MARYLAND:

Baltimore, MD; Washington, DC-MD-VA; and Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD Nonattainment Areas

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

1.0 Summary

This technical support document (TSD) describes EPA's intent to designate the following as nonattainment areas for the 2015 ozone national ambient air quality standards (NAAQS):
Baltimore, MD; Washington, DC-MD-VA, and Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD. These nonattainment areas are, in whole or in part, located within the State of Maryland.

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

Under section 107(d), states were required to submit area designation recommendations to EPA for the 2015 ozone NAAQS no later than 1 year following promulgation of the standards, i.e., by October 1, 2016. Tribes were also invited to submit area designation recommendations. On September 23, 2016, the District recommended that the city identified in the second column of Table 1 be designated as nonattainment for the 2015 ozone NAAQS based on air quality data from 2013-2015.

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

Table 1. Maryland's Recommended Nonattainment Areas and EPA's Intended Designated Nonattainment Areas for the 2015 Ozone NAAQS

Area	Maryland's Recommended Nonattainment Counties and City	EPA's Intended Nonattainment Counties and City
Baltimore, MD	Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties, and the City of Baltimore	Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties, and the City of Baltimore
Washington, DC-MD-VA (MD)	Calvert, Charles, Frederick, and Prince George's Counties	Calvert, Charles, Frederick, and Prince George's Counties

Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD (MD)	Cecil County	Cecil County

EPA does not intend to modify Maryland's recommendations for nonattainment counties and cities as outlined in Table 1. EPA intends to designate the remainder of Maryland as attainment/unclassifiable based on ambient monitoring data for the 2014-2016period showing compliance with the 2015 ozone NAAQS, and EPA's assessment that these areas are not contributing to a violation in a nearby area.

Please note that the Washington, DC-MD-VA area and the Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD area are multi-state areas. The Washington, DC-MD-VA area is composed of the District of Columbia and counties and cities in Maryland and Virginia. The Philadelphia-Wilmington-Atlantic City area is composed of counties in Pennsylvania, New Jersey, Delaware, and Maryland.

On November 6, 2017 (82 FR 54232; November 16, 2017), the EPA signed a final rule designating most of the areas the State did not recommend for designation as nonattainment as attainment/unclassifiable.[1] EPA explains in section 2.0 the approach it is now taking to designate the remaining areas in the State.

2.0 Nonattainment Area Analyses and Intended Boundary Determination

The EPA evaluated and determined the intended boundaries for each nonattainment area on a case-by-case basis, considering the specific facts and circumstances of the area. In accordance with the CAA section 107(d), the EPA intends to designate as nonattainment the areas with the monitors that are violating the 2015 ozone NAAQS and nearby areas with emissions sources (i.e., stationary, mobile, and/or area sources) that contribute to the violations. As described in the EPA's designations guidance for the 2015 NAAQS (hereafter referred to as the "ozone designations guidance"[2] after identifying each monitor indicating a violation of the ozone NAAQS in an area, the EPA analyzed those nearby areas with emissions potentially contributing to the violating area. In guidance issued in February 2016, the EPA provided that using the Core Based Statistical Area (CBSA) or Combined Statistical Area (CSA)[3] as a starting point for the contribution analysis is a reasonable approach to ensure that the nearby areas most likely to contribute to a violating area are evaluated. The area-specific analyses may support nonattainment boundaries that are smaller or larger than the CBSA or CSA.

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

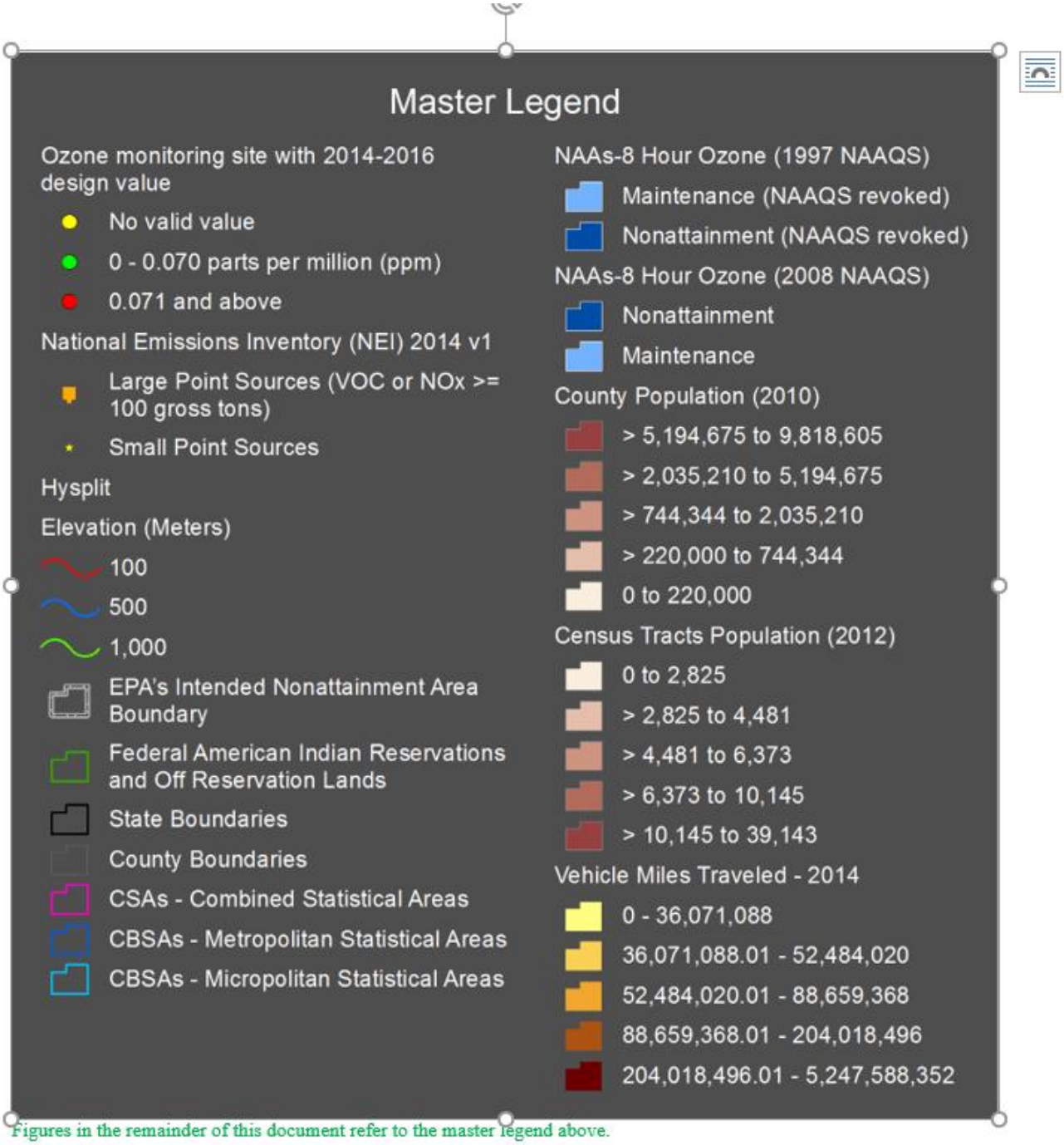
[2] The EPA issued guidance on February 25, 2016 that identified important factors that the EPA intends to evaluate in determining appropriate area designations and nonattainment boundaries for the 2015 ozone NAAQS. Available at *https://www.epa.gov/ozone-designations/epa-guidance-area-designations-2015-ozone-naaqs*

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

On November 6, 2017, the EPA issued attainment/unclassifiable designations for approximately 85% of the United States and one unclassifiable area designation.[4] At that time, consistent with statements in the designations guidance regarding the scope of the area the EPA would analyze in determining nonattainment boundaries, EPA deferred designation for any counties in the larger of a CSA or CBSA where one or more counties in the CSA or CBSA was violating the standard and any counties with a violating monitor not located in a CSA or CBSA. In addition, the EPA deferred designation for any other counties adjacent to a county with a violating monitor. The EPA also deferred designation for any county that had incomplete monitoring data, any county in the larger of the CSA or CBSA where such a county was located, and any county located adjacent to a county with incomplete monitoring data.

The EPA is proceeding to complete the remaining designations consistent with the designations guidance (and EPA's past practice) regarding the scope of the area EPA would analyze in determining nonattainment boundaries for the ozone NAAQS as outlined above. For those deferred areas where one or more counties violating the ozone NAAQS or with incomplete data are located in a CSA or CBSA, in most cases the technical analysis for the nonattainment area includes any counties in the larger of the relevant CSA or CBSA. For counties with a violating monitor not located in a CSA or CBSA, EPA explains in the 3.0 Technical Analysis section, its decision whether to consider in the five-factor analysis for each area any other adjacent counties for which EPA previously deferred action. We intend to designate all counties not included in five-factor analyses for a specific nonattainment or unclassifiable area analyses, as attainment/unclassifiable. These deferred areas are identified in a separate document entitled "Intended Designations for Deferred Counties and Partial Counties Not Addressed in the Technical Analyses." which is available in the docket.

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



Figures in the remainder of this document refer to the master legend above.

3.0 Technical Analyses for Nonattainment Areas

The technical analysis first identifies the area with a monitor that violates the 2015 ozone NAAQS. EPA then evaluates this area and any nearby areas to determine whether those nearby areas have emissions sources that potentially contribute to ambient ozone concentrations at the violating monitor in the area, based on the weight-of-evidence of the five factors recommended in EPA's ozone designations guidance and any other relevant information. In developing this technical analysis, EPA used the latest data and information available to EPA (and to the states and tribes through the Ozone Designations Mapping Tool and EPA Ozone Designations

Guidance and Data web page).[5] In addition, EPA considered any additional data or information provided to EPA by states or tribes.

3.1 Technical Analysis for the Washington, DC-MD-VA and Baltimore, MD Areas

The area of analysis for this section of the technical support document is the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA, which includes several CBSAs in Maryland (MD), Virginia (VA), West Virginia (WV), Pennsylvania (PA), and the District of Columbia (DC). The analysis of the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA is the basis for two separate intended nonattainment areas: the Washington DC-MD-VA nonattainment area and the Baltimore MD nonattainment area.

This technical analysis first identifies the areas with monitors that violate the 2015 ozone NAAQS. It also provides EPA's evaluation of these areas and any nearby areas to determine whether those nearby areas have emission sources that potentially contribute to ambient ozone concentrations at the violating monitors in the area, based on the weight-of-evidence of the five factors recommended in EPA's ozone designations guidance and any other relevant information. In developing this technical analysis, EPA used the latest data and information available to EPA (and to the states and tribes through the Ozone Designations Mapping Tool and EPA Ozone Designations Guidance and Data web page).[6] In addition, EPA considered any additional data or information provided to EPA by states or tribes.

The area of analysis for this technical support document is the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA, which includes several CBSAs in Maryland (MD), Virginia (VA), West Virginia (WV), Pennsylvania (PA), and the District of Columbia (DC).

The Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA includes the District of Columbia as well as Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland and Hampshire and Jefferson Counties in West Virginia. The Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA also includes Arlington, Clarke, Culpeper, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Rappahannock, Spotsylvania, Stafford, and Warren Counties and Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park, and Winchester Cities in Virginia.

The Baltimore-Columbia-Towson, MD CBSA includes Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties as well as Baltimore City in Maryland.

The remaining counties in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA are single county CBSAs with the exception of Berkeley County and Washington County. These remaining counties and their associated CBSAs are as follows: Berkeley County, WV and Washington County, MD are in the Hagerstown-Martinsburg, MD-WV CBSA, Franklin County, PA is in the Chambersburg-Waynesboro, PA CBSA, Dorchester County, MD is the Cambridge, MD CBSA, St. Mary's County, MD is the California-Lexington Park, MD CBSA and Talbot County, MD is the Easton, MD CBSA.

Table 1 provides a list of all the jurisdictions within the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA and each jurisdiction's corresponding CBSA.

Table 1. CBSAs and Counties within the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA.

County/City, State	CBSA

[5] EPA's Ozone Designations Guidance and Data web page can be found at *https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data.*

[6] EPA's Ozone Designations Guidance and Data web page can be found at https://www.epa.gov/ozone-designations/ozonedesignations-guidance-and-data.

District of Columbia	Washington-Arlington-Alexandria, DC-VA-MD-WV
Calvert, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV
Charles, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV
Prince George's, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV
Arlington, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Clarke, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Culpeper, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Fairfax, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Fauquier, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Frederick, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Loudoun, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Prince William, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Rappahannock, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Spotsylvania, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Stafford, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Warren, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Alexandria City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Fairfax City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Falls Church City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Fredericksburg City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Manassas City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Manassas Park City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Winchester City, VA	Washington-Arlington-Alexandria, DC-VA-MD-WV
Hampshire, WV	Washington-Arlington-Alexandria, DC-VA-MD-WV
Jefferson, WV	Washington-Arlington-Alexandria, DC-VA-MD-WV
Frederick, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV
Montgomery, MD	Washington-Arlington-Alexandria, DC-VA-MD-WV
Anne Arundel, MD	Baltimore-Columbia-Towson, MD
Baltimore, MD	Baltimore-Columbia-Towson, MD
Carroll, MD	Baltimore-Columbia-Towson, MD
Harford, MD	Baltimore-Columbia-Towson, MD
Howard, MD	Baltimore-Columbia-Towson, MD
Queen Anne's, MD	Baltimore-Columbia-Towson, MD
Baltimore City, MD	Baltimore-Columbia-Towson, MD
Washington, MD	Hagerstown-Martinsburg, MD-WV
Berkeley, WV	Hagerstown-Martinsburg, MD-WV
Franklin, PA	Chambersburg-Waynesboro, PA
Dorchester, MD	Cambridge, MD
St. Mary's, MD	California-Lexington Park, MD
Talbot, MD	Easton, MD

Grouping of Areas for Analysis:

As the Washington-Baltimore-Arlington CSA is made up of 40 cities and counties, the area of analysis will be discussed using the subcomponents identified below. These subcomponent groupings are consistent with the multiple CBSAs that comprise the Washington-Baltimore-Arlington CSA, with the recommendations submitted

by the states and the District of Columbia, and with the manner in which the area has been considered and designated for previous ozone NAAQS:

(1) The Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA includes the District of Columbia as well as Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland and Hampshire and Jefferson Counties in West Virginia. It also includes Arlington, Clarke, Culpeper, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Rappahannock, Spotsylvania, Stafford, and Warren Counties and Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park, and Winchester Cities in Virginia.

(2) The Baltimore-Columbia-Towson, MD CBSA includes Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties as well as Baltimore City in Maryland.

(3) Remaining: Berkeley County, WV and Washington, MD (of the Hagerstown-Martinsburg, MD-WV CBSA), Franklin County, PA (of the Chambersburg-Waynesboro, PA CBSA), Dorchester County, MD (of the Cambridge, MD CBSA), St. Mary's County, MD (of the California-Lexington Park, MD CBSA) and Talbot County, MD (of the Easton, MD CBSA.)

The five factors recommended in EPA's guidance are:

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

Figure 1a is a map of EPA's intended nonattainment boundary for the Baltimore, MD nonattainment area for the 2015 ozone NAAQS. The map shows the location of the ambient air quality monitors, county, and other jurisdictional boundaries. For purposes of the 1997 and 2008 ozone NAAQS, the Baltimore-Columbia-Towson, MD CBSA, with the exception of Queen Anne's County, was designated nonattainment. The boundary for the nonattainment area for both the 1997 and 2008 ozone NAAQS included Baltimore City and the entire counties of Anne Arundel, Baltimore, Carroll, Harford, and Howard in Maryland. The intended boundary for the Baltimore, MD for the 2015 ozone NAAQS is the same as the boundaries for the 1997and the 2008 ozone NAAQS.

Figure 1b is a map of EPA's intended nonattainment boundary for the Washington, DC-MD-VA nonattainment area for the 2015 ozone NAAQS. The map shows the location of the ambient air quality monitors, county, and other jurisdictional boundaries. For purposes of the 1997 and 2008 ozone NAAQS, the nonattainment area included the District of Columbia and the entire counties of Calvert, Charles, Frederick, Montgomery, and Prince George's in Maryland and Arlington, Fairfax, Loudoun, and Prince William in Virginia. The 1997 and 2008 ozone NAAQS nonattainment area also included the cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park. The intended boundary for the Washington, DC-MD-VA nonattainment area for the 2015 ozone NAAQS is the same as the boundaries for the 1997 and 2008 ozone NAAQS.

Figure 1a. EPA's Intended Nonattainment Boundaries for the Baltimore, MD Area.

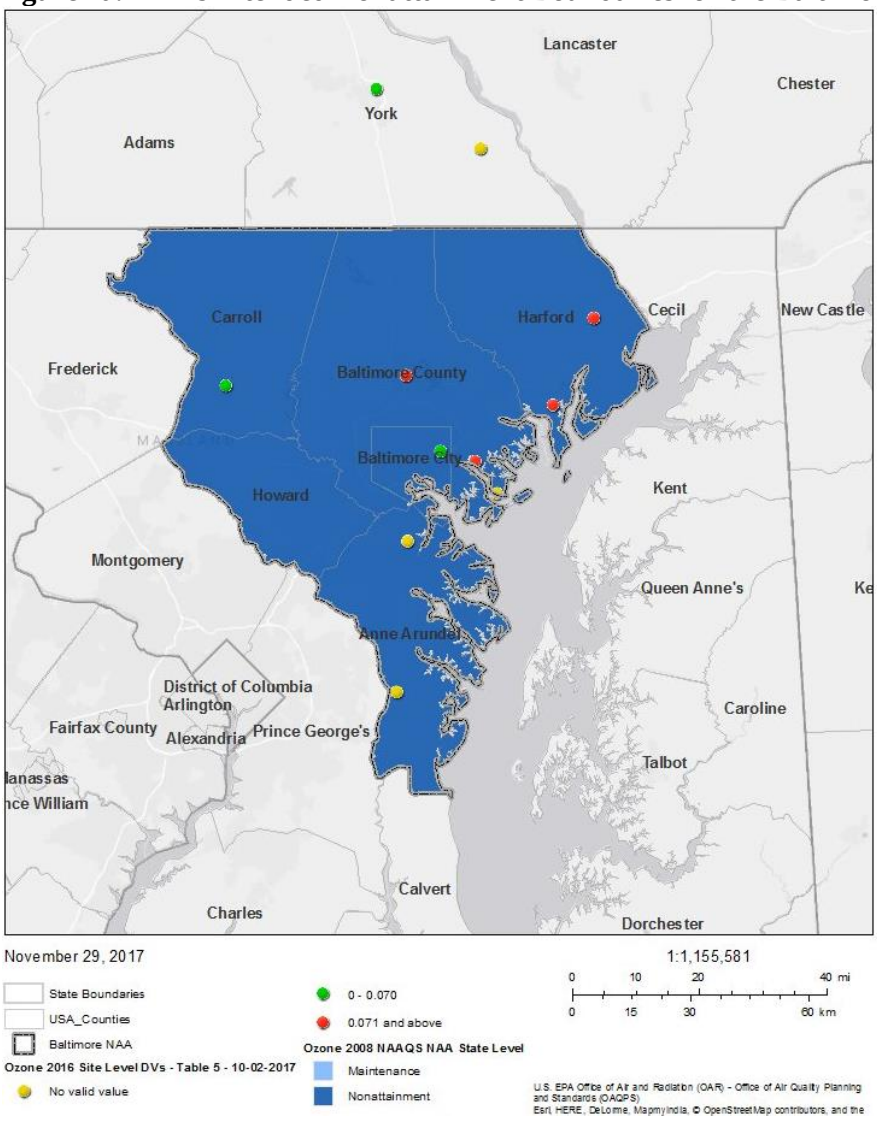
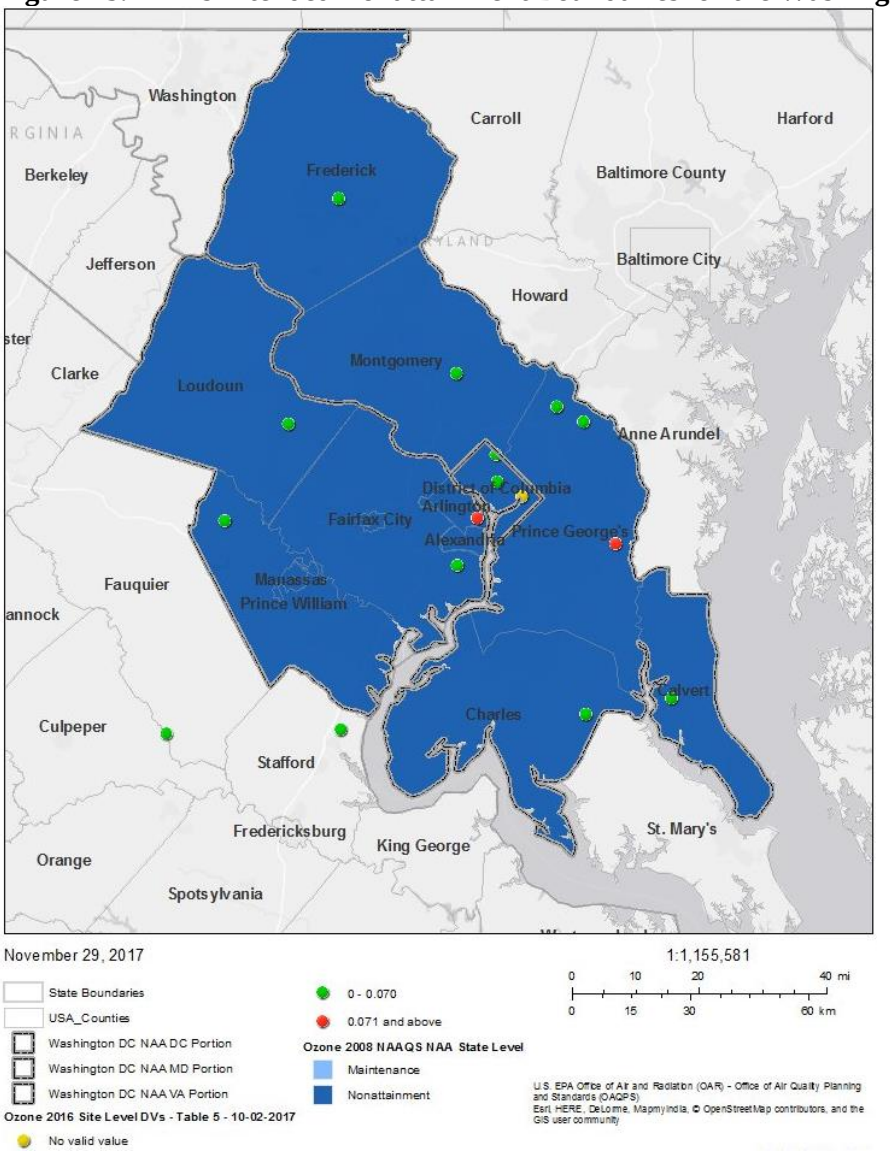


Figure 2b. EPA's Intended Nonattainment Boundaries for the Washington, DC-MD-VA Area.



EPA must designate as nonattainment any area that violates the NAAQS and any nearby areas that contribute to the violation in the violating area.

Baltimore and Harford Counties have monitors in violation of the 2015 ozone NAAQS, therefore these counties are included in the intended Baltimore nonattainment area. As detailed in the analysis that follows, EPA has also determined that Anne Arundel, Carroll, and Howard Counties as well as Baltimore City contribute to the violating monitors in Baltimore and Harford Counties in the Baltimore area.

Arlington County, VA and Prince George's County, MD each have a monitor in violation of the 2015 ozone NAAQS, therefore these counties are included in the intended Washington, DC-MD-VA nonattainment area. EPA has also determined that the District of Columbia as well as the following Maryland and Virginia counties contribute to the violating monitors in Arlington, VA and Prince George's, MD in the Washington, DC-MD-VA area: Calvert, Charles, Frederick, Fairfax, Loudoun, and Prince William. In addition, EPA determined that the following Virginia cities also contribute to the violating area: Fairfax, Falls Church, Manassas, and Manassas Park.

The following sections describe the five factor analysis. While the factors are presented individually, they are not independent. The five factor analysis process carefully considers the interconnections among the different factors and the dependence of each factor on one or more of the others, such as the interaction between emissions and meteorology for the area being evaluated.

Factor Assessment

Factor 1: Air Quality Data

EPA considered 8-hour ozone design values in ppm for air quality monitors in the Washington-Baltimore-Arlington CSA area of analysis based on data for the 2014-2016 period (i.e., the 2016 design value, or DV). This is the most recent three-year period with fully-certified air quality data. The design value is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration.[7] The 2015 NAAQS are met when the design value is 0.070 ppm or less. Only ozone measurement data collected in accordance with the quality assurance (QA) requirements using approved (FRM/FEM) monitors are used for NAAQS compliance determinations.[8] EPA uses FRM/FEM measurement data residing in EPA's Air Quality System (AQS) database to calculate the ozone design values. Individual violations of the 2015 ozone NAAQS that EPA determines have been caused by an exceptional event that meets the administrative and technical criteria in the Exceptional Events Rule[9] are not included in these calculations. Whenever several monitors are located in a county (or designated nonattainment area), the design value for the county or area is determined by the monitor with the highest valid design value. The presence of one or more violating monitors (i.e. monitors with design values greater than 0.070 ppm) in a county or other geographic area forms the basis for designating that county or area as nonattainment. The remaining four factors are then used as the technical basis for determining the spatial extent of the designated nonattainment area surrounding the violating monitor(s) based on a consideration of what nearby areas are contributing to a violation of the NAAQS.

EPA identified monitors where the most recent design values violate the NAAQS, and examined historical ozone air quality measurement data (including previous design values) to understand the nature of the ozone ambient air quality problem in the area. Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are operated in accordance with 40 CFR part 58, appendix A, C, D and E and operating with an FRM or FEM monitor. These requirements must be met in order to be acceptable for comparison to the 2015 ozone NAAQS for designation purposes. All data from Special Purpose Monitors (SPMs) using an FRM or FEM are eligible for comparison to the NAAQS, subject to the requirements given in the March 28, 2016 Revision to Ambient Monitoring Quality Assurance and Other Requirements Rule (81 FR 17248).

The 2014-2016 design values for counties in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA area are shown in Table 2. Monitors located in the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA are in cells shaded in gray. The table rows containing monitors located in the Baltimore-Columbia-Towson, MD CBSA are shaded in green. The remaining rows in white are for monitors within other CBSAs located geographically within the CSA.

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

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

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

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

County, State	State Recommended Nonattainment	AQS Site ID	2014-2016 DV (ppm)	2014 4th highest daily max value	2015 4th highest daily max value	2016 4th highest daily max value
District of Columbia	Yes	11-001-0041	N/A	0.047	N/A	0.065
District of Columbia		11-001-0043	0.070	0.068	0.072	0.072
District of Columbia		11-001-0050	**0.070**	0.069	0.072	0.071
Anne Arundel, MD	Yes	24-003-0014	N/A	0.066	0.071	N/A
Anne Arundel, MD		24-003-1003	N/A	N/A	N/A	0.076
Baltimore, MD	Yes	24-005-1007	**0.072**	0.067	0.078	0.073
Baltimore, MD		24-005-3001	0.072	0.068	0.072	0.078
Baltimore, MD		24-005-3474	N/A	N/A	N/A	0.088
Baltimore (City), MD	Yes	24-510-0054	**0.069**	0.060	0.072	0.075
Calvert, MD	Yes	24-009-0011	**0.069**	0.070	0.067	0.070
Carroll, MD	Yes	24-013-0001	**0.068**	0.064	0.070	0.072
Charles, MD	Yes	24-017-0010	**0.070**	0.070	0.068	0.073
Dorchester, MD	No	24-019-0004	0.064	0.065	0.061	0.067
Dorchester, MD		24-019-9991	**0.066**	0.065	0.065	0.068
Frederick, MD	Yes	24-021-0037	**0.067**	0.063	0.070	0.070
Harford, MD	Yes	24-025-1001	**0.073**	0.067	0.074	0.079
Harford, MD		24-025-9001	0.073	0.070	0.073	0.077
Howard, MD	Yes	No monitor	N/A			
Montgomery, MD	Yes	24-031-3001	**0.068**	0.064	0.072	0.068
Prince George's, MD	Yes	24-033-0030	0.069	0.065	0.072	0.070
Prince George's, MD		24-033-8003	**0.071**	0.069	0.069	0.076
Prince George's, MD		24-033-9991	0.068	0.069	0.067	0.070
Queen Anne's, MD	No	No monitor	N/A			
St. Mary's, MD	No	No monitor	N/A			
Talbot, MD	No	No monitor	N/A			
Washington, MD	No	24-043-0009	**0.066**	0.061	0.067	0.070
Franklin, PA	No	42-055-0001	**0.060**	0.063	0.059	0.059
Alexandria (City), VA	Yes	No monitor	N/A			
Arlington, VA	Yes	51-013-0020	**0.072**	0.071	0.073	0.072
Clarke, VA	No	No monitor	N/A			
Culpeper, VA	No	No monitor	N/A			
Fairfax, VA	Yes	51-059-0030	**0.070**	0.065	0.072	0.073
Fairfax (City), VA	Yes	No monitor	N/A			
Falls Church (City), VA	Yes	No monitor	N/A			
Fauquier, VA	No	51-061-0002	**0.059**	0.059	0.056	0.063

Frederick, VA	No	51-069-0010	**0.061**	0.059	0.061	0.065
Frederick (City), VA	No	No monitor	N/A			
Loudoun, VA	Yes	51-107-1005	**0.067**	0.063	0.071	0.068
Manassas (City), VA	Yes	No monitor	N/A			
Manassas Park (City), VA	Yes	No monitor	N/A			
Prince William, VA	Yes	51-153-0009	**0.065**	0.062	0.067	0.067
Rappahannock, VA	No	No monitor	N/A			
Spotsylvania, VA	No	No monitor	N/A			
Stafford, VA	No	51-179-0001	**0.063**	0.062	0.063	0.066
Warren, VA	No	No monitor	N/A			
Winchester (City), VA	No	No monitor	N/A			
Jefferson, WV	No	No monitor	N/A			
Berkeley, WV	No	54-003-0003	**0.063**	0.060	0.066	0.064
Hampshire, WV	No	No monitor	N/A			

[a] The highest design value in each county is indicated in bold type.
N/A indicates that the monitor did not meet the completeness criteria described in 40 CFR, part 50, appendix U, or that no data exists for that county.

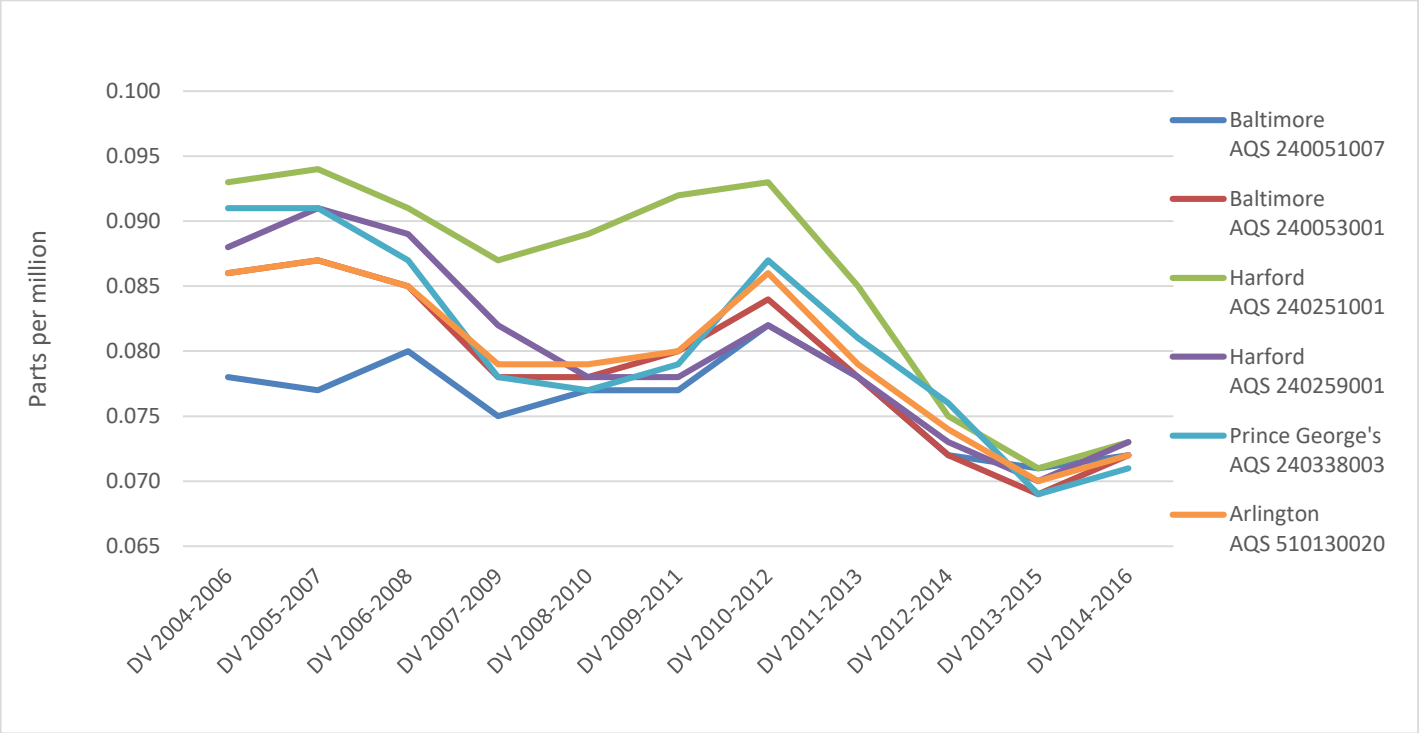
The violating monitors within the Baltimore-Columbia-Towson, MD CBSA are located within two counties. Baltimore County, MD and Harford County, MD each contain two violating monitors. Violating monitors 24-005-1007 and 24-005-3001 are located within Baltimore County in Padonia, MD and Essex, MD, respectively. A third monitor located within Baltimore County, Maryland, 24-005-3474, only had complete data for 2016 and three years of complete data are required in order to determine a complete design value at any one monitor. Violating monitors 24-025-1001 and 24-025-9001 are located within Harford County in Edgewood, MD and Churchville, MD, respectively. There are two monitors located in the Baltimore-Columbia-Towson, MD CBSA that are attaining the 2008 ozone NAAQS based on the 2014-2016 design values and three monitors in the CBSA (two in Anne Arundel, MD and one in Baltimore, MD) which do not have enough valid data to determine a design value.

The violating monitors within the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA are located within two counties, Prince George's in Maryland (monitor 24-033-8003) and Arlington in Virginia (monitor 51-013-0020). There are 14 monitors within the CBSA that are attaining the 2015 ozone NAAQS based on the 2014-2016 design values and one monitor located, in the District of Columbia, which does not have enough valid data to determine a design value.

There are five counties that contain monitors which are within the Washington-Baltimore-Arlington CSA, yet are outside of either the Washington-Arlington-Alexandria CBSA and the Baltimore-Columbia-Towson CBSA. All five of these monitors are attaining the 2015 ozone NAAQS based on the 2014-2016 design values.

Table 2identifies the design values for all monitors in the area of analysis and Figure 2 shows the historical trend of design values for the violating monitors within the CSA. There are four violating monitors that are located within the Baltimore-Columbia-Towson, MD CBSA and two violating monitors that are located within the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA. Baltimore, MD monitors 240051007 and 240053001 as well as Harford, MD monitors 240251001 and 240259001 are located within the Baltimore CBSA. The Prince George's, MD monitor 240338003 and the Arlington, VA monitor 510130020 are located within the Washington CBSA.

Figure 2. Three-Year Design Values for Violating Monitors (2007-2016).



As shown in Figure 2, every monitor in the CSA had steep decreases in design value measurements between 2012 and 2015. Universally, these monitors also display an uptick between 2015 and 2016 measurements.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

EPA reviewed data from the 2014 National Emissions Inventory (NEI), the most recent NEI data available at the time of the analysis. For each county in the area of analysis, EPA examined the number of large sources (NO_x or VOC emissions greater than 100 tons per year) and small point sources and the magnitude of county-level emissions reported in the NEI. These county-level emissions represent the sum of emissions from the following general source categories: Point sources, non-point (i.e., area) sources, non-road mobile, on-road mobile, and fires. Emissions levels from sources in a nearby area indicate whether there is the potential for the area to contribute to monitored violations.

Table 3a provides a county-level emissions summary of NO_x and VOC (given in tons per year (tpy)) emissions for the area of analysis, the Washington-Baltimore-Arlington CSA. Counties located in the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA are in cells shaded in gray. Counties located in the Baltimore-Columbia-Towson, MD CBSA are shaded in green. The remaining counties in white are located within other CBSAs of the CSA. Table 3b provides the total NO_x and VOC emissions separated into three main categories, the Washington-Arlington-Alexandria CBSA, the Baltimore-Columbia-Towson CBSA and a grouping of all the remaining counties in the CSA which are not included in either of the previously mentioned CBSAs.

Table 3a. Total County-Level NO_x and VOC Emissions [a].

County, State	State Recommended Nonattainment?	Total NO_x (tpy)	Total VOC (tpy)
District of Columbia	Yes	7,791	7,729
Anne Arundel, MD	Yes	16,850	10,946
Baltimore, MD	Yes	17,557	11,828
Baltimore City, MD	Yes	9,586	7,885
Calvert, MD	Yes	1,635	1,817
Carroll, MD	Yes	5,534	3,420
Charles, MD	Yes	3,723	3,286
Dorchester, MD	No	1,502	8,893
Frederick, MD	Yes	5,686	5,158
Harford, MD	Yes	5,433	5,442
Howard, MD	Yes	6,698	5,590
Montgomery, MD	Yes	16,420	16,638
Prince George's, MD	Yes	18,988	13,738
Queen Anne's, MD	No	1,926	1,781
St. Mary's, MD	No	3,852	3,790
Talbot, MD	No	1,711	2,263
Washington, MD	No	6,783	3,902
Franklin, PA	No	5,045	4,778
Alexandria City, VA	Yes	1,146	1,870
Arlington, VA	Yes	3,691	2,807
Clarke, VA	No	702	588
Culpeper, VA	No	1,420	1,430
Fairfax City, VA	Yes	264	606
Fairfax, VA	Yes	15,177	16,051
Falls Church City, VA	Yes	107	274
Fauquier, VA	No	3,273	2,310
Frederick, VA	No	4,119	4,308
Fredericksburg City, VA	No	859	706
Loudoun, VA	Yes	6,230	6,586
Manassas City, VA	Yes	405	618
Manassas Park City, VA	Yes	85	263
Prince William, VA	Yes	6,624	6,724
Rappahannock, VA	No	215	1,777
Spotsylvania, VA	No	3,300	1,162
Stafford, VA	No	3,757	788
Warren, VA	No	1,394	1,271
Winchester City, VA	No	424	798
Berkeley, WV	No	4,280	3,937
Hampshire, WV	No	828	1,977
Jefferson, WV	No	1,601	1,421
	Total	196,621	177,156

[a] Total emission levels do not include biogenic sources.

Table 3b. CSA NO_x and VOC Emissions.

Area	Total NO_x (tpy)	Total VOC (tpy)
Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA (including the following jurisdictions: DC, Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland; Hampshire and Jefferson Counties in West Virginia; Arlington, Clarke, Culpeper, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Rappahannock, Spotsylvania, Stafford, and Warren Counties in Virginia; and Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park, and Winchester Cities in Virginia.	109,864	102,701
Baltimore-Columbia-Towson, MD CBSA (including the following jurisdictions: Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties as well as Baltimore City in Maryland.	63,584	46,892
Remaining Areas of Washington-Baltimore-Arlington CSA which are not included in the above two CBSAs. (including the following jurisdictions: Dorchester, Talbot, Washington, and St. Mary's Counties in Maryland; Berkeley County in West Virginia; and Franklin County in Pennsylvania.	23,173	27,563
Total	196,621	177,156

For the Baltimore-Columbia-Towson CBSA (identified by the green cells in Table 3a), the counties/cities NO_x emissions ranked highest to lowest are: Baltimore, MD; Anne Arundel, MD; Baltimore City, MD; Howard, MD; and Carroll, MD, Harford, MD and Queen Anne's MD. Baltimore County and Anne Arundel County have the largest NOx emissions with each contributing approximately 27% of the total CBSA NO_x emissions. Baltimore City contributes approximately 15% and Howard and Carroll about 10.5% and 9%, respectively. Harford County contributes 8.5% of the total CBSA NO_x emissions and Queen Anne County has the lowest NO_x emissions, contributing about 3%. The counties/cities in the Baltimore-Columbia-Towson CBSA ranked highest to lowest in terms of VOC emissions are: Baltimore, MD (25% of CBSA emissions); Anne Arundel, MD (23%); Baltimore City, MD (17%); Howard, MD (12%); and Harford, MD (12%), Carroll, MD (7%) and Queen Anne's, MD (4%)

The counties/cities with the ranked by NO_x emissions (highest to lowest) within the Washington-Arlington-Alexandria CBSA (identified by gray cells in Table 3a) are as follows: Prince George's, MD (17%); Montgomery, MD (15%); Fairfax, VA (14%); District of Columbia (7%); and Prince William, VA (6%), Loudoun VA (6%), Frederick, MD (5%), Frederick, VA (4%), Stafford, VA (3%), Charles, MD (3%), Arlington, VA (3%), Spotsylvania, VA (3%), Fauquier, VA (3%), Calvert, MD (1%), Jefferson, WV (1%), Culpeper, VA (1%), Warren, VA (1%), Alexandria City VA (1%), Fredericksburg City, VA (1%), Hampshire WV (1%), Clark, VA (1%), Winchester City, VA (<0.5%), Manassas City, VA (<0.5%), Fairfax City, VA (<0.5%), Rappahannock, VA (<0.5%), Falls Church City, VA (<0.5%), and Manassas Park City, VA (<0.5%) . The total NO_x emissions from five highest areas account for over half (59%) of the total NO_x emissions within the CBSA, which includes a total of 26 counties/cities, plus the District of Columbia. Prince George's County has the highest NO_x emissions in the Washington-Arlington-Alexandria CBSA as well as in the larger Washington-Baltimore-Arlington CSA boundary. Prince George's also is home to one of the monitors which is currently violating the 2015 ozone NAAQS. The counties/cities with the ranked by VOC emissions (highest to lowest) in the Washington-Arlington-Alexandria CBSA (ranked highest to lowest) are: Montgomery, MD (16%); Fairfax, VA (16%); Prince Georges, MD (13%); District of Columbia (8%); and Prince William (7%), Loudoun, VA (6%), Frederick, MD (5%), Frederick, VA (4%), Charles, MD (3%), Arlington, VA (3%), Fauquier, VA (2%), Hampshire, WV (2%), Alexandria City, VA (2%), Calvert, MD (2%), Rappahannock, VA (2%), Jefferson, WV (1%), Warren, VA (1%), Spotsylvania, VA (1%), Winchester City, VA (1%), Stafford, VA (1%), Fredericksburg City, VA (1%), Manassas City, VA (1%), Fairfax City, VA (1%), Clarke, VA (1%), Falls Church City, VA (<0.5%), Manassas Park City, VA (<0.5%). The five highest areas are also noted as being the top five NO_x county-wide emitters within the CBSA. The Washington-Arlington-Alexandria CBSA counties

with the three highest VOC emissions, Montgomery County, Fairfax, and Prince George's are also the highest VOC emitters within the larger Washington-Baltimore-Arlington CSA.

Figures 3a and 3b provide a visual representation of the county-level of NO_x and VOC emissions within the entire area of analysis.

Figure 3a. County-level NO_x emissions within the Area of Analysis.

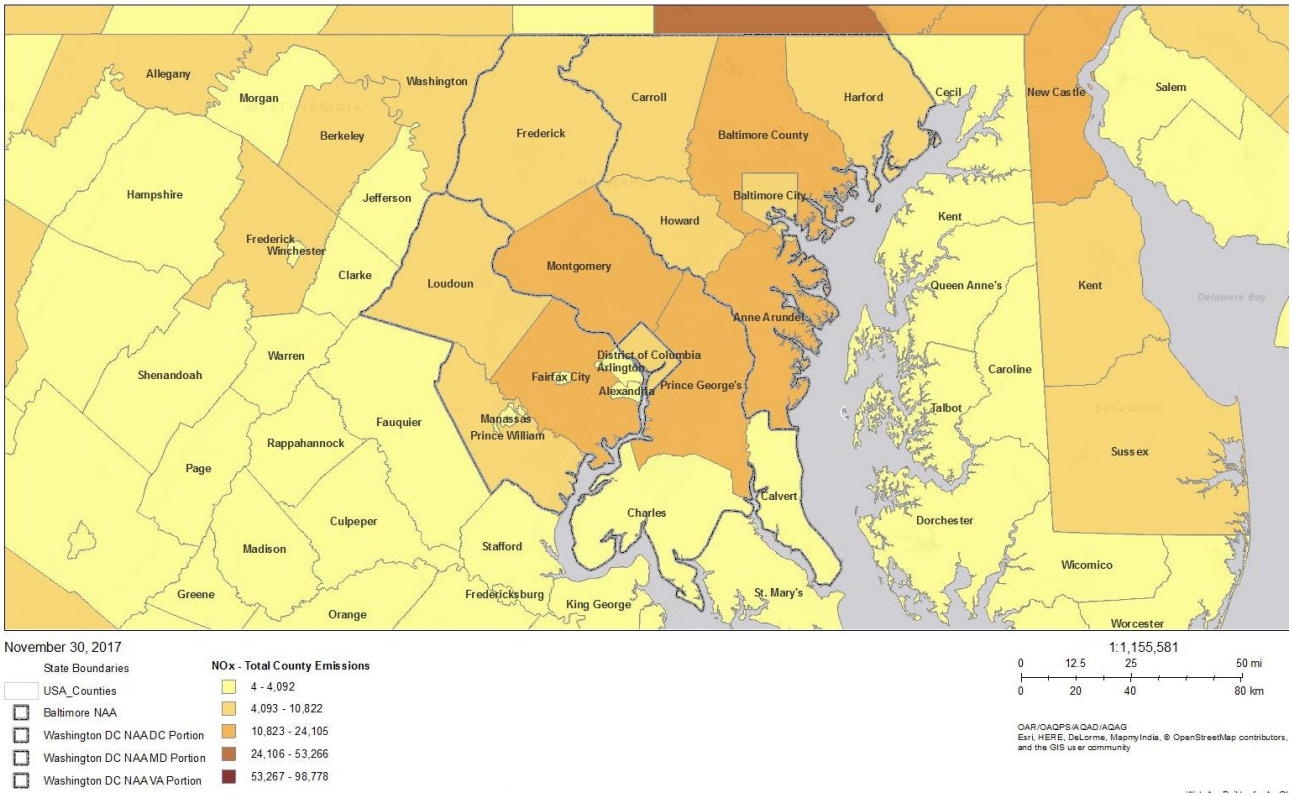
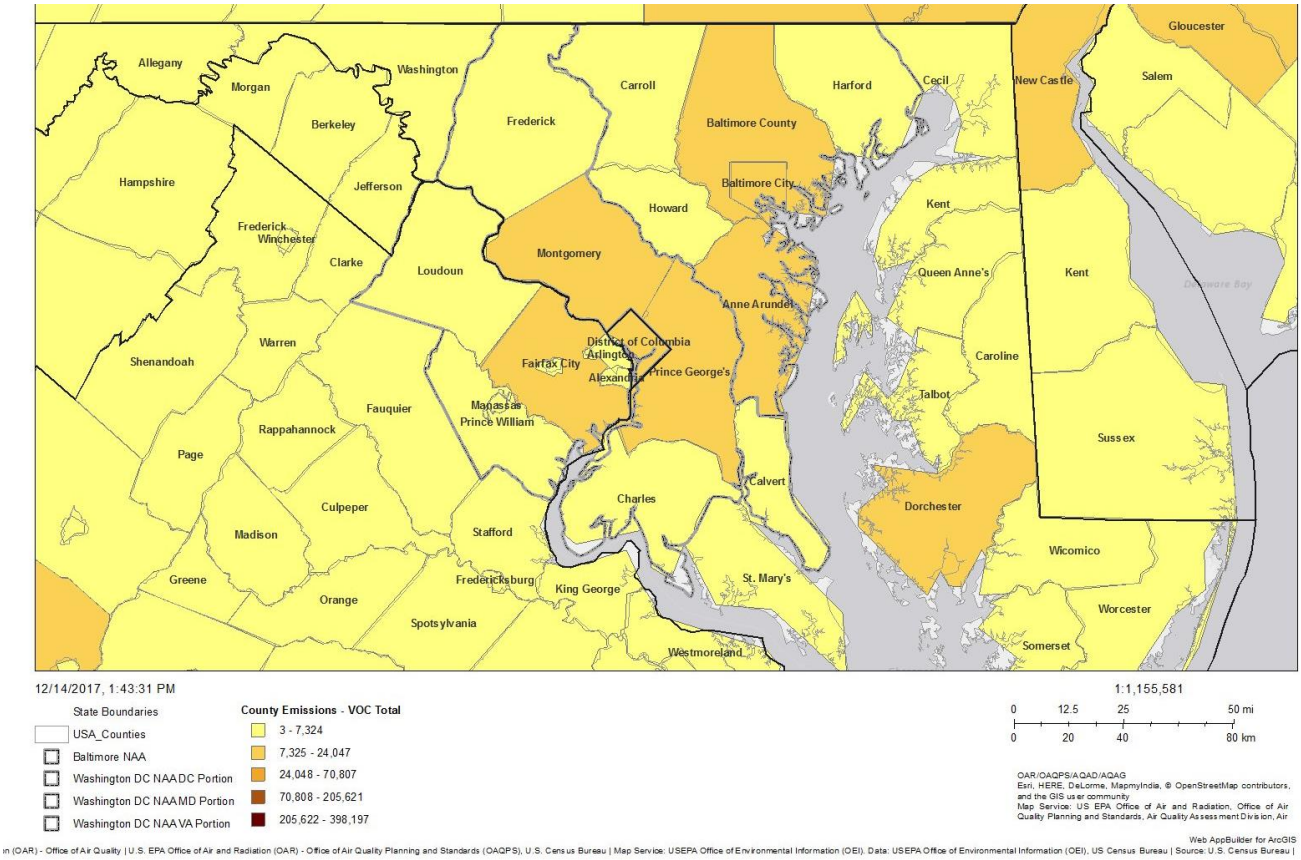


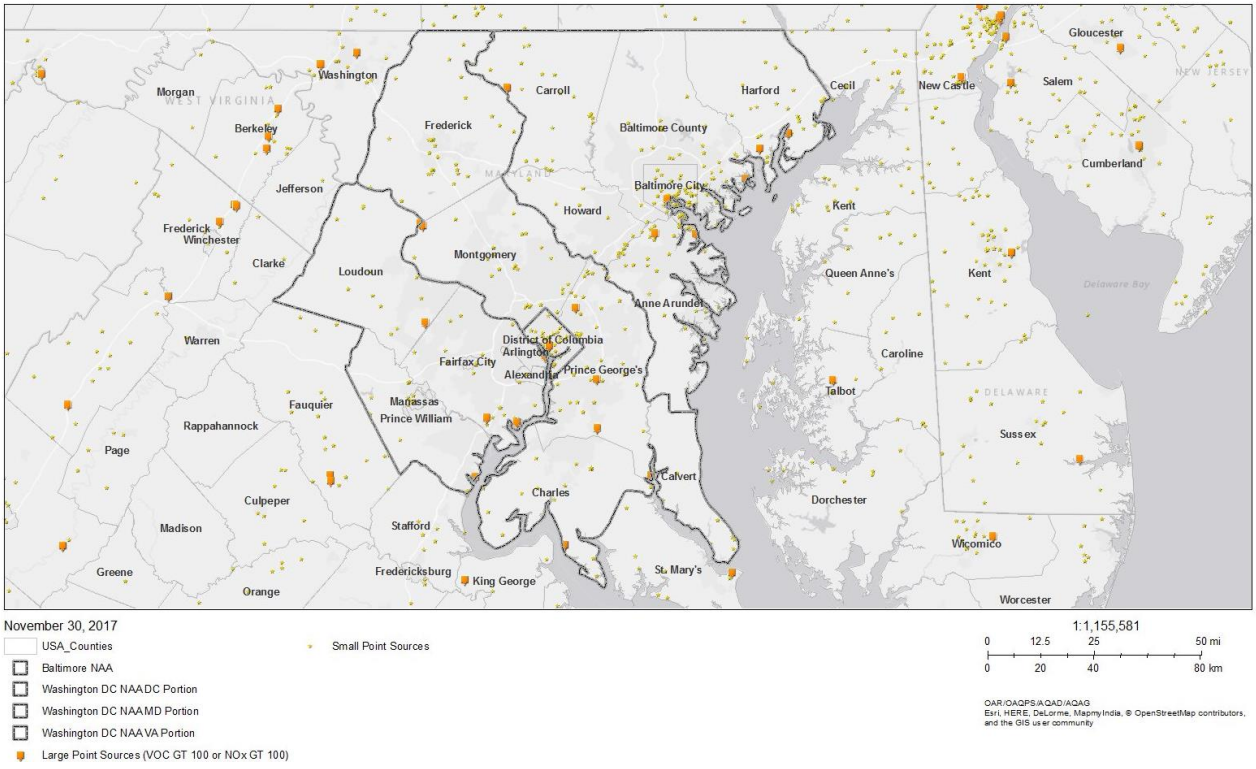
Figure 3b. County-level VOC emissions within the Area of Analysis.



In Table 3a, the jurisdictions located in white cells do not fall under either the Washington-Arlington-Alexandria CBSA, nor the Baltimore-Columbia-Towson CBSA. Each of these counties located in Maryland, West Virginia or Pennsylvania contribute NO_x emissions that are less than 3% of the total for the CSA. However, there is a mix among how much each of these counties emits individually. Three counties (Washington, MD; Franklin, PA; and Berkeley, WV) each emitted over 4,000 tpy of total NO_x in 2014, while the remaining three counties (Dorchester, MD; Talbot, MD; and St. Mary's, MD) emitted less than 4,000 tpy each. Among these six counties, Dorchester, MD contributes the highest VOC emissions, at 8,893 tpy, which is about 5% of the total Washington-Baltimore-Arlington CSA.

In addition to reviewing county-wide emissions of NO_x and VOC in the area of analysis, EPA also reviewed emissions from large point sources. The location of these sources, together with the other factors, can help inform nonattainment boundaries. The locations of the large point sources are shown in Figure 4 below. The intended nonattainment boundaries for the two areas are also shown. The Washington-Baltimore area is home to a number of both small and larger point sources that emit NO_x and/or VOCs. The I-95 corridor, which runs through both the Washington-Arlington-Alexandria CBSA and the Baltimore-Columbia-Towson CBSA, provides a home for the majority of these point sources.

Figure 4. Large Point Sources in the Area of Analysis.



Population density and degree of urbanization

In this part of the second factor analysis, EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include emissions of NO_x and VOC from on-road and non-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO_x and VOC emissions that may contribute to violations of the NAAQS. Table 4a shows the population, population density, and population growth information for each county in the area of analysis. Counties located in the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA are in cells shaded in gray. Counties located in the Baltimore-Columbia-Towson, MD CBSA are in cells shaded in green. The remaining counties in white are located within other CBSAs of the CSA.

Table 4b provides summary information for the three analysis areas: the Washington-Arlington-Alexandria CBSA, the Baltimore-Columbia-Towson CBSA and a grouping of all the remaining counties in the CSA which are not included in either of the previously mentioned CBSAs.

Table 4a. Population and Growth.

County, State	State Recommended Nonattainment?	2010 Population	2015 Population	2015 Population Density (per sq. mi.)	Absolute Change in Population (2010-2015)	Population % Change (2010-2015)
Fairfax, VA	Yes	1,081,726	1,142,234	2,922	60,508	5.59
Montgomery, MD	Yes	971,777	1,040,116	2,117	68,339	7.03
Prince George's, MD	Yes	863,420	909,535	1,884	46,115	5.34
Baltimore, MD	Yes	805,029	831,128	1,389	26,099	3.24
District of Columbia	Yes	601,723	672,228	11,011	70,505	11.72

Baltimore City, MD	Yes	620,961	621,849	7,682	888	0.14
Anne Arundel, MD	Yes	537,656	564,195	1,360	26,539	4.94
Prince William, VA	Yes	402,002	451,721	1,343	49,719	12.37
Loudoun, VA	Yes	312,311	375,629	729	63,318	20.27
Howard, MD	Yes	287,085	313,414	1,250	26,329	9.17
Harford, MD	Yes	244,826	250,290	573	5,464	2.23
Frederick, MD	Yes	233,385	245,322	372	11,937	5.11
Arlington, VA	Yes	207,627	229,164	8,823	21,537	10.37
Carroll, MD	Yes	167,134	167,627	375	493	0.29
Charles, MD	Yes	146,551	156,118	341	9,567	6.53
Franklin, PA	No	149,618	153,638	199	4,020	2.69
Washington, MD	No	147,430	149,585	327	2,155	1.46
Alexandria City, VA	Yes	139,966	153,511	10,216	13,545	9.68
Stafford, VA	No	128,961	142,003	528	13,042	10.11
Spotsylvania, VA	No	122,397	130,475	325	8,078	6.60
Berkeley, WV	No	104,169	111,901	348	7,732	7.42
St. Mary's, MD	No	105,151	111,413	312	6,262	5.96
Calvert, MD	Yes	88,737	90,595	425	1,858	2.09
Frederick, VA	No	78,305	83,199	201	4,894	6.25
Fauquier, VA	No	65,203	68,782	106	3,579	5.49
Jefferson, WV	No	53,498	56,482	269	2,984	5.58
Culpeper, VA	No	46,689	49,432	130	2,743	5.88
Queen Anne's, MD	No	47,798	48,904	131	1,106	2.31
Manassas City, VA	Yes	37,821	41,764	4,227	3,943	10.43
Warren, VA	No	37,575	39,083	183	1,508	4.01
Talbot, MD	No	37,782	37,512	140	-270	-0.71
Dorchester, MD	No	32,618	32,384	60	-234	-0.72
Fredericksburg City, VA	No	24,286	28,118	2,693	3,832	15.78
Winchester City, VA	No	26,203	27,284	2,955	1,081	4.13
Fairfax City, VA	Yes	22,565	24,013	3,849	1,448	6.42
Hampshire, WV	No	23,964	23,353	36	-611	-2.55
Manassas Park City, VA	Yes	14,273	15,726	6,206	1,453	10.18
Clarke, VA	No	14,034	14,363	82	329	2.34
Falls Church City, VA	Yes	12,332	13,892	6,949	1,560	12.65
Rappahannock, VA	No	7,373	7,378	28	5	0.07
Area Wide		9,051,961	9,625,360	762	573,399	6.33

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

Table 4b. CSA Population and Growth.

Area	2015 Population Density (per sq. mi.)	Population % Change (2010-2015)

Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA (including the following jurisdictions: DC, Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland; Hampshire and Jefferson Counties in West Virginia; Arlington, Clarke, Culpeper, Fairfax, Fauquier, Frederick, Loudoun, Prince William, Rappahannock, Spotsylvania, Stafford, and Warren Counties in Virginia; and Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park, and Winchester Cities in Virginia.	853	8.10
Baltimore-Columbia-Towson, MD CBSA (including the following jurisdictions: Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties as well as Baltimore City in Maryland.	1,075	3.21
Remaining Areas of Washington-Baltimore-Arlington CSA which are not included in the above two CBSAs. (including the following jurisdictions: Dorchester, Talbot, Washington, and St. Mary's Counties in Maryland; Berkeley County in West Virginia; and Franklin County in Pennsylvania.	219	3.41

Of the 10 counties/cities with the largest 2015 population, six fall within the Washington-Arlington-Alexandria CBSA boundaries: Fairfax County, VA; Montgomery County, VA; Price George's County, MD; District of Columbia; Prince William County, VA; and Loudon, VA. The other four areas with the largest 2015 population fall under the Baltimore-Columbia-Towson CBSA jurisdiction: Baltimore County, MD; Baltimore City, MD; Anne Arundel County, MD; and Howard, County, MD. As of 2015, over 6 million people reside within the Washington CSBA and over 2.5 million live within the Baltimore CBSA.

The Washington-Arlington-Alexandria CBSA overall has experienced high population growth between 2010 and 2015. Nine jurisdictions have experienced population growth greater than 10 percent: Loudoun County, VA (20.27); Fredericksburg City, VA (15.78); Falls Church City, VA (12.65); Prince William County, VA (12.37); District of Columbia (11.72); Manassas City, VA (10.43); Arlington, VA (10.37); Manassas Park City, VA (10.18); and Stafford County, VA (10.11). Within the Washington CBSA, Hampshire, WV is the only area experiencing negative population growth and Rappahannock remained essentially unchanged. Clark and Calvert Counties had relativity low growth for the area, with growth rates of slightly over 2 percent.

While Fairfax, VA, Montgomery, MD, and Prince George's, MD have only moderate growth rates for the area of 5.59, 7.03, and 5.34, respectively, these counties have the largest populations amongst all of the Washington CBSA and also the Washington Baltimore-Arlington CSA jurisdictions. A number of the jurisdictions had moderate growth (around 5 to 7 percent) and mid-range total population. These areas include Anne Arundel, Frederick, Charles, and St. Mary's Counties in Maryland as well as Spotsylvania County in Virginia. It also includes slightly smaller jurisdictions like Frederick, Fauquier, and Culpeper Counties in Virginia as well as Jefferson County in West Virginia. Other Washington CBSA jurisdictions experiencing moderate growth rates, such as Falls Church City, VA and Manassas Park City, VA, have the smallest populations in the area. Most of the jurisdictions had moderate growth (around 5 to 7 percent) and mid-range total population.

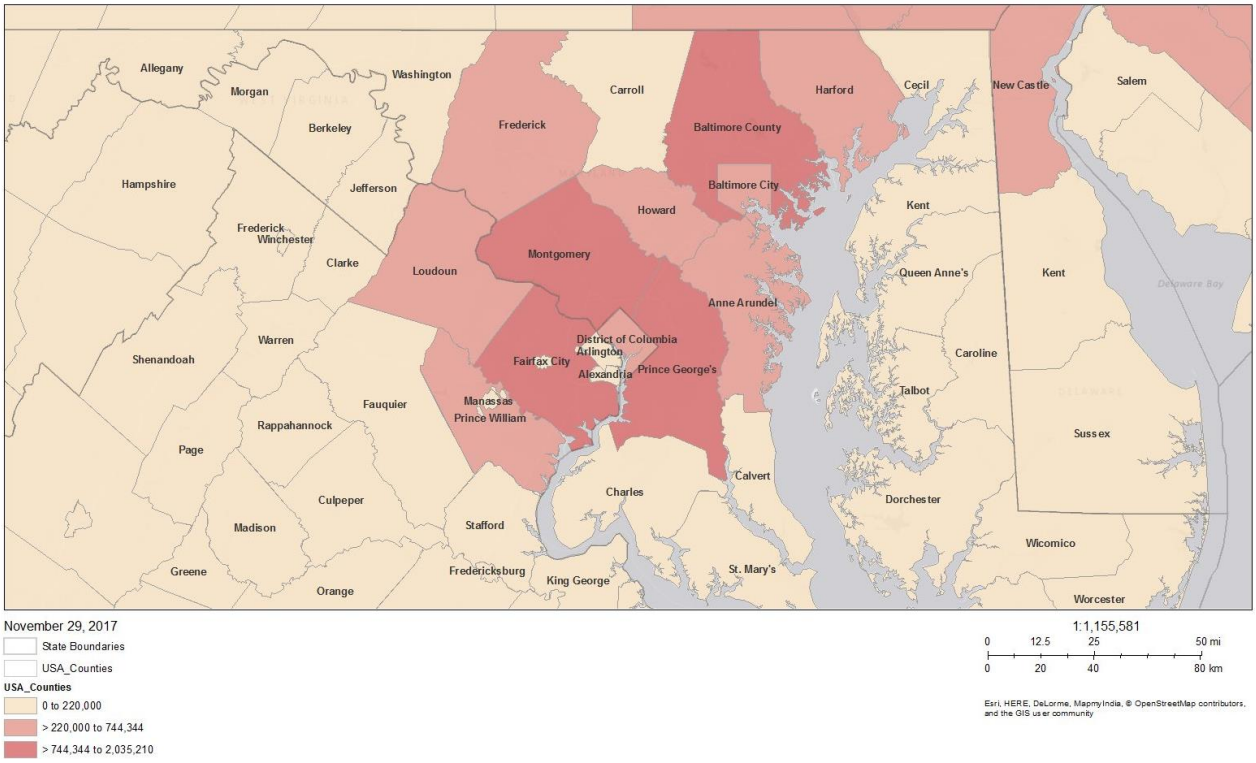
The District of Columbia, Alexandria City, VA, and Arlington, VA, all within the Washington CBSA, have the highest population densities (person per square mile) within the Washington CBSA and the Washington-Baltimore-Arlington CSA. The three areas within the CBSA that have the smallest population densities (Rappahannock, VA; Hampshire, WV; and Clarke, VA) also have the smallest population densities within the CSA.

The areas included in the Baltimore CBSA have a wide diversity of population densities, ranging from 131 people per square mile (Queen Anne's, MD) to 7,682 people per square mile (Baltimore City, MD). Baltimore County has the fourth largest population within the Washington-Baltimore-Arlington CSA with over 800,000 residents in 2015. Those living in Harford and Baltimore Counties account for almost 40% of the entire population residing within the Baltimore CBSA. This population is also in close proximity to the Harford

monitor, located in Edgewood, MD, with the highest design value in the CSA. Baltimore CBSA residents account for 29% of the total population within the CSA.

Of the counties outside either the Washington nor Baltimore CBSA (identified in the white cells in Table 4a), most are relatively sparsely populated with populations ranging from approximately 32,000 to 154,000 and population densities ranging from 60 to 348. Two of these six counties, Talbot and Dorchester, MD, had negative population growth between 2010 and 2015. These counties rank among the least densely populated areas within the Washington-Baltimore-Arlington CSA. In total, the population within these areas account for only 6% of residents living within the CSA. Figure 5 shows the county-level population density for the area of analysis.

Figure 5. County-Level Population.



Traffic and Vehicle Miles Travelled (VMT)

EPA evaluated the commuting patterns of residents, as well as the total vehicle miles traveled (VMT) for each county in the area of analysis. In combination with the population/population density data and the location of main transportation arteries, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and high VMT and/or high number of commuters indicates the presence of motor vehicle emissions that may contribute to violations of the NAAQS. Rapid population or VMT growth in a county on the urban perimeter may signify increasing integration with the core urban area, and thus could indicate that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. In addition to VMT, EPA evaluated worker data collected by the U.S. Census Bureau[10] for the area of analysis, the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA. Tables 5a and 5b show the traffic and commuting pattern data for the counties within the area of analysis, including 2014 data of the total VMT for each county, number of residents who work in each county, number of residents that work in counties with

violating monitors, and the percent of residents working in counties with violating monitors. Table 5a also uses 2014 data to show the number and percentage of residents commuting within the same county they reside in, within the area of analysis. Tables 5a and 5b, below, take data from the VMT spreadsheet from the Ozone Designations web page, https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data, as well as On the Map from the Census Bureau, http://onthemap.ces.census.gov/. The first 4 columns of Tables 5a and 5b are the same. The last 2 columns of Table 5a refer to the number and percentage of commuters to counties with violating monitors while the last 2 columns in Table 5b refer to the number and percentage of commuters staying within their county of residence.

Table 5a. Traffic and Commuting Patterns. [a]

County, State	State Recommended Attainment?	2014 Total VMT (Million Miles)	Number of County Residents Who Work	Number Commuting to or Within Counties with Violating Monitors	Percentage Commuting to or Within Counties with Violating Monitors
Fairfax, VA	Yes	9,642	513,786	49,807	9.69%
Prince George's, MD	**Yes**	**8,563**	**414,287**	**140,380**	**33.88%**
Baltimore, MD	**Yes**	**8,027**	**399,242**	**184,435**	**46.20%**
Montgomery, MD	Yes	7,172	468,752	53,905	11.50%
Anne Arundel, MD	Yes	5,620	253,808	50,418	19.86%
Howard, MD	Yes	3,863	147,383	31,563	21.42%
District of Columbia	Yes	3,649	286,131	32,310	11.29%
Prince William, VA	Yes	3,382	197,743	12,204	6.17%
Baltimore City, MD	Yes	3,282	245,424	72,315	29.47%
Frederick, MD	Yes	2,913	120,851	9,207	7.62%
Loudoun, VA	Yes	2,588	185,175	11,440	6.18%
Harford, MD	**Yes**	**2,354**	**116,325**	**75,295**	**64.73%**
Washington, MD	No	1,948	66,251	4,163	6.28%
Stafford, VA	No	1,866	51,967	2,271	4.37%
Arlington, VA	**Yes**	**1,550**	**113,965**	**24,154**	**21.19%**
Washington, MD	No	1,948	66,251	4,163	6.28%
Franklin, PA	No	1,440	66,408	1,076	1.62%
Spotsylvania, VA	No	1,336	53,824	1,206	2.24%
Fauquier, VA	No	1,289	35,991	1,634	4.54%
Carroll, MD	Yes	1,225	86,566	20,730	23.95%
Charles, MD	Yes	1,217	69,127	16,708	24.17%
Frederick, VA	No	1,118	37,689	397	1.05%
Berkeley, WV	No	1,037	48,864	574	1.17%
Queen Anne's, MD	No	915	23,285	3,206	13.77%
St. Mary's, MD	No	871	43,533	5,757	13.22%
Alexandria City, VA	Yes	755	73,045	10,672	14.61%
Calvert, MD	Yes	723	35,543	7,839	22.05%
Talbot, MD	No	605	17,345	1,641	9.46%
Culpeper, VA	No	553	20,421	474	2.32%
Jefferson, WV	No	477	25,464	305	1.20%
Warren, VA	No	450	19,305	667	3.46%
Fredericksburg City, VA	Yes	392	10,315	271	2.63%

Dorchester, MD	No	354	15,502	1,435	9.26%
Clarke, VA	No	294	7,357	263	3.57%
Hampshire, WV	No	199	8,937	131	1.47%
Fairfax City, VA	Yes	175	11,266	964	8.56%
Manassas City, VA	Yes	158	19,366	870	4.49%
Winchester City, VA	No	137	12,240	123	1.00%
Rappahannock, VA	No	93	2,933	19	0.65%
Falls Church City, VA	Yes	50	6,074	792	13.04%
Manassas Park City, VA	Yes	25	7,169	319	4.45%

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

Table 5b. Traffic and Commuting Within County.

County, State	State Recommended Attainment?	2014 Total VMT (Million Miles)	Number of County Residents Who Work	Number Commuting Within Own County	Percentage Commuting Within Own County
Fairfax, VA	Yes	9,642	513,786	235,797	45.89%
Prince George's, MD	Yes	8,563	414,287	117,332	28.32%
Baltimore, MD	Yes	8,027	399,242	162,157	40.62%
Montgomery, MD	Yes	7,172	468,752	231,790	49.45%
Anne Arundel, MD	Yes	5,620	253,808	107,006	42.16%
Howard, MD	Yes	3,863	147,383	43,597	29.58%
District of Columbia	Yes	3,649	286,131	189,302	66.16%
Prince William, VA	Yes	3,382	197,743	47,344	23.94%
Baltimore City, MD	Yes	3,282	245,424	114,284	46.57%
Frederick, MD	Yes	2,913	120,851	47,840	39.59%
Loudoun, VA	Yes	2,588	185,175	56,151	30.32%
Harford, MD	Yes	2,354	116,325	42,752	36.75%
Washington, MD	No	1,948	66,251	32,878	49.63%
Stafford, VA	No	1,866	51,967	11,648	22.41%
Arlington, VA	Yes	1,550	113,965	21,181	18.59%
Franklin, PA	No	1,440	66,408	32,471	48.90%
Spotsylvania, VA	No	1,336	53,824	13,568	25.21%
Fauquier, VA	No	1,289	35,991	8,452	23.48%
Carroll, MD	Yes	1,225	86,566	27,476	31.74%
Charles, MD	Yes	1,217	69,127	16,175	23.40%
Frederick, VA	No	1,118	37,689	8,610	22.84%
Berkeley, WV	No	1,037	48,864	20,902	42.78%
Queen Anne's, MD	No	915	23,285	5,677	24.38%
St. Mary's, MD	No	871	43,533	19,413	44.59%
Alexandria City, VA	Yes	755	73,045	12,091	16.55%
Calvert, MD	Yes	723	35,543	11,602	32.64%
Talbot, MD	No	605	17,345	7,308	42.13%
Culpeper, VA	No	553	20,421	6,197	30.35%
Jefferson, WV	No	477	25,464	7,364	28.92%
Warren, VA	No	450	19,305	4,836	25.05%

Fredericksburg City, VA	Yes	392	10,315	2,326	22.55%
Dorchester, MD	No	354	15,502	5,119	33.02%
Clarke, VA	No	294	7,357	993	13.50%
Hampshire, WV	No	199	8,937	2,112	23.63%
Fairfax City, VA	Yes	175	11,266	1,010	8.97%
Manassas City, VA	Yes	158	19,366	2,648	13.67%
Winchester City, VA	No	137	12,240	4,038	32.99%
Rappahannock, VA	No	93	2,933	576	19.64%
Falls Church City, VA	Yes	50	6,074	509	8.38%
Manassas Park City, VA	Yes	25	7,169	406	5.66%

As can be seen in Tables 5a and 5b, the five counties with the highest VMT in the area of analysis (ranked highest to lowest) are: Fairfax, VA; Prince George's, MD; Baltimore, MD; Montgomery, MD; and Anne Arundel, MD. Rappahannock County, Virginia and the cities of Falls Church and Manassas Park in Virginia have the lowest VMT within the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA, all with less than 100,000,000 total miles traveled within each jurisdiction.

Fairfax, VA, and Montgomery and Prince George's Counties in Maryland have the largest numbers of residents who work within the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA while Rappahannock, VA has the least amount of residents who work. Rappahannock, VA also has the lowest percentage of workers commuting into counties with violating monitors. Within the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA, Harford, Baltimore, and Prince George's Counties in Maryland have the highest percentage of workers commuting into counties with violating monitors. However, 37% of Harford, MD residents and 41% of Baltimore, MD residents commute within their own counties. Twenty-eight percent of Prince George's, MD residents and only 19% of Arlington, VA resident commute within their own counties.

The Washington CBSA contains over 60% of the total 2014 VMT within the Washington-Baltimore-Arlington CSA and approximately 65% of total CSA residents who work. There is a vast disparity in the absolute VMT values within the Washington CBSA counties.[11] The VMT of Fairfax County, VA is over 48 times that of Hampshire, WV and over 13 times that of Calvert County, MD. In the Washington CBSA, the three counties with the highest absolute VMT are Fairfax County, VA, and Prince George's and Montgomery Counties in Maryland. Together these three counties account for over 64% of all commuters within the CBSA commuting to or within a county with a violating monitor in the CSA. The cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park each have less than 17% of their working population working within their own county. This indicates that a majority of the working population within these small areas commute to other areas, which could presumably be towards the District of Columbia and its neighboring counties in Virginia and Maryland, several of which have a violating monitor.

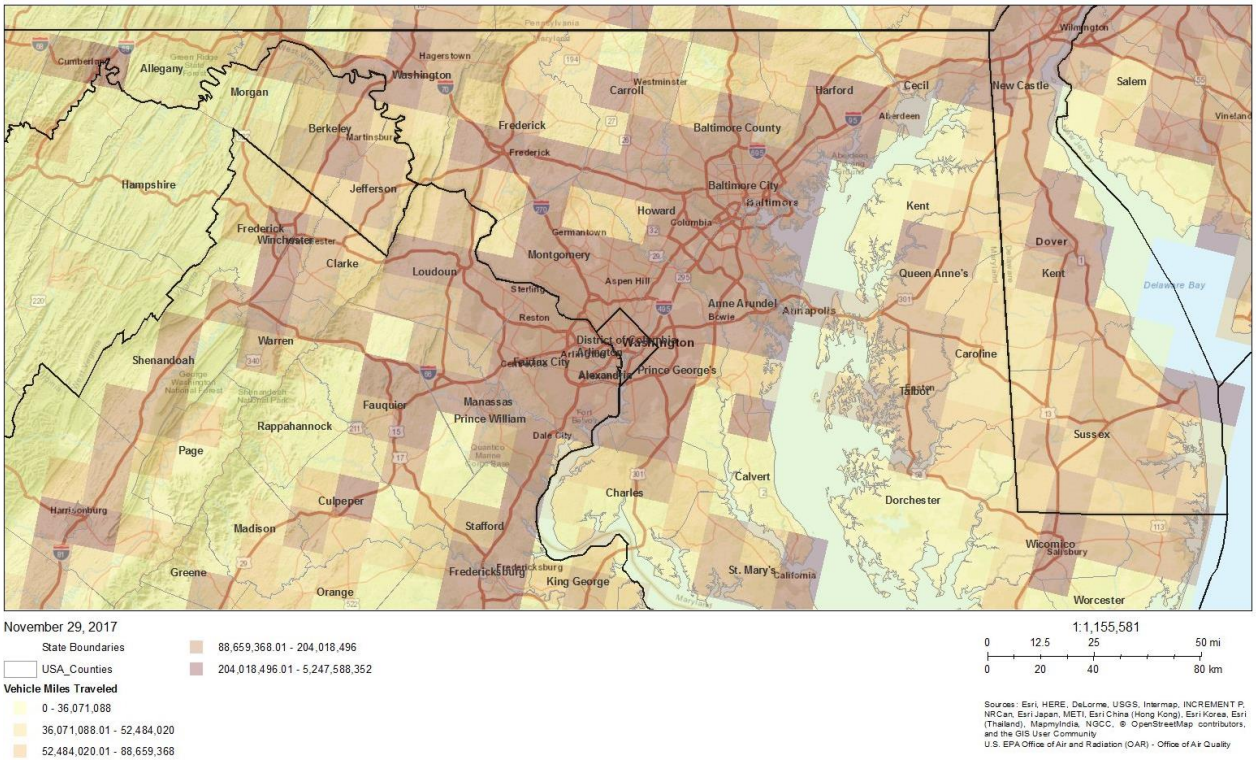
The Baltimore CBSA contains 31% of the total 2014 VMT within the Washington-Baltimore-Arlington CSA. Baltimore County, MD (8,027 million VMT) is the county with the highest VMT within the Baltimore CBSA while Queen Anne's County, MD (915 million VMT) has the lowest within the CBSA.

The remaining areas that are within the CSA, but outside of either the Baltimore or Washington CBSA, comprise 8% of the Washington-Baltimore-Arlington CSA's total VMT and 6% of the Washington-Baltimore-Arlington CSA's total workers. Of these remaining counties, all, but one (Dorchester, MD) have over 40% of their working population commuting within their own county.

[11] This analysis does not look at such physically small areas as the cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park.

As shown in Figure 6, I-95 runs through the area of analysis from Stafford, VA northeast through Harford, MD, with two major beltways that circle the Washington metropolitan area and two that circle the Baltimore metropolitan area. Figure 6 also shows high VMT through these traffic corridors, where the majority of violating monitors in the area of analysis are located.

Figure 6. Twelve Kilometer Gridded VMT (Miles) Overlaid with Transportation Arteries.



Factor 3: Meteorology

Evaluation of meteorological data helps to assess the fate and transport of emissions contributing to ozone concentrations and to identify areas potentially contributing to the monitored violations. Results of meteorological data analysis may inform the determination of nonattainment area boundaries. In order to determine how meteorological conditions, including, but not limited to, weather, transport patterns, and stagnation conditions, could affect the fate and transport of ozone and precursor emissions from sources in the area, EPA evaluated 2014-2016 HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) trajectories at 100, 500, and 1000 meters above ground level (AGL) that illustrate the three-dimensional paths traveled by air parcels to a violating monitor. Figures 7a through 7h show the 24-hour HYSPLIT back trajectories[12] for each exceedance day (i.e., daily maximum 8 hour values that exceed the 2015 ozone NAAQS) for the violating monitors.

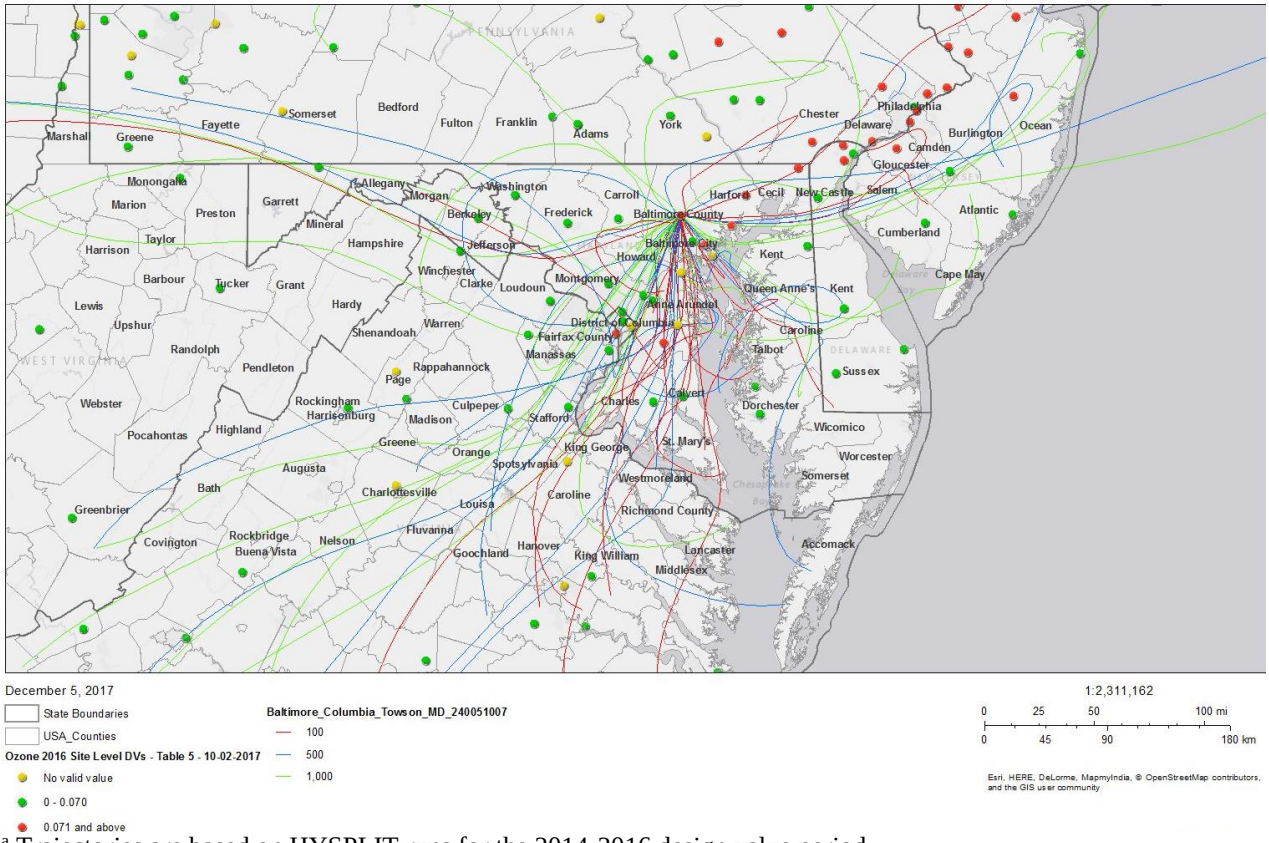
The HYSPLIT back trajectories for violating monitor 240051007 in Baltimore County, MD are shown in Figure 7a. The back trajectories at the 1,000 meter AGL indicate the monitor receives input from almost every direction, though most heavily from the southwest. The trajectory lines in red, which indicate air particles traveling 100 meters AGL, look to come mostly from the south, with additional input from west, and east. Figure 7b shows the HYSPLIT back trajectories for the other violating monitor within Baltimore County, 240053001. The back trajectories at the 1,000 meter AGL indicate that this monitor also receives input from almost every direction, though this time most heavily from north of the monitor. The lower traveling trajectory

[12] EPA memorandum "Area Designations for the 2015 Ozone National Ambient Air Quality Standards." Attachment 3. https://www.epa.gov/sites/production/files/2016-02/documents/ozone-designations-guidance-2015.pdf

lines in red, seem to come partly from the north, but more consistently from the south. Figure 7c shows the HYSPLIT back trajectories for both violating Baltimore County, MD monitors overlaying VMT. As seen in Figure 7c, the largest clustering of HYSPLIT back trajectories travel along the I-95 corridor and from within the Washington-Baltimore-Arlington CSA main commuter area. However, other back trajectories, mainly the higher altitude 1,000 m AGL (shown in green) lines seem to travel along areas with less vehicle miles traveled indicated.

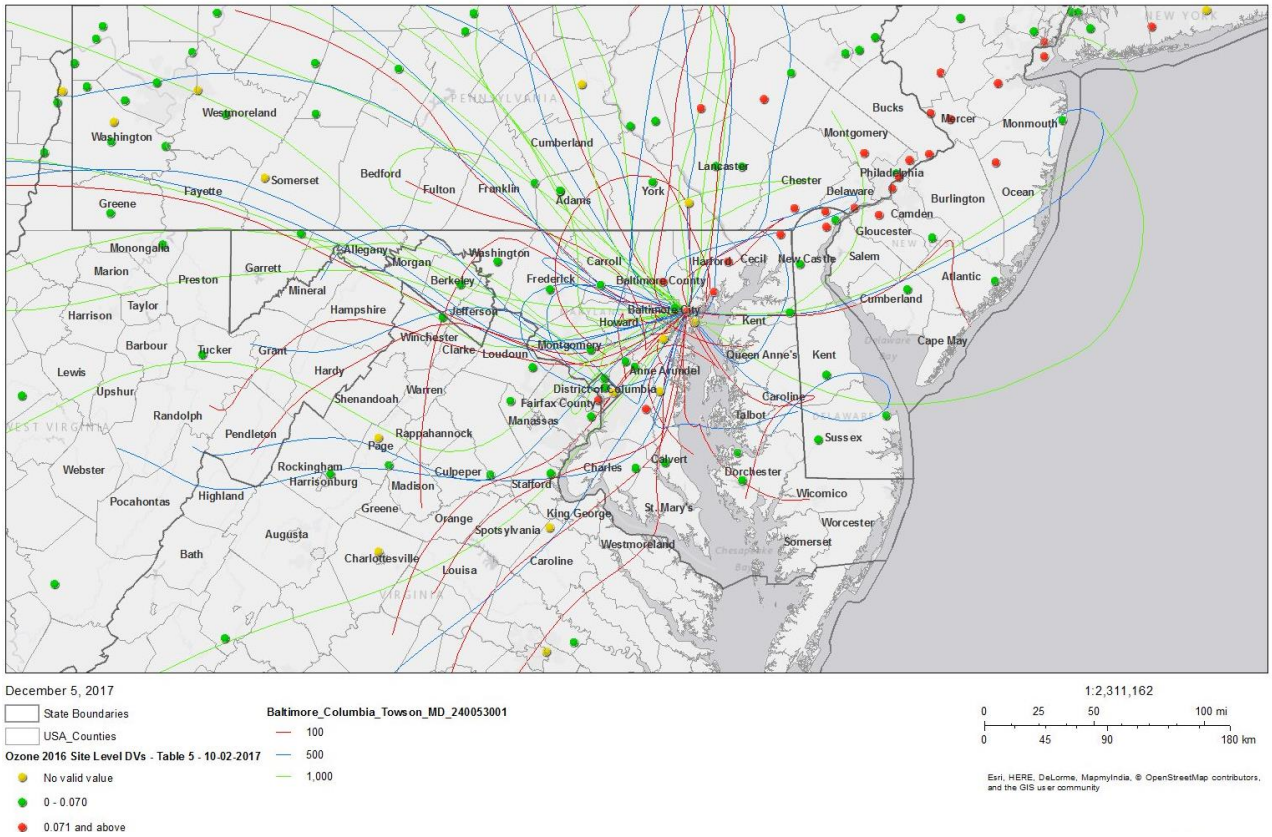
The HYSPLIT back trajectories for Harford County, MD violating monitors 240251001 and 240259001 are shown in Figures 7d and 7e, respectively. These trajectories indicate that these two monitors are downwind of Baltimore County, Baltimore City, the counties of Anne Arundel, Howard, Montgomery, Prince George's, Frederick in Maryland as well as Arlington County, VA and the District of Columbia. The figures indicate that on exceedance days, the air particles traveling at the higher altitudes look to meet up with air particles traveling at the lower levels in the Baltimore City/Baltimore County area, all of which look to continue on towards Harford County, MD. The air particles traveling at the higher altitudes, 500-1,000 meters AGL, look to come most heavily from areas northwest of Baltimore while the air particles traveling at the lower level, 100 meters AGL, look to come mostly from the south and southeast which includes Anne Arundel and Calvert Counties in Maryland. Figure 7f shows both the VMT of the area of analysis as well as the HYSPLIT back trajectories. Figure 7f shows that the Baltimore and District of Columbia commuting zones contribute heavily to the Harford County monitors, though it is apparent that not all contributions come from the I-95 corridor.

Figure 7a. HYSPLIT Back Trajectories for Baltimore County, MD Violating Monitor 240051007[a].



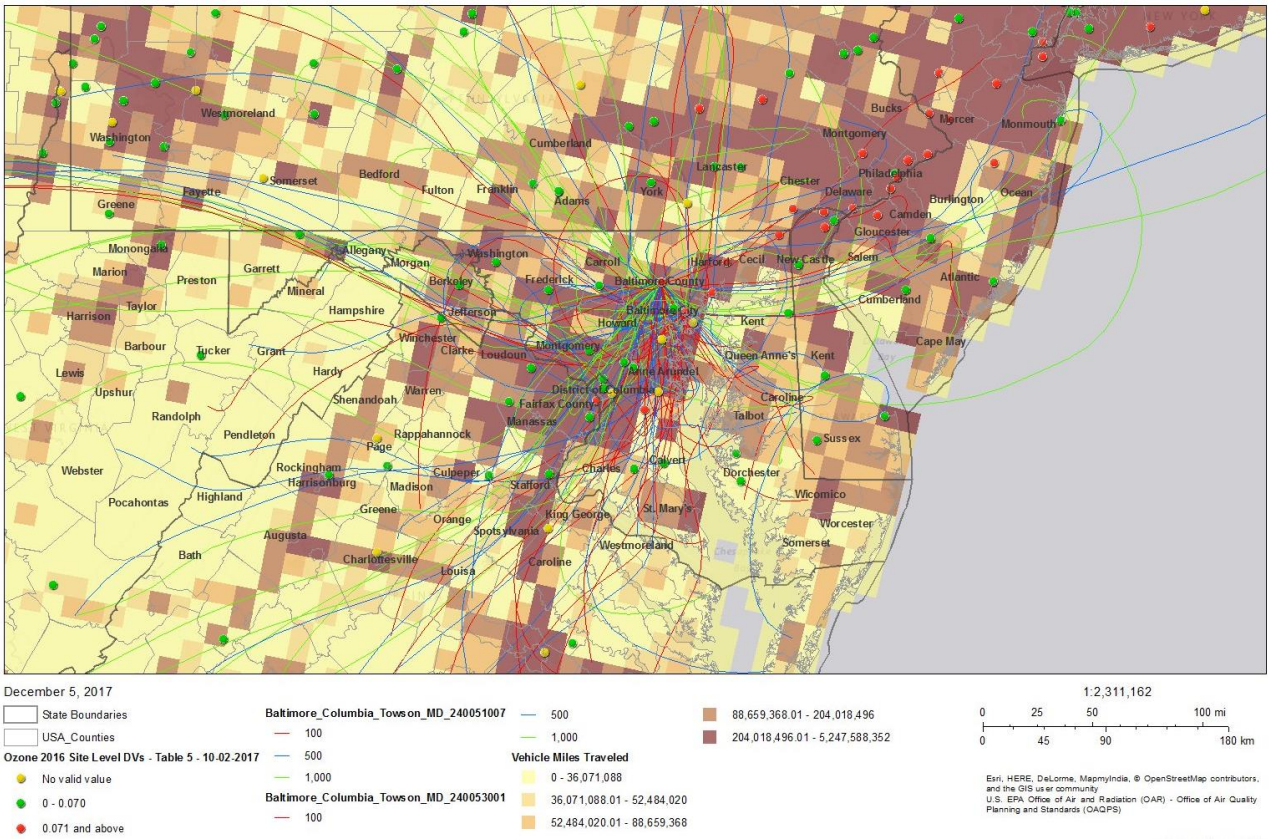
[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7b. HYSPLIT Back Trajectories for Baltimore County, MD Violating Monitor 240053001[a].



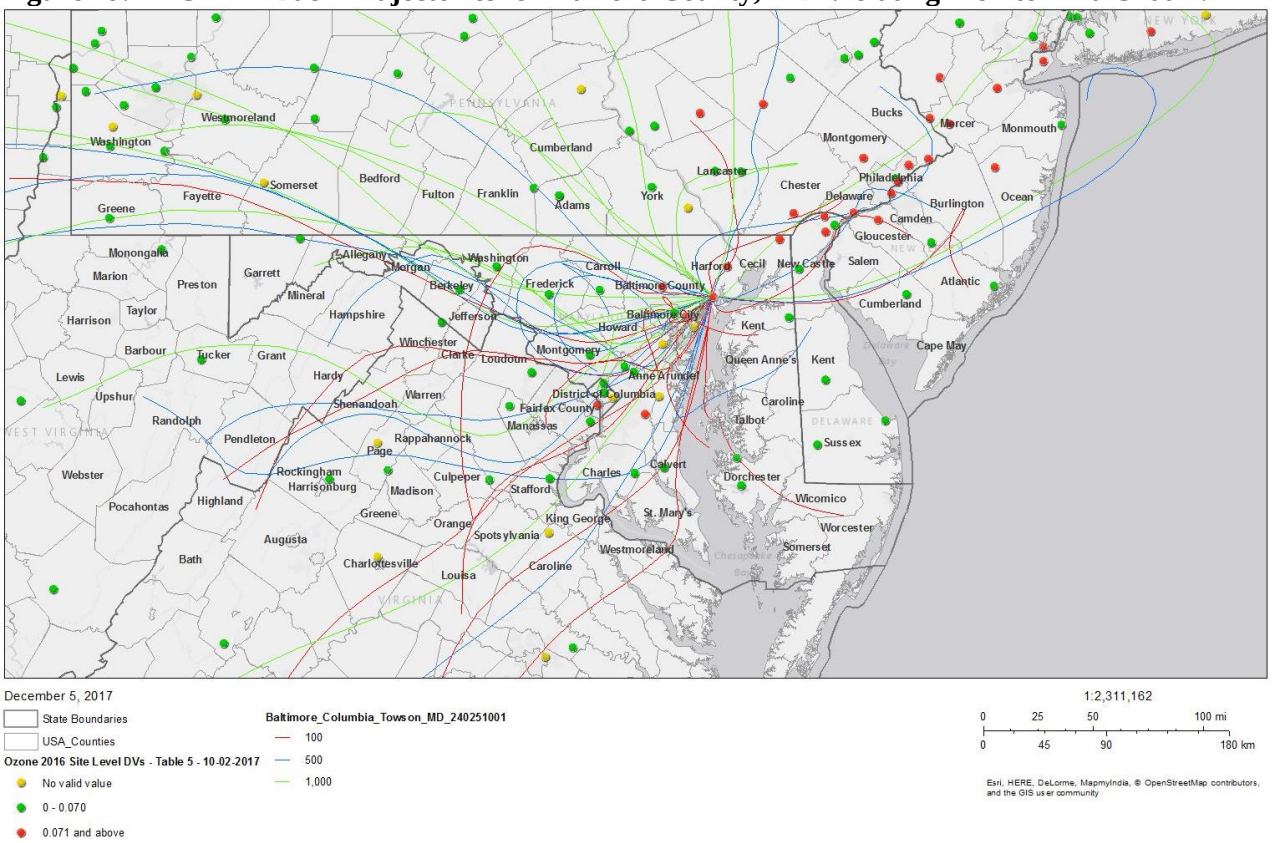
[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7c. VMT and HYSPLIT Back Trajectories for Violating Monitors in Baltimore County, MD[a].



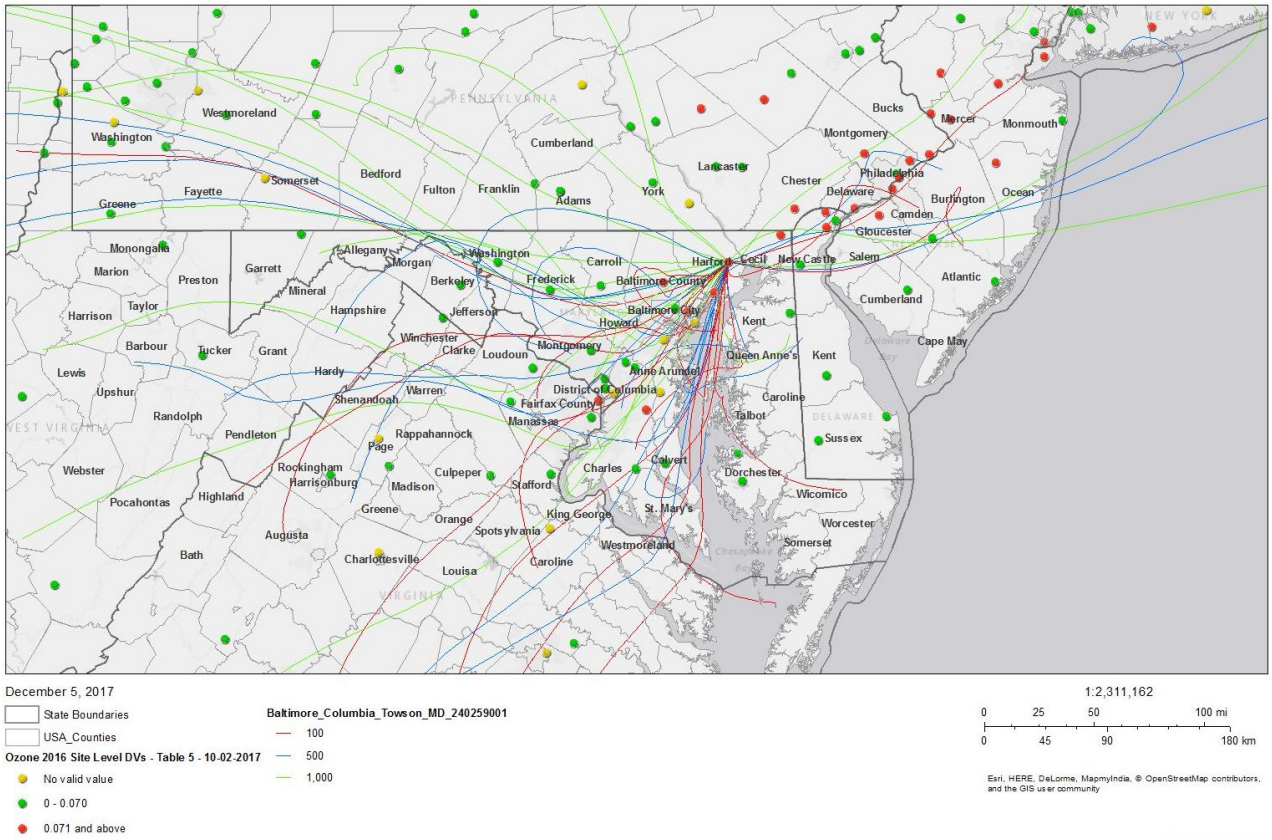
[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7d. HYSPLIT Back Trajectories for Harford County, MD Violating Monitor 240251001[a].



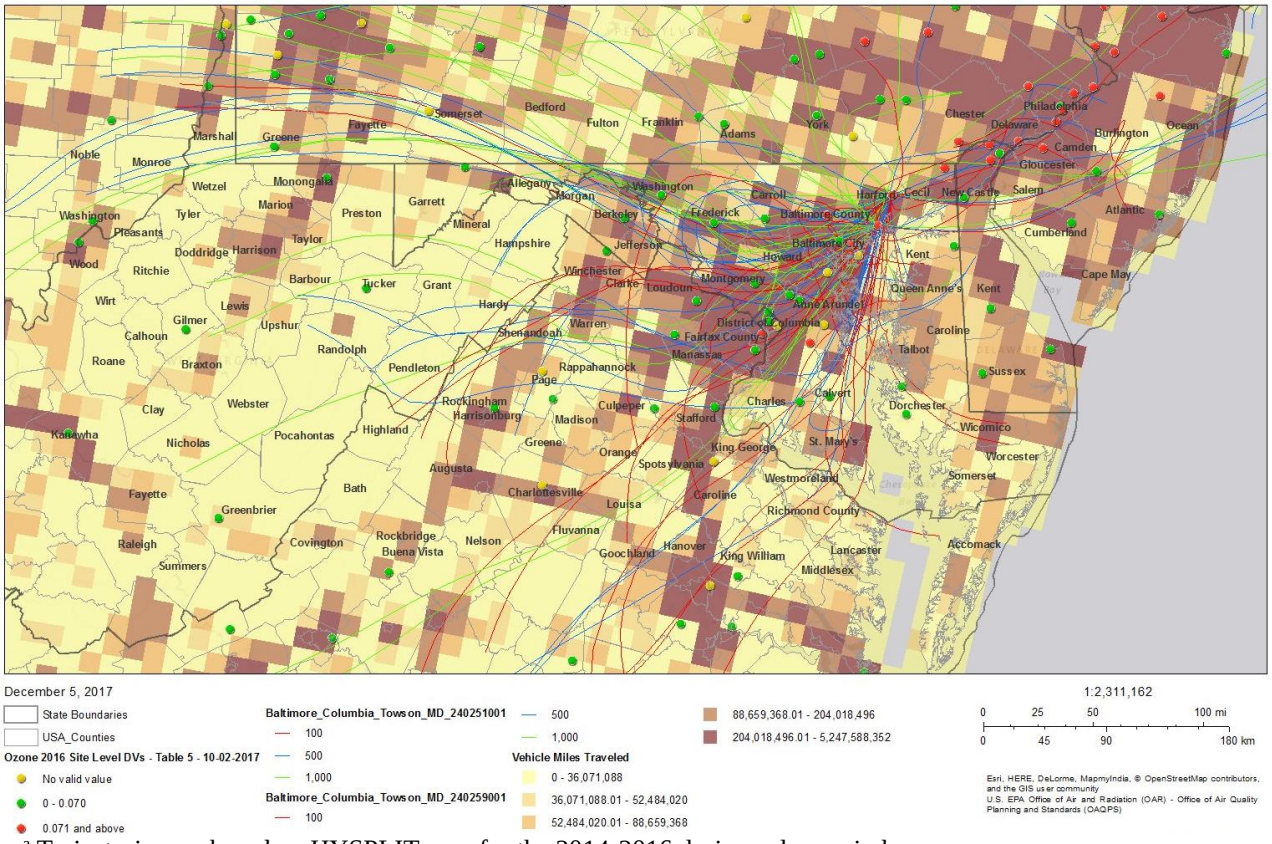
[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7e. HYSPLIT Back Trajectories for Harford County, MD Violating Monitor 240259001[a].



[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7f. VMT and HYSPLIT Back Trajectories for Violating Monitors in Harford County, MD[a].

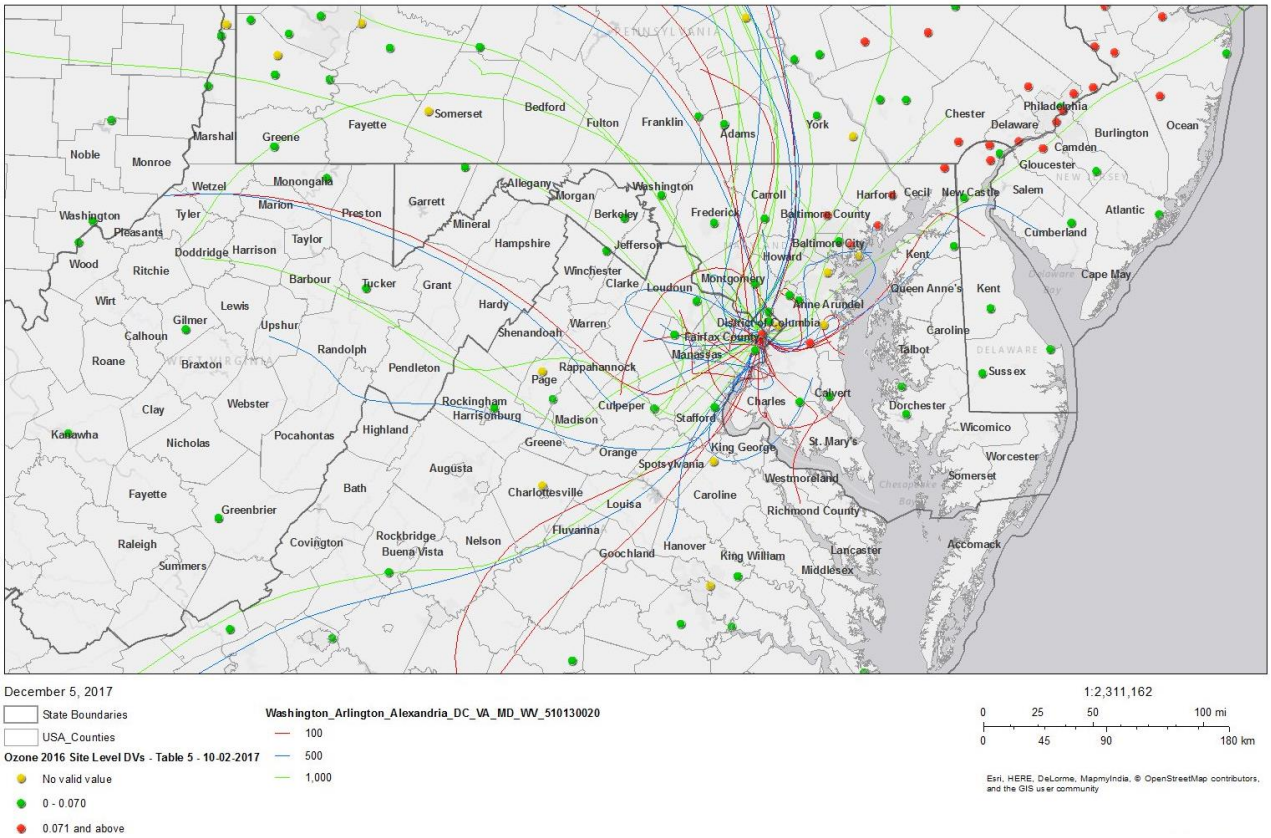


[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

As shown in Figure 7g, below, the meteorology for Arlington County, VA indicates its violating monitor is downwind of the District of Columbia, Howard, Baltimore, Carroll, Frederick, and Montgomery Counties in Maryland, all of which are north of Arlington. The back trajectories also show that the Arlington monitor is impacted by the following counties and cities which are southwest of Arlington County: Stafford, Spotsylvania, Manassas, Manassas Park, Alexandria, Fairfax, Falls Church, and Charles. The back trajectories coming from the southwest look to be concentrated over the I-95 corridor.

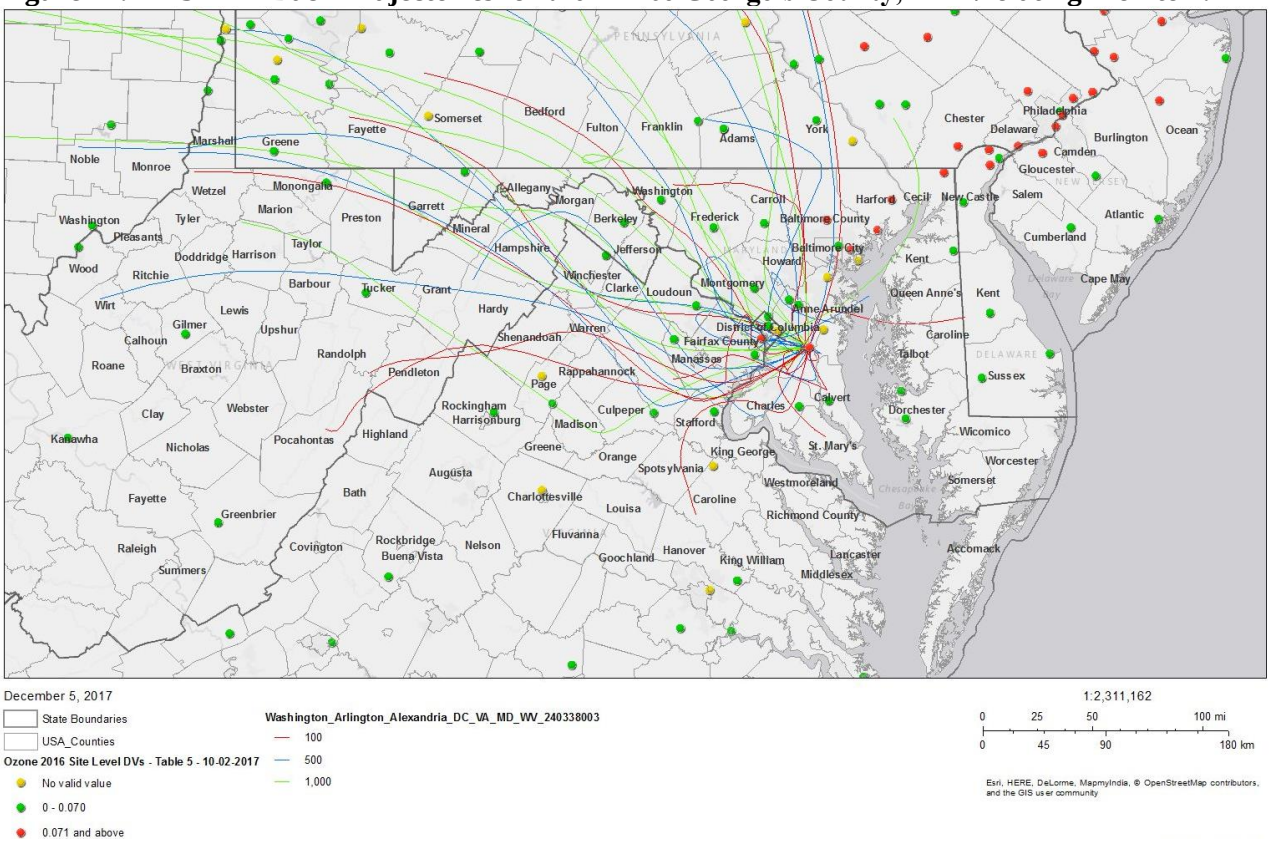
Figure 7h shows the HYSPLIT back trajectories for the violating monitor in Prince George's County, MD. These back trajectories indicate that the Prince George's violating monitor is downwind of a large part of both the Baltimore CBSA, excluding Harford and Queen Anne's Counties in Maryland, and the Washington CBSA. The Prince George's County monitor looks to be most heavily influenced by areas to the north, west, and northwest. The higher (green) back trajectory lines seem to mostly originate from further north and northwest of the Washington CBSA boundary.

Figure 7g. HYSPLIT Back Trajectories for the Arlington County, VA Violating Monitor[a].



[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

Figure 7h. HYSPLIT Back Trajectories for the Prince George's County, MD Violating Monitor[a].



[a] Trajectories are based on HYSPLIT runs for the 2014-2016 design value period.

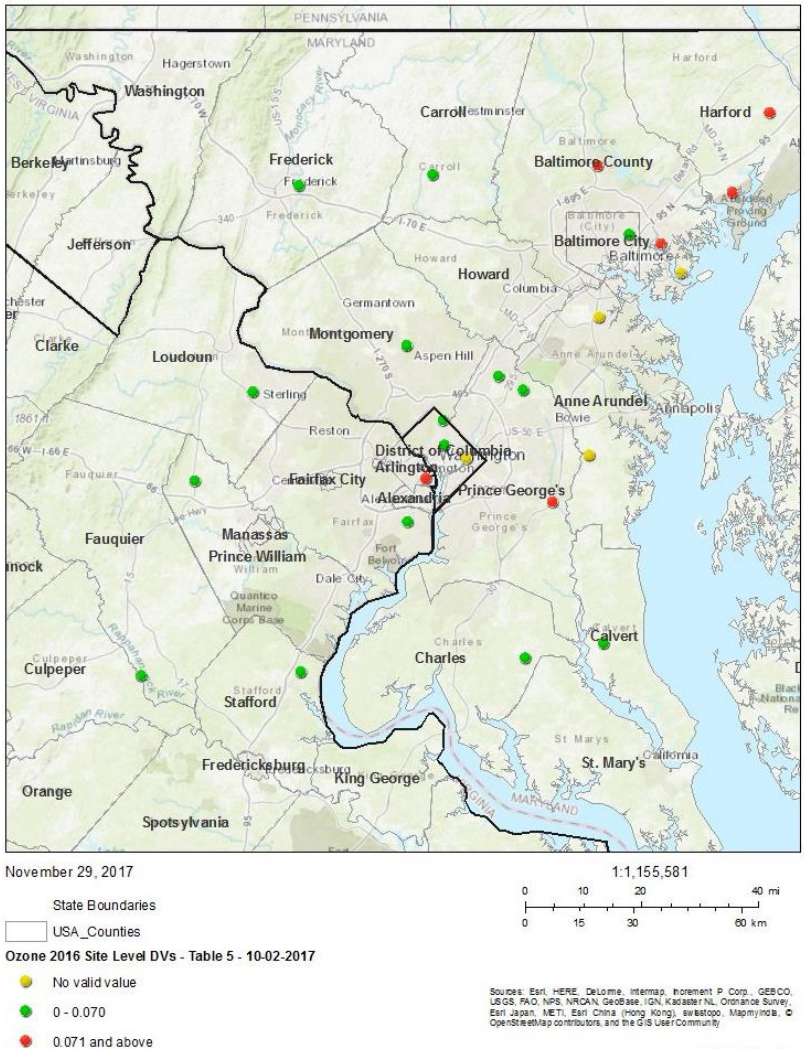
Factor 4: Geography/topography

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

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

The Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA area does not have any geographical or topographical features significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a role in this evaluation.

Figure 8. Topographic illustration of the Washington-Baltimore-Arlington CSA.



Factor 5: Jurisdictional boundaries

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

As previously discussed in the TSD, the area of analysis is the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA CSA, which includes several CBSAs in Maryland, Virginia, West Virginia, Pennsylvania, and the District of Columbia. Of the seven CBSAs which make up the Washington-Baltimore-Arlington CSA, there are two CBSAs which account for a majority of the area; the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA and the Baltimore-Columbia-Towson, MD CBSA.

In regards to transportation planning, the Baltimore CBSA and the Washington CBSA are served by different MPOs. An MPO is the policy board of an organization created and designated to carry out the metropolitan transportation planning processes.[13] The Baltimore Regional Transportation Board covers Baltimore City and the counties of Anne Arundel, Baltimore, Carroll, Harford and Howard in Maryland.

The National Capital Region Transportation Planning Board (TPB) is the MPO for a sizable portion of the Washington CBSA, covering the District of Columbia and surrounding jurisdictions.[14] In Maryland these jurisdictions include Frederick County, Montgomery County, Prince George's County, and Charles County. In Virginia, the planning area includes the counties of Arlington, Fairfax, Loudoun and Prince William and the cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park.

The Fredericksburg Area Metropolitan Planning Organization (FAMPO) planning area consists of Spotsylvania and Stafford Counties, as well as the City of Fredericksburg in Virginia.

The air quality planning for the Washington DC-MD-VA area has been a multi-jurisdictional area since before 1990. The Metropolitan Washington Air Quality Committee (MWAQC), a multi-state air quality planning organization, includes members from the air management and transportation directors of the District of Columbia, Maryland, and Virginia. The principal mandates of MWAQC are to prepare plans demonstrating attainment of the federal ozone 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.

Also, as previous noted the Washington DC and Baltimore areas have previously been designated nonattainment for multiple ozone NAAQS. For each NAAQS the two areas have been designated as separate nonattainment areas.

Conclusion

The Washington area and Baltimore area have previously established nonattainment boundaries associated with the 1997 and 2008 ozone NAAQS. Maryland, Virginia, and the District of Columbia have recommended the same boundaries for the 2015 ozone NAAQS.

EPA does not intend to modify the states' recommendations to establish two separate nonattainment areas or their recommendation to establish the same nonattainment boundaries for the 2015 ozone NAAQS as were promulgated previously for both the 1997 and 2008 ozone NAAQS. EPA therefore intends to designate a Washington, DC-MD-VA nonattainment area and a separate Baltimore, MD nonattainment area for the 2015 ozone NAAQS. As explained in the jurisdictional factor, these two areas are served by different MPOs. The designation of these two areas under the previous ozone NAAQS has given the counties within the areas experience working together and EPA believes this experience and history will continue to support the ability of the area as a whole to timely attain the 2015 ozone NAAQS.

Summary Analysis of Cities/Counties Within the Baltimore-Columbia-Towson, MD CBSA

Baltimore County, MD and Harford County, MD
The air quality monitors in Baltimore County and Harford County indicate violations of the 2015 ozone NAAQS based on the 2016 design values, therefore these counties are included in the intended Baltimore nonattainment area.

[13] https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/metropolitan-planning-organization-mpo
[14] https://www.mwcog.org/tpb/

Baltimore City, MD; Anne Arundel County, MD; Carroll County, MD; and Howard County, MD
Baltimore City, Anne Arundel County, Carroll County, and Howard County do not have monitors that are violating the 2015 ozone NAAQS, however they are adjacent and nearby to Baltimore and Harford Counties that do have violating monitors. Additionally, the meteorology shows, in Figures 7a, 7b, 7d, and 7e that emissions from these counties are transported to violating monitors in Harford and Baltimore Counties on days when those monitors are exceeding the NAAQS. Anne Arundel County and Baltimore City have the second and third highest total NO_x emissions within the Baltimore-Columbia-Towson CBSA. Anne Arundel County has the highest total VOC emissions of any jurisdiction in the CBSA. Baltimore City, Anne Arundel County, Carroll County, and Howard County are among the top third of all the Washington-Baltimore-Arlington CSA jurisdictions when it comes to population size. On average, 23% of residents in these areas commute to a county with a violating monitor. The Baltimore Regional Transportation Board area covers Baltimore City and the counties of Anne Arundel, Carroll, and Howard in Maryland. EPA does not intend to modify the State's recommendation to include these counties in the Baltimore nonattainment area.

Queen Anne's County, Maryland
The Chesapeake Bay sits between Queen Anne's County, MD, and the majority of the remaining areas included in the Washington-Baltimore-Arlington CSA, including the four counties with violating monitors. Queen Anne's County has the lowest NOx emissions of any county in the Baltimore CBSA. When looking at total NO_x emissions within the Baltimore CBSA, Queen Anne's County emits less than half of what the area with next lowest emissions does and eight times less than that of the highest emitting area.[15] EPA does not intend to modify the state's recommendation that Queen Anne's County, MD not be included in the nonattainment area.

Based on the above, EPA does not intend to modify the State's recommendation to designate Baltimore, Anne Arundel, Carroll, Harford, Howard, and Baltimore City as the Baltimore, MD nonattainment area for the 2015 ozone NAAQS. Further, EPA intends to designate Queen Anne's County, MD as attainment/unclassifiable for the 2015 ozone NAAQS

Summary Analysis of Cities/Counties Within the Washington-Arlington-Alexandria, DC-VA-MD-WV CBSA

Arlington County, VA; and Prince George's County, MD
The air quality monitors in Arlington County, VA and Prince George's County, MD, indicate a violation of the 2015 ozone NAAQS based on the 2016 design values, therefore these counties are included in the intended Washington DC-MD-VA nonattainment area.

Fairfax County, VA; and Montgomery County, MD
Within the Washington-Baltimore-Arlington CSA, Fairfax County has the highest population in both 2010 and 2015, gaining over 60,000 people in those five years. In regards to the Washington CBSA, the three counties with the highest absolute VMT are Fairfax County, VA, and Prince George's and Montgomery Counties in Maryland. These same three counties account for over 64% of all commuters within the CBSA commuting to or within a county with a violating monitor. Fairfax County, VA and Montgomery County, MD also have among the highest emissions of any jurisdiction in the CSA. Additionally, the meteorology shows, in Figures 7g and 7h that emissions from these counties are transported to the violating monitors in Arlington and Price George's Counties on days when those monitors are exceeding the NAAQS. Fairfax and Montgomery Counties are both included in the area covered by the National Capital Region TPB. EPA does not intend to modify the State's recommendation to include these counties in the Washington DC-MD-VA nonattainment area.

District of Columbia

[15] According to the 2014 NEI, Queen Anne's County, MD emits 1,926 tpy of total NO_x. The Baltimore CBSA area with the next smallest emissions of total NO_x is Harford County, MD with 5,433 tpy. Baltimore County, MD emits the largest amount of total NO_x within the Baltimore CBSA with 17,552 tpy.

While the District of Columbia emits a little less than half the amount of total NO_x per year as Montgomery County, MD, that county has an area eight times the size of the District. The District of Columbia has the highest population density (11,011 people per square mile) among all jurisdictions in the Washington-Baltimore-Arlington CSA. The District's population increased by almost 12% between 2010 and 2015, gaining over 70,000 residents in those years. Traffic and commuting information is consistent with the fact that the District is at the core of this large metropolitan area. Additionally, the meteorology shows, in Figures 7g and 7h that emissions from the District are transported to the violating monitors in Arlington and Price George's Counties on days when those monitors are exceeding the NAAQS. The District is also included in the area covered by the National Capital Region TPB. EPA does not intend to modify the District of Columbia's recommendation that it be included in the Washington DC-MD-VA nonattainment area

Prince William County, VA; Loudoun County, VA; Frederick County, MD; Calvert County, MD; and Charles County, MD

While none of these counties have a violating monitor, they share other characteristics that support inclusion in the nonattainment area. NOx emission levels in these counties are moderately high for the area and are generally higher than counties to the west, which are more remote from the violating monitors and the urban core (e.g. Stafford, Culpeper, Faquier, and Clarke Counties in Virginia and Jefferson County in West Virginia). Prince William, Loudoun, and Frederick Counties are among the top third of all the Washington CBSA's jurisdictions when it comes to population. Loudoun County, VA saw a population increase of over 20% in the years between 2010 and 2015, while Prince William County, VA saw an increase of over 12% during the same time period. The monitors within Charles and Calvert Counties have 2016 design values barely below the 2015 ozone NAAQS with a design value of 0.070 ppm and 0.069 ppm, respectively. These counties are included in the area covered by the National Capital Region TPB. EPA does not intend to modify the States' recommendations that these five counties be included in the Washington DC-MD-VA nonattainment area.

Cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park in Virginia

Each of these cities are relatively small in land mass which is reflected by populations lower than a number of the other jurisdictions, but have relatively high population density. Alexandria City in particular has one of the highest population densities (with over 10,000 people per square mile) among all other jurisdictions in the Washington-Baltimore-Arlington CSA. While the rest of theses counties do not have quite the population density as Alexandria, they do have moderately high population densities of 4,000-7,000 people per square mile. Each has less than 17% of their working population working within their own county, indicating that a majority of the working population within these small areas commute to other areas, including towards the District of Columbia and its neighboring counties in Virginia and Maryland, several of which have a violating monitor. These areas tend to have lower emissions of NO_x and/or VOC, reflecting their small size and the fact that they are more urban and thus have few stationary emission sources of significant size. These counties are included in the area covered by the National Capital Region TPB. EPA does not intend to modify the State's recommendation that these three cities be included in the Washington nonattainment area.

Clarke County, VA; Culpepper County, VA; Fauquier County, VA; Frederick County, VA; Rappahannock County, VA; Spotsylvania County, VA; Stafford County, VA; Warren County, VA; Fredericksburg City, VA; Winchester City, VA; Hampshire County, WV; and Jefferson County, WV

None of these areas have a monitor violating the 2015 ozone NAAQS, with all measured values 0.003-0.011 ppm below the NAAQS value of 0.070 ppm. Additionally, none of these areas is adjacent to a county with a violating monitor. Hampshire County, Winchester City, Rappahannock County, Fredericksburg City, and Clarke County all emit less than 1,000 tpy of total NO_x. The remaining of the counties discussed in this section, Culpeper County, Fauquier County, Frederick County, Spotsylvania County, Stafford County, Warren County, and Jefferson County, emit less than 4,000 tpy of total NO_x. These 12 areas each have less than 150,000 residents and a very low percentage of their population that commutes to or within a county with a violating monitor. For the reasons listed above, EPA does not intend to modify the States' recommendations that these jurisdictions be designated as attainment/unclassifiable for the 2015 ozone NAAQS.

Based on the above, EPA does not intend to modify the States' and the District of Columbia's recommendations that the following counties/cities not be included in the Washington, DC-MD-VA nonattainment area: District of Columbia, Calvert County, MD; Charles County, MD; Frederick County, MD; Prince George's County, MD; Arlington County, VA; Fairfax County, VA; Loudoun County, VA; Prince William County, VA; Fairfax City, VA; Falls Church City, VA; Manassas City, VA; and Manassas Park City, VA. Furthermore, consistent with the recommendations of Virginia and West Virginia, EPA intends to designate as attainment/unclassifiable for the 2015 ozone NAAQS the following counties: Clarke County, VA; Culpepper County, VA; Fauquier County, VA; Frederick County, VA; Rappahannock County, VA; Spotsylvania County, VA; Stafford County, VA; Warren County, VA; Fredericksburg City, VA; Winchester City, VA; Hampshire County, WV; and Jefferson County, WV.

Summary Analysis of Remaining Cities/Counties Within the Washington-Baltimore-Arlington CSA

Talbot County, MD; St. Mary's County, MD; Dorchester County, MD; Franklin County, PA Berkeley County, WV; and Washington County, MD

The States did not recommend these counties for inclusion in either the Baltimore or Washington nonattainment areas for the 2015 ozone NAAQS. None of these counties have a monitor violating the 2015 ozone NAAQS nor are they adjacent to a county with a violating monitor. With the exception of Berkeley and Washington Counties, there is only one (or no) large point source in each individual jurisdiction. Although a couple of these counties, such as Washington County, MD and Franklin County, PA have a similar level of NOx emissions as counties recommended for nonattainment, they are more remote from the violating monitors. Importantly, they rank low in terms of total population, population densities and population growth. Less than 10% of each of these communities commute to a county with a violating monitor indicating they are not well-integrated with the urban core and with the areas with violating monitors. None of these counties are within one of the two larger CBSA planning areas. EPA does not intend to modify the States' recommendations that these counties not be included in either the Washington or Baltimore nonattainment areas for the 2015 ozone NAAQS and EPA intends to designate as attainment/unclassifiable for the 2015 ozone NAAQS: Talbot, St. Mary's, Dorchester, and Washington Counties in Maryland; Franklin County in Pennsylvania; and Berkeley County in West Virginia.

3.2 Technical Analysis for the Philadelphia-Wilmington-Atlantic City and the Reading Areas

This technical analysis first identifies the areas with monitors that violate the 2015 ozone NAAQS. EPA then evaluates these areas and any nearby areas to determine whether those nearby areas have emission sources that potentially contribute to ambient ozone concentrations at the violating monitors in the areas, based on the weight-of-evidence of the five factors recommended in EPA's ozone designations guidance and any other relevant information. In developing this technical analysis, EPA used the latest data and information available to EPA (and to the states and tribes through the Ozone Designations Mapping Tool and EPA Ozone Designations Guidance and Data web page).[16] In addition, EPA considered any additional data or information provided to EPA by states or tribes.

The area of analysis for this technical support document is the Philadelphia-Reading-Camden, PA-NJ-DE-MD CSA, plus two counties in New Jersey (Mercer and Ocean) that are in the New York-Newark, NY-NJ-CT-PA CSA, and are in the current Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area for the 2008 ozone NAAQS. Mercer and Ocean Counties in New Jersey were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 2008 ozone NAAQS. Based on EPA's analysis, Ocean and Mercer Counties, NJ were more affected by emissions from counties in the Philadelphia metropolitan area than

[16] EPA's Ozone Designations Guidance and Data web page can be found at *https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data.*

emissions from counties in the New York City metropolitan area, thus EPA concluded that Ocean and Mercer Counties, NJ should be included in the Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD nonattainment area. The Philadelphia-Reading-Camden CSA includes several CBSAs in Pennsylvania (PA), New Jersey (NJ), Delaware (DE), and Maryland (MD). The Philadelphia-Camden-Wilmington CBSA includes Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania, Burlington, Camden, Gloucester, and Salem Counties in New Jersey, New Castle County in Delaware, and Cecil County in Maryland. In New Jersey, the Atlantic City-Hammonton, Ocean City, and Vineland-Bridgeton CBSAs include Atlantic, Cape May, and Cumberland Counties, respectively. The Dover CBSA includes Kent County in Delaware, and the Reading CBSA includes Berks County in Pennsylvania.

The five factors recommended in EPA's guidance are:

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

Figure 1 is a map of EPA's intended nonattainment boundaries for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Area and the Reading, PA Area. The map shows the location of the air quality monitors, counties, and other jurisdictional boundaries for the area. It also shows the 2008 nonattainment boundary.

For purposes of the 1997 and 2008 ozone NAAQS, the Philadelphia-Wilmington-Atlantic City Area and Reading Area were designated as nonattainment. The boundary for the Reading, PA nonattainment area for the 1997 and 2008 ozone NAAQS included the entire county of Berks County, PA (Figure 1a). The boundary for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area for the 1997 and 2008 ozone NAAQS included the entire counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania. Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem Counties in New Jersey; New Castle County in Delaware, and Cecil County in Maryland (Figure 1). For the Philadelphia-Wilmington-Atlantic City and Reading Areas, the intended boundaries for the 2015 ozone NAAQS are the same as the boundaries for the 1997 and 2008 ozone NAAQS.

Exceptional Events

Pennsylvania has submitted an Exceptional Events (EE) package for the Berks County monitor. EPA is reviewing the EE package. If EPA approves the EE package, the 2014-2016 design value for that monitor would move from violating to attaining the 2015 ozone NAAQS. In that case, EPA would revise its recommendation for the Reading, PA Area from nonattainment to attainment/unclassifiable. Pennsylvania recommended attainment for Berks County, PA.

Figure 3. EPA's Intended 2015 Ozone Nonattainment Boundaries for the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Area

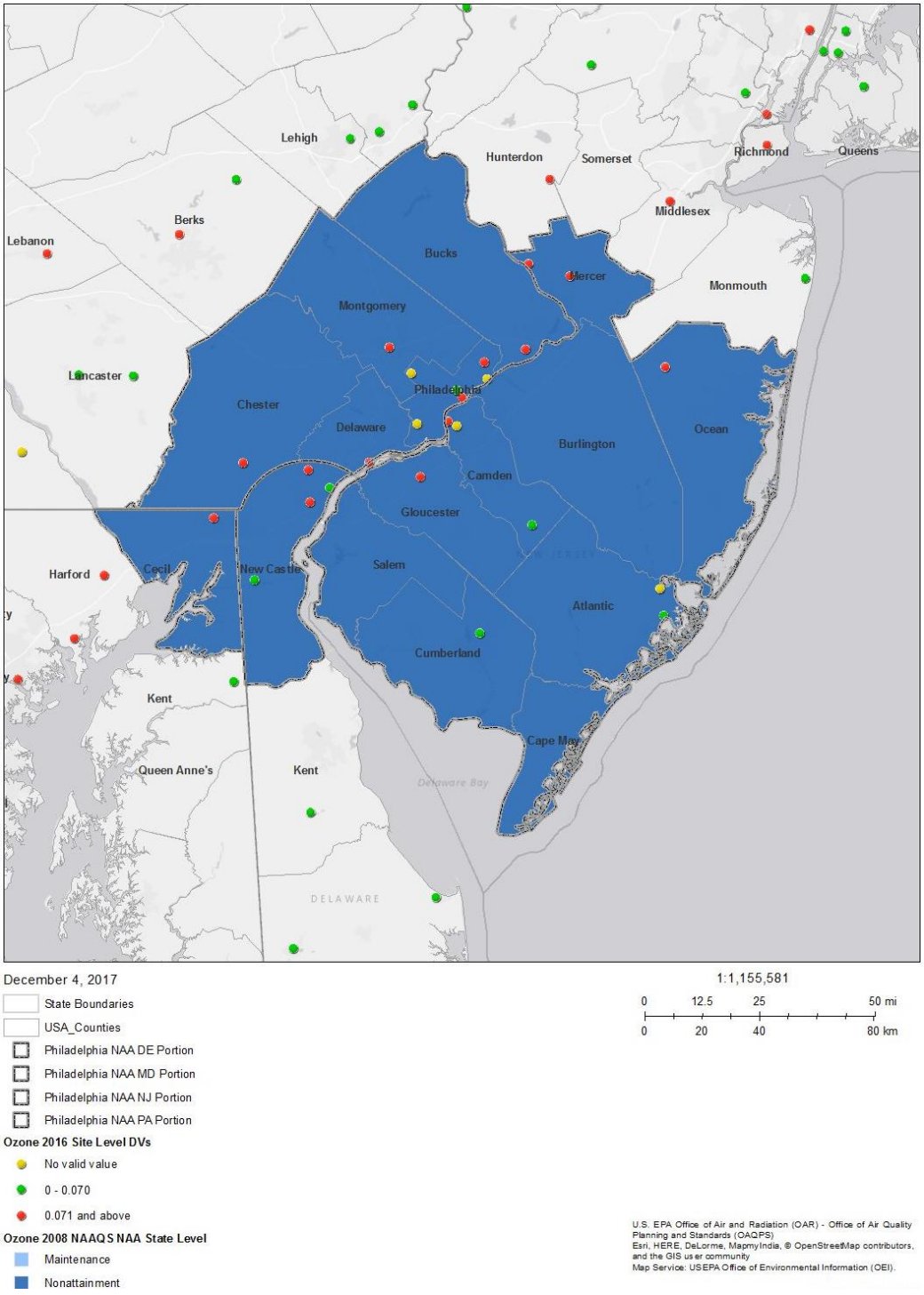
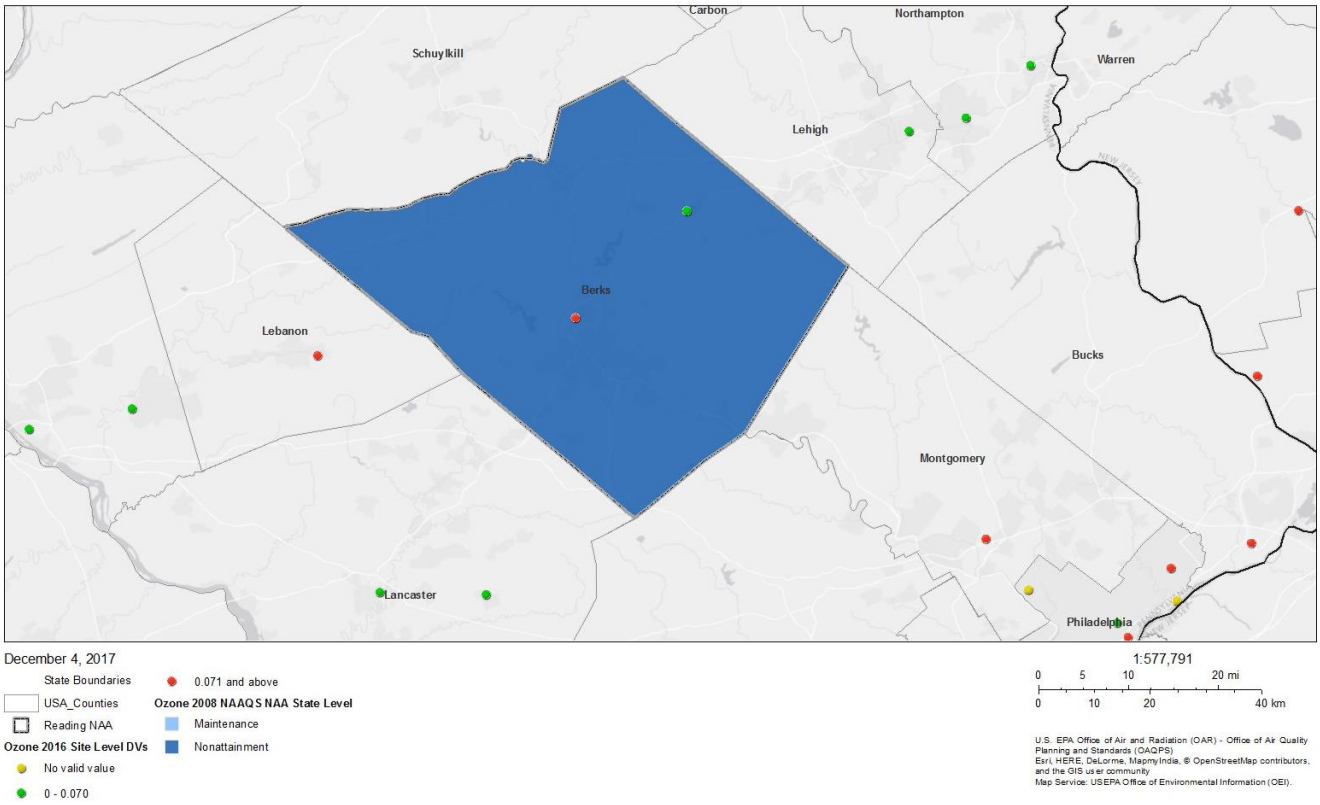


Figure 1a. EPA's Intended 2015 Ozone Nonattainment Boundaries for the Reading, PA Area (Berks County)



EPA must designate as nonattainment any area that violates the NAAQS and any nearby areas that contribute to the violation in the violating area. New Castle County, DE; Cecil County, MD; Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in PA, and Camden, Gloucester, Mercer, and Ocean Counties, NJ, all have monitors in violation of the 2015 ozone NAAQS, therefore these counties are included in the intended nonattainment areas. New Jersey recommended that the entire State of New Jersey be designated nonattainment, but in an expanded New York City nonattainment area. However, EPA determined that Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean and Salem Counties, NJ more appropriately belong in the Philadelphia-Wilmington-Atlantic City nonattainment area. The following sections describe the five factor analysis. While the factors are presented individually, they are not independent. The five factor analysis process carefully considers the interconnections among the different factors and the dependence of each factor on one or more of the others, such as the interaction between emissions and meteorology for the area being evaluated.

Factor Assessment

Factor 1: Air Quality Data

EPA considered 8-hour ozone design values in ppm for air quality monitors in the area of analysis based on data for the 2014-2016 period (i.e., the 2016 design value, or DV). This is the most recent three-year period with fully-certified air quality data. The design value is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration.[17] The 2015 NAAQS are met when the design value is 0.070 ppm or less. Only ozone measurement data collected in accordance with the quality assurance (QA) requirements using

[17] The specific methodology for calculating the 2015 and 2016 ozone design values, including computational formulas and data completeness requirements, is described in 40 CFR part 50, appendix U.

approved (FRM/FEM) monitors are used for NAAQS compliance determinations.[18] EPA uses FRM/FEM measurement data residing in EPA's Air Quality System (AQS) database to calculate the ozone design values. Individual violations of the 2015 ozone NAAQS that EPA determines have been caused by an exceptional event that meets the administrative and technical criteria in the Exceptional Events Rule[19] are not included in these calculations. Whenever several monitors are located in a county (or designated nonattainment area), the design value for the county or area is determined by the monitor with the highest valid design value. The presence of one or more violating monitors (i.e. monitors with design values greater than 0.070 ppm) in a county or other geographic area forms the basis for designating that county or area as nonattainment. The remaining four factors are then used as the technical basis for determining the spatial extent of the designated nonattainment area surrounding the violating monitors based on a consideration of what nearby areas are contributing to a violation of the NAAQS.

EPA identified monitors where the most recent design values violate the NAAQS, and examined historical ozone air quality measurement data (including previous design values) to understand the nature of the ozone ambient air quality problem in the area. Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are operated in accordance with 40 CFR part 58, appendix A, C, D and E and operating with an FRM or FEM monitor. These requirements must be met in order to be acceptable for comparison to the 2015 ozone NAAQS for designation purposes. All data from Special Purpose Monitors (SPMs) using an FRM or FEM are eligible for comparison to the NAAQS, subject to the requirements given in the March 28, 2016 Revision to Ambient Monitoring Quality Assurance and Other Requirements Rule (81 FR 17248).

The 2014-2016 design values for counties in the Philadelphia-Reading-Camden, PA-NJ-DE-MD CSA (area of analysis) are shown in Table 2.

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

County, State	State Recommended Nonattainment?	AQS Site ID	2014-2016 DV	2014 4th highest daily max value	2015 4th highest daily max value	2016 4th highest daily max value
Kent, DE	No	100010002	0.066	0.066	0.066	0.068
New Castle, DE	Yes	100031007	0.068	0.071	0.065	0.069
		100031010	**0.074**	0.074	0.071	0.078
		100031013	0.070	0.069	0.069	0.074
		100032004	0.071	0.068	0.072	0.073
Cecil, MD	No	240150003	**0.076**	0.074	0.074	0.080
Atlantic, NJ	Yes	340010006	0.064	0.061	0.068	0.063
Burlington, NJ	Yes	No monitor				
Camden, NJ	Yes	340070002	**0.075**	0.068	0.079	0.078
		340071001	0.069	0.068	0.072	0.069
Cape May, NJ	Yes	No monitor				
Cumberland, NJ	Yes	340110007	0.068	0.067	0.068	0.069
Gloucester, NJ	Yes	340150002	**0.074**	0.070	0.076	0.076

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

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

Mercer, NJ	Yes	340210005	0.072	0.071	0.073	0.074
		340219991	**0.073**	0.071	0.075	0.074
Ocean, NJ	Yes	340290006	**0.073**	0.072	0.075	0.072
Salem, NJ	Yes	No monitor				
Berks, PA	No	420110006	0.066	0.063	0.066	0.070
		420110011	**0.071**	0.068	0.071	0.075
Bucks, PA	Yes	420170012	**0.077**	0.071	0.082	0.080
Chester, PA	Yes	420290100	**0.073**	0.071	0.068	0.080
Delaware, PA	Yes	420450002	**0.072**	0.073	0.074	0.071
Montgomery, PA	Yes	420910013	**0.072**	0.072	0.073	0.073
Philadelphia, PA	Yes	421010004	0.061	0.058	0.057	0.069
		421010024	**0.077**	0.072	0.079	0.080
		421010048	0.074	0.068	0.078	0.076

[a] The highest design value in each county is indicated in bold type.

New Castle County, DE; Cecil County, MD; Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia, PA; and Camden, Gloucester, Mercer, and Ocean Counties, NJ all show violations of the 2015 ozone NAAQS, therefore, these counties are included in the intended nonattainment areas. 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.

Figures 1 and 1a, shown previously, identifies the Philadelphia-Wilmington-Atlantic City and Reading intended nonattainment areas and the violating monitors. Table 2 identifies the design values for all monitors in the area of analysis. Figure 2a, below, shows the historical trends of design values for the violating monitors except for monitor 421010048 (in Philadelphia), which is a new monitor that started operating in October 2013. The 2014-2016 design value of 0.074 ppm is the first valid design value for this monitor. Figures 2b and 2c, below, show more detail by separating the monitors into two groups, those with design values equal to or greater than 0.074 ppm and less than 0.074 ppm, respectively.

As indicated on the maps in Figure 1 and 1a, there are 15 violating monitors located in 12 counties in the area of analysis. The violating monitor in Berks County, PA is located in the City of Reading, at the Reading Regional Airport. The violating monitor in Montgomery County is located adjacent to the Pennsylvania Turnpike (Interstate 76 or I-76) in the City of Norristown, approximately nine miles northwest of Philadelphia. Seven violating monitors are located adjacent to Interstate 95 (I-95), one in Bucks County, PA, two in the City of Philadelphia, PA, one in the City of Chester, in Delaware County, PA, one in Camden County, NJ, one in Mercer County, NJ at Rider University in Lawrenceville, and one in New Castle County, DE in the City of Wilmington. Another violating monitor in New Castle County, DE is located due north of the City of Wilmington, near U.S. Route 202. Another violating monitor in Mercer County, NJ is located along the Delaware River in Washington Crossing State Park. The violating monitor in Ocean County, NJ is located in the Colliers Mills Wildlife Management Area. The violating monitor in Gloucester County, NJ is located adjacent to the New Jersey Turnpike. The violating monitor in Delaware County, PA is adjacent to U.S. Route 1. The violating monitor in Cecil County, MD is located in the Fair Hill Natural Resource Management Area, a Maryland state park.

Figure 2a. Three-Year Design Values for Violating Monitors (2006-2016).

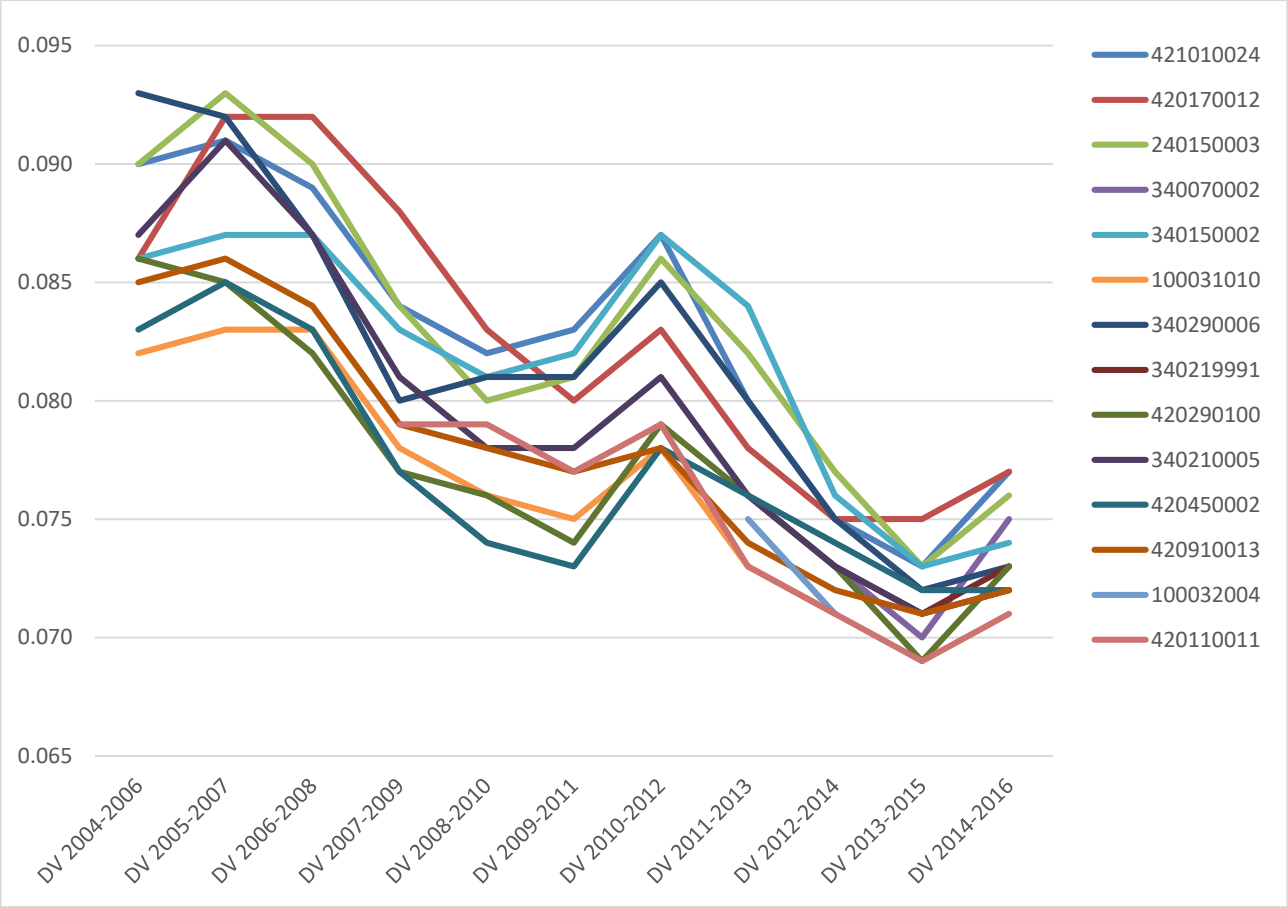
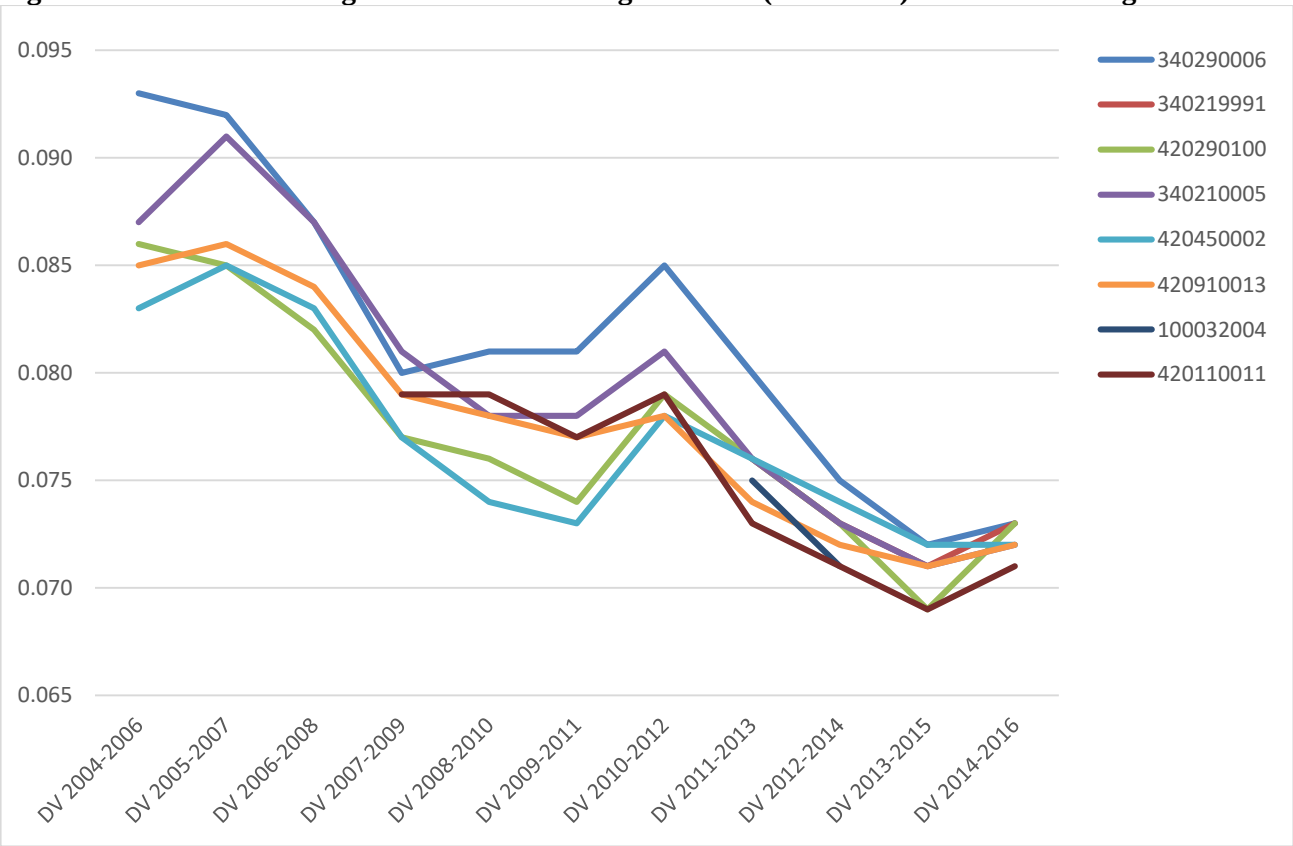


Figure 2b. Three-Year Design Values for Violating Monitors (2006-2016) – Highest Violating Monitors.

Figure 2c. Three-Year Design Values for Violating Monitors (2006-2016) – Other Violating Monitors



Almost all the violating monitors in the area of analysis show design value peaks in 2007, 2012, and 2016 and lows in 2011 and 2015. The Berks County, PA violating monitor (420110011) has the lowest 2014-2016 design value, just above the 2015 ozone NAAQS at 0.071 ppm, and has DVs among the lowest in the area from 2013 through 2016. Monitors in Bucks (420170012) and Philadelphia (421010024) Counties in Pennsylvania have the highest 2014-2016 design values, at 0.077 ppm, with the Cecil County, MD monitor (240150003) close behind at 0.076 ppm.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

EPA reviewed data from the 2014 National Emissions Inventory (NEI). For each county in the area of analysis, EPA examined the magnitude of large sources (NO_x or VOC emissions greater than 100 tons per year) and small point sources and the magnitude of county-level emissions reported in the NEI. These county-level emissions represent the sum of emissions from the following general source categories: point sources, non-point (i.e., area) sources, non-road mobile, on-road mobile, and fires. Emissions levels from sources in a nearby area indicate the potential for the area to contribute to monitored violations.

Table 3a provides a county-level emissions summary of NO_x and VOC (given in tons per year (tpy)) emissions for the area of analysis considered for inclusion in the intended Philadelphia-Wilmington-Atlantic City and Reading nonattainment areas.

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

County	State Recommended Nonattainment?	Total NO_x (tpy)	Total VOC (tpy)
Kent, DE	No	6,760	5,255
New Castle, DE	Yes	15,115	9,191
Cecil, MD	No	3,662	2,794
Atlantic, NJ	Yes	5,795	6,351
Burlington, NJ	Yes	7,900	15,844
Camden, NJ	Yes	7,243	9,311
Cape May, NJ	Yes	3,645	4,122
Cumberland, NJ	Yes	3,445	6,173
Gloucester, NJ	Yes	6,168	8,640
Mercer, NJ	Yes	6,400	6,134
Ocean, NJ	Yes	12,990	16,317
Salem, NJ	Yes	2,919	1,945
Berks, PA	No	13,379	13,067
Bucks, PA	Yes	13,311	16,700
Chester, PA	Yes	11,246	13,627
Delaware, PA	Yes	13,144	11,009
Montgomery, PA	Yes	18,285	21,117
Philadelphia, PA	Yes	20,210	21,732
	Area wide	171,617	189,329

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

Figure 3a. Large Point Sources in the Area of Analysis.

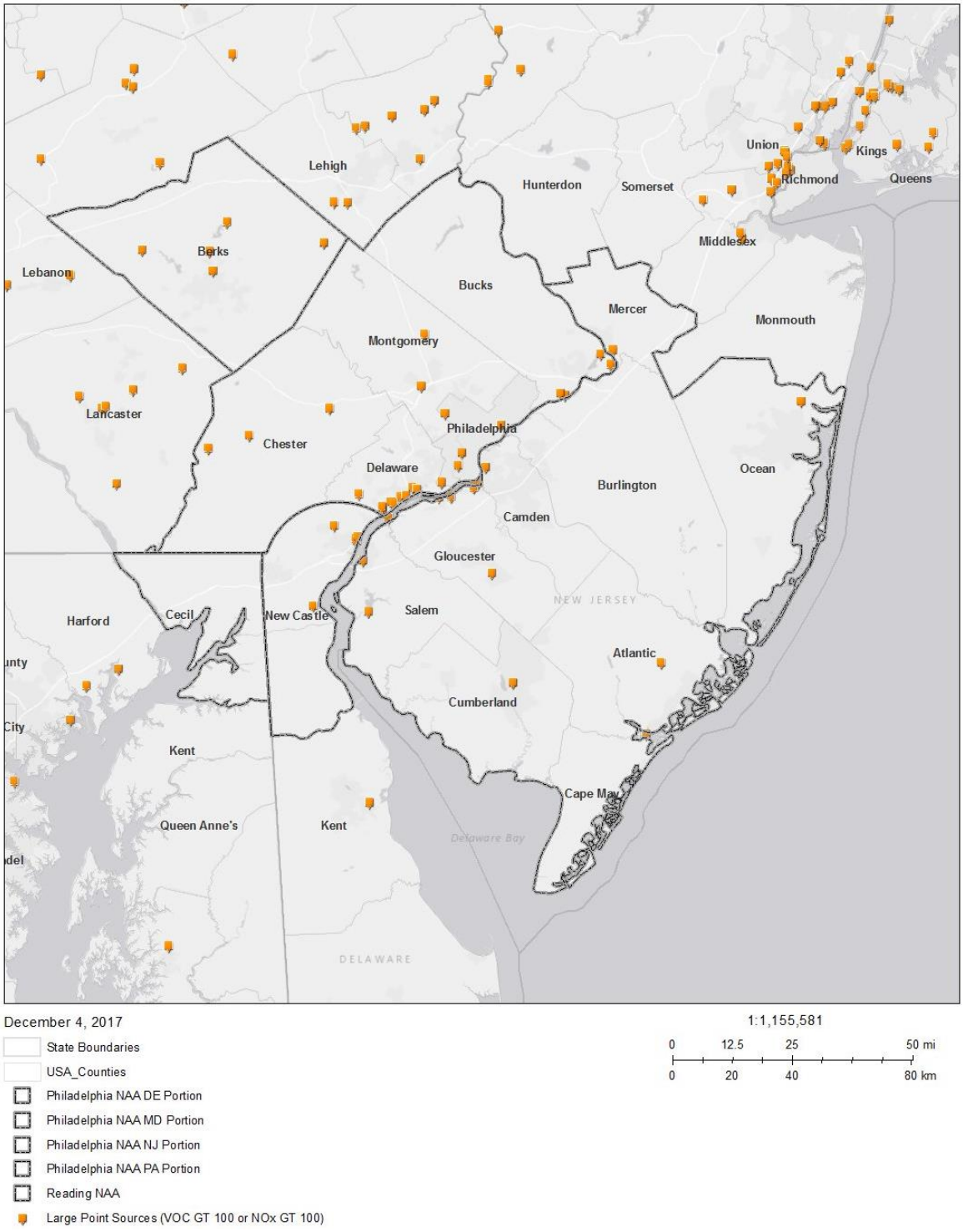
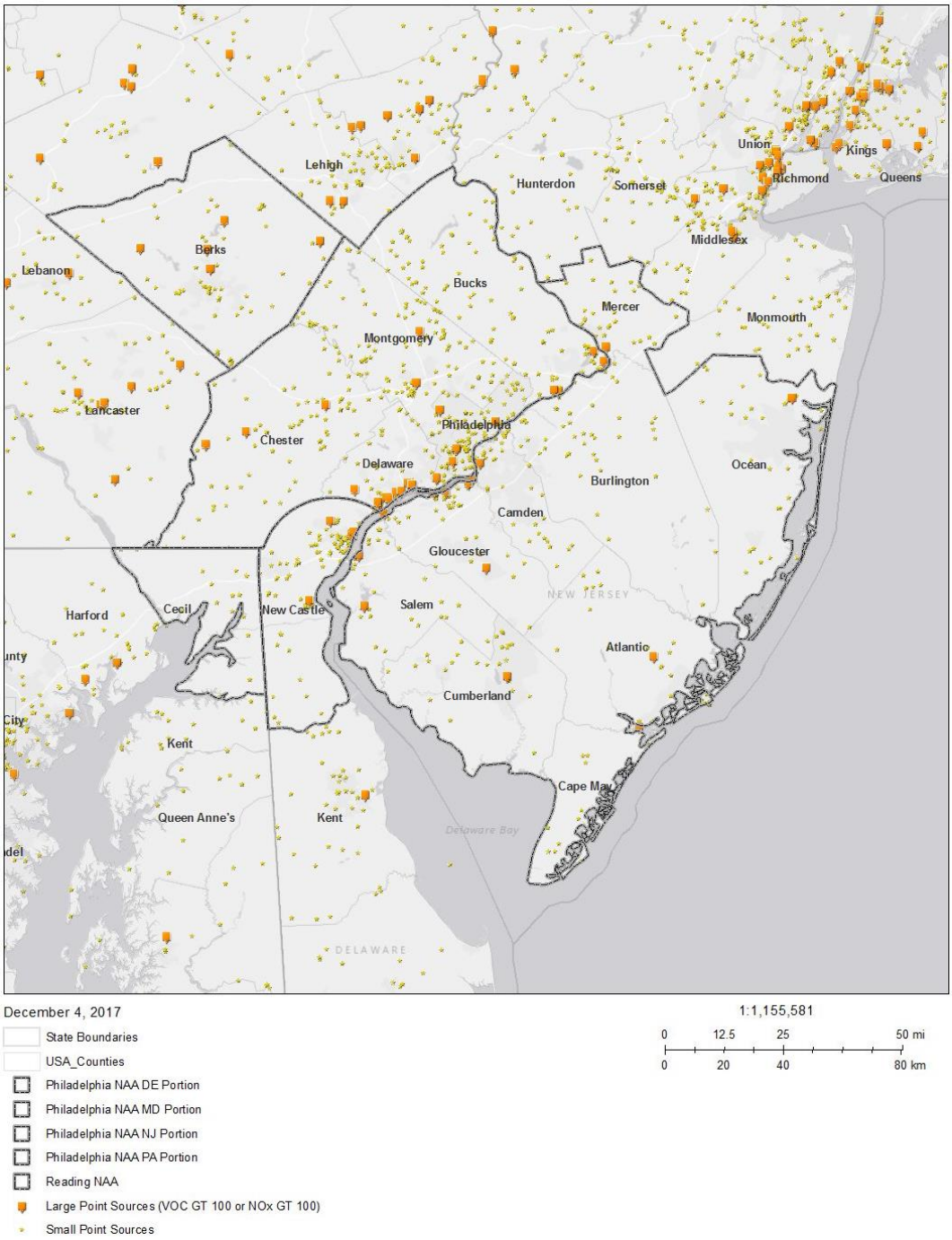


Figure 3b. Large and Small Point Sources in the Area of Analysis.



As shown in Table 3a, Philadelphia County, PA has the highest NO_x emission in the area of analysis. Philadelphia County, PA also has the highest VOC emissions, followed closely by Montgomery County, PA. Cecil County, MD and Cape May, Cumberland, and Salem Counties, NJ have the lowest NO_x emissions in the area of analysis. Salem County, NJ and Cecil County, MD have the lowest VOC emissions. Out of the 16 counties in the area of analysis, Kent County, DE has the seventh lowest NOx emissions and the fourth lowest VOC emissions. New Castle County, DE, Burlington and Ocean Counties, NJ, and Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA all have over 13,000 tons of NO_x and/or VOC emissions.

As shown in Figure 3a and Table 3b, Kent County, DE, and Atlantic, Burlington, Camden, Cape May, Cumberland, Mercer, and Ocean Counties, NJ each have only one large point source. The other counties in the area of analysis have multiple large sources. The Delaware City Refinery in New Castle County, DE and the Philadelphia International Airport in Delaware County, PA have the highest NOx emissions in the area of analysis. Both sources emit over 1900 tons of NO_x. Other sources in Berks, Delaware, and Philadelphia Counties, PA have NO_x emissions over 1000 tons. As can be seen in Figure 3b, all counties in the area of analysis have numerous small NO_x and VOC sources. Philadelphia and Montgomery Counties, PA appear to have the highest density of small sources, while Atlantic County, NJ has the lowest density of small sources.

As shown in Figure 3c, Berks, Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA; New Castle County, DE; and Ocean County, NJ have the highest county-level NOx emissions in the area of analysis, while Cape May, Cumberland, and Salem Counties have the lowest. As shown in Figure 3d, Berks, Bucks, Chester, Montgomery, and Philadelphia Counties, PA, and Atlantic, Burlington, and Ocean Counties, NJ have the highest county-level VOC emissions in the area of analysis.

Table 3b. Large Point Sources and Emissions (tpy)

County	Facility Site Name	Facility Source Description	NO_x	VOC
Kent, DE	Dover Airforce Base Airport	Airport	693	337
New Castle, DE	Delaware City Refinery	Petroleum Refinery	1968	192
	Hay Road Energy Center	Electricity Generation via Combustion	886	38
	Edge Moor Energy Center	Electricity Generation via Combustion	334	27
	Dupont Edge Moor	Chemical Plant	33	114
	Dupont Experimental Station		198	11
Atlantic, NJ	Atlantic City International	Airport	283	119
Burlington, NJ	Burlington Generating Station	Electricity Generation via Combustion	119	4
Camden, NJ	Camden County Energy Recovery Associates, L.P.	Municipal Waste Combustor	327	2
Cape May, NJ	B. L. England Generating Station	Electricity Generation via Combustion	538	11
Cumberland, NJ	Gerresheimer Glass Inc.	Glass Plant	119	2
Gloucester, NJ	Eagle Point Tank Farm and Dock		6	124
	West Deptford Energy Station	Electricity Generation via Combustion	122	4
	Aleris Rolled Products, Inc		5	166
	Paulsboro Refining Company LLC	Petroleum Refinery	649	322
	Wheelabrator Gloucester Company L P	Municipal Waste Combustor	229	1
	Logan Generating Plant	Electricity Generation via Combustion	546	2
Mercer, NJ	PSEG Fossil LLC Mercer Generating Station	Electricity Generation via Combustion	236	20
Ocean, NJ	Essential Power Operating Company LLC	Electricity Generation via Combustion	152	10
Salem, NJ	Ardagh Glass Containers Inc.	Glass Plant	353	10
	Carneys Point Generating Plant	Electricity Generation via Combustion	896	3
Berks, PA	Texas Eastern Trans/Bernville Sta	Compressor Station	155	6
	Texas Eastern Trans/Bechtelsville	Compressor Station	171	29
	Novipax Llc/Reading			541

	Lehigh Cement Co LLC/ Evansville Cement Plant & Quarry	Portland Cement Manufacturing	1419	24
	Carpenter Tech Corp/Reading Plt	Steel Mill	246	72
Bucks, PA	Exelon Generation Co/Croydon Gen Station	Electricity Generation via Combustion	130	0
	Wheelabrator Falls Inc/Falls Twp	Municipal Waste Combustor	793	7
	Fairless Energy Llc/Falls Twp	Electricity Generation via Combustion	194	35
Chester, PA	Transcontinental Gas/Frazer Station 200	Compressor Station	138	15
	Quad / Graphics Atglen	Printing/Publishing Facility	11	288
	Arcelormittal Plate LLC/Coatesville	Steel Mill	235	135
Delaware, PA	FPL Energy Marcus Hook LP/750 MW	Electricity Generation via Combustion	274	20
	Laurel Pipeline Co LP/Boothwyn Breakout Station			115
	Liberty Elec Power LLC/Eddystone Plt	Electricity Generation via Combustion	155	15
	Braskem Amer Inc/Marcus Hook	Plastic, Resin, Syn Fiber or Rubber Products Plant	9	180
	PQ Corp/Chester	Chemical Plant	243	1
	Kimberly Clark Pa LLC/Chester Opr	Pulp and Paper Plant	220	14
	Exelon Generation Co/Eddystone	Electricity Generation via Combustion	161	5
	Monroe Energy LLC/Trainer	Petroleum Refinery	696	334
	Covanta Delaware Valley LP/Delaware Valley Res Rec	Municipal Waste Combustor	1231	11
	Philadelphia International	Airport	1980	388
Montgomery, PA	Merck Sharp & Dohme / West Point	Pharmaceutical Manufacturing	119	30
	Covanta Plymouth Renewable Energy/ Plymouth	Municipal Waste Combustor	793	2
Philadelphia, PA	Honeywell/Frankford Plant		239	106
	Grays Ferry Cogen Partnership/Phila	Electricity Generation via Combustion	216	10
	Paperworks Ind Inc/Mill Div	Pulp and Paper Plant	109	8
	Phila Energy Sol Ref/ Pes	Petroleum Refinery	1458	593

Figure 3c. Total County-Level NO_x Emissions in the Area of Analysis

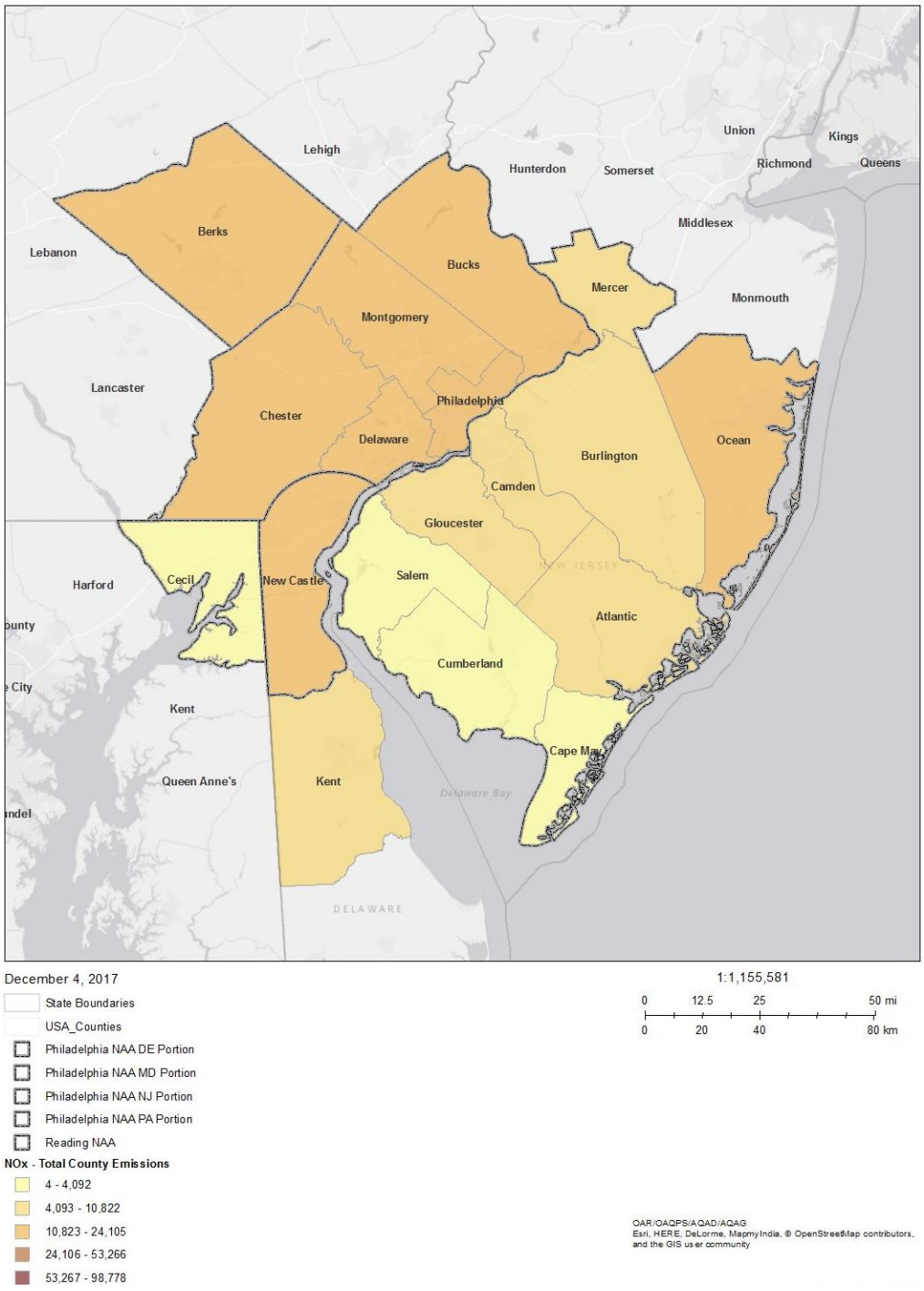
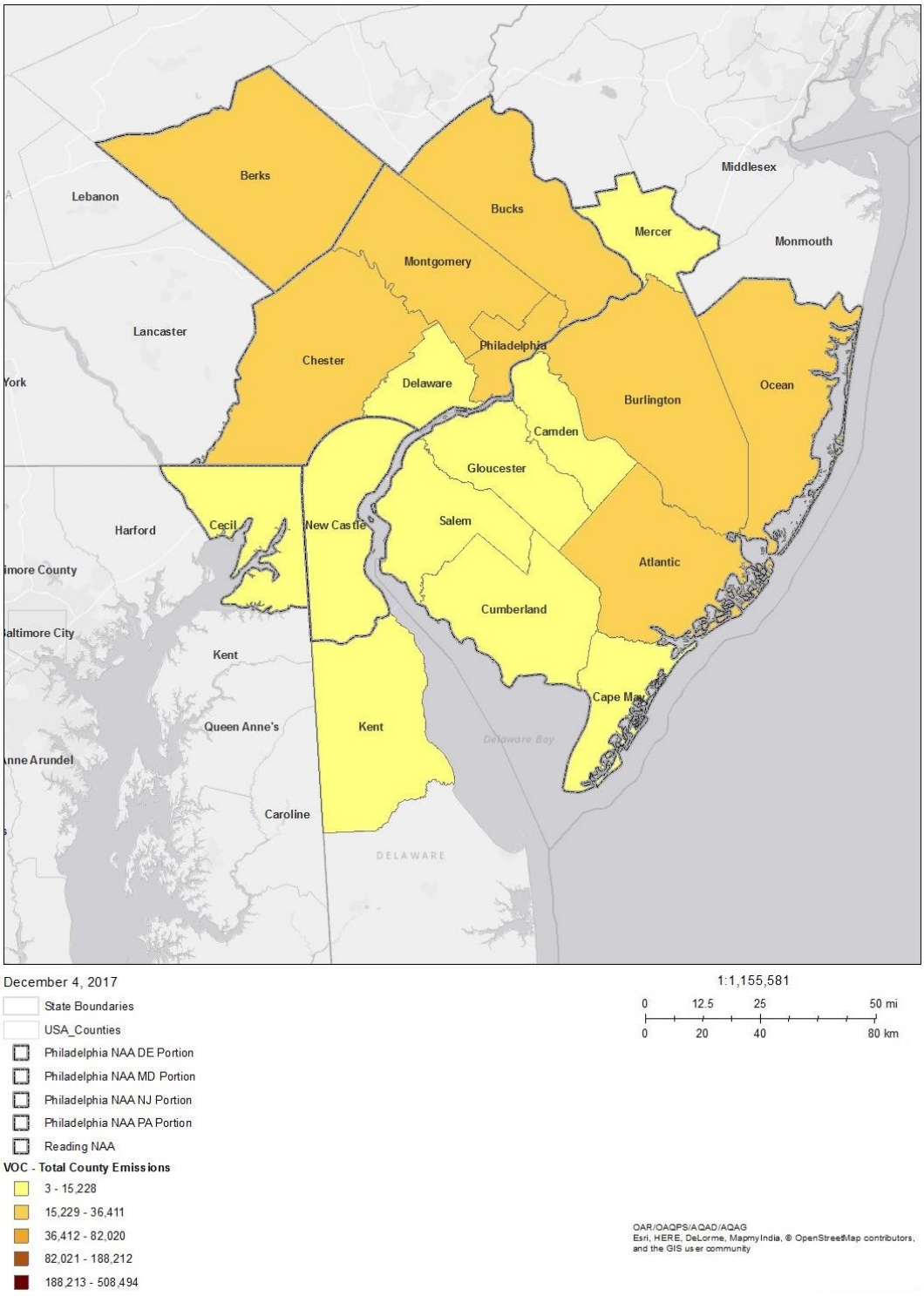


Figure 3d. Total County-Level VOC Emissions in the Area of Analysis



Population density and degree of urbanization

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

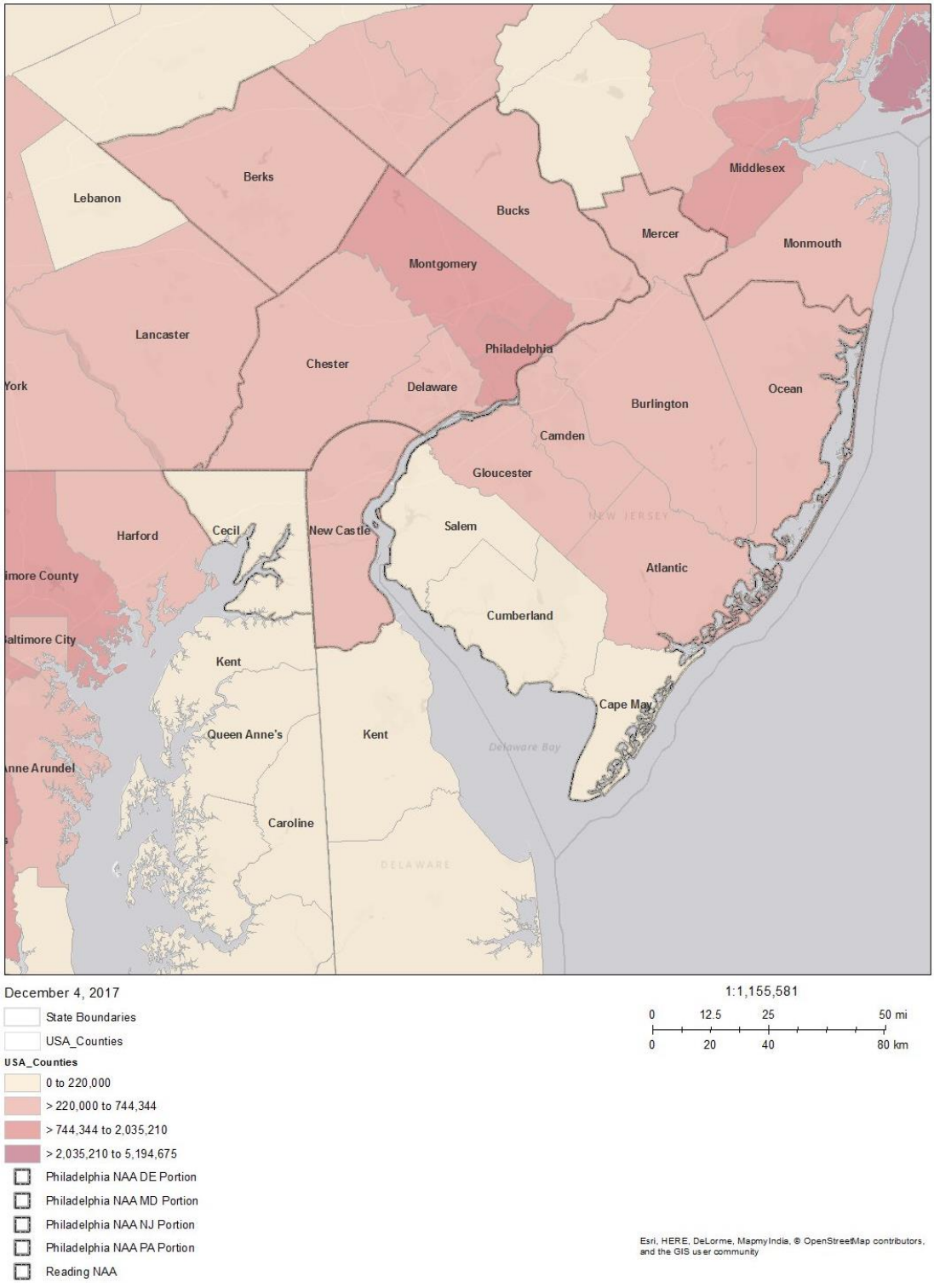
NAAQS. Table 4 shows the population, population density, and population growth information for each county in the area of analysis. Figure 4 depicts the county-level population.

Table 4. Population and Growth.

County	State Recommended Nonattainment?	2010 Population	2015 Population	2015 Population Density (per sq. mi.)	Absolute change in population (2010-2015)	Population % change (2010-2015)
Kent, DE	No	162,310	173,533	296	11,223	7
New Castle, DE	Yes	538,479	556,779	1,306	18,300	3
Cecil, MD	No	101,108	102,382	296	1,274	1
Atlantic, NJ	Yes	274,549	274,219	493	-330	-0.1
Burlington, NJ	Yes	448,734	450,226	564	1,492	0.3
Camden, NJ	Yes	513,657	510,923	2,309	-2,734	-0.5
Cape May, NJ	Yes	97,265	94,727	377	-2,538	-2
Cumberland, NJ	Yes	156,898	155,854	322	-1,044	-0.7
Gloucester, NJ	Yes	288,288	291,479	905	3,191	1
Mercer, NJ	Yes	366,513	371,398	1,654	4,885	1
Ocean, NJ	Yes	576,567	588,721	936	12,154	2
Salem, NJ	Yes	66,083	64,180	193	-1,903	-3
Berks, PA	No	411,442	415,271	485	3,829	0.9
Bucks, PA	Yes	625,249	627,367	1,038	2,118	0.3
Chester, PA	Yes	498,886	515,939	687	17,053	3
Delaware, PA	Yes	558,979	563,894	3067	4,915	0.9
Montgomery, PA	Yes	799,874	819,264	1696	19,390	2
Philadelphia, PA	Yes	1,526,006	1,567,442	11,689	41,436	3
	Area wide	8,010,887	8,143,598	994	132,711	2

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

Figure 4. County-Level Population.



Philadelphia and Montgomery Counties, PA have the highest populations in the area of analysis, and Kent County, DE, Cecil County, MD, and Cape May, Cumberland, and Salem Counties, NJ have the lowest. Philadelphia, PA has the highest population density, at 11,689, while Cecil County, MD and Kent County, DE are tied for the lowest, at 296. Atlantic, Camden, Cape May Cumberland and Salem Counties experienced a decrease in population between 2010 and 2015. Philadelphia, PA experienced the biggest absolute increase in

population in the same time period, while Kent County, DE experienced the largest percent increase in population.

Traffic and Vehicle Miles Travelled (VMT)

EPA evaluated the commuting patterns of residents, as well as the total vehicle miles traveled (VMT) for each county in the area of analysis. In combination with the population/population density data and the location of main transportation arteries, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and high VMT and/or high number of commuters indicates the presence of motor vehicle emissions that may contribute to violations of the NAAQS. Rapid population or VMT growth in a county on the urban perimeter may signify increasing integration with the core urban area, and thus could indicate that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. In addition to VMT, EPA evaluated worker data collected by the U.S. Census Bureau[20] for the area of analysis. Table 5a shows the traffic and commuting pattern data, including total VMT for each county, number of residents who work in each county, number of residents that work in counties with violating monitors, and the percent of residents working in counties with violating monitors. In addition, Table 5b shows the number and percentage of residents who commute within their county of residence. The data in Tables 5a and 5b are 2014 data.

Table 5a. Traffic and Commuting Patterns.

County	State Recommended Nonattainment?	2014 Total VMT (Million Miles)	Number of County Residents Who Work	Number Commuting to or Within Counties with Violating Monitors	Percentage Commuting to or Within Counties with Violating Monitors
Kent, DE	No	1,650	68,246	16,485	24.2%
New Castle, DE	**Yes**	**5,546**	**255,431**	**227,862**	**89.2%**
Cecil, MD	**No**	**1,275**	**44,500**	**27,437**	**61.7%**
Atlantic, NJ	Yes	2,759	125,197	15,904	12.7%
Burlington, NJ	Yes	4,699	223,456	95,006	42.5%
Camden, NJ	**Yes**	**3,941**	**238,179**	**161,840**	**67.9%**
Cape May, NJ	Yes	996	38,277	4,905	12.8%
Cumberland, NJ	Yes	1,162	60,502	11,847	19.6%
Gloucester, NJ	**Yes**	**2,746**	**143,718**	**104,033**	**72.4%**
Mercer, NJ	**Yes**	**3,390**	**164236**	**93,117**	**56.7%**
Ocean, NJ	**Yes**	**4,827**	**231657**	**119,427**	**51.6%**
Salem, NJ	Yes	786	33,649	15,628	46.4%
Berks, PA	**No**	**3,298**	**194,993**	**147,822**	**75.8%**
Bucks, PA	**Yes**	**4,652**	**317,908**	**263,321**	**82.8%**
Chester, PA	**Yes**	**4,193**	**246,357**	**217,427**	**88.3%**
Delaware, PA	**Yes**	**3,278**	**265,338**	**244,659**	**92.2%**
Montgomery, PA	**Yes**	**6,458**	**405,300**	**365,300**	**90.1%**
Philadelphia, PA	**Yes**	**5,496**	**572,291**	**521,674**	**91.16%**
	Total:	61,152	3,629,235	2,574,558	70.9%

* Counties with a monitors violating the NAAQS are indicated in bold.

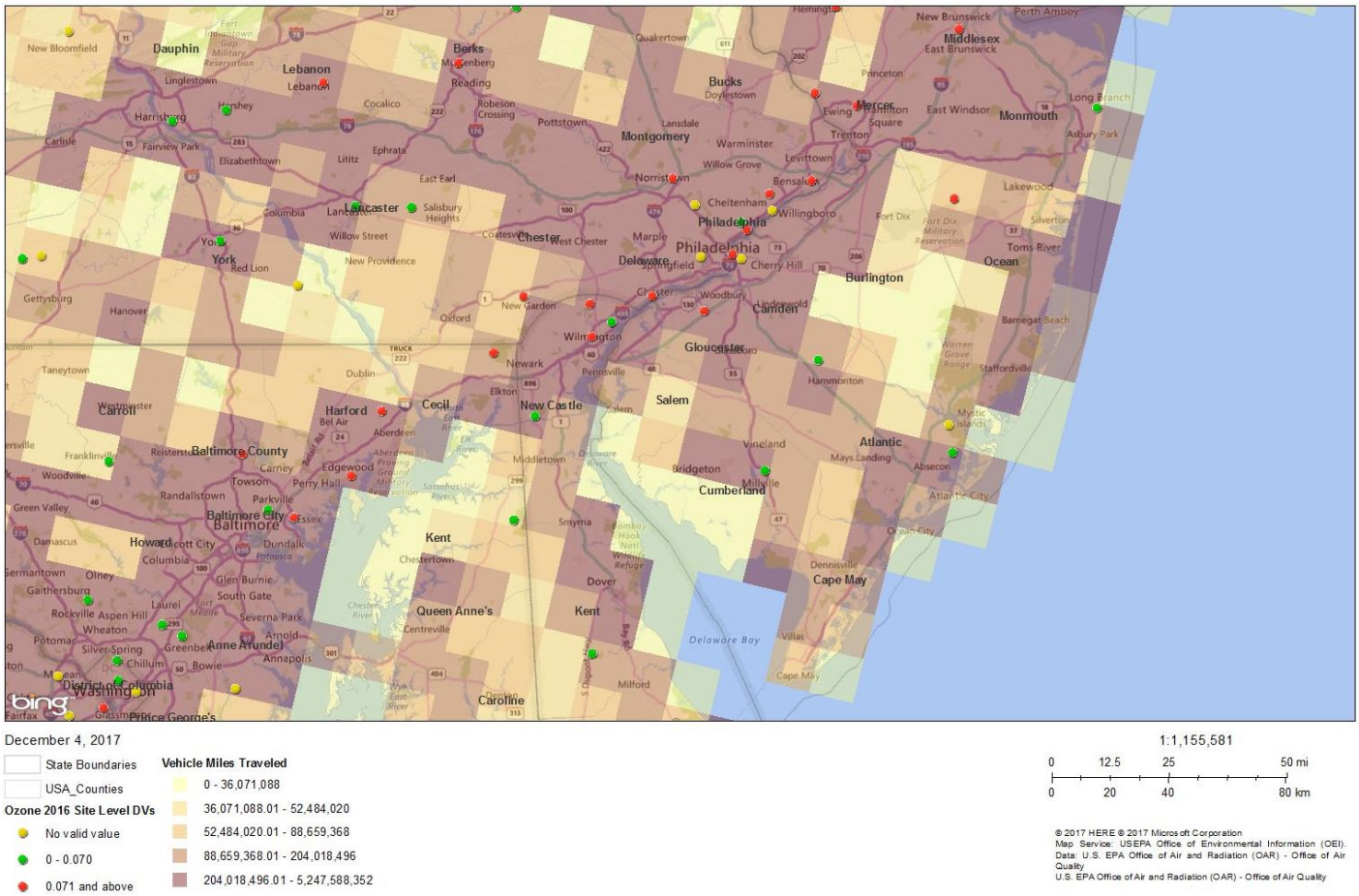
[20] The worker data can be accessed at: http://onthemap.ces.census.gov/.

Table 5b. Commuting Patterns Including Commuting Within County of Residence.

County	State Recommended Nonattainment?	Number of County Residents Who Work	Number Commuting to or Within Counties with Violating Monitors	Percentage Commuting to or Within Counties with Violating Monitors	Number Commuting Within County of Residence	Percentage Commuting Within the County of Residence
Kent, DE	No	68,246	16,485	24.2%	39,070	57.2%
New Castle, DE	Yes	255,431	227,862	89.2%	192,971	75.5%
Cecil, MD	No	44,500	27,437	61.7%	13,908	31.3%
Atlantic, NJ	Yes	125,197	15,904	12.7%	84,158	67.2%
Burlington, NJ	Yes	223,456	95,006	42.5%	83,745	37.5%
Camden, NJ	Yes	238,179	161,840	67.9%	90,701	38.1%
Cape May, NJ	Yes	38,277	4,905	12.8%	20,793	54.3%
Cumberland, NJ	Yes	60,502	11,847	19.6%	31,385	51.9%
Gloucester, NJ	Yes	143,718	104,033	72.4%	43,131	30.0%
Mercer, NJ	Yes	164236	93,117	56.7%	78,888	48.0%
Ocean, NJ	Yes	231657	119,427	51.6%	102,034	44.0%
Salem, NJ	Yes	33,649	15,628	46.4%	9,130	27.1%
Berks, PA	No	194,993	147,822	75.8%	111,542	57.2%
Bucks, PA	Yes	317,908	263,321	82.8%	130,805	41.1%
Chester, PA	Yes	246,357	217,427	88.3%	112,313	45.6%
Delaware, PA	Yes	265,338	244,659	92.2%	104,298	39.3%
Montgomery, PA	Yes	405,300	365,300	90.1%	194,295	47.9%
Philadelphia, PA	Yes	572,291	521,674	91.16%	348,108	60.8%
	Total:	3,629,235	2,574,558	70.9%	1,791,275	49.4%

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

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



As can be seen in Tables 5a and 5b, Montgomery County, PA, New Castle County, DE, and Philadelphia, PA have the highest VMT in the area of analysis, and Salem County, NJ has the lowest.

Cape May and Salem Counties, NJ have the fewest residents who work, while Philadelphia and Montgomery Counties, PA have the most. Atlantic and Cape May Counties, NJ have the lowest percentage of workers commuting into counties with violating monitors, with the majority of their residents commuting within their own counties. Chester, Delaware, Montgomery, Philadelphia Counties, PA and New Castle County, DE have the highest percentage of workers commuting into counties with violating monitors. However, 60.8% of Philadelphians and 75.5% of residents of New Castle County commute within their own counties.

As shown in Figure 5, I-95 runs through the area of analysis from Cecil County, MD northeast through New Castle County, DE, and Delaware, Philadelphia, and Buck Counties, PA, and into Mercer County, NJ. The New Jersey Turnpike and I-295 parallel I-95 on the east side of the Delaware River, through Mercer, Burlington, Camden, Gloucester, and Salem Counties, NJ. The Pennsylvania Turnpike (I-76) starts in Philadelphia and extends west through Montgomery, Chester Counties, PA, and through the southern tip of Berks County, PA into Lancaster County, PA. Figure 5 shows high VMT through these traffic corridors, where the majority of violating monitors in the area of analysis are located.

Factor 3: Meteorology

Evaluation of meteorological data helps to assess the fate and transport of emissions contributing to ozone concentrations and to identify areas potentially contributing to the monitored violations. Results of meteorological data analysis may inform the determination of nonattainment area boundaries. In order to

determine how meteorological conditions, including, but not limited to, weather, transport patterns, and stagnation conditions, could affect the fate and transport of ozone and precursor emissions from sources in the area., EPA evaluated 2014-2016 HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) trajectories at 100, 500, and 1000 meters (m) above ground level (AGL) that illustrate the three-dimensional paths traveled by air parcels to a violating monitor. Figure 6 shows the 24-hour HYSPLIT back trajectories in red, blue and green, representing 100, 500, and 1000 m AGL, respectively, for each exceedance day (i.e., daily maximum 8 hour values that exceed the 2015 ozone NAAQS) for the violating monitors. Figures 6a through 6o show the HYSPLIT back trajectories for the violating monitors.

Figure 6a. HYPLIT Back Trajectories for Monitor 100031010 New Castle County, Delaware

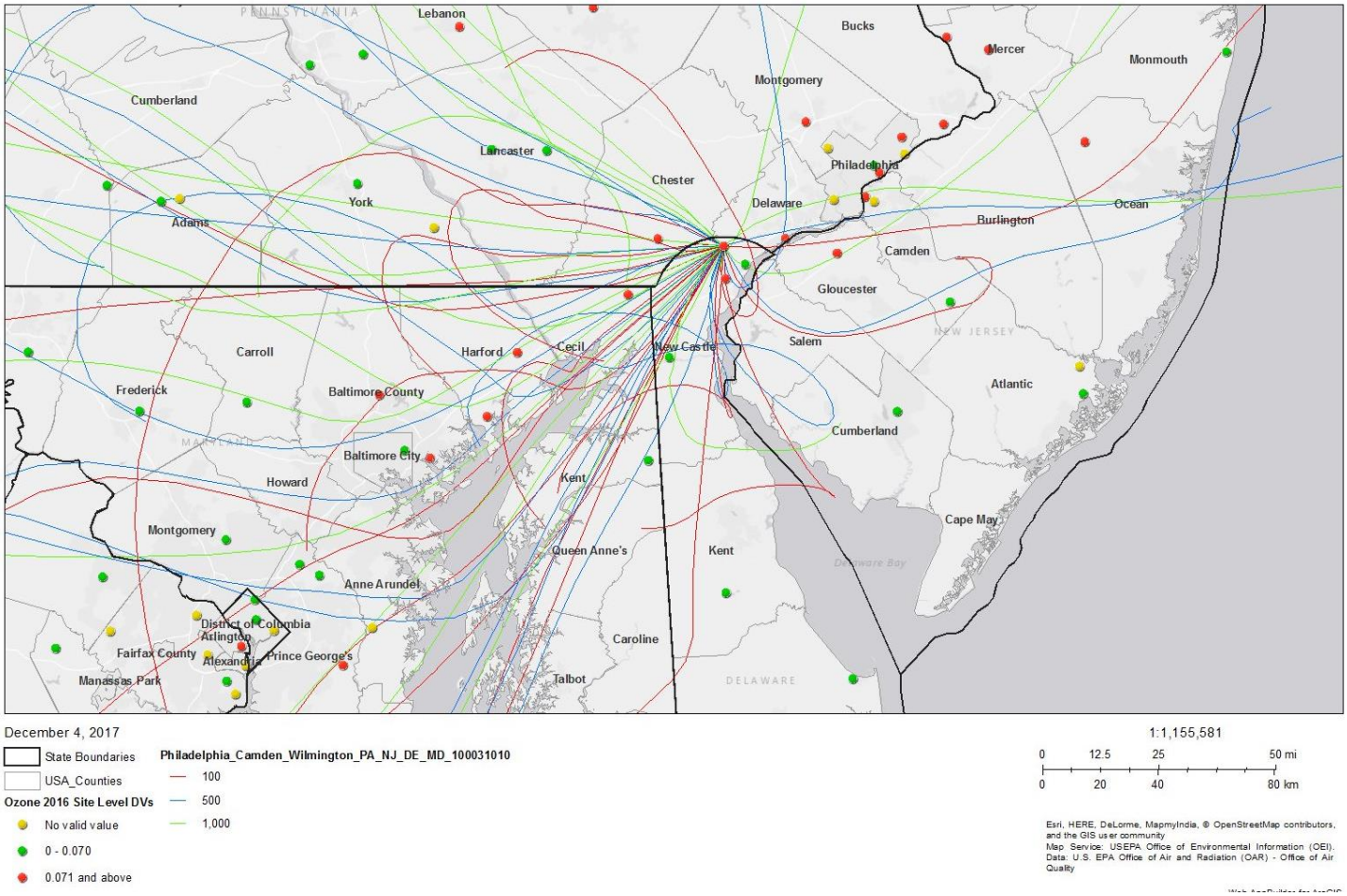


Figure 6b. HYPLIT Back Trajectories for Monitor 100032004 New Castle County, Delaware

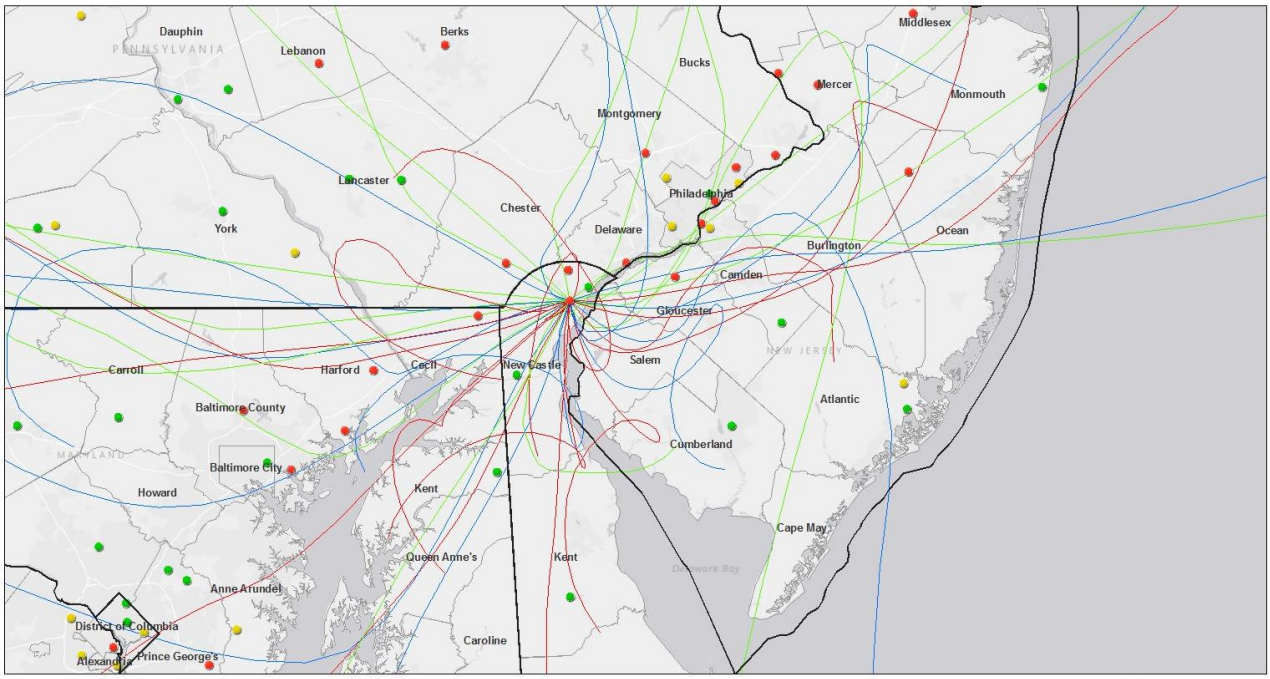


Figure 6c. HYPLIT Back Trajectories for Monitor 240150003 Cecil County, Maryland

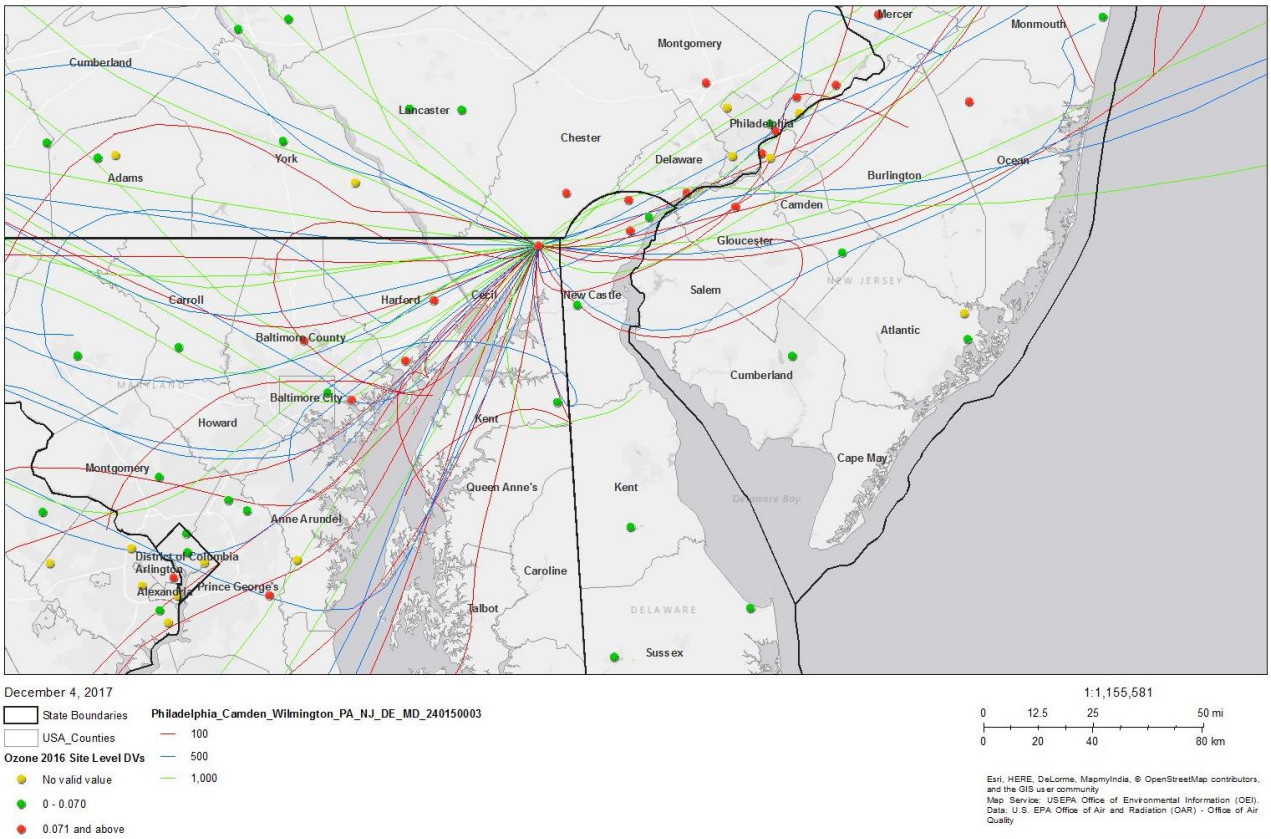


Figure 6d. HYPLIT Back Trajectories for Monitor 340070002 Camden County, New Jersey

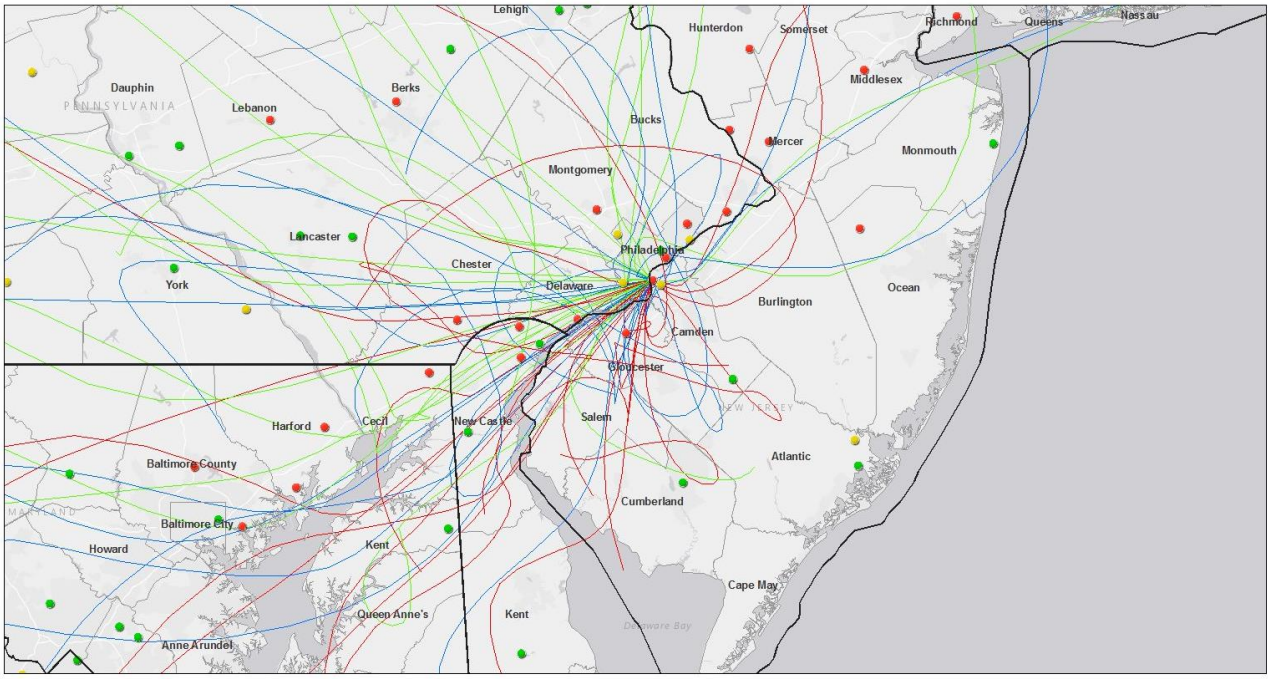


Figure 6e. HYPLIT Back Trajectories for Monitor 340150002 Gloucester County, New Jersey

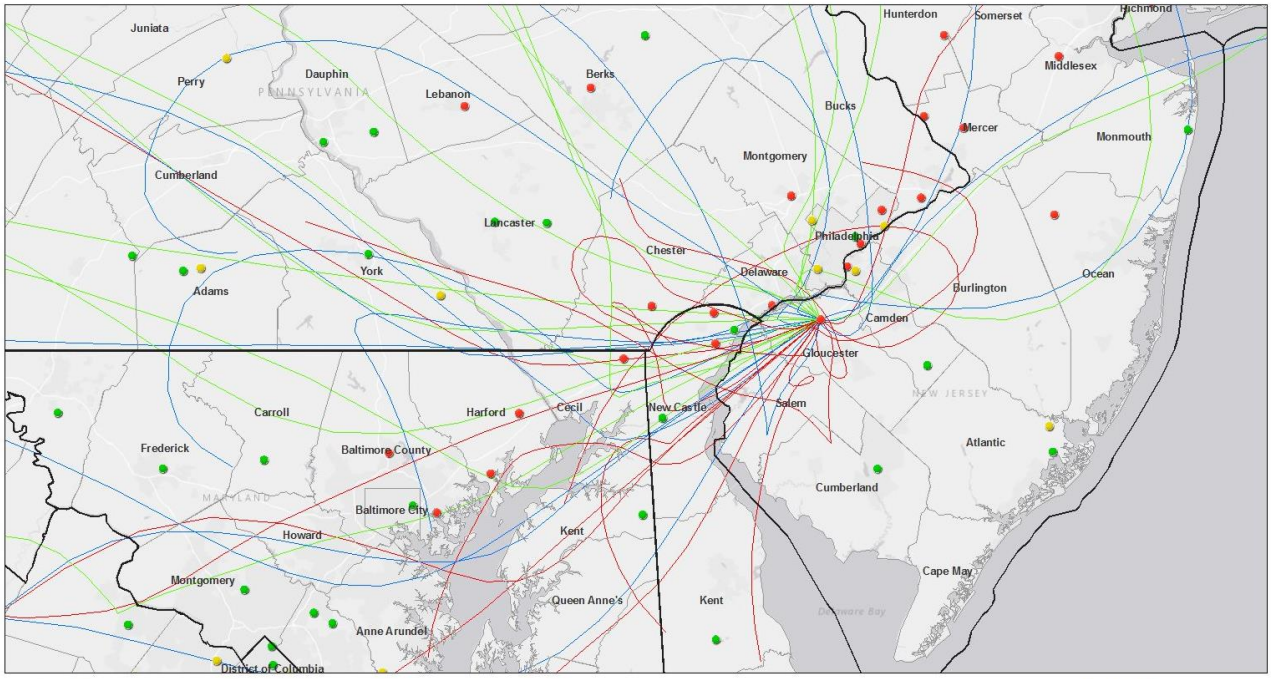


Figure 6f. HYPLIT Back Trajectories for Monitor 420110011 Berks County, Pennsylvania

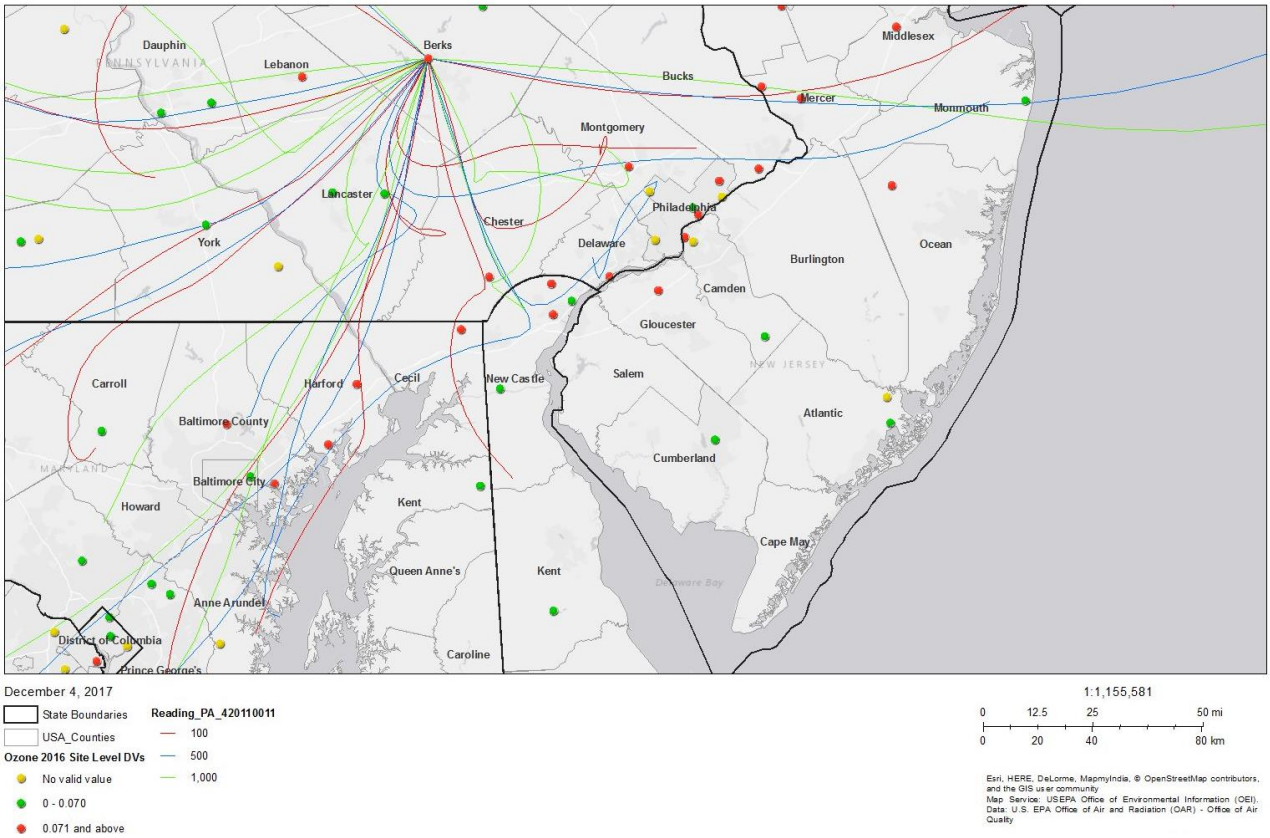


Figure 6g. HYPLIT Back Trajectories for Monitor 420170012 Bucks County, Pennsylvania

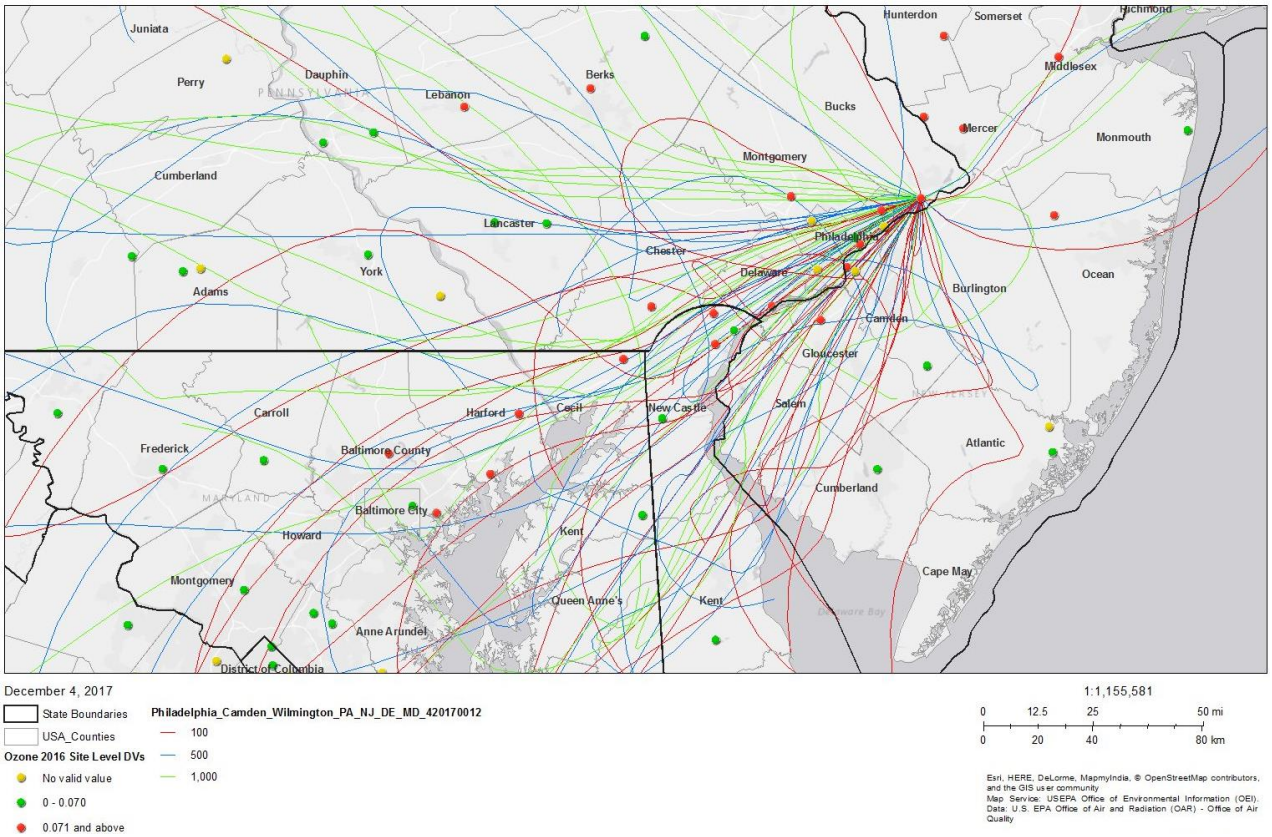


Figure 6h. HYPLIT Back Trajectories for Monitor 420290100 Chester County, Pennsylvania

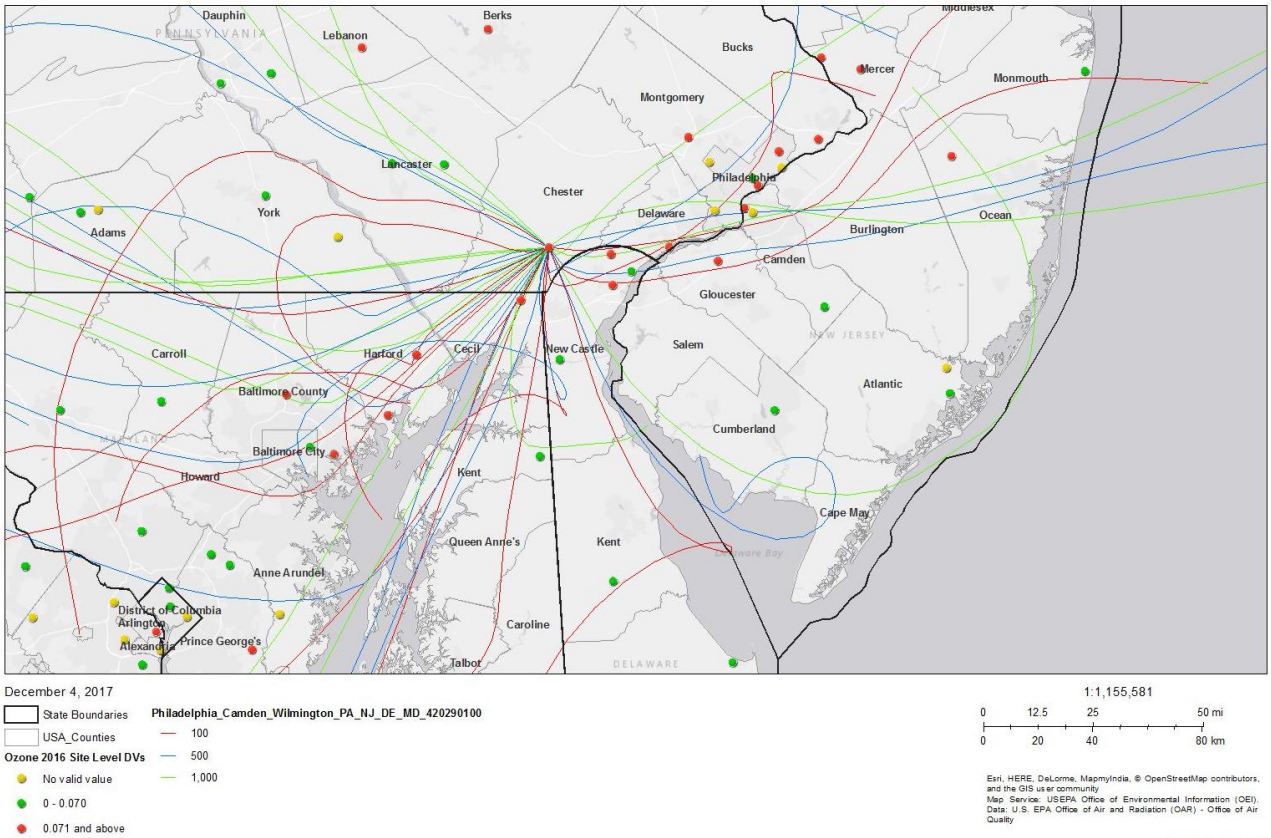


Figure 6i. HYPLIT Back Trajectories for Monitor 420450002 Delaware County, Pennsylvania

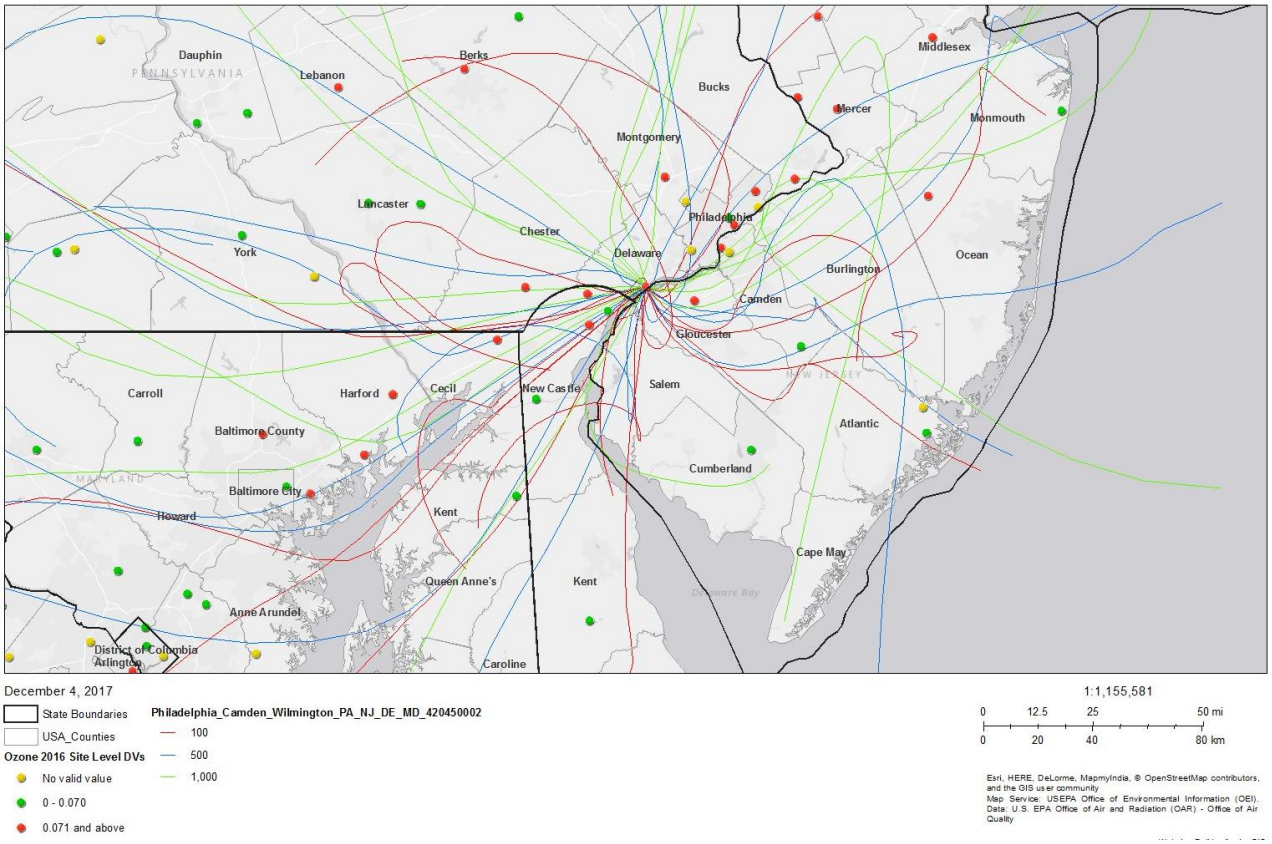


Figure 6j. HYPLIT Back Trajectories for Monitor 420910013 Montgomery County, Pennsylvania

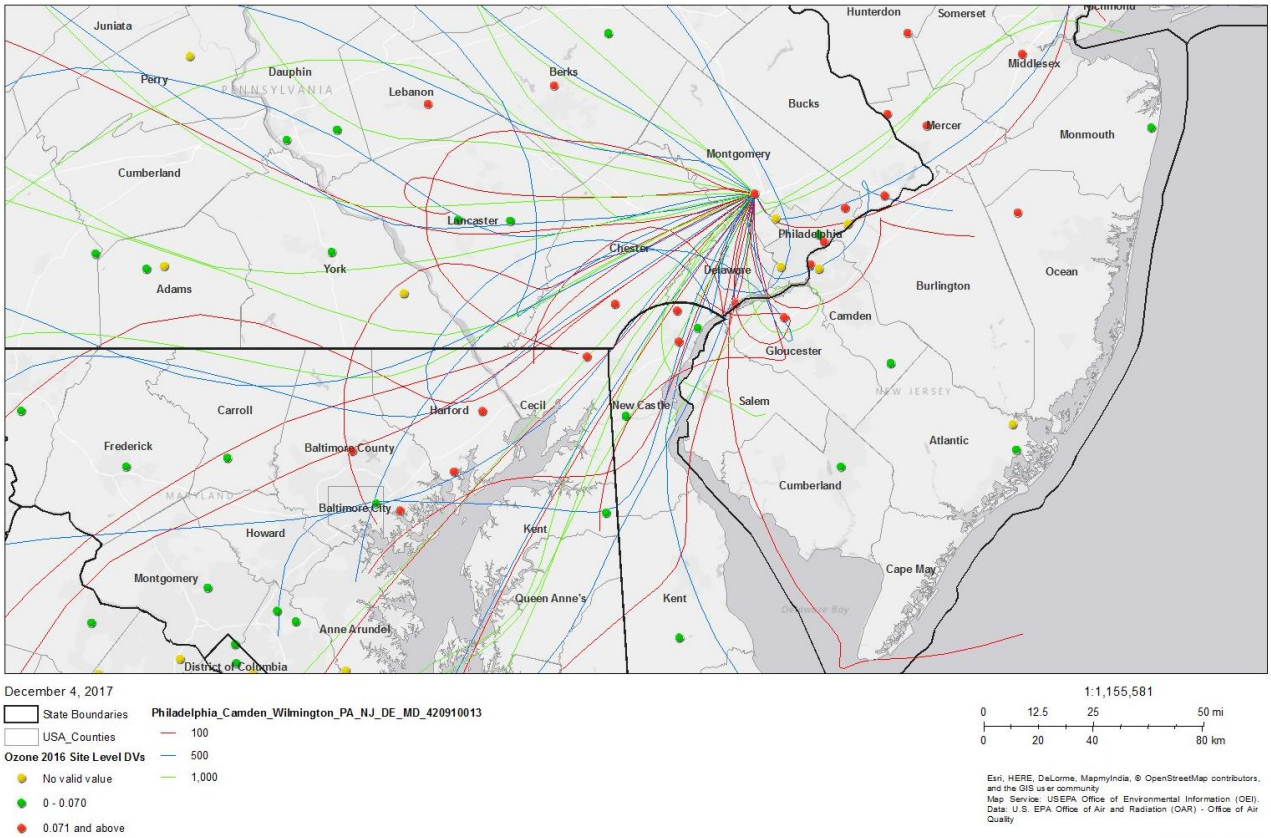


Figure 6k. HYPLIT Back Trajectories for Monitor 421010024 Philadelphia County, Pennsylvania

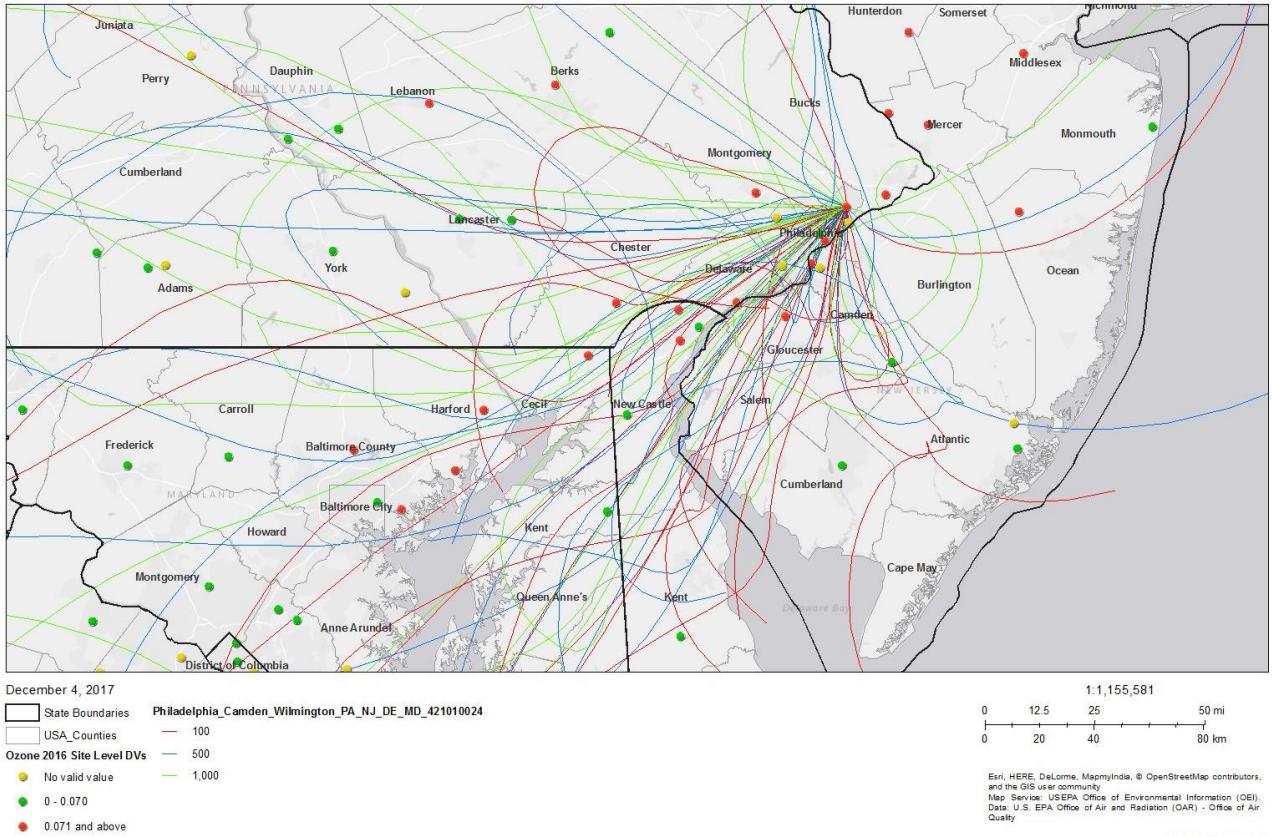


Figure 6l. HYPLIT Back Trajectories for Monitor 421010048 Philadelphia County, Pennsylvania

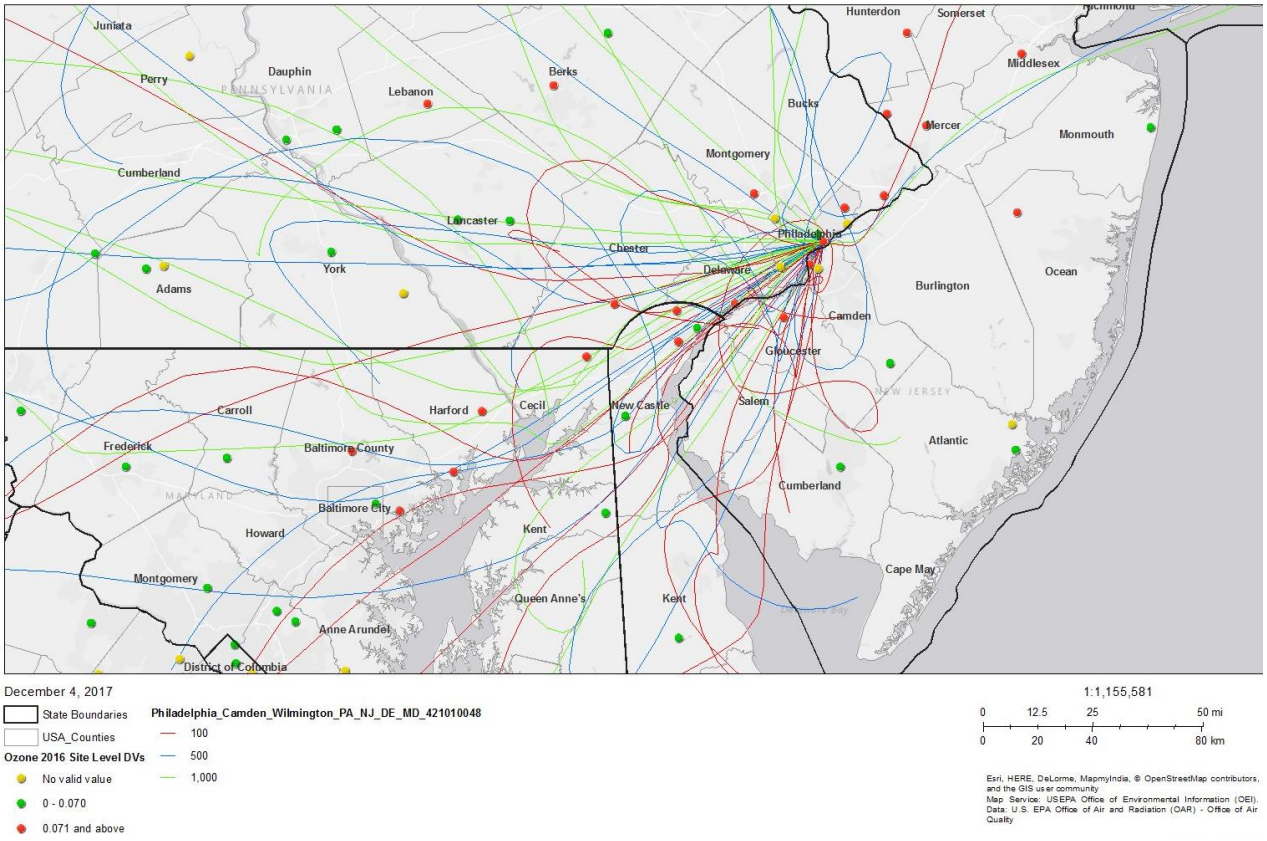


Figure 6m. HYPLIT Back Trajectories for Monitor 340210005 Mercer County, New Jersey

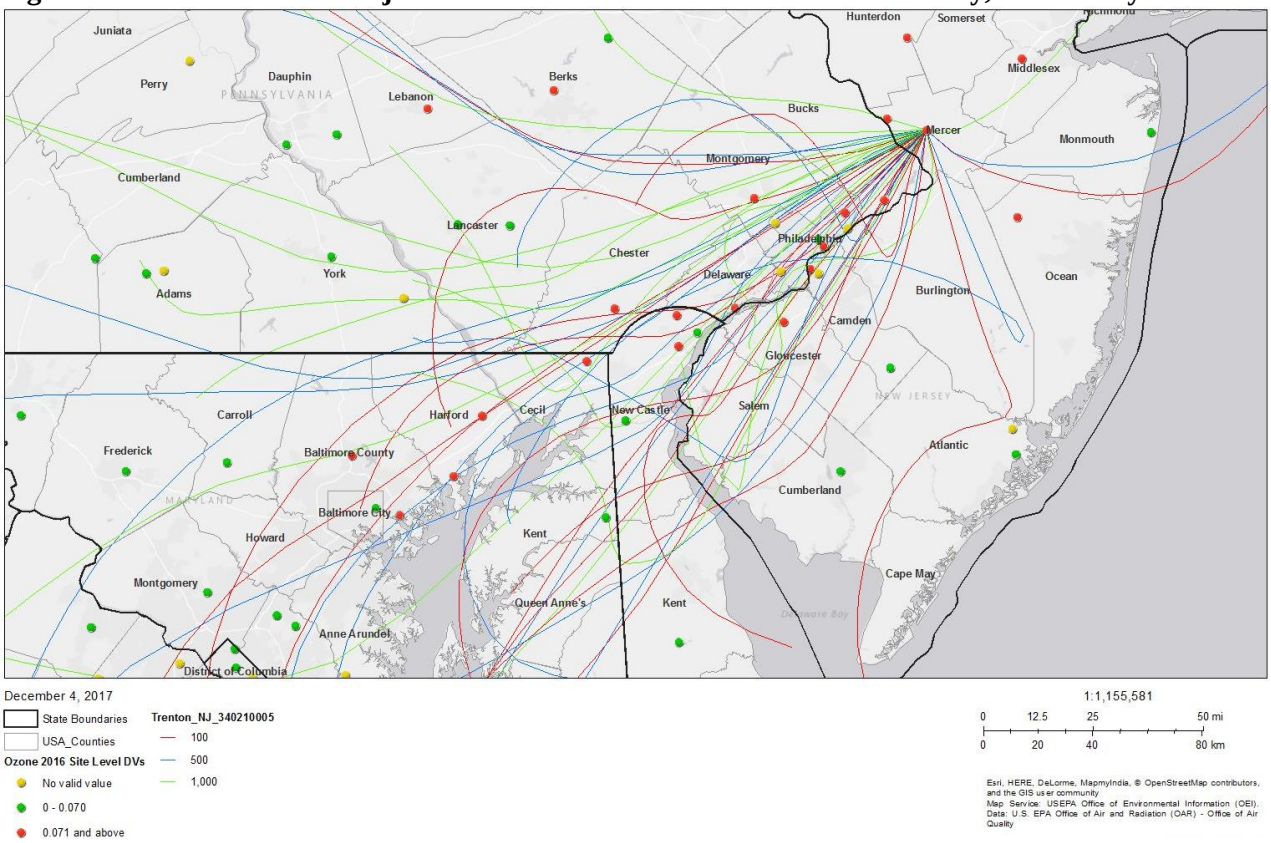


Figure 6n. HYPLIT Back Trajectories for Monitor 340219991 Mercer County, New Jersey

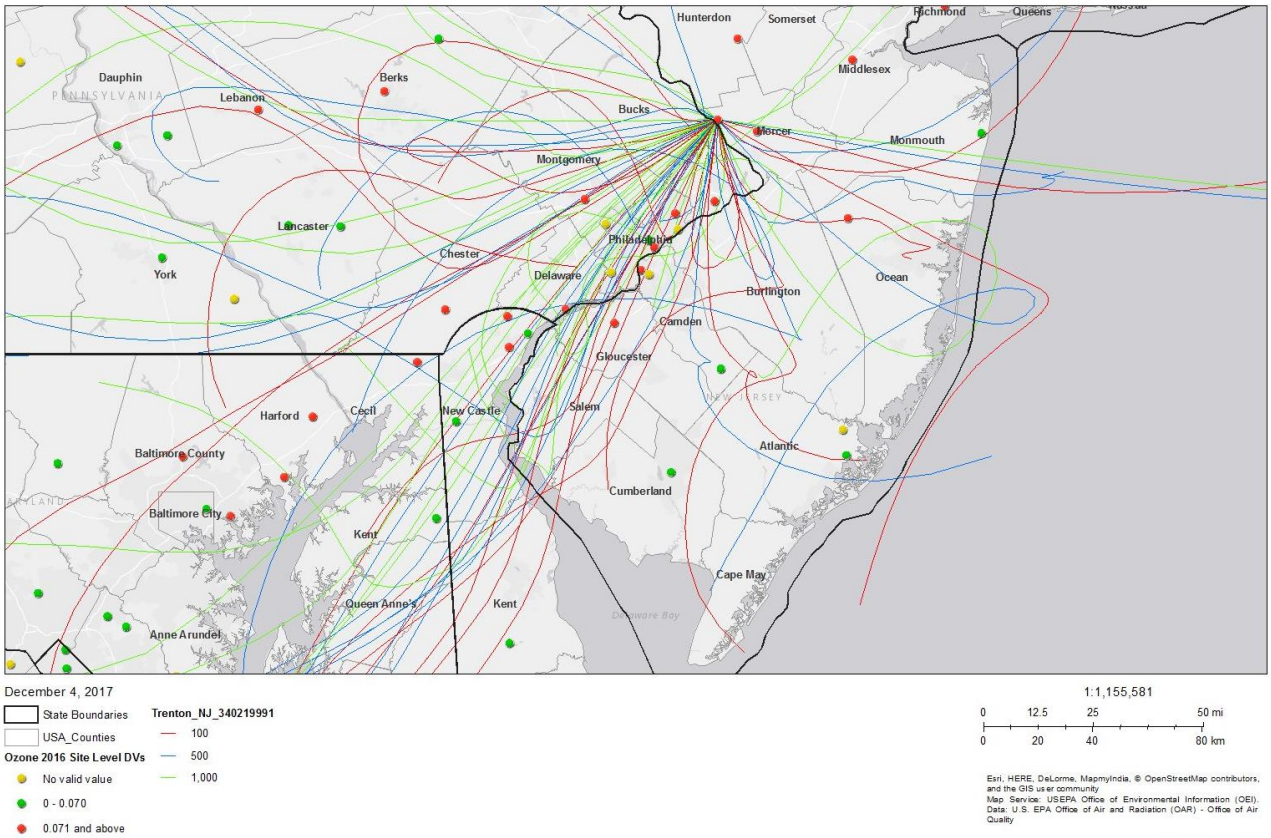
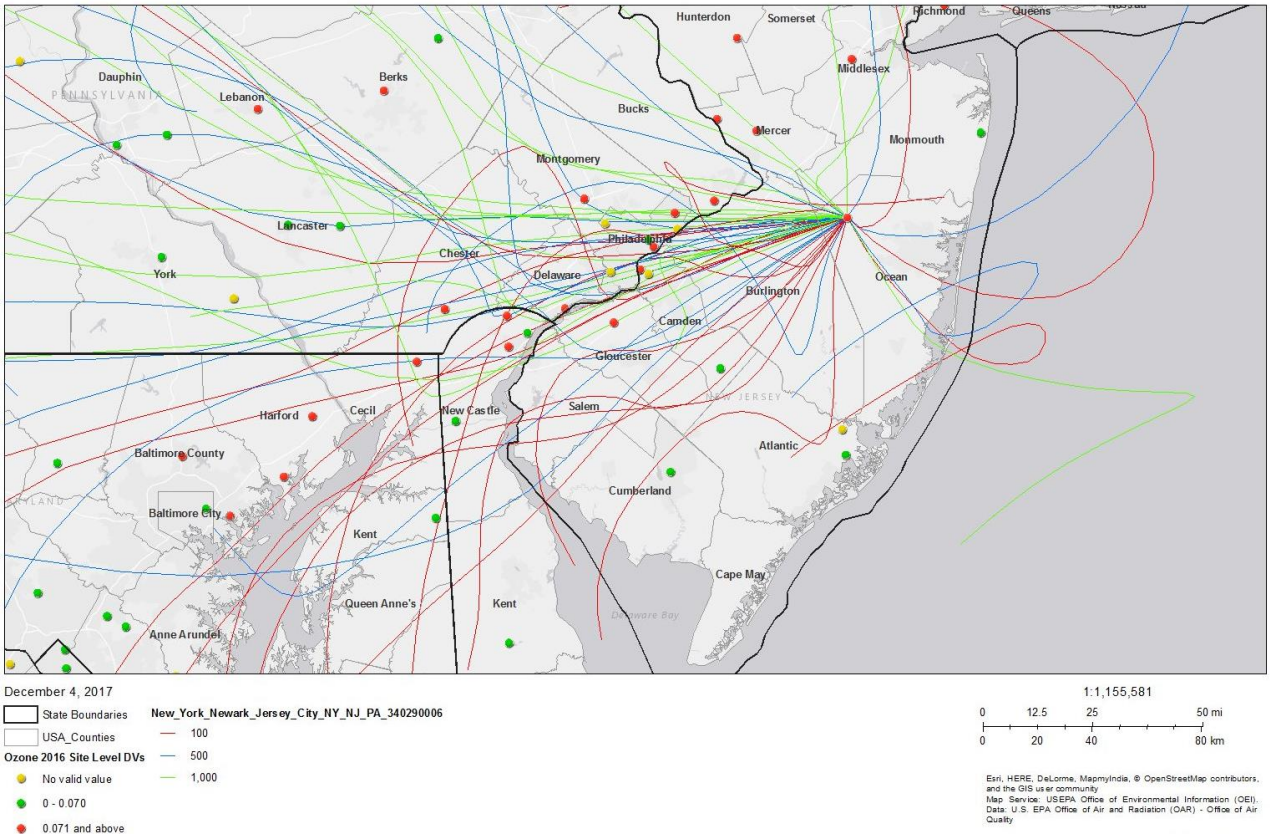


Figure 6o. HYPLIT Back Trajectories for Monitor 340290006 Ocean County, New Jersey



Figures 6a and 6b show HYSPLIT back trajectories for the two violating monitors in New Castle County, DE. Figure 6a shows that for most violating days, winds were coming generally from the west and southwest, through Chester County, PA and Cecil County, MD as well as the Eastern Shore of Maryland. Figure 6b shows southwestern winds, but also contribution from the east, through Salem, Gloucester, Camden, and Burlington Counties, NJ.

Figures 6c shows HYSPLIT back trajectories for the violating monitor in Cecil County, MD. This figure shows predominant winds from the southwest, but also contribution from the northeast, through New Castle County, DE, and Salem, Gloucester, Camden, Burlington, and Mercer Counties, NJ and Delaware and Philadelphia Counties, PA, and from the northwest through Chester, Lancaster, and York Counties, PA.

Figures 6d and 6e show HYSPLIT back trajectories for the violating monitors in Camden and Gloucester Counties, NJ. Both figures show southwestern winds, but also contribution from almost every direction including circular wind patterns. The back trajectories in Figure 6d show contribution to the violating monitor in Camden County, NJ from Gloucester and Salem Counties, NJ, New Castle County, DE, and Chester, Delaware, Montgomery, Bucks and Berks Counties, PA, and to a lesser extent from Cumberland, Atlantic, and Burlington Counties, NJ. The back trajectories in Figure 6e show contribution to the violating monitor in Gloucester County, NJ from Salem, Camden, and Burlington Counties, NJ, New Castle County, DE, and Chester, Delaware, and Bucks Counties, PA, and to a lesser extent from Montgomery and Berks Counties, PA.

Figures 6f shows HYSPLIT back trajectories for the violating monitor in Berks County, PA. This figure shows that on violating days, winds are predominantly southwest and south through Lancaster and York Counties, PA. There are also westerly winds, through Lebanon County, PA, and less contribution from the southeast, east, and northwest, through Chester, Montgomery, and Schuylkill Counties, PA, respectively.

Figures 6g shows HYSPLIT back trajectories for the violating monitor in Bucks County, PA. This figure shows that on violating days, winds are predominantly from the southwest, through Montgomery, Philadelphia, Delaware, and Chester Counties, PA, Burlington, Camden, Gloucester, Salem, and Cumberland Counties, NJ, New Castle County, DE, and Cecil County, MD. There is a lesser northeasterly contribution, through Mercer County, NJ.

Figures 6h shows HYSPLIT back trajectories for the violating monitor in Chester County, PA. The back trajectories in this figure show that on violating days, the predominant wind direction is from the southwest, through New Castle County, DE. There is also northwesterly contribution through Lancaster County, PA, and a lesser easterly component, through New Castle County, DE, Delaware and Philadelphia Counties, PA, and Gloucester, Camden, and Burlington Counties, NJ.

Figures 6i shows HYSPLIT back trajectories for the violating monitor in Delaware County, PA. The back trajectories in this figure show that on violating days at the Delaware County, PA monitor, winds are from almost every direction. However, there are western, southwestern, and southern winds, through Delaware and Chester Counties, PA, New Castle County, DE, and Salem and Gloucester Counties, NJ. There are also eastern, northeastern, and northern winds, through Gloucester, Camden, Burlington, and Mercer Counties, NJ, and Delaware, Philadelphia, Montgomery, and Bucks Counties, PA.

Figures 6j shows HYSPLIT back trajectories for the violating monitor in Montgomery County, PA. This figure shows that on violating days, winds are mainly coming into Montgomery County from the southwest, through Chester and Delaware Counties, PA, New Castle County, DE, and Cecil County, MD. The back trajectories also show lesser contribution from the northeast, west, and northwest through Philadelphia, Bucks, Berks, and Lancaster Counties, PA.

Figures 6k and 6l show HYSPLIT back trajectories for the two violating monitors in Philadelphia County, PA. Both figures show that the predominant wind direction into Philadelphia on violating days is from the southwest, through Chester and Delaware Counties, PA, New Castle County, DE, and Camden, Gloucester, and Salem Counties, NJ. The back trajectories also show contribution from Montgomery, Bucks, and Lancaster Counties, PA, and, to a lesser extent, Berks County, PA, and Burlington, Cumberland, and Atlantic Counties, NJ.

Figures 6m and 6n show HYSPLIT back trajectories for the two violating monitors in Mercer County, NJ. Both figures show that the predominant wind direction on violating days in Mercer County, NJ is southwest, through Bucks, Montgomery, Philadelphia, Chester, and Delaware counties, PA, and Burlington, Camden, Gloucester, and Salem Counties, NJ, New Castle and Kent Counties, DE, and Cecil County, MD.

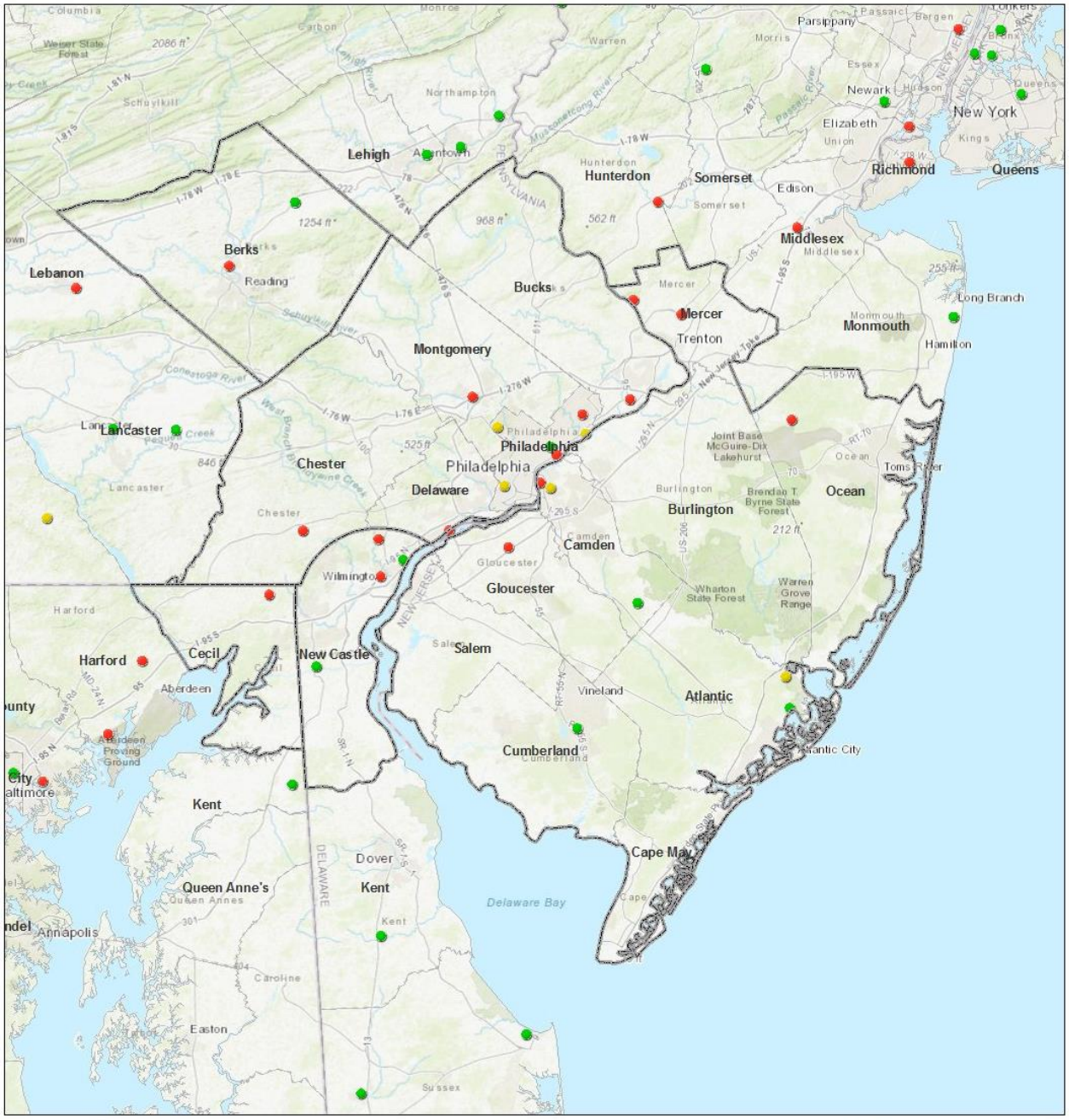
Figures 6o shows HYSPLIT back trajectories for the violating monitor in Ocean County, NJ. This figures show predominant winds from the west-southwest, through Burlington, Camden, Gloucester, and Salem Counties, NJ, Philadelphia, Chester, and Delaware Counties, PA, New Castle County, DE, and Cecil County, MD on days when the Ocean County, NJ monitor is violating.

Factor 4: Geography/topography

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

EPA used geography/topography analysis to evaluate the physical features of the land that might affect the air shed and, therefore, the distribution of ozone over the area. The Philadelphia-Wilmington-Atlantic City and Reading Areas do not have any geographical or topographical features significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a role in this evaluation.

Figure 7. Topographic Illustration of the Physical Features.



December 4, 2017

1:1,155,581

0 12.5 25 50 mi

0 20 40 80 km

USA_Counties

Philadelphia NAA DE Portion

Philadelphia NAA MD Portion

Philadelphia NAA NJ Portion

Philadelphia NAA PA Portion

Reading NAA

Ozone 2016 Site Level DVs

No valid value

0 - 0.070

0.071 and above

Factor 5: Jurisdictional boundaries

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

The Philadelphia-Wilmington-Atlantic City and Reading Areas have previously established nonattainment boundaries associated with the 1997 and 2008 ozone NAAQS. Pennsylvania and Maryland have recommended the same boundary for the Philadelphia-Wilmington-Atlantic City Area for the 2015 ozone NAAQS. Delaware and New Jersey have recommended different boundaries for the 2015 ozone NAAQS. Delaware recommended that New Castle County be a single county nonattainment area, separate from the Philadelphia-Wilmington-Atlantic City Area. New Jersey recommended that the entire state be designated nonattainment in an expanded New York City nonattainment area, extending from Connecticut to northern Virginia, and containing the entire States of Connecticut, New Jersey, and Delaware, along with eastern New York State and eastern Pennsylvania, the Baltimore nonattainment area, and the Washington, DC-MD-VA nonattainment area.

Pennsylvania recommended attainment for the Reading Area (Berks County) based on 2013-2015 air quality monitoring data. However, the area is violating the 2015 NAAQS based on 2014-2016 air quality monitoring data.

The Delaware Valley Regional Planning Commission (DVRPC), the MPO in the greater Philadelphia area, serves Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties in Pennsylvania, and Burlington, Camden, Gloucester, and Mercer Counties in New Jersey. The MPO for Atlantic, Cape May, Cumberland, and Salem Counties is the South Jersey Transportation Planning Organization. Ocean County is part of the North Jersey Transportation Planning Organization, which also includes Bergen, Essex, Newark, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren Counties, including Newark and Jersey City. New Castle County, DE and Cecil County, MD are in the Wilmington Area Planning Council (WILMAPCO) MPO. Kent County, DE is served by the Dover/Kent County MPO. Berks County is covered by a separate MPO, the Berks County Planning Commission.

Conclusion for the Philadelphia-Wilmington-Atlantic City Area, and Reading Area

Based on the assessment of factors described above, EPA has concluded that the following counties meet the CAA criteria for inclusion in the intended Philadelphia-Wilmington-Atlantic City Area: Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem Counties, NJ: New Castle County, DE: and Cecil County, MD. These are the same counties that are included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 and 2008 ozone NAAQS. The air quality monitors in Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA, Camden, Gloucester, Mercer, and Ocean Counties, NJ, New Castle County, DE, and Cecil County, MD indicate violations of the 2015 ozone NAAQS based on the 2014-2016 design values, therefore these counties are included in the intended nonattainment area. Atlantic, Burlington, Cape May, Cumberland, and Salem Counties, NJ are nearby counties that do not have violating monitors but that EPA has determined contribute to the Philadelphia-Wilmington-Atlantic City Area.

Delaware recommended that New Castle County be designated as a single-county nonattainment area, separate from the Philadelphia-Wilmington-Atlantic City area. However, considering the five factors above, EPA has determined that New Castle County is closely tied to the greater Philadelphia area, and contributes to other nearby violating monitors in the area. Therefore, EPA intends to designate New Castle County as nonattainment as part of the Philadelphia-Wilmington-Atlantic City Area. New Castle County, DE has relatively high emissions, high population, and high VMT compared to the other counties in the area of analysis. As shown in Figures 6c-e, 6g, and 6j-o, the prevailing winds from the southwest show that emissions in New Castle County contribute to most counties with violating monitors in the greater Philadelphia area. Furthermore, New Castle County is part of the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 and 2008 ozone NAAQS. Based on its relatively high emissions and meteorology that indicates that it is upwind of nearby violating counties in the Philadelphia-Wilmington-Atlantic City area, EPA concludes that it is contributing to those violations and should be part of that nonattainment area. Furthermore. New Castle County is served by DVRPC, the MPO for the greater Philadelphia area, and is part of the Philadelphia-Camden-Wilmington CBSA, which includes the Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA, four counties in southern New Jersey, and Cecil County, MD.

Delaware also recommended attainment for Kent County, and EPA does not intend to modify the state's recommendation. Kent County has relatively low NOx & VOC emissions, population, and VMT compared with most counties in the area of analysis. It is served by a separate MPO than the rest of the area, the Dover/Kent County MPO, and is in a separate CBSA, the Dover CBSA. In addition, meteorology shows relatively little contribution to nearby violating monitors in New Castle County, DE, Cecil County, MD, Camden and Gloucester Counties, NJ, and Chester and Delaware Counties, PA, as shown in Figures 6a – 6e, 6h, and 6i.

New Jersey has recommended that the entire state be designated as nonattainment, as part of an expanded New York City nonattainment area. However, EPA concludes that the nine counties that were included in the Philadelphia-Wilmington-Atlantic City nonattainment area for the 1997 and 2008 ozone NAAQS should be designated nonattainment for the 2015 NAAQS. This would facilitate continuity in planning. Moreover, these New Jersey counties are more closely tied to the greater Philadelphia area than New York City. Seven of these counties, Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Salem, are in the Philadelphia-Reading-Camden CSA, and four of those are in the Philadelphia-Camden-Wilmington CBSA, which includes Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties, PA, New Castle County, DE, and Cecil County, MD. Burlington, Camden, Gloucester, and Mercer Counties are part of the DVRPC, the MPO for the greater Philadelphia area. Atlantic, Cape May, Cumberland, and Salem Counties are served by the South Jersey Transportation Planning Organization, whereas the New Jersey counties closely tied to New York City are part of the North Jersey Transportation Planning Organization. Furthermore, as shown in Figures 6a-o, meteorology indicates that counties in the greater Philadelphia area in Pennsylvania, Delaware, and Maryland are contributing to the violating monitors in Camden, Gloucester, Mercer, and Ocean Counties, NJ, and New Jersey counties in the area of analysis are contributing to counties in the greater Philadelphia area in Pennsylvania, Delaware, and Maryland.

EPA has determined that Berks County (Reading, PA) should once again be separate from the Philadelphia-Wilmington-Atlantic City area. It is its own, single-county CBSA, the Reading CBSA, and is served by a single-county MPO, the Berks County Planning Commission. More importantly, meteorology shows, in Figures 6a-e and 6g-o, that violating monitors in the Philadelphia-Wilmington-Atlantic City area are generally not impacted by Berks County, i.e., relative to other counties in the area of analysis, Berks County isn't contributing as much to those violations. Furthermore, as shown in Figure 6f, contribution to Berks County is mainly coming from Lancaster, York, and Lebanon Counties. EPA is recommending that Lancaster, York, and Lebanon Counties be designated nonattainment as part of the Harrisburg-York-Lebanon-Lancaster area.

Exceptional Events (EE)

As stated above, if EPA approves Pennsylvania's pending EE package, EPA would revise its recommendation for the Reading Area from nonattainment to attainment/unclassifiable.