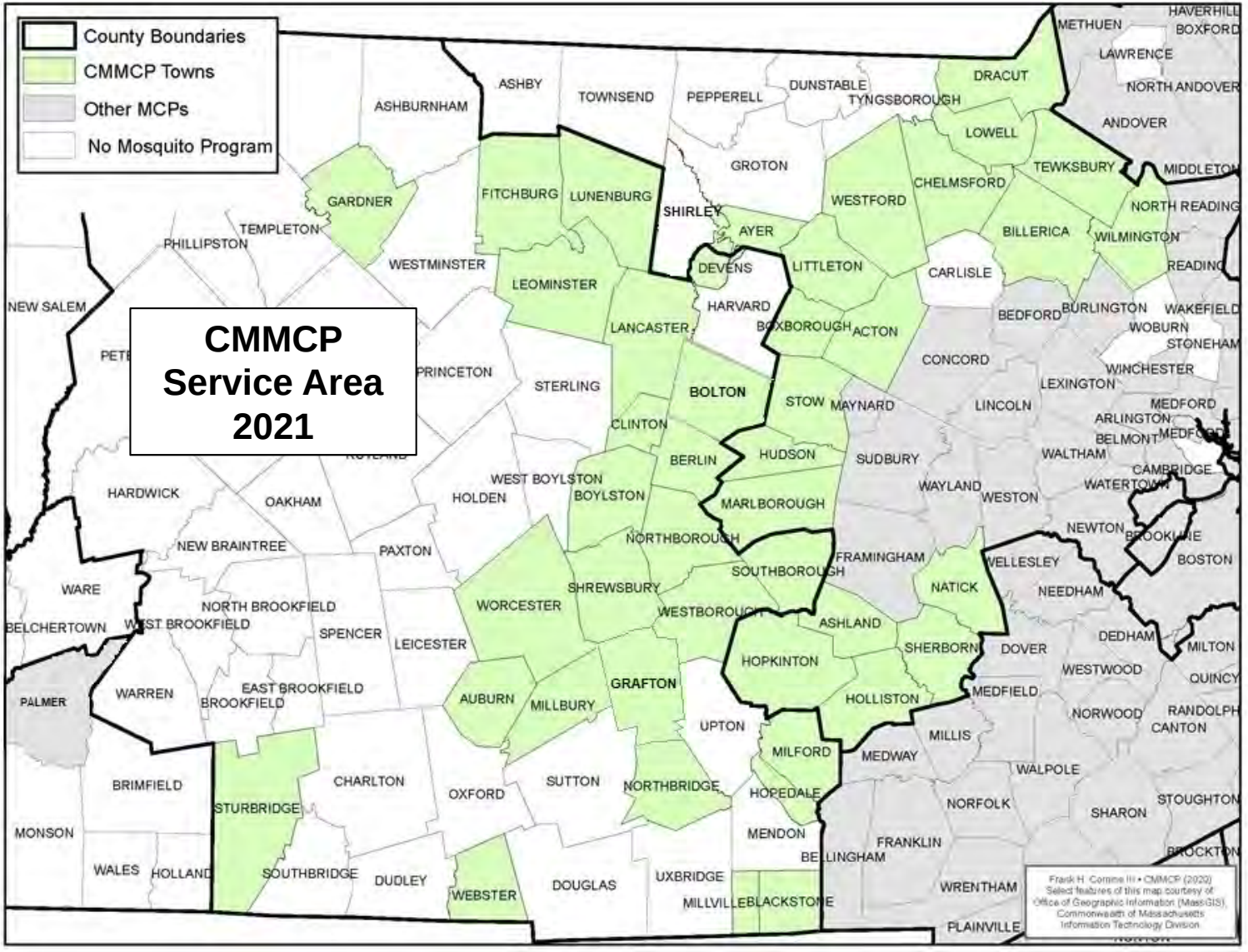
MOSQUITO CONTROL IN MASSACHUSETTS

11 Mosquito Districts in Mass.

1. Berkshire County MCP
2. Bristol County MCP
3. Cape Cod MCP
4. **Central Mass. MCP**
5. East Middlesex MCP
6. Martha's Vineyard (new in 2013)
7. NE Mass. Wetlands Mgmt. & MC District
8. Norfolk County MCD
9. Pioneer Valley MCD (new in 2017)
10. Plymouth County MCP
11. Suffolk County MCP

Mosquito Control Projects and Districts
Commonwealth of Massachusetts




County Boundaries
CMMCP Towns
Other MCPs
No Mosquito Program
CMMCP Service Area 2021
METHUEN
HAVERHILL
BOXFORD
LAWRENCE
NORTH ANDOVER
ANDOVER
DRACUT
DUNSTABLE
TYNGSBOROUGH
LOWELL
TEWKSBURY
MIDDLETON
NORTH READING
WILMINGTON
READING
BILLERICA
CHELMSFORD
WESTFORD
GROTON
SHIRLEY
AYER
DEVENS
LITTLETON
CARLISLE
ASHBY
TOWNSEND
PEPPERELL
ASHBURNHAM
GARDNER
FITCHBURG
LUNENBURG
TEMPLETON
PHILLIPSTON
WESTMINSTER
LEOMINSTER
NEW SALEM
HARVARD
BOXBOROUGH
ACTON
LANCASTER
BEDFORD
BURLINGTON
WAKEFIELD
WOBURN
STONEHAM
CONCORD
WINCHESTER
LEXINGTON
MEDFORD
ARLINGTON
BELMONT
WALTHAM
CAMBRIDGE
WATERTOWN
NEWTON
BROOKLINE
BOSTON
LINCOLN
PRINCETON
STERLING
BOLTON
STOW
MAYNARD
CLINTON
BERLIN
HUDSON
SUDBURY
WAYLAND
WESTON
MARLBOROUGH
HARDWICK
OAKHAM
HOLDEN
WEST BOYLSTON
BOYLSTON
NEW BRAINTREE
PAXTON
NORTHBOROUGH
FRAMINGHAM
SOUTHBOROUGH
WELLESLEY
NEEDHAM
NATICK
WARE
NORTH BROOKFIELD
WEST BROOKFIELD
BELCHERTOWN
SPENCER
LEICESTER
WORCESTER
SHREWSBURY
WESTBOROUGH
ASHLAND
HOPKINTON
SHERBORN
DOVER
DEDHAM
MILTON
WESTWOOD
QUINCY
MEDFIELD
HOLLISTON
NORWOOD
RANDOLPH
CANTON
MILLIS
MEDWAY
WALPOLE
NORFOLK
STOUGHTON
SHARON
FRANKLIN
BELLINGHAM
BROCKTON
WRENTHAM
PLAINVILLE
PALMER
WARREN
EAST BROOKFIELD
BROOKFIELD
AUBURN
MILLBURY
GRAFTON
UPTON
MILFORD
HOPEDALE
MENDON
BRIMFIELD
CHARLTON
STURBRIDGE
OXFORD
SUTTON
NORTHBRIDGE
MONSON
WALES
HOLLAND
SOUTHBRIDGE
DUDLEY
WEBSTER
DOUGLAS
UXBRIDGE
MILLVILLE
BLACKSTONE
Frank H. Cormine III • CMMCP (2020)
Select features of this map courtesy of
Office of Geographic Information (MassGIS)
Commonwealth of Massachusetts
Information Technology Division

CMMCP SUITE OF SERVICES

Services Offered:

1. **Surveillance**
2. **Public Education**
3. **Ditch Maintenance**
4. **Larval Control**
5. **Source Reduction**
6. **Beaver Mitigation (new)**

PROACTIVE

7. **Adult Control**

PROACTIVE/REACTIVE*

8. **Research & Efficacy**

CHECKS & BALANCES

***Adult control can be considered proactive by reducing certain species before they can transmit virus**

MOSQUITO SURVEILLANCE

Adult mosquito surveillance to monitor mosquito-borne diseases, document species diversity and population densities.

Trap types

Surveillance

- Adult mosquito surveillance will be performed in town at least once per week. 675+ traps deployed in our service area
- If virus is identified, then additional traps will be placed in that area – intervention options will be discussed with the Board of Health.

Arbovirus Testing

Adult mosquito samples sent to Mass. Dept. of Public Health each week, tested for:

- West Nile Virus
- Eastern Encephalitis
- Other diseases (Highlands J, SLE, La Crosse, etc.)

2020 CMMCP Surveillance

- 1,210 collections tested (4,319 total)
- 28,446 specimens tested (50,317 total)
- 0 viral isolates in mosquitoes
- 0 EEE, 0 WNV detected in 2020

PUBLIC EDUCATION

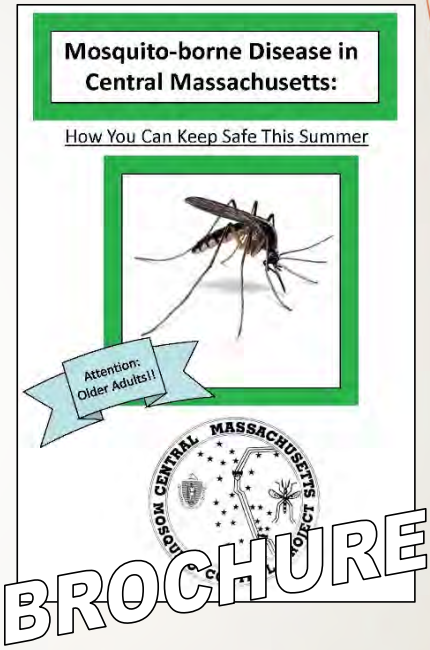
Education to schools, civic groups, local and state officials about mosquito biology, program services, control techniques and personal protection methods.

Public Education

SCHOOL PROGRAM

BOOKMARKS

Public Education



Public Education

PUBLIC PROGRAM

BROCHURE

SOCIAL MEDIA

YouTube

Find us on Facebook

follow us on twitter

CENTRAL MASSACHUSETTS MOSQUITO CONTROL PROJECT

SCHOOL PROGRAM

Year	# students	# presentations
2020	***0**	***0**

SENIOR PROGRAM

Year	# seniors	# presentations
2020	***0**	***0**

PUBLIC PRESENTATIONS

Year	# people	# presentations
2020	**565**	**14**

TOTAL OUTREACH 2020

14 presentations to 565 people

***COVID restrictions did not allow in-person learning after March**

Central Mass. Mosquito Control Project

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Learn more about EEE and how to protect your family..... Read more »

SEASONAL UPDATES

Personal Protection Measures »

Be aware of peak exposure times and places. Exposure to arthropod bites may be reduced if travelers modify their...

Tire Collection Program »

Our tire program is on hiatus while we deal with the EEE issue, but we will take your information and will schedule a...

Dog Heartworm »

Please consult your veterinarian to be sure all vaccinations are up to date, and if a booster is needed during the...

+ VIEW ALL

- Service Request
- Prevention Tips
- Pesticide Info
- Surveillance Summary
- 2019 Spray Schedule
- No Spray Info
- Virus Information
- Program Presentation

CMMCP is a partner in the EPA's PESP program.

CMMCP is a partner with the EPA's WasteWise program.

CMMCP • 111 Otis Street, Northborough, MA 01532 • Phone: (508) 393-3055 • Fax: (508) 393-8492
Business Hours: Monday - Friday, 7:00 AM to 3:30 PM

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs

2013 Secretary's Award for Excellence
in Energy and Environmental Education

Certificate of Excellence

Central Massacusetts Mosquito Control Project

CMMCP Education Programs

In recognition for your dedication, commitment and contributions to environmental education

Richard K. Sullivan, Jr., Secretary

May 13, 2013

Date

DITCH MAINTENANCE

Restoring drainage systems to historic flow patterns to allow the free flow of water, reducing larval mosquito development from that area.

Ditch Maintenance

- All proposed work is assessed by a wetland scientist on staff (a former Conservation Agent)
- Most work is low impact using hand/power tools
- More extensive projects using low ground pressure equipment requires more site evaluation
- Work is done after receipt of property owner permission

Ditch Maintenance (Hopedale 1999)

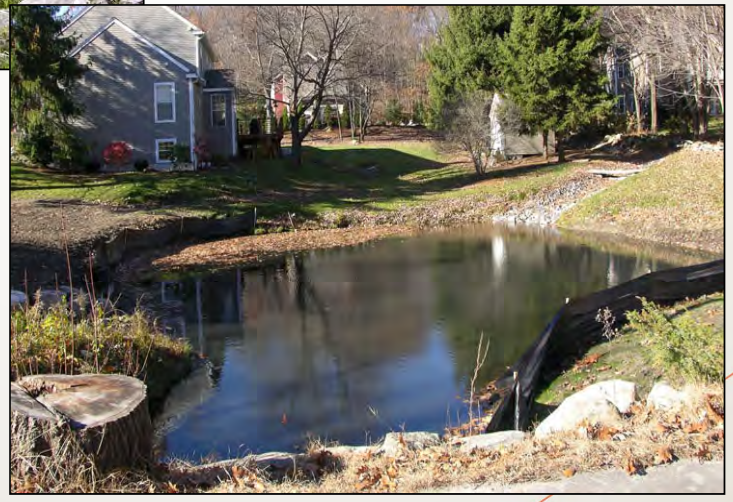
BEFORE

AFTER

Ditch Maintenance (Shrewsbury 2004)

← BEFORE

AFTER →



Ditch Maintenance (Chelmsford 2010)

Ditch Maintenance (Natick 2010)

LARVAL MOSQUITO CONTROL

Surveys of wetlands and other habitats to monitor the development of mosquito larvae and perform control techniques to minimize mosquito emergence.

Larval Control Products

- Bacterial
  - *Bti (*Bacillus thuringiensis israelensis*)
  - *Spinosad (*Saccharopolyspora spinosa*)
  - Bsph (*Bacillus sphaericus)*
- Insect Growth regulator
  - Methoprene
- Surfactant/Oils (limited use)
  - Oils derived from plant extracts
  - Petroleum based

*organic formulations used at CMMCP

Standard Larval Control Program

Standard Larval Control (cont.)

- Technicians sample wetland to identify mosquito larvae
- Applications of granular Bti are done at that time if criteria are met. Aquabac® 200G was used, an organically-certified formulation of *Bacillus thuringiensis israelensis*
- Sites are databased and checked periodically throughout the season

Pre-hatch Larval Control Program

Pre-hatch Larval Control (cont.)

- Wetlands with historic larval activity are chosen
- Applications are done in late winter or early springtime on frozen sites
- Natular G30®, an organically-certified extended release formulation
- Results are checked and good larval control has been recorded for 30+ days

Figure 1: Larval Averages during Natular™ G30 Evaluation - 2020

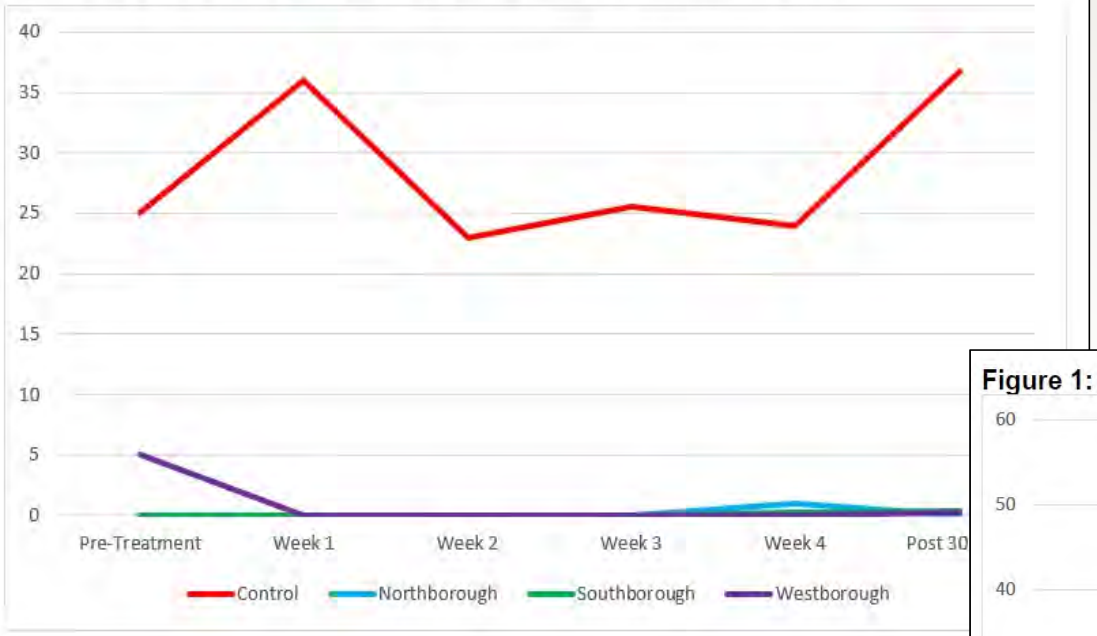
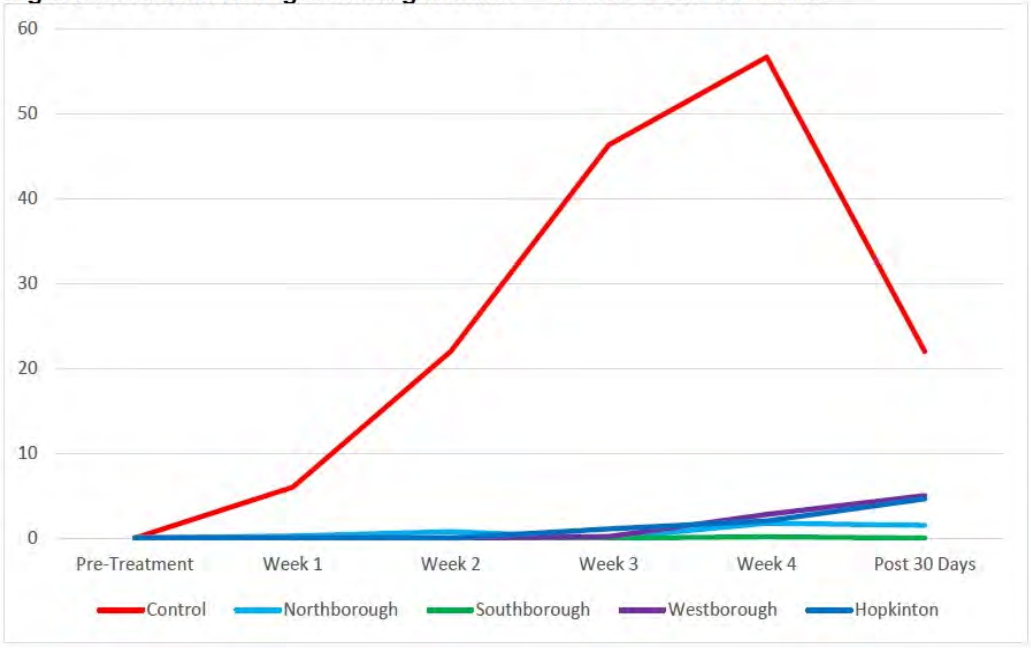


Figure 1: Larval Averages during Natular™ G30 Evaluation - 2019



Springtime Aerial Larval Control*

*__NOTE__: this is the only program that is done with supplemental funding provided by participating member communities.

Springtime Aerial Larval Control (cont.)

- 3 towns in program, Chelmsford (~700 acres), Billerica (~600 acres) and Boxborough (~900 acres)
- Aimed at reducing dependence on the spraying program in June and reducing springtime mosquito species, as well as possible vector species
- Aquabac® 200G was used, an organically-certified formulation of *Bacillus thuringiensis israelensis*

2021 aerial maps

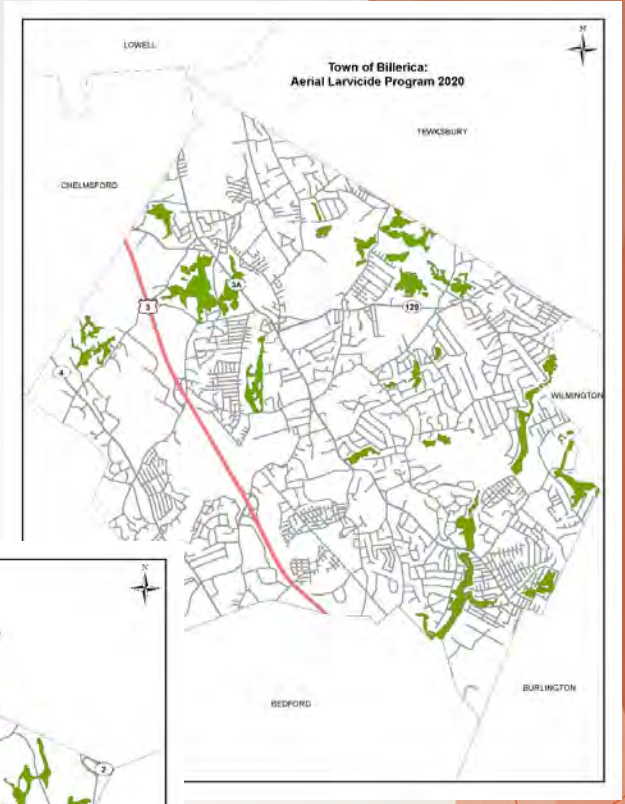


Table 1: Larval Surveillance of Treatment and Control RDS

Treatment Sites	Pre-application	Post-application	Observed Change
BIL116	72	4	-94.44%
BIL112	78	3	-96.15%
BIL408	93	3	-96.77%
BOX44	29	2	-93.10%
BOX116	24	3	-87.50%
CHM82	31	5	-83.87%
CHM279	29	1	-96.55%
CHM236	57	33	-42.11%
Overall:	413	54	**-86.92%**
Control Sites	**Pre-application**	**Post-application**	**Observed Change**
BIL227	84	84	0.00%
ACT41	56	86	53.57%
CHM146	74	94	27.03%
Overall:	214	264	**23.36%**

Figure 1: Billerica Treatment RDS Pre and Post Application

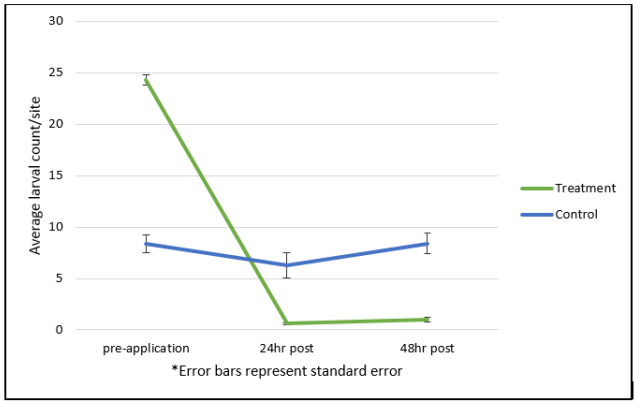


Figure 2: Chelmsford treatment RDS Pre and Post Application

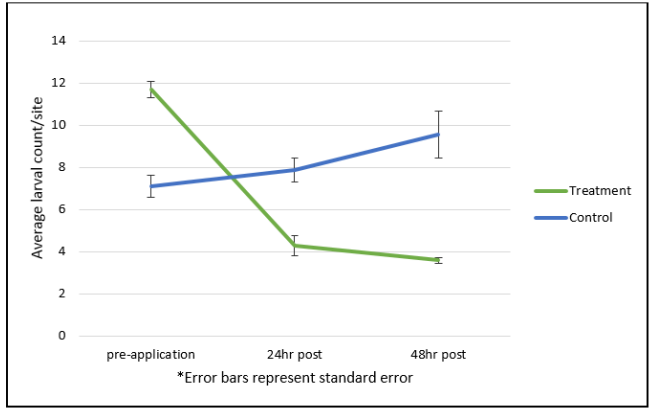
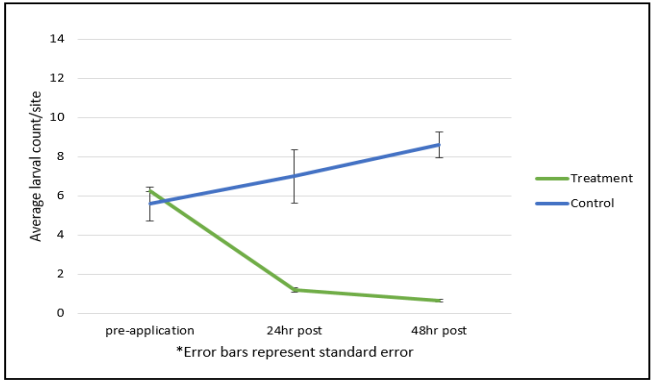


Figure 3: Boxborough Treatment RDS Pre and Post Application



2021 aerial results

Enhanced Larval Control for EEE Mitigation*

*__NOTE__: supplemental funding was received from the State for this program in 2020 & 2021

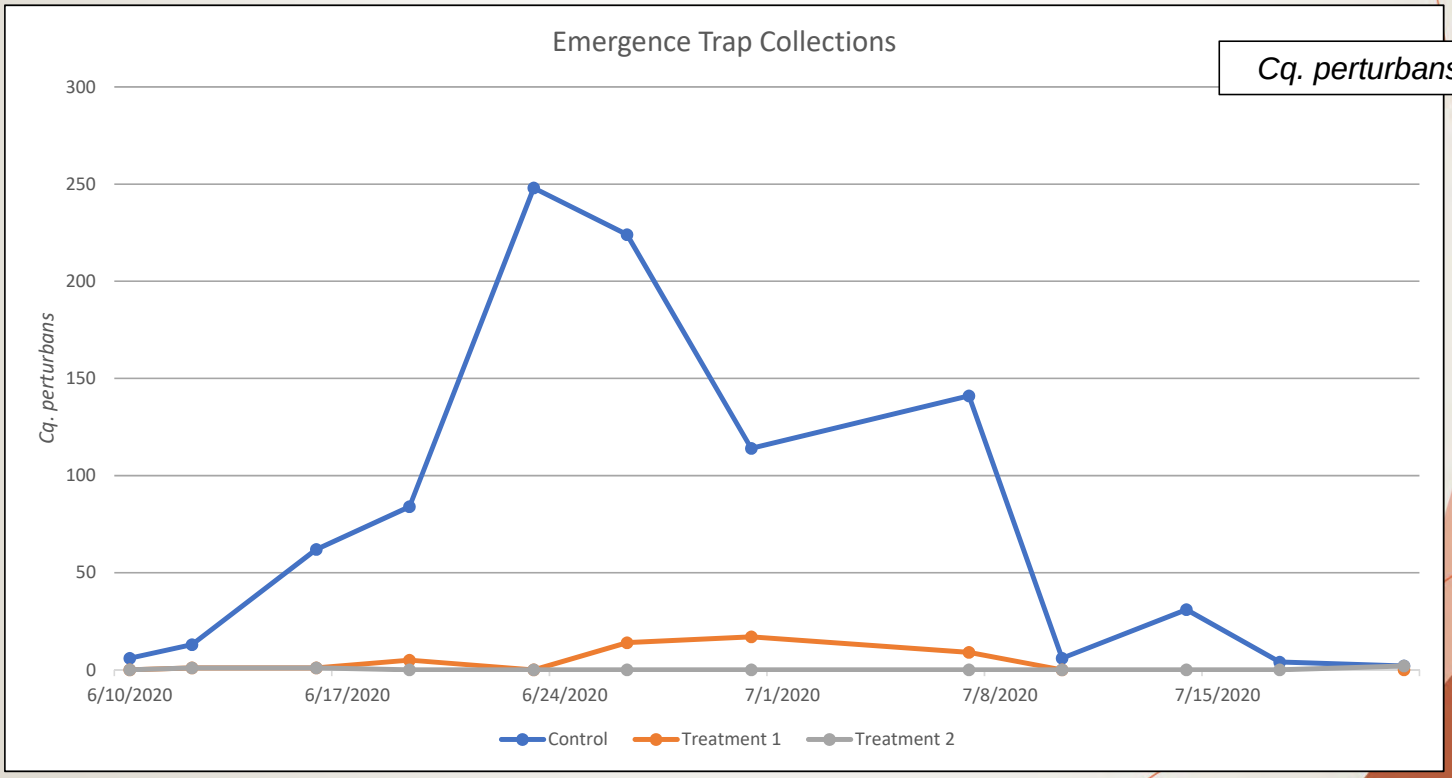
Enhanced Larval Control - 2020

- Targeted wetlands in 21 communities designated as “High” or “Critical” risk from EEE in 2019
- Over 2,500 acres treated in 2 species habitats
- Aimed at reducing emergence of these 2 species that can transmit the EEE virus
- Natular® G and Natular® G30 were used – an organically-certified bacterium called **spinosad**

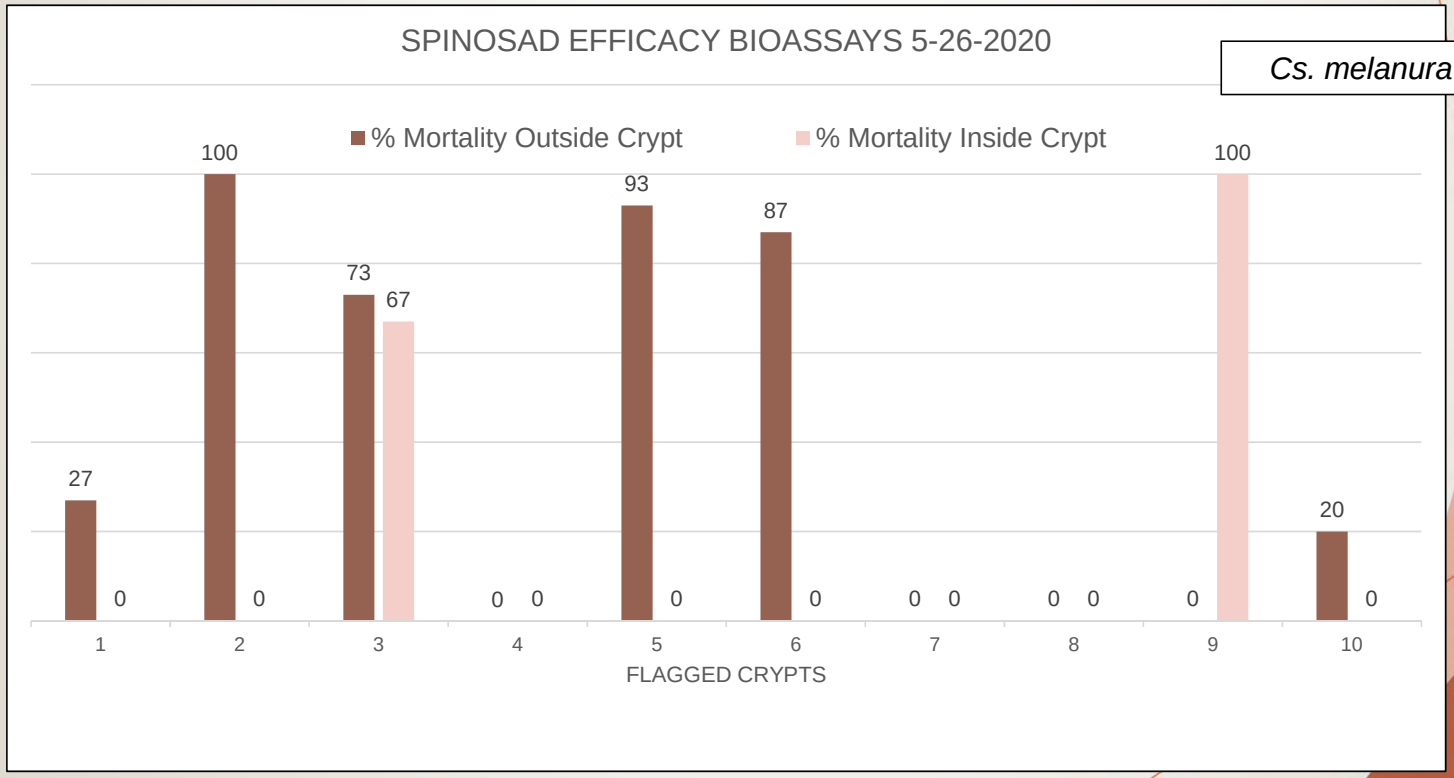
Cs. melanura habitat
White Cedar/Red Maple swamps

Cq. perturbans habitat
Cattail swamps

Enhanced Larval Control - 2020 (cont.)



Enhanced Larval Control - 2020 (cont.)

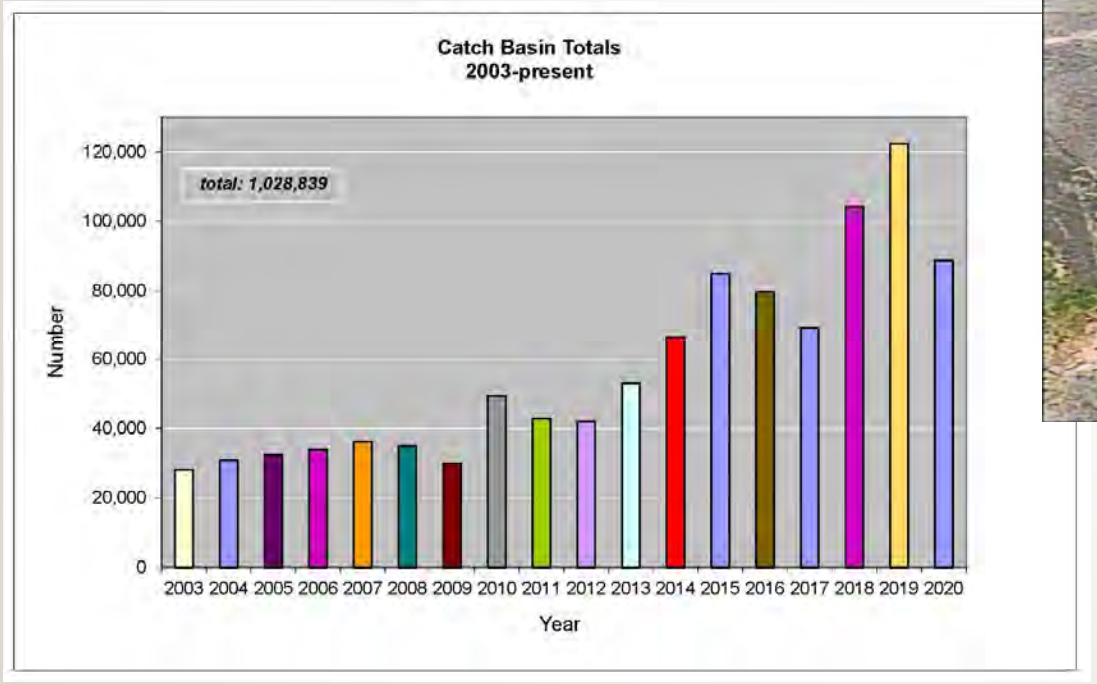


Cs. melanura habitats

Enhanced Larval Control - 2021

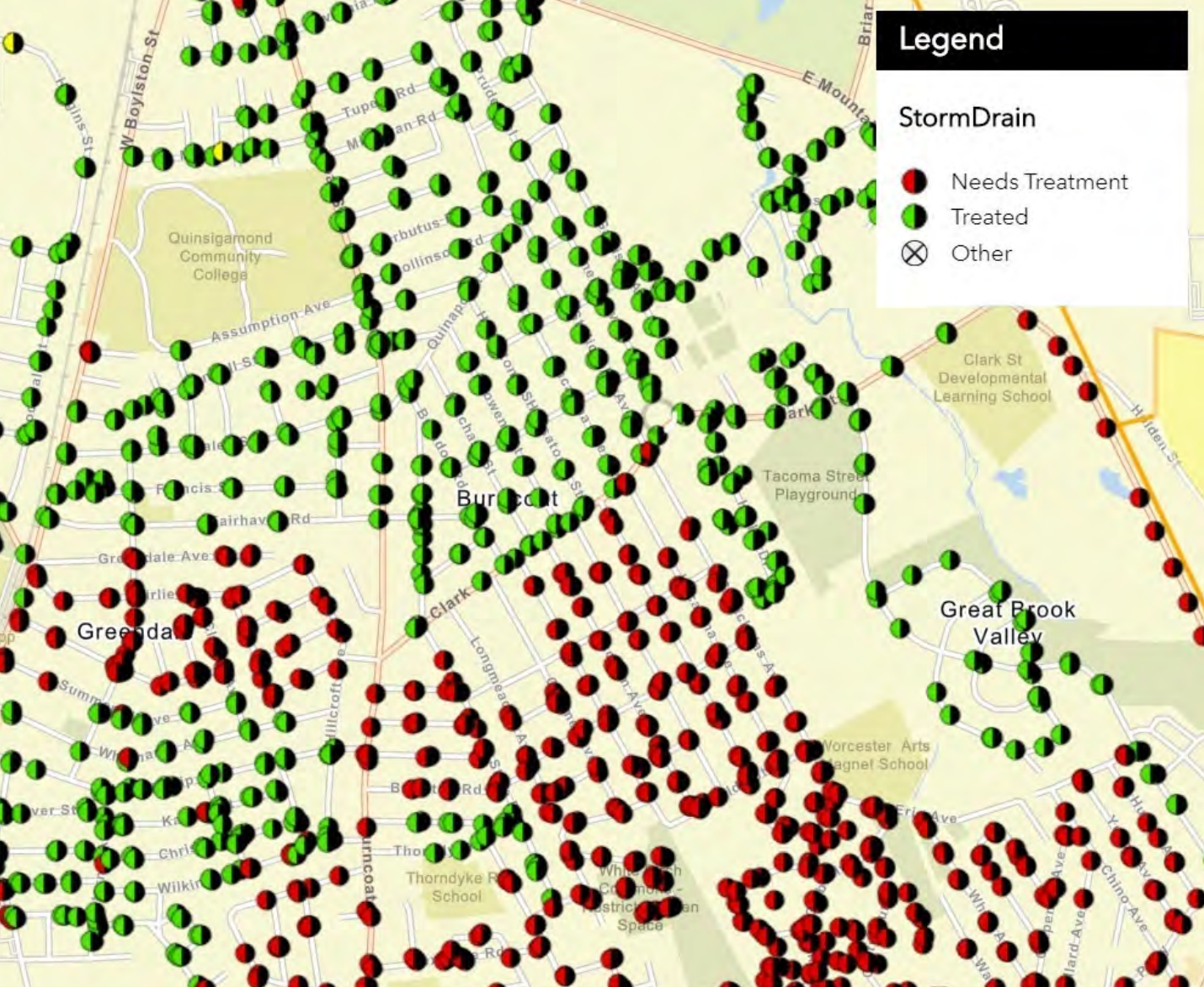
- Targeted wetlands in 12 communities designated as “Critical” risk from EEE in 2019
- Over 2,100 acres treated in 2 species habitats
- Aimed at reducing emergence of these 2 species that can transmit the EEE virus
- Natular® G and Natular® G30 were used – an organically-certified bacterium called **spinosad**

Catch Basin Program



Catch Basin Program (cont.)

- Targeted in habitat for *Culex* mosquitoes, a vector of WNV
- Catch basins hold water for extended periods of time, allowing multiple generations of *Culex* to emerge
- Tracking by GPS, indications when re-application is needed


Legend
StormDrain
Needs Treatment
Treated
Other
Quinsigamond Community College
Assumption Ave
W Boylston St
Burncoat
Greendale
Clark St Developmental Learning School
Tacoma Street Playground
Great Brook Valley
Worcester Arts Magnet School
Thorndyke Road School
Clark
Longmeadow
Millcroft
Burncoat

Abandoned Pools

Abandoned pools (cont.)

- Unopened swimming pools hold water for extended periods of time, allowing multiple generations to emerge weekly
- Treatments last all summer, pool can be reopened in the future

SOURCE REDUCTION

Tire recycling to eliminate larval mosquito habitat and reduce risk from mosquito-borne diseases.

Source Reduction

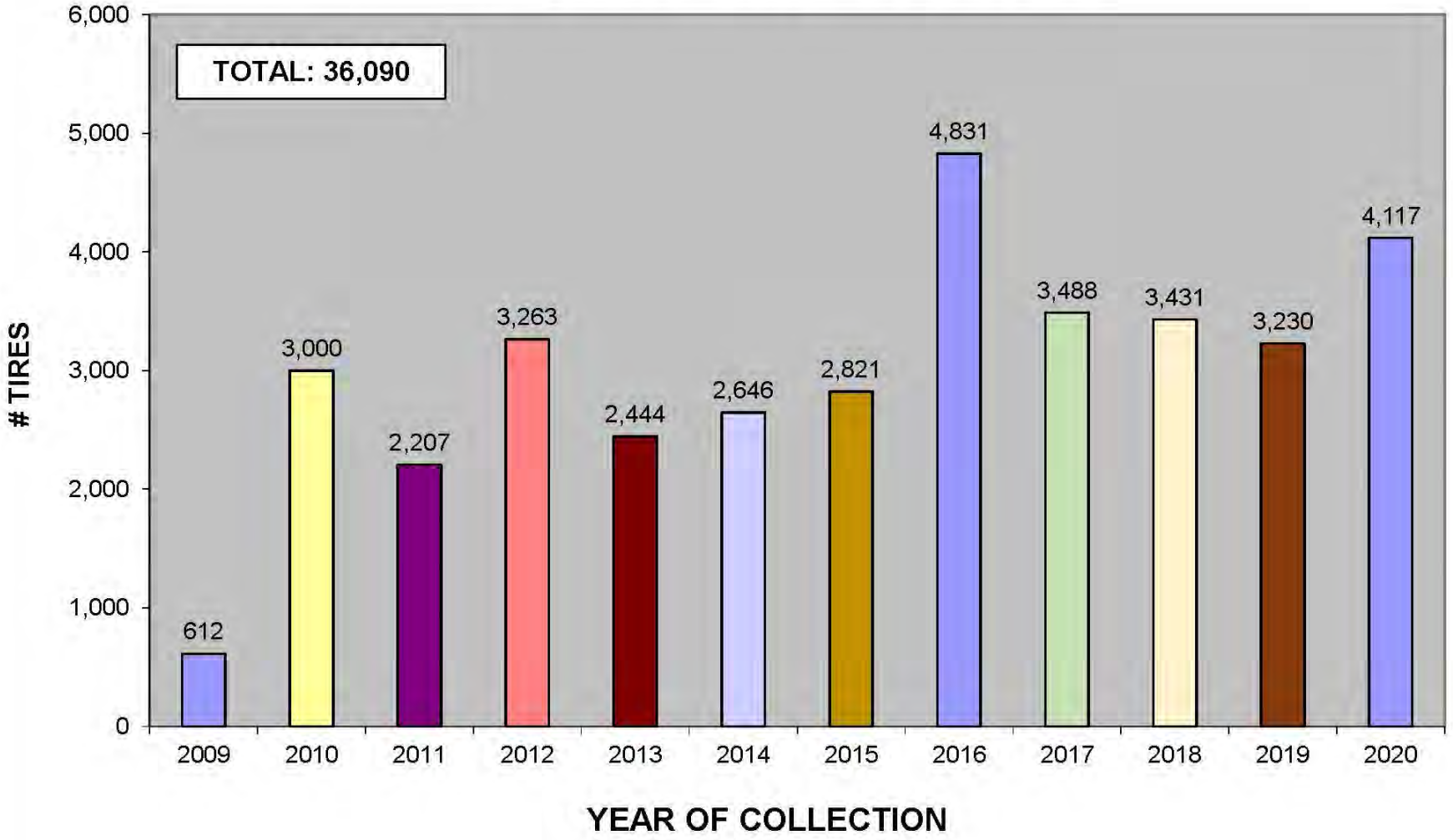
- Program began in 2010
- Operates off initial grant, funding now in operating budget
- 36,090 tires recycled to date in 42 member cities & towns

Tires in the environment are the preferred larval habitat of several species of mosquitoes, some that transmit West Nile Virus

Source Reduction

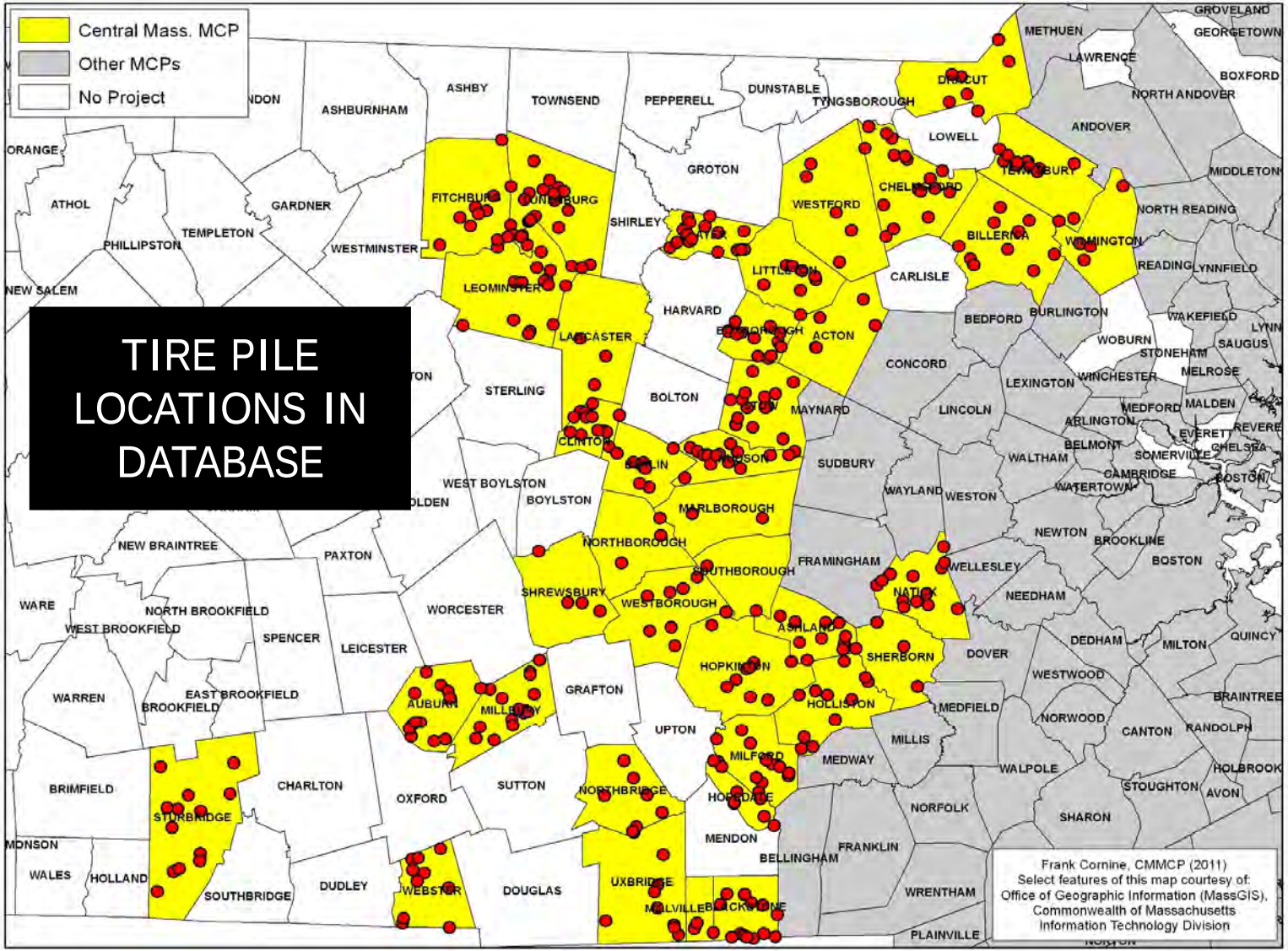
- Clean-up of large waste tire dumping sites that we have databased;
- Residential waste tire removal (curb-side);
- Removal of waste tires discarded on the side of the road; and
- Coordination with communities during recycle events, hazardous waste collections, river cleanups, etc.

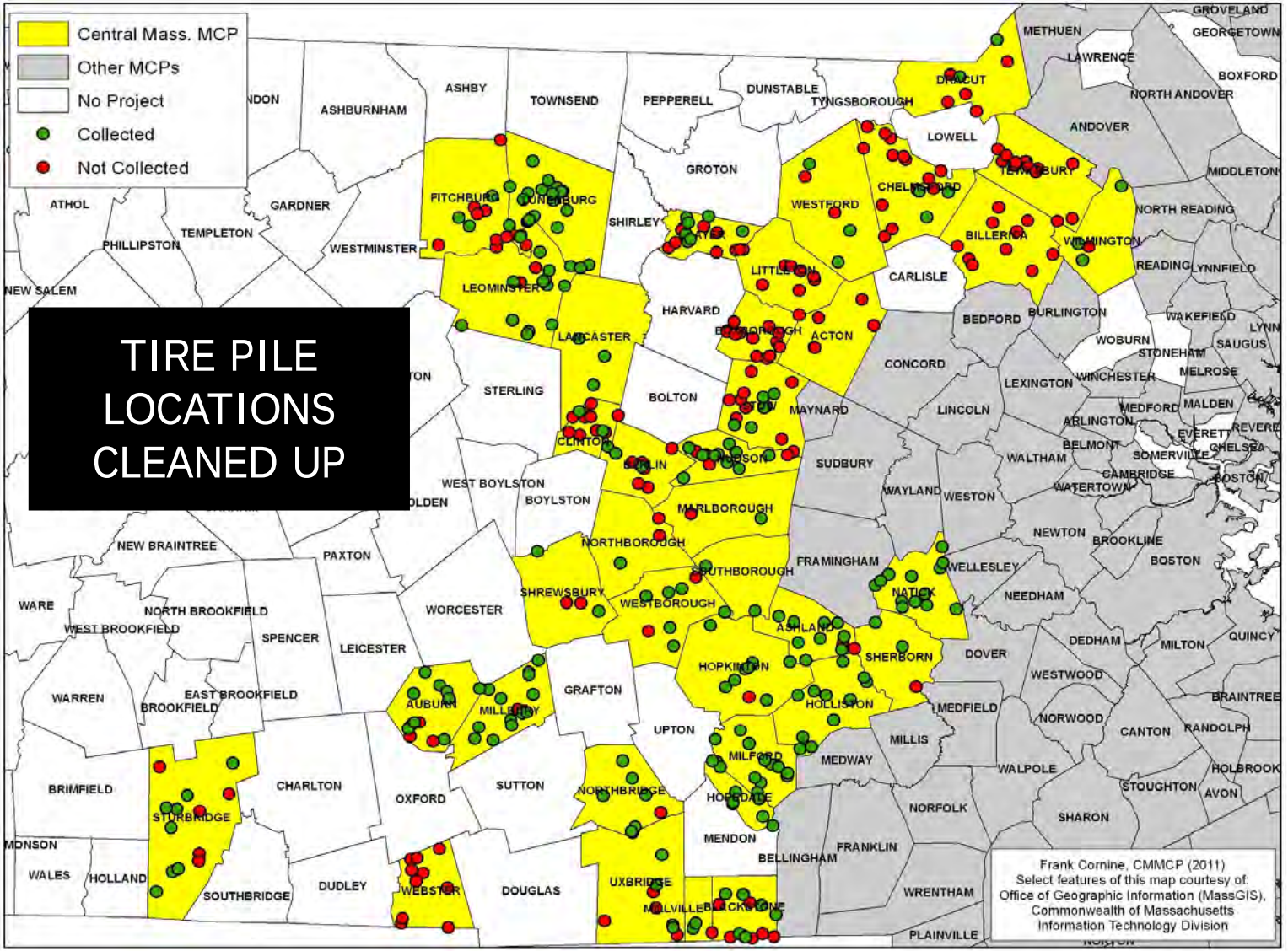
TIRE COLLECTIONS IN CENTRAL MASS.




ASHLAND, MA
1,300+ tires
BEFORE


ASHLAND, MA
0 tires
AFTER


Central Mass. MCP
Other MCPs
No Project
TIRE PILE LOCATIONS IN DATABASE
Frank Cornine, CMMCP (2011)
Select features of this map courtesy of:
Office of Geographic Information (MassGIS),
Commonwealth of Massachusetts
Information Technology Division


Central Mass. MCP
Other MCPs
No Project
Collected
Not Collected
TIRE PILE LOCATIONS CLEANED UP
Frank Cornine, CMMCP (2011)
Select features of this map courtesy of:
Office of Geographic Information (MassGIS),
Commonwealth of Massachusetts
Information Technology Division

MassRecycle

presents the 2011

BRONZE

Institution & Nonprofit Award

to

Central Mass Mosquito Control Project

for

Outstanding efforts to increase recycling and reduce waste

MASSRECYCLE

Dmitriy Nikolayev

Dmitriy Nikolayev, President

November 15, 2011

From the EPA awards:

"*Through this project, the organization has recycled 11,500 tires, which saved 192 staff hours in monitoring larval habitats, and resulted in usage of 720 pounds less of pesticides.*"

Our tire program was recognized in 2014 by the EPA – Region 1

2017 Certificate of Achievement
WasteWise

The U.S. Environmental Protection Agency's National Sustainable Materials Management Program commends

Central Massachusetts Mosquito Control

for your demonstrated commitment to improving sustainable waste management practices since becoming a participant in 2011.

Deborah A. Szaro

DEBORAH A SZARO ,
ACTING REGIONAL ADMINISTRATOR
EPA REGION 1

Sustainable Materials Management

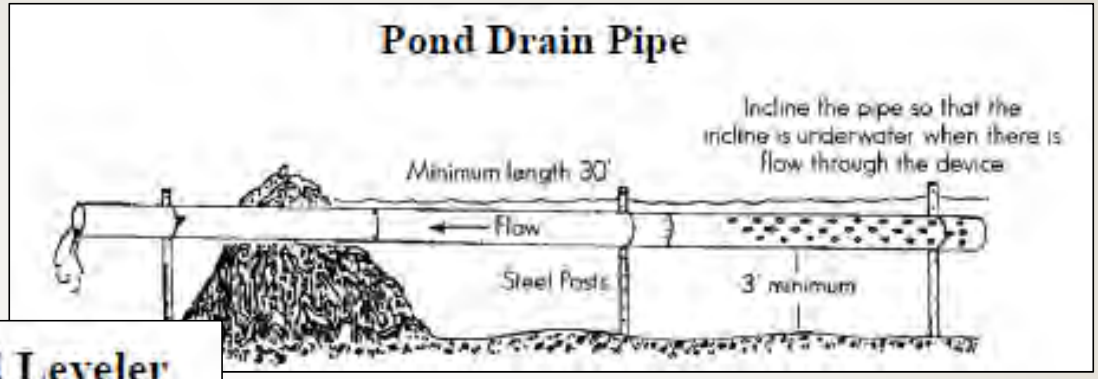
Rethink

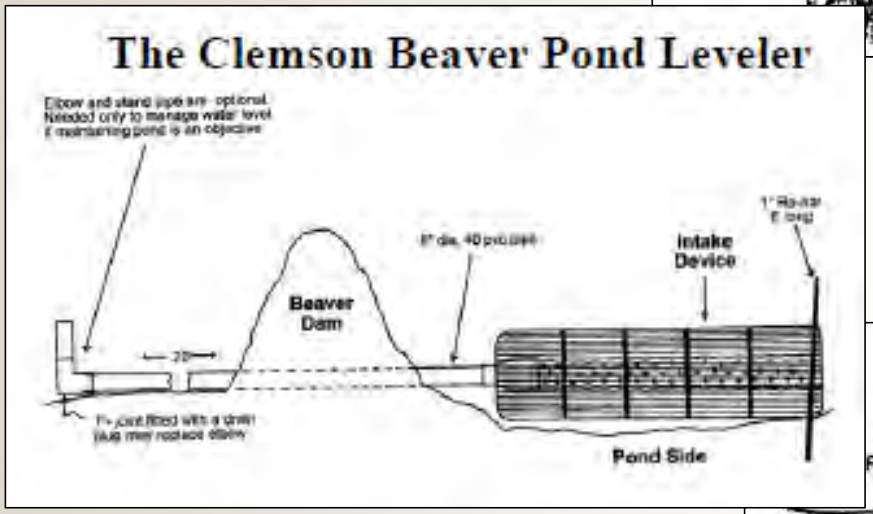
BEAVER MITIGATION

Proper management of beaver populations to reduce potential negative aspects of beaver activity.

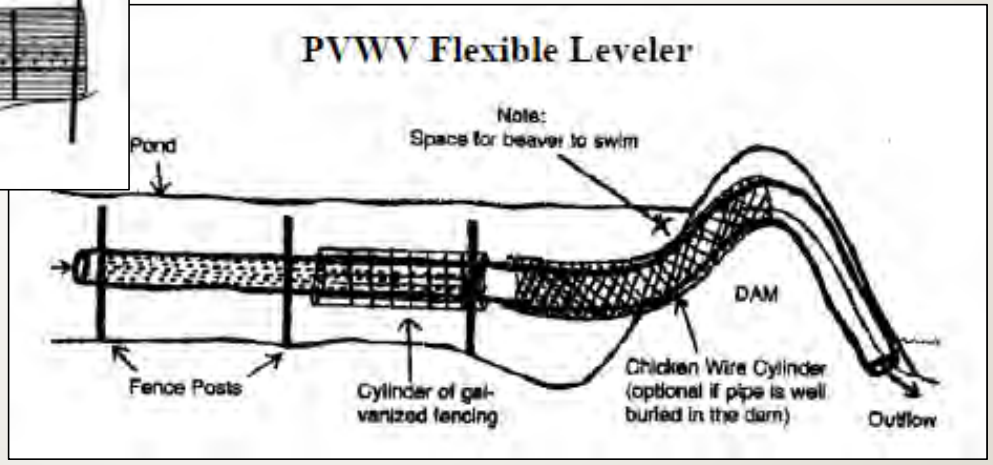
Beaver Mitigation

- New program for CMMCP (2014)
- Working under emergency permits through BOH & ConCom
- Installation of WLCD
- Dam breaching
- Licensed trappers on staff





WLCD EXAMPLES



HOLLISTON, MA – Upper Charles River watershed

HOLLISTON, MA – Upper Charles River watershed

HOLLISTON, MA – Upper Charles River watershed

ADULT MOSQUITO CONTROL

Targeted applications to control adult mosquitoes and reduce risk from mosquito-borne diseases.

Adult Control Product

- Etofenprox, a reduced risk* synthetic pyrethroid
- Not a residual product, rapid decomposition in the environment
- Low toxicity to humans, pets, etc.

*as classified by the EPA

Application rates

Application rate pound A.I. per acre	Flow rates		Vehicle Speed
	Undiluted		
	Oz/Acre	Oz/Minute	
0.00175		2.25	5
	0.75	4.50	10
		7.00	15
0.00350		4.50	5
	1.5	9.00	10
		13.50	15
0.00700	3.0	9.00	5
		18.00	10

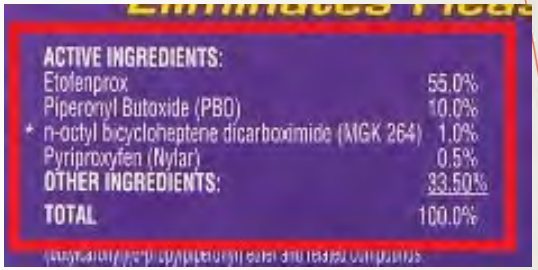
The red box are the application rates of the 4% solution of etofenprox over the area the size of an acre – 43,560 sq. ft.

The green box is the typical application rate we use

Pyrethroids

- Animal Products (flea spray, flea shampoos)
- Restaurant applications
- Food & grain storage
- Available to homeowners as Yard Guard®, Repel®, etc.

Pyrethroids in Pet Products



Here is a common pet product for topical (skin) applications using the same pesticide we use, but at higher rates (55% vs. 4%)

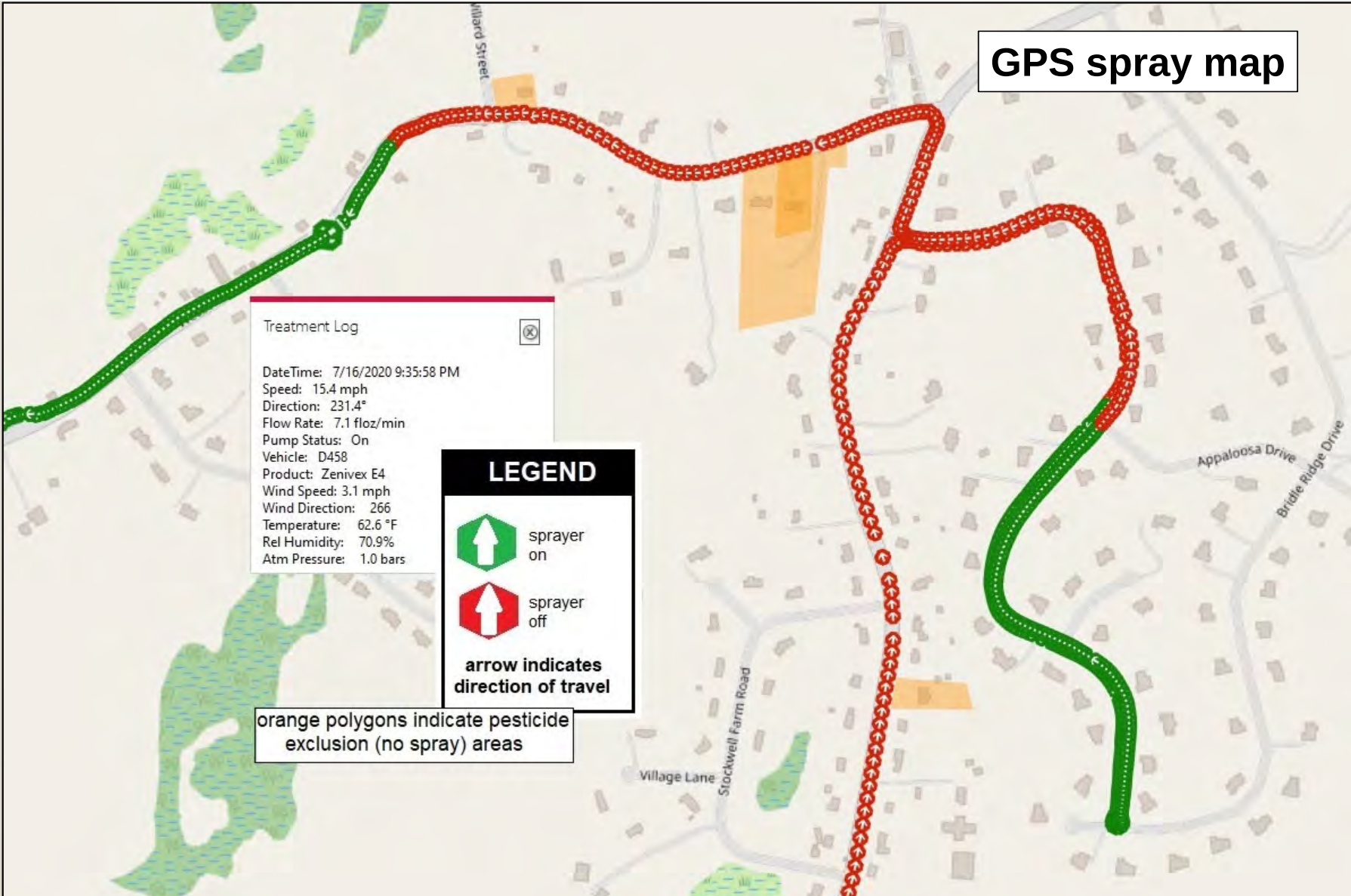
Adult Control (spraying)

- If no service requests are received from residents, then no spraying will be done. Other work like larval control, landing counts, etc. may be performed in town on the scheduled day/evening

- If spraying is done for virus control, it will be done only after consultation with local and state officials

Adult Control (spraying)

- Website redesign to allow electronic notifications before spray applications
- New GPS tracking system in place, includes Windows® tablets
- Spray areas are detailed in new report system showing exact locations and time of spray
- All spray trucks equipped with ultrasonic weather stations to give notice for wind speed, wind direction and air temperatures


GPS spray map
Treatment Log
DateTime: 7/16/2020 9:35:58 PM
Speed: 15.4 mph
Direction: 231.4°
Flow Rate: 7.1 floz/min
Pump Status: On
Vehicle: D458
Product: Zenivex E4
Wind Speed: 3.1 mph
Wind Direction: 266
Temperature: 62.6 °F
Rel Humidity: 70.9%
Atm Pressure: 1.0 bars
LEGEND
sprayer on
sprayer off
arrow indicates direction of travel
orange polygons indicate pesticide exclusion (no spray) areas
Willard Street
Appaloosa Drive
Bridle Ridge Drive
Stockwell Farm Road
Village Lane

Mobile weather stations

Ultrasonic weather station

The ultrasonic weather station instrument calculates apparent wind speed and direction, barometric pressure, air temperature, relative humidity, dew point and wind chill temperature. Using the internal compass and Global Positioning System, true wind speed and direction can also be calculated. The UV stabilized, compact housing is fully waterproof and resistant to chemicals.

Information display on technician’s tablet

Exclusion properties (No Sprays)

- Register through MDAR under new process
- Detailed list sent with all pesticide applicators & on tablets in spray vehicles
- Audible and visual warnings in truck cab when approaching the exclusion property.

Spray Notifications

- Monthly schedules sent to all Boards of Health & City/Town Clerks 2 weeks prior to start of each month
- Street listings on CMMCP phone system after 3:30pm each day
- Street listing on CMMCP website after 3:30pm each day.

Landing Rates

- Landing rates >1 per min.*
- 296 landing rates in 2020** (140 with no application 47%)

*from the Mass. Mosquito Generic Environmental Impact Report

** Landing rates were suspended after confirmation of virus on July 6

RESEARCH & EFFICACY

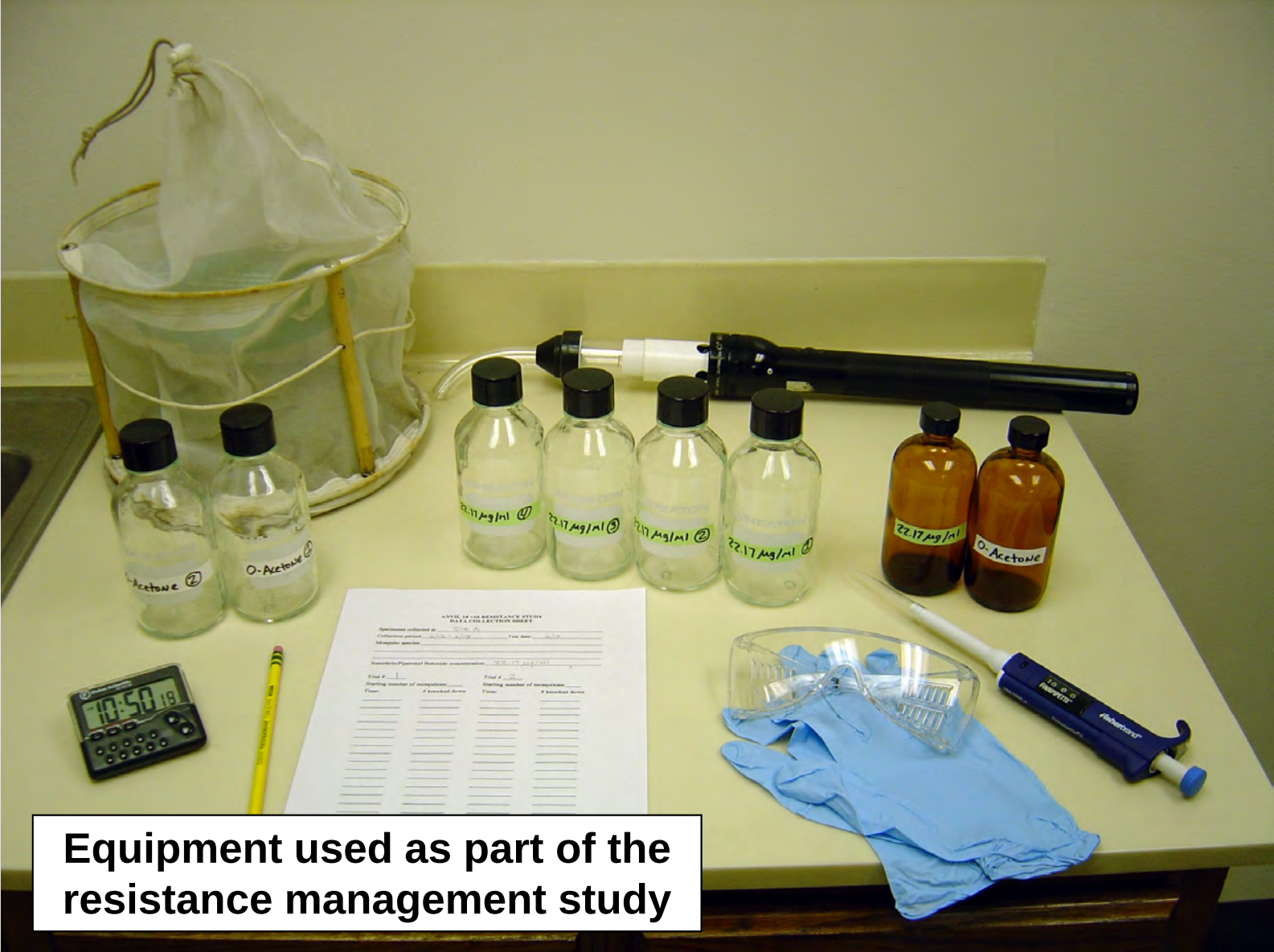
To check the efficacy of our products and techniques, and perform research in new or advanced control methods.

Research & Efficacy

- Department began in 2007 – includes GIS capabilities
- Provides checks & balances
- Past studies:
  - Mosquito bloodmeal analysis
  - Catch basin efficacy
  - Adulticide program efficacy evaluation
  - Host-seeking activity
  - Resident survey

Research & Efficacy (cont.)

- Test new products/formulations
  - Prehatch
- Pesticide resistance (sumithrin/resmethrin)
  - Using CDC protocols
  - Done for past 14 years, no resistance noted in area



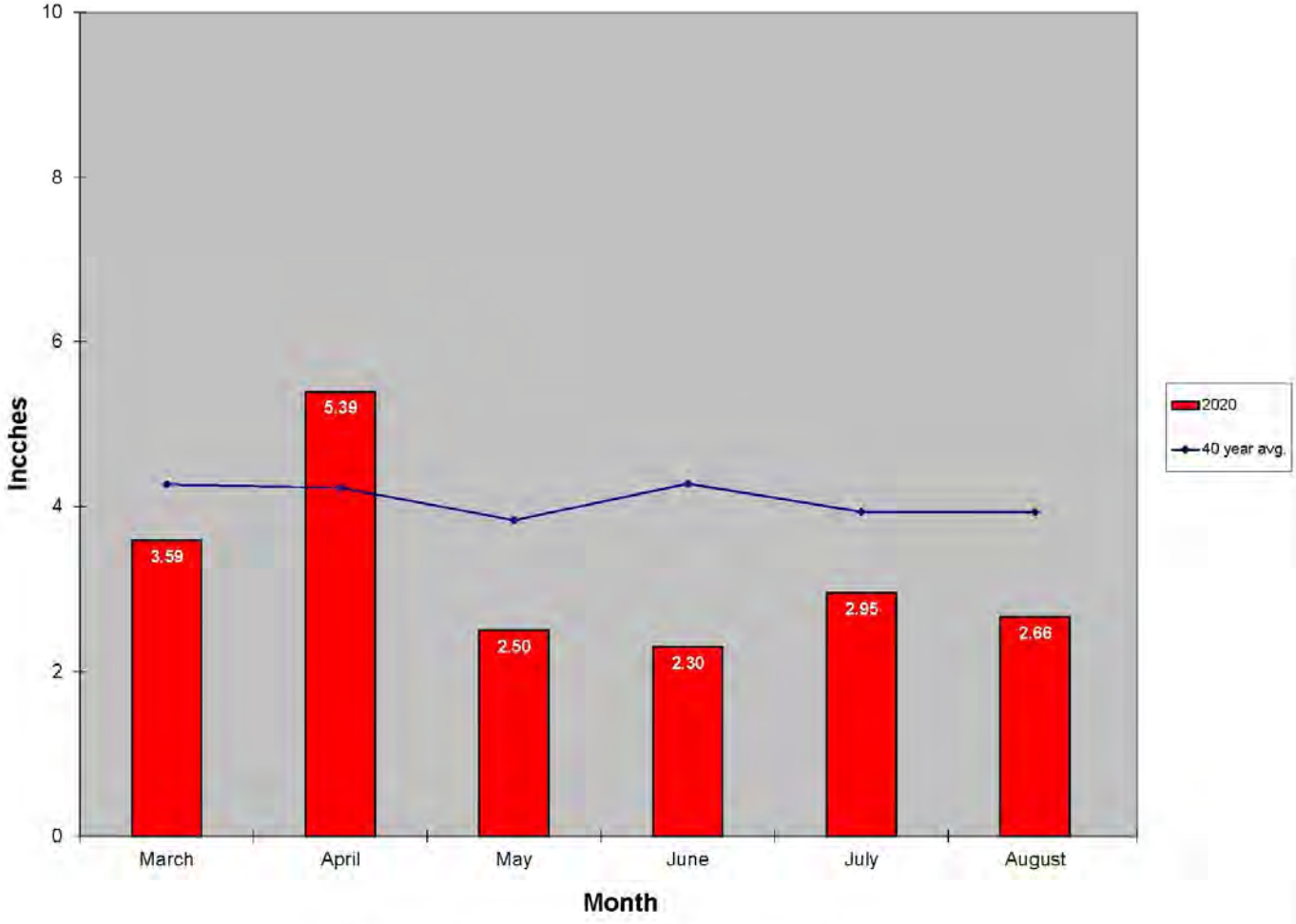
Equipment used as part of the resistance management study

Resistance management

Rotator light traps used in the adulticide efficacy study & host seeking activity study

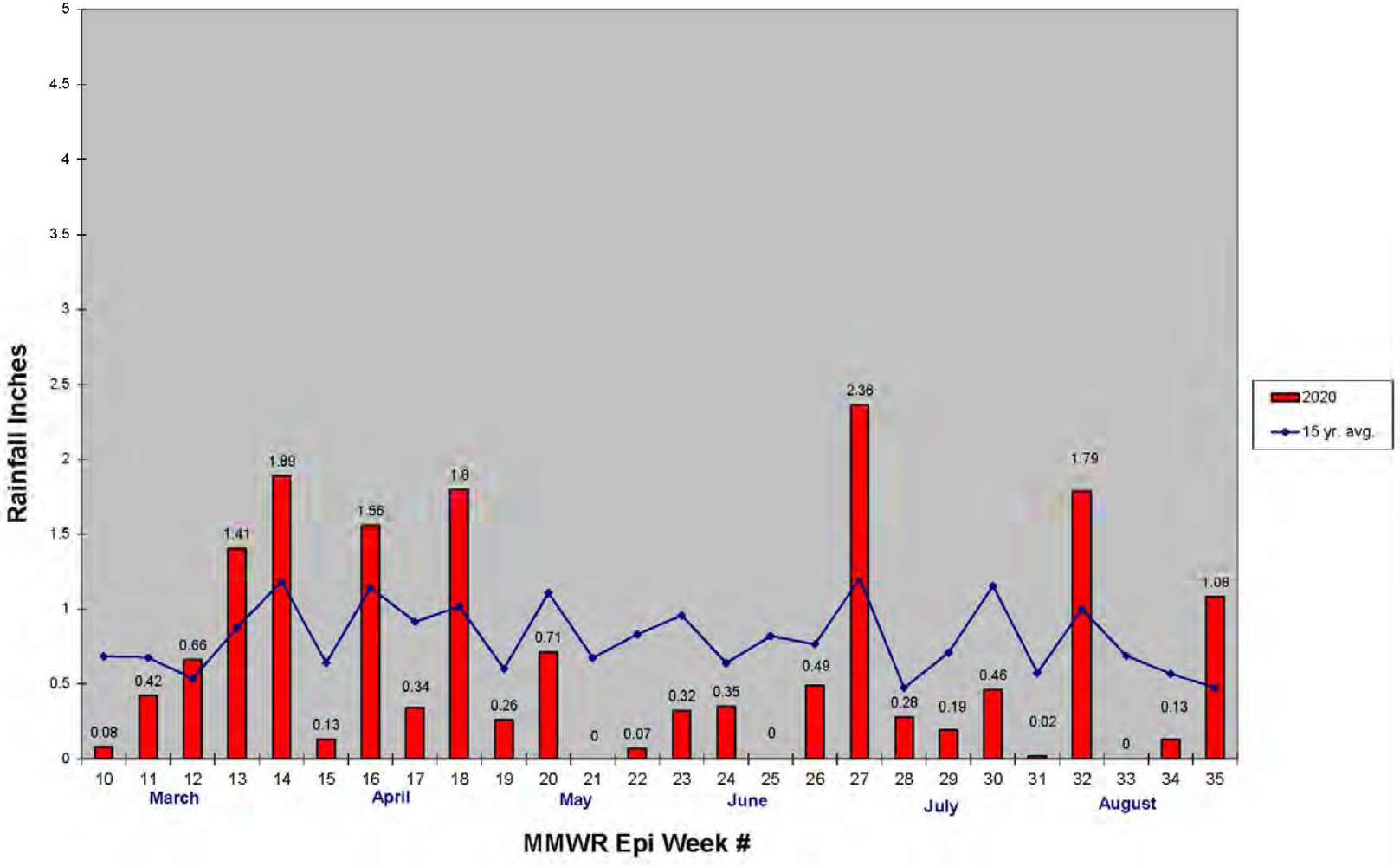
CMMCP weather station to monitor wind, rain & temperature

2020 Mass. Rainfall Data vs. 40 Year Average*



*source: http://www.nrcc.cornell.edu/regional/tables/tables.html

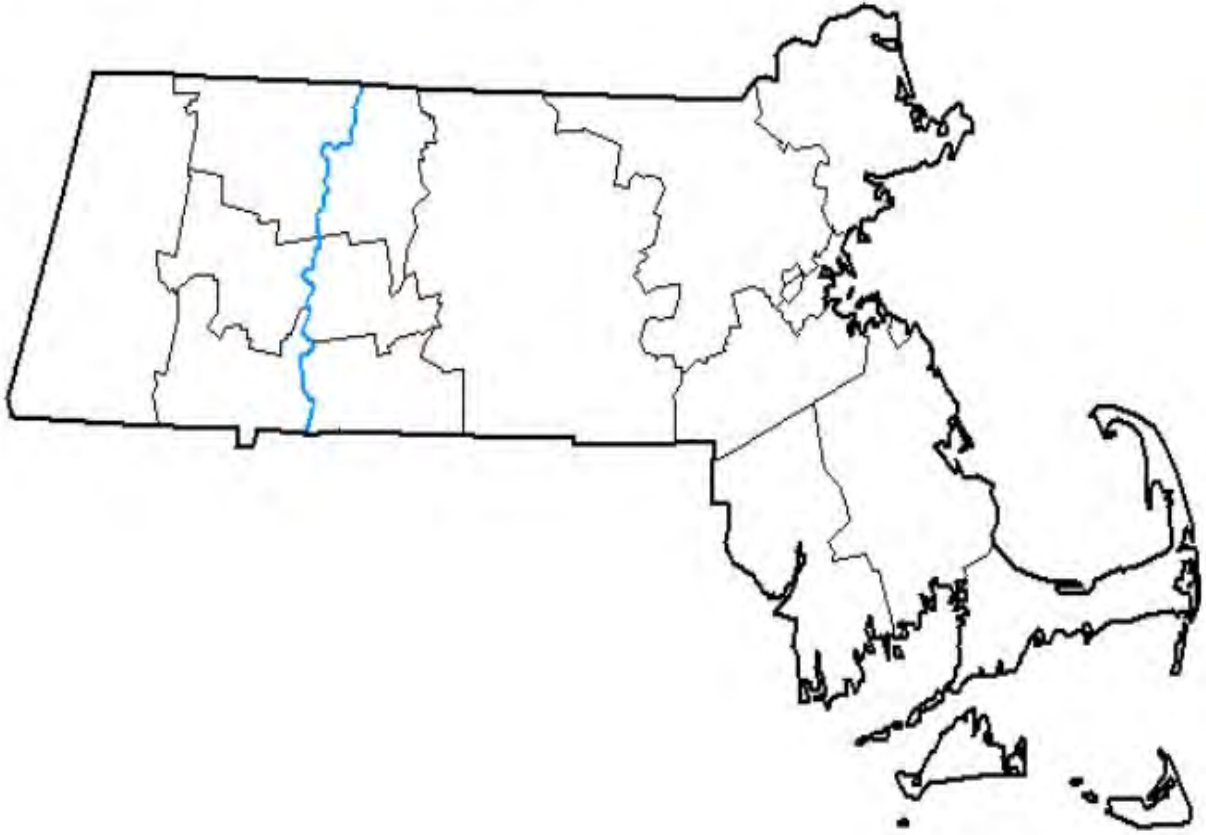
2020 CMMCP Weekly Rainfall vs. 15 Year Average*



*source: CMMCP weather station Northborough, MA

U.S. Drought Monitor

Massachusetts



March 3, 2020

(Released Thursday, Mar. 5, 2020)

Valid 7 a.m. EST

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

Adam Hartman
NOAA/NWS/NCEP/CPC

droughtmonitor.unl.edu

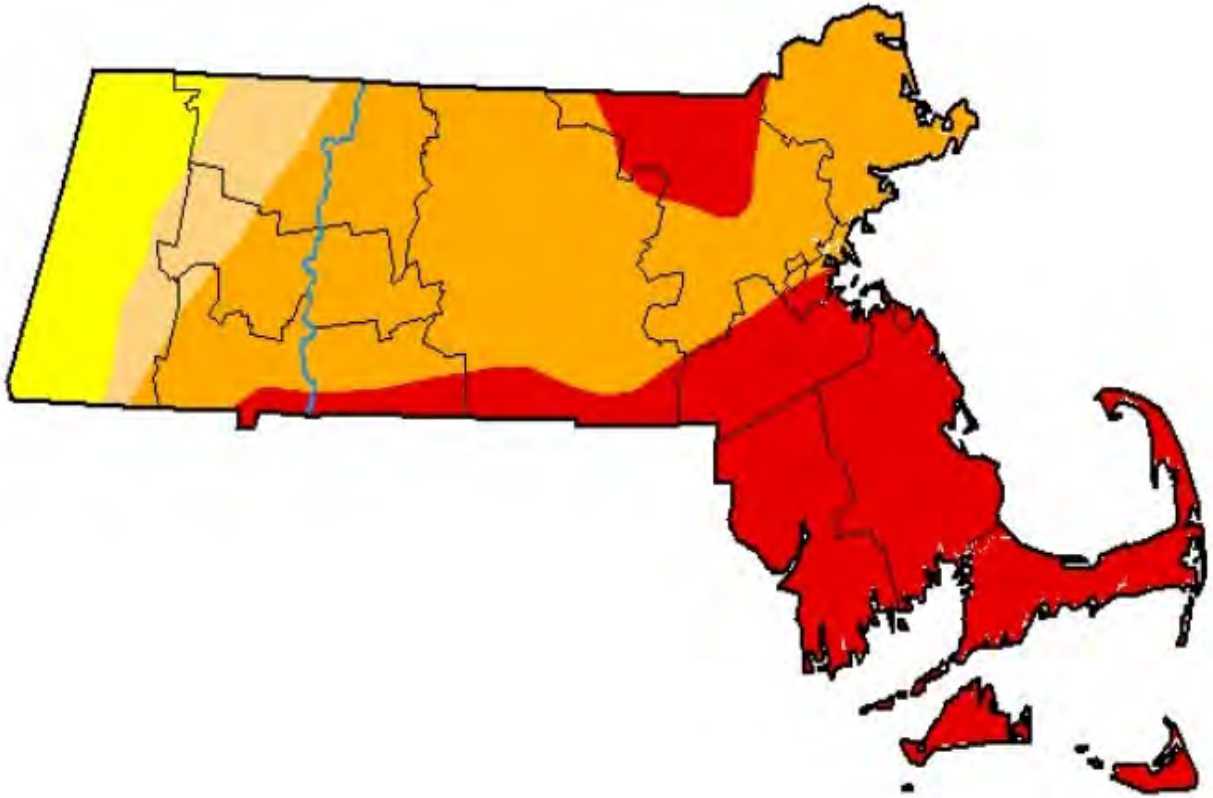
U.S. Drought Monitor

Massachusetts

October 6, 2020

(Released Thursday, Oct. 8, 2020)

Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
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Author:

Brian Fuchs
National Drought Mitigation Center

droughtmonitor.unl.edu

MOSQUITO-BORNE DISEASES IN MASS.

ARBOVIRUS TRANSMISSION CYCLE

MOSQUITO (VECTOR)

INCIDENTAL INFECTIONS

AMPLIFICATION

BIRD (RESERVOIR)

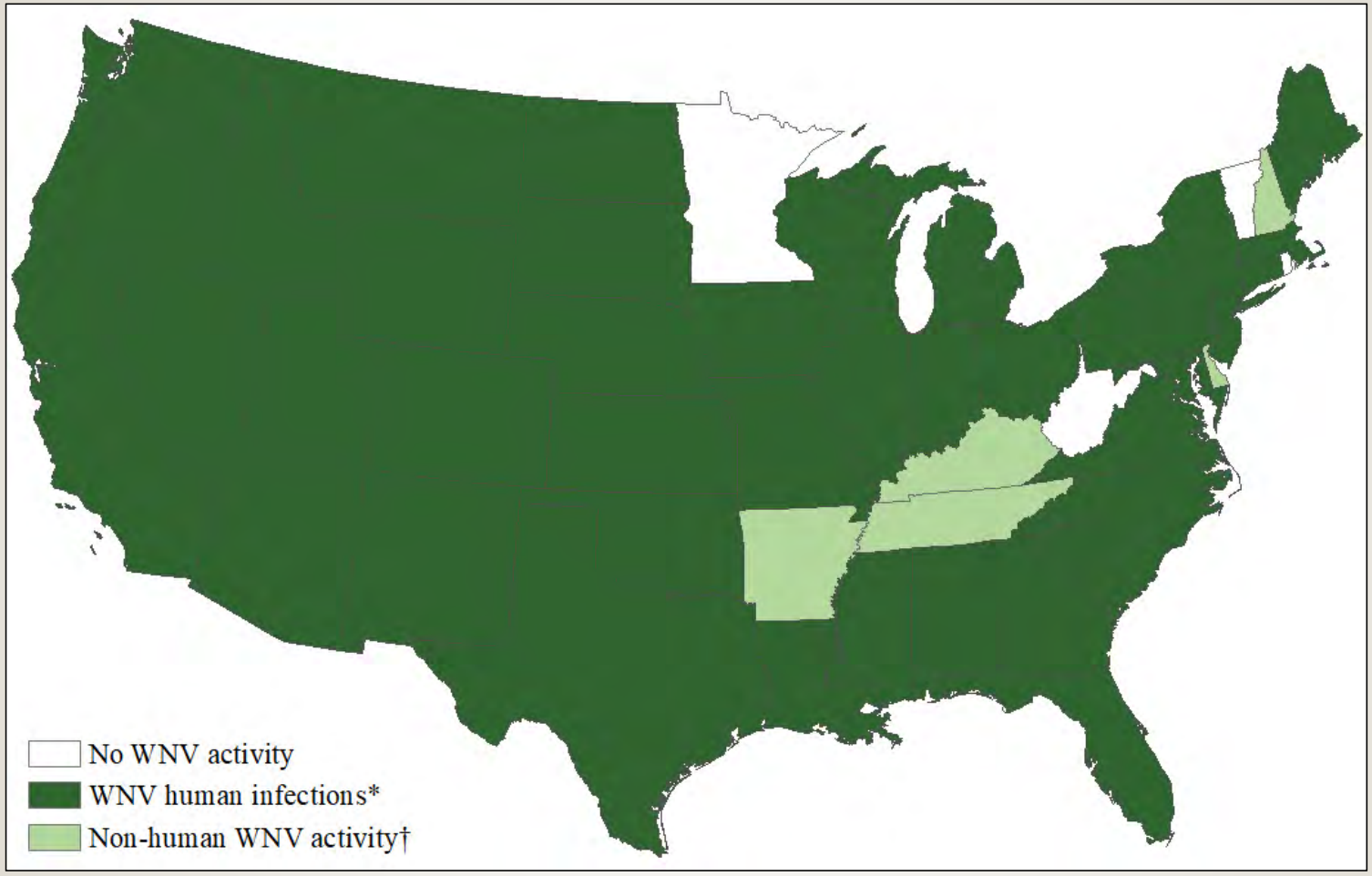
AMPLIFICATION

"ARBOVIRUS" - arthropod-borne virus. A mosquito (vector) picks up a virus from a bird (reservoir), lays eggs and transmit the virus to another bird - this is called amplification. Incidental infections occur when an infected mosquito bites a susceptible mammal.

West Nile Virus

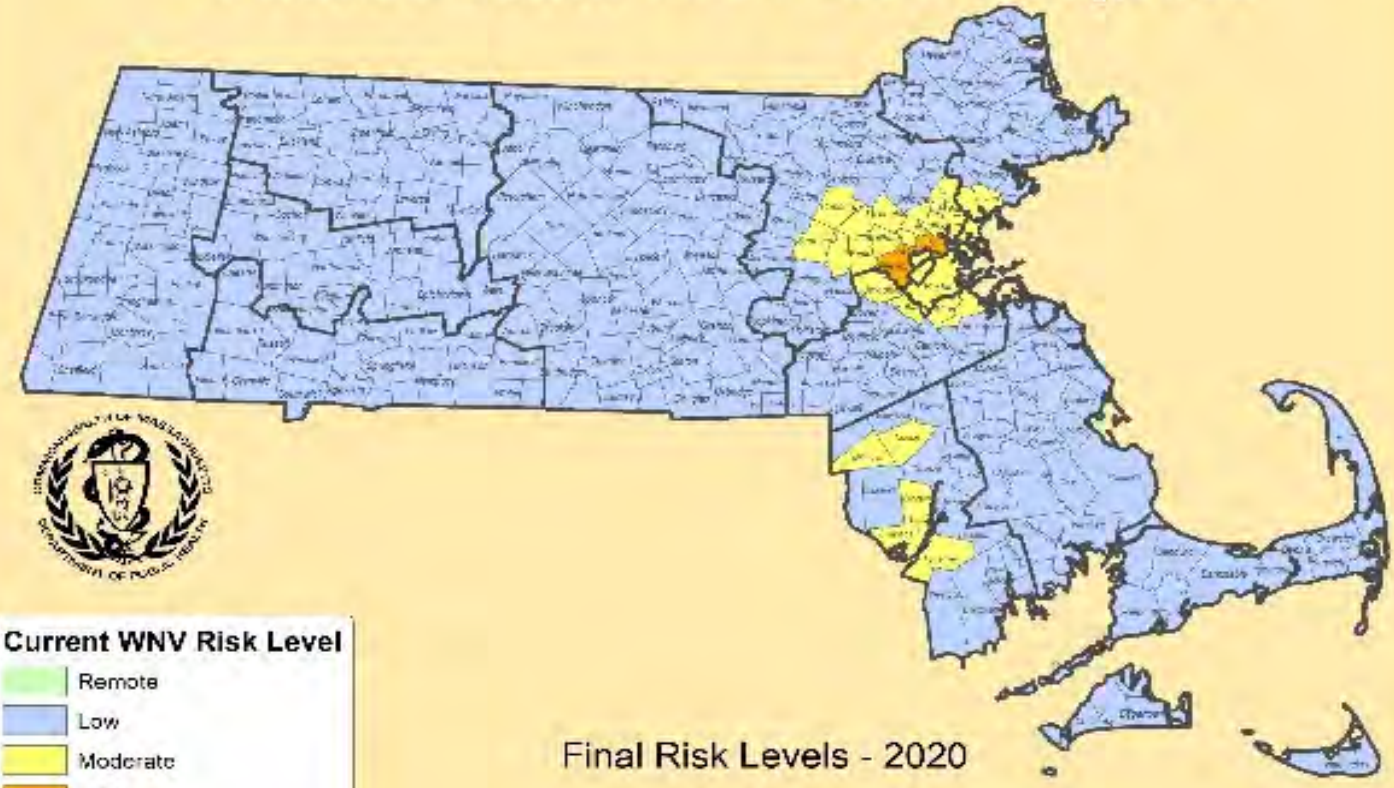
- Discovered in USA in New York in 1999
- Discovered in Mass. in 2000
- Firmly established in the nation with sporadic, localized outbreaks

2020 WNV - Nationwide



664 human cases reported – 11 in Mass.
52 deaths nationwide – 0 in Mass.

Massachusetts WNV Risk Categories



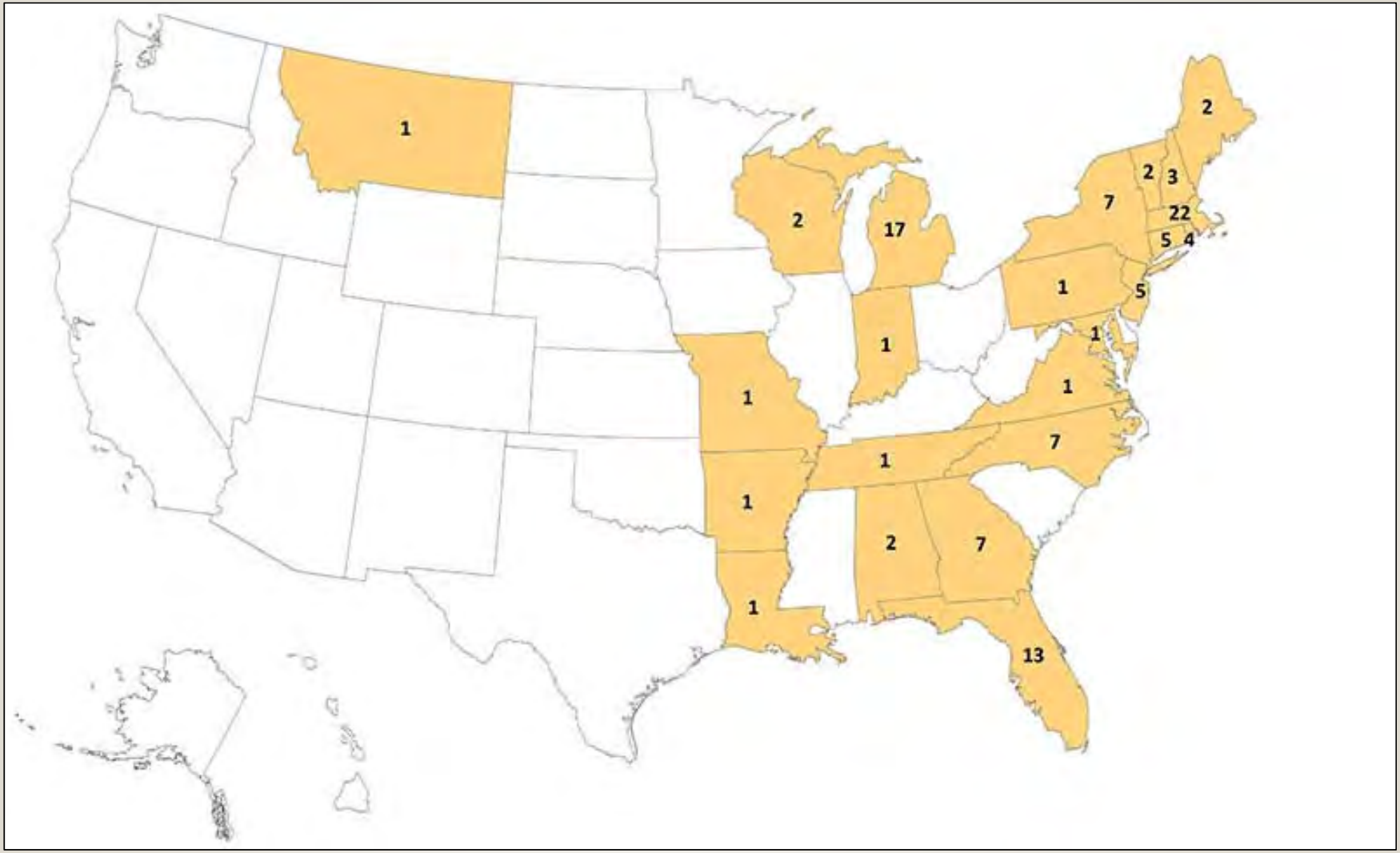
MA WNV Surveillance Summary
2020

Mosquito Pools Positive	97
Horses Positive	0
Humans Positive	11

Eastern Equine Encephalitis

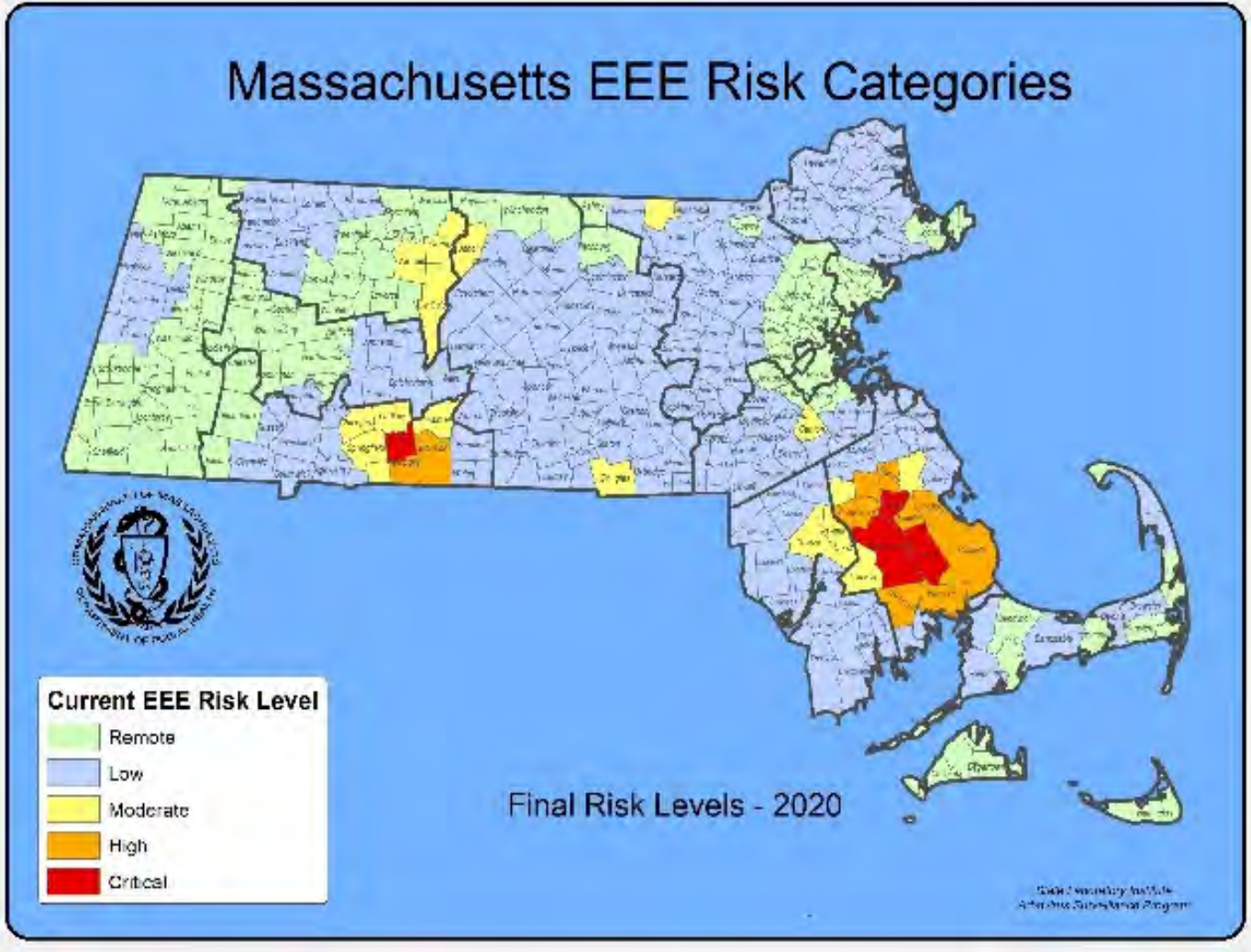
- 30-50% mortality
- Of the survivors, most have severe permanent neurological damage
- Most common in SE Mass. but may be moving west/north

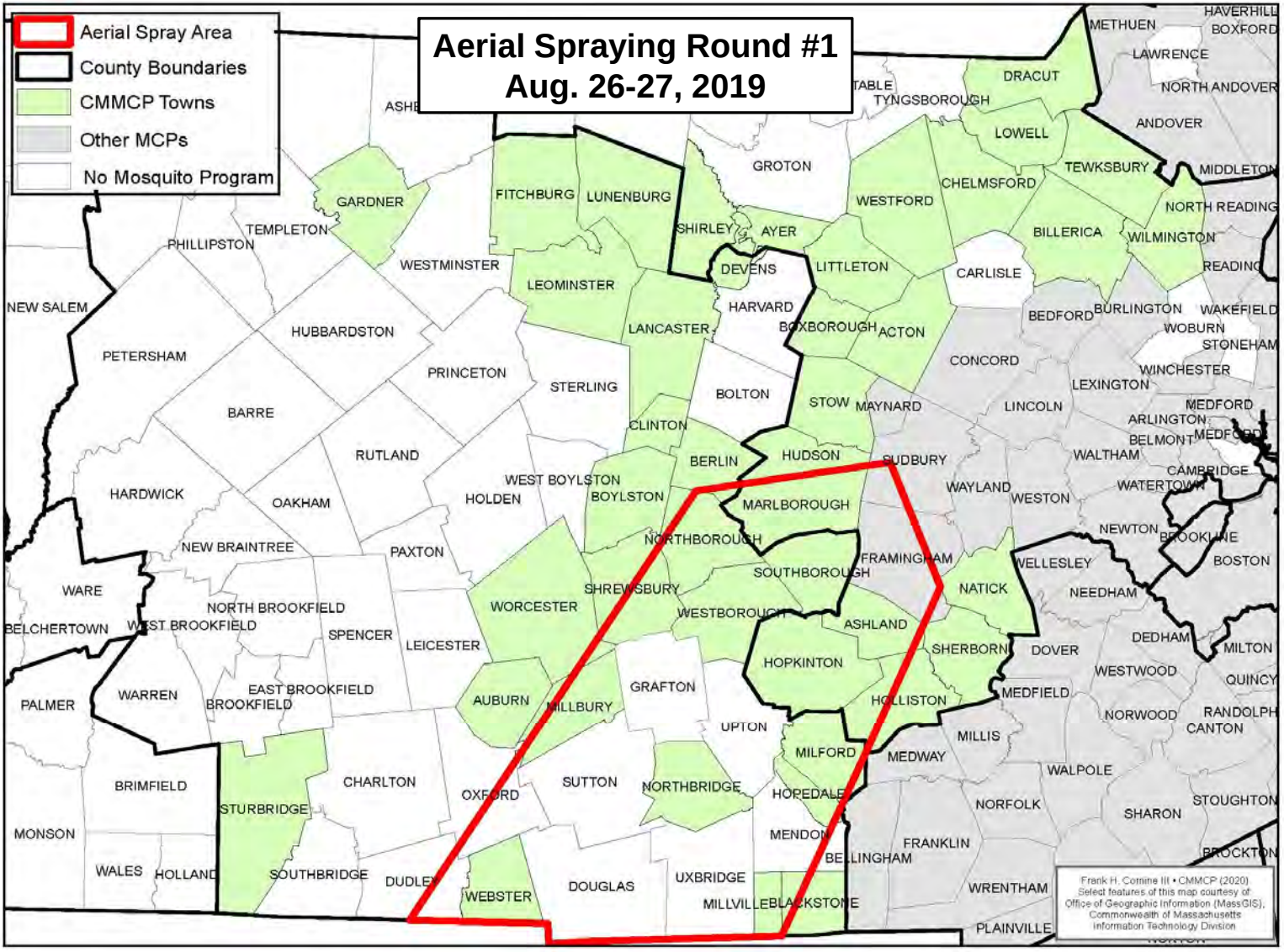
2010-2019 EEE - Nationwide



MA EEEV Surveillance Summary
2020

Mosquito Pools Positive	66
Horses Positive	0
Humans Positive	5


Massachusetts EEE Risk Categories
Current EEE Risk Level
Remote
Low
Moderate
High
Critical
Final Risk Levels - 2020


Aerial Spray Area
County Boundaries
CMMCP Towns
Other MCPs
No Mosquito Program
Aerial Spraying Round #1
Aug. 26-27, 2019
METHUEN
HAVERHILL
BOXFORD
LAWRENCE
NORTH ANDOVER
ANDOVER
DRACUT
TYNGSBOROUGH
LOWELL
TEWKSBURY
MIDDLETON
CHELMSFORD
WESTFORD
NORTH READING
BILLERICA
WILMINGTON
READING
CARLISLE
GROTON
FITCHBURG
LUNENBURG
GARDNER
TEMPLETON
PHILLIPSTON
WESTMINSTER
SHIRLEY
AYER
DEVENS
LITTLETON
LEOMINSTER
HARVARD
BOXBOROUGH
ACTON
LANCASTER
BEDFORD
BURLINGTON
WAKEFIELD
WOBURN
STONEHAM
NEW SALEM
HUBBARDSTON
PETERSHAM
PRINCETON
STERLING
CONCORD
WINCHESTER
LEXINGTON
BOLTON
STOW
MAYNARD
LINCOLN
MEDFORD
ARLINGTON
BELMONT
BARRE
CLINTON
RUTLAND
BERLIN
HUDSON
SUDBURY
WALTHAM
CAMBRIDGE
WATERTOWN
WAYLAND
WESTON
HARDWICK
OAKHAM
WEST BOYLSTON
BOYLSTON
HOLDEN
MARLBOROUGH
NEWTON
BROOKLINE
NEW BRAINTREE
PAXTON
NORTHBOROUGH
FRAMINGHAM
SOUTHBOROUGH
WELLESLEY
BOSTON
WARE
SHREWSBURY
WORCESTER
NATICK
NEEDHAM
NORTH BROOKFIELD
BELCHERTOWN
WEST BROOKFIELD
SPENCER
LEICESTER
WESTBOROUGH
ASHLAND
DEDHAM
MILTON
SHERBORN
DOVER
HOPKINTON
WESTWOOD
QUINCY
PALMER
WARREN
EAST BROOKFIELD
BROOKFIELD
AUBURN
MILLBURY
GRAFTON
HOLLISTON
MEDFIELD
NORWOOD
RANDOLPH
CANTON
UPTON
MILLIS
MILFORD
MEDWAY
WALPOLE
BRIMFIELD
CHARLTON
OXFORD
SUTTON
NORTHBRIDGE
HOPEDALE
NORFOLK
STOUGHTON
SHARON
STURBRIDGE
MONSON
MENDON
FRANKLIN
BELLINGHAM
BROCKTON
WALES
HOLLAND
SOUTHBRIDGE
DUDLEY
WEBSTER
DOUGLAS
UXBRIDGE
WRENTHAM
MILLVILLE
BLACKSTONE
PLAINVILLE
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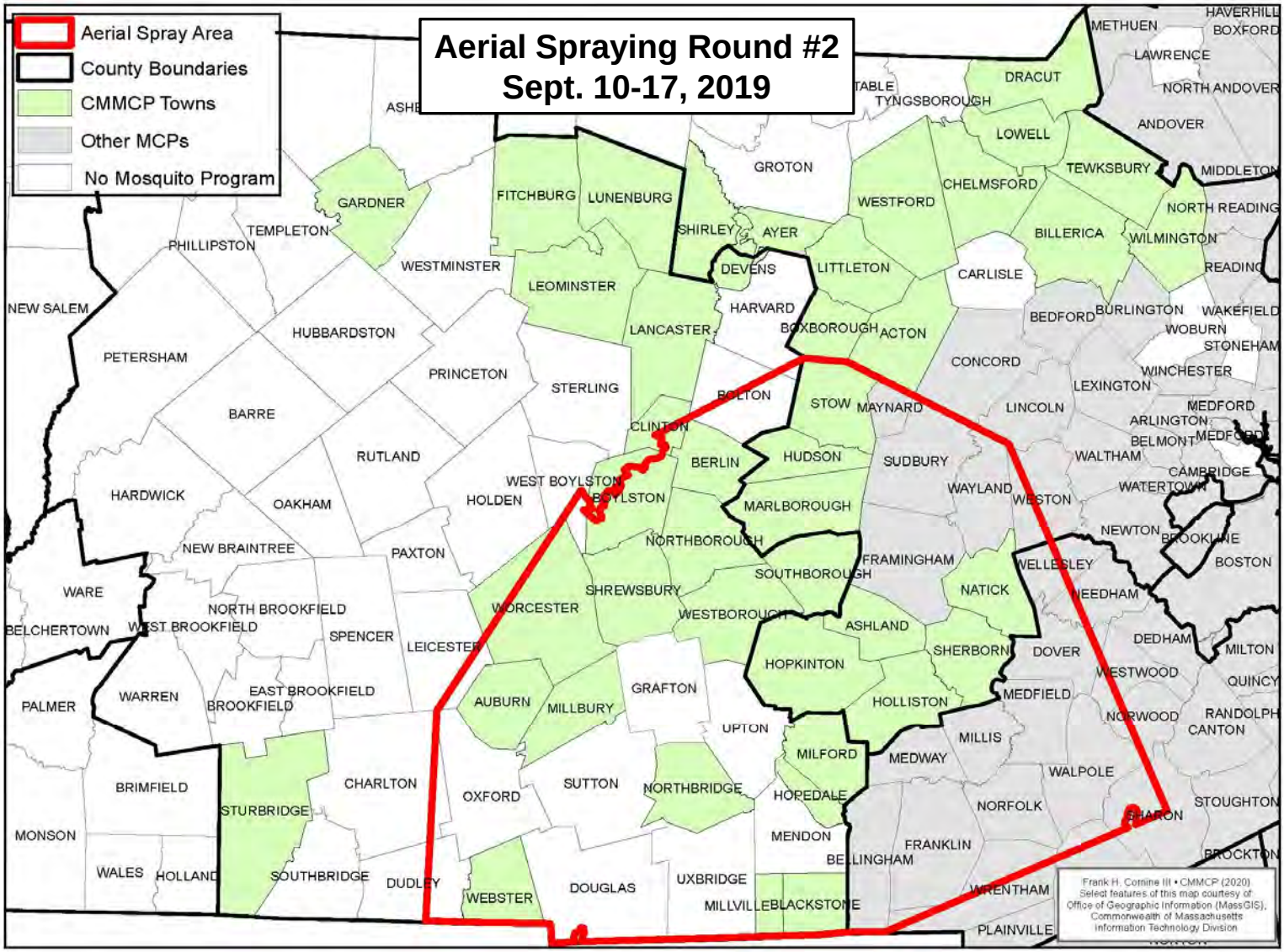
Information Technology Division


Aerial Spray Area
County Boundaries
CMMCP Towns
Other MCPs
No Mosquito Program
Aerial Spraying Round #2
Sept. 10-17, 2019
METHUEN
HAVERHILL
BOXFORD
LAWRENCE
NORTH ANDOVER
ANDOVER
DRACUT
TYNGSBOROUGH
LOWELL
TEWKSBURY
MIDDLETON
NORTH READING
WILMINGTON
READING
BILLERICA
CHELMSFORD
WESTFORD
GROTON
SHIRLEY
AYER
DEVENS
LITTLETON
CARLISLE
BEDFORD
BURLINGTON
WAKEFIELD
WOBURN
STONEHAM
WINCHESTER
LEXINGTON
MEDFORD
ARLINGTON
BELMONT
WALTHAM
CAMBRIDGE
WATERTOWN
BROOKLINE
BOSTON
NEWTON
WELLESLEY
NEEDHAM
DEDHAM
MILTON
WESTWOOD
QUINCY
RANDOLPH
CANTON
STOUGHTON
BROCKTON
WRENTHAM
PLAINVILLE
FRANKLIN
FOXBOROUGH
NORFOLK
WALPOLE
MEDWAY
MILLIS
MEDFIELD
NORWOOD
HOLLISTON
SHERBORN
DOVER
NATICK
FRAMINGHAM
SUDBURY
WAYLAND
WESTON
LINCOLN
CONCORD
ACTON
BOXBOROUGH
HARVARD
LANCASTER
BOLTON
STOW
MAYNARD
HUDSON
BERLIN
MARLBOROUGH
NORTHBOROUGH
SOUTHBOROUGH
WESTBOROUGH
ASHLAND
HOPKINTON
MILFORD
HOPEDALE
MENDON
BELLINGHAM
BLACKSTONE
MILLVILLE
UXBRIDGE
DOUGLAS
WEBSTER
DUDLEY
SOUTHBRIDGE
STURBRIDGE
CHARLTON
OXFORD
SUTTON
NORTHBRIDGE
UPTON
GRAFTON
MILLBURY
AUBURN
WORCESTER
SHREWSBURY
BOYLSTON
WEST BOYLSTON
HOLDEN
CLINTON
STERLING
PRINCETON
RUTLAND
BARRE
PETERSHAM
HUBBARDSTON
WESTMINSTER
LEOMINSTER
FITCHBURG
LUNENBURG
GARDNER
TEMPLETON
PHILLIPSTON
NEW SALEM
ORANGE
NEW BRAINTREE
HARDWICK
OAKHAM
PAXTON
LEICESTER
SPENCER
NORTH BROOKFIELD
WEST BROOKFIELD
EAST BROOKFIELD
BROOKFIELD
WARREN
PALMER
WARE
BELCHERTOWN
BRIMFIELD
MONSON
WALES
HOLLAND
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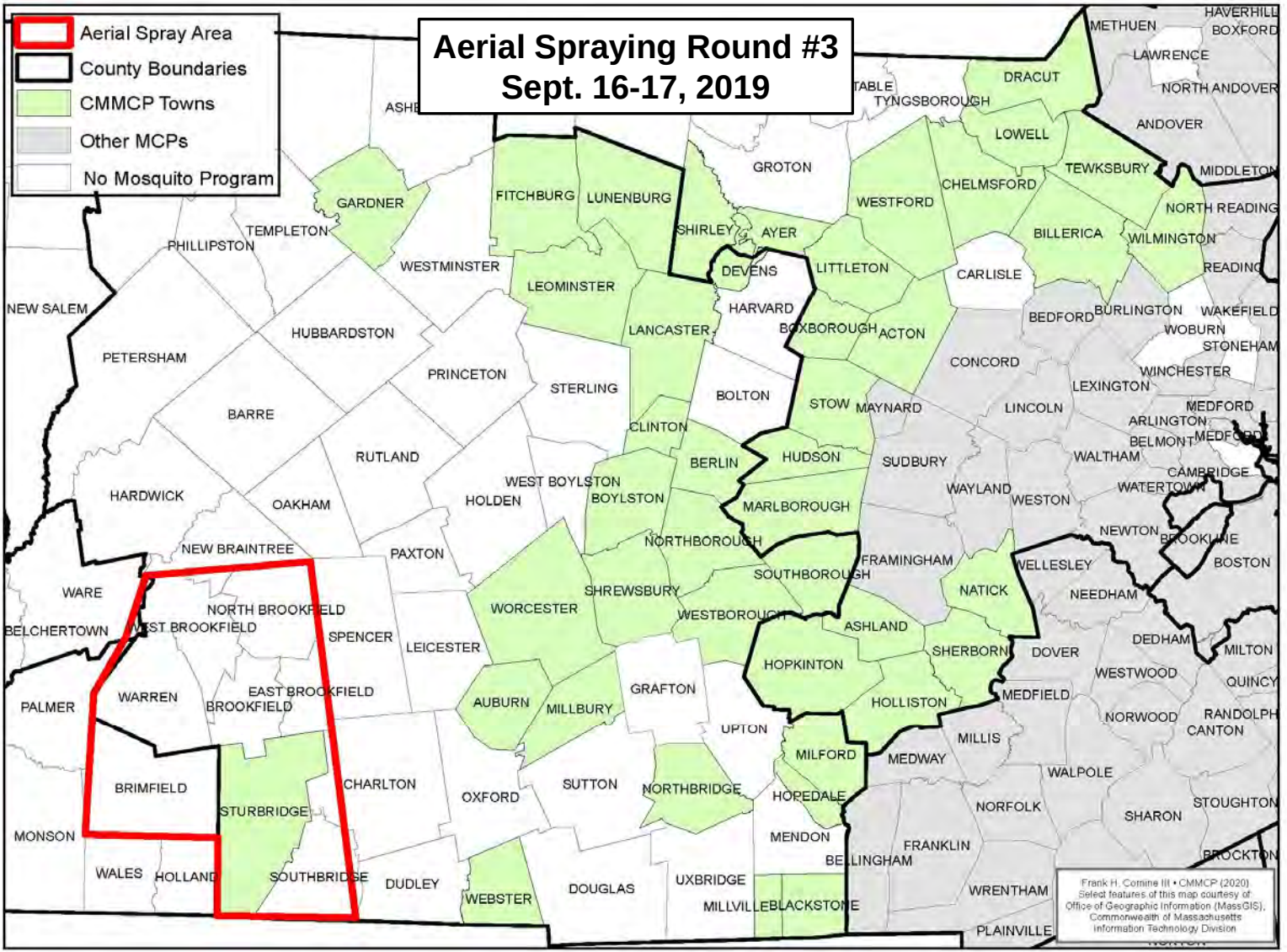
Information Technology Division


Aerial Spray Area
County Boundaries
CMMCP Towns
Other MCPs
No Mosquito Program
Aerial Spraying Round #3
Sept. 16-17, 2019
METHUEN
HAVERHILL
BOXFORD
LAWRENCE
NORTH ANDOVER
ANDOVER
DRACUT
TYNGSBOROUGH
LOWELL
TEWKSBURY
MIDDLETON
CHELMSFORD
WESTFORD
NORTH READING
BILLERICA
WILMINGTON
READING
CARLISLE
GROTON
SHIRLEY
AYER
DEVENS
LITTLETON
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WALTHAM
CAMBRIDGE
WATERTOWN
LINCOLN
MAYNARD
STOW
BOLTON
SUDBURY
WAYLAND
WESTON
NEWTON
BROOKLINE
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FRAMINGHAM
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WESTBOROUGH
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WARREN
PALMER
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WARE
NEW BRAINTREE
PAXTON
OAKHAM
HARDWICK
RUTLAND
BARRE
PETERSHAM
NEW SALEM
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UXBRIDGE
MILLVILLE
BLACKSTONE
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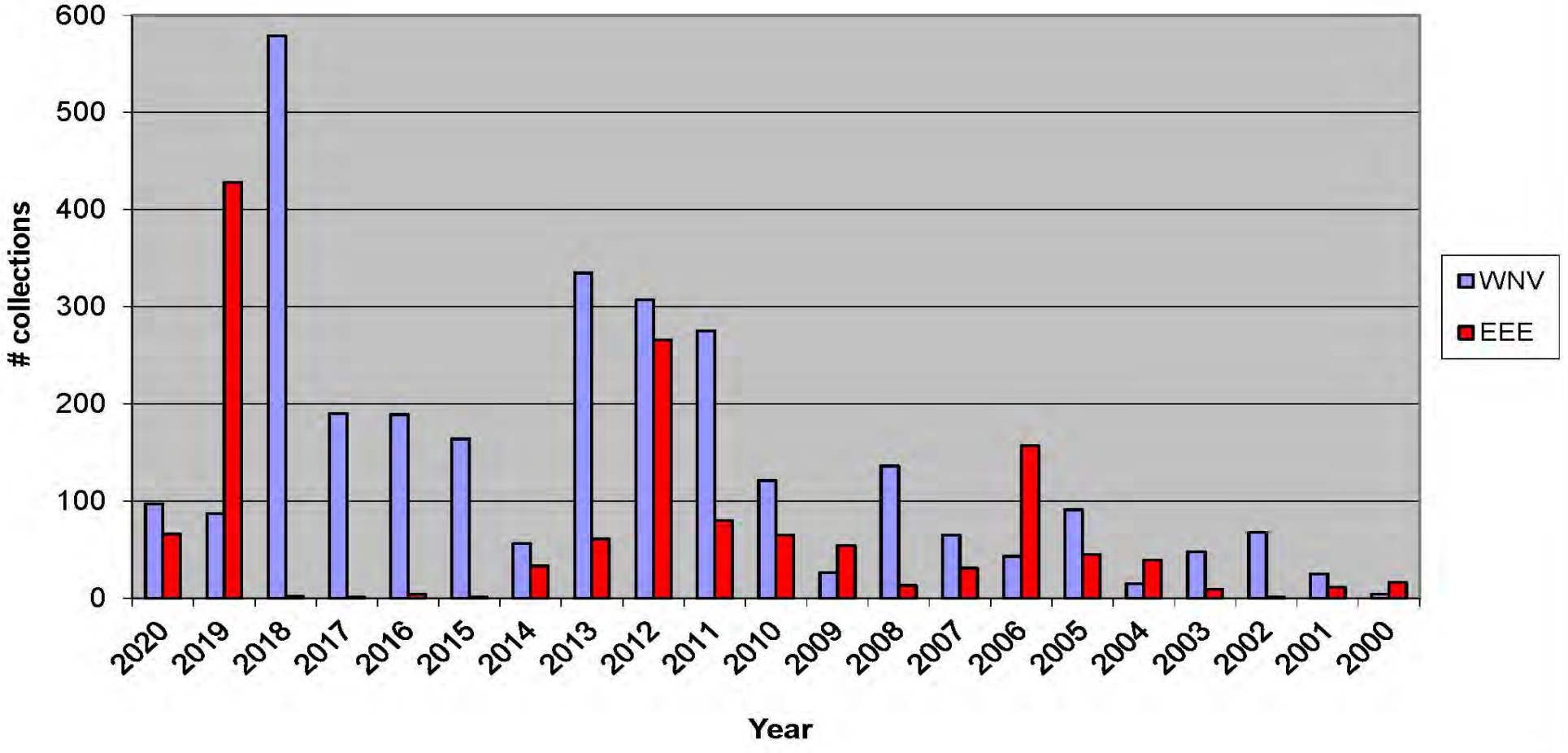
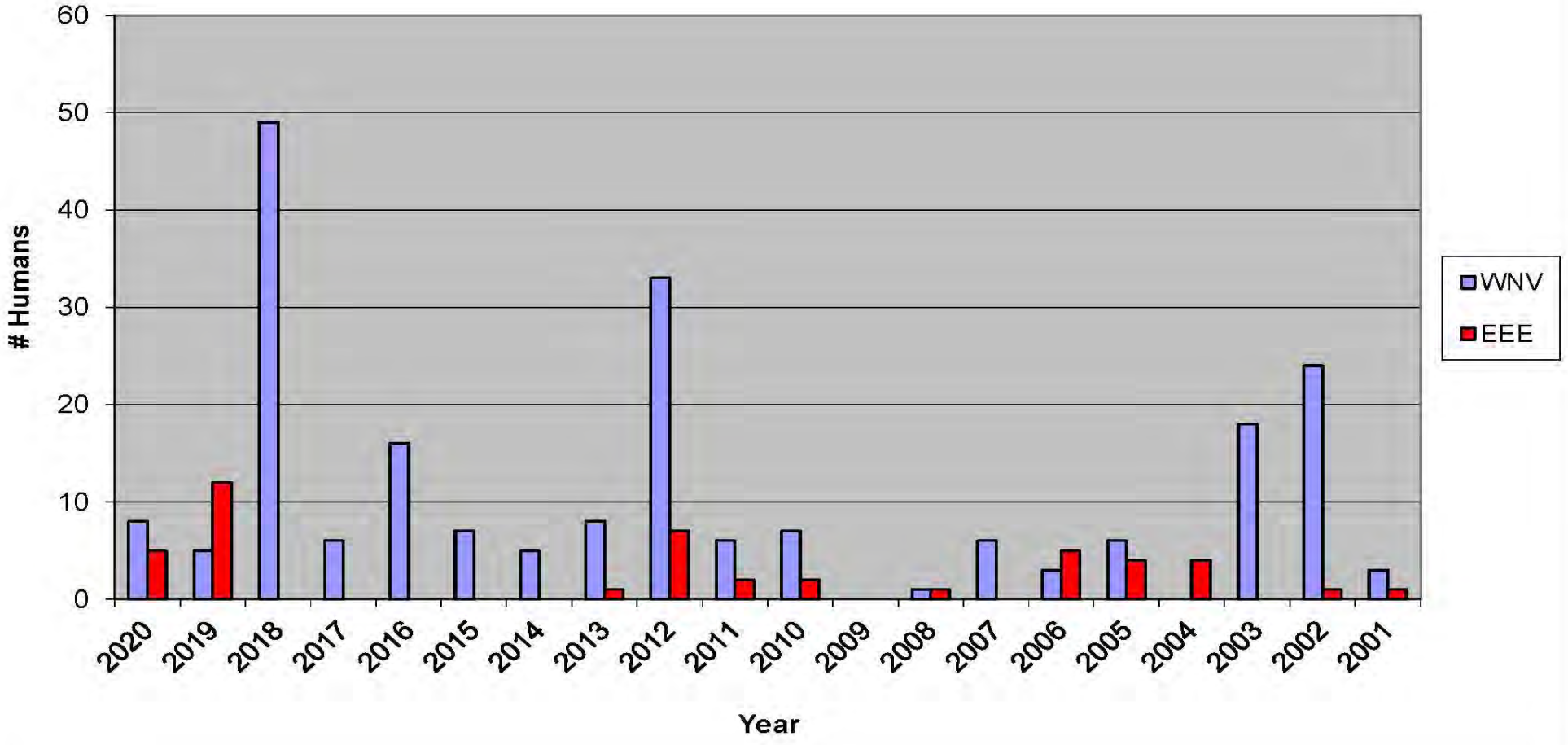
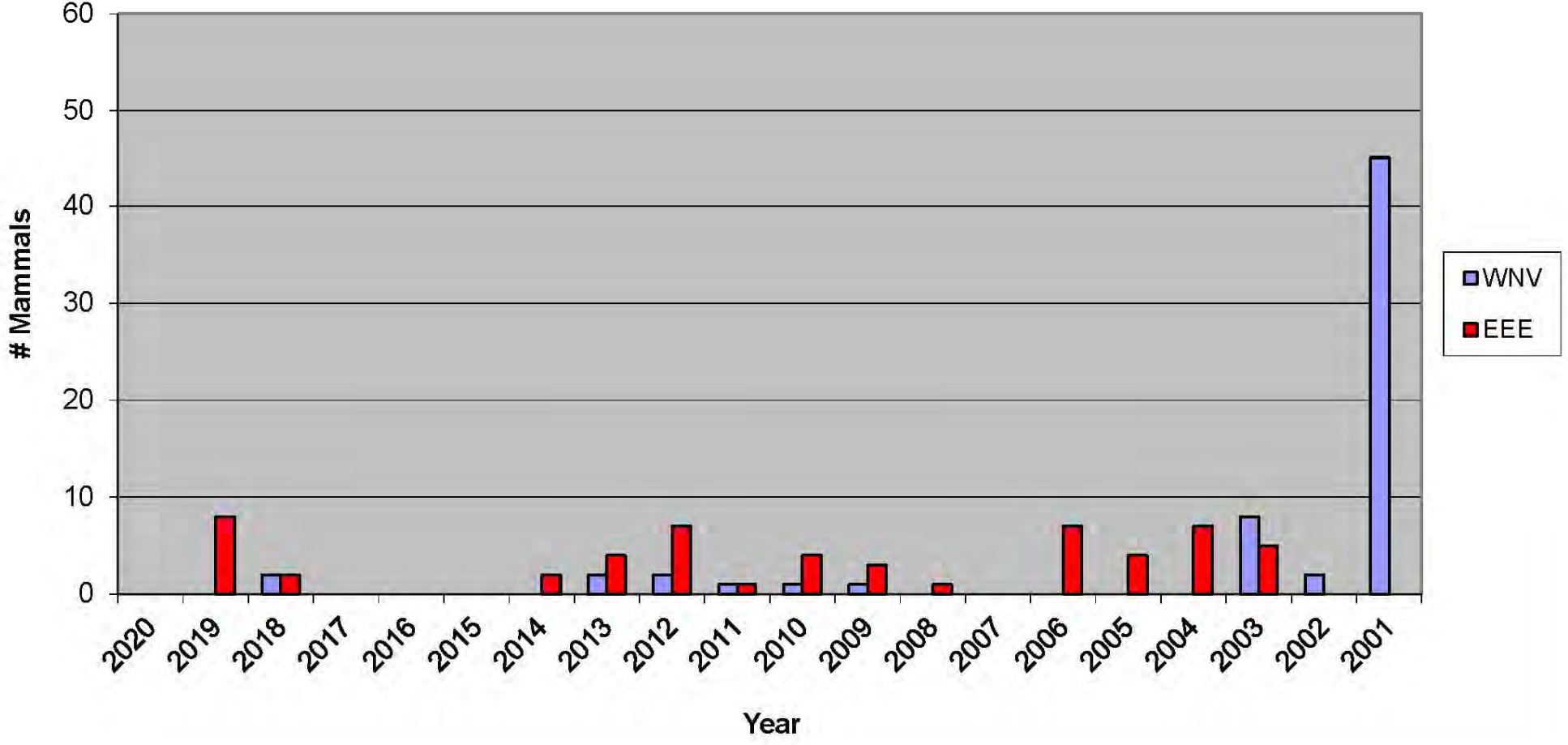
Statewide Mosquito Collections 2000-2020



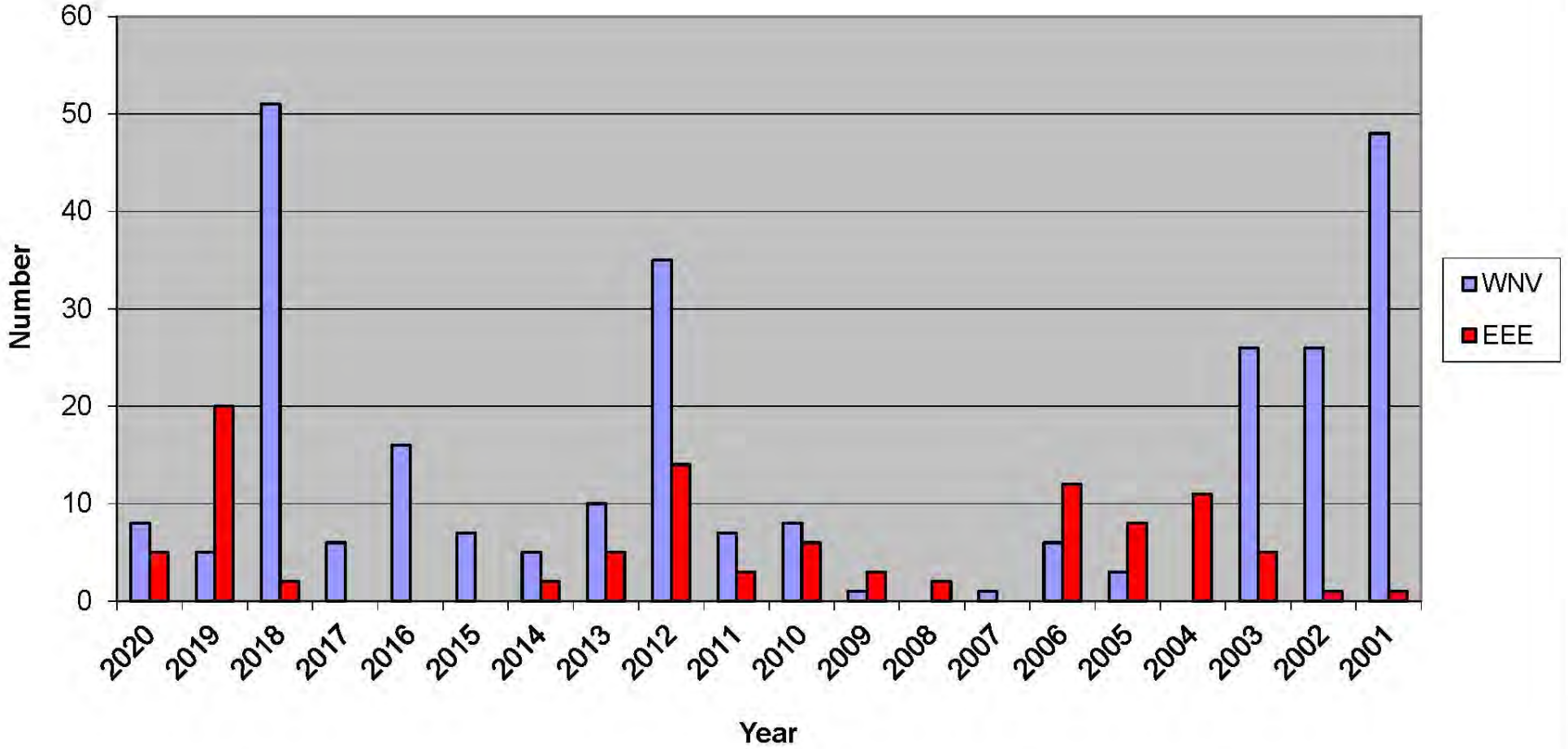
Statewide Human Cases 2000-2020



Statewide Mammal Cases 2001-2020



Mammal & Human Cases Statewide 2001 - 2020



PERSONAL PROTECTION MEASURES

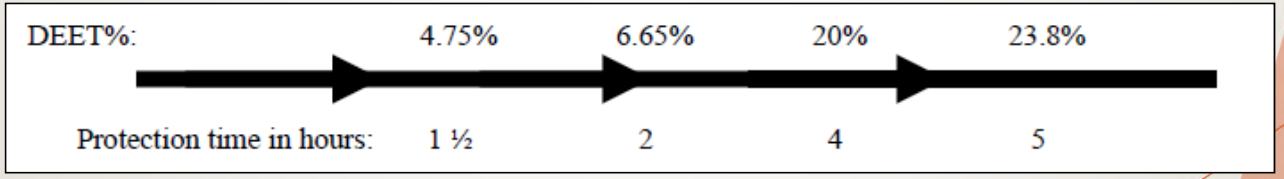
Repellents

- DEET
- Permethrin*
- Picaridin
- Oil of Lemon Eucalyptus (PMD)

*clothing only

DEET*

- The “Gold Standard” since 1946 (military use – 1957 civilian use)
- **READ THE LABEL** – under 30% recommended for children >2 months
- Not recommended for infants



*_N,N_-Diethyl-_m_-toluamide

Permethrin

- Contact insecticide
- Intended for use on clothing, bed nets, shoes, camping gear – **NOT ON SKIN**
- Follow label instructions
- Very effective against mosquitoes, ticks & other biting insects

READ THE LABEL

Picaridin & PMD

- Shorter effectiveness (comparable to low concentrations of DEET)
- Newer products, less data available
- Don’t use PMD (oil of lemon eucalyptus) on children under 3 years of age

READ THE LABEL

Natural Repellents

- Limited data available of effectiveness and toxicity
- Look for products with an EPA registration number
- Just because it's "natural" doesn't mean it works or is safer than alternatives

READ THE LABEL

Application of Repellents

- Don’t use repellents under clothing
- Don’t use on cuts or irritated skin
- Don’t use repellents near the mouth or eyes and use them sparingly around the ears. When using spray products, spray the product onto your hands first, and then apply it to your face.

Ticks

- Repellents
- Tick checks
- Increase sunlight & wind
- Remove underbrush & leaves
- Information on website:

http://www.cmmcp.org/tickcontrol.htm

CONTACT INFORMATION

Central Mass Mosquito Control Project

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(508) 393-3055

www.cmmcp.org

Timothy D. Deschamps

Executive Director

deschamps@cmmcp.org