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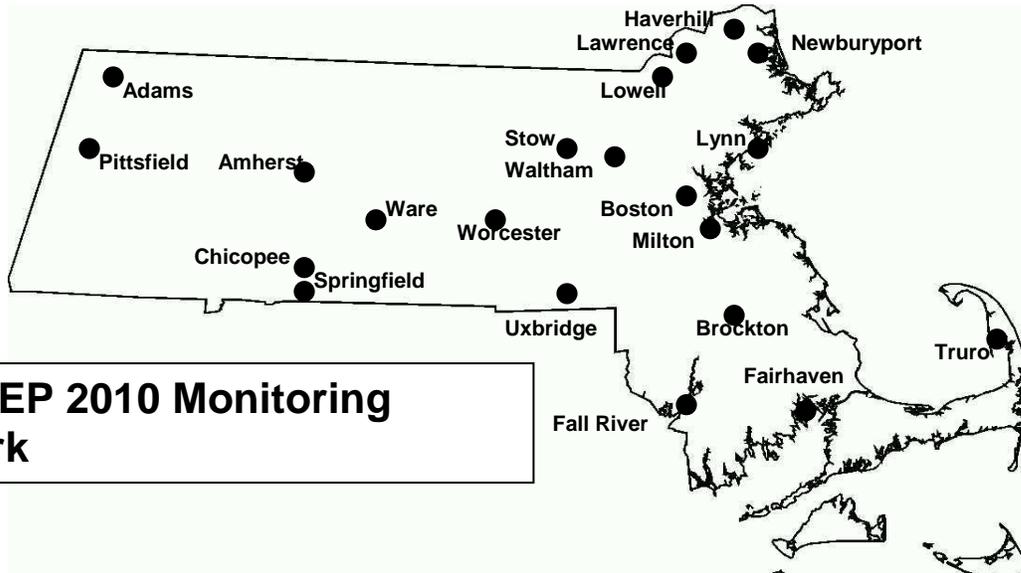
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**Massachusetts 2010 Air Monitoring Network Plan
 August 2010**

This is the Massachusetts 2010 Air Monitoring Network Plan, prepared by the Massachusetts Department of Environmental Protection (MassDEP) in accordance with Title 40 CFR Part 58.10. Each year, MassDEP is required to submit a Network Plan to the U.S. Environmental Protection Agency (EPA) for review and approval.

MassDEP operates a network of 29 ambient air quality monitoring stations at locations across the state as part of a comprehensive program to provide information about air quality to the public and to determine compliance with National Ambient Air Quality Standards. This Network Plan reviews the ambient air monitoring network to determine that the requirements of 40 CFR Part 58 Appendices A, C, D and E are met, describes which pollutants and other parameters MassDEP measures at its various ambient air monitoring sites, and discusses recent and planned changes to the network.



MassDEP 2010 Monitoring Network

1. Criteria Pollutants

This section describes MassDEP’s current efforts and future plans to monitor criteria pollutants listed in the federal Clean Air Act for which EPA has set National Ambient Air Quality Standards (NAAQS), including ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter (PM₁₀ and PM_{2.5}) and lead. EPA periodically reviews and revises these standards based on new public health and scientific information. These revisions often require changes to air monitoring networks and methodologies.

National Ambient Air Quality Standards				
Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
Lead	0.15 µg/m ³	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m ³	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour ⁽²⁾	None	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽³⁾	Same as Primary	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽⁴⁾ (Arithmetic Average)	Same as Primary	
	35 µg/m ³	24-hour ⁽⁵⁾	Same as Primary	
Ozone	0.075 ppm	8-hour ⁽⁶⁾	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour ⁽¹⁾
	0.14 ppm	24-hour ⁽¹⁾		
	75 ppb ⁽⁷⁾	1-hour	None	

µg/m³ = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; mg/m³ = milligrams per cubic meter

⁽¹⁾ Not to be exceeded more than once per year.

⁽²⁾ To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (0.100 ppm).

⁽³⁾ Not to be exceeded more than once per year on average over 3 years.

⁽⁴⁾ To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

⁽⁵⁾ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³.

⁽⁶⁾ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

⁽⁷⁾ To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb (0.075 ppm).

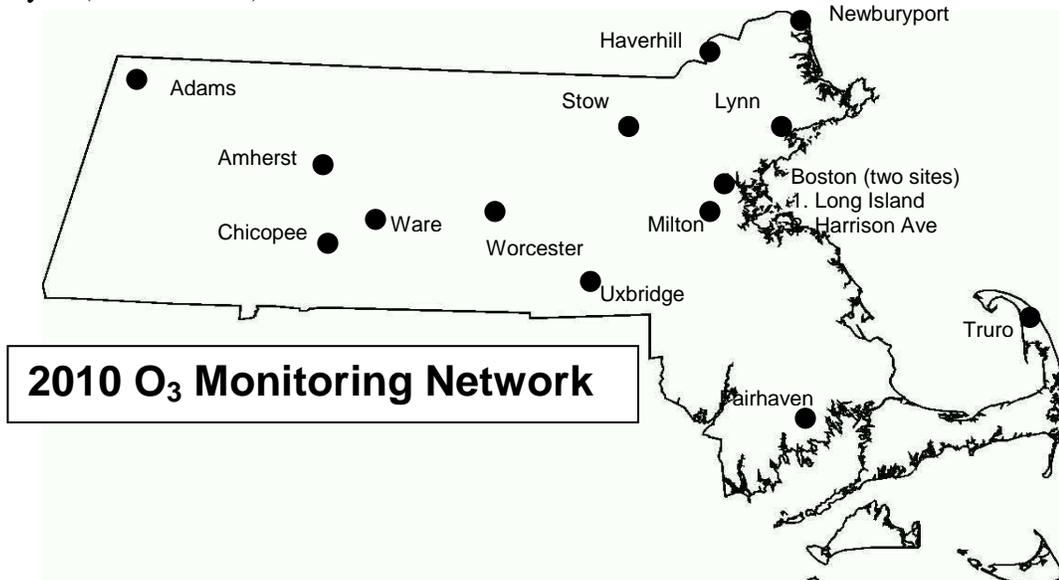
A. OZONE

MassDEP currently operates 15 ozone monitoring sites. This includes a new ozone monitor that also measures meteorological parameters that MassDEP installed at the Blackstone River and Canal State Park in Uxbridge in October 2008. This site became operational for the measurement of ozone on April 1, 2009 and is showing significant value for measuring ozone concentrations at a location upwind of the Greater Boston Metropolitan Area.

Due to a nearby construction project, MassDEP had to discontinue ozone monitoring at the Parker River National Wildlife Sanctuary in Newbury (25-009-4004) and move the monitor to the former Sanctuary headquarters site in Newburyport (25-009-4005) approximately two (2) miles north of the previous site. MassDEP currently is measuring ozone and is installing and testing Photochemical Assessment Monitoring Site (PAMS)¹ equipment at the new site. MassDEP previously used this location for measuring ozone from 1983 to 1994.

MassDEP may propose changes to the existing ozone monitoring network in future correspondence as warranted. The following sites make up MassDEP's current (2010) ozone monitoring network:

Adams (25-023-4002)	Milton (25-021-3003)
Amherst (25-015-0103)	Newburyport (25-009-4005)
Boston - Long Island (25-025-0041)	Stow (25-017-1102)
Boston – Harrison Ave/Roxbury (25-025-0042)	Truro (25-001-0002)
Chicopee (25-013-0008)	Uxbridge (25-017-4003)
Fairhaven (25-005-1002)	Ware (25-015-4002)
Haverhill (25-009-5005)	Worcester Airport (25-027-0015)
Lynn (25-009-2006)	



The Wampanoag Tribe of Gay Head (Aquinnah) on Martha's Vineyard and the EPA Chelmsford Laboratory also operate ozone monitors that generate ozone concentration data, which is equivalent to that produced by MassDEP. MassDEP, the Wampanoag Tribe and EPA-Chelmsford all are members of a

¹ PAMS is a special designation for enhanced monitoring stations that are designed to gather information on the ozone formation process.

Primary Quality Assurance Organization (PQAO), which ensures consistent quality assurance for ambient air quality data collected in Massachusetts.

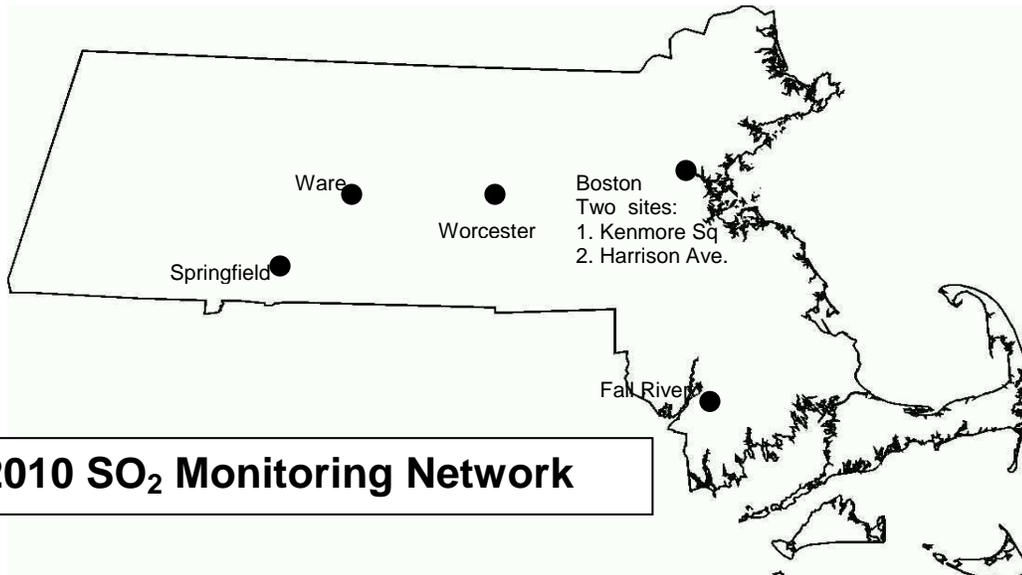
B. SULFUR DIOXIDE

MassDEP currently operates six (6) sulfur dioxide (SO₂) monitors. The following four are full-scale instruments that are used for comparison with the SO₂ NAAQS:

- Boston – Kenmore Square (25-025-0002)
- Fall River (25-005-1004)
- Springfield – Liberty Street (25-013-0016)
- Worcester – Summer Street (25-027-0023)

MassDEP operates trace scale (low measurement scale) SO₂ analyzers at Boston-Harrison Avenue (25-025-0042) and Ware (25-015-4002). MassDEP operates trace-level instruments for SO₂ (and carbon monoxide) at the Harrison Avenue site because of its National Core Monitoring Network (NCore) designation. MassDEP operates trace-level SO₂ at Ware because of the background/rural nature of the site.

MassDEP does not have any immediate plans to alter the SO₂ measurement network; however, EPA's recent revisions to the SO₂ NAAQS establishing a 1-hour standard of 75 ppb will have implications for the measurement of SO₂ beginning in 2013. Under EPA's new SO₂ monitoring regulations, MassDEP must account for six (6) new or existing monitoring locations.



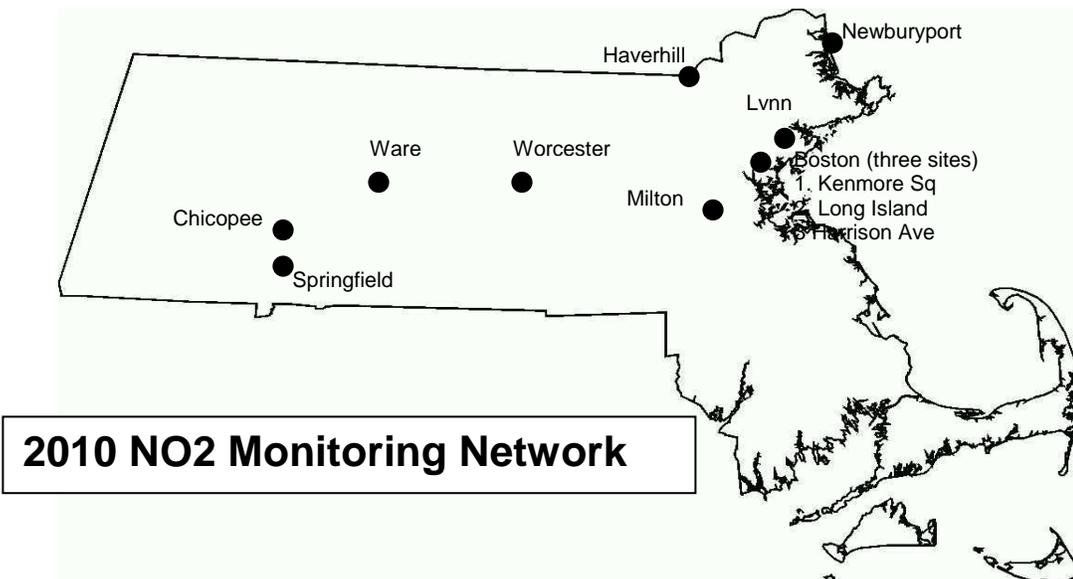
C. NITROGEN DIOXIDE

MassDEP has not made any changes to the nitrogen dioxide (NO₂) network within the last year. NO₂ and nitric oxide (NO) are monitored together in one analyzer and are referred to collectively as NO_x. Although NO₂ is a NAAQS pollutant, NO₂ and other oxides of nitrogen also are ozone precursors. Therefore, MassDEP operates NO₂ sites for NAAQS compliance (based on population exposure) and sites for ozone precursor purposes (i.e., PAMS). MassDEP currently operates 11 NO₂/NO_x monitors, including 7 PAMS sites and 4 population exposure sites. As noted above, the former Newbury PAMS site (25-009-4004) has been moved to a new location in Newburyport (25-009-4005).

- Boston – Kenmore Square (25-025-0002)*
- Boston – Harrison Ave (25-025-0042)*
- Boston - Long Island (25-025-0041)
- Chicopee (25-013-0008)
- Haverhill (25-009-5005)
- Lynn (25-009-2006)
- Milton (25-021-3003)
- Newburyport (25-009-4005)
- Springfield – Liberty Street (25-013-0016)*
- Ware (25-015-4002)
- Worcester (25-027-0023)*

** Sites currently operated for NAAQS compliance*

MassDEP may propose changes to the existing NO₂/NO_x monitoring network in future correspondence as warranted. EPA recently strengthened the NO₂ NAAQS and according to EPA’s implementing regulations MassDEP will be required to monitor NO₂ at 4 new near-road locations (to be determined) beginning in 2013, assuming that a fifth near-road site will be located in the Greater Providence Area in Rhode Island. MassDEP intends to retain the NAAQS compliance sites to address the urban community background requirement of the new NO₂ provisions.



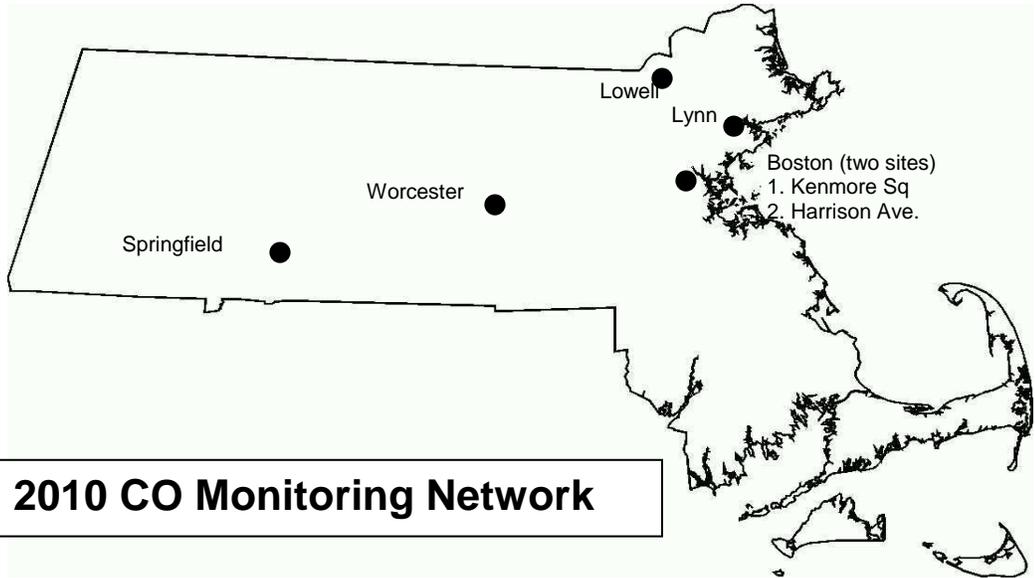
D. CARBON MONOXIDE (CO)

MassDEP currently operates 7 carbon monoxide (CO) monitors, including 3 trace-level CO instruments in Lynn (25-009-2006), Boston-Harrison Ave (25-025-0042), and Chicopee (25-013-0008). The Chicopee instrument was added in 2009. Trace-level CO analyzers (0 to 5 parts per million) are installed at sites where CO measurement is of interest, but where levels are expected to be low (less than 2 parts per million). Full scale, NAAQS compliance instruments (0 to 50 ppm) are operated at the following locations.

- Boston – Kenmore Square (25-025-0002)
- Lowell – Old City Hall (25-017-0007)

Springfield – Liberty Street (25-013-0016)
Worcester – Summer Street (25-027-0023)

EPA has approved the shutdown of the CO monitor at Old City Hall in Lowell (25-017-0007), contingent on the approved revision of MassDEP’s CO maintenance plan for Lowell, which was submitted to EPA this year. MassDEP will continue to operate that site until the CO maintenance plan revision is approved.



E. PARTICULATE MATTER

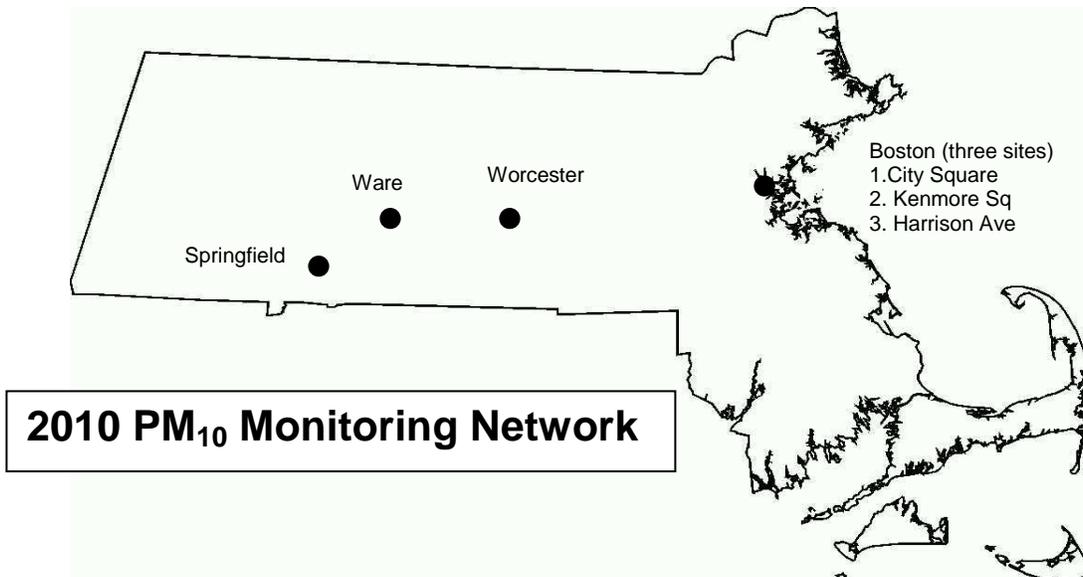
PM₁₀

MassDEP operates 6 PM₁₀ instruments using low volume sampling instrumentation according to the EPA equivalent method at the following sites:

- Boston - Harrison Avenue (25-025-0042) (includes collocated PM₁₀ low volume monitor)
- Boston - Kenmore Square (25-025-0002)
- Boston - City Square (25-025-0027)
- Springfield – Main Street (25-013-2009)
- Ware (25-015-4002)
- Worcester - Summer Street (25-027-0023)

MassDEP began operating collocated high volume PM₁₀ samplers at the Boston-Harrison Avenue site in October 2003 to collect samples for analysis of elements in association with the National Air Toxics Trends (NATTS) program. The gravimetric results are used for comparison with those from the low volume units also located at the Boston-Harrison Avenue site.

MassDEP may in future correspondence propose further changes to its existing PM₁₀ monitoring network as warranted.



PM_{2.5}

MassDEP's PM_{2.5} FRM (Federal Reference Method) monitoring network consists of 15 monitoring locations. The network consists of one site on a daily sampling schedule [Boston- North St (25-025-0043)], and 14 sites on every third day schedules. Two samplers at the City Square site collect collocated samples daily. An additional site [Brockton (25-023-0004)] collects collocated samples on the every third day schedule. Data from MassDEP's FRM network are currently used for comparison to the PM_{2.5} NAAQS. The following is a list of PM_{2.5} FRM monitors.

Boston-Harrison Avenue (25-025-0042)
 Boston-North St (25-025-0043)
 Boston-City Square (25-025-0027)
 Boston-Kenmore Square (25-025-0002)
 Brockton (25-023-0004)
 Chicopee (25-013-0008)
 Fall River-Globe Street (25-005-1004)
 Haverhill-Consentino School (25-009-5005)

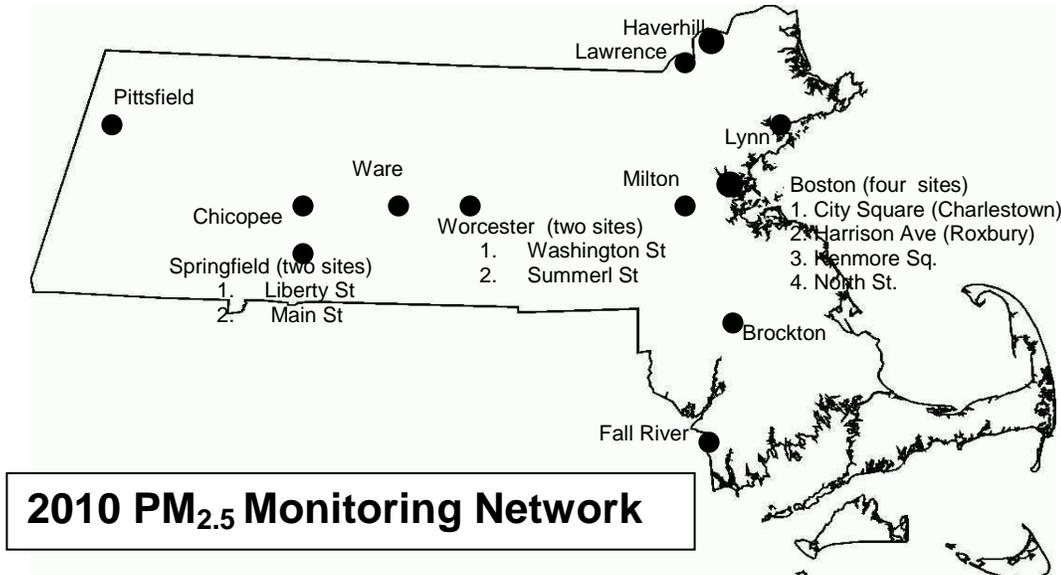
Lawrence (25-009-6001)
 Lynn-Water Treatment Plant (25-009-2006)
 Pittsfield (25-003-5001)
 Springfield- Liberty St (25-013-0016)
 Springfield-Main St (25-013-2009)
 Worcester –YWCA (25-027-0016)
 Worcester-Summer Street (25-027-0023)

MassDEP has equipped 10 monitoring stations with continuous PM_{2.5} instruments (Beta Attenuation Monitors or BAMs):

Boston-Harrison Avenue (25-025-0042)
 Boston-City Square (25-025-0043)
 Fall River-Globe Street (25-005-1004)
 Haverhill-Consentino School (25-009-5005)
 Lynn-Water Treatment Plant (25-009-2006)
 Milton-Blue Hill (25-021-3003)
 Pittsfield (25-003-0006)
 Springfield-Liberty Street (25-013-0016)
 Ware-Quabbin Summit (25-015-4002)
 Worcester-Summer Street (25-027-0023)

MassDEP now has Federal Equivalent Method (FEM) designated instruments at all sites listed above except Pittsfield. BAMs provide the hourly PM_{2.5} data that appears on the MassDEP website, but currently are not used to determine NAAQS compliance. MassDEP is currently evaluating the PM_{2.5} data obtained by FRMs in relation to data obtained by FEM BAMs located at the same sites to determine the viability of using the FEM instruments for compliance purposes at appropriate sites, potentially saving MassDEP resources in a time of budgetary constraints without jeopardizing data quality.

Currently, MassDEP is facing limited access to and the potential loss of its PM_{2.5} site at Boston-North Street. MassDEP will work with EPA and the City of Boston in finding another comparable site if it becomes necessary.



Speciated PM_{2.5}

MassDEP collects speciated PM_{2.5} samples at Boston-Harrison Avenue (25-025-0042) and Chicopee (25-013-0008), and upgraded these sites to the new carbon method in 2009. The speciated PM_{2.5} program is designed to determine some of the chemical components (elements, sulfates/nitrates, carbon species) that are contained in PM_{2.5}.

IMPROVE sampling sites also provide speciated PM_{2.5} data. The IMPROVE program measures parameters that are similar to those measured by the speciation program, and is designed to measure these species at rural locations to evaluate the contribution of fine particulates and their constituents to the degradation of visibility. Two IMPROVE samplers are located at the following sites:

- Truro - National Sea Shore (25-001-0002), operated by the National Park Service
- Ware - Quabbin Reservoir (25-015-4002), operated by MassDEP

The Wampanoag Tribe on Martha's Vineyard also operates an IMPROVE sampler.

PM_{coarse} (PM₁₀ – PM_{2.5})

MassDEP will begin using the Federal Reference Method (FRM) for PM_{coarse} in compliance with NCore requirements at the designated NCore site at Boston-Harrison Avenue (Roxbury) beginning in January 2011.

This method consists of the subtraction of PM_{2.5} values from PM₁₀ values at a site that has side-by-side samplers of each type sampling on the same dates. Harrison Avenue currently has samplers of the appropriate types. MassDEP has no plans to measure PM_{coarse} at any of the other four PM₁₀/PM_{2.5} collocated sites in Massachusetts.

MassDEP will monitor closely the development and FEM designations of new PM_{coarse} monitoring equipment. It should be noted that the designated NCore site [Boston-Harrison Avenue (25-025-0042)] has the FRM low volume PM₁₀ and PM_{2.5} configuration for calculating PM_{coarse} values. Over the last few years, EPA has been evaluating the potential health effects of this PM fraction.

F. LEAD

In 2008, EPA lowered the NAAQS for lead from 1.5 µg/m³ to 0.15 µg/m³ and established new requirements for measuring lead. EPA subsequently reconsidered its lead monitoring requirements and in December 2009 proposed revised monitoring requirements. EPA proposed to require lead monitoring around sources that emit 0.5 tons or more of lead (instead of 1.0 tons or more), and to require lead monitoring at NCore sites beginning January 1, 2011 (instead of in urban areas with a population of 500,000 or more people).

It appears that potential lead emissions at Nantucket Memorial Airport may exceed the proposed 0.5 ton threshold for source-oriented ambient lead monitoring. MassDEP is confirming the emissions estimates for this airport. If the result is confirmed, MassDEP will work with EPA on how the requirement for lead monitoring will be met given logistics and resources.

The NCore site in Massachusetts is the Boston-Harrison Avenue (25-025-0042) site. As noted in last year's plan, in 2009 MassDEP moved its Total Suspended Particulate (TSP) FRM lead sampler from Boston-Kenmore Square (25-025-0002) to Boston-Harrison Avenue (25-025-0042) due to the reduced available space at the Kenmore location.

EPA provided fiscal year 2010 funding to MassDEP to begin lead measurements prior to the January 2011 deadline. MassDEP has used this opportunity to obtain analyses for low volume PM₁₀ samples taken at both the Harrison Avenue and Kenmore locations to determine the comparability of these two locations. MassDEP also is interested in measuring lead concentrations in the Springfield Area. Therefore, MassDEP plans to measure lead using low volume PM₁₀ samples from the samplers at Boston-Harrison Avenue (25-025-0042) [or potentially Boston-Kenmore Square (25-025-0002)] and, if resources allow, at Springfield-Main Street (25-013-2009) beginning in January 2011. When MassDEP begins official PM₁₀-based lead measurements in January 2011 (presumably at the Boston-Harrison Avenue NCore site), MassDEP proposes to shut down the TSP-based lead sampler at the site.

2. Photochemical Assessment Monitoring Stations

MassDEP has operated Photochemical Assessment Monitoring Stations (PAMS) since 1994. The purpose of PAMS is to measure ozone precursors (ingredients) and meteorological parameters at a number of enhanced ozone monitoring stations in order to provide data about ozone formation and the effect of precursor controls on ozone production. In addition to oxides of nitrogen, other ozone precursors, such as volatile organic compounds, including hydrocarbons and carbonyl compounds (aldehydes), are measured. These are measured by taking discrete samples and by operating hourly gas chromatographs that measure individual hydrocarbon compounds.

MassDEP is collecting carbonyl samples at the two PAMS Type 2 locations at Lynn (25-009-2006) and Chicopee (25-013-0008) during the PAMS season on a 1-in-3 day schedule (taking eight 3-hour samples per day).

Automated hourly gas chromatographs (GCs) were operated at Lynn, Chicopee and Ware (25-015-4002) during the PAMS season in 2009. The Newbury PAMS Site (25-009-4004), which also traditionally hosts an automated hourly gas chromatograph, was shut down during the 2009 season due to a nearby construction project. Although the site was supposed to be returned to service for the 2010 PAMS season, the site was rendered unsuitable for a monitoring station given the size of the building that was constructed. Therefore, MassDEP has moved the Type 3 PAMS site to 261 Northern Boulevard (Parker River National Wildlife Refuge property) in Newburyport (25-009-4005) for the 2010 season, which is approximately two miles north of the previous Newbury site. MassDEP resumed ozone and NO_x measurements at the Newburyport location in July 2010, and hopes to have the automated GC online in August.

MassDEP has operated the Milton-Blue Hill site (25-021-3003) as a Type 1 PAMS monitoring station since the 2002 PAMS season. MassDEP has collected canister samples during the PAMS season at the Boston-Long Island (25-025-0041) Type 2 site since 2004. Eight, 3-hour canister samples are collected on the 1-in-3 day schedule at both Blue Hill and Long Island during the PAMS season. MassDEP collects every sixth day 24-hour canister and carbonyl samples throughout the year at Chicopee and Lynn, in compliance with the original PAMS regulations.

MassDEP continues to operate an Upper Air Profiler at the Stow monitoring site (25-017-1102). This instrument was down for most of 2009 due to a final amplifier problem. This instrument measures wind speed, wind direction and temperature at high elevations in the atmosphere to characterize meteorological effects on the long-range transport of air pollutants, especially ozone and its precursors. The site is up and running for 2010.

In future correspondence MassDEP plans to propose changes to the existing PAMS monitoring network in accordance with both the national guidelines and strategy and the results of a regional PAMS monitoring network assessment.

3. Total Reactive Nitrogen (NO_y)

NO_y measurement is very similar to NO_x, except that the NO_y instrument configuration monitors for a wider range of nitrogen species than the traditional NO_x monitor. Compounds in this wider nitrogen compound group participate in ozone and particulate matter formation and can be pollutants themselves.

MassDEP has operated NO_y analyzers during the PAMS season at Ware (25-015-4002) and Newbury (25-009-4004) since 2007, in conformance with EPA siting requirements for NO_y. NO_y was not measured at the Newbury site during 2009 because of the construction activity at that location described above, and has been moved to the Newburyport location for the 2010 season and for future years. NO_y measurements resumed at the Newburyport location in July 2010.

MassDEP applied for a waiver to be exempted from measuring NO_y at the NCore site at Boston-Harrison Avenue (25-025-0042) because of its urban location and because of the large number of analyzers already stationed there. It is generally thought that NO and NO₂ constitute the overwhelming bulk of NO_y in urban locations because of the preponderance of fresh emissions in those locations. EPA did not approve the waiver application and therefore MassDEP will measure NO_y at the Boston-Harrison Avenue site beginning in January 2011.

4. Air Toxics

Boston-Harrison Avenue (25-025-0042) is a designated National Air Toxics Trends Site (NATTS) monitoring station, in addition to being an NCore site. NATTS is an EPA program comprised of monitoring sites across the country designated and equipped to measure a wide range of toxic air pollutants, including metals, VOCs, carbonyls, black carbon and semi-volatile organic compounds (SVOCs). Black carbon (using an aethalometer) and toxic VOCs have been monitored at Harrison Avenue since 1999. Carbonyls (formaldehyde and acetaldehyde) and toxic metals from PM₁₀ filters were added in 2003. MassDEP added Chromium +6 in January 2005 and PAHs in May 2008.

In addition to the Harrison Avenue site, canister samples for toxics analysis are collected at Lynn (25-009-2006), which serves as a Boston Area background location. The toxic VOCs program, which began in 1999, consists of the collection of 24-hour canister samples every sixth day at the two locations, and analysis of the samples by the State of Rhode Island Department of Public Health Laboratory.

MassDEP also has monitored black carbon at Boston-North Street (25-025-0043) since 2003 and at Springfield-Liberty Street (25-013-0016) since June 2006.

5. Private Monitoring

Exelon Generation Company, LLC continues to conduct air quality measurements near its facilities in Boston. The four air monitoring stations remain the same as in previous network reviews and are still being operated by AECOM/ENSR. The sites are at Boston-Long Island (25-025-0019), Dorchester (25-025-0020), East Boston (25-025-0021), and South Boston (25-025-0040). Exelon is currently preparing a proposal for changes in their monitoring network.

6. Summary

EPA approved MassDEP's NCore site for Boston-Harrison Avenue (25-025-0042) on October 30, 2009. MassDEP will have the full complement of NCore equipment at the site by the January 1, 2011 deadline. The NO_y monitor and its associated calibration equipment are the only current outstanding equipment items, and these currently are being procured.

In July 2010, a new PAMS site was established in Newburyport (25-009-4005) to replace the previous Newbury (25-009-4004) location 2 miles to the south. A CO trace-level instrument was added to Chicopee (25-013-0008). In May 2010, the Worcester-Summer Street monitoring shelter was replaced with a new shelter of a similar size. To comply with new lead monitoring requirements, MassDEP will begin measuring lead at the Boston-Harrison Avenue NCore site (or potentially the Boston-Kenmore Square site) and, if resources allow, at the Springfield-Main Street site beginning in January 2011. MassDEP proposes to discontinue the TSP sampler for lead (used for compliance with the previous lead NAAQS) at Boston-Harrison Avenue in January 2011.

In addition, it should be noted that in 2009 the EPA National Air and Radiation Environmental Laboratory (EPA NAREL) set up a continuous atmospheric radiation sampler at the Worcester-Summer Street station (25-0270023). A total suspended particulate (TSP) based sampler was installed late-July, 2009. MassDEP continues to operate this monitor in cooperation with the EPA NAREL.