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THE COMMONWEALTH OF MASSACHUSETTS
STATE RECLAMATION & MOSQUITO CONTROL BOARD

CENTRAL MASSACHUSETTS MOSQUITO CONTROL PROJECT

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Telephone (508) 393-3055 • Fax (508) 393-8492
www.cmmcp.org

ANNUAL REPORT 2008

PREFACE

The 2008 Annual Report of the Central Massachusetts Mosquito Control Project (the Project) has been prepared to provide the citizens and officials of the member cities and towns with information pertaining to the Project's control procedures and related activities.

As you read through this report you will notice that the Project is committed to an Integrated Pest Management (IPM) program. IPM utilizes a variety of control techniques and evaluation procedures. All control efforts are undertaken only after surveillance data has been collected and analyzed. This allows control decisions to be made based on the exact need that exists at each specific site. Environmental considerations are paramount when prescribing various control techniques.

The CMMCP Board of Commission is appointed by the State Reclamation and Mosquito Control Board to represent your community's interest. The Commissioners meet with the Executive Director and Director of Operations on a regular basis to discuss and formulate policies, and to provide their expertise in the operation of the Project. The Commissioners welcome your input, and we encourage you to schedule an appointment to visit our Project headquarters.

Copies of this report are distributed to key officials and departments in our member communities, as well as to the public libraries. We would encourage officials to take time from their busy schedule to read this report. Project personnel are available to answer questions you may have, and to meet with you to discuss out procedures and techniques. The Project's website at www.cmmcp.org has extensive information on mosquito control in Central Massachusetts.

The Project's goal is to provide effective and environmentally sound mosquito control, reducing mosquito annoyance and the potential for the transmission of mosquito-borne diseases. Our staff of competent, well-trained employees are known throughout the member communities as individuals who take great pride in their work.

Thank you,

Richard J. Day, Chair
Board of Commissioners
Central Massachusetts Mosquito Control Project

Member,
Northeastern
Mosquito Control
Association

Sustaining Member,
American
Mosquito Control
Association

Partner,
EPA Pesticide
Environmental
Stewardship Program

Member,
New Jersey
Mosquito Control
Association

THE COMMONWEALTH OF MASSACHUSETTS

State Reclamation & Mosquito Control Board
251 Causeway Street Suite 500
Boston, Massachusetts 02114

http://www.mass.gov/agr/mosquito/

State Reclamation Board - Members

Mr. Mark Buffone (DAR) - Chair

Ms. Anne Monnelly (DCR)

Mr. Gary Gonyea (DEP)

Ms. Alisha Bouchard - Projects Administrator

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Leominster, Massachusetts

Mr. Pablo E. Noguera
Billerica, Massachusetts

Mr. Paul Mazzuchelli
Milford, Massachusetts

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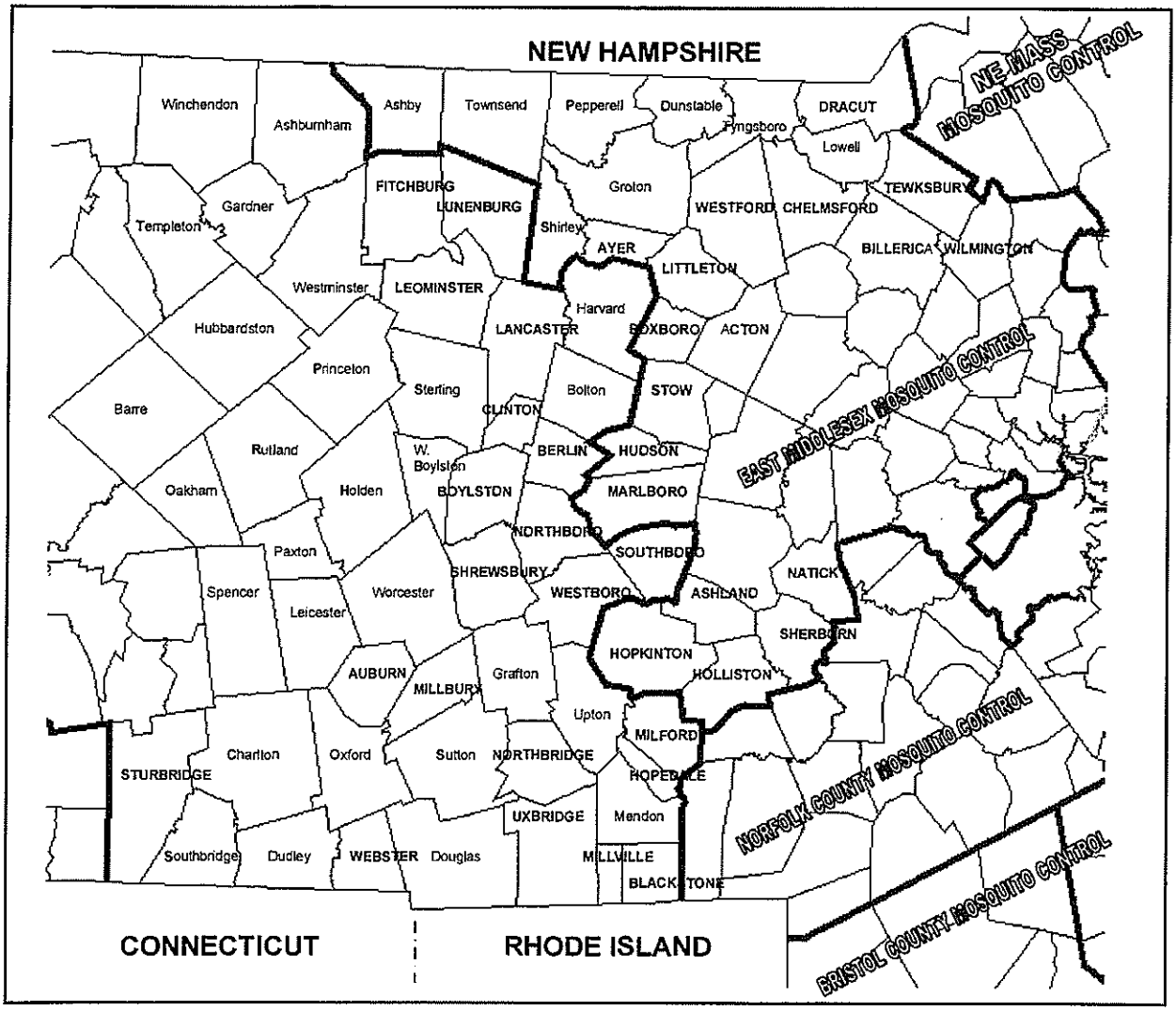
LIST OF MEMBER COMMUNITIES - 2008

TOWN	SQUARE MILES
DISTRICT ONE	
BILLERICA	25.96
CHELMSFORD	22.70
DRACUT	20.90
LITTLETON	16.60
TEWKSBURY	20.70
WESTFORD	30.60
WILMINGTON	17.12
DISTRICT TWO	
ACTON	20.00
AYER	9.00
BOXBOROUGH	10.40
FITCHBURG	27.80
LANCASTER	27.70
LEOMINSTER	28.90
LUNENBURG	26.40
STOW	17.60
DISTRICT THREE	
BERLIN	12.90
*BOYLSTON	16.00
CLINTON	5.70
HUDSON	11.50
MARLBOROUGH	21.10
NORTHBOROUGH	18.50
SHREWSBURY	20.70
SOUTHBOROUGH	14.10
DISTRICT FOUR	
ASHLAND	12.40
HOLLISTON	18.70
HOPEDALE	5.27
HOPKINTON	26.60
MILFORD	14.60
NATICK	15.10
SHERBORN	16.00
WESTBOROUGH	20.50
DISTRICT FIVE	
AUBURN	15.40
BLACKSTONE	10.90
MILLBURY	15.70
MILLVILLE	4.92
NORTHBRIDGE	17.20
STURBRIDGE	37.40
UXBRIDGE	29.50
WEBSTER	12.50
Total Square Miles	715.57

*Membership dropped July 1, 2008

CMMCP SERVICE AREA



≈ 2008 ≈

= member towns

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*Note: Boylston dropped out effective July 1, 2008

MOSQUITO CONTROL ACTIVITIES

One basic fact of the mosquito's biology is the dependence on still, stagnant water to complete its life cycle from egg to adult. Currently, there are two basic control methods practiced by the Project to disrupt this process. The first and most permanent method is called "*water management, source reduction or wetlands restoration*". This method reduces or eliminates the source of a potential mosquito problem, and consists of cleaning road-side ditches and culverts, removal of brush and accumulated debris from streams, and removal of containers which contain water. All of the above mentioned methods serve to accomplish the same goal - they permit water to flow freely, and reduce the likelihood for stagnant areas, areas in which the mosquito needs to reproduce. Source reduction is practiced year-round, and is done only after extensive examinations, and permission is received by the property owner(s).

There are places where water management is neither practical nor feasible for one reason or another. In these situations, we practice a method called *larviciding*. After a field technician has determined that larval mosquitoes are present, a small amount of environmentally sensitive product is applied to the area according to label directions. This is often a very effective control method, reducing the emergence of the adult mosquito from that area. Larviciding is practiced from late-March to September. Bti is the product of choice for larviciding in wetlands.

A third method is to attempt to control the adult mosquito. The control of adult mosquitoes is done on a *request-only* basis, and the presence of adult mosquitoes is confirmed before any application is done. Adulticiding can be an effective method of *temporary* control, which can be beneficial prior to public gatherings, outdoor events and festivals, or when mosquito populations have been determined to be intolerable. Since this part of the program is done only upon **request**, this allows the individual resident to have the ultimate discretion on mosquito spraying in their area - how much or how little. Exemptions for spraying are handled through the City/Town Clerk and the Project office, and are updated each year. Adulticiding is done from approximately Memorial Day to Labor Day, depending on prevalent mosquito populations and the mosquito-borne disease situation.

All products used by the Project have been extensively tested by manufacturers, the US government and mosquito control agencies for many years. They are registered by the EPA and the Mass. Pesticide Bureau. Labels and fact sheets are available upon request to the public from the Project's office, or from our website.

We operate a full surveillance program in our service area. The landing rates performed by our field staff are brought back to the Project lab to be keyed out to species, allowing us to tailor our larviciding program and reduce future dependence on adulticides. We have a mobile team of specialized mosquito traps, called *gravid traps*, designed to capture virus-bearing mosquitoes. These mosquito collections, called *pools*, are sent into the Mass. Dept. of Public Health (MDPH) laboratory in Jamaica Plain for testing of West Nile Virus, Eastern Equine Encephalitis, and other arboviruses of concern by MDPH. These traps are used in a rotation throughout our service area, and are then concentrated in areas showing arboviral activity to supplement MDPH's collection protocols. Additional trap types are utilized in suspect areas to monitor and evaluate the risk of viral transmission to the local populace.

A comprehensive educational program is offered to area schools and civic groups. The program is aimed towards mosquito biology, mosquito habitat, and efforts citizens can undertake to reduce the potential for mosquito populations in their own neighborhood. This program is tailored to suit the requirements of the individual group, from elementary school children, to high school, to adult groups.

PROGRAM EVALUATION

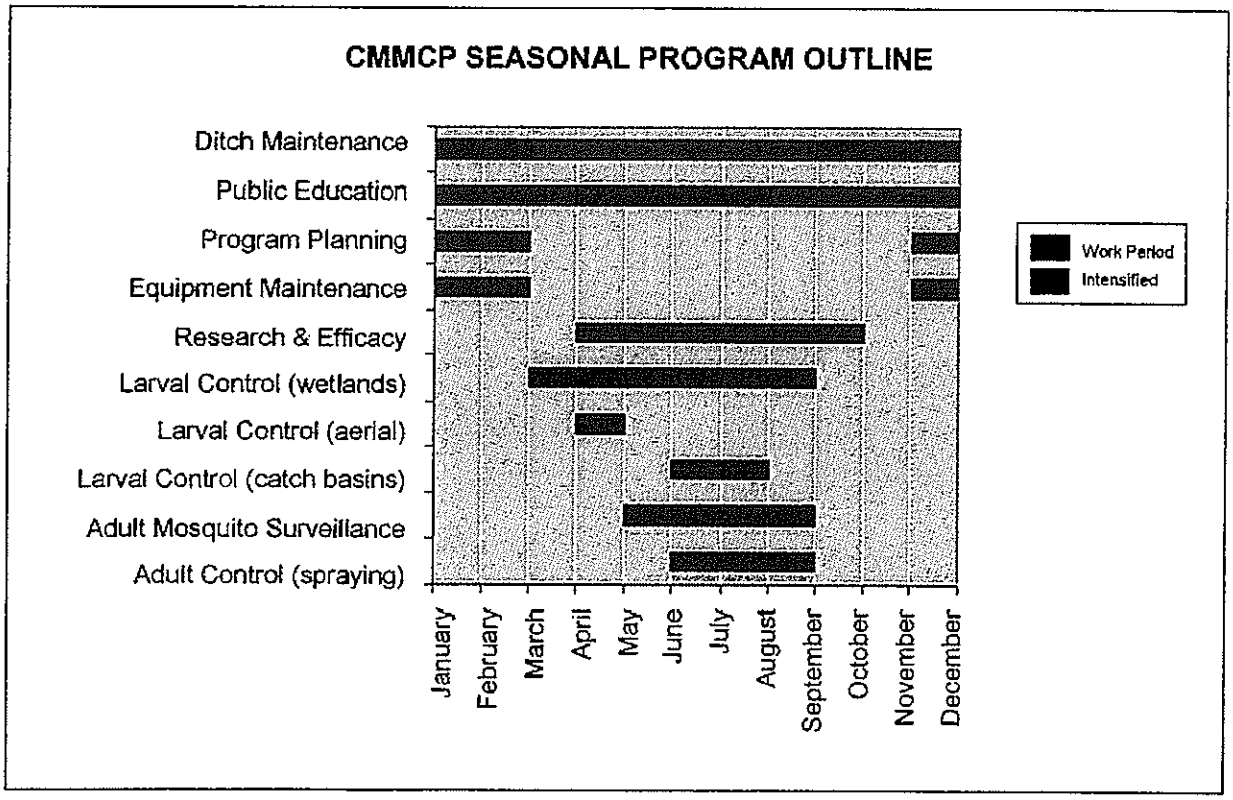
This is a part of the program which many people involved directly never see. It must begin with a carefully planned program, one designed so that the data obtained during surveys before treatment and the surveys taken after treatment can be analyzed by statistically sound methods. Only by doing this can the value of a mosquito control program be determined. We will then know what type (species) of mosquito we are dealing with; what the population density is; what method(s) of control provide the most economical and efficient results.

Then and only then can we say that we have or have not affected mosquito control on a level that is acceptable to the community.

SEASONAL OUTLINE OF MOSQUITO CONTROL PROGRAM

1. Vehicle and equipment repair and storage - November through March
2. Wetlands Restoration - throughout the year
3. Program Preparation - December through March
4. Map compilation and training - throughout the year
5. Larviciding - May through September
6. Adulticiding - June through September
7. Catch Basin Treatment - May through September

Any mosquito control being done by individual member communities must, by law, be coordinated through the Central Massachusetts Mosquito Control Project.



SERVICES AND ACTIVITIES

The following services and activities are available to those communities participating in the Central Massachusetts Mosquito Control Project:

ADMINISTRATIVE

1. Assess the need for mosquito control within each of the member communities.

2. Plan and organize a mosquito control program for each member community based on the specific needs of that community.

3. Assist member communities to implement mosquito control programs so as to enable the residents of that community to receive maximum benefits from organized mosquito control.

4. Administer new and coordinate existing mosquito control programs.

5. Collect and maintain accurate records of mosquito populations, ascertain prevalent species, and collate pertinent data for each member community.

6. Cooperate with federal, state and local agencies concerned with vector control programs which may be implemented in the community.

7. Prepare annual reports of Project activities, mosquito population density profiles, recommendations, and any other data requested by the member communities.

8. Provide supervision to staff members and encourage policies which lend themselves to effective and efficient mosquito control.

PUBLIC EDUCATION

1. Inform the general public, as well as professional groups, of the mosquito control activities intended for each member community through news releases, speakers for community and professional organizations, special educational and training programs (including seminars for environmental interest groups), integration of proposed vector control programs with other organizations, agencies and institutions with similar goals.

2. Offer educational programs to the public school system within the member cities and towns. Programs will be aimed toward mosquito biology, mosquito habitat, and efforts which citizens can undertake to reduce mosquito populations in their neighborhoods.

3. Keep the member communities informed of changes and advancements in mosquito control technology and legislation.

MEDICAL ENTOMOLOGY LABORATORY REPORT, 2008

The mission of the Medical Entomology Laboratory is to refine and maximize the CMMCP's ongoing effort to control mosquitoes. During 2008 Medical Entomology Laboratory personnel carried this mission forward in the following ways.

During the spring of the year the aerial larviciding practices of the Central Massachusetts Mosquito Control Project were evaluated for efficacy. The method and material used for this effort were found to be an efficient and effective way to control immature mosquitoes.

Medical Entomology Laboratory personnel made 61 educational presentations before 2,952 elementary school students in 12 Elementary schools and 25 members of a youth group. The students learned about the life cycle and biology of mosquitoes. They also learned what they could do to control the mosquito population around their own home and how to protect themselves from nuisance mosquitoes.

The Medical Entomology Laboratory's physical capabilities were improved during 2008 by the acquisition of a - 80 Degree Centigrade freezer. Mosquitoes collected throughout the Project area were stored in the freezer. The extremely cold temperature preserves any virus particles that may be present in the tissue of the mosquitoes. The opportunity to detect a mosquito borne virus during testing is enhanced when the tissue is better preserved.

The laboratory also acquired five additional Modified Reiter Gravid Traps. Modified Reiter Gravid Traps are used to monitor the adult mosquito population for West Nile virus. Modified Reiter Gravid Traps are attractive to the mosquito species thought most likely to have a role in the maintenance and spread of West Nile virus in the United States of America.

CMMCP personnel constructed Resting Boxes to add to the Laboratory's array of mosquito traps. Resting boxes are attractive to *Culiseta melanura* the mosquito species known to play a part in the transmission cycle of Eastern Equine encephalitis. A Resting Box is made from plywood and measures one cubic foot in size. One side of the box is open. The box is painted black on the outside and red on the inside. The black color is attractive to mosquitoes that come to rest inside the box. The red colored interior of the box makes it easier for the collector to see the mosquitoes resting inside the box. One or more boxes are set out in a habitat favored by *Cs. melanura* mosquitoes. When the time comes to check the trap the collector first closes the open end of the box with a Plexiglas cover. Then the collector injects a chemical spray into the box which anesthetizes any adult mosquitoes which have come to rest in the box. The collector vacuums up the adult mosquitoes with a battery operated aspirator and places them in a cooler with cold packs. The mosquitoes are brought back to the laboratory for processing.

During 2008, three interns were employed for part of the season to operate the mosquito surveillance traps. CMMCP staff also participated in the operation of surveillance traps. Using their knowledge of mosquito behavior and the local terrain, these skilled and experienced personnel monitored the adult mosquito population.

CMMCP personnel made and processed 8,617 collections this season. The collections contained 45,162 adult mosquitoes which were identified to species. Thirty-five mosquito species were represented in the collections. Adult mosquitoes of species known to play a role in the transmission of disease were tested for the presence of West Nile virus and Eastern Equine Encephalitis virus. Seventeen thousand four hundred and twenty-eight mosquitoes were determined to be suitable for virus testing. They were divided into 854 groups or pools. These groups or pools of mosquitoes were tested for West Nile and Eastern Equine virus infection. Ten of these pools tested positive for West Nile virus. The findings are listed below.

The CMMCP increased surveillance of mosquitoes in these areas in response to the positive test results. Mosquito control measures were augmented as well. The data from these collections was shared with the Massachusetts Department of Public Health.The surveillance indicates that these pathogens were circulating in the local environment during 2008.

Trap Set Date	Collection Date	Species	Town	Test Type	Result
6/30/2008	7/1/2008	*Culex pipiens/restuans complex*	Millbury	West Nile virus	Positive
8/12/2008	8/13/2008	*Culex pipiens/restuans complex*	Clinton	West Nile virus	Positive
9/3/2008	9/4/2008	*Culex pipiens/restuans complex*	Shrewsbury	West Nile virus	Positive
9/3/2008	9/4/2008	*Culex pipiens/restuans complex*	Auburn	West Nile virus	Positive
9/9/2008	9/10/2008	*Culex pipiens/restuans complex*	Berlin	West Nile virus	Positive
9/9/2008	9/10/2008	*Culiseta melanura*	Berlin	West Nile virus	Positive
9/11/09	9/12/09	*Culex pipiens/restuans complex*	Hopkinton	West Nile virus	Positive
9/17/2008	9/18/2008	*Culex pipiens/restuans complex*	Auburn	West Nile virus	Positive
9/17/2008	9/18/2008	*Culex pipiens/restuans complex*	Auburn	West Nile virus	Positive
9/18/2008	9/19/2008	*Culex pipiens/restuans complex*	Hudson	West Nile virus	Positive

WNV Surveillance Summary – Statewide	2008
Dead Birds Reported	2517
Birds Tested	142
Birds Positive	63
Mosquito Pools Positive	135
Horses Positive	0
Humans Positive	0
EEE Surveillance Summary - Statewide	2008
Mosquito Pools Positive	13
Horses Positive	1
Humans Positive	1
CMMCP Surveillance Summary	2008
Mosquitoes Collected and Identified	45,162
Mosquito Pools Submitted for testing	854 (17,428 specimens)
Mosquito Pools Positive WNV	10
Horses Positive	0
Humans Positive	0
Mosquito Pools Positive EEE	0
Horses Positive	0
Humans Positive	0

During 2008, Medical Entomology Laboratory personnel participated in a research project with Dr. Theodore Andreadis, Chief Medical Entomologist, Department of Soil and Water, Connecticut Agricultural Experiment Station in New Haven, Connecticut.
CMMCP personnel placed Resting Box traps throughout the Project territory. The traps were checked on a regular basis throughout the season. The captured mosquitoes were treated as described above. In the laboratory the mosquitoes were sexed and identified to species. Females of the species *Culiseta melanura* were examined for the presence of a blood meal in their gut. A specimen that proved positive for the presence of a blood meal was placed in a test tube. The tube was sealed and placed in the - 80 degree freezer. At the end of the collecting season the tubes were sent to Dr. Andreadis at the Connecticut Agricultural Experiment Station. During 2008, the CMMCP contributed 32 blooded female *Culiseta melanura* to the research project being undertaken by Dr. Andreadis. Dr. Andreadis will assay each blood meal to determine its origin. The results will tell what hosts *Cs. melanura* feeds upon and when. Such information will provide an insight into the blood feeding preferences of female *Cs. melanura*. It will lead to a better understanding of how mosquitoes move viruses like West Nile and Eastern Equine Encephalitis from birds to mammals and humans. It will further the study of mosquito borne disease.

Modern, scientifically based mosquito control has many facets. These include public education, surveillance, water management and control of immature and adult mosquitoes. Medical Entomology Laboratory personnel are committed to advancing all facets of mosquito control. Such a commitment will further enable the Central Massachusetts Mosquito Control Project to provide its member communities with quality mosquito control.

Respectfully submitted,
Curtis R. Best, Staff Entomologist

Central Mass. Mosquito Control Project
2008 SEASON SUMMARY

Cumulative Surveillance Summary

Target Species	*Ae. vex*	*Cq. per*	*Cs. mel*	*Oc. can*	*Culex*	All Species
No. Pools	221	441	282	230	719	3660
Total Specimens	2774	15630	1613	1602	12269	40183
No. Pools WNV +	0	0	1*	0	9*	10*
No. Pools EEE +	0	0	0	0	0	0

*Pool of WNV+ *Culex pipiens/restuans* collected in Millbury on 7/1/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Clinton on 8/13/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Auburn on 9/4/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Shrewsbury on 9/4/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Berlin on 9/10/08
*Pool of WNV+ *Culiseta melanura* collected in Berlin on 9/10/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Hopkinton on 9/12/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Auburn on 9/18/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Auburn on 9/18/08
*Pool of WNV+ *Culex pipiens/restuans* collected in Hudson on 9/19/08

Cumulative Surveillance Summary - Bird/Mammal/Other

Species	Date	Town	County	Virus
Crow	8/5/08	Natick	Middlesex	WNV
Blue Jay	8/6/08	Dracut	Middlesex	WNV
Crow	8/13/08	Auburn	Worcester	WNV
Crow	9/8/08	Chelmsford	Middlesex	WNV
Crow	9/11/08	Tewksbury	Middlesex	WNV
Crow	9/15/08	Blackstone	Worcester	WNV

Weather Summary (Northborough, MA): This mosquito season was remarkably wet, showing a complete turnaround from the previous year's drought like conditions. Monthly rain totals were as follows (CMMCP totals): May, 2.18" (1.98"); June, 4.24" (3.61"); July, 6.72" (6.72"); August 4.08" (3.04"); September, 8.27" (7.92"). NOTE: June and July saw varying rainfall total statewide, some higher than the listed amounts.

CMMCP Mosquito Summary-

Target Species	• From Last Year's Final Totals	Predominant Trap Sites
Aedes vexans	+723.2%	Westborough, Dracut
Coquillettidia perturbans	-21.95%	Westborough, Boxborough, Stow
Culiseta melanura	+33.97%	Holliston, Boxborough
Ochlerotatus canadensis	+46.57%	Chelmsford, Millbury
Culex Species	+56.33%	Hopedale, Clinton, Stow
All Species	+16.10%	Westborough, Stow, Dracut, Boxborough

The predominant mosquito species for the 2008 surveillance season was *Coquillettidia perturbans* with approximately 39% of the total specimens collected. *Aedes vexans* populations spiked in may areas along with other floodwater species with the tremendous amounts of rain received, especially in September. *Culex spp.* populations were also higher than average, and we recorded a record number (8) of positive WNV in these species this year. 854 pools of mosquitoes comprising 17,433 mosquitoes were sent into Jamaica Plain for testing.

Requests for service, especially adulticiding, showed a 6.2% increase over 2007 with a total of 9,966 calls. All requests for service this year totaled 10,650.

Frank Cornine, Field Biologist
Tim Deschamps, Executive Director

ACTON SURVEILLANCE DATA

2008

#	Town	Pool ID	Trap Set Date	Number of Traps	Trap Site	Pool Size	Species	Test Type	Result
1	Acton	CM08NS-0118	6/4/2008	2	Concord Road - Woodlawn Cemetery	1	*Culex restuans*	N/S	
2	Acton	CM08NS-0216	6/11/2008	2	Concord Road - Woodlawn Cemetery	2	*Culex restuans*	N/S	
3	Acton	CM08NS-0217	6/11/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus triseriatus*	N/S	
4	Acton	CM08NS-0394	6/18/2008	2	Concord Road - Woodlawn Cemetery	3	*Culex pipiens/restuans complex*	N/S	
5	Acton	CM08NS-0395	6/18/2008	2	Concord Road - Woodlawn Cemetery	2	*Coquillettidia perturbans*	N/S	
6	Acton	CM08NS-0396	6/18/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus japonicus*	N/S	
7	Acton	CM08NS-0397	6/18/2008	2	Concord Road - Woodlawn Cemetery	2	*Ochlerotatus triseriatus*	N/S	
8	Acton	CM08NS-0456	6/18/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
9	Acton	CM08-0103	6/25/2008	2	Concord Road - Woodlawn Cemetery	9	*Culex pipiens/restuans complex*	WNV & EEE	Negative
10	Acton	CM08NS-0614	6/25/2008	2	Concord Road - Woodlawn Cemetery	2	*Coquillettidia perturbans*	N/S	
11	Acton	CM08NS-0615	6/25/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus excrucians*	N/S	
12	Acton	CM08NS-0616	6/25/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus triseriatus*	N/S	
13	Acton	CM08NS-0617	6/25/2008	2	Concord Road - Woodlawn Cemetery	3	*Ochlerotatus japonicus*	N/S	
14	Acton	CM08NS-0825	6/25/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
15	Acton	CM08NS-0859	7/2/2008	2	Concord Road - Woodlawn Cemetery	3	*Coquillettidia perturbans*	N/S	
16	Acton	CM08NS-0860	7/2/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus triseriatus*	N/S	
17	Acton	CM08NS-0861	7/2/2008	2	Concord Road - Woodlawn Cemetery	1	*Culex pipiens/restuans complex*	N/S	
18	Acton	CM08-0169	7/9/2008	2	Concord Road - Woodlawn Cemetery	20	*Culex pipiens/restuans complex*	WNV & EEE	Negative
19	Acton	CM08NS-0914	7/9/2008	2	Concord Road - Woodlawn Cemetery	69	*Coquillettidia perturbans*	N/S	
20	Acton	CM08NS-0915	7/9/2008	2	Concord Road - Woodlawn Cemetery	2	*Anopheles punctipennis*	N/S	
21	Acton	CM08NS-0916	7/9/2008	2	Concord Road - Woodlawn Cemetery	1	*Aedes vexans*	N/S	
22	Acton	CM08NS-0920	7/9/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
23	Acton	CM08NS-1115	7/15/2008	3	Concord Road - Woodlawn Cemetery	3	*Culex pipiens/restuans complex*	N/S	
24	Acton	CM08NS-1116	7/15/2008	3	Concord Road - Woodlawn Cemetery	7	*Coquillettidia perturbans*	N/S	
25	Acton	CM08NS-1117	7/15/2008	3	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus japonicus*	N/S	
26	Acton	CM08NS-1118	7/15/2008	3	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus triseriatus*	N/S	
27	Acton	CM08NS-1204	7/23/2008	3	Concord Road - Woodlawn Cemetery	1	*Culex pipiens/restuans complex*	N/S	
28	Acton	CM08NS-1205	7/23/2008	3	Concord Road - Woodlawn Cemetery	7	*Coquillettidia perturbans*	N/S	
29	Acton	CM08NS-1206	7/23/2008	3	Concord Road - Woodlawn Cemetery	4	*Ochlerotatus japonicus*	N/S	
30	Acton	CM08NS-1207	7/23/2008	3	Concord Road - Woodlawn Cemetery	4	*Ochlerotatus triseriatus*	N/S	
31	Acton	CM08-0308	7/30/2008	3	Concord Road - Woodlawn Cemetery	7	*Culex pipiens/restuans complex*	WNV & EEE	Negative
32	Acton	CM08BM-0013	7/30/2008	1	Concord Road - Woodlawn Cemetery	1	*Culiseta melanura*	N/S	
33	Acton	CM08NS-1454	7/30/2008	3	Concord Road - Woodlawn Cemetery	2	*Anopheles punctipennis*	N/S	
34	Acton	CM08NS-1455	7/30/2008	3	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus trivittatus*	N/S	
35	Acton	CM08NS-1456	7/30/2008	3	Concord Road - Woodlawn Cemetery	31	*Coquillettidia perturbans*	N/S	
36	Acton	CM08NS-1457	7/30/2008	3	Concord Road - Woodlawn Cemetery	6	*Ochlerotatus triseriatus*	N/S	
37	Acton	CM08NS-1459	7/30/2008	1	Concord Road - Woodlawn Cemetery	2	*Anopheles quadrimaculatus sl*	N/S	
38	Acton	CM08NS-1460	7/30/2008	1	Concord Road - Woodlawn Cemetery	1	*Coquillettidia perturbans*	N/S	
39	Acton	CM08NS-1461	7/30/2008	1	Concord Road - Woodlawn Cemetery	4	*Ochlerotatus triseriatus*	N/S	
40	Acton	CM08NS-1646	8/6/2008	2	Concord Road - Woodlawn Cemetery	2	*Culex pipiens/restuans complex*	N/S	
41	Acton	CM08NS-1647	8/6/2008	2	Concord Road - Woodlawn Cemetery	2	*Anopheles punctipennis*	N/S	
42	Acton	CM08NS-1648	8/6/2008	2	Concord Road - Woodlawn Cemetery	2	*Anopheles quadrimaculatus sl*	N/S	

ACTON SURVEILLANCE DATA

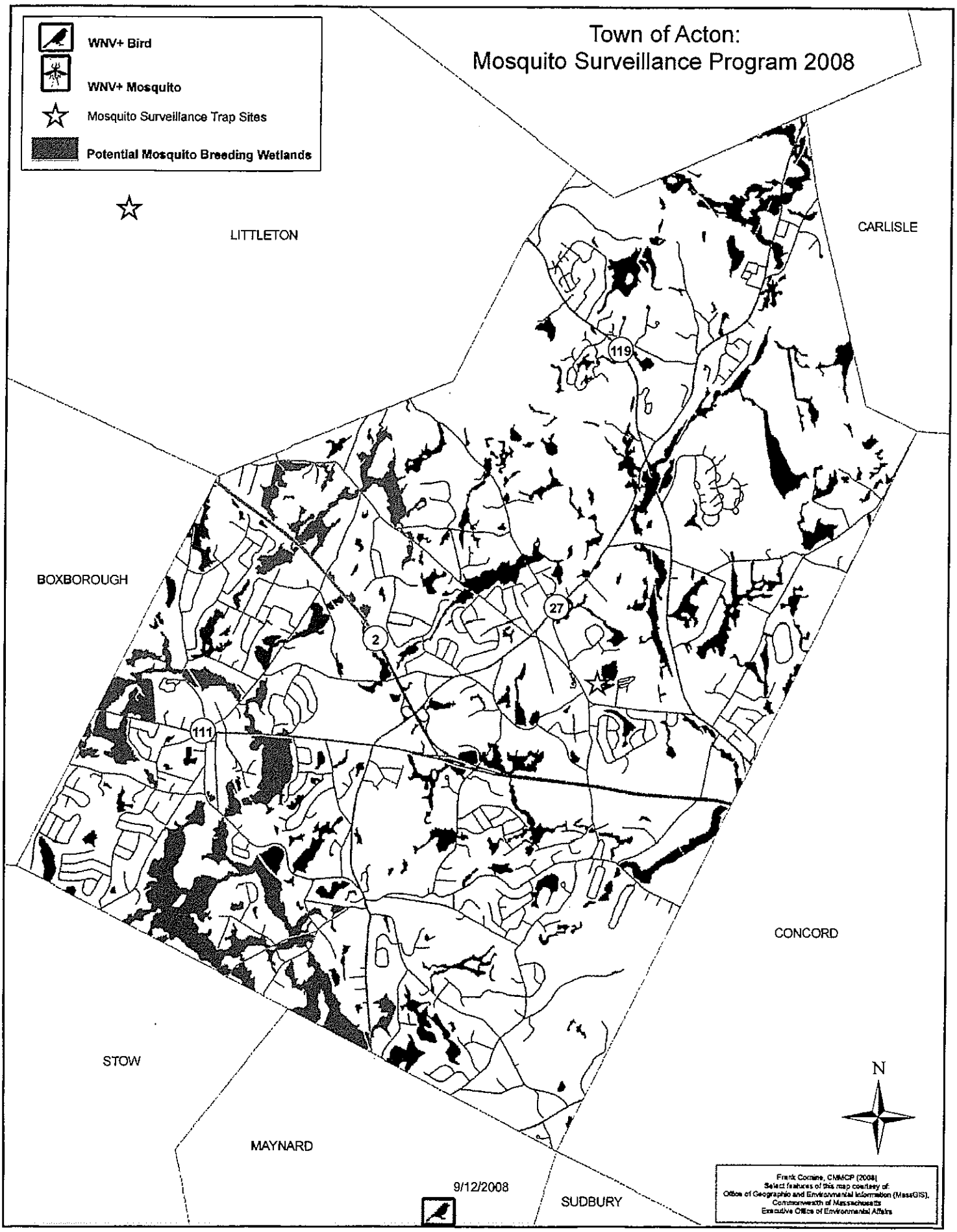
2008

#	Town	Pool ID	Trap Set Date	Number of Traps	Trap Site	Pool Size	Species	Test Type	Result
43	Acton	CM08NS-1649	8/6/2008	2	Concord Road - Woodlawn Cemetery	2	*Ochlerotatus triseriatus*	N/S	
44	Acton	CM08NS-1650	8/6/2008	1	Concord Road - Woodlawn Cemetery	3	*Anopheles punctipennis*	N/S	
45	Acton	CM08NS-1715	8/6/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
46	Acton	CM08-0492	8/13/2008	2	Concord Road - Woodlawn Cemetery	10	*Ochlerotatus triseriatus*	WNV & EEE	Negative
47	Acton	CM08NS-1961	8/13/2008	2	Concord Road - Woodlawn Cemetery	2	*Culex pipiens/restuans complex*	N/S	
48	Acton	CM08NS-1962	8/13/2008	2	Concord Road - Woodlawn Cemetery	2	*Anopheles punctipennis*	N/S	
49	Acton	CM08NS-1963	8/13/2008	2	Concord Road - Woodlawn Cemetery	1	*Psorophora ferox*	N/S	
50	Acton	CM08NS-1964	8/13/2008	2	Concord Road - Woodlawn Cemetery	3	*Aedes vexans*	N/S	
51	Acton	CM08NS-1965	8/13/2008	2	Concord Road - Woodlawn Cemetery	2	*Ochlerotatus canadensis*	N/S	
52	Acton	CM08NS-2010	8/13/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
53	Acton	CM08NS-2128	8/13/2008	1	Concord Road - Woodlawn Cemetery	1	*Aedes cinereus*	N/S	
54	Acton	CM08NS-2129	8/13/2008	1	Concord Road - Woodlawn Cemetery	1	*Mosquito Unknown*	N/S	
55	Acton	CM08NS-2144	8/20/2008	2	Concord Road - Woodlawn Cemetery	2	*Culex pipiens/restuans complex*	N/S	
56	Acton	CM08NS-2145	8/20/2008	2	Concord Road - Woodlawn Cemetery	3	*Aedes vexans*	N/S	
57	Acton	CM08NS-2146	8/20/2008	2	Concord Road - Woodlawn Cemetery	2	*Ochlerotatus canadensis*	N/S	
58	Acton	CM08NS-2147	8/20/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus triseriatus*	N/S	
59	Acton	CM08NS-2148	8/20/2008	2	Concord Road - Woodlawn Cemetery	1	*Coquillettidia perturbans*	N/S	
60	Acton	CM08NS-2188	8/20/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
61	Acton	CM08NS-2396	8/27/2008	2	Concord Road - Woodlawn Cemetery	3	*Culex pipiens/restuans complex*	N/S	
62	Acton	CM08NS-2397	8/27/2008	2	Concord Road - Woodlawn Cemetery	1	*Culiseta morsitans*	N/S	
63	Acton	CM08NS-2398	8/27/2008	2	Concord Road - Woodlawn Cemetery	2	*Coquillettidia perturbans*	N/S	
64	Acton	CM08NS-2399	8/27/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus japonicus*	N/S	
65	Acton	CM08NS-2400	8/27/2008	2	Concord Road - Woodlawn Cemetery	7	*Ochlerotatus triseriatus*	N/S	
66	Acton	CM08NS-2424	8/27/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
67	Acton	CM08NS-2560	9/3/2008	2	Concord Road - Woodlawn Cemetery	3	*Culex pipiens/restuans complex*	N/S	
68	Acton	CM08NS-2561	9/3/2008	2	Concord Road - Woodlawn Cemetery	1	*Culiseta melanura*	N/S	
69	Acton	CM08NS-2562	9/3/2008	2	Concord Road - Woodlawn Cemetery	1	*Culiseta morsitans*	N/S	
70	Acton	CM08NS-2563	9/3/2008	2	Concord Road - Woodlawn Cemetery	3	*Aedes vexans*	N/S	
71	Acton	CM08NS-2564	9/3/2008	2	Concord Road - Woodlawn Cemetery	13	*Ochlerotatus triseriatus*	N/S	
72	Acton	CM08NS-2565	9/3/2008	2	Concord Road - Woodlawn Cemetery	2	*Coquillettidia perturbans*	N/S	
73	Acton	CM08NS-2566	9/3/2008	2	Concord Road - Woodlawn Cemetery	5	*Psorophora ferox*	N/S	
74	Acton	CM08NS-2567	9/3/2008	2	Concord Road - Woodlawn Cemetery	1	*Anopheles barberi*	N/S	
75	Acton	CM08NS-2568	9/3/2008	2	Concord Road - Woodlawn Cemetery	2	*Anopheles punctipennis*	N/S	
76	Acton	CM08NS-2661	9/3/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
77	Acton	CM08NS-2753	9/10/2008	2	Concord Road - Woodlawn Cemetery	2	*Culex pipiens/restuans complex*	N/S	
78	Acton	CM08NS-2754	9/10/2008	2	Concord Road - Woodlawn Cemetery	1	*Culiseta melanura*	N/S	
79	Acton	CM08NS-2755	9/10/2008	2	Concord Road - Woodlawn Cemetery	2	*Aedes vexans*	N/S	
80	Acton	CM08NS-2756	9/10/2008	2	Concord Road - Woodlawn Cemetery	10	*Ochlerotatus triseriatus*	N/S	
81	Acton	CM08NS-2757	9/10/2008	2	Concord Road - Woodlawn Cemetery	6	*Anopheles punctipennis*	N/S	
82	Acton	CM08NS-2877	9/10/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
83	Acton	CM08-0785	9/17/2008	2	Concord Road - Woodlawn Cemetery	13	*Culex pipiens/restuans complex*	WNV & EEE	Negative
84	Acton	CM08NS-3104	9/17/2008	2	Concord Road - Woodlawn Cemetery	1	*Anopheles punctipennis*	N/S	

ACTON SURVEILLANCE DATA

2008

#	Town	Pool ID	Trap Set Date	Number of Traps	Trap Site	Pool Size	Species	Test Type	Result
85	Acton	CM08NS-3105	9/17/2008	2	Concord Road - Woodlawn Cemetery	1	*Psorophora ferox*	N/S	
86	Acton	CM08NS-3106	9/17/2008	2	Concord Road - Woodlawn Cemetery	6	*Ochlerotatus triseriatus*	N/S	
87	Acton	CM08NS-3107	9/17/2008	2	Concord Road - Woodlawn Cemetery	5	*Ochlerotatus japonicus*	N/S	
88	Acton	CM08NS-3501	9/17/2008	1	Concord Road - Woodlawn Cemetery	1	*Culiseta melanura*	N/S	
89	Acton	CM08NS-3502	9/17/2008	1	Concord Road - Woodlawn Cemetery	6	*Anopheles punctipennis*	N/S	
90	Acton	CM08NS-3503	9/17/2008	1	Concord Road - Woodlawn Cemetery	3	*Anopheles quadrimaculatus sl*	N/S	
91	Acton	CM08-0790	9/24/2008	2	Concord Road - Woodlawn Cemetery	8	*Ochlerotatus triseriatus*	WNV & EEE	Negative
92	Acton	CM08NS-3135	9/24/2008	2	Concord Road - Woodlawn Cemetery	3	*Culex pipiens/restuans complex*	N/S	
93	Acton	CM08NS-3136	9/24/2008	2	Concord Road - Woodlawn Cemetery	1	*Culiseta melanura*	N/S	
94	Acton	CM08NS-3137	9/24/2008	2	Concord Road - Woodlawn Cemetery	1	*Anopheles barberi*	N/S	
95	Acton	CM08NS-3138	9/24/2008	2	Concord Road - Woodlawn Cemetery	2	*Aedes vexans*	N/S	
96	Acton	CM08NS-3139	9/24/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus japonicus*	N/S	
97	Acton	CM08NS-3539	9/24/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
98	Acton	CM08NS-3456	10/1/2008	2	Concord Road - Woodlawn Cemetery	1	*Culex pipiens/restuans complex*	N/S	
99	Acton	CM08NS-3457	10/1/2008	2	Concord Road - Woodlawn Cemetery	20	*Aedes vexans*	N/S	
100	Acton	CM08NS-3458	10/1/2008	2	Concord Road - Woodlawn Cemetery	1	*Coquillettidia perturbans*	N/S	
101	Acton	CM08NS-3459	10/1/2008	2	Concord Road - Woodlawn Cemetery	4	*Ochlerotatus triseriatus*	N/S	
102	Acton	CM08NS-3460	10/1/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus canadensis*	N/S	
103	Acton	CM08NS-3461	10/1/2008	2	Concord Road - Woodlawn Cemetery	2	*Ochlerotatus trivittatus*	N/S	
104	Acton	CM08NS-3462	10/1/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus sticticus*	N/S	
105	Acton	CM08NS-3463	10/1/2008	2	Concord Road - Woodlawn Cemetery	1	*Ochlerotatus japonicus*	N/S	
106	Acton	CM08NS-3601	10/1/2008	1	Concord Road - Woodlawn Cemetery	0	No Collections Recorded	N/S	
		106 collections				**399**	**mosquitoes collected**		
		6 collections submitted for testing				**67**	**submitted for testing**		
		NO VIRUS IDENTIFIED IN 2008				**N/S = not submitted for testing**			


Town of Acton:
Mosquito Surveillance Program 2008
WNV+ Bird
WNV+ Mosquito
Mosquito Surveillance Trap Sites
Potential Mosquito Breeding Wetlands
LITTLETON
CARLISLE
BOXBOROUGH
CONCORD
STOW
MAYNARD
SUDBURY
119
27
2
111
N
9/12/2008
Frank Comeau, CMMCP (2008)
Select features of this map courtesy of:
Office of Geographic and Environmental Information (MassGIS),
Commonwealth of Massachusetts
Executive Office of Environmental Affairs

FIELD BIOLOGIST REPORT 2008

Furthering our knowledge of mosquitoes and their control, the CMMCP Research & Efficacy Department was involved with several diverse and interesting projects this year. These projects including a continuation of our bottle assays for mosquito resistance to ANVIL® 10+10, the *Culiseta melanura* bloodmeal analysis study headed by Dr. Ted Andreadis at the Connecticut Agriculture Experiment Station, as well as the annual *Culiseta melanura* count established by the MDPH. The results of the bottle assays for resistance again showed no significant development of resistance to ANVIL® 10+10 in local adult field populations. An overview of this project was presented at the 54th annual meeting of the Northeastern Mosquito Control Association, and was well received during the question period as well as afterwards. Following the presentation several parties expressed an interest in beginning their own bottle assay projects for use with their particular adulticide products, and requested helpful references as well as possible future correspondence on this topic. A poster outlining all of our projects this season was also created for the conference and received positive feedback.

New projects for the Research & Efficacy Department included an initial evaluation of a barrier sprayer efficacy using Suspend® (deltamethrin), a host seeking mosquito activity study, and also a project in conjunction with Dr. Thomas H. Kunz of Boston University, and the Bristol County Mosquito Control Project, where the diet of *Myotis lucifugus*, the Little Brown Bat, is to be analyzed to determine specific mosquito species and levels present. The barrier treatment was conducted at a local recreation field where the surrounding foliage was treated with the residual synthetic pyrethroid. Collections were made in the test area as well as a control area both before the treatment and after, resulting in positive control for several weeks. This possible control method will be further evaluated in the future to determine its viability as an option for interested parties in certain situations. The data from the host seeking activity study and the *Myotis lucifugus* diet study are currently being analyzed with a continuation of data collection possible for the upcoming season. The staff of the Norfolk County Mosquito Control Project has also shown an interest in coordinating with CMMCP to expand the host seeking activity study.

The Research & Efficacy Department again assisted in several facets of the surveillance program, from early season larval surveillance in the southern districts of the Project, to setting and collecting adult mosquito traps, training seasonal staff, maintaining trap sites and surveillance equipment, as well as entering surveillance data into the MDPH database. Mosquito identification skills improved and should continue to advance, allowing more specimens and collections to be identified with a faster turnaround as well. Larval surveillance was also conducted before and after the aerial larvicide at designated recoverable dip stations. Weekly reports for the CMMCP mosquito surveillance program were again prepared which noted virus findings, population changes for target species, historical comparisons, as well as weather data and trends. These reports were shared with interested agencies and posted on the CMMCP website for public viewing. The Research & Efficacy department also created several GIS layers for the surveillance program including trap site location layers and virus location layers.

The addition of an intern for the Research & Efficacy Department was a benefit during the season. From a local university, this student had a background in mosquitoes and exhibited an interest in learning more about their biology and current control methods. It was the Department's goal to introduce as wide a variety of projects and activities to this intern, in order to maximize their learning experience. Overall, the addition of the intern aided the Department in all facets of the program, and proved to be a valuable experience.

The Research & Efficacy Department updated the CMMCP GIS and created new data layers. These town specific layers included a geocoded service requests layer, ground and aerial larvicide sites layers, a catch basins surveyed/treated layer, and a geocoded exclusion area layer. These geocoded exclusion addresses were then exported for use in our GPS navigation devices (Garmin nuvi® 200s), which alert the field technicians when in proximity to an exclusion area. The Department created various maps for other CMMCP departments, including mosquito surveillance and virus maps, aerial larvicide maps for the helicopter pilot, wetland job site maps (with aerial photos and topographical views), and also a map set of the outstanding resource waters in the CMMCP service area.

Early in 2008 a meeting between the Division of Fisheries and Wildlife and Mosquito Control Projects was held regarding a memorandum concerning mosquito control and non-target impacts to species of concern. Following this meeting data layers were exchanged

dealing with new control restricted areas. These impacted areas were highlighted in maps that were distributed to field personnel and the CMMCP wetlands coordinator. These maps will stay updated as changes to the exclusions are published.

Looking towards possible field data collection devices for the CMMCP field personnel, the Research & Efficacy Department was involved in several brainstorms sessions looking into various possible solutions. The Department will continue to work with prospective developers as to the needs of CMMCP and the eventual implementation of these field units.

The Research & Efficacy Department was also involved with several interdepartmental activities including helping to calibrate the new CMMCP electric ULV adulticiding machines, assisting field staff prepare for their Category 47 Specialty Exam of the Massachusetts Pesticide Bureau, and setting up various electronic devices for the staff. First aid, CPR/AED, and forklift training were all completed during this past year. Other meetings and conferences attended by the Department include the 2008 ESRI Solutions EXPO, a Clarke Mosquito Control workshop, and several dealing with the MDPH.

As for 2009, the Research & Efficacy Department plans to gather further data for the host seeking mosquito activity study, barrier treatment efficacy project, and bottle assays for mosquito resistance to our current products, in addition to possibly continuing the *Myotis lucifugus* diet study. Retaining current licenses and advancing through educational opportunities will be undertaken. The Department will also continue assisting the other CMMCP departments, as well as any other duties that may arise.

Respectfully submitted,
Frank H. Cornine, III, Field Biologist

SATISFACTION SURVEY OF SERVICE REQUESTS IN THE CENTRAL MASSACHUSETTS MOSQUITO CONTROL PROJECT SERVICE AREA – 2008

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ABSTRACT

Residents of our service area request service from the menu of services offered to them by CMMCP. Requests for adulticiding (spraying) and larval control are the most common forms of service requests we receive. We accepts request for service through a variety of means, primarily by telephone, but increasing more by the online service request form from the CMMCP website. Additional methods include personal visits to our office, phone calls on behalf of residents from town and/or state officials, and direct requests to our field staff. The CMMCP Commission requested a survey of resident who requested service in 2008 to determine if our staff was meeting acceptable levels of customer satisfaction. This is the same survey that was done in 2005 and 2007. After compiling these results, we find that a majority of residents in our service area were satisfied with our control efforts and methods, which mirrors our results from previous years.

SURVEY METHODOLOGY

In 2008 we received 10,650 requests for service, ranging from adulticiding to larval control. 5,088 adulticiding calls were filtered (multiples removed) and placed into a separate database. Service calls were sorted according to town, and each town was tabulated for total requests received in 2008. These towns were then graphed to show which towns had the most calls. Each town was assigned a percentage according to this data. This percentage would determine the number of postcards sent to each town from the overall total. The CMMCP Commission decided that 1,000 postcards would be a representative sample of the service calls received this year. The survey was designed to be as easy as possible for residents to access and complete. An online survey was created, and the postcards would include unique identifiers that the residents would use. The postcards contained a blind weblink to the survey so that unauthorized users would not be able to participate in the survey. Information such as how they contacted us, were the office and field staff helpful and informative, how long did they wait for service, was the service provided effective, and their overall satisfaction was measured. This study uses the same methodology as the two previous resident surveys.

SURVEY FINDINGS

From 1,000 postcards mailed, 224 responses were received (22.4%). The results are as follows:

1). In your most recent experience, how did you contact the Central Mass. Mosquito Control Project?

	Number	Percent
Telephone	115	52%
Website	100	45.2%
In person	1	0.5%
Other*	5	2.3%
Total	221	100%

2). If by telephone or in person at the CMMCP office, were your questions or concerns answered to your satisfaction?

	Number	Percent
Yes	113	96.6%
No	4	3.4%
Total	117	100%

3). If by telephone, did you experience difficulty reaching our staff?

	Number	Percent
Yes	11	9.2%
No	109	90.8%
Total	120	100%

4). If through the website or e-mail, did you find the information you needed in a satisfactory manner?

	Number	Percent
Yes	113	100%
No	0	0%
Total	113	100%

5). Please give the approximate time you waited for service from your initial request:

NOTE: 94.9% within a week or less

	Number	Percent
1-3 days	100	45.2%
3-5 days	56	25.3%
1 week	54	24.4%
2 weeks+	11	5.1%
Total	221	100%

6). Did you find our response from your initial request to when you received service within a reasonable amount of time?

	Number	Percent
Yes	213	96.4%
No	8	3.6%
Total	221	100%

7). When you received service, did our field representative appear knowledgeable and competent about his/her profession?

	Number	Percent
Yes	204	95.8%
No	9	4.2%
Total	213	100%

8). Were your questions and concerns answered by the Technician to your satisfaction?

	Number	Percent
Yes	199	94.8%
No	11	5.2%
Total	210	100%

9). Did you receive any written information (pamphlets, etc.) from our representative?

	Number	Percent
Yes	112	51.9%
No	104	48.1%
Total	216	100%

10). Did you find this information useful?

	Number	Percent
Yes	111	60%
No	2	1.1%
Did not receive	72	38.9%
Total	185	100%

11). Did you request service more than once in 2008?

	Number	Percent
Yes	108	49.1%
No	112	50.9%
Total	220	100%

12). If you requested additional service in 2008, was it because the original application was insufficient to meet your needs, or for a later re-treatment or follow up?

	Number	Percent
Re-treatment	101	81.5%
Insufficient	23	18.5%
Total	124	100%

13). Would you/did you recommend our service to others in the future?

	Number	Percent
Yes	216	97.7%
No	5	2.3%
Total	221	100%

14). In your opinion, did our application made your area better, worse, or had no effect?

	Number	Percent
Better	185	85.3%
Worse	0	0%
No Effect	32	14.7%
Total	217	100%

15). If you think your area improved, can you give an approximate length of time you experienced relief from mosquito annoyance?

	Number	Percent
1-2 days	31	16.9%
3-5 days	29	15.8%
1 week	48	26.2%
2 weeks+	75	41%
Total	183	100%

NOTE: 67% experienced at least a week of relief, nearly 1/2 report more than 2 weeks of relief

16). On average, our services cost $2.00 – $4.00 per person each year (withheld from local aid rec'd from the State). In your opinion, is this amount too high, too low, or sufficient?

	Number	Percent
Sufficient	179	83.3%
Too Low	35	16.3%
Too High	1	0.5%
Total	215	100%

17). In which month or months do you recall receiving service?

	Number	Percent
June	58	26.7%
July	54	24.9%
August	37	17.1%
1+	68	31.3%
Total	217	100%

18). Overall, are you happy with the service provided this year by CMMCP?

	Number	Percent
Yes	202	91.8%
No	18	8.2%
Total	220	100%

19). Do you plan on using our service again in the future?

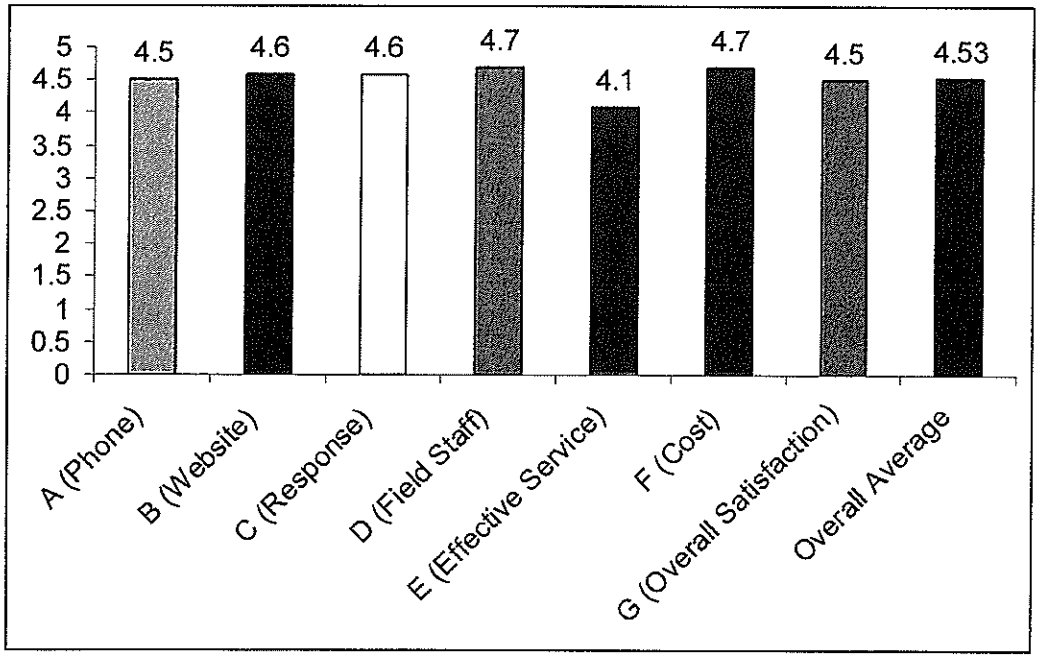
	Number	Percent
Yes	219	99.1%
No	2	0.9%
Total	221	100%

Please rate our performance for 2008 from 0 to 5, where 5 is the best rating, 0 is the worst rating:

QUESTION	POINTS	AVERAGE
The information you received over the phone was informative & helpful	682 points from 760	4.5 average from 5
The information on our website is easily available and helpful	849 points from 925	4.6 average from 5
The response time for service is reasonable	1,001 points out of 1,080	4.6 average from 5
Our field staff that responded is knowledgeable and competent	968 points out of 1,035	4.7 average from 5
The service provided was effective	880 points out of 1,070	4.1 average from 5
This service is reasonable compared to the cost	986 points out of 1,055	4.7 average from 5
Please rate your overall satisfaction with the service received in 2005	969 points out of 1,065	4.5 average from 5
Total satisfaction rating: 6,335 points out of 6,990 possible – 4.53 average		

CONCLUSION

Overall satisfaction was 91.8%, and 99.1% would use our services again in the future. One weakness identified in this study is that only 51.8% of the residents polled recalled receiving our written information. The importance of public education and outreach will be stressed to all CMMCP personnel in 2009. We will also continue to explore options regarding our phone system, and push the website as a viable solution for sending and receiving service requests.



BOTTLE ASSAYS OF FIELD COLLECTED MOSQUITOES FOR LEVEL OF RESISTANCE TO ANVIL® 10+10 IN CENTRAL MASSACHUSETTS – 2008

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ABSTRACT

Continuing in 2008, the Central Mass. Mosquito Control Project conducted bottle assays, which test the potency of a substance on live specimens, to determine if pesticide resistance has been developing in local mosquito populations. Using procedures recommended by the Center for Disease Control and Prevention, the results of unexposed mosquitoes were compared to those collected from areas serviced by the CMMCP adulticide program. It was determined that the level of resistance in local mosquito populations does not warrant any procedural or insecticide changes at this time. Despite these findings, CMMCP will continue bottle assays of local mosquito populations to monitor the levels of resistance so that if indications of resistance are observed, proper actions could be implemented to ensure control effectiveness.

INTRODUCTION

With environmental changes, mosquito species have the potential to change their current distribution and bring disease with them to new areas (Brogdon 1998; Simsek 2003). These possible diseases include malaria, dengue, yellow fever and Rift Valley Fever among others (McAbee 2003; Simsek 2003). Faced with these new threats, vector control personnel must be aware of the dynamics of local mosquito species in order to lessen the threat of human infections.

Resistance to pesticides can have a major impact on the abilities of public health officials against vector-borne disease (Brogdon 1998). It has been shown that some past agricultural and pest control use of insecticides has led to the development of resistance of these chemicals in select populations of mosquitoes (Rodriguez 2005). This resistance is predicted to be the basis for future reemergence of vector-borne diseases, and also impair the control efforts in these situations (Brogdon 1998).

There are several factors that may have contributed to this development, including the narrowing scope of insecticides available for public health use, along with increasing restrictions from regulatory agencies (Brogdon 1998). Resistance to pyrethroids in particular could be due in part to past use of DDT in some areas, with the resistance mechanism being similar for both (Brogdon 1998; McAbee 2003). This cross-resistance, as observed between pyrethroids and DDT, is becoming more prevalent as the existing resistance mechanisms

are being enhanced in the target insects (Brogdon 1998).

Despite research that has shown resistance in specific mosquito species, the actual impact of this on vector control is not known due to several issues. One is the lack of information about the current resistance levels, due in part to the wide variety of surveillance programs and data collection efforts. Another factor, and potentially more important, is that resistance seems to be localized. In one study, certain mosquito populations that were only a few kilometers apart varied greatly on the presence and levels of resistance, including the actual mechanism for the resistance (Brogdon 1998).

These unknowns about the level of resistance in vector species have reinforced the need to study pesticide resistance by CMMCP. The goals of this research will be to create baseline data for control efforts, detect early resistance, and to observe the current effects of control strategies (Brogdon 1998). If resistance is observed, then a change in application rates or a change to a different class of insecticides may need to be considered.

To control adult mosquitoes, CMMCP uses ANVIL® 10+10 (Clarke Mosquito Control Products, Inc., Roselle, IL) (EPA Reg. No. 1021-1688-8329), a synthetic pyrethroid composed of 10% SUMITHRIN® (Sumitomo Chemical Company, Ltd., Osaka, Japan)(d-phenothrin) and 10% piperonyl butoxide (PBO)(Center for Disease Control and Prevention 2002; PHEREC 2001), which is used as a synergist[1]. In this ongoing study to monitor resistance levels in its service area, CMMCP continued conducting bottle assays in the summer of 2008 for ANVIL® 10+10.

METHODS

The bottle assay procedure used by CMMCP was modeled after the CDC method (Center for Disease Control and Prevention 2002), where a baseline for resistance was established using specimens collected from an area without any historical adulticide exposure. This data could then be plotted against data from mosquito populations in areas where our records show past insecticide usage has occurred. This will determine if any degree of resistance has developed to our current adulticide product.

To start, clean 250ml Wheaton bottles (Wheaton Science Products, Millville, NJ) were lined with 1ml of various concentrations of ANVIL® 10+10 (8.868µg/ml, 22.17µg/ml, 44.34µg/ml, and 88.68µg/ml), which were diluted with pesticide grade acetone (Thermo Fisher Scientific, Inc., Fair Lawn, NJ). Approximately 10-15 field collected mosquitoes were introduced into each bottle by mechanical aspiration and % knockdown was recorded at 5 minute intervals, up to 100% knockdown. For control bottles lined with only acetone, (zero ANVIL®

[1] Synergist- Additional substance that will assist in the elimination of certain resistance mechanisms; PBO synergist eliminates oxidase activity (Center for Disease Control and Prevention 2002).

10+10) % knockdown was observed at 5 minute intervals up to an hour. Each pesticide concentration assay had several trials until a concentration was found that created a timely morality curve that reached total knockdown around 30 minutes. Once the ANVIL® 10+10 baseline concentration was determined, it could be used against the exposed mosquito populations, with control bottles running simultaneously.

The collection of mosquitoes for the bottle assays were facilitated by the use of several CDC light traps (John W. Hock Co., Gainesville, FL), baited with CO_2 at a flow rate of 500ml/min. ABC standard collection nets (Clarke Mosquito Control Products, Inc., Roselle, IL) were used to contain the mosquitoes, along with a simple food source, until resistance testing took place, which was usually within a couple of hours. The mechanical aspiration from the collection cages to the assay bottles was enabled by the use of a flashlight aspirator (BioQuip Products, Inc., Rancho Dominguez, CA).

The baseline mosquitoes were collected from an area located near an organic farm. This site has been an official exclusion property since 2006, but even prior to that CMMCP has no record of using adulticide products there. Once the baseline concentration had been determined using these naive mosquitoes, collections were made at several other sites that had varying number of adulticide events (~2-15) over the previous couple of years. In 2007 six different locations were used, with two sites having multiple collections and trial sets. An additional site was added in 2008, with several trials made at previously monitored areas as well. These potentially resistant mosquitoes were then run against the baseline concentration from the unexposed population, as well as control bottles coated with only acetone.

After conducting bottle assays on the collected mosquitoes against the baseline concentration, the knockdown percentage was plotted against the time interval to determine if any degree of resistance was forming in these populations compared to those unexposed. If any specimens survived longer than those of the baseline group, this could represent some degree of resistance has developed.

RESULTS

The baseline component of the bottle assay that resulted in the optimal concentration of the ANVIL® 10+10 was 22.17µg/ml, which corresponded with data from previous studies (PHEREC 2001). Using this concentration, it was found that in 2007 only one assay of eight trial sets had specimens that did not reach 100% knockdown before the 25 minute mark. This particular site, Haskell Street, had an average of 98.9% knockdown at the 25 minute mark, and by the next time interval did reach 100% knockdown. Both Otis Street locations had a slower curve than the rest of the sites, although they still reached 100% knockdown at 25 minutes like the baseline population. As one would expect, the control bottles

coated with only acetone had zero knockdown effect (Figures 1, 2).

Figure 1: 2007 Time-% Knockdown Curve of Bottle Assay for ANVIL® 10+10 (22.17µg/ml)

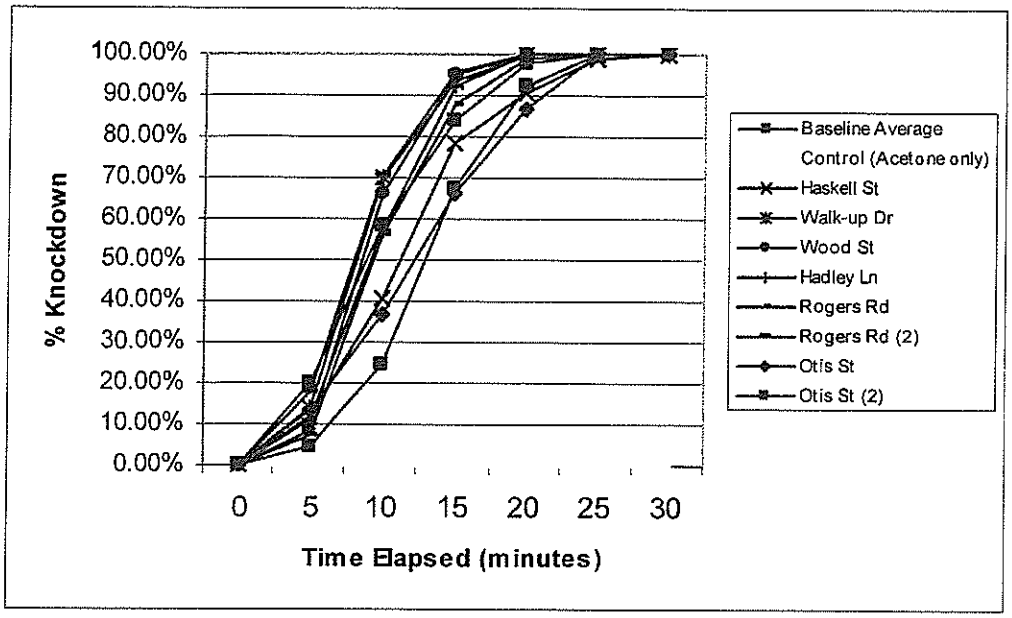
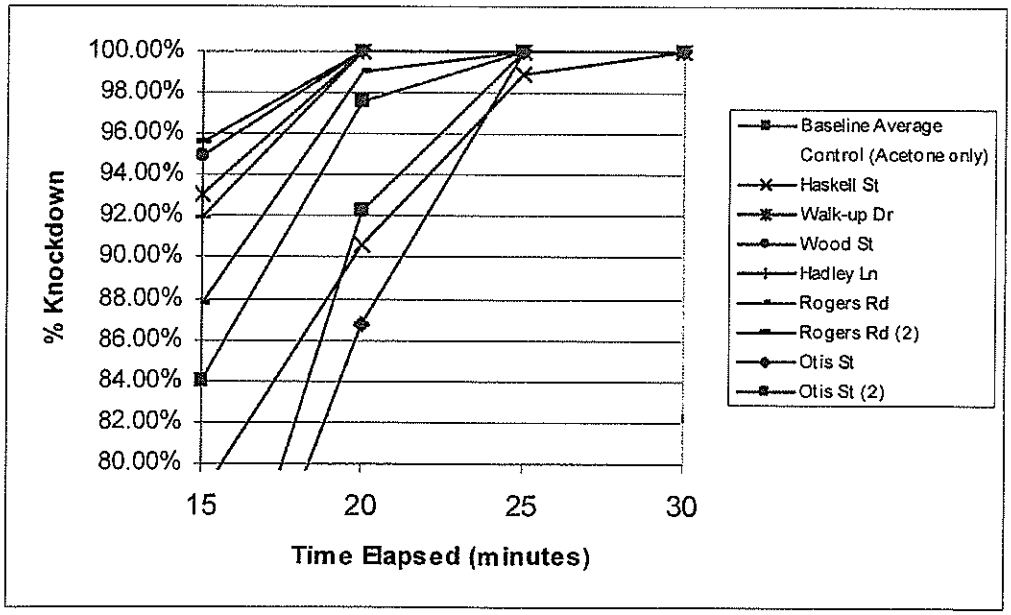


Figure 2: 2007 Time-% Knockdown Curve of Bottle Assay (2) for ANVIL® 10+10 (22.17µg/ml)



The bottle assays preformed in 2008 resulted in similar findings to 2007. Of the 13 trial sets, 6 had specimens that did not reach 100% knockdown by the 25 minute mark. However, these findings were not significant

and all had knockdown rates at the 25 minute mark of over 97.22%. Again, the acetone only coated bottles had zero knockdown effect (Figures 3, 4).

Figure 3: 2008 Time-% Knockdown Curve of Bottle Assay for ANVIL® 10+10 (22.17µg/ml)

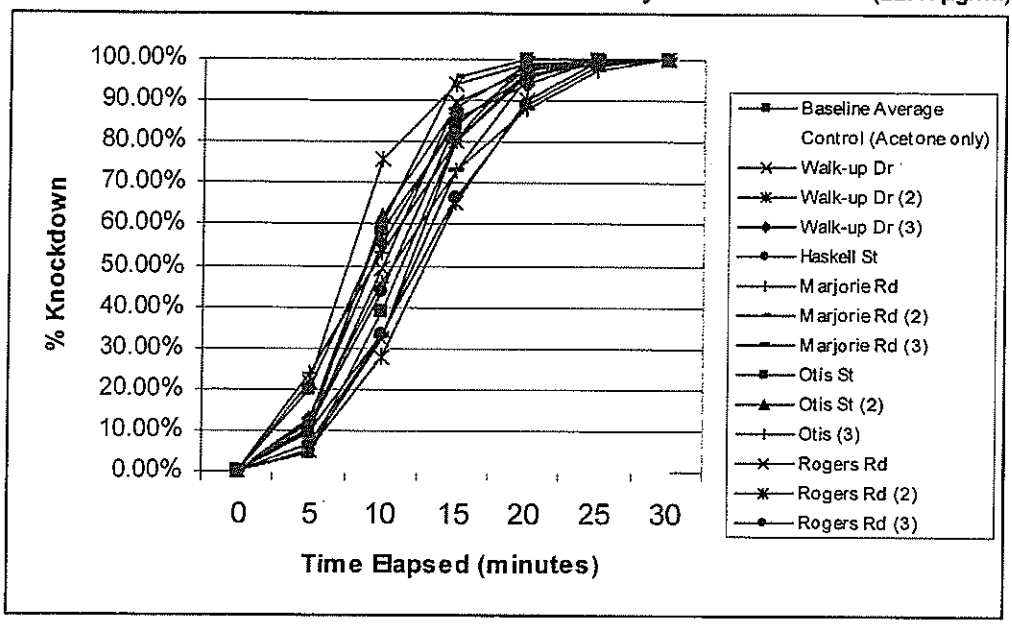
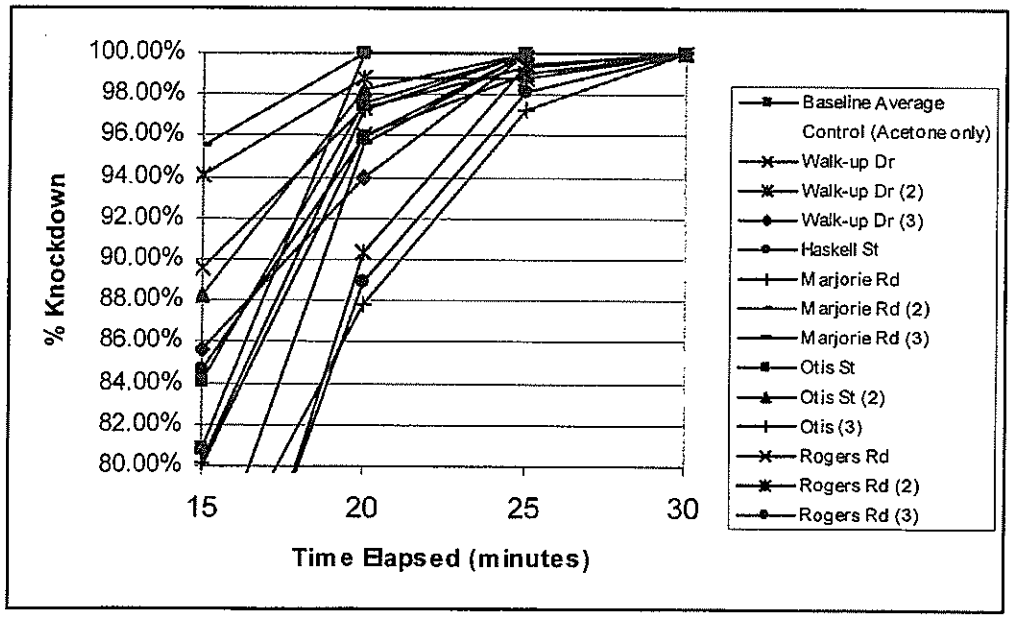


Figure 4: 2008 Time-% Knockdown Curve of Bottle Assay (2) for ANVIL® 10+10 (22.17µg/ml)



DISCUSSION

The results of the bottle assays indicate that the level of resistance in the populations of the local mosquitoes tested in the CMMCP service area is not significant enough where a change of pesticide or application protocol is needed at this time. This is not necessarily surprising considering the nature of the CMMCP adulticide program, which is primarily request-only in localized, targeted areas. Another reason would be the vast size of the CMMCP service area, encompassing 39 municipalities, with non-member cities and towns with no mosquito control program scattered in and around them. These factors contribute to local mosquito populations not being consistently exposed to a single class of insecticides, lessening the potential development of resistance. The rapid degradation and low residual nature of the insecticide also could contribute to low resistance development.

CMMCP had used resmethrin (Scourge® Bayer Environmental Science, Montvale, NJ) (EPA Reg. No. 432-667), for their ULV applications since 1988 before switching to ANVIL® 10+10 in 2007. Both products are synthetic pyrethroids. Both insecticides also use piperonyl butoxide (PBO) as a synergist, in different concentrations, with ANVIL® 10+10 using 10% PBO compared to 18% for Scourge® (Center for Disease Control and Prevention 2002; PHEREC 2001). Before using either of those synthetic pyrethroids, CMMCP had been using Malathion, an organophosphate, which is of a different chemical class (Nauen 2006).

Drought conditions in the latter part of 2007 impacted collection numbers, which hindered collections for additional bottle assay trials that season. The 2008 season collections were not impacted by lack of rain, allowing more trials to be conducted. Additional bottle assays in subsequent seasons will provide more baseline data for resistance management in the CMMCP service area.

In conclusion, the results of the bottle assay research conducted in the 2007 and 2008 seasons showed that the level of resistance in the mosquito populations tested does not warrant a change in protocol or product, but monitoring for resistance should continue because it is considered a vital tool in resistance management.

ACKNOWLEDGEMENTS

I would like to thank the following people and groups for their help and guidance throughout this project: Timothy Deschamps, Timothy McGlinchy, Curtis Best, Peter Laptewicz, Ann Meyer, & the Central Mass. Mosquito Control Project Commissioners.

REFERENCES

Brogdon WG, McAllister JC. 1998. Insecticide Resistance and Vector Control. *Emerg Infect Dis* 4:605-613. Center for Disease Control and Prevention. 2002.

Resistance Assays [Internet]. Atlanta,GA: Center for Disease Control and Prevention [accessed October 24, 2007]. Available from: http://www.cdc.gov/ncidod/wbt/resistance/assay/index.htm.

McAbee RD, Kang KD, Stanich MA, Christiansen JA, Wheelock CE, Inman AD,

Hammock BD, Cornel AJ. 2003. Pyrethroid tolerance in *Culex pipiens pipiens* var *molestus* from Marin County, California. *Pest Manag Sci* 60:359-368.

Nauen R. 2006. A challenge for effective vector control. *Public Health Bayer Environmental Science Journal* [Internet] 18:8-15. [accessed October 22, 2007]. Available from: http://www.bayervector.co.za/docs/Public%20Health%20No%2018%20Nov%202006_100.pdf.

PHEREC [Public Health Entomology Research and Education Center]. 2001. Dilution of ANVIL 10+10® for the Bottle Bioassay [Internet]. Available from the Public Health Entomology Research and Education Center, Panama City, FL [accessed June 16, 2005]. http://www.pherec.org/memorand a/anvil10.html.

Rodriguez MM, Bisset JA, DeArmas Y, Ramos F. 2005. Pyrethroid Insecticide-Resistant Strain of *Aedes Aegypti* From Cuba Induced by Deltamethrin Selection. *J Am Mosq Control Assoc* 21(4):437-445.

Simsek FM. 2003. Seasonal Population Dynamics and Breeding Habitat Diversity of *Culex pipiens* Linnaeus, 1758 (Diptera: Culicidae) in Gölbasi District, Ankara, Turkey. *J Ent Res Soc* 5(1):51-62.

EVALUATION OF DELTAMETHRIN BARRIER TREATMENT BY THE CENTRAL MASSACHUSETTS MOSQUITO CONTROL PROJECT

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ABSTRACT

To evaluate the effectiveness of the residual synthetic pyrethroid SUPSPEND® SC (deltamethrin), the Central Massachusetts Mosquito Control Project (CMMCP) conducted a field trial in the summer of 2008 by using it to treat the foliage around a local recreational field. Surveillance traps were placed in the treatment area of the field as well as at a nearby control site of similar characteristics. Collections were made at both sites starting five weeks before the initial application and ending five weeks after the final treatment. Results show that overall, 74.31% control was achieved and continued for six weeks until surveillance ceased, due in part to cold evening temperatures which was contributing to overall low collection numbers for both sites. With experience gained in these initial trials, CMMCP plans to further evaluate this product as a barrier treatment in the upcoming seasons, with the hope of obtaining another valuable tool for the suppression of high mosquito populations and potential vectors in arbovirus situations.

INTRODUCTION

The use of barrier treatments involving insecticides with residual properties has been used in the past by control agencies to combat disease vectors and reduce high populations of mosquitoes. Barrier treatments are used to reduce the number of mosquitoes from entering areas where people typical gather such as sleeping domiciles or recreation sites by applying the insecticide onto surfaces where mosquitoes would likely have to come in contact with (Cilek 2006). These surfaces could include the inside and outside walls of a residence, a bed net, or the foliage around a recreational field for example (Anderson 1991, Frances 2007, Matthews 2007).

Many synthetic pyrethroids have little residual properties, while deltamethrin has been shown to persist for several weeks (Cilek 2006, Wu 1991). The formulation used, SUSPEND® SC (Bayer Environmental Science, Montvale, NJ) (EPA Reg. No. 432-763), is composed of 4.75% deltamethrin, 0.42lbs AI/gal. SUSPEND® SC is a suspension concentrate in which the active ingredient is in crystal form, producing a more stable product against the impacts of precipitation and sunlight. In the case of foliar treatments, eventual control loss has been attributed to the natural breakdown of the product as well as the formation of new, untreated plant

growth for mosquito resting habitat (Cilek 2006).

For ultra-low volume (ULV) adulticiding there are several factors that can impact efficacy, including foliage and other barriers, droplet size, and time of application (Mount 1998, Reddy 2006). Many of these issues do not generally apply to barrier treatments. Because barrier treatments work by treating contact surfaces for mosquitoes and not necessarily the mosquitoes directly, foliage and other barriers are actually the medium for the application, not an obstruction as with ULV applications. Droplet size, as it relates to transport during drift, does not apply in barrier treatments because the application is designed to stay on the resting site medium, and not drift through active mosquito areas (Cilek 2006). Application time is not a vital a factor for barrier treatments because host-seeking mosquitoes are not required to be present for successful control as with ULV applications (Mount 1998).

With interest for possible barrier treatments at CMMCP, field trials with SUSPEND® SC were conducted in the summer of 2008.

METHODS

A local collection of recreational fields was selected as the site for this project based primarily on layout and dense barrier foliage, ideal for this type of application. The treatment and control sites were on separate fields towards the opposite ends of the complex. Once established, pre-application surveillance began at the two sites using model 512 CDC miniature light traps baited with CO_2 (500ml/min), along with model 1512 collection bottle rotators (John W. Hock Co., Gainesville, FL). These traps were place in the recreational field away from the foliage so that in order for the host-seeking mosquitoes to reach the traps, they would have to travel through the treated foliage.

The applications were made by a modified LECO ULV Model HD[1], which supplied a flow rate of approximately 1gal/min with a subsequent increased droplet size over a standard ULV sprayer. The SUSPEND® SC was diluted in water to 1oz/gal. This dilution rate of 1oz/gal is the middle of the labeled range. A visual inspection was made of the foliage following the treatments to observe the absence or presence of product. Several modifications were made to the application protocol for the second application due to a perceived lack of control. In the first application, a vehicle speed of 8-10mph was used, but was lowered to 5mph for the second application. We also moved the vehicle from 4-6ft away from the foliage barrier in the first application to 10ft in the second one. In addition to removing the shear ring to achieve coarser droplets, the spray head angle for the second application was lowered approximately 10-15° and positioned perpendicular to the foliage medium.

Weekly collections were made at both sites prior to the initial application for five weeks. In the

[1]Pictures and schematics are available by calling the CMMCP office at (508) 393-3055.

days following this initial application, two collections were made, with results prompting the consideration and implementation of a second barrier treatment. Following the second application, seven more collections were made over the course of five weeks. Mosquito collections were labeled by site and date, and stored for later identification by morphology (Andreadis 2005). The collection means for both the control and treatment sites were computed and graphed according to their relationship to the barrier treatments. The individual collections were also graphed for both sites with the application events noted.

RESULTS

Pre-treatment surveillance consisted of weekly collections over 5 weeks, and showed substantial mean mosquito levels at both the control site and the treatment sites (approximately 134 and 204 respectively). After the initial application, both sites saw drops in average collections. However, following the second application, the treatment site had a decrease of 87.29% compared to the collection period after the initial application, while the control site actually observed an increase of 1.40% during this period (Figures 1, 2). Comparing the pre-treatment surveillance levels to those following the second application, the treatment site had an 89.8% mean reduction. Overall, following the initial application to the end of surveillance, there was a 74.31% drop in average collections at the treatment site compared to the pre-application surveillance there (Figures 3, 4).

Figure 1: Trap Site Collection Means (%Δ From Previous Collection Period)

	Pre-Application 1	A1-A2	Post-Application 2
Control Site	133.80	92.00(-31.24%)	93.29(+1.40%)
Treatment Site	203.60	163.00(-19.94%)	20.71(-87.29%)

Figure 2: Comparison of Trap Site Collection Means

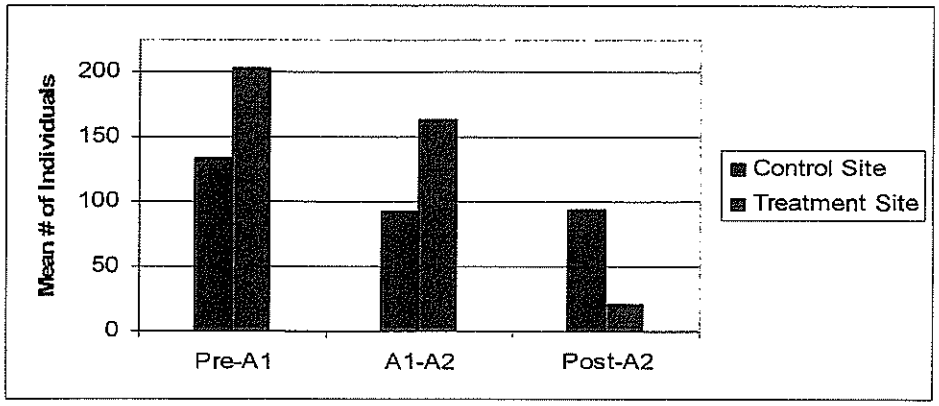


Figure 3: Comparison of Weekly Collections for Project Sites

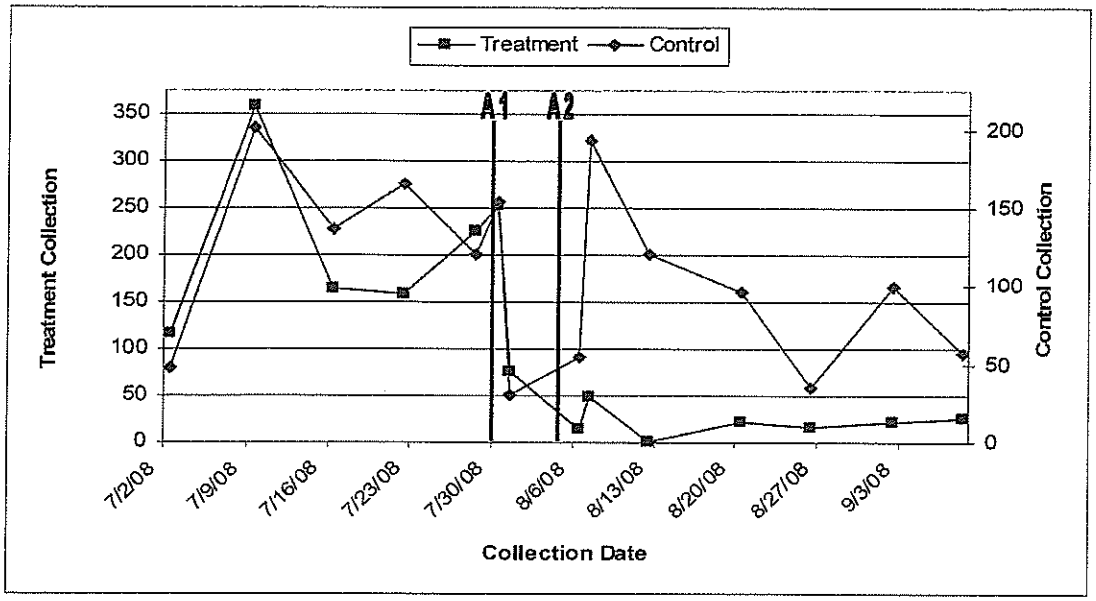
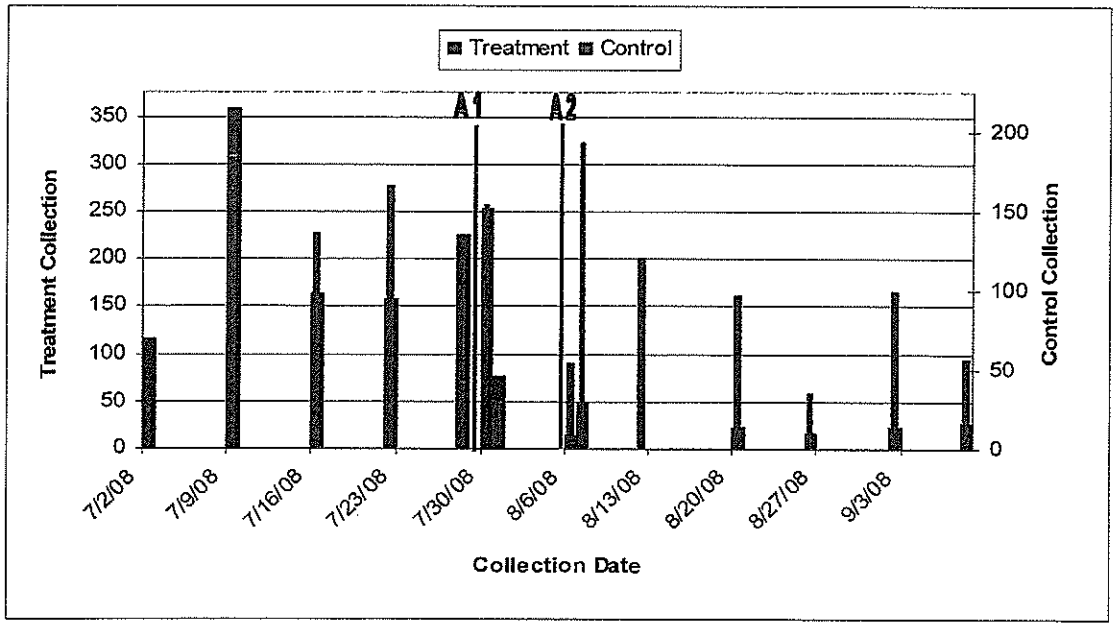


Figure 4: Comparison of Weekly Collections for Project Sites (2)



DISCUSSION

Surveillance showed that control was achieved following both applications, although the initial application was not perceived to have been as effective as it potentially could have been, therefore necessitating a review of the equipment and prompting a second application. One potential cause discussed was that the spray head was not at an angle that was conducive for applying coverage to the lower half of the foliage around the field. With the spray angle too high, the application was possibly missing the lowest couple of feet, which may have influenced the collections. With the spray head angle adjusted, spray head nozzle modifications, decreased vehicle speeds, and increased distance from application medium, the second application showed significantly more control than the first, while the control site actually saw an increase in the average collection numbers following the second application. This decrease for the treatment site lasted until collections ended, but may have also been influenced by lowering evening temperatures. New untreated plant growth and the natural breakdown of the deltamethrin would have been cause for an increase in collection numbers. Trials in the future will be conducted with the second treatment protocol.

Although sustained control can be achieved from the use of barrier treatments using products such as SUSPEND® SC, we will not be using this product exclusively, but in conjunction with all other elements of a successful IPM program. The CMMCP use of a mid-level dilution rate lowered the potential for impact to non-target species, while still achieving the control observed. These promising observations will lead CMMCP to further evaluate SUSPEND® SC as a situational tool in the suppression of high mosquito populations and the control of vector-borne diseases such as West Nile virus and Eastern Encephalitis.

ACKNOWLEDGEMENTS

I would like to thank the following people and groups for their help and guidance throughout this project: Timothy Deschamps, CMMCP Executive Director; Timothy McGlinchy, CMMCP Director of Operations; Curtis Best, CMMCP Staff Entomologist; Timothy Welch, CMMCP Facility Manager; Ann Meyer, CMMCP Seasonal Lab Assistant; Earl Storey, Town of Westboro Parks & Recreation Dept. & The Central Mass. Mosquito Control Project Commissioners

REFERENCES

Anderson AL, Apperson CS, Knake R. 1991. Effectiveness of Mist-blower Applications of Malathion and Permethrin to Foliage as Barrier Sprays for Salt Marsh Mosquitoes. *J Am Mosq Control Assoc* 7(1):116-117.

Andreadis TG, Thomas MC, Shepard JJ. 2005. *Identification Guide to the Mosquitoes of Connecticut* . New Haven, CT: The Connecticut Agricultural Experiment Station.

Cilek JE, Hallmon CF. 2006. Residual Effectiveness of Pyrethroid-treated Foliage Against Adult *Aedes albopictus* and *Culex quinquefasciatus* in Screened Field Cages. *J Am Mosq Control Assoc* 22(4):725-731.

Frances SP. 2007. Evaluation of Bifenthrin and Permethrin as Barrier Treatments for Military Tents Against Mosquitoes in Queensland, Australia. *J Am Mosq Control Assoc* 23(2):208-212.

Reddy MR, Spielman A, Lepore TJ, Henley D, Kiszewski AE, Reiter P. 2006. Efficacy of Resmethrin Aerosols Applied from the Road for Suppressing *Culex* Vectors of West Nile Virus. *Vector-Borne Zoonotic Dis* 6(2):117-127.

Matthews G. 2007. Tackling Integrated Vector Management for Mosquitoes and Black Flies in Cameroon, Central Africa. *Wing Beats* 18(4):5-14.

Mount G. 1998. A Critical Review of Ultralow-volume Aerosols of Insecticide Applied With Vehicle-mounted Generators for Adult Mosquito Control. *J Am Mosq Control Assoc* 14(3):305-334.

Wu N, Xiao Y, Dazhon C, Huang F. 1991. Laboratory Evaluation of Efficacy of Bednets Impregnated with Pyrethroids. *J Am Mosq Control Assoc* 7(2):294-298.

DIET STUDY OF THE LITTLE BROWN BAT, *MYOTIS LUCIFUGUS*

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ABSTRACT

Along with Bristol County Mosquito Control and Dr. Thomas H. Kunz of Boston University, the Central Massachusetts Mosquito Control Project assisted in a diet composition study of *Myotis lucifugus*, the Little Brown Bat. Mosquito surveillance was conducted around the area of a bat colony and guano from these bats is currently being analyzed for possible genetic markers of specific mosquito species. Once analyzed, those results can be compared to the surveillance data CMMCP collected as well as other factors to determine the extent of mosquito feeding by this species of bat, and possible impact levels. Identification of the mosquito collections indicated a high level of *Coquillettidia perturbans* for the majority of the season, as well as a consistent, although much lower level of *Anopheles punctipennis*. Low levels of *Aedes vexans* were also present consistently towards the end of the season. Once the guano is analyzed, it will be determined if these mosquito species are present there and if the rates are reflective of those seen in the trap collections. If other species are more prevalent in the guano than our highest collection species, it will lead to further questions as to why *Myotis lucifugus* would seem to prefer certain species despite their lesser numbers. Mosquito and/or bat surveillance may continue in the upcoming season if parties deem it useful to furthering this study.

HOST-SEEKING ACTIVITY OF MOSQUITOES IN CENTRAL MASSACHUSETTS

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ABSTRACT

In evaluating various time periods for ULV adulticiding potential, the Central Massachusetts Mosquito Control Project conducted mosquito surveillance used programmable collection devices to observe the host-seeking activity periods for local mosquito species. Collections were made in multiple environments for 3 hour intervals around sunset, with that being the point of reference. Three collections were made before sunset, with another four afterwards. The collections were identified into several target groups including *Coquillettidia perturbans*, *Aedes vexans*, *Culex pipiens/restuans* complex, *Culiseta melanura*, and an *Anopheles* group which included *Anopheles punctipennis* and *Anopheles quadrimaculatus*. All species showed relatively little activity until the period right before sunset. Sunset was then followed by the largest activity period for all targeted mosquito groups. Most species began to taper off for the rest of the collection period, except for *Coquillettidia perturbans* and the *Anopheles* group which had a slight resurgence in the early morning hours. These preliminary findings reinforce the adulticiding protocol for CMMCP, which is to commence applications following sunset. Collections may be continued in upcoming seasons to determine if these results can be further established.

TOWN OF ACTON

DATE	WORK DONE	LOCATION
03-12-08	Stream Survey	Barker Road
03-24-08	Larviciding	Beechnut Street, Acorn Park Drive
	Larval Survey	Breezy Point Road, Great Road, Walnut Street, Acorn Park Drive, Chestnut Street, Beechnut Street, Great Road
04-01-08	Larviciding	Skyline Drive, Great Road, Main Street, Nagog Hill Road
	Larval Survey	Skyline Drive, Great Road, Main Street, Nagog Hill Road
04-03-08	Set Up Trap Site	Concord Street
	Trap Site Survey	Davis Road
04-09-08	Public Relations	Windsor Avenue, Chestnut Street, Fort Pond Road
	Larviciding	Chestnut Street, Fort Pond Road, Bulette Road
	Larval Survey	Windsor Avenue, Newtown Road, Fort Pond Road, Bulette Road
04-15-08	Public Relations	Paul Revere Road, Fort Pond Road, Arlington Street, Lincoln Drive
	Larviciding	Paul Revere Road, Arlington Street, Musket Drive, Newtown Road
	Larval Survey	Fort Pond Road, Arlington Street, Lincoln Drive, Jackson Drive, Musket Drive, John Swift Road, Minuteman Road, Newtown Road
04-22-08	Larval Survey	Central Street
04-23-08	Public Relations	Robinwood Road, Albertine Drive, Martin Street, Charter Road
	Larviciding	Robinwood Road, Martin Street, Charter Road, Agawam Road
	Larval Survey	Albertine Drive, Martin Street, Charter Road, Arlington Street
04-24-08	Larval Survey	Central Street
04-25-08	Larval Survey	Central Street
05-01-08	Public Relations	Breezy Pint Road
	Stream Cleaning 15'	Perkins Lane
	Culvert Cleaning (1)	Perkins Lane
	Larviciding	Breezy Point Road, Perkins Lane, Haywood Road
	Larval Survey	Carter Road, Agawam Road, Perkins Lane, Arlington Street, Kennedy Lane, Hayward Road
05-06-08	Public Relations	Taylor Road
	Larviciding	Taylor Road, Concord Road
	Larval Survey	Taylor Road, Barker Road, Stacy' Way, Minot Avenue, Old Village Road, Nagog Hill Road, Concord Road, Great Road
05-13-08	Public Relations	Olde Lantern Road, Tuttle Drive, Arborwood Road, Main Street, Hammond Street
	Larviciding	Main Street, Hammond Street
	Larval Survey	Tuttle Drive, School Street, Hosmer Street, Arborwood Road, Old Meadow Lane, River Street, Main Street, Hammond Street, Taylor Road, Concord Road
05-19-08	Public Relations	Revolutionary Road, Nagog Hill Road, Esterbrook Road
	Larval Survey	Revolutionary Road, Nagog Hill Road, Esterbrook Road
	Catch Basin Larviciding [150]	Stoneymeade Way, Breezy Point Road, Acorn Park Drive, Palmer Lane, Hazelnut Street, Chestnut Street, Beechnut Street, Walnut Street, Nonset Path, Capt. Handley Road, Alexandra Way, Reese Street, Harris Street, Woodfield Road, Shady Lane, Ethan Allen Drive, Paul Revere Road, Betsy Ross Circle, Patrick Henry Circle
05-28-08	Administrative Contact	Police Department
	Public Relations	Nonset Path, Spring Hill Road, Dunster Lane, Phlox Lane, Minot Avenue, Lexington Drive, Pond View Drive, Parker Street, Conant Street, Albertine Drive, Paul Revere Road, Grist Mill Road, Wayside Lane, Main Street, Musket Drive, Jefferson Drive, Revolutionary Road, Washington Drive, Coolidge Drive, Jackson Drive, Madison Lane, Lincoln Drive, Hammond Street, Fort Pond Road, Nagog Hill Road
	Landing Count	Main Street, Coolidge Drive, Central Street

TOWN OF ACTON

DATE	WORK DONE	LOCATION
05-28-08	Adulticiding	Nonset Path, Spring Hill Road, Dunster Lane, Phlox Lane, Minot Avenue, Lexington Drive, Pond View Drive, Parker Street, Conant Street, Albertine Drive, Paul Revere Musket Drive, Jefferson Drive, Revolutionary Road, Washington Drive, Coolidge Drive, Jackson Drive, Madison Lane, Lincoln Drive, Hammond Street, Fort Pond Road, Nagog Hill Road, Grist Mill Road, Wayside Lane, Main Street
	Larval Survey	Main Street
06-04-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Beechnut Street, Harris Street, Wyndcliff Drive, Alcott Street, Esterbrook Road, Patriots Road, Newtown Road, Fort Pond Road, Hayward Road, Agawam Road, Seminole Road, Massachusetts Avenue, Duggan Road, Woodchester Drive, Olde Lantern Road, Tuttle Drive, Central Street, Liberty Street, Faulkner Hill Road, Concord Road, Putter Drive, School Street, Sandalwood Road
	Landing Count	Central Street, Newtown Road, Harris Street
	Set Trap	Concord Road
06-05-08	Public Relations	Harris Street
	Adulticiding	Harris Street
	Pick Up Trap	Concord Road
06-11-08	Administrative Contact	Police Department
	Public Relations	Breezy Point Road, Beechnut Street, Acorn Park Drive, Wyndcliff Drive, Esterbrook Road, Alcott Street, Patriots Road, Newtown Road, Fort Pond Road, Sarah Indian Way, Hayward Road, Tuttle Drive, Summer Street, Duggan Road, Olde Lantern Lane, Woodchester Drive, Grist Mill Road, Liberty Street, Martin Street, Central Street, School Street, Sandalwood Road, Putter Drive, Conant Street, Faulkner Hill Road
	Adulticiding	Breezy Point Road, Beechnut Street, Acorn Park Drive, Wyndcliff Drive, Esterbrook Road, Alcott Street, Patriots Road, Newtown Road, Fort Pond Road, Sarah Indian Way, Hayward Road, Tuttle Drive, Summer Street, Duggan Road, Olde Lantern Lane, Woodchester Drive, Grist Mill Road, Liberty Street, Martin Street, Central Street, School Street, Sandalwood Road, Putter Drive, Conant Street, Faulkner Hill Road
	Landing Count	Wyndcliff Drive
	Set Trap	Concord Road
06-12-08	Pick Up Trap	Concord Road
06-18-08	Administrative Contact	Police Department
	Public Relations	Spruce Street, Quaboag Road, Agawam Road, Seminole Road, Seneca Road, Massachusetts Avenue, Juniper Ridge Road, Nagog Hill Road, Evergreen Way, Willis Holden Drive, Lincoln Drive, Jackson Drive, Washington Drive, Coolidge Drive, Monroe Drive, Revolutionary Road, John Swift Road, Acorn Park Drive, Palmer Lane, Paul Revere Road, Ethan Allen Drive, Ticonderoga Road, Flintlock Drive
	Adulticiding	Nagog Hill Road, Acorn Park Drive, Palmer Lane, Evergreen Way, Willis Holden Drive, Lincoln Drive, Jackson Drive, Washington Drive, Coolidge Drive, Monroe Drive, John Swift Road, Seneca Road, Revolutionary Road, Seneca Road, Quaboag Road, Agawam Road, Seminole Road, Spruce Street, Massachusetts Avenue, Juniper Ridge Road, Paul Revere Road, Flintlock Drive, Ethan Allen Drive, Ticonderoga Road
	Set Trap	Concord Road
06-19-08	Pick Up Trap	Concord Road

TOWN OF ACTON

DATE	WORK DONE	LOCATION
06-25-08	Administrative Contact	Police Department
	Public Relations	Wyndcliff Drive, Beechnut Street, Stoneymeade Way, Coolidge Drive, Newtown Road, Sarah Indian Way, Central Street, Ethan Allen Street, Woodfield Road, Grist Mill Road, Willow Street, Wayside Lane, Tuttle Drive, Apple Valley Drive, Robbins Street, Martin Street, Main Street, Albertine Drive, Conant Street, Silver Hill Road, Lexington Drive, Brucewood Road
	Adulticiding	Wyndcliff Drive, Beechnut Street, Stoneymeade Way, Coolidge Drive, Newtown Road, Sarah Indian Way, Central Street, Ethan Allen Street, Woodfield Road, Grist Mill Road, Willow Street, Wayside Lane, Tuttle Drive, Apple Valley Drive, Robbins Street, Martin Street, Main Street, Albertine Drive, Conant Street, Silver Hill Road, Lexington Drive, Brucewood Road
	Landing Count	Wyndcliff Drive
	Larval Survey	Martin Street
	Set Trap	Concord Road
06-26-08	Pick Up Trap	Concord Road
07-02-08	Set Trap	Concord Road
	Administrative Contact	Police Department, Board of Health
	Public Relations	Lexington Drive, Piper Road, Milldam Road, Chestnut Street, Main Street, Hammond Street, Lincoln Drive, Jefferson Drive, Isaac Davis Way, Cedar Terrace, Paul Revere Road
	Adulticiding	Lexington Drive, Piper Road, Milldam Road, Chestnut Street, Main Street, Hammond Street, Lincoln Drive, Jefferson Drive, Isaac Davis Way, Cedar Terrace, Paul Revere Road
07-03-08	Pick Up Trap	Concord Road
07-09-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Chestnut Street, Harris Street, Minot Avenue, Taylor Road, Newtown Road, Seminole Road, Paul Revere Road, Ethan Allen Drive, Grist Mill Road, Lexington Drive, School Street
	Adulticiding	Chestnut Street, Harris Street, Minot Avenue, Taylor Road, Newtown Road, Seminole Road, Paul Revere Road, Ethan Allen Drive, Grist Mill Road, Lexington Drive, School Street
	Catch Basin Larviciding [88]	Lexington Drive, Lisa Lane, Bellantoni Drive, Old Colony Lane, Heritage Road, Foster Street, Russell Road, Hosmer Street, Robinwood Road, Brucewood East Road, Sandalwood Road, Guswood Road, Arborwood Road, Fernwood Road, Driftwood Road, Brucewood Road
07-09-08	Set Trap	Concord Road
07-10-08	Pick Up Trap	Concord Road
07-15-08	Catch Basin Larviciding [103]	Ethan Allen Drive, Ticonderoga Road, Powder Horn Lane, Flint Lock Drive, Black Horse Drive, Winter Street, Arlington Street, Kingman Road, Castle Drive, Notre Dame Road, Smart Road, Townsend Road, Marion Road, Squirrel Hill Road, Highland Road
	Set Trap	Concord Road
07-16-08	Pick Up Trap	Concord Road
	Administrative Contact	Police Department, Board Of Health
	Public Relations	Musket Drive, Revolutionary Road, Jefferson Drive, Washington Drive, Wilson Lane, Monroe Drive, Jackson Drive, Lincoln Drive, Madison Lane, Fort Pond Road, Sarah Indian Way, Newtown Road, Minot Avenue
	Adulticiding	Fort Pond Road, Sarah Indian Way, Newtown Road, Lincoln Drive, Jackson Drive, Washington Drive, Jefferson Drive, Musket Drive, Revolutionary Road, Wilson Lane, Madison Lane, Minot Avenue

TOWN OF ACTON

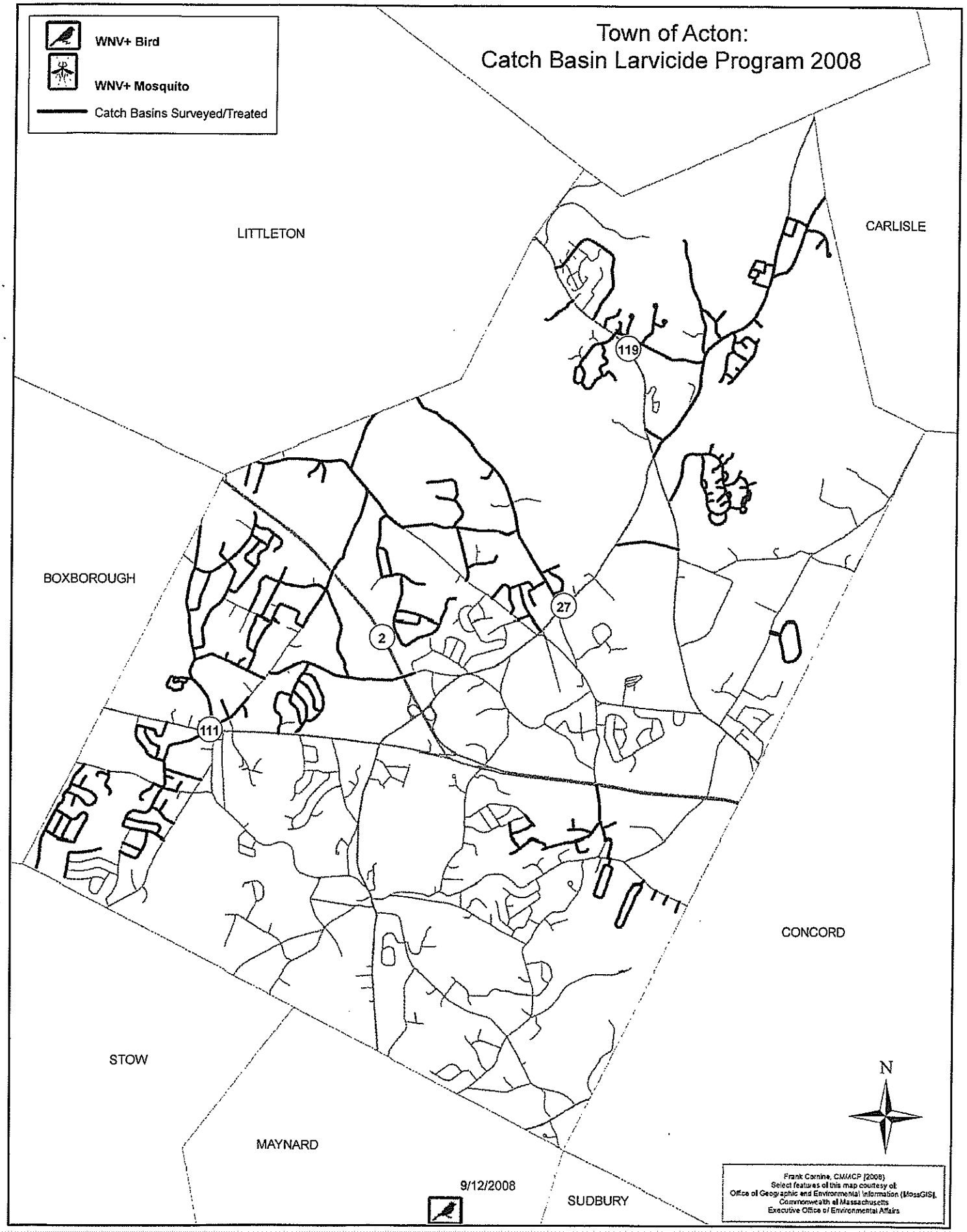
DATE	WORK DONE	LOCATION
07-16-08	Catch Basin Larviciding [600]	Homestead Street, Birch Ridge Road, Juniper Ridge Road, Cherry Ridge Road, Half Moon Hill, Spruce Street, West Road, Elm Street, Jesse Drive, Elm Court, Arlington Street, Charter Road, Freedom Farm Road, Mohegan Road, Agawam Road, Seminole Road, Oneida Road, Cherokee Road, Huron Road, Nashoba Road, Central Street, Littlefield Road, Orchard Drive, Lillian Road, Bulette Road, Chaffin Way, Isabella's Way, Fort Pond Road, Madison Lane, Lincoln Drive, Jackson Drive, Washington Drive, Wilson Lane, Coolidge Drive, Hemlock Lane, Putnam Road, Patriots Road, Woodbury Lane, Larch Road, Evergreen Road, Samuel Parlin Drive, Hammond Street, Willis Holden Drive, Sutton Place, Long Ridge Road, Partridge Hollow, Brook Street, Deergrass Lane, Davis Road, Bellows Farm Road, Bramble Way, Sweetbriar Way, Winding Wood Lane, Quail Run, Hartland Way, Carlisle Road, North Street, Sachem Way, Captain Handley Road, Alexander Way, Reeve Street, Granite Road, Ledge Rock Way, Quarry Road, Milldam Road, Till Drive, Wheeler Lane, Eastern Road, Marshall Path, Cross Street
07-23-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Ethan Allen Drive, Olde Lantern Road, Grist Mill Road, Apple Valley Drive, School Street, Lexington Drive, Parker Street, River Street, Francine Road, Breezy Point Road, Chestnut Street, Strawberry Hill Road, Freedom Farme Road, Central Street
	Adulticiding	Breezy Point Road, Chestnut Street, Strawberry Hill Road, Freedom Farme Road, Central Street, Ethan Allen Drive
	Set Trap	Concord Road
07-24-08	Pick Up Trap	Concord Road
07-30-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Grist Mill Road, Olde Lantern Lane, Apple Valley Drive, Albertine Drive, Parker Street, River Street, School Street, Lexington Drive, Brucewood Road, Francine Road, Joseph Reed Lane, Deacon Hunt Drive, Captain Browns Lane, Mohawk Drive, Newtown Road, Sarah Indian Way
	Adulticiding	Grist Mill Road, Olde Lantern Lane, Apple Valley Drive, Albertine Drive, Parker Street, River Street, School Street, Lexington Drive, Brucewood Road, Francine Road, Joseph Reed Lane, Deacon Hunt Drive, Captain Browns Lane, Mohawk Drive, Newtown Road, Sarah Indian Way
	Set Trap	Concord Road
07-31-08	Pick Up Trap	Concord Road
08-06-08	Set Trap	Concord Road
	Administrative Contact	Police Department, Board Of Health
	Public Relations	Chestnut Street, Lincoln Drive, Jackson Drive, Washington Drive, Coolidge Drive, Deacon Hunt Drive, Woodchester Drive, Patrick Henry Circle, Flintlock Drive
	Stream Cleaning 5'	New Town Road
	Stream Cleaning 5'	New Town Road
	Stream Cleaning 20'	New Town Road
	Stream Cleaning 5'	New Town Road
	Stream Cleaning 25'	Charter Road
	Stream Cleaning 30'	Charter Road
	Stream Cleaning 20'	Charter Road
	Stream Cleaning 10'	Arlington Road
	Stream Cleaning 5'	Hammond Street
	Stream Cleaning 10'	Isabella's Way
	Stream Cleaning 10'	Chaffin Way
	Culvert Cleaning (24)	New Town Road, Charter Road, Arlington Road, Jackson Road, Hammond Street, Nagog Hill Road, Isabella's Way, Chaffin Way
08-07-08	Pick Up Trap	Concord Road

TOWN OF ACTON

DATE	WORK DONE	LOCATION
08-13-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Strawberry Hill Road, Chestnut Street, Main Street, Newtown Road, Lincoln Drive, Jackson Drive, Washington Drive, Coolidge Drive, Taylor Road, Conant Street, Willow Street, Nadine Road, Woodchester Drive, Flintlock Drive, Patrick Henry Circle
	Adulticiding	Strawberry Hill Road, Chestnut Street, Main Street, Newtown Road, Lincoln Drive, Jackson Drive, Washington Drive, Coolidge Drive, Taylor Road, Conant Street, Willow Street, Nadine Road, Woodchester Drive, Flintlock Drive, Patrick Henry Circle
	Set Trap	Concord Road
08-14-08	Pick Up Trap	Concord Road
08-20-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Ethan Allen Drive, Ticonderoga Road, Patrick Henry Circle, Summer Street, Olde Lantern Lane, Spruce Street, Seneca Road, Deacon Hunt Drive, Wayside Lane, Hennessey Drive, Apple Valley Drive, Sarah Indian Way, Lincoln Drive, Nagog Hill Road, Strawberry Hill Road
	Larviciding	Ethan Allen Drive, Ticonderoga Road, Patrick Henry Circle, Summer Street, Olde Lantern Lane, Spruce Street, Seneca Road, Deacon Hunt Drive, Wayside Lane, Hennessey Drive, Apple Valley Drive, Sarah Indian Way, Lincoln Drive, Nagog Hill Road, Strawberry Hill Road
	Set Trap	Concord Road
08-21-08	Pick Up Trap	Concord Road
08-27-08	Administrative Contact	Police Department, Board Of Health, Board Of Assessors
	Public Relations	School Street, Apple Valley Drive, Overlook Drive, Windsor Avenue, Fort Pond Road, Jackson Drive, Minot Avenue, Arlington Street, Old Lantern Lane, Highland Road, Paul Revere Road, Patrick Henry Circle, Ethan Allen Drive
	Adulticiding	School Street, Apple Valley Drive, Overlook Drive, Windsor Avenue, Fort Pond Road, Jackson Drive, Minot Avenue, Arlington Street, Old Lantern Lane, Highland Road, Paul Revere Road, Patrick Henry Circle, Ethan Allen Drive
	Larval Survey	Highland Road, Patrick Henry Circle
	Stream Survey	Juniper Ridge Road, Charter Road
	Set Trap	Concord Road
08-28-08	Pick Up Trap	Concord Road
09-03-08	Set Trap	Concord Road
09-04-08	Pick Up Trap	Concord Road
	Administrative Contact	Police Department, Board Of Health
	Public Relations	Patriots Road
	Adulticiding	Patriots Road, Newtown Road
09-10-08	Administrative Contact	Police Department, Board Of Health
	Public Relations	Ethan Allen Drive
	Adulticiding	Ethan Allen Drive
	Larviciding	Walnut Street, Acorn Park Drive, Chestnut Street
	Larval Survey	Breezy Point Road, Great Road, Walnut Street, Acorn Park Drive, Chestnut Street, Beechnut Street
	Set Trap	Concord Road
09-11-08	Pick Up Trap	Concord Road
09-15-08	Larviciding	Acorn Park Drive, Skyline Drive, Great Road, Main Street
	Larval Survey	Acorn Park Drive, Great Road, Skyline Drive, Main Street, Nagog Hill Road
09-17-08	Set Trap	Concord Road
09-18-08	Pick Up Trap	Concord Road
09-19-08	Larviciding	Concord Road, Great Road
	Larval Survey	Nagog Hill Road, Concord Road, Great Road, Esterbrook Road, Strawberry Hill Road, Stoney Meade Way
09-24-08	Set Trap	Concord Road
09-25-08	Pick Up Trap	Concord Road

TOWN OF ACTON

DATE	WORK DONE	LOCATION
09-30-08	Trap Survey	Concord Road
10-01-08	Set Trap	Concord Road
10-02-08	Pick Up Trap	Concord Road
10-06-08	Pick Up Trap Site	Concord Road
10-07-08	Administrative Contact	Assessor's Office
	Stream Survey	Juniper Ridge Road, Spencer Road
10-23-08	Stream Cleaning 20'	Nagog Hill Road
	Stream Cleaning 10'	Nagog Hill Road
	Stream Cleaning 5'	Nagog Hill Road
	Stream Cleaning 30'	Nagog Hill Road
	Stream Cleaning 10'	Nagog Hill Road
	Stream Cleaning 25'	Nagog Hill Road
	Stream Cleaning 15'	Nagog Hill Road
	Stream Cleaning 10'	Nagog Hill Road
	Stream Cleaning 5'	Sutton Place
	Stream Cleaning 50'	Sutton Place
	Stream Cleaning 60'	Hammond Street
	Stream Cleaning 75'	Hammond Street
	Stream Cleaning 40'	Larch Road
	Stream Cleaning 10'	Newtown Road
	Stream Cleaning 10'	Newtown Road
	Stream Cleaning 5'	Newtown Road
	Stream Cleaning 15'	Newtown Road
	Stream Cleaning 10'	Newtown Road
	Stream Cleaning 10'	Newtown Road
	Stream Cleaning 5'	Newtown Road
	Culvert Cleaning (28)	Nagog Hill Road, Hemlock Lane, Sutton Place, Hammond Street, Larch Road, Newtown Road
11-03-08	Brush Cutting 670'	Charter Road
11-04-08	Stream Cleaning 670'	Charter Road
11-05-08	Brush Cutting 350'	Charter Road
	Stream Survey	Charter Road
11-12-08	Stream Cleaning 450'	Charter Road
11-14-08	Administrative Contact	Board of Health
12-10-08	Administrative Contact	Board of Health
	Stream Cleaning 50'	Hayward Street
	Stream Cleaning 50'	Hayward Street
	Stream Cleaning 300'	Charter Road
	Stream Cleaning 60'	Perkins Lane
	Stream Cleaning 100'	Arlington Street
	Stream Cleaning 125'	Arlington Street
	Stream Cleaning 50'	Arlington Street
	Stream Cleaning 5'	Arlington Street
	Culvert Cleaning (15)	Arlington Street, Hayward Street, Charter Road, Perkins Lane
12-15-08	Stream Cleaning 45'	Fort Pond Road
	Stream Cleaning 20'	Fort Pond Road
	Stream Cleaning 15'	Nagog Hill Road
	Stream Cleaning 20'	Newtown Road
	Stream Cleaning 10'	Newtown Road
	Stream Cleaning 10'	Bulette Road
	Stream Cleaning 35'	Newtown Road
	Stream Cleaning 10'	Chaffin Way
	Stream Cleaning 30'	Hayward Road
	Stream Cleaning 5'	Elm Street
	Stream Cleaning 10'	Mohawk Drive
	Stream Cleaning 20'	Mohawk Drive
	Stream Cleaning 15'	Mohawk Drive
	Stream Cleaning 15'	Mohawk Drive
	Stream Cleaning 15'	Agawam Road
	Culvert Cleaning (28)	Newtown Road, Fort Pond Road, Nagog Hill Road, Bulette Road, Chaffin Way, Jackson Drive, Musket Drive, Hayward Road, Elm Street, Mohawk Drive, Algonquin Road, Seneca Road, Freedom Farme Road, Agawam Road


WNV+ Bird
WNV+ Mosquito
Catch Basins Surveyed/Treated
Town of Acton:
Catch Basin Larvicide Program 2008
LITTLETON
CARLISLE
BOXBOROUGH
STOW
MAYNARD
SUDBURY
CONCORD
119
27
2
111
N
9/12/2008
Frank Cornine, CMMCP (2008)
Select features of this map courtesy of:
Office of Geographic and Environmental Information (MassGIS),
Commonwealth of Massachusetts
Executive Office of Environmental Affairs

2008 SUMMARY

The Central Massachusetts Mosquito Control Project (the Project) currently provides its services to 38 cities and towns throughout Middlesex and Worcester Counties. The Project's headquarters is located at 111 Otis Street, Northboro, MA. Tours of the headquarters or visits to field work sites may be arranged by calling the office in advance. Please call (508) 393-3055 during business hours for more information. The Project practices Integrated Pest Management (IPM), blending state of the art methods and techniques with expertise, experience, and scientific research to provide our member communities with environmentally sound and cost effective mosquito control.

During 2008 the Project received ten thousand, six hundred and fifty (10,650) requests for service from town residents and officials. Eleven thousand, three hundred and twenty seven (11,327) pounds of Bti (*Bacillus thuringiensis israelensis*) was applied by helicopter in 3 towns, Chelmsford, Billerica & Boxborough, and five thousand, eleven thousand, one hundred and fifteen (11,115) pounds by hand throughout our service area were applied to area wetlands to reduce the emergence of adult mosquitoes. This represents over four thousand, four hundred and forty eight (4,488) acres of wetland that was treated with this mosquito-specific bacterium, significantly reducing adult mosquito populations in these areas. Thirty four thousand, nine hundred and thirty five (34,935) catch basins were treated with larvicidal product to control the mosquitoes that seek out these cool dark wet areas to breed, including the *Culex* mosquito, a major target for West Nile Virus transmission. Three thousand, two hundred and seven five (3,275) culverts were cleaned in an attempt to eliminate unnecessary standing water and reduce mosquito breeding. This work was done in conjunction with cleaning, clearing, and digging of one hundred and fifty five thousand, six hundred and fifty seven (155,657) feet of streams, brooks and ditches. This represents nearly twenty nine and a half (29.5) miles of waterways which were cleaned and improved by Project personnel in 2008.

The Mosquito Awareness Program which we offer to elementary schools and other civic organizations in our district has become very popular. Project staff meets with students, teachers or concerned residents to discuss mosquito biology, mosquito habitat, and control procedures. Much of the presentation is directed towards what children and their families can do to prevent mosquitoes from breeding around their homes. Slides, videos, coloring books and other handouts make this an interesting program. This program is tailored to meet the needs of the specific audience. In 2008, CMMCP laboratory personnel made sixty one (61) educational presentations before two thousand, nine hundred and fifty two (2,952) students in twelve (12) Elementary schools and twenty five (25) members of a youth group. CMMCP gave a presentation on our program to 12 Clarke University students in the Clarke Vector Ecology program.

As part of our effort to reduce the need for pesticides we continue to expand our wetlands restoration program. By cleaning clogged and overgrown waterways, mosquito breeding can be reduced and drainage areas are restored to historic conditions.

Bti mosquito larvicide is used to treat areas where mosquito larvae are found. We routinely check known breeding sites kept in out database, but also encourage the public to notify us of any areas they suspect could breed mosquitoes. Our field crews will investigate all such requests and treat the area only if surveillance gathered at the time shows an imminent threat of mosquito emergence.

Our goal is to manage all mosquito problems with education, wetlands restoration or larviciding, but we recognize that there are times when adult mosquito spraying is the only viable solution. In such cases specific areas are treated with either hand-held or pickup truck mounted sprayers if surveillance gathered at the time exceeds a pre-determined threshold to warrant an application. This program is offered on a **request-only** basis, and the exclusion process allows residents and/or town officials to exclude areas under their control from this or any part of our program.

The Project's surveillance program monitors adult mosquito and larval population density, and is the backbone for prescribing various control techniques. Specialized mosquito traps are deployed throughout the Project's service area to sample for mosquitoes that may be transmitting mosquito-borne diseases. In conjunction with the Mass. Dept. of Public Health we sample in areas suspected of harboring WNV and other viruses. Eight hundred and fifty four (854) pools (collections) of mosquitoes totaling seventeen thousand four hundred and twenty-eight (17,428) specimens were tested for mosquito-borne viruses this year. 10 collections were identified positive with West Nile Virus (WNV) - details are available in the Medical Entomology report in this document. No human cases of EEE or WNV were identified in our service area. CMMCP lab personnel made eight thousand, six hundred and seventeen (8,617) total collections of mosquitoes containing forty five thousand, one

hundred and sixty two (45,162) individual specimens, representing thirty five (35) mosquito species.

Some additional highlights from 2008:

- Resistance management study; no significant resistance to pyrethroids noted, no change recommended in adulticide material choice (see full report).
- Adulticide (barrier treatment) efficacy; 4-5 weeks of control noted with rebound in mosquito densities to pre-application level (see full report).
- Resident satisfaction survey: conclusion; overall satisfaction with the adulticide program was 91.8%, 99.1% plan to use our services again (see full report).
- Working with Tufts Veterinary Hospital to measure effects of adulticide program on non-target effects; no conclusion as of yet, multi year study begun in late 2007.
- Working with CT Agr. Experiment Station to determine host preference of *Culiseta melanura* by collecting and analyzing DNA of blood meals; results expected soon.
- Working with Dr. Thomas Kunz from Boston University on the diet of the little brown bat, *Myotis lucifugus*, to determine how much (if any) of their diet is comprised of mosquitoes; results expected soon
- We have been awarded PESP status by the US EPA again this year. The Pesticide Environmental Stewardship Program (PESP) is a voluntary program that forms partnerships between the EPA and pesticide users to reduce the potential health and environmental risks that may be associated with pesticide use.

Educational pamphlets are available to anyone interested in learning about mosquito control and the services provided by the Project, and these items are routinely stocked in member Town/City Halls and libraries. Display boards with information on our program are rotated through area Town Halls throughout the year. We also have a website, **www.cmmcp.org** that has extensive information on mosquito biology, our control procedures, etc. This website has become a model for other Mosquito Projects and has been widely used throughout our service area and beyond.

We would like to thank you for your support during 2008 and we look forward to helping you and your community with its mosquito problems in 2009 and beyond.