SUMMARY OF GENERIC ENVIRONMENTAL IMPACT REVIEW (GEIR) UPDATES MASSACHUSETTS *MOSQUITO CONTROL PROGRAM #5027*

INTRODUCTION

The Commonwealth of Massachusetts has in place regulations that create a uniform system for compliance with the Massachusetts Environmental Policy Act or MEPA, (M.G.L. c. 30, sections 61 through 62 H, inclusive).

The purpose of MEPA and its regulations is to provide meaningful opportunities for public review of the potential environmental impacts of Projects such as for mosquito control.

The MEPA review, and in this case, the special review process is an informal administrative process that is intended to involve any interested agency or person as well as the proponent and each participating agency. The Secretary of Energy and Environmental Affairs (EEA) conducts MEPA review in response to one or more review documents prepared and filed by a Proponent; *in this case the State Reclamation and Mosquito Control Board (hereafter the Board)*. The Secretary's decision that a review document is adequate or that there has been other due compliance with MEPA means that the Proponent, the Board has adequately described and analyzed the Mosquito Control Program its alternatives, assessed its potential environmental impacts, and mitigation measures.

Mosquito control in Massachusetts has been subject to MEPA review. In 1998, a Generic Environmental Impact Report (GEIR) was commissioned and submitted to MEPA. The document can be found at the Board's website (http://www.mass.gov/agr/mosquito/geir.htm). This meaningful document summarizes the history of mosquito control in Massachusetts, describes the extent of problems due to mosquitoes, reviews the scope and effectiveness of past and current control practices, discusses the potential and real environmental costs of such actions, reviews alternative strategies, and makes recommendations for future improvement. It was intended as a living document, to be updated as practices and procedures advanced**.**

During original time of the **review**, the GEIR identified a few diverse issues that needed clarification such developing Best Management Practices (BMP) for specific mosquito control activities and practices. Addressing such issues would incrementally improve the general practice of mosquito control in Massachusetts; see Documents 4 and 5, "MEPA Certificate_5027_February 15, 2008" and "MEPA Certificate _5027_October 25, 1998" of the 1st EIR filing (http://www.mass.gov/agr/mosquito/mepa_filing_102408.htm).

One such issue, for example, was the lack of a statewide Best Management Practices (BMP) for conducting mosquito control in freshwater habitats. This document was developed when all the parties involved such as regulators, environmentalists, and mosquito practitioners came together to ensure that mosquito activities in these sensitive areas would follow a agreed upon set of standards (or BMP) to both control mosquitoes and minimize impacts to the environment; see "Document 2 - Freshwater BMP to MEPA_ Oct_24_2008" from the 1st EIR filing or
http://www.mass.gov/agr/mosquito/docs/mepa/Document_2_Freshwater%20BMP%20to%20MEPA_%20Oct_24_2008.pdf

The GEIR was thus approved by MEPA with the condition that updates would be forthcoming as they became available. The Updates (as mentioned above) provide the public with an opportunity to express concerns and/or satisfaction with mosquito control practices and procedures; see, for example, Document 4 – Appendix 2, Response to Comments and Comment Letters from 1st EIR Update October 24, 2008.
http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_2.pdf

In addition, to Freshwater BMP, the Board recently submitted an update to the Secretary of EEA to inform Massachusetts citizens as to what mosquito control comprises, including the status of selected activities from 1998 to the present (see Document 1 of the August 14, 2009 MEPA filing - "Cover Letter to MEPA_08_14_09").
http://www.mass.gov/agr/mosquito/docs/mepa2/2nd_eir_mepa_cover_letter.pdf

By necessity, this update (August 14, 2009 MEPA filing, Document 2, "Update to the 1998 Mosquito Control Program Generic Environmental Impact Report") is extensive and there are many associated documents and appendices.
http://www.mass.gov/agr/mosquito/docs/mepa2/geir_update_2009.pdf

The GEIR and associated MEPA filings are resources for the public to become educated about mosquito control in Massachusetts. For example, concerns about the effects of mosquito control practices and procedures on the environment, such as the use of insecticidal spraying, might be alleviated if it were widely known that there is a rigorous regulatory mechanism in place at the federal and state levels to review and approve mosquito control products. The U.S. Environmental Protection Agency (EPA) mandates specific requirements for use of these chemicals, including the training and credentialing of personnel, by issuing a Label for each chemical (see Document 6/Appendix 4, "MCP Product MSDS and Labels, MEPA filing August 14, 2009). http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_4.pdf

SUMMARY OF GENERIC ENVIRONMENTAL IMPACT REVIEW (GEIR) UPDATES
MASSACHUSETTS *MOSQUITO CONTROL PROGRAM #5027*

The following discussion provides a brief summary of the Board's MEPA filing for August 14, 2009, essentially fulfilling the task of updating the mosquito GEIR.

Shortly after 1998, West Nile virus (WNv) a newly emerging mosquito-borne threat made it necessary to develop and formulate an appropriate response. As a result, numerous meetings, workshops, and conference calls were conducted in order to update the 1998 Mosquito GEIR.

MOSQUITO CONTROL-THE NEED

There is no "good" mosquito bite. Most people think of mosquitoes as only an annoyance that does not let them enjoy their backyards. Reducing such annoyance improves the quality of life for many citizens. However, mosquito bites are mainly a public health issue. Over 50 species of mosquitoes are found in Massachusetts (Table #) and many of these species are presumed vectors for mosquito-borne viruses (arbo-viruses). Although mosquito-transmitted diseases are considered rare in Massachusetts, those people who get infected may have their lives changed, or even die. Eastern equine encephalitis virus (EEEv) is one of the most dangerous vector-borne virus infections in the world: there is no treatment, and a third of the people who get sick die. Those who do not die often will have permanent brain damage. West Nile virus (WNv) can cause fever in about 10% of the people who get infected; those who get neurological disease have a 3-15% chance of dying. There are other poorly studied viruses transmitted by mosquitoes in Massachusetts, including Jamestown Canyon, Cache Valley, and Lacrosse viruses. These may cause a disease comprising a week of fever and headache that resolves spontaneously. The incidence is not known, but virtually all deer are infected by Jamestown Canyon virus, suggesting that it is a common cause of fevers in humans.

Thus, although the actual number of reported cases of mosquito-borne disease is low, prediction of where and when mosquitoes may contain virus, the public should try to avoid bites whenever possible. EEEv, for example, once appeared to be restricted to southeastern Massachusetts; virus-carrying mosquitoes are now frequently detected in North Shore communities and have even been found in south central Massachusetts.

Increasingly, changes in or variable weather can cause local conditions that foster even greater numbers of mosquitoes. Non-native mosquitoes such as the Asian tiger mosquito (found in 2000 and recently in New Bedford, MA in September 2009 or the Asian rock pool mosquito have invaded North America and could become a problem in Massachusetts.

The introduction of WNv to North America suggests the possibility that other globally important mosquito-borne infections such as Chikungunya, Rift Valley, or Sindbis fevers could also become endemic here. Therefore, it is necessary that Massachusetts maintain a modern mosquito control infrastructure to defend or respond against such current and future arbovirus threats.

MOSQUITO CONTROL-WHAT IS IT?

Ideally, individual citizens can clean up around their homes to discourage mosquito development; wear clothing that reduces the attraction for mosquitoes to bite, avoid outdoor activity at peak mosquito times; or use repellants judiciously whenever they are outdoors. However, in reality these recommendations are not always followed. "Mosquito control" seeks to reduce annoyance by mosquitoes and thereby reduce the small risks of infection to even smaller levels. Mosquito control comprises 6 activities. Only 3 of these activities actually involve "controlling" mosquitoes (larviciding, adultiding, and water management). The other important activities are public education, surveillance, and research.

Female mosquitoes need blood to lay eggs. Each time a mosquito bites, it will allow the production of a few dozen eggs; once these are laid, a female mosquito may bite again and lay more eggs. Eggs are laid near or on water. The eggs for some species of mosquitoes hatch quickly and others may lay dormant over the fall and winter, hatching in the spring. Larval or immature mosquitoes live in water and feed on organic material. Depending on temperatures, usually in two weeks, they turn into a pupa (*non-feeding stage*), which also lives in the water. Within a few days, the adult mosquito emerges from the pupa. Male and female mosquitoes mate after emergence, and the females start to seek someone or something such as birds and animals to bite; males feed on plant sugar sources. Based on the mosquito life cycle, there are 4 places to beat the cycle.

(1) Prevent female mosquitoes biting by using personal protection or by spraying (adulticiding).
(2) Prevent eggs from being laid or hatching by eliminating stagnant water.
(3) Prevent larvae from developing by killing them.
(4) Prevent pupae from turning into adult mosquitoes by suffocating them.

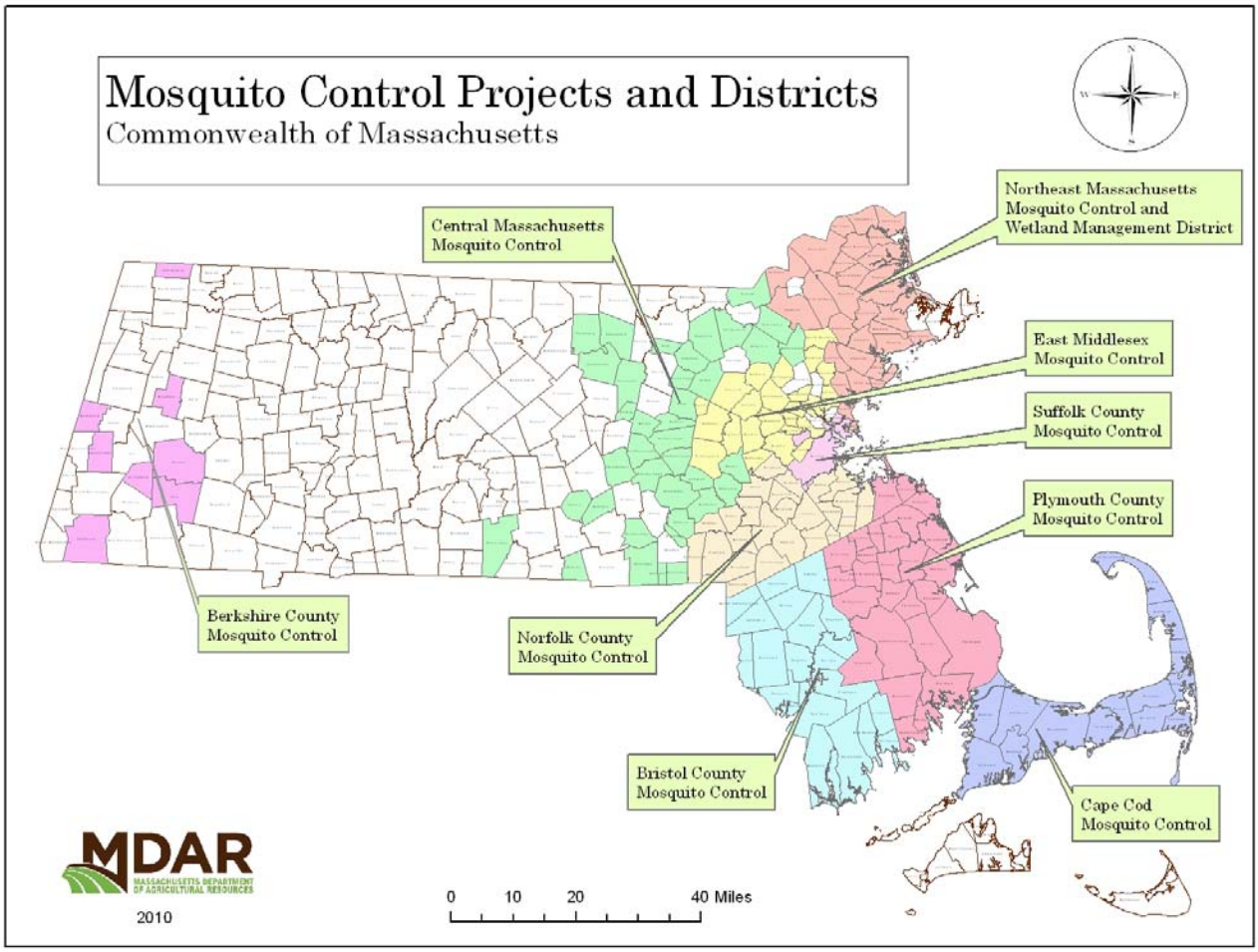
It is important to remember that mosquitoes can be controlled but not eradicated. Eradication, or the process of making an animal locally extinct, is not possible given how many eggs even a single female mosquito can lay; given that some adult mosquitoes may be hiding in places where spray cannot reach; or given that not all breeding sites or adult mosquito habitats are accessible. As one brood of larvae is dying from larviciding effects, egg bearing female mosquitoes is getting ready to lay more eggs.

Different species of mosquitoes (and there are over 50 different kinds in Massachusetts) may become active and replace the ones that have been common within the last month. Some species will thrive in re-flood areas; others in catch basins, salt marshes, and any area where water is shallow and non-flowing. This is why standard mosquito control activities must be repeated periodically, even on a weekly basis. Even saturating the environment with insecticides would not eradicate mosquitoes and would be likely to have unwanted effects on the environment. "Mosquito control" produces temporary and time-limited effects on the local density of a very prolific insect. Nonetheless, standard, and when necessary, emergency operations will provide relief from annoyance and suppression of mosquito-borne disease risk.

ORGANIZATION OF MOSQUITO CONTROL IN MASSACHUSETTS.

All mosquito control activities and work are performed pursuant to the provisions of Chapter 252 of the Massachusetts General Laws. This law created a Board called the State Reclamation and Mosquito Control Board. The Board is made up of three (3) members representing the Department of Agricultural Resources (DAR), Department of Conservation and Recreation (DCR), and Department of Environmental Protection (DEP). It's housed within the Department of Agricultural Resources and oversees mosquito control in the Commonwealth of Massachusetts. The Board establishes administrative and technical policy, guidelines, and best management practices to insure that mosquito control programs are effective and safe.

There are nine (9) organized or regional mosquito control projects/districts (MCP) throughout the state encompassing 193 municipalities as member communities (Figure 1). Regional mosquito control projects were either created by special legislation (Acts and Resolves) or by Chapter 252. Each program is overseen by Commissioners whom the Board appoints to a specific term of service.



Each regional mosquito control project employs a director or superintendent to manage the day to day operations. Starting in 2007, the Board requires annual reports of the 9 programs as a means of ensuring public transparency and educating taxpayers about their services and the costs of these services. The 2007, 2008, and 2009 reports can be found at http://www.mass.gov/agr/mosquito/annualreports.htm.

Finally, the Board's staff consists of 2.5 FTE's that includes a critical position titled projects administrator to manage all of the state accounting and fiscal transactions for these mosquito control projects.

MCP control mosquitoes using an approach known as Integrated Pest Management or IPM. IPM includes a variety of strategies such as monitoring for both immature and adult mosquitoes. IPM helps the MCP to make intelligent decisions on how best to control mosquitoes in various areas while at the same time minimizing impacts to the environment. IPM identifies, documents, and corrects conditions conducive to development of mosquitoes. IPM establishes outreach efforts to educate the public on how best to reduce of sources of mosquitoes in and around their property. IPM include the use of biological control methods such open marsh water management (OMWM) to increase fish and birds on salt marsh areas. IPM also involves the judicious use of pesticides using lower risk products such as environmentally acceptable larvicide (those pesticides that impact the immature mosquito, and, when necessary, adulticides (those pesticides that impact adult mosquitoes). Diverse situations and objectives involve diverse approaches and decision making steps based on IPM and in emergency situations a variety of state agency stakeholders.

Mosquito control activities in Massachusetts are based upon a number of factors, including but not limited, to larval (immature mosquitoes) and adult mosquito surveys, public health data, local ecology and topography, costs, local and regional values/needs, weather, and other pertinent conditions. The scope and type of tactic used to control mosquitoes can differ from one mosquito control project to another due to differences in geographic location, topography, budgets, and mosquito species. Management strategies for inland fresh water mosquitoes would include source reduction (e.g. freshwater water management, elimination of used tires), larviciding and adulticiding. Salt marsh or coastal site management relies heavily on larviciding where OMWM has not yet taken or cannot take place because breeding sites are predictable and accessible.

MOSQUITO CONTROL SPECIFIC ACTIVITIES

LARVICIDING

Wetlands and suspected mosquito breeding sites are checked from March through September to determine the need for applications of environmentally sensitive products (typically Bti, a bacterium that specifically kills mosquitoes) to control and/or eliminate the larval mosquito. By controlling mosquitoes in their larval stage the need for adult mosquito spraying is reduced.

In other words, this stage is confined and localized which is ideal for control. MCP staff walks around the woods and fields, and around residential sites looking for signs of mosquito breeding. Mosquito dippers (2 cup capacity white ladles on the ends of wood handles) are used to sample water; any mosquito larvae are counted and recorded. A threshold number, often the finding of 1 larva in 5 dips with the sampling cup, will cause mosquito control staff to apply a larvicide to a site. Bti and other larvicides can be applied by hand or by a broadcast spreader into water sources containing larvae. Some habitats which are not amenable to or have not yet been managed by water management methods may always generate large numbers of "spring snow melt" mosquitoes. The hatching of eggs lay the previous year and development of larvae within puddles formed from melt water is often explosive, yielding hundreds of thousands of mosquitoes a day.

Some MCPs will prevent this by flying over such sites by helicopter and distributing Bti. This one yearly application will reduce 90% or more of the larvae within such sites; see "*2005 CMMCP Larval Control Plan Product Efficacy Evaluation"* pages 4 and 5 of the 94 page Document 11/Appendix 9, (MEPA filing August 14, 2009) "MCP Research", for an example of efficacy data. http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_9.pdf However, because not all larvae are killed, some survive to become adults and lay eggs; these eggs form the next year's crop.

ADULTICIDING

When adult mosquito populations reach levels that cause annoyance, the MCP will receive calls for service, after reviewing MCP data such as trap counts, hand-held or truck mounted sprayers are used to spray insecticides that reduce the adult mosquito levels in residential areas. Mosquito control practitioners have worked diligently over the past 10 years to achieve the goal of reducing the dependency on adulticiding by increasing the emphasis on larviciding, public education and water management.

The decision to spray may come from objective estimates of trends in the mosquito population as determined by trapping (surveillance), or from a citizen request (service call). If a citizen requests service, mosquito control staff visit that person's home and walk around to get a qualitative feel for the problem. Standing water sources are checked for presence of and number of larvae. The number of mosquitoes landing on a mosquito control staff person (for example, more than 1 per minute) is often used as a threshold in deciding whether to spray; (*see Page 27)*, Document 2 of the August 14, 2009 MEPA filing, "Update to the 1998 GEIR". http://www.mass.gov/agr/mosquito/docs/mepa2/geir_update_2009.pdf

When spraying is done, several MCPs post online, every day, a list of tentative spray areas; or the information is accessible by telephone message. Residents who want their property excluded can register their properties with the MCP so that they will not be sprayed. Other laws and regulations require prior written notification to every parent, for example if school properties are to be sprayed.

The chemicals that are used for spraying are insecticides that are synthetic versions of the pyrethrums, which come from chrysanthemums. Some of these versions have ingredients that enhance the insecticide to get quick control. All of these chemicals have been reviewed and approved by the EPA and registered by the Massachusetts Pesticide Board subcommittee. The label directions of all mosquito control products are basically strict rules for the amounts of insecticide that can be applied, when (usually at dusk or during the night, when "good" insects are less likely to be sprayed as well), where, and even for the weather conditions needed (no wind, for example); see August 14, 2009 MEPA filing Document 6/Appendix 4, "MCP Product MSDS and Labels". http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_4.pdf This 130 page document shows the label directions of mosquito control products. The rules also mandate good recordkeeping to account for all amounts of insecticide that is bought, deployed, or destroyed.

MCPs do not have the expertise for performing environmental monitoring sampling and measurement for impacts that have not been observed. This is not a standard for mosquito control operations elsewhere in the United States.

Although there are suggestions that chemicals used in mosquito control may have profound ecological effects, there are no peer reviewed scientific publications that support this (see searches/literature review in Document 14/Appendix #12 of the August 14, 2009 MEPA filing). This 951 page document references many studies that support the above statement. http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_12.pdf It would be difficult to determine whether any accumulations of insecticidal chemicals in the environment come from mosquito control activities as opposed to other use patterns for example from suburban commercial services like lawn care, agricultural operations or, even homeowner use.

Many anecdotal alternatives have been proposed for mosquito control. These include promoting bat or dragonfly populations; mosquito magnets or zappers; or increasing biodiversity. Each of these suggestions is reviewed (*see pages 32-38*) of Document 2, "Update to the 1998 GEIR", MEPA filing of August 14, 2009) http://www.mass.gov/agr/mosquito/docs/mepa2/geir_update_2009.pdf and the literature review in its entirety is presented in Document 13/Appendix 11 of the August 14, 2009 MEPA filing. http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_11.pdf Few of the suggested alternatives have been demonstrated to be effective and should not be considered as replacements for current mosquito control practices and procedures.

WETLAND MANAGEMENT

Mosquitoes need still, stagnant water to complete their metamorphosis from egg to adult. MCPs conduct maintenance on ditches, culverts and man-made ponds to improve water quality and increase water flow, reducing the potential for mosquito breeding. Sediment is removed; vegetation on the edges is reduced; channels are widened or straightened; see MEPA 1st EIR filing, Document 2, "Freshwater BMP to MEPA". http://www.mass.gov/agr/mosquito/mepa_filing_102408.htm Discarded tires (which are an excellent breeding container) are removed if resources permit.

SURVEILLANCE

Mosquito populations are monitored in both the larval and adult stages to determine the appropriate control methods to be employed, prevalent mosquito species, and disease transmission potential. The Massachusetts Department of Public Health (DPH) relies on mosquito control projects to provide mosquitoes for Eastern Equine Encephalitis virus (EEEv) and West Nile virus (WNv) testing to supplement DPH's extensive surveillance program comprising mosquito collections in Southeastern and other Massachusetts locations.

MCPs set traps for adult mosquitoes at fixed locations throughout their service areas; these can be quickly moved to respond to the immediate needs of intensified monitoring of sites where virus is detected. When WNv is confirmed in a town, targeted adulticiding is done in the area where virus-infected mosquitoes were detected. This action is critical to kill other potentially infected mosquitoes.

EEEv detection triggers a decision making process directed by the Department of Public Health; see Document 7 of the 1st MEPA EIR filing, *"MASSACHUSETTS ARBOVIRUS SURVEILLANCE AND RESPONSE PLAN"*. This 21 page plan can be found at the Board's August 14th 2009 2nd filing Document 12 Appendix 10 (*pages 193 to 213*). http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_10.pdf

There are 5 escalating risk levels. Level 5, the greatest risk, is designated when there are one or more human EEEv cases, repeated detection of EEEv within mosquitoes near their homes, and the time of year suggests that mosquitoes can continue to be active. One possible Level 5 action might be to undertake an aerial application of adulticide. This extreme action has only occurred twice in the last 20 years. In this situation, the Board kicks into action its *OPERATIONAL RESPONSE PLAN TO REDUCE THE RISK OF MOSQUITO-BORNE DISEASE IN MASSACHUSETTS*. The Operational Response Plan takes effect only after a decision is made to spray after consultation with stakeholders and monitoring for environmental effects in the event of such an action. This plan can be found at the Board's August 14th, 2009 2nd filing Document 12 Appendix 10 (*pages 214 to 287* http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_10.pdf and includes a copy of the *MASSACHUSETTS ARBOVIRUS SURVEILLANCE AND RESPONSE PLAN* mentioned above.

PUBLIC EDUCATION

Educating the public about mosquitoes and their biology is an important aspect of mosquito control programs. School-aged children from Kindergarten to High School are given information on how to reduce mosquito breeding and how to use personal protection; see August 14, 2009 MEPA filing, Document 8/Appendix 6, "Education and Outreach Examples". http://www.mass.gov/agr/mosquito/docs/mepa2/Slide1.JPG Information brochures are produced and provided to Town boards of health for distribution; brochures are left at each service call to a citizen's home. Mosquito control staff often meet with civic organizations, town/city boards, and participate in Health Fairs. http://www.mass.gov/agr/mosquito/docs/mepa2/Slide2.JPG

RESEARCH

Although MCPs are solely charged with the control of mosquitoes, most check for efficacy of products and techniques, and whenever possible perform research in new or different areas of mosquito control. Tests are done to determine whether mosquitoes are becoming resistant to the insecticides that are being used. Collaborative research with universities include projects such as the measurement of the amount of mosquito parts in bat feces; or the effects of routine spraying on "good" insects. Examples of research papers may be found in the August 14, 2009 MEPA filing Document 11/Appendix 9, "Research by MCPs".
http://www.mass.gov/agr/mosquito/docs/mepa2/appendix_9.pdf

Many MCPs have added or are adding capacity for Geographic Information Systems (GIS) as funding permits. GIS uses high resolution satellite images and data collected on the ground to provide detailed maps of mosquito habitats. Data on mosquito numbers can be added to provide maps of sites that need attention. In addition, new spray systems are computer controlled and use GIS information to precisely deliver swaths of spray, often to an accuracy of 10 meters.

LIST OF MEPA FILINGS: August 14, 2009

Document 1 - Cover Letter to MEPA_08_14_09. This letter formally submits the GEIR Update and associated documents to MEPA.

Document 2 - Update to the 1998 Mosquito Control Program Generic Environmental Impact Report (GEIR) EOEEA #5027 dated August 14, 2009. This is a 45 page document that comprises the GEIR Update.

Document 3 – Appendix 1, Secretary's Certificate_#5027_January 16, 2009. This certificate from the Secretary of Environmental Affairs stipulates the requirements and scope of the GEIR update.

Document 4 – Appendix 2, Response to Comments and Comment Letters from 1st EIR Update October 24, 2008. This appendix contains the comment letters received in response to the first EIR Update, filed October 24, 2008. This filing contained the Freshwater Best Management Practices, Dept of Public Health response plan, summaries of activities and testing done during the 2006 aerial spraying to suppress the risk of EEE; and documents providing information on the main insecticide used in aerial spraying. In addition, SRMCB's formal response to each of the comments is contained here.

Document 5 – Appendix 3, MCP Data Files. This appendix contains raw data provided by MCPs to support the GEIR Update's conclusion that adequate entomological monitoring is being performed, as part of an IPM approach.

Document 6 – Appendix 4, MCP Product MSDS and Labels. The Material Safety Data Sheets and US EPA Labels for each of the chemical products used by MCPs are provided here.

Document 7 – Appendix 5, Adulticide Efficacy Review. A working group from the Dept of Public Health and MCPs reviewed the available scientific literature on the practices and procedures as well as chemicals used for controlling adult mosquitoes and the summary generated by this working group is provided.

Document 8 – Appendix 6, Education and Outreach Examples. Education is an important IPM tenet. Examples of MCP educational materials are provided.

Document 9 – Appendix 7, Post Monitoring Addendum to Freshwater BMP. The Freshwater Best Management Practices document provided for the 1st EIR Update did not provide guidelines for monitoring the efficacy of manipulations of freshwater habitat in terms of reduction of mosquito breeding. This document provides a suggested monitoring protocol.

LIST OF MEPA FILINGS: August 14, 2009

Document 10 – Appendix 8, Customer Satisfaction Survey. Much mosquito control activity in Massachusetts is requested by individual citizens. One MCP, Central Massachusetts Mosquito Control, has undertaken a customer satisfaction survey to determine whether they are meeting the needs of the public.

Document 11 – Appendix 9, Research by MCPs. Although MCPs are service organizations, most conduct research designed to improve their practices and procedures. This appendix provides examples of research papers generated by MCP staff.

Document 12 – Appendix 10, Various Documents such as Board policies, plans, management practices, DAR-DFW MOU, Methoprene Review, 10-year OMWM review, Cranberry Sampling and Anvil 10+10 ULV etc. These documents update the original GEIR The documents are titled and paged as listed below. In addition, the Board now requires annual reports of the 9 mosquito control programs as a means of ensuring public transparency and educating taxpayers about their services and the costs of these services. The reports from all MCPs for 2007, 2008, and 2009 can be found at http://www.mass.gov/agr/mosquito/annualreports.htm

- Board Administrative Policies (**pages 1-21**)
- OMWM (**pages 22-48**)
- Cranberry Sampling for Anvil 10+10 ULV in SE Massachusetts (**pages 49-63**)
- MOU between Division of Fisheries and Wildlife & DOR (**pages 64-67**)
- Freshwater Mosquito Control BMP Letter to Secretary dated October 24, 2008 (**pages 68-72**)
- Letter regarding EEEv Aerial Spray Report for August 22-24, 2006 (**pages 73-80**)
- Memo concerning Choice of Anvil 10+10 ULV for Aerial Mosquito Control dated July 28, 2006 (**pages 81-86**)
- Final Report to EPA for use of Anvil 10+10 ULV (**pages 87-91**)
- Letter dated March 4, 2002 to Director of MEPA regarding updates (**pages 92-94**)
- Comment Letters from public regarding the Board's Freshwater Mosquito Control BMP (**pages 95-119**)
- The Board's Freshwater Mosquito Control BMP document dated October 24, 2008 (**pages 120-147**)
- The Board Responses to Public Comments to the Freshwater Mosquito Control BMP (**pages 148-167**)
- The Secretary's Certificate regarding GEIR #5027 updates dated February 15, 2008 (**pages 168-171**)
- The original Secretary's Certificate regarding GEIR #5027 dated October 25, 1998 (**pages 172-180**)
- The Board's RFR to secure contractor to update the original GEIR dated September 26, 2008 (**pages 181-192**)
- The DPH ARBOVIRUS SURVEILLANCE AND RESPONSE PLAN (**pages 193-213**)
- The Board's OPERATIONAL RESPONSE PLAN TO REDUCE THE RISK OF MOSQUITO-BORNE DISEASE IN MASSACHUSETTS (**pages 214-287**)
- The Board's EEE Aerial Spray Summary report for first round of spraying dated August 18, 2006 (**pages 288-293**)
- The original Final Mosquito Control GEIR dated October 14, 1998 (**pages 294-576**)
- The Methoprene Report for the MA Pesticide Board Subcommittee (**pages 577-616**)
- A public health fact Sheet on Mosquitoes in Massachusetts (**pages 617-618**)
- The Board's Mosquito Misting System Policy (**pages 619-620**)
- The Board's Adult Mosquito Control Pesticide label Compliance Policy regarding protecting honey bees (**pages 621-622**)

•

LIST OF MEPA FILINGS: August 14, 2009

Document 13 – Appendix 11, Literature Review of Alternatives. Comment letters for the GEIR and 1st EIR update filings suggested numerous possible alternatives to current mosquito control practices and procedures. Such alternatives are reviewed with respect to the peer reviewed scientific evidence for their potential use.

Document 14 – Appendix 12, Literature Cited. Copies of the primary peer reviewed scientific literature used to support statements in the GEIR update are provided here if copyright allowed.

Document 15- Appendix 13, Curriculum vitae of consultant. The GEIR update was written by Dr. Sam R. Telford III, ScD. His professional credentials for reviewing such a complex topic are provided in this appendix.