



Ambient Monitoring Network Assessments in New England

National Air Quality Conference



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EPA- Region 1

Denver, CO – May 15, 2012



Overview of what we did...

- OAQPS presentations
- Review of CFR requirements
- Review of Region 1 monitors based on CFR/air quality measurements
- Putting it all together
- Next steps



Air Monitoring Updates

- EPA has recently updated a number of National Ambient Air Quality Standards (NAAQS).
- Over the past year, EPA- OAQPS has reached out to NACAA and Multi-State Organizations on new monitoring requirements to support the NAAQS.
- In Region 1, we provided State specific outreach to **reinforce** the OAQPS message.



OAQPS outreach and Air Monitoring Updates

- Message included descriptions of how EPA has tried to embrace NACAA/ State concerns regarding resources needed to meet those new NAAQS.
- Message also included a discussion about the discontinuation of low-value monitors.



Highlights – Protecting Public Health with Air Monitoring under the new NAAQS

NO₂ Network - Includes required community/ area wide NO₂ sites, 40 “Sensitive and Vulnerable population” monitor requirements, and near-road monitoring. Existing monitors may be used to meet the first two requirements but only with new near-road monitors in place will the revised NO₂ NAAQS lead to the degree of public health protection envisioned in the final NAAQS rule.



CO network that leverages multi-pollutant concept and acknowledges opportunities for legacy monitor divestment and relocation to near road NO₂ sites, with timelines from 2015 to 2017.

SO₂ network that may utilize mostly existing monitors based on current network.



Lead (Pb) network that requires lead monitors at urban NCore sites; larger “traditional” point sources greater than 0.5 tons per year; and monitors at airports larger that 1.0 ton per year and 15 additional airports indentified by the Administrator.



Ozone network that is expected to only require extended ozone monitoring season.



A Quick Review – Why Do We Operate Monitors?

- Providing air quality data to the public in a timely manner
 - Air Quality Index, AIRNOW program
- Determining compliance with air quality standards and assessing effectiveness of emission control strategies
 - Model validation
 - Monitors referenced in SIP's and maintenance plans
- Supporting air pollution research studies (health, methods development, atmospheric chemistry)
- **Monitors that don't support key objectives (or are redundant) should be reviewed during annual planning process**
- **Now, a few examples.....**



OAQPS- Legacy Monitoring Requirements in NESCAUM Region

Question:

What opportunities for divestment exist across NESCAUM (and country)?

Using SO₂, NO₂, and CO as examples to compare actual network size to current federal requirements

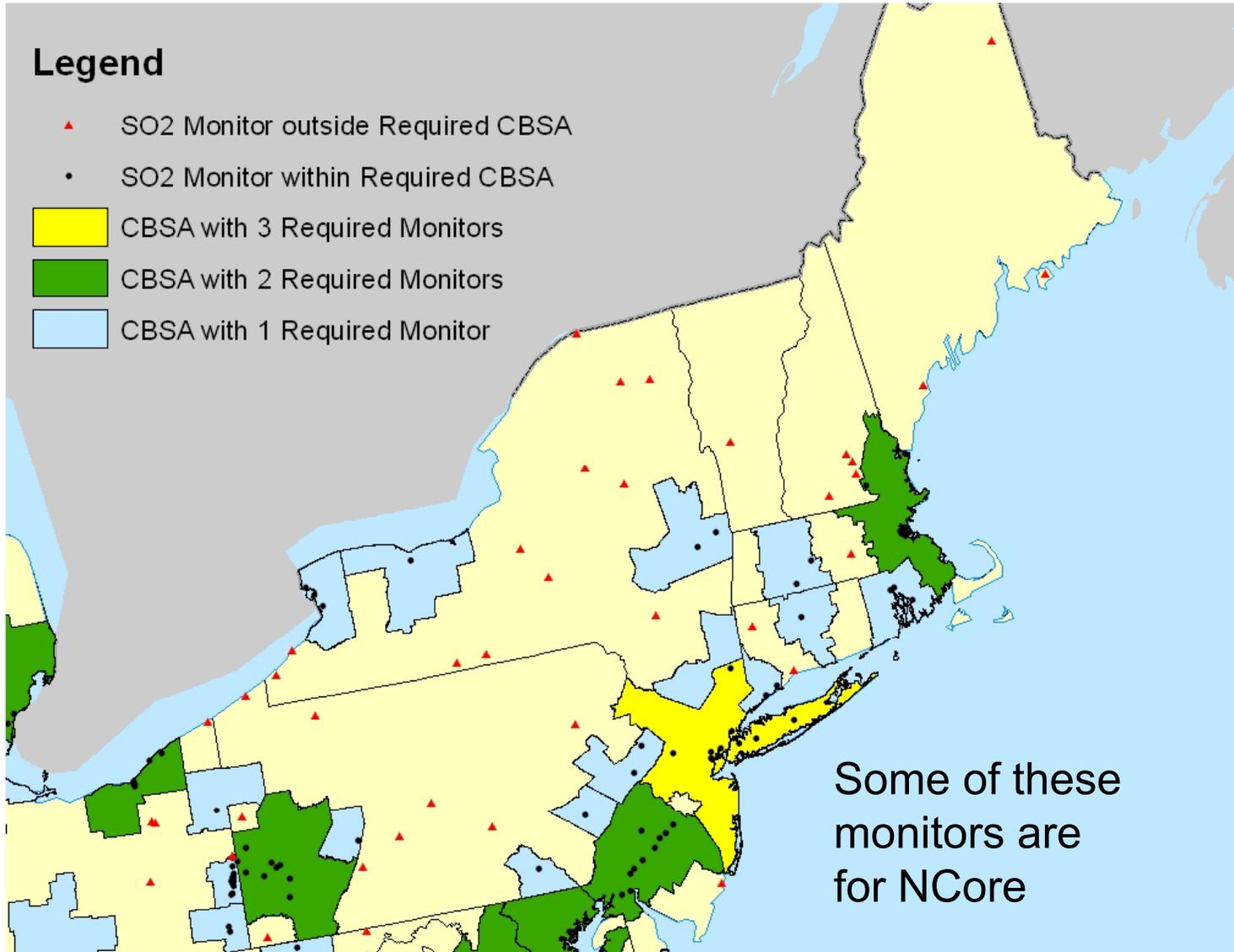
SO2 Monitors – NESCAUM Area Active in 2011



Legend

- ▲ SO2 Monitor outside Required CBSA
- SO2 Monitor within Required CBSA

- Yellow CBSA with 3 Required Monitors
- Green CBSA with 2 Required Monitors
- Light Blue CBSA with 1 Required Monitor

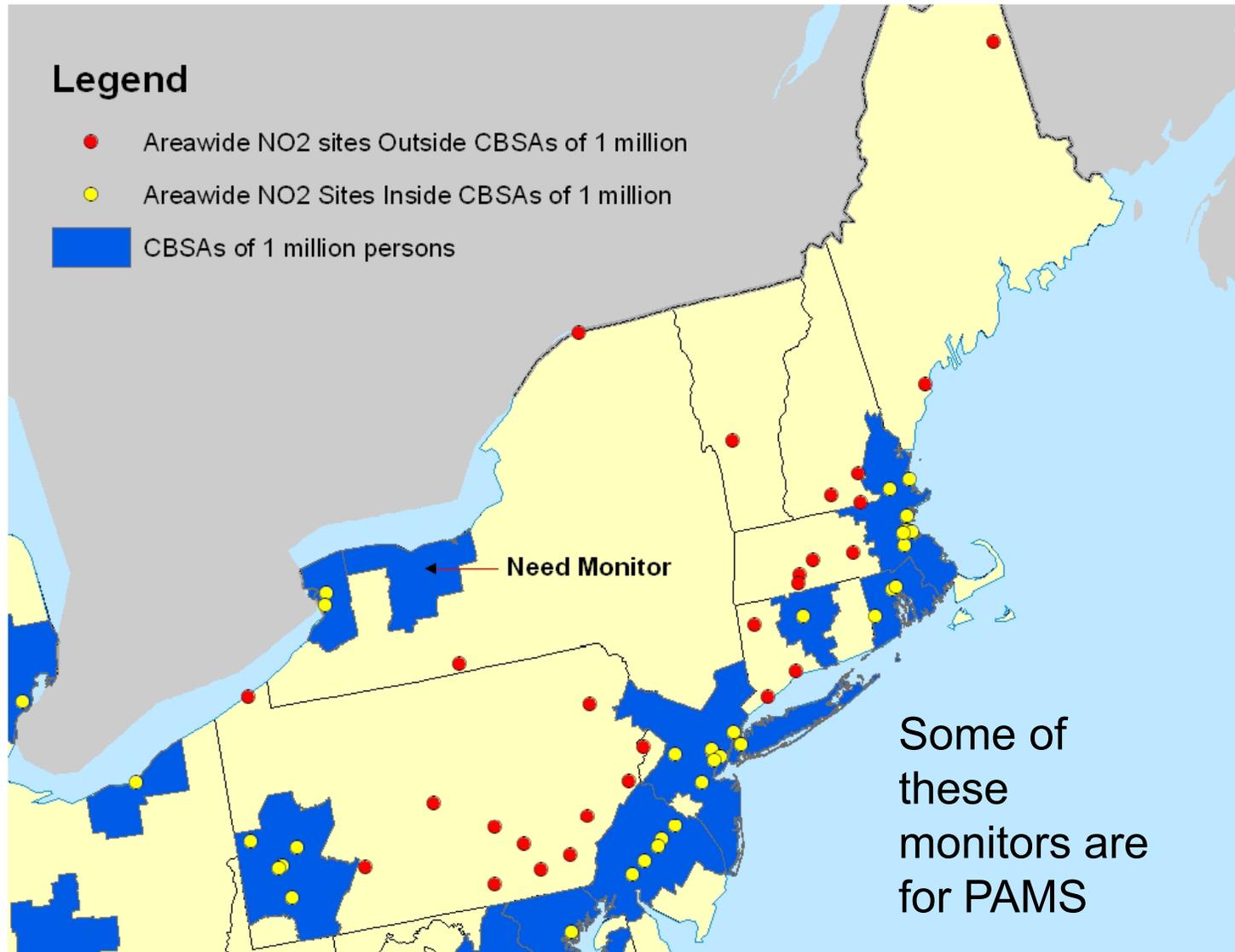


NO2 Area-Wide Monitors – NESCAUM Area Active in 2011

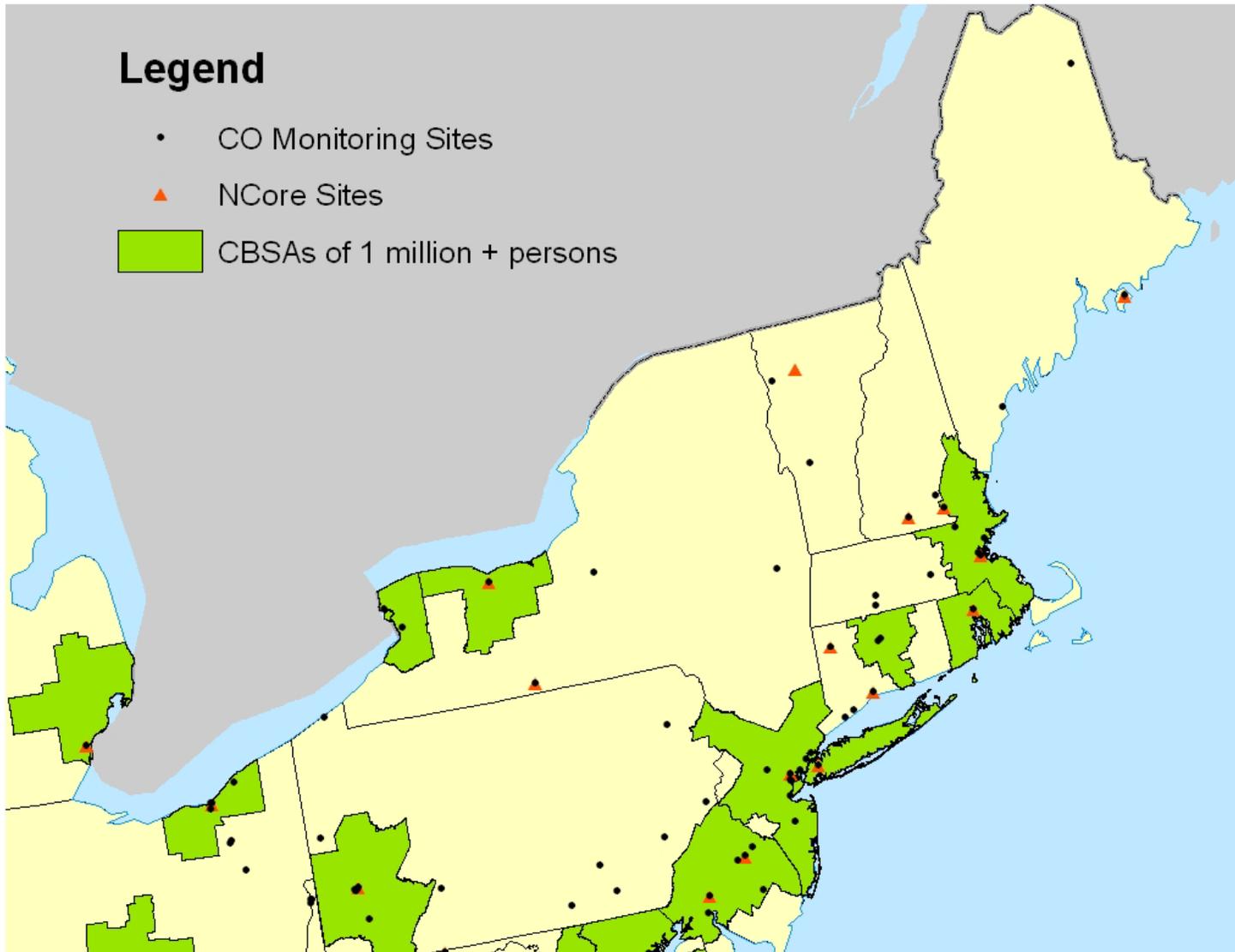


Legend

- Areawide NO2 sites Outside CBSAs of 1 million
- Areawide NO2 Sites Inside CBSAs of 1 million
- CBSAs of 1 million persons



CO Monitors – NESCAUM Area Active in 2011





OAQPS Recommendations

- ✓ States are running far more SO₂, NO₂, and CO monitors than required by current federal requirements
- ✓ These networks, along with PM₁₀, should be closely reviewed for redundancy and value on a monitor-by-monitor basis
- ✓ **Work with your EPA Regional Office to develop plans for monitor divestment and/or relocation**
- ✓ Resulting burden reduction in monitor operations, quality assurance, and data validation and reporting can partially offset new requirements such as near-road and lead monitoring



Work with your EPA Regional Office...?

- What does this mean for me..?





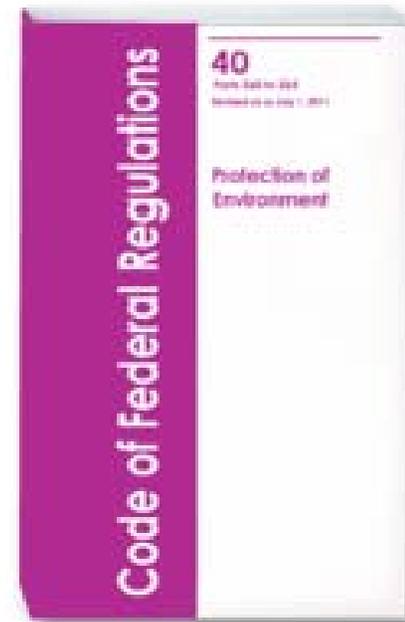
...So we tried to go beyond...





EPA Region 1 reviewed the CFR...

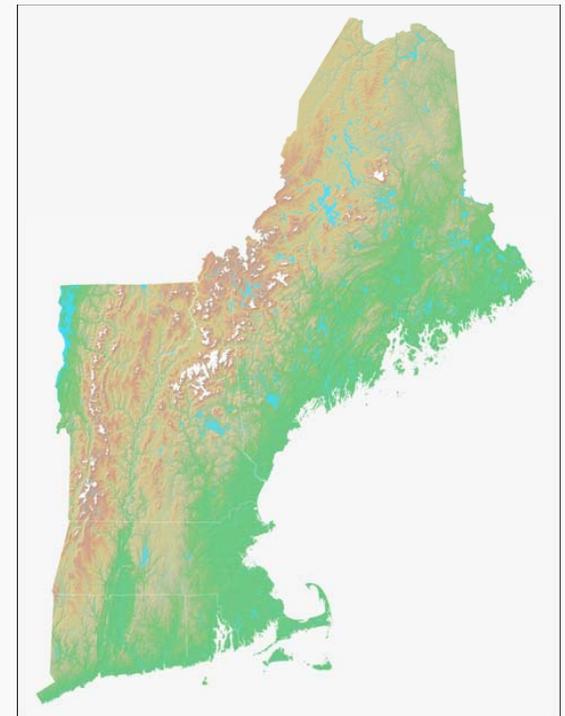
- We investigated the CFR to determine each and every monitoring requirement, for each pollutant- and considered population and design value thresholds.....





40 CFR Part 58.10 requirements....

(d) The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, **whether existing sites are no longer needed and can be terminated ...**

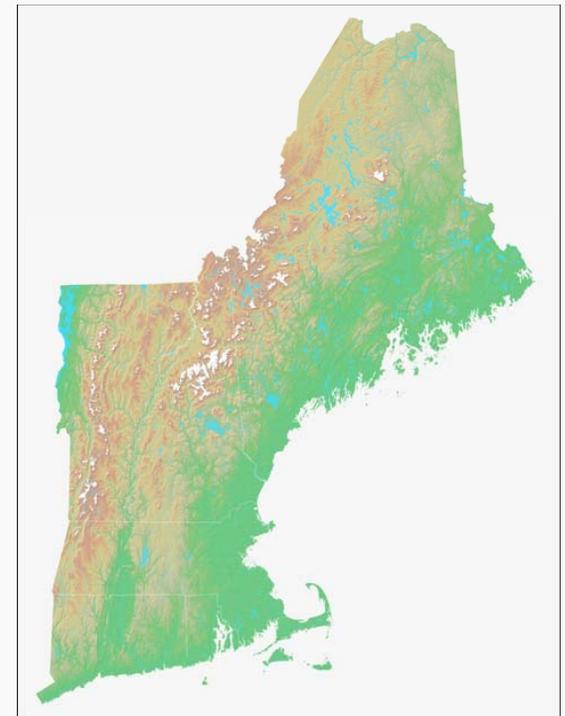




40 CFR Part 58.14 requirements....

(c) State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be met. ...

(1) Any $PM_{2.5}$, O_3 , CO , PM_{10} , SO_2 , Pb , or NO_2 SLAMS monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be **triggered by an air quality concentration** and the monitor to be discontinued is **the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.**





40 CFR Part 58 requirements....O₃

Table D-2 of Appendix D to Part 58— SLAMS Minimum O₃ Monitoring Requirements

MSA population ^{1,2}	Most recent 3-year design value concentrations $\geq 85\%$ of any O ₃ NAAQS ³	Most recent 3-year design value concentrations $< 85\%$ of any O ₃ NAAQS ^{3,4}
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000 ⁵	1	0

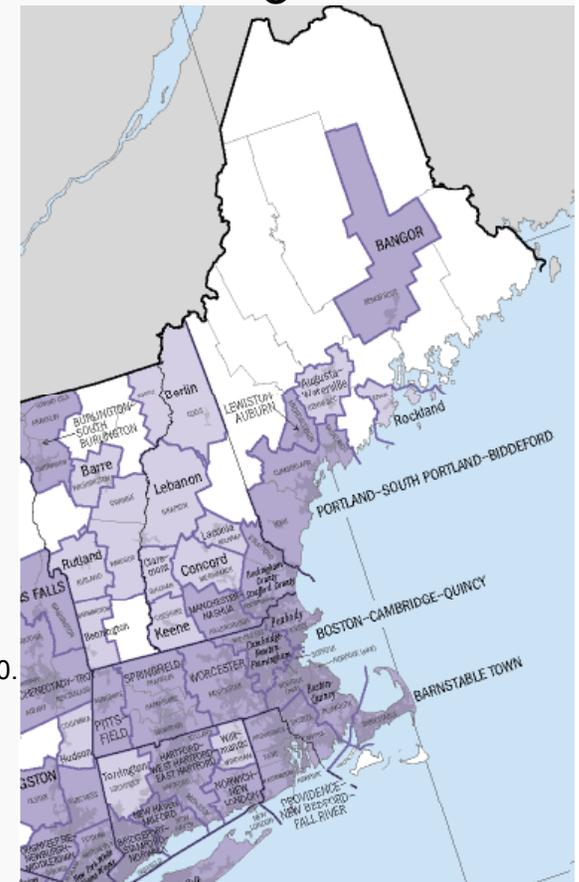
¹Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

²Population based on latest available census figures.

³The ozone (O₃) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.





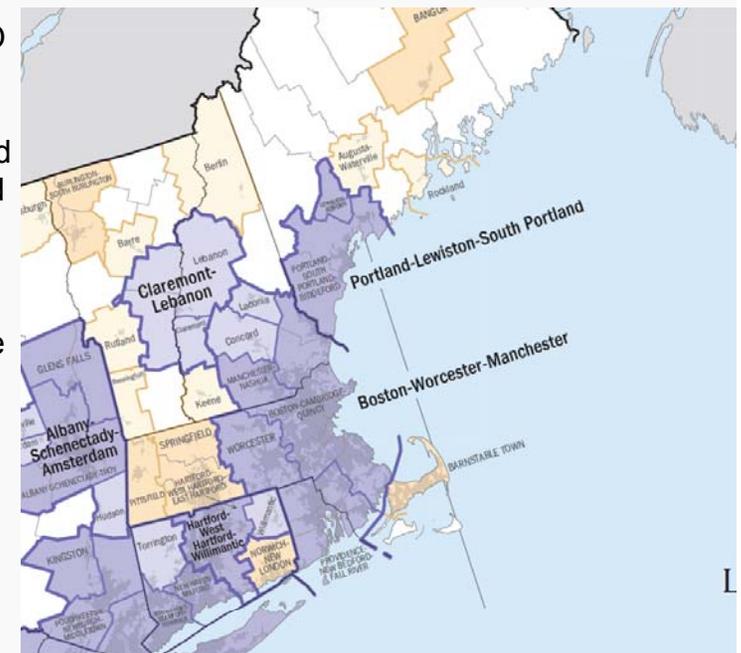
40 CFR Part 58 requirements....CO

Appendix D to Part 58

4.2 Carbon Monoxide (CO) Design Criteria

4.2.1 General Requirements. (a) Except as provided in subsection (b), one CO monitor is required to operate collocated with one required near-road NO₂ monitor, as required in Section 4.3.2 of this part, in CBSAs having a population of 1,000,000 or more persons. If a CBSA has more than one required near-road NO₂ monitor, only one CO monitor is required to be collocated with a near-road NO₂ monitor within that CBSA.

(b) If a state provides quantitative evidence demonstrating that peak ambient CO concentrations would occur in a near-road location which meets microscale siting criteria in Appendix E of this part but is not a near-road NO₂ monitoring site, then the EPA Regional Administrator may approve a request by a state to use such an alternate near-road location for a CO monitor in place of collocating a monitor at near-road NO₂ monitoring site.





40 CFR Part 58 requirements....SO₂

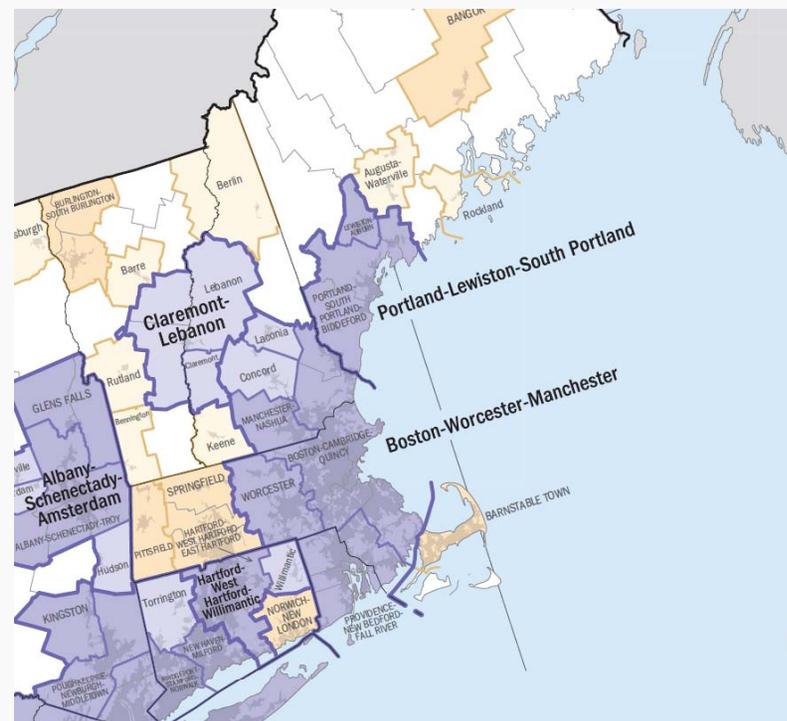
Appendix D to Part 58

4.4 Sulfur Dioxide (SO₂) Design Criteria.

4.4.1 *General Requirements.* (a) State and, where appropriate, local agencies must operate a minimum number of required SO₂ monitoring sites as described below.

4.4.2 *Requirement for Monitoring by the Population Weighted Emissions Index.....*

4.4.3 *Regional Administrator Required Monitoring.* (a) The Regional Administrator may require additional SO₂ monitoring stations...





40 CFR Part 58 requirements....NO₂

Appendix D to Part 58

4.3 Nitrogen Dioxide (NO₂) Design Criteria

4.3.1 General Requirements

(a) State and, where appropriate, local agencies must operate a minimum number of required NO₂ monitoring sites as described below.

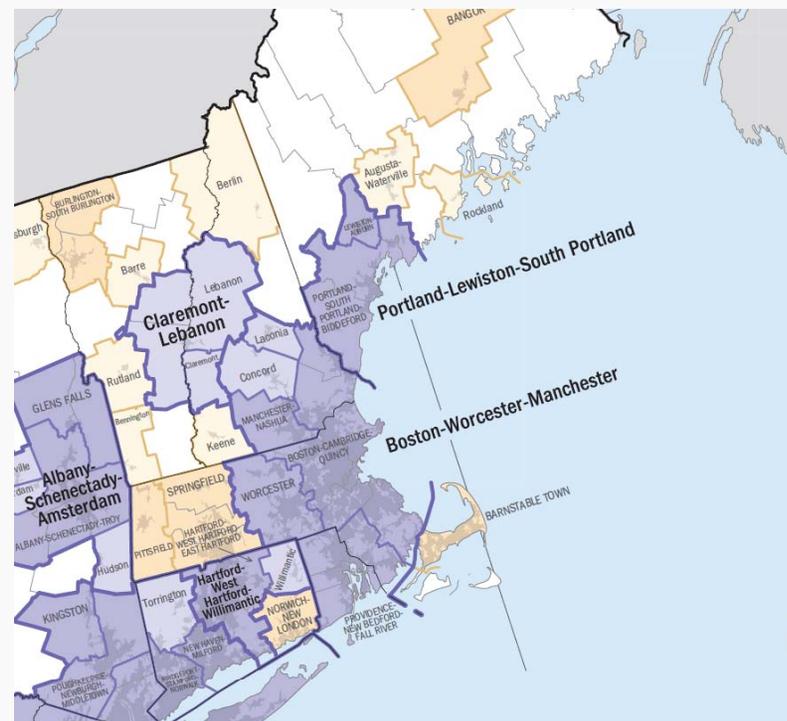
4.3.2 Requirement for Near-road NO₂ Monitors

(a) Within the NO₂ network, there must be one microscale near-road NO₂ monitoring station in each CBSA ...of 500,000... sited near a major road with high AADT counts ...

4.3.3 Within the NO₂ network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO₂ concentrations representing the neighborhood or larger spatial scales....

4.3.4 Regional Administrator Required Monitoring

(a) The Regional Administrators, in collaboration with States, must require a minimum of forty additional NO₂ monitoring stations ...to protect susceptible and vulnerable populations.





40 CFR Part 58 requirements....PM₁₀

Table D-4 of Appendix D to Part 58—PM₁₀ Minimum Monitoring Requirements (Approximate Number of Stations Per MSA)¹

Population category	High concentration ²	Medium concentration ³	Low concentration ^{4,5}
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	4–8	2–4	1–2
250,000–500,000	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

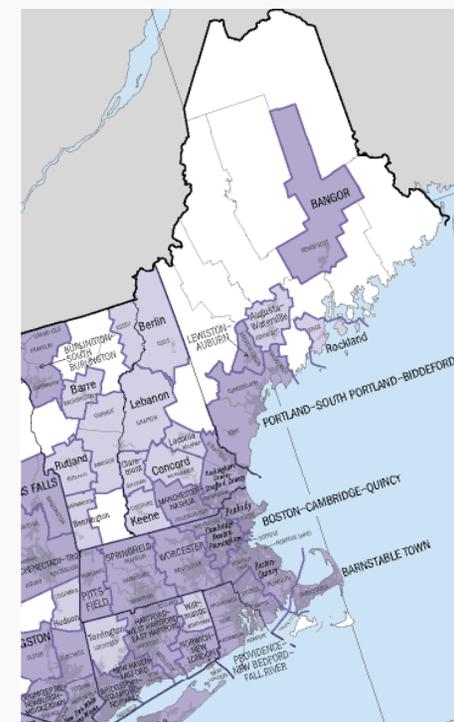
¹Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.

²High concentration areas are those for which ambient PM₁₀ data show ambient concentrations exceeding the PM₁₀NAAQS by 20 percent or more.

³Medium concentration areas are those for which ambient PM₁₀ data show ambient concentrations exceeding 80 percent of the PM₁₀ NAAQS.

⁴Low concentration areas are those for which ambient PM₁₀ data show ambient concentrations less than 80 percent of the PM₁₀NAAQS.

⁵These minimum monitoring requirements apply in the absence of a design value.





40 CFR Part 58 requirements....PM_{2.5}

Table D-5 of Appendix D to Part 58—PM_{2.5} Minimum Monitoring Requirements

MSA population ^{1,2}	Most recent 3-year design value ≥85% of any PM _{2.5} NAAQS ³	Most recent 3-year design value <85% of any PM _{2.5} NAAQS ^{3,4}
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000 ⁵	1	0

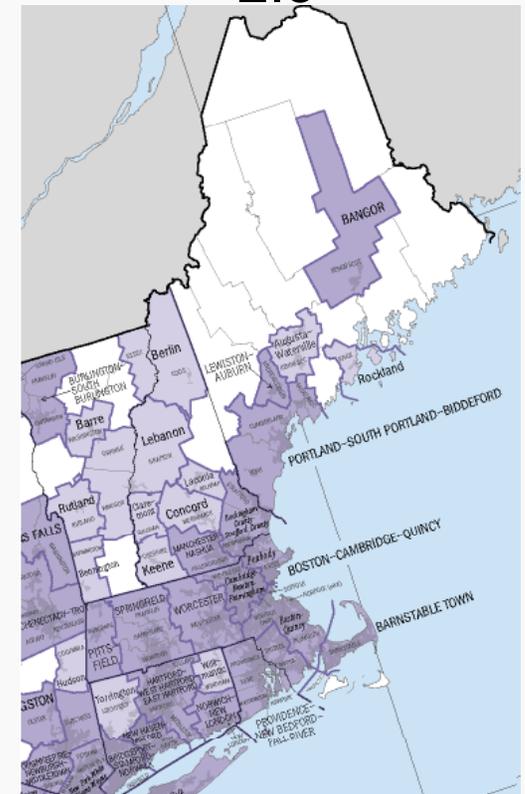
¹Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

²Population based on latest available census figures.

³The PM_{2.5}National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.





40 CFR Part 58 requirements....

Other Appendix D requirements:

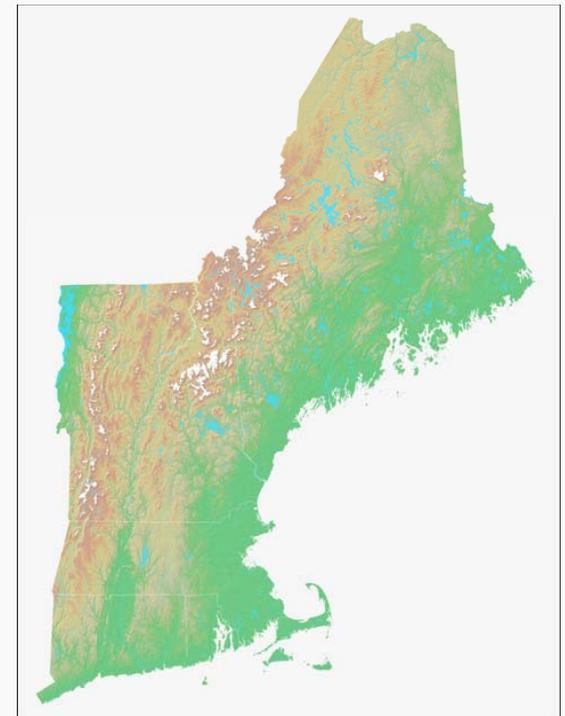
NCore

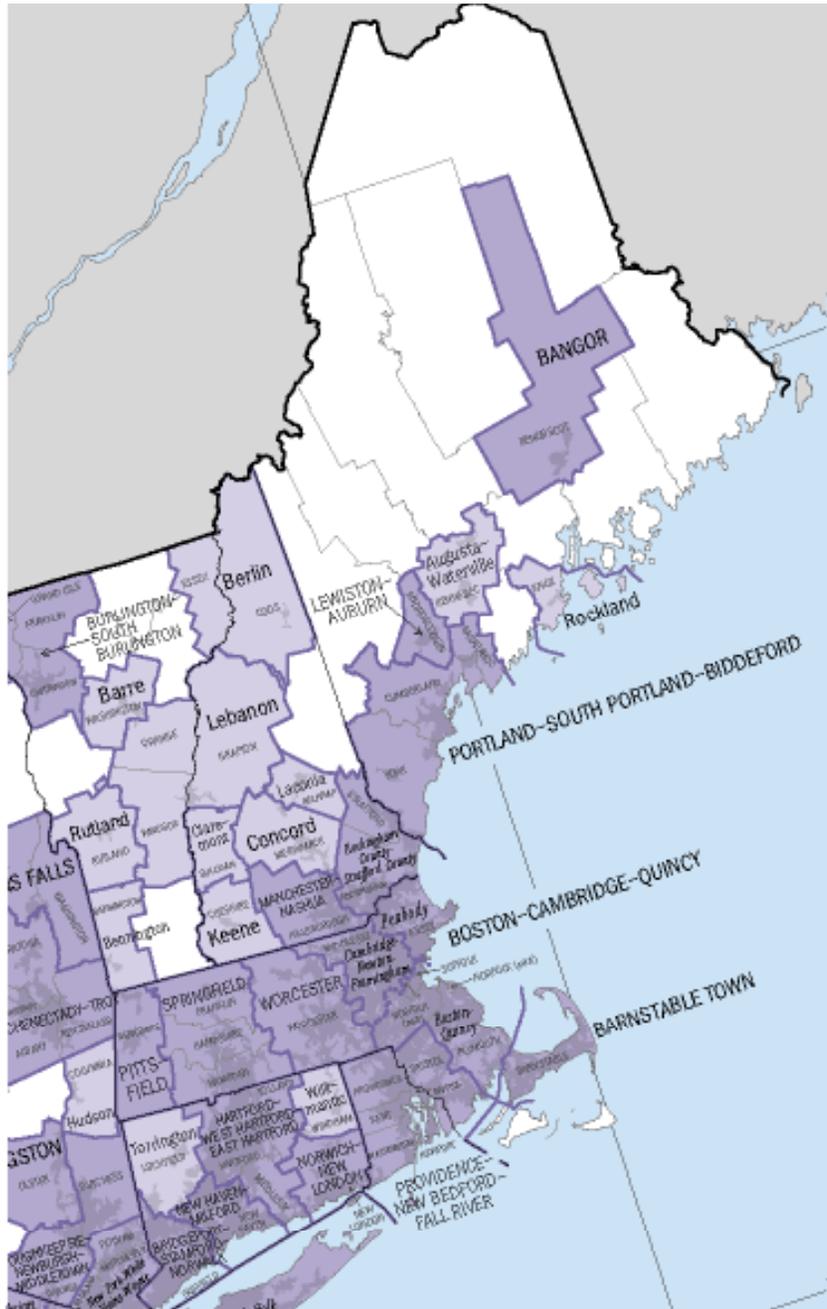
PM speciation

PM coarse

Lead

PAMS

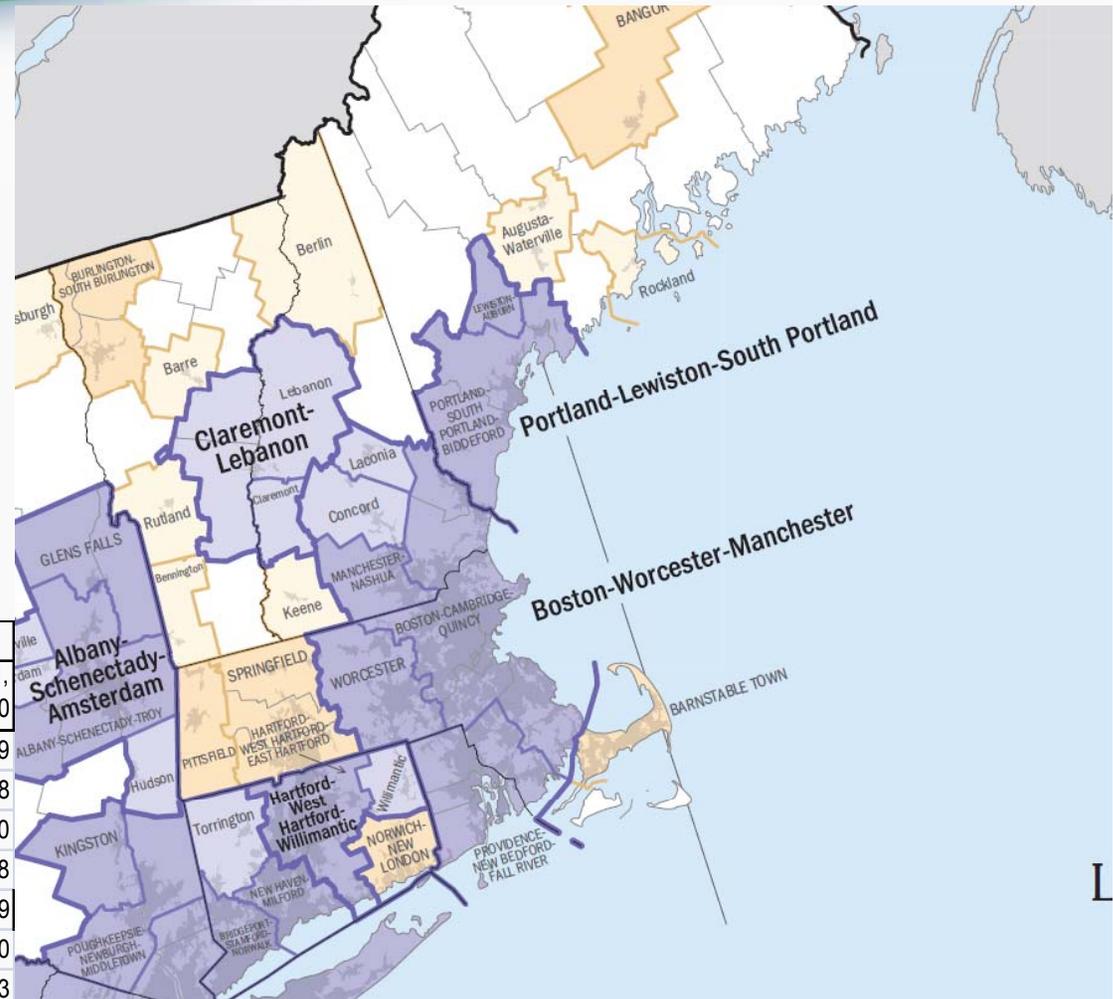




We reviewed the US Census populations of each CMSA in New England...



We reviewed the US Census populations of each CBSA in New England...



Metropolitan Statistical Area Micropolitan Statistical Area	Legal/Statistical Area Description	Population	
		April 1, 2000	April 1, 1990
Boston-Quincy, MA	Metropolitan Division	1,812,937	1,715,269
Cambridge-Newton-Framingham, MA	Metropolitan Division	1,465,396	1,398,468
Essex County, MA	Metropolitan Division	723,419	670,080
Rockingham County-Strafford County, NH	Metropolitan Division	389,592	350,078
Boulder, CO ¹	Metropolitan Statistical Area	269,814	208,949
Bowling Green, KY	Metropolitan Statistical Area	104,166	87,030
Bozeman, MT	Micropolitan Statistical Area	67,831	50,463
Bradford, PA	Micropolitan Statistical Area	45,936	47,131
Brainerd, MN	Micropolitan Statistical Area	82,249	66,040

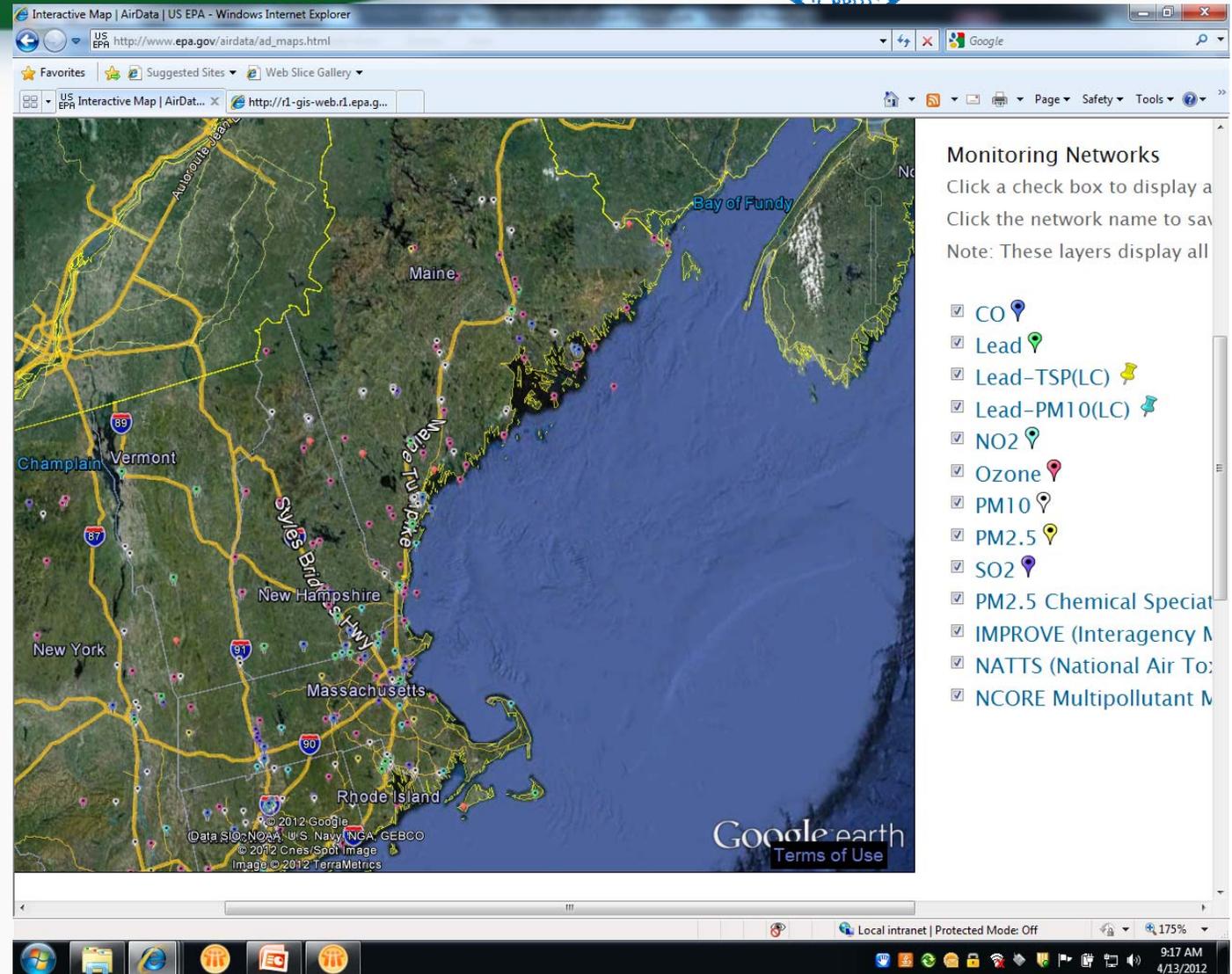


We reviewed current EPA design values both relative to CFR requirements, and to help make value judgments as to which monitors might be less useful than others.

A screenshot of the EPA website's "Design Values" page. The browser window shows the URL "http://www.epa.gov/airtrends/values.html". The page header includes the EPA logo and navigation tabs for "LEARN THE ISSUES", "SCIENCE & TECHNOLOGY", "LAWS & REGULATIONS", and "ABOUT EPA". A left sidebar lists various air quality topics, with "Design Values" highlighted. The main content area is titled "Design Values" and includes a breadcrumb trail: "You are here: EPA Home » Air and Radiation » Air Trends » Design Values". The text explains that design values are statistics describing air quality relative to NAAQS standards. A bulleted list defines design values and their use. Two informational boxes mention the need for Adobe Acrobat Reader and Microsoft Excel. At the bottom, there are links for "Design Values 2008 - 2010" with sub-links for PM2.5 and PM10 design values, each with an "Excel spreadsheet" link and file size information. The Windows taskbar at the bottom shows the date as 4/12/2012 and the time as 5:01 PM.



We reviewed the location of each monitor, and determined its location relative to each CBSA or CMSA in New England



6/5/2012

U.S. Environmental Protection Agency

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We prepared spreadsheets putting it all together... for Connecticut

State Code	County Code	Site ID	Parameter Code	Oppor	City Name	Street Address	CFR required	Why?	PAMS?	AIRNOW	Start date	Co-lo with cont PM	Shutdown
09	003	1003	SO2		East Hartf	MCAULIFFE PAR	PWEI (Hartford)						
09	003	1003	NO2		East Hartf	MCAULIFFE PAR	Comm-wide NO2?		PAMS				
09	003	1003	PAMS		East Hartf	MCAULIFFE PARK			PAMS				
09	003	1003	ozone		East Hartf	MCAULIFFE PAR	2 req, 3 in Hartford		PAMS	Yes			
09	003	1003	PM2.5		East Hartf	MCAULIFFE PAR	2 req, 2 in Hartford					Yes	
09	003	1003	PM2.5 (cont.)		East Hartf	MCAULIFFE PAR	2 req, 2 in Hartford			Yes			
09	003	2006	PM2.5		East Hartf	85 HIGH STREET	2 req, 2 in Hartford					Yes	
09	003	2006	PM2.5 (cont.)		East Hartf	85 HIGH STREET	2 req, 2 in Hartford			Yes			
09	005	0004	CO		Thomasto	ACROSS FROM 258 OLD WATERBURY ROAD							Shutdown
09	005	0004	SO2		Thomasto	ACROSS FROM 258 OLD WATERBURY ROAD							Shutdown
09	005	0004	NO2		Thomasto	ACROSS FROM 258 OLD WATERBURY ROAD							Shutdown
09	005	0004	PM2.5		Thomasto	ACROSS FROM 258 OLD WATERBURY ROAD							Shutdown
09	005	0005	CO		Not in a ci	MOHAWK MOUN	NCore						
09	005	0005	SO2		Not in a ci	MOHAWK MOUN	NCore						
09	005	0005	NO2		Not in a ci	MOHAWK MOUNTAIN ROAD							
09	005	0005	ozone		Not in a ci	MOHAWK MOUN	NCore			Yes			
09	005	0005	PM10		Not in a ci	MOHAWK MOUN	Ncore (req?)						
09	005	0005	PM2.5		Not in a ci	MOHAWK MOUN	NCore						
09	005	0005	PM2.5 (cont.)		Not in a ci	MOHAWK MOUN	NCore			Yes			



We prepared spreadsheets putting it all together.... for Connecticut (cont'd)

State Code	Count Code	Site ID	Parameter Code	Opportu	City Name	Street Address	CFR required	Why?	PAMS?	AIRNOW	Co-lo with cont PM	Shutdown
09	001	0010	CO		Bridgeport	ROOSEVELT SCH	Maint Plan?					
09	001	0010	PM10		Bridgeport	ROOSEVELT SCH	1 req, 3 in Bridgeport area					
09	001	0010	PM2.5		Bridgeport	ROOSEVELT SCH	2 req, 4 in Bridgeport	Maintenance?			Yes	
09	001	0010	PM2.5 (cont.)		Bridgeport	ROOSEVELT SCH	2 req, 4 in Bridgeport	Maintenance?		Yes		
09	001	0012	SO2	?	Bridgeport	115 BOSTON TER	PWEI (Bridgeport)					
09	001	0017	ozone		Greenwich	GREENWICH POIN	2 req, 4 in Bridgeport area			Yes		
09	001	1123	ozone		Danbury	TRAILER, W. CON	2 req, 4 in Bridgeport area			Yes		
09	001	1123	PM2.5		Danbury	TRAILER, W. CON	2 req, 4 in Bridgeport	Maintenance?			Yes	
09	001	1123	PM2.5 (cont.)		Danbury	TRAILER, W. CON	2 req, 4 in Bridgeport	Maintenance?		Yes		
09	001	3005	PM10	?	Norwalk	NORWALK HEALT	1 req, 3 in Bridgeport area					
09	001	3005	PM2.5	?	Norwalk	NORWALK HEALT	2 req, 4 in Bridgeport	Maintenance?				
09	001	3007	ozone		Stratford (T	USCG LIGHTHOU	2 req, 4 in Bridgeport area			Yes		
09	001	9003	CO		Westport	SHERWOOD ISLA	Maint Plan?		PAMS			
09	001	9003	SO2		Westport	SHERWOOD ISLA	PWEI (Bridgeport)					
09	001	9003	NO2		Westport	SHERWOOD ISLAND STATE PARK			PAMS			
09	001	9003	PAMS		Westport	SHERWOOD ISLAND STATE PARK			PAMS			
09	001	9003	ozone		Westport	SHERWOOD ISLA	2 req, 4 in Bridgeport area		PAMS	Yes		



We prepared spreadsheets putting it all together....for Maine

ME Code	Count Code	Site ID	Parameter Code	Oppo	City Name	CFR required	Why?	Tribal monitor	PAMS?	AIRNOW	Co-lo with cont PM	Shutdown
23	009	0103	CO		Not in a ci	NCORE						
23	009	0103	SO2		Not in a ci	NCORE						
23	009	0103	ozone		Not in a ci	NCORE				Yes		
23	009	0103	PM10		Not in a ci	NCORE (req?)						
23	009	0103	PM2.5		Not in a ci	NCORE						
23	009	0103	PM2.5 (cont.)		Not in a ci	NCORE				Yes		
23	009	0103	IMPROVE		Not in a ci	NCORE	IMPROVE					
23	011	0016	PM10	?	Augusta							
23	011	0016	PM2.5	?	Augusta							
23	011	2005	ozone		Gardiner					Yes		
23	013	0004	ozone		Not in a city					Yes		
23	017	2011	PM2.5	?	Rumford							
23	017	3001	ozone		Not in a city					Yes		
23	019	0002	PM10		Bangor							
23	019	0002	PM2.5		Bangor						Yes	
23	019	0002	PM2.5 (cont.)		Bangor					Yes		
23	019	0002	PM2.5 (cont.)		Bangor					Yes?		Shutdown
23	019	1100	ozone		Not in a ci	1 req, 2 in Bangor		Tribal monitor		Yes		
23	019	4008	ozone	y on P	Not in a ci	1 req, 2 in Bangor				Yes		



We prepared spreadsheets putting it all together...for Maine (cont'd)

ME Code	Count Code	Site ID	Parameter Code	Oppo	City Name	CFR required	Why?	Tribal monitor	PAMS?	AIRNOW	Co-lo with cont PM	Shutdown
23	001	0011	PM10		Lewiston							
23	001	0011	PM2.5		Lewiston						Yes	
23	001	0011	PM2.5 (cont.)		Lewiston					Yes		
23	001	0014	ozone		Not in a ci	1 req, 1 in Lew-Aub				Yes		
23	003	0014	PM10	?	Madawaska							
23	003	0014	PM2.5	?	Madawaska							
23	003	1008	PM2.5	?	Presque Isle							
23	003	1011	PM10		Presque Is	Maintenance?						
23	003	1011	PM2.5		Presque Isle							
23	003	1019	PM10	?	Van Buren							Shutdown
23	003	1100	CO		Presque Isle			Tribal monitor				
23	003	1100	SO2		Presque Isle			Tribal monitor				
23	003	1100	NO2		Presque Isle			Tribal monitor				
23	003	1100	ozone		Presque Isle			Tribal monitor		Yes		
23	003	1100	IMPROVE		Presque Is	IMPROVE		Tribal monitor				
23	003	1100	PM2.5 (cont.)		Presque Isle			Tribal monitor		Yes		
23	005	0015	PM10	ate St	Portland	1 req., 1 in Portland						
23	005	0015	PM2.5	?	Portland	1 req, 2 in Portland						
23	005	0029	CO		Portland							



We met and discussed our assessment
and new air monitoring needs with our
State partners...





For example, in Connecticut we discussed....

- New monitoring requirements for the new NAAQS, including near road NO₂ and lead.
- Extra PM_{2.5} monitors that were beyond minimum federal requirements.
- Monitoring locations in the same city that might save resources by consolidating.
- A CO monitor referenced in a maintenance plan, that might be relocated to a near road location required to measure NO₂ and CO, thus serving a dual purpose.



For example, in Maine we discussed.

- Extra PM_{2.5} and PM₁₀ monitors that were beyond minimum federal requirements.
- Ozone monitors beyond federal requirements that might save resources by eliminating or relocating.



6/5/2012

U.S. Environmental Protection Agency

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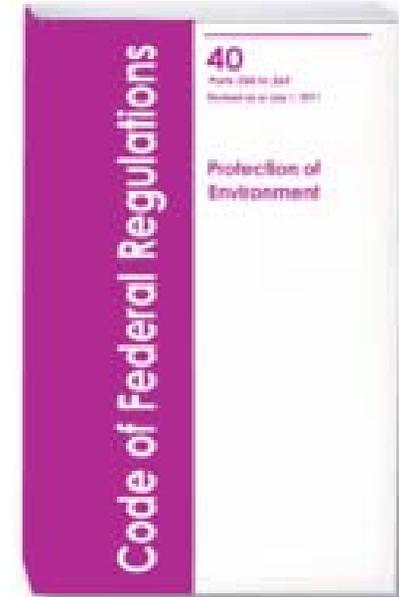
So what comes next...?

It is the beginning of an ongoing conversation..

- Annual Network Plans
- State budget planning
- Staff capabilities
- Ongoing Network evaluations
- Single pollutant monitoring locations vs. multi-pollutant locations



Monitoring needs....





...And limitations...





A Quick Recap – Why Do We Operate Monitors?

Providing air quality data to the public in a timely manner

- Air Quality Index, AIRNOW program
- Determining compliance with air quality standards and assessing effectiveness of emission control strategies
 - Model validation
 - Monitors referenced in SIP's and maintenance plans
- Supporting air pollution research studies (health, methods development, atmospheric chemistry)

Monitors that don't support key objectives (or are redundant) should be reviewed during annual planning process



Review the purpose of every monitor you run...

“It was like that when I got here”- Homer Simpson



- Is it for historical trends?
- Supports research studies?
- Is it mandated by the CFR?
- Is it required by a SIP?
- AIRNOW real time reporting value?
- What do the measured values tell you that another “nearby” air monitor doesn’t?



Questions?

- **Bob Judge**
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