

US EPA ARCHIVE DOCUMENT

Technical Support Document (TSD) for 2008 Ozone NAAQS Designations

Connecticut Area Designations for the 2008 Ozone National Ambient Air Quality Standards Greater Connecticut Area

The table below identifies the areas and associated counties or parts of counties in Connecticut that EPA intends to designate as nonattainment for the 2008 ozone national ambient air quality standards (2008 NAAQS). In accordance with section 107(d) of the Clean Air Act, EPA must designate an area (county part of a county) “nonattainment” if it is violating the 2008 ozone NAAQS or if it is contributing to a violation of the 2008 ozone NAAQS in a nearby area. The technical analyses supporting the boundaries for the individual nonattainment areas are provided below.

Intended Ozone Nonattainment Areas in Connecticut (state-wide nonattainment)

Area	Connecticut Recommended Nonattainment Counties	EPA’s Intended Nonattainment Counties
Connecticut Portion of New York-Newark-Bridgeport, NY-NJ-CT area	Fairfield, New Haven and Middlesex	Fairfield, New Haven and Middlesex
Greater Connecticut ¹ area	Hartford, Litchfield, New London, Tolland and Windham	Hartford, Litchfield, New London, Tolland and Windham

EPA intends to designate the entire state of Connecticut as nonattainment. The analysis below provides the basis for intended nonattainment area boundaries. It relies on our analysis of whether and which monitors are violating the 2008 ozone NAAQS, based on certified air quality monitoring data from 2008-2010 and an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas based on a weight of evidence analysis considering the factors identified below. The analysis below provides the basis for intended nonattainment area boundaries for the Greater Connecticut ozone nonattainment area. A separate TSD has been prepared for the rest of Connecticut. The rest of Connecticut will also be designated nonattainment for the 2008 ozone NAAQS, and referred to as the Connecticut portion of the New York-Newark-Bridgeport, NY-NJ-CT ozone nonattainment area. EPA issued guidance on December 4, 2008 that identified these factors as ones EPA would consider in determining nonattainment area boundaries and recommended that states consider these factors in making their designations recommendations to EPA.²

1. Air quality data (including the design value calculated for each FRM or FEM monitor in the area);
2. Emissions and emissions-related data (including location of sources and population, amount of emissions and emissions controls, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography and topography (mountain ranges or other basin boundaries);

¹ Greater Connecticut is a multijurisdictional nonattainment area that includes areas of Indian Country.

² The December 4, 2008 guidance memorandum “Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards” refers to 9 factors. In this technical support document we have grouped the emissions-related factors together under the heading of “Emissions and Emissions-Related Data,” which results in 5 categories of factors.

5. Jurisdictional boundaries (e.g., counties, air districts, existing nonattainment areas, Indian country, metropolitan planning organizations (MPOs))

Ground-level ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Because NO_x and VOC emissions from a broad range of sources over a wide area typically contribute to violations of the ozone standards, EPA believes it is important to consider whether there are contributing emissions from a broad geographic area. Accordingly, EPA chose to examine the 5 factors with respect to the larger of the Combined Statistical Area (CSA) or Core Based Statistical Area (CBSA) associated with the violating monitor(s).³ All data and information used by EPA in this evaluation are the latest available to EPA and/or provided to EPA by states or tribes.

In EPA's designations guidance for the 2008 ozone NAAQS, EPA recommended examining CSA/CBSAs because certain factors used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 ozone NAAQS. EPA used the same basic approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's guidance recommended using the boundary of the county containing the violating monitor as the starting point for considering the nonattainment area's boundary.

Technical Analysis for Greater Connecticut

Figure 1 is a map of the Greater Connecticut intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, CSA/CBSA boundaries, existing nonattainment boundaries and state borders, and major highways.

For purposes of the 1997 8-hour ozone NAAQS, the area's boundaries were the same as the State initially recommended for the 2008 ozone NAAQS and the same as the area we intend to designate as nonattainment for the 2008 ozone NAAQS.

In March 2009, Connecticut recommended that the entire State of Connecticut be designated nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008. In its March 2009 letter, Connecticut recommended that the state be split between two ozone nonattainment areas, with the same boundaries as for the 1997 ozone NAAQS. On October 28, 2011 Connecticut submitted an updated recommendation in which it recommended including all of Connecticut as part of a large multi-state nonattainment area that included all or portions of 17 other States. On November 23, 2011, Connecticut clarified their position that, if EPA does not agree with creating a large 18 state nonattainment area, the State of Connecticut should be split between two 2008 ozone nonattainment areas, with the same boundaries as for the 1997 ozone NAAQS. All ozone data referenced in the recommendations submitted by the State are from Federal Reference Method monitors, sited and operated in accordance with 40 CFR Part 58. (See letter to EPA dated November 23, 2011.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate Hartford, Litchfield, New London, Tolland and Windham Counties as

³ Lists of CBSAs and CSAs and their geographic components are provided at www.census.gov/population/www/metroareas/metrodef.html. The lists are periodically updated by the Office of Management and Budget. EPA used the most recent update, based on 2008 population estimates, issued on December 1, 2009 (OMB Bulletin No. 10-02).

“nonattainment” for the 2008 ozone NAAQS as part of the Greater Connecticut area. EPA intends to designate the remaining three counties in Connecticut (Fairfield, New Haven, and Middlesex counties) as nonattainment, but joined with New York-Newark-Bridgeport, NY-NJ-CT ozone nonattainment area.

Because Connecticut, in its clarifying recommendation of November 23, 2011 is recommending that all areas in the State be designated nonattainment and included in one of two different nonattainment areas, EPA focused its analysis on whether the boundaries for Connecticut’s proposed nonattainment areas for the 2008 eight-hour ozone NAAQS are supported by available data. EPA intends to designate the areas as requested, in the aforementioned letter from Connecticut, in the absence of information strongly supporting that one or more of the counties should be included in an area different than the one recommended by the State.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for Greater Connecticut and Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT Ozone Nonattainment Areas

Area	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Greater Connecticut area	Hartford	Hartford
	Litchfield	Litchfield
	New London	New London
	Tolland	Tolland
	Windham	Windham
Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT area	Fairfield	Fairfield
	New Haven	New Haven
	Middlesex	Middlesex

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in parts per million (ppm)) for air quality monitors in counties in the Greater Connecticut area based on data for the 2008-2010 period (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. A monitor’s DV is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met when the annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years is 0.075 ppm or less. A DV is only valid if minimum data completeness criteria are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the DV for the county or area is determined by the monitor with the highest level.

The 2010 DVs for the ozone NAAQS for counties in the Greater Connecticut ozone nonattainment area and the Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT ozone nonattainment area are shown in Tables 2a and 2b.

Table 2a. Air Quality Data for the Greater Connecticut Ozone Nonattainment Area

County	State Recommended Nonattainment?	2008-2010 Design Value (ppm)
Hartford	Yes	0.074
Litchfield	Yes	0.073 ⁴
New London	Yes	0.076
Tolland	Yes	0.079
Windham	Yes	No monitor in county

Table 2b. Air Quality Data for the Three Counties of the Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT Ozone Nonattainment Area

County	State Recommended Nonattainment?	2008-2010 Design Value (ppm)
Fairfield	Yes	0.081
New Haven	Yes	0.076
Middlesex	Yes	0.077

EPA believes that since Connecticut has recommended the entire state be nonattainment, air quality is not important for purposes of determining in which of the two nonattainment areas these counties should be placed.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions of ozone precursors (NO_x and VOC) and other emissions-related data that provide information on areas contributing to violating monitors.

Emissions Data

EPA evaluated county-level emissions data for NO_x and VOC derived from the 2008 National Emissions Inventory (NEI), version 1.5. This is the most recently available NEI. (See <http://www.epa.gov/ttn/chief/net/2008inventory.html>.) Significant emissions levels in a nearby area would indicate the potential for the area to contribute to observed violations. We will also consider any additional information we receive on changes to emissions levels that are not reflected in recent inventories. These changes include emissions reductions due to permanent and enforceable emissions controls that will be in place before final designations are issued and emissions increases due to new sources.

Tables 3a and 3b show emissions of NO_x and VOC (given in tons per year (tpy)) for violating and potentially contributing counties in the State of Connecticut.

⁴ 2008-2010 ozone data used to compute the Design Value for Litchfield County is incomplete. 40 CFR part 50 Appendix P requires a monitoring site to meet a 3-year data completeness of 90 percent. The Litchfield County monitor is meeting a 3-year data completeness of 89 percent.

Table 3a. Total 2008 NO_x and VOC Emissions for the Greater Connecticut Ozone Nonattainment Area

County	State Recommended Nonattainment?	NO _x (tpy)	VOC (tpy)
Hartford	Yes	20,253	20,808
Litchfield	Yes	3,429	6,115
New London	Yes	8,558	9,160
Tolland	Yes	3,553	3,764
Windham	Yes	3,469	3,626
Areawide:		39,262	43,473

Table 3b. Total 2008 NO_x and VOC Emissions for the Three Counties of the Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT Ozone Nonattainment Area

County	State Recommended Nonattainment?	NO _x (tpy)	VOC (tpy)
Fairfield	Yes	24,983	22,700
New Haven	Yes	20,789	19,705
Middlesex	Yes	4,484	5,130
Three County Total:		50,256	47,535

EPA believes that this factor is not important for purposes of determining in which of the two nonattainment areas these counties should be placed.

Population density and degree of urbanization

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 ozone-creating emissions from on-road and off-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 ozone formation. Rapid population or VMT growth (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Tables 4a and 4b show the population, population density, and population growth information for each county in the state.

Table 4a. Population and Growth for Greater Connecticut Ozone Nonattainment Area

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Hartford	Yes	894,014	1.19	35,575	4.1
Litchfield	Yes	189,927	0.20	7,313	4.0
New London	Yes	274,055	0.39	14,519	5.6
Tolland	Yes	152,691	0.37	15,839	11.6
Windham	Yes	118,428	0.23	9,236	8.5
Areawide:		1,629,115		82,482	

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011

Table 4b. Population and Growth for the Three Counties of the Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT Ozone Nonattainment Area

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Fairfield	Yes	916,829	1.41	32,348	3.7
New Haven	Yes	862,477	1.39	37,492	4.5
Middlesex	Yes	165,676	0.43	10,061	6.5

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011

The population in the Greater Connecticut Ozone Nonattainment Area is growing modestly and the population density is rather high, since the area includes the State capital of Hartford. EPA believes that this factor is not important for purposes of determining in which of the two nonattainment areas these counties should be placed.

Traffic and commuting patterns

EPA evaluated the commuting patterns of residents in the area, as well as the total Vehicle Miles Traveled (VMT) for each county. In combination with the population/population density data and the location of main transportation arteries (Figure 1), 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 indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Tables 5a and b show 2008 VMT for Connecticut.

Table 5a. Traffic for the Greater Connecticut Ozone Nonattainment Area

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Hartford	Yes	8,330
Litchfield	Yes	1,258
New London	Yes	2,916
Tolland	Yes	1,499
Windham	Yes	1,202
Areawide:		15,205

* MOBILE model VMTs are those inputs into the NEI version 1.5.

Table 5b. Traffic for the Three Counties of the Connecticut Portion of the New York-Newark-Bridgeport, NY-NJ-CT Ozone Nonattainment Area

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Fairfield	Yes	7,803
New Haven	Yes	7,248
Middlesex	Yes	1,394

* MOBILE model VMTs are those inputs into the NEI version 1.5.

EPA believes that this factor is not important for purposes of determining in which of the two nonattainment areas these counties should be placed.

Factor 3: Meteorology (weather/transport patterns)

EPA evaluated meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation. During the ozone season the winds are generally southwesterly. The only area downwind of Connecticut that EPA intends to designate to be nonattainment is the Dukes County area of Massachusetts.

EPA believes that this factor is not important for purposes of determining in which of the two nonattainment areas these counties should be placed.

Factor 4: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis evaluates the physical features of the land that might affect the air shed and, therefore, the distribution of ozone over the area. The Greater Connecticut ozone nonattainment area does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in this evaluation.

Factor 5: Jurisdictional boundaries

Once the general areas to be included in the nonattainment area were determined, EPA considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment areas for ozone or other urban-scale pollutants, counties, air districts, townships, metropolitan planning organizations, state lines, Reservations, urban growth boundary, etc. Where existing jurisdictional boundaries are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates were considered.

The Greater Connecticut ozone nonattainment area has previously established nonattainment boundaries associated with 1997 8-hour ozone NAAQS. The state has recommended, in its most recent clarifying letter to EPA dated November 23, 2011, that the boundary for nonattainment areas for the 2008 ozone NAAQS be the same as those that exist for the 1997 8-hour NAAQS. Connecticut's reasoning was to "avoid unnecessary confusion among Connecticut's regulated community and the general public that may otherwise result from having three distinct nonattainment area boundaries within Connecticut for the 2008 8-hour ozone NAAQ." This is the most important factor for determining which Connecticut counties are to be in which Connecticut nonattainment area.

The Greater Connecticut ozone nonattainment area also includes areas 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.” EPA recognizes the sovereignty of tribal governments, and has attempted to take the desires of the tribes into account in establishing appropriate nonattainment area boundaries.

There are two tribes in the Greater Connecticut ozone nonattainment area: Mashantucket Pequot Tribal Nation and the Mohegan Tribe. Neither Tribe submitted a designation recommendation for the 2008 ozone NAAQS. EPA has preliminarily concluded that all of Connecticut, including areas of Indian Country, are nonattainment for the 2008 ozone NAAQS.

EPA Position on the Connecticut Recommendation of a “Super-Regional” Ozone Nonattainment Area for the 2008 Ozone NAAQS

In a letter dated October 28, 2011, Connecticut recommended that EPA designate the entire State as part of a large multi-state nonattainment area including all or portions of 17 other states, and the District of Columbia. Section 107(d) of the Clean Air Act (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 pollutions, 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 Connecticut seeks to include as part of this large nonattainment area did not make a similar request. While a few other states did request that EPA designate a broad area in the eastern part of the United States as nonattainment, each of those recommendations varied from the others. In the absence of broad agreement among a large group of states to create such a large nonattainment area, demonstrating a commitment to work together to address both long-range and local transport of emissions, we do not intend to designate a large nonattainment area as suggested by Connecticut.

Conclusion

Based on the assessment of factors described above, EPA preliminarily proposes to keep the nonattainment boundaries in Connecticut the same for the 2008 ozone NAAQS as for the 1997 ozone NAAQS, to avoid unnecessary confusion, and to aide in planning, permitting, transition and enforcement. The following counties meet the Clean Air Act criteria for inclusion in the Greater Connecticut ozone nonattainment area: Hartford, Litchfield, New London, Tolland and Windham. All of Connecticut will be recommended to be nonattainment. The remaining three counties in Connecticut (Fairfield, New Haven, and Middlesex counties) will be joined with the multi-state New York-Newark-Bridgeport, NY-NJ-CT ozone nonattainment area and are fully discussed in the technical support document for that area.

Figure 1. Map of Greater Connecticut Ozone Nonattainment Area

Greater Connecticut, CT

