

Recommendations of the Mosquito Control for the Twenty-First Century Task Force



Established by Chapter 120 of the Acts of 2020

March 31, 2022

Acknowledgements

The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) is grateful to all members of the Mosquito Control for the Twenty-First Century Task Force, whose time, efforts, and expertise led to the development of a robust set of recommendations for modernizing the Commonwealth's mosquito control programs. These recommendations and related work products of the Task Force are presented in this summary report, which will be provided to the Massachusetts Legislature. Over the past two years, the Task Force received a range of public input from numerous individuals and organizations who shared their perspectives, real-world experiences, and expertise, as well as providing comments on draft recommendations developed by the Task Force.

In addition, EEA would like to thank MDAR staff for providing the Task Force with technical expertise and knowledge related to historical and current mosquito control activities and programs in Massachusetts.

Finally, the Task Force is grateful to Eastern Research Group (ERG) for the research and preparation of the background report delivered to the Task Force in August 2021 and for providing facilitation and recommendation development support to four subcommittees and the Task Force.

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Introduction

In 2020, the Massachusetts Legislature passed Chapter 120 of the Acts of 2020, which:

- Created the Mosquito Control for the Twenty-First Century Task Force (“Task Force”). Task Force requirements were established in SECTION 3. “(a) There shall be a task force to be known as the mosquito control for the twenty-first century task force. The task force shall study the commonwealth’s mosquito control process established under chapter 252 of the General Laws and this act and recommend comprehensive reforms of the commonwealth’s mosquito control system.” Membership requirements are listed later in the Introduction.
- Required the Task Force to commission a “study by an independent research or academic organization with expertise in the environmental and health effects of pesticides, pest management and mosquito control to complete a comprehensive evaluation of the commonwealth’s mosquito control process for 2020. The evaluation shall determine the effectiveness of any spraying by examining the impact of the spraying on arbovirus diseases, the cost-effectiveness of the spraying, the impact of spraying on the environment, agriculture and wildlife and other factors.” This report, prepared by ERG, is included as Appendix B.
- Specified eleven directives and requested recommendations related to specific directives. These directives are listed later in the Introduction.

The Task Force membership was specified by the Legislature as follows:

“The task force shall consist of the following members or their designee: the secretary of energy and environmental affairs, who shall serve as chair; the commissioner of public health, who shall serve as vice-chair; the commissioner of agricultural resources; the commissioner of conservation and recreation; the commissioner of environmental protection; the director of fisheries and wildlife; and 2 representatives to be appointed by the state reclamation and mosquito control board, 1 of whom shall be a representative of a city or town that is part of a mosquito control district and 1 of whom shall be a representative of a city or town that is not part of a mosquito control district but had significant mosquito activity in the past year.

The task force shall include 15 additional members appointed by the chair, 1 of whom shall be an academic epidemiologist with expertise in arbovirus spread and control, 1 of whom shall be an academic expert in pesticides and mosquito control, 1 of whom shall be an ecological risk assessor with a background in ecotoxicology, 1 of whom shall be commissioner of a regional mosquito control program in the commonwealth, 1 of whom shall be a superintendent, director or manager of a regional mosquito control program in the commonwealth, 1 of whom shall be an individual with a valid Massachusetts pesticide applicator license or certification, 1 of whom shall be a representative of a statewide land conservation organization, 1 of whom shall be a representative of a regional or statewide river protection organization, 1 of whom shall be a

representative of a statewide wildlife protection organization, 1 of whom shall be a representative of a statewide organization representing farms and agriculture, 1 of whom shall be a representative of a statewide organization representing organic farms and agriculture, 1 of whom shall be a representative of a statewide organization representing bee keepers or groups concerned about pollinators, 1 of whom shall be a representative of a Massachusetts public water supplier and 1 of whom shall be a representative of the Massachusetts Water Works Association, Inc. and 1 of whom shall be a microbiologist with expertise in zoonotic diseases whose transmission to humans is facilitated by insects and ticks.”

Mosquito Control for the Twenty-First Century Task Force Membership

Ex-Officios or Designees	Name
Secretary of Energy and Environmental Affairs (Chair); Designee	Bethany Card
Commissioner of Public Health (Vice-Chair); Designee	Kevin Cranston
Commissioner of Agricultural Resources	John Lebeaux
Commissioner of Conservation and Recreation; Designee	Nicole Keleher
Commissioner of Environmental Protection; Designee	Kathleen Baskin
Director of Fisheries and Wildlife; Designee	Eve Schluter

State Reclamation and Mosquito Control Board Appointees	Name
Representative of a city or town that is not part of a mosquito control district but had significant mosquito activity in the past year	Derek Brindisi
Representative of a city or town that is part of a mosquito control district	Heidi Porter

Additional Members of Task Force	Name
Representative of a regional or statewide river protection organization	Julia Blatt
Microbiologist with expertise in zoonotic diseases whose transmission to humans is facilitated by insects and ticks	Tonya Colpitts
Representative of a statewide organization representing bee keepers or groups concerned about pollinators	Anita Deeley
Representative of a statewide wildlife protection organization	Russell Hopping
Representative of a Massachusetts public water supplier	Kimberly LeBeau
Individual with a valid Massachusetts pesticide applicator license or certification	Bob Mann
Superintendent, director or manager of a regional mosquito control program	Priscilla Matton
Representative of a statewide organization representing farms and agriculture	Brad Mitchell
Representative of the Massachusetts Water Works Association, Inc.	Jennifer Pederson
Commissioner of a regional mosquito control program in the commonwealth	Richard Pollack

Ecological risk assessor with a background in ecotoxicology	Helen Poynton
Representative of a statewide land conservation organization	Heidi Ricci
Academic expert in pesticides and mosquito control	Stephen Rich
Representative of a statewide organization representing organic farms and agriculture	Richard Robinson
Academic epidemiologist with expertise in arbovirus spread and control	Sam Telford

The Legislature requested that the Task Force develop recommendations for the following directives:

- (i) facilitating the use of integrated pest management, including surveillance, public education, enhanced habitat for mosquito predators and storm water management*
- (ii) promoting public participation in mosquito management decisions*
- (iii) providing for local options regarding the use of pesticides*
- (iv) protecting organic agriculture from pesticide use*
- (v) assessing the need to update the composition of the state reclamation and mosquito control board*
- (vi) developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators*
- (vii) promoting the use of the safest or minimum risk pesticides feasible and employing methods, including product disclosures or implementation of testing protocols and procedures, to avoid the use of pesticides containing per- and polyfluoroalkyl substances*
- (viii) providing for comprehensive annual evaluations of each season's mosquito control process, including the effectiveness of the process in controlling arbovirus and any effects of spraying on the environment, agriculture and wildlife*
- (ix) identifying known ingredients in pesticide products used for mosquito control, analyzing the ability, or lack of ability, to identify such ingredients, and making recommendations for determining such ingredients*
- (x) identifying the challenges, including but not limited to financial barriers, facing municipalities in joining a regional mosquito control project or district*
- (xi) any other priority as determined by the task force*

Summary of Task Force Activities

The Task Force was assembled in 2020 and held its first meeting on August 14, 2020. A full schedule of meetings as well as minutes from each public meeting are presented in Appendix C. All meetings were public and held virtually, via Zoom webinar.

Between Task Force formation and Fall 2020, the Task Force's work focused on familiarization with current mosquito control practices in Massachusetts.

From late Fall 2020 through Winter 2020-2021, the Task Force drafted requirements for and commissioned the independent study to complete a comprehensive evaluation of the commonwealth's mosquito control process, including "effectiveness of any spraying by examining the impact of the spraying on arbovirus diseases, the cost-effectiveness of the spraying, the impact of spraying on the environment, agriculture and wildlife and other factors." Through Spring 2021, EEA oversaw development of the study, which was submitted to the Task Force for its consideration and review on August 16, 2021, and presented at the Task Force meeting on September 2, 2021.

In October 2021, the Task Force created four subcommittees, each responsible for drafting of recommendations within a subset of assigned legislative directives, for eventual consideration by the full Task Force. Each subcommittee met at least eleven times for about two hours each meeting between October 2021 and early March 2022, during which they reviewed the study prepared for the Task Force, defined information gaps, discussed issue areas, developed outlines of recommendations and then draft recommendations for Task Force discussion and debate and public comment, and voted to advance recommendations to the full Task Force.

Overview of Assigned Subcommittee Directives

Mosquito Control Policy Structure Subcommittee

(v) assessing the need to update the composition of the state reclamation and mosquito control board

(x) identifying the challenges, including but not limited to financial barriers, facing municipalities in joining a regional mosquito control project or district

Local Engagement Subcommittee

(ii) promoting public participation in mosquito management decisions

(iii) providing for local options regarding the use of pesticides

(viii) providing for comprehensive annual evaluations of each season's mosquito control process, including the effectiveness of the process in controlling arbovirus and any effects of spraying on the environment, agriculture and wildlife

Pesticide Selection Subcommittee

(vii) promoting the use of the safest or minimum risk pesticides feasible and employing methods, including product disclosures or implementation of testing protocols and procedures, to avoid the use of pesticides containing per- and polyfluoroalkyl substances

(ix) identifying known ingredients in pesticide products used for mosquito control, analyzing the ability, or lack of ability, to identify such ingredients, and making recommendations for determining such ingredients

Best Practices Subcommittee

(i) facilitating the use of integrated pest management, including surveillance, public education, enhanced habitat for mosquito predators and storm water management

(vi) developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators and aquatic life

(iv) protecting organic agriculture from pesticide use

For General Consideration by the Full Task Force and Subcommittees

(xi) any other priority as determined by the task force

Public Input

All Task Force and Subcommittee meetings were public and held virtually via Zoom webinar which included use of the Q&A feature. Meeting information and minutes and presentation materials were posted regularly to the [Mosquito Control for the Twenty-First Century Task Force webpage](#). Further, an online public comment portal remained open for public comment submission throughout the Task Force process. Comments were periodically aggregated, indexed, and shared with members and posted online.

In addition, the Task Force hosted two two-hour listening sessions (May 3, 2021 and February 10, 2022). Task Force members were strongly encouraged to attend the public listening sessions, and were provided a summary of oral public comments, an index of written comments, and copies of all written public comments.

All public comments from this process are presented in Appendix D.

Goal Statement

In February 2022, the Task Force voted to “undergo a process to define goals for mosquito control, in order to effectively advance recommendations to the Legislature.” At the March 3, 2022 Task Force meeting, there was a majority vote (19 of the 20 Task Force members present) to approve the following goal statement.

Massachusetts' mosquito control program and control decisions should:

- *follow best available science;*
- *follow an Integrated Pest Management (IPM) approach;*
- *be designed to minimize impacts on non-target species;*
- *be transparent;*
- *actively engage with the public;*
- *protect public health;*
- *encourage funding and research to fill gaps in available science as necessary; and*
- *minimize incidence of mosquito-borne diseases in humans.*

Mosquito Control for the Twenty-First Century Task Force Recommendations

All recommendations voted on by subcommittees were advanced to the full Task Force for consideration. The following recommendations received majority support from Task Force members present at the March 29, 2022 meeting. On March 29, 2022, when voting took place, 20 of the 23 Task Force members were present. The text of the recommendation and vote outcome, as well as any background information prepared by the subcommittees are presented in this section.

Recommendations Overview
<u>POL-1: Repeal and replace M.G.L. c. 252 and Mosquito Control District (MCD) enabling legislation or amend M.G.L. c. 252 and repeal MCD enabling legislation</u>
<u>POL-2: Amend the Massachusetts Stormwater Handbook (and relevant local land use and stormwater regulations)</u>
<u>POL-3: Revise the structure, function, and funding of MCDs to ensure a comprehensive and cohesive framework for mosquito control across Massachusetts that establishes baseline mosquito control services for all municipalities in the Commonwealth, allows municipalities to join MCDs at lower costs, and allows member municipalities to add services as they wish or as needed</u>
<u>BP-1: Improving Consistency in the Implementation of Integrated Pest Management</u>
<u>BP-3: State-Wide Mosquito Surveillance</u>
<u>BP-4: Improving Consistency in MCD Staffing</u>
<u>BP-5: Statewide Education on Mosquito Management</u>
<u>BP-7: Online Reporting for Commercial Applicators</u>
<u>BP-8: Communication with Public Water Systems</u>
<u>BP-10: Protection of Receptor Areas from Pesticide Run-Off</u>
<u>BP-12: Monitoring and Evaluations After Spraying</u>
<u>BP-13: Research the Impacts of Pesticides on Vulnerable Populations</u>
<u>BP-16: Protected Status of Certified Organic Farms</u>
<u>BP-17: Enhancing and Updating Wetlands Management within Integrated Pest Management</u>
<u>BP-18: Notification</u>
<u>LE-1: Online system for requesting property exclusions and property opt-outs</u>
<u>LE-2: Marking methods for property exclusions and property opt-outs</u>
<u>LE-3: Public engagement</u>
<u>LE-6: Increased sharing of pesticide application locations</u>
<u>PS-1: Active Ingredients</u>
<u>PS-2: Inert Ingredients (Option 1)</u>
<u>PS-4: Selecting Pesticides and Ensuring a Transparent Selection Process</u>
<u>PS-7: Avoiding Use of Pesticides Containing PFAS and Other Contaminants</u>

Recommendation POL-1: Repeal and replace M.G.L. c. 252 and Mosquito Control District (MCD) enabling legislation or amend M.G.L. c. 252 and repeal MCD enabling legislation

Directive: *(v) Assessing the need to update the composition of the State Reclamation and Mosquito Control Board (SRB)*

Background

Chapter 252 of the Massachusetts General Laws (M.G.L. c. 252) was first enacted in 1918 and therefore is out of date, in addition to not providing clear and comprehensive guidance for Commonwealth-wide mosquito management for the twenty-first century. The current SRB lacks official representation from a variety of relevant entities, including agencies such as the Massachusetts Department of Public Health (DPH) and Massachusetts Division of Fisheries and Wildlife (MassWildlife). There is also a lack of clear pathways for guidance for mosquito management to promote cohesive best practices and consistency in decision-making for mosquito management actions across the Commonwealth and within Mosquito Control Districts or Projects (MCDs). Furthermore, the legal structure of MCDs under M.G.L. c. 252 is inconsistent, with some MCDs having been formed directly under M.G.L. c. 252 and others having been formed through individual enabling legislations. These inconsistencies, as well as a lack of comprehensive guidance from M.G.L. c. 252, contribute to a lack of uniformity in decision-making, funding structure, and services offered. Additionally, the current mosquito management program structure lacks opportunities for public input and for the tailoring of mosquito management services to the needs (or desires) of the communities. Furthermore, while M.G.L. c. 252 does not cover most of the practices that constitute current mosquito management operations, it does give the authority to perform actions such as draining wetlands, entering private property for mosquito management, or generally reclaiming land—all of which are no longer considered best practices. An updated mosquito management program should provide services across the entire Commonwealth to ensure comprehensive coverage of ecologically based mosquito management, surveillance, monitoring, and source management (e.g., by helping municipalities revise stormwater practices so they are not creating mosquito breeding grounds, wetlands management, and other interventions).

Wetland managers are making progress on methods for managing and restoring both coastal and inland wetlands with multiple benefits, including—but not limited to—reducing mosquito habitat and increasing access for fish and other mosquito predators. These techniques (e.g., salt marsh runnelling, ditch remediation, culvert replacements, dam removals, restoration of streams and wetlands on abandoned cranberry bogs) could be more broadly applied through a reorganized system that supports mosquito management partnerships with other entities. A more concerted effort to address artificial sources (around homes and businesses, roadside dumping and litter, and/or stormwater management designs) through cooperative outreach and education would also have substantial benefits with no negative environmental or health effects.

Repealing and replacing or revising M.G.L. c. 252 and MCD enabling legislation will create a more standardized policy structure that will serve as a framework for a mosquito management program in the Commonwealth. Amended or new legislation will provide clear guidance on best practices and decision-making and allow for the current SRB to be renamed and restructured to reflect the present-day goals and needs for mosquito management.

Recommendation

An amended M.G.L. c. 252 would have a clear goal statement that emphasizes:

- Protecting public health and the environment by using the best available social and environmental science; encouraging funding and research aimed at evaluating risks and benefits of mosquito management efforts; relying on approaches such as integrated pest management (IPM); and emphasizing transparency in approaches and decision-making.

An amended M.G.L. c. 252 and repeal of enabling legislation would:

- Restructure the existing SRB to create a modified oversight board that includes representation from relevant agencies who are involved in and have expertise in mosquito management.
- Establish modified funding mechanisms for mosquito management services and MCD membership.
- Restructure the existing centralized mosquito control program to allow for more centralized oversight and guidance of MCDs and extend to commercial mosquito management applicators.
- Allow for public input and accountability in the system; at a minimum, any new statewide mosquito management plan should include a requirement to have public input and periodic review.
 - Include information technology (IT) systems and data that support transparency; data on what is being done, where it is located, and the resulting effects.
- Outline clear guidelines that specify the purview of the state, municipalities, and individuals so that respective roles and responsibilities are clear.
- Acknowledge and create systems to continue the administrative functions that are needed to support the system.
- Clearly identify actions needed to transition from the current to the new structure to ensure continuity of mosquito management services.

A restructured oversight board would:

- Have a new name and clear statement of purpose that appropriately reflect the goals of the mosquito management program.
- Ensure scientific consensus in mosquito management approaches, as well as consistency and transparency in decision-making processes at the state and district levels.
- Include representatives from the appropriate state agencies (i.e., Commissioners or their designees) and universities, including representatives from these entities and various groups within the agencies with appropriate expertise:
 - Department of Agricultural Resources
 - Department of Environmental Protection
 - Department of Public Health
 - Department of Fish and Game
 - University of Massachusetts
- Include subcommittees created by the oversight board that ensure the appropriate accountable bodies are represented, such as:
 - Division of Ecological Restoration
 - MassWildlife/Division of Ecological Restoration/Natural Heritage
 - DPH Bureau of Environmental Health
 - Academic and research institutions with relevant expertise (e.g., public health entomology),
 - Massachusetts Department of Conservation and Recreation (DCR)
 - The Massachusetts Municipal Association
 - External human health and ecotoxicology experts
- Be able to create additional subcommittees as needed (e.g., a subcommittee with school boards, departments of education, and others) to bring in additional experts and perspectives as necessary).
- Be able to confer with other states to share best practices, lessons learned, and techniques and insights on mosquito management.
- Expand upon the existing centralized program with centralized operations and human resources functions (e.g., hiring, salary), similar to the centralized administrative functions of the current SRB. A centralized program would extend monitoring and surveillance to areas and species that are not currently monitored. It would also create, support, and regulate regional mosquito management districts or projects to work cooperatively with state and local public health and environmental

agencies to monitor and intervene against mosquitoes and mosquito-borne diseases.

- Provide oversight of public (e.g., MCD) and commercial mosquito management operations. The board could determine the correct balance of state and district oversight to ensure the appropriate level of independence for MCDs, while still providing centralized guidance and allowing municipalities to obtain the mosquito management services they desire and need, recognizing that these needs will vary across the Commonwealth.

An amended funding structure would:

- Ensure that mosquito management services are provided across the Commonwealth—not just where communities can afford services—to ensure comprehensive coverage of monitoring, surveillance, and intervention.
- Potentially include a base fee for municipalities to fund services such as monitoring, education, research, and quality management.
- Fund new data and IT systems to track and report on mosquito management operations, results, opt-out process, and effectiveness of management techniques.
- Fund periodic review of the mosquito management program.

An amended M.G.L. c. 252 and repeal of enabling legislation would create frameworks for:

- Consensus-driven, science-based mosquito management.
- Development of a mosquito-borne disease management plan that includes IPM with standardized metrics, an evaluation protocol to determine efficacy of management, and thresholds for action.
- Engagement with local officials, conservation commissions, and watershed associations.
- Statewide educational outreach and support to local boards of health (BOHs).
- Periodic public input and reviews of program effectiveness to determine preferences of MCD member towns.
 - At a minimum, enable public comment and input on new statewide mosquito management plans.
- Transitioning current MCD staff into the new program so they retain their jobs and mosquito management efforts continue throughout the program/SRB transition period.
- Updating the Generic Environmental Impact Report (GEIR).

Voting Results

	Yes	No	Abstain	Total
POL-1: Repeal and replace M.G.L. c. 252 and Mosquito Control District (MCD) enabling legislation or amend M.G.L. c. 252 and repeal MCD enabling legislation	18	2	0	20

Recommendation POL-2: Amend the Massachusetts Stormwater Handbook (and relevant local land use and stormwater regulations)

- **Directive:** *(v) Assessing the need to update the composition of the State Reclamation and Mosquito Control Board*

Background

Land development efforts may include creating structures to reduce erosion and capture sediments and other contaminants from runoff. Stormwater structures sometimes hold water for sufficient intervals to create productive mosquito habitats, and they are generally known to be monitored or treated by the MCDs.

Updates or amendments to the Handbook and relevant land use and stormwater regulations to require low-impact development practices will contribute to more holistic mosquito management practices across the Commonwealth. They could also contribute to design of maintenance-free or low-maintenance practices and could allow for the consideration of climate change and associated impacts. Stormwater management is part of an MCD's duties, and by encouraging low-impact and low-maintenance design of stormwater management systems, the burden for management could be lessened.

Recommendation

Amend the Massachusetts Stormwater Handbook (and relevant local land use and stormwater regulations) to ensure that newly created stormwater retention and detention basins, including (but not limited to) catch basins, sediment forebays, vegetated filter strips, and bioretention swales:

- Drain or otherwise percolate to a state of no standing water within three days (in the case of stormwater structures that are intended to do so) so as not to provide habitat for the development and emergence of mosquitoes.
- If designed to retain water for longer than three days, allow this to happen, but in a way that does not allow for mosquito breeding (e.g., if the water retention area becomes a more permanent water body, have aquatic organisms present that will eat mosquito larvae). Alternatively, the site can be treated to prevent development and emergence of mosquitoes.
- Use low-impact development techniques that are designed to require minimal maintenance.
- Be maintained with sufficient frequency to preclude these features from producing mosquitoes.
- Be listed with the regional MCD and municipal BOH so that the structures may be monitored and treated, as appropriate.

Voting Results

Title	Yes	No	Abstain	Total
POL-2: Amend the Massachusetts Stormwater Handbook (and relevant local land use and stormwater regulations)	18	2	0	20

Recommendation POL-3: Revise the structure, function, and funding of MCDs to ensure a comprehensive and cohesive framework for mosquito control across Massachusetts that establishes baseline mosquito control services for all municipalities in the Commonwealth, allows municipalities to join MCDs at lower costs, and allows member municipalities to add services as they wish or as needed

Directive: *(x) Identifying the challenges, including but not limited to financial barriers, facing municipalities in joining a regional mosquito control project or district*

Background

A revised framework for the MCDs and their oversight could contribute to greater consistency in mosquito management in MCDs across Massachusetts and could potentially support a “menu-based” approach to mosquito management services. municipalities that are members of MCDs may feel their needs/preferences are better considered through this “menu-based” approach. A “menu-based” approach may be an incentive for more towns to join MCDs, which could contribute to wider-spread education, surveillance, and mosquito management throughout the Commonwealth. If certain services require a minimum of municipalities to sign on to make it financially feasible for a district, MCDs should establish these thresholds or targets and the new oversight board could and should identify means of subsidizing these services if a district cannot recruit the minimum number of municipalities. Note that in municipalities not currently monitored, these additional services will require additional funding and resources.

Recommendation

Revise the structure, function, and funding of MCDs to ensure cohesive and comprehensive mosquito management services across Massachusetts that includes baseline services such as education, surveillance, and source reduction. Revised structure, function, and funding for MCDs would allow municipalities to join MCDs at lower costs and allow member municipalities to add additional services such as local stormwater management, larviciding, and adulticiding as they wish or as needed.

A framework would:

- Provide for two levels of services:
 - **Basic state-funded services** (such as, education; disease [in nonhuman species], pathogen, and mosquito population surveillance; and source reduction) would be performed by the state and supported by tax dollars. All municipalities on a regional basis would receive these services, regardless of MCD membership.
 - **Additional services** (such as larviciding, adulticiding, and local storm water management) would be municipally funded either through cherry sheet deductions or direct appropriation through opting into those services, with

municipalities being required to opt-in for a three-year minimum. Only municipalities that indicate a desire to receive these services would receive them.

- Support a cohesive mosquito management program with all MCDs as part of one system with centralized data systems to keep track of operations and standardized policies that all districts abide by. Data reporting will be overseen by the new oversight board.
- Provide support for the basic and administrative costs of the MCDs, as well as capital improvement and capital equipment costs needed for mosquito management actions.

If disease risk is identified, pathogen-carrying mosquitoes would be managed with the appropriate response as determined by the new SRB.

Voting Results

Title	Yes	No	Abstain	Total
POL-3: Revise the structure, function, and funding of MCDs to ensure a comprehensive and cohesive framework for mosquito control across Massachusetts that establishes baseline mosquito control services for all municipalities in the Commonwealth, allows municipalities to join MCDs at lower costs, and allows member municipalities to add services as they wish or as needed	18	2	0	20

Recommendation BP-1: Improving Consistency in the Implementation of Integrated Pest Management

Directive: *(i) Facilitating the use of integrated pest management*

Background

Integrated Pest Management (IPM) is defined in Chapter 132B of the Massachusetts General Laws (M.G.L. c. 132B), the Massachusetts Pesticide Control Act, as “a comprehensive strategy of pest control whose major objective is to achieve desired levels of pest control in an environmentally responsible manner by combining multiple pest control measures to reduce the need for reliance on chemical pesticides; more specifically, a combination of pest controls which addresses conditions that support pests and may include, but is not limited to, the use of monitoring techniques to determine immediate and ongoing need for pest control, increased sanitation, physical barrier methods, the use of natural pest enemies and a judicious use of lowest risk pesticides when necessary.” See, M.G.L. c. 132B, Section 2. Although the principles of IPM underlie the practice of mosquito control in Massachusetts, there is a lack of consistency in the implementation of IPM across the state and no statewide system for documenting mosquito control actions and associated results. Inconsistent application of IPM and lack of efficacy information for IPM components may result in an increase in the amount of pesticide released into the environment without a commensurate benefit in the reduction of mosquitoes or mosquito-borne diseases.

Recommendation

The implementation of IPM should follow the science-based guidelines and protocols established in a new statewide Mosquito Management Plan to promote more consistent use of all components of IPM across the state. The board overseeing mosquito control in the Commonwealth of Massachusetts (the Board) should direct the preparation of the Plan. The Plan should provide operational guidance and best practices for state agencies and MCDs including:

- A. Implementation guidance on each IPM component
- B. Rationale and thresholds for each IPM component
- C. Guidance for flexibility in implementing IPM
- D. A summary of actions taken, lessons learned, and program data analysis since the prior report
- E. Evaluation of effectiveness and non-target impacts (e.g., human health and ecological impacts) of each IPM component as deemed appropriate and practical by the Board
- F. A summary of new developments in all aspects of IPM for mosquito control using best available information and new data

Additionally:

- As defined in M.G.L. c. 132B, the Plan should involve a combination of “multiple pest control measures to reduce the need for reliance on chemical pesticides.” This means activities including but not limited to surveillance, public outreach and education, and source reduction, when applicable, should be prioritized over the usage of chemical pesticides.
- The existing Massachusetts Department of Public Health (DPH) MA Arbovirus Surveillance and Response Plan and the MDAR MA Operations Response Plan for Mosquito-Borne Illness would be incorporated into the Plan.
- The Plan should include flexibility in mosquito control responses tailored to differences in geography, habitats, disease risk levels, season and weather conditions, mosquito species and abundance, and density of residences.
- Plan updates should consider input from the public as well as the involvement of stakeholders. All components of the Plan should be updated at a minimum of once every three years. Stakeholders should convene annually to determine whether individual components need to be updated more frequently.
- The Commonwealth should establish communication with Beekeepers via the State Apiary Inspector, the Massachusetts Beekeepers Association (MassBee) and local county bee clubs so beekeepers can incorporate best management practices to protect their hives with at least 48 hours’ notice in event of spraying.

Voting Results

Title	Yes	No	Abstain	Total
BP-1: Improving Consistency in the Implementation of Integrated Pest Management	17	3	0	20

Recommendation BP-3: State-Wide Mosquito Surveillance

Directive: *(i) Facilitating the use of integrated pest management*

Background

The monitoring of mosquitoes and surveillance of agents of mosquito-borne disease are essential components of mosquito management in Massachusetts. Accumulated data and trend analysis can inform decisions as to the manner of any intervention and public educational messaging. Current monitoring efforts are performed mainly by personnel from MCDs, and such activities are primarily limited to communities that support their regional MCD. Therefore, there has historically been limited data available from communities that are not part of MCDs, which limits evidence-based risk assessment and decision-making in those areas. This results in an incomplete understanding of mosquito species distribution, populations, and disease risk at the state level necessary for a comprehensive statewide control strategy.

Recommendation

The Legislature is encouraged to authorize and fund an enhanced monitoring network to include areas of the Commonwealth that are not currently served by a regional MCD. The goals would be to increase the spatial coverage of monitoring mosquitoes that are particularly relevant as vectors of disease agents, and to perform surveillance for those vector-borne agents. Surveillance would be guided by a protocol that includes standards for implementation and analysis. Areas to be monitored should be selected on ecological and epidemiological bases rather than on political boundaries. A state-wide agency should be responsible for overseeing this program to ensure procedural and analytical consistency. Said agency can partner with qualified entities as appropriate.

Voting Results

Title	Yes	No	Abstain	Total
BP-3: State-Wide Mosquito Surveillance	19	1	0	20

Recommendation BP-4: Improving Consistency in MCD Staffing

Directive: *(i) Facilitating the use of integrated pest management*

Background

Newer and/or smaller MCDs may not have available entomological and wetland biology/permit specialist expertise. Objective data may thereby be lacking to inform decisions in those areas.

Recommendation

Each MCD should employ or consult with an entomologist to identify mosquitoes and a wetland biologist/permit specialist to evaluate/oversee habitat modification efforts.

Voting Results

Title	Yes	No	Abstain	Total
BP-4: Improving Consistency in MCD Staffing	20	0	0	20

Recommendation BP-5: Statewide Education on Mosquito Management

Directive: *(i) Facilitating the use of integrated pest management*

Background

Educational outreach regarding mosquito management is currently fragmented and uncoordinated in the Commonwealth. Further, no MCD has access to the platform that is available to state officials, in order to issue messages of concern.

Recommendation

A state agency should be principally responsible for statewide education on mosquito management.

Voting Results

Title	Yes	No	Abstain	Total
BP-5: Statewide Education on Mosquito Management	20	0	0	20

Recommendation BP-7: Online Reporting for Commercial Applicators

Directive: *(vi) Developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators and aquatic life*

Background

There is a lack of understanding of the scale of commercial pesticide applications for mosquito control; moreover, commercial pesticide applicators working in the private sector in Massachusetts must submit annual use reports via paper mail. Having ready access to this information through an online system, in addition to including locational information, will allow state agencies to assess private mosquito control measures in conjunction with state control measures for a more complete understanding of annual statewide mosquito control measures.

Recommendation

The Commonwealth should develop an online reporting system for mosquito control-related pesticide application records from commercial applicators working in the private sector. This system would replace the current paper-based reporting and expand the current reporting requirements to identify the location of the application. The information reported to this online system should include product name, Environmental Protection Agency (EPA) registration number, application method, location of application by town, and total amount of product applied, as well as identify the application target as for mosquito control. Reporting would be required at least annually. Funding should be allocated for developing and maintaining this system.

Voting Results

Title	Yes	No	Abstain	Total
BP-7: Online Reporting for Commercial Applicators	17	2	1	20

Recommendation BP-8: Communication with Public Water Systems

Directive: *(vi) Developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators, and aquatic life*

Background

Public Water Systems could benefit from enhanced communication in order to better prepare for the impacts of these events.

Recommendation

The Commonwealth should develop an electronic Geographic Information System (GIS) based system where pesticide applicators communicate spray application plans for aerial and MCD truck-based spray applications. The Massachusetts Department of Environmental Protection (MassDEP) will assist in this endeavor to ensure the MCD and aerial spray applicators can easily view the location of surface water supplies as well as 500-foot aerial application and 300-foot truck-spray buffer zones on all statewide mapping while still maintaining the security of PWS source locations. Additionally, MassDEP shall develop and implement a training program. The main training program goals are to help PWSs a) understand the stakeholders involved and the protective methods employed during applications, b) comprehend spray event sampling protocols, c) communicate “no spray zones” or voice questions to local MCDs, and d) review local aerial and MCD truck-based spray application information. MassDEP can furthermore assist PWSs by providing sample language and response actions for inclusion in Emergency Response Plans.

Voting Results

Title	Yes	No	Abstain	Total
BP-8: Communication with Public Water Systems	18	2	0	20

Recommendation BP-10: Protection of Receptor Areas from Pesticide Run-Off

Directive: *(vi) Developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators and aquatic life*

Background

Not developed.

Recommendation

The Legislature shall fund and the Board shall implement additional research to investigate potential impacts from mosquito-related pesticide run-off on private well sources, wetlands, PWS groundwater source supplies, apiaries, fisheries, streams, farms, recreational water bodies, or any other sensitive receptor as defined by the Board. Research studies shall include, at a minimum, studies on both larvicides and adulticides as well as testing of alternative pesticides and/or formulations with the purpose of identifying if alternative-method applications are needed in certain receptor areas or if application restrictions are recommended. Following research studies, the implementing researcher shall present scientific findings to the Board.

Voting Results

Title	Yes	No	Abstain	Total
BP-10: Protection of Receptor Areas from Pesticide Run-Off	14	6	0	20

Recommendation BP-12: Monitoring and Evaluations After Spraying

Directive: *(vi) Developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators and aquatic life*

Background

Massachusetts currently has limited ecological monitoring in place following aerial adulticide spraying events and does not have a monitoring plan in place to assess the impacts of vehicle adulticide spray events. According to the DPH Arbovirus Surveillance and Response Plan¹, monitoring prior and post aerial adulticide spraying includes:

- Pre and post monitoring of public drinking water supplies and surface areas in the spray area (such as what was conducted in 2019)².
- MassDEP and Massachusetts Department of Agricultural Resources (MDAR) conduct pre and post monitoring of honeybees.
- All agencies (MassDEP, MDAR, MassWildlife, and DPH) collaborate to develop environmental monitoring plans. For example, following an aerial spray event in 2006, MassDEP conducted water sampling, macroinvertebrate surveys, and insect field collections to determine the impact of insecticide spraying on non-target species³. To our knowledge, there is no record of similar studies conducted after other aerial spray events, even after the multiple events in 2019.
- Aerial spraying of insecticides is covered under EPA's [National Pollutant Discharge and Elimination System \(NPDES\)](#) and therefore the SRB must submit a notice of intent prior to spray events that will include applications to bodies of water. If the application area includes [Priority Habitat Areas for endangered species](#), then the SRB must request a permit from the MassWildlife.

¹ Bharel and Cranston, 2021. Massachusetts Arbovirus Surveillance and Response Plan. Massachusetts Department of Public Health. Available at, <https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data>.

² MassDEP, 2020, Response to Eastern Equine Encephalitis Virus Mosquito Control Aerial Spray Events 2019: A Summary of the Surface Water Quality Sampling Operations. Available at, <https://www.mass.gov/doc/response-to-eastern-equine-encephalitis-virus-mosquito-control-aerial-spray-events-2019/download>

³ MA State Reclamation and Mosquito Control Board, 2010. Final Report: Aerial adulticiding intervention to diminish risk of Eastern equine encephalitis virus (EEEV), Southeast Massachusetts. Available at, https://www.cmmcp.org/sites/g/files/vyhlif2966/f/uploads/final_report_-_aerial_adulticiding_intervention_to_diminish_risk_of_eeev_2010.pdf

Although there is limited ecological monitoring in Massachusetts following truck-based adulticide spraying, there is evidence of ecological impacts elsewhere (e.g., Philips et al., 2014⁴). To determine if adulticide spray events in Massachusetts are causing impacts to non-target receptors, the Commonwealth should design an ecological monitoring program that will reveal when impacts are occurring. This information can guide best practices to minimize these impacts. However, designing an effective monitoring program requires knowledge of which non-target receptors may be at greatest risk for adverse effects. Pilot monitoring projects are recommended to inform the creation of a new monitoring program.

Recommendation

To determine if adulticide spray events are causing impacts to non-target receptors, the Commonwealth should design an ecological monitoring program. The appropriate state agencies should be charged to design an effective ecological monitoring plan to assess impacts to non-target receptors following aerial and truck-based adulticide spray events. This monitoring plan will detail which types of biological and chemical surveys should be conducted, when these surveys should occur, and their frequency. Agencies and departments involved in mosquito control (DPH, MCDs) should be involved or consulted during plan development to ensure consideration of logistics and practicalities of adulticide spray events (e.g., limited notice of spray events, unanticipated changes made to spray plans).

To best inform the design of the ecological monitoring plan, state agencies should conduct pilot research projects to determine vulnerable receptors and the environmental compartments where adulticides are applied and/or accumulating. Pilot projects could include experiments before and after adulticide spray events and should take into account that some areas receive multiple adulticide applications over the course of the mosquito season. Pilot projects should consider both chemical monitoring of appropriate media (e.g., water, soil, sediments) and hive products, macroinvertebrate surveys in impacted water bodies, insect field collections, and surveys of pollinators and honeybees.

Funding and personnel resources should be allocated for pilot research projects and for the design and on-going implementation of the monitoring plan.

Voting Results

Title	Yes	No	Abstain	Total
BP-12: Monitoring and Evaluations After Spraying	20	0	0	20

⁴ Phillips, B.M., Anderson, B.S., Voorhees, J.P., Siegler, K., Denton, D., TenBrook, P., Larsen, K., Isorena, P. and Tjeerdema, R.S., 2014. Monitoring the aquatic toxicity of mosquito vector control spray pesticides to freshwater receiving waters. *Integrated environmental assessment and management*, 10(3), pp.449-455.

Recommendation BP-13: Research the Impacts of Pesticides on Vulnerable Populations

Directive: *(vi) Developing procedures to protect human and ecological health and minimize non-target impacts of mosquito pesticides, including, but not limited to, effects on persons with respiratory or immune system illnesses, drinking water supplies, pollinators and aquatic life*

Background

Not developed.

Recommendation

The Commonwealth should fund research into the impacts of pesticide applications for mosquito control on vulnerable populations (e.g., persons with respiratory or immune system illnesses, persons with multiple chemical sensitivities). Findings from the research should inform the future development of procedures to protect human health.

Voting Results

Title	Yes	No	Abstain	Total
BP-13: Research the Impacts of Pesticides on Vulnerable Populations	6	5	9	20

Recommendation BP-16: Protected Status of Certified Organic Farms

Directive: *(iv) Protecting organic agriculture from pesticide use*

Background

Currently, the protection from aerial spraying afforded to certified farms is a DPH policy, but not a law, and as such is revocable by executive action. Should the Legislature deem it necessary to reverse that protection for a specific arbovirus outbreak, they could vote to do so.

Recommendation

Codify the protection from aerial spray for certified organic farms in legislation, not just in policy.

Voting Results

Title	Yes	No	Abstain	Total
BP-16: Protected Status of Certified Organic Farms	14	5	1	20

Recommendation BP-17: Enhancing and Updating Wetlands Management within Integrated Pest Management

Directive: *(i) Facilitating the use of integrated pest management*

Background

Not developed.

Recommendation

The updated mosquito management program should include an enhanced emphasis on the advancement of ecologically based wetlands and waterway restoration practices for source reduction, as a key element of IPM under the new statewide Mosquito Management Plan.

- The new program structure should facilitate increased cooperation and collaboration among MCDs, the Division of Ecological Restoration, other government agencies, nonprofit organizations, wetland scientists, and municipalities to integrate coastal and inlands restoration and stewardship with mosquito management.
- Innovative techniques for managing salt marshes and restoring inland wetlands and fisheries should be integrated into updated best practices for mosquito management as specified in the Mosquito Management Plan.

Voting Results

Title	Yes	No	Abstain	Total
BP-17: Enhancing and Updating Wetlands Management within Integrated Pest Management	19	1	0	20

Recommendation BP-18: Notification

Directive: Not selected

Background

Not developed.

Recommendation

The state response plan for mosquito-borne illness should be amended such that any individual may request to receive at least 48 hours’ notice of an impending aerial spray event. In the event that a planned event must be delayed after notice has been given, updates should be issued to keep individuals informed of the new schedule.

Voting Results

Title	Yes	No	Abstain	Total
BP-18: Notification	16	4	0	20

Recommendation LE-1: Online system for requesting and tracking property exclusions and property opt-outs

Directives: *(ii) promoting public participation in mosquito management decisions*

(iii) providing for local options regarding the use of pesticides

(viii) providing for comprehensive annual evaluations of each season's mosquito control process, including the effectiveness of the process in controlling arbovirus and any effects of spraying on the environment, agriculture, and wildlife

Background

Currently the subcommittee agrees there is little direct public engagement in the mosquito control process in Massachusetts. While the public can attend District Commission meetings and town meetings where residents vote on joining or withdrawing from an MCD, the public rarely attends the MCD meetings and once a town votes to join a MCD there is little opportunity for the public to participate directly in decisions regarding control.

Homeowners currently have two options for direct participation in mosquito control operations as it pertains to the application of pesticides: requesting the MCD spray their parcel(s) or requesting their parcel(s) not be sprayed. Landowners who want their parcel(s) treated can directly request this service where it is offered by contacting their MCD by phone or email throughout the mosquito season. Individuals who do not want their properties treated are required by regulation to submit their request to be excluded from the wide area use of pesticides, including MCD spraying, to MDAR in accordance with 333 CMR 13.03. A *Request For Exclusion of Wide Area Application of Pesticides* form must be mailed directly to MDAR, or applicants may use the online system that requires additional information (e.g., parcel numbers) that may result in landowners not completing the request. While the online system is an improvement over the past, streamlining this service would increase its user friendliness and efficacy as a service for those not wanting their properties treated. This could lead to greater public participation. The online request expires annually at the end of December requiring landowners to reenter data annually. Providing a renewal option on the online system would facilitate greater landowner participation. In particular, this will reduce effort for large landowners, including land trusts and other organizations, which have multiple parcels.

The landowner opt-out process is the only direct option for public participation, especially for members of the public that feel their voice or concerns have not been fully addressed or met through other channels and do not want their properties treated. This recommendation would streamline the opt-out process for individual landowners who do not want their properties treated for mosquito control through a MCD and lead to greater direct participation by the public in mosquito control.

Recommendation

The Task Force recommends that the online opt-out form be amended to include an option for renewal that eliminates the need to reenter data annually and by town. The amended form should include, at a minimum, the option for landowners to carry over previously submitted information. The system should also allow addition or removal of parcels for users with multiple parcels. Funding should be provided for the implementation and ongoing maintenance of the system. The system should be implemented as soon as feasible once funding is secured. The option to submit a paper form should be retained with no changes required.

Considerations for Implementation

The regulations currently allow for exclusion requests on an annual basis, all exclusion requests expire on December 31st of the year in which they were submitted. Any change to this annual requirement would require an amendment to 333 CMR 13.03. This regulation was promulgated by MDAR under its authority set forth in M.G.L. c. 132B. Any regulatory change would require Pesticide Board approval pursuant to M.G.L. c. 132B, Section 5, along with complying with the regulatory amendment process set forth in M.G.L. c. 30A.

Funding is needed in order to change the system that is currently used. Because MDAR is the agency that currently has regulatory authority over exclusion requests pursuant to 333 CMR 13.03, MDAR would need additional funds to update and change the current IT system available for this recommended change. It is unclear if short term or long-term funds will be needed; depends on the system.

Timing on implementation of the changes would be of concern in that it is unknown how long it will take to establish a new system. MDAR would need to go through the Executive Office of Energy and Environmental Affairs (EEA) IT to work to develop and implement any IT system change.

Voting Results

Title	Yes	No	Abstain	Total
LE-1: Online system for requesting property exclusions and property opt-outs	20	0	0	20

Recommendation LE-2: Marking methods for property exclusions and property opt-outs

Directives: *(ii) promoting public participation in mosquito management decisions*

(iii) providing for local options regarding the use of pesticides

(viii) providing for comprehensive annual evaluations of each season's mosquito control process, including the effectiveness of the process in controlling arbovirus and any effects of spraying on the environment, agriculture, and wildlife

Background

Currently the subcommittee agrees there is little direct public engagement in the mosquito control process in Massachusetts. While the public can attend District Commission meetings and town meetings where residents vote on joining or withdrawing from an MCD, the public rarely attends the MCD meetings and once a town votes to join a MCD there is little opportunity for the public to participate directly in decisions regarding control.

Homeowners currently have two options for direct participation in mosquito control operations as it pertains to the application of pesticides: requesting the MCD apply pesticide to their parcel(s) or requesting their parcel(s) be excluded from pesticide applications. Currently landowners requesting exclusions from MCD pesticide application and opt-outs from SRB pesticide application are required to physically mark their property every 50 feet with markers approved by the Department as set forth in 333 CMR 13.03. This requirement is not practical for all but the smallest of parcels and is burdensome for landowners with large acres and many miles of road frontage. Simplifying the marking requirement will facilitate greater landowner participation.

The landowner opt-out and exclusion process is the only direct option for public participation, especially for members of the public that feel their voice or concerns have not been fully addressed or met through other channels and do not want their properties treated. This recommendation(s) streamlines the opt-out process for individual landowners who do not want their properties treated for mosquito control through an MCD and greater direct participation by the public in mosquito control.

Recommendation

The Task Force recommends that the landowner opt-out/exclusion process as articulated in 333 CMR 13.03 be amended to remove the physical marking requirement as required under 333 CMR 13.03 and make physical marking optional given Global Positioning System (GPS) and GIS technology is used by all MCDs and is readily available to private property owners. Funding must be provided for any district that is not currently capable of using GIS/GPS technology to manage pesticide applications. Funding to maintain these systems should be provided on an ongoing basis. Suggested amendments are shown below, with ***bold italics*** indicating additions

to 333 CMR 13.03 and strikethrough indicating deletion. These changes are intended only to apply to mosquito control operations and should be implemented as such.

“Marking Areas for Exclusion. All areas designated for exclusion from Wide Area Applications of pesticides and mosquito control applications of pesticides approved by the State Reclamation and Mosquito Control Board shall be marked as follows:

(a) Applications by Aircraft. The person requesting exclusion shall **provide GIS boundary data layer(s) or** clearly mark boundaries or areas to be excluded using marking methods approved by the Department.

(b) Ground Applications. The person requesting exclusion shall **provide GIS boundary data layer(s) or** mark the boundaries or areas to be excluded at least every 50 feet using marking methods approved by the Department which clearly defines the area of exclusion. **If GIS boundary data layers are provided, the person requesting exclusion may mark the corners (i.e., start and end) of the area to be excluded and post markers at any intersection.** Approved marking methods shall be listed on the Department's website at www.mass.gov/eea/agencies/agr/pesticides/mosquito. ~~A mosquito control project or district may require a specific method from the approved list, which shall also be made available on its website.”~~

Furthermore, the legislation should be amended to require that applicators follow best practices to avoid pesticide drift onto any excluded properties.

Considerations for implementation

The regulations currently allow marking methods to be determine by MDAR. Any change to this requirement could be done by MDAR but would need to be considered carefully as 333 CMR 13.03 applies to the wide area application of pesticides by all in the Commonwealth, not just those conducted for mosquito control operations. MDAR would need to update its guidance document for approved marking methods. MDAR would also provide any draft changes to the Pesticide Board under M.G.L. c. 132B.

It is essential to ensure that MCDs have GIS/GPS capability. If not, funding should be provided to the appropriate oversight agency (currently the SRB) to provide this capability to the MCDs.

Voting Results

Title	Yes	No	Abstain	Total
LE-2: Marking methods for property exclusions and property opt-outs	19	0	1	20

Recommendation LE-3: Public engagement

Directive: *(ii) promoting public participation in mosquito management decisions*

Background

The public is not very engaged in mosquito management decisions and creative strategies are required to improve public engagement.

Provide a process for meaningful public input into a mosquito-borne disease management plan and regular updates. Under the current structure, input would be provided to the SRB during updates to the Massachusetts Emergency Operations Response Plan for Mosquito-Borne Illness and to DPH on updates to the Massachusetts Arbovirus Surveillance and Response Plan. The Local Engagement subcommittee recognizes that the structure of mosquito control in the Commonwealth may change as a result of other recommendations from this task force. In that case, public input should be provided to any agency developing a mosquito or mosquito-borne disease management plan. It is expected that these plans will be updated periodically and public input should be considered during any update process.

Public input is one of many sources of information to be considered by decision makers. The plan must be based in science, but public input can contribute additional information and perspectives for consideration

Recommendation

Improve outreach to the public and input from the public.

Outreach activities will include, at a minimum:

- The Department of Public Health will create and maintain public engagement resources for use by municipal government entities, MCDs, individuals, and nongovernmental organizations regarding mosquito control activities in Massachusetts. These materials are to include:
 - Curriculum materials
 - Public education on source reduction and personal protection
 - Outreach plans for MCDs and municipalities.
 - Information explaining IPM. IPM is defined in statute. DPH should utilize standard IPM materials, updated as appropriate, to avoid duplication of effort and to avoid creating any conflicting information.
- Surveying municipal governments and the public to understand municipal and public understanding of and desires for the mosquito control process. The survey should be designed and distributed to capture a range of opinions.
- Information from mosquito control agencies:

- Updates on planned mosquito control activities. Details on which activities are to be announced, and when, will be included in the state mosquito control plan.
- Summaries of mosquito management efforts and the effectiveness of these activities. Details of what information is to be provided, including how to consider effectiveness of mosquito management and outreach, should be included in mosquito management or mosquito-borne disease management plan(s). This information should be provided as soon as possible; at the latest, this information should be provided within two years of the date the activities were conducted. Alternatively, this data may be provided through technology solutions (such as a “data dashboard”) instead of periodic reports. Any technology solutions must be supported with funding, technical assistance, and reporting to assess their effectiveness as outreach tools.

Public input activities will include, at a minimum:

- Providing opportunities for public comment during mosquito management or mosquito-borne disease management plan development.
- To the extent allowed by other regulations and legislation, MCD board meetings should be open to remote participation by constituents.

Considerations for implementation

Implementation of any aspects of this recommendation shall necessitate appropriate funding and provision of other resources.

Voting Results

Title	Yes	No	Abstain	Total
LE-3: Public engagement	17	3	0	20

Recommendation LE-6: Increased sharing of pesticide application locations

Directive: *(viii) providing for comprehensive annual evaluations of each season’s mosquito control process, including the effectiveness of the process in controlling arbovirus and any effects of spraying on the environment, agriculture and wildlife*

Background

Currently, landowners/tenants and municipalities may not know whether their properties are subject to pesticide applications by their MCD. MCDs track truck-based spray activities using GIS/GPS systems. Providing information on areas treated is not expected to be a large burden to MCDs, under the condition that data are only required to be provided as one map after the season’s end.

This recommendation is intended to improve transparency of the program, allowing the public to know if their properties or other areas of interest were sprayed. This may also help the public and municipal decision makers assess whether they want to opt-out of spraying.

Recommendation

Prior to the end of each calendar year, MCDs should be required to share map files of each pesticide application from the prior season with the MDAR and require this information to be presented by MDAR to the public through MassGIS along with maps of the Commonwealth’s pesticide spray events. The data should include what areas were treated and how many times each area was treated.

Implementation of any aspect of this recommendation shall necessitate appropriate funding and provision of other resources.

Considerations for implementation

Implementation of any aspects of this recommendation shall necessitate appropriate funding and provision of other resources. It is also important to consider:

- Does this include only spraying, or other applications (such as hand treatments of catch basins)?
- It would be burdensome for districts to map all treated catch basins. Are data on catch basin locations available that could be shared with districts? Could statistics on hand applications instead be shared at a summary level?

Voting Results

Title	Yes	No	Abstain	Total
LE-6: Increased sharing of pesticide application locations	14	5	1	20

Recommendation PS-1: Active Ingredients

Directive: *(ix) identifying known ingredients in pesticide products used for mosquito control, analyzing the ability, or lack of ability, to identify such ingredients, and making recommendations for determining such ingredients*

Background

Pesticide formulations generally consist of two types of ingredients: active ingredients and “inert” ingredients. Active ingredients are those chemicals in a formulation that have pesticidal action against a target pest. Pesticidal action may include killing the pest, repelling it, deterring feeding, or otherwise mitigating the pest. Synergists, a subcategory of active ingredients, enhance the pesticidal action of another active ingredient in the formulation. The synergist piperonyl butoxide (PBO) is a common ingredient in mosquito adulticide formulations containing pyrethroid or pyrethrum/pyrethrin ingredients.

Active ingredients, including synergists, are required by federal law to be listed on pesticide labels. The MCTF Pesticide Selection Subcommittee found no evidence of active ingredients not being identified on labels of registered pesticides.

Recommendation and Rationale

The MCTF Pesticide Selection Subcommittee makes no recommendation relative to additional active ingredient disclosure beyond what is currently required. Subcommittee members unanimously agreed that the identity of active ingredients, including synergists, is adequately addressed through the current federal and state regulatory programs and processes.

Voting Results

Title	Yes	No	Abstain	Total
PS-1: Active Ingredients	18	1	1	20

Recommendation PS-2: Inert Ingredients (Option 1)

Directive: *(ix) identifying known ingredients in pesticide products used for mosquito control, analyzing the ability, or lack of ability, to identify such ingredients, and making recommendations for determining such ingredients*

Background

Pesticide formulations generally consist of two types of ingredients: active ingredients and “inert” ingredients. Inert ingredients are those chemicals in a pesticide formulation without intended pesticidal action. They are sometimes referred to as “other” ingredients on pesticide labels. These inert ingredients may include adjuvants, drift retardants, solvents, fragrances, etc. Inert ingredients are not necessarily toxicologically inert and may pose risks to human or ecological health. EPA categorizes inert ingredients based on their use and toxicological profile (<https://www.epa.gov/pesticide-registration/categorized-lists-inert-ingredients-old-lists>).

Inert ingredients are considered to be Confidential Business Information (CBI) and are often not listed on the label. In some situations, the disclosure of inert ingredients can be used by competitors to recreate a formulation. This creates an issue with regulatory/government review of pesticides as some agencies do not have the ability to protect submitted information from public records/freedom of information laws. While EPA has the ability to review inert ingredients as part of registration without disclosing CBI, this has not typically been the case in Massachusetts. The Pesticide Board Subcommittee does not have the ability to protect CBI from public disclosure, but other Massachusetts agencies reportedly do have this ability.

Recommendation and Rationale

The MCTF Pesticide Selection Subcommittee critically evaluated the current EPA process for reviewing inert ingredients; and the majority of the Subcommittee felt that EPA’s review is adequate and recommended that no further action is necessary.

These Subcommittee members acknowledged that Massachusetts is a relatively small market for mosquito pesticides. If faced with public disclosure of CBI, many companies would simply choose not to register products in the state. CBI is typically a larger issue with newer products, many of which offer health, efficacy, and environmental safety advantages over older products. As such, it will often be in the best interest of the Commonwealth to be able to protect CBI.

Voting Results

Title	Yes	No	Abstain	Total
PS-2: Inert Ingredients (Option 1)	14	6	0	20

Recommendation PS-4: Selecting Pesticides and Ensuring a Transparent Selection Process

Directive: *(vii) promoting the use of the safest or minimum risk pesticides feasible and employing methods, including product disclosures or implementation of testing protocols and procedures, to avoid the use of pesticides containing per- and polyfluoroalkyl substances*

Introduction

The MCTF Pesticide Selection Subcommittee has been charged with providing guidance on “promoting the use of the safest or minimum risk pesticides feasible.”

From a technical/scientific perspective, the MCTF Pesticide Selection Subcommittee does not feel this language of the charge is appropriate for several reasons:

- Risk communicators and regulators have long eschewed the use of the word “safe” as it is an imprecise/subjective term often interpreted by the public to mean that no precautions are necessary.
- “Minimum Risk” is a preferable term, but still simplifies the dynamic of choosing the most appropriate pesticide. For instance, it does not acknowledge that pesticides may pose a relatively low risk in one area (for instance human health) and a greater risk in another (for instance pollinators).
- The charge ignores the fact that efficacy must be a consideration in choosing a pesticide. Pesticides are registered based on benefit and risk. If a pesticide is not efficacious, then the risk is unacceptable. As worded, garlic-based products would score highly on a list of preferable products, despite a consensus among mosquito management professionals that garlic (and most products referred to as “25(b)” as minimum risk pesticides as set forth in 40 CFR 152.25(f)) have very limited efficacy.
- Use patterns and application methods (ultra-low volume, barrier applications, etc.), site of application (water, playgrounds, etc.), and even the level of licensure of the applicator have significant implications on the benefits and risks that might result by the use of a pesticide. The charge ignores this fact.

The MCTF Pesticide Selection Subcommittee has redefined its charge to meet what it collectively believe to be the intent and spirit of the original language. It have been operating under the following:

When a pesticide is considered justified from those products already registered by EPA and the Pesticide Board Subcommittee, applicators shall select formulations and manner of their application that will be deemed efficacious, practical, and pose more benefit than risk to human health while minimizing non-target effects.

Background

Stakeholders (including the public, elected officials, and environmental groups) may be unfamiliar with the pesticide registration and selection process, which leads them to believe there is no scientific basis for pesticide selection. The risk from a pesticide depends on exposure and toxicity. Human and environmental health must be considered when selecting a pesticide for use. The biology and lifecycle of mosquitoes, as well as their habitat, spatial and temporal abundance, and their capacity to transmit pathogens must also be considered.

The existing active ingredients for mosquito control are quite limited. In relation to agriculture, mosquito control is a small market and new active ingredients are not often formulated or sold. This leaves MCDs with limited options for product selection.

While there is a formalized process for registering pesticides by EPA and the Commonwealth of Massachusetts, many are not aware of these processes because the information is not centralized in one location, such as a website. Stakeholders would need to search multiple sites to find the information necessary to understand the process. Following a product's federal registration, the current process for registration in Massachusetts requires the Pesticide Board Subcommittee approval, as outlined in M.G.L. c. 132B and 333 CMR 8.00. The five-member Pesticide Board Subcommittee is chaired by the Director of the Food Protection Program within DPH, with the other four members consisting of representatives of the MDAR, DCR, DPH, and a Commercial Pesticide Applicator appointed by the Governor. The Pesticide Board Subcommittee is responsible for registering all pesticides for use in the Commonwealth. The Massachusetts Pesticide Board Subcommittee is also responsible for reviewing new active ingredients and issuing all experimental use permits.

Describing the manner by which pesticides are registered and selected may better satisfy the desires of persons and organizations who seek such information. It may also promote and encourage consistency on selection of mosquito control products, whether such products are used on behalf of the Commonwealth or by commercial applicators. Currently the SRB relies on several state agencies to review and provide their opinion on products used for aerial adulticiding applications in the event of a declared public health emergency. These agencies include DPH, MassWildlife NHESP, MassDEP, MDAR and Division of Marine Fisheries (DMF). MassWildlife-NHESP Division currently reviews and provides guidance on all pesticides used by MCDs in the Commonwealth within sensitive areas.

Recommendation and Rationale

All pesticides used by the Commonwealth's organized MCDs and the SRB are reviewed by EPA and are federally registered. The pesticides are approved for use by the Commonwealth's Pesticide Board Subcommittee as outlined in M.G.L. c. 132B and 333 CMR 8.00. In keeping with best practices and acknowledging concerns by some stakeholders that these reviews are not sufficient, the SRB or a new subcommittee established by the SRB should further review

pesticide products used in the management of mosquito populations. This new subcommittee should include DPH, MassWildlife-NHESP Division, DEP, MDAR, DMF, and a representative from an MCD. Each representative would review the products from their Agency’s purview. The MCD representative would provide information on how, where, and when the pesticides may be used based on the labels to help in the review. Review shall include but not be limited to ensuring adequate protections of surface and groundwaters of the Commonwealth, PWS, aquatic organisms, and endangered species. It should also consider the toxicity of active ingredients and the potential for synergists to amplify the toxicity of pesticides already in the environment. Risk assessments and benefits to public health should also be taken into account.

This formalized review of products would be conducted when deemed necessary. When a pesticide is reviewed, formulations and manner of application would be considered and recommendations would be made if the pesticide is deemed efficacious, practical, and pose more benefit to human health than risk to human health and the environment.

Once pesticide products are reviewed, they are included in the statewide mosquito management program, which specifies factors that are considered in the process of selecting pesticides used to control mosquitoes. An opportunity for public comment should be provided before this mosquito management plan is finalized. Agencies would read and consider comments but will not be bound to incorporate all suggestions. The statewide mosquito management plan would be freely available and discoverable on a centralized statewide mosquito control website. The centralized website would also contain a summary of the pesticide registration and approval processes of the EPA and Massachusetts Pesticide Board Subcommittee.

Voting Results

Title	Yes	No	Abstain	Total
PS-4: Selecting Pesticides and Ensuring a Transparent Selection Process	18	1	1	20

Recommendation PS-7: Avoiding Use of Pesticides Containing PFAS and Other Contaminants

Directive: *(vii) promoting the use of the safest or minimum risk pesticides feasible and employing methods, including product disclosures or implementation of testing protocols and procedures, to avoid the use of pesticides containing per- and polyfluoroalkyl substances*

Background:

Concern about the impact that PFAS compounds have on human health and the environment has increased in the last decade. Massachusetts has been proactive in regulating PFAS in drinking water and groundwater by setting a Massachusetts Maximum Contaminant Level (MCL) of 20 parts per trillion (ppt) for the sum of six PFAS compounds (PFAS6), as well as classifying PFAS as a hazardous material under M.G.L. c. 21E and the Massachusetts Contingency Plan. PFAS are ubiquitous, they are persistent, and sampling conducted throughout the Commonwealth shows their presence in rivers, groundwater, soils, drinking water sources (both public and private), wastewater discharges, and biosolids.⁵

In September 2020, Public Employees for Environmental Responsibility (PEER) notified the Commonwealth and the EPA Region 1 office that sampling they conducted indicated the presence of PFAS in the pesticide Anvil 10+10. Follow up sampling conducted by MassDEP and EPA confirmed the presence of PFAS in the pesticide. The EPA Office of Pesticide Programs had previously determined that there were no pesticide active or inert ingredients with structures similar to prominent PFAS such as Perfluorooctane sulfonic acid (PFOS), Perfluorooctanoic acid (PFOA), and Hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt, know together as “GenX”.⁶ After further investigation it was found that the PFAS was not part of the product formulation, but rather PFAS was leaching from the fluorinated HDPE containers that the pesticide was distributed in.⁷ EPA confirmed that it detected eight types PFAS from the containers, with levels ranging from 20-50 parts per billion.⁸ This is quite a bit higher than the Massachusetts MCL of 20 ppt. Given that government bodies are still trying to understand PFAS fate and transport in the environment, seeing levels as high as they were causes concern about the potential impact previous applications of those pesticides could have had on

⁵ Commonwealth of Massachusetts. Per- and polyfluoroalkyl substances (PFAS). Massachusetts Department of Environmental Protection. Available at, <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>

⁶ U.S. Environmental Protection Agency. (2021, September 29). Updates on EPA efforts to address PFAS in pesticide packaging. Available at, [https://www.epa.gov/pesticides/updates-epa-efforts-address-pfas-pesticide-packaging#:~:text=To%20date%2C%20the%20only%20PFAS,\(Anvil%2010%2D10\).](https://www.epa.gov/pesticides/updates-epa-efforts-address-pfas-pesticide-packaging#:~:text=To%20date%2C%20the%20only%20PFAS,(Anvil%2010%2D10).)

⁷ U.S. Environmental Protection Agency. (2022). Per- and polyfluoroalkyl substances (PFAS) in pesticide and other packaging. Available at, <https://www.epa.gov/pesticides/pfas-packaging>

⁸ U.S. Environmental Protection Agency. (2022). Per- and polyfluoroalkyl substances (PFAS) in pesticide and other packaging. Available at, <https://www.epa.gov/pesticides/pfas-packaging#info>

groundwater and surface waters of the Commonwealth. EPA and the manufacturer responded swiftly to the detection of PFAS in Anvil 10+10; EPA encouraged states not to use the impacted product and to return it to the manufacturer. Recognizing the importance of addressing concerns related to PFAS across many regulatory programs, EPA released a strategic roadmap for actions they will be taking relative to PFAS. Massachusetts should monitor the process closely and respond accordingly as new information emerges.

Scientific research on PFAS is rapidly evolving, as is the ability to detect these compounds in various media. EPA released a draft method for sample analysis of PFAS in oily matrix. In addition, EPA is currently evaluating chemical structures and applying the working definition from EPA's Office of Pollution Prevention and Toxics (OPPT). EPA states: "Under FIFRA Section 6(a)(2), pesticide registrants should report to EPA additional factual information on unreasonable adverse effects, including metabolites, degradates, and impurities (such as PFAS). EPA considers any level of PFAS to be potentially toxicologically significant and may trigger 159.179(b) in the Code of Federal Regulations (CFR)."⁹ MDAR reports that the Pesticide Board Subcommittee is reviewing PFAS concerns and may make recommendations related to adopting EPA's working definition.

Finding PFAS in pesticides that do not have these chemicals in their formulations raises the question of how the Commonwealth can ensure that other "contaminants" are not inadvertently introduced to the environment through the application of pesticides. The MCTF Pesticide Selection Subcommittee recognizes that while PFAS is the current focus, the Commonwealth should be prepared for other emerging contaminants, especially those that are persistent and bioaccumulative, and proactively have a plan to address any concerns. Source control is an important measure to ensure that inadvertent contamination of our drinking water sources and the environment does not occur.

Recommendation:

To avoid use of pesticides containing PFAS and other contaminants, the MCTF Pesticide Selection Subcommittee makes several recommendations. The text below directs these recommendations to whatever body reviews mosquito pesticides for use in Massachusetts. The recommendations are:

- As analytical capabilities evolve, the Pesticide Board Subcommittee should have methods available to ensure pesticide products registered in Massachusetts are not contaminated with PFAS or emerging contaminants of concern as identified by EPA or the United States Geological Survey. The MCTF Pesticide Selection Subcommittee understands there are complexities and costs associated with testing products for

⁹ U.S. Environmental Protection Agency. (2022). Per- and polyfluoroalkyl substances (PFAS) in pesticide and other packaging. Available at, <https://www.epa.gov/pesticides/pfas-packaging#info>

- use in the Commonwealth. Some considerations to be discussed are the extent and frequency of testing (e.g., is it every lot, is it each method of delivery, is it annually or just newly registered pesticides, who is responsible for undertaking the testing, who is responsible for paying for the testing). The MCTF Pesticide Selection Subcommittee also recognizes that the charge of this Task Force is specific to mosquito control, but some members have concern that all pesticide products registered in Massachusetts should be under evaluation. The Commonwealth could institute producer certification requirements, or require the manufacturers to submit sampling results, or the Commonwealth could undertake the sampling and analysis on its own, but additional financial and personnel resources would need to be provided to any Massachusetts agency tasked with that effort, not only to collect samples but also to interpret results.
- The MCTF Pesticide Selection Subcommittee is concerned about the old adage: “You don’t know what you don’t know.” The MCTF Pesticide Selection Subcommittee desires the Commonwealth to be proactive rather than reactive in identifying pesticides that might have unintended properties. While the MCTF Pesticide Selection Subcommittee is currently focused on PFAS, there may be other characteristics, such as pesticides that might have endocrine disrupting properties, which the Pesticide Board Subcommittee may want to consider. Pesticides registered for use in Massachusetts could be required to have bioassay screening which can pick up on emerging contaminants or undesirable compounds, without requiring manufacturers to disclose inert ingredients which could compromise Confidential Business Information. Bioassay screening could utilize high-throughput in vitro assays such as those developed and promoted by the federal [Tox21 program](#) and offered as services by toxicology testing contractor companies. Additional financial and personnel resources would need to be provided to the Pesticide Board Subcommittee to accomplish such an evaluation.
 - The Pesticide Board Subcommittee, a subcommittee of the SRB, or the appropriate entity should prevent the use, through a “stop sale” or “stop use” order, of any pesticides where PFAS or emerging contaminants of concern have been detected as an active or inert ingredient or a contaminant in the product. This issue should be raised with the Legislature’s Interagency PFAS Task Force which may have recommendations related to PFAS source control in the Commonwealth. An outright ban on the sale or use of pesticides that contain PFAS might need to be implemented through legislative action. There is pending legislation to ban the use of PFAS in consumer products and food packaging; pesticides could be added to that pending legislation.

- The Pesticide Board Subcommittee should define or categorize “persistence,” as it relates to pesticides. Understanding that persistence may be a desirable trait in some pesticide products; the Pesticide Board Subcommittee should have a process to evaluate where persistence might be a concern and they should take appropriate action to restrict use of such products in Massachusetts.
- EPA continues to evaluate what universe of chemicals are considered to be PFAS as it relates to pesticides. If EPA determines that any pesticides have active ingredients that fall into a current or revised PFAS definition, Massachusetts must make appropriate registration decisions, including evaluating whether substances should be added to the Groundwater Protection List.

Voting Results

Title	Yes	No	Abstain	Total
PS-7: Avoiding Use of Pesticides Containing PFAS and Other Contaminants	19	1	0	20