# Delaware
# Area Designations for the
# 2008 Ozone National Ambient Air Quality Standards

In March 2009, the State of Delaware recommended a large, multi-state nonattainment area, covering the entire States of Delaware, Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia, plus the District of Columbia. Alternatively, Delaware recommended that the entire State of Delaware be designated as a stand-alone nonattainment area. In October 2011, Delaware updated its recommendations. In that letter, Delaware expanded its recommended large multi-state nonattainment area to include the States of Kentucky, Indiana, Illinois, Missouri, Tennessee, and Wisconsin. In addition, in its October 2011 letter, the State of Delaware specified that if EPA did not accept either of its designation options, then Kent County should not be designated nonattainment. This recommendation is based on 2008-2010 data and preliminary 2009-2011 data.

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 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 Delaware 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 Delaware.

The table below identifies the areas and associated counties or parts of counties in Delaware 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 "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 Nonattainment Areas in Delaware

| Area | Delaware Recommended Nonattainment Counties | EPA's Intended Nonattainment Counties |
|---|---|---|
| Philadelphia-Wilmington-Atlantic City | none | New Castle |
| Seaford | none | Sussex |

The Philadelphia- Wilmington-Atlantic City Area is a multi-state nonattainment area. Table 1 in the Technical Analysis for the Philadelphia- Wilmington-Atlantic City Area, below, identifies the counties in the other states that EPA intends to designate as part of the nonattainment area.

EPA intends to designate the remaining county in Delaware that is not listed in the table above as "unclassifiable/attainment" for the 2008 ozone NAAQS.

The analysis below provides the basis for the 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. 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.[1]

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);
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 (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Because NOx 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) within which is located the violating monitor(s).[2] 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[3] EPA recommended examining CSA/CBSAs because certain factors (such as population) 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.

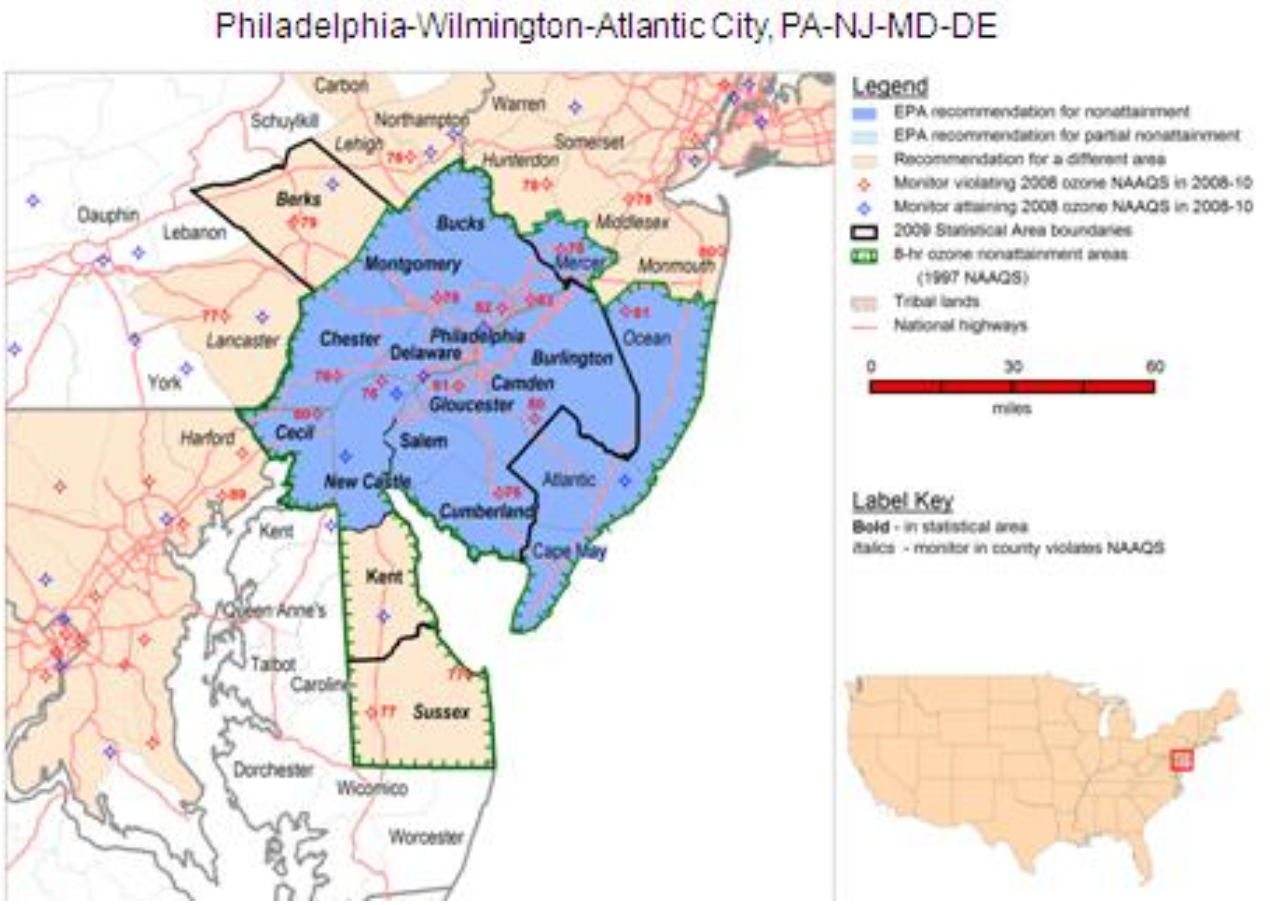
[1] The December 4, 2008 guidance memorandum "Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards" refers to 9 factors. In this technical support document we have grouped the emissions-related factors together under the heading of "Emissions and Emissions-Related Data,"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

[2] 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).

**Technical Analysis for the Philadelphia-Wilmington-Atlantic City Area**

Figure 1 is a map of the Philadelphia-Wilmington-Atlantic City intended nonattainment area (the Philadelphia Area). The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries. The map shows the boundaries of the Philadelphia-Camden-Vineland CSA, the existing nonattainment area boundary for the 1997 ozone NAAQS, and EPA's intended nonattainment boundary for the 2008 ozone NAAQS.

Figure 1.




For purposes of the 1997 8-hour ozone NAAQS, this area was designated nonattainment. The Philadelphia-Wilmington-Atlantic City nonattainment area included the entire counties of Kent, New Castle, and Sussex in Delaware; Cecil in Maryland; Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem in New Jersey; and Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania.

In March 2009, the State of Delaware recommended that no counties in Delaware be included in the Philadelphia Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. Instead, Delaware recommend a large, multi-state nonattainment area, covering the entire States of Delaware, Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia, and the District of Columbia. Alternatively, Delaware recommended that the entire State of Delaware be designated as a stand-alone nonattainment area. In October 2011, Delaware updated its recommendations. In that letter, Delaware expanded its recommended large multi-state

nonattainment area to include the States of Kentucky, Indiana, Illinois, Missouri, Tennessee, and Wisconsin. In addition, in its October 2011 letter, the State of Delaware specified that if EPA did not accept either of its designation options, then Kent County should not be designated nonattainment. This recommendation is based on 2008-2010 data and preliminary 2009-2011 data. The recommendations were based on data from Federal Reference Method (FRM) monitors or Federal Equivalent Method (FEM) monitors sited and operated in accordance with 40 CFR Part 58. (See the March 18, 2009 letter from Governor Jack A. Markell to EPA, received on April 3, 2009; and the October 28, 2011 letter from the Delaware Department of Natural Resources and Environmental Control.)

In March 2009, the State of Maryland recommended that Cecil County be designated as nonattainment as part of the Philadelphia Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. This is the same Maryland County that was included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 ozone NAAQS. This recommendation was based on data from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the March 10, 2009 letter from Governor Martin O'Malley to EPA, received on March 16, 2009.)

In April 2009, the State of New Jersey recommended that the same nine counties in New Jersey that were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 ozone NAAQS be designated as nonattainment in the Philadelphia Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. This recommendation was based on data from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the April 1, 2009 letter from the New Jersey Department of Environmental Protection to EPA.)

In March 2009, the Commonwealth of Pennsylvania recommended that the same five counties in Pennsylvania that were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 ozone NAAQS be designated as nonattainment in the Philadelphia Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. Pennsylvania provided an update to the original recommendation in November 2011 based on air quality data from 2009-2011. That recommendation was to remove Chester and Delaware Counties from the Philadelphia Area, and designate those counties as attainment. This recommendation was based on data from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the March 17, 2009 and November 22, 2011 letters from the Pennsylvania Department of Environmental Protection to EPA.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate 16 counties in Delaware, Maryland, New Jersey, and Pennsylvania (identified in Table 1 below) as "nonattainment" for the 2008 ozone NAAQS as the Philadelphia Area nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for the Philadelphia Area.

| Philadelphia | State-Recommended Nonattainment Counties | EPA Intended Nonattainment Counties |
|---|---|---|
| Delaware | None | New Castle |
| Maryland | Cecil | Cecil |
| New Jersey | Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, | Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, |

| | | |
|---|---|---|
| | and Salem | Mercer, Ocean, and Salem |
| Pennsylvania | Bucks, Montgomery, and Philadelphia | Bucks, Chester, Delaware, Montgomery, and Philadelphia |

**Factor Assessment**

The counties evaluated in this analysis include all counties in the Philadelphia-Camden-Vineland CSA plus the counties outside the CSA that were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 ozone NAAQS.

## *Factor 1: Air Quality Data*

For this factor, we considered 8-hour ozone design values (in parts per billion (ppb)) for air quality monitors in counties in the Philadelphia 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.

Note: Monitors that are eligible for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are sited in accordance with 40 CFR Part 58, Appendix D (Section 4.1) and operating with a federal reference method (FRM) or federal equivalent method (FEM) monitor that meets the requirements of 40 CFR part 58, appendix A. All data from a special purpose monitor (SPM) using an FRM or FEM which has operated for more than 24 months is eligible for comparison to the NAAQS unless the monitoring agency demonstrates that the data came from a particular period during which the requirements of appendix A (quality assurance requirements) or appendix E (probe and monitoring path siting criteria) were not met.

The 2010 DVs for the ozone NAAQS for counties in the Philadelphia-Camden-Vineland CBSA and several nearby surrounding area are shown in Table 2.

Table 2. Air Quality Data.

| County | State Recommended Nonattainment? | 2010 8-hour Ozone DV (ppb) |
|---|---|---|
| Atlantic, NJ | Yes | 74 |
| Berks, PA | Yes, other area | 79 |
| Bucks, PA | Yes | 83 |
| Burlington, NJ | Yes | -- |
| Camden, NJ | Yes | 80 |
| Cape May, NJ | Yes | -- |
| Cecil, MD | Yes | 80 |
| Chester, PA | No | 76 |
| Cumberland, NJ | Yes | 76 |
| Delaware, PA | No | 74 |

| | | |
|---|---|---|
| Gloucester, NJ | Yes | 81 |
| Kent, DE | No | 74 |
| Mercer, NJ | Yes | 78 |
| Montgomery, PA | Yes | 78 |
| New Castle, DE | Yes, other area | 76 |
| Ocean, NJ | Yes | 81 |
| Philadelphia, PA | Yes | 82 |
| Salem, NJ | Yes | -- |
| Sussex, DE | Yes, other area | 77 |

Note: Counties with no ozone monitor are identified with "--" in the 2010 8-hour Ozone DV column.

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area nonattainment if it is violating the 2008 ozone NAAQS. New Castle and Sussex Counties in Delaware, Cecil County, Maryland; Berks, Bucks, Montgomery, and Philadelphia Counties in Pennsylvania; and several counties in New Jersey show violations of the 2008 ozone NAAQS. Therefore, these counties must be included in a 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.

## *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 emission 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 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.

Table 3 shows emissions of $NO_x$ and VOC (given in tons per year) for violating and potentially contributing counties in the Philadelphia Area.

Table 3. Total 2008 $NO_x$ and VOC Emissions.

| County | State Recommended Nonattainment? | $NO_x$ (tpy) | VOC (tpy) |
|---|---|---|---|
| Atlantic, NJ | Yes | 6,143 | 10,713 |
| Berks, PA | Yes, other area | 18,908 | 15,918 |
| Bucks, PA | Yes | 17,736 | 21,160 |

| | | | |
|---|---|---|---|
| Burlington, NJ | Yes | 10,919 | 12,909 |
| Camden, NJ | Yes | 12,725 | 10,731 |
| Cape May, NJ | Yes | 6,407 | 7,774 |
| Cecil, MD | Yes | 4,763 | 3,715 |
| Chester, PA | No | 16,806 | 16,351 |
| Cumberland, NJ | Yes | 4,916 | 5,727 |
| Delaware, PA | No | 28,118 | 15,881 |
| Gloucester, NJ | Yes | 18,335 | 11,756 |
| Kent, DE | No | 7,667 | 5,381 |
| Mercer, NJ | Yes | 9,909 | 8,160 |
| Montgomery, PA | Yes | 22,741 | 26,372 |
| New Castle, DE | Yes, other area | 22,633 | 14,133 |
| Ocean, NJ | Yes | 9,909 | 19,572 |
| Philadelphia, PA | Yes | 33,176 | 32,021 |
| Salem, NJ | Yes | 6,106 | 3,308 |
| Sussex, DE | Yes, other area | 14,870 | 9,972 |

Philadelphia County, PA has the highest NOx and VOC emissions in the area of analysis. Other counties with comparatively high emissions are New Castle County in Delaware; and Delaware and Montgomery Counties in Pennsylvania. Counties with comparatively low emissions are Kent County, Delaware; Cecil County, Maryland; and several counties in New Jersey.

**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. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

| County | State Recommended Nonattainment? | 2010 Population | 2010 Population Density (1000 pop/sq mi) | Absolute change in population (2000-2010) | Population % change (2000-2010) |
|---|---|---|---|---|---|
| Atlantic, NJ | Yes | 274,549 | 0.45 | 21,569 | +9% |
| Berks, PA | Yes, other area | 411,442 | 0.48 | 36,945 | +10% |
| Bucks, PA | Yes | 625,249 | 1.01 | 25,841 | +4% |
| Burlington, NJ | Yes | 448,734 | 0.55 | 24,255 | +6% |
| Camden, NJ | Yes | 513,657 | 2.26 | 6,064 | +1% |
| Cape May, NJ | Yes | 97,265 | 0.34 | (5,043) | -5% |
| Cecil, MD | Yes | 101,108 | 0.27 | 14,643 | +17% |
| Chester, PA | No | 498,886 | 0.66 | 63,107 | +14% |
| Cumberland, NJ | Yes | 156,898 | 0.31 | 10,547 | +7% |
| Delaware, PA | No | 558,979 | 2.93 | 6,938 | +1% |
| Gloucester, NJ | Yes | 288,288 | 0.86 | 31,962 | +12% |

| | | | | | |
|---|---|---|---|---|---|
| Kent, DE | No | 162,310 | 0.27 | 35,200 | +28% |
| Mercer, NJ | Yes | 366,513 | 1.60 | 14,979 | +4% |
| Montgomery, PA | Yes | 799,874 | 1.64 | 48,936 | +7% |
| New Castle, DE | Yes, other area | 538,479 | 1.11 | 36,620 | +7% |
| Ocean, NJ | Yes | 576,567 | 0.76 | 62,913 | +12% |
| Philadelphia, PA | Yes | 1,526,006 | 10.71 | 12,194 | +1% |
| Salem, NJ | Yes | 66,083 | 0.19 | 1,867 | +3% |
| Sussex, DE | Yes, other area | 197,145 | 0.20 | 39,710 | +25% |

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011. (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.STO5&prodType=table)

Philadelphia County, Pennsylvania has the highest population and population density in the area of analysis. Bucks, Chester, Montgomery, and Delaware Counties, in Pennsylvania and New Castle County in Delaware also have comparatively large populations compared to Kent County, Delaware and several counties in New Jersey with comparatively small populations and population densities. Most counties in the analysis have experienced some population growth.

**Traffic and commuting patterns**

EPA evaluated the total Vehicle Miles Traveled (VMT) for each county in the area. In combination with the population/population density data and the location of main transportation arteries (see Figure 1, above), this information helps identify the probable location of non-point source emissions. A county with high VMT 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. Table 5 shows total 2008 VMT for each county.

Table 5. Traffic (VMT) Data.

| County | State Recommended Nonattainment? | 2008 VMT* (million miles) |
|---|---|---|
| Atlantic, NJ | Yes | 2,863 |
| Berks, PA | Yes, other area | 3,335 |
| Bucks, PA | Yes | 5,021 |
| Burlington, NJ | Yes | 4,524 |
| Camden, NJ | Yes | 3,923 |
| Cape May, NJ | Yes | 1,040 |
| Cecil, MD | Yes | 1,350 |
| Chester, PA | No | 4,410 |
| Cumberland, NJ | Yes | 1,163 |
| Delaware, PA | No | 3,782 |
| Gloucester, NJ | Yes | 2,645 |
| Kent, DE | No | 1,565 |
| Mercer, NJ | Yes | 3,306 |
| Montgomery, PA | Yes | 6,883 |

| | | |
|---|---|---|
| New Castle, DE | Yes, other area | 5,266 |
| Ocean, NJ | Yes | 3,834 |
| Philadelphia, PA | Yes | 5,955 |
| Salem, NJ | Yes | 992 |
| Sussex, DE | Yes, other area | 2,122 |

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

New Castle County, Delaware; and Bucks, Montgomery, and Philadelphia Counties in Pennsylvania have the highest VMT in the area of analysis. Kent County, Delaware; Cecil County, Maryland; and several counties in New Jersey have relatively low VMT.

Table 6. County to County Worker Flow.

| **Residence County →** | Kent, DE | New Castle, DE | Sussex, DE | Cecil, MD | Berks, PA | Bucks, PA | Chester, PA | Delaware, PA | Montgomery, PA | Philadelphia, PA |
|---|---|---|---|---|---|---|---|---|---|---|
| **Workplace County ↓** | | | | | | | | | | |
| Kent, DE | 47,455 | 3,927 | 5,704 | 186 | 157 | 18 | 131 | 112 | 41 | 65 |
| New Castle, DE | 6,058 | 209,742 | 1,119 | 14,059 | | 493 | 12,976 | 9,002 | 1,201 | 1,856 |
| Sussex, DE | 3,779 | 319 | 52,073 | 33 | | | 29 | 15 | 6 | 39 |
| Cecil, MD | 243 | 3,379 | 42 | 18,446 | | 18 | 557 | 192 | | 52 |
| Atlantic, NJ | 11 | 142 | | 31 | 4 | 172 | 73 | 231 | 181 | 831 |
| Burlington, NJ | 40 | 475 | 25 | 27 | 40 | 4,250 | 426 | 1,306 | 1,559 | 5,087 |
| Camden, NJ | 55 | 434 | 10 | 72 | 27 | 2,039 | 539 | 2,287 | 1,844 | 7,196 |
| Cape May, NJ | | 27 | 20 | | 13 | 54 | 81 | 118 | 95 | 324 |
| Cumberland, NJ | 26 | 164 | 5 | 19 | | 42 | 24 | 103 | 66 | 140 |
| Gloucester, NJ | | 750 | 19 | 82 | 16 | 362 | 411 | 1,251 | 405 | 1,502 |
| Mercer, NJ | 10 | 78 | 12 | 7 | 37 | 20,812 | 222 | 345 | 1,298 | 1,676 |
| Ocean, NJ | | 13 | 30 | 8 | 5 | 220 | 23 | 10 | 13 | 86 |
| Salem, NJ | 32 | 1,841 | 11 | 139 | | 37 | 155 | 245 | 59 | 84 |
| Berks, PA | | 4 | 48 | 5 | 140,819 | 410 | 1,916 | 187 | 4,231 | 243 |
| Bucks, PA | 12 | 261 | 12 | 22 | 675 | 168,090 | 1,133 | 2,060 | 23,722 | 23,248 |
| Chester, PA | 37 | 4,738 | 33 | 941 | 5,596 | 3,036 | 137,678 | 18,504 | 25,006 | 7,810 |
| Delaware, PA | 125 | 8,150 | 61 | 373 | 505 | 2,754 | 17,870 | 137,988 | 11,758 | 21,802 |
| Montgomery, PA | 27 | 1,851 | 53 | 176 | 12,727 | 48,414 | 25,673 | 28,144 | 245,619 | 59,970 |
| Philadelphia, PA | 83 | 5,386 | 131 | 254 | 702 | 31,892 | 10,568 | 48,151 | 54,576 | 429,667 |

Source: US Census Bureau County-To-County Worker Flow Files
http://www.census.gov/population/www/cen2000/commuting/index.html

Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania have the highest numbers of commuters to other counties in the Philadelphia-Camden-Vineland CSA. New Castle County, Delaware, Cecil County, Maryland, and Berks County, Pennsylvania have moderate numbers of commuters into other counties in the CSA. Sussex and Kent Counties in Delaware, which are not in the Philadelphia-Camden-Vineland CSA, have the fewest commuters into the CSA.

## *Factor 3: Meteorology (weather/transport patterns)*

EPA evaluated available meteorological data, consisting of 30-year average summertime wind directions from the National Weather Service, 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.

The highest ozone design values, over 80 ppb, are in Bucks and Philadelphia Counties, in

Pennsylvania, and Ocean County in New Jersey. The winds during the ozone season come predominantly from the southwest. This indicates that emissions from Chester and Delaware Counties in Pennsylvania; New Castle County, Delaware; Cecil County, Maryland; and counties in southwest New Jersey contribute to the downwind violations in Bucks and Philadelphia Counties during most of the ozone season. Considering prevailing wind patterns and the location of the highest violating monitors, Berks County, Pennsylvania and Kent and Sussex Counties in Delaware are unlikely to contribute to downwind violations during most of the ozone season.

### *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 airshed and, therefore, the distribution of ozone over the area.

The Philadelphia Area does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, there are no barriers to contribution from upwind areas.

### *Factor 5: Jurisdictional boundaries*

EPA considers existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and so that areas designated nonattainment have the legal authority and cooperative planning necessary to 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 are used.

The major jurisdictional boundaries in the Philadelphia-Wilmington-Atlantic area are the state lines between Pennsylvania, Delaware, and New Jersey. Air-quality monitors that violate the 2008 8-hour ozone NAAQS in the Philadelphia Area are located in Delaware, Maryland, New Jersey, and Pennsylvania.

The Philadelphia-Camden-Vineland CSA consists of New Castle County, Delaware; Cecil County, Maryland; Burlington, Camden, Cumberland, Gloucester, and Salem Counties in New Jersey, and Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania. All those counties, except for Berks County, Pennsylvania are included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 8-hour ozone NAAQS. The nonattainment area also includes Kent and Sussex Counties, Delaware and Atlantic, Cape May, Mercer, and Ocean Counties, New Jersey.

Mercer and Ocean Counties, New Jersey are part of the New York-Newark-Bridgeport, NY-NJ-CT-PA CSA. Atlantic County makes up the Atlantic City-Hammonton, NJ MSA. Cape May County makes up the Ocean City, NJ MSA. In Delaware, Kent County, Delaware makes up the Dover MSA and Sussex County makes up the Seaford Micropolitan Statistical Area.

The Delaware Valley Regional Planning Commission (DVRPC), the metropolitan planning organization (MPO) in the Philadelphia Area, serves Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania, and Burlington, Camden, Gloucester, and Mercer Counties in New Jersey. New Castle County, DE and Cecil County, Maryland are in a separate MPO, the Wilmington Area Planning Council (WILMAPCO).

Delaware

New Castle County has historically been part of the Philadelphia nonattainment area for ozone (1-hour and 8-hour) and fine particulate matter ($PM_{2.5}$). New Castle County is part of the Wilmington, DE-MD-NJ Metropolitan Division of the Philadelphia-Camden-Wilmington Metropolitan Statistical Area (MSA) in the Philadelphia-Camden-Vineland CSA. Being part of a statistical area indicates that counties are linked through employment and commuting. According to the Office of Management and Budget's "Standards for Defining Metropolitan and Micropolitan Statistical Areas," published in the Federal Register on December 27, 2000 (65 FR 82228), the "general concept of a Metropolitan Statistical Area or a Micropolitan Statistical Area is that of an area containing a recognized population nucleus and adjacent communities that have a high degree of integration with that nucleus." Delaware, Pennsylvania, Maryland and New Jersey have a long history of working cooperatively through the Ozone Transport Commission (OTC) and the Mid-Atlantic Northeast Visibility Union (MANE-VU) with ozone attainment planning. Furthermore, the two local MPOs, DVRPC and WILMAPCO, have worked together for decades.

Kent and Sussex Counties are less connected to the Philadelphia Area. They are not part of the Philadelphia-Camden-Vineland CSA. Kent County makes up the Dover MSA, and Sussex County makes up the Seaford Micropolitan Statistical Area. The Dover/Kent County MPO is the planning organization for Kent County, Delaware. This MPO covers 20 municipalities including all of Smyrna, which is also in New Castle County and all of Milford, which is also in Sussex County. Planning for Sussex County is done by the Sussex County Planning and Zoning Commission While Kent County was part of the Philadelphia-Wilmington-Trenton nonattainment area for the 1-hour ozone NAAQS, Sussex County was a separate nonattainment area.

Maryland

Cecil County has historically been part of the Philadelphia nonattainment area for ozone (1-hour and 8-hour) and $PM_{2.5}$. Cecil County is part of the Wilmington, DE-MD-NJ Metropolitan Division of the Philadelphia-Camden-Wilmington MSA in the Philadelphia-Camden-Vineland CSA. Maryland, Delaware, Pennsylvania, and New Jersey have a long history of working cooperatively through the OTC and MANE-VU and with ozone attainment planning. Furthermore, the two local MPOs, DVRPC and WILMAPCO, have worked together for decades.

Pennsylvania

Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties have historically been part of the Philadelphia nonattainment area for ozone (1-hour and 8-hour) and $PM_{2.5}$. These five counties are part of the Philadelphia, PA Metropolitan Division of the Philadelphia-Camden-Wilmington MSA in the Philadelphia-Camden-Vineland CSA. These counties are part of DVRPC, the main MPO for the Philadelphia Area.

Berks County is less connected to Philadelphia. While it was added to the Philadelphia-Camden-Vineland CSA in December 2005, it's in a separate MSA, the Reading, PA MSA. Berks County has historically not been part of the Philadelphia nonattainment area for 8-hour ozone and $PM_{2.5}$, but has

been designated separately as the Reading area. Berks County was designated attainment/unclassifiable for 1-hour ozone. In addition, Berks County is covered by a separate MPO, the Berks County Planning Commission.

## Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Philadelphia-Camden-Atlantic City nonattainment area: New Castle County, Delaware; Cecil County, Maryland; Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem Counties in New Jersey; and Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania. The Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 8-hour ozone NAAQS included these same counties, plus Kent and Sussex Counties in Delaware. New Castle County in Delaware; Cecil County in Maryland; and Berks, Bucks, Montgomery, and Philadelphia Counties in Pennsylvania show violations of the 2008 ozone NAAQS.[4] Maryland and Pennsylvania have requested that these violating counties in their respective States be included as part of the Philadelphia nonattainment area, which is consistent with their inclusion of that area for the 1-hour and 1997 8-hour NAAQS and the PM2.5 NAAQS. Additionally, we think the factors above support inclusion of these counties in that nonattainment area. Therefore, we intend to include them as part of the Philadelphia nonattainment area for the 2008 ozone NAAQS.

New Castle County, Delaware has relatively high emissions, high population, and high VMT. Considering prevailing winds from the southwest, this county likely contributes to downwind violations of the ozone NAAQS in the Philadelphia Area. Furthermore, New Castle County is part of the Philadelphia-Wilmington-Atlantic City 8-hour ozone nonattainment area and the Philadelphia-Camden-Vineland CSA. New Castle County has a moderate degree of commuting into the other counties in the CSA, including over 24,000 commuters into Cecil, Chester, Delaware, Montgomery, and Philadelphia Counties. Therefore, EPA intends to designate New Castle County as nonattainment as part of the Philadelphia Area.

Chester and Delaware Counties in Pennsylvania are part of the Philadelphia, PA Metropolitan Division of the Philadelphia-Camden-Wilmington MSA in the Philadelphia-Camden-Vineland CSA. These counties have been historically part of the Philadelphia nonattainment areas for ozone (8-hour and 1-hour) and $PM_{2.5}$ and are linked together with significant commuting throughout the 5 counties. These counties have relatively high populations and population densities. Delaware County has the second highest NOx emissions in the areas of analysis and among the highest VOC emissions. Taking into account the prevailing winds during the ozone season are predominantly from the southwest, emissions from Chester and Delaware Counties likely contribute to downwind violations in Bucks and Philadelphia Counties during most of the ozone season. Considering all these factors, EPA has concluded that Chester and Delaware Counties should be included in the Philadelphia Area.

In addition, monitors in Sussex County, Delaware and Berks County, Pennsylvania show violations of the 2008 ozone NAAQS and must be designated nonattainment. We believe that Sussex County, Delaware and Berks County, Pennsylvania should be designated as in separate nonattainment areas, and explained below.

[4] We discuss our conclusions as to the New Jersey counties in a Technical Analysis for the Philadelphia-Wilmington-Atlantic City Area sent to the State of New Jersey from EPA Region II.

Berks County, Pennsylvania has a violating monitor, but relatively moderate emissions, population, and VMT. There is some commuting from Berks County to the other counties in the Philadelphia Area, and Berks County is part of the Philadelphia-Camden-Vineland CSA. However, Berks County has historically been a separate ozone and PM2.5 nonattainment area. The County's MPO, the Berks County Planning Commission, is separate from the Philadelphia Area's MPO, DVRPC. Furthermore, meteorology indicates that on typical summer days when the violating monitors are experiencing exceedances of the ozone NAAQS, emissions from Berks County are not upwind of those monitors in the Philadelphia Area and thus we believe emissions from Berks County do not significantly contribute to nonattainment at those monitors. Therefore, EPA has preliminarily concluded that Berks County should not be included in the Philadelphia Area, and should be designated as nonattainment in a separate area[5].

Sussex County, Delaware has a monitor that is violating the 2008 ozone NAAQS. It has moderate emissions and population in the area as compared with the other counties in the area of analysis. It is not part of the Philadelphia-Camden-Vineland CSA. Furthermore, considering prevailing winds from the southwest and the location of the highest violating monitors in the Philadelphia Area, it is not likely that Sussex County is contributing significantly to the Philadelphia Area. Therefore, EPA has preliminarily concluded that Sussex County should not be included in the Philadelphia Area, and should be designated as nonattainment in a separate area[6].

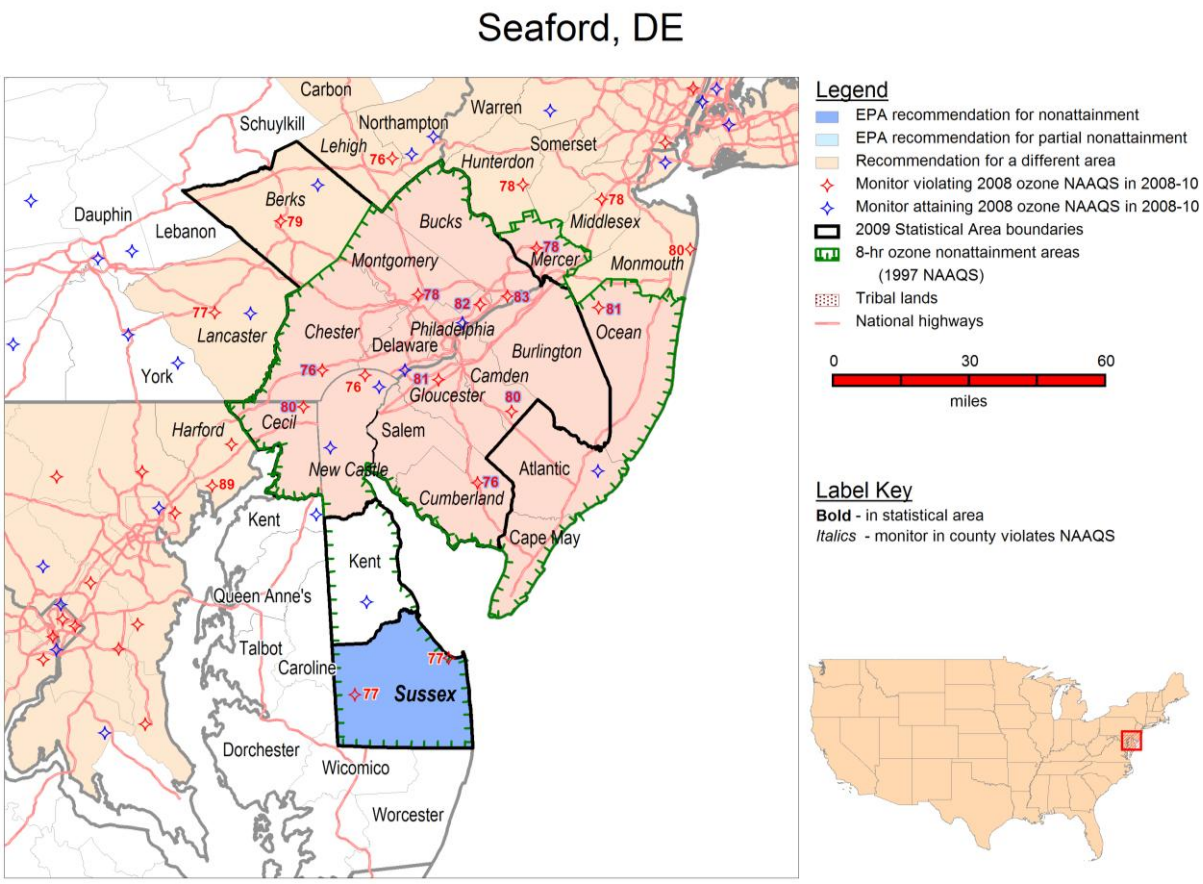
Kent County, Delaware has a monitor that meets the 2008 8-hour ozone NAAQS. This county has comparatively low emissions, population and VMT, and is not part of the Philadelphia-Camden-Vineland CSA. Therefore, EPA has preliminarily concluded that Kent County should not be included in the Philadelphia Area, and should be designated as unclassifiable/attainment.

[5] See EPA's Technical Analysis for the Reading Area, sent to the Commonwealth of Pennsylvania by EPA Region III.
[6] See EPA's Technical Analysis for the Seaford Area, sent to the State of Delaware by EPA Region III.

**Technical Analysis for the Seaford Area**

Figure 1 is a map of the intended Seaford nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries. The map shows the boundaries of the Seaford Micropolitan Statistical Area (Sussex County, Delaware), the Dover Metropolitan Statistical Area (MSA) (Kent County, Delaware), the Philadelphia-Camden-Vineland CSA, the existing nonattainment area boundary for the 1997 ozone NAAQS, and EPA's intended nonattainment boundary for the 2008 ozone NAAQS.

Figure 1.




For purposes of the 1997 ozone NAAQS, the entire State of Delaware, including the Seaford Area, was designated nonattainment and was included in the Philadelphia-Wilmington-Atlantic City nonattainment area.

In March 2009, the State of Delaware recommended a large, multi-state nonattainment area, covering the entire States of Delaware, Maryland, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia, and the District of Columbia. Alternatively, Delaware recommended that the entire State of Delaware be designated as a stand-alone nonattainment area. In October 2011, Delaware updated its recommendations. In that letter, Delaware expanded its recommended large multi-state nonattainment area to include the States of Kentucky, Indiana, Illinois, Missouri, Tennessee, and Wisconsin. In addition, in its October 2011 letter, the State of Delaware specified that if EPA did not accept either of its designation options, then Kent County should not be designated nonattainment. This recommendation is based on 2008-2010 data

and preliminary 2009-2011 data. The recommendations were based on data from Federal Reference Method (FRM) monitors or Federal Equivalent Method (FEM) sited and operated in accordance with 40 CFR Part 58. (See the March 18, 2009 letter from Governor Jack A. Markell to EPA, received on April 3, 2009; and the October 28, 2011 letter from the Delaware Department of Natural Resources and Environmental Control.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate one county in Delaware, Sussex County (identified in Table 1 below) as "nonattainment" for the 2008 ozone NAAQS as part of a newly designated Seaford nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for the Seaford Area.

| Seaford | State-Recommended Nonattainment Counties | EPA Intended Nonattainment Counties |
|---|---|---|
| Delaware | None | Sussex |

**Factor Assessment**

The area covered by this analysis is the Seaford Micropolitan Statistical Area (Sussex County, Delaware) and surrounding counties.

## *Factor 1: Air Quality Data*

For this factor, we considered 8-hour ozone design values (DV) (in parts per billion (ppb)) for air quality monitors in the county in the Seaford Area (Sussex County, Delaware) and counties in the nearby surrounding 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 DV.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM or FEM monitor. All data from Special Purpose Monitors (SPM) using an FRM or FEM are 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 given in 71 FR 61236 to 61328 in order to be acceptable for comparison to 2008 ozone NAAQS for designation purposes.

The 2010 DVs for the ozone NAAQS for counties in the Seaford Area (Sussex County, Delaware) and nearby surrounding area are shown in Table 2.

Table 2. Air Quality Data.

| County | State Recommended Nonattainment? | 2010 8-hour Ozone DV (ppb) |
|---|---|---|
| Cape May, NJ | Yes, other area | -- |
| Caroline, MD | No | -- |
| Cumberland, NJ | Yes, other area | 76 |
| Dorchester, MD | No | -- |
| Kent, DE | No | 74 |
| Sussex, DE | Yes, other area | 77 |
| Talbot, MD | No | -- |
| Wicomico, MD | No | -- |
| Worcester, MD | No | -- |

Note: Counties with no ozone monitor are indicated with "--" in the 2010 8-hour Ozone DV column.

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area nonattainment if it is violating the 2008 ozone NAAQS. Sussex County, Delaware and Cumberland County, New Jersey show violations of the 2008 ozone NAAQS. Therefore, these counties must be included in a nonattainment area. EPA's preliminary recommendation is to designate Cumberland County, New Jersey nonattainment in another nonattainment area, the Philadelphia-Wilmington-Atlantic City nonattainment area.

Note that the absence of a violating monitor is not a sufficient reason to eliminate counties as candidates for nonattainment status based upon contribution to violations in other nearby areas. Each county is evaluated based on the weight of evidence of the five factors.

## *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 emission 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 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.

Table 3 shows emissions of $NO_x$ and VOC (in tons per year (tpy)) for violating and potentially contributing counties in the Seaford Area.

Table 3. Total 2008 $NO_x$ and VOC Emissions.

| County | State Recommended Nonattainment? | $NO_x$ (tpy) | VOC (tpy) |
|---|---|---|---|
| Cape May, NJ | Yes, other area | 6,407 | 7,774 |
| Caroline, MD | No | 983 | 1,324 |
| Cumberland, NJ | Yes, other area | 4,916 | 5,727 |
| Dorchester, MD | No | 1,666 | 3,516 |
| Kent, DE | No | 7,667 | 5,381 |
| Sussex, DE | Yes, other area | 14,870 | 9,972 |
| Talbot, MD | No | 1,822 | 2,869 |
| Wicomico, MD | No | 2,391 | 3,669 |
| Worcester, MD | No | 2,154 | 4,860 |

Sussex County, Delaware has the highest NOx and VOC emissions in the area of analysis. Kent County, Delaware; and Cape May County, New Jersey have the next highest emissions, but those counties emissions are about half that of Sussex County's. Caroline and Talbot Counties, Maryland, have the lowest emissions suggesting that these counties may not be contributors to ozone nonattainment in the Seaford Area (Sussex County, Delaware).

**Population density and degree of urbanization**

EPA evaluated the population and vehicle use characteristics and trends in the Seaford Area and the nearby surrounding area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from sources such as 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. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

| County | State Recommended Nonattainment? | 2010 Population | 2010 Population Density (1000 pop/sq mi) | Absolute change in population (2000-2010) | Population % change (2000-2010) |
|---|---|---|---|---|---|
| Cape May, NJ | Yes, other area | 97,265 | 0.34 | (5,043) | -5% |
| Caroline, MD | No | 33,066 | 0.10 | 3,241 | +11% |
| Cumberland, NJ | Yes, other area | 156,898 | 0.31 | 10,547 | +7% |
| Dorchester, MD | No | 32,618 | 0.05 | 35,200 | +28 |
| Kent, DE | No | 162,310 | 0.27 | 35,200 | +28% |
| Sussex, DE | Yes, other area | 197,145 | 0.20 | 39,710 | +25% |
| Talbot, MD | No | 37,782 | 0.12 | 3,890 | +11% |
| Wicomico, MD | No | 98,733 | 0.25 | 13,872 | +16% |
| Worcester, MD | No | 51,454 | 0.09 | 4,678 | +10% |

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011. (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.STO5&prodType=table)

Sussex and Kent Counties, Delaware and Cumberland County, New Jersey have the largest populations and are the most densely populated in the area of analysis. Caroline, Dorchester, Talbot,

and Worcester Counties in Maryland have the smallest population and are the least densely populated in the area of analysis. All but once county in the area of analysis has experienced population growth from 2000 to 2010. Note that the eastern coast of Sussex County, Delaware has several popular beaches, including Lewes and Rehoboth. The population of these beach areas increases substantially in the summertime (i.e., in the ozone season). Thus, non-point source emissions in Sussex County are higher in the ozone season than the rest of the year.

**Traffic and commuting patterns**

EPA evaluated the total Vehicle Miles Traveled (VMT) for each county in the Seaford Area and nearby surrounding area. In combination with the population/population density data and the location of main transportation arteries (see Figure 1, above), this information helps identify the probable location of non-point source emissions. A county with high VMT 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. Table 5 shows the total vehicle miles traveled (VMT) for each county in 2008.

Table 5. Traffic (VMT) Data.

| County | State Recommended Nonattainment? | 2008 VMT* (million miles) |
|---|---|---|
| Cape May, NJ | Yes, other area | 1,040 |
| Caroline, MD | No | 371 |
| Cumberland, NJ | Yes, other area | 1,163 |
| Dorchester, MD | No | 395 |
| Kent, DE | No | 1,565 |
| Sussex, DE | Yes, other area | 2,122 |
| Talbot, MD | No | 614 |
| Wicomico, MD | No | 1,008 |
| Worcester, MD | No | 645 |

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

Sussex County, Delaware has the highest VMT in the area of analysis. Furthermore, as stated above, the eastern coast of Sussex County, Delaware has several popular beaches, including Lewes and Rehoboth. The traffic through Sussex County to the beach areas increases substantially in the summertime (i.e., in the ozone season). Thus, VMT and mobile source emissions in Sussex County are higher in the ozone season than the rest of the year. Caroline and Dorchester Counties, Maryland have the lowest VMT.

Table 6. County to County Worker Flow.

| **Residence County →** | Kent, DE | Sussex, DE | Caroline, MD | Dorchester, MD | Talbot, MD | Wicomico, MD | Worcester, MD | Cape May, NJ | Cumberland, NJ |
|---|---|---|---|---|---|---|---|---|---|
| **Workplace County ↓** | | | | | | | | | |
| Kent, DE | 47,455 | 5,704 | 731 | 55 | 51 | 109 | 28 | 9 | 0 |
| Sussex, DE | 3,779 | 52,073 | 504 | 416 | 43 | 2,422 | 1,112 | 0 | 0 |
| Caroline, MD | 297 | 607 | 6,219 | 734 | 598 | 104 | 13 | 0 | 0 |
| Dorchester, MD | 68 | 373 | 566 | 9,391 | 774 | 844 | 20 | 0 | 0 |
| Talbot, MD | 121 | 371 | 3,221 | 1,955 | 12,194 | 274 | 21 | 0 | 0 |
| Wicomico, MD | 112 | 3,518 | 120 | 646 | 74 | 32,576 | 2,896 | 0 | 0 |
| Worcester, MD | 29 | 1,869 | 8 | 43 | 2 | 2,954 | 15,463 | 0 | 0 |
| Cape May, NJ | 0 | 20 | 0 | 0 | 4 | 10 | 28 | 31,782 | 1,162 |
| Cumberland, NJ | 26 | 5 | 0 | 0 | 0 | 0 | 0 | 1,129 | 43,866 |

Source: US Census Bureau County-To-County Worker Flow Files
http://www.census.gov/population/www/cen2000/commuting/index.html

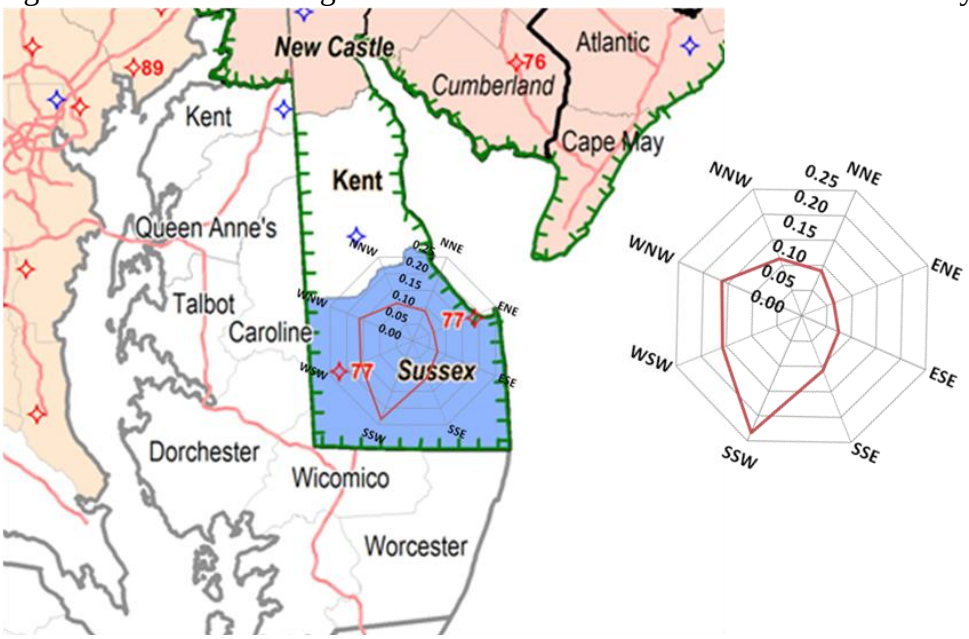
As shown in Table 6, above, Kent County, Delaware; and Wicomico and Worcester Counties, Maryland have the most commuting to and from Sussex County, Delaware. Caroline, Dorchester, and Talbot Counties, Maryland have comparatively little commuting to and from Sussex County, Delaware. The counties in New Jersey have no commuters to and from Sussex County, Delaware.

## *Factor 3: Meteorology (weather/transport patterns)*

EPA evaluated available meteorological data, consisting of 30-year average summertime wind directions from the National Weather Service, to help determine how weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation in the Seaford Area.

As shown in Figure 2 below, in Sussex County, Delaware, the prevailing winds during the ozone season come predominantly from the south-southwest. This indicates that emissions from Kent County, Delaware and the counties in New Jersey are not expected to contribute to violations at the Sussex County, Delaware monitors. Dorchester, Wicomico, and Worcester Counties in Maryland are upwind of the violating monitors. Although emissions from those counties might contribute to violations in downwind Sussex County, Delaware, the emissions levels from those counties are so low that little actual contribution is expected.

Figure 2. 30-Year Average Summertime Wind Directions in Sussex County, Delaware.




## *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 airshed and, therefore, the distribution of ozone over the area.

The Seaford Area does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, there are no barriers to contribution from upwind areas.

## *Factor 5: Jurisdictional boundaries*

EPA considers existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and so that areas designated nonattainment have the legal authority and cooperative planning necessary to 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 are used.

Kent and Sussex Counties, Delaware were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for 1997 ozone NAAQS. However, EPA's preliminary recommendation is to not include them in that area for the 2008 ozone NAAQS, as supported by EPA's five-factor analysis for the Philadelphia-Wilmington-Atlantic City area[7].

[7] See EPA's Technical Analysis for the Philadelphia-Wilmington-Atlantic City nonattainment area.

Sussex and Kent Counties in Delaware are in separate statistical areas. Being part of a statistical area indicates that counties are linked through employment and commuting. According to the Office of Management and Budget's "Standards for Defining Metropolitan and Micropolitan Statistical Areas," published in the Federal Register on December 27, 2000 (65 FR 82228), the "general concept of a Metropolitan Statistical Area or a Micropolitan Statistical Area is that of an area containing a recognized population nucleus and adjacent communities that have a high degree of integration with that nucleus." Sussex County makes up the Seaford Micropolitan Statistical Area, while Kent County, Delaware makes up the Dover MSA. The Dover/Kent County MPO is the planning organization for Kent County. This MPO covers 20 municipalities including all of Smyrna, which is also in New Castle County, and all of Milford, which is also in Sussex County. While Kent County was part of the Philadelphia-Wilmington-Trenton nonattainment area for the 1-hour ozone NAAQS, Sussex County was a separate nonattainment area.

The main jurisdiction boundaries that separate Caroline, Dorchester, Talbot, Wicomico, and Worcester Counties, Maryland; and Cape May and Cumberland Counties, New Jersey from the Seaford area are state boundaries. Furthermore, these counties are not part of the Seaford Micropolitan Statistical Area. Cape May County, New Jersey is in the Ocean City, NJ MSA. Cumberland County, New Jersey is in the Vineland-Millville-Bridgeton, NJ MSA, which is part of the Philadelphia-Camden-Vineland, DE-MD-NJ-PA CSA. Dorchester County, Maryland is in the Cambridge, MD Micropolitan Statistical Area. Talbot County, Maryland makes up the Easton, MD Micropolitan Statistical Area. Worcester County, Maryland makes up the Ocean Pines, MD micropolitan statistical area and Wicomico County, Maryland is in the Salisbury, MD MSA, which are both part of the Salisbury-Ocean Pines, MD CSA. Therefore, the Seaford Area is generally unconnected with these other counties.

## Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that Sussex County, Delaware meets the Clean Air Act criteria for inclusion in its own nonattainment area, the Seaford nonattainment area.

Sussex County, Delaware has violating monitors and the highest emissions, population, and VMT in the area of analysis. EPA has concluded that the other counties in this analysis are not likely to contribute to ozone violations in Sussex County. These counties have comparatively low emissions, populations, and VMT. Kent County, Delaware; and Cape May County, New Jersey have the next highest emissions, but those counties emissions are about half that of Sussex County's. Dominant ozone season winds are from the south-south west. This indicates that emissions from Kent County and the counties in New Jersey are not expected to contribute to violations at the Sussex County, Delaware monitors. Dorchester, Wicomico, and Worcester Counties in Maryland are upwind of the violating monitors. However, emissions from those counties are comparatively low suggesting that emissions from those counties would contribute little to violations in downwind Sussex County. Furthermore, the other counties in the area of analysis are not linked jurisdictionally to Sussex County and are not part of the Seaford Microplitan Statistical Area.