

**Response to Eastern Equine Encephalitis Virus
Mosquito Control Aerial Spray Events 2019:
A Summary of the Surface Water Quality Sampling Operations**



**Massachusetts Department of Environmental Protection
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Introduction

Eastern Equine Encephalitis (EEE) is a rare but serious and potentially fatal disease that can affect people of all ages. Transmitted by mosquitoes, the disease occurs sporadically in Massachusetts. Prior to 2019, the most recent outbreak years were 2004-2006 and 2010-2012. From August to September 2019, there were twelve human cases, three of which reportedly resulted in death, and nine animal cases (eight horses and one goat) of EEE arbovirus in the state.

To address the potential public health risks during the active mosquito season, the Massachusetts Department of Public Health (MDPH) works in conjunction with Mosquito Control Districts/Projects (MCDs) to conduct weekly mosquito surveillance, monitoring, and testing to determine if populations of mosquitoes carrying EEE, West Nile and other potentially concerning arboviruses are on the rise in areas throughout the Commonwealth. When necessary, affected communities and the MCDs perform localized ground and aerial spraying of federal and state-approved adulticides and/or larvicides to reduce areas with confirmed high arbovirus mosquito populations. The mosquito adulticides are applied from dusk until dawn and the larvicides are applied during the day with appropriate prior public notification. If local MCD's mosquito control efforts are not enough, and an EEE virus outbreak occurs, MDPH coordinates with municipal boards of health, other local officials and state legislators prior to issuing a "Certification of a Public Health Hazard that Requires Pesticide Application to Protect Public Health." This certificate identifies areas or counties at risk and sets in motion a collective multi-agency state response. The State Reclamation and Mosquito Control Board (SRMCB), upon declaration of a public health hazard, oversees aerial mosquito spraying of the areas identified in the MDPH Certificate. The SRMCB, created by statute, is housed within the Massachusetts Department of Agricultural Resources (MDAR) and is represented by 3 agencies; MDAR, the Department of Conservation and Recreation (MDCR) and the Department of Environmental Protection (MassDEP). The SRMCB funds MDAR staff to support mosquito control related responsibilities. Prior to spraying, technical and GIS staff of cooperating state agencies work together to identify and map the exclusion (no-spray) zones, often sensitive areas such as surface water sources of public water supplies, organic farms, fish hatcheries and endangered species habitats.

Since 2006, SRMCB has used the pesticide product Anvil 10+10 (see the [MDAR website](#)), which has been extensively tested and used in both ground-level and aerial spraying in the U.S. to control mosquitoes. Anvil 10+10 contains two ingredients: Sumithrin and piperonyl butoxide (PBO). Sumithrin is an ingredient similar to the natural components of the chrysanthemum flower, also found in some over-the-counter products such as pet shampoos. Sumithrin is rapidly inactivated and decomposes with exposure to light and air, with a half-life of less than one day in the air and on plants. In soil, it degrades rapidly and has proven to be extremely effective in killing mosquitoes worldwide for over 20 years. PBO serves to increase the ability of Sumithrin to kill mosquitoes. The product is registered by U.S. Environmental Protection Agency (U.S. EPA) and in Massachusetts for this use. It was used in previous aerial applications for mosquito control (2006, 2010, and 2012). It is also used by some of the MCDs for ground applications. From August to September 2019, six mosquito control aerial spray events were conducted throughout the state, encompassing 119 communities and seven counties; some were areas that had more than one event (see Appendix B). The geographic scope of these spraying operations covered a wider range of counties and communities than in previous years due to confirmed EEE cases that were more dispersed throughout the state.

In response to the aerial spraying, the Massachusetts Department of Environmental Protection (MassDEP) conducted an extensive monitoring program to ensure that public water supplies were safe

for human consumption and that surface waters were safe for public use. MassDEP conducted monitoring before and after each aerial spraying event, with assistance from public water suppliers who performed water quality testing of their water supplies, to ensure that the public was not exposed to the short-lived Sumithrin pesticide and piperonyl butoxide synergist.

MassDEP's responsibilities prior to, during, and after a mosquito aerial spray event included:

- 1) Oversaw and ensured that protocols for surface water protections are implemented;
- 2) Provided GIS maps of drinking water supply reservoirs to establish aerial spray exclusion zones and assisted in collective interagency efforts to develop and update on-line web postings of the Massachusetts Aerial Mosquito Spray Maps;
- 3) Coordinated and conducted sampling of drinking water supplies and other surface waters pre- and post-pesticide application and assess potential impacts to these surface waters;
- 4) Participated in daily cross-agency coordination efforts among MDAR, MDPH, MassDEP, Executive Office of Health and Human Services (EOHHS) and Executive Office of Energy and Environmental Affairs (EOEEA) to ensure that the key agency contacts had the latest information about operations, monitoring, and public outreach/communications; and
- 5) Provided a MassDEP representative to serve on the SRMCB (Commissioner or designee).

Description of Water Quality Sampling Operations

Six mosquito aerial spraying events using the pesticide product known as Anvil 10 + 10 the spray zone was conducted.¹ The water quality sampling and assessment of public drinking water supply (PWS) surface water bodies were conducted in collaboration with public water suppliers in the spray zones to determine if these waters were safe for public consumption after each night's spray. Public water suppliers collected samples prior to water treatment (raw) and after treatment (finished). PWSs were sampled on multiple days that included a day before the spray event to obtain baseline data against which to compare the post-spray Sumithrin (pesticide) and piperonyl butoxide (PBO/synergist) levels, the day after spraying, and the second day after spraying. MassDEP staff sampled select non-PWS surface waters to determine if the spray event resulted in risks to ecological receptors. Selected water bodies close to, but outside, the spray zones were sampled to serve as controls or comparisons. The water quality sampling was conducted following an existing MassDEP water quality sampling monitoring plan (See Appendix A for definitions of sampling terminology). Due to the rapid degradation of the pesticide and PBO once exposed to light and air, MassDEP staff and the water suppliers made every effort to mobilize quickly and collect samples by approximately 8:00 am after the previous night's aerial spray operation.

MassDEP transported pre- and post-spray event samples to the University of Massachusetts Pesticide Analysis Lab (MPAL) in Amherst for analyses and resulting data were forwarded to MassDEP's Office of Research and Standards (ORS) for assessment of potential human and ecological risks. ORS evaluated the analytical data to determine if any concentrations of Sumithrin (the pesticide) and piperonyl butoxide (PBO, the synergist that amplifies its effectiveness) were of public health concern or posed risks to aquatic animals based on U.S. EPA benchmarks, the Human Health Drinking Water Criteria (Table 1) and the Aquatic Life Benchmark Concentrations for fish and invertebrates for (Table 2), respectively.

¹The analytical data resulting from this effort were compiled into a spreadsheet by the MassDEP Geographic Information System (GIS) and BWR Boston and Regional staff.

Table 1: U.S. EPA Guidance Levels for Human Health

COMPOUND	Chronic Criteria (ug/L)			Acute Criteria (ug/L)		
	general population	child	lactating woman	child	female (13-49 years)	lactating woman
Sumithrin	992	206	575	42,000		117,000
Piperonyl Butoxide	40	23	26		800	557

Table 2: U.S. EPA Aquatic Life Benchmark Concentrations

COMPOUND	Chronic Criteria (ug/L)		(Acute Criteria (ug/L)	
	Fish	Invertebrates	Fish	Invertebrates
Sumithrin	40	30	950	255
Piperonyl Butoxide	1.1	0.47	7.9	2.2

Overview of Water Sampling

Six spray events took place between August 8 and September 23, 2019 (Figure 1 and Table 3). Sampling that was conducted in response to these events extended from the day before and two days after each spray event to obtain baseline pre-spray conditions and to assess any potential impacts over time. These spray events were:

Spray Event #1 (Event Code “BP1”) was conducted between August 8-11, 2019 and involved 37 municipalities in Bristol and Plymouth Counties. Water quality sampling supporting this spray event was conducted between August 7-12, 2019 (Figure 2).

Spray Event #2 (Event Code “BP2”), which occurred between August 21-24, 2019, involved 41 municipalities in Bristol and Plymouth Counties. Water quality sampling associated with this spray event was conducted between August 20-24, 2019 (Figure 3).

Spray Event #3 (Event Code “MW”) occurred between August 26-27, 2019 and involved 28 municipalities in Middlesex and Worcester Counties. Water quality sampling corresponding to this spray event was conducted between August 25-28, 2019 (Figure 4).

Spray Event #4 (Event Code “M-N-W”), which occurred between September 10-18, 2019, involved 62 municipalities in Middlesex, Norfolk, and Worcester Counties. Water quality sampling associated with this spray event was conducted between September 9-19, 2019 (Figure 5).

Spray Event #5 (Event Code “HHW”) was conducted between September 16-17, 2019 and involved 16 municipalities in Hampden, Hampshire, and Worcester Counties. Water quality sampling supporting this spray event was conducted between September 15-18, 2019 (Figure 6).

Spray Event #6 (Event Code “BP3”), which occurred between September 20-24, 2019, involved 39 municipalities in Bristol and Plymouth Counties. Water quality sampling associated with this spray event was conducted between September 19-25, 2019 (Figure 7).

Figure 1: 2019 MassDEP Water Sampling Map for Aerial Mosquito Spraying

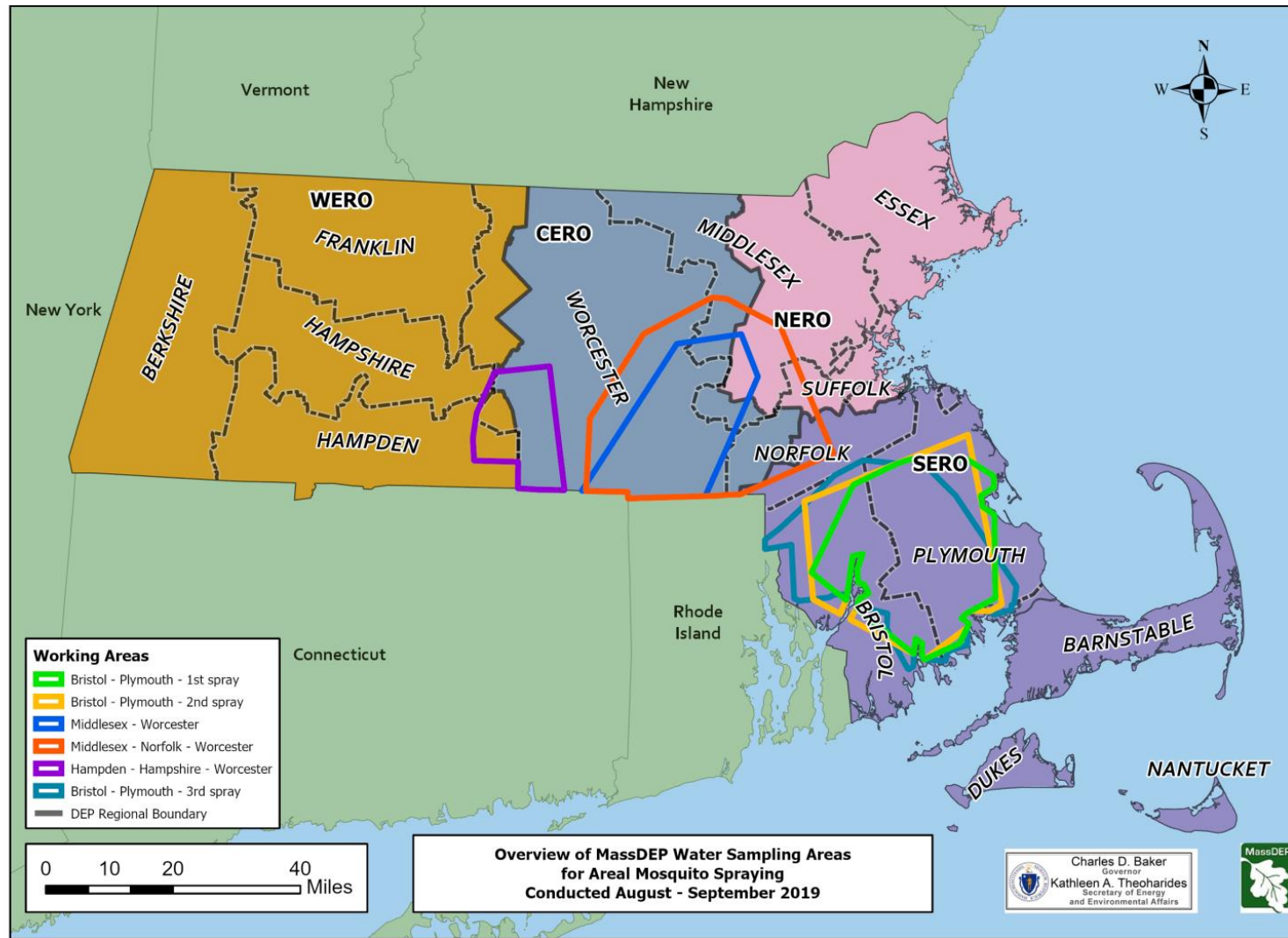


Table 3: Locations of Samples Collected for Each Sampling Event

Spraying Event	Sample Source			
	Surface Water Supply	Public Water Supply Water Treatment Plant	Open Water Body (Non-Public Water Supply)	Quality Assurance/ Quality Control Samples
Event 1: Bristol/ Plymouth (BP1)	<ul style="list-style-type: none"> Assawompset Pond 	<ul style="list-style-type: none"> Great Sandy Bottom WTP Silver Lake WTP Quittacas WTP Charles J. Rocheleau WTP Fall River WTP Somerset WTP 	<ul style="list-style-type: none"> Lake Nippenicket Lake Rico Snipatuit Pond (2 samples) Norton Reservoir (Control sample) Forge Pond Lake Sabbatia (2 samples) Johns Pond Stetson Pond Long Pond (2 Control Samples) Peterson's Saw Mill Pond 	<ul style="list-style-type: none"> 2 Field Blanks
Event 2: Bristol/ Plymouth (BP2)		<ul style="list-style-type: none"> Great Sandy Bottom WTP Silver Lake WTP Quittacas WTP Charles J. Rocheleau WTP Fall River WTP Somerset WTP 	<ul style="list-style-type: none"> Peterson's Saw Mill Pond (2 samples) Hobomock Pond Lake Nippenicket Tispaquin Pond Norton Reservoir (2 samples) Lake Rico Forge Pond (2 samples)) Sassaquin Pond 	<ul style="list-style-type: none"> 4 Field Blanks
Event 3: Middlesex/ Worcester (MW)	<ul style="list-style-type: none"> Somerset Reservoir 	<ul style="list-style-type: none"> Milford WC-Dilla St WTP Westboro Water Dept., Fisher St. WTP 	<ul style="list-style-type: none"> Wallum Lake (2 samples) Bartlett Pond Flint Pond (3 samples) Manchaug Pond Webster Lake Indian Lake (Control sample) Framingham Reservoir North Pond Nipmuck Pond (2 samples) Indian Lake (2 Control samples) 	
Event 4: Middlesex/ Norfolk/ Worcester (M-N-W)		<ul style="list-style-type: none"> Hudson Water Dept., Chestnut St WTP Milford WC-Dilla St WTP Carroll WTP Westboro Water Dept., Fisher St. WTP MWRA-Carroll WTP 	<ul style="list-style-type: none"> Chaffin Pond (Control & Duplicate Samples) Arcade Pond (2 samples) Whitehall Reservoir (2 samples) Chauncy Lake (2 samples) 	
Event 5: Hampden/Hampshire/ Worcester (HHW)		<ul style="list-style-type: none"> Hudson Water Dept., Chestnut St WTP Bell Hill WTP 	<ul style="list-style-type: none"> Quaboag Pond Lake Whittemore (Control sample) East Brimfield Lake (2 samples) Sherman Pond (2 samples) 	

Spraying Event	Sample Source			
	Surface Water Supply	Public Water Supply Water Treatment Plant	Open Water Body (Non-Public Water Supply)	Quality Assurance/ Quality Control Samples
		<ul style="list-style-type: none"> • Southbridge WTP 	<ul style="list-style-type: none"> • Comins Pond • Brookhaven Lake 	
Event 6: Bristol/ Plymouth (BP3)		<ul style="list-style-type: none"> • Russell Tennant WTP • Silver Lake WTP • Quittacas WTP • Charles J. Rocheleau WTP • Somerset WTP 	<ul style="list-style-type: none"> • Warren Upper Reservoir (2 samples) • Monponsett Pond (2 samples) • Lake Nippenicket • Tispaquin Pond • Snipatuit Pond • Middle Pond • Long Pond (Control sample) • Sassaquin Pond (2 samples) • Norton Reservoir 	<ul style="list-style-type: none"> • 2 Field Blanks

Note 1: Some of the above non-PWSs were sampled more than once for each spray event and are shown by the number within the parentheses **or** these were control sites or control site duplicates. Control sites were waterbodies outside of the spray area. Control site data is used as a reference to compare data from within the spray area. The control site duplicate is an additional sample collected from the control site. The total of 75 Non-PWS open water samples includes additional samples per waterbody, control samples and field blanks.

Note 2: Lake Wallum, located in south central MA, is a supply for a PWS in Rhode Island and was sampled for raw water only because it is NOT a Massachusetts Public Water Supply.

Note 3: Water Treatment Plant samples were obtained directly from the faucet taps at the plant facilities and not directly from the water body.

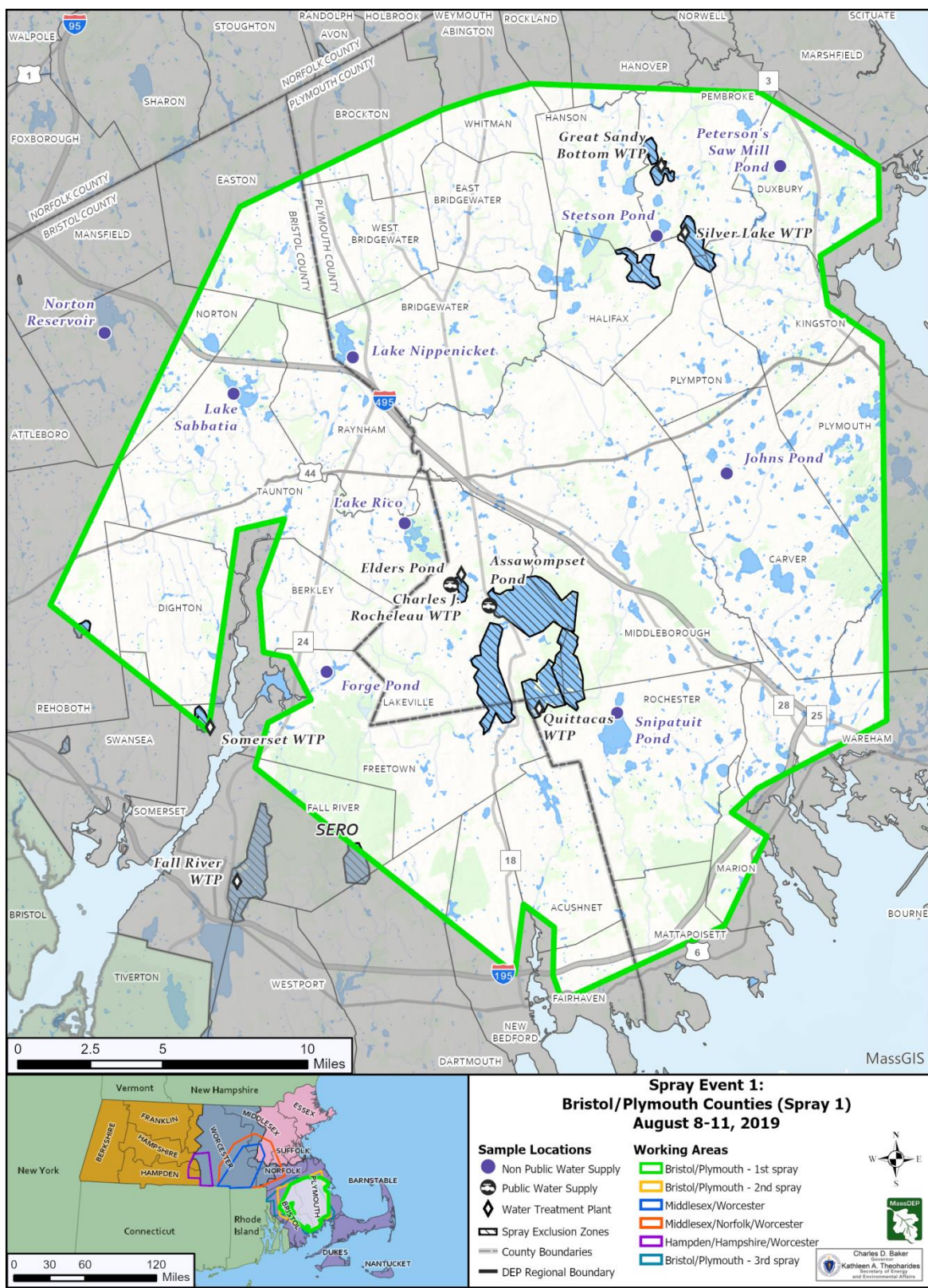
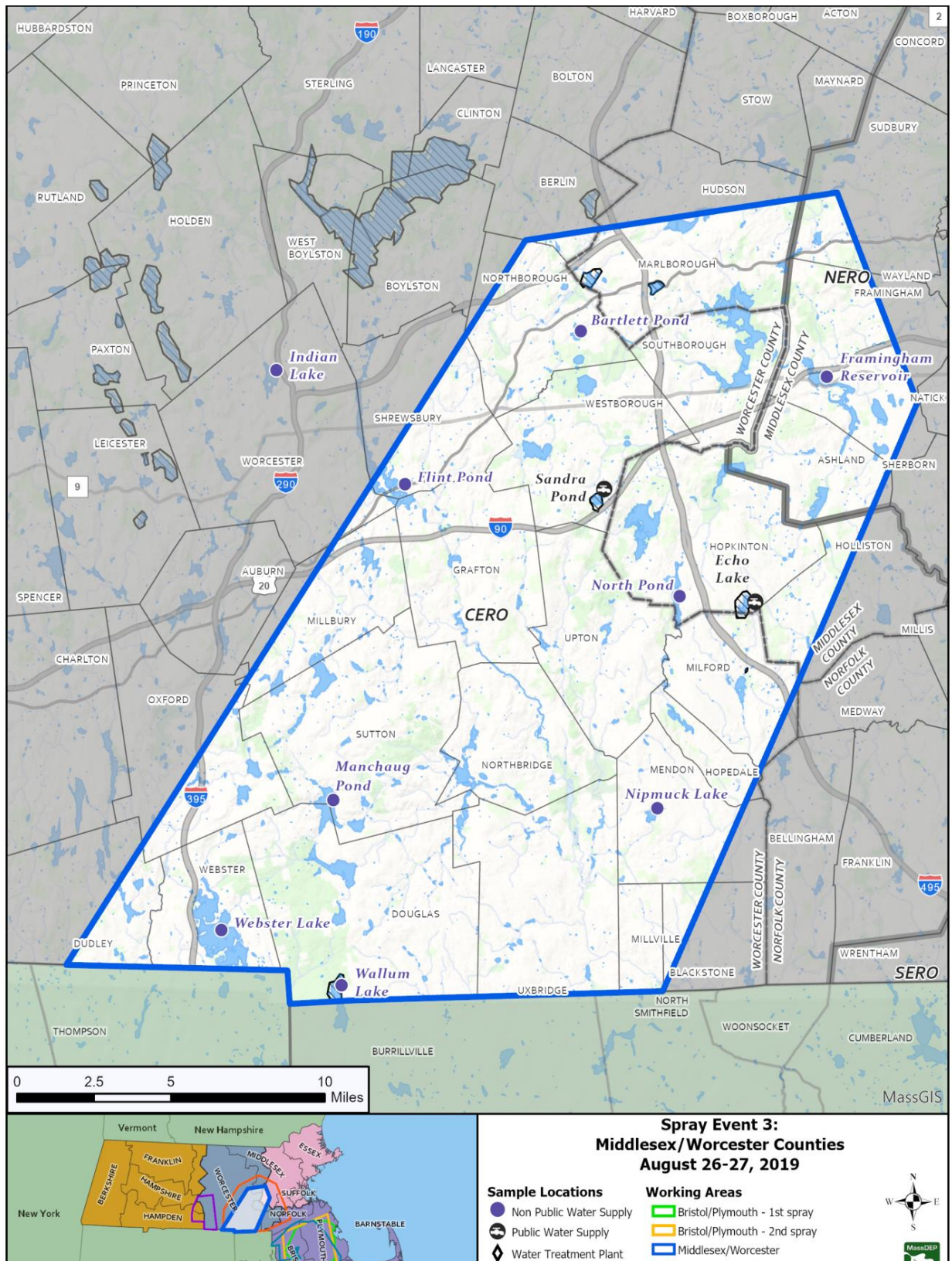


Figure 2: Spray Event #1: August 8-11, 2019 in Bristol/Plymouth Counties (Event Code "BP1")



**Figure 4: Spray Event #3: August 26-27, 2019 in Middlesex/Worcester Counties
(Event Code "MW")**

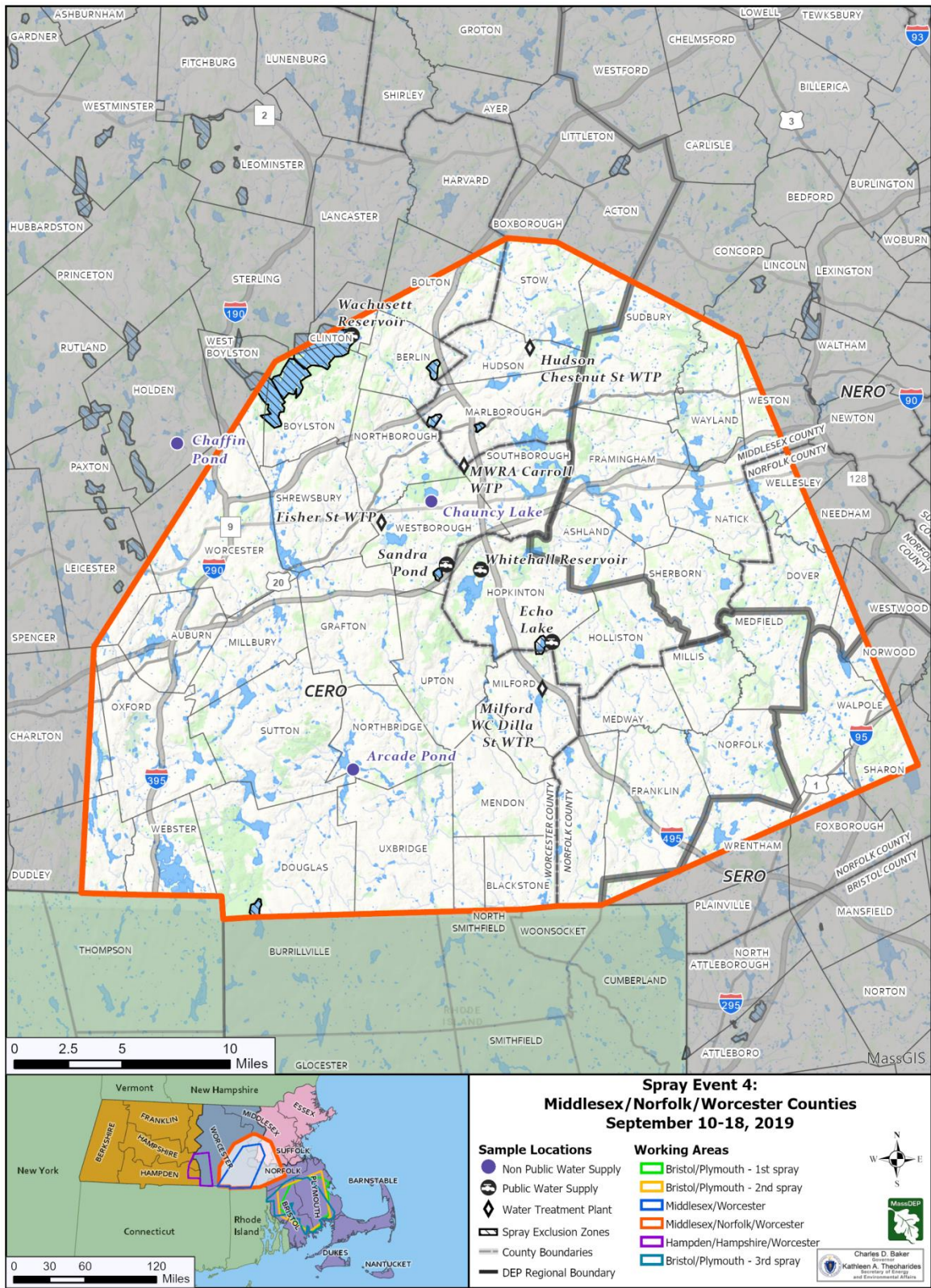


Figure 5: Spray Event #4: September 10-18, 2019 in Middlesex/ Norfolk/Worcester Counties (Event Code "M-N-W")

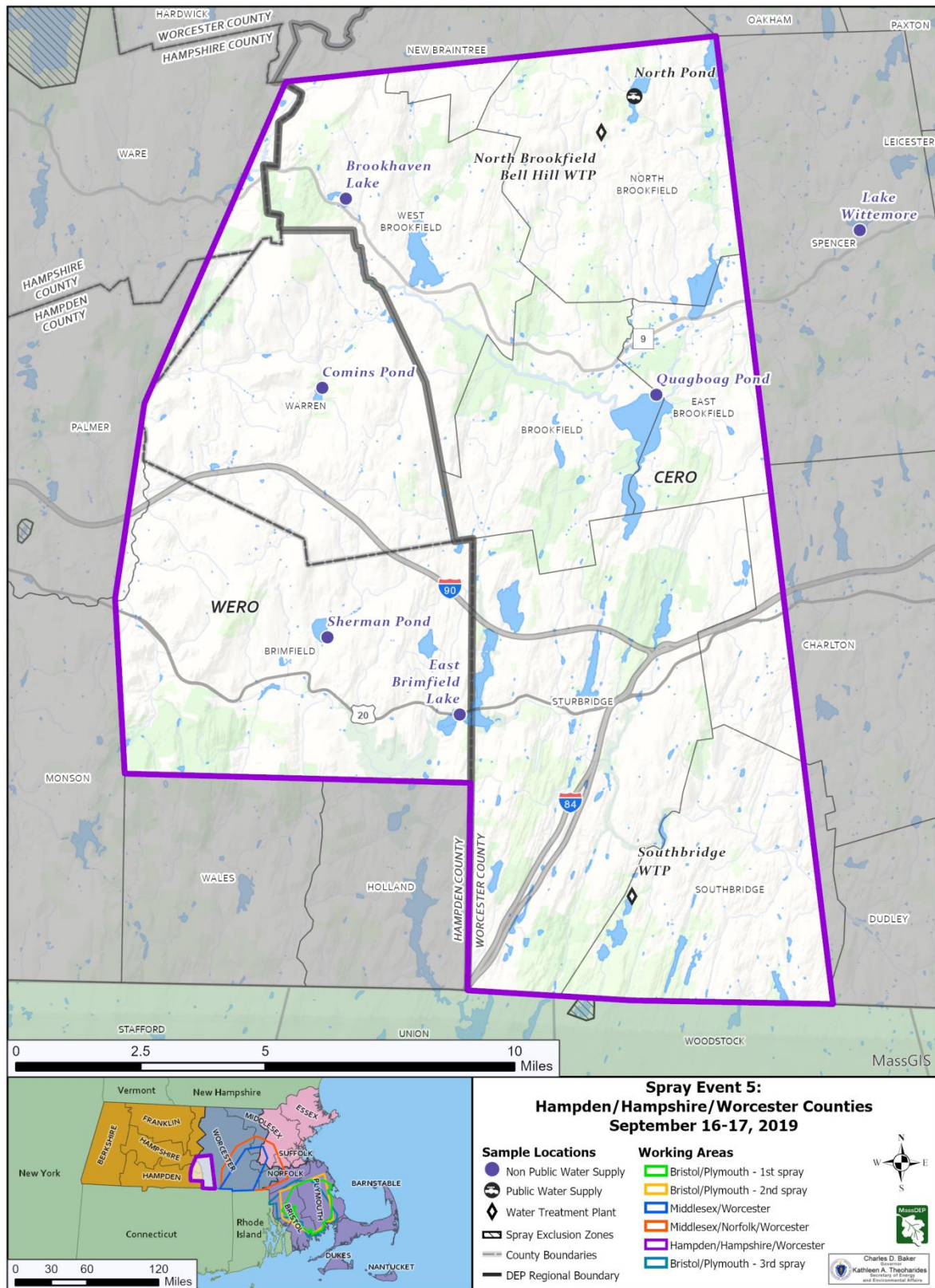
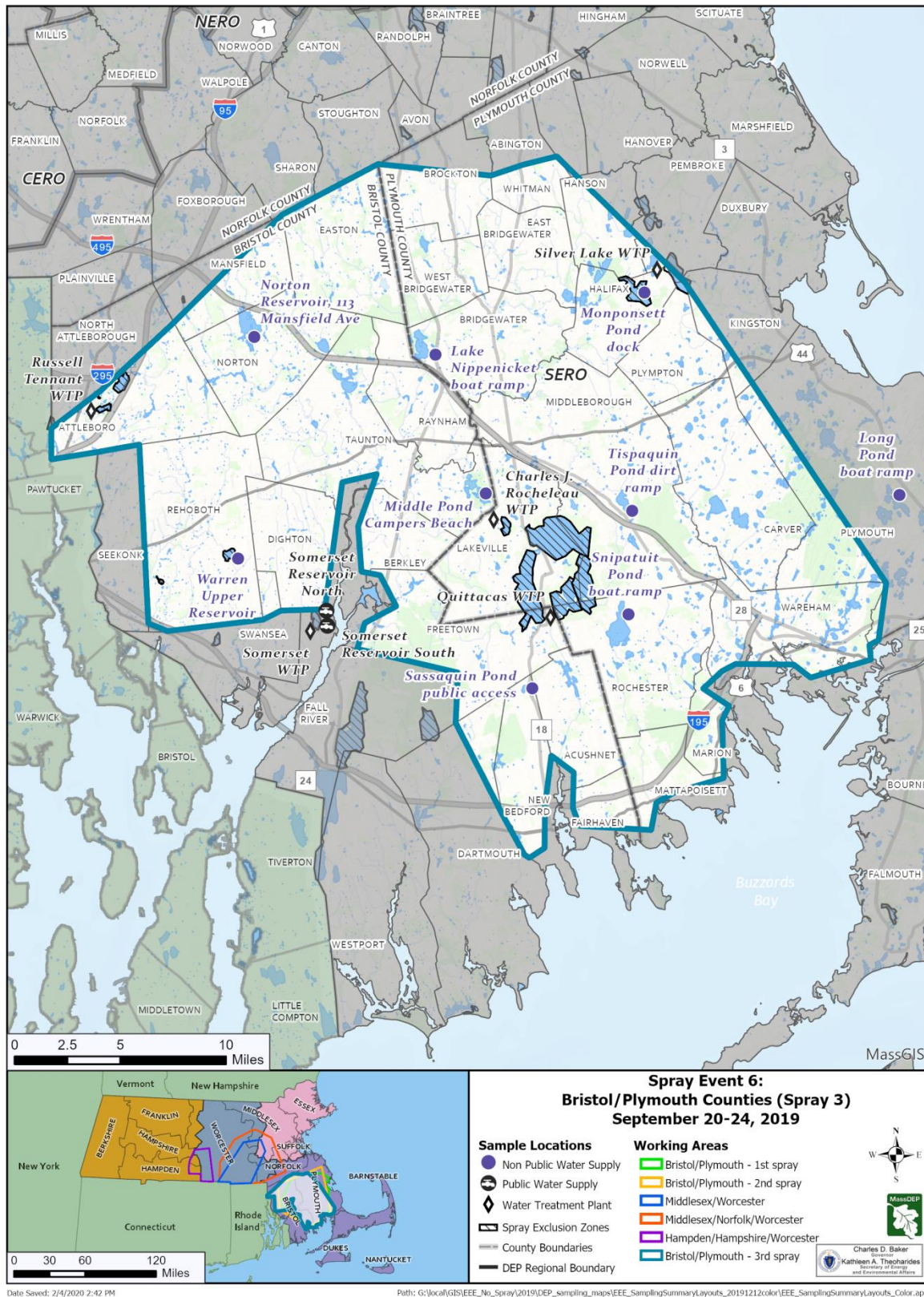


Figure 6: Spray Event #5: September 16-17, 2019 in Hampden/Hampshire/Worcester Counties (Event Code “HHW”)



**Figure 7: Spray Event #6: September 20-24, 2019 in Bristol/Plymouth Counties
(Event Code "BP3")**

Altogether, over the six sampling events, 277 water quality samples were collected, analyzed, and evaluated. Of these, 195 samples were collected from water treatment plant facilities and seven samples were obtained from two open water reservoirs, including six from the Somerset Water Treatment Plant (WTP) reservoir and one from the Quittacas WTP reservoir. Fifty-eight non-public surface water bodies were sampled directly from open waters. An additional eight control sites and one control site duplicate (nine total) were collected from outside the spray areas. Eight field blanks (see definition in Appendix A) were also collected. Those affected municipalities and counties corresponding to each of the six spray events are listed in Appendix B. Appendix C presents more detailed information about the type, number, and locations of samples collected during each of the spray events.

Summary of Results

Sumithrin was detected in 5 of 58 samples collected from surface water bodies that are not drinking water sources (non-PWS water samples) and the synergist PBO was detected in 53 of the non-PWS water samples. However, all detected concentrations were far below the U.S. EPA Aquatic Life Benchmark Concentrations for fish and invertebrates (Table 2). The highest concentration of Sumithrin was 0.051 ug/L, detected in a sample collected from Manchaug Pond in Sutton, MA in Spray Event 3 in Middlesex and Worcester Counties (MW). The highest concentration of PBO was 0.334 ug/L, detected in a sample from Lake Nippenicket in Bridgewater, MA during Spray Event 2 (BP2). Sample results for non-PWS water samples are summarized in Tables 4 and 5. Detailed results of each samples collected are presented in Appendix D.

Sumithrin was detected in 4 of 84² raw water (prior to drinking water treatment) samples collected from water treatment plants; these concentrations were thousands of times below the U.S. EPA Guidance Levels for Human Health (Table 1). Sumithrin was not detected in any sample collected from a finished (post-treatment) drinking water supply; all results from finished water samples were below the Limit of Detection (0.01 ug/L) for Sumithrin and, therefore, well below the Guidance Levels for Human Health, which range between 23 and 800 ug/L. The synergist, PBO, was detected in 54 of 84 raw drinking water samples and in 12 of 84 finished drinking water samples from water treatment plants; these were also at concentrations thousands of times below the U.S. EPA Guidance Levels for Human Health. Sample results for water samples collected from public water supplies are summarized in Tables 6 and 7. Detailed results of each samples collected are presented in Appendix D.

Conclusions

MassDEP conducted extensive monitoring throughout August and September of 2019 in response to aerial spraying conducted by MDAR in order to control populations of mosquitoes carrying Eastern Equine Encephalitis Virus, and other potentially concerning arboviruses. Analytical results for the 277 samples collected during the six spray events conducted during this period indicate that concentrations of Sumithrin and its PBO synergist were far below the U.S. EPA Benchmarks for human health risk level of concern and the U.S. EPA Aquatic Life Benchmark Concentrations for fish and invertebrates.

² In addition to the 84 raw samples collected from WTP's, there were also seven samples collected from open waterbody sources associated with PWS, for a total of 91 raw water samples collected.

Table 4: Comparison of Detected Sumithrin Levels in Non-Public Water System Waters to U.S. EPA Aquatic Life Benchmark Concentrations

SPRAYING EVENT CODE	Sumithrin (ug/L)		Chronic Criteria (ug/L)		(Acute Criteria (ug/L)	
	Average	Range	Fish	Invertebrates	Fish	Invertebrates
Event 1: Bristol/Plymouth (BP1)	<LOD*		1.1	0.47	7.9	2.2
Event 2: Bristol/Plymouth (BP2)	0.012	(<LOD-0.012)	1.1	0.47	7.9	2.2
Event 3: Middlesex/Worcester (MW)	0.041	(0.030-0.051)	1.1	0.47	7.9	2.2
Event 4: Middlesex/Norfolk/Worcester (M-N-W)	0.023	(0.021-0.025)	1.1	0.47	7.9	2.2
Event 5: Hampden/Hampshire/Worcester (HHW)	<LOD		1.1	0.47	7.9	2.2
Event 6: Bristol/Plymouth (BP3)	<LOD		1.1	0.47	7.9	2.2

*LOD = Limit of Detection: Sumithrin = 0.01 ug/L. See Definitions in Appendix A for additional information.

Table 5: Comparison of Detected PBO Levels in Non-Public Water System Waters to U.S. EPA Aquatic Life Benchmark Concentrations

SPRAYING EVENT	PBO (ug/L)		Chronic Criteria (ug/L)		(Acute Criteria (ug/L)	
	Average	Range	Fish	Invertebrates	Fish	Invertebrates
Event 1: Bristol/Plymouth (BP1)	0.0975	(0.02-0.25)	40	30	950	255
Event 2: Bristol/Plymouth (BP2)	0.105	(0.018-0.334)	40	30	950	255
Event 3: Middlesex/Worcester (MW)	0.123	(0.007-0.235)	40	30	950	255
Event 4: Middlesex/Norfolk/Worcester (M-N-W)	0.061	(0.013-0.102)	40	30	950	255
Event 5: Hampden/Hampshire/Worcester (HHW)	0.078	(0.048-0.077)	40	30	950	255
Event 6: Bristol/Plymouth (BP3)	0.057	(0.005-0.076)	40	30	950	255

Table 6: Mean and Range of PBO and Sumithrin Detections by Spraying Event and Water Treatment Plant (WTP)

EVENT CODE	Water Treatment Plant	PBO RAW* (ug/L)		PBO FINISHED (ug/L)		SUMITHRIN RAW (ug/L)		SUMITHRIN FINISHED (ug/L)	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range
Event 1: Bristol/Plymouth (BP1)	Great Sandy Bottom WTP	0.04 (3)**	(0.03-0.05)	<LOD		0.012 (1)	(<LOD-0.012)	<LOD	
	Silver Lake WTP	0.02 (3)	(0.01-0.03)	<LOD		<LOD		<LOD	
	Fall River WTP	<LOD***		0.08 (1)	(<LOD-0.08)	<LOD		<LOD	
	Quittacas WTP	0.013 (3)	(0.01-0.02)	0.015 (2)	(0.01-0.02)	<LOD		<LOD	
	Somerset WTP	<LOD		<LOD		<LOD		<LOD	
	Charles J. Rocheleau WTP	0.015 (2)	(0.01-0.02)	<LOD		<LOD		<LOD	
Event 2: Bristol/Plymouth (BP2)	Great Sandy Bottom WTP	0.082 (3)	(0.0795-0.084)	<LOD		0.0375 (2)	(0.025-0.05)	<LOD	
	Silver Lake WTP	0.019 (3)	(0.009-.03)	<LOD		<LOD		<LOD	
	Fall River WTP	0.007 (2)	(0.006-0.008)	<LOD		<LOD		<LOD	
	Quittacas WTP	0.023 (3)	(0.13-0.039)	0.012 (3)	(0.009-0.016)	<LOD		<LOD	
	Somerset WTP	0.033 (2)	(0.024-0.41)	0.0095 (2)	(0.009-0.01)	<LOD		<LOD	
	Charles J. Rocheleau WTP	0.0125 (2)	(0.007-0.018)	<LOD		<LOD		<LOD	
Event 3: Middlesex/Worcester (MW)	Milford WC-Dilla St WTP	0.01975	(0.012-0.027)	<LOD		0.024	(<LOD-0.024)	<LOD	
	Westboro Water Dept., Fisher St. WTP	0.119	(0.088-0.149)	<LOD		<LOD		<LOD	
Event 4: Middlesex/Norfolk/Worcester (M-N-W)	Hudson Water Dept., Chestnut St WTP	0.009	(0.006-0.012)	<LOD		<LOD		<LOD	
	Milford WC-Dilla St WTP	0.017	(0.003-0.042)	<LOD		<LOD		<LOD	
	Westboro Water Dept., Fisher St. WTP	0.0328	(0.006-0.61)	0.009	(<LOD-0.009)	<LOD		<LOD	
	Carroll WTP	0.009	(<LOD-0.009)	0.006	(<LOD-0.006)	<LOD		<LOD	

Table 6: Mean and Range of PBO and Sumithrin Detections by Spraying Event and Water Treatment Plant (WTP) (cont.)

EVENT CODE	Water Treatment Plant	PBO RAW* (ug/L)		PBO FINISHED (ug/L)		SUMITHRIN RAW (ug/L)		SUMITHRIN FINISHED (ug/L)	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range
Event 5: Hampden/Hampshire/Worcester (HHW)	Bell Hill WTP	0.03	(<LOD-0.03)	<LOD		<LOD		<LOD	
	Southbridge WTP	0.016	(<LOD-0.016)	<LOD		<LOD		<LOD	
Event 6: Bristol/Plymouth (BP3)	Russell Tennant WTP	0.01175	(0.010-0.014)	<LOD		<LOD		<LOD	
	Silver Lake WTP	0.0055	0.005-0.006	<LOD		<LOD		<LOD	
	Quittacas WTP	0.028	(0.022-0.034)	0.0155	(0.015-0.016)	<LOD		<LOD	
	Somerset WTP	0.006	(<LOD-0.006)	<LOD		<LOD		<LOD	
	Charles J. Rocheleau WTP	0.005	(<LOD-0.005)	<LOD		<LOD		<LOD	

*Total number of RAW and FINISHED samples from each WTP by spray event is presented in Table C-4 Appendix C.

**Number in parentheses represents the number of detected samples for that Water. Treatment Plant

***LOD = Limit of Detection: PBO = 0.005 ug/L; Sumithrin = 0.01 ug/L. See **Definitions** in Appendix A

Table 7: Comparison of Detected PBO Levels in Finished Water to Guidance Levels for Human Health

EVENT CODE	WATER TREATMENT PLANT*	mean (ug/L)	range (ug/L)	Chronic Criteria (ug/L)			Acute Criteria (ug/L)	
				general population	child	lactating woman	child	lactating woman
Event 1: Bristol/Plymouth (BP1)	Fall River WTP (1)	0.08	(<LOD**-0.08)	992	206	575	42,000	117,000
	Quittacas WTP (2)	0.015	(0.01-0.02)	992	206	575	42,000	117,000
Event 2: Bristol/Plymouth (BP2)	Quittacas WTP (3)	0.012	(0.009-0.016)	992	206	575	42,000	117,000
	Somerset WTP (2)	0.0095	(0.009-0.01)	992	206	575	42,000	117,000
Event 3: Middlesex/Worcester (MW)	-----	<LOD	<LOD	992	206	575	42,000	117,000
Event 4: Middlesex/Norfolk/Worcester (M-N-W)	Westboro Water Dept., Fisher St. WTP(1)	0.009	(<LOD-0.009)	992	206	575	42,000	117,000
	Carroll WTP (1)	0.006	(<LOD-0.006)	992	206	575	42,000	117,000
Event 5: Hampden/Hampshire/Worcester (HHW)	-----	<LOD	<LOD	992	206	575	42,000	117,000
Event 6: Bristol/Plymouth (BP3)	Quittacas WTP (2)	0.0155	(0.015-0.016)	992	206	575	42,000	117,000

*Number in parentheses represents the number of detected samples for that Water Treatment Plant.

LOD = Limit of Detection: PBO = 0.005 ug/L. See **Definitions in Appendix A for additional information.

Appendix A: Definitions

DUPLICATE – A duplicate water sample is a second water sample collected concurrently with a first sample.

DUP (short for the term Duplicate)

FIELD BLANK - A field blank (also called a trip blank) is a clean, unopened sample bottle filled with (usually) deionized or distilled water, that accompanies the sample bottles to the "field", i.e., the area where the samples are collected, and back to the analytical laboratory. The field blank should not contain any target analyte (i.e., in this case, PBO or Sumithrin) at a concentration greater than its corresponding reporting limit and should not contain additional compounds that would interfere with identification and measurement of a method analyte. If a field blank is found to be contaminated with one of the target analyte, these samples should be flagged as possibly contaminated.

LIMIT OF DETECTION (LOD) - The Limit of Detection is the lowest concentration of an analyte that can be reliably seen or detected in a sample.

MICROGRAMS PER LITER (ug/L) - A microgram per liter (abbreviated in this document as ug/L) is the unit in which the detected concentrations of PBO and Sumithrin in water may be expressed. It is a Metric SI (System International) unit of measurement expressed as mass (in micrograms) per unit volume (in liters). One ug/L is equal to one microgram of the detected chemical in one liter of water. This measurement is equal to parts per billion (ppb).

PARTS PER BILLION (PPB) – A part per billion is a unit in which the detected concentrations of PBO and Sumithrin in water may be expressed. One ppb is equivalent to one part of the detected chemical in one billion parts of water. To put the magnitude of ppb in perspective, some examples of measurements in everyday life that are equal to about one ppb include: 1 inch in 16,000 miles and 1 second in 32 years. This measurement is equal to micrograms per liter (ug/L).

SPIKE RECOVERY - Spike Recovery (also called percent recovery) is calculated by analyzing a reference sample (which is not from the collected test samples) that has been spiked with a known concentration of the material being tested (i.e., PBO or Sumithrin in this case) and then analyzed to see how much of the known sample the lab analysis detects. The lab doing the analysis also must specify a percent recovery range that is acceptable.

Appendix B:
Towns and Counties per Spray Event

Spray Event	Event #	County	Town
Bristol-Plymouth 1	Event #1	PLYMOUTH	HANOVER
Bristol-Plymouth 1		PLYMOUTH	BROCKTON
Bristol-Plymouth 1		PLYMOUTH	PEMBROKE
Bristol-Plymouth 1		PLYMOUTH	ABINGTON
Bristol-Plymouth 1		PLYMOUTH	ROCKLAND
Bristol-Plymouth 1		PLYMOUTH	MATTAPOISETT
Bristol-Plymouth 1		PLYMOUTH	MARION
Bristol-Plymouth 1		PLYMOUTH	EAST BRIDGEWATER
Bristol-Plymouth 1		PLYMOUTH	WEST BRIDGEWATER
Bristol-Plymouth 1		PLYMOUTH	HALIFAX
Bristol-Plymouth 1		PLYMOUTH	KINGSTON
Bristol-Plymouth 1		PLYMOUTH	PLYMPTON
Bristol-Plymouth 1		PLYMOUTH	WHITMAN
Bristol-Plymouth 1		PLYMOUTH	DUXBURY
Bristol-Plymouth 1		PLYMOUTH	HANSON
Bristol-Plymouth 1		PLYMOUTH	ROCHESTER
Bristol-Plymouth 1		PLYMOUTH	BRIDGEWATER
Bristol-Plymouth 1		PLYMOUTH	PLYMOUTH
Bristol-Plymouth 1		PLYMOUTH	MIDDLEBOROUGH
Bristol-Plymouth 1		PLYMOUTH	CARVER
Bristol-Plymouth 1		PLYMOUTH	LAKEVILLE
Bristol-Plymouth 1		PLYMOUTH	WAREHAM
Bristol-Plymouth 1		BRISTOL	FAIRHAVEN
Bristol-Plymouth 1		BRISTOL	SOMERSET
Bristol-Plymouth 1		BRISTOL	FALL RIVER
Bristol-Plymouth 1		BRISTOL	ACUSHNET
Bristol-Plymouth 1		BRISTOL	NEW BEDFORD
Bristol-Plymouth 1		BRISTOL	DARTMOUTH
Bristol-Plymouth 1		BRISTOL	NORTON
Bristol-Plymouth 1		BRISTOL	EASTON
Bristol-Plymouth 1		BRISTOL	SWANSEA
Bristol-Plymouth 1		BRISTOL	TAUNTON
Bristol-Plymouth 1		BRISTOL	RAYNHAM
Bristol-Plymouth 1		BRISTOL	REHOBOTH
Bristol-Plymouth 1		BRISTOL	DIGHTON
Bristol-Plymouth 1		BRISTOL	BERKLEY
Bristol-Plymouth 1		BRISTOL	FREETOWN

Spray Event	Event #	County	Town
Bristol-Plymouth 2	Event # 2	PLYMOUTH	HANOVER
Bristol-Plymouth 2		PLYMOUTH	BROCKTON
Bristol-Plymouth 2		PLYMOUTH	PEMBROKE
Bristol-Plymouth 2		PLYMOUTH	ABINGTON
Bristol-Plymouth 2		PLYMOUTH	NORWELL
Bristol-Plymouth 2		PLYMOUTH	ROCKLAND
Bristol-Plymouth 2		PLYMOUTH	MARSHFIELD
Bristol-Plymouth 2		PLYMOUTH	MATTAPOISETT
Bristol-Plymouth 2		PLYMOUTH	MARION
Bristol-Plymouth 2		PLYMOUTH	EAST BRIDGEWATER
Bristol-Plymouth 2		PLYMOUTH	WEST BRIDGEWATER
Bristol-Plymouth 2		PLYMOUTH	HALIFAX
Bristol-Plymouth 2		PLYMOUTH	KINGSTON
Bristol-Plymouth 2		PLYMOUTH	PLYMPTON
Bristol-Plymouth 2		PLYMOUTH	WHITMAN
Bristol-Plymouth 2		PLYMOUTH	DUXBURY
Bristol-Plymouth 2		PLYMOUTH	HANSON
Bristol-Plymouth 2		PLYMOUTH	ROCHESTER
Bristol-Plymouth 2		PLYMOUTH	BRIDGEWATER
Bristol-Plymouth 2		PLYMOUTH	PLYMOUTH
Bristol-Plymouth 2		PLYMOUTH	MIDDLEBOROUGH
Bristol-Plymouth 2		PLYMOUTH	CARVER
Bristol-Plymouth 2		PLYMOUTH	LAKEVILLE
Bristol-Plymouth 2		PLYMOUTH	WAREHAM
Bristol-Plymouth 2		BRISTOL	FAIRHAVEN
Bristol-Plymouth 2		BRISTOL	SOMERSET
Bristol-Plymouth 2		BRISTOL	FALL RIVER
Bristol-Plymouth 2		BRISTOL	ACUSHNET
Bristol-Plymouth 2		BRISTOL	NEW BEDFORD
Bristol-Plymouth 2		BRISTOL	DARTMOUTH
Bristol-Plymouth 2		BRISTOL	MANSFIELD
Bristol-Plymouth 2		BRISTOL	NORTON
Bristol-Plymouth 2		BRISTOL	EASTON
Bristol-Plymouth 2		BRISTOL	SWANSEA
Bristol-Plymouth 2		BRISTOL	TAUNTON
Bristol-Plymouth 2		BRISTOL	RAYNHAM
Bristol-Plymouth 2		BRISTOL	ATTLEBORO
Bristol-Plymouth 2		BRISTOL	REHOBOTH
Bristol-Plymouth 2		BRISTOL	DIGHTON
Bristol-Plymouth 2		BRISTOL	BERKLEY
Bristol-Plymouth 2		BRISTOL	FREETOWN

Spray Event	Event #	County	Town
Middlesex-Worcester	Event # 3	MIDDLESEX	ASHLAND
Middlesex-Worcester		MIDDLESEX	MARLBOROUGH
Middlesex-Worcester		MIDDLESEX	FRAMINGHAM
Middlesex-Worcester		MIDDLESEX	HOPKINTON
Middlesex-Worcester		MIDDLESEX	HOLLISTON
Middlesex-Worcester		MIDDLESEX	HUDSON
Middlesex-Worcester		MIDDLESEX	SUDBURY
Middlesex-Worcester		WORCESTER	WESTBOROUGH
Middlesex-Worcester		WORCESTER	NORTHBOROUGH
Middlesex-Worcester		WORCESTER	WORCESTER
Middlesex-Worcester		WORCESTER	SHREWSBURY
Middlesex-Worcester		WORCESTER	SOUTHBOROUGH
Middlesex-Worcester		WORCESTER	GRAFTON
Middlesex-Worcester		WORCESTER	MILLBURY
Middlesex-Worcester		WORCESTER	UPTON
Middlesex-Worcester		WORCESTER	UXBRIDGE
Middlesex-Worcester		WORCESTER	HOPEDALE
Middlesex-Worcester		WORCESTER	MENDON
Middlesex-Worcester		WORCESTER	OXFORD
Middlesex-Worcester		WORCESTER	SUTTON
Middlesex-Worcester		WORCESTER	MILFORD
Middlesex-Worcester		WORCESTER	NORTHBRIDGE
Middlesex-Worcester		WORCESTER	BERLIN
Middlesex-Worcester		WORCESTER	WEBSTER
Middlesex-Worcester		WORCESTER	BLACKSTONE
Middlesex-Worcester		WORCESTER	MILLVILLE
Middlesex-Worcester		WORCESTER	DOUGLAS
Middlesex-Worcester		WORCESTER	DUDLEY
Middlesex-Norfolk-Worcester	Event # 4	MIDDLESEX	ACTON
Middlesex-Norfolk-Worcester		MIDDLESEX	ASHLAND
Middlesex-Norfolk-Worcester		MIDDLESEX	MARLBOROUGH
Middlesex-Norfolk-Worcester		MIDDLESEX	FRAMINGHAM
Middlesex-Norfolk-Worcester		MIDDLESEX	NATICK
Middlesex-Norfolk-Worcester		MIDDLESEX	SHERBORN
Middlesex-Norfolk-Worcester		MIDDLESEX	HOPKINTON
Middlesex-Norfolk-Worcester		MIDDLESEX	HOLLISTON
Middlesex-Norfolk-Worcester		MIDDLESEX	BOXBOROUGH
Middlesex-Norfolk-Worcester		MIDDLESEX	WAYLAND
Middlesex-Norfolk-Worcester		MIDDLESEX	HUDSON

Spray Event	Event #	County	Town
Middlesex-Norfolk-Worcester	Event # 4	MIDDLESEX	WESTON
Middlesex-Norfolk-Worcester		MIDDLESEX	CONCORD
Middlesex-Norfolk-Worcester		MIDDLESEX	STOW
Middlesex-Norfolk-Worcester		MIDDLESEX	LINCOLN
Middlesex-Norfolk-Worcester		MIDDLESEX	MAYNARD
Middlesex-Norfolk-Worcester		MIDDLESEX	SUDBURY
Middlesex-Norfolk-Worcester		WORCESTER	HARVARD
Middlesex-Norfolk-Worcester		WORCESTER	LEICESTER
Middlesex-Norfolk-Worcester		WORCESTER	WESTBOROUGH
Middlesex-Norfolk-Worcester		WORCESTER	NORTHBOROUGH
Middlesex-Norfolk-Worcester		WORCESTER	WORCESTER
Middlesex-Norfolk-Worcester		WORCESTER	SHREWSBURY
Middlesex-Norfolk-Worcester		WORCESTER	SOUTHBOROUGH
Middlesex-Norfolk-Worcester		WORCESTER	GRAFTON
Middlesex-Norfolk-Worcester		WORCESTER	MILLBURY
Middlesex-Norfolk-Worcester		WORCESTER	AUBURN
Middlesex-Norfolk-Worcester		WORCESTER	UPTON
Middlesex-Norfolk-Worcester		WORCESTER	UXBRIDGE
Middlesex-Norfolk-Worcester		WORCESTER	HOPEDALE
Middlesex-Norfolk-Worcester		WORCESTER	MENDON
Middlesex-Norfolk-Worcester		WORCESTER	OXFORD
Middlesex-Norfolk-Worcester		WORCESTER	SUTTON
Middlesex-Norfolk-Worcester		WORCESTER	CHARLTON
Middlesex-Norfolk-Worcester		WORCESTER	MILFORD
Middlesex-Norfolk-Worcester		WORCESTER	NORTHBRIDGE
Middlesex-Norfolk-Worcester		WORCESTER	BERLIN
Middlesex-Norfolk-Worcester		WORCESTER	WEST BOYLSTON
Middlesex-Norfolk-Worcester		WORCESTER	STERLING
Middlesex-Norfolk-Worcester		WORCESTER	BOLTON
Middlesex-Norfolk-Worcester		WORCESTER	CLINTON
Middlesex-Norfolk-Worcester		WORCESTER	BOYLSTON
Middlesex-Norfolk-Worcester		WORCESTER	WEBSTER
Middlesex-Norfolk-Worcester		WORCESTER	BLACKSTONE
Middlesex-Norfolk-Worcester		WORCESTER	MILLVILLE
Middlesex-Norfolk-Worcester		WORCESTER	DOUGLAS
Middlesex-Norfolk-Worcester		WORCESTER	DUDLEY
Middlesex-Norfolk-Worcester		NORFOLK	NEEDHAM
Middlesex-Norfolk-Worcester		NORFOLK	DOVER
Middlesex-Norfolk-Worcester		NORFOLK	WELLESLEY
Middlesex-Norfolk-Worcester		NORFOLK	MEDFIELD
Middlesex-Norfolk-Worcester		NORFOLK	NORWOOD

Spray Event	Event #	County	Town
Middlesex-Norfolk-Worcester	Event # 4	NORFOLK	WALPOLE
Middlesex-Norfolk-Worcester		NORFOLK	WESTWOOD
Middlesex-Norfolk-Worcester		NORFOLK	FRANKLIN
Middlesex-Norfolk-Worcester		NORFOLK	BELLINGHAM
Middlesex-Norfolk-Worcester		NORFOLK	NORFOLK
Middlesex-Norfolk-Worcester		NORFOLK	MILLIS
Middlesex-Norfolk-Worcester		NORFOLK	MEDWAY
Middlesex-Norfolk-Worcester		NORFOLK	SHARON
Middlesex-Norfolk-Worcester		NORFOLK	WRENTHAM
Middlesex-Norfolk-Worcester		NORFOLK	FOXBOROUGH
Hampden-Hampshire-Worcester	Event # 5	WORCESTER	NORTH BROOKFIELD
Hampden-Hampshire-Worcester		WORCESTER	WEST BROOKFIELD
Hampden-Hampshire-Worcester		WORCESTER	NEW BRAINTREE
Hampden-Hampshire-Worcester		WORCESTER	WARREN
Hampden-Hampshire-Worcester		WORCESTER	EAST BROOKFIELD
Hampden-Hampshire-Worcester		WORCESTER	BROOKFIELD
Hampden-Hampshire-Worcester		WORCESTER	CHARLTON
Hampden-Hampshire-Worcester		WORCESTER	STURBRIDGE
Hampden-Hampshire-Worcester		WORCESTER	SOUTHBRIDGE
Hampden-Hampshire-Worcester		WORCESTER	DUDLEY
Hampden-Hampshire-Worcester		HAMPSHIRE	WARE
Hampden-Hampshire-Worcester		HAMPDEN	PALMER
Hampden-Hampshire-Worcester		HAMPDEN	MONSON
Hampden-Hampshire-Worcester		HAMPDEN	BRIMFIELD
Hampden-Hampshire-Worcester		HAMPDEN	WALES
Hampden-Hampshire-Worcester		HAMPDEN	HOLLAND
Bristol-Plymouth 3	Event # 6	PLYMOUTH	BROCKTON
Bristol-Plymouth 3		PLYMOUTH	PEMBROKE
Bristol-Plymouth 3		PLYMOUTH	ABINGTON
Bristol-Plymouth 3		PLYMOUTH	ROCKLAND
Bristol-Plymouth 3		PLYMOUTH	MATTAPOISETT
Bristol-Plymouth 3		PLYMOUTH	MARION
Bristol-Plymouth 3		PLYMOUTH	EAST BRIDGEWATER
Bristol-Plymouth 3		PLYMOUTH	WEST BRIDGEWATER
Bristol-Plymouth 3		PLYMOUTH	HALIFAX
Bristol-Plymouth 3		PLYMOUTH	KINGSTON
Bristol-Plymouth 3		PLYMOUTH	PLYMPTON
Bristol-Plymouth 3		PLYMOUTH	WHITMAN
Bristol-Plymouth 3		PLYMOUTH	HANSON

Spray Event	Event #	County	Town
Bristol-Plymouth 3	Event # 6	PLYMOUTH	ROCHESTER
Bristol-Plymouth 3		PLYMOUTH	BRIDGEWATER
Bristol-Plymouth 3		PLYMOUTH	PLYMOUTH
Bristol-Plymouth 3		PLYMOUTH	MIDDLEBOROUGH
Bristol-Plymouth 3		PLYMOUTH	CARVER
Bristol-Plymouth 3		PLYMOUTH	LAKEVILLE
Bristol-Plymouth 3		PLYMOUTH	WAREHAM
Bristol-Plymouth 3		BRISTOL	FAIRHAVEN
Bristol-Plymouth 3		BRISTOL	SOMERSET
Bristol-Plymouth 3		BRISTOL	FALL RIVER
Bristol-Plymouth 3		BRISTOL	ACUSHNET
Bristol-Plymouth 3		BRISTOL	NEW BEDFORD
Bristol-Plymouth 3		BRISTOL	DARTMOUTH
Bristol-Plymouth 3		BRISTOL	MANSFIELD
Bristol-Plymouth 3		BRISTOL	NORTH ATTLEBOROUGH
Bristol-Plymouth 3		BRISTOL	NORTON
Bristol-Plymouth 3		BRISTOL	EASTON
Bristol-Plymouth 3		BRISTOL	SWANSEA
Bristol-Plymouth 3		BRISTOL	TAUNTON
Bristol-Plymouth 3		BRISTOL	RAYNHAM
Bristol-Plymouth 3		BRISTOL	ATTLEBORO
Bristol-Plymouth 3		BRISTOL	REHOBOTH
Bristol-Plymouth 3		BRISTOL	SEEKONK
Bristol-Plymouth 3		BRISTOL	DIGHTON
Bristol-Plymouth 3		BRISTOL	BERKLEY
Bristol-Plymouth 3		BRISTOL	FREETOWN

Appendix C: Sample Analysis Summary Statistics

Table C-1: Number of Water Samples of Each Type Analyzed

SAMPLE TYPE	# ANALYZED
RAW* Water from PWS	91
RAW DUPLICATE** Water from PWS	27
FINISHED* Water from PWS	84
Non-PWS	58
Control Site***	8
Control Site DUPLICATE	1
FIELD BLANK****	8
TOTAL SAMPLES	277

*RAW Water – water that has not been processed in a water treatment plant.

FINISHED Water – water that has been processed in a water treatment plant and is ready to be delivered to consumers.

**DUPLICATE – a second water sample collected concurrently with a first sample.

***Control Site - a waterbody outside of the spray area used as a reference to compare data from within the spray area.

****Field Blank – a clean unopened sample bottle that accompanies the sample bottles to the “field” and back to the analytical laboratory. See **Definitions** in Appendix A for additional information.

Table C-2: Summary Statistics of Detected PBO and Sumithrin Greater than Limit of Detection

STATISTIC	PBO	Sumithrin
TOTAL # SAMPLES	277	
# DETECTIONS > LOD*	140	9
AVERAGE SPIKE RECOVERY**	99.4%	69.3%
AVERAGE CONC. (ug/L)*** (of all detects)	0.005	0.03
MINIMUM CONC. (ug/L) (of all detects)	0.01	0.01
MAXIMUM CONC. (ug/L) (of all detects)	0.33	0.05

*LOD = Limit of Detection: PBO = 0.005 ug/L; Sumithrin = 0.01 ug/L. See **Definitions** in Appendix A for additional information.

** Spike Recovery: PBO – 60%-120%; Sumithrin – 60%-120%. See **Definitions** in Appendix 2 for additional information.

*** ug/L means micrograms per liter (also equal to parts per billion (ppb)).

Table C-3: Number of Detections of PBO and Sumithrin of Each Sample Type

SAMPLE TYPE DETECTIONS	PBO	Sumithrin
TOTAL detections*	140	9
FINISHED WATER** detections	12	0
RAW WATER** detections	54	4
RAW WATER duplicate*** detections	18	0
non-PWS detections	53	5
FIELD BLANK detections	1	---
Control Site***** detections	2	---

*Detection – Concentration of a chemical that is greater than its Limit of Detection (LOD): PBO = 0.005 ug/L;

Sumithrin = 0.01 ug/L. See **Definitions** in Appendix A for additional information.

**FINISHED Water – Water that has been processed in a water treatment plant and is ready to be delivered to consumers.

RAW Water – Water that has not been processed in a water treatment plant.

***DUPLICATE – a second water sample collected concurrently with a first sample.

****Field Blank – a clean unopened sample bottle that accompanies the sample bottles to the field and back to the analytical laboratory. See **Definitions** in Appendix A for additional information.

*****Control Site - a waterbody outside of the spray area used as a reference to compare data from within the spray area.

Table C-4: Number and Type of Samples from Water Treatment Plants Over Each Spray Event

EVENT	Event	RAW*	FINISHED**	TOTAL
Great Sandy Bottom WTP	Total	7	6	13
	BP1	4	4	8
	BP2	3	2	5
Silver Lake WTP	Total	10 (+2 DUPLICATES*)	10	22
	BP1	4	4	8
	BP2	3	3	6
	BP3	3 (+2 DUPLICATES)	3	8
Quittacas WTP	Total	12 (+1 DUPLICATES)	12	25
	BP1	4	4	8
	BP2	3	3	6
	BP3	5 (+1 DUPLICATES)	5	11
Charles J. Rocheleau WTP	Total	13 (+ 4 DUPLICATES)	13	30
	BP1	5	5	10
	BP2	3 (+2 DUPLICATES)	3	8
	BP3	5 (+2 DUPLICATES)	5	12
Fall River WTP	Total	5	5	10
	BP1	3	3	6
	BP2	2	2	4
Somerset WTP	Total	7 (+ 2 DUPLICATES)	7	16
	BP1	3	3	6
	BP2	2 (+2 DUPLICATES)	2	6
	BP3	2	2	4
Russell Tennant WTP	Total	3 (+ 1 DUPLICATES)	3	7
	BP3	3 (+1 DUPLICATES)	3	7
Milford WC-Dilla St WTP	Total	6 (+ 3 DUPLICATES)	6	15
	M-N-W	3 (+2 DUPLICATES)	3	8
	MW	3 (+1 DUPLICATES)	3	7
Westboro Water Dept., Fisher St. WTP	Total	8 (+ 5 DUPLICATES)	8	21
	M-N-W	5 (+3 DUPLICATES)	5	13
	MW	3 (+2 DUPLICATES)	3	8
Hudson Water Dept., Chestnut St WTP	Total	3	3	6
	M-N-W	3	3	6
Carroll WTP/MWRA-Carroll WTP	Total	5 (+ 4 DUPLICATES)	5	14
	M-N-W	5 (+ 4 DUPLICATES)	5	14
Southbridge WTP	Total	4 (+ 2 DUPLICATES)	3	9
	HHW	4 (+ 2 DUPLICATES)	3	9
Bell Hill WTP	Total	3 (+ 1 DUPLICATES)	3	7
	HHW	3 (+ 1 DUPLICATES)	3	7

*RAW Water – water that has not been processed in a water treatment plant.

FINISHED Water – water that has been processed in a water treatment plant and is ready to be delivered to consumers.

**DUPLICATE – a second water sample collected concurrently with a first sample.

Appendix D: Water Sampling Data Sorted by Spray Event

(see end of appendix for additional descriptions of table)

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP1	SD1R 8/11	nd@0.005	nd@0.01	DAY1	FINISH	8/10/2019	8/11/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP1	SD1F 8/11	nd@0.005	nd@0.01	DAY1	RAW	8/10/2019	8/11/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP1	TD3R 8/11	0.02	nd@0.01	DAY3	RAW	8/10/2019	8/11/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD3F 8/11	nd@0.005	nd@0.01	DAY3	FINISH	8/10/2019	8/11/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD1R 8/11	0.04	nd@0.01	DAY1	RAW	8/10/2019	8/11/2019	LAKEVILLE - 146	4201000-02S	Assawompset Pond
BP1	FP01 8/11	0.25	nd@0.01	DAY1	Non-PWS	8/10/2019	8/11/2019	FREETOWN - 102	No SOURCE_ID	Forge Pond
BP1	LS01 8/11	0.08	nd@0.01	DAY1	Non-PWS	8/10/2019	8/11/2019	TAUNTON - 293	No SOURCE_ID	Lake Sabbatia
BP1	LSD02 8/11	0.10	nd@0.01	DAY1	Non-PWS	8/10/2019	8/11/2019	TAUNTON - 293	No SOURCE_ID	Lake Sabbatia
BP1	JP01 8/11	nd@0.005	nd@0.01	DAY1	Non-PWS	8/10/2019	8/11/2019	CARVER - 52	No SOURCE_ID	Johns Pond
BP1	SP01 8/11	nd@0.005	nd@0.01	DAY1	Non-PWS	8/10/2019	8/11/2019	PEMBROKE - 231	No SOURCE_ID	Stetson Pond
BP1	LP01-C 8/11	0.005	nd@0.01		Control Site	8/10/2019	8/11/2019	PLYMOUTH - 239	No SOURCE_ID	Long Pond
BP1	TB01 8/11	nd@0.005	nd@0.01		BLANK	8/10/2019	8/11/2019	LAKEVILLE - 146	No SOURCE_ID	
BP1	SPIKE RECOVERY 8/13/2019	PBO: 99.8% Sumithrin: 71%								
BP1	ABD2R 8/12	0.04µg/L	nd@0.01	DAY2	RAW	8/11/2019	8/12/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	ABD2F 8/12	nd@0.005	nd@0.01	DAY2	FINISH	8/11/2019	8/12/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	BD2R 8/12	0.01µg/L	nd@0.01	DAY2	RAW	8/11/2019	8/12/2019	HALIFAX - 118	4044000-01S	Silver Lake

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP1	ABD0R 8/09	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/9/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	ABD0F 8/09	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/9/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	33 8/09	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/9/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	10352 8/09	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/9/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	NBD0R 8/09	nd@0.005	nd@0.01	DAY1	RAW	8/8/2019	8/9/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	NBD0F 8/09	nd@0.005	nd@0.01	DAY1	FINISH	8/8/2019	8/9/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	TD0R 8/08	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/8/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD0F 8/08	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/8/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD1R 8/09	nd@0.005	nd@0.01	DAY1	RAW	8/8/2019	8/9/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD1F 8/09	nd@0.005	nd@0.01	DAY1	FINISH	8/8/2019	8/9/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	SPIKE RECOVERY 8/10/2019	PBO: 91.6% Sumithrin: 65.6%								
BP1	NBD1R 08/10	0.01	nd@0.01	DAY2	RAW	8/9/2019	8/10/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	NBD1F 08/10	nd@0.005	nd@0.01	DAY2	FINISH	8/9/2019	8/10/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	TDZR 08/10	nd@0.005	nd@0.01	DAY2	RAW	8/9/2019	8/10/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TDZF 08/10	nd@0.005	nd@0.01	DAY2	FINISH	8/9/2019	8/10/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	LN01 08/10	0.12	nd@0.01	DAY1	Non-PWS	8/9/2019	8/10/2019	BRIDGEWATER - 42	No SOURCE_ID	Lake Nippenicket
BP1	LR01 08/10	0.02	nd@0.01	DAY1	Non-PWS	8/9/2019	8/10/2019	TAUNTON - 293	No SOURCE_ID	Lake Rico

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP1	SP01 08/10	0.08	nd@0.01	DAY1	Non-PWS	8/9/2019	8/10/2019	ROCHESTER - 250	No SOURCE_ID	Snipatuit Pond
BP1	SPD02 08/10	0.07	nd@0.01	DAY1	Non-PWS	8/9/2019	8/10/2019	ROCHESTER - 250	No SOURCE_ID	Snipatuit Pond
BP1	NR01-C 08/10	nd@0.005	nd@0.01		Control Site	8/9/2019	8/10/2019	NORTON - 218	No SOURCE_ID	Norton Reservoir
BP1	TB01 08/10	nd@0.005	nd@0.01		BLANK	8/9/2019	8/10/2019	LAKEVILLE - 146	No SOURCE_ID	
BP1	SPIKE RECOVERY 8/12/2019	PBO: 91.5% Sumithrin: 61.3%								
BP1	ABD1R 8/11	0.05	0.012	DAY1	RAW	8/10/2019	8/11/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	ABD1F 8/11	nd@0.005	nd@0.01	DAY1	FINISH	8/10/2019	8/11/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	BD1R 8/11	0.03	nd@0.01	DAY1	RAW	8/10/2019	8/11/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	BD1F 8/11	nd@0.005	nd@0.01	DAY1	FINISH	8/10/2019	8/11/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	FRD0R 8/10	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/10/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	FRD0F 8/10	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/10/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	FRD1R 8/11	nd@0.005	nd@0.01	DAY1	RAW	8/10/2019	8/11/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	FRD1F 8/11	nd@0.005	nd@0.01	DAY1	FINISH	8/10/2019	8/11/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	NBD2R 8/11	0.01	nd@0.01	DAY3	RAW	8/10/2019	8/11/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	NBD2F 8/11	0.01	nd@0.01	DAY3	FINISH	8/10/2019	8/11/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	SD0R 8/10	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/10/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP1	SD0F 8/10	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/10/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP1	BD2F 8/12	nd@0.005	nd@0.01	DAY2	FINISH	8/11/2019	8/12/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	FRD2R 8/12	nd@0.005	nd@0.01	DAY2	RAW	8/10/2019	8/12/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	FRD2F 8/12	0.08	nd@0.01	DAY2	FINISH	8/10/2019	8/12/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP1	NBD5R 8/12	0.02	nd@0.01	DAY4	RAW	8/10/2019	8/12/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	NBD5F 8/12	0.02	nd@0.01	DAY4	FINISH	8/10/2019	8/12/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP1	SD2R 8/12	nd@0.005	nd@0.01	DAY2	RAW	8/11/2019	8/12/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP1	SD2F 8/12	nd@0.005	nd@0.01	DAY2	FINISH	8/11/2019	8/12/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP1	TD4R 8/12	0.01	nd@0.01	DAY4	RAW	8/10/2019	8/12/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	TD4F 8/12	nd@0.005	nd@0.01	DAY4	FINISH	8/10/2019	8/12/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP1	PS01 8/12	0.06	nd@0.01	DAY1	Non-PWS	8/11/2019	8/12/2019	DUXBURY - 82	No SOURCE_ID	Peterson's Saw Mill Pond
BP1	LP01 8/12	0.006	nd@0.01		Control Site	8/11/2019	8/12/2019	PLYMOUTH - 239	No SOURCE_ID	Long Pond
BP1	SPIKE RECOVERY 8/14/2019	PBO: 89.9% Sumithrin: 63.5%								
BP1	ABD3R 8/13	0.03	nd@0.01	DAY3	RAW	8/11/2019	8/13/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	ABD3F 8/13	nd@0.005	nd@0.01	DAY3	FINISH	8/11/2019	8/13/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP1	BD3R 8/13	0.02	nd@0.01	DAY3	RAW	8/11/2019	8/13/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP1	BD3F 8/13	nd@0.005	nd@0.01	DAY3	FINISH	8/11/2019	8/13/2019	HALIFAX - 118	4044000-01S	Silver Lake

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP1	SPIKE RECOVERY 8/15/2019	PBO: 91.2% Sumithrin: 65.6%								
BP2	ARD1R 8/22	0.081	0.025	DAY1	RAW	8/21/2019	8/22/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP2	ARD1R-D1 (dup) 8/22	0.078	0.05	DAY1	RAW	8/21/2019	8/22/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP2	ARD1F 8/22	nd@.002	nd@.01	DAY1	FINISH	8/21/2019	8/22/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP2	BD1R 8/22	0.018	nd@.01	DAY1	RAW	8/21/2019	8/22/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	BD1F 8/22	nd@.002	nd@.01	DAY1	FINISH	8/21/2019	8/22/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	SM01 8/22	0.049	nd@.01	DAY1	Non-PWS	8/21/2019	8/22/2019	DUXBURY - 82	No SOURCE_ID	Peterson's Saw Mill Pond
BP2	SM02 8/22	0.058	nd@.01	DAY1	Non-PWS	8/21/2019	8/22/2019	DUXBURY - 82	No SOURCE_ID	Peterson's Saw Mill Pond
BP2	HP01 8/22	0.05	nd@.01	DAY1	Non-PWS	8/21/2019	8/22/2019	PEMBROKE - 231	No SOURCE_ID	Hobomock Pond
BP2	TB01 8/22	nd@.002	nd@.01		BLANK	8/21/2019	8/22/2019	LAKEVILLE - 146	No SOURCE_ID	
BP2	SPIKE RECOVERY 8/23/2019	PBO: 96% Sumithrin: 63.7%								
BP2	ARD2R 8/23	0.084	nd@0.01	DAY2	RAW	8/21/2019	8/23/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP2	ARD2F 8/23	nd@0.005	nd@0.01	DAY2	FINISH	8/21/2019	8/23/2019	PEMBROKE - 231	4001000-01S	Great Sandy Bottom Pond
BP2	BD1R 8/23	0.009	nd@0.01	DAY2	RAW	8/22/2019	8/23/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	BD1F 8/23	nd@0.005	nd@0.01	DAY2	FINISH	8/22/2019	8/23/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	NBD1R 8/23	0.013	nd@0.01	DAY1	RAW	8/22/2019	8/23/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP2	NBD1F 8/23	0.009	nd@0.01	DAY1	FINISH	8/22/2019	8/23/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP2	TD1R 8/23	nd@0.005	nd@0.01	DAY1	RAW	8/22/2019	8/23/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	TD1R-D1 (dup) 8/23	nd@0.005	nd@0.01	DAY1	RAW DUP	8/22/2019	8/23/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	TD1F 8/23	nd@0.005	nd@0.01	DAY1	FINISH	8/22/2019	8/23/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	LN01 8/23	0.334	0.012	DAY1	Non-PWS	8/22/2019	8/23/2019	BRIDGEWATER - 42	No SOURCE_ID	Lake Nippenicket
BP2	TP01 8/23	0.218	nd@0.01	DAY1	Non-PWS	8/22/2019	8/23/2019	MIDDLEBOROUGH - 182	No SOURCE_ID	Tispaquin Pond
BP2	TB02 8/23	nd@0.005	nd@0.01		BLANK	8/22/2019	8/23/2019	LAKEVILLE - 146	No SOURCE_ID	
BP2	SPIKE RECOVERY 8/24/2019	PBO: 113% Sumithrin: 77.4%								
BP2	BD1R_8/24	0.03	nd@0.01	DAY3	RAW	8/22/2019	8/24/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	BD1F_8/24	nd@0.005	nd@0.01	DAY3	FINISH	8/22/2019	8/24/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP2	NBD2R_8/24	0.039	nd@0.01	DAY2	RAW	8/23/2019	8/24/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP2	NBD2F_8/24	0.011	nd@0.01	DAY2	FINISH	8/23/2019	8/24/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP2	TD2R_8/24	0.007	nd@0.01	DAY2	RAW	8/23/2019	8/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	TD2R-D2_8/24 (dup)	0.007	nd@0.01	DAY2	RAW DUP	8/23/2019	8/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	TD2F-8/24	nd@0.005	nd@0.01	DAY2	FINISH	8/23/2019	8/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	NR1_8/24	0.063	nd@0.01	DAY1	Non-PWS	8/23/2019	8/24/2019	NORTON - 218	No SOURCE_ID	Norton Reservoir
BP2	NR2_8/24	0.072	nd@0.01	DAY1	Non-PWS	8/23/2019	8/24/2019	NORTON - 218	No SOURCE_ID	Norton Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP2	LR1_8/24	0.044	nd@0.01	DAY1	Non-PWS	8/23/2019	8/24/2019	TAUNTON - 293	No SOURCE_ID	Lake Rico
BP2	TB-03_8/24	nd@0.005	nd@0.01		BLANK	8/23/2019	8/24/2019	LAKEVILLE - 146	No SOURCE_ID	
BP2	SPIKE RECOVERY 8/25/2019	PBO: 97.6% Sumithrin: 62.3%								
BP2	FRD1R 8/25	0.008	nd@0.01	DAY1	RAW	8/24/2019	8/25/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP2	FRD1F 8/25	nd@0.005	nd@0.01	DAY1	FINISH	8/24/2019	8/25/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP2	NBD3R 8/25	0.017	nd@0.01	DAY3	RAW	8/23/2019	8/25/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP2	NBD3F 8/25	0.016	nd@0.01	DAY3	FINISH	8/23/2019	8/25/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP2	SD1R 8/25	0.04	nd@0.01	DAY1	RAW	8/24/2019	8/25/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	SD1RD1 8/25	0.042	nd@0.01	DAY1	RAW DUP	8/24/2019	8/25/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	SD1F 8/25	0.01	nd@0.01	DAY1	FINISH	8/24/2019	8/25/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	TD3R 8/25	0.018	nd@0.01	DAY3	RAW	8/23/2019	8/25/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	TD3F 8/25	nd@0.005	nd@0.01	DAY3	FINISH	8/23/2019	8/25/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP2	FP01 8/25	0.017	nd@0.01	DAY1	Non-PWS	8/24/2019	8/25/2019	FREETOWN - 102	No SOURCE_ID	Forge Pond
BP2	FPD1 8/25	0.02	nd@0.01	DAY1	Non-PWS	8/24/2019	8/25/2019	FREETOWN - 102	No SOURCE_ID	Forge Pond
BP2	SP01 8/25	0.053	nd@0.01	DAY1	Non-PWS	8/24/2019	8/25/2019	NEW BEDFORD - 201	No SOURCE_ID	Sassaquin Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP2	TB04 8/25	nd@0.005	nd@0.01		BLANK	8/24/2019	8/25/2019	LAKEVILLE - 146	No SOURCE_ID	
BP2	SPIKE RECOVERY 8/26/2019	PBO: 101% Sumithrin: 61.3%								
BP2	FRD2R 8/26	0.006	nd@0.01	DAY2	RAW	8/24/2019	8/26/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP2	FRD2F 8/26	nd@0.005	nd@0.01	DAY2	FINISH	8/24/2019	8/26/2019	FALL RIVER - 95	4095000-01S	North Watuppa Lake
BP2	SD2R 8/26	0.025	nd@0.01	DAY2	RAW	8/24/2019	8/26/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	SD2RD1 (dup) 8/26	0.023	nd@0.01	DAY2	RAW DUP	8/24/2019	8/26/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	SD2F 8/26	0.009	nd@0.01	DAY2	FINISH	8/24/2019	8/26/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP2	SPIKE RECOVERY 8/27/2019	PBO: 98.1% Sumithrin: 71.1%								
BP3	AD0R 9/20	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/20/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	AD0F 9/20	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/20/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	AD1R 9/21	0.016	nd@0.01	DAY1	RAW	9/20/2019	9/21/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	AD1RD 9/21	0.011	nd@0.01	DAY1	RAW DUP	9/20/2019	9/21/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	AD1F 9/21	nd@0.005	nd@0.01	DAY1	FINISH	9/20/2019	9/21/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	BD0R 9/20	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/20/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	BD0F 9/20	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/20/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	NBD0R 9/20	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/20/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP3	NBD0F 9/20	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/20/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	TD0R 9/20	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/20/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD0F 9/20	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/20/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	WUR01 9/21	0.027	nd@0.01	DAY1	Non-PWS	9/20/2019	9/21/2019	REHOBOTH - 247	No SOURCE_ID	Warren Upper Reservoir
BP3	WUR01D 9/21	nd@0.005	nd@0.01	DAY1	Non-PWS	9/20/2019	9/21/2019	REHOBOTH - 247	No SOURCE_ID	Warren Upper Reservoir
BP3	WUR01B 9/21	0.029	nd@0.01		BLANK	9/20/2019	9/21/2019	REHOBOTH - 247	No SOURCE_ID	
BP3	SPIKE RECOVERY 9/22/2019	PBO: 105.4% Sumithrin: 70.1%								
BP3	AD2R 9/22	0.010	nd@0.01	DAY2	RAW	9/20/2019	9/22/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	AD2F 9/22	nd@0.005	nd@0.01	DAY2	FINISH	9/20/2019	9/22/2019	ATTLEBORO - 16	4016000-06S	Manchester Pond Reservoir
BP3	BD1R 9/22	nd@0.005	nd@0.01	DAY1	RAW	9/21/2019	9/22/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	BD1R Dup 9/22	nd@0.005	nd@0.01	DAY1	RAW DUP	9/21/2019	9/22/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	BD1F 9/22	nd@0.005	nd@0.01	DAY1	FINISH	9/21/2019	9/22/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	SD2R 9/22	nd@0.005	nd@0.01	DAY2	RAW	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	SD2F 9/22	nd@0.005	nd@0.01	DAY2	FINISH	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	SR01 North 9/22	0.012	nd@0.01	DAY2	RAW	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP3	SR01 North Dup 9/22	0.012	nd@0.01	DAY2	RAW DUP	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	SR02 South 9/22	0.019	nd@0.01	DAY2	RAW	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	SR02 South Dup 9/22	0.019	nd@0.01	DAY2	RAW DUP	9/20/2019	9/22/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	MP1 9/22	0.0171	nd@0.01	DAY1	Non-PWS	9/21/2019	9/22/2019	HALIFAX - 118	No SOURCE_ID	Monponsett Pond
BP3	MP2 9/22	0.0176	nd@0.01	DAY1	Non-PWS	9/21/2019	9/22/2019	HALIFAX - 118	No SOURCE_ID	Monponsett Pond
BP3	FB1 Field Blank 9/22	nd@0.005	nd@0.01		BLANK	9/21/2019	9/22/2019	LAKEVILLE - 146	No SOURCE_ID	
BP3	SPIKE RECOVERY 9/23/2019	PBO: 97.5% Sumithrin: 60.7%								
BP3	BD2R 9/23	0.005	nd@0.01	DAY2	RAW	9/21/2019	9/23/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	BD2R (dup) 9/23	0.006	nd@0.01	DAY2	RAW DUP	9/21/2019	9/23/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	BD2F 9/23	nd@0.005	nd@0.01	DAY2	FINISH	9/21/2019	9/23/2019	HALIFAX - 118	4044000-01S	Silver Lake
BP3	NBD1F 9/23	nd@0.005	nd@0.01	DAY1	FINISH	9/22/2019	9/23/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	NBD1R 9/23	nd@0.005	nd@0.01	DAY1	RAW	9/22/2019	9/23/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	TD1R 9/23	nd@0.005	nd@0.01	DAY1	RAW	9/22/2019	9/23/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD1F 9/23	nd@0.005	nd@0.01	DAY1	FINISH	9/22/2019	9/23/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	Day 2 Raw (treatment plant) 9/23	0.006	nd@0.01	DAY3	RAW	9/20/2019	9/23/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP3	Day 2 Finish (treatment plant) 9/23	nd@0.005	nd@0.01	DAY3	FINISH	9/20/2019	9/23/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	Day 2 Reservoir North Raw 9/23	0.017	nd@0.01	DAY3	RAW	9/20/2019	9/23/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	Day 2 Reservoir South Raw 9/23	0.021	nd@0.01	DAY3	RAW	9/20/2019	9/23/2019	SOMERSET - 273	4273000-01S	Somerset Reservoir
BP3	LN01 9/23	0.155	nd@0.01	DAY1	Non-PWS	9/22/2019	9/23/2019	BRIDGEWATER - 42	No SOURCE_ID	Lake Nippenicket
BP3	TP01 9/23	0.047	nd@0.01	DAY1	Non-PWS	9/22/2019	9/23/2019	MIDDLEBOROUGH - 182	No SOURCE_ID	Tispaquin Pond
BP3	SPIKE RECOVERY 9/24/2019	PBO: 103.1% Sumithrin: 65.9%								
BP3	NBD2R 9/24	nd@0.005	nd@0.01	DAY2	RAW	9/23/2019	9/24/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	NBD2F 9/24	nd@0.005	nd@0.01	DAY2	FINISH	9/23/2019	9/24/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	TD2R 9/24	nd@0.005	nd@0.01	DAY2	RAW	9/23/2019	9/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD2R-D1 9/24	nd@0.005	nd@0.01	DAY2	RAW DUP	9/23/2019	9/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD2F 9/24	nd@0.005	nd@0.01	DAY2	FINISH	9/23/2019	9/24/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	SP-1 9/24	0.070	nd@0.01	DAY1	Non-PWS	9/23/2019	9/24/2019	ROCHESTER - 250	No SOURCE_ID	Snipatuit Pond
BP3	MP-1 9/24	0.067	nd@0.01	DAY1	Non-PWS	9/23/2019	9/24/2019	TAUNTON - 293	No SOURCE_ID	Middle Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP3	LP-1 9/24	nd@0.005	nd@0.01		Control Site	9/23/2019	9/24/2019	PLYMOUTH - 239	No SOURCE_ID	Long Pond
BP3	SPIKE RECOVERY 9/25/2019	PBO: 93.1% Sumithrin: 79.0%								
BP3	NBD3R 9/25	0.034	nd@0.01	DAY3	RAW	9/24/2019	9/25/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	NBD3F 9/25	0.015	nd@0.01	DAY3	FINISH	9/24/2019	9/25/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	TD3R 9/25	nd@0.005	nd@0.01	DAY3	RAW	9/24/2019	9/25/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD3R-D 9/25	nd@0.005	nd@0.01	DAY3	RAW DUP	9/24/2019	9/25/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	TD3F 9/25	nd@0.005	nd@0.01	DAY3	FINISH	9/24/2019	9/25/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	SP-01 9/25	0.047	nd@0.01	DAY1	Non-PWS	9/24/2019	9/25/2019	NEW BEDFORD - 201	No SOURCE_ID	Sassaquin Pond
BP3	SP-01D 9/25	0.048	nd@0.01	DAY1	Non-PWS	9/24/2019	9/25/2019	NEW BEDFORD - 201	No SOURCE_ID	Sassaquin Pond
BP3	NR-01 9/25	0.076	nd@0.01	DAY1	Non-PWS	9/24/2019	9/25/2019	NORTON - 218	No SOURCE_ID	Norton Reservoir
BP3	SPIKE RECOVERY 9/26/2019	PBO: 98.9% Sumithrin: 75.4%								
BP3	NBD4R 9/26	0.022	nd@0.01	DAY4	RAW	9/24/2019	9/26/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	NBD4RD1 9/26	0.021	nd@0.01	DAY4	RAW DUP	9/24/2019	9/26/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	NBD4F 9/26	0.016	nd@0.01	DAY4	FINISH	9/24/2019	9/26/2019	ROCHESTER - 250	4201000-02S	Little Quittacas Pond
BP3	TD4R 9/26	0.005	nd@0.01	DAY4	RAW	9/24/2019	9/26/2019	LAKEVILLE - 146	4293000-02S	Elders Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
BP3	TD4F 9/26	nd@0.005	nd@0.01	DAY4	FINISH	9/24/2019	9/26/2019	LAKEVILLE - 146	4293000-02S	Elders Pond
BP3	SPIKE RECOVERY 9/27/19	PBO: 100.4% Sumithrin: 70.8%								
MW	MD0R (8/25)	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/25/2019	HOPKINTON	2185000-02S	Echo Lake
MW	MD0F (8/25)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/25/2019	HOPKINTON	2185000-02S	Echo Lake
MW	WD0R (8/25)	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	8/25/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	WD0F (8/25)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	8/25/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	SPIKE RECOVERY 8/27/2019	PBO: 98.1% Sumithrin: 71.1%								
MW	154 (8/27)	0.008	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	DOUGLAS		Wallum Lake
MW	109 (8/27)	0.197	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	NORTHBOROUGH		Bartlett Pond
MW	110 (8/27)	0.204	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	SHREWSBURY		Flint Pond
MW	128 (8/27)	0.206	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	SHREWSBURY		Flint Pond
MW	146 (8/27)	nd@0.005	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	SHREWSBURY		Flint Pond
MW	162 (8/27)	0.235	0.051	DAY1	Non-PWS	8/26/2019	8/27/2019	SUTTON		Manchaug Pond
MW	165 (8/27)	0.053	nd@0.01	DAY1	Non-PWS	8/26/2019	8/27/2019	WEBSTER		Webster Lake
MW	WD1R (8/27)	0.148	nd@0.01	DAY1	RAW	8/26/2019	8/27/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	WD1RD1 (dup) (8/27)	0.150	nd@0.01	DAY1	RAW DUP	8/26/2019	8/27/2019	WESTBOROUGH	2328000-01S	Sandra Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
MW	WD1F (8/27)	nd@0.005	nd@0.01	DAY1	FINISH	8/26/2019	8/27/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	117 (8/27)	nd@0.005	nd@0.01	DAY1	Control Site	8/26/2019	8/27/2019	WORCESTER		Indian Lake
MW	SPIKE RECOVERY 8/28/2019	PBO: 106% Sumithrin: 69%								
MW	154 (8/28)	0.007	nd@0.01	DAY2	Non-PWS	8/27/2019	8/28/2019	DOUGLAS		Wallum Lake
MW	168 (8/28)	0.092	0.030	DAY1	Non-PWS	8/27/2019	8/28/2019	FRAMINGHAM		Framingham Reservoir
MW	103 (8/28)	0.225	nd@0.01	DAY1	Non-PWS	8/27/2019	8/28/2019	HOPKINTON		North Pond
MW	162 (8/28)	nd@0.005	nd@0.01	DAY1	Non-PWS	8/27/2019	8/28/2019	MENDON		Nipmuck Pond
MW	156 (8/28)	0.060	nd@0.01	DAY1	Non-PWS	8/27/2019	8/28/2019	MENDON		Nipmuck Pond
MW	159 (8/28)	0.064	nd@0.01	DAY1	Non-PWS	8/27/2019	8/28/2019	MENDON		Nipmuck Pond
MW	MD1R (8/28)	0.027	0.024	DAY1	RAW	8/27/2019	8/28/2019	HOPKINTON	2185000-02S	Echo Lake
MW	MD1F (8/28)	nd@0.005	nd@0.01	DAY1	FINISH	8/27/2019	8/28/2019	HOPKINTON	2185000-02S	Echo Lake
MW	WD2R (8/28)	0.085	nd@0.01	DAY2	RAW	8/27/2019	8/28/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	WD2RD2 (dup) (8/28)	0.091	nd@0.01	DAY2	RAW DUP	8/27/2019	8/28/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	WD2F (8/28)	nd@0.005	nd@0.01	DAY2	FINISH	8/27/2019	8/28/2019	WESTBOROUGH	2328000-01S	Sandra Pond
MW	135 (8/28)	nd@0.005	nd@0.01	DAY1	Control Site	8/27/2019	8/28/2019	WORCESTER		Indian Lake
MW	SPIKE RECOVERY 8/29/2019	PBO: 96% Sumithrin: 64.7%								
MW	MD2R (8/29)	0.011	nd@0.01	DAY2	RAW	8/27/2019	8/29/2019	HOPKINTON	2185000-02S	Echo Lake
MW	MD2RD2 (dup) (8/29)	0.013	nd@0.01	DAY2	RAW DUP	8/27/2019	8/29/2019	HOPKINTON	2185000-02S	Echo Lake

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
MW	MD2F (8/29)	nd@0.005	nd@0.01	DAY2	FINISH	8/27/2019	8/29/2019	HOPKINTON	2185000-02S	Echo Lake
MW	SPIKE RECOVERY 8/30/2019	PBO: 100.5% Sumithrin: 66.8%								
M-N-W	70 (9/11)	nd@0.005	nd@0.01	DAY1	Control Site	9/11/2019	9/11/2019	HOLDEN		Chaffin Pond
M-N-W	71 (9/11)	nd@0.005	nd@0.01	DAY1	Control Site DUP	9/11/2019	9/11/2019	HOLDEN		Chaffin Pond
M-N-W	HD0R (9/10)	0.012	nd@0.01	DAY0	RAW	Pre-Spray	9/10/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	HD0F (9/10)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/10/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	MD0R (9/10)	0.006	nd@0.01	DAY0	RAW	Pre-Spray	9/10/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	MD0F (9/10)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/10/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	CD0R (9/10)	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/10/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	CD0F (9/10)	0.006	nd@0.01	DAY0	FINISH	Pre-Spray	9/10/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	WD0R (9/10)	0.013	nd@0.01	DAY0	RAW	Pre-Spray	9/10/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD0F (9/10)	0.009	nd@0.01	DAY0	FINISH	Pre-Spray	9/10/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	SPIKE RECOVERY 9/12/2019	PBO: 103.2% Sumithrin: 77.1%								
M-N-W	MD2R (9/12)	nd@0.005	nd@0.01	DAY1	RAW	9/11/2019	9/12/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	MD2RD2 (9/12)	0.005	nd@0.01	DAY1	RAW DUP	9/11/2019	9/12/2019	HOPKINTON	2185000-02S	Echo Lake

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
M-N-W	MD2F(9/12)	nd@0.005	nd@0.01	DAY1	FINISH	9/11/2019	9/12/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	72 (9/12)	0.102	0.021	DAY1	Non-PWS	9/11/2019	9/12/2019	NORTHBRIDGE		Arcade Pond
M-N-W	73 (9/12)	0.078	0.025	DAY1	Non-PWS	9/11/2019	9/12/2019	NORTHBRIDGE		Arcade Pond
M-N-W	WD1R (9/12)	0.078	nd@0.01	DAY1	RAW	9/11/2019	9/12/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD1RD1 (9/12)	0.044	nd@0.01	DAY1	RAW DUP	9/11/2019	9/12/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD1F (9/12)	nd@0.005	nd@0.01	DAY1	FINISH	9/11/2019	9/12/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	SPIKE RECOVERY 9/13/2019	PBO: 107.6% Sumithrin: 72.3%								
M-N-W	MD2R (9/13)	0.041	nd@0.01	DAY2	RAW	9/12/2019	9/13/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	MD2RD2 (9/13)	0.042	nd@0.01	DAY2	RAW DUP	9/12/2019	9/13/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	MD2F (9/13)	nd@0.005	nd@0.01	DAY2	FINISH	9/12/2019	9/13/2019	HOPKINTON	2185000-02S	Echo Lake
M-N-W	WD2R (9/13)	0.010	nd@0.01	DAY2	RAW	9/12/2019	9/13/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD2RD2 (9/13)	0.012	nd@0.01	DAY2	RAW DUP	9/12/2019	9/13/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD2F (9/13)	nd@0.005	nd@0.01	DAY2	FINISH	9/12/2019	9/13/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	SPIKE RECOVERY 9/14/2019	PBO: 103% Sumithrin: 77%								
M-N-W	CWTP Raw (9/16)	nd@0.005	nd@0.01	DAY1	RAW	9/15/2019	9/16/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	CWTP Raw Dup (9/16)	nd@0.005	nd@0.01	DAY1	RAW DUP	9/15/2019	9/16/2019	MWRA	6000000-01S	Wachusett Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
M-N-W	CWTP Fin B (9/16)	nd@0.005	nd@0.01	DAY1	FINISH	9/15/2019	9/16/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	HD1R (9/16)	nd@0.005	nd@0.01	DAY1	RAW	9/15/2019	9/16/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	HD1F (9/16)	nd@0.005	nd@0.01	DAY1	FINISH	9/15/2019	9/16/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	SPIKE RECOVERY 9/17/2019	PBO: 108.8% Sumithrin: 85.6%								
HHW	80 Quaboag Pond (9/17)	0.18	nd@0.01	DAY1	Non-PWS	9/16/2019	9/17/2019	BROOKFIELD		Quaboag Pond
M-N-W	82 Whitehall Res. (9/17)	0.013	nd@0.01	DAY1	Non-PWS	9/16/2019	9/17/2019	HOPKINTON		Whitehall Reservoir
M-N-W	83 Whitehall Res. (9/17)	0.013	nd@0.01	DAY1	Non-PWS	9/16/2019	9/17/2019	HOPKINTON		Whitehall Reservoir
M-N-W	HD2R (9/17)	0.006	nd@0.01	DAY2	RAW	9/16/2019	9/17/2019	BERLIN	2141000-01S	Gates Pond
HHW	HD2RD2 (9/17)	nd@0.005	nd@0.01	DAY2	RAW DUP	9/16/2019	9/17/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	HD2F (9/17)	nd@0.005	nd@0.01	DAY2	FINISH	9/16/2019	9/17/2019	BERLIN	2141000-01S	Gates Pond
M-N-W	CWTP Raw (9/17)	nd@0.005	nd@0.01	DAY2	RAW	9/16/2019	9/17/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	CWTP Raw DUP (9/17)	nd@0.005	nd@0.01	DAY2	RAW DUP	9/16/2019	9/17/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	CWTP Fin B (9/17)	nd@0.005	nd@0.01	DAY2	FINISH	9/16/2019	9/17/2019	MWRA	6000000-01S	Wachusett Reservoir
HHW	NBD0R (9/16)	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/16/2019	NORTH BROOKFIELD	2212000-02S	Horse (North) Pond
HHW	NBD0F (9/16)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/16/2019	NORTH BROOKFIELD	2212000-02S	Horse (North) Pond
HHW	NBD1R (9/17)	nd@0.005	nd@0.01	DAY1	RAW	9/16/2019	9/17/2019	NORTH BROOKFIELD	2212000-02S	Horse (North) Pond
HHW	NBD1RD1 (9/17)	nd@0.005	nd@0.01	DAY1	RAW DUP	9/16/2019	9/17/2019	NORTH BROOKFIELD	2212000-02S	Horse (North) Pond

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
HHW	NBD1F (9/17)	nd@0.005	nd@0.01	DAY1	FINISH	9/16/2019	9/17/2019	NORTH BROOKFIELD	2212000-02S	Horse (North) Pond
HHW	SD0R (9/16)	nd@0.005	nd@0.01	DAY0	RAW	Pre-Spray	9/16/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD0F (9/16)	nd@0.005	nd@0.01	DAY0	FINISH	Pre-Spray	9/16/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD1R (9/17)	nd@0.005	nd@0.01	DAY1	RAW	9/16/2019	9/17/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD1RD1 (9/17)	nd@0.005	nd@0.01	DAY1	RAW	9/16/2019	9/17/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD1F (9/17)	nd@0.005	nd@0.01	DAY1	FINISH	9/16/2019	9/17/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	82 Lake Whittemore (9/17)	nd@0.005	nd@0.01	DAY1	Control Site	9/16/2019	9/17/2019	SPENCER		Lake Whittemore
HHW	76 Brimfield Lake (9/17)	0.048	nd@0.01	DAY1	Non-PWS	9/16/2019	9/17/2019	BRIMFIELD		East Brimfield Lake
HHW	77 Dup Brimfield (9/17)	0.058	nd@0.01	DAY1	Non-PWS	9/16/2019	9/17/2019	BRIMFIELD		East Brimfield Lake
M-N-W	WD2RX (9/17)	0.039	nd@0.01	DAY3	RAW	9/16/2019	9/17/2019	WESTBOROUGH	2328000-01S	Sandra Pond
M-N-W	WD2FX (9/17)	nd@0.005	nd@0.01	DAY3	FINISH	9/16/2019	9/17/2019	WESTBOROUGH	2328000-01S	Sandra Pond
HHW and M-N-W	SPIKE RECOVERY 9/18/2019	PBO: 100% Sumithrin: 73.5%								
HHW	90 Sherman Pond (9/18)	0.07	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	BRIMFIELD		Sherman Pond
HHW	91 Sherman Pond (9/18)	0.077	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	BRIMFIELD		Sherman Pond
M-N-W	CWTPRD2-2 (9/18)	0.009	nd@0.01	DAY3	RAW	9/17/2019	9/18/2019	MWRA		Wachusett Reservoir
M-N-W	CWTPRD2-2D (9/18)	0.009	nd@0.01	DAY3	RAW DUP	9/17/2019	9/18/2019	MWRA		Wachusett Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
M-N-W	CWTPFD2-2 (9/18)	nd@0.005	nd@0.01	DAY3	FINISH	9/17/2019	9/18/2019	MWRA		Wachusett Reservoir
HHW	NBD2R (9/18)	0.03	nd@0.01	DAY2	RAW	9/17/2019	9/18/2019	NORTH BROOKFIELD		North Pond
HHW	NBD2F (9/18)	nd@0.005	nd@0.01	DAY2	FINISH	9/17/2019	9/18/2019	NORTH BROOKFIELD	2212000-02S	North Pond
HHW	SD2R (9/18)	0.016	nd@0.01	DAY2	RAW	9/17/2019	9/18/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD2RD2 (9/18)	0.016	nd@0.01	DAY2	RAW DUP	9/17/2019	9/18/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	SD2F (9/18)	nd@0.005	nd@0.01	DAY2	FINISH	9/17/2019	9/18/2019	SOUTHBRIDGE	2278000-01S	Hatchett Brook Reservoir
HHW	92 Comins Pond (9/18)	0.061	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	WARREN		Comins Pond
HHW	94 Brookhaven Lake (9/18)	0.049	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	WEST BROOKFIELD		Brookhaven Lake
M-N-W	96 Chauncy Lake (9/18)	0.067	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	WESTBOROUGH		Chauncy Lake
M-N-W	97 Chauncy Lake (9/18)	0.091	nd@0.01	DAY1	Non-PWS	9/17/2019	9/18/2019	WESTBOROUGH		Chauncy Lake
M-N-W	WD2-2R (9/18)	0.039	nd@0.01	DAY4	RAW	9/17/2019	9/18/2019	WESTBOROUGH		Sandra Pond
M-N-W	WD2-2RD (9/18)	0.041	nd@0.01	DAY4	RAW DUP	9/17/2019	9/18/2019	WESTBOROUGH		Sandra Pond
M-N-W	WD2-2F (9/18)	nd@0.005	nd@0.01	DAY4	FINISH	9/17/2019	9/18/2019	WESTBOROUGH		Sandra Pond
HHW and M-N-W	SPIKE RECOVERY 9/19/2019	PBO: 99.9% Sumithrin: 67.5%								
M-N-W	CWTPRD2-2 (9/19)	nd@0.005	nd@0.01	DAY4	RAW	9/17/2019	9/19/2019	MWRA	6000000-01S	Wachusett Reservoir
M-N-W	CWTPRD2-2D (9/19)	nd@0.005	nd@0.01	DAY4	RAW DUP	9/17/2019	9/19/2019	MWRA	6000000-01S	Wachusett Reservoir

Event ID	Chain Of Custody ID	PBO (ug/L)	Sumithrin (ug/L)	Sample Day #	Sample Type	Spray Event Date	Sample Date	GEO_TOWN	SOURCE_ID	Water Body Name
M-N-W	CWTPFD2-2 (9/19)	nd@0.005	nd@0.01	DAY4	FINISH	9/17/2019	9/19/2019	MWRA		Wachusett Reservoir
M-N-W	SPIKE RECOVERY 9/20/2019	PBO: 93.8% Sumithrin: 60.7%								

Note: The values reported in the above Appendix 3 Table without the "ND" designation represent concentrations (in ug/L) of PBO and Sumithrin found above their respective Limits of Detection. "ND" means "Non-Detect" and designates results below the Limit of Detection. The value appearing together with each "ND" designation represents the Limit of Detection (in ug/L) for that chemical.

Additional Information about the Water Sampling Data in the above Appendix D Table

Massachusetts EEE Surface Water Sampling: August - September 2019	
Water quality sampling was undertaken in response to EEE Aerial Spraying Events in Massachusetts during August and September, 2019.	
The table above was compiled and inputted into the above table by MassDEP GIS and Bureau of Water Resource staff using the Massachusetts Pesticide Analysis Laboratory Final Report of Sumithrin/PBO Water Analysis as provided to MassDEP and also MassGIS data.	
The Massachusetts Pesticide Analysis Laboratory (MPAL) - Morrill 1 N441, 637 North Pleasant Street, University of Massachusetts, Amherst, MA 01003-0230, Phone: 413-545-4369	

Fields that can be found in the MPAL lab report in the above Water Sampling Data Table	
Chain Of Custody ID	Unique sample identifier from Field Sample Collection Datasheet - unique identifier for tracking purposes - note : the SPIKE RECOVERY record for each lab date includes the MM/DD/YYYY of the Analysis Date.
PBO ug/L	Piperonyl Butoxide concentration in ug/L per UMass lab (micrograms per liter is the same as parts per billion).
Sumithrin ug/L	Sumithrin a.k.a. Phenothrin concentration in ug/L (micrograms per liter is the same as parts per billion)
Spray Event Date	Date when spraying began - if spraying took place on Sept 12 from 10pm until 2am Sept 13th the spray date is listed as Sept 12 th .
Sample Date	Date water quality sample was collected.

Parameters related to Sampling	
Sample Day #	Day Number is related to Sample Type. RAW and FINISH Samples were collected from public water supply (PWS) treatment plants starting before spraying (Day 0) and continues following spraying until the second day after spraying had been completed. In events where spraying over or near a public water supply reservoir spanned multiple days, sampling continued for as many days spraying occurred until the second day after spraying was completed. This may have taken 3 nights, which would make DAY4 the second day after spraying was completed. In events where there was a gap between sprays over or near a PWS reservoir, sampling stopped the second day after the first spray, and re-started the morning after the next spray event as DAY3 and continued until the second day after spraying was completed. Non-PWS samples were only collected the first morning after a spray event -DAY1.
	DAY0 - pre-spray sample
	DAY1 - before 8 AM the morning after spray event
	DAY2 - before 8 AM the 2nd morning after spray event
	DAY3 - before 8 AM the 3rd morning after continuing spray event
	DAY4 - before 8 AM the 4th morning after continuing spray event
	DAY5 - before 8 AM the 5th morning after continuing spray event

Sample Type	Water sample type - values are defined as follows:
	BLANK - clean de-ionized water sample for quality assurance/quality control
	DUP - Duplicate sample collected for quality assurance/quality control
	FINISH - Finished drinking water sample collected from the final sample tap (after treatment) at a public water supply treatment plant
	RAW - water supply reservoir sample collected from the raw water tap (before treatment) at a public water supply treatment plant.
	RAW DUP - duplicate water supply reservoir sample collected from the raw water tap (before treatment) at a public water supply treatment plant.
	Non-PWS - Sample collected directly from a water body that is not a public water supply source.
	Control Site - sample from area outside of spray area
	Control Site BLANK - clean sample for control - from outside of spray area
	Control Site DUP - duplicate sample for control - from outside of spray area
	SPIKE RECOVERY (<sample date>) - lab-provided quality control information

Fields that help define SAMPLING LOCATIONS	
GEO_TOWN	MA Municipality in which the sampling location was taken, may be followed by " - <TOWN_ID>"
SOURCE_ID	PWS Surface Water intake SOURCE_ID
WTP_Name	Water Treatment Plant name
Water Body Name	Lake/Pond name - primarily as found in HYDRO25K - also includes some locally-recognized names