MARYLAND
Area Designations for the 2008 Ozone National Ambient Air Quality Standards

The table below identifies the areas and associated counties or parts of counties in the State of Maryland that EPA intends to designate as nonattainment for the 2008 ozone national ambient air quality standards ("2008 ozone NAAQS" or "2008 NAAQS"). In accordance with section 107(d) of the Clean Air Act (CAA), EPA must designate an area (county or a 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 Nonattainment Areas in Maryland:

Area	Maryland's Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Washington, DC-MD-VA*	Calvert County Charles County Frederick County Montgomery County Prince George's County	Calvert County Charles County Frederick County Montgomery County Prince George's County
Baltimore MD	Anne Arundel County Baltimore City Baltimore County Carroll County Harford County Howard County	Anne Arundel County Baltimore City Baltimore County Carroll County Harford County Howard County
Philadelphia**	Cecil County	Cecil County

*The Washington, DC-MD-VA area is a multi-state nonattainment area. Table 3 in Part I of this document identifies the counties in the other states that EPA intends to designate as part of the nonattainment area.

** The Philadelphia area is a multi-state nonattainment area. Table 16 in Part II of this document identifies the counties in the other states that EPA intends to designate as part of the nonattainment area.

EPA intends to designate the remaining counties, cities and areas in Maryland that are not listed in the table above as "unclassifiable/attainment" for the 2008 ozone NAAQS.

The analyses below provide 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. 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 Federal Reference Method (FRM) monitors or Federal Equivalent Method (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 the violating monitor(s) are located.[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 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.

Maryland's Recommendations:

On March 10, 2009, Maryland recommended retention of the current nonattainment boundaries "if EPA is confident that strong national rules would be in place three years in advance of attainment dates for nonattainment areas in Maryland." These nonattainment areas included the current Baltimore nonattainment area and boundaries, the Maryland portions of the current Washington DC-MD-VA nonattainment area, and Cecil County as part of a Philadelphia based nonattainment area. With these recommendations, Maryland also recommended that Washington County be part of a nonattainment area based upon Hagerstown, Maryland, and an "Eastern Shore" nonattainment area comprising Kent and Queen Anne's Counties.

In the alternative, Maryland supports the "implementation of a large regional nonattainment area encompassing a significant portion of the U.S. East Coast" "if EPA is not confident that strong national rules will be in place" in order to "force regional controls and reductions in transported pollution" in an time frame

[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).

appropriately related to the dates by which areas in Maryland are required to attain the 2008 NAAQS. Under this alternative, Maryland would support a nonattainment designation for all counties and cities in the State.

Maryland noted that most of the State is already heavily regulated due to existing ozone and fine particle requirements. Maryland stated that its scientific research, which uses airplanes, ozone-measuring balloons, and laser measuring techniques, shows that air transported into Maryland often carries levels of ozone already exceeding the standard. Maryland concluded that it will need to rely heavily on reductions in transported pollution to meet the 2008 NAAQS. Maryland concluded that because of "incoming" ozone levels above the standard, strong national rules will be needed for areas like Maryland to attain the 2008 NAAQS.

Maryland provided a map which represented the spatial extent of 2008 ozone levels in Maryland, Delaware, New Jersey and southeastern Pennsylvania to show that large areas outside of Maryland have levels above the 2008 NAAQS.

Maryland also provided a summary table of modeled 2009 design values for Delaware and Maryland based upon work performed by the Bureau of Air Quality Analysis and Research, Division of Air Resources, New York State Department of Environmental Conservation.

EPA proposes to modify and respond to Maryland's recommendations as follows:

(1) EPA would not designate Kent, Queen Anne's and Washington Counties as nonattainment for the reasons provided in our cover letter.

(2) EPA would retain the current nonattainment area boundaries for portions of Maryland current**ly** designated nonattainment under the 1997 ozone NAAQS for the reasons provided in Parts I and II to the "Technical Analysis for State of Maryland" below.

(3) EPA intends to modify Maryland's recommendations for Anne Arundel, Baltimore, Calvert, Carroll, Cecil, Charles, Frederick, Harford, Howard, Montgomery, and Prince George's Counties and Baltimore City insofar as EPA declines to base its decisions upon the likelihood that additional "strong national rules" will be in-place at some time in the future.

First, EPA believes that EPA cannot base decisions regarding nonattainment area boundaries upon the likelihood of additional national rules being promulgated in the future. EPA believes the CAA places limits upon the sort of factors EPA can consider when designating areas nonattainment and setting boundaries for those areas. Section 107(d)(1)(A) sets forth the requirements for designating areas:

> "…the Governor of each State shall (and at any other time the Governor of a State deems appropriate the Governor may) submit to the Administrator a list of all areas (or portions thereof) in the State, designating as—
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> (i) nonattainment, any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant,
>
> (ii) attainment, any area (other than an area identified in clause (i)) that meets the national primary or secondary ambient air quality standard for the pollutant …"

EPA interprets this provision to require States and EPA to designate as "nonattainment" any area containing a monitor violating a NAAQS as long as the monitor meets the requirements for a FRM monitor or FEM monitor, the monitor is properly sited, and the data meets minimum data quality

requirements.[3] Then, starting with the monitor, the States and EPA are to build nonattainment areas outward from the violating monitor with the "contributes to nonattainment" provision – "contributes to ambient air quality in a nearby area that does not meet" a NAAQS. Section 107(d)(1)(A)(i) uses the present tense – "contributes" and not some other tense such as the past tense "contributed" or some other conditional tense such as "would still contribute." Therefore, EPA believes section 107(d)(1)(A)(i) places certain limits regarding the factors which can be considered when setting boundaries under the "contributes to nonattainment" provision. One natural reading is that an area must be designated nonattainment if it "contributes to nonattainment" in a "nearby area" at the time EPA promulgates the final designations pursuant to section 107. Because the CAA sets statutory deadlines for EPA to promulgate designations, EPA must base its decision upon the best available information at the time the Administrator makes the final decisions.

EPA's designation and boundary guidance such as the December 4, 2008 guidance memorandum "Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards," reflect this view. This provided nine factors (consolidated into five for this document) for the States to consider and that EPA intends to consider. One factor is emissions-related data. EPA interprets emissions-related data to include actual and estimated emissions of VOC and NOx from sources, such as the data available in the latest National Emissions Inventory available, and to include the latest information and trends for Vehicle Miles Traveled (VMT) and commuting, and population characteristics and trends of the area. As far as control levels, EPA will consider any additional information received on enforceable emissions controls that are not reflected in recent inventories, but which will be in place before final designations are issued.

Maryland's recommendation of March 10, 2009 would exclude an area which "contributes to nonattainment" in a "nearby area" at the time EPA makes nonattainment decisions but would not "contribute to nonattainment" at some time in the future if some rule or rules are promulgated. EPA believes that such an action would contravene section 107(d)(1)(A)(i) because if the rules are not promulgated the contributing area would still "contribute to nonattainment" to the same "nearby area" and not be designated "nonattainment." Thus EPA concludes that the recommendation would have EPA base a nonattainment area boundary decision upon a criterion which does not comport with the CAA.

(4) EPA believes it cannot concur with a recommendation to designate as nonattainment a large portion of the East Coast of the U.S. due to transport from such an area.

Maryland recommended that EPA designate the entire State as part of a large multi-state nonattainment area including a significant portion of the U.S. East Coast. 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 Maryland 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

[3] If a monitor meets the FER or FEM and siting requirements but has insufficient data EPA can use other provisions of the CAA such as an "unclassifiable" designation or delay designation under the one-year extension provisions of section 107(d)(1)(B)(i) when this provisions is available.

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, EPA does not intend to designate a large nonattainment area as suggested by Maryland.

EPA notes that Maryland's support of its recommendations is dated (as a recommendation made two years ago will be) because it relies upon 2008 and 2009 design value data and projections. As EPA noted previously, EPA must consider the best information available at the time EPA promulgates designations. Because the 2010 design values are available, EPA must consider this information and based upon this information believes that the extent of areas still violating the 2008 NAAQS is less than it was two years ago.

Technical Analysis for State of Maryland:

Part I. Technical Analysis for the Washington, DC-MD-VA and Baltimore Areas.

The Washington, DC-MD-VA and Baltimore areas are part of the Washington-Baltimore-Northern Virginia, DC-MD-VA-WV Combined Statistical Area (Washington-Baltimore-NV CSA). This consists of the following CBSAs:[4]

(1) The Baltimore-Towson, MD Metropolitan Statistical Area (MSA) - Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties and Baltimore City in Maryland;
(2) The Culpeper, VA Micropolitan Statistical Area – Culpeper County in Virginia;
(3) The Lexington Park, MD Micropolitan Statistical Area - St. Mary's County in Maryland;
(4) The Washington-Arlington-Alexandria, DC-VA-MD-WV MSA: The Maryland Portion: the Counties of Frederick, Montgomery, Calvert, Charles, and Prince George's; the entire District of Columbia; the Virginia Portion: the Counties of Arlington, Clarke, Fairfax, Fauquier, Loudoun, Prince William, Spotsylvania, Stafford, and Warren, and the Cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park; and the West Virginia Portion: Jefferson County.
(5) The Winchester, VA-WV Metropolitan Statistical Area - Frederick County and Winchester City in Virginia and Hampshire County in West Virginia.

The December 4, 2008 guidance memorandum "Area Designations for the 2008 Revised Ozone National Ambient Air Quality Standards" recommended for CSAs that the analysis should start with the CSA boundary associated with violating monitors. The Washington-Baltimore-NV CSA consists of five CBSAs comprising 34 counties and independent cities plus the District of Columbia.[5]

As will be discussed under Factor 1 in a following section of this document, the monitors violating the 2008 NAAQS are located in two areas still designated nonattainment under the 1997 ozone NAAQS – the current Baltimore nonattainment area and the current Washington DC-MD-VA nonattainment area. (Further details of the designation of areas under the 1997 ozone NAAQS are discussed under Factor 5 "*Jurisdictional boundaries.*")

[4] OMB Bulletin No. 10-02, December 1, 2009.

[5] Under section 302(d) of the CAA, the District of Columbia is considered a state. In this analysis the terms "state," a "county" and/or an "independent city" when used in a broad sense may also refer to the District of Columbia when required by context.

EPA used the same basic approach in the designation process for the 1997 ozone NAAQS as EPA is using for the 2008 ozone NAAQS. Therefore, EPA has previously considered the same factors for setting the boundaries of the current Baltimore and Washington DC-MD-VA nonattainment areas. For purposes of analysis, a reasonable step is to break the area into smaller pieces that reflect the boundaries used to designate areas under the 1997 ozone NAAQS. In other words, start with a presumption that the boundaries of the current Baltimore and Washington DC-MD-VA nonattainment areas include the counties and independent cities which contribute to the currently violating monitors, and then apply the five factors to see if the current Baltimore and Washington DC-MD-VA nonattainment areas should be contracted, expanded, realigned, or even merged based upon differences in current conditions as opposed to conditions as of 2004 when areas were designated for the 1997 ozone NAAQS.

For the purposes of **the presentation of** this analysis, the Washington-Baltimore-NV CSA will be broken into the following subcomponents:

(1) The Baltimore Nonattainment Area as it is currently defined under the 1997 ozone NAAQS (current Baltimore nonattainment area) consisting of Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties and Baltimore City in Maryland.

(2) The Washington DC-MD-VA Nonattainment Area as it is currently defined under the 1997 ozone NAAQS (current Washington DC-MD-VA nonattainment area) consisting of: the Maryland Portion: Frederick, Montgomery, Calvert, Charles, and Prince George's Counties; the entire District of Columbia; and the Virginia Portion: Arlington, Fairfax, Loudoun, Prince William Counties, and the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.

(3) The Frederick County, VA Area consisting of Frederick County and Winchester City in Virginia.

(4) Fredericksburg, VA Area consisting of Fredericksburg City and Spotsylvania and Stafford Counties in Virginia.

(5) Eight other counties: Queen Anne's County in Maryland (which is a portion of the Kent County and Queen Anne's County Area); St. Mary's County in Maryland; Clarke, Culpeper, Fauquier, and Warren Counties in Virginia; and Hampshire and Jefferson Counties in West Virginia.

EPA's overall assessment of the factors for the Washington-Baltimore-NV CSA is as follows:

(1) The Current Baltimore Nonattainment Area

Harford County: Harford County must be designated nonattainment due to the presence of two monitors violating the 2008 ozone NAAQS. It contains the monitor with the highest design value within the Washington-Baltimore-NV CSA as well as the current Baltimore nonattainment area. Harford County has emissions which are neither at the low or high end – it ranks in the middle (that is between 12th through 23rd inclusive when ranked from largest to smallest) within the Washington-Baltimore-NV CSA; its population is one tenth of that in the current Baltimore nonattainment area and not exceptionally large or small; its population density is half the overall average for the current Baltimore nonattainment area; traffic and commuting patterns merit no special attention one way or another; meteorology indicates its emissions may contribute to nonattainment in Baltimore County (as well as to its own nonattainment). Factors that favor placement of this county in a nonattainment area containing Baltimore County and hence as part of a Baltimore Area with the same or similar boundaries as for the current Baltimore nonattainment area are jurisdictional boundaries, and meteorology which indicates it

is both upwind and downwind of Baltimore County. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Baltimore Area with the same boundaries as for the current Baltimore nonattainment area.

Baltimore County: Baltimore County must be designated nonattainment due to the presence of two monitors violating the 2008 ozone NAAQS. Baltimore County is among "top five" counties for emissions in the Washington-Baltimore-NV CSA. It is adjacent to Harford County which has the highest design value in the Washington-Baltimore-NV CSA and the current Baltimore nonattainment area. It has the highest population in the current Baltimore nonattainment area. Its growth rate is well below the Washington-Baltimore-NV CSA's average, but equal to the current Baltimore nonattainment area average rate. It has the highest VMT within the current Baltimore nonattainment area and third highest within the Washington-Baltimore-NV CSA. Its VMT is about one-third the total for the current Baltimore nonattainment area and about one-ninth of the total for the Washington-Baltimore-NV CSA. Meteorology indicates it is upwind Harford County's Edgewood monitor over 60 percent of the time. Factors that favor placement of Baltimore County in a nonattainment area containing Harford County, that is, as part of a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area, are its emissions, jurisdictional boundaries and meteorology which indicates it is both upwind and downwind of a violating monitor in Harford County. We weigh Maryland's recommendations as supporting placement in a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area. No factors favor any other grouping.

Baltimore City: This city does not have violating monitor. It ranks in the "top 11" counties for emissions within the Washington-Baltimore-NV CSA and third (of six) in the current Baltimore nonattainment area. It is densely populated, but experienced a population decline over the past 10 years. Its VMT is about one-eighth that of the current Baltimore nonattainment area. Meteorology indicates it is upwind of Harford County's violating Edgewood monitor over 30 percent of the time and upwind of violating monitors in Baltimore County. Factors that favor designation of Baltimore City as nonattainment based upon contribution are emissions, Maryland's recommendations, jurisdictional boundaries, and possible contribution to Harford and Baltimore Counties. These factors support placement in a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Baltimore Area with the same boundaries as for the current Baltimore nonattainment area. No factors favor any other grouping.

Howard County: Howard County does not have a violating monitor. It ranks in the "top 11" counties for emissions within the Washington-Baltimore-NV CSA and fourth (of six) in the current Baltimore nonattainment area. It is densely populated. Its growth rate is about equal the Washington-Baltimore-NV CSA's average but over twice that for the current Baltimore nonattainment area average. Its VMT is not exceptional. Meteorology indicates it is upwind of both violating monitors in Baltimore County 21 and 18 percent of the time and of the violating monitor in Carroll County 16 percent of the time. It is also upwind of a violating monitor in Prince George's County up to 11 percent of the time. Meteorology indicates it has more influence on nonattainment in the current Baltimore nonattainment area than in the current Washington DC-MD-VA nonattainment area. Factors that favor designation of Howard County as nonattainment based upon contribution are its emissions, are jurisdictional boundaries, Maryland's recommendations and meteorology indicating contribution to violating monitors in Baltimore and Carroll Counties. Factors that favor placement with Prince George's County are its possible contribution to that county. Howard County's possible contribution is to a greater number of monitors in the current Baltimore nonattainment area and such possible contribution likely is more

frequent than to monitors in the current Washington DC-MD-VA nonattainment area. Overall the former factors would outweigh the latter, and, therefore support placement of Howard County in a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Baltimore Area with the same boundaries as for the current Baltimore nonattainment area.

Carroll County: Carroll County must be designated nonattainment due to the presence of a monitor violating the 2008 ozone NAAQS. It is adjacent to one other county with a violating monitor – Baltimore County. It has emissions which are neither at the low or high end – it ranks in the middle (12^{th} through 23^{rd} inclusive) within the Washington-Baltimore-NV CSA. It has the lowest population and population density within the current Baltimore nonattainment area with a growth rate less than the Washington-Baltimore-NV CSA's average but twice that for the current Baltimore nonattainment area. Likewise, its VMT and number of commuters are at the lower end for the Washington-Baltimore-NV CSA and the current Baltimore nonattainment area. Meteorology indicates that it is upwind of the violating Padonia monitor in Baltimore County 52 percent of the time and also indicates that Carroll County is downwind from some counties (Frederick and Montgomery Counties in Maryland and probably to a lesser extent Loudoun County, VA) in the current Washington DC-MD-VA nonattainment area some 31 to 32 percent of the time.

Its monitor has a design value is within 0.001 parts per million (ppm) of attaining the 2008 ozone NAAQS. This air quality consideration suggests that the monitor in Carroll County will likely be attaining the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in an area containing Harford County. Factors favoring including it as part of a Baltimore Area with the same or similar boundaries as for the 1997 NAAQS: (1) jurisdictional boundaries; and (2) meteorology indicates that emissions from the county impact violating monitors in Baltimore County approximately 50 percent of the time, which is significantly more than emissions impact other monitors in the CSA. Factors favoring inclusion with the current Washington DC-MD-VA nonattainment area counties are meteorology supporting contribution from these approximately 30 percent of the time when its monitor is showing exceedances. The possible contribution to the violating monitor in Carroll County from Frederick and Montgomery Counties in Maryland is likely much more than the possible contribution from Loudoun County because the total (NOx plus VOC) emissions from these two counties are four times that of Loudoun County and because the Maryland counties are more proximate. While Loudoun County, VA does not have a violating monitor but is intended to be designated nonattainment. Overall the factors support placement in a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Baltimore Area with the same boundaries as for the current Baltimore nonattainment area.

Anne Arundel County: Anne Arundel County must be designated nonattainment due to the presence of a monitor violating the 2008 ozone NAAQS. It is among the "top five" in emissions in the Washington-Baltimore-NV CSA and the top two in the current Baltimore nonattainment area. It is more densely populated than the either the average for the Washington-Baltimore-NV CSA or the current Baltimore nonattainment area. Its growth rate is less than the Washington-Baltimore-NV CSA's average but higher than that for the current Baltimore nonattainment area. Its VMT is about one-fifth the total for the current Baltimore nonattainment area and about one-thirteenth of the total for the Washington-Baltimore-NV CSA. Meteorology indicates it is upwind of a violating monitor in Prince

George's County which is part of the current Washington DC-MD-VA nonattainment area and has a more frequent impact on that monitor than it does on violating monitors in other portions of the current Baltimore nonattainment area; likewise, meteorology indicates that the monitor in this county is downwind of two adjacent counties (Calvert and Prince George's) in the current Washington DC-MD-VA nonattainment area and that emissions from those counties likely impact that monitor more frequently than emissions from other counties in the current Baltimore nonattainment area. Factors that favor inclusion of Anne Arundel County in a nonattainment area based upon contribution are its emissions, jurisdictional boundaries, and meteorology. Factors that favor inclusion with a nonattainment area including Calvert and Prince George's Counties are meteorology. Factors that favor inclusion with Baltimore City and County and Harford County are jurisdictional boundaries and Maryland's recommendation to retain current nonattainment area boundaries. Because Anne Arundel's possible contribution involves only *intrastate* contribution Maryland's recommendation deserves extra weight because Maryland will be responsible for mitigating any such intrastate contribution. Air quality considerations suggest that the monitor in Anne Arundel County will likely be attaining the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in an area containing Harford County. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a nonattainment area with the same boundaries as the current Baltimore nonattainment area. For these reasons, the factors weigh in favor of grouping Anne Arundel County with the rest the current Baltimore nonattainment area.

(2) The Current Washington DC-MD-VA Nonattainment Area

Fairfax County, VA: Fairfax County must be designated nonattainment due to the presence of a monitor violating the 2008 ozone NAAQS. It contains the monitor with the second highest design value within the Washington-Baltimore-NV CSA as well as the current Washington DC-MD-VA nonattainment area. However, its design value is only 0.002 ppm more than other monitors in the District of Columbia and Arlington County. The monitors in Arlington and Fairfax Counties and in the District of Columbia are clustered in a relatively small area at the core of the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. Fairfax County is among the "top five" counties for emissions in the Washington-Baltimore-NV CSA. It has the highest population in the Washington-Baltimore-NV CSA. Its growth rate is slightly below the Washington-Baltimore-NV CSA's average rate and the current Washington DC-MD-VA nonattainment area's average rate. It has the highest VMT and number of commuters within the current Washington DC-MD-VA nonattainment area and highest within the Washington-Baltimore-NV CSA. Its VMT is about one-fourth the total for the current Washington DC-MD-VA nonattainment area and one-seventh of the total for the Washington-Baltimore-NV CSA. Meteorology indicates it is upwind of violating monitors in Arlington County, VA and the District of Columbia about 50 percent of the time. Factors that favor inclusion in a nonattainment that includes Arlington County and the District of Columbia, that is, as part of a Washington-DC-MD-VA nonattainment area with the same or similar boundaries as for the 1997 ozone NAAQS are its emissions, meteorology, the close proximity of Arlington and Fairfax Counties' and the District of Columbia's monitors with design values of 0.079 to 0.081 ppm at the Arlington-Fairfax-District core of 0.079 to 0.081 ppm at the Arlington-Fairfax-District core, jurisdictional boundaries and Virginia's recommendation. No factors support inclusion in a different nonattainment area.

Prince George's County, MD: Prince George's County must be designated nonattainment due to the presence of two monitors violating the 2008 NAAQS. It is among the "top five" counties for emissions in the Washington-Baltimore-NV CSA and essentially tied for second with Montgomery County, MD within the current Washington DC-MD-VA nonattainment area. It is more densely populated the either

the average for the Washington-Baltimore-NV CSA or the current Washington DC-MD-VA nonattainment area. Its growth rate is slightly less than that in the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area averages. It is the third most populous area in the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area. It has the second highest VMT and third highest number of commuters within the Washington-Baltimore-NV CSA. Its VMT is about one-fifth the total for the current Washington DC-MD-VA nonattainment area and about one-ninth of the total for the Washington-Baltimore-NV CSA. Meteorology indicates it is upwind of the violating monitor in Anne Arundel County which is part of the current Baltimore nonattainment area more frequently than it is upwind of any violating monitors in other portions of the current Washington DC-MD-VA nonattainment area; meteorology indicates it is upwind of the violating monitor in Anne Arundel County 66 percent of the time; and meteorology indicates it is upwind of violating monitors in Fairfax County and the District of Columbia about 27 and 38 percent of the time and suggests it is upwind of the Calvert County's violating monitor (which is part of the current Washington DC-MD-VA nonattainment area for the 1997 NAAQS), about 27 percent of the time. In addition, meteorology indicates that the monitors in this county are downwind of Anne Arundel and Montgomery Counties in Maryland (29% and 15%, respectively) and the District of Columbia and Fairfax County, VA (18 and 16%, respectively). Meteorology indicates this county could be included in a nonattainment area containing Anne Arundel County or in a nonattainment area including Fairfax County, Calvert County and the District of Columbia. While meteorology more strongly favors for including Prince George's County as part of a nonattainment area with Anne Arundel County, we weigh Maryland's recommendation as to which nonattainment area to include the county in when all counties at issue will be designated as nonattainment. Moreover, because Prince George's County receives possible contribution from counties in other States and possibly contributes to violations at monitors in other states, this consideration weighs heavily in grouping this county those other counties. Therefore, the factors favor grouping Prince George's County with the Fairfax County, VA and the District of Columbia monitors as part of a Washington-DC-MD-VA Area with the same or similar boundaries as for the 1997 ozone NAAQS.

Montgomery County, MD: Montgomery County does not have a violating monitor, but has a monitor with a design value of 0.074 ppm. It is among the "top five" counties for emissions in the Washington-Baltimore-NV CSA and essentially tied for second with Prince George's County, MD within the current Washington DC-MD-VA nonattainment area. It is more densely populated the either the average for the Washington-Baltimore-NV CSA or the current Washington DC-MD-VA nonattainment area. Its growth rate is slightly less than the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area averages. It is the second most populous area in the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area. It has the fourth highest VMT within the Washington-Baltimore-NV CSA and third highest number of commuters within the Washington-Baltimore-NV CSA. Its VMT is about one-sixth the total for the current Washington DC-MD-VA nonattainment area and about one-tenth of the total for the Washington-Baltimore-NV CSA. Meteorology indicates it is upwind of the violating monitor in Carroll County 32 percent of the time; and meteorology indicates it is upwind of violating monitors in Prince George's County and the District of Columbia about 15 and 13 percent of the time, respectively. Meteorology indicates this county could be included in a nonattainment area containing Carroll County (that is, as part of a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area) or in a nonattainment area including Prince George's County and the District of Columbia (that is, as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area). The possible effects on Prince George's County and the District of Columbia deserve more weight because the design value of Carroll County is less than those of Prince George's

County and the District of Columbia and because this grouping places it with monitors in other States to which it may contribute. The monitor in Carroll County has a design value is within 0.001 ppm of attaining the 2008 ozone NAAQS. This air quality consideration suggests that the monitor in Carroll County will likely be attaining the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in an area containing Harford County. We give weight to Maryland's recommendation as to which nonattainment area to include the county in when we intend to designate as nonattainment all counties at issue. Factors that favor inclusion of this county in a nonattainment area based upon contribution are its emissions, jurisdictional boundaries, and meteorology. Factors that favor inclusion in a nonattainment area containing Carroll County are its emissions and meteorology. Factors that favor inclusion with Prince George's County and the District of Columbia as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area are its emissions, meteorology, placement in an interstate area and jurisdictional boundaries. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area.

Frederick County, MD: Frederick County does not have violating monitor, but has a monitor with a design value of 0.074 ppm. It ranks in the "top 11" counties for emissions within the Washington-Baltimore-NV CSA and fifth in the current Washington DC-MD-VA nonattainment area. It is sparsely populated. Its growth rate is a little more than the current Washington DC-MD-VA nonattainment area average but over 1.5 times that of the Washington-Baltimore-NV CSA's average. Its VMT is not exceptional. Meteorology indicates it is upwind of the violating monitor in Carroll County 31 percent of the time. Meteorology supports inclusion in a nonattainment area containing Carroll County. Air quality considerations suggest that Carroll County will attain the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in a smaller area only containing Harford County. Frederick County is in the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA and thus has commuting ties to the rest of this MSA which includes the current Washington DC-MD-VA nonattainment area. The Washington-Arlington-Alexandria, DC-VA-MD-WV MSA is part of the Washington Baltimore-NV CSA which means there are some commuting ties between this MSA and other CBSAs within this CSA. In the case of Frederick County, the adjacent CBSA is the Baltimore-Towson MSA which includes the current Baltimore nonattainment area. Because Frederick County's possible contribution involves only *intrastate* contribution either of Maryland's recommendations are valid because Maryland will be responsible for mitigating any such intrastate contribution. Emissions and meteorology support inclusion of Frederick County in a nonattainment area based upon possible contribution. While meteorology more strongly favors for including Frederick County as part of a nonattainment area with Carroll County, we give great weight Maryland's recommendation as to which nonattainment area to include the county in when we intend to designate as nonattainment all counties at issue and when the possible contribution is only intrastate. Factors that favor inclusion in a nonattainment area containing Carroll County are meteorology. Factors that favor inclusion with a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area are jurisdictional boundaries, and Maryland's one recommendation

Calvert County, MD: Calvert County must be designated nonattainment due to the presence of a monitor violating the 2008 ozone NAAQS. It ranks in the "middle group" (between 12th and 23rd inclusive) for NOx and VOC emissions within the Washington-Baltimore-NV CSA. It has the smallest population of any county (and even less than Alexandria City, VA) in the current Washington DC-MD-

VA nonattainment area (some cities in Virginia are smaller). It has the lowest VMT of any county (but those of most cities in Virginia are smaller) within the current Washington DC-MD-VA nonattainment area. Its growth rate is one and one half times the Washington-Baltimore-NV CSA's average but the overall change is low. Its population density is low at less than one third that of the current Washington DC-MD-VA nonattainment area. Meteorology indicates it is upwind of violating monitors in Prince George's County (in the current Washington-DC-MD-VA nonattainment area) and in Anne Arundel County (in the current Baltimore nonattainment area) about 18 and 20 percent of the time. Meteorology indicates that at times Anne Arundel is upwind of Prince George's and, at other times, vice versa. The effect which Calvert County can have on either Anne Arundel or Prince George's is far less than Anne Arundel and Prince George's have on each other because Calvert County's emissions are far less than that of either Anne Arundel or Prince George's Counties. Meteorology also indicates that at times Prince George's is upwind of Calvert County about 22 percent of the time. However, the emissions in Prince George's County are around 8 times that of Calvert County and thus the effects of Prince George's County's emissions on Calvert County are much greater than vice versa. Furthermore, meteorology indicates that Charles County, MD is upwind of Calvert County about 29 percent of the time and thus more frequently than Calvert County is upwind of Anne Arundel County. Overall, meteorology and the ratio of Prince George's County's emissions to Calvert County's emissions favors grouping Calvert County with Charles Prince George's Counties. Because possible contribution across current nonattainment area boundaries involves only *intrastate* contribution Maryland's recommendations are valid; Maryland will be responsible for mitigating any such intrastate contribution. Air quality considerations suggest that Anne Arundel County will attain the 2008 NAAQS within a few years without further controls and its monitor will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in an area containing Fairfax County. Air quality considerations suggest that the same is true for Calvert and Prince George's Counties in that attainment within a few years is possible without further controls and neither will be the key monitor needed for attainment within the Washington-Baltimore-NV CSA or in an area containing Harford County. Therefore, it does not matter whether this county is grouped with the Harford County monitor or the Fairfax County monitor. Factors that favor inclusion in a nonattainment area containing Anne Arundel County as part of a Baltimore Area with the same or similar boundaries as the current Baltimore nonattainment area are meteorology which indicates that at times Calvert County is upwind of Anne Arundel County at times but less strongly than it favors inclusion in a nonattainment area containing Charles and Prince George's Counties. We heavily weigh Maryland's recommendation to retain the current nonattainment area boundaries when we intend to designate all counties at issue as nonattainment. Factors that favor inclusion in a nonattainment area containing Charles and Prince George's Counties are: meteorology which indicates Calvert County could contribute to and could receive contribution from counties which are part of the current Washington-DC-MD-VA nonattainment area and jurisdictional boundaries.

Charles County, MD: Charles County does not have violating monitor but has a monitor with a design value of 0.075 ppm. It ranks in the "middle group" (between 12th and 23rd inclusive) for NOx and VOC emissions within the Washington-Baltimore-NV CSA. Its population is smaller than any county in the current Washington DC-MD-VA nonattainment area except Calvert County (but those of cities in Virginia are smaller). Its growth rate is around one and one half times both the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area averages but the overall change is lower than any other county except Calvert County within the current Washington DC-MD-VA nonattainment area. Its population density is low at less than one third that of the current Washington DC-MD-VA nonattainment area. It has the lowest VMT of any county except Calvert County (but those of the cities in Virginia are smaller) within the current Washington DC-MD-VA nonattainment area. The overall number of commuters is but a tiny fraction of that for the current

Washington DC-MD-VA nonattainment area. Meteorology indicates it is upwind of violating monitors in Fairfax County, VA about 39 percent of the time and of violating monitors in Prince George's County and Calvert County about 35 and 29 percent of the time, respectively. Factors that favor inclusion in a nonattainment area are meteorology with possible interstate contribution to Fairfax County, VA, Maryland's recommendations and jurisdictional boundaries. Factors that favor inclusion with Prince George's County, Calvert County and Fairfax Country as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area are: meteorology and jurisdictional boundaries. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a nonattainment area with the same boundaries as for the 1997 ozone NAAQS.

Loudoun County, VA: Loudoun County does not have violating monitor but has a monitor with a design value of 0.075 ppm. It ranks in the "top 11" counties (10^{th} for VOC and 11^{th} for NOx) for emissions within the Washington-Baltimore-NV CSA and ties for sixth (with Frederick County, MD) in the current Washington DC-MD-VA nonattainment area. Its population is near the median for counties in the current Washington DC-MD-VA nonattainment area and its density is one-half that of the current Washington DC-MD-VA nonattainment area. Its growth rate was 80 percent and the absolute change in population was greater than the entire population of all the cities in Virginia except Alexandria and even some of the counties in the current Washington DC-MD-VA nonattainment area. Its growth rate is around one and one half times both the Washington-Baltimore-NV CSA and current Washington DC-MD-VA nonattainment area averages but the overall change is lower than any other county except Calvert County within the current Washington DC-MD-VA nonattainment area. Meteorology indicates it is upwind of violating monitors in Fairfax and Arlington Counties, VA in the current Washington-DC-MD-VA nonattainment area about 16 percent of the time and Carroll County, MD in the current Baltimore nonattainment area in Maryland about 15 percent of the time. Air quality considerations suggest that Carroll County with a design value of 0.0076 ppm counties will attain the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA. Carroll County likely will attain sooner than Fairfax and Arlington Counties with design vales of 0.081 and 0.079 ppm respectively. Loudoun County is adjacent to Fairfax County, VA; in contrast, the shortest path for transport of ozone and its precursors from Loudoun County to Carroll has to pass through Frederick or Montgomery Counties in Maryland.

Factors that favor placement of Loudoun County in a nonattainment area Fairfax and Arlington Counties as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area are its closer proximity to Fairfax and Arlington Counties, the higher design values of the monitors in Fairfax and Arlington Counties, air quality considerations and jurisdictional boundaries.

Arlington County, VA: Arlington County must be designated nonattainment due to the presence of a monitor violating the 2008 ozone NAAQS. Its design value is similar to those in part of the District of Columbia and only 0.002 ppm less than that in Fairfax County. These monitors are clustered in a relatively small area at the core of the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. It ranks high in the "middle group" for emissions within the Washington-Baltimore-NV CSA. While its absolute emissions and population are not exceptional, its emissions and population densities are both high which is indicative of an urban core area. Population growth was slightly less than the averages for the Washington-Baltimore-NV CSA and the current Washington DC-MD-VA nonattainment area. Its VMT is less than one-twenty-fifth of that even for the current Washington DC-MD-VA nonattainment area. Meteorology indicates this county is upwind of violating monitors in Fairfax County, VA and the

District of Columbia about 10 and 15 percent of the time, respectively. It is downwind of Fairfax County about 50 percent of the time and the District of Columbia about 10 percent of the time. The factors somewhat favor a designation of nonattainment based upon contribution: these are its emissions and population densities, meteorological indications of possible interstate contribution to and from the District of Columbia and jurisdictional boundaries. The factors favor placing Arlington County in the same nonattainment area as Fairfax County and the District of Columbia as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area. Factors favoring this placement are jurisdictional boundaries, meteorological indications of possible interstate contribution among Arlington and Fairfax Counties and the District of Columbia, the close proximity of these three counties monitors with design values of 0.079 to 0.081 ppm at the Arlington-Fairfax-District core and Virginia's recommendation. No factors compel placement in a different nonattainment area.

Prince William County, VA: Prince William County does not have violating monitor. It ranks in the "top 11" counties (8th for VOC and 10th for NOx) for emissions within the Washington-Baltimore-NV CSA and ties for fourth (VOC) and fifth (NOx) in the current Washington DC-MD-VA nonattainment area. Its population is fifth within the current Washington DC-MD-VA nonattainment area and its population density is a little less than that of the current Washington DC-MD-VA nonattainment area. Its growth rate was 42 percent, and, the absolute change in population was second highest in the current Washington DC-MD-VA nonattainment area. Its VMT is not exceptional. Meteorology indicates this county is upwind of violating monitors in Fairfax and Arlington Counties in Virginia about 36 percent of the time and of the monitor in Loudoun County about 39 percent of the time. The factors favor a designation of nonattainment based upon contribution: these are possible contribution to the monitors in Fairfax and Arlington Counties and jurisdictional boundaries. Factors that strongly favor inclusion in a nonattainment area based upon contribution are its possible contribution to violating monitors in Virginia and other states and to the possible design value monitor for a nonattainment area in Fairfax County, VA, Virginia's recommendation, its emissions, its, and jurisdictional boundaries. The factors favor placing this county in the same nonattainment area as Fairfax and Arlington Counties. Factors favoring this placement are jurisdictional boundaries, possible contribution to Fairfax and Arlington Counties, and Virginia's recommendation. No factors compel placement in a different nonattainment area.

Alexandria City, VA: Alexandra City does not have violating monitor. It has emissions which are neither at the low or high end – it ranks in low end (21st VOC and 20th VOC) of the middle (12th through 23rd inclusive) within the Washington-Baltimore-NV CSA. Its population is not exceptional, but it is densely populated – about 7 times the current Washington DC-MD-VA nonattainment area average. Its growth was less than the current Washington DC-MD-VA nonattainment area average. Its VMT is not exceptional. Its emission densities are high. Meteorology indicates this county is upwind of violating monitors in both Arlington County, VA and the District of Columbia about 25 percent of the time and of that in Fairfax County, VA about 10 percent of the time. The factors favor a designation of nonattainment based upon contribution: these are possible contribution to the monitors in Fairfax and Arlington Counties and the District of Columbia, emissions and population densities, Virginia's recommendation and jurisdictional boundaries. The factors favor placing this county in the same nonattainment area as Fairfax and Arlington Counties and the District of Columbia. Factors favoring this placement are jurisdictional boundaries, possible contribution to Fairfax and Arlington Counties, and Virginia's recommendation. No factors compel placement in a different nonattainment area.

Fairfax, Manassas, Manassas Park, and Falls Church Cities, VA: Fairfax, Manassas, Manassas Park, and Falls Church Cities do not have a monitor. Fairfax and Falls Church Cities are between the violating monitors in Arlington Fairfax and Arlington Counties and the attaining monitor in Loudoun County. All are small – ten square miles or less (for comparison: Alexandria City is 26, the District of Columbia is over 60 and Frederick County, MD the largest is over 650 square miles). Generally all have low absolute emissions, VMT, and number of commuters. All are densely populated with a density just under 3 to 7 times the overall CSA density. The emissions densities are high which is likely typical for urban core areas. Their emissions and population densities are comparable to or higher than the adjacent/surrounding counties and thus these cities are indistinguishable from these adjacent/surrounding counties. The factors that favor designation of nonattainment for contribution are mainly their emissions and population densities which are comparable to or higher than the adjacent/surrounding counties and Virginia's recommendations. Fairfax City should be in a nonattainment area that includes Fairfax and Arlington Counties and the District of Columbia as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area. Falls Church City should be in a nonattainment area that includes Fairfax and Arlington Counties and the District of Columbia, for the same reasons as for Arlington and Fairfax Counties between which Falls Church is located. Manassas and Manassas Park Cities should be in the same nonattainment area as Fairfax and Arlington Counties for the same reasons as for Prince William County, which encloses both.

The District of Columbia: The District of Columbia must be designated nonattainment due to the presence of monitors violating the 2008 ozone NAAQS. Its design value is similar to those in part of the Arlington County and only 0.002 ppm less than that in Fairfax County. These monitors are clustered in a relatively small area at the core of the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. It ranks in the "top 11" counties (at 7th for both NOx and VOC) for emissions within the Washington-Baltimore-NV CSA and fourth in the current Washington DC-MD-VA nonattainment area. It is densely populated (8 times the average for the current Washington DC-MD-VA nonattainment area) and has the sixth highest population within the Washington-Baltimore-NV CSA and the fourth within the current Washington DC-MD-VA nonattainment area. Its growth rate is well less than – about one-third – of the current Washington DC-MD-VA nonattainment area and CSA averages. Its VMT is not exceptional at one-twelfth that of the current Washington DC-MD-VA nonattainment area. Meteorology indicates this county is upwind of violating monitors in Prince George's County, MD about 18 percent of the time and the Arlington and Fairfax monitors about 10 and 5 percent of the time, respectively. Meteorology indicates it is <u>downwind</u> of Arlington County, VA and Montgomery County, MD about 15 and 13 percent of the time respectively. Meteorology indicates it is <u>downwind</u> of Prince George's County, MD about 28 percent of the time. Meteorology indicates that Fairfax County, VA is likely upwind of the violating monitors in the District of Columbia about 50 percent of the time and has higher emissions than the District of Columbia. The District of Columbia's recommendation was for nonattainment. The District of Columbia's analysis suggested that its emissions were a small (7% NOx and 9% VOC) part of those in the current Washington DC-MD-VA nonattainment area and suggested the need for additional controls on on-road and off-road mobile and disperse area sources and stricter controls on large industrial sources and power plants to curtail transported pollution. At this point in the designation process, EPA preliminarily agrees with the District of Columbia that an appreciable part of the air quality problem within the District of Columbia is due to emissions outside its borders. This preliminary decision is based in part upon the District of Columbia's evaluation and in part upon EPA's evaluation to date contained within this document. The District of Columbia is surrounded by three of the "top five" counties for emissions in the Washington-Baltimore-NV CSA. These are: Fairfax County, VA (4th NOx, 1st VOC); Montgomery County, MD (5th NOX, 2nd VOC); and Prince George's County,

MD (3rd for NOx and VOC). These three counties comprise the top three within the current Washington DC-MD-VA nonattainment area. The District is a densely populated area at the core of the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. The factors that favor the placement of the District of Columbia in the same nonattainment area as Fairfax and Arlington Counties as part of a Washington-DC-MD-VA Area with the same or similar boundaries as the current Washington-DC-MD-VA nonattainment area are: jurisdictional boundaries; meteorological indications of possible contribution to and from the District of Columbia and counties in the current Washington-DC-MD-VA nonattainment area; and the close proximity of Arlington and Fairfax Counties' and the District of Columbia's monitors with design values of 0.079 to 0.081 ppm at the Arlington-Fairfax-District core. No factors compel placement in a different nonattainment area.

(3) The Frederick County, VA Area (Frederick County and Winchester City in Virginia)

This area does not have a violating monitor, but has a monitor with a design value of 0.070 ppm. In total, this area has aggregate emissions about equal to Arlington County, VA for NOx and less than Frederick County, MD for VOC. As such, the area would rank 13th VOC and 15th NOx within the Washington-Baltimore-NV CSA. The total population is less than Alexandria City and would exceed only Calvert County, MD (and the other cities in Virginia). The growth rate was not quite twice the Washington-Baltimore-NV CSA average but the absolute change is less than most counties in the Washington-Baltimore-NV CSA. Total VMT is less than Alexandria City. The area is separated from the main parts of the Washington-Baltimore-NV CSA by the easternmost portion of the Appalachian Mountains. The area is not adjacent to any county with a violating monitor. The factors would seem to favor a designation as "attainment/unclassifiable" due to the remoteness of this area from violating monitors and its low population density, and the presence of a monitor attaining the 2008 ozone NAAQS.

(4) Fredericksburg, VA Area (City of Fredericksburg, Spotsylvania and Stafford Counties)

Stafford County does not have violating monitor but has a monitor with a design value of 0.070 ppm. For emissions, Spotsylvania and Stafford Counties rank between 15th and 19th for emissions – within the "middle group" (between 12th and 23rd inclusive) – within the Washington-Baltimore-NV CSA. Their populations, VMT and number of commuters are not exceptional. They are relatively sparely populated having a population density less than even the Washington-Baltimore-NV CSA average. In total the Fredericksburg, VA Area would have emissions about equal to Prince William County, VA, a population less than Loudoun County, VA, an absolute population growth between Montgomery and Prince George's Counties in Maryland, VMT about 110 percent of Prince William's. Meteorology indicates that the Fredericksburg, VA Area is upwind of violating monitors in Arlington County, VA about 22 percent of the time and of the monitor in Prince George's County, MD about 18 percent of the time. Meteorology and emissions indicate the possibility of contribution to Arlington and Prince George's Counties. However, as the tip of the Fredericksburg, VA Area closest to violating monitors in the Washington-Baltimore-NV CSA, Stafford County, is more remote from these violating monitors than Charles County, MD or Prince William County, VA over which emissions from Stafford County have to travel to reach a violating monitor. Charles County, MD or Prince William County, VA are adjacent to Stafford County and are attaining the 2008 ozone NAAQS. The factors that favor designation of "attainment/unclassifiable" would seem to outweigh those for another designation are the better than the NAAQS air quality in Stafford County, this area's lack of close proximity to areas with a violating monitor, jurisdictional boundaries and Virginia's recommendations.

(5) Eight Other Counties: Queen Anne's County in Maryland; St. Mary's County in Maryland; Clarke, Culpeper, Fauquier, and Warren Counties in Virginia; and Hampshire and Jefferson Counties in West Virginia.

Queen Anne's County, MD: Queen Anne's County does not have violating monitor. For emissions it ranks at the bottom (23rd for both NOx and VOC) within the "middle group" (between 12th and 23rd inclusive) within the Washington-Baltimore-NV CSA. Its population is low – about one fourth of the county within the current Baltimore MD nonattainment area (Carroll Co.) with the lowest population. Its growth rate is about three times that of the current Baltimore MD nonattainment area, but the absolute change is less than half that of Carroll County, MD. Its VMT is low and less than that of even Carroll County, MD. Meteorology indicates it is upwind of the violating Edgewood monitor about 25 percent of the time, is upwind of the violating Essex monitor about 24 percent of the time and is upwind of the violating monitor in Anne Arundel County about 23 percent of the time. This county is in the OTR and is subject to Maryland's enhanced I/M program. The meteorology favors designation as nonattainment based upon contribution, and, the emissions related factors are not compelling for a nonattainment designation given that the county is in the OTR and given the limited access for commuting to the rest of the Washington-Baltimore-NV CSA. It is possible contributions to nonattainment are solely intrastate. Because its possible contribution involves only *intrastate* counties either of the Maryland's recommendations are valid; Maryland will be responsible for mitigating any such intrastate contribution. Maryland's recommendation and the jurisdictional boundaries factor would seem to favor designation as attainment/unclassifiable and outweigh factors favoring a nonattainment designation. Therefore, we do not believe that there is a strong reason to modify Maryland's recommendation to include this County as part of a Baltimore Area with the same boundaries as for the current Baltimore area.

St. Mary's County: St. Mary's County does not have violating monitor. For emissions it ranks 16th VOC and 17th NOx– within the "middle group" (between 12th and 23rd inclusive) of the Washington-Baltimore-NV CSA. Its population is lower than all other jurisdictions within the current Washington DC-MD-VA nonattainment area. Its growth rate is about one and one-half times that of the current Washington DC-MD-VA nonattainment area, but the absolute change is less than half that of Carroll County, MD. Its VMT is low and less than that of Alexandria City and less than one and one-half times that of Calvert County. Meteorology indicates it is upwind of the violating monitor in Calvert County about 36 percent of the time. However, the violating monitor in Calvert County has a design value is within 0.001 ppm of attaining the 2008 ozone NAAQS. This air quality consideration suggests that the monitor in Calvert County will likely be attaining the 2008 NAAQS within a few years without further controls and will not be the key monitor needed for attainment within the Washington-Baltimore-NV CSA St. Mary's County is in the OTR. Its emissions related factors are not compelling for a nonattainment designation given that the county is in the OTR. Its possible contributions to nonattainment are solely intrastate. Because its possible contribution to violating monitors involves only *intrastate* counties Maryland will primarily be responsible for mitigating any such intrastate contribution. We will give Maryland's recommendation great weight and conclude that the factors of jurisdictional boundaries and air quality considerations favor designation as "attainment/unclassifiable" and outweigh factors favoring a nonattainment designation.

Fauquier County, VA: Fauquier County does not have violating monitor but has a monitor with a design value of 0.065 ppm. For emissions it ranks 15th VOC and 20th NOx within the Washington-Baltimore-NV CSA – within the "middle group" (between 12th and 23rd inclusive). Its population is low, and, it is sparely populated. Its growth rate was about one and one-half times that of the

Washington-Baltimore-NV CSA as a whole, but the absolute change is low. Its VMT is low in comparison to most other areas within the current Washington DC-MD-VA nonattainment area. Only 27 percent of its commuters travel into an area with a violating monitor. Meteorology indicates this county is upwind of violating monitors in Fairfax and Arlington Counties in Virginia about 10 percent of the time. Factors that favor designation as nonattainment for contribution are possible contribution to Fairfax and Arlington Counties. Factors that favor designation as attainment/unclassifiable are Virginia's recommendation (possible contribution to the closest violating monitors is *intrastate*), low population, jurisdictional boundaries, and the presence of a monitor attaining the 2008 NAAQS. The factors that favor designation as attainment/unclassifiable seem to outweigh factors for a nonattainment designation.

Culpeper, Clarke, and Warren Counties in Virginia and Hampshire and Jefferson Counties in West Virginia: None of these counties have a violating monitor. Both states recommended that these counties within their State be designated attainment. For emissions, each ranks 24th or lower in the Washington-Baltimore-NV CSA. The population of each is low, and, each is sparely populated. The VMT of each is low. For all but Jefferson County, the total number of commuters is less than that of Manassas City. The total number of commuters in Jefferson County is not appreciably greater than that of Manassas City (20,937 versus 18,077, respectively). The emissions of each are 1 percent or less than the total for the Washington-Baltimore-NV CSA. These "outer rim" counties in the Washington-Baltimore-NV CSA in Virginia and West Virginia are closest to attaining monitors to the extent they are upwind of any monitors in the Washington-Baltimore-NV CSA. These "outer rim" areas are the Counties of Frederick, Warren, Clarke, and Culpeper and Winchester City in Virginia, Jefferson County, WV. The relevant attaining monitors are those in Frederick County, MD and in Loudoun, Prince William, Fauquier, and Stafford Counties in Virginia. Of these "outer rim" counties, Clarke County, VA and Jefferson County, WV are the ones more likely to sufficient contribute to a violating monitor because the closest monitors within the Washington-Baltimore-NV CSA just attain the 2008 ozone NAAQS. No factors would seem to support designation as nonattainment; the factors that favor designation as "attainment/unclassifiable" are the States' recommendations, remoteness from violating monitors, low emissions related factors, and jurisdictional boundaries.

Two Separate Nonattainment Areas: Baltimore and Washington DC-MD-VA

Baltimore-Towson, MD MSA:
The Edgewood monitor in Harford County has the highest design value in the current Baltimore nonattainment area and Washington-Baltimore-NV CSA at 0.089 ppm. Building from this monitor, meteorology and emissions-related factors suggest the existence of the following relationships between possible contributing area(s) and receptor monitors shown in Table 1:

Table 1. Upwind-Downwind Linkages current Baltimore MD nonattainment area.

Location of Downwind Receptor Monitor	Close Upwind Possible Contributing Area(s) in Maryland	Close Upwind Possible Contributing Area(s) in other States
Harford County	Baltimore and Queen Anne's County; Baltimore City.	
Baltimore County	Anne Arundel, Carroll, Harford, Howard and Queen Anne's Counties; Baltimore City.	
Carroll County	Baltimore, Frederick, Howard	(Loudoun County, VA.)

	and Montgomery Counties.	
Anne Arundel County	Calvert, Prince George's and Queen Anne's Counties.	
Note: A county in parentheses is not adjacent to the downwind receptor monitor.		

The current Baltimore MD nonattainment area forms an area with progression of possible upwind contributing areas and possible downwind receptor monitors. The farthest of these upwind counties however have a possible contribution-receptor relationship with counties in the current Washington DC-MD-VA nonattainment area. Harford County's high design value is no doubt influenced by the close proximity of Baltimore County and Baltimore City and to a lesser extent by Anne Arundel County. Baltimore and Anne Arundel Counties both rank in the "top five" counties for emissions in the Washington-Baltimore-NV CSA for both NOx and VOC emissions. Baltimore City is ranked sixth in the Washington-Baltimore-NV CSA for both NOx and VOC emissions.

Washington-Arlington-Alexandria, DC-VA-MD-WV MSA, Winchester, VA-WV MSA, Culpeper, VA and Lexington Park, MD Micropolitan Statistical Areas:
These areas are summarized together because the smaller statistical areas of Winchester, Culpeper and Lexington Park are adjacent to the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA and not adjacent to the Baltimore-Towson, MD MSA. The monitor in Fairfax County, VA has a design value of 0.081 ppm which is the second highest within the Washington-Baltimore-NV CSA. In close proximity are the monitors in Arlington County, VA and the District of Columbia all of which have a design value of 0.079 ppm. Surrounding these monitors are counties with monitors that have lower design values of 0.078 or 0.077 ppm in Prince George's and Calvert Counties in Maryland or of 0.075 ppm or less – Charles, Frederick and Montgomery Counties in Maryland, and Loudoun and Prince William Counties (plus Alexandria City) in Virginia. This suggests a core of peak nonattainment surrounded by declining ozone concentrations on the predominantly upwind or downwind sides. Building from these "core" monitors in Arlington and Fairfax Counties and the District of Columbia, meteorology and emissions-related factors suggest the existence of the following relationships between possible contributing area and receptor monitors shown in Table 2:

Table 2. Upwind-Downwind Linkages current Washington DC-MD-VA nonattainment area and Adjacent Areas.

Location of Downwind Receptor Monitor	Close Upwind Possible Contributing Area(s) in State with Downwind Receptor	Close Upwind Possible Contributing Area(s) in another State
Fairfax County, VA	Arlington, Fauquier, Loudoun and Prince William[6] Counties, VA, and, Alexandria and Falls Church Cities in Virginia.	Charles and Prince George's Counties in Maryland.
Arlington County, VA	Fairfax,[7] (Fauquier,) Loudoun, Prince William, and Stafford Counties in Virginia, and, Alexandria and Falls Church Cities in Virginia in Virginia.	
District of Columbia		Arlington, Fairfax, (Fauquier.)

[6] Wherever Prince William County is indicated also includes at times also Manassas and Manassas Park Cities.
[7] Wherever Fairfax County is indicated also includes at times also Fairfax City.

		Loudoun and Prince William Counties, and, Alexandria and Falls Church Cities in Virginia. Montgomery and Prince George's Counties in Maryland.
Prince George's County, MD	Calvert, Charles and Howard Counties in Maryland.	District of Columbia. Fairfax and Stafford William Counties in Virginia.
Calvert County, MD	Charles, Prince George's and St. Mary's Counties in Maryland.	
Note: A county in parentheses is not adjacent to the downwind receptor monitor.		

The monitors in the District of Columbia, Arlington County and Fairfax County (and at time in Prince George's County, MD) apparently form a "central core of nonattainment monitors" in the current Washington DC-MD-VA nonattainment area. This result is not surprising because Montgomery and Prince George's Counties in Maryland and Fairfax County, VA are all rank in the "top five" for emissions in the Washington-Baltimore-NV CSA. In addition, the District of Columbia and Loudoun and Prince William Counties in Virginia rank between 6th and 11th for emissions.

Overall, the air quality data strongly suggest that there are two main peak points of ozone concentrations in the Washington-Baltimore-NV CSA. The first is in Harford County, Maryland in the northeast of the Washington-Baltimore-NV CSA. The second peak area is located at the Fairfax County monitor in Virginia and this peak extends into Arlington County, VA, the District of Columbia and often into Anne Arundel and Prince George's Counties in Maryland.

Consideration of emissions and meteorological related factors suggest that the monitor in Harford County, MD is primarily influenced by the current Baltimore nonattainment area as shown in the summary in Table 1 above.
Harford County's high design value is no doubt influenced by the close proximity of Baltimore County and Baltimore City and to a lesser extent by Anne Arundel County. Baltimore and Anne Arundel Counties both rank in the "top five" counties in the Washington-Baltimore-NV CSA for both NOx and VOC emissions. Baltimore City is ranked sixth in the Washington-Baltimore-NV CSA for both NOx and VOC emissions.

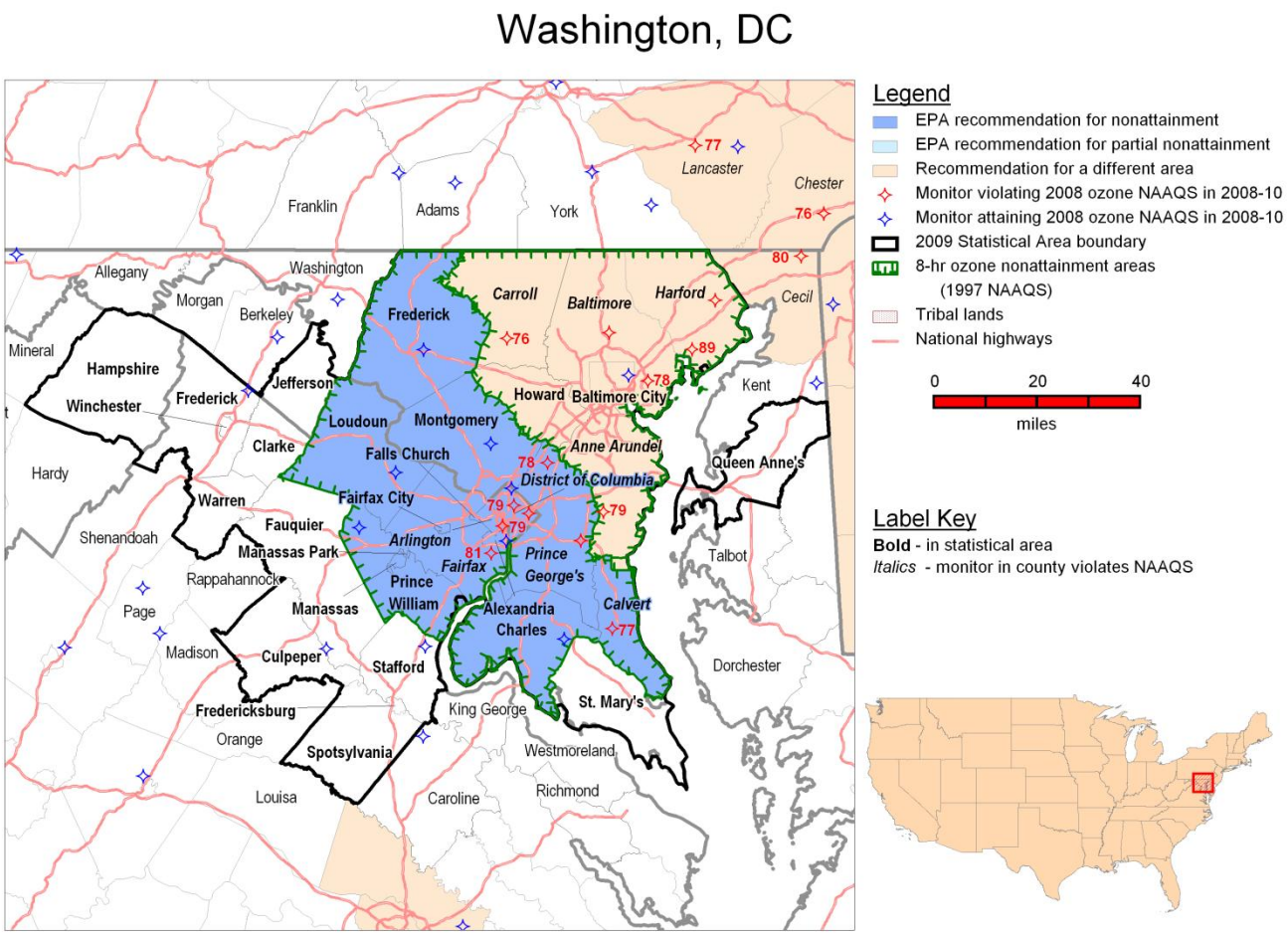
Consideration of emissions and meteorological related factors suggest that the "central core of nonattainment monitors" in the current Washington DC-MD-VA nonattainment area are primarily influenced by possible contribution from the current Washington DC-MD-VA nonattainment area. See Table 2. These monitors in the District of Columbia, Arlington County and Fairfax County, and, to a lesser extent, Prince George's County form a "central core of nonattainment monitors" because they are within or surrounded by high emissions counties of: Montgomery and Prince George's Counties in Maryland and Fairfax, Loudoun and Prince William Counties in Virginia and the District of Columbia. Table 1 suggests that the monitor in Anne Arundel County, MD is an extension of this "central core of nonattainment monitors" because two counties in the current Washington DC-MD-VA nonattainment area – Calvert and Prince George's Counties – are upwind of this monitor at times.

Tables 1 and 2 suggest that these counties– Anne Arundel, Carroll and Howard Counties in Maryland – in the current Baltimore nonattainment area could contribute to, could receive contribution from, or could both contribute and receive contribution from counties in the current Washington DC-MD-VA nonattainment the current Baltimore nonattainment area. Likewise, Tables 1 and 2 suggest that the following counties – Calvert, Frederick, Montgomery and Prince George's in Maryland and to a lesser extent Loudoun County, VA in the current Washington DC-MD-VA nonattainment area could contribute, could receive contribution, or could both contribute and receive contribution from counties in the current Baltimore nonattainment area. However, consideration of all the factors including jurisdictional boundaries and including the States' recommendations the current nonattainment boundaries should be maintained.

With regards to Howard County, MD, it can be kept with the rest of the current Baltimore nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Baltimore Nonattainment Area." With regards to Carroll County, MD, it can be kept with the rest of the current Baltimore nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Baltimore Nonattainment Area." With regards to Anne Arundel County, MD, it can be kept with the rest of the current Baltimore nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Baltimore Nonattainment Area." With regards to Fredrick County, MD, it can be kept with the rest of the current Washington DC-MD-VA nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Washington DC- MD-VA Nonattainment Area." With regards to Calvert County, MD, it can be kept with the rest of the current Washington DC-MD-VA nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Washington DC- MD-VA Nonattainment Area." With regards to Montgomery County, MD, it can be kept with the rest of the current Washington DC-MD-VA nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Washington DC- MD-VA Nonattainment Area." With regards to Prince George's County, MD, it can be kept with the rest of the current Washington DC-MD-VA nonattainment area because overall consideration of the five factors including the State's recommendations favor this result as previously discussed in this document under "Analysis and Assessment of Factors" for the "Current Washington DC- MD-VA Nonattainment Area."

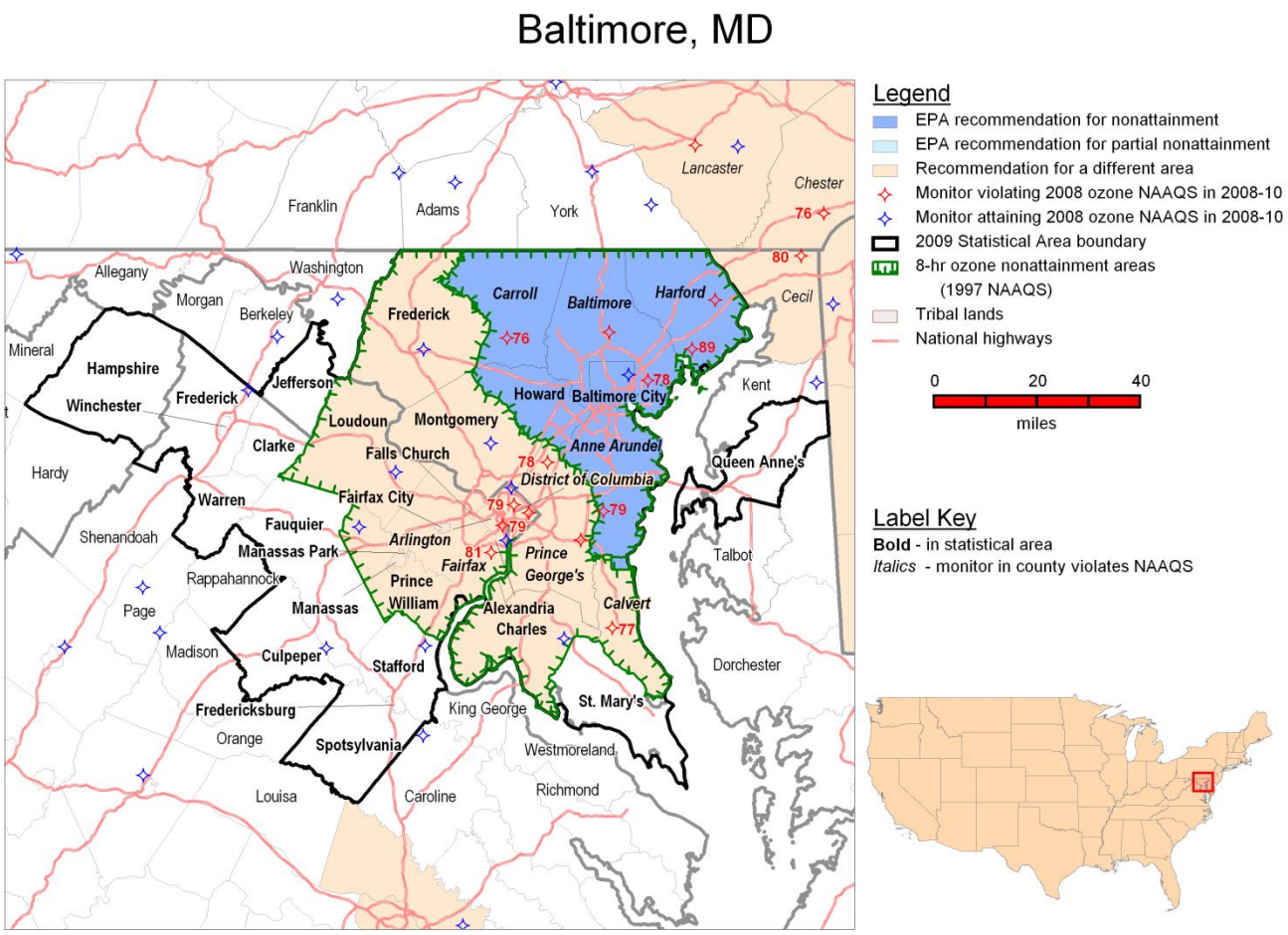
Figure 1 is a map of the intended Washington, DC-MD-VA nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, the CSA boundary, the current existing nonattainment area boundaries for 1997 ozone NAAQS, and major transportation arteries.

Figure 1a. The Intended Washington DC-MD-VA Nonattainment Area



For the 1997 ozone NAAQS, this identical area was designated nonattainment. The boundary for the current Washington DC-MD-VA nonattainment area for the 1997 ozone NAAQS includes:
(1) The Counties of Arlington, Fairfax, Loudoun, and Prince William, and the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park in Virginia;
(2) The entire District of Columbia; and
(3) The Counties of Calvert, Charles, Frederick, Montgomery, and Prince George's in Maryland.

Figure 1b. The Intended Baltimore MD Area



For purposes of the 1997 ozone NAAQS, this identical area was designated nonattainment. The boundary for the current Baltimore nonattainment area for the 1997 ozone NAAQS included Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties and Baltimore City.

On March 10, 2009, Maryland recommended that the same counties in both areas be designated as nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008. These data are from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate the counties and independent cities in the States identified in Table 3 below as "nonattainment" for the 2008 ozone NAAQS as part of the Washington, DC-MD-VA Area multi-state nonattainment area and the Baltimore area intrastate nonattainment area. Table A includes Maryland's portion of an intended nonattainment area was well as the counties/independent cities in the other states that EPA intends to designate as part of an intended nonattainment area.

Table 3. State's Recommended and EPA's Intended Designated Nonattainment Counties for the Washington, DC-MD-VA Area and the Baltimore MD Area.

Washington, DC-MD-VA	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
District of Columbia	Entire District of Columbia	Entire District of Columbia
Maryland	Calvert County Charles County Frederick County Montgomery County Prince George's County	Calvert County Charles County Frederick County Montgomery County Prince George's County
Virginia	Alexandria City Arlington County Fairfax City Fairfax County Falls Church City Loudoun County Manassas City Manassas Park City Prince William County	Alexandria City Arlington County Fairfax City Fairfax County Falls Church City Loudoun County Manassas City Manassas Park City Prince William County
Baltimore	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Maryland	Anne Arundel County Baltimore City Baltimore County Carroll County Harford County Howard County	Anne Arundel County Baltimore City Baltimore County Carroll County Harford County Howard County

Factor Assessment

Factor 1: Air Quality Data

For this factor, EPA considered 8-hour ozone design values in parts per million (ppm) for air quality monitors in counties in the Washington-Baltimore-NV CSA area based on data for the 2008-2010 period, that is, based upon a monitor's 2010 design value, which are the most recent years with fully-certified air quality data. A monitor's design value 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 design value 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 design value for the county or for an area (which in general can be any grouping of counties or be some currently defined area such as a CBSA, CSA or current or former nonattainment area) is determined by the monitor in that county/area with the highest design value.

The 2010 design values for the ozone NAAQS for counties in the Washington-Baltimore-NV CSA are shown in Tables 4 and 5. Note that only counties in the Washington-Baltimore-NV CSA that have ozone monitors are included in Tables 4 and 5.

Table 4. Monitor data for Maryland's Portions of the Washington-Baltimore-NV CSA.

County/City, State	Monitor AQS ID#	Short Name	State Recommended Nonattainment?	8-hr Ozone Design Values, 2008-2010 (ppm)
Anne Arundel Co., MD	240030014	Davidsonville	Yes	0.079
Baltimore Co., MD	240051007 240053001	Padonia Essex	Yes	0.077 0.078
Calvert Co., MD	240090011	Calvert Co.	Yes	0.077
Carroll Co., MD	240130001	South Carroll	Yes	0.076
Charles Co., MD	240170010	Southern Maryland	Yes	0.075
Frederick Co., MD	240210037	Frederick Co.	Yes	0.075
Harford Co., MD	240251001 240259001	Edgewood Aldino	Yes	**0.089** 0.078
Montgomery Co., MD	240313001	Rockville	Yes	0.074
Prince George's Co., MD	240330030 240338003	Howard U. – Beltsville Pr. Georges Co. Equestrian Ctr	Yes	0.078 0.077
Baltimore City, MD	245100054	Furley E.S.Rec Center	Yes	0.067

Table 5. Monitor data for Portions of the Washington-Baltimore-NV CSA in Other States.

County/City, State	Monitor AQS ID#	Short Name	State Recommended Nonattainment?	8-hr Ozone Design Values, 2008-2010 (ppm)
District of Columbia	110010025 110010041 110010043	Takoma River Terrace McMillan Reservoir	Yes	0.075 0.077 0.079
Virginia portion of the Washington-Baltimore CSA:				
Arlington Co., VA	510130020	Arlington	Yes	0.079
Fairfax Co., VA	510590030	Franconia	Yes	0.081
Fauquier Co., VA	510610002	Sumerduck	No	0.065
Frederick Co., VA	510690010	Butler Manuf. Co Near Rest	No	0.068
Loudoun Co., VA	511071005	Ashburn	Yes	0.075
Prince William Co., VA	511530009	James S. Long Park	Yes	0.070
Stafford Co., VA	511790001	Widewater	No	0.070
Alexandria City, VA	515100009	Alexandria	Yes	0.074

Note: Data Source: ozone_dv75_20082010.xls (downloaded on 9/22/2011 from http://www.epa.gov/airtrends/values.html).

A county or city that shows a violation of the 2008 ozone NAAQS must be included in a nonattainment area. See, section 107(d)(1)(A) of the CAA which requires designation of nonattainment for any area that does not meet a NAAQS. 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 sufficiently contributes to a nearby violation.

Identification of Violating Monitors:

Nine counties within the Washington-Baltimore-NV CSA contain a monitor violating the 2008 Ozone NAAQS. These monitors are contained solely within the boundaries of those areas currently designated nonattainment under the 1997 Ozone NAAQS; these are the current Washington, DC-MD-VA nonattainment area and the current Baltimore nonattainment area. (See, 40 CFR 81.309, 81.321 and 81.347.) All other monitors within the CSA, but outside the boundaries of designated nonattainment areas under the 1997 ozone NAAQS are attaining the 2008 Ozone NAAQS. Therefore, the following jurisdictions must be designated by operation of law as nonattainment,[8] either within one or more nonattainment area(s) within the Washington-Baltimore-NV CSA: (1) The District of Columbia; (2)

[8] EPA would expand the boundaries of nonattainment to include the whole county or the District of Columbia containing a violating monitor because the States or the District of Columbia so recommended.

Anne Arundel, Baltimore, Calvert, Carroll, Harford, Prince George's Counties in Maryland; and (3) Arlington and Fairfax Counties in Virginia.

Analysis of the Concentrations within the Washington-Baltimore-NV CSA:

The highest concentrations within the Washington-Baltimore-NV CSA are found at the Edgewood site in Harford County, MD and the Franconia site in Fairfax County, VA which have design values of 0.089 and 0.081 ppm, respectively. The fact that the Edgewood site has a high value is not surprising because this monitor was located for the objective of measuring highest concentrations on an urban scale. One can reasonably infer that this monitor was sited to be downwind of Baltimore City and other parts of the Baltimore-Towson MSA. See, Table 3-2a. in "Ambient Air Monitoring Network Plan For Calendar Year 2011," by the Ambient Air Monitoring Program, Air and Radiation Administration Management, Maryland Department of the Environment, May 27, 2010.[9] Appendix 1 to Part I of this analysis contains a summary of relevant regulatory and guidance documents related to selection of sites for ozone monitors and to monitoring objectives.

In the current Washington DC-MD-VA nonattainment area, the Howard University (HU)-Beltsville site has a dual monitoring objective of population exposure and highest concentration. This site would fulfill the requirement that the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area have such a site. Refer to Appendix 1 to Part I of this analysis. See, Table 3-2a. in "Ambient Air Monitoring Network Plan For Calendar Year 2011," by the Ambient Air Monitoring Program, Air and Radiation Administration Management, Maryland Department of the Environment, May 27, 2010. One can reasonably infer that that this monitor was sited to monitor the expected highest concentrations downwind of the densely populated urban core surrounding the District of Columbia.

Generally, within the Washington-Baltimore-NV CSA the highest concentrations occur in two separate areas of peak ozone concentrations: (1) the first of these areas of peak ozone concentrations is centered on the monitors in Fairfax County, the District of Columbia and Anne Arundel County with design values of 0.079 to 0.081 ppm; (2) the second areas of peak ozone concentrations is northeast of Baltimore City and centered on the Edgewood monitor in Harford County with a design value of 0.089 ppm. These two areas are "circled" with a red, solid line in Figure 2a below.

Near each of these areas of peak ozone concentrations are monitors each with a design value of 0.077 ppm or 0.078 ppm. Near the Fairfax County-District of Columbia-Anne Arundel County group are the two monitoring sites in Prince George's County, MD. In close proximity to and northeast of the Edgewood site are the Aldino site in Harford County and the two monitoring sites in Baltimore County. Outside these areas, the design values fall off to attaining monitors. Monitors attaining the 2008 ozone NAAQS are found north, northwest, west, southwest and south of the curve formed by the Calvert County, MD—Fairfax County, VA—Carroll—Baltimore (Padonia) —Harford Counties, MD monitors. (The curve of the Calvert County, MD—Fairfax County, VA—Carroll—Baltimore (Padonia) —Harford Counties, MD monitors is shown in Figure 2b below with a solid, pink line.)

Just outside this curve of violating monitors are three monitors each with a design value of 0.075 ppm (just attaining the 2008 NAAQS) – the ones in Charles County, MD, Loudoun County, VA and Frederick County, MD. These attaining monitors are joined by a red, dashed line in Figure 2b.

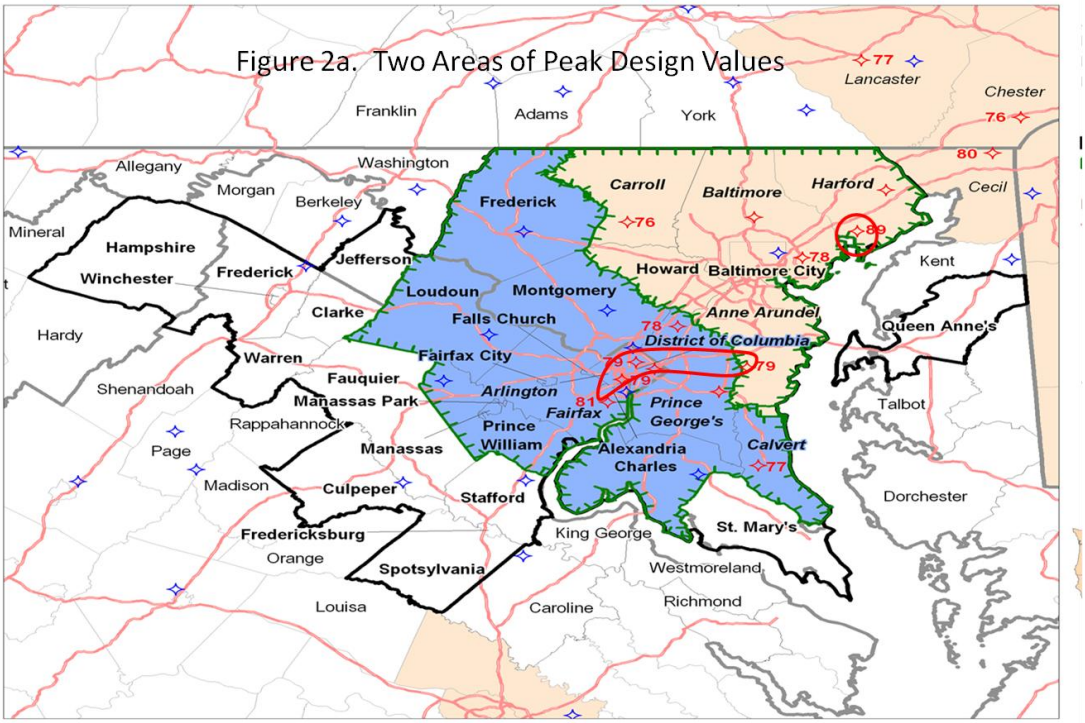
[9] Source: MDPlan2010.pdf (Downloaded 12/9/2011 from http://www.epa.gov/ttn/amtic/plans.html).

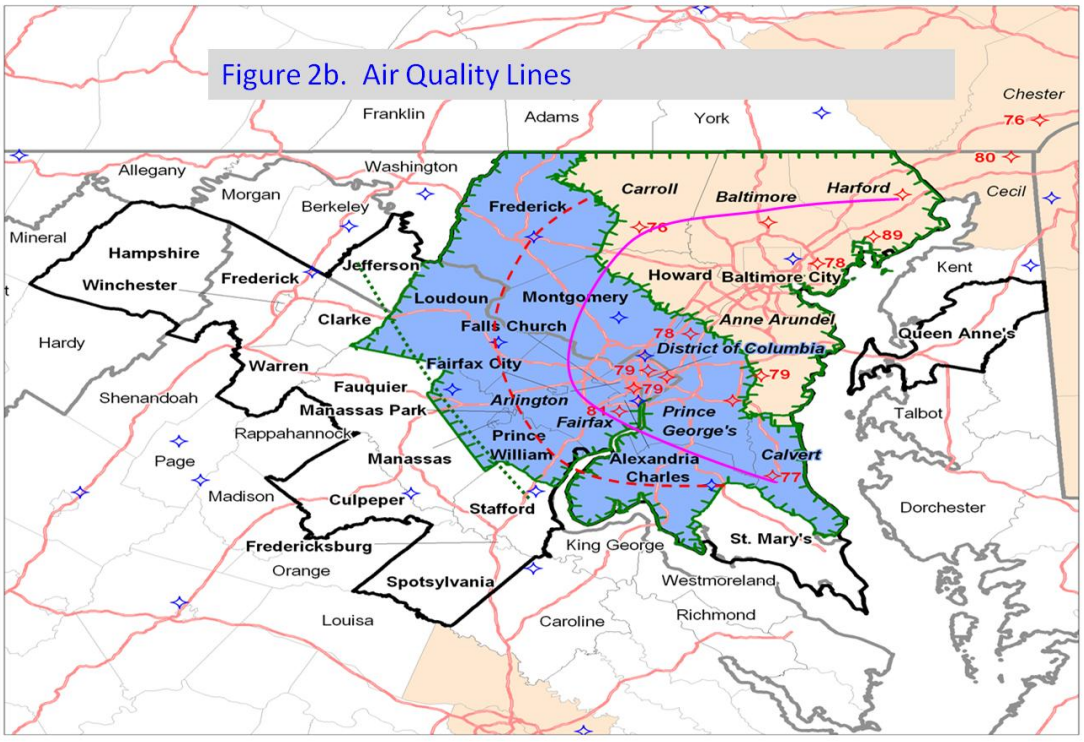
South, southwest, west, and northwest of these three monitors are a number of monitors generally 0.005 ppm below the 2008 NAAQS. These are the monitors in Fauquier, Frederick, Prince William and Stafford Counties in Virginia. (These three are joined by a dotted, green line in Figure 2b.) There are also attaining monitors in the northern tip of Caroline County, VA, Berkeley County, WV and Washington County, MD. Table 6 provides basic data for these other monitors:

Table 6. Three Attaining Monitors Outside the Washington-Baltimore-NV CSA.

County/City, State	Monitor AQS ID#	Short Name	State Recommended Nonattainment?	8-hr Ozone Design Values, 2008-2010 (ppm)
Caroline County, VA	510330001	Corbin	No	0.073
Berkeley County, WV	540030003	Martinsburg Ball Field	No	0.070
Washington County, MD	240430009	Hagerstown	No	0.072

These patterns of ozone concentrations suggest that there could be two separate areas with a linkage between high emissions of ozone precursors in within some geographic region and peak ozone design values in that geographic region: One such geographic region might be the area northwest of Baltimore City centered on the Edgewood monitoring site in Harford County, MD. The Edgewood monitoring site is circled (in red) in Figure 2a below and is in Harford County, MD, the north-easternmost county in the -Baltimore-NV CSA. The peak ozone area for the second such geographic region might be the group of monitors comprised of the monitors in Fairfax County, VA, in the District of Columbia and possibly of the monitor in Anne Arundel County, MD. These are also "circled" in Figure 2a below with a surrounding red solid line.





Design Value Changes – 2003 to 2010:

Table 7 shows the 2003 design values used to designate and classify areas under the 1997 ozone NAAQS, the 2008 design values used by the States to make their 2009 recommendations for the 2008 NAAQS and the 2010 design values. The first and second highest design values in the Washington-Baltimore-NV CSA are emphasized in bold, underlined type; design values within 0.002 ppm of the second highest value are emphasized in bold type.

Table 7. Air Quality Data – Design Values for 2003, 2008 and 2010.

County	State Recommended Nonattainment for 2008 NAAQS?	2003 8-hour ozone design value (ppm)[10]	2008 8-hour Ozone design value (ppm)[11]	2010 8-hour Ozone design value (ppm)[12]
Current Baltimore nonattainment area:				
Anne Arundel Co., MD	Yes	**0.098**	**0.087**	**0.079**
Baltimore Co., MD	Yes	0.093	0.085	0.078
Carroll Co., MD	No	0.089	0.083	0.076
Harford Co., MD	Yes	**0.103**	**0.091**	**0.089**
Baltimore City, MD	Yes	0.082	Inc. D	0.067
Current Washington DC-MD-VA nonattainment area				
District of Columbia, DC	Yes	0.094	**0.087**	**0.079**
Calvert Co., MD	No	N/D	0.079	0.077
Charles Co., MD	No	0.094	0.082	0.075
Frederick Co., MD	No	0.088	0.082	0.075
Montgomery Co., MD	No	0.088	Inc. D	0.074
Prince George's Co., MD	Yes	0.093	**0.087**	0.078
Arlington Co., VA	Yes	**0.099**	0.085	0.079
Fairfax Co., VA	Yes	0.097	**0.087**	**0.081**
Loudoun Co., VA	Yes	0.092	0.083	0.075
Prince William Co., VA	Yes	0.087	0.078	0.070
Alexandria City, VA	Yes	0.092	0.081	0.074
Frederick Co., VA Area				
Frederick, VA	No	0.085	0.073	0.068
Fredericksburg, VA Area				
Stafford, VA	No	0.088	0.081	0.070
Other Counties				
Fauquier, VA	No	<0.085	0.071	0.065

Note: N/D means no data; Inc. D means there was incomplete data to calculate a design value; "<0.085" means the design value was under the 1997 ozone NAAQS and the county was designated attainment.

[10] "Chapter 2 8-Hour Ozone Nonattainment Designations and Classifications" docket item EPA-HQ-OAR-2003-0083-1812 in docket EPA-HQ-OAR-2003-0083 (downloaded November 15, 2011) and available on-line at Regulations.gov.
[11] Data Source: dv_ozone_2006_2008.xls (downloaded on 11/29/2011 from http://www.epa.gov/airtrends/values.html.
[12] Data Source: ozone_dv75_20082010.xls (downloaded on 9/22/2011 from http://www.epa.gov/airtrends/values.html.

For designations under the 1997 ozone NAAQS, the Edgewood site in Harford County had a design value (for the period 2000-2002) of 0.103 ppm, and, all other monitored counties in the current Baltimore nonattainment area except that in Baltimore City violated the 1997 ozone NAAQS with a design value of 0.085 ppm or more.[13] Likewise, for designations under the 1997 ozone NAAQS, Arlington County, VA had the highest design value of 0.099 ppm (2000-2002); for the 2000-2002 period, all other counties currently having monitors in the current Washington DC-MD-VA nonattainment area except Calvert County (which did not have a monitor with 3 years of valid data for 2000-2002) violated the 1997 ozone NAAQS with a design value of 0.085 ppm or more.[14] For the designations under the 1997 ozone NAAQS, the design value for the current Baltimore nonattainment area was 0.004 ppm greater than the design value for the current Washington DC-MD-VA nonattainment area. Both areas were classified as moderate nonattainment areas.[15]

For their 2009 recommendations, the States generally relied upon 2008 design values. Three monitors in the current Washington DC-MD-VA nonattainment area had a design value of 0.087 ppm which set the design value for the current Washington DC-MD-VA nonattainment area at 0.087 ppm. The Edgewood site in Harford County, MD had a design value of 0.091 ppm which set the design value for the current Baltimore nonattainment area at 0.087 ppm. The difference in 2008 design values between these two current nonattainment areas was still 0.004 ppm.

Currently, for the period 2008-2010, the difference in design values for these two current nonattainment areas has grown to 0.008 ppm. Whether or not this difference would cause these two current nonattainment areas to have a different classification in the event they remain separate areas will only be known once EPA promulgates a final rule that sets the classification scheme for the 2008 NAAQS.

The trend in design values has been downward since 2003. In 2008, no monitor in the current Baltimore and Washington DC-MD-VA nonattainment areas were attaining the 2008 NAAQS of 0.075 ppm; nor was the monitor in the Fredericksburg, VA Area. Now some of the counties and cities on the edge are attaining the 2008 NAAQS, and, some interior areas, such Alexandria City, VA and Montgomery County, MD, are as well. Admittedly, due to year to year fluctuations in weather from one ozone season to the next, the design values will also fluctuate in response but over longer periods of time a definite overall trend will be apparent if there is progress. The counties and cities in the Washington-Baltimore-NV CSA saw a decrease in design values of 0.006 to 0.014 ppm over the period 2003 to 2008. Most counties and cities in the Washington-Baltimore-NV CSA over the last two years (2008 to 2010) saw design value decreases of 0.006 to 0.011 ppm; however, during the last two years, two saw decreases of only 0.002 ppm. These were the monitors in Harford and Charles Counties in Maryland.

Of particular note are the design values in Frederick and Charles Counties in Maryland. These are within 0.002 ppm of attaining the 2008 NAAQS. As such, these counties would likely be classified as marginal nonattainment areas if each were a separate nonattainment area. The CAA contains a presumption that marginal areas are expected to attain the relevant ozone NAAQS without any additional controls beyond those already promulgated; currently promulgated federal mobile source measures are one source of reductions available for marginal areas to attain the 2008 NAAQS and continue to occur as the fleet of older highway motor vehicles and other mobile source engines are

[13] "Chapter 2 8-Hour Ozone Nonattainment Designations and Classifications" docket item EPA-HQ-OAR-2003-0083-1812 in docket EPA-HQ-OAR-2003-0083 (downloaded November 15, 2011) and available on-line at Regulations.gov (http://www.regulations.gov).

[14] *Ibid.*

[15] *Ibid.* See also, 69 FR 23858, April 30, 2004.

replaced by new highway motor vehicles and other mobile source engines required to meet newer, more stringent emission standards.

Also of note is the apparent trend in Anne Arundel County, MD. The trend at this monitor seems to track that of the current Washington DC-MD-VA nonattainment area. In 2003, this monitor's design value was 0.001 ppm less than the design value of 0.099 ppm for Arlington County, VA and 0.005 ppm of that in Harford County, MD (which establishes the design value for the current Baltimore nonattainment area). In 2008 this monitor's design value was equal to that for the current Washington DC-MD-VA nonattainment area and 0.004 ppm less than that of Harford County. For 2010, this monitor's design value was 0.002 ppm less than the design value of 0.081 ppm for Arlington County, VA and 0.010 ppm of that in Harford County, MD. This monitor seems to track (that is, is always equal or less than) the peak in the current Washington DC-MD-VA nonattainment area and, as with the peak in the current Washington DC-MD-VA nonattainment area, has diverged from the trend in the Harford County, MD. This result suggest that the air quality data at the monitor in Anne Arundel County is more related to activity in the current Washington DC-MD-VA nonattainment area than the rest of the current Baltimore nonattainment area.

The 2008 to 2010 air quality data strongly suggest that there are two main peak points of ozone concentrations in the Washington-Baltimore-NV CSA. The first is in Harford County, Maryland in the northeast of the Washington-Baltimore-NV CSA. The second peak area is located at the Fairfax County monitor in Virginia and this peak extends into Arlington County, VA, the District of Columbia and possibly into Anne Arundel County Maryland.

A similar situation existed in 2004 when EPA designated areas for the 1997 ozone NAAQS. Harford County had the highest design value (0.103 ppm) of any monitor in the current CSA. Arlington County had the highest design value (0.099 ppm) in the current Washington DC-MD-VA nonattainment area; Fairfax County, VA and Anne Arundel County, MD both had design values close (0.097 and 0.098 ppm, respectively) to that in Arlington County, VA.

For 2008, the pattern was repeated. Harford County had the highest design value (0.091 ppm) of any monitor in the current CSA. Fairfax County, VA, the District of Columbia and Prince George's County, MD all had the highest design (0.087 and 0.098 ppm, respectively) in the current Washington DC-MD-VA nonattainment area and Anne Arundel County, MD had the same design value. All monitors in the current Washington DC-MD-VA nonattainment area are showing currently attainment of the 1997 ozone NAAQS. Except for the monitors in Harford County, MD all other monitors (including that in Anne Arundel County, MD) in the current Baltimore MD nonattainment area are currently showing attainment of the 1997 ozone NAAQS.

The air quality data over the last 7 years indicates that there are two central peak areas of nonattainment within the Washington-Baltimore-NV CSA. The first is in Harford County, MD in the far northeast portion of the Washington-Baltimore-NV CSA. The second is in the vicinity of Fairfax and Arlington Counties in Virginia and extends into the District of Columbia, and into Anne Arundel and Prince George's Counties in Maryland.

However, as stated previously in this document, a county/independent city (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. . In a CSA where counties with violating monitors are adjacent to each other and where EPA in the past concluded that there were two separate nonattainment areas, even a county with a violating monitor needs to be evaluated to see if that county sufficiently contributes to violations at another nearby, violating county. Such an evaluation can guide a decision on grouping counties with violating monitors to set the boundaries of a nonattainment area (or areas) containing more than one violating monitor.

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). Sufficiently high emissions levels in a nearby area indicate the potential for the area to contribute to monitored 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 8 shows emissions of NO_x and VOC given in tons per year (tpy) for violating and potentially contributing counties in the current Baltimore MD and Washington DC-MD-VA nonattainment areas and other portions of the Washington-Baltimore-NV CSA.

Table 8. Total 2008 NO_x and VOC Emissions.

County/City	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Current Baltimore MD Nonattainment Area:			
Anne Arundel County Co., MD	Yes	30,541	14,423
Baltimore City, MD	Yes	18,621	11,397
Carroll County, MD	Yes	6,617	3,948
Harford County, MD	Yes	5,854	6,396
Howard County, MD	Yes	9,219	7,848
Baltimore County, MD	Yes	29,392	16,807
	Baltimore Subtotal:	100,244	60,819

Table 8 (continued). Total 2008 NO_x and VOC Emissions.

County/City	State Recommended Nonattainment?	NOx (tpy)	VOC (tpy)
Current Washington DC-MD-VA Nonattainment Area:			
District of Columbia, DC	Yes	11,332	11,362
Calvert County, MD	Yes	2,797	2,406
Charles County, MD	Yes	5,823	3,939
Frederick County, MD	Yes	9,389	6,460
Montgomery County, MD	Yes	21,097	20,426
Prince George's County, MD	Yes	24,043	18,882
Arlington County, VA	Yes	5,264	4,329
Fairfax County, VA	Yes	21,403	25,603
Loudoun County, VA	Yes	6,948	7,331
Prince William County, VA	Yes	7,698	8,603
Alexandria City, VA	Yes	3,349	2,625
Fairfax City, VA	Yes	326	794
Falls Church City, VA	Yes	138	324
Manassas City, VA	Yes	553	1,020
Manassas Park City, VA	Yes	92	285
Washington DC-MD-VA Subtotal:		120,252	114,389

Table 8 (continued). Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Fredericksburg, VA Area:			
Spotsylvania County, VA	No	3,539	4,226
Stafford County, VA	No	3,377	3,516
Fredericksburg City, VA	No	859	1,007
Fredericksburg, VA Subtotal:		7,775	8,749
Frederick County, VA Area:			
Frederick County, VA	No	2,838	4,714
Winchester City, VA	No	508	1,006
Frederick Co., VA Area Subtotal:		3,346	5,720
Other counties:			
Queen Anne's County, MD	No	2,725	2,402
St. Mary's County, MD	No	3,475	4,038
Clarke County, VA	No	941	949
Culpeper County, VA	No	1,726	2,109
Fauquier County, VA	No	3,383	3,389
Warren County, VA	No	1,463	1,773
Hampshire County, WV	No	734	2,078
Jefferson County, WV	No	1,566	1,481
All other counties subtotal:		16,013	18,218
	CSA Total:	247,630	207,894

Data sources:
(1) NOx emissions (tpy)-NEI08v1.5 – Total NOx emissions include Nonpoint, Nonroad, Onroad and Facility NOx emissions from ftp://ftp.epa.gov/EmisInventory/2008_nei/v1.5_GPR (May 19, 2011).
(2) VOC emissions (tpy)-NEI08v1.5 –Total VOC emissions include Nonpoint, Nonroad, Onroad and Facility VOC emissions from ftp://ftp.epa.gov/EmisInventory/2008_nei/v1.5_GPR (May 19, 2011)

The current Washington DC-MD-VA nonattainment area contains 48.5% of the Washington-Baltimore-NV CSA's total NOx emissions and 55% of the Washington-Baltimore-NV CSA's total VOC emissions.

The current Baltimore nonattainment area contains 40.5% of the Washington-Baltimore-NV CSA's total NOx emissions and 29% of the Washington-Baltimore-NV CSA's total VOC emissions.

Together the current Washington DC-MD-VA and Baltimore nonattainment areas contain 89% of the Washington-Baltimore-NV CSA's total NOx emissions and 84% of the Washington-Baltimore-NV CSA's total VOC emissions.

In the Washington-Baltimore-NV CSA, Anne Arundel, Baltimore, Prince George's and Montgomery Counties in Maryland and Fairfax County in Virginia comprise the "top five" [16] when ranking by VOC or by NOx emissions (with first being highest). An area in the "top five" within the Washington-Baltimore-NV CSA needed to have NOx emissions of more than 20,000 tpy or VOC emissions of more than 14,000 tpy. With the exception of Montgomery County, MD, all of these areas contain monitors violating the 2008 ozone NAAQS. Montgomery County, MD is adjacent to two counties that contain monitors violating the 2008 ozone NAAQS. Likewise, Anne Arundel, Baltimore, and Prince George's Counties in Maryland and Fairfax County are adjacent to one or more counties or the District of Columbia which contain a monitor violating the 2008 ozone NAAQS.

The following comprise the next six highest ranked (that is, numbers 6 through 11 within the Washington-Baltimore-NV CSA) for VOC or NOx emissions (not listed in order of ranking): Baltimore City and Frederick and Howard Counties in Maryland, the District of Columbia, and, Loudoun and Prince William Counties in Virginia. An area ranking 6th through 11th within the Washington-Baltimore-NV CSA needed to have NOx emissions of between 6,900 and 20,000 tpy or VOC emissions of between 6,400 and 14,000 tpy. Of these, only the District of Columbia has two of three monitors violating the 2008 ozone NAAQS. Loudoun County, VA and Frederick County each has a monitor with a design value of 0.075 ppm which is only one ppm from violating the 2008 ozone NAAQS. All are adjacent to one or more counties or the District of Columbia which contain at least monitor violating the 2008 ozone NAAQS.

Of these "top 11" counties for emissions, Frederick, Montgomery, Prince George's Counties in Maryland, the District of Columbia, and, Fairfax and Loudoun Counties in Virginia are clustered around the Fairfax County monitor which has a design value of 0.081 ppm.

Of the top eleven, only Baltimore County, MD is adjacent to Harford County, MD which contains the Edgewood monitor which has a design value of 0.089 ppm.

The low emissions of the Cities of Fairfax, Falls Church, Manassas and Manassas Park in Virginia result in low ranking for emissions when the jurisdictions in the Washington-Baltimore-NV CSA are ranked by emissions from highest to lowest. The Cities of Fairfax, Falls Church, and Manassas Park rank 32nd, 33rd, and 34th (of 34) in the Washington-Baltimore-NV CSA. Manassas City ranks 28th for VOC and 30th for NOx within the Washington-Baltimore-NV CSA. However, these are cities with very small land areas and are entirely surrounded or wedged in between larger counties. Table 9 compares the emissions and emission density of these cities with those jurisdictions that entirely surround these cities. Data for Alexandria City and with the District of Columbia are also presented to provide emissions densities for other highly urbanized areas.

[16] The groupings by ranking were set to divide the 34 jurisdictions into four groups. To some extent the groups fell out naturally and are composed as follows: The same five jurisdictions ranked first to fifth for both NOx and VOC emissions and thus defined the "top five." The same six jurisdictions fell within a rank of sixth through eleventh for both NOx and VOC emissions and thus defined the second group of sixth through eleventh. A "middle group" of those ranked between 12th and 23rd inclusive included the same twelve jurisdictions where: Calvert County, MD ranked at 22nd for both NOx and VOC emissions; and Queen Anne's County, MD ranked at 23rd for both NOx and VOC emissions. Jurisdictions with less than approximately 2,500 tpy NOx or 2,200 tpy VOC represent less than one per of the CSA total emissions and comprise those areas ranked 24th or lower.

Table 9. Total 2008 NO_x and VOC Emissions Densities of Selected Cities and Counties.

County	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)	Land Area (sq. mi.)	Emissions Density NO_x (tpy/sq. mi.)	Emissions Density VOC (tpy/sq. mi.)
District of Columbia	Yes	11,332	11,362	67.9	166.89	167.34
Fairfax Co., VA	Yes	21,403	25,603	405.9	52.73	63.08
Fairfax City, VA	Yes	326	794	6.1	53.37	130.21
Falls Church City, VA	Yes	138	324	2.0	68.80	162.14
Arlington Co., VA	Yes	5,264	4,329	25.8	204.04	167.78
Prince William Co., VA	Yes	7,698	8,603	348.9	22.06	24.66
Manassas City, VA	Yes	553	1,020	10.1	54.74	100.98
Manassas Park City, VA	Yes	92	285	1.5	61.25	190.25
Alexandria City, VA	Yes	3,349	2,625	15.2	220.35	172.70
Notes: "sq. mi." means square miles.						

As can be seen from this table, the Cities of Fairfax, Falls Church, Manassas and Manassas Park have emissions densities in tons per year per square mile equal or greater than the surrounding county in the cases of the Cities of Fairfax, Manassas and Manassas Park. In the case of Falls Church City, Falls Church has emissions densities greater than Fairfax County but less than Arlington County. Due to Virginia's system of governance, these cities are inventoried separately; in most other states (Baltimore City in Maryland being one exception), such high density areas such as cities are not. The Cities of Fairfax, Falls Church, Manassas and Manassas Park can be considered to be high emissions areas on the basis of their emissions densities as opposed to their absolute emissions.

As for Arlington County and Alexandria City in Virginia, these rank, respectively, 14th and 21st for VOC emissions and 15th and 20th for NOx, respectively. These jurisdictions are small in absolute land area but the emissions densities are the highest in the both the DC-MD-VA nonattainment area and the Washington-Baltimore-NV CSA. Both are adjacent to other areas containing a monitor violating the 2008 NAAQS.

Of the remaining two counties, Charles and Calvert in the current Washington DC nonattainment area, these two rank in the "middle group" (between 12th and 23rd inclusive): Calvert County, MD ranks low in this "middle group" – 22nd within the Washington-Baltimore-NV CSA for both NOx and VOC, respectively; Charles County, MD ranks higher than Calvert in this "middling" group – 18th and 14th for VOC and NOx emissions, respectively. Both are adjacent to counties with violating monitors. Of the two, Charles is more likely to be upwind of a violating monitor because it is southeast of the Fairfax County, VA monitor, west-southwest of the monitor in Calvert County, MD and south-southwest of the Equestrian Center monitor in Prince George's County, MD; Calvert County is due south of the monitor in Anne Arundel County, MD and south-southeast of the Equestrian Center monitor in Prince George's County, MD.

Of the remaining two counties, Harford and Carroll in the current Baltimore nonattainment area, these two rank in the middle (between 12th and 23rd inclusive): Carroll County, MD ranks in the middle or high in this "middling" group – 17th and 12th for VOC and NOx emissions, respectively; Harford County, MD ranks higher than Carroll in this "middling" group – 12th and 13th for VOC and NOx

emissions, respectively. Both are adjacent to counties with violating monitors. Of the two, Carroll County is more likely to be upwind of a violating monitor because it is west-southwest to west of the Padonia monitor in Baltimore County, MD. Harford County, MD is adjacent to Baltimore County, MD but one can expect that it is unlikely to be upwind of either violating monitor in Baltimore County because both monitors in Harford County were sited to be downwind of the urbanized core of both Baltimore City and County.

In general, the counties and cities in the current Baltimore and Washington nonattainment areas likely sufficiently contribute to nonattainment at one or more monitors in at least one of these two areas because the County has a violating monitor, because the county or city is adjacent to a county with a violating monitor or the small city has emissions densities comparable to or higher than surrounding or adjacent areas.

Of the other areas or the counties listed under "other counties" in the preceding table most have low emissions and are remote from areas containing a monitor violating the 2008 NAAQS:

(1) The Frederick County, VA Area contains 1.4% and 2.8% of the Washington-Baltimore-NV CSA NOx and VOC emissions, respectively. As a whole this area would rank 18th for NOx emissions and 13th (the actual rank for Frederick County, VA alone) for VOC emissions. If the Frederick County, VA Area was included with the current Washington DC-MD-VA nonattainment area, the emissions of the Frederick County, VA Area would be about 2.7and 4.8 percent of such an area's NOx and VOC emissions, respectively. (For example, for VOC emissions, 2.7% = 3,346/(3346+120,252) * 100.) This area is remote from any counties with violating monitors and is separated from the current Washington DC-MD-VA nonattainment area by the sparsely populated Clarke and Warren Counties in Virginia.

(2) Hampshire County (emissions rankings within CSA: 25th for VOC & 29th for NOx) is remote from any violating monitor in the Washington-Baltimore-NV CSA and likewise has low emissions (1 percent or less of the Washington-Baltimore-NV CSA's total for either NOx or VOC) in spite of its size (644 square miles). If included with the current Washington DC-MD-VA nonattainment area, its emissions would be about 1.8 percent or less of such an area's NOx or VOC emissions, respectively. The nearest monitors in the Washington-Baltimore-NV CSA or elsewhere are those in Frederick County, VA and Berkeley County, WV. These have a design value well less than the 2008 NAAQS of 0.075 ppm. The design values are 0.068 ppm for Frederick County, VA and 0.070 ppm for Berkeley County, WV (Data source: Table 5 to ozone_dv75_20082010.xls (downloaded on 9/22/2011 from http://www.epa.gov/airtrends/values.html).

(3) Clarke (emissions rankings within CSA: 27th for VOC & 31st for NOx) and Warren (emissions rankings within CSA: 26th for both VOC for NOx) Counties in Virginia each comprise less than one percent of CSA total for either NOx or VOC emissions. If either were included with the Current Washington DC-MD-VA nonattainment area, the emissions of either would be less than 1.6 percent of such an area's NOx or VOC emissions, respectively. The nearest monitors within the CSA are attaining the 2008 NAAQS.

(4) Queen Anne's County MD (emissions rankings within CSA: 23th for both VOC & NOx) is at the bottom of the "middling" group (12th through 23rd inclusive) in the Washington-Baltimore-NV CSA. Its emissions are 1.1 to 1.2 percent of the Washington-Baltimore-NV CSA's total for NOx or VOC. If included with the current Baltimore nonattainment area, its emissions would be about 2.9 and 3.5 percent of such an area's NOx and VOC emissions, respectively. Its emissions would add about 2.7 to

3.8 percent. Queen Anne's County is in close proximity (that is separated from adjacent counties in the Washington-Baltimore-NV CSA by stretches of the Chesapeake Bay) to several violating monitors, namely the Essex monitor in Baltimore County and the monitor in Anne Arundel County. Because Queen Anne's County is in the Ozone Transport Region (OTR), section 184 of the CAA requires many sources of VOC and major stationary sources of NOx be controlled by reasonably available control technology (RACT) pursuant to sections 182(b)(2) and 182(f) and requires major stationary sources of VOC and NOx be subject to nonattainment new source review (NSR) requirements at the OTR major stationary source thresholds. Also motor vehicles in Queen Anne's County are subject to enhanced inspection and maintenance program (enhanced I/M) as required by section 184 of the CAA.[17]

(5) Jefferson County, WV (emissions rankings within CSA: 27th for VOC & 25th for NOx), if included with the current Washington DC-MD-VA nonattainment area, would comprise about 1.3 percent of such an area's NOx or VOC emissions, respectively.

(6) Fauquier County, VA emissions rankings within CSA: 20th for VOC & 18st for NOx is in the "middling" group (ranks 12th through 23rd inclusive) of the Washington-Baltimore-NV CSA. If included with the current Washington DC-MD-VA nonattainment area, its emissions would be about 2.7 and 2.9 percent of such an area's NOx and VOC emissions, respectively. However, Fauquier County is not adjacent to a county containing a monitor violating the 2008 NAAQS. Both the geographically nearest monitors (in Stafford and Prince William Counties, VA) have a design value of 0.070 ppm well below the 2008 NAAQS.

(7) Culpeper County, VA (emissions rankings within CSA: 24th for both VOC & NOx) is just below the "middling" group. If included with the current Washington DC-MD-VA nonattainment area, its emissions would be about 1.4 and 1.8 percent of such an area's NOx and VOC emissions, respectively. Culpeper County is even more remote than the adjacent Fauquier County from any county containing a monitor violating the 2008 NAAQS.

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(8) St. Mary's County, MD ranks in the "middle" within the Washington-Baltimore-NV CSA (17th for NOx and 16th for VOC) for NOx and VOC emissions. If included with the current Washington DC-MD-VA nonattainment area, its emissions would be about 2.8 and 3.4 percent of such an area's NOx and VOC emissions, respectively. St. Mary's County is adjacent to Calvert County which does contain a monitor violating the 2008 NAAQS.

(9) The Fredericksburg, VA Area contains the following areas: Stafford County (emissions rankings within CSA: 19th for both VOC & NOx); Spotsylvania County (emissions rankings within CSA: 16th for NOx and 15th for VOC); and Fredericksburg City (emissions rankings within CSA: 28th for NOx and 29th for VOC). The total emissions in the Fredericksburg, VA Area are about 6.5 and 7.7 percent of the current Washington DC-MD-VA nonattainment area's NOx and VOC emissions, respectively. Alone, Spotsylvania County's emissions are about 2.8 and 3.1 percent of the current Washington DC-MD-VA nonattainment area's NOx and VOC emissions, respectively; the nearest monitors to Spotsylvania County are those in Fauquier and Stafford Counties in Virginia and Charles County in Maryland. The former two monitors are easily attaining the 2008 NAAQS. All of these three monitors are interposed

[17] See, 61 FR 56183 at 56185, October 31, 1996 for details on the OTR enhanced I/M requirements in Maryland. The relevant provisions that define the geographic scope of Maryland's enhanced I/M program can be found in Code of Maryland Regulations (COMAR) 11.14.08.02B (19) and 11.14.08.03 in the approved Maryland SIP – see 40 CFR 51.1070(c). Copies of COMAR 11.14.08.02B(19) and 11.14.08.03 are available on-line via http://yosemite.epa.gov/r3/r3sips.nsf/SIPIndex!OpenForm

between Spotsylvania County and violating monitors in the Washington-Baltimore-NV CSA. (Another monitor in an adjacent county is that in Caroline County, VA which is attaining the 2008 NAAQS with a design value of 0.073 ppm [Data source: Table 5 to ozone_dv75_20082010.xls (downloaded on 9/22/2011 from http://www.epa.gov/airtrends/values.html)]). If Spotsylvania County contributes to ozone levels in other counties its highest contribution is likely to any one of these three counties. If Spotsylvania and Stafford Counties were included in a nonattainment area encompassing the current Washington DC-MD-VA nonattainment area or one consisting of both the current Baltimore and Washington DC-MD-VA nonattainment areas, then Fredericksburg City should also be included because although its absolute emissions are low its emissions densities exceed that of each of the two surrounding counties.

If added to the current Washington DC-MD-VA nonattainment area, the total emissions of Stafford County alone would be about 2.8 and 3.0 percent of the combined area's NOx and VOC emissions, respectively. For the case where a combination of Stafford County and Fredericksburg City are included in such an expanded nonattainment area, their combined emissions would be about 3.4 and 3.8 percent of such an area's NOx and VOC emissions, respectively. The monitor in Stafford County is in the northeast corner of the county and is interposed between much of the county's (or the combined emissions of the county plus Fredericksburg City) and the violating monitor in Fairfax County. The attaining monitor in Charles County, MD is interposed between Stafford County and the violating monitor in Calvert County, MD. Likewise, the attaining monitors in Stafford and Fauquier Counties in Virginia and the attaining monitor in Charles County Maryland are interposed between Spotsylvania County and Fredericksburg City and the violating monitors in Calvert County, MD and Fairfax County, VA.

Finally, Stafford County is in the OTR. Section 184 of the CAA requires that in attainment areas within the OTR many sources of VOC and major stationary sources in the OTR of NOx be controlled by reasonably available control technology (RACT) pursuant to sections 182(b)(2) and 182(f) and requires major stationary sources of VOC and NOx be subject to nonattainment NSR requirements at the OTR major stationary source thresholds. Also motor vehicles in Stafford County are subject to enhanced I/M as required by section 184 of the CAA.[18]

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. Tables 10 and 11 show the population, land area, population density (in thousands of persons per square mile), and population growth information for each county/city in the Washington-Baltimore-NV CSA.

[18] See 61 FR 57343 at 57346, November 6, 1996 for details on the OTR enhanced I/M requirements for Virginia. The relevant provisions that define the geographic scope of Virginia's enhanced I/M program can be found in 9 VAC 5-91-20 and 9 VAC 5-91-30 in the approved Virginia SIP – see 40 CFR 51.2420(c). Copies of 9 VAC 5-91-20 and 9 VAC 5-91-30 are available on-line via http://yosemite.epa.gov/r3/r3sips.nsf/SIPIndex!OpenForm.

Table 10. Population and Growth in the Current Baltimore and Washington DC-MD-VA Nonattainment Area Portions of the Washington-Baltimore-NV CSA.

County	State Recommended Nonattainment?	2010 Population	Land Area (sq. mi.)*	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Current Baltimore MD Nonattainment Area:						
Anne Arundel Co., MD	Yes	537,656	452	1.19	46,325	+9%
Baltimore City, MD	Yes	620,961	87	7.14	(27,626)	-4%
Carroll Co., MD	Yes	167,134	453	0.37	15,557	+10%
Harford Co., MD	Yes	244,826	460	0.53	25,362	+12%
Howard Co., MD	Yes	287,085	253	1.13	37,565	+15%
Baltimore Co., MD	Yes	805,029	624	1.29	49,037	+6%
	Baltimore Subtotals:	2,662,691	2,330	1.14	146,220	+6%
Current Washington DC-MD-VA Nonattainment Area:						
District of Columbia, DC	Yes	601,723	68	8.86	30,000	+5%
Calvert Co., MD	Yes	88,737	237	0.37	13,573	+18%
Charles Co., MD	Yes	146,551	473	0.31	25,347	+21%
Frederick Co., MD	Yes	233,385	666	0.35	36,884	+19%
Montgomery Co., MD	Yes	971,777	506	1.92	94,282	+11%
Prince George's Co., MD	Yes	863,420	493	1.75	60,213	+7%
Arlington Co., VA	Yes	207,627	26	8.05	18,045	+10%
Fairfax Co., VA	Yes	1,081,726	406	2.67	106,808	+11%
Loudoun Co., VA	Yes	312,311	521	0.60	138,440	+80%
Prince William Co., VA	Yes	402,002	349	1.15	118,206	+42%
Alexandria City, VA	Yes	139,966	15	9.21	10,626	+8%
Fairfax City, VA	Yes	22,565	6	3.70	929	+4%
Falls Church City, VA	Yes	12,332	2	6.17	1,940	+19%
Manassas City, VA	Yes	37,821	10	3.74	2,466	+7%
Manassas Park City, VA	Yes	14,273	2	9.52	3,934	+38%
Washington DC-MD-VA Subtotals:		5,136,216	3,779	1.36	661,693	+15%

Table 11. Population and Growth in Other Portions of the Washington-Baltimore-NV CSA.

County	State Recommended Nonattainment?	2010 Population	Land Area (sq. mi.)*	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Fredericksburg, VA Area:						
Spotsylvania Co., VA	No	122,397	412	0.30	30,891	+34%
Stafford Co., VA	No	128,961	280	0.46	35,437	+38%
Fredericksburg City, VA	No	24,286	11	2.29	4,922	+25%
Fredericksburg, VA Subtotals:		275,644	702	0.39	71,250	+35%

Frederick County, VA Area:						
Frederick Co., VA	No	78,305	415	0.19	18,725	+31%
Winchester City, VA	No	26,203	9	2.82	2,510	+11%
Frederick Co., VA Area Subtotals:		104,508	425	0.25	21,235	+26%
Other counties:						
Queen Anne's Co., MD	No	47,798	395	0.12	7,031	+17%
St. Mary's Co., MD	No	105,151	402	0.26	18,631	+22%
Culpeper Co., VA	No	46,689	382	0.12	12,215	+35%
Clarke Co., VA	No	14,034	178	0.08	1,333	+10%
Fauquier Co., VA	No	65,203	651	0.10	9,615	+17%
Warren Co., VA	No	37,575	216	0.17	6,025	+19%
Hampshire Co., WV	No	23,964	644	0.04	3,673	+18%
Jefferson Co., WV	No	53,498	212	0.25	11,059	+26%
All other counties subtotals:		393,912	3,080	0.13	69,582	+21%
CSA Totals:		8,572,971	10,315	0.83	969,980	+13%
* Values are rounded to nearest whole number; sub-totals and CSA total may not add-up due to rounding.						

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).

The current Washington DC-MD-VA nonattainment area contains 59.9% of the Washington-Baltimore-NV CSA's total population and 68.2% of the Washington-Baltimore-NV CSA's total absolute change in population. The Cities of Fairfax, Falls Church, Manassas and Manassas Park once again have lower absolute populations and change in population but these areas are generally more densely populated than the surrounding county or nearby counties. The exception is Falls Church City which has a density less than Arlington County on one side (6.17 versus 8.05) but twice as high as Fairfax County (6.17 versus 2.67) on its other side. Some densely populated cities had low growth rates less than the area's overall rate while others such as Falls Church were slightly greater than the area's overall rate while Manassas Park's was over twice the area's overall rate. Of the other portions, those with the highest population densities grew at a rate less than the area's overall rate, and, conversely those with population densities less than the area's overall average grew more quickly. The fastest growing areas are in Virginia (Loudoun and Prince William Counties) both of which border Fairfax County which has a monitor violating the 2008 NAAQS. Just over half (55%) of the population live in the areas – the District of Columbia and Fairfax, Arlington Charles, Prince George's and Calvert Counties – that contain one or more monitors violating the 2008 NAAQS. Adding in those who live in areas adjacent to these areas with violating monitors (that is the entire current Washington DC-MD-VA nonattainment area less Frederick County Maryland) encompasses 95 percent of the current nonattainment area's population; Frederick County is however adjacent to Carroll County, MD that contains a monitor violating the 2008 NAAQS.

The current Baltimore nonattainment area contains 38.1% of the Washington-Baltimore-NV CSA's total population and 15.1% of the Washington-Baltimore-NV CSA's total absolute change in population. Of the areas in the current Baltimore NAA, Howard and Harford Counties had growth rates appreciably higher than the area's overall rate. Carroll County is the least densely populated area in the nonattainment area and had a growth rate greater than the area's overall rate. Well over half (63%) the area's population lives in Harford and Baltimore Counties, and, Baltimore City and thus are in close

proximity to the Edgewood monitor with the highest design value in the Washington-Baltimore-NV CSA's and the current Baltimore nonattainment area. Well over half (64%) the area's population lives in Howard and Baltimore Counties, and, Baltimore City and thus are in close proximity to the monitors in Baltimore County. Anne Arundel County is adjacent to the heavily populated Prince George's County, MD and Howard County which had the highest growth rate in the Baltimore nonattainment area and had a growth rate comparable to the faster growing current Washington DC-MD-VA nonattainment area.

Together the current Washington DC-MD-VA and Baltimore nonattainment areas contain 91.0% of the Washington-Baltimore-NV CSA's total population and 83.3% of the overall change within the Washington-Baltimore-NV CSA. Most of the areas within these two current nonattainment areas are moderately to very densely populated. In general, the counties and cities in the current Baltimore and Washington nonattainment areas likely sufficiently contribute to nonattainment at one or more monitors in at least one of these two areas because the County has a violating monitor, because the county or city is adjacent to a county with a violating monitor or the small city has a population density comparable to or higher than surrounding or adjacent areas.

Of the other areas or the counties listed under "other counties" in the preceding table most are relatively sparsely populated or remote from areas containing a monitor violating the 2008 NAAQS:

(1) The Frederick County, VA Area still contains only 1.2% of the Washington-Baltimore-NV CSA's population in spite of its growth rate of twice the overall rate in the Washington-Baltimore-NV CSA. This area is remote from any counties with violating monitors and is separated from the current Washington DC-MD-VA nonattainment area by the sparsely populated Clarke and Warren Counties in Virginia. This area's *total population* is less than the *absolute population change* in Fairfax County, Loudoun County or Prince William County in Virginia.

(2) Hampshire County is remote from any violating monitor in the Washington-Baltimore-NV CSA and is likewise sparsely populated. It growth rate is not appreciably greater than that of the Washington-Baltimore-NV CSA as a whole and its absolute population change is one-tenth that of Frederick County, MD which has a similar land area and growth rate.

(3) Clarke and Warren Counties in Virginia are sparsely populated and their absolute change in population is small in comparison to areas within the current Washington DC-MD-VA nonattainment area. Clarke County has a population that is less than all other areas in the Washington-Baltimore-NV CSA except the very small Falls Church City.

(4) Queen Anne's County MD has a growth rate nearly three times that of the current Baltimore nonattainment area but both the absolute change and the absolute population are small. It is still sparsely populated.

(5) Jefferson County, WV had a growth rate twice the overall rate in the Washington-Baltimore-NV CSA. It is still sparsely populated and is not adjacent to a county containing a monitor violating the 2008 NAAQS. In addition, Jefferson County's *total population* is half the *absolute population change* in the adjacent Loudoun County, VA.

(6) Fauquier County, VA had a growth rate comparable to that of the current Washington DC-MD-VA nonattainment area (17% versus 15%) but its absolute change was small – around 9,600 which is one

one-hundredth of the Washington-Baltimore-NV CSA's overall change or 1.5% of that for the current Washington DC-MD-VA nonattainment area. Fauquier County is still sparely populated and is not adjacent to a county containing a monitor violating the 2008 NAAQS.

(7) The situation for Culpeper County, VA is similar to that for Fauquier County, VA. Culpeper had a growth rate of 35 percent. In addition, it is still sparely populated and has a smaller population than Fauquier County. However, Culpeper County is even more remote from any county containing a monitor violating the 2008 NAAQS.

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(8) St. Mary's County, MD is the most populous and most densely populated of the "other counties." Even so, its *total population* is less than the *absolute population change* in Fairfax County, Loudoun County or Prince William County in Virginia. St. Mary's County is less densely populated than any county or city in either the Washington DC-MD-VA or Baltimore nonattainment areas. Its absolute population is greater than Calvert County, MD which is smaller in size. St. Mary's County is adjacent to Calvert County which does contain a monitor violating the 2008 NAAQS.

(9) The Fredericksburg, VA Area had not insubstantial growth. Its individual jurisdictions grew at a rate from about two to three times faster than the Washington-Baltimore-NV CSA's overall rate and overall at a rate twice that of the current Washington DC-MD-VA nonattainment area. In terms of land area and population density it is somewhat comparable to Frederick County, MD, but it had an absolute change in population almost twice Frederick County. Unlike Fredrick County, MD, the Fredericksburg, VA Area is not adjacent to any county with a monitor violating the 2008 NAAQS.

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 (see Figure 1 above); 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. Table 12 shows the total vehicle miles traveled (VMT) and total number of commuters for each county within the Washington-Baltimore-NV CSA.

Table 12. Traffic and Commuting Patterns.

County	State Recommended Nonattainment?	2008 VMT (million miles)	Total Commuters
Current Baltimore MD Nonattainment Area:			
Anne Arundel Co., MD	Yes	5,759	255,425
Baltimore City, MD	Yes	3,619	249,125
Carroll Co., MD	Yes	1,272	77,394
Harford Co., MD	Yes	2,324	111,398
Howard Co., MD	Yes	3,793	134,596
Baltimore Co., MD	Yes	8,227	373,013
	Baltimore Subtotals:	24,994	1,200,951
Current Washington DC-MD-VA Nonattainment Area:			
District of Columbia, DC	Yes	3,685	260,296

Calvert Co., MD	Yes	764	37,355
Charles Co., MD	Yes	1,260	61,504
Frederick Co., MD	Yes	2,932	102,033
Montgomery Co., MD	Yes	7,443	454,680
Prince George's Co., MD	Yes	8,718	396,948
Arlington Co., VA	Yes	1,634	115,614
Fairfax Co., VA	Yes	10,484	526,655
Loudoun Co., VA	Yes	1,567	92,040
Prince William Co., VA	Yes	3,094	150,274
Alexandria City, VA	Yes	793	76,811
Fairfax City, VA	Yes	177	11,753
Falls Church City, VA	Yes	62	5,803
Manassas City, VA	Yes	290	18,077
Manassas Park City, VA	Yes	27	5,415
Washington DC-MD-VA Subtotals:		42,929	2,315,258
Fredericksburg, VA Area:			
Spotsylvania Co., VA	No	1,256	45,132
Stafford Co., VA	No	1,698	48,202
Fredericksburg City, VA	No	363	9,564
Fredericksburg, VA Subtotals:		3,317	102,898
Frederick County, VA Area:			
Frederick Co., VA	No	542	30,167
Winchester City, VA	No	135	11,865
Frederick Co., VA Area Subtotals:		677	42,032
Other counties:			
Queen Anne's Co., MD	No	923	20,736
St. Mary's Co., MD	No	822	43,101
Clarke Co., VA	No	300	6,438
Culpeper Co., VA	No	520	15,951
Fauquier Co., VA	No	1,055	28,103
Warren Co., VA	No	435	15,286
Hampshire Co., WV	No	216	8,255
Jefferson Co., WV	No	388	20,937
	All other counties subtotals:	4,659	158,807
	CSA Totals:	76,576	3,819,946

* MOBILE model VMTs are those inputs into the NEI version 1.5.
** U.S. Census Bureau estimates for 2000 County-to-County Worker Flow http://www.census.gov/hhes/commuting/data/commuting.html.

Together the current Washington DC-MD-VA and Baltimore nonattainment areas contain 88.7 percent of total VMT and 92 percent of the total commuters within the Washington-Baltimore-NV CSA.

As stated previously in this document, 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. These similar factors include degree of urbanization which is used to define a "central county (or counties)" in a CBSA and certain employment related commuting indices which are used to join "outlying counties" to "central county (or counties)" to form a CBSA. One or more CBSAs are always joined if the "employment interchange rate" [19] is 25 percent and may be joined to form a CSA if the "employment interchange rate" is at least 15 percent between these two CBSAs. [20] Therefore, there is some degree of urbanization and commuting within the CBSAs comprising the Washington-Baltimore-NV CSA and some degree of commuting between CBSAs within this CSA. However, when a county's number of commuters or VMT are a significant fraction of another county's, such a county cannot indicate the presence of as much motor vehicle emissions that may contribute to ozone formation as the county with the higher VMT or number of commuters.

The current Washington DC-MD-VA nonattainment area contains 56.1% of the total VMT and 60.6% of total commuters within the Washington-Baltimore-NV CSA. There is a vast disparity in the absolute VMT values within the current Washington DC-MD-VA nonattainment area: excluding such physically small areas as the Cities of Fairfax, Falls Church, Manassas and Manassas Park, the VMT of Fairfax County, VA is over 13 times that of Calvert County, MD. The top three in terms of absolute VMT are Fairfax County, VA and Montgomery and Prince George's Counties in Maryland. Together they comprise 26,644 million (62%) of 42,929 million VMT for the current Washington DC-MD-VA nonattainment area. Together they contain or enclose all the violating monitors within the current Washington DC-MD-VA nonattainment area except that in Calvert County, MD. The next three areas in terms of VMT are the District of Columbia, Prince William County, VA and Frederick County, MD which comprise 9,711 million (22.6%) of 42,929 million VMT for this current nonattainment area. Filling out 95 percent of the VMT in the current Washington DC-MD-VA nonattainment area are the combined VMT of Loudoun and Arlington Counties in Virginia and Charles County, MD with 4,461 million (10.4%) of 42,929 million. With respect to the Cities of Alexandria, Fairfax and Falls Church, these are all adjacent to an area that contains a violating monitor. With respect to the Cities of Manassas and Manassas Park, these two cities under this factor might or might not sufficiently contribute to nonattainment within the Washington-Baltimore-NV CSA but should be included in a nonattainment area if the surrounding county of Prince William County is. As far as VMT is concerned, Calvert County is on the edge of the Washington-Baltimore-NV CSA and has the lowest VMT of any area within the current Washington DC-MD-VA nonattainment area exclusive of the smaller independent cities in Virginia. Calvert County is adjacent to two counties (Prince George's and Anne Arundel) in Maryland containing a violating monitor.

The current Baltimore nonattainment area contains 32.6% of the Washington-Baltimore-NV CSA's total VMT and 31.4% of the Washington-Baltimore-NV CSA's total commuters. Of the areas in the current Baltimore NAA, all except Baltimore City and Howard contain a violating monitor. Baltimore and Anne Arundel Counties rank one and two for total VMT and for total number of commuters within the current Baltimore nonattainment area. Carroll County has the lowest VMT and number of commuters

[19] The "employment interchange rate" between two areas is defined as the sum of the percentage of employed residents of the area with the smaller total population who work in the area with the larger total population and the percentage of employment in the area with the smaller total population that is accounted for by workers residing in the area with the larger total population. See, 64 FR 56628 at 56643, October 20, 1999.

[20] See "*Section 8. Combining Adjacent Core Based Statistical Areas*," 65 FR 82228 at 82237, December 27, 2000. These current standards came into use starting 2003 (65 FR 82228 at 82235-82236) and will be replaced in 2013 when the 2010 standards come into force (75 FR 37246 at 37249, June 28, 2010).

within the current Baltimore nonattainment area. As far as absolute VMT, the ratio of the highest to the smallest value is about 6.5 to 1. Carroll and Harford Counties are at the bottom. Carroll County's VMT comprises about 5% of current Baltimore nonattainment area's VMT. Harford County likely contributes to the ozone violation at the two monitors located within Harford County; because these monitors were located to be downwind of the main urbanized core surrounding Baltimore City, Harford County might not be a contributor to violations at other monitors in the Washington-Baltimore-NV CSA but rather more a receptor of ozone and precursor emissions from within the Washington-Baltimore-NV CSA.

In general, the counties and cities in the current Baltimore and Washington nonattainment areas likely sufficiently contribute to nonattainment at one or more monitors in at least one of these two areas because in most cases commuting patterns and VMT favor inclusion and most are adjacent to a county containing a violating monitor.

Of the other areas or the counties listed under "Other counties" in the preceding table, all but one have less than 1,000 million VMT. Together these eight "other" counties comprise 6.1 percent of the Washington-Baltimore-NV CSA's total VMT and comprise 4.2 percent of the Washington-Baltimore-NV CSA's total commuters. Of these "Other counties," St. Mary's and Queen Anne's in Maryland with Fauquier in Virginia comprise most of the VMT and total commuters of these eight "other" counties. Table 13 shows the share (as a percentage of the Washington-Baltimore-NV CSA's total) of Fauquier, Queen Anne's, and St. Mary's Counties of the VMT and total commuters and compares these three with the remaining five "Other" counties:

Table 13. Traffic and Commuting Patterns – Fauquier, Queen Anne's and St. Mary's Counties as a Percentage of CSA Totals.

County, State	2008 VMT (% of CSA total)	Number commuting to any violating counties (% of CSA total)	Total Commuters (% of CSA total)
Fauquier Co., VA	1.4%	0.3%	1.1%
St. Mary's Co., MD	1.1%	0.3%	1.1%
Queen Anne's Co., MD	1.2%	0.3%	0.5%
Subtotal:	3.7%	0.9%	2.8%
Subtotal for Clarke, Culpeper, & Warren Counties, VA and Hampshire & Jefferson Counties, WV	2.4%	0.4%	1.4%
Total eight "other" counties	6.1%	1.3%	4.2%
Share of Fauquier, Queen Anne's, and St. Mary's Counties	60.1%	72.1%	67.3%

(1) The Frederick County, VA Area contains less than 1 percent of the Washington-Baltimore-NV CSA's VMT or those "commuting to or within any violating counties." The area's VMT (677 million) is less than any other area within the current Washington nonattainment area (independent cities

excepted). The total number of commuters is 1.1 percent of the total number of commuters in the Washington-Baltimore-NV CSA. This area is remote from any counties with violating monitors and is separated from the current Washington DC-MD-VA nonattainment area by Clarke and Warren Counties in Virginia.

(2) Hampshire County is remote from any violating monitor in the Washington-Baltimore-NV CSA and likewise has low VMT (216 million). The VMT is less than all but the three smallest independent cities in the current Washington nonattainment area.

(3) Clarke and Warren Counties in Virginia have low VMT which is only greater than some of the small independent cities of comparable population (Manassas Park City and Manassas City, respectively) in the Washington-Baltimore-NV CSA.

(4) Queen Anne's County MD has 20,576 total commuters which is less than one-third the number of the next lowest county (Carroll County with 77,394) in the Baltimore-Towson, MD MSA but only one-half percent (0.5%) of the Washington-Baltimore-NV CSA's total or 1.7 percent of the total for the current Baltimore nonattainment area. Queen Anne's County is only connected to the rest of the MSA by the Chesapeake Bay Bridge (U.S. Routes 50 and 301) across the Chesapeake Bay to Anne Arundel County (see Figure 1 which shows a road crossing the Chesapeake Bay from Queen Anne's to Anne Arundel). Queen Anne's has 923 million VMT (1.2% of the Washington-Baltimore-NV CSA's total or 3.7% of the current Baltimore nonattainment area) which is comparable to that of Carroll County ((1,272 million) even though Queen Anne's population is roughly one third of Carroll's (47,798 versus 167,134).

(5) Jefferson County, WV has low VMT (388 million) which is only greater than some of the small independent cities of comparable population (Manassas Park City and Manassas City combined). Jefferson County is not adjacent to a county containing a monitor violating the 2008 NAAQS.

(6) Fauquier County, VA has the most VMT of these "other counties" at 1,055 million (1.4% of the Washington-Baltimore-NV CSA's total or 2.5% of the total for the current Washington-DC-MD-VA nonattainment area) which is comparable to Charles County, MD (1,260 million) which has twice the population (146,551 versus 65,203) but is greater than that of Calvert County, MD (764 million VMT) of slightly greater population. Fauquier County has fewer commuters than either Charles or Calvert Counties. Fauquier County is separated from the nearest counties with violating monitors by Loudoun and Prince William Counties in Virginia.

(7) The situation for Culpeper County, VA is similar to that for Warren County, VA. Its VMT is slightly greater at 520 million (versus 435) than Warren's. The numbers of commuters are similar, at 15,951 versus 15,286, respectively. However, Culpeper County is even more remote from any county containing a monitor violating the 2008 NAAQS. Culpeper County is separated from the nearest counties with violating monitors by Fauquier, Loudoun and Prince William Counties in Virginia.
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(8) St. Mary's County, MD has a VMT of 822 million (1.1% of the Washington-Baltimore-NV CSA's total or 1.9% of the total for the current Washington-DC-MD-VA nonattainment area). This is more than Calvert County, MD. The total number of commuters at 43,101 (1.1% of the Washington-Baltimore-NV CSA's total or 1.9% of the total for the current Washington-DC-MD-VA nonattainment area) is between that of Calvert and Charles Counties which is not surprising because St. Mary's population is between that of these other two. St. Mary's comprises the CBSA of the Lexington Park

MD *micropolitan* statistical area whereas Charles County is part of the current Washington DC-MD-VA nonattainment area; the current Washington DC-MD-VA nonattainment area is within a different CBSA – the Washington-Arlington-Alexandria, DC-VA-MD-WV *Metropolitan* Statistical Area – than St. Mary's. Because St. Mary's County is in a separate CBSA from the current Washington DC-MD-VA nonattainment area, that is, is not part of the Washington-Arlington-Alexandria, DC-VA-MD-WV *Metropolitan* Statistical Area, one can infer that the degree of integration between St. Mary's County and the current Washington DC-MD-VA nonattainment area is likely less than that of either Charles or Calvert County. St. Mary's County is adjacent to Calvert County which does contain a monitor violating the 2008 NAAQS.

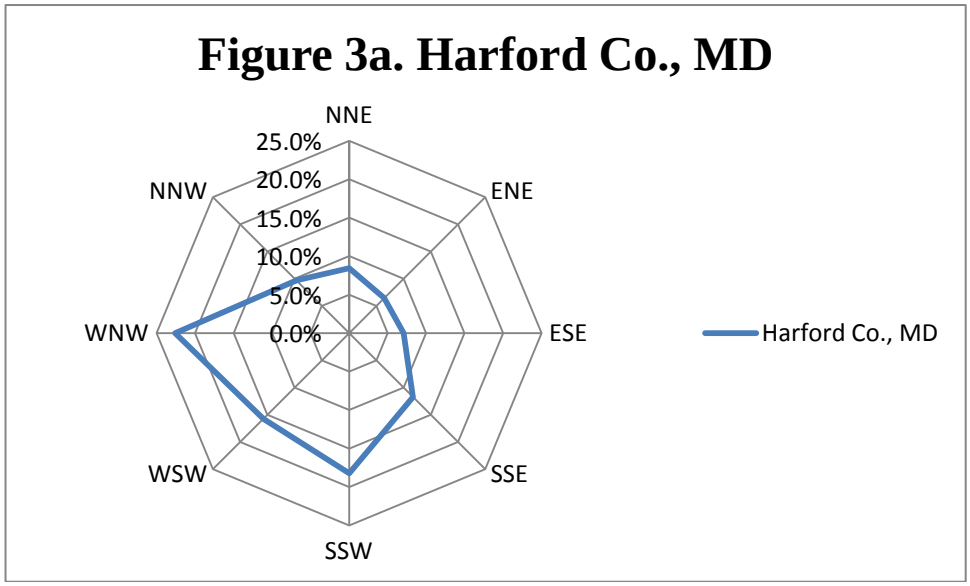
(9) The Fredericksburg, VA Area as a whole has 3,317 million VMT which is 4.3% of the Washington-Baltimore-NV CSA's total or 7.7% of the total for the current Washington-DC-MD-VA nonattainment area. The total number of commuters is 22,124; this is 2.7 percent of the Washington-Baltimore-NV CSA's total or 4.4 percent of the total for the current Washington-DC-MD-VA nonattainment area. The total VMT and total number of commuters for the Fredericksburg, VA Area are comparable to that of Prince William County, VA. Unlike Prince William County, VA, the Fredericksburg, VA Area is not adjacent to any county with a monitor violating the 2008 NAAQS. The Fredericksburg, VA Area is within the Washington-Arlington-Alexandria, DC-VA-MD-WV *Metropolitan* Statistical Area which contains the current Washington DC-MD-VA nonattainment area. Of the three jurisdictions within the Fredericksburg, VA Area, Stafford County has the largest VMT and total number of commuters.

Factor 3: Meteorology (weather/transport patterns)

The data:

The 30-year average summer surface-level wind directions for the design value county in each of the current areas is shown in Figures 3a through 3 d.

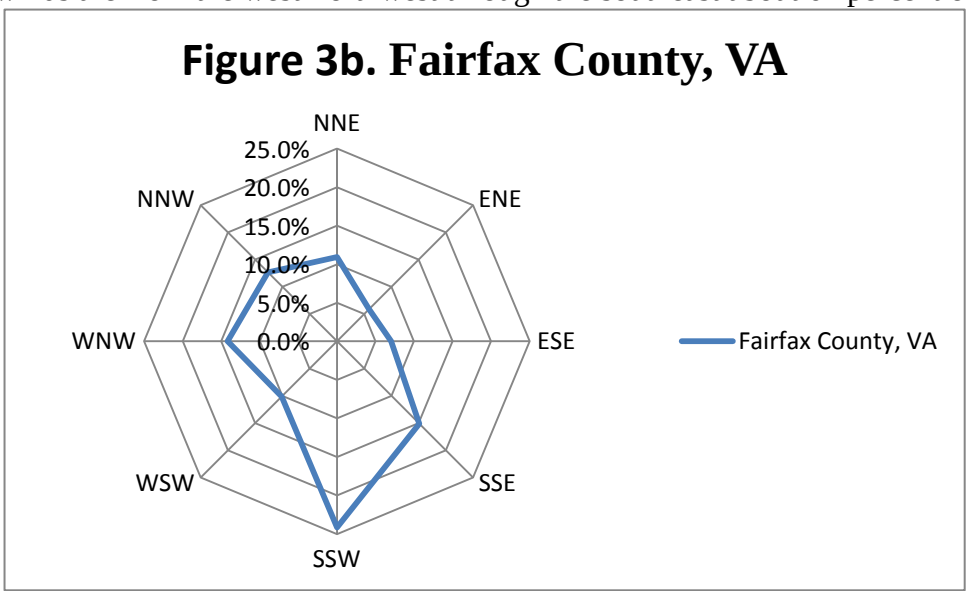
For Harford County (Figure 3a), MD in the in the current Baltimore nonattainment area the winds are from the west-northwest through the south-southeast about 62 percent of the time.



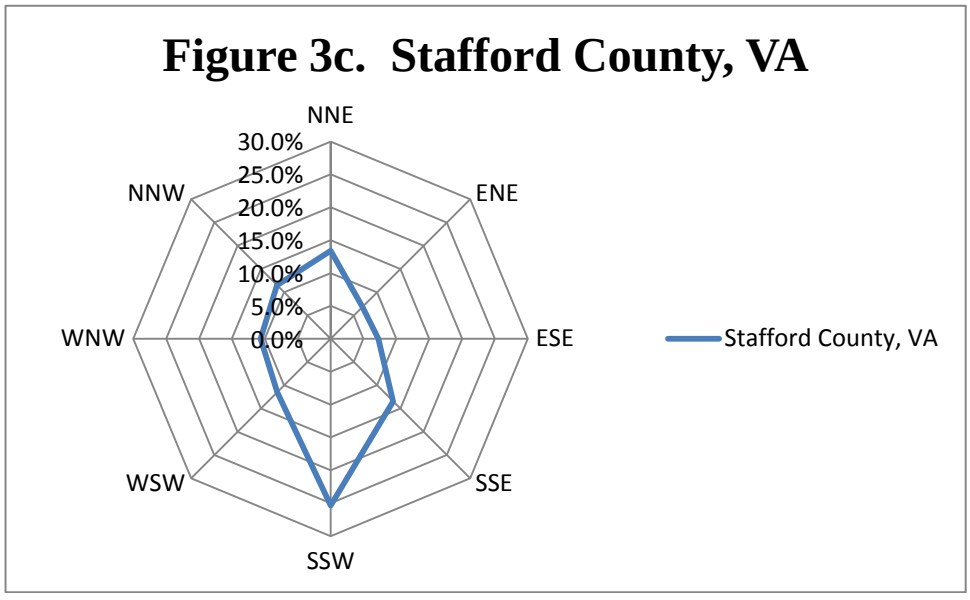
Map Legend: WNW means from the west-northwest; NNW means from the north-northwest; NNE means from the north-northeast; ENE means from the east-northeast; ESE means from the east-

southeast; SSE means from the south-southeast; SSW means from the south-southwest; and, WSW means from the west-southwest.

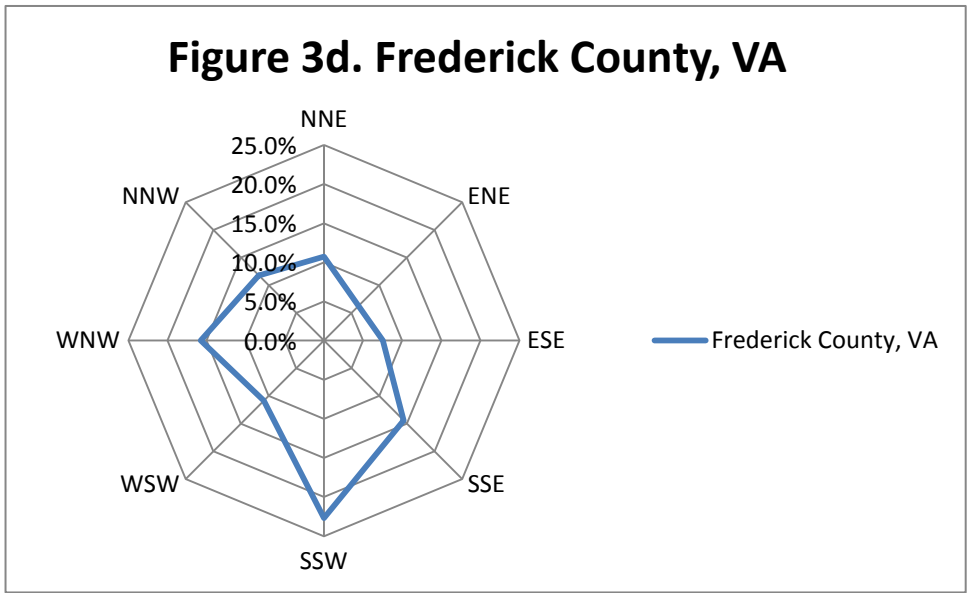
For Fairfax County (Figure 3b), VA in the current Washington DC-MD-VA nonattainment area the winds are from the west-northwest through the southeast about 64 percent of the time.



For Stafford County (Figure 3c) in the Fredericksburg, VA Area the winds are from the south-southwest through the south-southeast about 39 percent of the time and from other directions more or less equally.



For Frederick County (Figure 3d) in the Frederick County, VA Area the winds are from the south-southwest through the south-southeast about 37 percent of the time and from other directions more or less equally with the exception of west-northwest which occurs a little over 15 percent of the time.



Figures 3e and f show the data for all the counties in the current Baltimore and Washington DC-MD-VA nonattainment areas, respectively. The patterns are essentially the same for all counties and cities in the current Washington DC-MD-VA nonattainment area and the same for all counties and cities in the current Baltimore nonattainment area.

Figure 3e. Current Baltimore Nonattainment Area

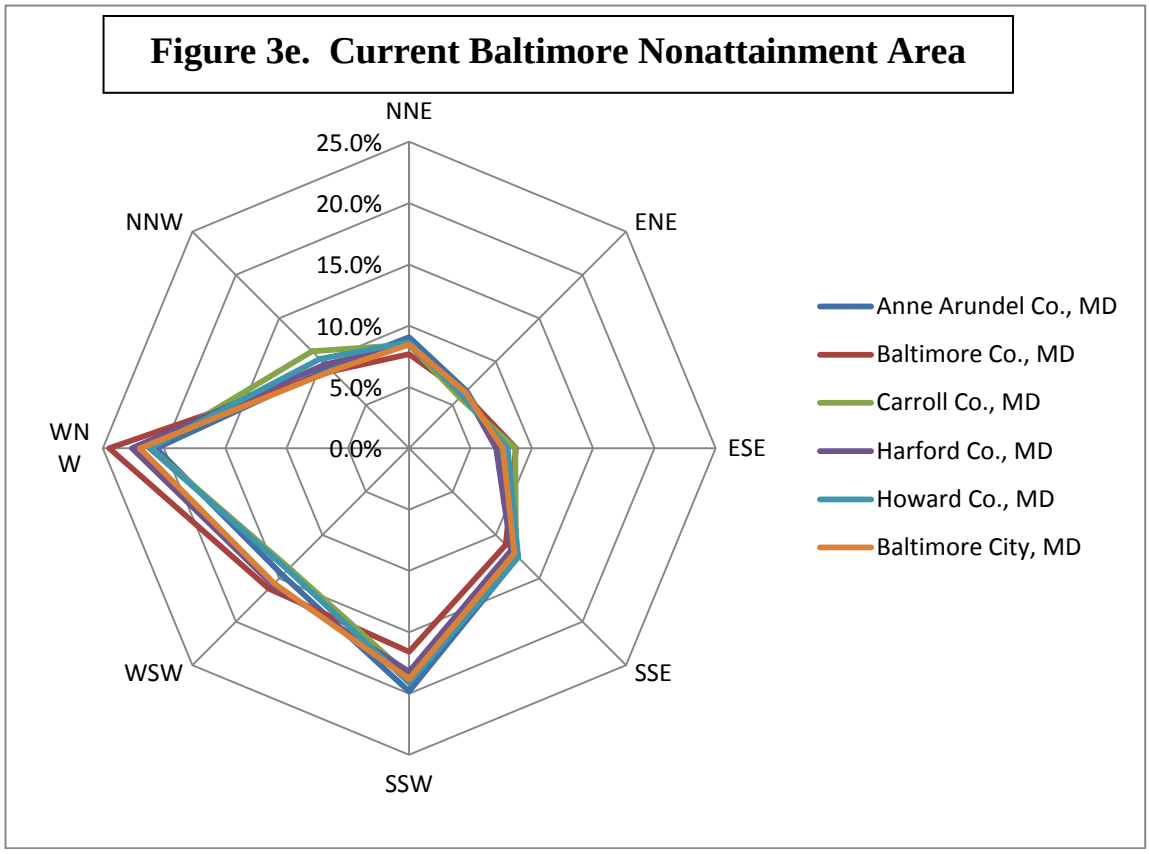
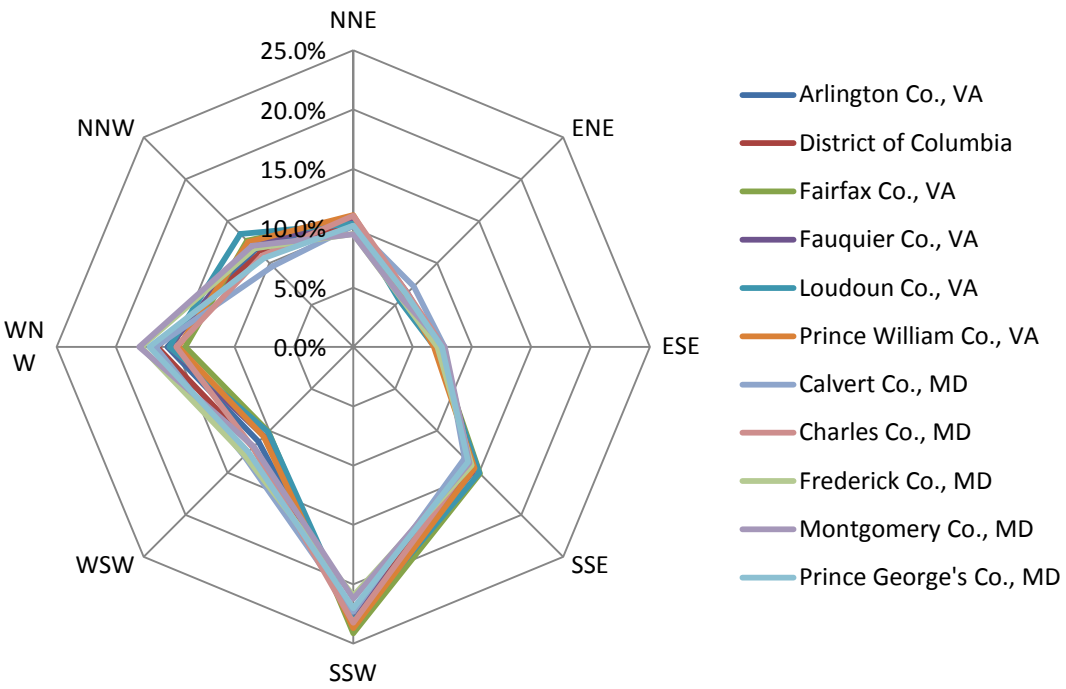


Figure 3f. Current Washington DC-MD-VA NA Area



Analyses:

In general, a county with a violating monitor or monitors will be presumed to be "upwind" of its monitor or those monitors at least some of the time because Figures 3a through 3f suggest summertime winds can come from any direction some of the time.

The analysis for each county or city (or sometimes a county and any enclosed or adjacent city) will estimate the percent of time that county or city is upwind of the nearest violating monitors. At times the monitors in Frederick, Loudoun and Charles counties will be considered to see if a county not in either the current Baltimore or Washington nonattainment areas could be having an effect on these monitors which are close to violating the 2008 NAAQS.

The effects counties in the current Washington nonattainment area might be having on the violating monitors in Anne Arundel and Carroll Counties will be considered see if the current Baltimore and Washington nonattainment areas might be sufficiently linked by contribution. Likewise, the effects that counties in the current Baltimore nonattainment area might be having on the violating monitors in Prince George's County, MD will be considered for the same purpose. Also, the Frederick County, MD monitor will be considered with respect to possible impacts from nearby counties in the current Baltimore nonattainment for the purpose to see if the current Baltimore and Washington nonattainment areas might be sufficiently linked here by contribution from Baltimore to Washington.

Fredericksburg, VA Area, Frederick County, VA Area, and the "other counties:"

The closest monitors to the "outer rim" Virginia and West Virginia counties in the Washington-Baltimore-NV CSA are attaining the 2008. These "outer rim" counties are the Counties of Frederick, Warren, Clarke, and Culpeper and Winchester City in Virginia, and Jefferson County, WV. The most relevant attaining monitors are those in Frederick County, MD and in Loudoun, Prince William, Fauquier, and Stafford Counties in Virginia. Of these "outer rim" counties, Clarke County, VA and Jefferson County, WV are adjacent to Frederick County, MD or Loudoun County, VA both of which contain a monitor with a design value of 0.075 ppm. Frederick County, MD or Loudoun County, VA is interposed between Clarke County, VA and/or Jefferson County, WV, and the violating monitors in Carroll County, MD and/or Fairfax County, VA. In contrast, Culpeper County, VA is adjacent to Fauquier, and Stafford Counties both of which contain a monitor with a design value of 0.070 ppm or lower. Prince William County, VA is interposed between Fauquier, and Stafford Counties and thus between Culpeper County and the violating monitor in Fairfax County. To the extent Clarke County, VA and Jefferson County, WV are upwind of the monitors in Frederick County, MD or Loudoun County, VA their contribution to air quality in Frederick County, MD or Loudoun County, VA does not result in a violation of the 2008 NAAQS. In the case of Culpeper County, VA, to the extent it is upwind of the monitors in to Fauquier, Prince William , and Stafford Counties Culpeper County's contribution to air quality in the latter three counties does not result in a violation of the 2008 NAAQS. The case of Frederick or Warren Counties and Winchester City in Virginia is the same as the case for Clarke County, VA and Jefferson County, WV.

Parts of Fauquier County, VA could be at times upwind of the Loudoun County monitor (roughly WSW) of the monitor and hence not upwind more than roughly 10 percent of the time; and at times, Fauquier County could not upwind more than roughly 10 percent of the time from the monitors in Fairfax County, Arlington County or the District of Columbia because Fauquier County is roughly WSW of these monitors.

Of the Fredericksburg, VA Area, Stafford County is closest to the Fairfax County-Arlington-District of Columbia monitors. Stafford County's monitor may not fully represent the effects of the emissions from the northwestern half of this county upon the monitor in Arlington County. This portion of Stafford is roughly south-southwest of Arlington County and hence upwind about 22 percent of the time. Likewise, Stafford is roughly southwest of Prince George's County, MD and would be upwind less than 18 percent of the time (average of the SSW and WSW values). Spotsylvania County and Fredericksburg City have the attaining monitors in Stafford and Fauquier Counties in Virginia and the attaining monitor in Charles County, MD between these portions of the Fredericksburg, VA Area and the nearest violating monitor in the Washington-Baltimore-NV CSA. With respect to the Stafford County monitor, Spotsylvania County and Fredericksburg City are essentially SW and thus would be upwind about 19 percent of the time (average of SSW and WSW).

St. Mary's County, MD is adjacent to Calvert County, MD and roughly SSW to west-southwest of the monitor and hence upwind approximately 36 percent of the time. Likewise, St. Mary's County is SSE of the Monitor in Charles County, MD and hence upwind about 15 percent of the time.

Queen Anne's County is closest to the violating Edgewood monitor in Harford County, the monitor in Anne Arundel County and the Essex monitor in Baltimore County. It is roughly south to SE of Edgewood and hence upwind about 25 (average of SSW and SSE plus average of SSE and ESE) percent of the time.

It is roughly south to SE of Essex and hence upwind about 24 (average of SSW and SSE plus average of SSE and ESE) percent of the time. It is roughly east to ESE of Anne Arundel and hence upwind about 23 (average of ESE and ENE plus ESE) percent of the time.

Current Washington DC-MD-VA Nonattainment Area:

Within the current Washington DC-MD-VA nonattainment area the situation is as follows:

The violating monitors closest to Prince William County, VA and the two associated cities (Manassas and Manassas Park) are those in Loudoun County, Fairfax County, Arlington County and the District of Columbia.[21] Prince William County and the two associated cities are generally south-southwest to due west-southwest of the Fairfax County-Arlington County-District of Columbia monitors. They would be upwind around 36 percent of the time. With respect to Loudoun County, VA they are essentially south-southeast to south-southwest of the monitor and are at upwind about 39 percent of the time.

The violating monitors closest to Loudoun County are those in Fairfax County, Arlington County and the District of Columbia. Loudoun County is essentially northwest of these monitors. It would be upwind around 16 percent of the time (average of north-northwest and west-northwest). With respect to the monitors in Frederick County, MD and Carroll County, MD, Loudoun County is south-southwest of Frederick County and west-southwest of Carroll County. It would be upwind of Frederick County, MD about 24 percent of the time and of Carroll County, MD less than 15 percent of the time.

The violating monitors closest to Fairfax County, VA (plus the enclosed Fairfax City) are those in Loudoun County, Arlington County and District of Columbia. With respect to the Arlington County and District of Columbia monitors[22] the "Fairfaxes" (county and city) are west-northwest to north-northwest and thus would be upwind over 50 percent of the time. With respect to the Loudoun County monitor, this county and city are essentially southwest and thus would be upwind roughly 17 percent of the time (average of south-southwest and west-southwest). Parts of Fairfax County are west of the easternmost monitor (Pr. Georges Co. Equestrian Ctr) in Prince George's County, MD and would be upwind roughly 16 percent of the time (average of west-southwest and west-northwest).

Falls Church City[23] and Arlington County are closest to the monitors in Fairfax County, VA and those in the District of Columbia. With respect to the Fairfax County monitor, this county and city are essentially north-northeast and thus would be upwind about 10 percent of the time. With respect to the Arlington County monitor, Falls Church City is roughly northwest and thus would be upwind at most 15 percent of the time (average of west-northwest and north-northwest). With respect to the District of Columbia monitors, this county and city are roughly west-southwest and thus would be upwind at most 15 percent of the time.

[21] With respect to this county these monitors are so close to ether that they will be considered as a group for the determination of percent of time the county is upwind.

[22] With respect to this county these monitors are so close to ether that they will be considered as a group for the determination of percent of time the county is upwind.

[23] Falls Church City is small geographically and will be considered as an appendage of Arlington County for any monitor except that in Arlington County, in which case Fall Church City will be considered on its own.

Alexandria City is closest to the monitors in Arlington and Fairfax Counties in Virginia and those in the District of Columbia. With respect to the Arlington County and District of Columbia monitors, this city is essentially south-southwest and thus would be upwind less than 25 percent of the time. With respect to the Fairfax County monitor, this city is essentially north and thus would be upwind less than 13 percent of the time.

Frederick County, MD is closest to the violating monitor in Carroll County, MD. With respect to the Carroll County monitor, this county is essentially west-northwest to west-southwest and thus would be upwind about 31 percent of the time.

Montgomery County, MD is closest to the violating monitors in Prince George's and Carroll Counties in Maryland and those in the District of Columbia. With respect to the Carroll County monitor, this county is essentially west-southwest to south-southwest and thus would be upwind about 32 percent of the time. With respect to the monitor (Howard U.–Beltsville) in the north of Prince George's County, this county is essentially northwest and thus would be upwind about 15 percent of the time (average of west-northwest and north-northwest). With respect to the monitors in the District of Columbia, this county is north-northwest to north-northeast and thus would be upwind at most 13 percent of the time.

Prince George's County, MD is close to the violating monitors in Anne Arundel and Calvert Counties in MD, Fairfax Co. VA, and the District of Columbia. With respect to the monitors in the District of Columbia, this county is south-southeast to north-northeast and thus would be upwind at most 38 percent of the time. With respect to the Anne Arundel County monitor, this county is south-southwest to north-northwest and thus would be upwind about 66 percent of the time. With respect to the Calvert County monitor, this county is north-northwest to west-northwest and thus would be upwind about 22 percent of the time. With respect to the Fairfax County monitor, this county is south-southeast to east-northeast and thus would be upwind about 27 percent of the time.

Charles County, MD is close to the violating monitors in Prince George's and Calvert Counties in Maryland and the violating monitor in Fairfax County, VA. With respect to the monitor (Pr. Georges Co. Equestrian Ctr) in the eastern part of Prince George's County, this county is essentially SSW to WSW and thus would be upwind about 35 percent of the time. With respect to the Calvert County monitor, this county is essentially WNW to WSW and thus would be upwind about 25 percent of the time. With respect to the Fairfax County monitor, this county is essentially SSW to SSE and thus would be upwind about 39 percent of the time.

Calvert County, MD is close to violating monitors in that it is adjacent to Prince George's and Anne Arundel Counties in Maryland. With respect to the monitor (Pr. Georges Co. Equestrian Ctr) in the eastern part of Prince George's County, this county is essentially southeast and thus would be upwind about 18 percent of the time (average of SSE and SSW). With respect to the Anne Arundel County monitor, this county is essentially SSW and thus would be upwind about 20 percent of the time.

The District of Columbia is close to the violating monitors in Prince George's County, MD, Arlington and Fairfax Counties in Virginia in that it is adjacent to these two counties. With respect to the Arlington County monitor, the District of Columbia is essentially ENE and thus would be upwind well less than 10 percent of the time. With respect to the Prince George's County monitors, the District of Columbia is essentially SW of the northernmost monitor (Howard U. –Beltsville) in Prince George's County and thus would be upwind about 18 percent of the time (average of WSW and SSW), and, the District of Columbia is essentially NNW of the monitor (Pr. Georges Co. Equestrian Ctr) in the east of Prince George's County and thus would be upwind no more than 7 percent of the time. With respect to the Fairfax County monitor, the District of Columbia is essentially NNE and thus would be upwind about 5 percent of the time.

Current Baltimore Nonattainment Area:

Harford County, MD is close to the violating monitors in Baltimore County in Maryland. With respect to the southernmost monitor (Essex) in Baltimore County, this county is essentially NNE to ESE and thus would be upwind about 8 percent of the time. With respect to the northernmost monitor (Padonia) in Baltimore County, this county is essentially ENE to NNE and thus would be upwind about 22 percent of the time.

Baltimore City, MD is close to the violating monitors in Harford and Baltimore Counties in Maryland. With respect to either monitor (Edgewood or Aldino) in Harford County, this city is essentially SW and thus would be upwind about 33 percent of the time (average of WSW and SSW). With respect to the southernmost monitor (Essex) in Baltimore County, this city is essentially west and thus would be upwind about 21 percent of the time (average of WSW and WNW). With respect to the northernmost monitor (Padonia) in Baltimore County, this city is essentially to the south and thus would be upwind about 14 percent of the time.

Baltimore County, MD is closest to the violating monitors in Harford and Carroll Counties in Maryland. With respect to the respect to the southernmost monitor (Edgewood) in Harford County, this county is essentially NNW to SSW and thus would be upwind about 61 percent of the time. With respect to the respect to the northernmost monitor (Aldino) in Harford County, this county is primarily WNW to SSW and thus would be upwind about 56 percent of the time. With respect to the Carroll County monitor, this county is essentially ENE to ESE and thus would be upwind about 14 percent of the time.

Howard County, MD is closest to the violating monitor in Carroll County, the northernmost monitor (Howard U. –Beltsville) in Prince George's County and somewhat proximate to the monitors in Baltimore County. With respect to the Carroll County monitor, this county is essentially southwest and thus would be upwind about 16 percent of the time (average of SSW and SSE). With respect to the Howard U. –Beltsville monitor, this county is essentially to the north and thus would be upwind about 11 percent of the time (average of NNW and NNE). With respect to the northernmost monitor (Padonia) in Baltimore County, this county is essentially SW and thus would be upwind about 18 percent of the time (average of SSW to WSW). With respect to the southernmost monitor (Essex) in Baltimore County, this county is essentially west and thus would be upwind about 21 percent of the time (average of WSW and WNW). With respect to the Frederick County, MD monitor, this county is essentially ESE to ENE and thus would be upwind about 14 percent of the time.

Anne Arundel County, MD is closest to the violating monitors in Prince George's County and somewhat proximate to the southernmost monitor (Essex) in Baltimore County. With respect to the respect to the southernmost monitor (Essex) in Baltimore County, this county is primarily SW and thus would be upwind about 17 percent of the time (average of SSW to WSW). With respect to the monitor (Pr. Georges Co. Equestrian Ctr) in the eastern part of Prince George's County, this county is essentially NNE to ESE and thus would be upwind about 18 percent of the time. With respect to the northernmost monitor (Howard U. –Beltsville) in Prince George's County, this county is essentially SSE to ENE and thus would be upwind about 29 percent of the time.

Carroll County, MD is closest to the northernmost monitor (Padonia) in Baltimore County. With respect to the Padonia monitor, this county is essentially NNW to WSW and thus would be upwind about 52 percent of the time. With respect to the Frederick County, MD monitor, this county is essentially NE and thus would be upwind about 8 percent of the time (average of NNE to ENE).

Discussion and summary for the current Baltimore nonattainment Area:
For the most part, the counties and cities in the current Baltimore nonattainment area mainly affect each other. With the exception of Anne Arundel County, the remainder of the current Baltimore nonattainment area seems to have the most frequent possible impacts on violating monitors within this nonattainment area:

Baltimore Area:
For the most part, the counties and cities in the current Baltimore nonattainment area mainly affect each other. With the exception of Anne Arundel County, the other areas have the most impact on violating monitors within this nonattainment area:

Highest percentages at a close violating monitor:

- Baltimore County is upwind of the Edgewood monitor in Harford County some 61 percent of the time.
- Baltimore City is upwind of the Edgewood and Aldino, Harford County monitors some 33 percent of the time.
- Carroll and Harford Counties upwind of the Padonia Baltimore County monitor monitors some 52 and 22 percent of the time, respectively.

Second highest percentages at a close violating monitor:

- Baltimore and Howard Counties upwind of the Carroll County monitor some 14 and 16 percent of the time, respectively.
- Baltimore City upwind of the Padonia, Baltimore County monitors some 14 percent of the time.

There appear to be some clear upwind-downwind effects across the boundaries of the current Baltimore and Washington DC-MD-VA nonattainment areas:

Anne Arundel County is likely upwind of the northernmost violating monitor (Howard U.–Beltsville) in Prince George's County 29 percent of the time but is upwind of the violating Essex monitor in Baltimore County 18 percent of the time.

Howard County is likely upwind of the northernmost violating monitor (Howard U.–Beltsville) in Prince George's County 29 percent 11 percent of the time.

Discussion and summary for the current Washington DC-MD_VA nonattainment Area
In the current Washington DC-MD-VA nonattainment area, the violating monitors in Fairfax and Arlington Counties in Virginia, and those in the District of Columbia are downwind of close-by counties and cities in Virginia. Loudoun and Prince William Counties in Virginia are most often upwind of the closest violating monitors in Fairfax and Arlington Counties in Virginia and those in the District of Columbia some 36 and 16 percent of the time. Fairfax County, VA is most often upwind of the Arlington County and District of Columbia monitors some 50 percent of the time. Charles County, MD is more often upwind of the Fairfax County, VA monitor (perhaps 39 percent of the time) than other monitors in this current nonattainment area.

That adjacent and geographically close counties and cities in Virginia are so often upwind of the District of Columbia is salient because such potential contributions cross state lines. For instance, Prince George's County, MD is likely upwind of the monitor in Anne Arundel County, MD (some 66 % of the time) than upwind of the monitor in Fairfax County (some 27 percent of the time). The same cross-state situation is true for the relationship between Charles and Prince George's Counties and Fairfax County, VA.

Several Maryland counties in the current Washington DC-MD-VA nonattainment area are most frequently upwind of and most proximate to a violating monitor in the current Baltimore nonattainment area. The Carroll County monitor is downwind of Frederick and Montgomery counties in Maryland some 31 to 32% of the time. Likewise the Anne Arundel County monitor is downwind of Prince George's and Calvert Counties in Maryland some 66 and 20 percent of the time, respectively. Montgomery, Calvert and Charles Counties in Maryland are upwind of one or more violating monitors in Prince George's County, MD some 15, 18 and 35 percent of the time, respectively.

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.

Warren and Clarke Counties are separated from the rest of the Washington-Baltimore-NV CSA by the easternmost portion of the Appalachian Mountains.[24] The Frederick County, VA area is west of these two counties and thus is also separated from the major, urbanized portions of this CSA by the

[24] Page 3-593 of "Chapter 3 Justifications in Support of EPA's 8-hour Ozone Designations & Classifications" docket item EPA-HQ-OAR-2003-0083-1813 in docket EPA-HQ-OAR-2003-0083 (downloaded May 27, 2011) and available on-line at Regulations.gov (http://www.regulations.gov/#!home;oldLink=false).

easternmost portion of the Appalachian Mountains. Jefferson Count, WV is adjacent to Clarke County, VA and also is so separated.

Other than Warren and Clarke Counties discussed in the preceding paragraph, the Washington-Baltimore-NV CSA area generally does not have any geographical or topographical barriers appreciably limiting air pollution transport within its air shed. Therefore, there are no barriers to transport elsewhere in this CSA.

Factor 5: Jurisdictional boundaries

EPA considers 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 (MPOs), 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.

For the 1997 ozone NAAQS, the Washington-Baltimore-NV CSA is currently broken down as shown in Table 14:

Table 14. Breakdown of the Washington-Baltimore-NV CSA by Area under the 1997 Ozone NAAQS.

Area Name	Constituent Counties and Cities:	Status (as of November 22, 2011) (40 CFR 81.309, 81.321, 81.347 and 81.349)
Current Baltimore Nonattainment Area:	Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties and Baltimore City in Maryland.	Nonattainment - Moderate
Current Washington DC-MD-VA Nonattainment Area:	Maryland Portion: Frederick, Montgomery, Calvert, Charles and Prince George's Counties. The entire District of Columbia. Virginia Portion: Arlington, Fairfax, Loudoun, Prince William Counties, and, the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.	Nonattainment - Moderate
Frederick County, VA Area:	Frederick County and Winchester City in Virginia.	Attainment
Fredericksburg, VA Area:	City of Fredericksburg and Spotsylvania and Stafford Counties in Virginia.	Attainment (Maintenance)
Queen Anne's County portion of the Kent County and Queen Anne's County Area:	Queen Anne's County in Maryland	Attainment (Maintenance)
Other Attainment Counties:	In Maryland: St. Mary's County In Virginia: Clarke, Culpeper, Fauquier, and Warren Counties. In West Virginia: Hampshire and Jefferson Counties.	Attainment Attainment Attainment
"Attainment (Maintenance)"signifies an area initially designated nonattainment effective June 15, 2004 (69 FR 23858, April 30, 2004) and later redesignated to attainment subject to a maintenance plan under section 175A of the CAA. "Attainment" signifies an area initially designated attainment effective June 15, 2004 (69 FR 23858, April 30, 2004) or April 15, 2008 (73 FR 17897).		

The boundaries of the Baltimore severe nonattainment area under the 1-hour ozone NAAQS were the same as those for the 1997 ozone NAAQS shown in the preceding table. (56 FR 56694, November 6, 1991)

The boundaries of the Washington DC-MD-VA severe nonattainment area under the 1-hour ozone NAAQS included those shown for the 1997 ozone NAAQS shown in the preceding table plus Stafford County, VA (56 FR 56694, November 6, 1991).

Queen Anne's County in Maryland was part of the Kent County and Queen Anne's County 1-hour attainment (maintenance) area under the 1-hour ozone NAAQS.

All other portions of the Washington-Baltimore-NV CSA were designated attainment for the 1-hour ozone NAAQS (56 FR 56694, November 6, 1991).

As far as transportation planning is concerned the current Baltimore nonattainment area and the current Washington DC-MD-VA nonattainment area are served by different MPOs. The National Capital Region Transportation Planning Board (TPB) is the MPO for the much of the Washington-Arlington-current Washington DC-MD-VA nonattainment area. TPB's planning area covers the District of Columbia and surrounding jurisdictions. In Maryland these jurisdictions include Frederick County, Montgomery County, and Prince George's County and the St. Charles urbanized area of Charles County, plus the cities of Bowie, College Park, Frederick, Gaithersburg, Greenbelt, Rockville, and Takoma Park. In Virginia, the planning area includes Alexandria, Arlington County, the City of Fairfax, Fairfax County, Falls Church, Loudoun County, and the Cities of Manassas and Manassas Park, and Prince William County. [25]

The Baltimore Regional Transportation Board consists of 11 members of the Baltimore Regional Transportation Board are made up of elected officials from the cities of Annapolis and Baltimore, the counties of Anne Arundel, Baltimore, Carroll, Harford and Howard .[26]

Likewise, the Fredericksburg VA Area is covered by its own MPO – the Fredericksburg Area Metropolitan Planning Organization (FAMPO). FAMPO's region includes the City of Fredericksburg and counties of Spotsylvania and Stafford.[27]

The Washington DC-MD-VA air quality planning area has been a multi-jurisdictional area since before 1990. Section 107(d)(4)(A) of the CAA set the presumptive boundaries for serious and higher classified ozone nonattainment areas at the larger of the Metropolitan Statistical Area (MSA) or Consolidated Metropolitan Statistical Area (CMSA) area subject to certain alterations allowed by section 107(d)(4)(A). In addition, the Metropolitan Washington Air Quality Committee (MWAQC), a multi-state air quality planning organization comprised of: (1) elected officials of the Council of Governments (COG) member jurisdictions plus members from Charles, Calvert, and Stafford counties; (2) the air management and transportation directors of the District of Columbia, Maryland, and Virginia; (3) members of the Maryland and Virginia General Assemblies; and (4) the chair of the TPB.[28] The principal mandates of MWAQC are to prepare plans demonstrating attainment of the federal ozone

[25] http://www.mwcog.org/transportation/tpb/, last checked November 28, 2011.
[26] "BRTB Members," http://www.baltometro.org/transportation-planning/brtb-members last checked November 28, 2011.
[27] "About FAMPO," http://www.fampo.gwregion.org/ last checked November 28, 2011.
[28] "BYLAWS of the Metropolitan Washington Air Quality Committee" as amended through October 27, 2004. http://www.mwcog.org/environment/air/downloads/MWAQC_bylaws.PDF downloaded November 28, 2011.

standards and "rate of progress" reductions in criteria pollutants and prepare inventories and budgets of emissions for the current Washington DC-MD-VA nonattainment area. No other area (nonattainment or otherwise) has such a group. Past practice dictates against splitting the relevant portions of the current Washington DC-MD-VA nonattainment area along state lines.

Conclusions:

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties and independent cities listed in Tables 15 below meet the CAA criteria for inclusion in the nonattainment areas indicated therein:

Table 15. EPA's Intended Designated Nonattainment Counties and Independent Cities in the Washington-Baltimore-NV CSA.

Washington, DC-MD-VA Area	
	EPA Intended Nonattainment Counties
District of Columbia	Entire District of Columbia
Maryland	Calvert County Charles County Frederick County Montgomery County Prince George's County
Virginia	Alexandria City Arlington County Fairfax City Fairfax County Falls Church City Loudoun County Manassas City Manassas Park City Prince William County
Baltimore Area	
	EPA Intended Nonattainment Counties
Maryland	Anne Arundel, Maryland Carroll, Maryland Harford, Maryland Howard, Maryland Baltimore, Maryland Baltimore City, Maryland

Appendix 1 to Part I: Pertinent Background on Monitoring Objectives and Scales

Objectives:

EPA has identified three major objectives for air quality monitoring:

(1) Provide air pollution data to the general public in a timely manner.
(2) Support compliance with ambient air quality standards and emissions strategy development. EPA and others will be used data from monitors for NAAQS pollutants to compare an area's air pollution levels against the NAAQS.
(3) Support for air pollution research studies.

EPA has specified that to support these three basic air quality monitoring objectives, a network must be designed with a variety of types of monitoring sites. Monitoring sites must be capable of determining among other things the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region, and air pollution levels near specific sources. The six general site types are:

(1) Sites located to determine the highest or maximum concentrations expected to occur in the area covered by the network.
(2) Sites located to measure "population exposure," that is, typical concentrations in areas of high population density.
(3) Sites located to determine the impact of substantial sources or source categories on air quality.
(4) Sites located to determine general background concentration levels.
(5) Sites located to determine the extent of regional pollutant transport among populated areas; and in support of secondary standards.
(6) Sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts.

See, section 1.1 of Appendix D to 40 CFR Part 58 "Ambient Air Quality Surveillance" (Appendix D hereafter).

Regarding Regulatory Compliance and Maximum Concentration Sites:

For regulatory compliance, the principle objective is to measure the ozone concentration in the high population density areas and the maximum downwind concentration from the urban region. It is important to be careful when selecting the high population sites because, particularly in dense urban areas, the greatest concentration of people may be in an area with heavy automobile traffic, which may result in low ozone concentration due to nitric oxide titration. See, section 4.2 of Guideline On Ozone Monitoring Site Selection, EPA-454/R-98-002, August 1998 (1998 Guideline hereafter).

Within an ozone monitoring network, at least one ozone site for each MSA, or CSA if multiple MSAs are involved, must be designed to record the maximum concentration for that particular metropolitan area (section 4.1(b) of Appendix D to 40 CFR Part 58). Based upon a review of meteorological and air quality data, the prospective maximum concentration monitor site should be selected in a direction from the city that is most likely to observe the highest ozone concentrations, more specifically, downwind during periods of photochemical activity. In many cases, these maximum concentration ozone sites will

be located 10 to 30 miles or more downwind from the urban area where maximum ozone precursor emissions originate (see, section 4.1(f) of Appendix D).

Regarding Scales:

Section 4.1(c) of Appendix D defines "urban scale" as "an area of city-like dimensions, on the order of several kilometers to 50 or more kilometers or more." "Urban-scale sites can also be used to measure high concentrations downwind of the area having the highest precursor emissions." See, section 4.2 of Guideline On Ozone Monitoring Site Selection, EPA-454/R-98-002, August 1998 (1998 Guideline).

Section 4.1(c) of Appendix D to 40 CFR Part 58 ("Ambient Air Quality Surveillance") defines "Neighborhood scale" as some reasonably homogeneous urban sub-region, with dimensions of a few kilometers. Homogeneity refers to pollutant concentrations. Neighborhood scale data will provide valuable information for developing, testing, and revising concepts and models that describe urban/regional concentration patterns. These data will be useful to the understanding and definition of processes that take periods of hours to occur and hence involve considerable mixing and transport. Under stagnation conditions, a site located in the neighborhood scale may also experience peak concentration levels within a metropolitan area.

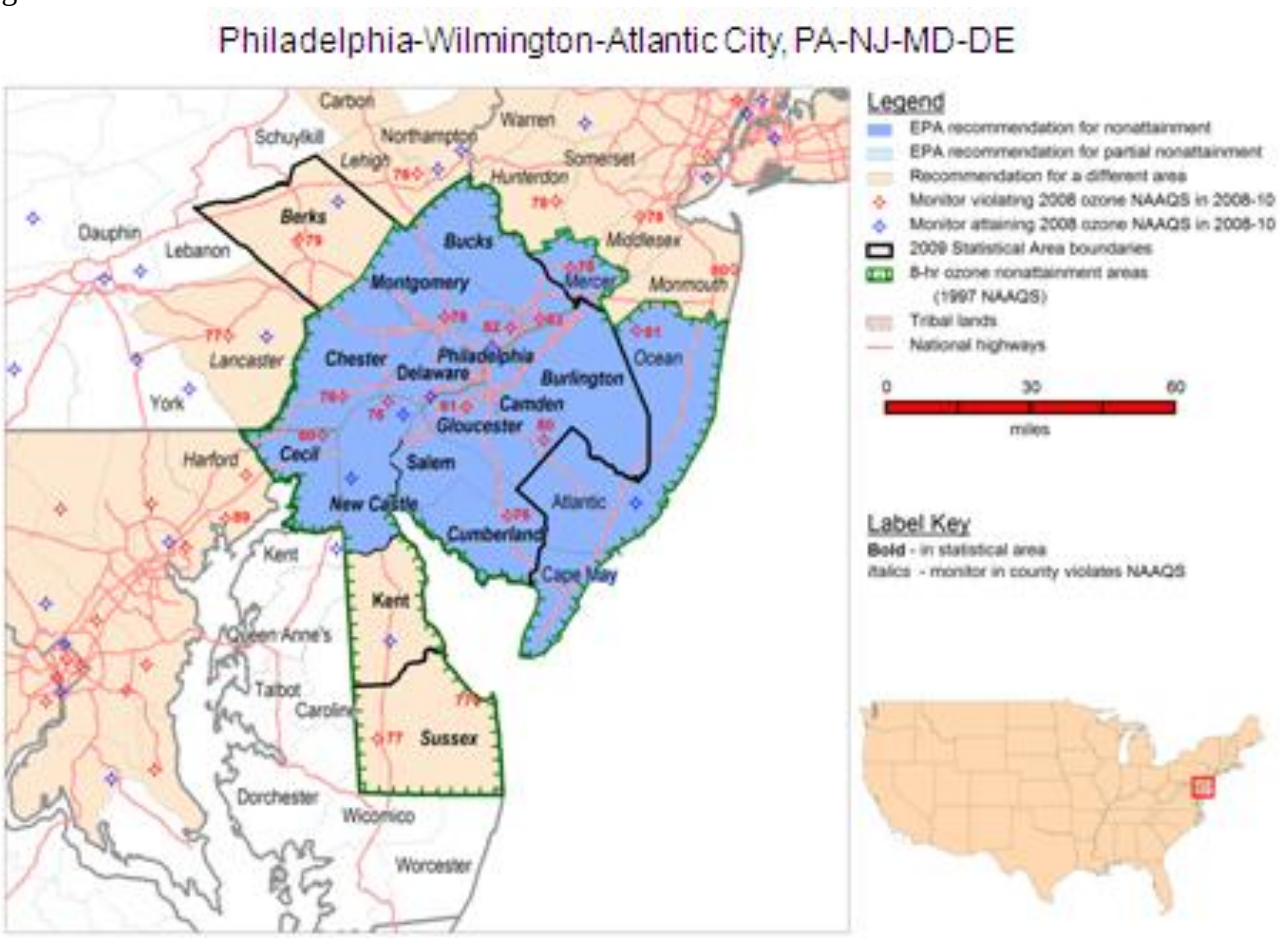
Section 4.1(c) of Appendix D to 40 CFR Part 58 ("Ambient Air Quality Surveillance") defines "Regional scale" as a scale of measurement will be used to typify concentrations over large portions of a metropolitan area and even larger areas with dimensions of as much as hundreds of kilometers. Such measurements will be useful for assessing the O_3 that is transported to and from a metropolitan area, as well as background concentrations. In some situations, particularly when considering very large metropolitan areas with complex source mixtures, regional scale sites can be the maximum concentration location.

Part II. Technical Analysis for the Philadelphia-Wilmington-Atlantic City Area

Note: Part II contains a new sequence of figure and table numbering that starts anew with figure 1and table 1.

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, and Salem	Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, 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.[29] 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,

[29] 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.

Delaware and Berks County, Pennsylvania should be designated as in separate nonattainment areas, and explained below.

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[30].

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[31].

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.

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