



PEER

PUBLIC EMPLOYEES FOR ENVIRONMENTAL RESPONSIBILITY • NEW ENGLAND

July 8, 2020

Inspector General Glenn A. Cunha
Office of the Inspector General
One Ashburton Place
Room 1311
Boston, MA 02108

RE: Request for investigation into waste by the Commonwealth of Massachusetts during 2019 arbovirus aerial spraying; sent to IGO-FightFraud@state.ma.us

Dear Inspector General Cunha:

Public Employees for Environmental Responsibility (PEER) is a Washington D.C.-based non-profit, non-partisan public interest organization concerned with honest and open government. Specifically, PEER serves and protects public employees working on environmental issues. PEER represents thousands of local, state and federal government employees nationwide; our New England chapter is located in the Boston, Massachusetts, metro area. Jones River Watershed Association is a non-profit dedicated to protecting, enhancing, and restoring Jones River and Cape Cod Bay. LEAD for Pollinators is an educational non-profit advocating for the health and sustainability of honey bees and native pollinators. PEER, Jones River Watershed Association, and LEAD for Pollinators (hereinafter “Petitioners”) are writing to request an investigation into the failure of the Commonwealth of Massachusetts to base their arbovirus aerial spraying on science, which has resulted in: failure to implement effective arbovirus measures; a substantial waste of public funds, including the waste of at least \$2.2 million in 2019 alone; and the failure to explore a science-based public health strategy. The specific facts are set forth below.

Background. Massachusetts has the unfortunate distinction of having the second largest number of reported human cases of eastern equine encephalitis (EEE) in the country. EEE is a rare but deadly mosquito-borne virus.¹ While EEE used to occur approximately once every 13 years or so, it is now becoming more and more frequent, and appears to be on a seven-year cycle.

The State Reclamation and Mosquito Control Board (SRMCB), a Board that is under the purview of Massachusetts Department of Agricultural Resources (MDAR), oversees mosquito control throughout the state. The SRMCB has 11 county/regional Districts, and each District is tasked with mosquito control, disease surveillance, and public education. While the Districts do engage in larviciding (treating aquatic larval habitats with biological pesticides), they also spray pesticides to kill adult mosquitoes. The Districts use mosquito surveillance to determine the locations of mosquitoes, and work with the Department of Public Health (PDH) to determine

¹ Since 2000, there have been 19 EEE case in Massachusetts, and seven of these were fatalities.

whether EEE-infected mosquitoes are present. In most years, the Districts use ultra-low volume (ULV) truck spraying or backpack sprayers to spray pesticides within their member municipalities.

However, in years where EEE is prevalent in mosquitoes, the Commonwealth makes a declaration of a public health emergency. A public health emergency is defined as "an occurrence or imminent threat of an illness or health condition, caused by bio terrorism, epidemic or pandemic disease, or an infectious agent or biological toxin, that poses a substantial risk to humans by either causing a significant number of human fatalities or permanent or long-term disability,"² and is made by the Governor pursuant to 17 M.G.L. Section 2A. This declaration often leads to the Commonwealth conducting wide-area aerial spraying of Anvil 10+10, a mosquito adulticide. This pesticide is a combination of two ingredients, sumithrin (10%) and piperonyl butoxide (PBO) (10%). The remainder of the ingredients are classified as inert, and are held as proprietary. Sumithrin is a synthetic pyrethroid, and PBO is a synergist which is classified by EPA as a possible human carcinogen. Anvil 10+10 was applied aerially in 2006, 2010, 2012, and 2019. The 2019 spraying lasted 26 days, treated 2,048,865 acres across the Commonwealth, and used 9,939 gallons on Anvil 10+10.³

Unfortunately, the aerial spraying of Anvil 10+10 is not benign. As such, Petitioners believe that the Commonwealth should weigh the costs – both monetary and environmental – with the benefits of any spraying. Aside from potential human health concerns from the spray, the Commonwealth should do a comprehensive evaluation of effects the spraying has on non-target insects, particularly pollinators.

The Commonwealth claims that “the potential hazard to direct application exposure from the aerial application was minimized since sprays occurred at night when honey bees are typically inside the hive box.”⁴ However, Massachusetts has an estimated 380 species of wild bee pollinators,⁵ and a number of other pollinators, such as moths, that are out at night. Moreover, sublethal effects of pesticide exposure “can diminish honey bee reproduction, immunity, cognition, and overall physiological functioning, leading to suboptimal honey bee performance and population reduction.”⁶ When the Commonwealth measured pesticide residues in samples of dead honey bees and pollen after spray events, they found sumithrin in one-third of the samples, and PBO in two-thirds.⁷ Insecticides, especially those applied aerially, also drift and can “contaminate pollen and nectar collected by bees for several days or weeks after it is applied.”⁸ Loss of bees is not restricted to Massachusetts; during the summer of 2019, roughly 32% of managed bee colonies were lost in the United States, the highest summer loss ever reported.⁹

² <https://www.mass.gov/info-details/public-health-emergencies>

³ May 14, 2020 memo from Taryn Lascola-Miner, Director Crop and Pest Services, DAR

⁴ <https://www.mass.gov/doc/honey-bee-monitoring-for-aerial-mosquito-adulticide-application-summary-report-2019/download>

⁵ <https://www.mass.gov/files/documents/2017/06/zw/pollinator-plan.pdf>

⁶ <https://www.frontiersin.org/articles/10.3389/fevo.2020.00022/full>

⁷ <https://www.mass.gov/doc/honey-bee-monitoring-for-aerial-mosquito-adulticide-application-summary-report-2019/download>

⁸ <https://www.canr.msu.edu/news/potential-impact-of-mosquito-and-nuisance-insect-sprays-on-pollinators>

⁹ https://beeinformed.org/wp-content/uploads/2020/06/BIP_2019_2020_Losses_Abstract.pdf

Reason for request of investigation. Petitioners requesting this investigation for several reasons:

- 1) there is no evidence that aerial spraying reduces the human cases of EEE, a fact that has been conceded by the Commonwealth;
- 2) the pesticide Anvil 10+10 kills non-target insects, including pollinators, and there is no comprehensive attempt to monitor or assess the full impacts associated with this mortality;
- 3) the pesticide is a respiratory irritant, suppresses the immune system, and contains a possible human carcinogen, yet no one has studied the human health impacts associated with the broadcast spraying;
- 4) many of the EEE cases arise *after* broadcast spraying has occurred, suggesting that aerial spraying may make people complacent about putting repellent on and being vigilant, which could actually increase the number of human cases;
- 5) spraying may result in mosquitoes that are resistant to pesticides, and/or result in birds – which are the vectors for the disease – leaving sprayed areas to forage where there are more insects, thus spreading the disease across the Commonwealth; these potential avenues of the spread of EEE have not been investigated; and
- 6) in June of 2020, DPH released its efficacy data regarding the aerial spray events that took place in 2019. These data show that 50% of the spray events, which cost more than \$2.2 million, took place *after* mosquito populations had dropped off precipitously, resulting in a 0% efficacy. These spray events are the primary focus of our referral.

Petitioners are sources from whom the Office of Inspector General can receive a referral. 945 CMR 1.04 states that “[c]omplaints, information or referrals may be received by the Office of the Inspector General from any source.”

Duty of the Office of Inspector General is to detect waste in the expenditure of public funds. This referral fits squarely into the Office of Inspector General duties. Specifically, 12A M.G.L. Section 7 states:

The office of inspector general shall act to prevent and detect fraud, waste and abuse in the expenditure of public funds, whether state, federal, or local, or relating to programs and operations involving the procurement of any supplies, services, or construction, by agencies, bureaus, divisions, sections, departments, offices, commissions, institutions and activities of the commonwealth, including those districts, authorities, instrumentalities or political subdivisions created by the general court and including the cities and towns.

“Public funds” are defined as “state, federal and local funds.”¹⁰ “Waste” occurs when “a government entity or official, or individuals or entities doing business with the government, take

¹⁰ 12A M.G.L. Section 1.

actions that have no benefit to the public.”¹¹ In this case, the Commonwealth used state funds to take an action (aerial spraying) that had no benefit to the public (0% efficacy).

The public entity involved. The public entities involved are the DPH, DAR, SRMCB, Mosquito Control Districts (MCD) and the Mosquito Advisory Group (MAG) (collectively, “the Commonwealth”).

The names of individuals involved, and their positions or titles. The August 2019 Massachusetts Emergency Operations Response Plan for Mosquito-Borne Illness¹² sets forth the legislative authority and roles and responsibilities for determining the “implementation of interventions to protect the public from mosquito-borne disease.”¹³ Specifically, it states:

DPH, the SRB/MDAR, and the MCDs are the principal entities responsible for the monitoring, detection and analysis of mosquito activity, as well as the implementation of interventions to protect the public from mosquito-borne disease ...The MCDs provide further mosquito surveillance and control for member municipalities across the state. The Mosquito Advisory Group (MAG) is a non-governmental partner that provides expert technical advice to the SRB and DPH. Other key agencies and entities involved in mosquito surveillance and emergency response are listed and described below:

State

- Executive Office of Energy and Environmental Affairs (EOEEA or “EEA”)
- State Reclamation and Mosquito Control Board (SRB)
- Mosquito Control Projects/Districts (MCDs)
- Massachusetts Department of Agricultural Resources (MDAR)
- Massachusetts Department of Environmental Protection (DEP)
- Massachusetts Department of Conservation and Recreation (DCR)
- Division of Fisheries & Wildlife, Natural Heritage and Endangered Species Program (Massachusetts Department of Fish & Game)
- Massachusetts Department of Public Health (DPH) (under the Executive Office of Health and Human Services)
- Bureau of Environmental Health (BEH)
- Bureau of Infectious Disease and Laboratory Sciences (BIDLS) ...

Other

- Mosquito Advisory Group (MAG)

As such, the names of the individuals who may be responsible for the decisions regarding aerial spraying include, but may not be limited to:

- Dr. Monica Bharel, Commissioner, Massachusetts DPH

¹¹ <https://www.mass.gov/info-details/fraud-reporting-faq-what-to-know#:~:text=Waste%20occurs%20when%20a%20government,overpaying%20an%20employee%20or%20vendor.>

¹² <https://www.mass.gov/files/documents/2019/08/06/2019SRBEmergencyResponsePlan.pdf>

¹³ Id.

- Dr. Larry Madoff, Medical Director, Bureau of Infectious Disease and Laboratory Sciences
- Dr. Catherine Brown, State Epidemiologist, Bureau of Infectious Disease and Laboratory Sciences
- John Lebeaux, Commissioner, Massachusetts DAR
- Nancy Lin, Massachusetts Department of Environmental Protection (DEP)
- Jim Straub, Massachusetts Department of Conservation and Recreation (DCR)
- Juan Gutierrez, Operations Coordinator, SRMCB, DAR
- Jennifer Forman-Orth, Environmental Biologist, SRMCB, DAR
- Kathleen A. Theoharides, Secretary, Executive Office of Energy and Environmental Affairs (EOEEA)
- Superintendents of the 11 Mosquito Control Districts, found here: <https://www.mass.gov/service-details/mosquito-control-projects-and-districts>
- Mark Tisa, Director, Natural Heritage and Endangered Species Program (NHESP)
- Dr. Richard Pollack, Chairman, Mosquito Advisory Group (MAG) Chairman

The issue or concern, including the nature, scope and timeframe of the suspected wrongdoing. The key issue of the lack of efficacy of this program is epitomized by the use of taxpayer money to fund at least three aerial spray events in September of 2019 that were totally ineffective. More importantly, the DPH and DAR knew or should have known that this aerial spraying would be fruitless.

Between July 20, 2019 and July 26, 2019, DPH, DAR, SRMCB, MCD and the MAG decided that:

Aerial intervention targeting the intense Bristol and Plymouth County EEE foci was selected as the most viable control option available. Following the declaration of a Public Health Hazard by DPH the first aerial adulticiding interventions conducted by MDAR began on 8/8/19. As EEE risk increased throughout the season in Bristol County, Plymouth County, and areas of Central and Western Massachusetts additional targeted aerial adulticiding interventions occurred to reduce risk. A total of six aerial adulticiding interventions were completed during the 2019 season.¹⁴

Aerial spray events took place six times in August and September of 2019: 1) between August 8 – August 11; 2) between August 21 – August 25; 3) between August 26 – August 27; 4) between September 10 – September 18; 5) between September 15 – September 17; and 6) between September 18 – September 24. Spray events were disrupted by low evening temperatures (mosquitoes become inactive below 60°F), and rain, which resulted in sprays taking place over several nights. Ultimately, over 2 million acres of Massachusetts were sprayed with Anvil 10+10. The Commonwealth concedes:

Many of the aerial interventions took place over several nights and encompassed hundreds of thousands of acres. Longer term operations increase the likelihood of mosquito emergencies occurring within a spray window and migration of mosquitoes into

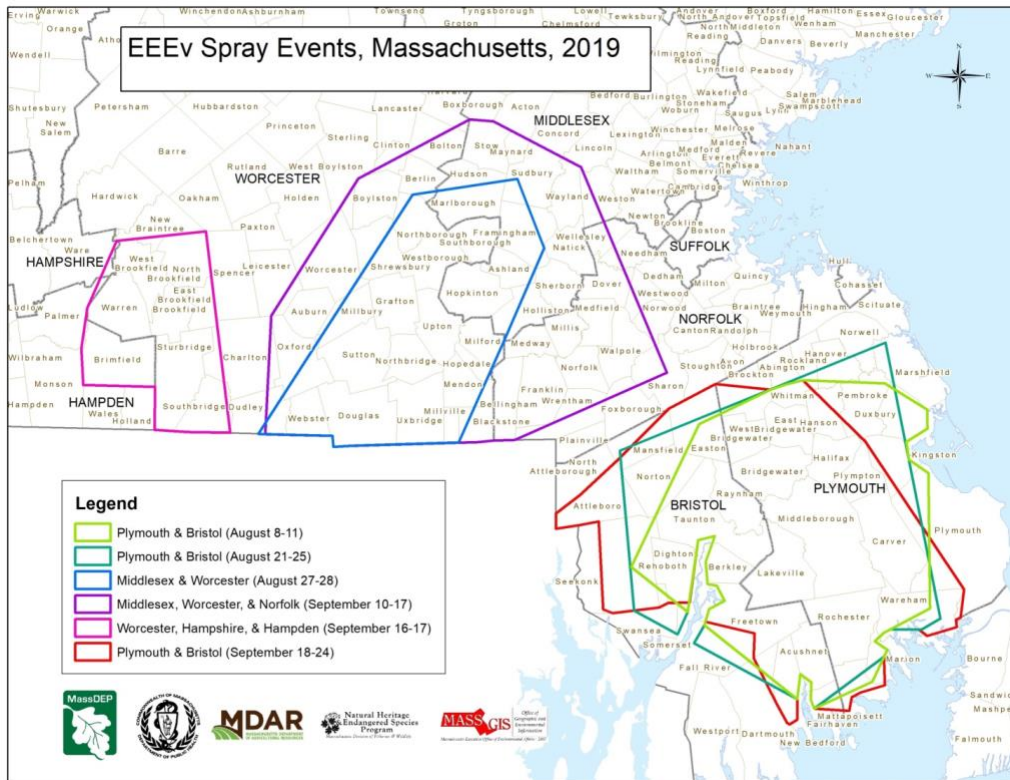
¹⁴ <https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data#current-data->

treated zones following the operations. Simply put, the longer the window of aerial adulticiding, the lower the overall efficacy.¹⁵

In other words, the Commonwealth knew that these so-called “long-term operations” would reduce efficacy of spraying. Nevertheless, they proceeded.

On June 11, 2020, DAR and DPH presented a Webinar entitled “EEE 2020 Overview” to Petitioners and a variety of other NGOs.¹⁶ The presentation included a map showing the six spray events, and a calendar showing the dates of the spraying (see Figure 1, below).

Figure 1



AUGUST 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
				4	5	6
	7	8	9	10	11	12
	13	14	15	16	17	18
	19	20	21	22	23	24
	25	26	27	28	29	30
						31

SEPTEMBER 2019

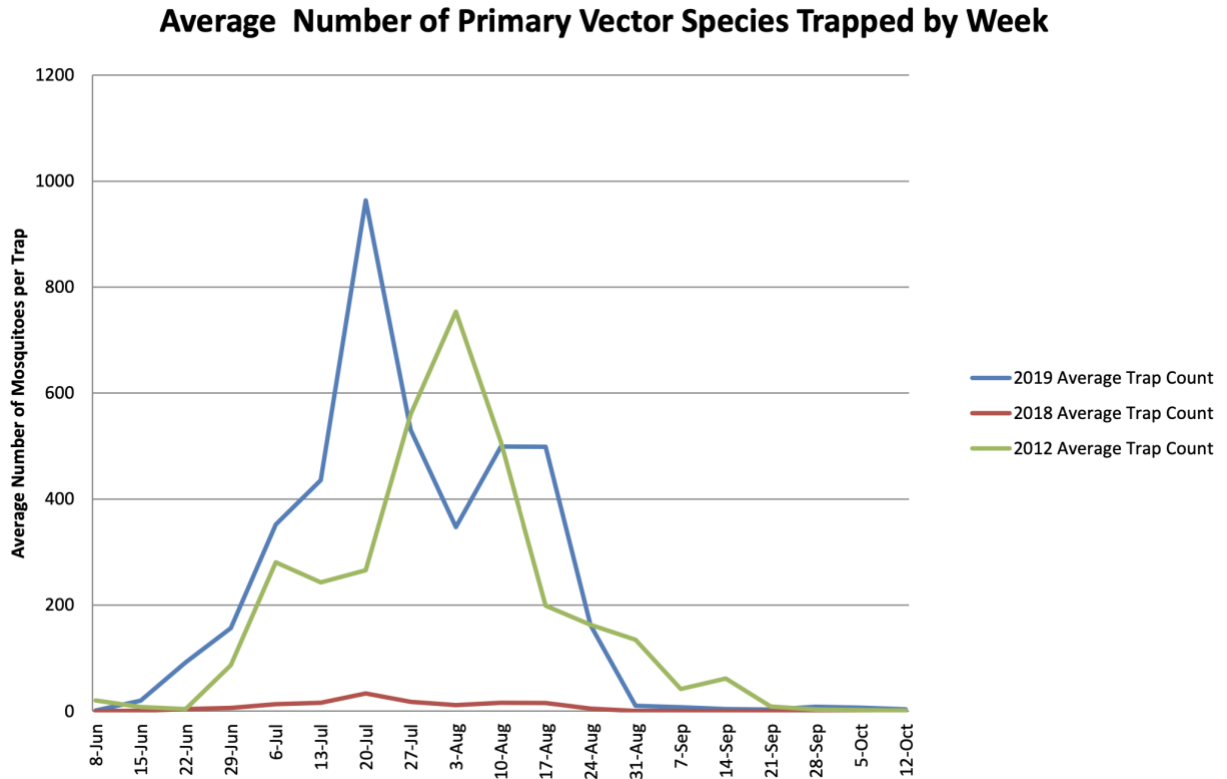
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

¹⁵ Id.

¹⁶ [EEE Env Briefing_6.11.20-1.pdf](#)

The presentation also included a graph (Figure 2, below) showing the number of mosquitoes trapped by week. The graph clearly shows that in 2019, virtually no mosquitoes were trapped after August 31st.

Figure 2



The presentation also stated that the “Timing of Surveillance & Applications” is from “[e]arly June through end of August/first week of September,” and that “Surveillance Data Drives Response: Mosquito populations, mosquito testing for EEE and determination of risk levels drives decisions for appropriate mosquito control interventions.”

Finally, the presentation included a chart that described the efficacy of the aerial spraying (see Figure 3, below). The chart showed that the last three aerial spray events that took place from September 10, 2020 through September 24, 2020, had “No Reduction” in primary mosquito vectors. The cost of these three spray events, all of which took place after the first week of September when mosquitoes were no longer present, was \$2,261,727.

It is also of note that the average efficacy associated with the six spray events was only 32.5%, and that this cost the Massachusetts taxpayers \$5,085,636. Indeed, it is unclear whether *any* of the six spray events actually reduced the incidence of human EEE cases.

Figure 3



Aerial Spray Efficacy – 2019

Percent Reduction in Mosquitoes Trapped: Comparing Pre-Spray Trapping Numbers to Post-spray Trapping Numbers

Aerial Intervention Location	Start Date	End Date	Total Reduction in Primary Mosquito Vector*	Total Reduction in Mosquito Trapped	Avg High Temp	Relative Humidity	Aerial Spray Costs
Bristol / Plymouth	8/8/2019	8/11/2019	66%	58%	85	83%	\$ 891,585
Bristol / Plymouth	8/21/2019	8/25/2019	91%	25%	80	86%	\$ 891,226
Middlesex / Worcester	8/26/2019	8/27/2019	38%	20%	72	70%	\$ 583,989
Middlesex / Norfolk / Worcester	9/10/2019	9/18/2019	NR	NR	72	74%	\$ 2,261,727
Hampden, Hampshire and Worcester	9/15/2019	9/17/2019	NR	NR	71	71%	
Bristol / Plymouth	9/18/2019	9/24/2019	NR	53%	78	84%	
NR = No Reduction							
Other: Supplies, Lab Testing, Employee Travel & OT, Ground Spraying & Late Fees							\$ 457,108
Total Costs:							\$ 5,085,636

Factors affecting efficacy

- The greater the mosquito activity, the greater the efficacy
 - Mosquito activity minimal at 60 degrees, increases with increasing temperature
 - Mosquito activity generally increased with increasing humidity but reduced when raining
- Large spray blocks conducted over the fewest possible nights increases efficacy
 - Small spray strips and increased time to complete entire polygon reduce efficacy

17

While it is abundantly clear that the last three of the 2019 six spray events involved waste of taxpayer money, Petitioners also believe that the entire aerial spray program is suspect. Earlier this year, five Commonwealth agencies – Division of Marine Fisheries (DMF), DEP, Division of Fisheries and Wildlife (DFW), DAR, and DPH - conducted a state inter-agency review of adulticide products being considered for use in the 2020 Massachusetts aerial spraying campaign for mosquito control.¹⁷ The agencies decided to continue to use Anvil 10+10, but all expressed concerns about the product itself, and/or its efficacy. Specifically:

- DMF stated that Anvil 10+10 is “very highly toxic to fish and aquatic invertebrates. For all products, runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates... Given that none of the considered alternatives alleviates potential threats to marine resources, MA DMF does not currently have any recommendations for transitioning away from the existing product for aerial spraying, Anvil 10+10.”
- DEP stated that Anvil 10+10 is “classified by the US EPA as “toxic” to aquatic life ... and “highly toxic” to honeybees by the US EPA...[and] are highly to very highly acutely

¹⁷ <https://www.peer.org/wp-content/uploads/2020/06/Adulticide-Product-Reviews.pdf>

toxic to fish, aquatic invertebrates and honeybees... sumithrin is among the most toxic active ingredient, both acutely and chronically, to both aquatic and benthic estuarine and marine invertebrates. It also has the longest half-life in sediment and is therefore the most persistent in sediments.”

- DFW stated, “Although their use may be warranted to protect public health as determined by the relevant authorities, unfortunately, all of these products impact a variety of native insects. Aerial application of these products in certain areas of the state would result in a Take of state-listed species and require a Permit from MassWildlife.”
- DAR stated that Anvil 10+10 is, “classified as being highly to very highly toxic to aquatic organisms and honeybees.” DAR also stated that the pesticide “... has a record of providing effective control in most situations without having caused unreasonable adverse effects to human health and non-target organisms,” but offers no proof of this statement. Indeed, the data indicate exactly the opposite.
- DPH stated, “Reduction of risk from EEE *relies primarily on the use of personal prevention behaviors by individuals* and includes recommendations to use mosquito repellent with a US Environmental Protection Agency (US EPA)- registered active ingredient, clothing to reduce mosquito access to bare skin and rescheduling outdoor events to avoid the hours of dusk and dawn when mosquitoes most likely to spread EEE are most active” (emphasis added). DPH also stated, “Experience in Massachusetts with Anvil 10 + 10 has resulted in a *wide range of efficacies* from approximately 30-90% dependent upon weather and timing of application relative to the mosquito life cycle. Although *it is impossible to measure the reduction in EEE cases based on aerial applications of pesticide*, reductions in populations of mosquitoes that transmit the virus can be considered as a proxy metric for risk reduction” (emphasis added).

Four of five agencies stressed the toxicity of Anvil 10+10 on aquatic life and non-target insects such as honeybees. However, the economic cost associated with the loss of pollinators has not been examined. Perhaps most importantly, DPH concedes that reduction of risk should rely “primarily” on personal protection, and that it is “impossible” to determine whether aerial spraying reduces EEE cases in humans. Therefore, it is clear that the Commonwealth spent over \$5 million of taxpayer money to spray over 2 million acres of the state with a highly toxic pesticide, without any evidence that it is reducing EEE incidence in humans, and despite the fact that personal protection should be the primary defense against the disease. Moreover, despite the fact that the Commonwealth says surveillance data drives their response, they conducted three spray events *after* surveillance data showed a lack of mosquitoes.

While Petitioners acknowledge that each illness and loss of life due to EEE is tragic, we do not believe that the aerial spray program should continue without evidence that it is effective, and that it is not causing more harm than good. In addition, we believe the economic impacts associated with spraying toxic chemicals across millions of acres of the Commonwealth should be examined.

Information about other individuals who may have relevant information or documents, as well as their contact information. Petitioners are unaware of any other individuals who may have relevant information or documents on this matter.

Conclusion. The Commonwealth lacks a coherent strategy for preventing or controlling arbovirus outbreaks, yet agencies continue to spend large amounts of taxpayer money without assessing the effectiveness of those expenditures. Agencies conducted three aerial spray events from September 10, 2019 through September 24, 2019, costing Massachusetts taxpayers over \$2.2 million, despite the fact that they knew there were no mosquitoes out, and that spraying after the first week of September would result in low efficacy. Therefore, the Commonwealth wasted millions of dollars in public funds by engaging in this aerial spray effort.

Given that the average efficacy for all six spray events was only 32.5%, and that there is no evidence that the aerial spraying reduces human cases of EEE, the entire aerial spray program may be a waste of public funds. It is extremely likely that the Commonwealth will determine that aerial application will be needed again this summer, and therefore Petitioners urge the Office of the Inspector General to investigate this matter as expeditiously as possible. It is especially important given that: 1) the Commonwealth is in financial distress given the pandemic and can ill afford to waste money; and 2) Anvil 10+10 can result in respiratory issues and immune suppression, and is dangerous to spray during a respiratory pandemic.

Given this lack of efficacy and the cited costs, Petitioners believe that the Commonwealth needlessly wasted public funds and will continue to do so unless your Office conducts a timely review.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Kyla Bennett, PhD, JD
Director, New England PEER

Pine duBois, Executive Director
Jones River Watershed Association

Michele Colopy, Executive Director
LEAD for Pollinators

cc: Suzanne M. Bump, State Auditor (auditor@sao.state.ma.us)
Maura Healey, Massachusetts Attorney General (ago@state.ma.us)