



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

Honorable M. Jodi Rell
Governor of Connecticut
210 Capital Avenue
Hartford, CT, 06106

Dear Governor Rell:

Thank you for your recommendations on the status of fine particle pollution throughout Connecticut. Fine-particle pollution represents one of the most significant barriers to clean air facing our nation today. Health studies link these tiny particles – about 1/30th the diameter of a human hair – to serious human health problems including aggravated asthma, increased respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death in people with heart and lung disease. Fine particle pollution can remain suspended in the air for long periods of time and create public health problems far away from emission sources. Reducing levels of fine-particle (PM_{2.5}) pollution is an important part of our nation's commitment to clean, healthy air.

We have reviewed the December 14, 2007 letter from Commissioner McCarthy submitting Connecticut's recommendations on air quality designations for the 2006 24-hour PM_{2.5} standards. We have also reviewed the technical information submitted to support Connecticut's recommendations. We appreciate the effort your State has made to develop this supporting information. Consistent with the Clean Air Act, this letter is to inform you that the Environmental Protection Agency (EPA) intends to support all of Connecticut's recommended designations and boundaries.

We have enclosed a detailed analysis of relevant areas that serves as the basis for EPA's preliminary concurrence with your state recommendations. Commissioner McCarthy will also receive a copy of this letter and the enclosure. Should you have additional information that you wish to be considered by EPA in this process, please provide it to us by October 20, 2008.

EPA has taken steps to reduce fine particle pollution across the country, such as the Clean Diesel Program to dramatically reduce emissions from highway, nonroad and stationary diesel engines. In addition, State programs to attain the 1997 PM_{2.5} standards will also help to reduce unhealthy levels of fine particle pollution.

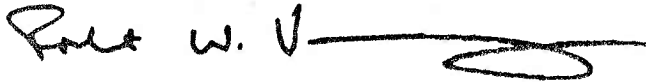
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We intend to make final designation decisions for the 2006 24-hour PM_{2.5} standards by December 18, 2008. Please also be aware that in near future, EPA is planning to publish a notice in the Federal Register to solicit public comments on our intended designation decisions. If you have any questions, please do not hesitate to contact me. Your air quality staff may wish to contact Anne Arnold, Manager of the Air Quality Planning Unit, at 617-918-1047. We look forward to a continued dialogue with you as we work together to implement the PM_{2.5} standards.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert W. Varney", followed by a long horizontal line that ends in a loop.

Robert W. Varney
Regional Administrator

Enclosure

cc: Gina McCarthy, Commissioner, CT DEP
Anne Gobin, CT DEP

Attachment 1

**CONNECTICUT
Area Designations For the
24-Hour Fine Particle National Ambient Air Quality Standard**

The table below identifies the counties in the Connecticut portion of the New York City metropolitan area that EPA intends to designate as not attaining the 2006 24-hour fine particle (PM_{2.5}) standard.¹ A county will be designated as nonattainment if it has an air quality monitor that is violating the standard or if the county is determined to be contributing to the violation of the standard.

Area	Connecticut-Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
New York City Metropolitan Area	New Haven County Fairfield County	New Haven County Fairfield County

EPA intends to designate New Haven and Fairfield Counties in Connecticut as nonattainment for the 24-hour PM_{2.5} NAAQS (National Ambient Air Quality Standard) as part of the New York City metropolitan nonattainment area, and the remaining counties in the state as "attainment/unclassifiable." EPA's proposed nonattainment area for Connecticut is the same as that recommended by the state (See Figure 1).

The nine-factor analysis presented herein focuses on the EPA Region 1 portion of the New York City metropolitan area (i.e., Fairfield and New Haven Counties in Connecticut) and also considers one ring of counties in Connecticut outside of the current nonattainment area (i.e., Middlesex, Hartford, and Litchfield Counties). See the EPA Region 2 nine-factor analysis for a detailed analysis of the portion of the New York City metropolitan area in New York and New Jersey.

¹ EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the 24-hour PM_{2.5} standard was revised from 65 micrograms per cubic meter (average of 98th percentile values for 3 consecutive years) to 35 micrograms per cubic meter; the level of the annual standard for PM_{2.5} remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

EPA Technical Analysis for the Connecticut Portion of the New York City Metropolitan Area

Discussion

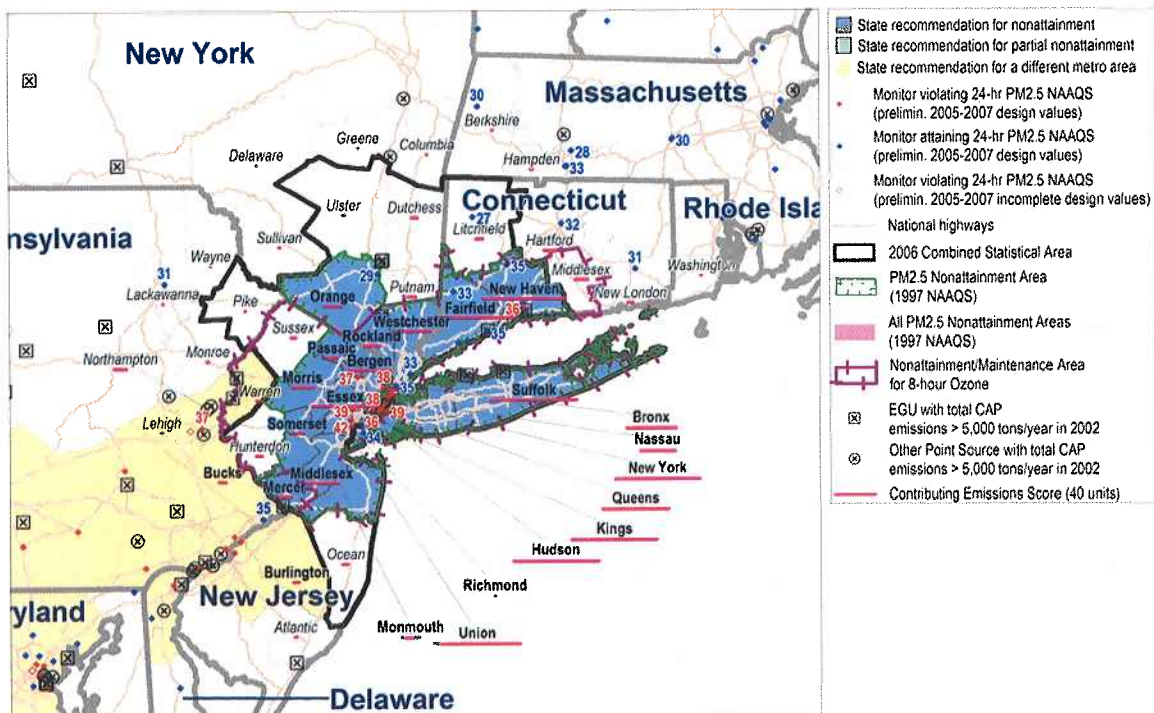
Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those areas that contribute to violations. This technical analysis for the Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT area (i.e., New York City metropolitan area) identifies the counties with monitors that violate the 24-hour PM_{2.5} standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology
- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure 1 is a map of the counties in the area and other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and counties recommended as nonattainment by the State.

Figure 1

New York-N. New Jersey-Long Island, NY-NJ-CT

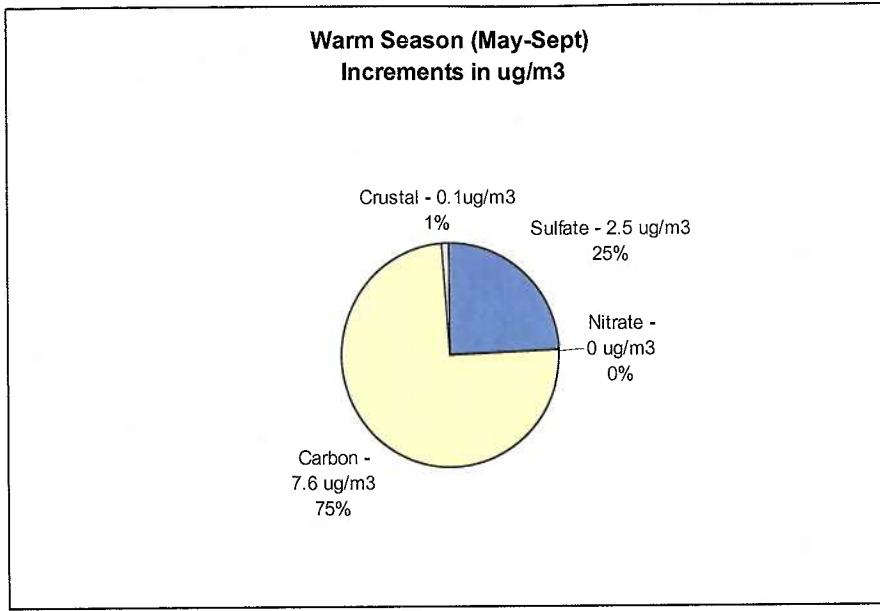


For this area, EPA previously established PM_{2.5} nonattainment boundaries for the 1997 PM_{2.5} NAAQS for the New York City metropolitan area that included Hartford and Fairfield Counties in Connecticut.

In December 2007, Connecticut recommended that the same Connecticut counties be designated as “nonattainment” for the 2006 24-hour PM_{2.5} standard based on air quality data from 2004-2006 (letter from Connecticut DEP to EPA, December 14, 2007). These data are from Federal Reference Method (FRM) and Federal Equivalent Method (FEM) monitors located in the state. Connecticut performed a technical analysis which they submitted with their recommendation letter. The state’s technical support document is, in all major respects, consistent with the analysis EPA has done, and we have arrived at the same conclusions as the state.

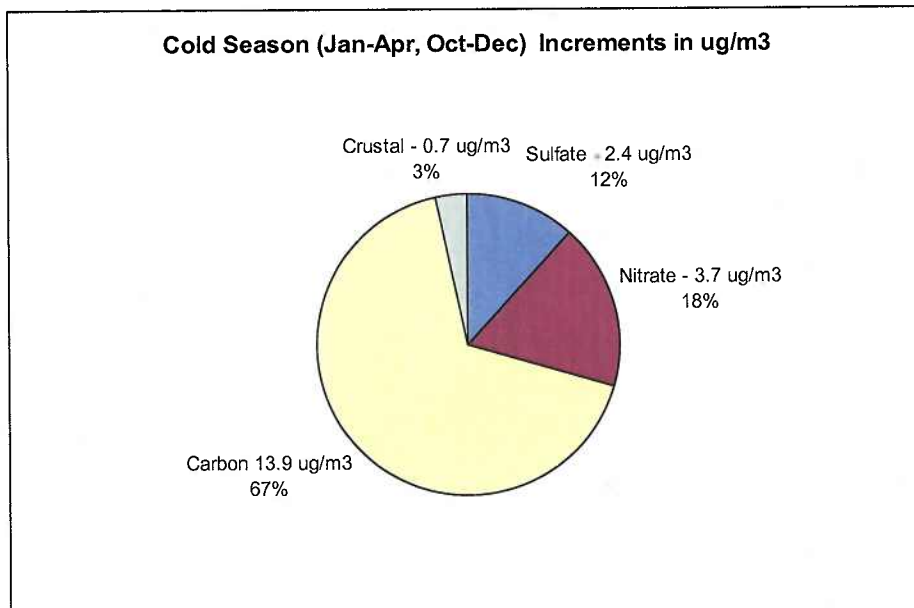
EPA’s analysis shows that on most days in 2004-2006 when PM_{2.5} levels were elevated in Fairfield and New Haven counties in Connecticut, the average prevailing surface wind direction was from the southwest, which is the direction of New York City. Air quality monitoring data on the composition of fine particles are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. Analysis of these data for the New York City metropolitan area indicates that the days with the highest fine-particle concentrations occur predominantly in the warm season.

As shown in Figures 2 and 3, during these high PM_{2.5} days, the PM_{2.5} urban increment for the New York City metropolitan area is dominated by total carbon in both the warm and cold season months (i.e. 75 percent in the warm season, and 67 percent in the cold season). Sulfates and nitrates comprise most of the remaining PM_{2.5} urban increment during the cold season (12 and 18 percent, respectively). However, during the warm season, sulfates comprise most of the remaining PM_{2.5} (25 percent), and nitrates are insignificant. This analysis of the composition of the PM_{2.5} urban increment did not play a major role in our decisions concerning PM_{2.5} nonattainment areas. However, it did show that the composition of the PM_{2.5} urban increment in the New York City metropolitan area is similar to many other urban areas in the eastern United States, and suggests that strategies to reduce PM_{2.5} may differ depending on the season.



Total Urban Increment = 10.2 ug/m³

Figure 2. PM_{2.5} composition of warm-season “urban increment” for the New York City Metropolitan area.



Total Urban Increment = 20.7 ug/m³

Figure 3. PM_{2.5} composition of cold-season “urban increment” for the New York City Metropolitan area.

Based on EPA's nine-factor analysis described below, EPA believes that Fairfield and New Haven Counties in Connecticut, the same counties that were previously designated for PM_{2.5}, should be designated nonattainment for the 24-hour PM_{2.5} air-quality standard as part of the New York City metropolitan nonattainment area, based upon currently available information. These counties are listed in the table below.

New York City Metropolitan Area	Connecticut-Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
New York-Northern New Jersey-Long Island, NY-NJ-Connecticut area	New Haven County Fairfield County	New Haven County Fairfield County

The following is a summary of the nine-factor analysis for the EPA Region 1 portion of the New York City metropolitan area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following PM_{2.5} components and precursor pollutants: "PM_{2.5} emissions total," "PM_{2.5} emissions carbon," "PM_{2.5} emissions other," "SO₂," and "NO_x." "PM_{2.5} emissions total" represents direct Connecticut emissions of PM_{2.5} and includes: "PM_{2.5} emissions carbon," "PM_{2.5} emissions other", primary sulfate (SO₄), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO₂ and NO_x, are part of "PM_{2.5} emissions total," they are not shown on the template or data spreadsheet as separate items). "PM_{2.5} emissions carbon" represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and "PM_{2.5} emissions other" represents other inorganic particles (crustal). Emissions of SO₂ and NO_x, which are precursors of the secondary PM_{2.5} components sulfate and nitrate, are also considered.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive way for consideration of data for these factors. A summary of the CES is included in the Appendix, and a more detailed description can be found at:

http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table 1 shows emissions of PM_{2.5} and precursor pollutants components (given in tons per year) and the CES for violating and potentially contributing counties in the New York City metropolitan area. Counties that are part of the New York City metropolitan nonattainment area for the 1997 PM_{2.5} NAAQS are shown in boldface. Counties are listed in descending order by CES. The five Connecticut counties shown on Table 1 comprise the areas that are considered in this nine-factor analysis as candidates for nonattainment status for the 2006 PM_{2.5} 24-hour standard. See the nine-factor analysis for EPA Region 2 for candidate areas for nonattainment in that region.

County	State Recommended Nonattainment?	CES	PM _{2.5} emissions total (tpy)	PM _{2.5} emissions carbon (tpy)	PM _{2.5} emissions other (tpy)	SO ₂ (tpy)	NO _x (tpy)
Kings, NY	Yes	100	2,230	1,053	1,176	8,274	27,886
New York, NY	Yes	100	3,522	1,864	1,658	13,060	36,742
Hudson, NJ	Yes	100	2,933	671	2,261	27,305	26,889
Suffolk, NY	Yes	100	4,408	1,836	2,572	47,134	54,932
Fairfield, CT	Yes	100	3,056	1,630	1,426	9,533	26,382
Union, NJ	Yes	100	1,092	603	488	3,806	20,040
New Haven, CT	Yes	97	2,871	1,642	1,230	8,250	21,693
Queens, NY	Yes	78	2,976	1,430	1,545	18,460	40,922
Essex, NJ	Yes	77	942	637	304	4,647	22,221
Bronx, NY	Yes	58	1,106	535	571	3,703	14,362
Richmond, NY	Yes	Not Available	790	307	483	2,623	9,466
Bergen, NJ	Yes	48	1,219	886	333	1,691	23,827
Westchester, NY	Yes	43	1,751	947	805	4,770	24,755
Middlesex, NJ	Yes	42	1,549	951	598	3,129	29,172
Nassau, NY	Yes	41	2,149	1,091	1,058	6,203	31,877
Morris, NJ	Yes	24	1,498	953	545	1,177	13,774
Monmouth, NJ	Yes	21	1,506	989	517	1,789	16,771
Rockland, NY	Yes	20	1,296	327	968	12,711	12,777

Orange, NY	Yes	19	2,637	934	1,704	32,973	18,631
Mercer, NJ	Yes	16	1,658	579	1,079	17,891	17,640
Middlesex, CT	No	15	1,173	641	533	2,684	6,941
Somerset, NJ	Yes	15	801	451	349	577	7,886
Hartford, CT	No	14	2,713	1528	1,185	5,301	24,631
Passaic, NJ	Yes	12	755	471	284	733	8,770
Litchfield, CT	No	8	1,671	949	721	1,234	4,400

Table 1. PM_{2.5} Related Emissions and Contributing Emissions Score

Based on emissions levels shown in Table 1, New Haven and Fairfield Counties in Connecticut rank well above the other Connecticut counties. CES scores are also quite low for the adjacent Connecticut counties (i.e., 15, 14, and 8 for Middlesex, Hartford, and Litchfield Counties, respectively), which indicates a low potential for emissions from these counties to contribute significantly to PM_{2.5} levels at violating monitors.

Note that this factor (emissions data) alone (or any other factor) is not a definitive test for identifying areas for inclusion in a nonattainment area. The boundary of an area may expand or contract during the nine-factor analysis. Final proposed boundaries were based on the weight of evidence of all relevant factors.

Factor 2: Air quality data

This factor considers the 24-hour PM_{2.5} design values (in $\mu\text{g}/\text{m}^3$) for air-quality monitors in counties in the New York City metropolitan area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air-quality standard. The 24-hour PM_{2.5} standard is met when the 3-year average of a monitor's 98th percentile values are $35 \mu\text{g}/\text{m}^3$ or less. A design value is only valid if minimum data completeness criteria are met. Table 2 gives 24-hour PM_{2.5} design values for counties in the New York City metropolitan area.

Table 2. Air Quality Data.

County	State Recommended Nonattainment	Design Values 2005-07 ($\mu\text{g}/\text{m}^3$)
Bronx, NY	Yes	39
Kings, NY	Yes	36

Nassau, NY	Yes	33
New York, NY	Yes	39
Orange, NY	Yes	29
Queens, NY	Yes	34*
Richmond, NY	Yes	34
Rockland, NY	Yes	No monitor
Suffolk, NY	Yes	32*
Westchester, NY	Yes	33
Bergen, NJ	Yes	38
Middlesex, NJ	Yes	34*
Monmouth, NJ	Yes	No monitor
Essex, NJ	Yes	39
Mercer, NJ	Yes	34*
Hudson, NJ	Yes	42
Union, NJ	Yes	42
Morris, NJ	Yes	31*
Passaic, NJ	Yes	37
Somerset, NJ	Yes	No monitor
Fairfield, CT	Yes	35
New Haven, CT	Yes	36
Litchfield, CT	No	27
Hartford, CT	No	32
Middlesex, CT	No	No monitor

** Data is from 2004-2006. 2005-2007 data was not available*

[Note: Counties that are part of the New York City Metropolitan nonattainment area for the 1997 PM_{2.5} NAAQS are shown in boldface.]

In EPA Region 1, air-quality monitors in only two counties in Connecticut, New Haven and Fairfield Counties (all FRM monitors), violate the 24-hour PM_{2.5} standard based on data for the 2004-2006 and 2005-2007 periods. Therefore, these counties are candidates for inclusion in the New York City metropolitan nonattainment area. However, the absence of a violating monitor alone is not a sufficient reason to eliminate the other

counties in EPA Region 1 as candidates for nonattainment status. EPA considered the nine factors and the CES for each county (plus other relevant factors or circumstances) when determining which counties to propose for a nonattainment designation.

Many of the violating monitors in the New York City metropolitan area are near major transportation routes, which is an indication of a significant mobile source contribution. Figure 4 shows a map of the location of PM_{2.5} air-quality monitors and major roadways in the New York City metropolitan area.

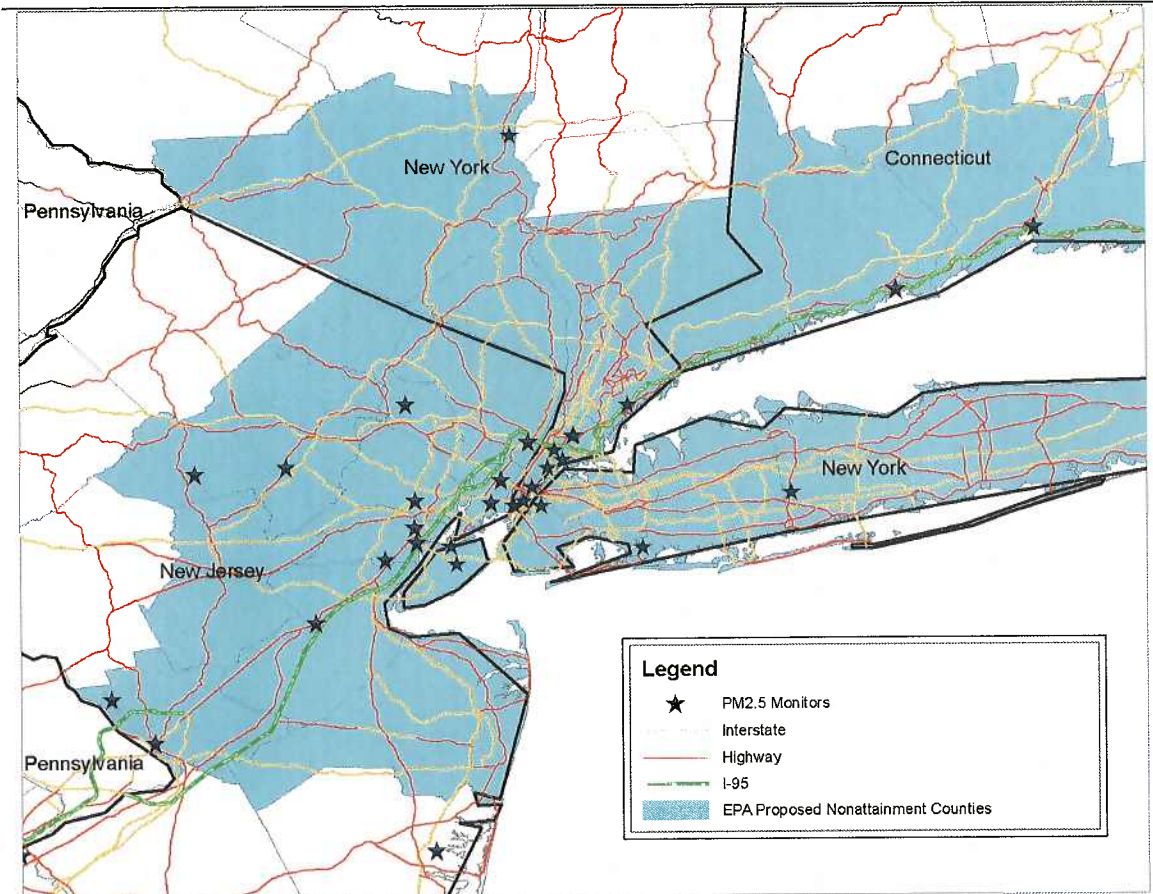


Figure 4. Map of state-recommended nonattainment counties, PM_{2.5} air-quality monitors, and major roadways in the New York City metropolitan area.

[Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with a FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM, FEM, or Alternative Reference Method (ARM) which has operated for more than 24 months is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements