

New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area

Intended Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)

1.0 Summary

This technical support document (TSD) describes the EPA's intent to designate the counties of Fairfield, New Haven and Middlesex in the state of Connecticut; the counties of Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren in the state of New Jersey; and the counties of Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk and Westchester in the state of New York as nonattainment, and include them in a single nonattainment area, for the 2015 ozone National Ambient Air Quality Standards (NAAQS). We refer to this nonattainment area as the New York-Northern New Jersey-Long Island, NY-NJ-CT Nonattainment Area, also referred to as the New York Metro nonattainment Area.

On October 1, 2015, the EPA promulgated revised primary and secondary ozone NAAQS (80 FR 65292; October 26, 2015). The EPA strengthened both standards to a level of 0.070 parts per million (ppm). In accordance with Section 107(d) of the Clean Air Act (CAA), whenever the EPA establishes a new or revised NAAQS, the EPA must promulgate designations for all areas of the country for that NAAQS. The EPA must complete this process within 2 years of promulgating the NAAQS, unless the Administrator has insufficient information to make the initial designations decisions in that time frame. In such circumstances, the EPA may take up to 1 additional year to complete the designations.

Under section 107(d), states were required to submit area designation recommendations to the EPA for the 2015 ozone NAAQS no later than 1 year following promulgation of the standards, i.e., by October 1, 2016. Tribes were also invited to submit area designation recommendations. On October 1, 2016, Connecticut recommended that the counties identified in Table 1 be designated as nonattainment for the 2015 ozone NAAQS based on air quality data from 2013-2015. On September 29, 2016, New Jersey recommended that the counties identified in Table 1 be designated as nonattainment for the 2015 ozone NAAQS based on air quality data from 2013-2015 and preliminary data from 2014-2016. On September 22, 2016, New York recommended that the counties identified in Table 1 be designated as nonattainment for the 2015 ozone NAAQS based on air quality data from 2013-2015.

After considering these recommendations and based on the EPA's technical analysis as described in this TSD, the EPA intends to designate the area listed in Table 1 as nonattainment for the 2015 ozone NAAQS. The EPA must designate an area nonattainment if it has an air quality monitor that is violating the standard or if it has sources of emissions that are contributing to a violation of the NAAQS in a nearby area. Detailed descriptions of the intended nonattainment boundaries for the area are found in the supporting technical analysis for the area in Section 3.

Table 1. States' Recommended Nonattainment Areas and the EPA's Intended Designated Nonattainment Areas for the 2015 Ozone NAAQS in the New York Metro Area

State	State’s Recommended Nonattainment Counties	EPA’s Intended Nonattainment Counties
Connecticut	Fairfield, New Haven, Middlesex	Fairfield, New Haven, Middlesex
New Jersey	Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, Warren	Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, Warren
New York	Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester	Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk, Westchester [Includes Shinnecock Indian Nation in Suffolk County]
Pennsylvania	None	None

On November 6, 2017 (Published at 82 FR 5423), the EPA signed a notice designating most of the areas the State did not recommend for designation as nonattainment as attainment/unclassifiable¹ EPA explains in section 2.0 the approach it is now taking to designate the remaining areas in the State.

The New York Metro area is a multi-jurisdictional nonattainment area that includes areas of Indian country of Federally-recognized tribes. The areas of Indian country of each tribe that the EPA intends to designate as part of the nonattainment area are discussed in Section 3, Technical Analysis.

In its recommendation letter, New York recommended that the EPA designate as “attainment” all other counties not identified in the State’s “Recommended Nonattainment Counties” column of Table 1. The EPA does not intend to modify the State’s recommendation, and the EPA intends to designate the remainder of New York as attainment/unclassifiable based on the State’s recommendation; ambient monitoring data collected during the 2014-2016 period, where available, showing compliance with the 2015 ozone NAAQS; and the EPA’s assessment that these areas are not contributing to a violation in a nearby area. All other counties in the states of New Jersey and Connecticut that are included in the New Jersey and Connecticut broader nonattainment recommendations are addressed in separate TSDs for the Philadelphia-Wilmington-Atlantic City and Greater Connecticut nonattainment areas.

The EPA will designate all tribes in accordance with two guidance documents issued in December 2011 by the EPA Office of Air Quality Planning and Standards titled, “Guidance to Regions for Working with Tribes during

¹ In previous ozone designations and in the designation guidance for the 2015 ozone NAAQS, the EPA used the designation category label Unclassifiable/Attainment to identify both areas that were monitoring attainment and areas that did not have monitors but for which the EPA had reason to believe were likely attainment and were not contributing to a violation in a nearby area. The EPA is now reversing the order of the label to be Attainment/Unclassifiable so that the category is more clearly distinguished from the separate Unclassifiable category.

the National Ambient Air Quality Standards (NAAQS)) Designations Process,”² and “Policy for Establishing Separate Air Quality Designations for Areas of Indian Country.”³

2.0 Nonattainment Area Analyses and Intended Boundary Determination

The EPA evaluated and determined the intended boundaries for each nonattainment area on a case-by-case basis, considering the specific facts and circumstances of the area. In accordance with the CAA section 107(d), the EPA intends to designate as nonattainment the areas with the monitors that are violating the 2015 ozone NAAQS and nearby areas with emissions sources (i.e., stationary, mobile, and/or area sources) that contribute to the violations. As described in the EPA’s designations guidance for the 2015 NAAQS (hereafter referred to as the “ozone designations guidance”),⁴ after identifying each monitor indicating a violation of the ozone NAAQS in an area, the EPA analyzed those nearby areas with emissions potentially contributing to the violating area. In guidance issued in February 2016, the EPA provided that using the Core Based Statistical Area (CBSA) or Combined Statistical Area (CSA)⁵ as a starting point for the contribution analysis is a reasonable approach to ensure that the nearby areas most likely to contribute to a violating area are evaluated. The area-specific analyses may support nonattainment boundaries that are smaller or larger than the CBSA or CSA. The EPA’s analytical approach is described in Section 3 of this technical support document.

On November 6, 2017, EPA issued attainment/unclassifiable designations for approximately 85% of the United States and one unclassifiable area designation.⁶ At that time, consistent with statements in the designations guidance regarding the scope of the area EPA would analyze in determining nonattainment boundaries, EPA deferred designation for (i) any counties in the larger of a CSA or CBSA where one or more counties in the CSA or CBSA was violating the standard; (ii) any counties with a violating monitor not located in a CSA or CBSA; (iii) any counties adjacent to a county with a violating monitor; and (iv) any county that had incomplete monitoring data, any county in the larger of the CSA or CBSA where such a county was located, and any county located adjacent to a county with incomplete monitoring data.

The EPA is proceeding to complete the remaining designations consistent with the designations guidance (and EPA’s past practice) regarding the scope of the area EPA would analyze in determining nonattainment boundaries for the ozone NAAQS as outlined above. For those deferred areas where one or more counties violating the ozone NAAQS or with incomplete data are located in a CSA or CBSA, in most cases the technical analysis for the nonattainment area includes any counties in the larger of the relevant CSA or CBSA. For

² <https://www.epa.gov/sites/production/files/2016-02/documents/ozone-designation-tribes.pdf>

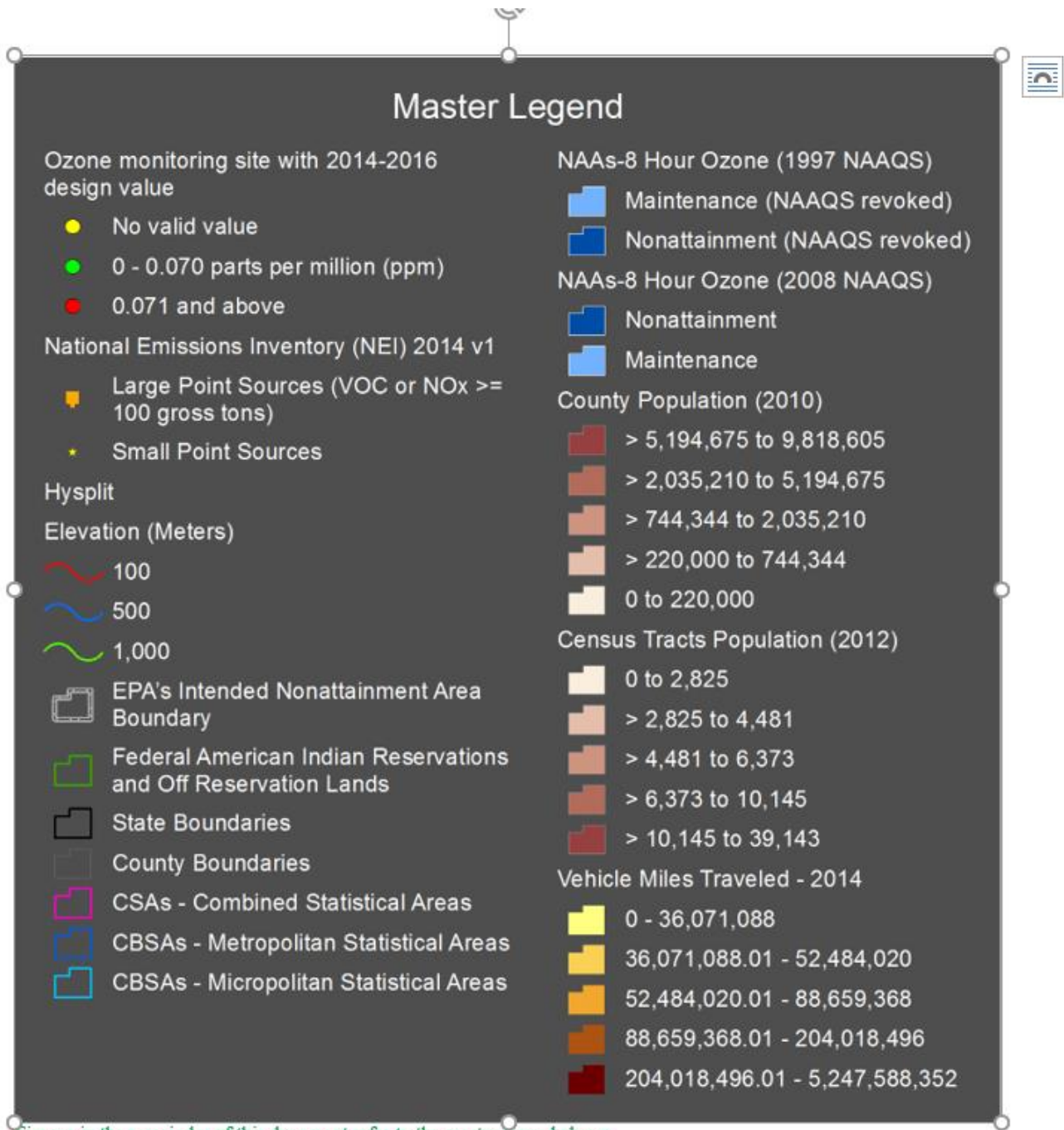
³ <https://www.epa.gov/sites/production/files/2016-02/documents/indian-country-separate-area.pdf>

⁴ The EPA issued guidance on February 25, 2016 that identified important factors that the EPA intends to evaluate in determining appropriate area designations and nonattainment boundaries for the 2015 ozone NAAQS. Available at <https://www.epa.gov/ozone-designations/epa-guidance-area-designations-2015-ozone-naaqs>

⁵ Lists of CBSAs and CSAs and their geographic components are provided at www.census.gov/population/www/metroareas/metrodef.html. The Office of Management and Budget (OMB) adopts standards for defining statistical areas. The statistical areas are delineated based on U.S. Census Bureau data. The lists are periodically updated by the OMB. The EPA used the most recent July 2015 update (OMB Bulletin No. 15-01), which is based on application of the 2010 OMB standards to the 2010 Census, 2006-2010 American Community Survey, as well as 2013 Population Estimates Program data.

⁶ Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards published on November 16, 2017(82 FR 54232).

counties with a violating monitor not located in a CSA or CBSA, EPA explains in the 3.0 Technical Analysis section, its decision whether to consider in the five-factor analysis for each area any other adjacent counties for which EPA previously deferred action. We intend to designate all counties not included in five-factor analyses for a specific nonattainment or unclassifiable area, as attainment/unclassifiable. These deferred areas are identified in a separate document entitled “Intended Designations for Deferred Counties and Partial Counties Not Addressed in the Technical Analyses,” which is available in the docket.



3.0 Technical Analysis for the New York Metro Area

This technical analysis identifies the areas with monitors that violate the 2015 ozone NAAQS. The EPA evaluated these areas and any nearby areas to determine whether those nearby areas have emissions sources that potentially contribute to ambient ozone concentrations at the violating monitors in the area, based on the weight-of-evidence of the five factors recommended in the EPA's ozone designations guidance and any other relevant information. In developing this technical analysis, the EPA used the latest data and information available to the EPA (and to the states and tribes through the Ozone Designations Mapping Tool and the EPA Ozone Designations Guidance and Data web page).⁷ In addition, the EPA considered any additional data or information provided to the EPA by states or tribes.

The New York-Newark, NY-NJ-CT-PA Combined Statistical Area (CSA), with the additional county of Middlesex in Connecticut, is the area of analysis for this TSD. The counties in Table 1, with the exception of Middlesex county in Connecticut, are part of this CSA. Mercer and Ocean (NJ) counties in the CSA are being excluded from the area of analysis because they are analyzed as part of the current Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area and discussed in separate TSDs.

The five factors recommended in the EPA's guidance are:

1. Air Quality Data (including the design value calculated for each Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitor);
2. Emissions and Emissions-Related Data (including locations of sources, population, amount of emissions, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography/Topography (including mountain ranges or other physical features that may influence the fate and transport of emissions and ozone concentrations); and
5. Jurisdictional Boundaries (e.g., counties, air districts, existing nonattainment areas, areas of Indian country, Metropolitan Planning Organizations (MPOs)).

Figure 1a is a map of the EPA's intended nonattainment boundary for the New York Metro Area. The map shows the location of the ambient air quality monitors as well as county boundary, state boundary, CSA boundary, existing 1997 and 2008 ozone NAAQS nonattainment boundary, and design values for violating monitors. The intended boundary for the 2015 ozone NAAQS is the same as the boundaries for the 1997 ozone NAAQS and the 2008 ozone NAAQS. Figures 1b through 1d show Connecticut's, New Jersey's, and New York's recommended nonattainment boundaries for the New York metro area.

Figure 1a. EPA's Intended Nonattainment Boundaries for the New York Metro Area.

⁷ The EPA's Ozone Designations Guidance and Data web page can be found at <https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data>.

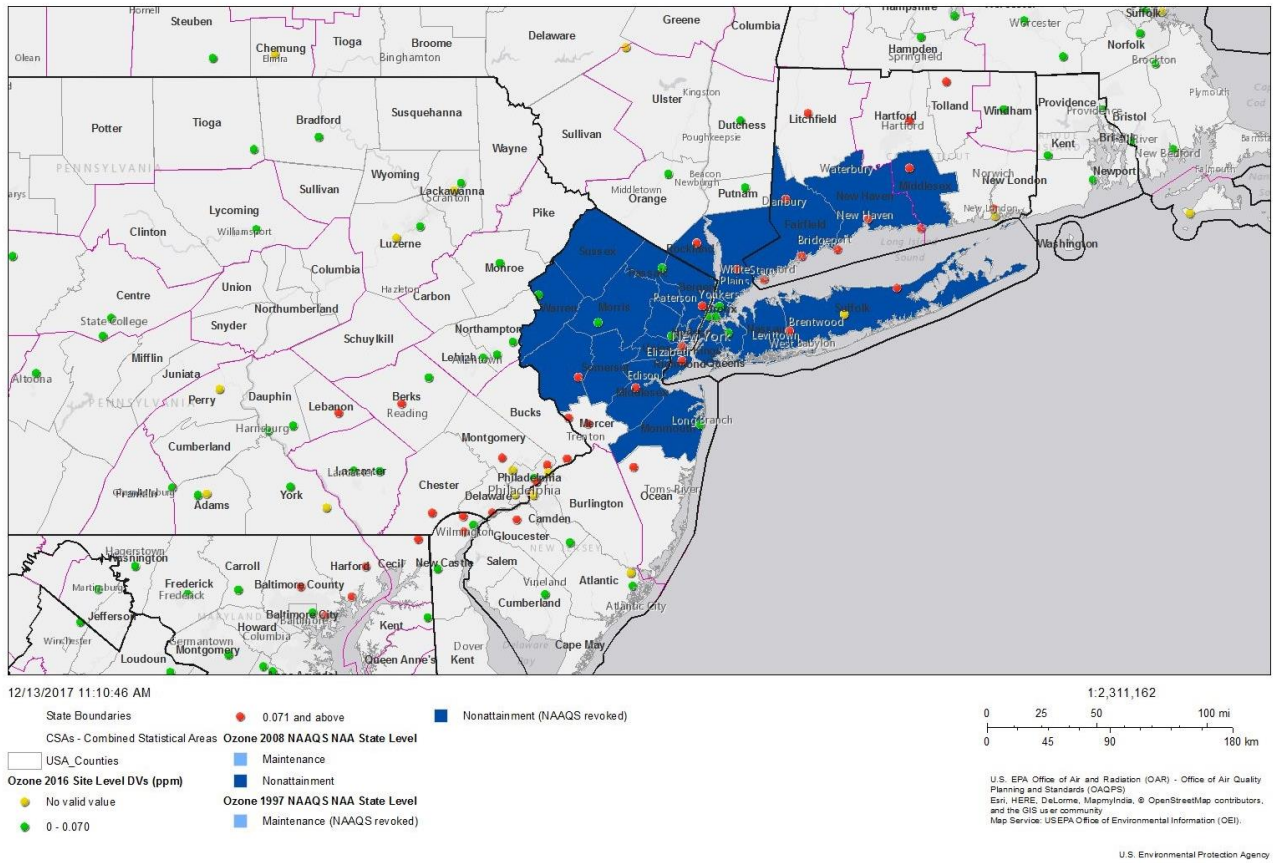


Figure 1b. Connecticut's Recommended Nonattainment Boundaries for the New York Metro Area

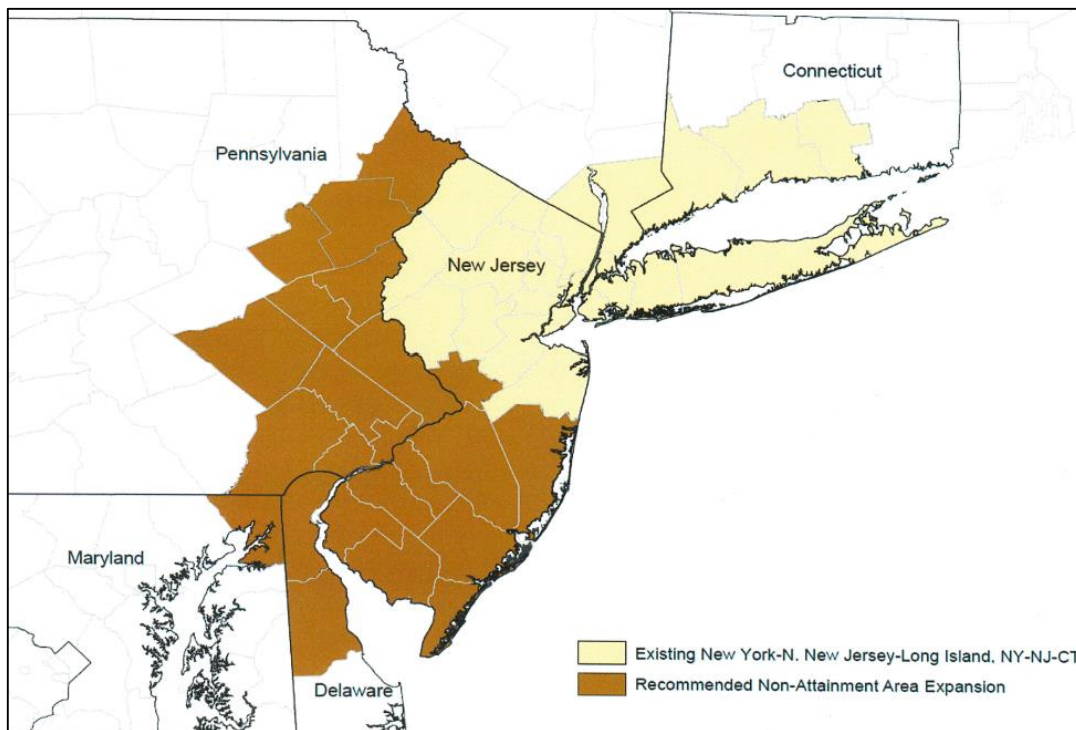


Figure 1c. New Jersey's Recommended Nonattainment Boundaries for the New York Metro Area

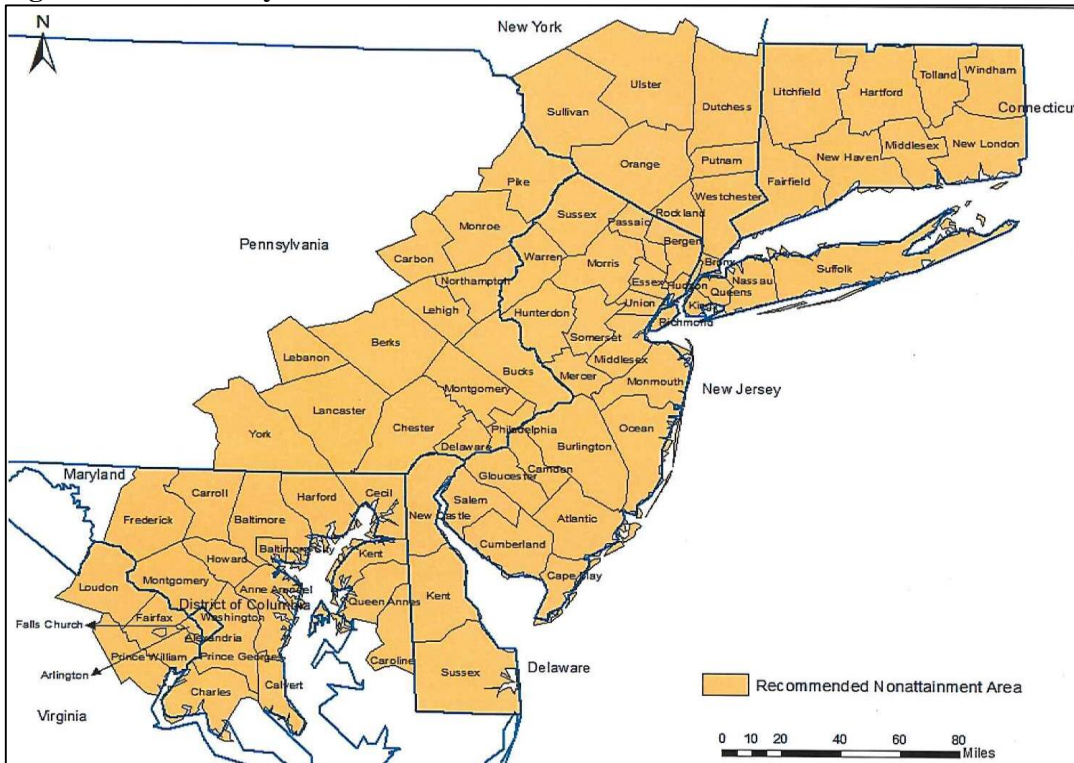
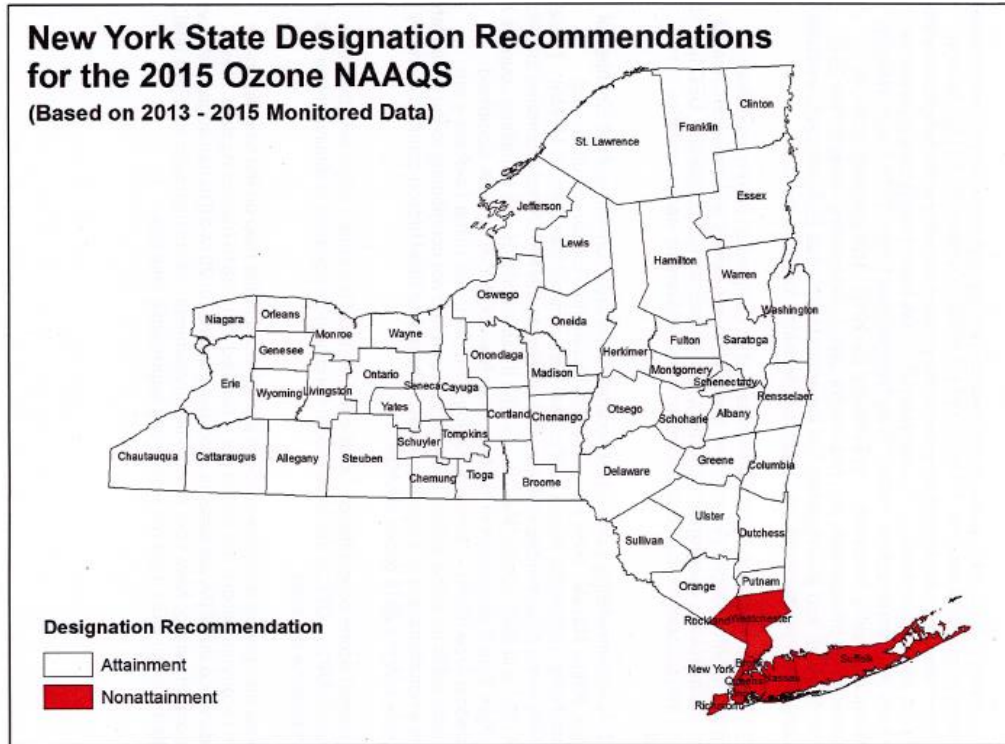


Figure 1d. New York's Recommended Nonattainment Boundaries for Its Portion of the New York Metro Area



The EPA must designate as nonattainment any area that violates the NAAQS and any nearby areas that contribute to the violation in the violating area. Fairfield, New Haven and Middlesex in Connecticut; Bergen,

Hudson, Hunterdon, Middlesex in New Jersey; and Rockland, Suffolk and Westchester in New York have monitors in violation of the 2015 ozone NAAQS. Therefore, these counties are included in the intended nonattainment area. The EPA determined that Essex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren in New Jersey; and Bronx, Kings, Nassau, New York, Queens and Richmond in New York contribute to the violating area. The following sections describe the five factor analysis. While the factors are presented individually, they are not independent. The five factor analysis process carefully considers the interconnections among the different factors and the dependence of each factor on one or more of the others, such as the interaction between emissions and meteorology for the area being evaluated.

Factor Assessment

Factor 1: Air Quality Data

The EPA considered 8-hour ozone design values in ppm for air quality monitors in the New York Metro area based on data for the 2014-2016 period (i.e., the 2016 design value, or DV). This is the most recent three-year period with fully-certified air quality data. The design value is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration.⁸ The 2015 NAAQS are met when the design value is 0.070 ppm or less. Only ozone measurement data collected in accordance with the quality assurance (QA) requirements using approved (FRM/FEM) monitors are used for NAAQS compliance determinations.⁹ The EPA uses FRM/FEM measurement data residing in the EPA's Air Quality System (AQS) database to calculate the ozone design values. Individual violations of the 2015 ozone NAAQS that the EPA determines have been caused by an exceptional event that meets the administrative and technical criteria in the Exceptional Events Rule¹⁰ are not included in these calculations. Whenever several monitors are located in a county (or designated nonattainment area), the design value for the county or area is determined by the monitor with the highest valid design value. The presence of one or more violating monitors (i.e. monitors with design values greater than 0.070 ppm) in a county or other geographic area forms the basis for designating that county or area as nonattainment. The remaining four factors are then used as the technical basis for determining the spatial extent of the designated nonattainment area surrounding the violating monitor(s) based on a consideration of what nearby areas are contributing to a violation of the NAAQS.

The EPA identified monitors where the most recent design values violate the NAAQS, and examined historical ozone air quality measurement data (including previous design values) to understand the nature of the ozone ambient air quality problem in the area. Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are operated in accordance with 40 CFR part 58, appendix A, C, D and E and operating with an FRM or FEM monitor. These requirements must be met in order to be acceptable for comparison to the 2015 ozone NAAQS for designation purposes. All data from Special Purpose Monitors (SPMs) using an FRM or FEM are eligible for comparison to the NAAQS, subject to the

⁸ The specific methodology for calculating the ozone design values, including computational formulas and data completeness requirements, is described in 40 CFR part 50, appendix U.

⁹ The QA requirements for ozone monitoring data are specified in 40 CFR part 58, appendix A. The performance test requirements for candidate FEMs are provided in 40 CFR part 53, subpart B.

¹⁰ The EPA finalized the rule on the Treatment of Data Influenced by Exceptional Events (81 FR 68513) and the guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events in September of 2016. For more information, see <https://www.epa.gov/air-quality-analysis/exceptional-events-rule-and-guidance>.

requirements given in the March 28, 2016 Revision to Ambient Monitoring Quality Assurance and Other Requirements Rule (81 FR 17248).

The 2014-2016 design values for counties in the New York Metro area are shown in Table 2. These values reflect the concurred upon exceptional event for Connecticut, but do not reflect the concurred upon exceptional event for New Jersey. The Connecticut concurrence letter, dated July 31, 2017, changed the design value for the designated area by lowering the peak monitor's design value. The New Jersey concurrence letter, dated October 24, 2017, does not change the overall intended designation of the area, but brings the Flemington monitor in Hunterdon, New Jersey into attainment for the 2015 NAAQS.¹¹

Table 2. Air Quality Data (all values in ppm)^a.

County, State	State Recommended Nonattainment?	AQS Site ID	2014-2016 DV	2014 4 th highest daily max value	2015 4 th highest daily max value	2016 4 th highest daily max value
Fairfield, CT	Yes	090010017	0.080	0.078	0.084	0.079
		090011123	0.078	0.074	0.079	0.081
		090013007	0.081	0.074	0.086	0.083
		090019003	0.083	0.081	0.087	0.081
Litchfield, CT	Yes	090050005	0.072	0.068	0.076	0.074
Middlesex, CT	Yes	090070007	0.079	0.080	0.078	0.080
New Haven, CT	Yes	090090027	0.076	0.072	0.081	0.075
		090099002	0.076	0.069	0.081	0.080
Bergen, NJ	Yes	340030006	0.074	0.073	0.076	0.075
Essex, NJ	Yes	340130003	0.070	0.070	0.072	0.070
Hudson, NJ	Yes	340170006	0.072	0.072	0.077	0.069
Hunterdon, NJ	Yes	340190001	0.072	0.065	0.073	0.078
Middlesex, NJ	Yes	340230011	0.074	0.071	0.077	0.076
Monmouth, NJ	Yes	340250005	0.070	0.064	0.077	0.070
Morris, NJ	Yes	340273001	0.069	0.068	0.070	0.069
Passaic, NJ	Yes	340315001	0.070	0.067	0.071	0.072
Somerset, NJ	Yes	No monitor	N/A			
Sussex, NJ	Yes	No monitor	N/A			
Union, NJ	Yes	No monitor	N/A			
Warren, NJ	Yes	340410007	0.064	0.060	0.066	0.066
Bronx, NY	Yes	360050110	0.067	0.071	0.063	0.069
		360050133	0.070	0.070	0.072	0.070

¹¹ The Exceptional Event Letters for Connecticut and New Jersey are included in the docket for this action.

Dutchess, NY	No	360270007	0.068	0.068	0.067	0.071
Kings, NY	Yes	No monitor	N/A			
Nassau, NY	Yes	No monitor	N/A			
New York, NY	Yes	360610135	0.069	0.065	0.071	0.071
Orange, NY	No	360715001	0.066	0.062	0.072	0.064
Putnam, NY	No	360790005	0.068	0.066	0.069	0.071
Queens, NY	Yes	360810124	0.069	0.063	0.073	0.071
Richmond, NY	Yes	360850067	0.076	0.072	0.079	0.077
Rockland, NY	Yes	360870005	0.072	0.068	0.077	0.073
Suffolk, NY	Yes	361030002	0.072	0.066	0.078	0.073
		361030004	0.072	0.064	0.076	0.078
		361030009	N/A	0.062	0.063	0.073
Ulster, NY	No	No monitor	N/A			
Westchester, NY	Yes	361192004	0.074	0.074	0.073	0.075
Carbon, PA	No	No monitor	N/A			
Lehigh, PA	No	420770004	0.070	0.068	0.070	0.073
Monroe, PA	No	420890002	0.065	0.060	0.067	0.070
Northampton, PA	No	420950025	0.070	0.067	0.070	0.075
		420958000	0.069	0.066	0.067	0.074
Pike, PA	No	No monitor	N/A			

^a The highest violating design value in each county is indicated in bold.

N/A means that the monitor did not meet the completeness criteria described in 40 CFR, part 50, Appendix U, or no data exists for the county.

Fairfield, New Haven and Middlesex in Connecticut; Bergen, Hudson, Hunterdon, Middlesex in New Jersey; and Richmond, Rockland, Suffolk and Westchester in New York all show a violation of the 2015 ozone NAAQS. Therefore, these counties are included in the intended nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight-of-evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Figure 1, shown previously, identifies the New York Metro Area intended nonattainment area, the CSA boundary and the violating monitors. Table 2 identifies the design values for all monitors in the area of analysis and Figures 2a and 2b show the historical trend of design values for the violating monitors in the area of analysis. As indicated in Table 2, there are 17 violating monitors in the area of analysis. The violating monitors are distributed amongst the three states in the area. Starting at the northeastern portion of Figure 1, the county of Middlesex in Connecticut has one violating monitor at the Connecticut Valley Hospital; to the west of that, the county of New Haven in Connecticut has two violating monitors in Criscuolo Park on 1 James Street and in Hammonasset State Park at Meigs Point; and to the west of that, the county of Fairfield in Connecticut has four violating monitors in Greenwich Point Park at Tods Driftway, Western Connecticut State University at White

Street at 8th Avenue parking garage roof, USCG Lighthouse at Prospect Street and Sherwood Island Connector in Sherwood Island State Park. In New York the county of Rockland has one violating monitor located at 2 South Mountain Road; to the southeast of that, in the county of Westchester there is one violating monitor located in White Plains at the White Plains Pump Station on 240 Orchard Street; to the southeast of that on Long Island, in the county of Suffolk there are two violating monitors in Riverhead at 3059 Sound Avenue, in Babylon at East Farmingdale Water Distribution on 72 Gazza Blvd; and to the west of that, in the county of Richmond there is one violating monitor at the Susan Wagner High School at 1200 Manor Road near Brielle Avenue. In New Jersey the county of Bergen has one violating monitor in Leonia at Overpeck Park at 40 Fort Lee Road; to the southwest of that, the county of Hudson has one violating monitor in Bayonne located at Veterans Park at Newark Bay on 25th Street near Park Road; to the southwest of that, the county of Middlesex has one violating monitor at Rutgers University at Horticultural Farm #3, off Ryder's Lane; and to the west of that, the county of Hunterdon has one violating monitor in Flemington at Raritan Township Municipal Utilities Authority on 365 Old York Road.

Figure 2a. Three-Year Design Values for Violating Monitors in the New York and New Jersey Portion of the New York Metro Area (2007-2016).

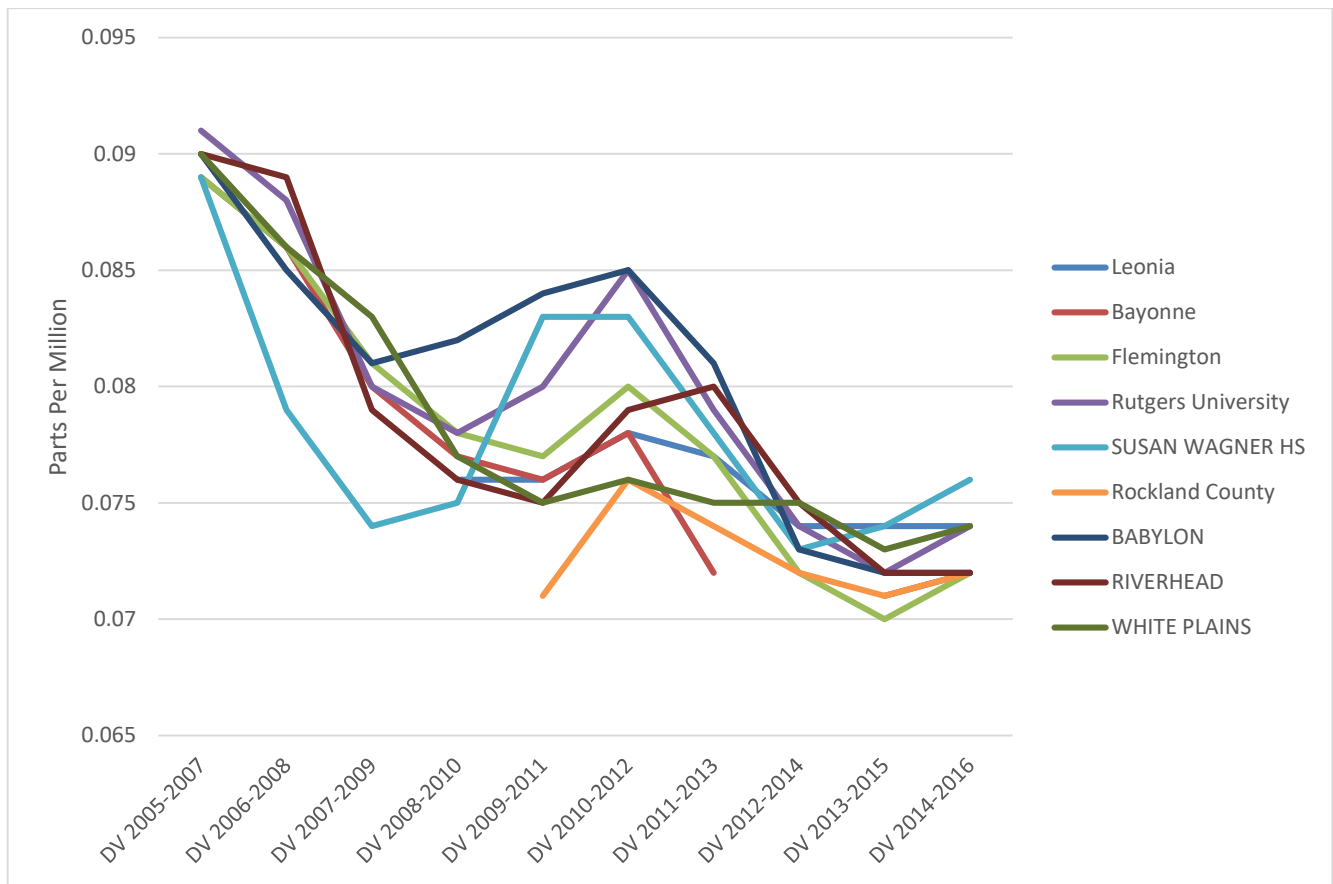


Figure 2b. Three-Year Design Values for Violating Monitors in Connecticut's Portion of the New York Metro Area (2007-2016).



The design values of the violating monitors in the area have almost all trended downwards, peaking at the 2005-2007 design values. The peak monitors that drive the overall design value for the area are in the county of Fairfield in Connecticut, where the Sherwood Island Connector monitor has a 2014-2016 design value of 0.083 parts per million, making it the highest 2014-2016 design value for the area.

Factor 2: Emissions and Emissions-Related Data

The EPA evaluated ozone precursor emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOC) and other emissions-related data that provide information on areas contributing to violating monitors.

Emissions Data

The EPA reviewed data from the 2014 National Emissions Inventory (NEI). For each county in the area of analysis, the EPA examined the magnitude of large sources (NO_x or VOC emissions greater than 100 tons per year) and small point sources, as well as the magnitude of county-level emissions reported in the NEI. These county-level emissions represent the sum of emissions from the following general source categories: point

sources, non-point (i.e., area) sources, non-road mobile, on-road mobile, and fires. Significant emissions levels from sources in a nearby area indicate the potential for the area to contribute to monitored violations.

Table 3 provides a county-level emissions summary of NO_x and VOC (given in tons per year (tpy)) emissions for the area of analysis considered for inclusion in the intended New York Metro nonattainment area.

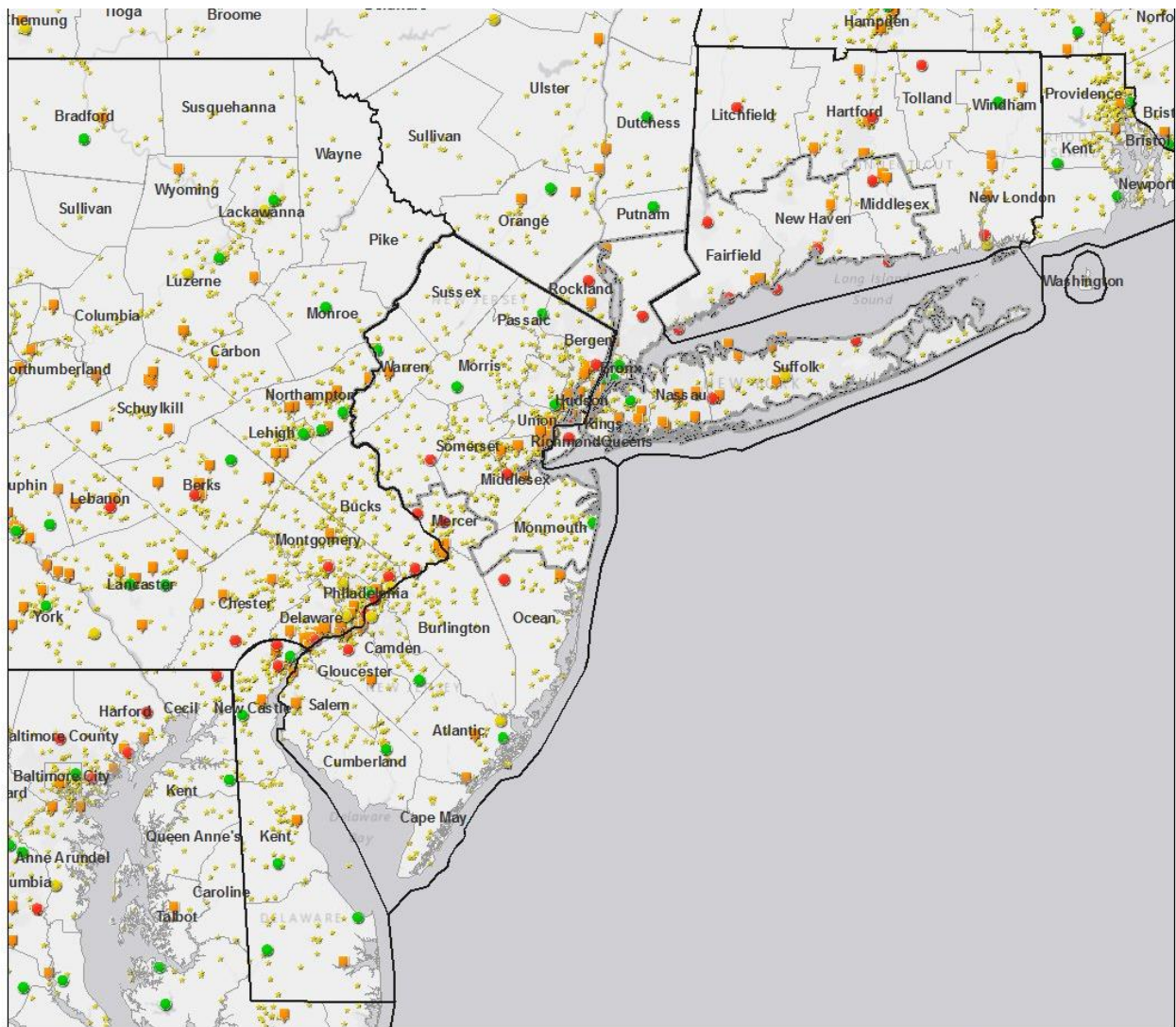
Table 3. Total County-Level NO_x and VOC Emissions.

County	State Recommended Nonattainment?	Total NO _x (tpy)	Total VOC (tpy)
Fairfield, CT	Yes	15,222	19,987
Litchfield, CT	Yes	2,608	5,693
Middlesex, CT	Yes	3,796	4,274
New Haven, CT	Yes	12,439	16,924
Bergen, NJ	Yes	13,418	15,228
Essex, NJ	Yes	12,527	10,844
Hudson, NJ	Yes	8,812	8,125
Hunterdon, NJ	Yes	3,145	3,375
Middlesex, NJ	Yes	16,126	15,081
Monmouth, NJ	Yes	12,288	11,488
Morris, NJ	Yes	9,461	9,995
Passaic, NJ	Yes	6,107	7,392
Somerset, NJ	Yes	6,170	6,459
Sussex, NJ	Yes	2,485	3,940
Union, NJ	Yes	12,128	9,523
Warren, NJ	Yes	2,439	2,660
Bronx, NY	Yes	8,709	7,944
Dutchess, NY	No	4,424	4,978
Kings, NY	Yes	17,260	15,521
Nassau, NY	Yes	21,698	17,625

New York, NY	Yes	24,514	16,447
Orange, NY	No	7,359	6,962
Putnam, NY	No	1,850	2,096
Queens, NY	Yes	27,848	17,252
Richmond, NY	Yes	6,019	4,730
Rockland, NY	Yes	5,926	4,234
Suffolk, NY	Yes	31,161	26,287
Ulster, NY	No	3,493	4,264
Westchester, NY	Yes	15,195	14,479
Carbon, PA	No	2,694	2,190
Lehigh, PA	No	9,021	9,979
Monroe, PA	No	4,959	5,967
Northampton, PA	No	12,944	7,357
Pike, PA	No	2,264	3,445
Area Wide:		365,898	345,195

In addition to reviewing county-wide emissions of NO_x and VOC in the area of analysis, the EPA also reviewed emissions from large point sources. The location of these sources, together with the other factors, can help inform nonattainment boundaries. The locations of the large point sources are shown in Figure 3 below. The intended nonattainment boundary is also shown.

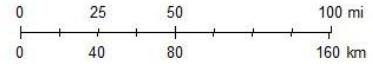
Figure 3. Large and Small Point Sources in the Area of Analysis.



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- State Boundaries
- USA_Countries
- New York CT
- New York NJ
- New York NY
- Ozone 2016 Site Level DVs
 - No valid value
 - 0 - 0.070
 - 0.071 and above
 - Large Point Sources (VOC GT 100 or NOx GT 100)
 - Small Point Sources



OAR/OAQPS/AQAD/AQAG
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 Map Service: USEPA Office of Environmental Information (OEI)
 Data: U.S. EPA Office of Air and Radiation (OAR) - Office of Air

In summary, the EPA’s analysis of relevant county-level emissions and the geographic locations of the relevant emission showed that the counties of Fairfield and New Haven in Connecticut; Bergen, Essex, Middlesex, Monmouth and Union in New Jersey; Kings, Nassau, New York, Queens, Suffolk and Westchester in New York; and Northampton in Pennsylvania all had over 10,000 tons per year of total NOx and/or VOC emissions.

Population density and degree of urbanization

In this part of the factor analysis, the EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include emissions of NO_x and VOC from on-road and non-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO_x and VOC emissions that may contribute to violations of the NAAQS. Table 4 shows the population, population density, and population growth information for each county in the area of analysis.

Table 4. Population and Growth.

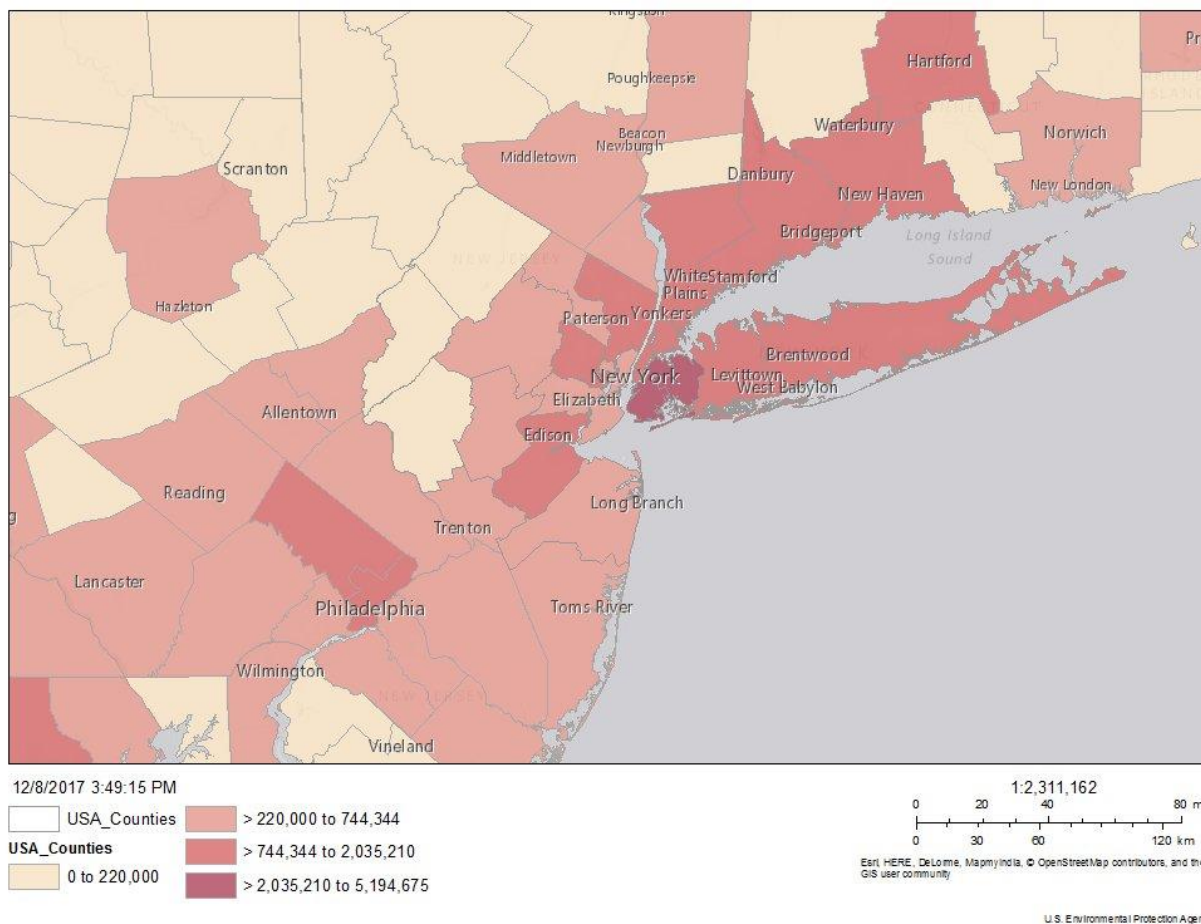
County	State Recommended Nonattainment ?	2010 Population	2015 Population	2015 Population Density (per sq mi)	Absolute change in population (2010 to 2015)	Population % change (2010 to 2015)
Fairfield, CT	Yes	916,829	948,053	1,517	31,224	3
Litchfield, CT	Yes	189,927	183,603	199	-6,324	-3
Middlesex, CT	Yes	165,676	164,063	444	-1,613	-1
New Haven, CT	Yes	862,477	859,470	1,422	-3,007	-0.4
Bergen, NJ	Yes	905,116	938,506	4,028	33,390	4
Essex, NJ	Yes	783,969	797,434	6,318	13,465	2
Hudson, NJ	Yes	634,266	674,836	14,610	40,570	6
Hunterdon, NJ	Yes	128,349	125,488	293	-2,861	-2
Middlesex, NJ	Yes	809,858	840,900	2,722	31,042	4
Monmouth, NJ	Yes	630,380	628,715	1,341	-1,665	-0.3
Morris, NJ	Yes	492,276	499,509	1,085	7,233	1
Passaic, NJ	Yes	501,226	510,916	2,768	9,690	2
Somerset, NJ	Yes	323,444	333,654	1,105	10,210	3
Sussex, NJ	Yes	149,265	143,673	277	-5,592	-4
Union, NJ	Yes	536,499	555,786	5,404	19,287	4
Warren, NJ	Yes	108,692	106,869	299	-1,823	-2
Bronx, NY	Yes	1,385,108	1,455,444	34,574	70,336	5
Dutchess, NY	No	297,488	295,754	372	-1,734	-0.6
Kings, NY	Yes	2,504,700	2,636,735	37,234	132,035	5
Nassau, NY	Yes	1,339,532	1,361,350	4,781	21,818	2
New York, NY	Yes	1,585,873	1,644,518	72,036	58,645	4
Orange, NY	No	372,813	377,647	465	4,834	1
Putnam, NY	No	99,710	99,042	430	-668	-0.7

Queens, NY	Yes	2,230,722	2,339,150	21,553	108,428	5
Richmond, NY	Yes	468,730	474,558	8,130	5,828	1
Rockland, NY	Yes	311,687	326,037	1,879	14,350	5
Suffolk, NY	Yes	1,493,350	1,501,587	1,646	8,237	0.6
Ulster, NY	No	182,493	180,143	160	-2,350	-1
Westchester, NY	Yes	949,113	976,396	2,268	27,283	3
Carbon, PA	No	65,249	63,960	168	-1,289	-2
Lehigh, PA	No	349,497	360,685	1,045	11,188	3
Monroe, PA	No	169,842	166,397	274	-3,445	-2
Northampton, PA	No	297,735	300,813	814	3,078	1
Pike, PA	No	57,369	55,949	103	-1,420	-2
Area Wide		23,242,340	23,887,759	1,680	645,419	3

Source: U.S. Census Bureau population estimates for 2010 and 2015. <https://www.census.gov/data.html>.

The New York Metro Area is a highly populated urban area. The area had a 3% increase in its population from 2010 to 2015. In Connecticut, the county of Fairfield had an increase in population from 2010 to 2015, whereas the counties of Middlesex and New Haven had a net decrease over that same time. In New Jersey, the counties of Bergen, Essex, Hudson, Middlesex, Morris, Passaic, Somerset and Union had a net increase in population from 2010 to 2015, whereas the counties of Hunterdon, Monmouth, Sussex and Warren had a net decrease over that same time. In New York, all the counties in the area had a net increase in population from 2010 to 2015. From Table 4 and Figure 4 we see that the two most populous counties are Kings and Queens Counties in New York, and these two counties also have the highest population density.

Figure 4. County-Level Population in the New York Metro Area.



Traffic and Vehicle Miles Travelled (VMT)

The EPA evaluated the commuting patterns of residents, as well as the total vehicle miles traveled (VMT) for each county in the area of analysis. In combination with the population/population density data and the location of main transportation arteries, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and high VMT and/or high number of commuters indicates the presence of motor vehicle emissions that may contribute to violations of the NAAQS. Rapid population or VMT growth in a county on the urban perimeter may signify increasing integration with the core urban area, and thus could indicate that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. In addition to VMT, the EPA evaluated worker data collected by the U.S. Census Bureau¹² for the counties recommended for inclusion in the nonattainment area. Table 5 shows the traffic and commuting pattern data, including total VMT for each county, number of residents who work in each county, number of residents that work in counties with violating monitor, and the percent of residents working in counties with violating monitor. The data in Table 5 are 2014 data.

¹² The worker data can be accessed at: <http://onthemap.ces.census.gov/>.

Table 5. Traffic and Commuting Patterns.

County	State Recommended Nonattainment?	2014 Total VMT (Million Miles)	Number of County Residents Who Work	Number Commuting to or Within Counties with Violating Monitor(s)	Percentage Commuting to or Within Counties with Violating Monitor(s)
Suffolk, NY	Yes	14,438	733,565	483,318	65.89%
Nassau, NY	Yes	10,156	670,413	96,126	14.34%
Westchester, NY	Yes	8,736	413,904	233,436	56.40%
Middlesex, NJ	Yes	8,016	392,540	223,300	56.89%
Bergen, NJ	Yes	7,302	448,458	251,602	56.10%
Queens, NY	Yes	7,150	809,125	51,225	6.33%
New Haven, CT	Yes	6,976	398,551	380,245	95.41%
Fairfield, CT	Yes	6,876	407,337	358,633	88.04%
Monmouth, NJ	Yes	6,489	299,254	89,470	29.90%
Morris, NJ	Yes	5,204	246,375	45,504	18.47%
Essex, NJ	Yes	4,952	337,839	77,478	22.93%
Kings, NY	Yes	4,444	1,099,855	61,411	5.58%
Union, NJ	Yes	4,387	251,795	67,059	26.63%
Orange, NY	No	3,940	161,708	28,238	17.50%
Somerset, NJ	Yes	3,357	165,050	58,238	35.29%
New York, NY	Yes	3,164	762,320	56,447	7.40%
Bronx, NY	Yes	3,069	527,769	68,269	12.94%
Lehigh, PA	No	2,933	163,187	31,563	19.40%
Rockland, NY	Yes	2,870	139,322	89,199	64.02%
Passaic, NJ	Yes	2,845	229,961	82,093	35.70%
Dutchess, NY	No	2,445	129,358	22,983	17.90%
Hudson, NJ	Yes	2,246	307,071	139,463	45.42%
Northampton, PA	No	2,114	138,355	23,134	16.70%
Richmond, NY	Yes	2,041	205,985	65,805	31.95%
Ulster, NY	No	2,014	75,908	4,953	6.60%
Hunterdon, NJ	Yes	1,796	65,107	34,675	53.26%
Middlesex, CT	Yes	1,707	84,898	81,724	96.26%
Monroe, PA	No	1,602	62,856	5,545	8.80%
Warren, NJ	Yes	1,396	51,716	12,119	23.43%
Putnam, NY	No	1,372	47,694	21,257	44.60%
Litchfield, CT	Yes	1,349	96,009	57,371	59.76%

Sussex, NJ	Yes	1,268	75,076	12,468	16.61%
Carbon, PA	No	698	28,833	4,332	14.90%
Pike, PA	No	559	21,531	1,307	6.10%
Total		148,127	10,444,618	3,582,486	34.30%

Counties with a monitor(s) violating the NAAQS are indicated in bold.

To show traffic and commuting patterns, Figure 5 overlays twelve-kilometer gridded VMT from the 2014 NEI with a map of the transportation arteries.

Figure 5. Twelve Kilometer Gridded VMT (Miles) Overlaid with Transportation Arteries.

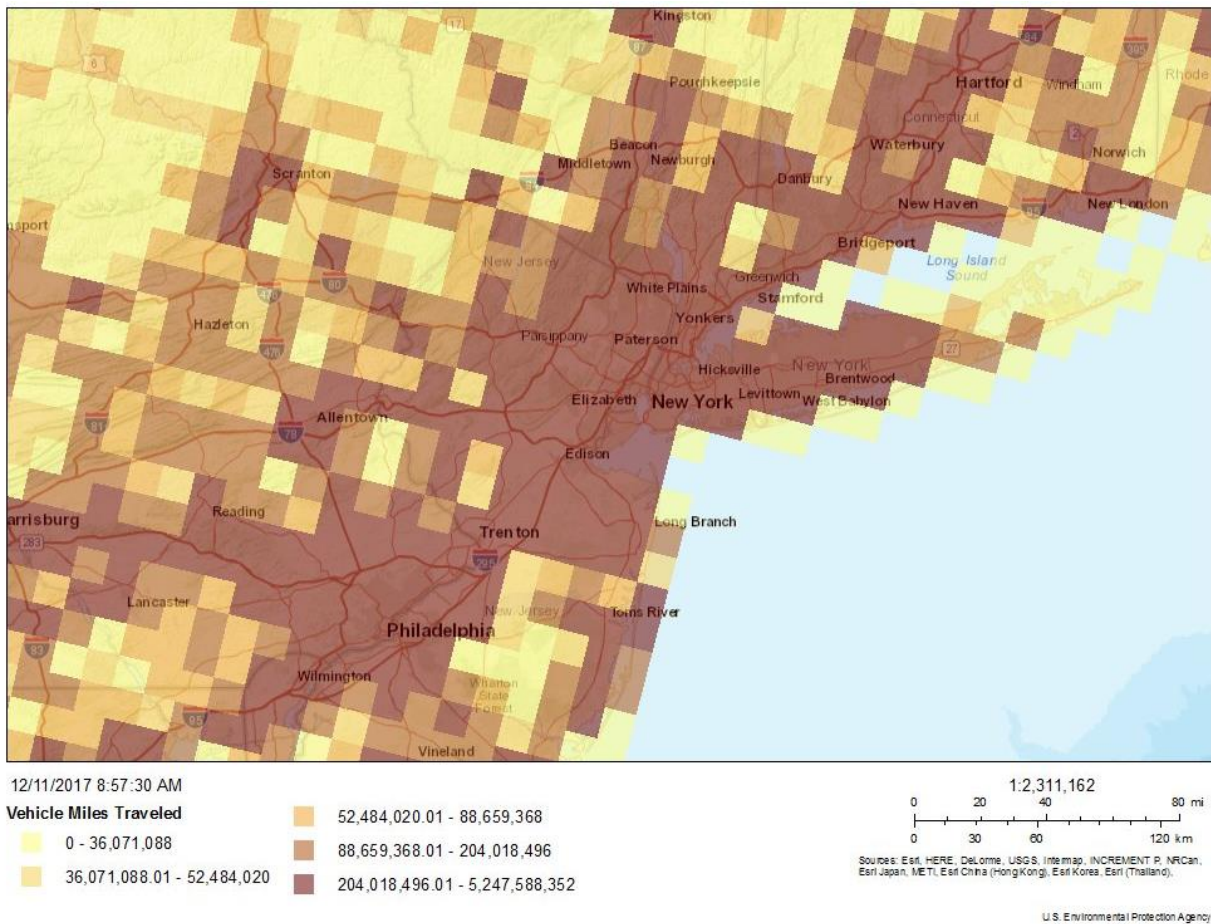


Table 5 and Figure 5 show that the area had a 2014 total vehicle miles traveled of over 120 billion miles. There were over 9 million county residents who work, with over 3 million of them commuting to or within counties with a violating monitor.

The counties of Suffolk and Nassau in Long Island had the highest county level total VMT for the area. This is reflected in Figures 5, as is the concentration of transportation arteries in and around the New York Metro area, with major highways, such as the I-95, running through a number of the counties in all three states.

Factor 3: Meteorology

Evaluation of meteorological data helps to assess the fate and transport of emissions contributing to ozone concentrations and to identify areas potentially contributing to the monitored violations. Results of meteorological data analysis may inform the determination of nonattainment area boundaries. In order to determine how meteorological conditions, including, but not limited to, weather, transport patterns, and stagnation conditions, could affect the fate and transport of ozone and precursor emissions from sources in the area., the EPA evaluated 2014-2016 HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) trajectories at 100, 500, and 1000 meters above ground level (AGL) that illustrate the three-dimensional paths traveled by air parcels to a violating monitor. Figures 6a through 6e shows the 24-hour HYSPLIT back trajectories for each exceedance day (i.e., daily maximum 8 hour values that exceed the 2015 ozone NAAQS) for the violating monitors in the New York Metro area. Figure 7 for the coastal Westport monitor in Connecticut (taken from the state’s recommendation) shows an ozone pollution rose for the monitor.

Figure 6a. HYSPLIT Back Trajectories for Violating Monitors in the New York Metro Area¹³.

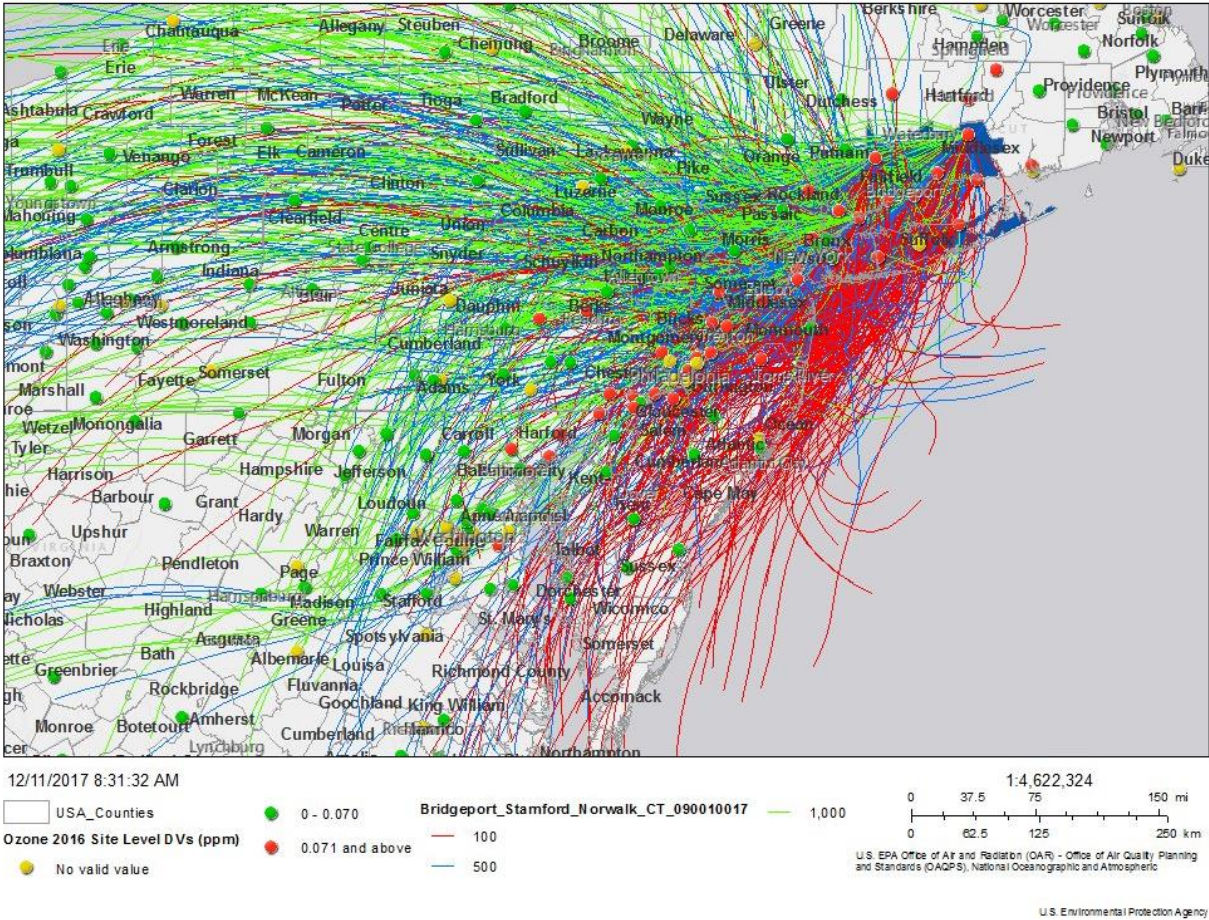


Figure 6b. HYSPLIT Back Trajectories for Connecticut Violating Monitors in the New York Metro Area.

¹³ HYSPLIT Back Trajectories for Hunterdon, New Jersey AQS Site ID 340190001 is not included because the Hunterdon monitor is now attaining based on concurrence of the exceptional event request.

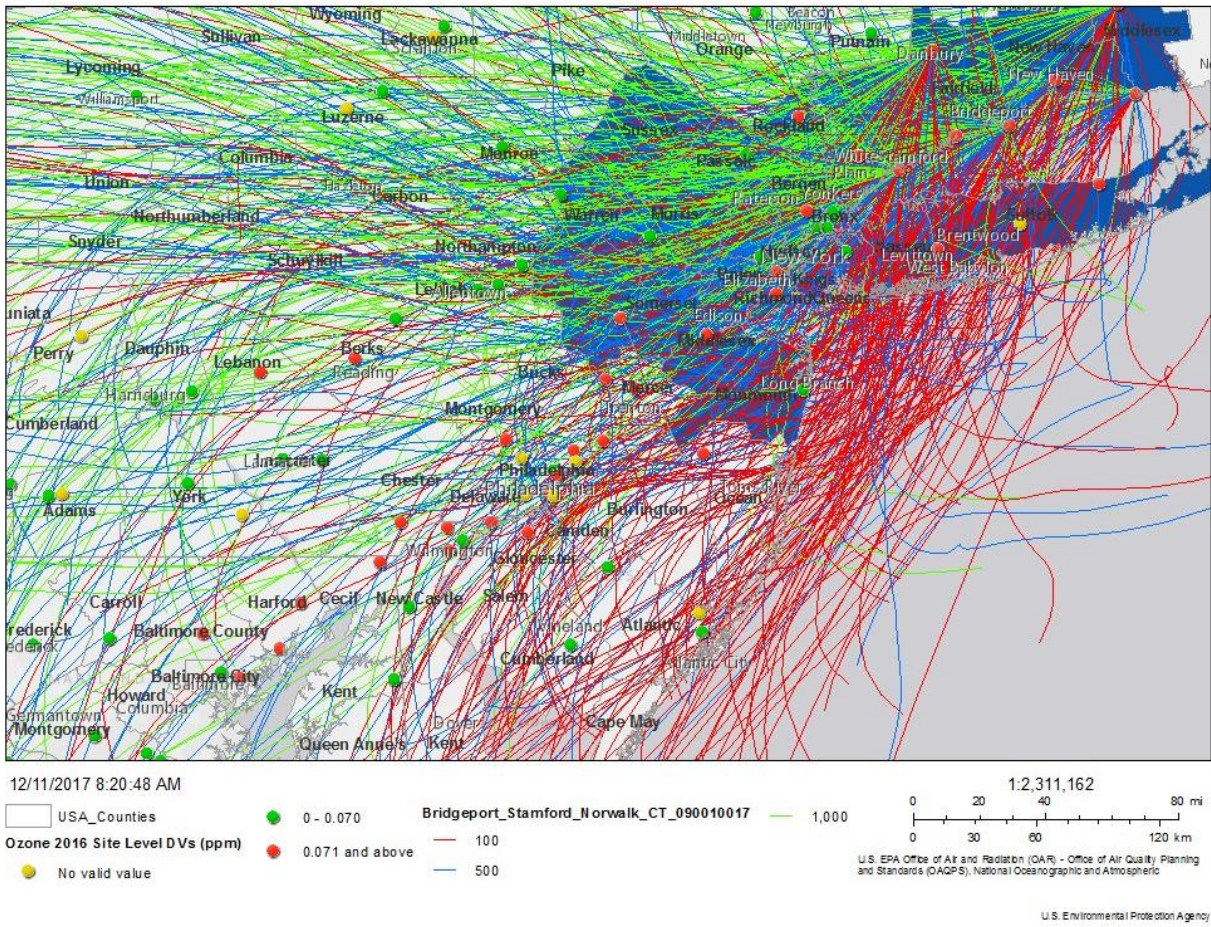


Figure 6c. HYSPLIT Back Trajectories for New York Violating Monitors in the New York Metro Area.

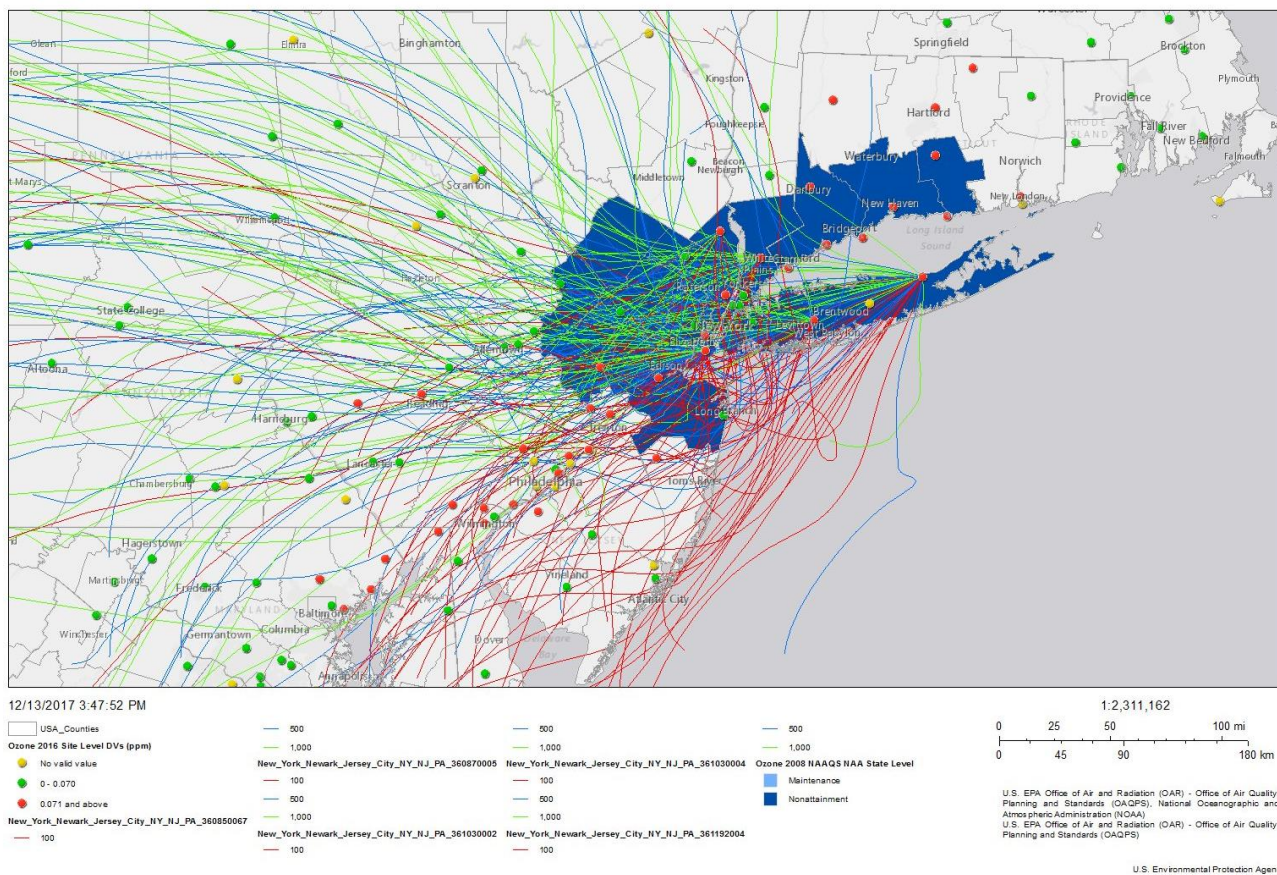


Figure 6d. HYSPLIT Back Trajectories for New Jersey Violating Monitors in the New York Metro Area.¹⁴

¹⁴ HYSPLIT Back Trajectories for Hunterdon, New Jersey AQS Site ID 340190001 is not included because the Hunterdon monitor is now attaining based on concurrence of the exceptional event request.

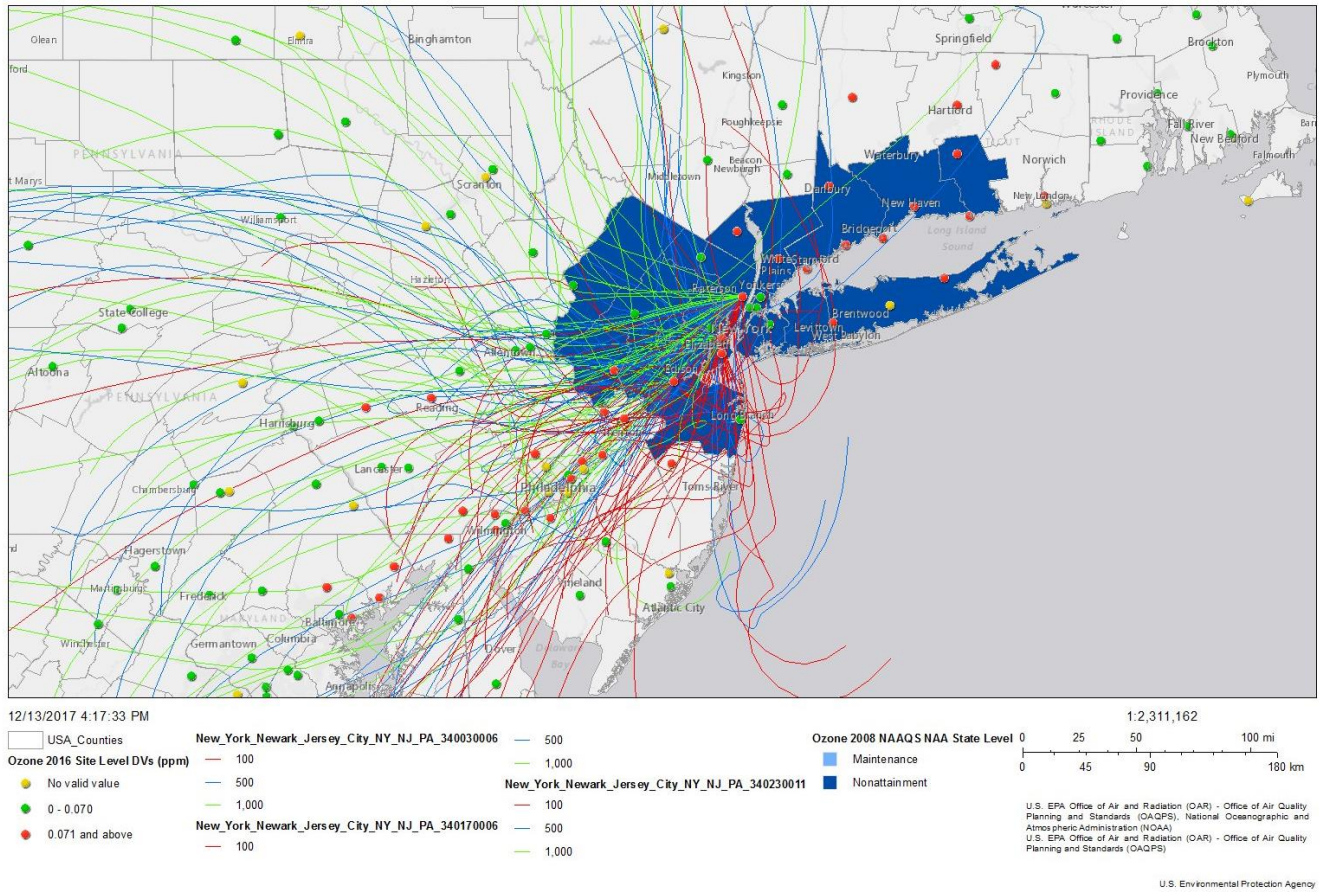


Figure 6e. HYSPLIT Back Trajectories for Fairfield, CT Sherwood Island Connector Violating Monitor.

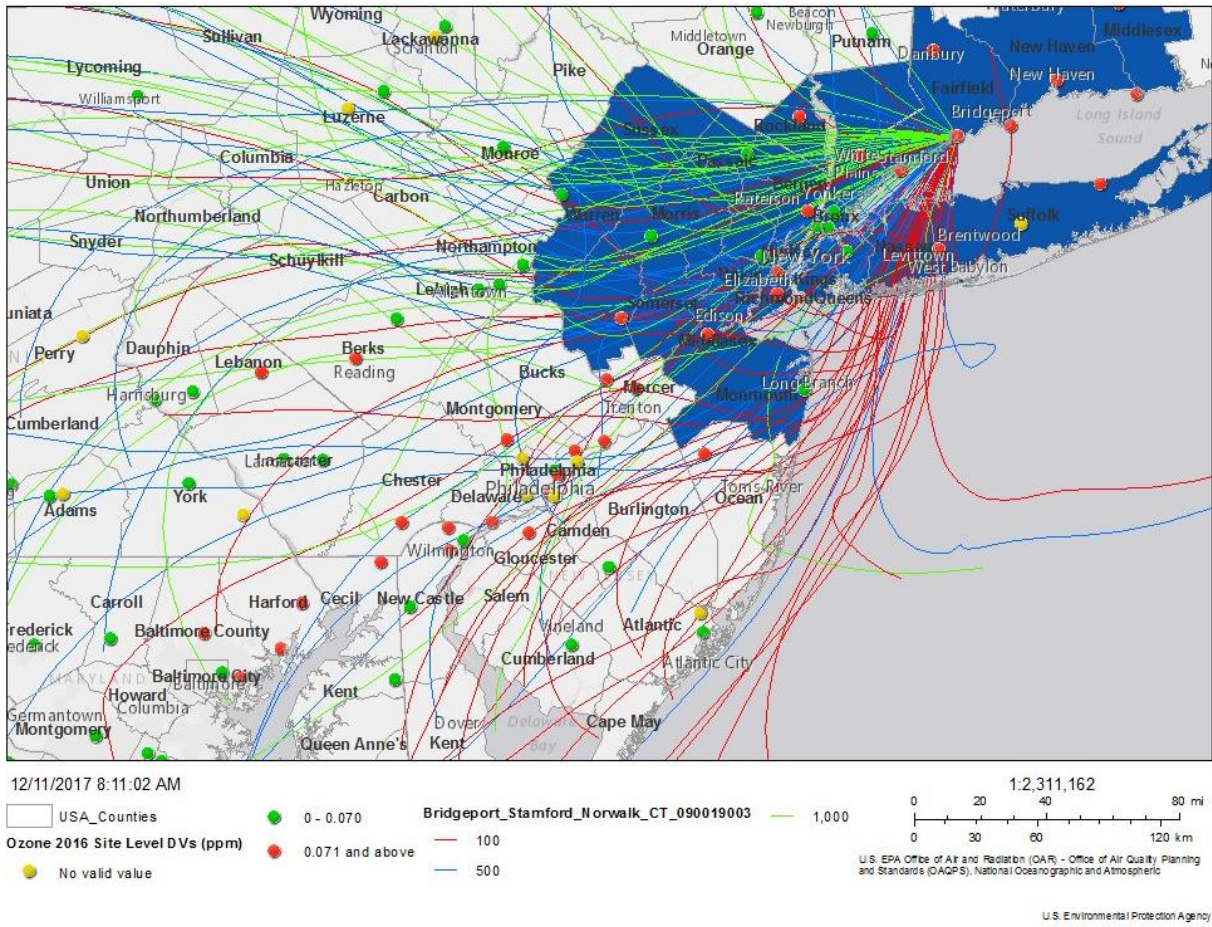
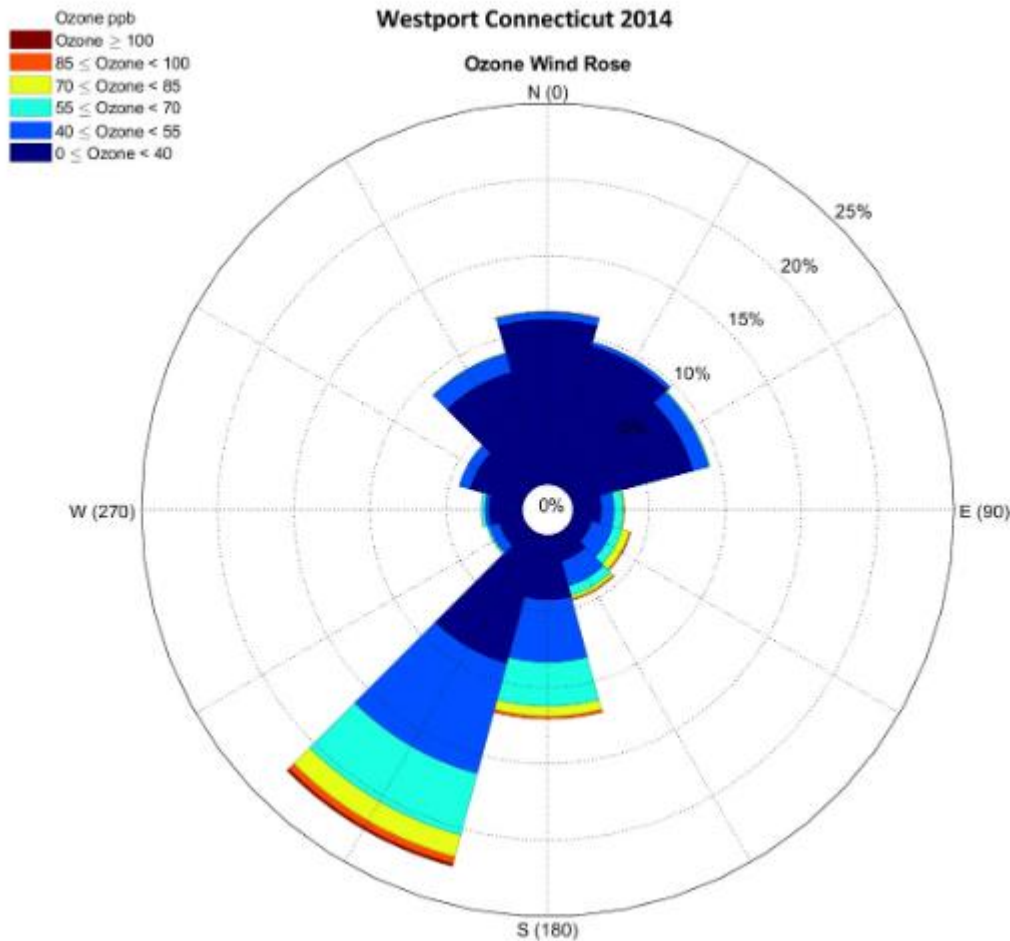


Figure 7. Ozone Concentration/Wind Direction Frequency Plots for a Coastal Monitor (Westport)



When looking at Figures 6a, 6b, 6c, 6d, 6e and 7 we see that the vast majority of high ozone days at the Connecticut peak monitors occur when winds are from the south and southwest directions. The vast majority of high ozone days at the New York and New Jersey violating monitors in the area also occur when winds are from the south and southwest directions.

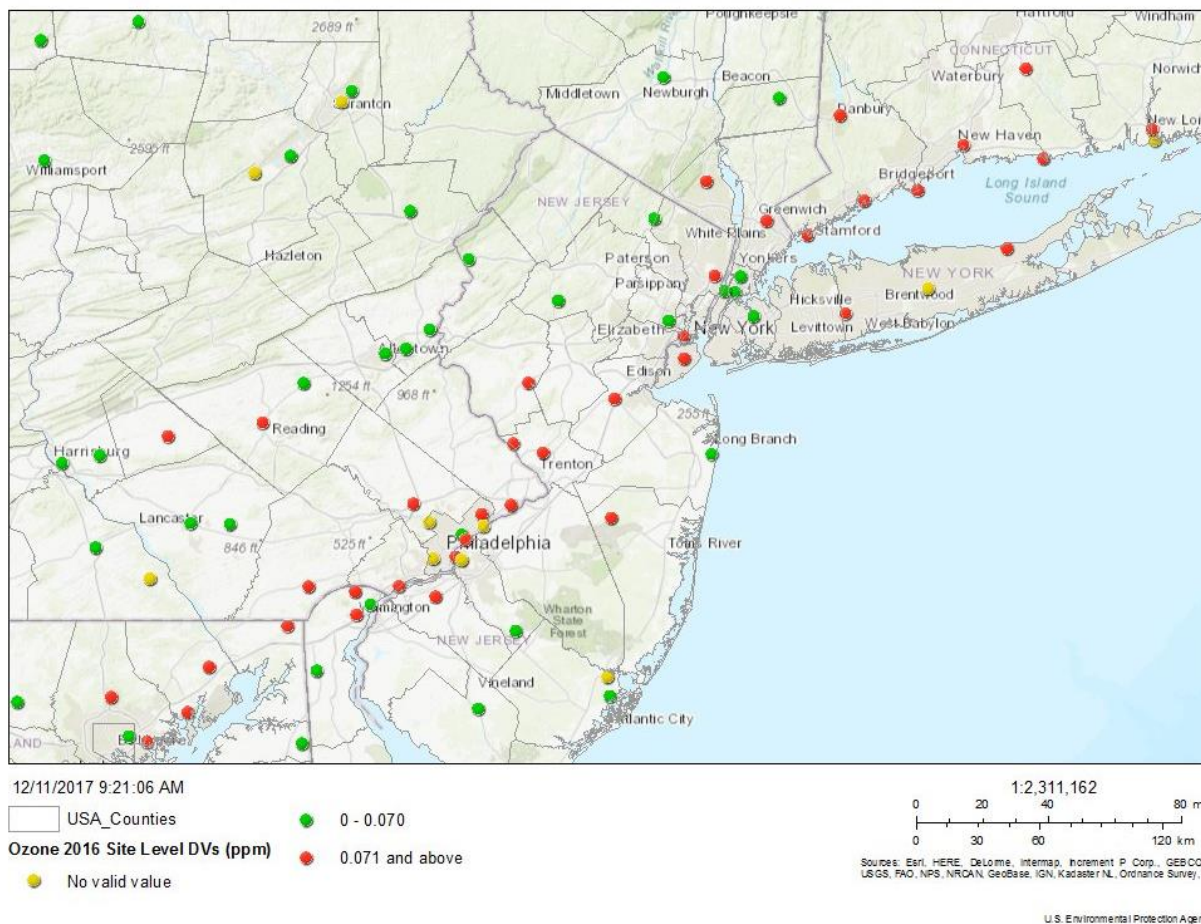
Factor 4: Geography/topography

Consideration of geography or topography can provide additional information relevant to defining nonattainment area boundaries. Analyses should examine the physical features of the land that might define the airshed. Mountains or other physical features may influence the fate and transport of emissions as well as the formation and distribution of ozone concentrations. The absence of any such geographic or topographic features may also be a relevant consideration in selecting boundaries for a given area.

The EPA used geography/topography analysis to evaluate the physical features of the land that might affect the airshed and, therefore, the distribution of ozone over the area.

The New York Metro area does not have any geographical or topographical features significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in this evaluation.

Figure 8. Topographic Illustration of the Physical Features.



Factor 5: Jurisdictional boundaries

Once the EPA determines the geographic extent of the violating area and the nearby area contributing to violations, the EPA considers existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary to carry out the air quality planning and enforcement functions for nonattainment areas. In defining the boundaries of the intended New York Metro nonattainment area, the EPA considered existing jurisdictional boundaries, which can provide easily identifiable and recognized boundaries for purposes of implementing the NAAQS. Examples of jurisdictional boundaries include, but are not limited to: counties, air districts, areas of Indian country, metropolitan planning organizations, and existing nonattainment areas. If an existing jurisdictional boundary is used to help define the nonattainment area, it must encompass all of the area that has been identified as meeting the nonattainment definition. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, the EPA considered other clearly defined and permanent landmarks or geographic coordinates for purposes of identifying the boundaries of the intended designated areas.

The intended New York Metro nonattainment area is in the New York-Newark, NY-NJ-CT-PA CSA with the addition of Middlesex, Connecticut, which is not in the same CSA. Specifically, the area includes 23 of the 35 counties in the CSA and Middlesex County in Connecticut.

The EPA also considered the pre-existing boundaries for the New York Metro area. As noted above, EPA's intended boundary for the nonattainment area is the same as EPA's previously established nonattainment boundaries associated with the 1997 and 2008 ozone NAAQS.

The New York Metro area also includes portions of Indian country. As defined at 18 U.S.C. 1151, "Indian country" refers to: "(a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same." The EPA recognizes the sovereignty of tribal governments, and has attempted to take the input of the tribes into account in establishing appropriate nonattainment area boundaries.

Conclusion for The New York Metro Area

Based on the assessment of factors described above, the EPA has concluded that the following counties meet the CAA criteria for inclusion in the intended New York Metro nonattainment area: Fairfield, New Haven and Middlesex in Connecticut; Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren in New Jersey; and Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland, Suffolk and Westchester in New York. These are the same counties that are included in the New York Metro nonattainment area for the 1997 and 2008 ozone NAAQS. The air quality monitors in the counties of Fairfield, Litchfield, New Haven and Middlesex in Connecticut; Bergen, Hudson, Hunterdon and Middlesex in New Jersey; and Richmond, Rockland, Suffolk (including Shinnecock Indian Nation in Suffolk County) and Westchester in New York indicate violations of the 2015 ozone NAAQS based on the 2016 design values; therefore, these counties are included in the intended nonattainment area. The counties of Essex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren in New Jersey and Bronx, Kings, Nassau, New York and Queens in New York are nearby counties that do not have violating monitors, but the EPA has concluded that these areas contribute to the ozone concentrations in violation of the 2015 ozone NAAQS through emissions from point sources and other non-point sources (e.g., vehicles and other small area sources) and from commuters into the counties with violating monitors.

The counties of Queens, New York, Nassau and Kings in New York; and Essex and Monmouth in New Jersey contribute more than 10,000 tpy of both NO_x and VOC emissions in the area. The counties of Nassau, Queens, Kings and New York in New York; Monmouth, Morris, Essex, Union and Somerset in New Jersey ranked in the top half of Table 5 for 2014 total vehicle miles traveled. Bronx, NY, Passaic, Warren, and Sussex, NJ counties rank in the bottom half for total vehicle miles traveled, have less than 10,000 tpy of emissions, and rank in the bottom half for emissions in Table 3. We are including them in the area because (i) as noted below, there are back trajectories indicating that they do contribute to the design value monitor; (ii) the State recommended that they be included; and (iii), they were included in the New York Metro Area for the 1997 and 2008 ozone NAAQS, so that ease of planning points towards including them in this area for the 2015 ozone NAAQS.

Based on the trajectories and ozone pollution rose, as illustrated in Figures 6a, 6b, 6c, 6d, 6e and 7 we see that the counties of Bronx, Kings, Nassau, New York and Queens in New York and the counties of Essex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren in New Jersey are on the trajectory path for the violating monitors downwind of them. These counties contribute to the ozone on violation days per the HYSPLIT trajectory analysis.

Also, Litchfield County in Connecticut was considered to be part of the Greater Connecticut nonattainment area. When reviewing the meteorology and back trajectories, it is concluded that the Litchfield monitor is downwind of the peak monitors along southern Connecticut and Litchfield County does not contribute to the New York Metro nonattainment area.

The counties of Dutchess, Orange, Putnam and Ulster in New York; Carbon, Lehigh, Monroe, Northampton and Pike in Pennsylvania are being excluded from the New York Metro nonattainment area because they did not contribute more than 10,000 tpy of both NO_x and VOC emissions in the area. They also ranked in the bottom half of Table 5 for 2014 total vehicle miles traveled, except for Orange County, New York. These counties were also not upwind of the peak monitor in Fairfield County, Connecticut. When looking at Figures 6a, 6b, 6c, 6d, 6e and 7 we see that the vast majority of high ozone days at the Connecticut peak monitors occur when winds are from the south and southwest directions. The vast majority of high ozone days at the New York and New Jersey violating monitors in the area also occur when winds are from the south and southwest directions.

EPA also considered the recommendations for boundaries made by the affected states. The state of New York has recommended the same boundary for the 2015 ozone NAAQS as the boundaries for the 1997 and 2008 ozone NAAQS, while Connecticut and New Jersey recommended different boundaries for the 2015 ozone NAAQS. Specifically, Connecticut recommended combining areas in the New York-Newark, NY-NJ-CT-PA CSA with the Philadelphia-Reading-Camden, PA-NJ-DE-MD CSA, and with the addition of Middlesex County in Connecticut, as Figure 1b, above, demonstrates. The area excluded the county of Litchfield in Connecticut and the counties of Dutchess, Orange, Putnam and Ulster in New York. This recommendation would combine several attaining counties in Pennsylvania to the existing nonattainment area. New Jersey recommended combining all of the areas in the Hartford-West Hartford, CT CSA, the New York-Newark, NY-NJ-CT-PA CSA, the Philadelphia-Reading-Camden, PA-NJ-DE-MD CSA, parts of the Harrisburg-York-Lebanon, PA CSA and parts of the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA with the counties of Windham in Connecticut, Sullivan in New York, Sussex in Delaware and Caroline in Maryland, as Figure 1c demonstrates. This recommended area spanned several existing nonattainment and attainment areas in the region.

EPA's intended boundary is further supported by the fact that it is consistent with New York State's recommendation. EPA's intended boundary does not include certain areas recommended by New Jersey and Connecticut in Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland that are outside the New York-Newark, NY-NJ-CT-PA CSA. New Jersey recommended all of the areas that Connecticut recommended that are outside that CSA, as well as additional ones.

Section 107(d) of the CAA requires EPA to designate as nonattainment all areas violating the ozone NAAQS and any *nearby* areas that are contributing to a violation in another area. Under the designation provision, only "nearby" areas that contribute to the violation must be included as part of the nonattainment area. There are other provisions of the CAA that address longer range transport of ozone pollution, such as sections 110(a)(2)(D), 126, and 184. The phenomenon of ozone transport must be balanced against the need to have smaller areas that can focus on local control measures. We note that most of the states that New Jersey and Connecticut seek to include as part of this large nonattainment area did not make a similar request, and that New Jersey's and Connecticut's recommendations differed from each other. While Delaware also requested that EPA designate a broad area in the eastern part of the United States as nonattainment, Delaware's recommendations varied from the New Jersey's and Connecticut's as well. In the absence of broad agreement among all affected states to recommend such a large nonattainment, we do not intend to designate a large nonattainment area as suggested by New Jersey or Connecticut, and instead intend to adhere to a common-sense interpretation of the term "nearby." EPA considered, and rejected, recommendations similar to New Jersey's and Connecticut's in

connection with the boundaries for the New York Metro Area under the 2008 ozone NAAQS. At that time, EPA explained that the CAA “does not require that all contributing areas be designated nonattainment, only the nearby areas,” and that “[r]egional strategies, such as those employed in the Ozone Transport Region and EPA’s NOx SIP Call are needed to address the long-range transport component of ozone nonattainment.” “Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards” (December 4, 2008), at 4; *see Mississippi Commission on Environmental Quality v. EPA*, 790 F.3d 138, 150-51 (D.C. Cir. 2015). The D.C. Circuit upheld EPA’s approach. *Id.* at 151-53.

In addition, we explain in other technical support documents (TSDs)¹⁵ our intended designation of the various counties outside the New York-Newark, NY-NJ-CT-PA CSA that New Jersey and Connecticut recommend be included in the New York Metro Area. For example, although New Jersey and Connecticut recommended that the southern half of New Jersey be included in the New York Metro Area, we explain in the TSD for the Philadelphia-Wilmington-Atlantic City PA-NJ-DE-MD Nonattainment Area that we intend to designate those counties as part of that latter area. Similarly, although New Jersey recommended that certain Maryland counties be included in the New York Metro Area, we explain in the TSD for Maryland that we intend to designate some of those counties as part of the Baltimore, MD nonattainment area, and other of those counties as part of the Washington, DC-MD-VA nonattainment area.

¹⁵ These TSDs are for other proposed 2015 ozone designation actions that EPA is taking at the same time as the present action concerning the New York Metro Area.