INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.

Mitchell E. Daniels Jr.
Governor

Thomas W. Easterly
Commissioner

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April 13, 2012

Ms. Susan Hedman
Regional Administrator
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, IL 60604-3950

Dear Ms. Hedman:

Re: Indiana 120-Day Response to U.S. EPA's Revised Designations for the 2008 8-Hour Ozone National Ambient Air Quality Standard

This letter is in response to the United States Environmental Protection Agency's (U.S. EPA's) January 31, 2012, notification of revised air quality designations for the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS) from those specified in U.S. EPA's December 9, 2011, letter to Governor Daniels. Indiana has carefully reviewed U.S. EPA's revised designations for Indiana under the 2008 8-hour ozone NAAQS. Indiana disagrees with U.S. EPA's recommendation that Jasper, Lake, and Porter counties be designated as nonattainment for the 2008 8-hour ozone NAAQS.

The counties at issue have no monitored violations themselves. Rather, the sole basis for U.S. EPA's recommendation that the above-mentioned counties be designated as nonattainment is a single monitored violation of the standard at the Zion, Illinois monitor. Indiana believes and is submitting modeling to demonstrate that this monitored violation is the result of the relaxation of requirements for the Northeast Illinois vehicle emissions testing (VET) program, and that meteorological and emissions data do not support the inclusion of the Indiana counties at issue as nonattainment. Indiana's modeling contradicts the less relevant data relied upon by U.S. EPA. Indiana is also submitting information demonstrating that U.S. EPA's recommendation that the counties at issue be designated as nonattainment is inconsistent with U.S. EPA's treatment of similarly-situated counties elsewhere in the country.

The attached technical support document (TSD) and appendices demonstrate, through the use of modeling and the designation factors identified by U.S. EPA, that Jasper, Lake, and Porter counties do not significantly contribute to the isolated monitor

violation in Zion, Illinois, and thus there is no basis for designating these counties as nonattainment for the 2008 8-hour ozone NAAQS.

First, emissions data and modeling do not support the inclusion of the counties at issue as nonattainment. Specifically, Indiana has conducted modeling that demonstrates that the monitored violation in Zion, Illinois is caused primarily by significant changes to the Northeast Illinois VET program, including the exemption of all vehicles from model years 1968 through 1995. As explained further in the TSD, IDEM evaluated whether the changes made to the Northeast Illinois VET program could have led to increased ozone concentrations, including the isolated violation at the Zion monitor. The results of IDEM's analysis indicate that the relaxation of state implementation plan (SIP)-based Northeast Illinois VET program requirements could, in fact, result in an increase of ozone concentrations in excess of 0.0004 parts per million. Absent the changes to the VET program, it is unlikely that there would be any monitored violations of the standard within the region. Additional analyses of the counties' respective share of nitrogen oxides (NO_x) and volatile organic compounds (VOC) emissions further support Indiana's position that these counties do not significantly contribute to the isolated violation in Zion, Illinois.[1]

Second, the emissions and the meteorological modeling relied upon by U.S. EPA are dated and not relevant to the monitored violation U.S. EPA seeks to address. U.S. EPA has indicated its inclusion of the counties at issue is "based on the high emissions in these counties that contribute to high ozone concentrations at the Zion monitor". U.S. EPA further stated that "meteorology on high ozone days in the Chicago area favor transport of ozone and ozone precursor emissions from these counties to the Zion monitor". However, U.S. EPA failed to conduct its own modeling and meteorological analysis to support these conclusions, and relied instead on limited and outdated meteorological analyses from the States of Illinois and Wisconsin to determine Indiana's potential culpability. Emission volumes or mass are far less relevant than the geographic origin of the emissions and whether meteorology enables those emissions to contribute to ozone formation at a specific downwind location, as at the Zion, Illinois site. The analyses utilized by U.S. EPA are irrelevant to this matter because they do not evaluate data relevant to the 2009 through 2011 time period of the single monitored violation, nor are they specific to the lone violating site. Furthermore, U.S EPA failed to conduct or reference a culpability analysis to support its conclusion. IDEM cannot provide a full critique of the meteorological analyses provided by Wisconsin and Illinois, because they have not been made available for our review. However as shown in the TSD, Indiana's own modeling, which properly accounts for the geographic, meteorological, and emission features of the counties at issue, indicates that these counties do not significantly contribute to the isolated monitored violation in Zion, Illinois.

Third, when compared with U.S. EPA's treatment of similarly situated counties, Jasper, Lake, and Porter counties' inclusion among nonattainment counties is in clear

[1] IDEM notes that the monitored violation in Zion, Illinois was certified prior to the requirement that states submit such data. IDEM believes this certification was performed with the sole purpose in preserving Congestion Mitigation and Air Quality (CMAQ) funding for the Chicago area.

error. IDEM's review of the materials available for proposed designations under the 2008 8-hour ozone NAAQS reveals widespread inconsistency in how U.S. EPA is handling counties within statistical area boundaries based on the contribution criteria. For example, in Indiana alone, U.S. EPA has proposed to designate an entire Indiana county (Jasper) as nonattainment with less technical support than it provided to narrow a nonattainment boundary for another Indiana county (Dearborn) to just a single township. As explained further in the TSD, the treatment of the Indiana counties at issue also differs greatly from similarly situated counties in metropolitan areas outside of Indiana. Specifically, U.S. EPA has proposed to designate Pickaway County, Ohio, Point Coupee Parish, Louisiana, and Roane County, Tennessee, as unclassifiable/attainment, despite the fact that the analyses of these counties under the contribution factors is nearly identical to the Indiana counties that U.S. EPA proposes to designate as nonattainment. IDEM also cites Lancaster and Berks counties in Pennsylvania as further evidence that U.S. EPA has applied the contribution guidance inconsistently. Due to the adverse consequences associated with a nonattainment designation, U.S. EPA should ensure absolute consistency in applying clearly defined criteria for designation purposes.

Monitoring data indicate that air quality throughout the State of Indiana meets the 2008 8-hour ozone NAAQS. Indiana firmly believes that nonattainment boundaries for the 2008 8-hour ozone NAAQS should be limited to the counties that actually possess a three-year average ambient monitor-based design value above the standard. However, even if some counties with no monitored violations are properly included as contributing to nonattainment in other counties, the counties at issue here are not properly included under U.S. EPA's contribution factors.

Indiana is in full compliance with its SIP and the emission control measures in place within Northwest Indiana represent one of the most stringent collections of SIP-based control strategies in the country. The wrongful inclusion of these counties will not result in any additional controls or emission reductions, or advance attainment of the standard for Illinois' portion of the area. It is unreasonable to punish Indiana, which is in full compliance with the air quality standard and its federally-approved SIP, for the negligence of a neighboring state.

Indiana continues to believe that U.S. EPA should issue designations based on sound science and not rely on arbitrary statistical area boundaries or incomplete and outdated data sets to substantiate this important and far-reaching policy matter. Therefore, Indiana urges U.S. EPA to carefully review the information presented herein, as well as federal and regional modeling of the impact of federal and state control measures prior to imposing undue economic hardships on Indiana counties that are simply adjacent to areas where data at a single monitor barely exceeds the revised standard.

I appreciate the opportunity to provide comments and recommendations to U.S. EPA concerning designations for the 2008 8-hour ozone NAAQS. Likewise, I look forward to working with your staff as U.S. EPA moves forward with the designation

process. If you have any questions regarding IDEM's analysis and recommendations, please feel free to contact me at (317) 232-8611 or Keith Baugues, Assistant Commissioner, Office of Air Quality, at (317) 232-8222.

Sincerely,

Thomas W. Easterly
Commissioner

Enclosures

- Enclosure 1—Indiana's Assessment of the Revised 2008 8-Hour Ozone National Ambient Air Quality Standard and Technical Support Documents
  - Appendix A—1990 Through 2010 Northwest Indiana Growth Rates and Patterns
  - Appendix B—2009 Northwest Indiana Commuting Patterns
  - Appendix C—2008 Nonattainment Area Emissions Inventory
  - Appendix D— Emission Reductions for Lake and Porter Counties Vehicle Emissions Testing
  - Appendix E—U.S. EPA Region 3, Region 4, Region 5, and Region 6 Technical Support Documents
  - Appendix F— Northwest Indiana Wind and Pollution Rose Analysis
- Enclosure 2—2000-2011 Indiana Ozone Monitoring Data Summary
- Enclosure 3—List of Indiana Counties with Final Ozone Designation Recommendations
- Enclosure 4—Map of Indiana Counties with Final Ozone Designation Recommendations

cc: Gina McCarthy, U.S. EPA Headquarters
Janet McCabe, U.S. EPA Headquarters
George Czerniak, U.S. EPA Region 5
John Mooney, U.S. EPA Region 5
Doug Aburano, U.S. EPA Region 5
Keith Baugues, IDEM-OAQ

Enclosure 1

Indiana's Assessment of the Revised 2008 8-Hour Ozone National Ambient Air Quality Standard and Technical Support Documents
April 2012

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Executive Summary

On March 11, 2009, Indiana submitted designation recommendations to the United States Environmental Protection Agency (U.S. EPA) in reference to the 2008 8-hour ozone standard. These recommendations were based on air quality data through the 2008 ozone season. At that time, 12 Indiana counties measured air quality above the standard, including Lake County. At this point in time, there were multiple measured violations of the standard within the Greater Chicago area as well. Since that time, much has changed. Indiana measures air quality that meets the standard throughout the state, Lake and Porter counties possess some of the lowest measured concentrations within the state, and there is only one of 22 monitors within the Greater Chicago area that measures air quality above the standard and it is within 0.0004 parts per million (ppm) of attaining as well.

Due to its reconsideration of the 2008 8-hour ozone standard, U.S. EPA did not proceed with the designation process upon receipt of state designation recommendations in 2009. Via memorandum to Air Division Directors on September 22, 2011, U.S. EPA outlined its intent to proceed with implementing the 2008 8-hour ozone standard, which included an expedited designation process. This process did not afford states the opportunity to develop designation recommendations based on updated air quality data and a proper nine-factor analysis per U.S. EPA's December 4, 2008 policy guidance concerning the designation process for the 2008 8-hour ozone standard.

U.S. EPA proposed designation boundaries for Indiana via letter to Governor Daniels dated December 9, 2011. Despite the fact that U.S. EPA's recommended boundaries were based on a dataset and analysis not relevant to Indiana's March 11, 2009, recommendations, Indiana was in agreement with U.S. EPA's recommended boundaries. However, on January 31, 2012, U.S. EPA issued a second letter to Governor Daniels updating its boundary recommendations to include Jasper, Lake, and Porter counties as part of the Chicago nonattainment area. Indiana is not in agreement with U.S. EPA's January 31, 2012, revisions to the proposed designation boundaries for Indiana.

Not only was Indiana not afforded the opportunity to conduct a proper nine-factor analysis and update its designation recommendations prior to U.S. EPA proceeding with designations, U.S. EPA failed to conduct an appropriate nine-factor analysis in proposing its designation boundaries for Indiana. U.S. EPA's January 31, 2012, letter to Governor Daniels states the following: "During the 120 day process, EPA will continue to work with state officials regarding appropriate designations and boundaries for the areas in Indiana. States will have time to review these letters and provide EPA with information to support any further changes to EPA's response." However, Indiana was subsequently notified by U.S. EPA in late March that any information to support further changes must be provided by mid-April to receive consideration. As a result, insufficient

time was available for Indiana to conduct an appropriate nine-factor analysis consistent with U.S. EPA's December 4, 2008, policy guidance. Nonetheless, Indiana has carefully reviewed U.S. EPA's January 31, 2012, letter and supplement, and has conducted an analysis that focuses on the conclusions that U.S. EPA made based on its limited evaluation.

U.S. EPA's letter to Governor Daniels stated that it intended to designate the Chicago-Naperville, Illinois-Indiana-Wisconsin area as nonattainment, with boundaries that include Jasper, Lake, and Porter counties in Indiana, revising U.S. EPA's December 9, 2011, proposal that designated these counties as unclassifiable/attainment. U.S. EPA based the revised proposal on 2011 data certified by the State of Illinois on December 7, 2011, which contained a monitored violation at the Zion, Illinois monitor.

However, in proposing that these Indiana counties be designated nonattainment in the Illinois-Indiana-Wisconsin Supplement, U.S. EPA performed no independent culpability study as a part of a complete five- or nine-factor analysis to support the designation recommendations and focused primarily on an unfounded cause and contribution assumption. In place of an independent analysis based on current data, U.S. EPA references the meteorological analyses conducted by the States of Illinois and Wisconsin in early 2009 (based on data through 2008). Indiana is not familiar with these analyses because they have not been made available for our review or comment. However, these analyses are irrelevant to this matter because they do not evaluate data for the 2009 through 2011 time period during which the lone area violation occurred. IDEM has performed detailed analyses to address these shortcomings to make scientifically sound recommendations for Indiana counties, which begins on page 8.

Indiana's analysis concludes that the localized nature of the violating Zion monitor is largely caused by onroad mobile source emissions originating in Illinois, that meteorological conditions do not support including any Indiana counties in the nonattainment area, and that the proposed inclusion of Indiana counties is inconsistent with U.S. EPA's proposed designations in other areas. Accordingly, Lake and Porter counties in Northwest Indiana should be designated attainment, and Jasper County should be designated unclassifiable/attainment for the 2008 8-hour ozone national ambient air quality standards (NAAQS).

Additionally, Indiana's analysis highlights the deficiencies associated with U.S. EPA's analysis provided to Governor Daniels on January 31, 2012. First, Indiana is concerned with Illinois' rush to provide the monitoring data to U.S. EPA. When a state certifies its data early with the sole interest of preserving its Federal Highway Administration Congestion Mitigation and Air Quality (CMAQ) funding, as Illinois has done, careful consideration is imperative. No other geographic area of the country has been put in the situation of being proposed attainment in one month (December 2011) to nonattainment the next (January 2012) as a result of a neighboring state's action to preserve CMAQ funding, as opposed to a focus on air quality and maintaining compliance with its own State Implementation Plan (SIP). Given the hurried quality

assurance process of the Illinois monitoring data and the variability in accuracy of the monitored data, it is especially important that U.S. EPA take more time to consider and then act on the data. As an initial matter, the data itself should undergo careful scrutiny to assure its accuracy, as U.S. EPA has properly acknowledged in its own standards for automated ozone monitors. See, *e.g.*, 40 Code of Federal Regulations (CFR) 58, Appendix A.2.3.1.2 (upper confidence limit of 95%; absolute bias of 7). Proper review of the data is especially important where only 1 of 22 monitors was measured a mere 0.0004 ppm above the standard. With a measured exceedance of less than 0.001 ppm at the single Zion monitor, the recommendation of a far-reaching nonattainment boundary is questionable at best. Moreover, there is a question as to the validity of an actual violation because U.S. EPA's administrative record is missing the raw data from the Zion monitor. Illinois' related assessment of the validity of that key data also has not been made available for IDEM's review. In spite of Illinois' rush to secure its CMAQ funding and provide this data to U.S. EPA, U.S. EPA proposes this last-minute change to include all of Jasper, Lake, and Porter counties as a part of the Chicago nonattainment area.

U.S. EPA's proposed designation boundaries are contrary to what regulators have learned about regional transport of pollutants in implementing the Clean Air Act (CAA) and will not facilitate or expedite compliance with the standard. The CAA provides highly specific requirements for attainment of the 1-hour ozone NAAQS, but does not make provisions for an 8-hour ozone NAAQS. IDEM recognizes that U.S. EPA is trying to make the existing language of Title I, Part D, Subpart 2 of the CAA fit the needs of the revised 8-hour ozone NAAQS. However, issuing designations and associated requirements based on guidance developed for the outdated 1-hour and the soon to be replaced 1997 8-hour ozone NAAQS is not supported by current science or the regional nature of emissions transport. Indiana counties are significantly impacted by regional transport of ozone and its precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOCs). Reducing ozone precursors regionally has a much greater impact on ground-level ozone than reductions achieved locally. Designating counties nonattainment that measure air quality that attains the standard, or designating adjacent counties or portions of counties nonattainment just because major stationary sources are located within them, serves no purpose in improving air quality. The inclusion of adjacent counties based on a potential to nominally contribute to monitored violations contradicts the federal and state emission control strategies being deployed today based on proper scientific evaluation.

No Indiana counties currently violate the revised 2008 8-hour NAAQS and modeling demonstrates that all Indiana counties will continue to attain the standard in advance of the applicable deadline. Additionally, most of the stationary sources within Indiana are already subject to federal control programs, including the Cross-State Air Pollution Rule (CSAPR), the Boiler Maximum Achievable Control Technology (MACT), and Mercury and Air Toxics Standards. Given the existing federal control plans, the inclusion of counties beyond those where monitored violations occur will not achieve additional emission reductions or advance the attainment date under the revised 2008 8-hour ozone NAAQS. Designating an Indiana county nonattainment solely based on a

slight and unproven potential to contribute at a monitor located in the same metropolitan statistical area will not result in additional controls on any major emission sources and the attainment date will not move forward or backward as a result of including surrounding counties based on this non-scientific approach. Modeling results, beginning on page 14, which include the U.S. EPA's own analyses of the CSAPR and Lake Michigan Air Director's Consortium (LADCO) technical modeling to date, suggest that all of Indiana will continue to meet the revised 2008 8-hour ozone NAAQS.

Second, U.S. EPA's justification for its revised designation proposal fails to properly account for the primary cause of the monitored violation in Zion, Illinois, and is unsupported by available data and modeling. IDEM's review of the Zion monitor clearly indicates that the monitored violation is caused primarily by significant changes to the Northeast Illinois Vehicle Emissions Testing (VET) program made by Illinois without first obtaining SIP approval. Beginning in 2007, Illinois made significant changes to its VET program, including the exemption of all vehicles from model years 1968 through 1995. Beginning on page 29, IDEM explains its study and the direct correlation between the Northeast Illinois VET program modifications and the monitored violation. IDEM's analysis goes on to demonstrate that Illinois' onroad mobile sources are the primary contributor to the emissions that form ozone over Lake Michigan, and that the lone violating monitor in Zion, Illinois is then impacted by "lake effect" ozone concentrations.

This analysis by IDEM stands in stark contrast to U.S. EPA's own justification provided in the revised designation proposal. U.S. EPA indicated in its letter to Governor Daniels that the proposed designations are "based on the high emissions in these counties that contribute to high ozone concentrations at the Zion monitor." U.S. EPA went on to state that "meteorology on high ozone days in the Chicago area favor transport of ozone and ozone precursor emissions from these counties to the Zion monitor." However, U.S. EPA failed to conduct its own modeling and meteorological analysis to support these conclusions. IDEM's analysis shows that emissions volume is far less relevant than the geographic origin of the emissions and whether meteorology enables those emissions to contribute to ozone formation at a specific downwind location when properly accounting for the "lake effect" on regional ozone formation. IDEM's conclusions are supported by stationary source emission inventories that demonstrate the overall emissions contribution to the Chicago nonattainment area from Jasper, Lake, and Porter counties is relatively insignificant when compared to Illinois counties. Illinois counties contribute 73% of the total NO_x and 86% of the total VOC emissions that typically build up over Lake Michigan to form ozone and return to the shoreline at a later date resulting in random and sometimes isolated monitor spikes. Furthermore, IDEM was able to conduct its review without being given the opportunity to adequately review the quality-assured monitoring data provided by the State of Illinois that indicates a monitored violation at the Zion, Illinois site in 2011. Therefore, IDEM urges U.S. EPA to review the information provided and ensure that it provides sound justification for any final action affecting Indiana counties.

Third, U.S. EPA is proceeding with implementation of the 2008 8-hour ozone standard in an inconsistent and unjustified manner. As demonstrated in further detail

beginning on page 32, U.S. EPA's proposed designations and the amount of scrutiny applied by U.S. EPA in making its proposals varies significantly between similarly situated counties. U.S. EPA cannot apply its designation criteria "inconsistently, resulting in similar counties being treated dissimilarly." *ATK Launch Sys., Inc. v. EPA*, 2012 U.S. App. LEXIS 3693, 10 (D.C. Cir. 2012) (emphasis omitted), *citing Catawba County v. EPA,* 571 F.3d 20, 40 (D.C. Cir. 2009). IDEM's review of several counties demonstrates that U.S. EPA not only applied a five-factor analysis inconsistently across the country, but also that other U.S. EPA regions applied a more robust analysis— for example, conducting their own analysis of state-provided data— than in the case of the rushed designation proposed based on last-minute data provided by Illinois. For example, in Indiana alone, U.S. EPA has proposed to designate all of Jasper County, Indiana, based predominantly on the contributions of Northern Indiana Public Service Company R. M. Schahfer Generating Station (NIPSCO - Schahfer), as nonattainment under the 2008 8-hour ozone NAAQS with less technical support than it provided to narrow down the nonattainment boundary for Dearborn County in Southeastern Indiana to just a single township that includes a lesser controlled coal-fired power plant. Jasper County's large emissions base was treated dissimilarly from Dearborn County and other comparable counties, where U.S. EPA apparently concluded that designating a county-wide area nonattainment based solely on the fact that a facility such as a coal-fired power plant is located there will not result in any further emission reductions or serve any useful purpose, as detailed on page 38 of this document. This widespread variability and inconsistency with the level of technical support and analyses used to support U.S. EPA's proposed actions in Indiana further support U.S. EPA reconsidering its proposed designations in Northwest Indiana.

Jasper, Lake, and Porter counties were proposed nonattainment by U.S. EPA under the 2008 8-hour ozone NAAQS as part of the greater Chicago nonattainment area due to their assumed contribution to the Zion, Illinois monitor, based on, in IDEM's view, insufficient and outdated information. The technical information provided below demonstrates that Jasper, Lake, and Porter counties in Northwest Indiana did not contribute to the elevated ozone concentrations during the days that led to the monitored violation at the Zion, Illinois monitor, and should not be included in the nonattainment area.

Northwest Indiana Ozone Designation History

Lake and Porter counties were designated nonattainment under the 1997 8-hour ozone NAAQS as part of the greater Chicago nonattainment area due measured violations of the standard throughout the region. Although Jasper County was part of the combined statistical area (CSA) at that time, and the NIPSCO – Schahfer facility was less controlled in 2004 than it is today, U.S. EPA did not include Jasper County in the nonattainment area designated in 2004.

All of the monitor sites in Lake and Porter counties have measured air quality that meets the 1997 8-hour ozone NAAQS since 2007. A Redesignation Petition and Maintenance Plan for the 1997 8-hour ozone NAAQS for Indiana's portion of the Chicago-Naperville-Michigan City, Illinois-Indiana-Wisconsin (IN-IL-WI) Combined Statistical Area herein referred to as the "Chicago nonattainment area" was approved by U.S. EPA on May 11, 2010 (75 FR 26113). The Indiana portion of the Chicago CSA includes Jasper, Lake, Newton, and Porter counties. There are no monitors in Jasper or Newton counties, but all remaining monitors in Lake and Porter counties measure attainment of the revised 2008 8-hour ozone NAAQS.

I. Monitoring Network and Measured Air Quality Data

Northwest Indiana Monitoring Data

There are five monitors located in the Indiana portion of the proposed Chicago nonattainment area. All five of the monitors listed in Table 1 are currently measuring attainment of the 2008 8-hour ozone NAAQS.

Table 1 –Monitor Values for Indiana Counties located in Chicago Nonattainment Area from 2008 – 2011

County	Monitor Location*	4th Highest Ozone Values (ppm)				Design Value 2008-2010 (ppm)	Design Value 2009-2011 (ppm)
		2008	2009	2010	2011		
Lake, IN	Gary IITRI	0.062	0.058	0.064	0.066	0.061	0.062
Lake, IN	Whiting	0.062	0.062	0.069	0.069	0.064	0.066
Lake, IN	Hammond	0.068	0.065	0.069	0.072	0.067	0.068
Porter, IN	Ogden Dunes	0.069	0.067	0.067	0.068	0.067	0.067
Porter, IN	Valparaiso	0.061	0.064	0.061	0.063	0.062	0.062

*There are no monitors in Jasper or Newton Counties.

Chicago CSA Monitoring Data

Table 2 shows the 19 monitors located in the Illinois and Wisconsin portion of the proposed Chicago nonattainment area. One of these monitors (Zion) is measuring values barely above the 2008 8-hour ozone NAAQS based on recent quality-assured monitoring data for the years 2009 through 2011.

Table 2 – Chicago Nonattainment Area Monitor Values from 2008 – 2011

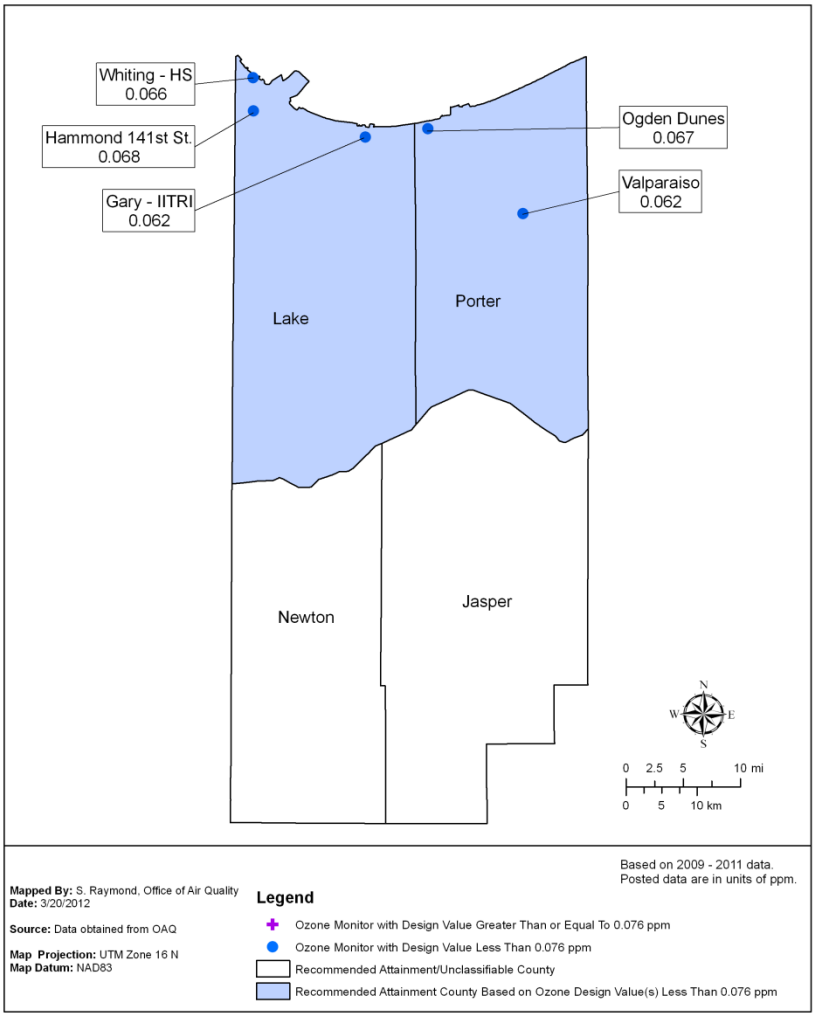
County	Monitor Location	4th Highest Ozone Values (ppm)				Design Value 2008-2010 (ppm)	Design Value 2009-2011 (ppm)
		2008	2009	2010	2011		
Cook, IL	Alsip	0.066	0.069	0.073	0.071	0.069	0.071
Cook, IL	Chicago-E. Cheltenham	0.067	0.065	0.074	0.079	0.069	0.073
Cook, IL	Chicago-Wacker at Adams	0.059	0.076	0.077		0.071	
Cook, IL	Chicago-S. Ellis Ave	0.063	0.060	0.071	0.074	0.065	0.068
Cook, IL	Chicago-E. Ohio	0.063	0.062	0.071	0.074	0.065	0.069
Cook, IL	Chicago-Lawndale	0.066	0.067	0.068	0.073	0.067	0.069
Cook, IL	Chicago-W. Hurlbut St.	0.064	0.064	0.070	0.067	0.066	0.067
Cook, IL	Lemont	0.071	0.067	0.073	0.069	0.070	0.070
Cook, IL	Cicero	0.060	0.067	0.068	0.072	0.065	0.069
Cook, IL	W. Harrison St.	0.057	0.057	0.064	0.065	0.059	0.062
Cook, IL	Northbrook	0.065	0.069	0.072	0.076	0.069	0.072
Cook, IL	Evanston	0.058	0.064	0.067	0.078	0.063	0.070
DuPage, IL	Rt. 53	0.057	0.059	0.064	0.068	0.060	0.064
Kane, IL	Elgin	0.061	0.068	0.069	0.070	0.066	0.069
Lake, IL	Waukegan	0.063	0.057	0.074		0.065	
Lake, IL	Zion	0.069	0.075	0.078	0.076	0.074	0.076
McHenry, IL	Cary	0.065	0.066	0.065	0.071	0.065	0.067
Will, IL	S. Essex Rd.	0.060	0.063	0.065	0.061	0.063	0.063
Kenosha, WI	Chiwaukee Prairie	0.072	0.071	0.081	0.081	0.075*	

Highlighted values are 0.076 ppm or above

*Most current certified data is based on 2008 through 2010 data.

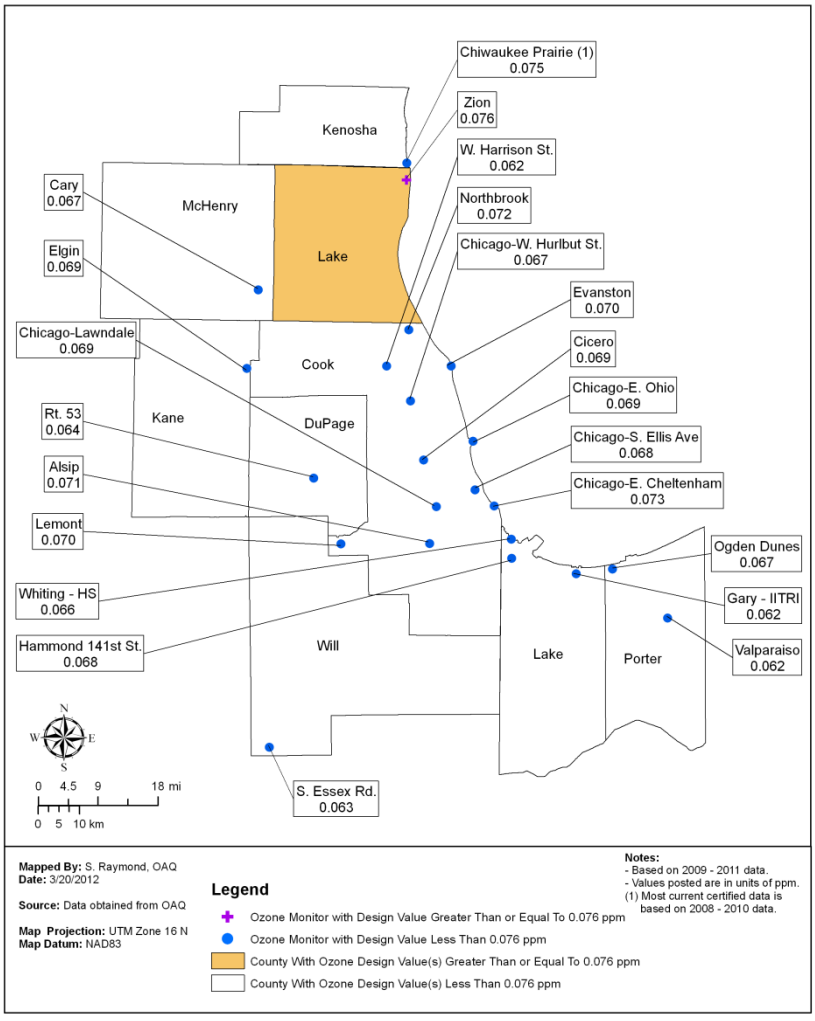
Although Jasper County, Indiana is part of the proposed Chicago nonattainment area, there are no ozone monitors located in the county as can be seen in Figure 1. The only stationary emission source in Jasper County is NIPSCO - Schahfer, which is controlled under the NO_x SIP Call and CSAPR. Jasper County is essentially rural in nature, does not have measured air quality in excess of the 2008 8-hour ozone NAAQS, and is not contributing to elevated ozone levels in the nonattainment area. Jasper County accounts for a small percentage of the total emissions for the entire MSA. Jasper County also maintains low population density, which is not expected to grow, and fewer than 10,000 of its residents work and commute outside the county. Indiana believes there is no justification to include Jasper County in the nonattainment area. U.S. EPA should keep the nonattainment area as small as possible due to the isolated manner of the violation in Northeast Illinois, and base designations on sound science, real-world air quality drivers, while ensuring absolute consistency.

Figure 1 – Indiana Portion of Chicago MSA



Figures 1 and 2 also demonstrate that Lake and Porter counties both currently measure attainment of the 2008 8-hour ozone NAAQS. Lake and Porter counties also do not significantly impact monitored violations in the Chicago area. IDEM has conducted an evaluation to determine the impact Lake and Porter counties have on ozone monitors in the Chicago area. It should be noted that quality-assured monitor values in Lake and Porter counties continue to be some of the lowest in the State of Indiana. The detailed results of this analysis are included later in this technical support document to show that Jasper, Lake, and Porter counties are not culpable for elevated ozone concentrations during the days that led to the single Chicago area violation at the Zion, Illinois monitor.

Figure 2 –U.S. EPA Proposed Chicago Nonattainment Area



Monitoring data in Tables 1 and 2 come from U.S. EPA's Air Quality System (AQS) repository of ambient air quality data. The U.S. EPA AQS lists monitor values in ppm using three significant digits. The procedure for calculating the three-year design value for the 2008 8-hour ozone NAAQS is detailed in the Federal Register at 73 FR 16512 (March 27, 2008), stating, "The computed 3-year average of the annual fourth-

highest daily maximum 8-hour average O3 concentrations shall be reported to three decimal places (the digits to the right of the third decimal place are truncated, consistent with the data handling procedures for the reported data)." As such, a monitor reading of 0.0759 ppm would be in attainment of the 2008 8-hour ozone NAAQS. Using this calculation method, the three-year average for the years 2009, 2010, and 2011 at the Zion monitor listed in Table 2 results in a value of 0.0763.

Figure 2 shows the locations and current quality-assured monitor values of the 18 monitors within Illinois' portion of the Chicago CSA, of which only one (located in Zion, IL) is over the revised 2008 8-hour ozone NAAQS by merely 0.0004 ppm.

Chart 1 - Comparison of 8-Hour 4th High Values from 2000 – 2011

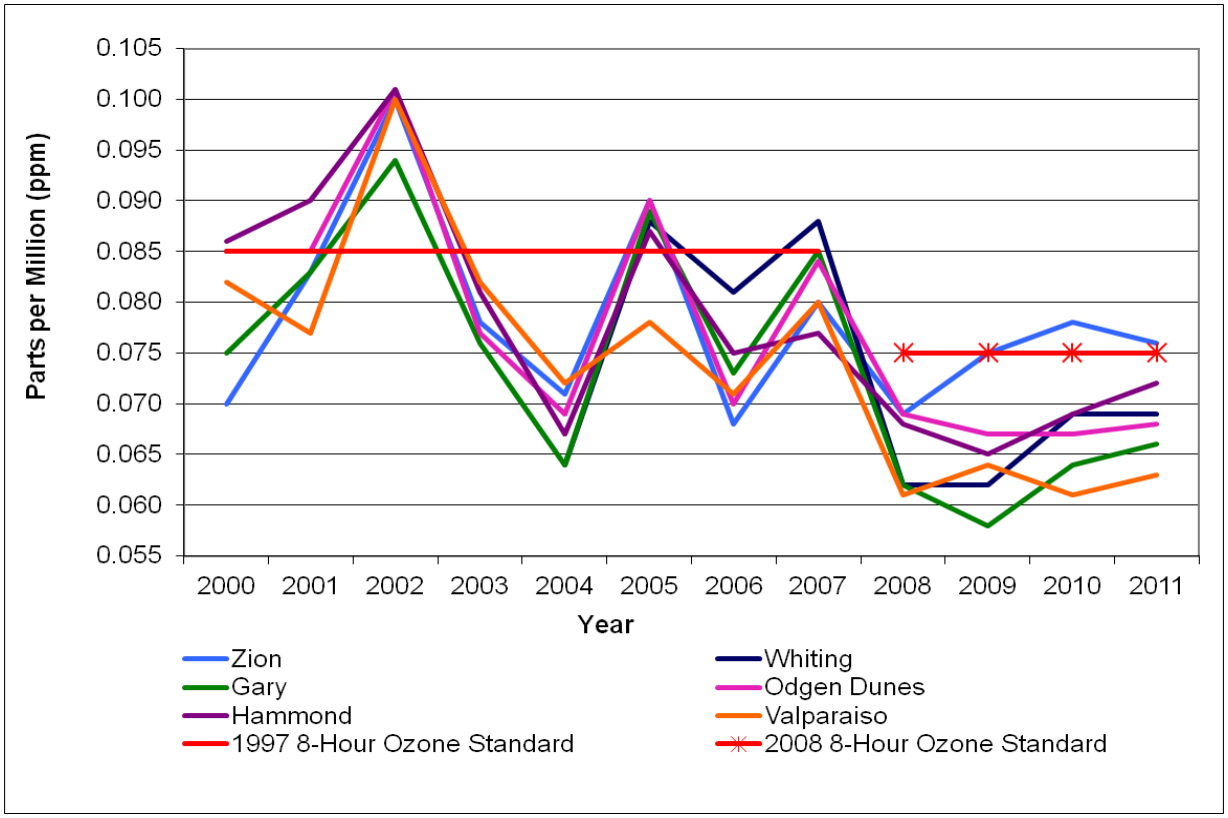


Chart 2 - Comparison of 8-Hour Design Values from 2000 – 2011

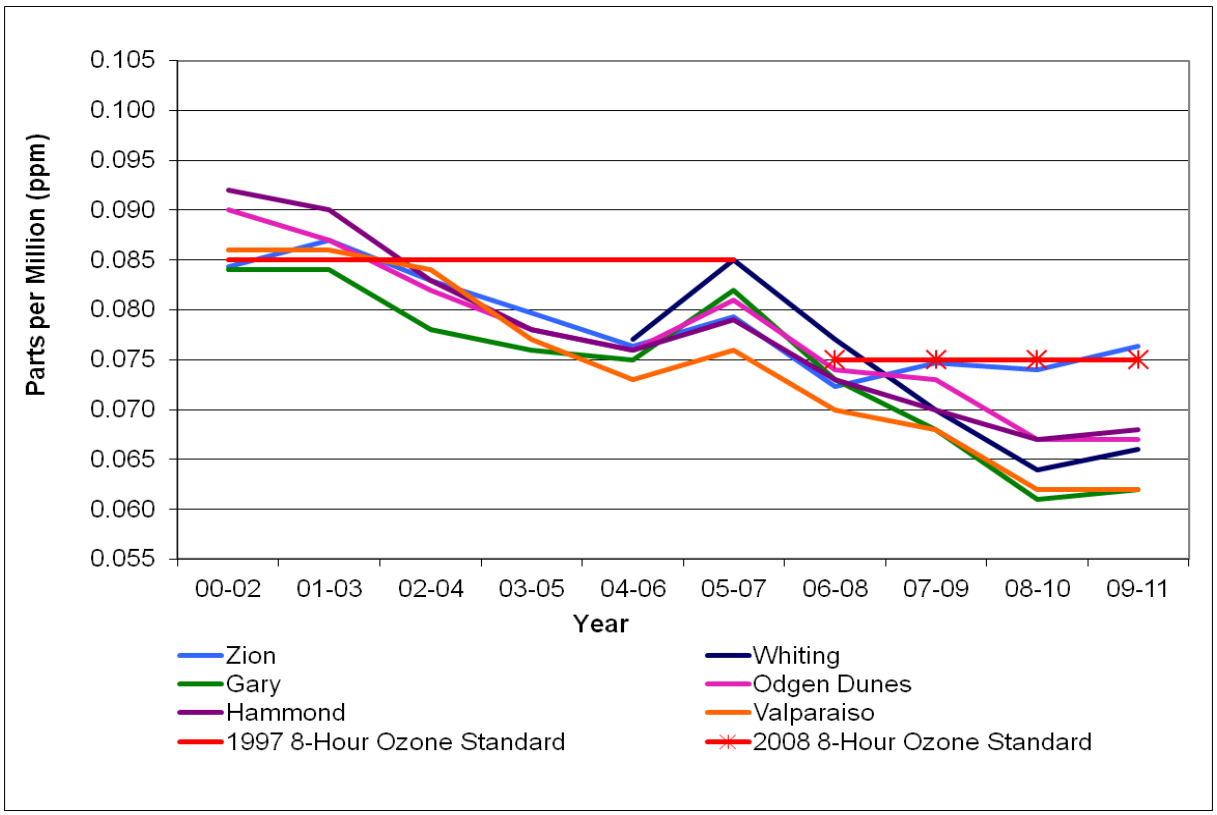


Chart 1 shows a clear decline in 4th high monitor values across the nonattainment area from 2000 through 2011, with the sole exception of the Zion, Illinois monitor. Chart 2 shows similar downward trends for these same monitors, once again with the notable exception of the Zion, Illinois location. If valid, this is clearly an isolated incident across the greater Chicago area. Local contributions can often be the cause of these unique circumstances. The monitors in the Chicago area located closest to the Indiana state line and the lakefront, which should be more directly impacted by emission sources located in Jasper, Lake, and Porter counties, are monitoring attainment of the revised 2008 8-hour ozone NAAQS. If emissions from Jasper, Lake, and Porter counties were significantly contributing to a monitored violation, higher concentration levels would be expected at the monitors located between Indiana and the violating monitor, not just the one isolated location of Zion, Illinois.

II. Air Quality Modeling, Meteorological, and Culpability Analyses

LADCO Ozone Source Apportionment Modeling

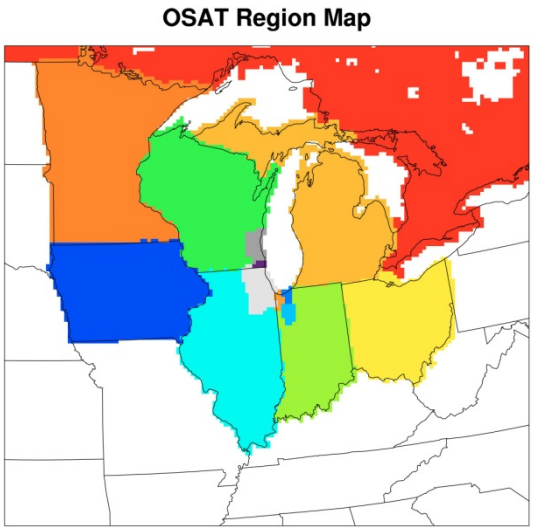
LADCO recently performed photochemical modeling, using the Comprehensive Air Quality Model (CAMx) model and most recent emission inventories and model updates. This modeling was performed to support attainment demonstrations and redesignation SIPs for the six-state LADCO region, consisting of Indiana, Illinois, Michigan, Minnesota, Ohio, and Wisconsin.

Model Inputs

The photochemical model used by LADCO for the 8-hour ozone NAAQS analysis is CAMx version 5.2, developed by Environ. This model has been accepted by U.S. EPA as an approved air quality model for regulatory analysis and attainment demonstrations. Requirements of 40 CFR 51.112, as well as "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS" (EPA-454/R-05-002, Oct. 2005) are satisfied with the use of CAMx. Meteorology, as well as baseyear emissions from 2007, were used to conduct this photochemical modeling. Ozone source apportionment (OSAT) traces the emissions from different emission sectors and regions to determine the modeled ozone impacts from each. The modeled impacts are then displayed in a chart to show the ozone contributions from specific regions and emission source sectors on an ozone monitor.

The regions modeled in LADCO's CAMx photochemical modeling run include: the Illinois portion of the Chicago nonattainment area; the Milwaukee nonattainment area: the Kenosha County, Wisconsin area; Lake County, Indiana; Porter County, Indiana; Jasper County, Indiana; the State of Illinois (without the Chicago nonattainment area): the State of Wisconsin (without the Milwaukee nonattainment area); the State of Indiana (without Lake, Porter and Jasper counties); the states of Ohio, Michigan, Minnesota, Iowa; and the southern portion of Canada. Other states included in the modeling grid and boundary conditions (BC) represent emissions from outside the boundary of the modeling grid domain. A representation of the regions modeled is shown below in Figure 3.

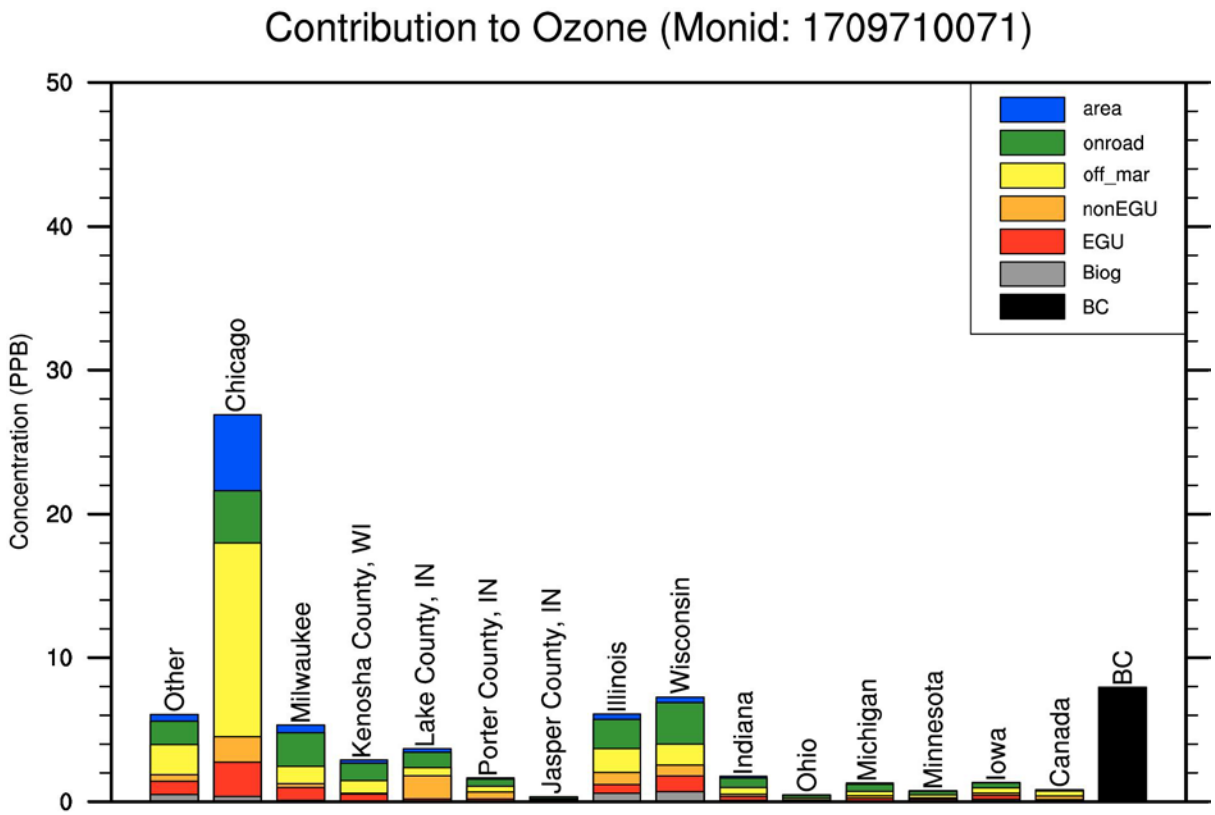
Figure 3 - Region Map for LADCO's OSAT Run



The individual emission sectors modeled in LADCO's OSAT run include all low level area sources, mobile sources (onroad), offroad and marine/air/rail sources (off_mar), large point sources with boilers or large heaters (nonEGUs), electric generating unit (EGU) point sources, biogenic naturally occurring emissions (biog), and BC. All the emission sectors are tracked separately to determine each sector's impact on ozone concentrations at an ozone monitor.

Chart 3 was created by LADCO to show the impact on the Zion ozone monitor in northern Lake County, Illinois. The results are listed by the level of ozone contributed in parts per billion (ppb) by each region modeled (total amount of each bar) and by the emission sector (colored portions of each bar, corresponding to each emission sector for the modeled region).

Chart 3 - Ozone Contributions at the Zion, Lake County, Illinois Monitor



OSAT Modeling Results - Regional Analysis

Based on the LADCO OSAT modeling results detailed in Chart 3, Jasper County, Indiana emissions accounted for less than 0.5 ppb (0.0005 ppm) impact on ozone concentrations at the Zion ozone monitor in Lake County, Illinois, while Porter County, Indiana accounted for less than 2 ppb (0.002 ppm), and Lake County, Indiana accounted for approximately 4 ppb (0.004 ppm). The rest of the State of Indiana contributed approximately 2 ppb (0.002 ppm) to ozone concentrations at the Zion ozone monitor. In comparison, the Chicago, Illinois portion of the Chicago nonattainment area

contributed approximate 27 ppb (0.027 ppm), the State of Wisconsin (minus the Milwaukee area) contributed 8 ppb (0.008 ppm), the State of Illinois (minus the Chicago nonattainment area) contributed 6 ppb (0.006 ppm), while the Milwaukee area was modeled to contribute over 5 ppb (0.005 ppm) to ozone concentrations at the Zion, Illinois monitor. If these results were used to evaluate potential cause and contribution of the monitored violation at the Zion site, U.S. EPA's proposed boundaries would be inconsistent and unfounded as the Milwaukee, Wisconsin impacts are higher than Lake, Porter, and Jasper counties impact. This is due to the fact that the contributions for Jasper and Porter counties are insignificant and below the threshold that U.S. EPA has used to address transport in the recent past, and the contributions from Lake County are exceeded by other areas not addressed in U.S. EPA's action, such as Milwaukee.

OSAT Modeling Results – Emission Sector Analysis

Emission sector contributions vary according to the regions. Lake County, Indiana contributions to ozone at Zion, Illinois were modeled to be from nonEGU sources and onroad emissions with lesser contributions from area, offroad and marine/aircraft/rail emissions. Porter County, Indiana contributions to ozone at Zion, Illinois included nonEGU sources and onroad emissions, as well as offroad and marine/aircraft/rail emissions. Jasper County, Indiana contributions were less than 0.5 ppb (0.0005 ppm) and each emission sector's impact on ozone was considered negligible.

These results show that Lake and Porter counties in Northwest Indiana have a very small impact on monitor values at Zion, Illinois. Most stationary sources in Lake and Porter counties are already stringently controlled and a designation of nonattainment would not have any quantifiable affect on emissions. As such, a designation of attainment based on this limited impact and current local monitor values in Northwest Indiana would be most appropriate for Lake and Porter counties. Moreover, the minimal impact from Jasper County, Indiana, is a clear indication that a designation of unclassifiable/attainment is both reasonable and scientifically sound.

U.S. EPA Modeling Analysis for Cross-State Air Pollution Rule (CSAPR)

U.S. EPA conducted modeling for CSAPR. This analysis was performed in 2011 and included in the "Air Quality Modeling – Final Rule Technical Support Document" to assist states in attaining the 1997 8-hour ozone NAAQS. CSAPR requires a total of 28 states to reduce annual SO_2 and NO_x emissions and/or ozone season NO_x emissions from power plants. Emission reductions will total 1.4 million tons per year of NO_x, representing a 54% reduction, including 340,000 tons per year of NO_x during the ozone season.

Model Inputs

The air quality model used for this rulemaking was the CAMx version 5.3. The modeling domain consisted of 36 kilometer (km) x 36 km coarse grid covering the continental United States and portions of Canada and Mexico with a 12 km x 12 km fine grid covering the East Coast westward to Texas to North Dakota. Thirty-seven states and the District of Columbia were included in the grid configuration. Baseyear 2005 emissions were modeled. Meteorology from 2005 was created using the Mesoscale Model (MM5) and used for the base case and future year modeling runs. More detailed information on the CAMx input file and additional data used for the photochemical modeling can be found in the U.S. EPA's "Air Quality Modeling Final Rule Technical Support Document," dated June 2011.

Modeling Results

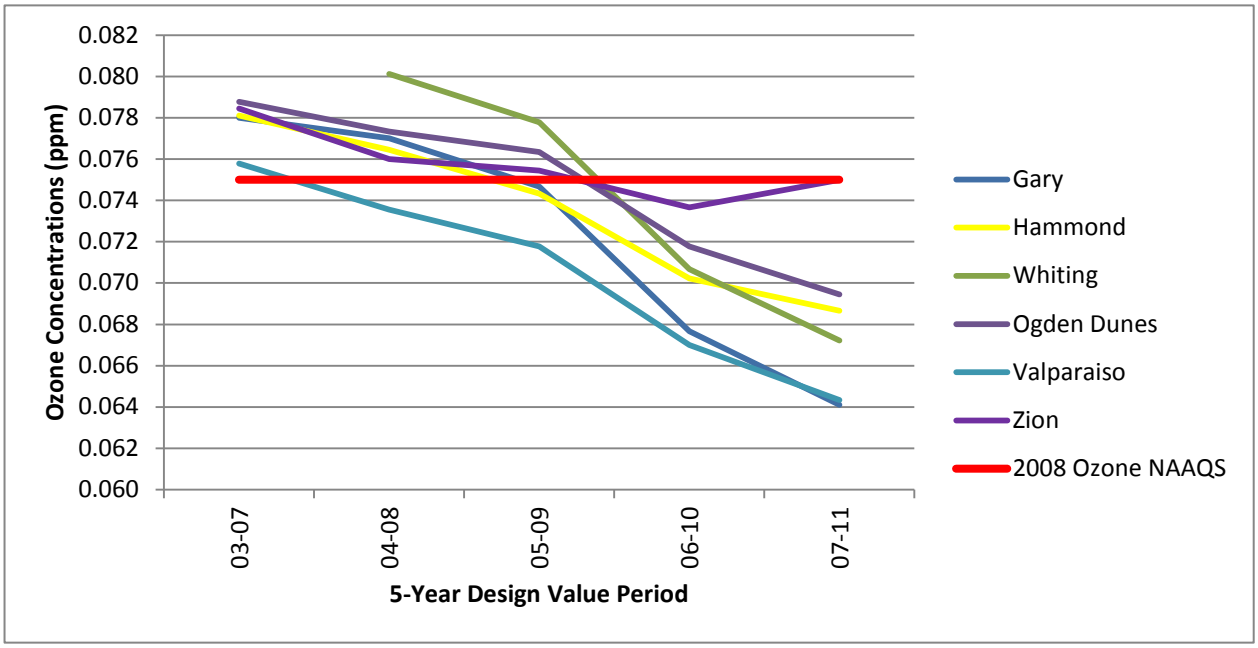
Table 3 shows the results of U.S. EPA's CSAPR modeling for ozone impacts at the Zion ozone monitor in Lake County, Illinois and ozone monitors in Lake and Porter counties in Indiana. The monitor identification number, name and county are listed, as well as the 2003 through 2007 8-hour ozone design values that were used to calculate base case and future year modeling results. Model results are used in a relative rather than absolute sense. Relative use of the model results calculates the percent change in concentrations based on two different emission scenarios. This percent change can be applied to each monitor's design value to determine ozone impacts. This approach differs from using the absolute or actual modeled result, which may show under or over-predictions with the actual monitored values. Based on the relative response factors (RRFs) that were modeled for each monitor site, the 2003 through 2007 design values were multiplied by the corresponding RRF to determine all future year base case and remedy modeled design values. The remedy design value takes into account all emission reductions that would be associated with the CSAPR rule and assesses the impacts from those emission reductions on the modeled ozone concentrations. The 2012 and 2014 base case emissions, along with the 2014 emissions with CSAPR emission reductions included, were modeled to determine the future year design values. The 2014 modeled future year design values for the Zion monitor in Lake County, Illinois are in attainment of the 8-hour ozone NAAQS of 0.075 ppm.

Table 3 - U.S. EPA CSAPR Modeling Results (Values in Parts Per Million)

Monitor ID	Monitor Name	County	Design Value	Base Case Maximum Value	Future Maximum Design Value	Future Maximum Design Value
			2003-2007	2012 Base	2014 Base	2014 Remedy
170971007	Zion	Lake, IL	0.079	0.074	0.073	0.072
180890022	Gary	Lake, IN	0.082	0.076	0.075	0.074
180892008	Hammond	Lake, IN	0.085	0.079	0.078	0.078
180890030	Whiting	Lake, IN	0.079	0.073	0.073	0.072
181270024	Ogden Dunes	Porter, IN	0.081	0.074	0.073	0.073
181270026	Valparaiso	Porter, IN	0.077	0.069	0.068	0.068

U.S. EPA used its modeling results to determine the contribution from each state on each ozone monitor in the modeling domain that had five days or more of maximum 8-hour ozone concentrations above 0.07 ppm. This approach is consistent with U.S. EPA's guidance on calculating ozone contributions, as described in the "Air Quality Modeling - Final Rule Technical Support Document". The entire State of Indiana's contribution to the Zion, Illinois modeled ozone concentrations were 0.01096 ppm, representing 14.8 % of Zion's ozone concentration. No further breakdown of emissions was modeled by U.S. EPA. It should be noted that various emission control strategies have gone into effect that would not be reflected in the 2005 base emissions that were modeled by U.S. EPA for CSAPR. Therefore, these results may be overly conservative as current design values are lower and emission controls may be in place in Northwest Indiana that would lessen the impacts. Comparison of the five-year average 8-hour ozone design values for the monitors in Northwest Indiana and Zion, Illinois over the past 9 years are shown in Chart 4.

Chart 4 - Comparison of Five-Year Average 8-Hour Ozone Design Values from 2003 – 2011



As Chart 4 shows, the downward trend in ozone concentrations from the 2003 through 2007 design value period to the most current 2007 through 2011 design value period is evident, with concentration decreases ranging from 0.009 to 0.014 ppm at all ozone monitors in Lake and Porter counties in Northwest Indiana and all other monitors within the region except the Zion ozone monitor in Lake County, Illinois. If more current design values were used in the CSAPR modeling, modeling results would show that the future year modeled design values for all area monitors would be up to 0.014 ppm lower and all monitors would fall well below the 2008 ozone NAAQS of 0.075 ppm. The upward trend in ozone concentrations between the five-year periods of 2006 through 2010 and 2007 through 2011 solely at the Zion, Illinois monitor demonstrates that this is an isolated incident driven by local emissions.

Summary of LADCO and U.S. EPA Modeling Results

LADCO's OSAT modeling results show lesser impacts from Lake and Porter counties, and most notably Jasper County, in Northwest Indiana when compared to the State of Illinois, and Wisconsin's portions of the Chicago nonattainment area (not to mention Milwaukee). Impacts from offroad and marine/air/rail emissions, as well as area and onroad sources in the Chicago nonattainment area have larger impacts on ozone at the Zion, Illinois monitor than the total impacts of all of the emission sectors from each of the three Northwest Indiana counties. U.S. EPA's CSAPR modeling results show that future year modeled design values for the Zion ozone monitor in Lake County, Illinois will fall below the 2008 8-hour ozone NAAQS, despite basing the relative modeling results on higher design values from 2003 to 2007 than the current 2007

through 2011 design values that are markedly lower. In the Illinois-Indiana-Wisconsin Supplement provided by U.S. EPA along with its letter to Governor Daniels, it was stated that the proposed designations are "based on the high emissions in these counties that contribute to high ozone concentrations at the Zion monitor." Modeling performed by LADCO and U.S. EPA, as contained in this technical support document, suggests that this broad approach to an isolated monitor violation lacks the technical support to include the Indiana counties of Jasper, Lake and Porter as "culpable," nor does it warrant adversely impacting this portion of the State of Indiana that is in full compliance with the air quality standard and its federally-approved SIP.

Northwest Indiana Topography and Geography

IDEM agrees with U.S. EPA's assessment that the topography of the Greater Chicago area is not unique and does not limit transport. However, IDEM strongly believes that the unique geography of the area does in fact affect ozone formation and transport within the air-shed. More specifically, the geographic proximity and vast size of Lake Michigan results in unique meteorological patterns that impact ozone formation and transport considerably in comparison to areas with contiguous land mass and no topographic limitations (i.e., Greater Indianapolis). The manner in which ozone forms over Lake Michigan and then transports in virtually all directions based on changes in temperatures, wind speed, and wind direction throughout the day results in "lake effect" impacts at shoreline monitors. This presents unique challenges from an air quality mitigation perspective because elevated ozone levels can be isolated and occur randomly with no consistent pattern or controlling monitor. The fact that the Zion, Illinois monitor has never represented the controlling design value for the region exemplifies this point.

III. Emissions Data and Emissions-Related Analysis

Northwest Indiana Emissions Data

Indiana counties are significantly impacted by regional transport of ozone and its precursors, NO_x and VOCs. Reducing ozone precursors regionally has a much greater impact on ground-level ozone concentrations than reductions achieved locally. The inclusion of adjacent counties based on cause and contribution contradicts federal and state control programs. Designating counties or portions of counties just because they contain major stationary sources would serve no positive purpose for air quality.

Table 4 – Total Chicago Nonattainment Area
2008 Stationary Source NO_x and VOC Emissions Breakdown

Chicago Proposed Nonattainment Area Emissions Summary 2008 Total NO_x and VOC Emissions (Tons Per Year)				
County/State	**NO_x**	**Percent of Nonattainment Area**	**VOC**	**Percent of Nonattainment Area**
Illinois	271,712.29	73%	229,333.51	86%
Jasper County, Indiana	19,787.78	5%	2,845.03	1%
Lake County, Indiana	46,808.29	13%	21,266.91	8%
Porter County, Indiana	27,054.63	7%	8,099.75	3%
Kenosha County, Wisconsin	6,788.19	2%	5,370.52	2%
Total	**372,151.18**		**266,915.72**	

Chart 5 - Total Chicago Nonattainment Area
2008 Stationary Source NO_x Emissions Breakdown

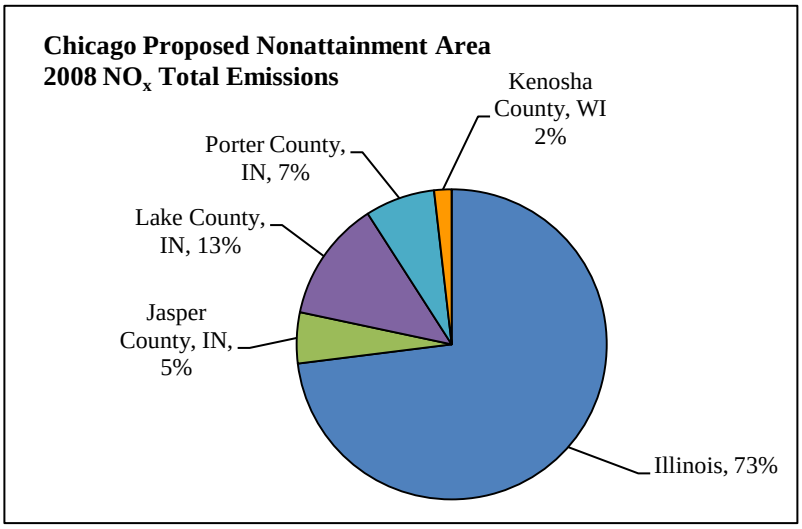


Chart 6 - Total Chicago Nonattainment Area
2008 Stationary Source VOC Emissions Breakdown

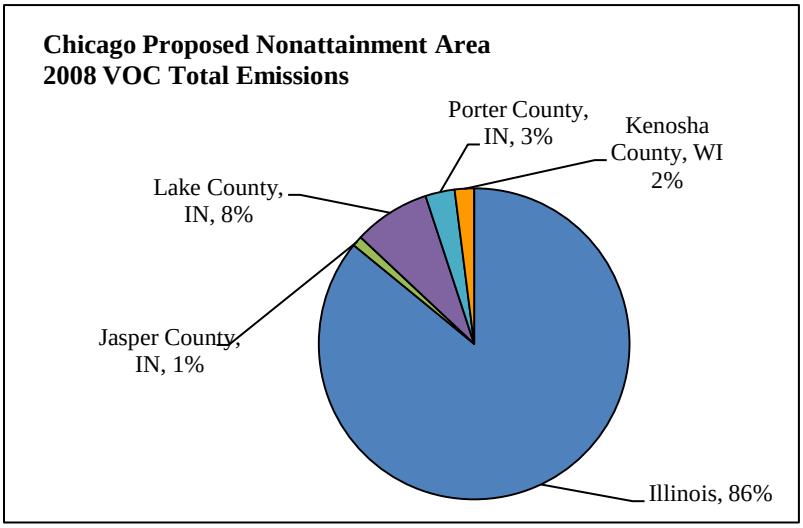


Table 5 – Total Chicago Nonattainment Area County-Level
2008 Stationary Source NO_x and VOC Emissions Breakdown

Emissions Summary Chicago Proposed Nonattainment Area 2008 Total NO_x and VOC Emissions (Tons Per Year)				
County/State	**NO_x**	**% of Area**	**VOC**	**% of Area**
Cook, IL	143,374.18	39%	129,469.81	49%
DuPage, IL	30,412.57	8%	30,508.73	11%
Grundy, IL	4,567.62	1%	3,269.52	1%
Kane, IL	15,161.39	4%	13,893.96	5%
Kendall, IL	4,636.17	1%	3,956.70	1%
Lake, IL	24,548.91	7%	19,978.44	7%
McHenry, IL	9,138.08	2%	9,012.59	3%
Will, IL	39,873.38	11%	19,243.76	7%
Jasper, IN	19,787.78	5%	2,845.03	1%
Lake, IN	46,808.29	13%	21,266.91	8%
Porter, IN	27,054.63	7%	8,099.75	3%
Kenosha, WI	6,788.19	2%	5,370.52	2%
Total	**372,151.18**		**266,915.72**	

Chart 7 - Total Chicago Nonattainment Area County-Level 2008 Stationary Source NO_x Emissions Breakdown

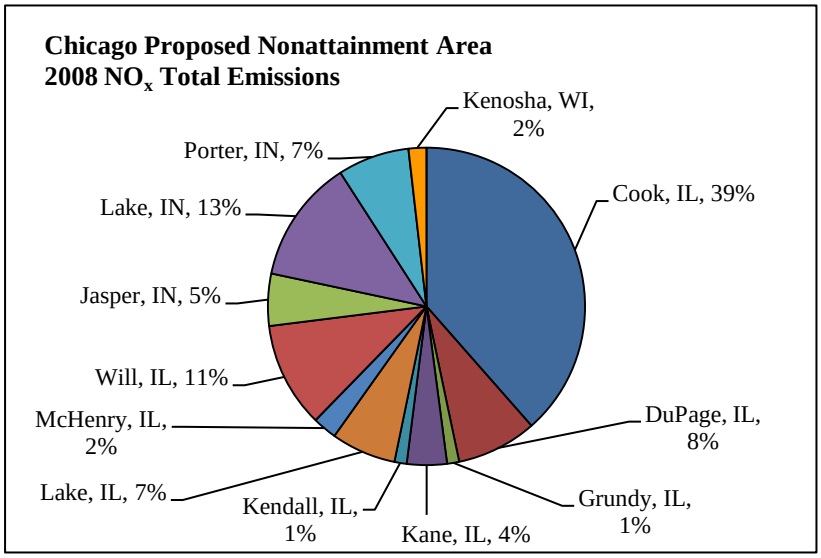
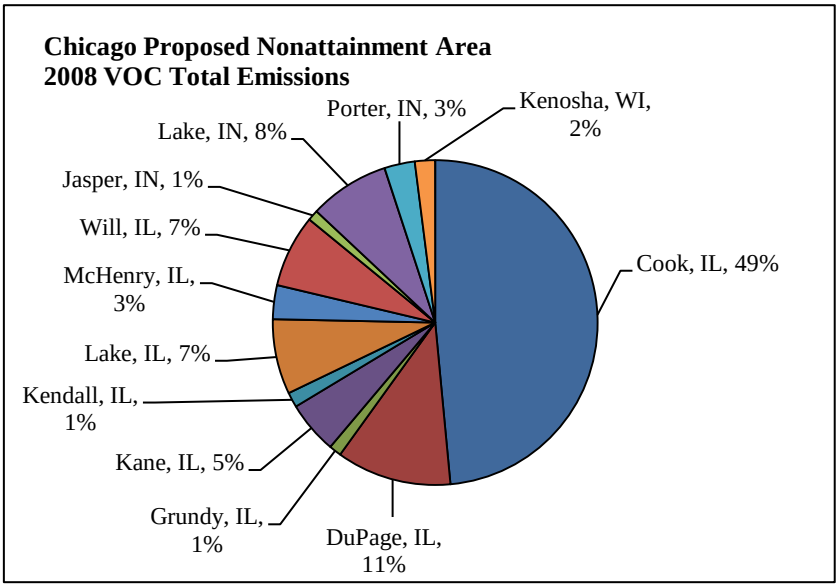


Chart 8 - Total Chicago Nonattainment Area County-Level 2008 Stationary Source VOC Emissions Breakdown



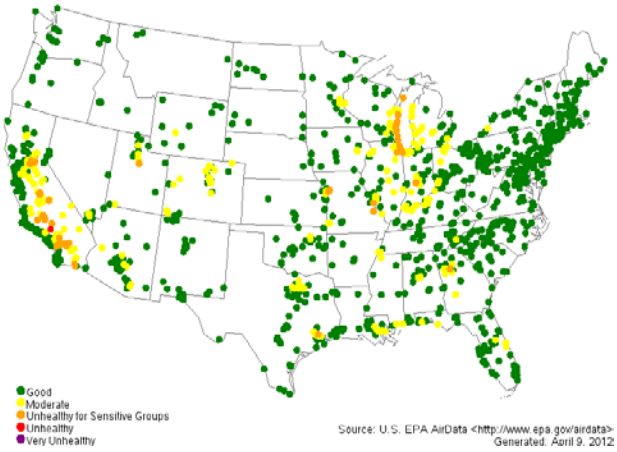
As can be seen in Table 4 and Charts 5 and 6, Jasper, Lake, and Porter counties, on the whole, account for a small portion (25%) of the stationary source contribution of NO_x and an even smaller portion (12%) of VOC emissions. The "lake effect" is a major factor when considering an area's actual contribution to high ozone

concentration days at any given air quality monitor within the region. Lake breezes form during sunny days when the sun heats land surfaces at a quicker pace than large bodies of water, such as Lake Michigan. This contrast in warmer air temperature on land and cooler air temperature over water produces rising, less dense air over the land and creates winds off the lake. This lake breeze phenomenon occurs in the early afternoon and can last for several hours, pulling ozone and ozone precursors inland until the land begins to cool in the evening and the lake breeze diminishes. Information on how the "lake effect" impacted the Zion, Illinois monitor on the four highest days for 2011 can be found in Appendix F of this document. The impact of emissions building over Lake Michigan and returning to the shoreline and impacting monitor values is a product of overall emission contributions from the greater Chicago area. Table 4 and Charts 5 and 6 also show that nearly 73% of the Chicago nonattainment area's total NO_x and 86% of the total VOC emissions are contributed by the Illinois counties of Cook, DuPage, Grundy, Kane, Kendall, Lake, McHenry, and Will. With Illinois counties providing the great majority of emissions in the area that cause and contribute to the "lake effect," it is unfair and unreasonable to include Jasper, Lake, and Porter counties based on the small overall emissions contribution to the nonattainment area, especially due to the isolated nature of the lone monitored violation within the area.

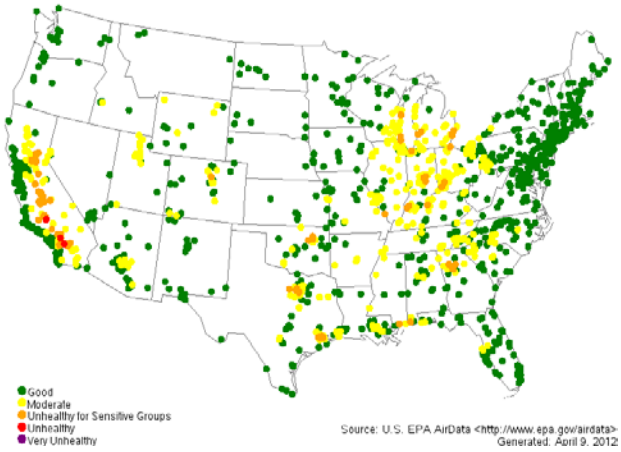
Charts 9, 10, and 11 are AIRNOW depictions of the four highest days for the Zion, Illinois, monitor site in 2009, 2010, and 2011, respectively. These charts were obtained from http://www.airnow.gov. The AIRNOW charts demonstrate a clear "lake effect" for these key days in 2009, 2010, and 2011, and further support that the impact of total NO_x and VOC emissions to the Lake Michigan airshed plays a significant role in the monitor readings at the Zion, Illinois, monitor site. When considering culpability for "lake effect" ozone concentrations at a near-shore monitor location, it is also important to point out that counties and urban areas outside of the CSA are equally or more culpable than the Indiana counties that U.S. EPA is proposing to single out.

Chart 9 – 2010 AIRNOW Depiction of Four Highest Monitor Value Days

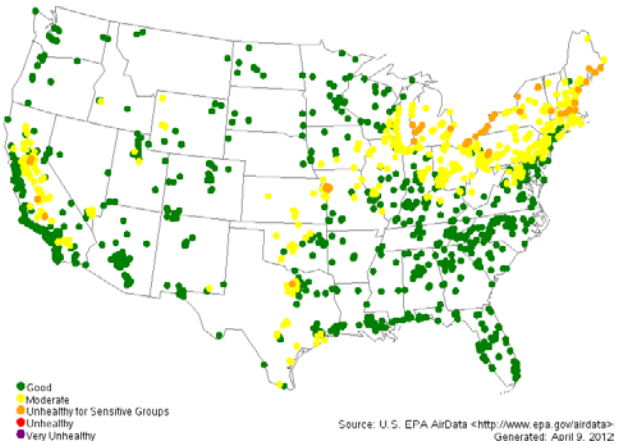
June 23, 2009 Zion => 86 ppb



June 24, 2009 Zion => 78 ppb



May 23, 2009 Zion => 75 ppb



August 15, 2009 Zion => 75 ppb

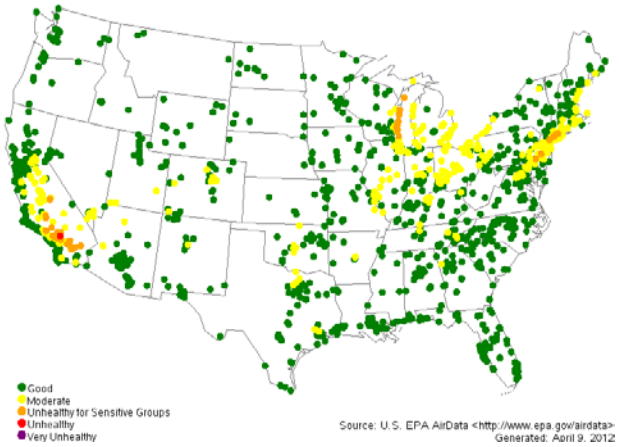
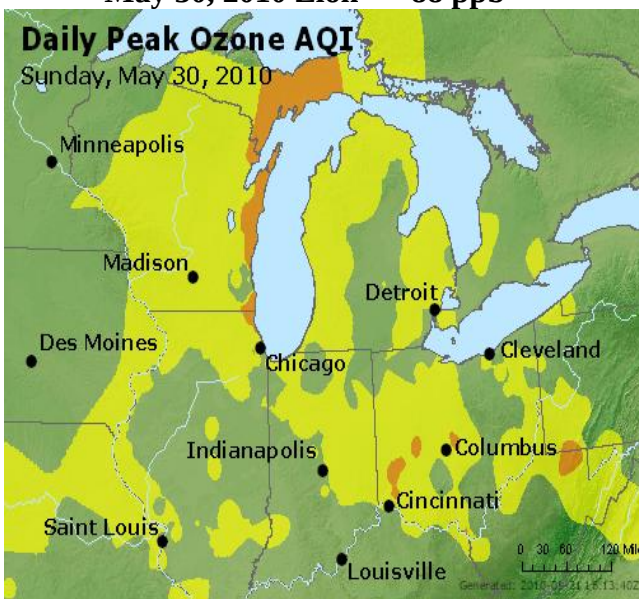
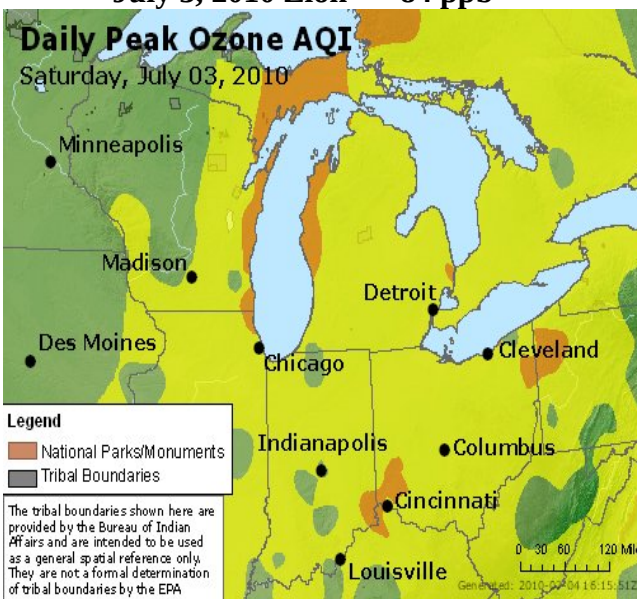


Chart 10 – 2010 AIRNOW Depiction of Four Highest Monitor Value Days

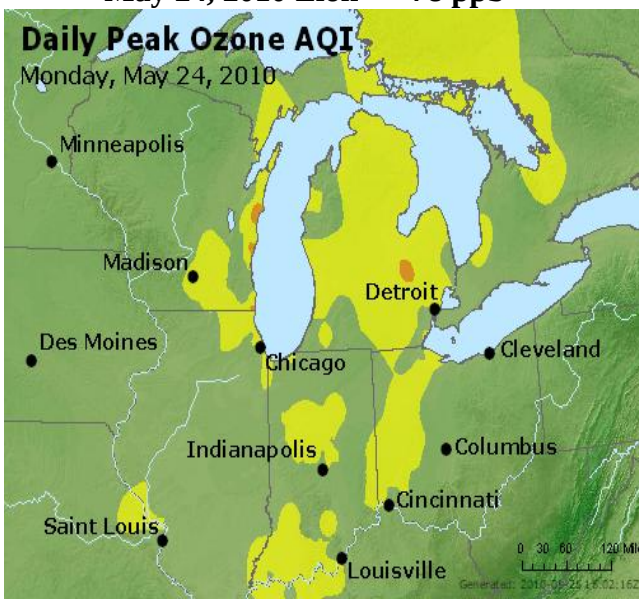
May 30, 2010 Zion => 88 ppb



July 3, 2010 Zion => 84 ppb



May 24, 2010 Zion => 78 ppb



August 19, 2010 Zion => 78 ppb

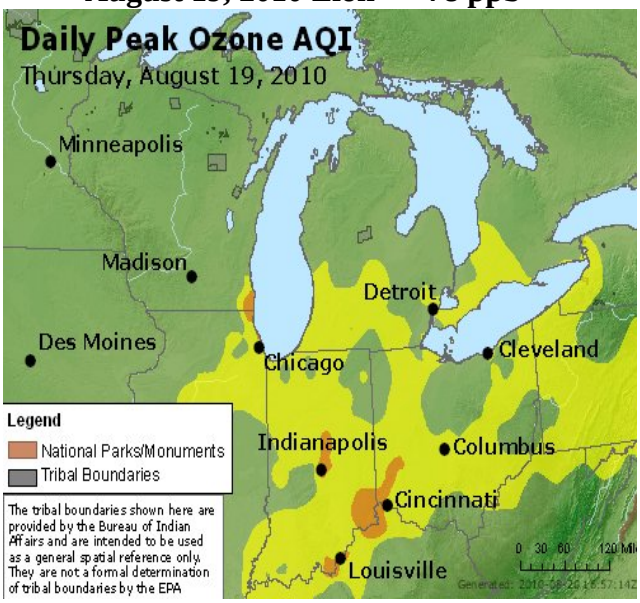
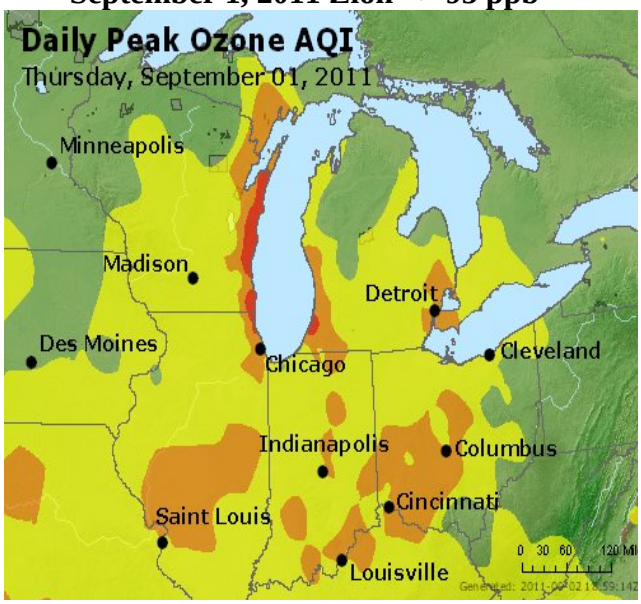
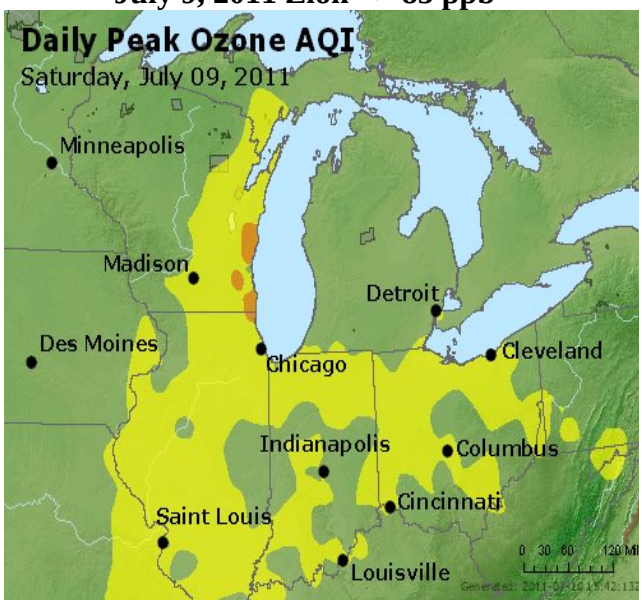


Chart 11 – 2011 AIRNOW Depiction of Four Highest Monitor Value Days

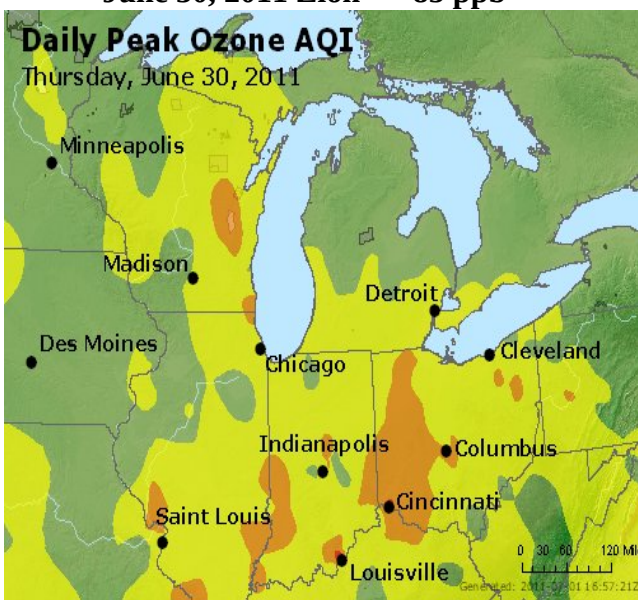
September 1, 2011 Zion => 95 ppb



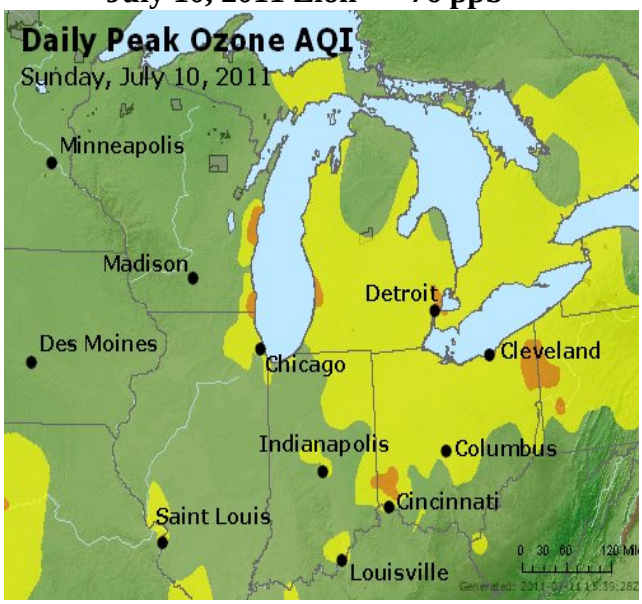
July 9, 2011 Zion => 85 ppb



June 30, 2011 Zion => 85 ppb



July 10, 2011 Zion => 76 ppb



It is unlikely that the emissions from stationary sources in Jasper County, Indiana contribute any more to the values in Lake County, Illinois, than emissions from other Indiana counties, or from counties outside Indiana's borders within or beyond the proposed nonattainment area. Table 5 and Charts 7 and 8 clearly show the limited emissions contribution from Jasper County, Indiana, as the county only contributes approximately 5% of the total NO_x emissions and 1 % of the VOC emissions in the proposed nonattainment area. These insignificant stationary source contributions and emissions-related population and vehicle miles travelled (VMT) data, as found in

Appendix B of this document for Jasper County, Indiana favor the exclusion of this county from the nonattainment area. In the specific case of Jasper County, Indiana, U.S. EPA focused on the combined total emissions from Jasper, Lake, and Porter counties as its basis for inclusion in the Chicago nonattainment area for the 2008 8-hour ozone NAAQS. U.S. EPA should consider each county on its own merits to fairly assess contributions to a monitored violation that results in a designation of nonattainment. As stated previously, the only significant source of ozone precursor emissions in Jasper County, Indiana is the well controlled coal-fired NIPSCO – Schahfer. U.S. EPA should not designate an area nonattainment based solely on the fact that a facility and/or coal-fired power plant is located there, especially when this designation will not result in any further emission reductions due to the existing controls on the facility. Additional details to support the exclusion of Jasper County, Indiana based on the cause and contribution methodology related to the NIPSCO – Schahfer facility are included later in this document.

Lake and Porter counties are subject to the most stringent group of emission controls within the State of Indiana. This collection of permanent and enforceable controls is equally stringent as those that apply elsewhere within the proposed nonattainment area and in some cases are more stringent. Vehicles registered in Lake and Porter counties are subject to reformulated gasoline and enhanced vehicle inspection and maintenance requirements. Indiana maintains a comprehensive vehicle inspection and maintenance program in Lake and Porter counties for all vehicles of model year 1976 and newer. Lake and Porter counties' vehicle inspection and maintenance program is more stringent than that which applies to the vast majority of the fleet that accounts for the VMT and long-term idling in close proximity to the monitoring sites. Furthermore, designating Jasper, Lake, or Porter counties as part of the Chicago nonattainment area would not result in substantive additional controls or subsequent emission reductions beyond those already in place.

Level of Control of Emission Sources (Anticipated Growth)

NO_x emissions within Northwest Indiana are projected to decline by almost 42% between 2005 and 2020. Emission reduction benefits from federal rules are factored into the emission projections. These rules include the NO_x SIP Call, CSAPR, Tier 2 Motor Vehicle Emission Standards and Gasoline Sulfur Control Requirements, the Highway Heavy-Duty Engine Rule, and the Non-Road Diesel Engine Rule. In fact, most of the major stationary sources within the area are already subject to the NO_x SIP Call, CSAPR, or RACT requirements.

IV. Illinois Vehicle Emissions Testing Program Changes-Impact Analysis

Northeastern Illinois Vehicle Inspection and Maintenance Lost Reductions and Modeling Analysis

Due to the localized nature of the violating monitor, IDEM evaluated potential causes for the isolated and marginal violation in Northeast Illinois. As the emissions inventory references for 2008, Illinois accounts for 73% of the total NO_x and 86% of the total VOC for the proposed nonattainment area. The sector responsible for the vast majority of Illinois' inventory for NO_x and VOC is onroad mobile. As with Lake and Porter counties in Northwest Indiana, VET, Stage II vapor recovery and reformulated gasoline apply to most of Northeast Illinois. Therefore, at first glance it would seem that the mobile source category is fully controlled, making the apparent backsliding at the Zion site even more puzzling.

However, beginning in 2007, Illinois made significant changes to its VET program, including the exemption of all vehicles from model years 1968 through 1995. Around that same time, IDEM considered making similar changes to its program but chose to conduct a detailed study to determine the potential impacts to air quality in the region. Instead of relying on output from the MOBILE6.2 model alone, IDEM evaluated actual tailpipe test data for the portion of the fleet in question, using actual reductions from 1995 and older vehicles that failed a tailpipe emissions test and subsequently passed during the same test period, as well as supplemental data from testing in British Columbia and Colorado. This was to evaluate the potential real-world impacts on air quality. The results of this study determined that Indiana would likely lose around 50% of the real reductions achieved from the program for ozone precursors. Therefore, IDEM chose to leave its VET program and the federally-approved SIP intact. A summary of this study is included in Appendix D of this Enclosure.

Due to the potential impacts of the changes that Illinois made to its VET program, and the absence of any technical information available since Illinois did not submit a SIP revision to support the program changes, IDEM investigated the potential impacts of the program changes to air quality, including at the Zion, Illinois, monitor location.

Time constraints associated with U.S. EPA's 120-day process prohibited IDEM from conducting as thorough analysis as desired; however, the results are quite compelling. First, two composite emission factors were created using MOBILE6.2: one based on Illinois VET program parameters used today, and one based on Illinois VET program parameters used prior to the changes in 2007. The difference between these two composite emission factors provided a difference of 3% for NO_x and 12% for VOC. This represents a general estimate of the MOBILE6.2-based lost reductions from Illinois' changes to the program. IDEM then increased Illinois' onroad emissions inventory by 3% for NO_x and 12% for VOC to evaluate the potential impact through CAMx. The results showed an increase of ozone concentrations at the Zion, Illinois, monitor of

0.0002 ppm. This is half of the difference between the level the monitor violated the standard by at the end of 2011 (0.0004 ppm).

It is important to note that the testing program for the Northwest Indiana VET program tests model year 1976 and newer vehicles, and that prior to 2007, Illinois' VET program tested model year 1968 and newer vehicles. Therefore, if methodology similar to what was used in IDEM's evaluation of potential emission reduction losses for the Northwest Indiana VET program were applied to the Northeast Illinois VET program, the lost "real" reductions would likely exceed the 50% identified in the Northwest Indiana study. Therefore, it is reasonable to assume that the true impact of the changes to Illinois' VET program would have been more than just 0.0004 ppm at the Zion, Illinois, monitor. To verify this, IDEM conducted a second CAMx run with a conservative alteration to the Northeast Illinois onroad inventory of 35% for both NO_x and VOC. This second CAMx run, while not representative of realized emission reductions, shows the impact on ozone concentrations from the onroad mobile sector of the Northeast Illinois VET area on the Zion, Illinois monitor. **The results of this model-based analysis show that the Zion, Illinois monitor would have attained the standard, if Illinois continued with its VET program as originally required by U.S. EPA by testing pre-1996 model year vehicles, and was in full compliance with its federally-approved SIP.**

Model Inputs

Photochemical modeling was performed for the Northeast Illinois VET program analysis using the CAMx version 5.2, developed by Environ. This model has been accepted by U.S. EPA as an approved air quality model for regulatory analysis and attainment demonstrations. Requirements of 40 CFR 51.112, as well as "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS" (EPA-454/R-05-002, Oct. 2005) are satisfied with the use of CAMx.

Meteorological files from 2007 were processed using the WRF modeling system. WRF is an update to the MM5 meteorological model that serves as an atmospheric simulation system. Emissions from 2007 were processed through the CONsolidated Community Emissions Processing Tool (CONCEPT) emissions modeling system to develop CAMx-ready emission files.

Emission Adjustments from Northeast Illinois VET Program

There are several types of emission sectors that are processed: area emission sources (marine/air/rail, nonroad, ammonia, other emissions not emitted through a stack), low-level point sources, EGUs, nonEGU point sources, and motor vehicle emissions. For purposes of this modeling demonstration, all emission files remained the same as the base case modeling run, except for the motor vehicle emissions in the seven-county Northeast Illinois VET program. The results of the MOBILE6.2 run showed an increase in NO_x emissions of 2.768% and an increase in VOC emissions of 11.945% when comparing the 2010 VET program to the 2005 VET program in

Northeast Illinois. IDEM maintains all emissions, meteorological and output files and these files can be made available upon request.

Results

Table 6 shows the modeling results of the NO_x and VOC emission changes from the Northeast Illinois VET program on the Zion, Illinois and the Northwest Indiana ozone monitors. The difference between the two results is the ozone impact (in ppm) on each ozone monitor. The calculated RRF are also listed for each monitor.

Table 6 – Results of Northeast Illinois VET Runs for Zion, Illinois and Northwest Indiana Ozone Monitors (3% NO_x, 12% VOC)

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference/ ozone impact (ppm)
170971007	Lake	Zion, IL	0.997	0.0780	0.0778	0.0002
180890022	Lake	Gary	1.0	0.0777	0.0777	0.0000
180890030	Lake	Whiting	0.999	0.0793	0.0793	0.0000
180892008	Lake	Hammond	0.999	0.0777	0.0776	0.0001
181270024	Porter	Ogden Dunes	1.002	0.0783	0.0785	+0.0002
181270026	Porter	Valparaiso	1.0	0.0753	0.0753	0.0000

Table 7 shows the modeling results of the 35% NO_x and VOC emission reductions from the Northeast Illinois VET program on the Zion, Illinois and the Northwest Indiana ozone monitors. The difference between the two results is the ozone impact of the VET program change on each ozone monitor. The ozone impact at the Zion, Illinois ozone monitor was modeled to be 0.0027 ppm.

Table 7 – Results of Northeast Illinois VET Runs for Zion, Illinois and Northwest Indiana Ozone Monitors (35% NO_x, 35% VOC)

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled VET Design Value (ppm)	2003-2007 Modeled Difference (ppm)
170971007	Lake	Zion, IL	0.966	0.0780	0.0753	0.0027
180890022	Lake	Gary	1.021	0.0777	0.0793	+0.0016
180890030	Lake	Whiting	1.002	0.0793	0.0795	+0.0002
180892008	Lake	Hammond	1.002	0.0777	0.0778	+0.0001
181270024	Porter	Ogden Dunes	1.047	0.0783	0.0820	+0.0037
181270026	Porter	Valparaiso	1.013	0.0753	0.0763	+0.001

Summary

Photochemical analyses were conducted to determine the ozone impact from reductions in the mobile NO_x and VOC emissions from the seven-county area included in the Northeast Illinois VET program. Illinois revised its Northeast Illinois VET program by exempting 1995 and older model vehicles from the Northeast Illinois VET program stating in 2007. The first modeling analysis looked at the ozone impacts resulting from this relaxation of the previously approved VET program and were quantified using MOBILE6.2 to determine a general estimate of lost reduction of NO_x and VOC emissions from local mobile sources. A second modeling analysis looked at the ozone impacts directly related to the 2007 relaxation of the Northeast Illinois VET program with mobile NO_x and VOC emissions reduced by 35%.

Reducing NO_x and VOC emissions from the seven-county Northeast Illinois VET program area and IDEM's first photochemical analysis showed a change in modeled ozone concentrations at the Zion, Illinois ozone monitor of 0.0002 ppm. A 0.0002 ppm increase in ozone concentrations was modeled at the Ogden Dunes, Porter County, Indiana monitor, indicating possible NO_x disbenefit associated with the Illinois VET program changes. These modeled results, from the Northeast Illinois VET program exemption of older vehicles being tested, results in more NO_x and VOC emissions in the Lake Michigan airshed, and shows ozone impacts on the Zion, Illinois ozone monitor.

The second photochemical analysis studied the ozone impact at the Zion, Illinois monitor, based on a conservative 35% reduction in the mobile NO_x and VOC emissions resulting from the Northeast Illinois VET program area. This analysis showed a change in modeled ozone concentrations at the Zion, Illinois ozone monitor of 0.0027 ppm (2.7 ppb). These modeled results, further demonstrate that lost NO_x and VOC emission reductions due to the relaxation of the Northeast Illinois VET program produced an increase in emissions to the Lake Michigan airshed and have a direct connection to the elevated ozone concentrations at the Zion, Illinois ozone monitor. If the modeled difference is applied to the current design value for the Zion site, the value would be 73.6 ppb, which would be in compliance with the standard.

V. Jurisdictional Considerations

Jurisdictional Coverage of the Air Quality Problem

Indiana has demonstrated herein that the monitored violation within Northeast Illinois is an isolated incident and does not represent a regional air quality problem warranting a widespread nonattainment boundary. Additionally, Indiana has demonstrated that the isolated violation of the standard within Northeast Illinois is likely the result of excess emissions deriving from the state of Illinois, and that these excess emissions derive from the relaxation of its vehicle emissions testing program.

Both the measured air quality problem and the remedy to solve it reside within the jurisdiction of the state of Illinois. Therefore, the nonattainment boundary should be limited to the jurisdiction where the authority resides to remedy the problem. In this case, the boundary should be limited to counties and townships within Northeast Illinois, and exclude any portion of Indiana.

Consistency With Existing Jurisdictional Boundaries

Jasper County is not within the jurisdiction of a Metropolitan Planning Organization (MPO) and has not been subject to transportation conformity for any criteria pollutant to date. Excluding Jasper County from the nonattainment area poses no inconsistencies with existing jurisdictional boundaries.

Lake and Porter counties fall under the jurisdiction of the Northwestern Indiana Regional Planning Commission, the MPO for Lake, LaPorte, and Porter counties, Indiana. The Illinois portion of the proposed nonattainment area falls under the jurisdiction of two MPOs, neither of which has jurisdiction for any portion of Indiana.

Lake and Porter counties are within the current maintenance area boundaries for the 1997 8-hour ozone standard. However, transportation conformity and SIP planning for Lake and Porter counties are conducted independently due to limitations of jurisdictional authority. Excluding Lake and Porter counties does not present any challenge with regard to coordination of transportation conformity or SIP development activities.

VI. Designation Consistency Evaluation

Nationally Recommended Designation Inconsistencies

IDEM continues to maintain that nonattainment designations should be nationally consistent and based on sound science and real-world air quality drivers. IDEM has studied U.S. EPA's proposed designations across the nation. As a result of this study, it is clear that Northwest Indiana is being treated disparately in comparison to similar areas across the country. In addition to the fact that all air quality monitors in Indiana currently measure attainment of the 2008 8-hour ozone NAAQS, IDEM also offers the following five examples of U.S. EPA inconsistencies associated with proposed designation boundaries:

1. Pickaway County, Ohio
2. Point Coupee Parish, Louisiana
3. Roane County, Tennessee
4. Berks County, Pennsylvania
5. Lancaster County, Pennsylvania

IDEM believes that, if U.S. EPA applied uniformly – in general terms and rigor of analysis – the factors it purports to have considered in proposing the revised Chicago nonattainment area, no Indiana counties would have been included in the revised designation.

Pickaway County, Ohio

Pickaway County, Ohio is part of the Columbus-Marion-Chillicothe 2009 Combined Statistical Area (CSA) boundary. U.S. EPA Region 5 proposed designating six of the twelve counties in the area as nonattainment under the 2008 8-hour ozone NAAQS. Five of these six counties have at least one ozone monitor. Only one county in this region of Ohio is currently above the standard (Franklin County) based on quality-assured monitoring data for the years 2008 through 2010. Pickaway County, Ohio borders Franklin County, Ohio and two other counties that U.S. EPA Region 5 is proposing to designate nonattainment. Columbus, Ohio is located in Franklin County, and population data show that approximately half of the 2010 population and 2000-2010 growth in the area occurred in this county. Based on 2030 projections, the populations in a number of counties in the area are expected to increase significantly (including Franklin, Pickaway, and Ross counties). However, U.S. EPA Region 5 proposed designating Pickaway County, Ohio as unclassifiable/attainment under the 2008 8-hour ozone NAAQS.

The proposed unclassifiable/attainment designation of Pickaway County, Ohio shows clear inconsistencies within the U.S. EPA Region 5 process. U.S. EPA Region 5 notes that population is "projected to increase significantly" in Pickaway County, Ohio, unlike Jasper, Lake, and Porter counties in Northwest Indiana. Pickaway County, Ohio is adjacent to Franklin County, Ohio and even with this "significant" population increase projection, U.S. EPA Region 5 recommended a designation of unclassifiable/attainment under the 2008 8-hour ozone NAAQS. In addition, Ross County, Ohio's population is "projected to increase significantly" as well. Not only is the population in Ross County projected to increase dramatically, but Ross County, Ohio, like Jasper County, Indiana, has a coal-fired power plant located within its borders. However, unlike Jasper County, Indiana, Ross County, Ohio was proposed unclassifiable/attainment under the 2008 8-hour ozone NAAQS. U.S. EPA seems to lack consistency applying designation criteria, and the weighting does not appear to be based on actual or potential air quality impact.

U.S. EPA Region 5 also notes that "wind direction percentage data do little to shed light on which counties in the Columbus-Marion-Chillicothe, Ohio CSA are the most important from an ozone and ozone precursor transport standpoint." In addition, U.S. EPA Region 5 chose to use a three-year old analysis provided by the States of Illinois and Wisconsin as the basis for determining Indiana's effect on the monitored violation at the Zion, Illinois monitor. IDEM strongly believes designation recommendations should be based on current, area specific

meteorological data and analysis, as opposed to using incomplete and/or out-of-date information to isolate the most critical ozone precursor source areas. Furthermore, if the necessary information is reasonably available, U.S. EPA should not justify its policy position on information not being "readily available."

IDEM strongly believes that national consistency based on sound science should be a priority for U.S. EPA. Considering the similarities between the Ohio and Indiana areas mentioned, IDEM would expect similar consideration for Northwest Indiana. Modeling and emissions data provided within this document demonstrate that Jasper, Lake, and Porter counties (as a part of the Chicago, Illinois area) are very similar to Pickaway County (as a part of the Columbus, Ohio area). IDEM believes that these two areas should be treated consistently. In addition, Ross County, Ohio mirrors the impact of Jasper County, Indiana as both contain coal-fired power plants. With consistent analysis and consideration, IDEM encourages U.S. EPA Region 5 to revise the recommendations for the Northwest Indiana counties of Lake and Porter to attainment under the 2008 8-hour ozone NAAQS based on the information contained within this document. Furthermore, Jasper County, Indiana, should be treated consistently with other areas across the country, and especially within the same U.S. EPA Region 5 area, and designated as unclassifiable/attainment under the 2008 8-hour ozone NAAQS.

Point Coupee Parish, Louisiana

Point Coupee Parish is part of the Baton Rouge-Pierre Part 2009 Consolidated Metropolitan Statistical Area (CMSA) boundary. U.S. EPA Region 6 proposed designating five of the ten parishes in this area as nonattainment for the 2008 8-hour ozone NAAQS. Six of the ten parishes have at least one ozone monitor. Point Coupee is the only parish with an ozone monitor that U.S EPA is not proposing to designate nonattainment under the 2008 ozone NAAQS. However, two of the parishes U.S. EPA is proposing to designate nonattainment have 2008 through 2010 three-year design values lower than Point Coupee (Iberville, 0.071 ppm; and West Baton Rouge, 0.073 ppm).

The U.S. EPA Region 6 Point Coupee proposed designations are a good example of how Northwest Indiana should have been treated regarding the 8-hour ozone designation process. First and foremost, U.S. EPA Region 6 conducted its own meteorology and back trajectory analysis to support their recommendations. Through their analysis, it was determined that although Point Coupee Parish has a coal-fired power plant located within its borders—similar to Jasper County in Northwest Indiana—it was not scientifically valid to designate the parish nonattainment. U.S. EPA Region 6 based the designations of the parishes on recent information and sound science, as opposed to using default CMSA boundaries, outdated and non-localized meteorological analysis conducted by a third party, and no cause and contribution evaluation.

In lieu of U.S. EPA Region 5 conducting this analysis to support their proposed designations, IDEM has recently completed the necessary analysis and is providing this detailed information as part of this technical support document. IDEM believes that if U.S. EPA Region 5 had conducted a similar analysis they would have been able to use the same sound science to propose a designation of attainment for Lake and Porter counties and a designation of unclassifiable/attainment for Jasper County in Northwest Indiana under the 2008 8-hour standard.

Roane County, Tennessee

Although Roane County, Tennessee is not part of a multi-state nonattainment area, it is part of the Knoxville-Sevierville-La Follette 2009 CSA boundary. U.S. EPA Region 4 proposed to designate five full counties and one partial county in the area as nonattainment. All of the full counties have monitors located within them, while the partial county does not. Three of these counties are currently above the standard (Blount, Knox, and Sevier counties) based on quality assured ambient air quality monitoring data for the years 2008 through 2010. U.S. EPA Region 4 is proposing to designate Roane County, Tennessee, as unclassifiable/attainment even though the county borders three other counties that it is proposing to designate nonattainment of the 8-hour ozone NAAQS.

Just as Northwest Indiana is included in the Chicago CSA, Roane County, Tennessee is included in the Knoxville CSA. Roane County, Tennessee has a notably greater portion of the CSA's VMT (5.8% versus 1.0%) and population (5.1% versus 1.0%) when compared to Jasper County, Indiana. Similar to Jasper County, Indiana, Roane County, Tennessee has a coal-fired power plant. Dissimilarly, Roane County, Tennessee was proposed as unclassifiable/attainment under the 2008 8-hour ozone NAAQS by U.S. EPA Region 4.

IDEM would appreciate consistent consideration and weight assigned to designation criteria for Northwest Indiana. Lake and Porter counties continue to have air quality monitors that measure attainment of the 8-hour ozone NAAQS. Although Jasper County, Indiana, is very similar to Roane County, Tennessee, from the standpoint of CSA inclusion, based on VMT and population alone, it is clear that Roane County, Tennessee, has a notably greater chance to contribute to air quality issues. However, U.S. EPA Region 4 chose not to include Roane County, Tennessee, in the Knoxville nonattainment area solely based on default CSA boundaries. IDEM recommends that U.S. EPA Region 5 provide the same consideration to Northwest Indiana, particularly Jasper County.

Berks County, Pennsylvania

Berks County, Pennsylvania, is a single-county MSA based on economic, political, and commuting patterns. After a very thorough analysis, U.S. EPA

Region 3 proposed to designate Berks County, Pennsylvania, which contains the City of Reading, as a single-county nonattainment area, consistent with the 1997 ozone designations for the Reading area. Berks County, Pennsylvania, has at least one ozone monitor located within its borders currently above the standard based on quality-assured monitoring data for the years 2008 through 2010 (0.079 ppm). U.S. EPA Region 3 also assessed two bordering counties (Lebanon and Schuylkill) in its technical analysis of the area. Lebanon and Schuylkill counties do not have ozone monitors located within their borders, but clearly contribute to ozone concentrations in the Reading area.

U.S. EPA Region 5's recommendations for Northwest Indiana in the letter of January 31, 2012, to Governor Daniels states that Jasper, Lake, and Porter counties in Indiana were proposed to be designated nonattainment based on "high emissions in these counties that contribute to high ozone concentrations at the Zion monitor." U.S. EPA Region 5 provided limited technical support for this assessment. However, emissions data included in this document demonstrate that the proportion of Indiana emissions are notably less than those of Lebanon and Schuylkill counties similarly located adjacent to Berks County, Pennsylvania. Specifically, Indiana has contributed approximately 25% of the NO_x and 12% of the VOC emissions in the recommended nonattainment area. When compared to the combined contributions of Lebanon and Schuylkill counties adjacent to Berks County, Pennsylvania of approximately 41% of the NO_x and 42% of the VOC emissions, it is clear that Northwest Indiana is not being designated for the 8-hour ozone NAAQS consistently with similar areas across the nation and that large discrepancies existing between the Regions in the depth and rigor of analyses conducted for proposing designations.

Lancaster County, Pennsylvania

Lancaster County, Pennsylvania, is a single-county MSA based on economic, political, and commuting patterns. U.S. EPA Region 3 proposed to designate Lancaster County, Pennsylvania, as nonattainment under the 2008 8-hour ozone NAAQS. Lancaster County, Pennsylvania, has at least one ozone monitor located within its borders currently above the 8-hour ozone NAAQS based on quality assured ambient air quality monitoring data for the years 2008 through 2010 (0.077 ppm). U.S. EPA Region 3 also assessed three bordering counties (Dauphin, Lebanon, and York) in its very detailed technical analysis of the area. Dauphin and York counties have at least one monitor located within their borders which currently have 2008 through 2010 three-year design values below the standard (0.073 ppm and 0.072 ppm, respectively).

Similar to Berks County, Pennsylvania, the Lancaster County, Pennsylvania example fits nicely with Northwest Indiana based on U.S. EPA Region 5's use of mass emission contributions to the area and the potential effect on the Zion, Illinois monitor. Even though York County, Pennsylvania is

not part of the single-county Lancaster County MSA, the county's NO_x emissions are approximately twice those of Lancaster County, the VOC emissions are the second highest in the area and York County has the highest population growth over the past decade. Northwest Indiana, in contrast, contributes significantly lower mass NO_x and VOC emissions to the nonattainment area and is growing at a substantially lower rate. Unlike U.S. EPA Region 6, U.S. EPA Region 5 did not perform or supply a detailed analysis of speciated emissions and the overall potential to impact air quality on a particular area or monitor. To address this deficiency, IDEM has performed a detailed analysis of area-specific emissions, meteorology, and the resulting culpability. The results of this analysis are included in this document.

Summary

IDEM agrees that using mass emissions for the purpose of determining a county's contribution to high ozone concentrations can be helpful, though inconclusive independently. Without quality emission analyses and modeling, mass emissions should not be the primary means of designating areas under the 2008 8-hour ozone NAAQS. In addition to the real-world support of air quality monitors that measure attainment under the 2008 8-hour ozone NAAQS, such as those in Lake and Porter counties, scientifically sound modeling, emissions, and meteorological analysis such as that included in this document should be used for to justify a designation of attainment for Lake and Porter counties along with unclassifiable/attainment for Jasper County in Northwest Indiana.

Nonattainment designations should be conducted on a nationally consistent basis using sound science and real-world air quality drivers weighted and applied fairly. As outlined above, Jasper, Lake, and Porter counties in Northwest Indiana share many characteristics with other areas across the nation, but U.S. EPA is proposing to handle them differently. It is clear that U.S. EPA's expedited implementation of the 2008 8-hour ozone NAAQS is leading to problematic and disparate inconsistencies. The manner in which the CAA is applied when proposing and finalizing designations simply must be fair and consistent. Using only these five examples, IDEM continues to believe that Northwest Indiana counties are not being treated fairly in comparison to similar areas across the nation.

The treatment of Jasper, Lake, and Porter counties in Northwest Indiana related to last-minute non-air quality-related decisions by a neighboring state are another example of unjust inconsistencies. Using the Zion, Illinois monitor as an example, because a state certifies its data early with the sole interest in preserving its Federal Highway Administration CMAQ funding, careful, and consistent consideration is imperative. No other geographic area of the country has been put in the situation of being proposed attainment in one month (December, 2011) to nonattainment the next (January, 2012) due to a neighboring state's action to preserve CMAQ funding, as opposed to focusing on air quality and maintaining compliance with its own SIP. Not to mention that this action was based on only 1 of 22 monitors being 0.0004 ppm above

the standard. This is a unique circumstance and quite different than was the case with the 1-hour and 1997 8-hour ozone NAAQS. If no precedent exists, U.S. EPA should proceed with designations in a consistent and conservative manner and not rush towards inclusion of non-culpable counties without clear scientific evidence to support its decision.

If emission contributions and potential impacts on upwind monitors are going to be considered when making 8-hour ozone NAAQS designations, IDEM encourages U.S. EPA Region 5 to perform detailed scientific analysis of all applicable data. As opposed to waiting for U.S. EPA Region 5 to complete or provide this detailed analysis, IDEM has worked within the less than 120-day response period to provide the necessary support for appropriate designations in Northwest Indiana. Based on current air quality data in Lake and Porter counties, in addition to the modeling and emissions data provided below, IDEM continues to support a recommendation of attainment for Lake and Porter counties and unclassifiable/attainment for Jasper County under the 2008 8-hour ozone NAAQS in Northwest Indiana.

Inconsistent Designations of "Power Plant" Counties

At a minimum, U.S. EPA should consider the size of any facility or power plant and its emission control effectiveness for a county that U.S. EPA feels may be contributing to a downwind monitor violation. For example, Jasper County, Indiana's emissions base is overwhelmingly dominated by a single source in the county. The only significant source of NO_x and VOC emissions in Jasper County, Indiana is the NIPSCO - Schahfer Generating Station. NIPSCO - Schahfer has had controls for NO_x installed since 2008. In 2008, Jasper County, Indiana stationary sources emitted NO_x emissions totaling 19,788 tons, NIPSCO - Schahfer accounted for 17,324 tons of this total, approximately 88%. However, in 2011, NIPSCO - Schahfer emitted 7,327 tons of NO_x, approximately a 10,000 ton reduction.

In addition to consideration of facility size and emission controls, IDEM encourages U.S. EPA to be consistent when making designations involving areas containing coal-fired power plants. The Technical Support Document sent to Louisiana with the December 9, 2011, U.S. EPA response letter, "LOUISIANA, Area Designations for the 2008 Ozone National Ambient Air Quality Standards," states "In our analysis of the emissions data for the area, we took note that the NO_x emissions from Pointe Coupee are primarily from a single point source that is already well-controlled and may undergo further emissions reductions resulting from implementation of regional air quality measures such as CSAPR." That single point source is the Big Cajun 2 plant. In the Clean Air Markets Division database, the three units at Big Cajun 2 are listed as having low NO_x Burners with overfire air (LNB/OFA) combustion controls, but no post-combustion controls such as selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR).

If combustion controls at Big Cajun 2 are described as "already well controlled," then NIPSCO - Schahfer with the same controls plus advanced SCR and SNCR controlled units, should also be described as "already well controlled." Furthermore, with roughly the same power output, NIPSCO - Schahfer already has lower ozone season NO_x emissions than Big Cajun 2, and these emission levels will likely continue to be the same or lower into the future.

NIPSCO has entered into a consent decree (CD) with U.S. EPA for the NIPSCO – Schahfer facility and their two other facilities in Northern Indiana. The CD requirements are intended to achieve greater efficiency from the present SCR system on Unit 14 and installation of a SNCR on Unit 15. Units 17 and 18 at NIPSCO - Schahfer will continue to operate with LNB/OFA combustion controls. Furthermore, there is an overall cap on total emissions from the three NIPSCO generating stations in Northern Indiana, which tightens each year through 2016, providing incentive to operate controls at maximum efficiency. Therefore, it is likely that emission levels at NIPSCO - Schahfer will remain near or below current levels into the future. The reductions from a facility like NIPSCO - Schahfer will help improve air quality in and around Northwest Indiana.

Table 8 compares actual 2011 emissions, CSAPR allocations, and 2014 emissions based upon the CD from NIPSCO - Schahfer, in Jasper County, Indiana. Projections for 2014 are based upon 2011 operating levels. Table 9 compares Big Cajun 2, in Point Coupee Parish, Louisiana, actual emissions in 2011 and CSAPR allocations. NO_x emissions in Jasper County, Indiana and Point Coupee Parish, Louisiana are each overwhelmingly dominated by a single coal-fired power plant located in the county and parish, respectively. Both power plants generate approximately 1.9 gigawatt electrical (GWe).

Table 8 –NIPSCO – Schahfer Ozone Season Emissions

		2011 Emissions	**CSAPR Allocations**	**Consent Decree Limit**	**Projected 2014 Emissions**
Unit	**NO_x Rate**	**NO_x Tons**	**NO_x Tons**	**NO_x Rate**	**NO_x Tons**
14	0.11	715	1,159	0.1	650
15	0.15	1,124	1,148	0.15	1124
17	0.18	832	1,002	0.2	924
18	0.19	934	1,004	0.2	983
Total		**3,605**	**4,313**		**3,682**

Table 9 – Big Cajun 2 Ozone Season Emissions

Unit	NO_x Rate	2011 Emissions NO_x Tons	CSAPR Allocations NO_x Tons
2B1	0.2	1,688	1,328
2B2	0.2	1,983	1,307
2B3	0.15	1,431	1,299
Total		**5,102**	**3,934**

NIPSCO - Schahfer is below the CSAPR ozone season allocation level for NO_x. If CSAPR becomes effective, Big Cajun 2 would need 1,168 tons of reductions to meet those levels of allocations, if operated at 2011 levels. This is further evidence that NIPSCO-Schahfer should be described as "already well controlled." A factor that IDEM believes would support excluding Jasper County from the proposed nonattainment area.

It is unlikely that NO_x or VOC emissions from Jasper County, Indiana, most specifically NIPSCO – Schahfer, have a significant impact on ozone values elsewhere in the Chicago nonattainment area. According to the Clean Air Markets Division, NIPSCO - Schahfer emitted 17,323.6 tons of NO_x in 2008, which is only 4% of the total NO_x emissions within the entire Chicago nonattainment area. However, as mentioned earlier, NIPSCO - Schahfer has substantially decreased NO_x emissions by installing permanent combustion controls and annual NO_x emissions from this facility have been reduced by over 10,000 tons. Once these reductions are applied to the inventory data, NIPSCO - Schahfer accounts for only 7,327 (2%) of the total annual NO_x emissions, and Jasper County, Indiana would account for only 9,791 (2.7%) of the total NO_x emissions within the Chicago nonattainment area.

U.S. EPA Region 6 excluded Point Coupee Parish, Louisiana from the nonattainment area because their analysis indicated that there was minimal impact on high ozone concentrations at the violating monitor (i.e. East Baton Rouge) and emissions from the parish were primarily from a single, well controlled stationary source. Since the same is clearly true of Jasper County, Indiana, where emissions from the NIPSCO – Schahfer Generating Station are actually better controlled than in Point Coupee, IDEM requests consistent treatment resulting in a designation of unclassifiable/attainment for Jasper County, Indiana under the 2008 8-hour ozone NAAQS.

Lastly, U.S. EPA has improperly evaluated Jasper, Lake, and Porter county emissions by comparing them to each other as opposed to all jurisdictions within the CSA, including the counties or portions of counties that U.S. EPA excluded from its proposal. Once conducted properly, it is clear that U.S. EPA cannot substantiate its conclusions. Also, with Jasper County and the primary emissions source being so far southeast of the urban area and Lake Michigan, the true impacts from emissions deriving from Jasper County are outside the proposed nonattainment area entirely. This is demonstrated through back trajectory analysis, and modeling conducted by IDEM and U.S. EPA. This again demonstrates why it is inappropriate to place weight on mass emissions as opposed to evaluate cause and contribution from a true scientific perspective.

Conclusion

IDEM's independent emissions, modeling, and meteorological analyses support the conclusion that that no Indiana counties should be included in the Chicago nonattainment area. Taken as a whole, the information presented in this document indicates that these counties do not contribute to the elevated concentrations that resulted in the violation at the Zion, Illinois, monitor in 2011. IDEM is concerned that U.S. EPA is proceeding with implementation of the 2008 8-hour ozone NAAQS in an unjustified and inconsistent manner based on the presumption that designated areas be based on default statistical area boundaries.

Indiana does not believe there would have been a violation at the Zion site at the close of 2011 if the State of Illinois was administering its VET program in compliance with its SIP, and thus properly fulfilling its obligations under the CAA. Indiana's analysis indicates that the large volume of ozone precursor emissions from Illinois—not Indiana—combined with Lake Michigan's unique effect on ozone formation and movement back onto land, has the greatest impact on measured high ozone levels in Illinois. Along with this compelling data, IDEM believes that the remaining factors and a need for consistent designations nationwide also support a conclusion that the monitored nonattainment is best remedied by the State of Illinois, without the inclusion of any Indiana counties in the nonattainment area.

Current quality-assured monitoring data indicates that air quality throughout the State of Indiana continues to meet the 2008 8-hour ozone NAAQS. Indiana continues to be in full compliance with its approved SIP, and the emission control measures in place within Northwest Indiana are some of the most stringent SIP-based controls in the nation. The wrongful inclusion of Jasper, Lake, and Porter counties will not result in any additional controls or advance attainment of the standard for Illinois' portion of the Chicago nonattainment area.

Based on the information contained within this technical support document, IDEM encourages U.S. EPA to reconsider the proposed designations for Jasper, Lake, and Porter counties. To be consistent with designations across the nation, IDEM

recommends U.S. EPA propose to designate Lake and Porter counties as attainment and Jasper County as unclassifiable/attainment under the 2008 8-hour ozone NAAQS.

Appendix A

1990 through 2010 Northwest Indiana Growth Rates and Patterns

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population 2010	Percent Change from 2000 to 2010	Population Estimate 2015	Percent Change from 2000 to 2015	Population Estimate 2020	Percent Change from 2000 to 2020
Jasper County	24,960	30,043	20.36%	33,478	11.43%	34,456	14.69%	35,206	17.19%
Lake County	475,594	484,564	1.89%	496,005	2.36%	496,191	2.40%	503,203	3.85%
Porter County	128,932	146,798	13.86%	164,343	11.95%	171,122	16.57%	175,175	19.33%

Jasper, Lake, and Porter counties have not grown very rapidly over the past decade, nor are they expected to in the future. There are no expectations for regional growth that would adversely affect air quality.

Appendix B

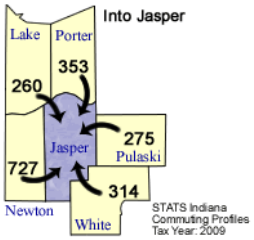
2009 Northwest Indiana Commuting Patterns

	Total Workforce: Number of Persons Who Live in County and Work	Number of Persons Who Live and Work in County	Number of Persons Who Live in County and Work in Another County	Percent in County	Percent out of County
Jasper County	21,473	16,107	5,366	75.01%	24.99%
Lake County	296,657	244,291	52,366	82.35%	17.65%
Porter County	106,390	76,079	30,311	71.51%	28.49%

Top five counties sending workers INTO Jasper County:

County Sending Workers	Workers
Newton County	727
Porter County	353
White County	314
Pulaski County	275
Lake County	260
Total of above	1,929

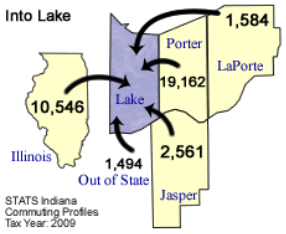
(10.2% of Jasper County workforce)



Top five counties sending workers INTO Lake County:

County Sending Workers	Workers
Porter County	19,162
Illinois	10,546
Jasper County	2,561
LaPorte County	1,584
Out of State	1,494
Total of above	35,347

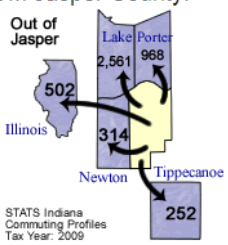
(12.5% of Lake County workforce)



Top 5 counties receiving workers FROM Jasper County:

County Receiving Workers	Workers
Lake County	2,561
Porter County	968
Illinois	502
Newton County	314
Tippecanoe County	252
Total of above	4,597

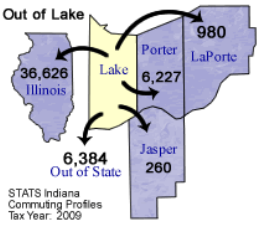
(21.4% of Jasper County labor force)



Top 5 counties receiving workers FROM Lake County:

County Receiving Workers	Workers
Illinois	36,626
Out of State	6,384
Porter County	6,227
LaPorte County	980
Jasper County	260
Total of above	50,477

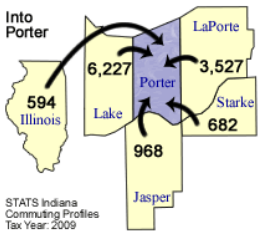
(17.0% of Lake County labor force)



Top five counties sending workers INTO Porter County:

County Sending Workers	Workers
Lake County	6,227
LaPorte County	3,527
Jasper County	968
Starke County	682
Illinois	594
Total of above	11,998

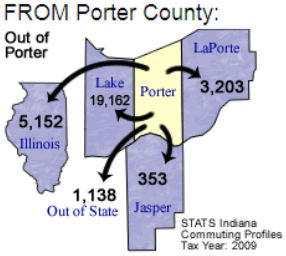
(13.4% of Porter County workforce)



Top 5 counties receiving workers FROM Porter County:

County Receiving Workers	Workers
Lake County	19,162
Illinois	5,152
LaPorte County	3,203
Out of State	1,138
Jasper County	353
Total of above	29,008

(27.3% of Porter County labor force)



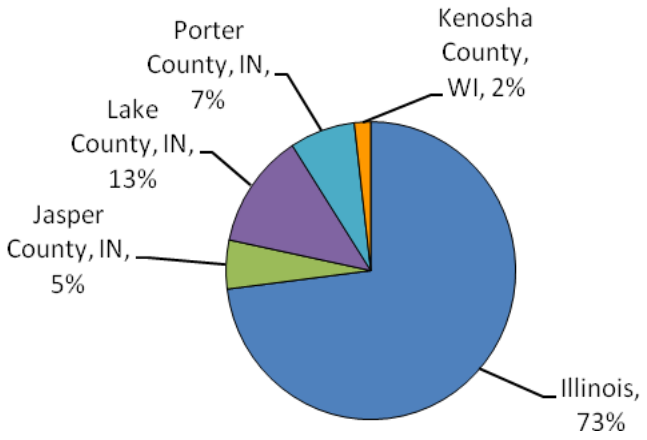
Within Northwest Indiana, Lake County maintains the highest concentration (82.3%) of employment by residents of the county, compared to the other counties within the area. Jasper and Porter counties also maintain high concentrations of employment of their residents (75% and 71.5%, respectively). The majority of the traffic congestion occurs in Lake County. A significant level of commuting occurs from the surrounding counties to Lake and Porter counties. In fact, Lake and Porter counties have the largest level of commuting to and from each other in Northwest Indiana.

Appendix C

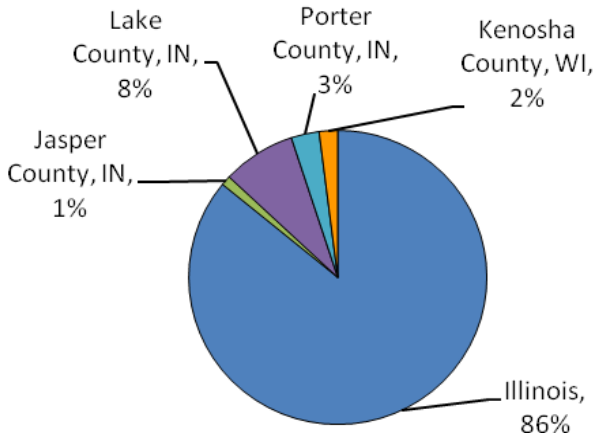
2008 Nonattainment Area Emissions Inventory

Chicago Proposed Nonattainment Area Emissions Summary 2008 Total NO_x and VOC Emissions (Tons Per Year)				
County/State	**NO_x**	**Percent of Nonattainment Area**	**VOC**	**Percent of Nonattainment Area**
Illinois	271,712.29	73%	229,333.51	86%
Jasper County, Indiana	19,787.78	5%	2,845.03	1%
Lake County, Indiana	46,808.29	13%	21,266.91	8%
Porter County, Indiana	27,054.63	7%	8,099.75	3%
Kenosha County, Wisconsin	6,788.19	2%	5,370.52	2%
Total	**372,151.18**		**266,915.72**	

Chicago Proposed Nonattainment Area 2008 NO_x Total Emissions

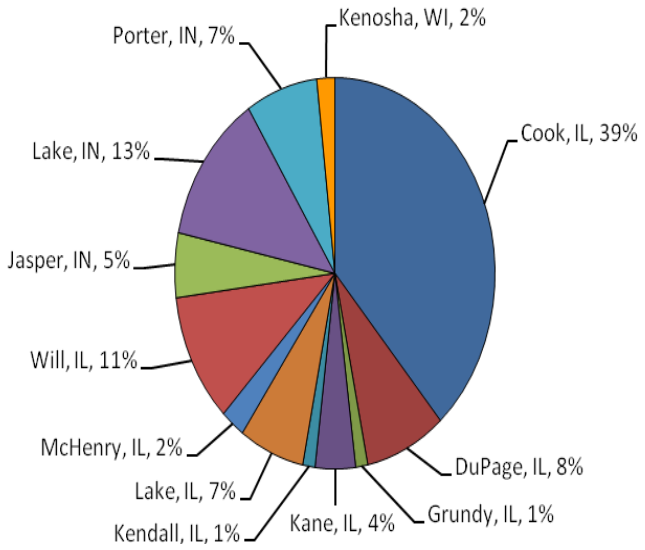


Chicago Proposed Nonattainment Area 2008 VOC Total Emissions

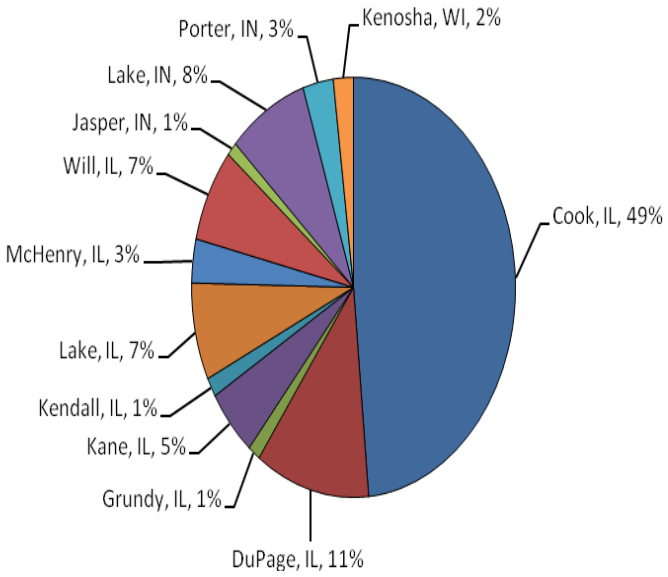


Chicago Proposed Nonattainment Area Emissions Summary 2008 Total NO_x and VOC Emissions (Tons Per Year)				
County/State	**NO_x**	**Percent of Nonattainment Area**	**VOC**	**Percent of Nonattainment Area**
Cook County, Illinois	143,374.18	39%	129,469.81	49%
DuPage County, Illinois	30,412.57	8%	30,508.73	11%
Grundy County, Illinois	4,567.62	1%	3,269.52	1%
Kane County, Illinois	15,161.39	4%	13,893.96	5%
Kendall County, Illinois	4,636.17	1%	3,956.70	1%
Lake County, Illinois	24,548.91	7%	19,978.44	7%
McHenry County, Illinois	9,138.08	2%	9,012.59	3%
Will County, Illinois	39,873.38	11%	19,243.76	7%
Jasper County, Indiana	19,787.78	5%	2,845.03	1%
Lake County, Indiana	46,808.29	13%	21,266.91	8%
Porter County, Indiana	27,054.63	7%	8,099.75	3%
Kenosha County, Wisconsin	6,788.19	2%	5,370.52	2%
Total	**372,151.18**		**266,915.72**	

Chicago Proposed Nonattainment Area
2008 NO_x Total Emissions



Chicago Proposed Nonattainment Area
2008 VOC Total Emissions



Appendix D

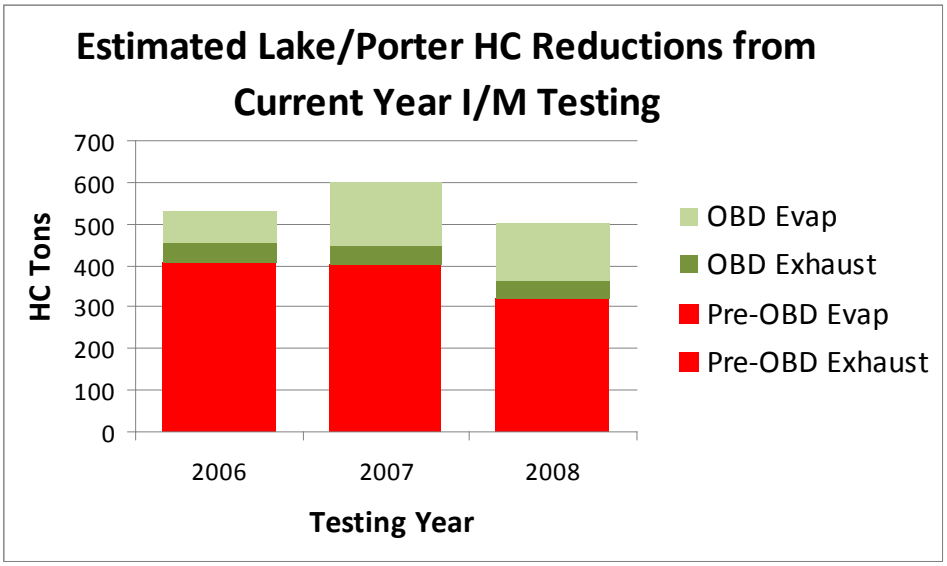
Emission Reductions for Lake and Porter Counties Vehicle Emissions Testing

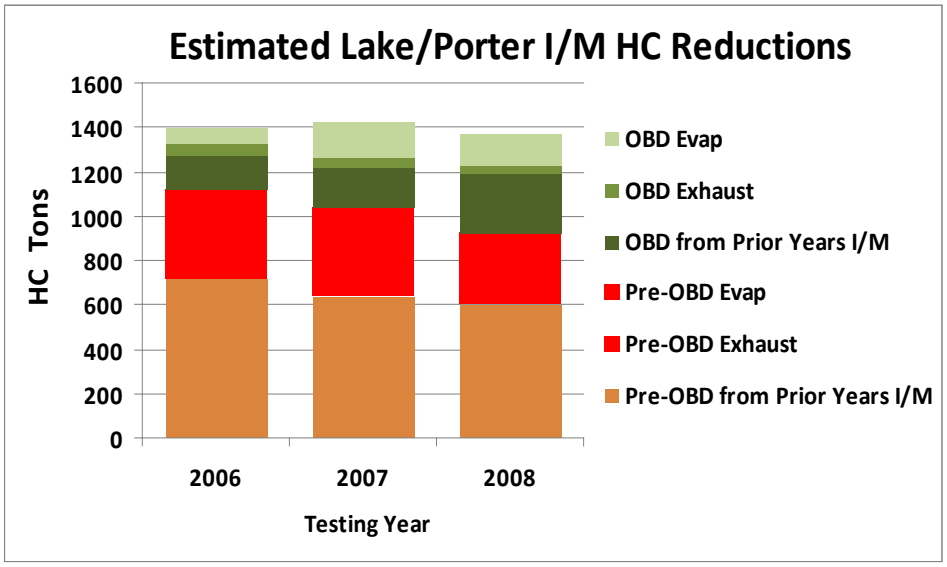
The Office of Air Quality was asked by agency management to evaluate the emission reduction benefits of the vehicle emissions and testing program in Lake and Porter counties, (referred to as the Clean Air Car Check program), to determine the reductions for pre-1996 model year vehicles. Specifically, the Office of Air Quality was tasked to compare the reduction benefits of testing pre-1996 model year vehicles (non-OBD) and 1996 model year and newer vehicles (OBD equipped). Due to limitations associated with the MOBILE emissions factor model, the Office of Air Quality's approach to this analysis was to quantify actual emission reductions to the extent possible. In order to accomplish this, the Office of Air Quality secured the technical assistance of our contractor for the program, Envirotest Systems Corporation, and its technical consultant, Dr. Peter McClintock.

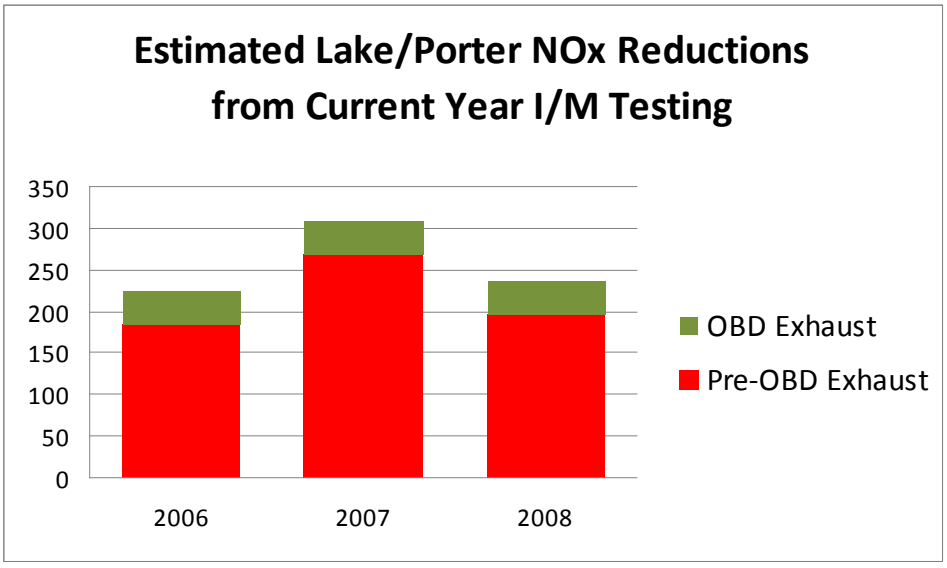
This report is structured to first provide a summary of the analysis, and then provide a detailed explanation of how the analysis was conducted. A description of the key assumptions, limitations, and caveats associated with the analysis is also provided following the summary of results.

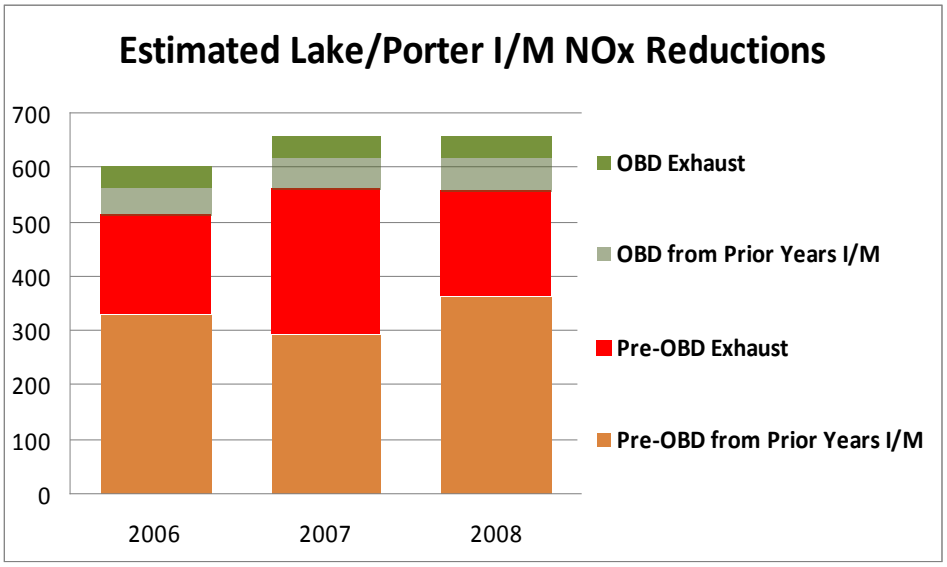
The following summarizes the results of the analysis:

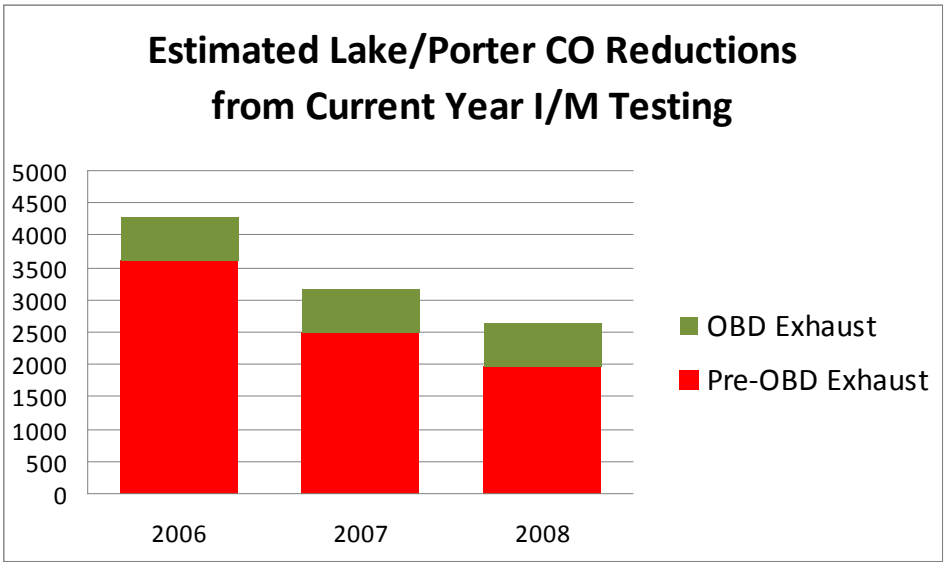
Lake/Porter I/M Reductions	HC Tons			CO Tons			NO_x Tons		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
OBD Exhaust	48	46	44	662	669	655	40	40	41
OBD Evap	79	156	140	0	0	0	0	0	0
Pre-OBD Exhaust	341	267	191	3,626	2,510	1,990	186	269	196
Pre-OBD Evap	65	136	130	0	0	0	0	0	0
OBD from Prior Years I/M	152	181	265	794	943	1,000	48	57	60
Pre-OBD from Prior Years I/M	721	640	606	6,436	5,711	4,323	329	292	362
Total	1,406	1,425	1,376	11,518	9,833	7,967	603	659	659

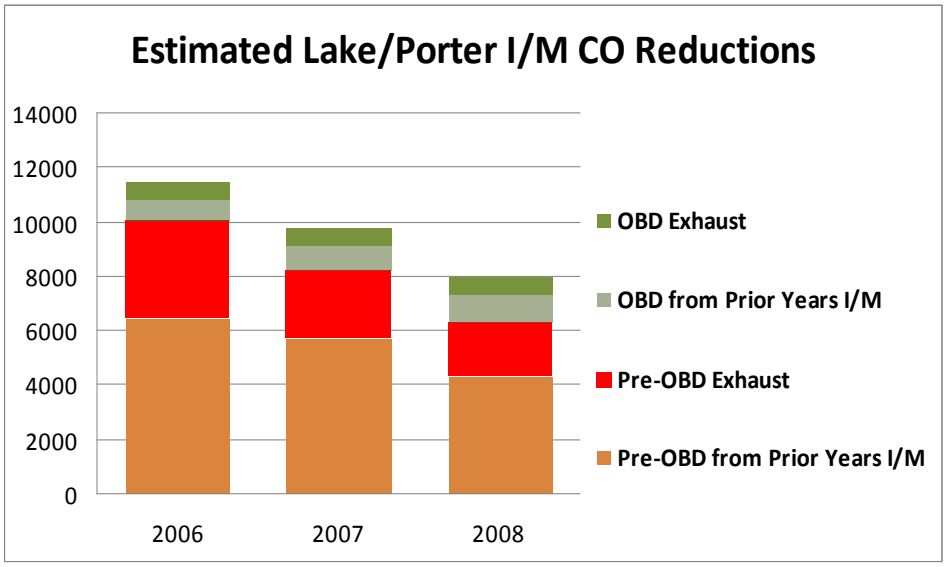












Reduction Calculation and Methodology

The general approach to this analysis was to calculate emission reductions for the vehicle emissions testing program through the use of actual test data specific to the program in place within Lake and Porter counties. However, due to the fact that little tailpipe data is collected for 1996 and newer vehicles, and actual vehicle use data (vehicle miles traveled by vehicle type and age) is unknown, some key assumptions and data from other programs was necessary to complete this analysis. Nevertheless, the results based on real world data should be more representative than those produced from a standard MOBILE model-based estimation.

Pre-1996 Vehicles:

Vehicle exhaust reductions for pre-1996 vehicles were calculated based on the difference between initial total failures and the final test (post repair) for the portion of the fleet that initially failed. This difference represents the actual reductions achieved through vehicle repairs made in conjunction with failed tailpipe testing (either IM 240 or BAR 90). In most cases, the final test represents a passing test, but in some cases, the needed repairs may be unresolved (most likely minimum expenditure waiver). The majority (80%) of unresolved vehicles are assumed to leave the jurisdiction following the unresolved test cycle and credit is taken for the removal of these vehicles from I/M area. MOBILE6 does not assume benefit for the removal or retirement of vehicles – the modeler would have to adjust the input registration fractions in I/M and no-I/M scenarios.

Owners of high emitting vehicles are often aware there is a problem in advance of the I/M inspection. This is obviously true in the case of OBD vehicles that have a malfunction indicator light specifically related to monitoring emissions controls. But many earlier models also had various malfunction indicators. Pre-inspection repairs of more than 50% were reported by Wenzel[1] and the percentages of measured exhaust emissions reductions within each OBD model year in Colorado were observed to be progressing at half the rate by age of the percentages of measured reductions within each pre-OBD model year[2]. For this assessment of emissions reductions in Indiana, for 1995 and older models, pre-inspection repairs were assumed to be an incremental 50% of the measured reductions described above. For 1996 and newer OBD models, pre-inspection repairs were assumed to be an incremental 100% of the measured exhaust reductions and 50% of the evaporative reductions. The lower percentage was used for evaporative emissions since most liquid leaks are not detected by OBD.

Since the test cycle is once every two years, and repairs made as a result of previous failures provide a residual benefit, reductions from previous year repairs have been accounted for. For vehicles repaired within the current test cycle (2007-2008), the assumed reduction benefit is 100%. For those repairs made in the year prior to the current two-year test cycle, e.g. repairs in 2006 for the 2007-2008 test cycle, the assumed residual benefit is 50%.

Tailpipe emissions data are collected in a grams per mile unit. In order to convert this to a tons per summer day or annual tons unit, the grams per mile factor for a vehicle classification is multiplied by the annual vehicle miles traveled for the same vehicle classification. The vehicle miles traveled assumptions made for this analysis derive from a study conducted and published by the Eastern Research Group for the State of Colorado in June of 2008. This showed higher annual mileage by older models than MOBILE6 default assumptions.

[1] Wenzel T, "Human Behavior in I/M Programs", 15th Annual Mobile Sources/Clean Air Conference, Sept 1999.
[2] McClintock P. "Trends in Vehicle Emissions Testing, Presentation to BC AirCare Steering Committee", April 2009.

Evaporative emission reductions were calculated based on the total number of gas caps replaced within the Clean Air Car Check program for Lake and Porter counties. The emission factor for evaporative system leaks derive from two separate studies: 1) Amlin D, Carlisle R, Kishan S, Klausmeier R, Haskew H "Evaporative Emissions Impact of Smog Check" California Bureau of Automotive Repair, ERG, dKC, August 2001; 2) Martin Reineman, "Effectiveness of OBD II Evaporative Emission Monitors - 30 Vehicle Study", EPA420-R-00-012, August 2000.

Clean Air Car Check did not initiate a liquid leak inspection procedure until mid-2007. Therefore, evaporative leak reductions are only quantified for 2008. Liquid leak reductions for 2008 were calculated based on an emission factor specific to the volume of leak detected. The assumptions were as follows: 1) <100pmm equivalent to leaky gas cap 3.5 g/mi; 2) 100-499 ppm equivalent to 7g/mi; 3) 500 & up equivalent to 15g/mi.

The following tables outline the results of the pre-1996 vehicle analysis for Lake and Porter counties:

2008: 1995 & Older Models

	Initial Fails	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
IM240 Tested Vehicles						
Repaired	4,875	33.8	56.0	607	61.7	1
Unresolved	3,903	26.9	67.3	689	69.0	1, 2
BAR90 Tested Vehicles						
Repaired	44	0.2	1.5	12		1, 8
Unresolved	56	0.3	2.3	18		1, 2, 8
Total Measured Exhaust	8,878	61.2	127.1	1,327	130.7	
Evaporative Emissions 1995 & Older:						
Gas Cap Repairs	1,036	7.3	28.4			1,3
Leaks Identified	1,795	12.1	58.4			1,4
Subtotal Evap		19.3	86.8	-	-	
Exhaust + evap			213.8	1,326.6	130.7	
Pre-inspection repairs		50%	106.9	663.3	65.4	5
Total new 2008			**320.7**	**1,989.9**	**196.1**	
Continuing Reductions from previous years repairs and retirements:						
From 2007	100%		402.9	2,510.0	269.1	6
From 2006 & before	50%		203.1	1,813.0	92.8	7
Total effective in 2008			**926.7**	**6,312.9**	**557.9**	

2007: 1995 & Older Models

	Initial Fails	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
IM240 Tested Vehicles						
Repaired	7,002	52.2	86.1	847	89.6	1
Unresolved	4,958	36.4	90.0	814	89.8	1, 2
BAR90 Tested Vehicles						
Repaired	15	0.1	0.6	5.3		1, 8
Unresolved	34	0.2	1.6	6.9		1, 2, 8
Total Measured Exhaust	12,009	88.9	178.3	1,673.2	179.4	
Evaporative Emissions 1995 & Older:						
Gas Cap Repairs Leaks Identified	3,300	23.1	90.4			1,3
Subtotal Evap		23.1	90.4			
Exhaust + evap			268.7	1,673.2	179.4	
Pre-inspection repairs		50%	134.3	836.7	89.7	5
Total new 2007			**402.9**	**2,510.0**	**269.1**	
Continuing Reductions from previous years repairs and retirements:						
From 2006 & before	100%		406.1	3,625.9	185.5	6
From 2005 & before	50%		233.5	2,084.9	106.7	7, 9
Total effective in 2007			**1,042.5**	**8,220.8**	**561.3**	

2006: 1995 & Older Models

	Initial Fails	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
IM240 Tested Vehicles						
Repaired	6,219	47.6	105.6	1,185	53.5	1
Unresolved	4,876	36.6	118.6	1,196	70.2	1, 2
BAR90 Tested Vehicles						
Repaired	74	0.4	2.0	21.8		1, 8
Unresolved	51	0.3	1.2	14.1		1, 2, 8
Total Measured Exhaust	11,220	84.9	227.4	2,416.9	123.7	
Evaporative Emissions 1995 & Older:						

Gas Cap Repairs Leaks Identified	1,582	11.1	43.3			1,3
Subtotal Evap		11.1	43.3	-	-	
Exhaust + evap			270.7	2,416.9	123.7	
Pre-inspection repairs		50%	135.4	1,208.6	61.8	5
Total new 2006			**406.1**	**3,625.9**	**185.5**	
Continuing Reductions from previous years repairs and retirements:						
From 2005 & before	100%		467.0	4,169.8	213.4	6, 9
From 2004 & before	50%		253.8	2,266.2	116.0	7, 9
Total effective in 2006			**1,126.9**	**10,061.9**	**514.9**	

Notes and assumptions legend:

1. VMT from Colorado 2007 Estimate by ERG, split 50/50 LDGV/LDGT. "Colorado Mileage Accumulation Rates from VID Odometer Readings Draft Report" for CDPHE by Eastern Research Group, Inc. June 30, 2008.
2. 80% of unresolved vehicles retire or leave the area as a result of registration enforcement.
3. Gas Cap Reductions: a) 1995 & older: 3.5 g/mi.
    a. 1996 & newer: 3.24 g/mi.
    b. Amlin D, Carlisle R, Kishan S, Klausmeier R, Haskew H "Evaporative Emissions Impact of Smog Check" California Bureau of Automotive Repair, ERG, dKC, August 2001.
    c. Martin Reineman, "Effectiveness of OBD II Evaporative Emission Monitors - 30 Vehicle Study", EPA420-R-00-012, August 2000.
4. Reductions per leak as identified in Leaks tab:
    a. <100pmm equivalent to leaky gas cap 3.5 g/mi.
    b. 100-499 ppm equivalent to 7g/mi.
    c. 500 & up equivalent to 15g/mi
5. Pre-inspection repairs assumed to be 50%. Wenzel T, "Human Behavior in I/M Programs", 15th Annual Mobile Sources/Clean Air Conference, Sept 1999.
6. Half the fleet is tested each year. Repairs from last year are assumed 100% effective in the current year.
7. Many repairs have a life greater than two years. Average life 3 years. Residual benefit from 2 year ago repairs assumed at 50%.
8. Idle test to IM240 conversions per Colorado via RSD (see BAR90 tab).
9. 1995 & older model original 2005 benefits assumed to be 115% of 2006, original 2004 benefits assumed to be 125% of 2006. The increased %'s are because more of these older model vehicles existed in previous years.

1996 and Newer Vehicles:

The Clean Air Car Check program initiated a fall-back test procedure for OBD-equipped vehicles that have failed the OBD test procedure more than three times in 2007. This has resulted in tailpipe test data for some 1996 and newer vehicles registered in Lake and Porter counties, but the sample set is too small to calculate total exhaust emission reductions for OBD vehicles. British Columbia is the only OBD I/M vehicle emissions testing program[i] that tests measurable emissions from a robust sample of OBD vehicles. Therefore, data was acquired from British Columbia to generate reduction factors specific to vehicle model years and classifications. These reduction factors were then applied to the fleet for Lake and Porter counties. This methodology, though not ideal, results in a more reliable estimate than that produced through MOBILE-based methodology and is more comparable to the reduction estimates for the pre-1996 fleet.

Since British Columbia only implemented OBD I/M testing at the start of 2007, the 2006 test year gram per mile reductions were assumed to be the same as those observed in 2007. This could be an overestimate of reductions since the OBD models were newer and presumably would have had a lower percentage of fails in 2006. On the other hand, British Columbia exempts the newest seven model years from inspection, which is three years longer than Indiana, and no reductions were included for 5 to 7-year old models.
As noted earlier, pre-inspection repairs for 1996 and newer OBD models were assumed to be an incremental 100% of the measured exhaust reductions and 50% of the evaporative reductions. The lower percentage was used for evaporative emissions since most liquid leaks are not detected by OBD.

Since the test cycle is once every two years, and repairs made as a result of previous failures provide a residual benefit, reductions from previous year repairs have been accounted for. For vehicles repaired within the current test cycle (2007-2008), the assumed reduction benefit is 100%. For those repairs made in the year prior to the current two-year test cycle, e.g. repairs in 2006 for the 2007-2008 test cycle, the assumed residual benefit is 50%.

Tailpipe emissions data are collected in grams per mile units. In order to develop tons per summer day or annual tons, the grams per mile factor for a vehicle classification is multiplied by the vehicle miles traveled for the same vehicle classification. The vehicle miles traveled assumptions made for this analysis derive from a study conducted and published by the Eastern Research Group for the State of Colorado in June of 2008 and the number of vehicles inspected in Indiana.

Evaporative emission reductions were calculated based on the total number of gas caps replaced within the Clean Air Car Check program for Lake and Porter counties. The emission factor for evaporative system leaks derive from two separate studies: 1) Amlin D, Carlisle R, Kishan S, Klausmeier R, Haskew H "Evaporative Emissions Impact of Smog Check" California Bureau of Automotive Repair, ERG, dKC, August 2001; 2) Martin Reineman, "Effectiveness of OBD II Evaporative Emission Monitors - 30 Vehicle Study", EPA420-R-00-012, August 2000.

Clean Air Car Check initiated a liquid lead test procedure in mid-2007. However, since the procedure results from a flag established within the IM 240 software, only vehicles subject to the IM 240 test are subjected to the liquid leak test procedure. This results in 1996 and newer vehicles being exempt from liquid leak inspection.

The following tables outline the results of the 1996 and newer model year vehicle analysis for Lake and Porter counties:

2008 British Columbia Data

Model Years	Initial Tests	VMT' M	BC Initial Emissions g/mi			BC Reductions g/mi			BC Reductions RFUAF		
			HC	CO	NO_x	HC	CO	NO_x	HC	CO	NO_x
1996-1997	17,702	156	0.62	10.35	1.13	0.063	0.87	0.050	0.022	0.26	0.017
1998-2001	53,860	559	0.34	6.06	0.63	0.009	0.17	0.010	0.003	0.05	0.004
2002 & newer	63,834	777	0.31	5.90	0.51	0.000	0.00	0.000	0.000	0.00	0.000
Total	135,396	1,492									

Model Years	BC Reductions (tons)			BC Reductions RFUAF		
	HC	CO	NO_x	HC	CO	NO_x
1996-1997	10.9	148.6	8.6	3.8	43.8	2.9
1998-2001	5.6	105.3	6.3	1.7	29.7	2.7
2002 & newer	0.0	0.0	0.0	0.0	0.0	0.0
Total	16.5	253.9	14.9	5.5	73.5	5.6

2008: 1996 & Newer Models-Lake and Porter

	Initial Tests	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
OBD Tested Vehicles	135,396	1,492				
Repaired			16.5	253.9	14.9	1, 8
Removed from Use After Failure			5.5	73.5	5.6	1, 2, 8
Subtotal Exhaust reductions			21.9	327.4	20.5	
Pre-inspection exhaust repairs		100%	21.9	327.4	20.5	9
Total Exhaust			43.8	654.8	41.0	
Evaporative Emissions 1996 & Newer:						
Gas Cap Repairs	2,375	26.1	93.3			1,3

Leaks Identified					1,4
Subtotal Evap	26.1	93.3	-	-	
Pre-inspection evap repairs	50%	46.7	-	-	5
Total evap		140.0	-	-	
Total new 2008		**183.9**	**654.9**	**41.0**	
Continuing Reductions from previous years repairs and retirements:					
From 2007	100%	201.8	668.7	40.1	6
From 2006 & before	50%	63.4	331.0	20.1	7
Total effective in 2008		**449.1**	**1,654.6**	**101.2**	

2007 British Columbia Data

Model Years	Initial Tests	VMT' M	BC Initial Emissions g/mi HC	CO	NO_x	BC Reductions g/mi HC	CO	NO_x	BC Reductions RFUAF HC	CO	NO_x
1996-1997	24,128	235	0.62	10.28	1.12	0.056	0.816	0.045	0.015	0.163	0.012
1998-2001	60,212	677	0.33	6.02	0.62	0.004	0.084	0.005	0.001	0.024	0.002
2002 & newer	32,700	412	0.31	5.90	0.51	0.000	0.000	0.000	0.000	0.000	0.000
Total	**117,040**	**1,324**									

Model Years	BC Reductions (tons) HC	CO	NO_x	BC Reductions RFUAF HC	CO	NO_x
1996-1997	14.6	211.3	11.7	4.0	42.1	3.2
1998-2001	3.3	62.6	3.6	1.0	18.3	1.6
2002 & newer	0.0	0.0	0.0	0.0	0.0	0.0
Total	**17.9**	**273.9**	**15.3**	**5.0**	**60.4**	**4.8**

2007: 1996 & Newer Models-Lake and Porter

	Initial Fails	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
OBD Tested Vehicles	117,040	1,325				
Repaired			17.9	273.9	15.3	1, 8

Unresolved			5.0	60.4	4.7	1, 2, 8
Subtotal Exhaust reductions			22.9	334.3	20.1	
Pre-inspection exhaust repairs		100%	22.9	334.3	20.1	9
Total Exhaust			45.8	668.6	40.2	
Evaporative Emissions 1996 & Newer:						
Gas Cap Repairs	2,650	29.2	104.1			1,3
Leaks Identified						
Subtotal Evap		29.2	104.1	-	-	
Pre-inspection evap repairs		50%	52.1	-	-	5
Total evap			156.2	-	-	
Total new 2007			**201.9**	**668.6**	**40.2**	
Continuing Reductions from previous years repairs and retirements:						
From 2006 & before		100%	126.9	662.0	40.1	6
From 2005 & before		50%	53.9	281.3	17.0	7, 10
Total effective in 2007			**382.7**	**1,611.9**	**97.3**	

2006* British Columbia Data

Model Years	Initial Tests	VMT'M	BC Initial Emissions g/mi HC	CO	NO_x	BC Reductions g/mi HC	CO	NO_x	BC Reductions RFUAF HC	CO	NO_x
1996-1997	29,018	284	0.62	10.28	1.12	0.06	0.82	0.05	0.02	0.16	0.01
1998-2001	80,063	906	0.33	6.02	0.62	0.00	0.08	0.00	0.00	0.02	0.00
2002 & newer	43,268	546	0.31	5.90	0.51	0.00	0.00	0.00	0.00	0.00	0.00
Total	**152,349**	**1,737**									

Model Years	BC Reductions tons HC	CO	NO_x	BC Reductions RFUAF HC	CO	NO_x
1996-2001	17.6	255.6	14.1	4.8	50.9	3.8
	4.4	83.8	4.9	1.3	24.5	2.1
	0.0	0.0	0.0	0.0	0.0	0.0
Total	**22.0**	**339.4**	**19.0**	**6.1**	**75.4**	**5.9**

*Assumes same gram/mile values as for 2007 due to unavailable OBD I/M data for 2006.

2006: 1996 & Newer Models

	Initial Fails	Total VMT 'M	Tons Per Year Reduction HC	CO	NO_x	Notes
OBD Tested Vehicles	29,018	284				
Repaired			17.6	255.6	14.1	1, 8
Unresolved			6.1	75.4	5.9	1, 2, 8
Subtotal Exhaust reductions			23.8	331	20.1	
Pre-inspection exhaust repairs		100%	23.8	331.0	20.1	9
Total Exhaust			47.6	662.0	40.2	
Evaporative Emissions 1996 & Newer:						
Gas Cap Repairs Leaks Identified	1,346	14.8	52.9			1,3
Subtotal Evap		14.8	52.9	-	-	
Pre-inspection evap repairs		50%	26.4	-	-	5
Total evap			79.3	-	-	
Total new 2006			**126.9**	**662.0**	**40.1**	
Continuing Reductions from previous years repairs and retirements:						
From 2005 & before	100%		107.8	562.7	34.1	6, 10
From 2004 & before	50%		44.4	231.7	14.0	7, 10
Total effective in 2006			**279.1**	**1,456.4**	**88.2**	

Notes and assumptions:

1. VMT from Colorado 2007 Estimate by ERG, split 50/50 LDGV/LDGT. "Colorado Mileage Accumulation Rates from VID Odometer Readings Draft Report" for CDPHE by Eastern Research Group, Inc. June 30, 2008.
2. Average per vehicle repair values from British Columbia.
3. RFUAF - Removal from Use After Failure - emissions of vehicles that cease operating after failing their I/M inspection.
4. Gas Cap Reductions: a) 1995 & older: 3.5 g/mi, b) 1996 & newer: 3.24 g/mi.
    a. Amlin D, Carlisle R, Kishan S, Klausmeier R, Haskew H "Evaporative Emissions Impact of Smog Check" California Bureau of Automotive Repair, ERG, dKC, August 2001.

   b. Martin Reineman, “Effectiveness of OBD II Evaporative Emission Monitors - 30 Vehicle Study”, EPA420-R-00-012, August 2000.
5. Reductions per leak as identified in Leaks tab:
   a. <100pmm equivalent to leaky gas cap 3.5 g/mi.
   b. 100-499 ppm equivalent to 7g/mi.
   c. 500 & up equivalent to15g/mi.
6. Pre-inspection repairs assumed to be 50%. Wenzel T, “Human Behavior in I/M Programs”, 15th Annual Mobile Sources/Clean Air Conference, Sept 1999.
7. Half the fleet is tested each year. Repairs from last year are assumed 100% effective in the current year.
8. Many repairs have a life greater than two years. Average life 3 years. Residual benefit from 2 year ago repairs assumed at 50%.
9. OBD vehicle emissions levels and reductions assumed to the same as those measured in British Columbia. Emissions levels are applied by model year ranges: 1996-1997, 1998-2001, 2002 & newer.
10. Pre-inspection exhaust repairs for OBD assumed to be 100%.
11. Trends in Vehicle Emissions Testing, Presentation to AirCare Steering Committee, April 2009 Slides 21-23.
12. 2005 original OBD benefits assumed to be 85% of 2006, and 2004 original OBD benefits assumed to be 70% of 2006 because of the fewer numbers of OBD models in those years.

[i] Colorado tests 1996 and newer model vehicles using IM240 but OBD status is not part of the pass/fail determination. Therefore, emissions reductions in the Colorado program might not be representative of an OBD I/M program,

Appendix E

U.S. EPA Region 3, Region 4, Region 5 and Region 6 Technical Support Documents

Including

U.S. EPA Region 3 Technical Support Document: "Pennsylvania Area Designations for the 2008 Ozone National Ambient Air Quality Standards"

U.S. EPA Region 4 Technical Support Document: "Tennessee Area Designations for the 2008 Ozone National Ambient Air Quality Standards"

U.S. EPA Region 5 Technical Support Document: "Illinois-Indiana-Wisconsin Supplement Area Designations for the 2008 Ozone National Ambient Air Quality Standards"

U.S. EPA Region 5 Technical Support Document: "Ohio Area Designations for the 2008 Ozone National Ambient Air Quality Standards"

U.S. EPA Region 6 Technical Support Document: "LOUISIANA Area Designations for the 2008 Ozone National Ambient Air Quality Standards"

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

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

Intended Nonattainment Areas in Pennsylvania

Area	Pennsylvania Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Allentown-Bethlehem-Easton	Lehigh	Carbon, Lehigh, Northampton
Lancaster	Lancaster	Lancaster
Philadelphia-Wilmington-Atlantic City	Bucks, Montgomery, Philadelphia	Bucks, Chester, Delaware, Montgomery, Philadelphia
Pittsburgh-Beaver Valley	Allegheny	Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, Westmoreland
Reading	Berks	Berks

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

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

The analysis below provides the basis for intended nonattainment area boundaries. It relies on our analysis of whether and which monitors are violating the 2008 ozone NAAQS, based on certified air quality monitoring data from 2008-2010 and an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas based on a weight of evidence analysis considering the factors identified below. EPA issued guidance on December 4, 2008 that identified these factors as ones EPA would consider in determining nonattainment area boundaries and recommended that states consider these factors in making their designations recommendations to EPA.[1]

1. Air quality data (including the design value calculated for each FRM or FEM monitor in the area);

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

2. Emissions and emissions-related data (including location of sources and population, amount of emissions and emissions controls, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography and topography (mountain ranges or other basin boundaries);
5. Jurisdictional boundaries (e.g., counties, air districts, existing nonattainment areas, Indian country, metropolitan planning organizations (MPOs))

Ground-level ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Because NOx and VOC emissions from a broad range of sources over a wide area typically contribute to violations of the ozone standards, EPA believes it is important to consider whether there are contributing emissions from a broad geographic area. Accordingly, EPA chose to examine the 5 factors with respect to the larger of the Combined Statistical Area (CSA) or Core Based Statistical Area (CBSA) within which is located the violating monitor(s).[2] All data and information used by EPA in this evaluation are the latest available to EPA and/or provided to EPA by states or tribes.

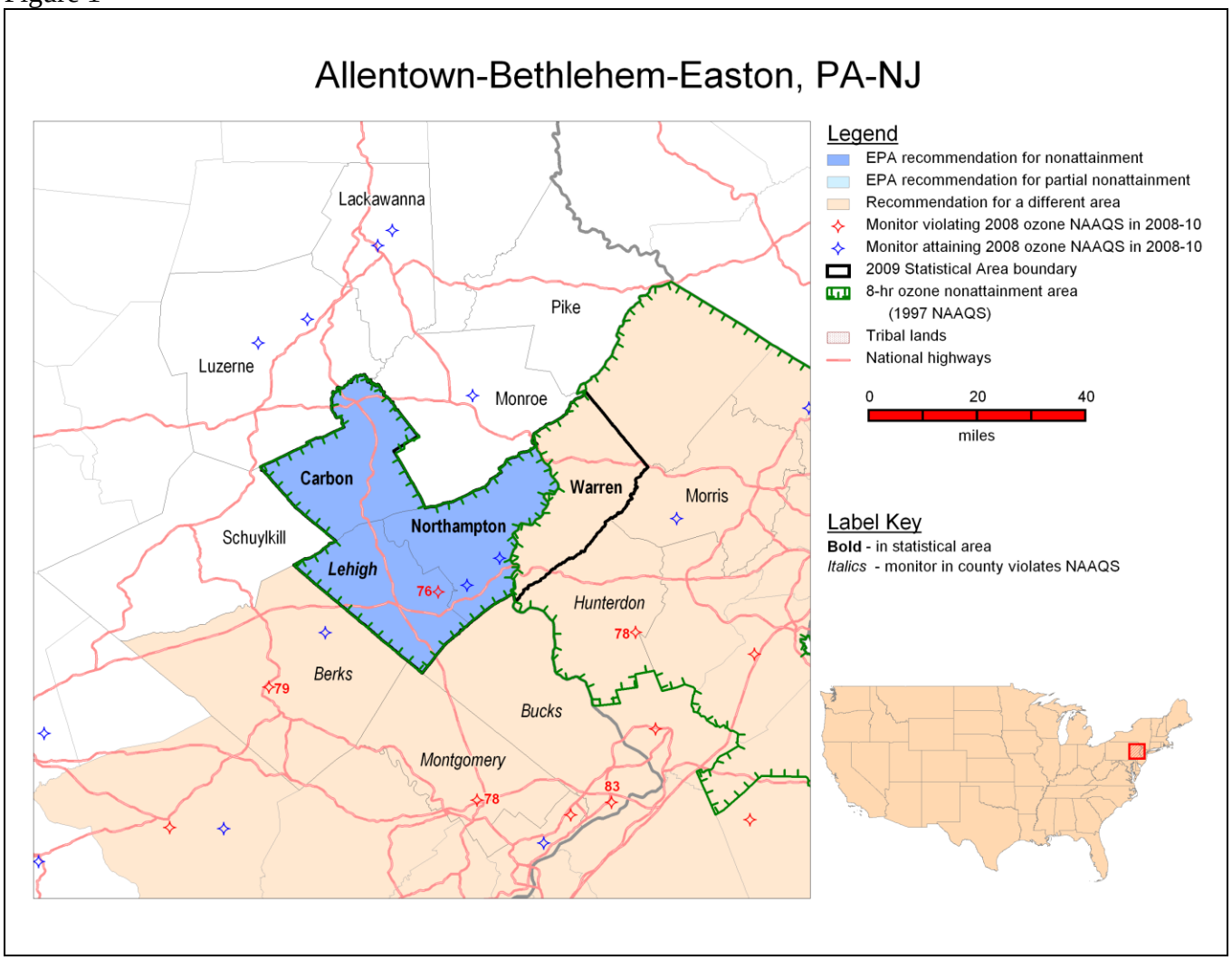
In EPA's designations guidance for the 2008 ozone NAAQS[3] EPA recommended examining CSA/CBSAs because certain factors (such as population) used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 ozone NAAQS. EPA used the same basic approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's guidance recommended using the boundary of the county containing the violating monitor as the starting point for considering the nonattainment area's boundary.

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

Technical Analysis for the Allentown-Bethlehem-Easton Area

Figure 1 is a map of the Allentown-Bethlehem-Easton intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, census-defined metropolitan statistical area boundary, existing maintenance area boundary for the 1997 ozone NAAQS, and EPA's intended nonattainment boundary for the 2008 ozone NAAQS.

Figure 1



For purposes of the 1997 ozone NAAQS, portions of this area were designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire counties of Carbon, Lehigh, and Northampton Counties. Warren County, NJ, which is part of the census-defined metropolitan statistical area was designated nonattainment for the 1997 ozone NAAQS as part of the separate New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment area.

In March 2009, the Commonwealth of Pennsylvania recommended that the same three counties in Pennsylvania be designated as nonattainment in the Allentown-Bethlehem-Easton Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. Pennsylvania provided an updated

recommendation on November 22, 2011, based on more recent air quality data from 2009-2011. That recommendation was to designate only Lehigh County as nonattainment (as it has a violating monitor) and to designate nearby Carbon and Northampton Counties as attainment. The same county, Lehigh County, is violating based on the 2008-2010 and 2009-2011 monitoring data. This data comes from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the March 17, 2009 and November 22, 2011 letters from the Pennsylvania Department of Environmental Protection to EPA.)

In April 2009, the State of New Jersey recommended the same nonattainment boundary for the twelve New Jersey counties (including Warren County) for the 2008 ozone NAAQS as was the case for the 1997 ozone NAAQS (i.e., that Warren County be part of the New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment area). These data are from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the April 1, 2009 letter from the New Jersey Department of Environmental Protection to EPA.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate three counties in Pennsylvania as "nonattainment" for the 2008 ozone NAAQS as part of the Allentown-Bethlehem-Easton nonattainment area.

Table 1. States' Recommended and EPA's Intended Designated Nonattainment Counties for Allentown-Bethlehem-Easton.

Allentown-Bethlehem-Easton	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Pennsylvania	Lehigh	Carbon, Lehigh, Northampton
New Jersey	None	None

Factor Assessment

EPA has determined that it is appropriate to place the nearby counties of Berks, Montgomery, and Bucks in Pennsylvania and Hunterdon and Morris in New Jersey, in separate nonattainment areas for the 2008 ozone NAAQS from the Allentown-Bethlehem-Easton Metropolitan Statistical Area. See EPA's respective technical analyses for these adjacent nonattainment areas for EPA's rationale for our intended nonattainment designation for these counties. To the extent that emissions from those counties may contribute to ozone concentrations in the Allentown-Bethlehem-Easton nonattainment area, that contribution will be lessened by emission controls put in place in those separate nonattainment areas. Therefore, EPA is not including Berks, Montgomery, and Bucks, Hunterdon and Morris in this analysis for the Allentown-Bethlehem-Easton nonattainment area.

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in parts per billion (ppb)) for air quality monitors in counties in the Allentown-Bethlehem-Easton area based on data for the 2008-2010 period (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. A monitor's DV is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met when the annual fourth-highest

daily maximum 8-hour average concentration, averaged over 3 years is 0.075 ppm or less. A DV is only valid if minimum data completeness criteria are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the DV for the county or area is determined by the monitor with the highest level.

The 2010 DVs for the ozone NAAQS for counties in the Allentown-Bethlehem-Easton and nearby surrounding area are shown in Table 2. We did not include neighboring counties to the south of the area, which have been recommended as intended nonattainment as part of separate areas from this area.

Table 2. Air Quality Data.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2010 8-hour Ozone DV (ppb)	Preliminary 2011 8-hour Ozone DV (ppb)
Carbon, PA	No	Yes	--	--
Lehigh, PA	Yes	Yes	76	76
Northampton, PA	No	Yes	75	75
Warren, NJ	Yes, other area	Yes, other area	--	--
Schuylkill, PA	No	No	--	--
Luzerne, PA	No	No	69	65
Lackawanna, PA	No	No	72	71
Monroe, PA	No	No	70	70

Note: Counties with no ozone monitor are identified with "--" in the 2010 and 2011 8-hour Ozone DV columns.

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area "nonattainment" if it is violating the 2008 ozone NAAQS. Lehigh County shows a violation of the 2008 ozone NAAQS, therefore this county must be included in a nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight of evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NO_x and VOC (given in tons per year) for violating and potentially contributing counties in the Allentown-Bethlehem-Easton area.

Table 3. Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Carbon, PA	No	Yes	3,302	3,452
Lehigh, PA	Yes	Yes	11,160	12,147
Northampton, PA	No	Yes	17,082	8,499
Warren, NJ	Yes, other area	Yes, other area	4,483	3,925
Schuylkill, PA	No	No	6,554	5,922
Luzerne, PA	No	No	12,045	13,183
Lackawanna, PA	No	No	7,118	7,233
Monroe, PA	No	No	5,761	8,017

Of the counties in the Allentown-Bethlehem-Easton Metropolitan Statistical Area, Northampton has the highest total NOx emissions, and Lehigh has the highest total VOC emissions. Lehigh also has high NOx emissions, and Northampton has relatively high VOC emissions. Carbon County and Warren County, by comparison, have much lower NOX and VOC emissions. Of the nearby counties outside this metropolitan statistical area, Luzerne has the highest NOx and VOC emissions. Monroe, Lackawanna, and Schuylkill have lower emissions by comparison, than Lehigh and Northampton, however, they are similar to Carbon County.

Population density and degree of urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO_x and VOC emissions that may contribute to ozone formation. Rapid population or VMT growth (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 4 shows the population, population density, and population growth information for each county in the area.

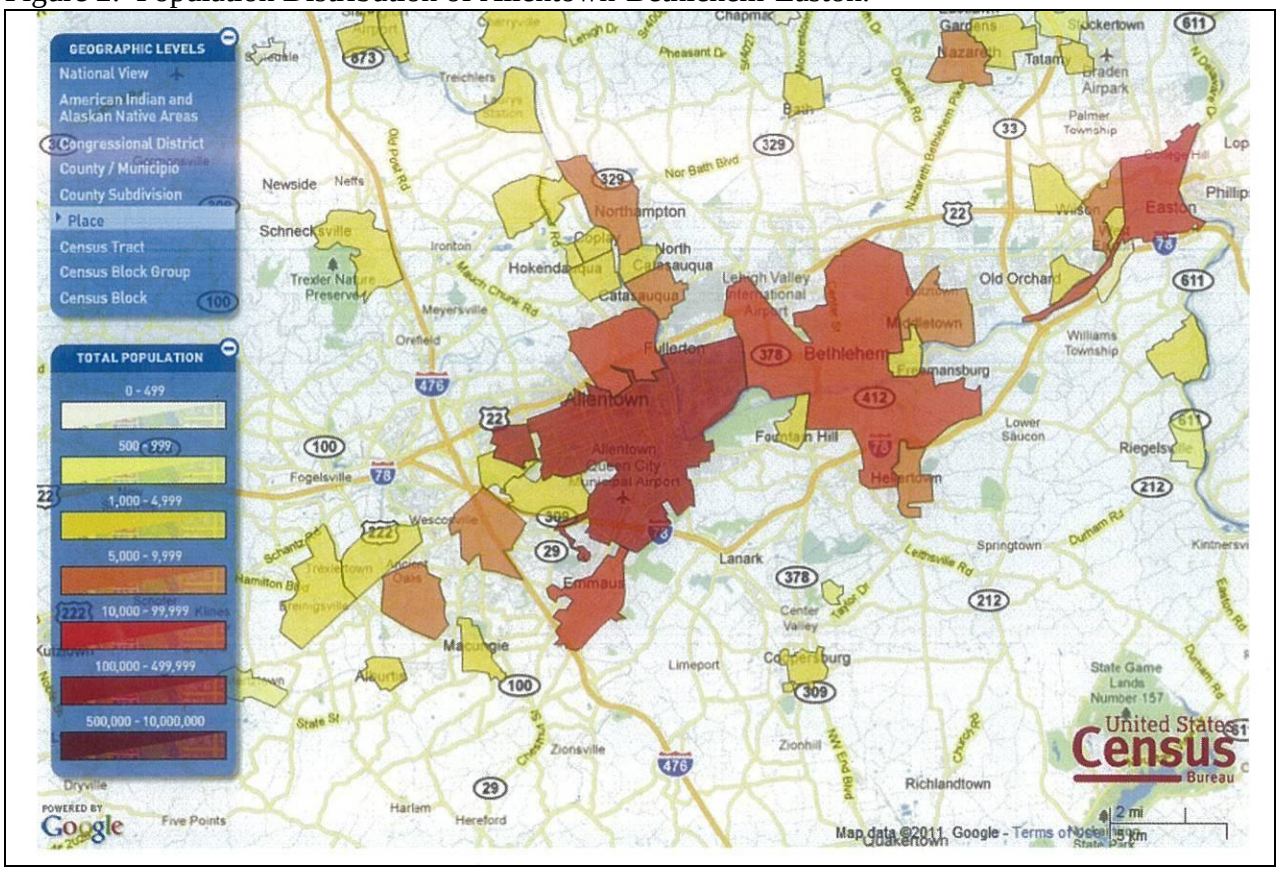
Of the counties that are part of the Allentown-Bethlehem-Easton Metropolitan Statistical Area, Lehigh and Northampton have the highest populations, with Carbon having the lowest population and population density (followed closely by Warren County). Lehigh is also the fastest growing county and has the largest population change. Carbon, Lehigh, and Northampton all experienced double digit population growth in the prior decade, but by comparison, are fairly sparsely populated. Of the counties nearby to, but outside of this, metropolitan statistical area, Luzerne has the highest population, very nearly as large as Lehigh, distantly followed by Lackawanna County.

Table 4. Population and Growth

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Carbon, PA	No	Yes	65,249	0.17	6,417	+11%
Lehigh, PA	Yes	Yes	349,497	1.00	36,843	+12%
Northampton, PA	No	Yes	297,735	0.79	30,295	+11%
Warren, NJ	Yes, other area	No	108,692	0.30	5,745	+6%
Schuylkill, PA	No	No	148,289	0.19	-1,798	-1.2%
Luzerne, PA	No	No	320,918	0.35	2,363	+0.7%
Lackawanna, PA	No	No	214,437	0.46	1,524	+0.7%
Monroe, PA	No	No	169,842	0.28	30,077	+22%

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

Figure 2. Population Distribution of Allentown-Bethlehem-Easton.



Source: US Census (http://2010.census.gov/2010census/popmap/)

The counties neighboring the Allentown-Bethlehem-Easton Metropolitan Statistical Area, have comparatively low population growth, with the exception of Monroe County. Monroe County has a population that is more than four times larger than Carbon County, with a population growth rate

twice that of Carbon County. These adjacent counties are comparatively sparsely populated, with population densities ranging from a high of 460 to a low of 190 persons per square mile. Figure 2 illustrates how the population centers of this area are clustered primarily in the urban centers, with very sparse populations in the surrounding communities.

Traffic and VMT data

EPA evaluated the total Vehicle Miles Traveled (VMT) and the commuting patterns of residents for each county in the area of analysis. In combination with the population/population density data and the location of main transportation arteries (see Figure 1 above), this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows traffic and commuting pattern data, including total 2008 VMT and 10-year VMT growth. Table 6 shows the number of commuters in each county who travel within that county or to another county in the area of analysis.

Table 5. Traffic and VMT Data.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2008 VMT (million miles)	Percent VMT Growth (2002-2008)
Carbon, PA	No	Yes	740	0.8%
Lehigh, PA	Yes	Yes	2,893	2.9%
Northampton, PA	No	Yes	1,997	0.7%
Warren, NJ	No	No	1,530	1.1%
Luzerne, PA	No	No	2,963	4.2%
Lackawanna, PA	No	No	1,994	5.9%
Monroe, PA	No	No	1,621	2.5%
Schuylkill, PA	No	No	1,394	-3.4%

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

Table 6. County to County Worker Flow

Residence County → / **Workplace County ↓**	Carbon, PA	Lehigh, PA	Northampton, PA	Warren, NJ	Monroe, PA	Lackawanna, PA	Luzerne, PA	Schuylkill, PA
Carbon, PA	12,341	550	390	8	614	38	634	1,014
Lehigh, PA	4,663	110,302	30,180	602	1618	193	678	1,742
Northampton, PA	1,975	18,040	68,449	1,803	3,467	46	142	258
Warren, NJ	88	682	7,192	21,034	1,359	4	7	15
Monroe, PA	1,185	410	2,137	200	39,829	2,536	1,664	98
Lackawanna, PA	100	80	92	0	579	79,507	8,105	72
Luzerne, PA	2,224	207	97	12	639	6,847	120,645	3,588
Schuylkill, PA	1,435	268	61	0	31	76	1,179	43,979

Source: U.S. Census Bureau estimates for 2000 County-to-County Worker Flow (http://www.census.gov/hhes/commuting/data/commuting.html)

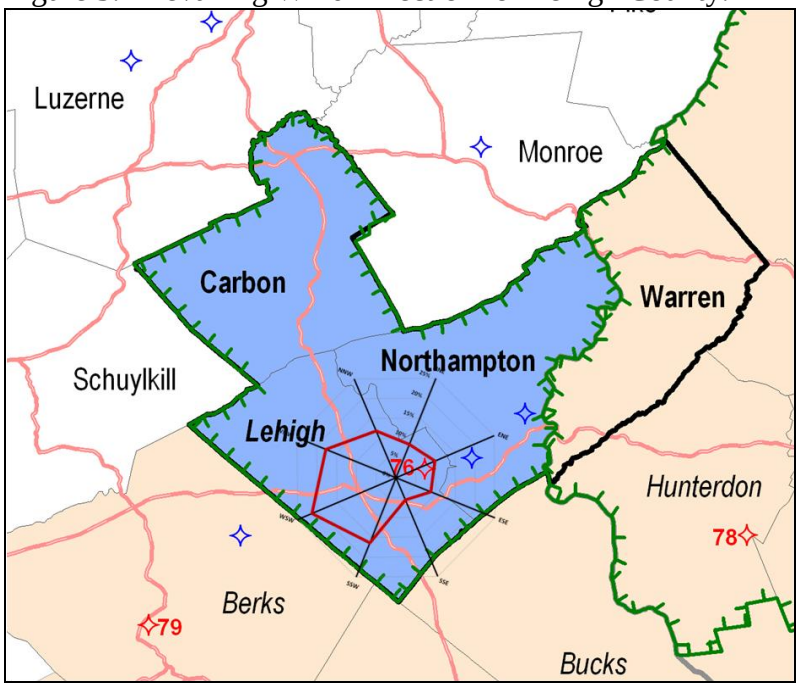
Of the counties in the Allentown-Bethlehem-Easton Metropolitan Statistical Area, Lehigh County has the highest overall VMT, and the highest proportion commuting to violating counties, with most of that commuting occurring within Lehigh County (see Table 6). Northampton County has significant VMT, with a sizable portion commuting to Lehigh County (the location of the violating monitor). Warren County has lower overall VMT, and comparatively lower commuting contribution to Lehigh County (or any of the nearby counties). Carbon County has extremely low VMT and commuting levels to a violating county. Of the counties in the area of analysis, Luzerne and Lackawanna have comparatively high overall VMT, and Lackawanna has the highest recent VMT growth. Table 6 illustrates how little commuting contribution these (or any of the neighboring counties) contribute to the Allentown-Bethlehem-Easton area.

Factor 3: Meteorology (weather/transport patterns)

EPA evaluated any available meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation.

The prevailing winds during the summer ozone season for Lehigh County come predominately from the southwest, and to a lesser degree the west and south direction. The violating monitor for this area is located near the center of Lehigh County, close to the eastern edge of the county. On this basis, the neighboring Scranton-Wilkes-Barre area to the northeast is less likely to contribute to a violation of the Lehigh County monitor, particularly in light of the topography separation between the areas (i.e., the Blue Mountain Ridge). Based solely on historical prevailing winds, the violating monitor in Lehigh County is unlikely to be impacted by downwind contribution from Monroe County and Warren County. However, the prevailing historical wind data analyzed is not specific to the violating monitor or the meteorological episodes when the ozone exceedances actually occurred.

Figure 3. Prevailing Wind Direction for Lehigh County.

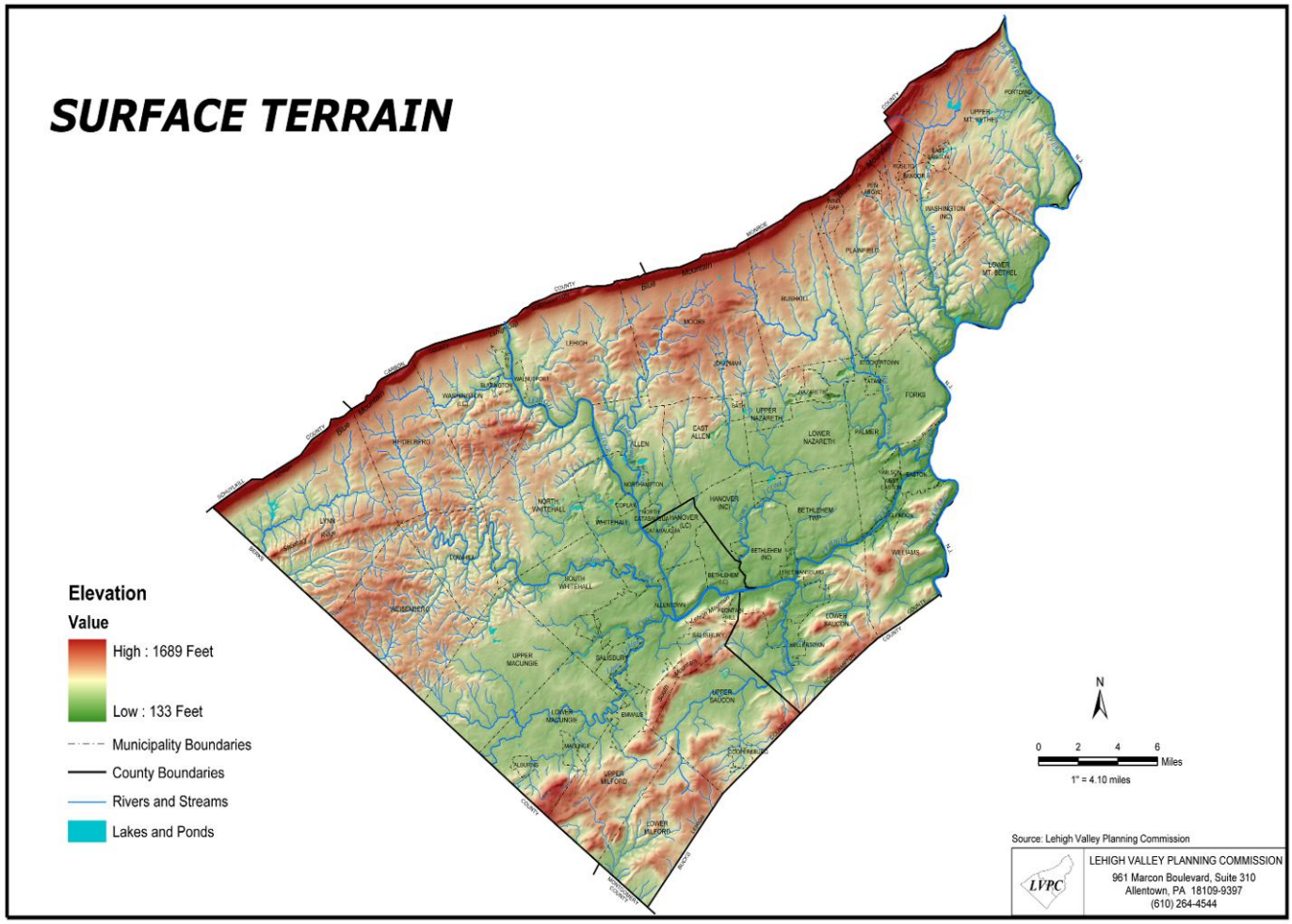


Factor 4: Geography/topography (mountain ranges or other air basin boundaries)

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

The Allentown-Bethlehem-Easton area does have several geographical and topographical barriers that impact air pollution generation and transport within its air shed. The region is bounded on the north by Pocono Mountains, and in particular by the Blue Mountain Ridge that runs west-southwest to north-northeast, creating a significant physical barrier to air movement from north to south and south to north. The Lehigh River crosses the area, with a broad valley that runs from east to west connecting both Lehigh and Northampton Counties. The Delaware River divides Northampton and Warren Counties. Elevation changes run from lows of just over 100 feet above sea level to nearly 1600 feet on the Blue Ridge Mountain Ridge, with the elevation at the Lehigh Valley Airport near Allentown falling at approximately 300 feet. The area lies approximately 80 miles west of the Atlantic Ocean. Warren County is mountainous, with the Kittatinny Ridge bounding the county on the west. Warren County is also part of the Lehigh Valley on its southern edge, and the Kittatinny Valley in the northern part of the county.

Figure 4. Allentown-Bethlehem-Easton Topography (Northampton and Lehigh Counties).



Source: Lehigh Valley Planning Commission

Factor 5: Jurisdictional boundaries

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

The Allentown-Bethlehem-Easton area has previously established nonattainment boundaries associated with the 1997 ozone NAAQS, with Carbon, Lehigh, and Northampton Counties forming the Allentown-Bethlehem-Easton nonattainment area. The Commonwealth initially recommended the same nonattainment area boundary for the 2008 ozone NAAQS in March 2009, but subsequently recommended that only Lehigh County be nonattainment in a November 2011 revised recommendation to EPA. Warren County, New Jersey was part of the separate New York-Northern New Jersey-Long Island, NY-NJ-CT nonattainment area under the 1997 ozone NAAQS, and New Jersey has recommended the same nonattainment boundary for the 2008 ozone NAAQS.

The counties comprising the Allentown-Bethlehem-Easton area historically have strong planning and economic ties. Maintaining the 1997 ozone NAAQS boundary promotes continuity of planning. Lehigh and Northampton counties comprise the metropolitan transportation planning organization, while Carbon County is part of a five-county rural planning organization. However, the Pennsylvania Department of Transportation supports Carbon County with respect to air quality-related technical work, and Pennsylvania concedes that past inclusion of Carbon County in the nonattainment area has not proven problematic from a jurisdictional perspective.

Warren County, NJ is part of the Allentown-Bethlehem-Easton census-defined metropolitan statistical area, but is covered by a separate transportation planning organization, and has historically been part of a separate nonattainment area for ozone, as well as for particulate matter NAAQS. New Jersey has recommended it for inclusion under the 2008 NAAQS as part of the nearby New York-Northern New Jersey-Long Island, NY-NJ-CT area, which has a higher overall design value than it would if included in the Allentown-Bethlehem-Easton nonattainment area.

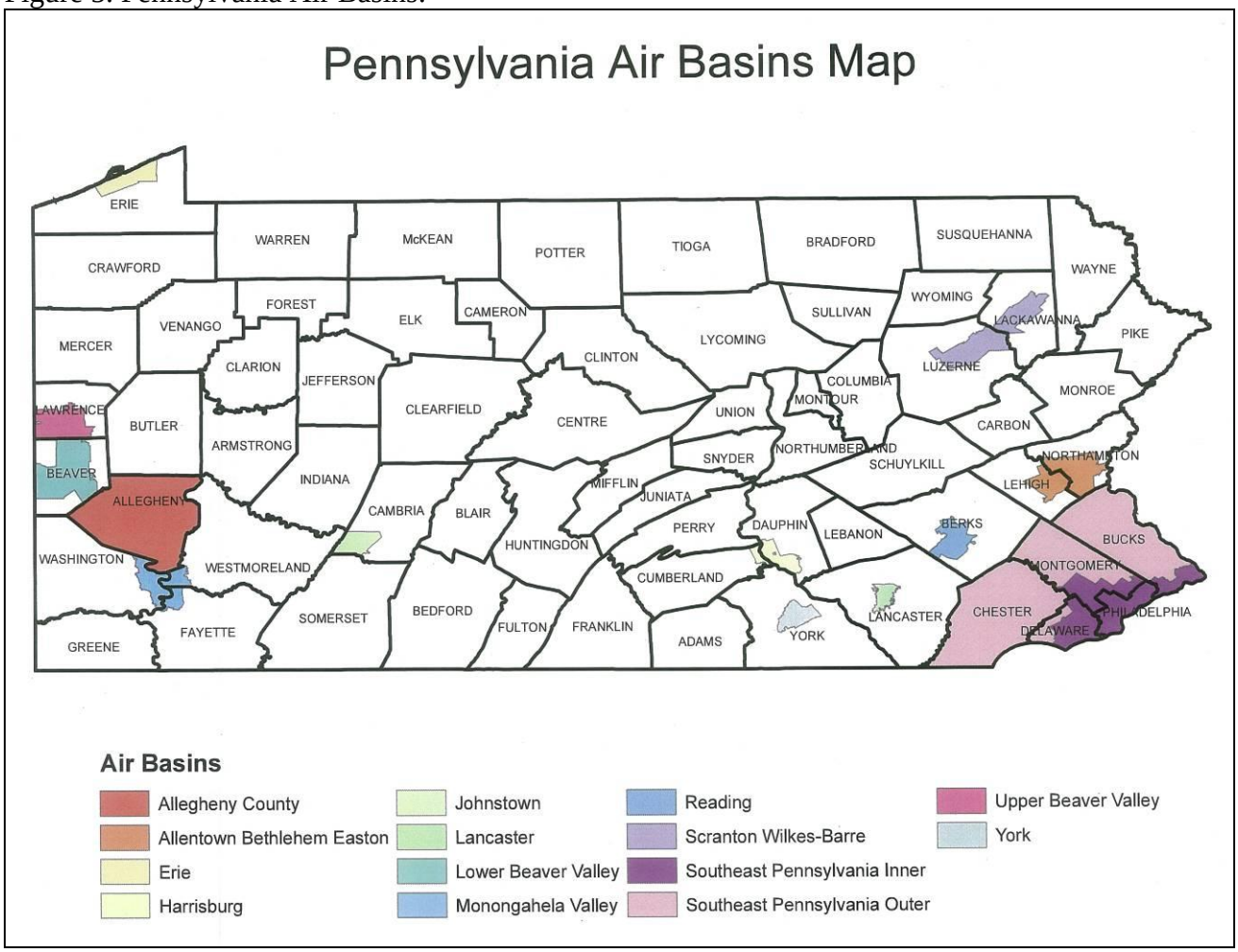
Luzerne and Lackawanna Counties have are part of the Scranton-Wilkes-Barre, PA Metropolitan Statistical Area, and have social and economic times associated with that area. They also have a separate transportation planning agency from the Allentown-Bethlehem-Easton area. Scranton was nonattainment under the 1997 ozone NAAQS, but the area is currently monitoring attainment of the 2008 ozone NAAQS. The topography of the region separates Allentown-Bethlehem-Easton from this and other nearby areas to the west and north of the area.

Monroe County is part of the East Stroudsburg Micropolitan Statistical Area. Schuylkill County is part of the one-county Pottsville Micropolitan Statistical Area. Neither of these two counties has strong economic or social ties to the Allentown-Bethlehem-Easton area.

The Allentown-Bethlehem-Easton Air Basin defined in 25 *Pa. Code* §121.1 covers portions of Lehigh and Northampton Counties (see Figure 5). These basins were developed for purposes of the

sulfur compound controls outlined in 25 *Pa. Code* § 123.22, yet they represent existing local boundaries for emission controls in the areas of the Commonwealth where they exist.

Figure 5. Pennsylvania Air Basins.



Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Allentown-Bethlehem-Easton nonattainment area: Carbon, Lehigh, and Northampton. These are the same counties that are included in the Allentown-Bethlehem-Easton nonattainment area for the 1997 ozone NAAQS.

The air quality monitor in Lehigh County indicates a violation of the 2008 ozone NAAQS based on the 2010 DV, therefore this county is included in the nonattainment area. Carbon and Northampton are nearby counties that do not have violating monitors, but EPA has concluded that these areas contribute to the ozone concentrations in violation of the 2008 ozone NAAQS through ozone precursor emissions. Northampton and Lehigh Counties have among the highest NOx and VOC emissions in the area. Lehigh and Northampton Counties contain the cities of Allentown, Bethlehem, and Easton, where the highest population concentrations in the area are located.

Vehicle miles of travel are highest in Lehigh and Northampton Counties, and Lehigh County also has the highest percentage of commuters travelling to a county with a violating monitor. Prevailing winds and topography support exclusion of the Scranton-Wilkes-Barre area counties of Luzerne and Lackawanna, as well as the downwind counties of Monroe and Warren.

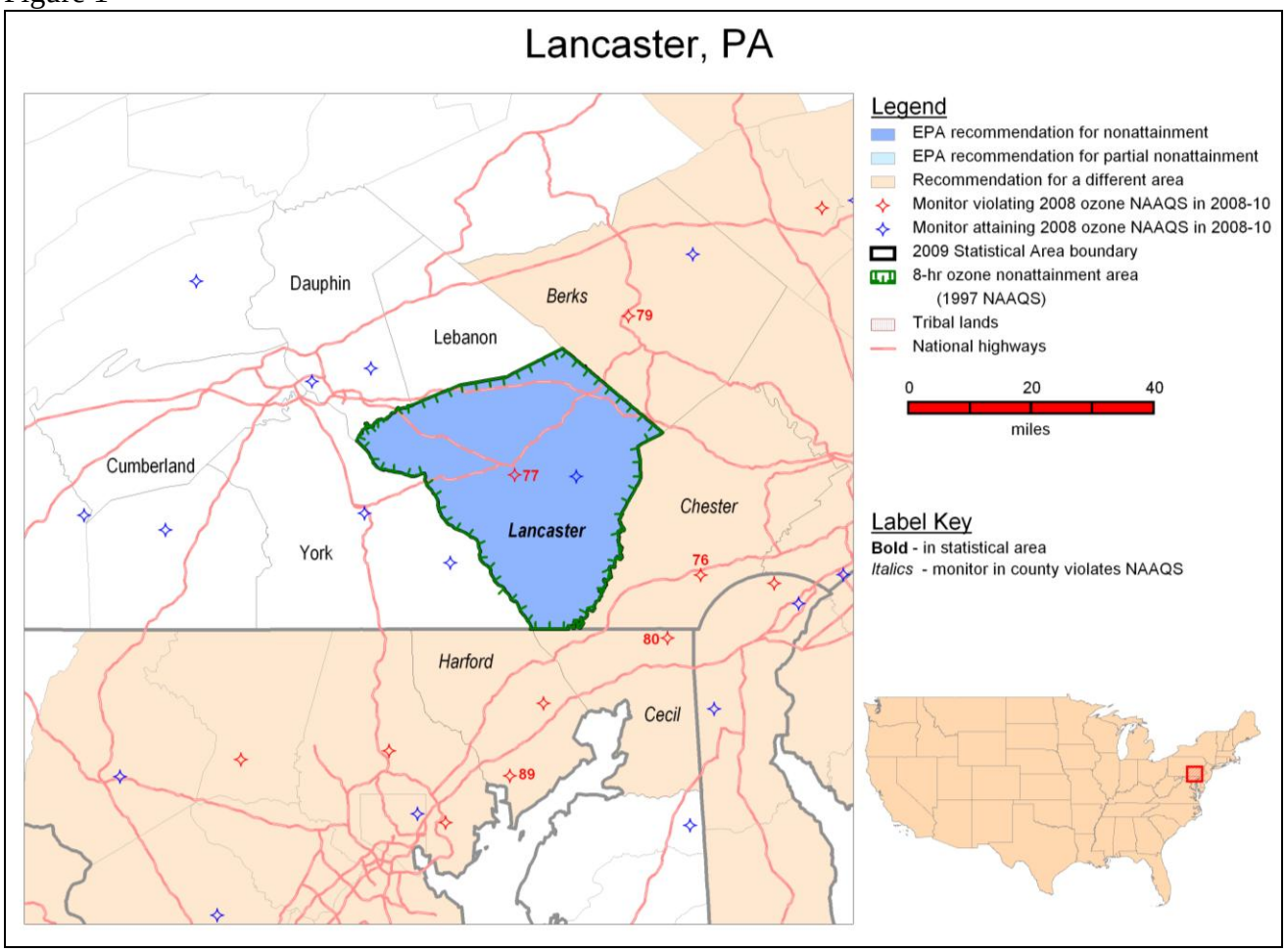
In 2009, Pennsylvania recommended that the Allentown-Bethlehem-Easton nonattainment area maintain the same boundaries as were in place for the 1997 ozone NAAQS. In November 2011, Pennsylvania revised its recommendation to shrink the area to only Lehigh County (the location of the violating monitor), setting aside past jurisdictional factors for inclusion of Carbon and Northampton counties as part of the nonattainment area. EPA's believes this jurisdictional argument is a prominent reason for recommending the same intended nonattainment area boundary for the 2008 ozone NAAQS. New Jersey recommends inclusion of Warren County in the New York-Northern New Jersey-Long Island nonattainment area, as it was under the 1997 ozone NAAQS, rather than including Warren County in the Allentown-Bethlehem-Easton area. Although Warren County lies in the Allentown-Bethlehem-Easton CSA, there are strong jurisdictional arguments for maintaining the nonattainment boundaries of the 1997 ozone standard for the 2008 ozone standard. EPA there recommends that Warren County not be part of the Allentown-Bethlehem-Easton nonattainment area.

The adjacent counties to the Allentown-Bethlehem-Easton area eastern and southern boundary are being recommended by EPA (and the states) as part of separate nonattainment areas with equal or higher classification as EPA recommends for this area. Finally, past ozone NAAQS boundaries and jurisdictional ties support keeping the prior nonattainment boundaries for Allentown-Bethlehem-Easton, to include Carbon, Lehigh, and Northampton Counties.

Technical Analysis for the Lancaster Area

Figure 1 is a map of the Lancaster intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, metropolitan statistical area boundary, existing maintenance area boundary for the 1997 ozone NAAQS, and EPA's intended nonattainment area boundary for the 2008 ozone NAAQS.

Figure 1



For purposes of the 1997 8-hour ozone NAAQS, this area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire county of Lancaster.

In March 2009, the Commonwealth of Pennsylvania recommended that Lancaster County be designated as nonattainment as the Lancaster Area for the 2008 ozone NAAQS based on air quality data from 2006-2008, keeping the same boundaries as the 1997 ozone NAAQS nonattainment area. Pennsylvania provided an update to the original recommendation in November 2011 based on air quality data from 2009-2011. Based on this updated information, the Commonwealth once more recommended that Lancaster County be designated nonattainment under the 2008 ozone NAAQS. The 2008-2010 and preliminary 2009-2011 monitoring data both show that the same county (Lancaster) is violating the 2008 ozone NAAQS. The recommendations are based on monitoring data from FRM monitors or FEM monitors sited and operated in accordance with 40 CFR Part 58. (See the March 17, 2009 and November 22, 2011 letters from the Pennsylvania Department of Environmental Protection to EPA.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate Lancaster County, Pennsylvania (identified in Table 1 below) as "nonattainment" for the 2008 ozone NAAQS as a single-county nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for Lancaster.

Lancaster	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Pennsylvania	Lancaster	Lancaster

Factor Assessment

EPA intends to include the nearby counties of Berks, Chester, Cecil, and Harford as part of separate nonattainment areas for the 2008 ozone NAAQS from Lancaster County. Based on EPA's five-factor analyses, EPA has preliminarily concluded that Berks County should be designated nonattainment as the Reading Area, Chester, and Cecil Counties should be designated nonattainment in the Philadelphia-Wilmington-Atlantic City Area, and Harford County should be designated nonattainment as part of the Baltimore Area. See EPA's respective technical analyses for these adjacent nonattainment areas for EPA's rationale for our intended nonattainment designation for these counties. To the extent that emissions from those counties may contribute ozone concentrations in the Lancaster nonattainment area, that contribution will be lessened by emission controls put in place in those separate nonattainment areas. Therefore, EPA is not including Berks, Chester, Cecil, and Harford Counties in this analysis for the Lancaster nonattainment area.

Factor 1: Air Quality Data

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

The 2010 DVs and preliminary 2011 DVs for the ozone NAAQS for counties in the Lancaster area and certain nearby surrounding counties are shown in Table 2.

Table 2. Air Quality Data.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2008-2010 Design Value (ppb)	2009-2011 Preliminary Design Value (ppb)
Lancaster, PA	Yes	Yes	77	77
York, PA	No	No	74	72
Lebanon, PA	No	No	--	--
Dauphin, PA	No	No	73	73

Note: Counties with no ozone monitor are identified with "--" in the 2010 and 2011 8-hour Ozone DV columns.

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area "nonattainment" if it is violating the 2008 ozone NAAQS. Lancaster County shows a violation of the 2008 ozone NAAQS, therefore this county must be included in a nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight of evidence of the five factors to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NO_x and VOC (given in tons per year) for violating and nearby potentially contributing counties in the Lancaster area.

Table 3. Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Lancaster, PA	Yes	Yes	18,217	22,877
York, PA	No	No	35,616	15,723
Lebanon, PA	No	No	6,166	5,367
Dauphin, PA	No	No	10,848	11,760

York County has much higher NOx emissions than the other nearby counties, having nearly as much total NOx emissions as all the other counties listed in Table 3. Lancaster has the highest VOC emissions, followed closely by York. Lebanon and Dauphin have comparatively lower emissions of both NOx and VOCs.

Population density and degree of urbanization

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

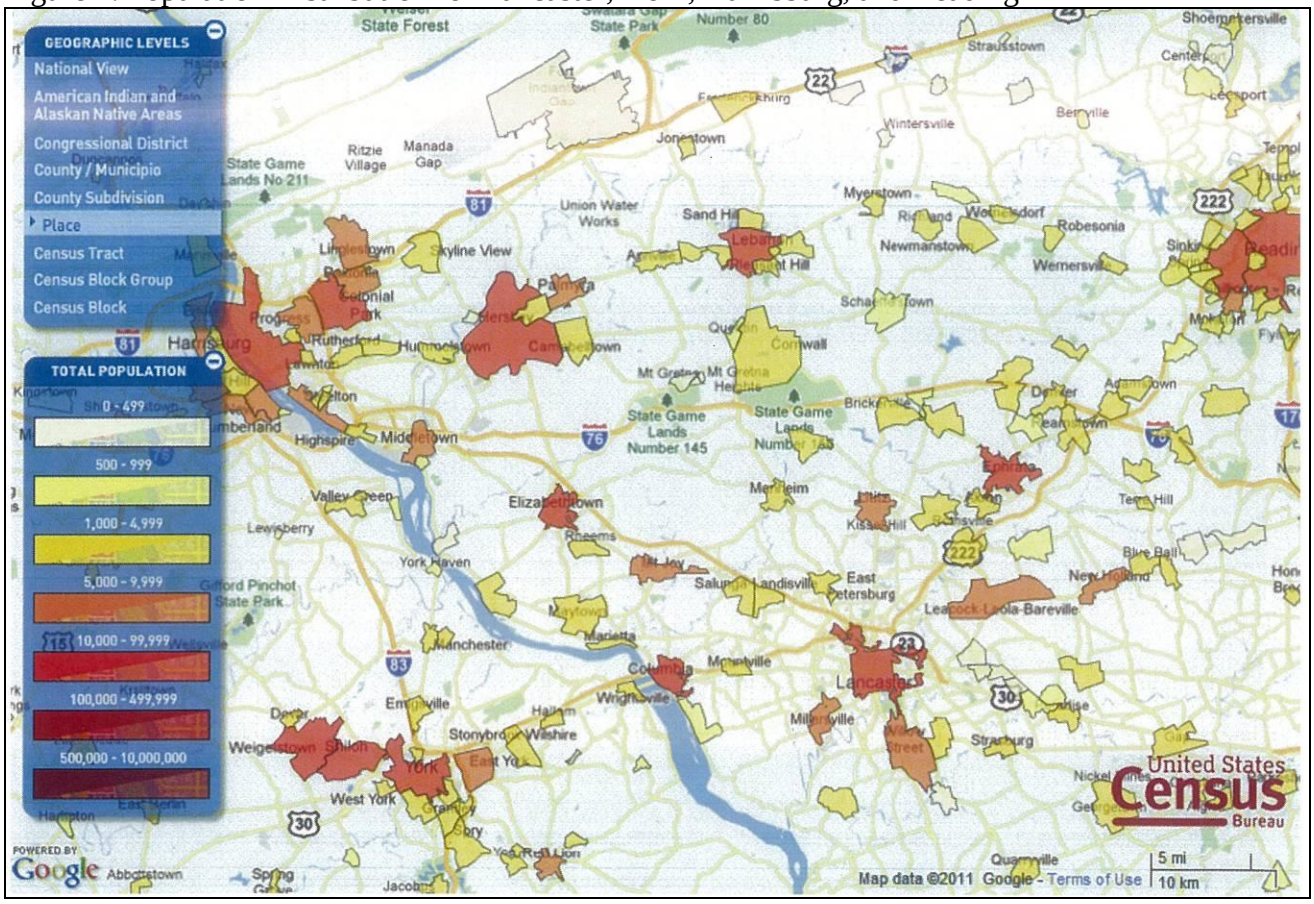
formation. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi	Absolute change in population (2000-2010)	Population % change (2000-2010)
Lancaster, PA	Yes	Yes	519,445	0.53	47,669	+10%
York, PA	No	No	434,972	0.48	52,263	+14%
Lebanon, PA	No	No	133,568	0.37	13,151	+11%
Dauphin, PA	No	No	268,100	0.48	16,303	+6%

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

Figure 2. Population Distribution for Lancaster, York, Harrisburg, and Reading



Source: US Census Bureau (http://2010.census.gov/2010census/popmap/)

Lancaster County has the highest population of any of the counties in the Lancaster and surrounding areas, followed by York County. Dauphin and Lebanon have much lower populations. All of these counties have similar population densities, ranging from 370 to 530 persons per square mile, however, these populations of the cities and towns are distributed unevenly between small, dense urban cores and outlying towns and rural areas. As can be seen in the Census map in Figure 2, the Cities of Lancaster,

York (and to a lesser extent Reading and Harrisburg) all have small dense urban centers surrounded by sparsely populated areas with smaller towns interspersed.

Nearly all of the counties in Table 4 have experienced double digit growth between 2000 and 2010, but the overall population growth numbers for all four counties total just over a hundred thousand persons over the past decade.

Traffic and commuting patterns

EPA evaluated the total Vehicle Miles Traveled (VMT) in the area and VMT growth, as well as commuter movement within and between counties. This information, in combination with the population/population density data and the location of main transportation arteries (see Figure 1, above), helps in identifying the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows traffic and commuting pattern data, including total 2005 VMT, growth in VMT for the period between 2002-2008, and the total vehicle miles traveled (VMT) for each county. Table 6 shows the number of commuters traveling within and between the counties in the area of analysis.

Table 5. Traffic and VMT data.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2008 VMT* (million miles)	Percent VMT Growth 2002-2008
Lancaster, PA	Yes	Yes	4,245	9.0%
York, PA	No	No	3,275	6.1%
Lebanon, PA	No	No	1,210	4.5%
Dauphin, PA	No	No	3,062	2.0%

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

Table 6. County to County Worker Flow.

Residence County → / **Workplace County ↓**	Lancaster, PA	York, PA	Lebanon, PA	Dauphin, PA
Lancaster, PA	201,608	5,485	3,770	2,585
York, PA	4,018	142,104	266	2,365
Lebanon, PA	1,952	332	36,677	2,508
Dauphin, PA	6,927	9,848	12,853	93,958

Source: U.S. Census Bureau estimates for 2000 County-to-County Worker Flow (http://www.census.gov/hhes/commuting/data/commuting.html

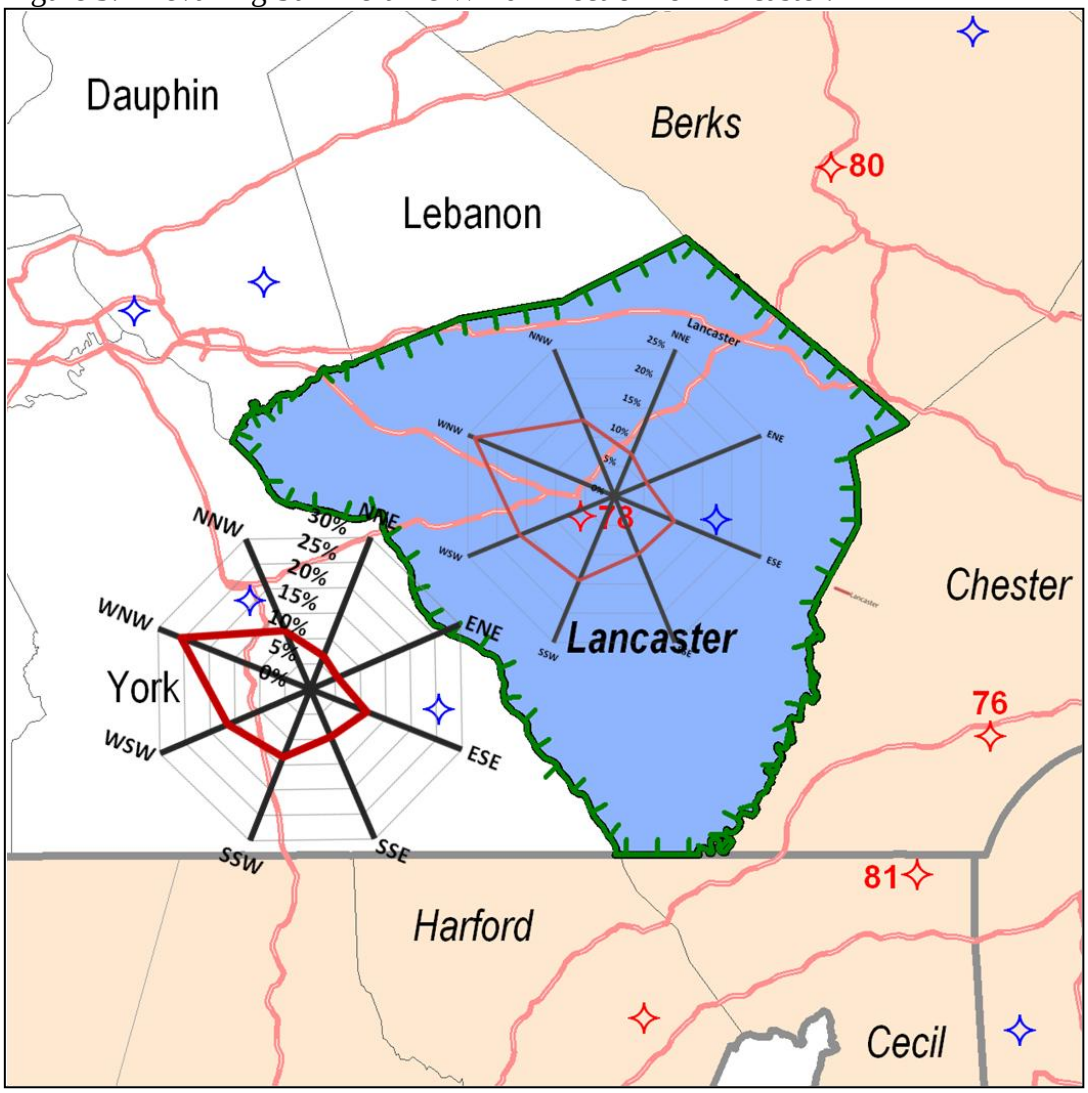
Lancaster County has the highest overall VMT and historical growth in VMT of the counties in the area of analysis, followed by York and Dauphin Counties. Table 6 shows the county to county commuter worker flow. Lancaster has the highest number of commuters, most of whom travel within Lancaster County, which has the only violating monitor in the area of analysis. Similarly, York County commuters travel predominantly inside York County, with only 10% travelling to any county with a

violating monitor. Dauphin and Lebanon Counties also contribute very few commuters to Lancaster County, with most commuting inside their home county.

Factor 3: Meteorology (weather/transport patterns)

EPA evaluated any available meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation.

Figure 3. Prevailing Summertime Wind Direction for Lancaster.



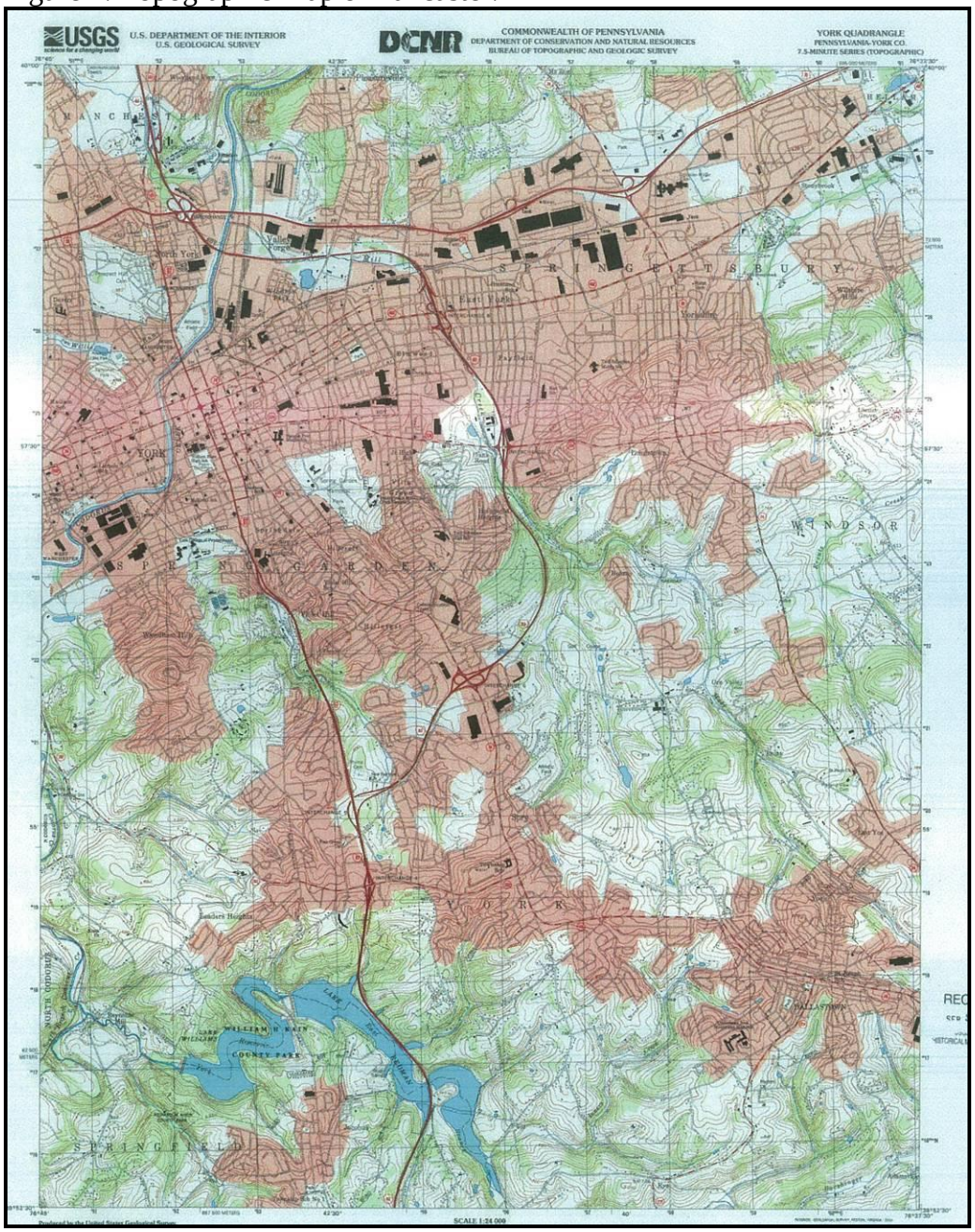
The prevailing winds during the ozone season predominate from the west-northwest, indicating that emissions from the Harrisburg-Lebanon-Carlisle metropolitan area counties of Lebanon and Dauphin may have an impact on the Lancaster violating monitor. To a lesser extent, York County emissions may also contribute to the violating monitor, dependent upon the wind direction during an ozone episode. The emissions impact from Berks, Chester, Cecil, and even Harford Counties appear to be lower, on the basis of prevalent wind direction alone, than the counties to the west of Lancaster. Note that the counties of Chester, Berks, and Harford, MD are downwind (based on prevalent wind direction) of Lancaster and have higher 2010 DVs than the monitors in York, Cumberland, and Dauphin Counties,

which are are upwind of Lancaster. Wind data alone is inconclusive, but it is possible the upwind counties are contributing emissions affecting Lancaster, and also that pollution is transported as it moves downwind along the MSAs in the Northeast Corridor. There may be local as well as long range impacts, but further meteorological modeling or source apportionment would be necessary to prove the impact between these nearby areas.

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

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

Figure 4. Topographic Map of Lancaster.



Source: US Geologic Society (www.usgs.gov)

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

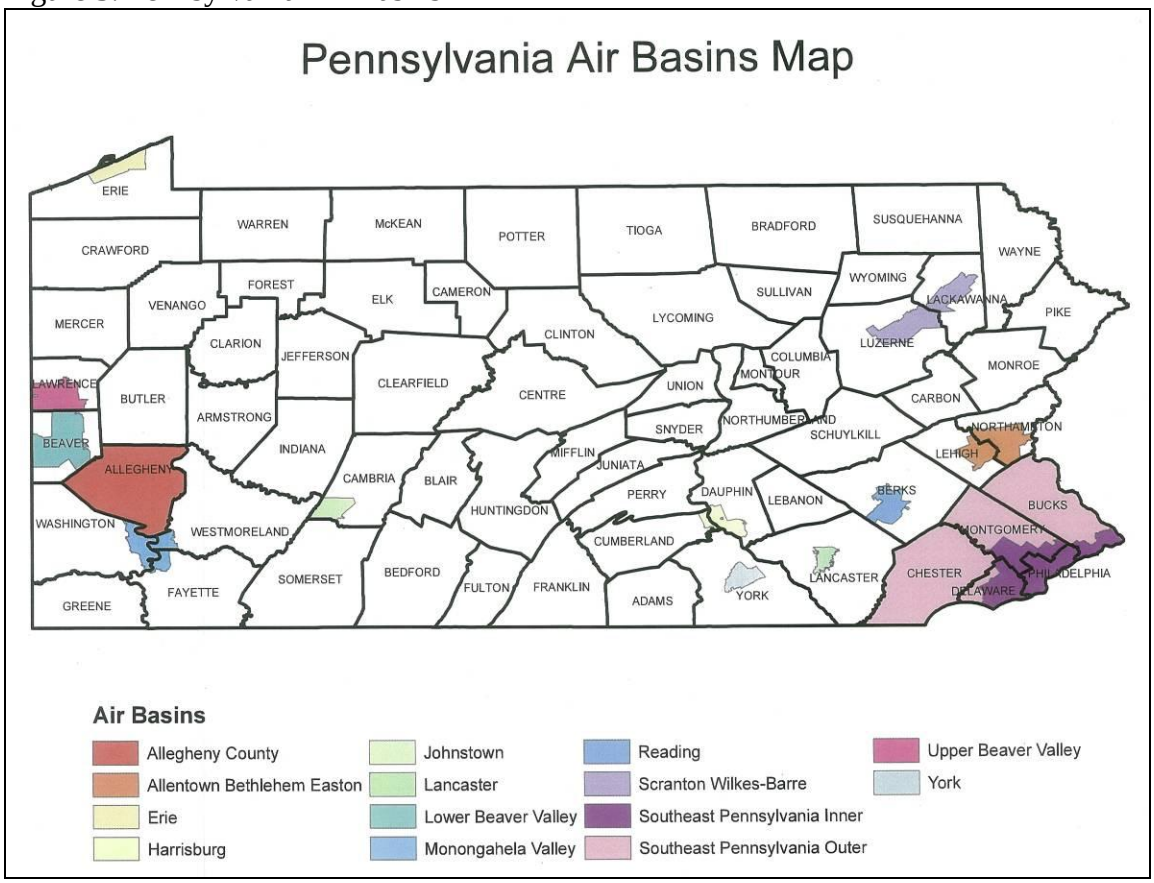
Factor 5: Jurisdictional boundaries

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

The single-county Lancaster MSA area has previously established nonattainment boundaries associated with the 1997 8-hour ozone NAAQS.

The Commonwealth has recommended the same boundary for the 2008 ozone NAAQS, with Lancaster County to be designated nonattainment as a single-county area for the 2008 ozone NAAQS. Lancaster County is a single-county metropolitan statistical area based on economic, political and commuting patterns. This area is served by a single-county transportation-planning agency.

Figure 5. Pennsylvania Air Basins



The Lancaster Air Basin defined in 25 *Pa. Code* §121.1 covers portions of Lancaster County (see Figure 5). These basins were developed for purposes of the sulfur compound controls outlined in 25 *Pa. Code* § 123.22, yet they represent existing local boundaries for emission controls in the areas of the Commonwealth where they exist.

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Lancaster nonattainment area: Lancaster.

This is the same county that is included in the Lancaster nonattainment area for the 1997 ozone NAAQS. The air quality monitor in Lancaster County indicates violations of the 2008 ozone NAAQS based on the 2010 DVs, therefore this county must be included in the nonattainment area. Chester, Harford, Cecil, and Berks are nearby counties that have violating monitors, but are part of nearby CSAs and are being recommended for nonattainment as part of separate areas. York, Cumberland, Dauphin, and Lebanon Counties do not have violating monitors, but EPA has concluded that these areas do not contribute to the ozone concentrations in violation of the 2008 ozone NAAQS of Lancaster County enough to warrant their inclusion in the Lancaster nonattainment area.

York County has the highest NOx emissions of the counties evaluated and has the second highest VOC emissions. York County has the second highest population and the largest population growth over the past decade. York County has the second highest VMT, but most York County commuters remain within York County and do not travel to Lancaster County (where the violating monitor is located). Meteorology indicates that emissions from York County may contribute little to violations of the ozone standard as prevalent wind patterns come predominantly from the west and northwest, and York County is to the west/southwest of Lancaster County and its violating monitor. Meteorology indicates that Lebanon and Dauphin may contribute to violations in Lancaster, because prevalent wind patterns come from the west and northwest, and those counties lie in that direction. However, the magnitude of NOx and VOCs from those counties is comparatively smaller than Lancaster or York Counties.

Lancaster has the highest VMT of all the counties being compared here (followed by York), and has by far the highest number of commuters, most of whom commute within Lancaster County, where the violating monitor is located.

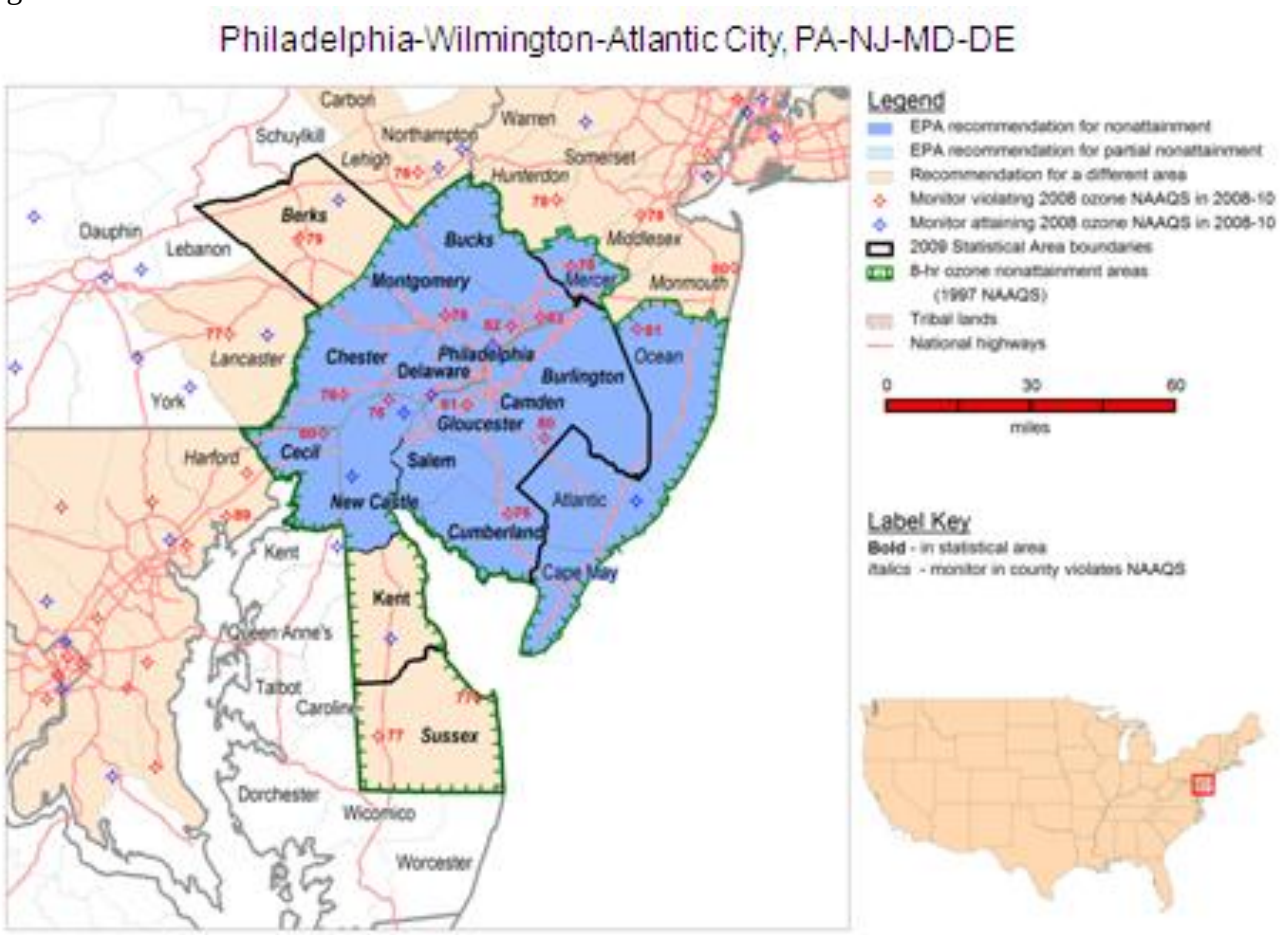
There are strong jurisdictional arguments for making Lancaster a single county nonattainment area. The county has is a single-county metropolitan statistical area based on economic, political and commuting patterns. Lancaster County was a single county nonattainment area under the 1997 ozone NAAQS, and the prior 1-hour ozone NAAQS. The area is served by a single-county transportation-planning agency, and has a unique political and cultural identity of its own.

The Commonwealth has recommended the same single-county boundary for the 2008 ozone NAAQS, with Lancaster County to be designated nonattainment for the 2008 ozone NAAQS. This area is served by a single-county transportation-planning agency. Designating it as a single-county nonattainment area maintains continuity of planning since the county has an approved maintenance plan for the 1997 ozone NAAQS.

Technical Analysis for the Philadelphia-Wilmington-Atlantic City Area

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

Figure 1.



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

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

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

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

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

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

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

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

Philadelphia	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Delaware	None	New Castle
Maryland	Cecil	Cecil
New Jersey	Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem	Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Ocean, and Salem
Pennsylvania	Bucks, Montgomery, and Philadelphia	Bucks, Chester, Delaware, Montgomery, and Philadelphia

Factor Assessment

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

Factor 1: Air Quality Data

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

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

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

Table 2. Air Quality Data.

County	State Recommended Nonattainment?	2010 8-hour Ozone DV (ppb)
Atlantic, NJ	Yes	74
Berks, PA	Yes, other area	79
Bucks, PA	Yes	83
Burlington, NJ	Yes	--
Camden, NJ	Yes	80
Cape May, NJ	Yes	--
Cecil, MD	Yes	80
Chester, PA	No	76
Cumberland, NJ	Yes	76
Delaware, PA	No	74
Gloucester, NJ	Yes	81
Kent, DE	No	74
Mercer, NJ	Yes	78
Montgomery, PA	Yes	78

New Castle, DE	Yes, other area	76
Ocean, NJ	Yes	81
Philadelphia, PA	Yes	82
Salem, NJ	Yes	--
Sussex, DE	Yes, other area	77

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

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area nonattainment if it is violating the 2008 ozone NAAQS. New Castle and Sussex Counties in Delaware, Cecil County, Maryland; Berks, Bucks, Montgomery, and Philadelphia Counties in Pennsylvania; and several counties in New Jersey show violations of the 2008 ozone NAAQS. Therefore, these counties must be included in a nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight of evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

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

Table 3. Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Atlantic, NJ	Yes	6,143	10,713
Berks, PA	Yes, other area	18,908	15,918
Bucks, PA	Yes	17,736	21,160
Burlington, NJ	Yes	10,919	12,909
Camden, NJ	Yes	12,725	10,731
Cape May, NJ	Yes	6,407	7,774
Cecil, MD	Yes	4,763	3,715
Chester, PA	No	16,806	16,351
Cumberland, NJ	Yes	4,916	5,727

Delaware, PA	No	28,118	15,881
Gloucester, NJ	Yes	18,335	11,756
Kent, DE	No	7,667	5,381
Mercer, NJ	Yes	9,909	8,160
Montgomery, PA	Yes	22,741	26,372
New Castle, DE	Yes, other area	22,633	14,133
Ocean, NJ	Yes	9,909	19,572
Philadelphia, PA	Yes	33,176	32,021
Salem, NJ	Yes	6,106	3,308
Sussex, DE	Yes, other area	14,870	9,972

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

Population density and degree of urbanization

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

Table 4. Population and Growth.

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Atlantic, NJ	Yes	274,549	0.45	21,569	+9%
Berks, PA	Yes, other area	411,442	0.48	36,945	+10%
Bucks, PA	Yes	625,249	1.01	25,841	+4%
Burlington, NJ	Yes	448,734	0.55	24,255	+6%
Camden, NJ	Yes	513,657	2.26	6,064	+1%
Cape May, NJ	Yes	97,265	0.34	(5,043)	-5%
Cecil, MD	Yes	101,108	0.27	14,643	+17%
Chester, PA	No	498,886	0.66	63,107	+14%
Cumberland, NJ	Yes	156,898	0.31	10,547	+7%
Delaware, PA	No	558,979	2.93	6,938	+1%
Gloucester, NJ	Yes	288,288	0.86	31,962	+12%
Kent, DE	No	162,310	0.27	35,200	+28%
Mercer, NJ	Yes	366,513	1.60	14,979	+4%
Montgomery, PA	Yes	799,874	1.64	48,936	+7%
New Castle, DE	Yes, other area	538,479	1.11	36,620	+7%
Ocean, NJ	Yes	576,567	0.76	62,913	+12%
Philadelphia, PA	Yes	1,526,006	10.71	12,194	+1%

Salem, NJ	Yes	66,083	0.19	1,867	+3%
Sussex, DE	Yes, other area	197,145	0.20	39,710	+25%

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

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

Traffic and commuting patterns

EPA evaluated the total Vehicle Miles Traveled (VMT) for each county in the area. In combination with the population/population density data and the location of main transportation arteries (see Figure 1, above), this information helps identify the probable location of non-point source emissions. A county with high VMT is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows total 2008 VMT for each county.

Table 5. Traffic (VMT) Data.

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Atlantic, NJ	Yes	2,863
Berks, PA	Yes, other area	3,335
Bucks, PA	Yes	5,021
Burlington, NJ	Yes	4,524
Camden, NJ	Yes	3,923
Cape May, NJ	Yes	1,040
Cecil, MD	Yes	1,350
Chester, PA	No	4,410
Cumberland, NJ	Yes	1,163
Delaware, PA	No	3,782
Gloucester, NJ	Yes	2,645
Kent, DE	No	1,565
Mercer, NJ	Yes	3,306
Montgomery, PA	Yes	6,883
New Castle, DE	Yes, other area	5,266
Ocean, NJ	Yes	3,834
Philadelphia, PA	Yes	5,955
Salem, NJ	Yes	992
Sussex, DE	Yes, other area	2,122

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

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

Table 6. County to County Worker Flow.

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

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

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

Factor 3: Meteorology (weather/transport patterns)

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

The highest ozone design values, over 80 ppb, are in Bucks and Philadelphia Counties, in Pennsylvania, and Ocean County in New Jersey. The winds during the ozone season come predominantly from the southwest. This indicates that emissions from Chester and Delaware Counties in Pennsylvania; New Castle County, Delaware; Cecil County, Maryland; and counties in southwest New Jersey contribute to the downwind violations in Bucks and Philadelphia Counties during most of the ozone season. Considering prevailing wind patterns and the location of the highest violating monitors, Berks County, Pennsylvania and Kent and Sussex Counties in Delaware are unlikely to contribute to downwind violations during most of the ozone season.

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

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

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

Factor 5: Jurisdictional boundaries

EPA considers existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and so that areas designated nonattainment have the legal authority and cooperative planning necessary to carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment areas for ozone or other urban-scale pollutants, counties, air districts, townships, metropolitan planning organizations, state lines, Reservations, urban growth boundary, etc. Where existing jurisdictional boundaries are not adequate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates are used.

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

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

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

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

<u>Delaware</u>
New Castle County has historically been part of the Philadelphia nonattainment area for ozone (1-hour and 8-hour) and fine particulate matter ($PM_{2.5}$). New Castle County is part of the Wilmington, DE-MD-

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

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

Maryland

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

Pennsylvania

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

Berks County is less connected to Philadelphia. While it was added to the Philadelphia-Camden-Vineland CSA in December 2005, it's in a separate MSA, the Reading, PA MSA. Berks County has historically not been part of the Philadelphia nonattainment area for 8-hour ozone and $PM_{2.5}$, but has been designated separately as the Reading area. Berks County was designated attainment/unclassifiable for 1-hour ozone. In addition, Berks County is covered by a separate MPO, the Berks County Planning Commission.

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Philadelphia-Camden-Atlantic City nonattainment area: New Castle County, Delaware; Cecil County, Maryland; Atlantic, Burlington, Camden, Cape

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

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

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

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

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

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

should not be included in the Philadelphia Area, and should be designated as nonattainment in a separate area[5].

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

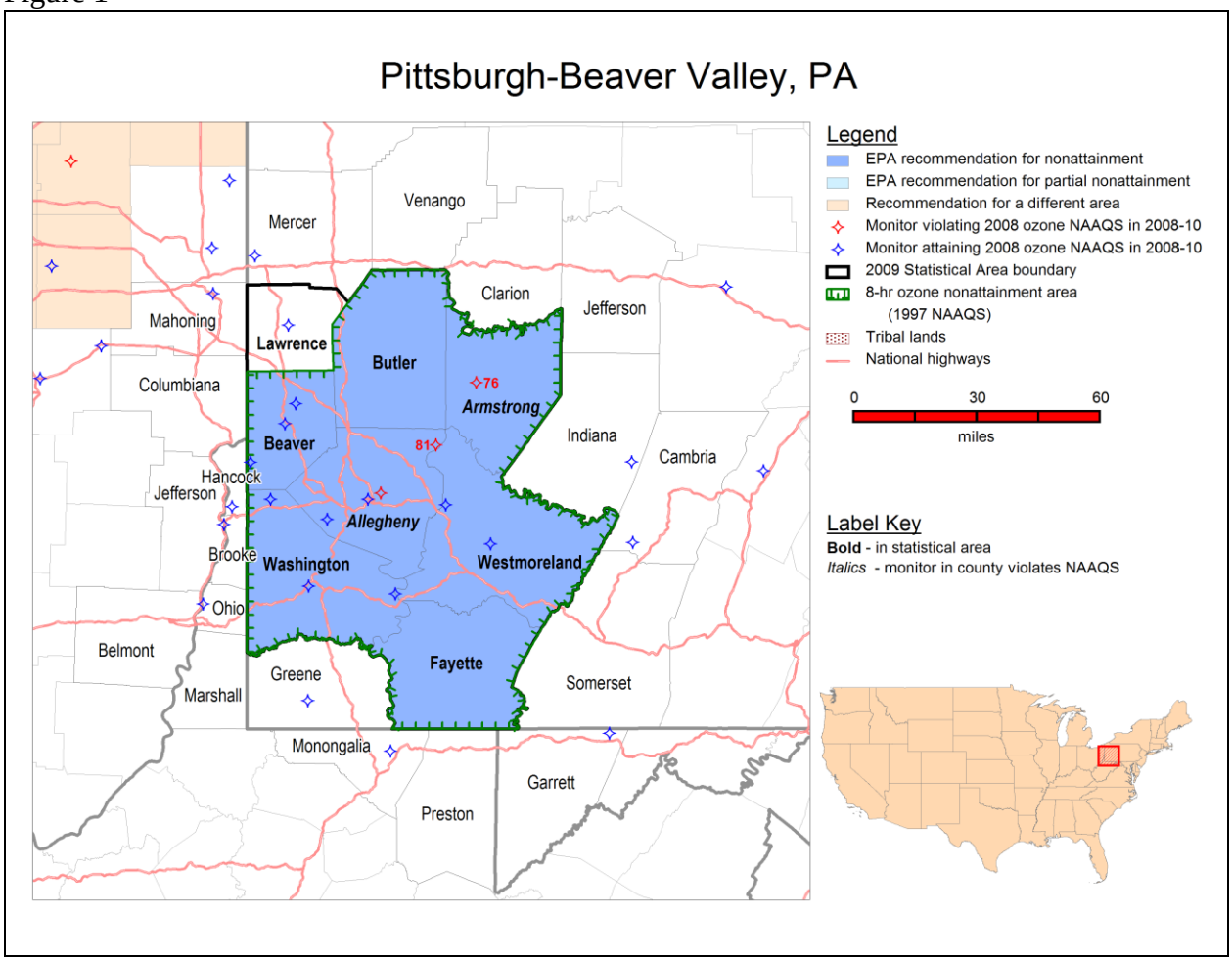
Kent County, Delaware has a monitor that meets the 2008 8-hour ozone NAAQS. This county has comparatively low emissions, population and VMT, and is not part of the Philadelphia-Camden-Vineland CSA. Therefore, EPA has preliminarily concluded that Kent County should not be included in the Philadelphia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

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

Technical Analysis for the Pittsburgh-Beaver Valley Area

Figure 1 is a map of the Pittsburgh-Beaver Valley EPA intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, CSA/CBSA boundary, existing nonattainment or maintenance boundary for 1997 ozone NAAQS, and EPA's recommended boundaries.

Figure 1



For purposes of the 1997 8-hour ozone NAAQS, the Pittsburgh-Beaver Valley area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire counties of Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, and Westmoreland.

In March 2009, Pennsylvania recommended that the same counties be designated as "nonattainment" for the 2008 ozone NAAQS based on air quality data from 2006-2008. Pennsylvania provided an update to the original recommendation on November 22, 2011 based on updated certified air quality data from 2009-2011. Pennsylvania's 2011 updated recommendation also revised the recommendation to limit the nonattainment area (for all areas in the Commonwealth) to only the county with the violating monitor. In the case of Pittsburgh, the Commonwealth recommends nonattainment for only Allegheny County, which continues to violate the 2008 ozone NAAQS based on 2009-2011 preliminary monitoring data. The preliminary data for 2009-2011 shows that Armstrong County is no longer violating the 2008 NAAQS.

This monitoring data is from Federal Reference Method (FRM) monitors or Federal Equivalent Method (FEM) monitors sited and operated in accordance with 40 CFR Part 58 (see the March 17, 2009 and November 22, 2011 letters from the Pennsylvania Department of Environmental Protection to EPA.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate seven counties in Pennsylvania (identified in Table 1 below) as "nonattainment" for the 2008 ozone NAAQS as part of the Pittsburgh-Beaver Valley nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for Pittsburgh-Beaver Valley.

Pittsburgh-Beaver Valley	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Pennsylvania	Allegheny	Allegheny, Armstrong, Beaver Butler, Fayette, Washington, and Westmoreland

Factor Assessment

Factor 1: Air Quality Data

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

The 2010 and 2011 DVs for the ozone NAAQS for counties in the Pittsburgh-New Castle CSA are shown in Table 2. Pennsylvania submitted a letter to revise its nonattainment area recommendations based on updated certified monitoring data for the three-year period 2009-2011. Based on the preliminary 2009-2011 monitoring data provided by Pennsylvania in its November 2011 revised recommendation, two of the three monitors that violated based on 2008-2010 data are attaining the 2008 NAAQS (one of the monitors in Allegheny County and the monitor in Armstrong County)

Table 2. Air Quality Data.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2010 8-hour Ozone DV (ppb)	Preliminary 2011 8-hour Ozone DV (ppb)
Allegheny, PA	Yes	Yes	81	79
Armstrong, PA	No	Yes	76	73
Beaver, PA	No	Yes	73	72
Butler, PA	No	Yes	--	--
Fayette, PA	No	Yes	--	--
Lawrence, PA	No	No	66	66

Washington, PA	No	Yes	71	69
Westmoreland, PA	No	Yes	72	69

Note: Counties with no ozone monitor are identified with "--" in the 2010 and 2011 8-hour Ozone DV columns.

One monitor in Allegheny County and one monitor in Armstrong County showed a violation of the 2008 ozone NAAQS based on 2008-2010 data. Pennsylvania updated its recommendations using 2009-2011 monitoring data via a letter to EPA dated November 22, 2011. Based on this more recent data, only the Harrison monitor in Allegheny County shows a violation of the 2008 ozone NAAQS. Therefore Allegheny County must be included in the nonattainment area. However, 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 nearby a county with a violating monitor has been evaluated based on the weight of evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NO_x and VOC (given in tons per year) for violating and potentially contributing counties in the Pittsburgh-New Castle CSA.

Table 3. Total 2008 NO_x and VOC Emissions

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Allegheny, PA	Yes	Yes	52,399	37,506
Armstrong, PA	No	Yes	21,140	3,253
Beaver, PA	No	Yes	35,714	6,030
Butler, PA	No	Yes	7,789	7,856
Fayette, PA	No	Yes	4,639	6,149
Lawrence, PA	No	No	8,960	3,814
Washington, PA	No	Yes	14,304	7,256
Westmoreland, PA	No	Yes	14,827	13,548

Allegheny County has the highest NOx and VOC emissions in the area. Beaver and Armstrong Counties NOx emissions are somewhat higher than the remaining counties in the area, although Beaver County has fairly low VOC emissions. Westmoreland County has higher emissions than the remaining counties. Lawrence and Fayette Counties have relatively low emissions of NOx and VOC, by comparison to the other counties.

Population density and degree of urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from mobile sources, such as on-road and off-road vehicles and engines, and area sources, such as consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO_x and VOC emissions that may contribute to ozone formation. Rapid population or vehicle miles travelled (VMT) growth (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

County	State Recommended Nonattainment?	EPA Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop /sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Allegheny, PA	Yes	Yes	1,223,348	1.64	(56,566)	-4%
Armstrong, PA	No	Yes	68,941	0.10	(3,374)	-5%
Beaver, PA	No	Yes	170,539	0.38	(10,576)	-6%
Butler, PA	No	Yes	183,862	0.23	9,343	+5%
Fayette, PA	No	Yes	136,606	0.17	(11,908)	-8%
Lawrence, PA	No	No	91,108	0.25	(3,514)	-4%
Washington, PA	No	Yes	207,820	0.24	4,873	+2%
Westmoreland, PA	No	Yes	365,169	0.35	(4,521)	-1%

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

Allegheny County has by far the largest overall 2010 population (and population density), with its population nearly totaling the combined population of the other seven counties in the CSA. All of the counties are relatively sparsely populated in comparison to Allegheny County, with Armstrong, Fayette, Butler, Washington, and Lawrence being the most sparsely populated (having population densities of less than 250 persons per square mile). In terms of population change, only Butler and Washington Counties have exhibited any population growth since 2000, with all remaining area counties exhibiting declining population.

Traffic and VMT data

EPA evaluated the total Vehicle Miles Traveled (VMT) for each county, as well as VMT growth. In combination with the population/population density data and the location of main transportation arteries (see above), this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows total 2008 VMT and 2002-2008 VMT growth for each county.

Table 5. Traffic and Commuting Patterns

County	EPA Recommended Nonattainment?	2008 VMT (million miles)	Percent VMT Growth (2002-2008)
Allegheny, PA	Yes	9,227	-0.6
Armstrong, PA	Yes	621	-1.0
Beaver, PA	Yes	1,434	-2.6
Butler, PA	Yes	1,747	2.8
Fayette, PA	Yes	1,062	5.7
Lawrence, PA	No	781	-0.6
Washington, PA	Yes	2,114	-7.2
Westmoreland, PA	Yes	3,430	-4.4

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

Table 6. County to County Worker Flow

Residence County → / **Workplace County ↓**	Allegheny	Armstrong	Beaver	Butler	Fayette	Washington	Westmoreland	Lawrence
Allegheny	536,655	4,582	23,946	21,403	5,151	27,645	43,536	2,043
Armstrong	635	16,279	14	1,013	25	22	2,197	12
Beaver	5,235	106	47,074	1,372	136	556	561	2,717
Butler	7,868	2,609	4,885	51,572	168	370	1,231	2,366
Fayette	732	12	28	35	35,915	1,317	2,391	25
Washington	9,211	68	467	267	25	53,268	3,473	53
Westmoreland	12,049	2,719	291	831	3,051	2,718	106,015	103
Lawrence	736	44	2,003	1013	8,985	69	165	27,536

Source: U.S. Census Bureau estimates for 2000 County-to-County Worker Flow (http://www.census.gov/hhes/commuting/data/commuting.html

Allegheny County has by far the highest VMT, totaling nearly the combined VMT of the next five highest counties VMT. Allegheny County also has by far the largest number of commuters travelling to or within violating counties, as of 2008. Fayette and Butler are the only counties in the area with appreciable VMT growth. Table 6 depicts commuter flow within and between the respective counties.

It is clear from Table 6 that Allegheny County draws the greatest number of commuters from all counties, but also that most of the counties have at least some contribution to each other. Lawrence County is a notable exception, as very few commuters travel to Allegheny County, or to any county in the Pittsburgh MSA.

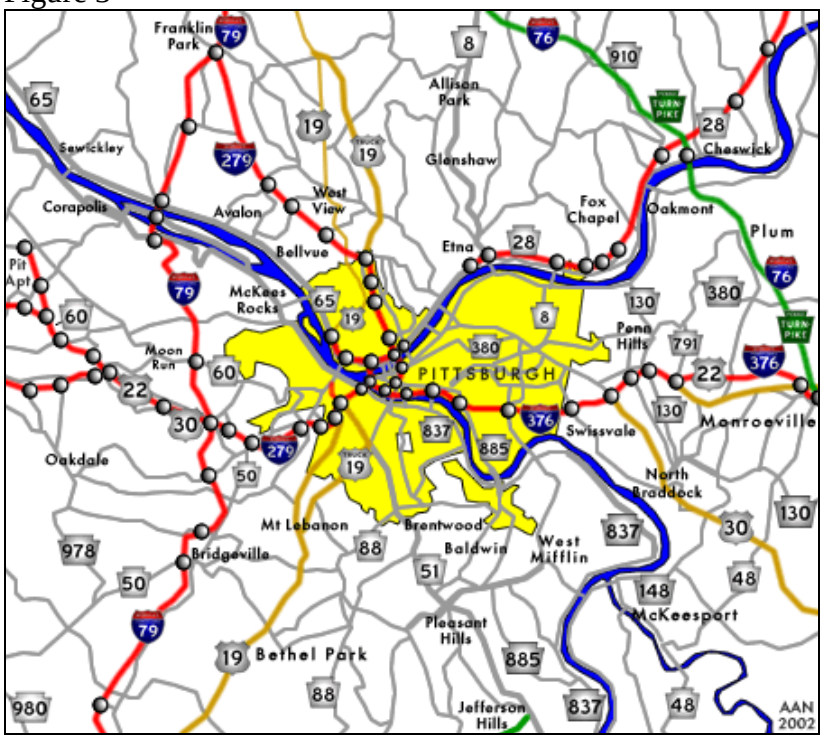
Figure 2 is a map depicting the arterial highway network for the Pittsburgh CSA. Figure 3 depicts the key interstate and arterial highways, focusing on Allegheny County, where the preponderance of the total area VMT and commuter traffic flow.

Figure 2

Figures 2 and 3 depict the arterial highway network for Pittsburgh, with figure 3 focusing on Allegheny County and the City of Pittsburgh downtown area. The main interstates for the region are: Interstate 376 (the main east-west route), Interstate 279 (the main north-south artery extending from downtown Pittsburgh north to meet with I-79), and Interstate 579 (a short freeway spur from Interstate 279 south). I-79 skirts the Pittsburgh downtown district to the west (passing north-south through Butler, Allegheny, and Washington Counties before leaving Pittsburgh to West Virginia). The Pennsylvania Turnpike (Interstate 76) skirts the Pittsburgh downtown district to the North and East (passing through Westmoreland, Allegheny, Beaver, and Lawrence Counties before passing into Ohio).

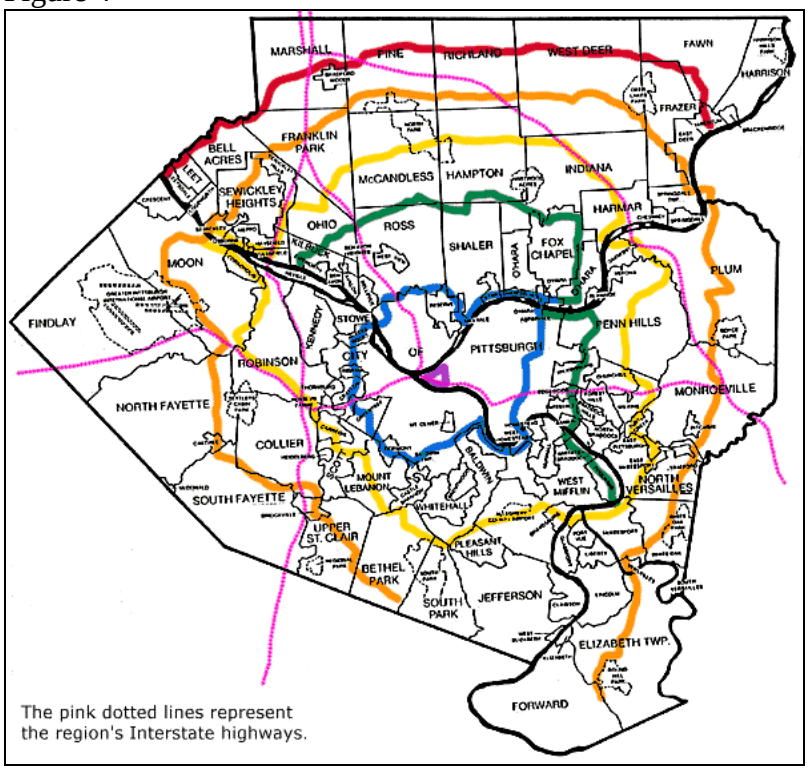
With most of these interstates looping outside the Pittsburgh downtown, Pittsburgh relies on an inner beltway system of smaller highways within Allegheny County. Figure 4 depicts the Beltway system of six color-coded loops surround the City of Pittsburgh and link the city and surrounding communities, highways, and airports.

Figure 3



Source: AA Roads (www.aaroads.com)

Figure 4



Source: Highway Route Markers of the United States (www.routemarkers.com)

From Table 5, it is clear that much of the total commuting for the area consists of Allegheny commuters commuting within Allegheny County. The commuting totals from the remaining counties are much smaller in comparison (in spite of some of the large percentages of commuters), due to their lower VMT

totals and lower population densities. The high percentage of commuters in Armstrong County traveling to a county with a violating monitor is a function of that county having been in violation of the 2008 ozone NAAQS prior to the 2009-2011 period. It is clear that the remaining Pittsburgh CSA counties have lower total commuters and smaller total VMT, and likely have a higher proportion of their VMT associated with the regional interstate highway network depicted in Figures 2 and 3 (although some of those may be regional commuters that are moving to the inner ring highways depicted in Figure 4).

Of all the CSA counties, Lawrence and Armstrong have the lowest overall 2008 VMT, and Lawrence has the lowest number of commuters to a violating county, based on 2008 data.

Factor 3: Meteorology (weather/transport patterns)

EPA evaluated any available meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation.

The highest ozone design value for the period 2008-2010 is 81 ppb in Allegheny County, followed by 76 ppb in Armstrong County. For the period 2009-2011, the highest ozone design value was 79 ppb in Allegheny County. The prevailing winds during the ozone season have strong westerly and southwesterly components. This indicates the potential contribution to violations from western Counties in the CSA and potentially from transport from areas in Ohio and West Virginia. However, a number of monitors in counties on both sides of the Pennsylvania-Ohio and Pennsylvania-West Virginia border are currently measuring attainment of the ozone standard.

Further analysis of backward trajectories could prove helpful in resolving the affect of meteorology on this area. Pennsylvania's March 2009 ozone recommendation did contain some NOAA HYSPLIT model backward trajectory information, but not for monitors in the Pittsburgh area. The supplied information for a monitor in eastern Pennsylvania indicated that HYSPLIT 24-hour period back trajectories were highly variable based upon the episode in question. Therefore, this information was not useful in determining the impact of meteorology on the Pittsburgh-New Castle CSA.

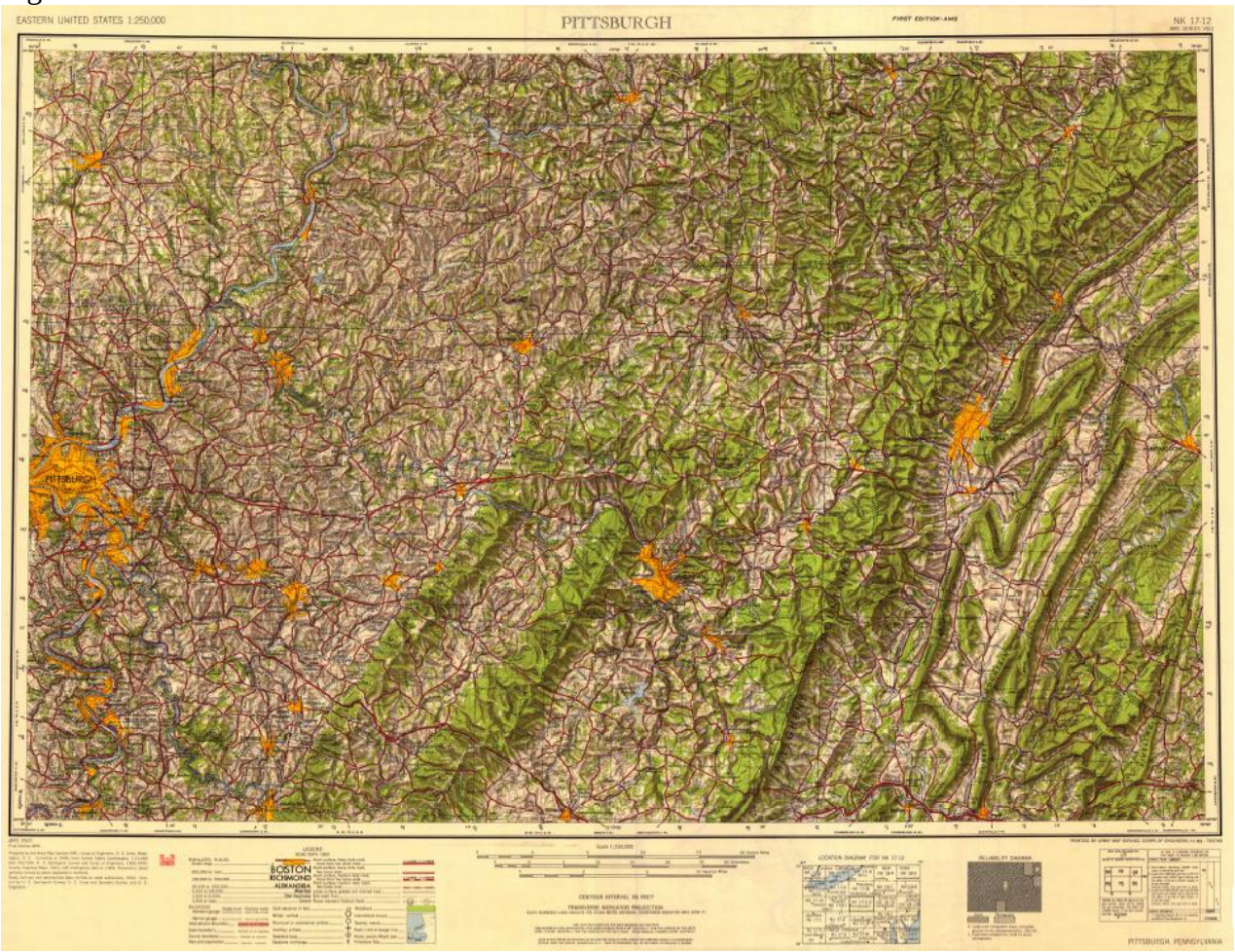
Factor 4: Geography/topography (mountain ranges or other air basin boundaries)

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

Pittsburgh lies on the Appalachian Plateau extending westward from the Allegheny Front, which is an escarpment that makes the western part of Pennsylvania higher than the eastern part of the Commonwealth. The City of Pittsburgh itself is defined by the river valleys of the Allegheny, the Monongahela, and the Ohio.

Elevations in the Pittsburgh region range from around 700 feet above sea level where the rivers meet, to 1,200 to 1,300 feet at the highest points, with dramatic hills and valleys often separating neighborhoods and communities. The highest land is at the prevailing level of the Appalachian Plateau, with the river valleys forming the low points, and varying slopes connecting it together.

Figure 5



Source: US Geologic Society, National Historic Map, Eastern United States

While this topography may not form a geographic or topographic barrier significantly limiting air pollution within the airshed, the topography may impact weather patterns in the area, result in atmospheric inversions or other conditions that affect local emissions transport or monitored ozone levels. Pennsylvania did not submit data as part of its recommendation indicating that topography plays a significant role in distribution of ozone across the Pittsburgh-Beaver Valley area.

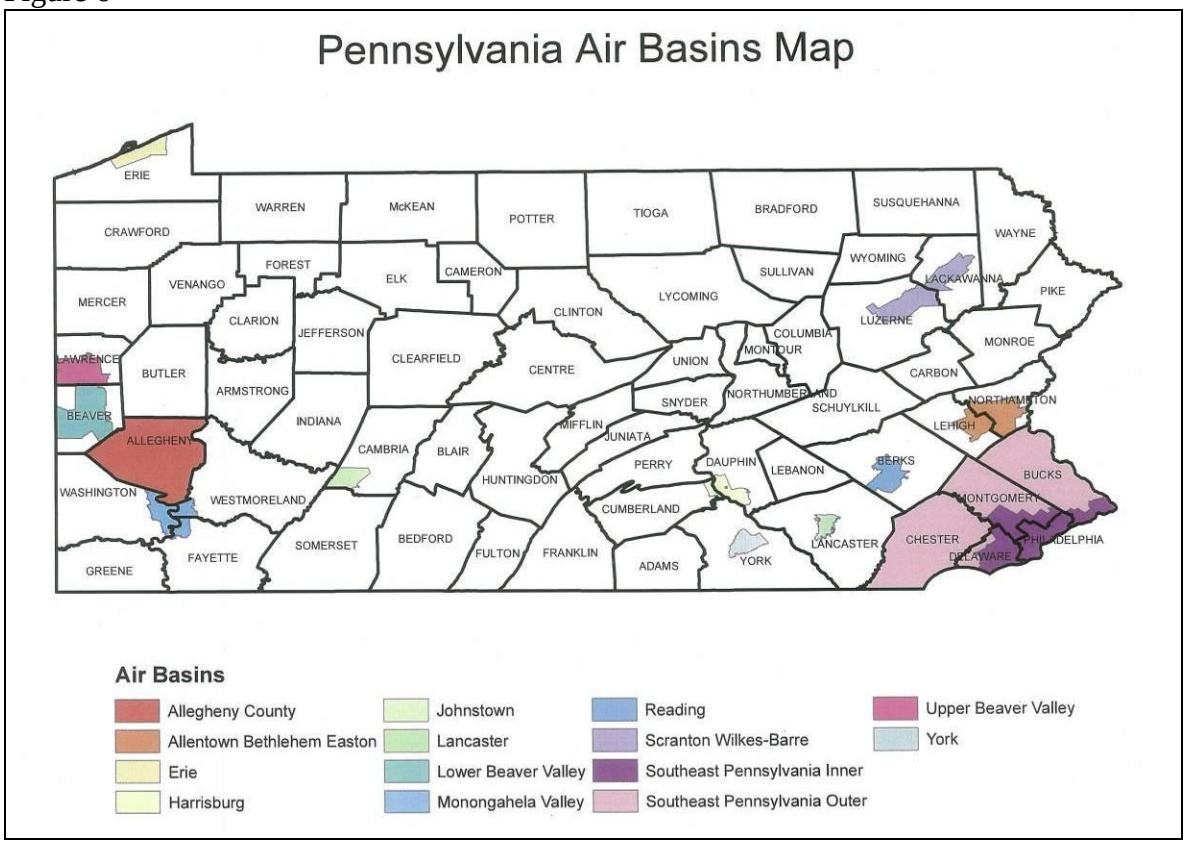
Factor 5: Jurisdictional boundaries

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

The Pittsburgh-Beaver Valley area has previously established nonattainment boundaries associated with both the 1-hour and 1997 8-hour ozone NAAQS. In its March 2009 recommendation to EPA, the Commonwealth recommended the same nonattainment area boundary for the 2008 ozone NAAQS. However, in a letter sent to EPA on November 22, 2011, Pennsylvania revised its recommendation to include as nonattainment only those counties having monitored violations of the 2008 ozone standard. In the case of the Pittsburgh-Beaver Valley area, Pennsylvania is now recommending that only Allegheny County be designated as nonattainment.

EPA relied on the Pittsburgh-New Castle CSA as its analytical starting point for determining nonattainment area boundaries. The Pittsburgh-New Castle CSA includes the 7-county Pittsburgh Metropolitan Statistical Area, as well as the one-county New Castle Micropolitan Statistical Area (comprised of Lawrence County).

Figure 6



As Pennsylvania indicated in its March 2009 recommendation to EPA, the counties in the Pittsburgh Metropolitan Statistical Area are part of one single transportation-planning agency as designated by the U.S. Department of Transportation (U.S. DOT) based on economic and commuting patterns. Retaining the existing boundary for this nonattainment area will allow the area to benefit from continuity of planning for the 1997 8-hour standard. Also, the 1997 Pittsburgh ozone nonattainment area has two emission control programs that pertain only to this area and not to surrounding counties: a requirement for cleaner gasoline during the ozone season and a requirement for gasoline pumps to control fumes when vehicles are refueling. Finally, the recommended nonattainment area includes three air basins (as defined in 25 *Pa.Code* § 121.1): the Lower Beaver Valley Air Basin, the Allegheny County Air Basin and the Monongahela Valley Air Basin. These basins were developed for purposes of the sulfur compound controls outlined in 25 *Pa. Code* § 123.22, yet they represent existing

local boundaries for emission controls in the areas of the Commonwealth where they exist.

In November 2011, Pennsylvania submitted a revised recommendation letter to EPA to alter its March 2009 recommendation to reflect only the county violating the 2008 ozone NAAQS (i.e. Allegheny County), dismissing its jurisdiction-based arguments set forth in the Commonwealth's prior March 2009 recommendation.

Pennsylvania did not recommend inclusion of Lawrence County in its March 2009 or November 2011 area recommendation letters to EPA. The Commonwealth's rationale in the March 2009 letter was that Lawrence County has a monitor that is monitoring well below the 2008 ozone NAAQS, that the area has traditionally been a stand-alone planning area, and that the county's micropolitan statistical area status indicates a lower level of social and economic ties to the Pittsburgh metropolitan area counties than counties within the Pittsburgh metropolitan statistical area.

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Pittsburgh-Beaver Valley nonattainment area: Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, and Westmoreland

On the basis of the factor discussion above, there is cause to extend the nonattainment boundary beyond the county having a violating monitor, i.e., Allegheny County. With respect to emissions and emissions-related data, Armstrong, Beaver, Washington, and Westmoreland Counties have relatively high emissions. Although the area is facing low to negative population growth (with the exception of Butler and Washington Counties) and many of the counties are sparsely populated, Washington, Westmoreland, Beaver, Butler, and Fayette Counties continue to have populations over 100,000 persons. Westmoreland, Washington, Beaver, and Butler Counties have high VMT, even relative to more densely populated Allegheny County.

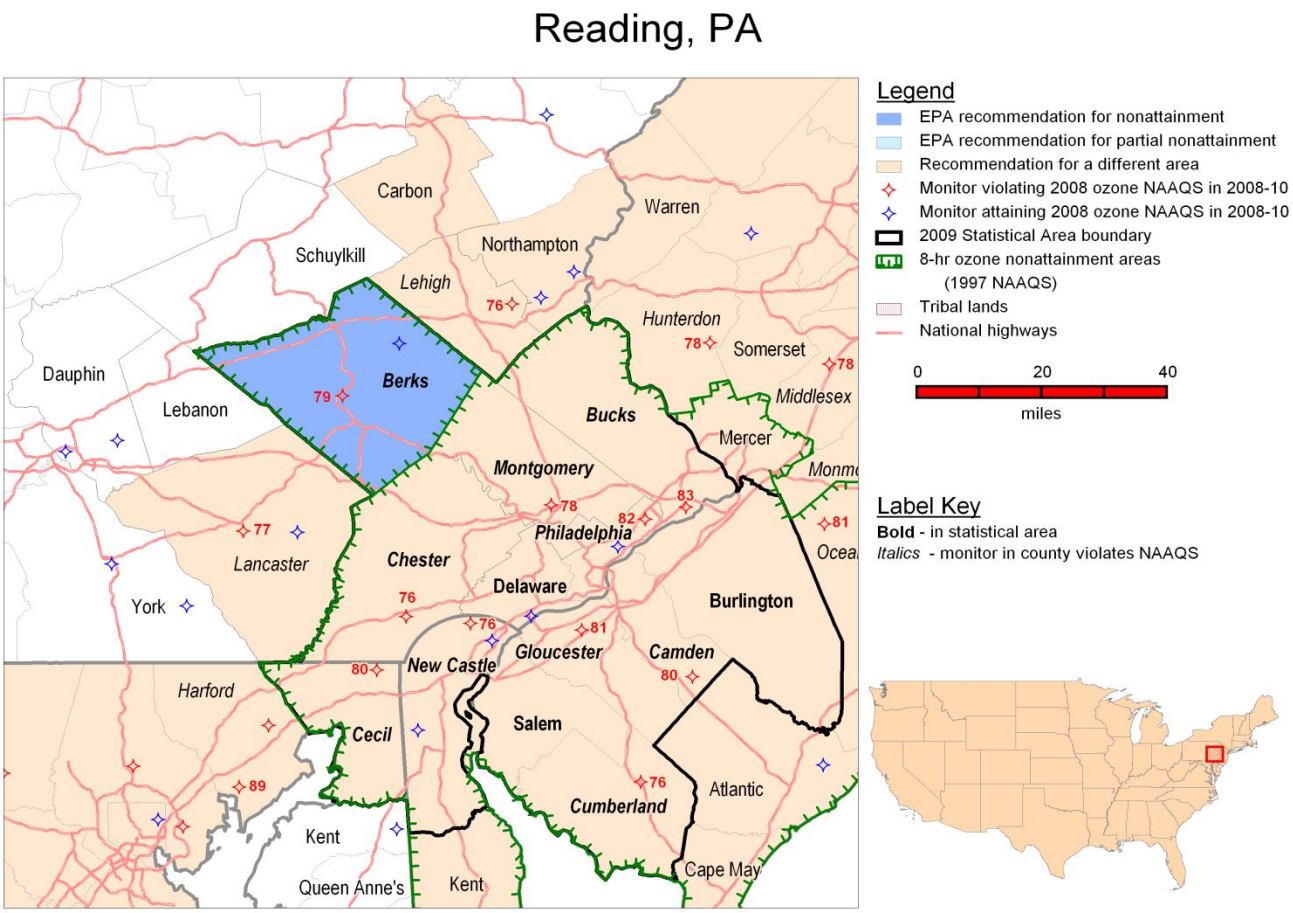
With respect to jurisdictional boundaries, it is clear that the counties in the Pittsburgh Metropolitan Statistical Area are socially and economically intertwined. The Pittsburgh metropolitan area counties utilize a single transportation-planning agency, and have emission control programs unique from neighboring counties and metropolitan areas. Historically, this Pittsburgh metropolitan area has been the ozone nonattainment boundary.

Based on this factor assessment, EPA contends that the Pittsburgh Metropolitan Statistical Area be the boundary for the 2008 nonattainment area, as it was for the 1997 ozone NAAQS nonattainment area. Based on the most recent 2009-2011 monitoring data, Allegheny County is the only county monitoring a violation of the 2008 NAAQS, and under the Clean Air Act must be designated nonattainment. However, we disagree with Pennsylvania's recommendation to exclude the remaining Pittsburgh area counties from the nonattainment area and believe the nearby counties in the Pittsburgh Metropolitan Statistical Area contribute to nonattainment of the 2008 ozone NAAQS. Therefore, these nearby counties must also be designated nonattainment. EPA agrees with Pennsylvania that there is sufficient evidence on the basis of the above factor assessment to exclude Lawrence County from the EPA intended nonattainment area. Therefore, EPA recommends that the intended nonattainment area for 2008 ozone NAAQS for the Pittsburgh-Beaver Valley area be the same as the 7-county nonattainment area boundary under the prior 1997 ozone NAAQS.

Technical Analysis for the Reading Area

Figure 1 is a map of the Reading intended nonattainment area, Berks County, Pennsylvania. The map provides other relevant information including the locations and design values of air quality monitors, major transportation arteries, and county and other jurisdictional boundaries. This map shows the former Reading nonattainment area for the 1997 ozone NAAQS, now a maintenance area, which consists of Berks County, Pennsylvania. It also shows the Philadelphia-Camden-Vineland CSA.

Figure 1.



For purposes of the 1997 8-hour ozone NAAQS, the Reading Area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire county of Berks in Pennsylvania.

In March 2009, the Commonwealth of Pennsylvania recommended that the same county, Berks, be designated as nonattainment in the Reading Area for the 2008 ozone NAAQS based on air quality data from 2006-2008. Pennsylvania provided an update to the original recommendation in November 2011 based on air quality data from 2009-2011. That recommendation update did not make any modification to the Reading area boundary. The recommendations are based on data from Federal Reference Method (FRM) monitors or Federal Equivalent Method (FEM) monitors sited and operated in accordance with 40 CFR Part 58. (See the March 17, 2009 and November 22, 2011 letters from the Pennsylvania Department of Environmental Protection to EPA.)

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate Berks County, Pennsylvania as "nonattainment" for the 2008 ozone NAAQS as the Reading nonattainment area.

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

Reading	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Pennsylvania	Berks	Berks

Factor Assessment

EPA has determined that it is appropriate to include Bucks, Chester, Montgomery, Lancaster, and Lehigh Counties in other separate nonattainment areas for the 2008 ozone NAAQS. Based on EPA's five-factor analyses, EPA has preliminary; determined that Bucks, Chester, and Montgomery Counties should be designated as nonattainment in the Philadelphia-Wilmington-Atlantic City Area, Lancaster County should be designated as nonattainment in the Lancaster Area, and Lehigh County should be designated nonattainment as part of the Allentown-Bethlehem-Easton Area. See EPA's respective technical analyses for these adjacent nonattainment areas for EPA's rationale for our intended nonattainment designation for these counties. To the extent that emissions from the Bucks, Chester, Montgomery, Lancaster, and Lehigh Counties may contribute ozone concentrations in the Reading nonattainment area, that contribution will be lessened by emission controls put in place in those separate nonattainment areas. Therefore, EPA is not including Bucks, Chester, Montgomery, Lancaster, and Lehigh Counties in this analysis for the Reading nonattainment area.

Factor 1: Air Quality Data

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

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

The 2010 DVs for the ozone NAAQS for Berks County and nearby surrounding counties are shown in Table 2.

Table 2. Air Quality Data.

County	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Berks, PA	Yes	79
Lebanon, PA	No	--
Schuylkill, PA	No	--

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

In accordance with section 107(d) of the Clean Air Act, EPA must designate an area nonattainment if it is violating the 2008 ozone NAAQS. Berks County shows a violation of the 2008 ozone NAAQS, therefore this county must be included in a nonattainment area. Note that the absence of a violating monitor is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status based upon contribution to violations in other nearby areas. Each county is being evaluated based on the weight of evidence of the five factors.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

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

Table 3. Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Berks, PA	Yes	18,908	15,918
Lebanon, PA	No	6,166	5,367
Schuylkill, PA	No	6,554	5,922

Berks County has the highest NOx and VOC emissions in the area of analysis. In fact, the emissions from Berks County are nearly three times higher than the emissions in Lebanon and Schuylkill Counties. This indicates that emissions from Lebanon and Schuylkill Counties are not likely to contribute to ozone violations in Berks County.

Population density and degree of urbanization

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

Table 4. Population and Growth.

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Berks, PA	Yes	411,442	0.48	36,945	+10%
Lebanon, PA	No	133,568	0.37	13,151	+11%
Schuylkill, PA	No	148,289	0.19	-1,798	-1.2%

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

Berks County has the highest population in the area of analysis. In fact, the population in Berks County is nearly three times higher than the populations of Lebanon and Schuylkill Counties. This indicates that non-point source emissions from Lebanon or Schuylkill Counties are not likely to contribute to ozone violations in Berks County.

Traffic and commuting patterns

EPA evaluated the commuting patterns of residents in the area, as well as the total Vehicle Miles Traveled (VMT) for each county. In combination with the population/population density data and the location of main transportation arteries (see Figure 1, above), this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows the total vehicle miles traveled (VMT) for each county in 2008.

Table 5. Traffic (VMT) Data..

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Berks, PA	Yes	3,335
Lebanon, PA	No	1,210
Schuylkill, PA	No	1,394

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

VMT in Berks County is more than twice as high as VMT in Lebanon and Schuylkill Counties. However, as shown in Table 6, below, Lebanon and Schuylkill Counties do have commuters into Berks County. Therefore, there is come contribution of VMT and mobile source emissions from Lebanon and Schuylkill Counties to Berks County.

Table 6. County to County Worker Flow.

Residence County → / Workplace County ↓	Berks, PA	Lebanon, PA	Schuylkill, PA
Berks, PA	140,819	2,799	5,790
Lebanon, PA	2,053	36,677	1,482
Schuylkill, PA	619	188	43,979

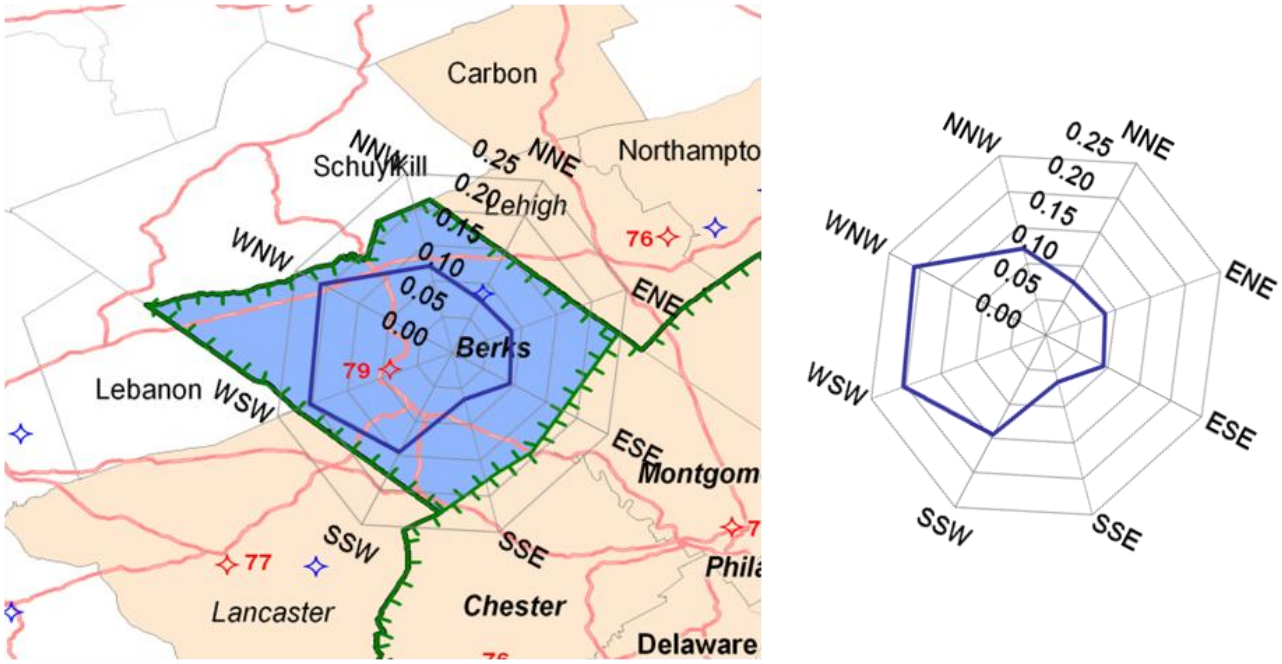
Source: US Census Bureau County-To-County Worker Flow Files
http://www.census.gov/population/www/cen2000/commuting/index.html

Factor 3: Meteorology (weather/transport patterns)

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

In the summertime, the predominant winds in Berks County come from the west, with the largest components from the west-southwest (20%) and west-northwest (20%). There is also a high frequency of winds from the south-southwest (15%). As shown in Figure 2, below, this indicates that Lebanon County is upwind of the violating monitor in Berks County. Therefore, emissions from Lebanon County likely contribute to ozone concentrations in Berks County. However, since emissions in Lebanon County are relatively low, the contribution to ozone concentrations in Berks County is also relatively low.

Figure 2. 30-Year Average Summertime Wind Directions in Berks County, Pennsylvania



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

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

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

Factor 5: Jurisdictional boundaries

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

The three counties in the area of analysis are in the same state, but otherwise are not connected jurisdictionally. They are served by different metropolitan planning organizations (MPOs); the Berks County Planning Commission, the Lebanon County MPO, and the Schuylkill County Planning and Zoning Commission. They are historically in separate nonattainment areas for ozone and fine particulate matter ($PM_{2.5}$). Finally, they are in separate statistical areas, as defined by the US Census Bureau.

The Reading area has a previously-established nonattainment boundary associated with the 1997 8-hour ozone NAAQS, which is the single county of Berks. Pennsylvania has recommended the same boundary for the 2008 ozone NAAQS. The Reading area for the 1997 $PM_{2.5}$.NAAQS also consists of the single county of Berks. Lebanon and Schuylkill Counties have historically been included in nonattainment areas other than the Reading area for ozone and/or $PM_{2.5}$. Lebanon County is part of the Harrisburg area for ozone (1-hour and 8-hour) and $PM_{2.5}$. Schuylkill County was a single-county nonattainment area for the 1-hour ozone NAAQS, and was designated attainment/unclassifiable for the 1997 8-hour NAAQS and $PM_{2.5}$.

According to the Office of Management and Budget's "Standards for Defining Metropolitan and Micropolitan Statistical Areas," published in the Federal Register on December 27, 2000 (65 FR 82228), the "general concept of a Metropolitan Statistical Area or a Micropolitan Statistical Area is that of an area containing a recognized population nucleus and adjacent communities that have a high degree of integration with that nucleus." Being part of a statistical area indicates that counties are linked through employment and commuting. Conversely, being in separate statistical areas implies little interconnection. As stated above, Berks, Lebanon, and Schuylkill Counties are in separate statistical areas. Lebanon County makes up the Lebanon MSA, which is part of the Harrisburg-Carlisle-Lebanon, CSA. Schuylkill County makes up the Pottsville Micropolitan Statistical Area. Berks County makes up the Reading MSA, which is part of the Philadelphia-Camden-Vineland CSA. However, EPA's

preliminary recommendation is to not include Berks County in the Philadelphia-Wilmington-Atlantic City Area for the 2008 ozone NAAQS, as supported by EPA's five-factor analysis for that area[7].

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties meet the CAA criteria for inclusion in the Reading nonattainment area: Berks County. This is the same county that was included in the Reading nonattainment area for the 1997 ozone NAAQS (now the Reading maintenance area). An air quality monitor in Berks County is violating the 2008 ozone NAAQS based on the 2010 DV, therefore this county must be included in a nonattainment area. EPA has preliminary concluded that Berks County should be included in the Reading Area.

EPA has concluded that the other counties in this analysis, Lebanon and Schuylkill Counties, do not contribute to ozone violations in Berks County. These counties do not have ozone monitors. These counties have relatively low emissions, populations, and VMT. Dominant ozone season winds in Berks County come from the west and west-southwest. Therefore, Lebanon County is upwind of the violating monitor in Berks County. However, since emissions in Lebanon County are relatively low, the contribution to ozone concentrations in Berks County from upwind emissions in Lebanon County is also relatively low. Furthermore, Lebanon and Schuylkill Counties are not linked jurisdictionally to the Reading area. They are served by different MPOs and they are in separate statistical areas. Therefore, Lebanon and Schuylkill Counties should not be included in the Reading nonattainment area.

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

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

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

Intended Nonattainment Areas in Tennessee

Area	Tennessee's Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Knoxville-Sevierville-La Follette, TN	Blount (partial) Cocke (partial) Sevier (partial)	Anderson Blount Cocke (partial) Knox Loudon Sevier
Memphis, TN-MS-AR*	None	Shelby

*Memphis, TN-MS-AR is a multi-state nonattainment area. Table 1 below identifies the counties in the other states that EPA intends to designate as part of the nonattainment area.

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

The analysis below provides the basis for intended nonattainment area boundaries. It relies on our analysis of whether and which monitors are violating the 2008 ozone NAAQS, based on certified air quality monitoring data from 2008-2010 and an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas based on a weight of evidence analysis considering the factors identified below. EPA issued guidance on December 4, 2008 that identified these factors as ones EPA would consider in determining nonattainment area boundaries and recommended that states consider these factors in making their designations recommendations to EPA.[1]

1. Air quality data (including the design value calculated for each Federal Reference Method monitor or Federal Equivalent Method (FEM) monitor in the area);
2. Emissions and emissions-related data (including location of sources and population, amount of emissions and emissions controls, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography and topography (mountain ranges or other basin boundaries);
5. Jurisdictional boundaries (e.g., counties, air districts, existing nonattainment areas, Indian country, metropolitan planning organizations (MPOs))

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

Ground-level ozone generally is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Because NOx and VOC emissions from a broad range of sources over a wide area typically contribute to violations of the ozone standards, EPA believes it is important to consider whether there are contributing emissions from a broad geographic area. Accordingly, EPA chose to examine the 5 factors with respect to the larger of the Combined Statistical Area (CSA) or Core Based Statistical Area (CBSA) associated with the violating monitor(s).[2] All data and information used by EPA in this evaluation are the latest available to EPA and/or provided to EPA by states or tribes.

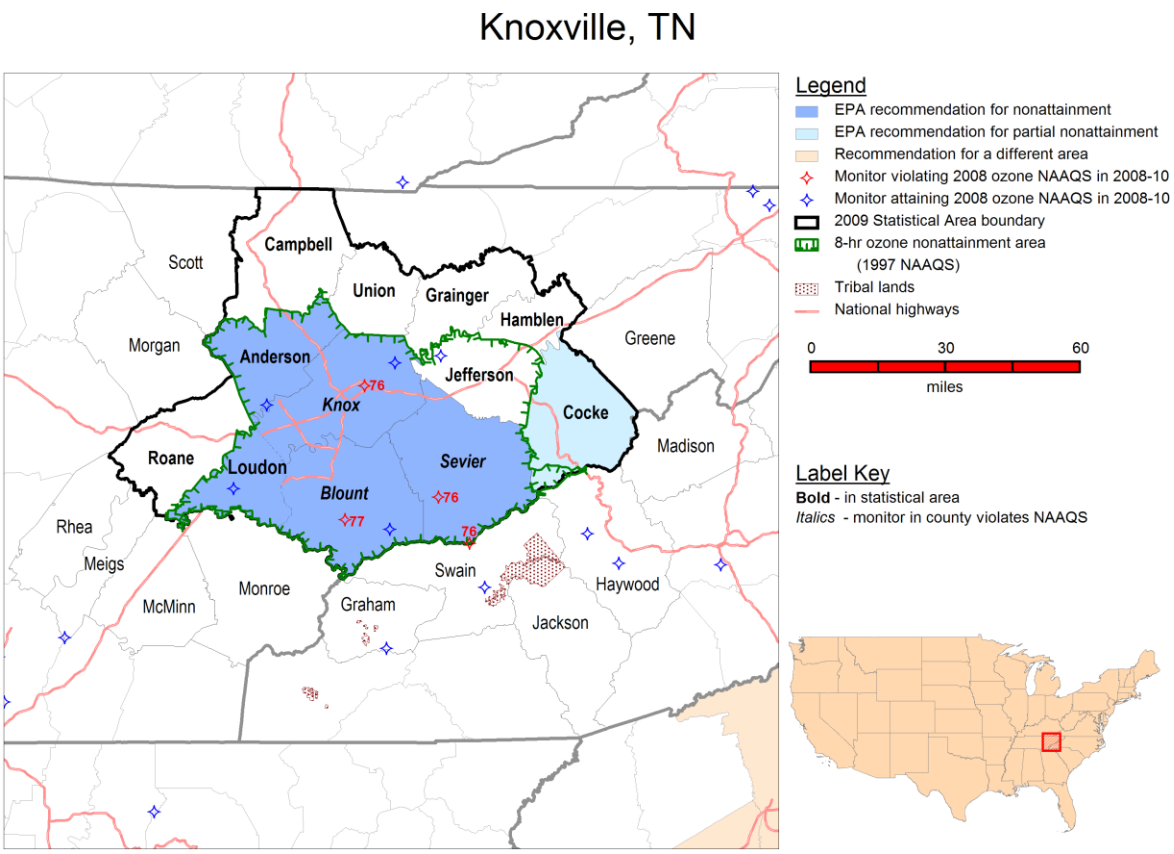
In EPA's designations guidance for the 2008 ozone NAAQS EPA recommended examining CSA/CBSAs because certain factors used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 ozone NAAQS. Congress required a similar approach in 1990 for areas classified as serious or above for the 1-hour ozone standard, and EPA used the same basic approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's guidance recommended using the boundary of the county containing the violating monitor as the starting point for considering the nonattainment area's boundary.

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

Technical Analysis for Knoxville-Sevierville-La Follette

Figure 1 is a map of the Knoxville-Sevierville-La Follette intended nonattainment area. The map also shows locations and design values of air quality monitors, county and other jurisdictional boundaries, the nonattainment area boundary for 1997 ozone NAAQS, and major transportation arteries.

Figure 1. Knoxville-Sevierville-La Follette CSA



For purposes of the 1997 8-hour ozone NAAQS, this area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire counties of Anderson, Blount, Jefferson, Knox, Loudon, and Sevier in Tennessee, and a portion of Cocke County, Tennessee.

In March 2009, Tennessee recommended that Anderson, Blount, Knox, Loudon, and Sevier Counties in their entireties, and a portion of Cocke County be designated as the "Knoxville" nonattainment area for the 2008 8-hour ozone standard based on air quality data from 2006-2008. In March 2009, Tennessee also recommended that Jefferson County be designated as the "Morristown" nonattainment area, separate from a Knoxville nonattainment area, for the 2008 8-hour ozone standard based on air quality data from 2006-2008. Letter from James H. Fyke, Commissioner, State of Tennessee Department of Environment and Conservation to A. Stanley Meiburg, Acting Regional Administrator, US EPA Region 4 (March 10, 2009) (on file with US EPA Region 4). In November 2011, Tennessee provided an update to their 2009 original recommendation based on preliminary air quality data from 2009-2011. In its updated recommendation, Tennessee recommended that the portions of Blount, Cocke and Sevier Counties that comprise the Tennessee portion of the Great Smoky Mountains National Park be

designated "nonattainment" for the 2008 ozone NAAQS. Letter from Robert J. Martineau Jr, Commissioner, State of Tennessee Department of Environment and Conservation to Gwen Keyes Fleming, Regional Administrator, US EPA Region 4 (Nov. 8, 2011) (on file with US EPA Region 4). The March 2009 and November 2011 recommendations were based on data from FEM monitors sited and operated in accordance with 40 CFR Part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate five entire counties and one partial county in Tennessee (identified in Table 1 below) as "nonattainment" for the 2008 ozone NAAQS as part of the Knoxville-Sevierville-La Follette nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for Knoxville-Sevierville-La Follette.

Knoxville-Sevierville-La Follette	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Tennessee	Blount (partial) Cocke (partial) Sevier (partial)	Anderson Blount Cocke (partial) Knox Loudon Sevier

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in parts per billion (ppb)) for air quality monitors in counties in the Knoxville-Sevierville-La Follette area based on data for the 2008-2010 period (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. A monitor's DV is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years is 75 ppb or less. A DV is only valid if minimum data completeness criteria are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the DV for the county or area is determined by the monitor with the highest level.

The 2010 DVs for the ozone NAAQS for counties in the Knoxville-Sevierville-La Follette and nearby surrounding area are shown in Table 2.

Table 2. Air Quality Data.

County*	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Anderson, TN	No	70
Blount, TN	**Yes (Partial)**	**77**
Cocke, TN	**Yes (Partial)**	**N/A**
Jefferson, TN	No	74
Knox, TN	**No**	**76**
Loudon, TN	No	73

Sevier, TN	**Yes (Partial)**	**76**

*Counties with violating monitors are shown in bold.

Blount, Knox and Sevier Counties show violations of the 2008 ozone NAAQS, therefore these counties are included in the nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated, as discussed below, based on the five factors and other relevant information to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NOx and VOC (given in tons per year (tpy)) for violating and nearby counties in the Knoxville-Sevierville-La Follette, TN CSA that we considered for inclusion in the Knoxville-Sevierville-La Follette area.

Table 3. Total 2008 NOx and VOC Emissions.

County*	State Recommended Nonattainment?	NOx (tpy)	VOC (tpy)
Anderson, TN	**No**	**12,475**	**3,569**
Blount, TN	**Yes (Partial)**	**3,593**	**6,749**
Campbell, TN	No	2,964	1,773
Cocke, TN	**Yes (Partial)**	**1,761**	**2,273**
Grainger, TN	No	687	1,216
Hamblen, TN	No	6,612	4,719
Jefferson, TN	No	3,148	3,329
Knox, TN	**No**	**15,169**	**16,182**
Loudon, TN	**No**	**3,751**	**3,340**
Roane, TN	No	10,711	3,006
Sevier, TN	**Yes (Partial)**	**2,602**	**5,399**
Union, TN	No	432	959
	Areawide:	63,905	52,514

*Counties that EPA intends to designate as nonattainment are shown in bold.

Knox County is leading all counties with 24 percent of NOx and 31 percent VOC of the CSA's emissions. Anderson County emitted 19 percent of the CSA's NOx emissions with 77 percent from point sources. It is worth noting that the Bull Run Facility Electric Generating Unit (EGU) in Anderson County generated 1,086 tons of NOx with Selective Catalytic Reduction (SCR) control during the 2008 ozone season. Blount County was the second highest VOC contributor at 6,749 tons, 13 percent of the CSA total. Sevier County had the third highest VOC levels with 5,400 tons, about 10 percent of the CSA total. In addition, 18 percent of all VOC emissions from mobile sources originated from Blount and Sevier Counties.

Population density and degree of urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions that may contribute to ozone formation. Rapid population or vehicle miles travelled (VMT) growth (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that it may be appropriate to include the area associated with the area source and mobile source emissions as part of the nonattainment area. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

County*	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Anderson	**No**	**75,129**	**0.22**	**3,897**	**+5%**
Blount	**Yes (Partial)**	**123,010**	**0.22**	**16,793**	**+16%**
Campbell	No	40,716	0.08	853	+2%
Cocke	**Yes (Partial)**	**35,662**	**0.08**	**2,035**	**+6%**
Grainger	**No**	22,657	0.07	1,920	+9%
Hamblen	No	62,544	0.36	4,301	+7%
Jefferson	No	51,407	0.16	6,825	+15%
Knox	**No**	**432,226**	**0.82**	**49,198**	**+13%**
Loudon	**No**	**48,556**	**0.20**	**9,342**	**+24%**
Roane	No	54,181	0.14	2,238	+4%
Sevier	**Yes (Partial)**	**89,889**	**0.15**	**18,190**	**+25%**
Union	No	19,109	0.08	1,250	+7%
	Areawide:	1,055,086	0.23	116,842	12%

*Counties that EPA intends to designate as nonattainment are shown in bold.

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

In terms of population growth, Sevier, Loudon and Blount Counties experienced the largest with 25 percent, 24 percent and 16 percent, respectively. Sevier County has the second highest absolute change in population with 18,190. Most of the urban area is in the center (Sevierville) with sparsely populated communities on the northwest side of the county adjacent to Knoxville. Loudon is mostly rural with

sparsely populated areas along the US Highway 11 corridor. Blount County's population grew 16 percent and is home to 11 percent of the CSA's population making it second to Knox County. Blount County's urban and agriculture development is in the northwestern half of the County. Knox County has highest population density, the largest absolute change in population, and, the largest population in the 12-county CSA. Anderson County has intermittent urbanization in Oak Ridge and Clifton on the southwestern part of the county, adjacent to Knoxville. Jefferson County is mostly rural with the center of the urban density in Jefferson City, and in closer proximity (compared to Knoxville) to the more urbanized area of Morristown in Hamblen County.

Traffic VMT data and commuting patterns

EPA evaluated the total VMT for each county. In combination with the population/population density data and the location of main transportation arteries (see above), this information helps identify the probable location of non-point source emissions. A county with high VMT is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation that contributes to nonattainment in the area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows the total 2008 VMT for each county.

Table 5. Traffic and VMT Data.

County*	State Recommended Nonattainment?	2008 VMT** (million miles)
Anderson	**No**	**831**
Blount	**Yes (Partial)**	**1,105**
Campbell	No	656
Cocke	**Yes (Partial)**	**455**
Grainger	**No**	232
Hamblen	No	656
Jefferson	No	819
Knox	**No**	**5,304**
Loudon	**No**	**782**
Roane	No	743
Sevier	**Yes (Partial)**	**1,164**
Union	No	134
	Areawide:	12,881

*Counties that EPA intends to designate as nonattainment are shown in bold.
**MOBILE model VMTs are those inputs into the NEI version 1.5.

Knox County leads the CSA with the highest VMT followed by Sevier and Blount counties.

Factor 3: Meteorology (weather/transport patterns)

For this factor, EPA analyzed 30-years of National Weather Service (NWS) wind speed and wind direction data collected at the Knoxville/McGhee Tyson Airport (Station #13891) to help determine transport patterns and source contributions. EPA assessed wind direction and speed for the 2008-2010 "ozone season" (March through October) in the Knoxville-Sevierville-La Follette, TN CSA. The analysis was conducted to better understand the fate and transport of precursor emissions contributing to

ozone formation. EPA's analysis of the NWS data indicate predominate southwest, west-southwest and northern component for the Knoxville-Sevierville-La Follette, TN CSA

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

The geography/topography analysis evaluates the physical features of the land that might affect the air shed and, therefore, the distribution of ozone over the area.

Regional topography consists of linear ridge and parallel lowland valleys. The Area has predominantly high elevations in the northern regions and lower elevations further south ranging from 700 to 1,500 feet. The Knoxville-Sevierville-La Follette, TN area includes the Tennessee portion of the Great Smoky Mountains National Park (GSMNP). This area consists of densely forested high peaks and valleys. The highest point in the state is at Clingman's Dome with an elevation of 6,643 feet. There are three violating monitors in the Knoxville area that are at the higher elevations and within the GSMNP. These monitors are Look Rock (AQS ID: 47-009-0101, 2008-2010 DV of 77 ppb) in Blount County, Cove Mountain (AQS ID: 47-155-0101, 2008-2010 DV of 76 ppb) in Sevier County, and Clingman's Dome (AQS ID: 47-155-0102, 2008-2010 DV of 76 ppb), also in Sevier County.

Figure 2 shows a topographical map of Knoxville and the National Park. These two monitors are located at a significantly higher elevation than the Knox County monitors. High elevation ozone sites often measure elevated ozone levels overnight due to regional transport of tropospheric ozone formed during the daytime. The regional transport mechanisms that cause these events are related to downward transport by vertical mixing that concentrates the tropospheric ozone or by horizontal transport from surrounding areas (Eliasson et al, 2003). The long duration of these nocturnal events can also be attributed to a lack of local Nitric Oxide (NO) emissions which act to titrate the ozone and reduce the ambient ozone concentration as occurs in urban areas overnight (Eliasson et al, 2003) [3].

Figure 3 compares the hourly distribution of daily maximum hourly ozone values over 65 ppb for four sites: Look Rock, two urban Knox County Sites, and Blue Ridge Parkway, another high elevation site in North Carolina in the GSMNP that is further removed from urban areas. The Knoxville sites show a typical urban pattern of ozone events in the afternoon (approximately 12:00 pm to 6:00 pm). The Blue Ridge Parkway site is impacted primarily by regional transport and shows a typical high elevation site pattern of ozone events overnight (approximately 9:00 pm to 3:00 am). This site is not in the Knoxville Sevierville-La Follette CBSA and is only included as an example of another high elevation site. The Look Rock site shows a combination of these two signals, indicating that the site is impacted by both downwind afternoon ozone formation from Knoxville and high elevation ozone transport. In some cases, these two processes could be affecting the Look Rock monitor simultaneously.

Figure 4 shows the frequency of ozone hourly values greater than 75 ppb by wind direction and time of day for the Look Rock site. This figure illustrates two distinct groups of high ozone events: afternoon ozone from the south to southeast (Knoxville) and overnight ozone from the north to northwest (regional transport). The Cove Mountain site in Sevier County shows a similar pattern as the Look Rock, although with a slightly less pronounced urban signal.

[3] Ingegärd Eliasson, Sofia Thorsson, Yvonne Andersson-Sköld, Summer nocturnal ozone maxima in Göteborg, Sweden, Atmospheric Environment, Volume 37, Issue 19, June 2003, Pages 2615-2627.

As a result of these analyses, EPA has preliminarily concluded that both downwind urban ozone formation from Knoxville Knox County and high elevation regional transport of ozone contribute to the NAAQS violations at the Look Rock and Cove Mountain monitors.

Figure 2. Topographical map of Knoxville and the Great Smoky Mountains National Park

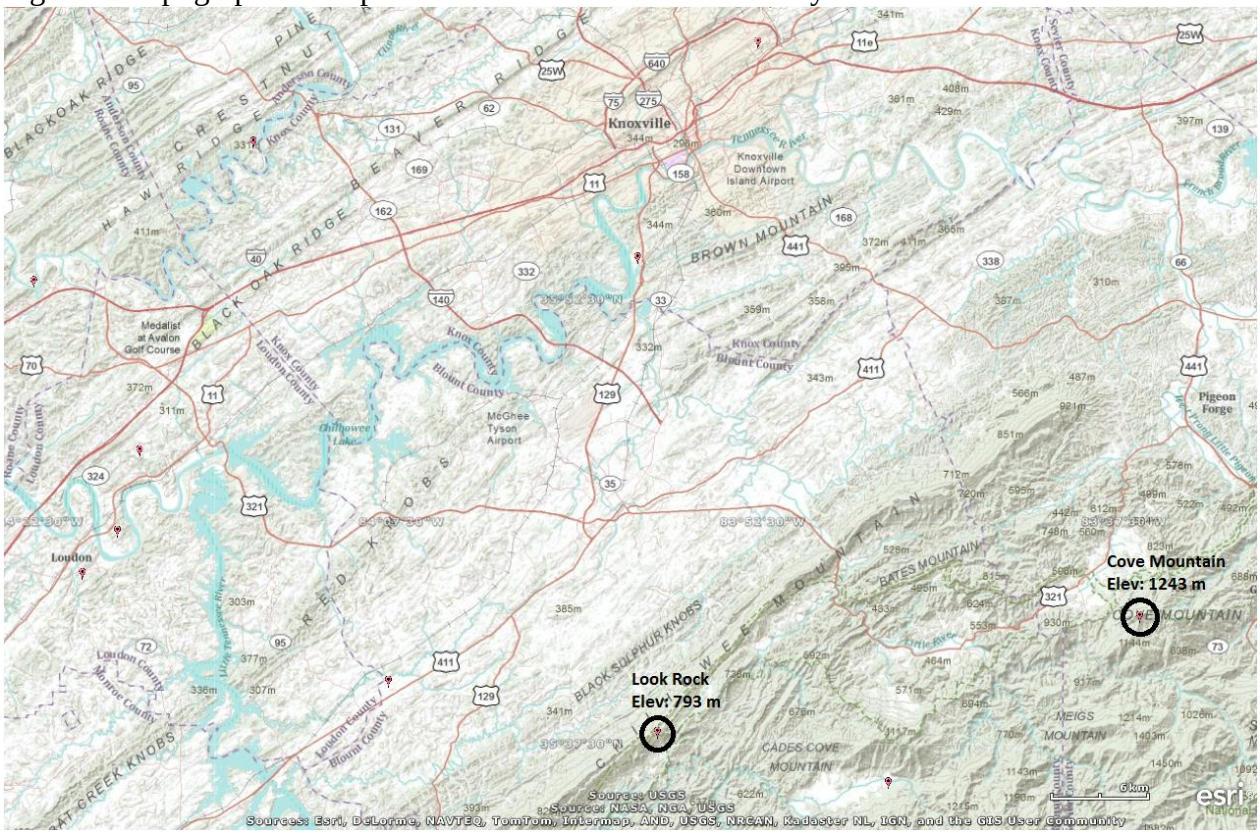


Figure 3. 2007-2010 Count of Daily Max Values > 65 ppb

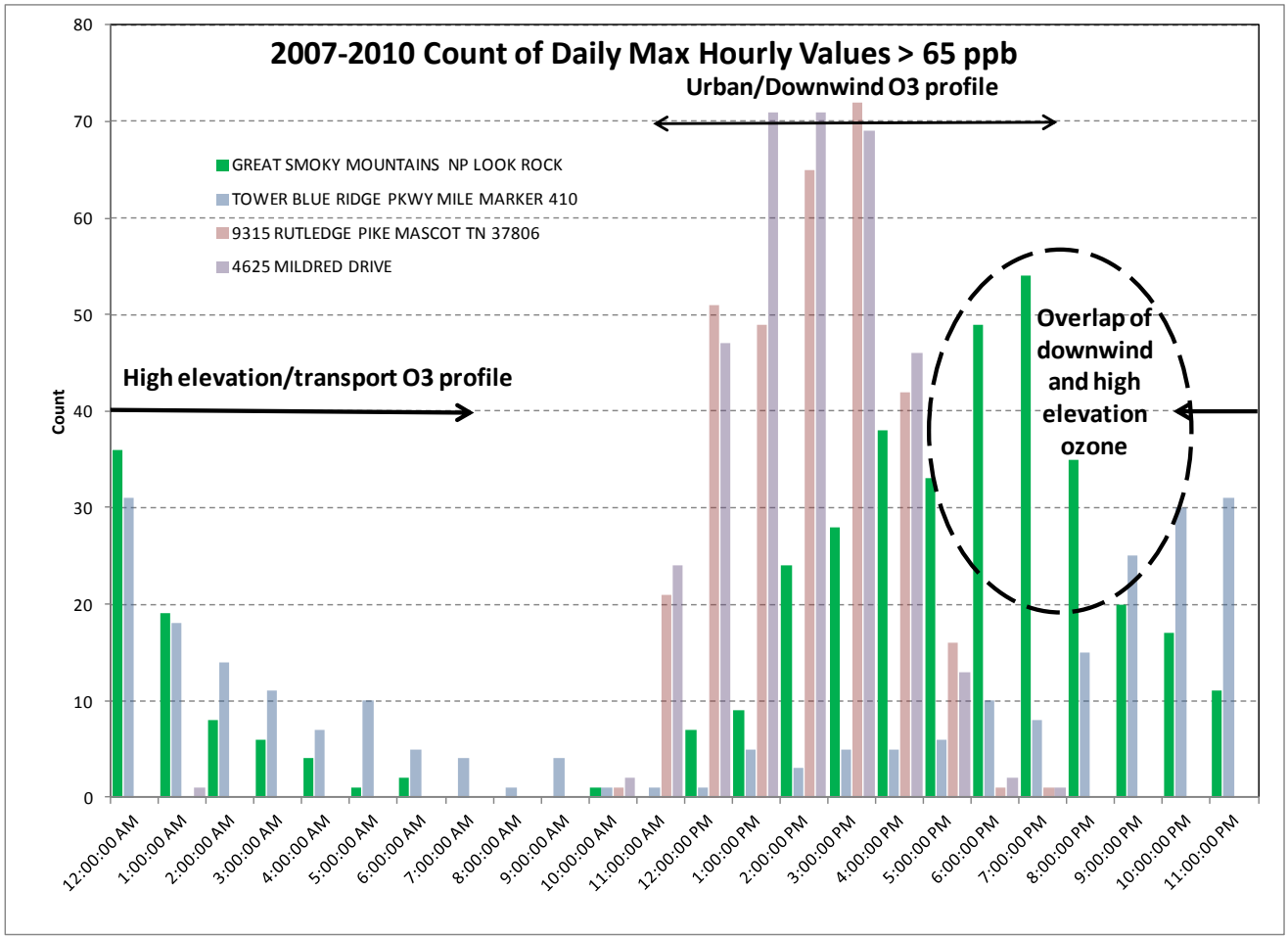
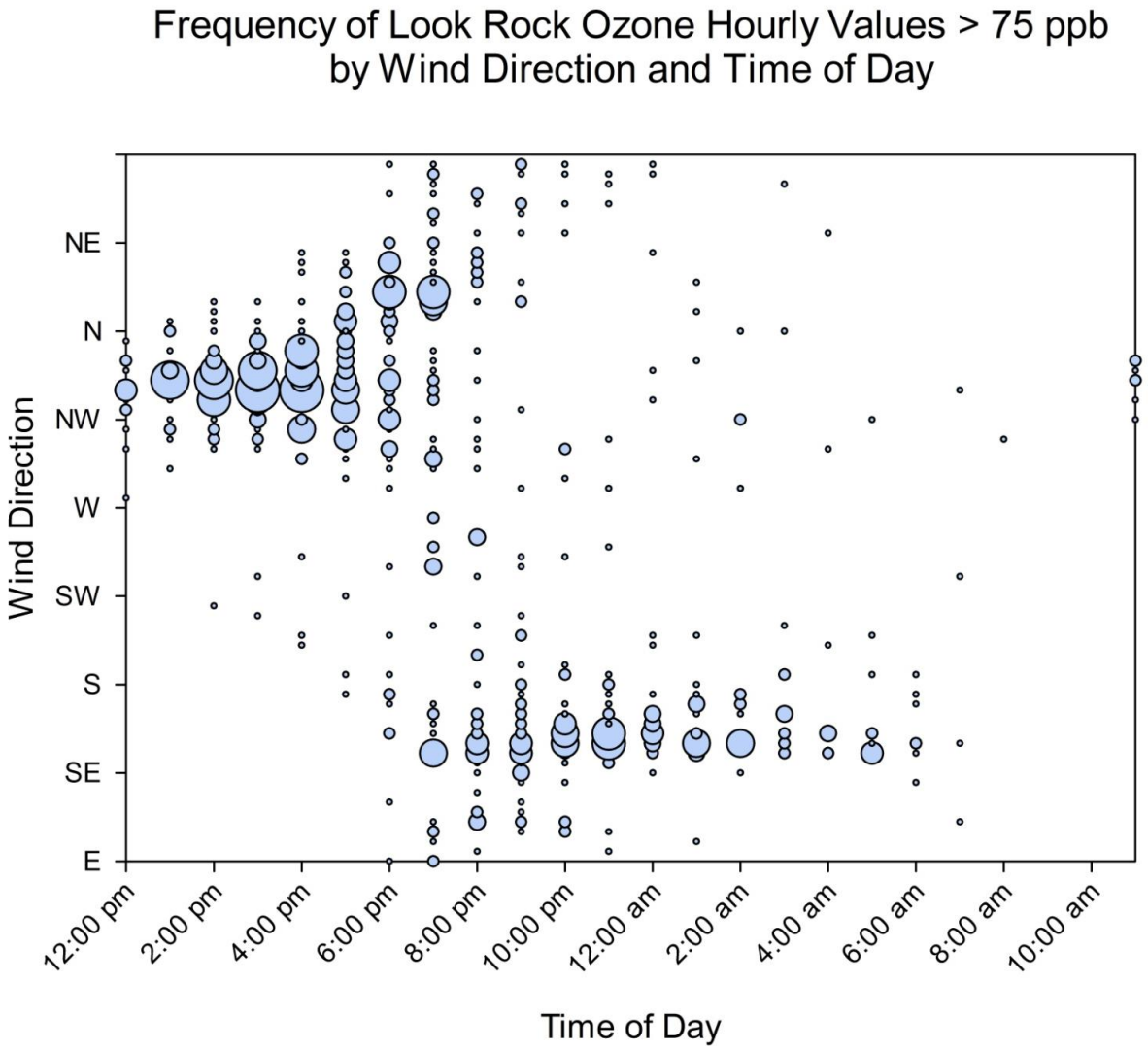


Figure 4. Frequency of Look Rock Ozone Hourly Values >75 ppb



Factor 5: Jurisdictional boundaries

Once we identified the general areas we anticipate recommending as nonattainment areas, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment area boundaries for ozone or other urban-scale pollutants, county lines, air district boundaries, township boundaries, area covered by a MPOs, state lines, areas of Indian Country, and urban growth boundary. Where existing jurisdictional boundaries were not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates were considered.

The Knoxville-Sevierville-La Follette area has previously established nonattainment boundaries associated with the both the 1-hour ozone and 1997 8-hour ozone NAAQS. The Knoxville-Sevierville-La Follette nonattainment boundary for the 1-hour ozone NAAQS included Knox County, Tennessee in its entirety. Whereas the Knoxville-Sevierville-La Follette nonattainment boundary for the 1997 8-hour

ozone NAAQS included Anderson, Blount, Jefferson, Knox, Loudon, and Sevier Counties in Tennessee in their entireties, and a portion of Cocke County, Tennessee.

The Knoxville-Sevierville-La Follette CSA is composed of two MPOs, the Knoxville Regional Transportation Planning Organization (TPO) and Lakeway Area Metropolitan Transportation Planning Organization (MTPO). The Knoxville TPO includes Loudon, Blount, Knox and Sevier Counties. The Lakeway MTPO includes Jefferson and Hamblen Counties.

Jefferson County had a violating monitor based on air quality data used for the 2004 designation for the 1997 ozone NAAQS. It was included within the nonattainment area boundary based on the violation, not based on a determination that emissions from the county were contributing to a violation in a nearby area violating the standard. Current monitor reading shows Jefferson as attaining. In addition, a portion of Jefferson County (Jefferson City) falls under the Lakeway MTPO.

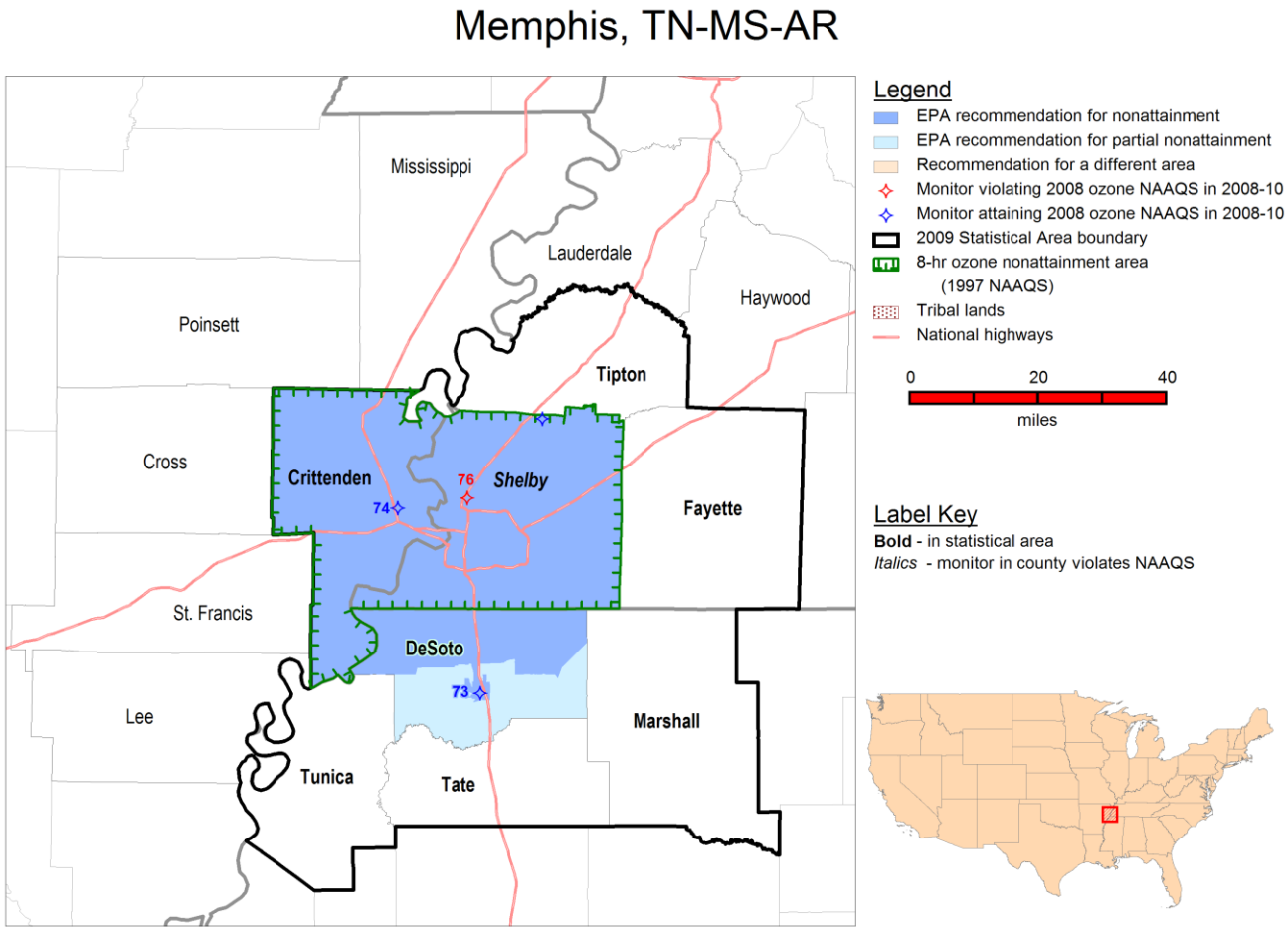
Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following counties should be included as part of the Knoxville-Sevierville-La Follette nonattainment area because they are either violating the 2008 ozone NAAQS or contributing to a violation in a nearby area: Anderson, Blount, Knox, Loudon and Sevier Counties, in their entireties. A portion of Cocke County is brought in since it comprises the GSMNP. All of these counties are included in the Knoxville nonattainment area for the 1997 ozone NAAQS. The air quality monitors in Blount, Knox and Sevier Counties indicate violations of the 2008 ozone NAAQS based on 2010 DVs, therefore these counties are preliminarily included in the nonattainment area. Anderson and Loudon Counties, in their entireties, and a portion of Cocke County in Tennessee are nearby counties that do not have a violating monitor, but EPA has preliminarily concluded that these counties contribute to the ozone concentrations in violation of the 2008 ozone NAAQS through emissions from point sources and non-point sources (e.g., vehicles and other small area sources). Knox County, Tennessee has among the highest NOx and VOC emissions in the area. Anderson County ranked relatively high for large NOx emissions, contributing 19 percent of the CSA's total NOx. Given the prevalent wind (southwest, west-southwest and northern), Anderson County, which is adjacent to Knox County, is contributing to the violating monitor to Knox County and therefore is being brought in for contribution. While SCR controls were installed at the plant, there has been a steady increase in NOx emission levels since 2006.

Technical Analysis for Memphis, TN-MS-AR

Figure 1 is a map of the Memphis, TN-MS-AR intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county and other jurisdictional boundaries, relevant statistical area boundaries, the nonattainment area boundary for 1997 ozone NAAQS, and major transportation arteries.

Figure 1. TN-MS-AR Nonattainment Area



For purposes of the 1997 8-hour ozone NAAQS, portions of this area were designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire counties of Crittenden County, Arkansas, and Shelby County, Tennessee.

In March 2009, Tennessee recommended that Shelby County be designated "nonattainment" for the 2008 8-hour ozone standard based on air quality data from 2006-2008. Letter from James H. Fyke, Commissioner, State of Tennessee Department of Environment and Conservation to A. Stanley Meiburg, Acting Regional Administrator, US EPA Region 4 (March 10, 2009) (on file with US EPA Region 4). Tennessee provided an update to its original recommendation in November 2011 based on preliminary 2009-2011 air quality data. In Tennessee's updated recommendation, the state did not provide a specific update to its 2009 recommendation for the Memphis TN-MS-AR but stated that all

other counties (with the exception of those recommended for Knoxville) should be designated unclassifiable/attainment. Letter from Robert J. Martineau Jr, Commissioner, State of Tennessee Department of Environment and Conservation to Gwendolyn Keyes Fleming, Regional Administrator, US EPA Region 4 (November 8, 2011) (on file with US EPA Region 4).

Also, in March 2009, Mississippi recommended that DeSoto County, Mississippi be designated as a nonattainment area separate from the Memphis nonattainment area for the 2008 ozone NAAQS based on air quality data from 2006-2008. Mississippi provided an update to the original recommendation in October 2011 based on air quality data from 2008-2010, and preliminary data from 2009-2011. In its updated recommendation, Mississippi recommended that all counties in the State be designated attainment for the 2008 ozone NAAQS. Letter from Haley Barbour, Governor of the State of Mississippi to A. Stanley Meiburg, Acting Regional Administrator, US EPA Region 4 (March 3, 2009) and Gwendolyn Keyes Fleming, Regional Administrator US EPA Region 4 (October 27, 2011) (on file with US EPA Region 4). Additionally, in March 2009, Arkansas recommended that Crittenden County, Arkansas be designated nonattainment based on 2006-2008 air quality data. Arkansas did not update its 2009 ozone recommendation. These data are from FEM monitors sited and operated in accordance with 40 CFR Part 58. Letter from Mike Beebe, Governor of the State of Arkansas to Lawrence E. Starfield, Acting Regional Administrator, US EPA Region 6 (March 10, 2009) (on file with US EPA Region 6).

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate one county in Arkansas, one county (partial) in Mississippi, and one county in Tennessee (identified in Table 1 below) as nonattainment for the 2008 ozone NAAQS as part of the Memphis, TN-MS-AR multi-state nonattainment area.

Table 1. State's Recommended and EPA's Intended Designated Nonattainment Counties for Memphis, TN-MS-AR.

Memphis, TN-MS-AR	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Arkansas	Crittenden	Crittenden
Mississippi	None	DeSoto (partial)
Tennessee	None	Shelby

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in parts per billion (ppb)) for air quality monitors in counties in the Memphis, TN-MS-AR area based on data for the 2008-2010 period (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. A monitor's DV is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years is 75 ppb or less. A DV is only valid if minimum data completeness criteria are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the DV for the county or area is determined by the monitor with the highest level.

The 2010 DVs for the ozone NAAQS for counties in the Memphis and nearby surrounding area are shown in Table 2.

Table 2. Air Quality Data[4].

County	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Crittenden, AR	Yes	74
DeSoto, MS	No	73
Shelby, TN	**No**	**76**

Shelby County, Tennessee shows a violation of the 2008 ozone NAAQS, therefore this county is included in the nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated, as discussed below, based on the five factors and other relevant information to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NOx and VOC (given in tons per year (tpy)) for violating and nearby counties that we considered for inclusion in the Memphis, TN-MS-AR area.

[4] Only counties in the Memphis CBSA that have ozone monitors are included in this table.

Table 3. Total 2008 NOx and VOC Emissions.

County	State Recommended Nonattainment	NO_x (tpy)	VOC (tpy)
Crittenden, AR	**Yes**	**4,047**	**3,805**
DeSoto, MS	**No**	**5,080**	**5,222**
Fayette, TN	No	2,385	1,406
Marshall, MS	No	1,769	1,527
Shelby, TN	**No**	**39,519**	**27,929**
Tate, MS	No	3,102	1,392
Tipton, TN	No	2,119	2,251
Tunica, MS	No	1,598	1,096
	Areawide:	59,619	44,628

*Counties that EPA intends to designate as nonattainment are shown in bold.

Shelby County contributes about 66 percent of the NOx and 63 percent of the VOC precursor emissions in the CBSA. Shelby makes up 23 percent of the entire CBSA NOx emissions and 22 percent of the area's VOC emissions. Of the county's 39,519 NOx emissions, 35 percent are from point and mobile emissions and 20 percent from area source emissions. The County's 27, 929 VOC emissions include 36 percent mobile sources and 32 percent area sources.

DeSoto County contributes about 9 percent NOx and 12 percent VOC precursor emissions in the CBSA. The County's 5,080 NOx emissions are mostly comprised of 45 percent area sources, 35 percent mobile sources. DeSoto County's total VOC emissions include 44 percent area sources and 34 percent mobile sources.

Crittenden County contributes less than 10 percent of the precursor CBSA emissions. Of the County's total NOx emissions listed in Table 1, 45 percent are from mobile sources and 34 percent from area sources. The County's total VOC emissions include 35 percent from area sources and 31 percent from mobile sources. Only 5 percent of the County's NOx emissions are from point sources. Both Crittenden and DeSoto Counties represent less than 1 percent of the entire area's NOx and VOC point source emissions

Fayette and Tipton Counties in Tennessee and Marshall, Tate, and Tunica counties in Mississippi all contribute 5 percent or less NOx and VOC precursor emissions in the CBSA.

Together, Crittenden, DeSoto and Shelby Counties account for 82 percent of the NOx emissions and 83 percent of the VOC emissions for the 8-county area. The emissions from Fayette and Tipton Counties in Tennessee and Marshall, Tate and Tunica Counties in Mississippi are not thought to contribute to the violations of the 2008 ozone NAAQS that have been observed by monitors in Shelby County, Tennessee and Crittenden County, Arkansas.

Population density and degree of urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions that may contribute to ozone formation. Rapid population or VMT growth (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that it may be appropriate to include the area associated with the area source and mobile source emissions as part of the nonattainment area. Table 4 shows the population, population density, and population growth information for each county in the area.

Table 4. Population and Growth.

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Crittenden, AR	**Yes**	**50,902**	**0.08**	**(75)**	**<1%**
DeSoto, MS	**No**	**161,252**	**0.32**	**52,584**	**+48%**
Fayette, TN	No	38,413	0.05	9,313	+32%
Marshall, MS	No	37,144	0.05	2,093	+6%
Shelby, TN	**No**	**927,644**	**1.18**	**29,393**	**+3%**
Tate, MS	No	28,886	0.07	3,444	+14%
Tipton, TN	No	61,081	0.13	9,545	+19%
Tunica, MS	No	10,778	0.02	1,557	+17%
	Areawide:	1,316,100	0.28	107,854	+9%

*Counties that EPA intends to designate as nonattainment are shown in bold.
Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011 (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.STO5&prodType=table)

Shelby County, Tennessee is densely populated containing 70 percent of the CBSA population. From 2000-2010, the County only had 3 percent growth in population. Fayette and Tipton County in Tennessee had moderate growth from 2000-2010 but are sparsely populated.

DeSoto County, Mississippi is moderately populated in the northern portion of the county and mostly rural in the remaining portion of the County. DeSoto County contains 12 percent of the CBSA population, but experienced 48 percent growth from 2000-2010. Tate, Tunica and Marshall Counties in Mississippi all make up 3 percent or less of the CBSA population and are sparsely populated.

Crittenden County, Arkansas had less than 1 percent population growth from 2000-2010 and contains only 4 percent of the CBSA population. The County is mostly rural with little urbanization.

The attachment to this document contains Figure 2, Memphis Area Ozone and Ozone Precursor Monitoring Network, and Figure 3, Population Density Change Percentage Between 2000 and 2010

Census for Memphis Ozone and Ozone Precursor Monitoring Network, which present graphical information on population density and growth for the Memphis area.

Traffic VMT data and commuting patterns

EPA evaluated the total VMT for each county in the Memphis CBSA. In combination with the population/population density data and the location of main transportation arteries (see above), this information helps identify the probable location of non-point source emissions. A county with high VMT is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation that contributes to nonattainment in the area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows total 2008 VMT for each county.

Table 5. Traffic and VMT Data.

County	State Recommended Nonattainment?	2008 VMT** (million miles)
Crittenden, AR	**Yes**	**903**
DeSoto, MS	**No**	**1,629**
Fayette, TN	No	573
Marshall, MS	No	725
Shelby, TN	**No**	**8,789**
Tate, MS	No	376
Tipton, TN	No	401
Tunica, MS	No	337
Areawide:		13,733

*Counties that EPA intends to designate as nonattainment are shown in bold.
**MOBILE model VMTs are those inputs into the NEI version 1.5.

Shelby County is the only county in the Memphis CBSA violating the 2008 ozone NAAQS with 2008-2010 air quality data and is considered the core CBSA county, with 64 percent of the VMT in the Memphis CBSA; Approximately 35 percent of Shelby County's NOx emissions and 34 percent VOC emissions are from mobile sources.

DeSoto County has the second highest VMT in the Memphis CBSA (12% of the total Memphis CBSA). Additionally, DeSoto County has a 48 percent growth in population from 2000-2010 with approximately 35 and 34 percent of the County's NOx and VOC emissions (respectively) deriving from mobile sources.

Crittenden County, has less than 10 percent of the CBSA VMT (third highest in the Memphis CBSA). From 2000-2010, Crittenden County had less than 1 percent population growth with 45 percent and 31 percent of the County's NOx and VOC emissions(respectively) deriving from mobile sources.

The remaining counties in the Memphis CBSA all have low total population and population growth with little urbanization and low precursor emission contribution suggesting negligible contribution of population-based emissions.

Factor 3: Meteorology (weather/transport patterns)

For this factor, EPA analyzed 30-years of National Weather Service (NWS) wind speed and wind direction data collected at the Memphis International Airport (NWS Station 13893) to help determine transport patterns and source contributions. EPA assessed wind direction and speed for the 2008-2010 "ozone season" (March through October) in the Memphis CBSA as well as on days when area ozone monitors exceeded the 2008 ozone NAAQS. Additionally, EPA evaluated wind back trajectories (which are an analysis of meteorological patterns) specifically on days when the current ozone design value monitor in Shelby County (Frayser monitor) exceeded the 2008 NAAQS. These analyses were conducted to better understand the fate and transport of precursor emissions contributing to ozone formation.

EPA's analysis of the NWS data indicate predominate south and south-southwest component for the Memphis CBSA. However, an examination on days when monitors in DeSoto County (Hernando) exceeded the 2008 ozone NAAQS suggested a northerly component. Additionally, on days when monitors in Shelby County exceeded the 2008 NAAQS, the data indicated a southerly wind component.

Figure 2, Memphis Area Ozone and Ozone Precursor Monitoring Network, and Figure 4 present graphical information on 24-hour back trajectories for exceedances in 2008-2010 at the Frayser monitor, locations of major stationary sources, and locations of ambient monitors with their design values. An examination of the meteorological data indicates that, for the 2008-2010 days with ozone concentrations above 75 ppb at the Memphis 2008-2010 Design Value site (Frayser monitor), the wind back trajectories primarily go back through Shelby County, TN (on 10 out of 10 days) and DeSoto County, MS (on 7 out of 10 days), with back trajectories going back through Crittenden County, AR on only 1 out of 10 days. As mentioned in Factor 1, the Shelby County monitor is the only monitor in the Memphis CBSA with a 2008-2010 violation of the 2008 ozone NAAQS.

Since the 2008-2010 data is only for three years and has only 10 exceedance days, we evaluated more years to better understand the meteorological transport conditions that exist during ozone exceedances. Normally when we are developing a conceptual model understanding of what yields ozone exceedances in an area we will evaluate 5 to 10 years worth of meteorological data. Therefore we decided to evaluate all days that had ozone exceedances at the Design Value monitor (Frayser) for the 2006-2010 period. The 2006 and 2007 years had more meteorology that was conducive for ozone formation than the years of 2008, 2009, and 2010. Figure 5 in the attachment to this document includes 72-hour back trajectories for 2006-2010 ozone exceedances at the Frayser monitor using the National Oceanic and Atmospheric Administration Hybrid Single Particle Lagrangian Integrated Trajectory Model (NOAA HYSPLIT). To further understand the meteorological transport conditions within the regional area around Memphis, we also evaluated24-hour back trajectories for the 2006-2010 time-periods using the NOAA HYSPLIT model. The results of these back trajectories are included in the attachment to this document as Figure 6 with a further zoom in view in Figure 7.

Evaluation of Figures 6 and 7 further supports our previous conclusions based on the 2008-2010 back trajectories when the Memphis area Frayser monitor has ozone exceedances. The 2006-2010 data further supports that most of the centerlines of the back trajectories passes through Shelby County TN, and many of the back trajectory centerlines pass through DeSoto county in northern Mississippi with smaller percentage passing through Crittenden County, Arkansas.

EPA's meteorological assessment of the area monitors ozone exceedances and specifically the wind back trajectory analysis at the Frayser monitor indicate that Shelby County is likely an emission

contributor to exceedances of the 2008 NAAQS at the Frayser monitor. Furthermore, the assessment also suggests that DeSoto and Crittenden Counties should be considered for potential inclusion in the intended Memphis nonattainment area.

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

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

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

Factor 5: Jurisdictional boundaries

Once we identified the general areas we anticipated we would recommend for nonattainment, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment area boundaries for ozone or other urban-scale pollutants, county lines, air district boundaries, township boundaries, area covered by an MPO, state lines, Reservation boundaries, and urban growth boundaries. Where existing jurisdictional boundaries were not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates were considered.

The Memphis Area MPO is comprised of two study areas; the Memphis Urban Area MPO and the West Memphis MPO. Both organizations are considered multi-jurisdictional agencies responsible for the implementation and coordination of urban transportation planning and establishing transportation conformity infrastructure within their respective boundaries. The Memphis Urban jurisdiction is comprised of all of Shelby County, Tennessee, the western four miles of Fayette County, Tennessee and the northern twelve miles of DeSoto County. The portion of the Memphis Urban MPO in DeSoto County captures the more urbanized portion of the county that has experience continuous growth as well as the ozone air quality monitor. The West Memphis jurisdiction is comprised of the current and potential future urbanized portion of Crittenden County (including the ozone air quality monitor) with the following legal description:

> That area west from the Mississippi River along the southern right of way line of County Road 18 (Miller Road and Caldwell Road) to the western right of way line of County Road 205 (Hinkley Road); then north along said right of way line and continuing north to the intersection of the southern right of way line of the St. Louis-Southwestern Railroad; then in a southwesterly direction along said right of way line to the intersection of eastern right of way line of State Highway 147; then north along said right of way to the intersection of the southern right of way line of State Highway 131; then west along said right of way line to the western right of way line of County Road 51(Eubank Road); then north along said right of way line to U.S. 70; then continuing north along the western right of way line of County Road 25 (Katie Goodhope) to the northern right of way line of County Road 12 (Buck Lake Road); then east along said northern right of way line to State Road 306; then continuing east along the northern right of way line of State Road 306 to the western right of way line of County Road 165; then north along said right of way line to the northern right of way line of County Road 168; then northeasterly along said

right of way line to the intersection of the northern right of way of County Road 172; then east along said right of way line to the intersection of the western right of way line of County Road 5; then north along said right of way line to the intersection of the northern right of way line of James Mill Road; then east along said northern right of way line to the Mississippi River being the eastern boundary of the study area.

Memphis, TN-MS-AR Area has previously established nonattainment boundaries associated with both the 1-hour ozone and 1997 8-hour ozone NAAQS. The Memphis nonattainment boundary for the 1-hour ozone NAAQS included Shelby County, Tennessee in its entirety. Whereas the Memphis nonattainment boundary for the 1997 8-hour ozone NAAQS included Crittenden County, Arkansas and Shelby County, Tennessee in their entireties. Tennessee has recommended a different boundary for the 2008 ozone NAAQS for their portion of this Area. Arkansas recommended the same as the previous boundary for their portion of this Area. In addition, there is current infrastructure for meeting the transportation conformity requirements in Shelby County and the urbanized portions of DeSoto County and Crittenden County since both the Memphis Urban area and West Memphis MPO are currently implementing these requirements for the 1997 8-hour ozone standard.

Even though, DeSoto and Crittenden Counties do not have violating monitors for the 2008 ozone NAAQS based on air quality data from 2008-2010, our analysis suggest that both are likely contributing to the violation in Shelby County due to potential population-based emissions from mobile sources (VMT) and area source, meteorology and population growth.

Conclusion

Based on the assessment of the factors described above, EPA has preliminarily concluded that the following counties should be included as part of the intended Memphis nonattainment area because they are either violating the 2008 ozone NAAQS or contributing to a violation in a nearby area: Crittenden County, Arkansas, and Shelby County, Tennessee in their entireties, and the portion of DeSoto County that is included in the Memphis MPO boundary. Two of these counties (i.e., Crittenden County, Arkansas and Shelby County, Tennessee) are included in the Memphis nonattainment area for the 1997 ozone NAAQS. One of the air quality monitors in Shelby County indicates violation of the 2008 ozone NAAQS based on 2010 DVs, therefore this county is preliminarily included in the nonattainment area. Crittenden County, Arkansas, and DeSoto County, Mississippi are nearby counties that do not have monitors indicating a violation of the standard based on 2010 DVs. However, EPA has preliminarily concluded that these counties (or portions thereof) contribute to the ozone concentrations in violation of the 2008 ozone NAAQS through population-based emissions from mobile and area sources (e.g., vehicles and other small area sources) and county VMT.

Source category emissions data indicate that mobile sources and area sources are the primary contributors to ozone formation in the Memphis CBSA. Thus, population-based emissions such as total population or population growth, and precursor emission transport would indicate a county with contribution in the Memphis Area.

Shelby County, Tennessee dominates the CBSA in terms of urbanization, precursor emission contribution and transport which indicate population-based emission (mobile and area sources) contribution to its own violating monitor. Although the County population growth was less than 5 percent from 2000-2010, it is densely populated with 70 percent of the CBSA population and five times DeSoto County's population. Shelby County makes up over 60 percent of the Area's NOx and VOC

emissions. The County's has over 30 percent of the County's NOx and VOC emission coming from mobile sources and point sources. Meteorological analysis also indicates that Shelby County is contributing to its own violation as well as other monitors in the Memphis CBSA.

The population in DeSoto County, Mississippi has grown steadily from 2000-2010 (particularly the northern portion) with a 48 percent increase, even though it only makes up 12 percent of the total population in the CBSA. The County also has the CBSA's second highest VMT. More than 30 percent of the County's NOx and VOC emissions are from mobile sources and over 40 percent from area sources. In addition, meteorology suggests that DeSoto County is likely contributing to the violation in Shelby County due to potential southerly transport of mobile and area emissions.

Crittenden County, Arkansas makes up less than 5 percent of the CBSA population with less than a 1 percent population growth from 2000-2010. Crittenden County is mostly rural with the least urbanization compared to Shelby and DeSoto Counties. The County contributes less than 10 percent of the CBSA NOx and VOC precursor emissions. However, Crittenden County has over 40 percent of its NOx emission deriving from area sources which is considered a primary contributor to the formation of ozone in the Memphis area. EPA is proposing to include all of Crittenden County in the 2008 ozone Memphis nonattainment area because the county was included in its entirety in the 1997 ozone Memphis nonattainment area and because Arkansas recommended inclusion of the county in its entirety.

The remaining Tennessee (Tipton, Fayette) and Mississippi (Marshal, Tate, and Tunica) counties all have low population and urbanization, and precursor emission contribution and transport suggesting negligible contribution to the violating county. With the exception of those counties that comprise the Memphis, TN-MS-AR 1997 8-hour ozone boundary and the portion of DeSoto County, Mississippi discussed in this TSD for inclusion, EPA preliminarily concludes that the remainder of the counties in the CBSA do not contribute to the violations at the monitors in the CBSA and therefore are not being considered as part of the nonattainment area.

ATTACHMENTS

Figure 2. Memphis Ozone and Ozone Precursor Monitoring Network, with Population Density.

Figure 3. Population Density Change Percentage Between 2000 and 2010 Census for Memphis Ozone and Ozone Precursor Monitoring Network.

Figure 4. Overlay of 24-hour HYSPLIT back trajectories of all 75 ppb exceedances at the Frayser monitor for the 2008-2010 period.

Figure 5. NOAA HYSPLIT MODEL 72-Hour Back Trajectory Frayser Exceedances (2006-10).

Figure 6. NOAA HYSPLIT MODEL 24-Hour Back Trajectory Frayser Exceedances (2006-10).

Figure 7. NOAA HYSPLIT MODEL 24-Hour Back Trajectory Frayser Exceedances (2006-10) - Zoom View.

Figure 2. Memphis Ozone and Ozone Precursor Monitoring Network, with Population Density

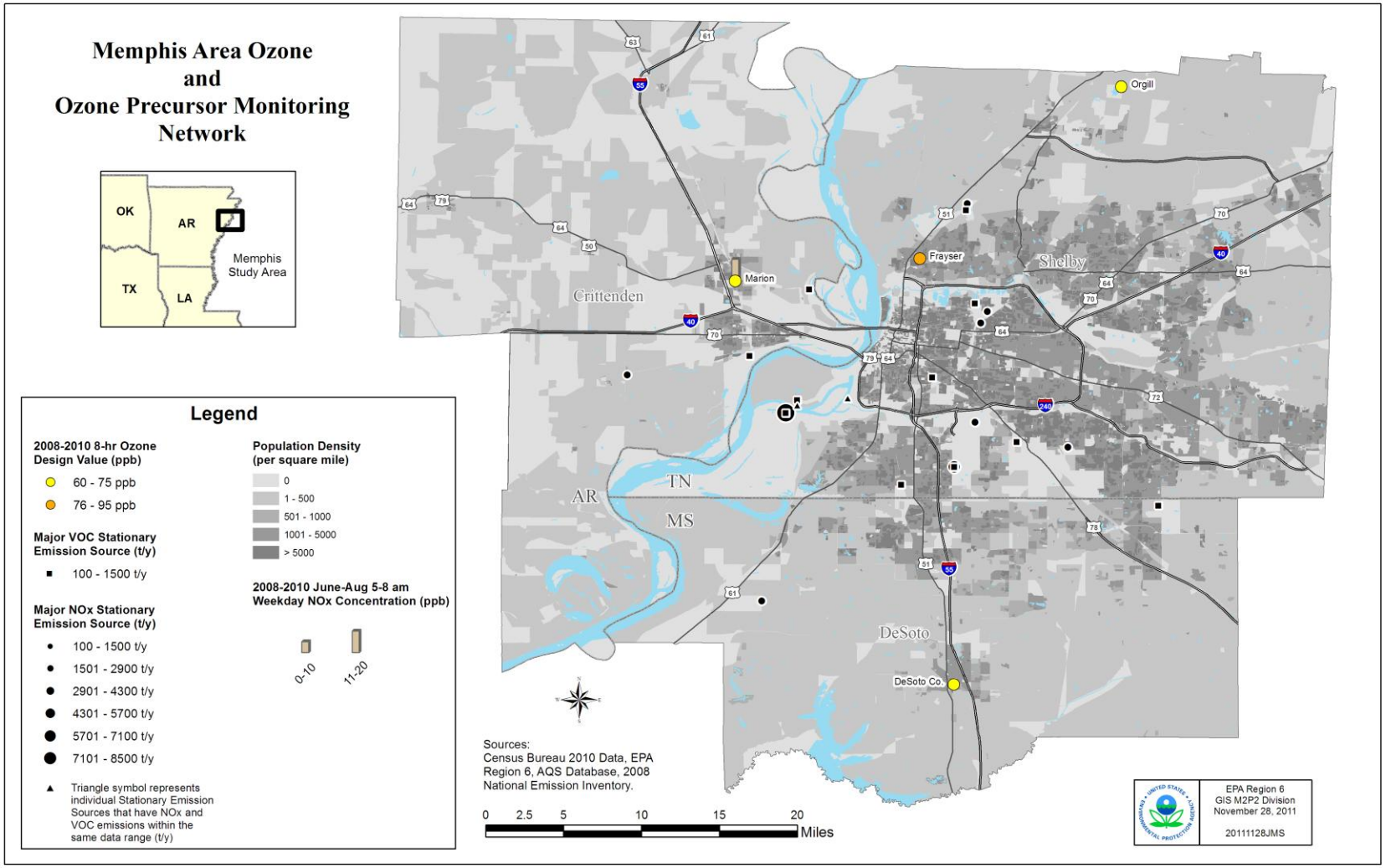


Figure 3. Population Density Change Percentage Between 2000 and 2010 Census for Memphis Ozone and Ozone Precursor Monitoring Network

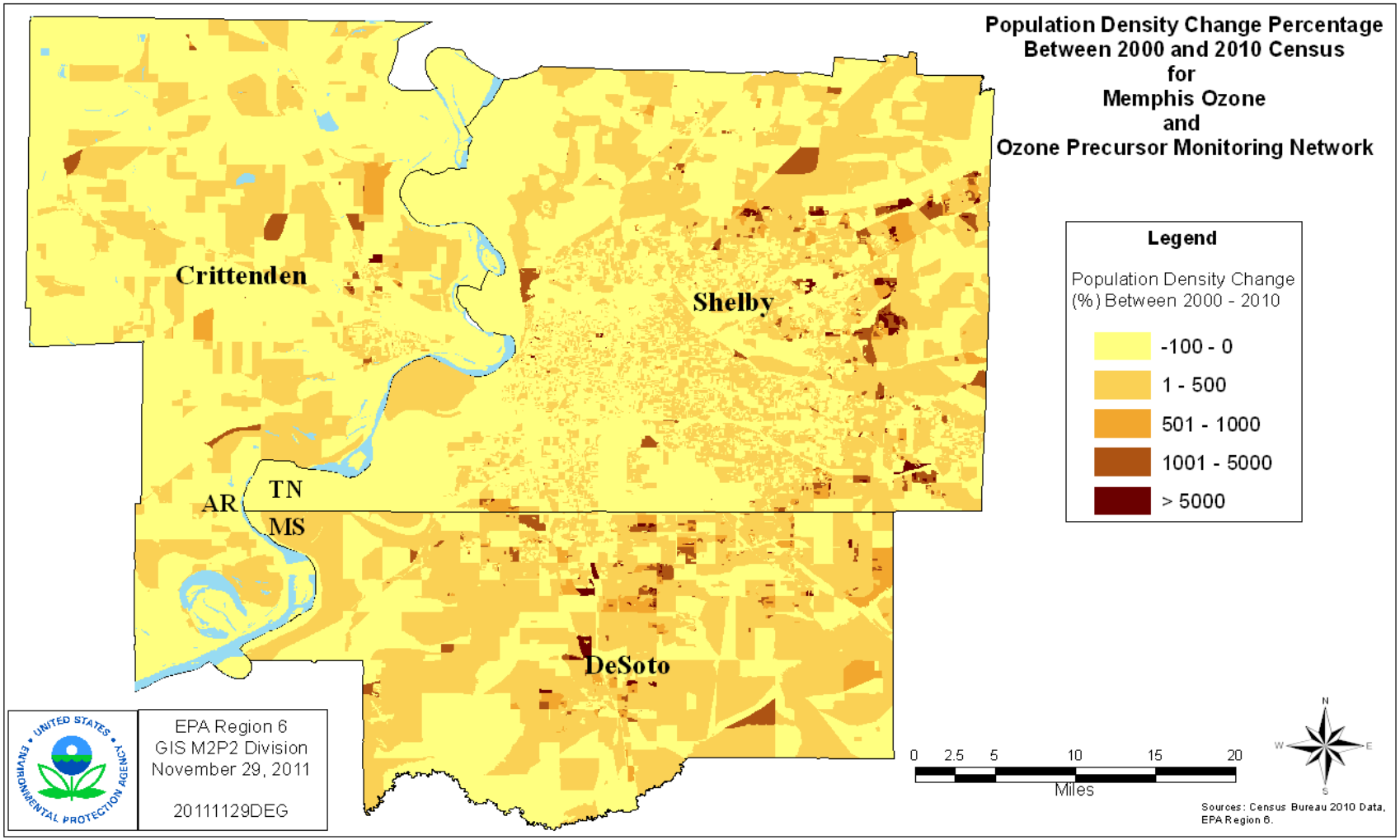


Figure 4 - Overlay of 24-hour HYSPLIT back trajectories of all 75 ppb exceedances at the Frayser monitor for the 2008-2010 period.

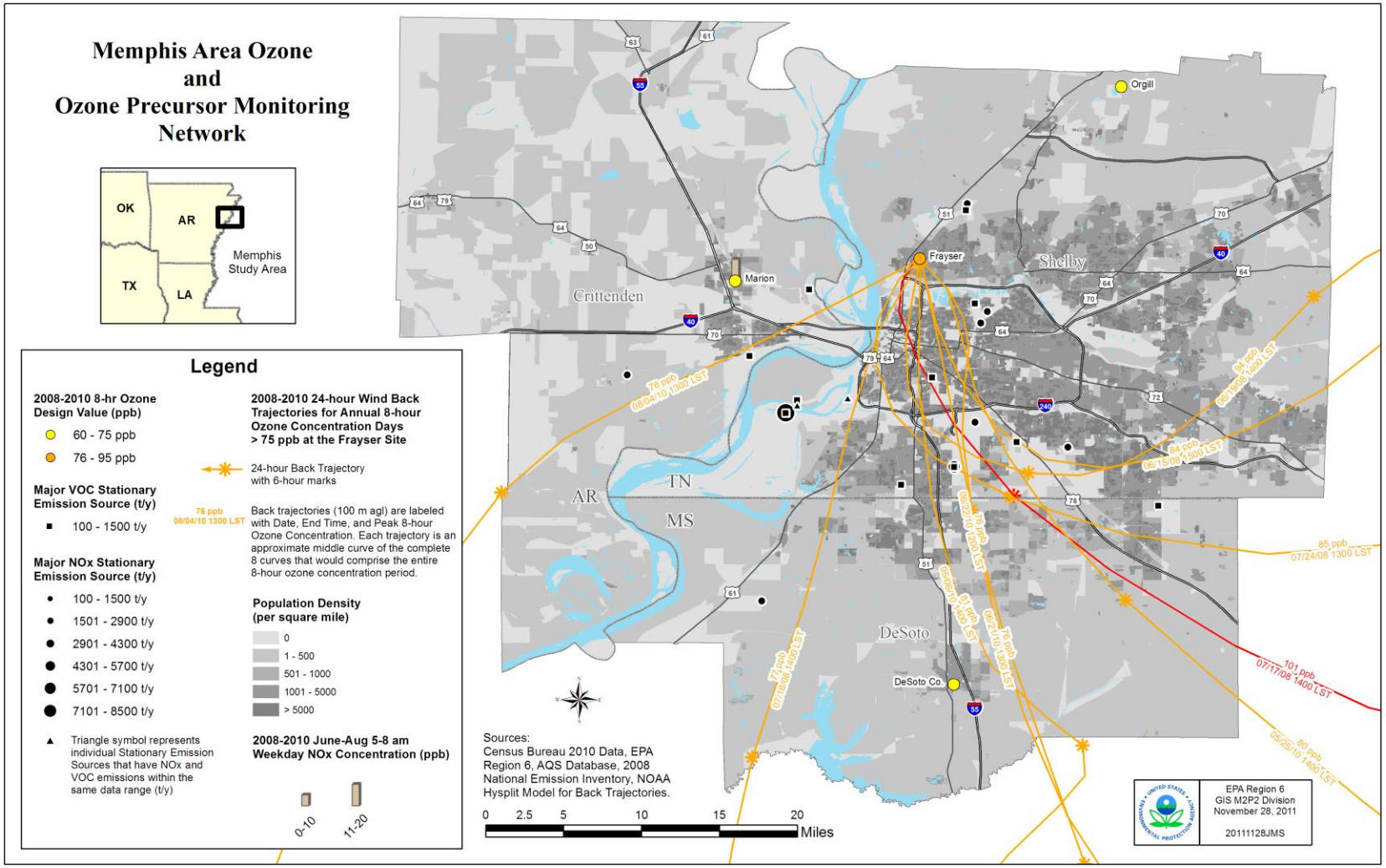


Figure 5. NOAA HYSPLIT MODEL 72-Hour Back Trajectory Frayser Exceedances (2006-10)

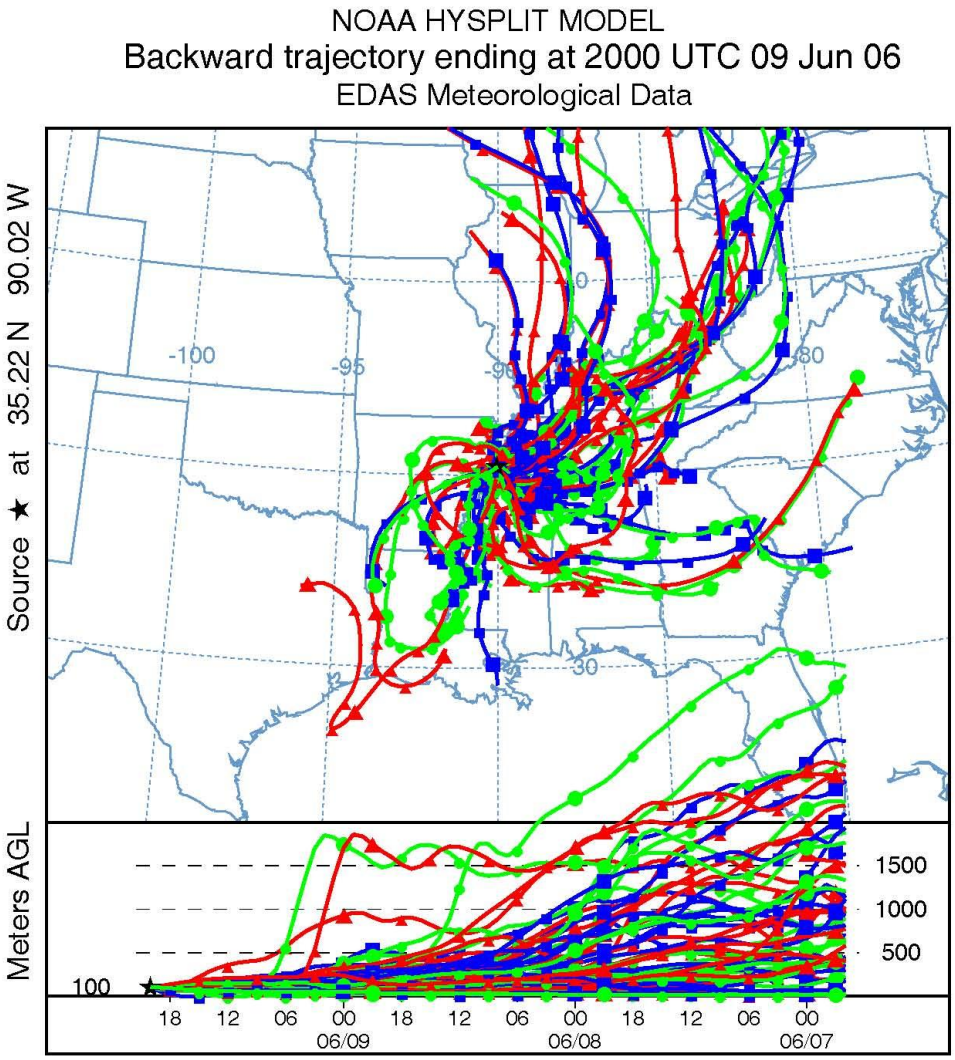


Figure 6. NOAA HYSPLIT MODEL 24-Hour Back Trajectory Frayser Exceedances (2006-10)

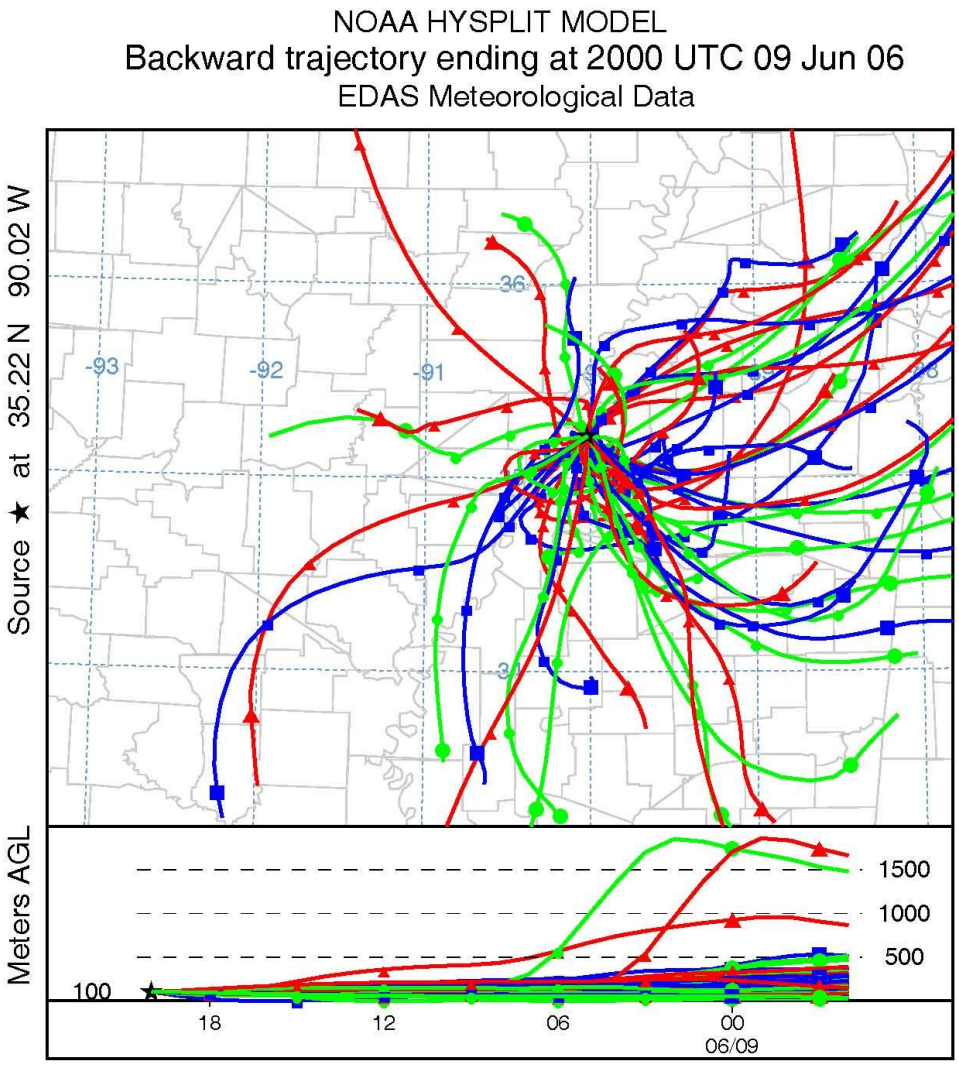
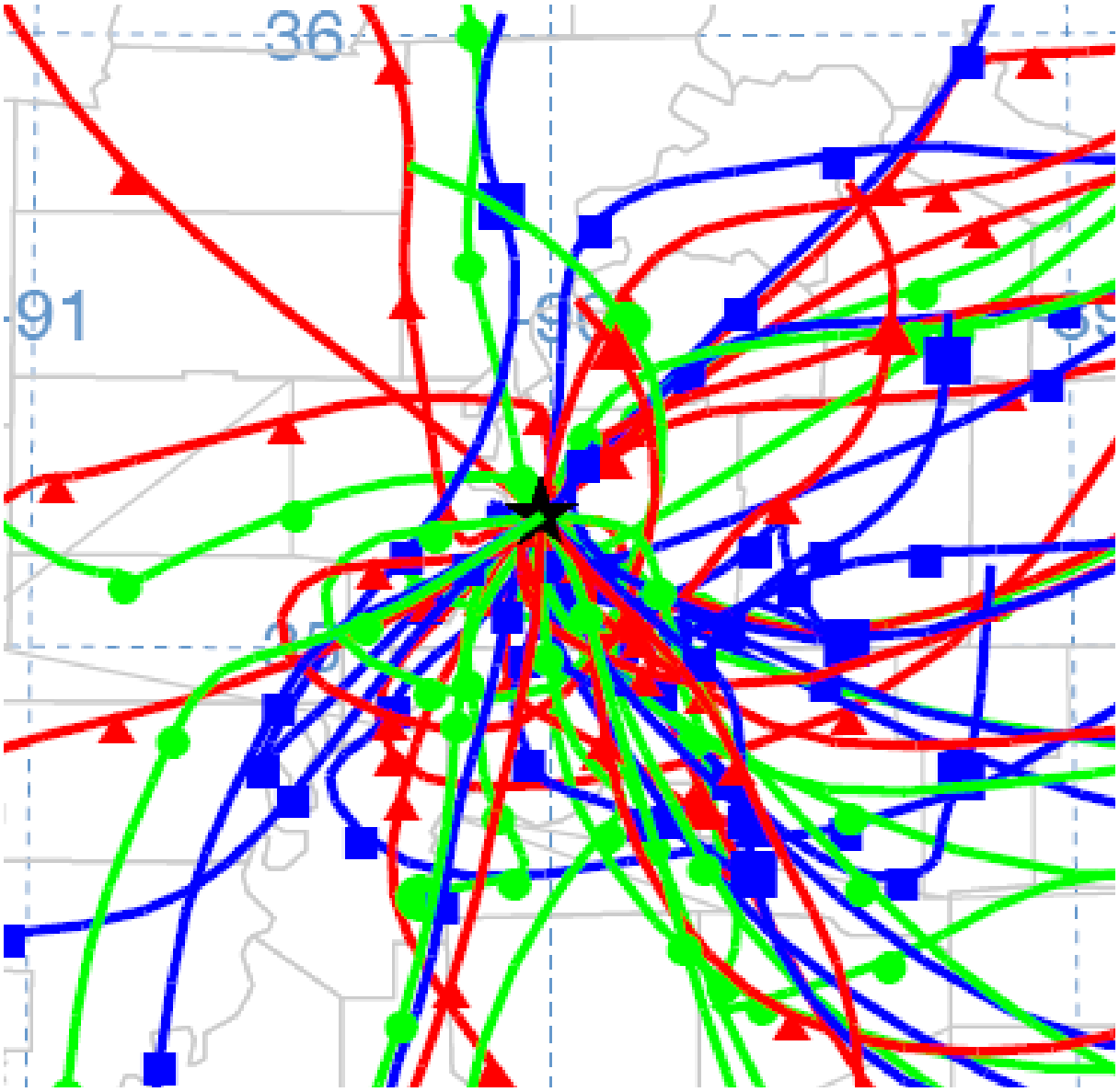


Figure 7. NOAA HYSPLIT MODEL 24-Hour Back Trajectory Frayser Exceedances (2006-10) - Zoom View



Illinois-Indiana-Wisconsin
Supplement
Area Designations for the 2008
Ozone National Ambient Air Quality Standards

On December 9, 2011, EPA sent letters to Governor Pat Quinn of Illinois, Governor Mitchell E. Daniels, Jr. of Indiana, and Governor Scott Walker of Wisconsin, providing that EPA intended to designate as "unclassifiable/attainment" all parts of the States of Illinois, Indiana, and Wisconsin not otherwise noted in those letters and accompanying enclosures as intended nonattainment areas for the 2008 8-hour ozone National Ambient Air Quality Standards (2008 8-hour ozone NAAQS or standards).[1] All counties in the Chicago-Naperville-Michigan City, Illinois-Indiana-Wisconsin (IL-IN-WI) Combined Statistical Area (CSA) were identified in these letters as intended unclassifiable/attainment areas.

Based on new information submitted by the State of Illinois just prior to issuance of those letters, EPA is now revising its intended designation for many of the counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. In a letter dated December 7, 2011, the State of Illinois submitted a letter stating that it had submitted certified ozone air quality data for 2011. That information was not submitted in sufficient time for EPA to consider it in the analyses provided in the December 9, 2011 letters. The newly submitted data, when considered in conjunction with data from the previous two years (2009 and 2010) indicate that a monitor (the Zion monitor) located in Lake County, Illinois is violating the 2008 8-hour ozone NAAQS. Based on that new information, EPA recently completed an analysis (provided below) to determine the area it intends to designate as nonattainment based on the violation of the 2008 8-hour ozone standard at the Zion monitor. The intended nonattainment designation for the counties identified in this Technical Support Document (TSD) replaces the intended designation of unclassifiable/attainment for these counties provided in the December 9, 2011 letters and enclosures. This document does not change or modify the intended designations

[1] The primary 8-hour ozone standard, set to protect human health, was revised on March 27, 2008 (73 FR 16436) from 0.08 parts per million to 0.075 parts per million (ppm) (75 parts per billion (ppb)). The secondary ozone standard, set to protect human welfare and the environment, was revised to be consistent with the primary standard in all respects.

identified in the December 9, 2011 letters and enclosures for any other counties in the States.

The table below identifies the counties or parts of counties in Illinois, Indiana, and Wisconsin that EPA intends to designate as nonattainment as part of the Chicago-Naperville, IL-IN-WI nonattainment area for the 2008 8-hour ozone NAAQS. In accordance with section 107(d) of the Clean Air Act (CAA), EPA must designate an area as "nonattainment" if it is violating the 2008 8-hour ozone NAAQS or if it contributes to a violation of the 2008 8-hour ozone NAAQS in a nearby area. The technical analyses supporting the boundaries for this nonattainment area are provided below.

Table 1. Intended Chicago-Naperville, IL-IN-WI Nonattainment Area for the 2008 Ozone NAAQS

State	State Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties†
Illinois	Cook DuPage Kane Lake McHenry Will Kendall – Partial Oswego Township Grundy – Partial Aux Sable Township Goose Lake Township	Cook DuPage Kane Lake McHenry Will Kendall – Partial Oswego Township Grundy – Partial Aux Sable Township Goose Lake Township
Indiana	Lake	Lake Porter Jasper
Wisconsin	None	Kenosha

† Nonattainment for both primary and secondary 2008 8-hour ozone standards.

The analysis below provides the technical and qualitative bases for the intended boundaries of the Chicago-Naperville, IL-IN-WI ozone nonattainment area under the 2008 8-hour ozone NAAQS. It relies on our analysis of whether and which monitors are recording violations of the 2008 8-hour ozone NAAQS, based on state-certified air quality monitoring data from 2009-2011 for the State of Illinois and from 2008-2010 for ozone monitors in Indiana and Wisconsin and on an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas (counties within the Chicago-Naperville-Michigan City, IL-IN-WI CSA) based on a weight-of-evidence analysis considering the factors identified below. EPA issued guidance on December 4, 2008 that identified these

factors as ones EPA would consider in determining nonattainment area boundaries, and recommended that states consider these factors in making their designation recommendations to EPA.[2]

1. Air quality data, including the ozone design value[3] calculated for each Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitor in the area;

2. Emissions and emissions-related data, including locations of sources, population, amounts of emissions and emission controls, and growth patterns;

3. Meteorology (weather/pollutant transport patterns);

4. Geography and topography (mountain ranges and other air basin boundaries affecting ozone levels and ozone precursor transport); and,

5. Jurisdictional boundaries, e.g. counties, air districts, existing ozone nonattainment areas, Indian country, Metropolitan Planning Organizations (MPOs) and their covered areas.

Ground-level ozone is generally not emitted directly into the air, but is created by chemical reactions involving Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) in the presence of sunlight.[4] Because NOx and VOC emissions from a broad range of sources over a wide area typically contribute to violations of the ozone standards, EPA believes it is important to consider whether there are contributing emissions from a broad geographic area. Accordingly, EPA chose to examine the five factors with respect to the counties in the larger of the CSA or Core Based Statistical Area (CBSA) associated with the

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

[3] Average of the annual fourth-highest daily maximum 8-hour ozone concentrations during a three-year period with complete data that the state has quality assured/quality controlled and certified. In evaluating the attainment status of an area, EPA generally considers complete ozone data for the most recent three-year period.

[4] Peak ozone concentrations generally occur downwind of source areas on relatively sunny days with high temperatures and relatively low wind speeds.

violating monitor(s).[5] All data and information used by EPA in this evaluation are the latest available to EPA and/or provided to EPA by states or tribes.

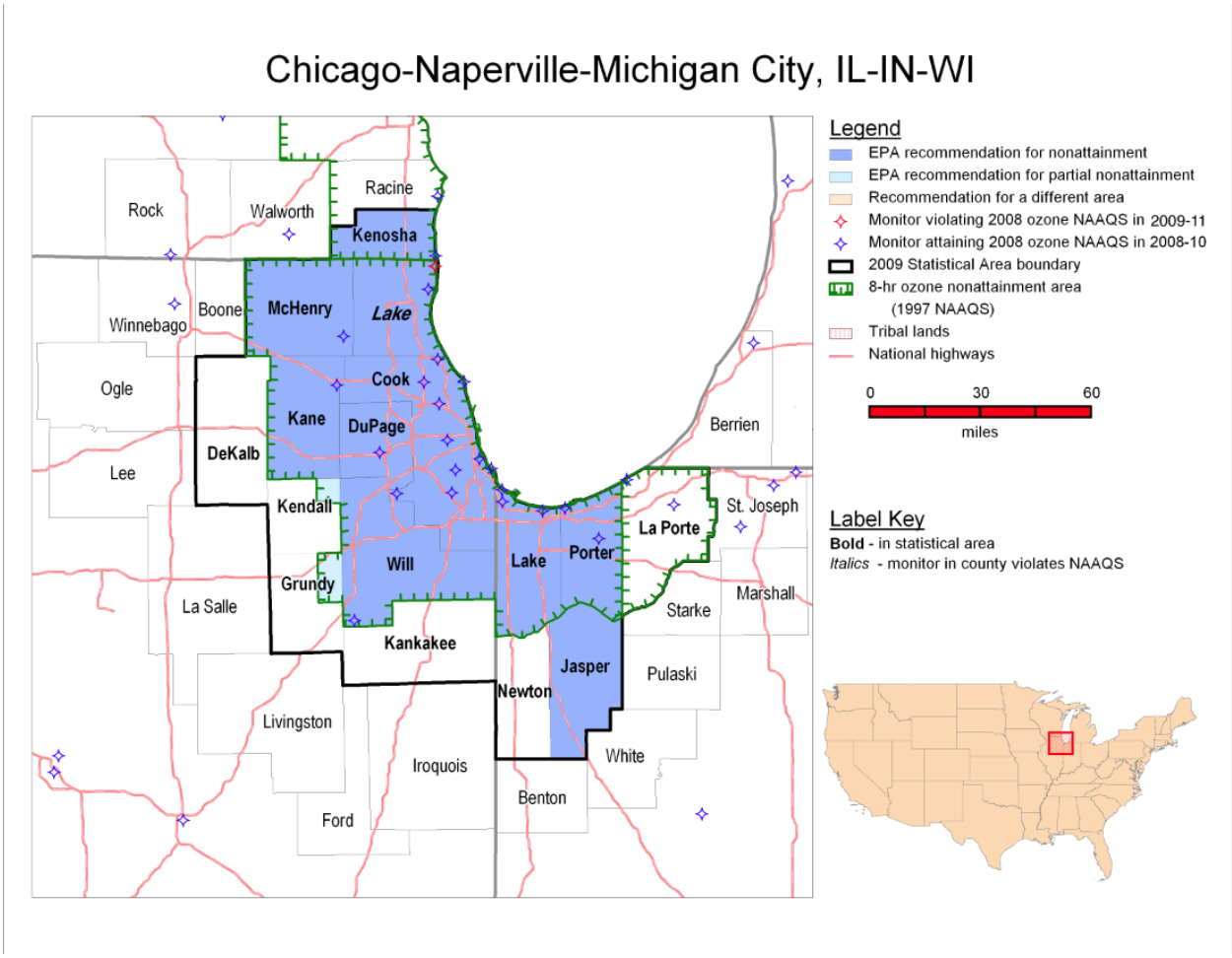
In EPA's designations guidance for the 2008 ozone NAAQS, EPA recommended examining CSA/CBSAs because certain factors used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 8-hour ozone NAAQS. Congress required a similar approach in 1990 for areas classified as serious and above for the 1-hour ozone standard and EPA used the same approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's September 4, 2008 guidance recommends using the boundary of the county containing the violating monitor as the starting point for considering the nonattainment area's boundary.

Technical Analysis for the Chicago-Naperville-Michigan City, IL-IN-WI CSA

Figure 1 is a map of the intended Chicago-Naperville, IL-IN-WI ozone nonattainment area. The map provides other relevant information, including the locations of ozone monitors, county and other jurisdictional boundaries, Chicago-Naperville-Michigan City, IL-IN-WI CSA boundary, and major transportation arteries.

Figure 1. Chicago-Naperville, IL-IN-WI Area

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



For purposes of the 1997 ozone NAAQS, as noted in Figure 1, portions of this area were designated nonattainment as parts of the Chicago-Gary-Lake County, IL-IN and Milwaukee-Racine, WI ozone nonattainment areas. The boundary of the Chicago-Gary-Lake County, IL-IN ozone nonattainment area for the 1997 ozone NAAQS included the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will in Illinois and Lake and Porter in Indiana. This nonattainment area also included parts of Kendall (Oswego Township) and Grundy (Aux Sable and Goose Lake Townships) in Illinois. Kenosha County in Wisconsin was designated as nonattainment, but was included in the Milwaukee-Racine, Wisconsin ozone nonattainment area for the 1997 ozone NAAQS. Although Kenosha County was designated as part of the Milwaukee-Racine, WI ozone nonattainment area, the Chiwaukee Prairie monitoring site in Kenosha County was used as the ozone design value site for both the Chicago-Gary-Lake County, IL-IN ozone nonattainment area and the Milwaukee-Racine, WI ozone nonattainment area for both the 1997 8-hour ozone standard and the 1-hour ozone standard.

La Porte County, Indiana was designated as a separate nonattainment area for the 1997 ozone NAAQS. All other counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA were designated as attainment/unclassifiable for the 1997 ozone NAAQS.

In March 2009, the Illinois Environmental Protection Agency (IEPA) recommended that Cook, DuPage, Kane, Lake, McHenry, Kendall (Oswego Township only), Grundy (Aux Sable and Goose Lake Townships only), and Will Counties be designated as nonattainment for the 2008 8-hour ozone NAAQS based on air quality data for 2006-2008. Illinois recommended that all other Illinois counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA be designated as attainment for the 2008 ozone NAAQS. On December 7, 2011, the Illinois Environmental Protection Agency submitted confirmation that the State had certified air quality data for 2011. The State did not provide a revised ozone nonattainment area recommendation in conjunction with these new data.

In March 2009, Indiana recommended that Lake County be designated as nonattainment for the 2008 8-hour ozone NAAQS based on a monitored violation of NAAQS in this county during 2006-2008, and that Porter, La Porte, Jasper, and Newton Counties be designated as attainment for the 2008 ozone NAAQS based on a lack of monitored violations of the 2008 ozone NAAQS in these counties during 2006-2008.

In March 2009, Wisconsin recommended that Kenosha County be designated as attainment for the 2008 ozone NAAQS despite the fact that violations of the 2008 8-hour ozone NAAQS were monitored in this county during 2006-2008.[6]

After considering these recommendations and the new certified air quality data submitted by the State of Illinois, and based

[6] Letter from Douglas P. Scott, Director, Illinois Environmental Protection Agency, to Bharat Mathur, Acting Regional Administrator, U.S. Environmental Protection Agency, Region 5, regarding Illinois' recommended ozone nonattainment boundaries (March 9, 2009); Letter from Thomas W. Easterly, Commissioner, Indiana Department of Environmental Management, to Bharat Mathur, Acting Regional Administrator, U.S. Environmental Protection Agency, Region 5, regarding: Recommendations Concerning Air Quality Designations for the 2008 Revised 8-Hour Ozone National Ambient Air Quality Standard (March 11, 2009); and, Letter from Governor Jim Doyle, State of Wisconsin, to Lisa Jackson, Administrator, U.S. Environmental Protection Agency, regarding: Designation of 8-Hour Ozone Nonattainment Areas in Wisconsin (March 12, 2009).

on EPA's technical analysis described below, EPA intends to designate the counties in Illinois, Indiana, and Wisconsin, and the partial counties in Illinois identified in Table 1 as "nonattainment" for the 2008 8-hour ozone NAAQS as part of the Chicago-Naperville, IL-IN-WI nonattainment area. We intend to designate all other portions of the Chicago-Naperville-Michigan City, IL-IN-WI CSA as unclassifiable/attainment for the 2008 8-hour ozone NAAQS.

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in ppm) for air quality monitors in counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. We used the most recent three-years of certified air quality data, and, thus, considered ozone data for the 2008-2010 period for Indiana and Wisconsin and for the 2009-2011 period for Illinois. We also provide the ozone design values for counties in Illinois based on air quality data for 2008-2010 to provide a complete view of the ozone air quality in this area for this three-year period.

A monitor's ozone design value is the metric or statistic that indicates whether that monitor attained the ozone air quality standard. The 2008 8-hour ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour ozone concentrations, averaged over three years is 0.075 ppm or less. A design value is valid only if minimum data completeness requirements are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the design value for the county, or area, is determined by the monitor with the highest individual design value.

Note: Monitors that are eligible for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are sited in accordance with 40 CFR part 58 Appendix D (Section 4.10) and operating with a FRM or FEM monitor that meets the requirements of 40 CFR part 58 Appendix A. All data from a Special Purpose Monitor (SPM) using an FRM or FEM monitor which has operated for more than 24 months is eligible for comparison to the NAAQS unless the monitoring agency demonstrates that the data came from a particular period during which the requirements of 40 CFR part 58 Appendix A (quality assurance requirements) or Appendix E (probe and monitoring path siting criteria) were not met.

The 2008-2010 and 2009-2011 ozone design values for monitors and counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA are given in Table 2.

Table 2. Ozone Air Quality Data for the Chicago-Naperville-Michigan City, IL-IN-WI CSA

State/County	**Site Number**	**2008-2010 8-Hour Ozone Design Value (ppm)**	**2009-2011 8-Hour Ozone Design Value (ppm)**
Illinois:			
Cook	170317002	0.063	0.069
Cook	170310032	0.068	0.072
Cook	170310064	0.064	0.068
Cook	170310076	0.067	0.069
Cook	170314002	0.065	0.069
Cook	170311601	0.070	0.069
Cook	170314007	0.059	0.062
Cook	170314201	0.068	0.072
Cook	170310001	0.069	0.071
Cook	170311003	0.066	0.067
DuPage	170436001	0.060	0.063
Kane	170890005	0.066	0.069
Lake	170971007	0.074	**0.076†**
McHenry	171110001	0.065	0.067
Will	171971011	0.062	0.063
Indiana:			
Lake	180892008	0.067	NA
Lake	180890030	0.064	NA
Lake	180890022	0.061	NA
Porter	181270026	0.062	NA
Porter	181270024	0.067	NA
La Porte	180910010	0.065	NA
La Porte	180910005	0.065	NA
Wisconsin:			
Kenosha	550590019	0.074	NA

† Monitored violation of the 2008 8-hour ozone NAAQS.

Lake County (the Zion monitor) in Illinois shows a violation of the 2008 8-hour ozone NAAQS and confirms that at least one ozone monitor in the Chicago-Naperville-Michigan City, IL-IN-WI CSA violates this NAAQS. This supports the inclusion of Lake County, Illinois in the intended ozone nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight-of-evidence of the five factors to determine whether it may have contributed to the nearby violation.

It should be noted that historically the Chiwaukee Prairie monitoring site in Kenosha County, Wisconsin has been the high downwind monitoring site for the Chicago region. The Chiwaukee Prairie ozone design value was used to establish the classification for the Chicago-Gary-Lake County, IL-IN ozone nonattainment area under both the 1997 8-hour ozone standard and the 1-hour ozone standard. In addition, monitoring data from this monitoring site were historically used by the States of Illinois, Indiana, and Wisconsin in conjunction with modeled ozone concentrations to demonstrate that emission reductions in the Chicago area were sufficient to attain the 1-hour ozone standard and the 1997 8-hour ozone standard.

These considerations led us to further consider the peak ozone concentrations at the Chiwaukee Prairie site relative to those for the Zion, Illinois site.

Figure 2 considers the relationship between daily peak 1-hour ozone concentrations for the Chiwaukee Prairie and Zion monitoring sites for the 2000-2011 period.

Figure 2. Correlation Between Daily Peak 1-Hour Ozone Concentrations at Chiwaukee Prairie (Wisconsin) and Zion (Illinois) Monitoring Sites (2000-2011)

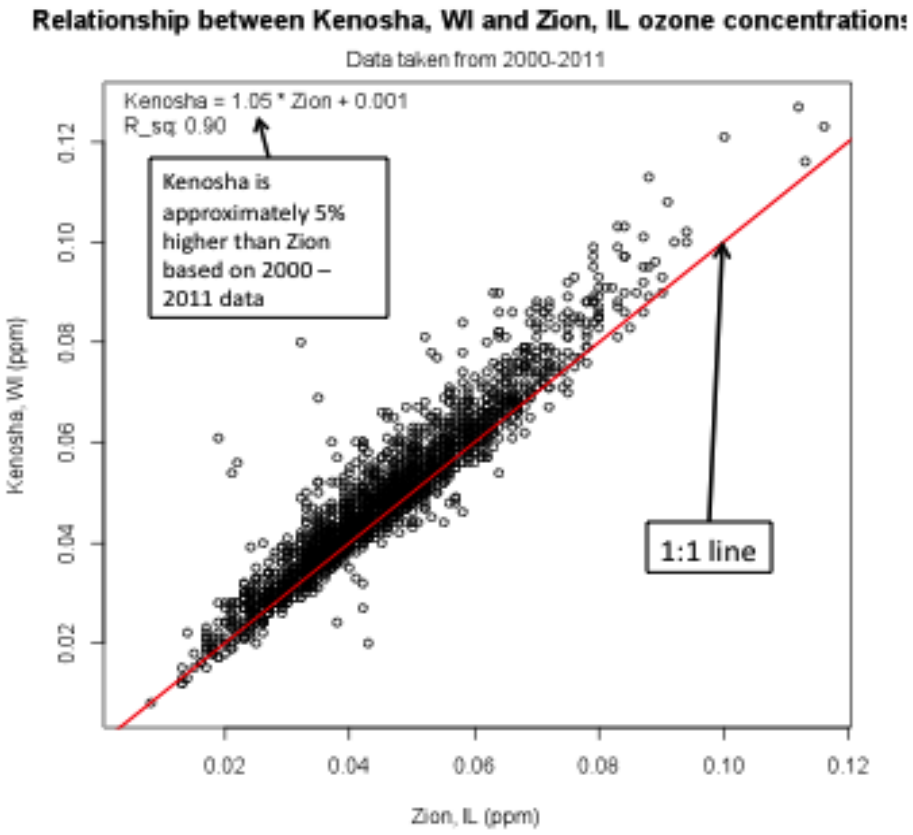


Figure 3 shows the comparison between 3-year ozone design values for the Chiwaukee Prairie and Zion monitoring sites for the 2000-2011 period (note that the 2001 ozone monitoring data for Chiwaukee Prairie have been quality assured, but have not been certified by the State of Wisconsin).

Figure 3. Three-Year 8-Hour Ozone Design Values for Chiwaukee Prairie (Wisconsin) and Zion (Illinois) Monitoring Sites (2000-2011)

The data displayed in Figures 2 and 3 demonstrate both the strong correlation between the peak ozone concentrations at the Chiwaukee Prairie and Zion monitoring sites and the fact that the peak ozone concentrations at the Chiwaukee Prairie monitoring site generally exceed those at the Zion monitoring site. The two monitoring sites are approximately six miles apart, with the Chiwaukee Prairie monitoring site located very near the Illinois-Wisconsin border. The proximity of the two monitoring sites and the above data comparisons strongly suggest that it is likely that the Chiwaukee Prairie monitoring site will be determined to be violating the 2008 8-hour ozone NAAQS once certified data are submitted later this year. Preliminary data for the site suggest that the site may well be violating this ozone standard.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions for ozone precursors (VOC and NOx) and other emissions-related data that provide information on area contributions to the ozone standard violation.

Emissions Data

EPA evaluated county-level emission data for NOx and VOC derived from the 2008 National Emissions Inventory (NEI), version 1.5. These are the most recently available NEI emissions data. (See http://www.epa.gov/ttn/chief/net/2008inventory.html) Significant emission levels in a nearby area indicate the potential for the area to contribute to the observed ozone standard violation.

Table 3 shows the 2008 emissions of VOC and NOx (tons per year (tpy)) for all counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. This table also indicates which of the counties were recommended to be nonattainment for the 2008 ozone NAAQS by their respective states.

Table 3. Total 2008 VOC and NOx Emissions (tons/year) in the Chicago-Naperville-Michigan City, IL-IN-WI CSA

State/County	State Recommended Nonattainment?	VOC Emissions (tpy)	NOx Emissions (tpy)
Illinois:			
Cook	Yes	129,466	143,372
DeKalb	No	4,395	4,637
DuPage	Yes	30,508	30,412
Grundy	Yes (partial)	3,291	4,577
Kane	Yes	13,893	15,161
Kankakee	No	5,179	6,941
Kendall	Yes (partial)	3,970	4,642
Lake	Yes	19,978	24,549
McHenry	Yes	9,012	9,138
Will	Yes	19,255	39,878
Illinois Totals		**235,347**	**283,307**
Indiana:			
Jasper	No	2,845	19,788
Lake	Yes	21,266	46,808
La Porte	No	5,555	8,875
Newton	No	1,913	841
Porter	No	8,100	27,055
Indiana Totals		**39,679**	**103,367**
Wisconsin:			
Kenosha	No	5,370	6,788
Total CSA Emissions		**283,996**	**393,462**

Emissions Observations by State

Illinois:

From the Illinois emissions in Table 3, it can be seen that comparatively high emissions originate in the following counties: Cook, DuPage, Kane, Lake, McHenry, and Will. Emissions from these counties, in 2008, account for 94.4 percent of the total Illinois VOC emissions and 92.7 percent of the total Illinois NOx emissions for the Illinois portion of the Chicago-Naperville-Michigan City, IL-IN-WI CSA. These same counties account for 78.3 percent of the total VOC emissions and 66.7 percent of the total NOx emissions for the entire Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Indiana:

From the Indiana emissions data in Table 3, it can be seen that comparatively high VOC emissions originate in Lake and Porter Counties, and comparatively high NOx emissions originate in Jasper, Lake, and Porter Counties. These counties account for 74.0 percent of the total VOC emissions and 90.6 percent of the total NOx emissions for the Indiana portion of the Chicago-Naperville-Michigan City, IL-IN-WI CSA. These same counties account for 10.3 percent of the total VOC emissions and 23.8 percent of the total NOx emissions for the entire Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Wisconsin:

The VOC and NOx emissions in Kenosha County are comparatively small; they are comparable to the emissions from the low-emissions counties in the Illinois and Indiana portions of the Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Population, Population Density, and Degree of Urbanization

EPA evaluated the county-specific populations, population trends, and vehicle use characteristics for the Chicago-Naperville-Michigan City, IL-IN-WI CSA as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions that may contribute to violating ozone monitors. Rapid population growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that it may be appropriate to

include this county in the ozone nonattainment area, particularly if this county already has moderate or higher VOC and/or NOx emissions. Table 4 shows the 2010 population, population density, and population growth information for each county in the Chicago-Naperville-Michigan City, IL-IN-WI CSA

Table 4. Population and Population Growth in the Chicago-Naperville-Michigan City, IL-IN-WI CSA

State/County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1,000 per square mile)	Change in Population (2000-2010)	Population Percent Change (2000-2010)
Illinois:					
Cook	Yes	5,194,675	5.43	-182,417	-3
DeKalb	No	105,160	0.17	15,839	18
DuPage	Yes	916,924	2.73	10,269	1
Grundy	Yes (partial)	50,063	0.12	12,388	33
Kane	Yes	515,269	0.98	107,749	26
Kankakee	No	113,449	0.17	9,573	9
Kendall	Yes (partial)	114,736	0.36	59,529	108
Lake	Yes	703,462	1.50	55,288	9
McHenry	Yes	308,760	0.51	46,890	18
Will	Yes	677,560	0.80	169,531	33
Indiana:					
Jasper	No	33,478	0.06	3,296	11
Lake	Yes	496,005	0.99	11,516	2
La Porte	No	111,467	0.18	1,309	1
Newton	No	14,244	0.04	-298	-2
Porter	No	164,343	0.39	17,188	12
Wisconsin:					
Kenosha	No	166,426	0.60	16,352	11

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011. (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.ST05&prodType=table) and U.S. Census Bureau GIS files for the county boundaries.

Population Observations By State

Illinois:

For Illinois, the population data show that Cook, DuPage, Kane, Lake, McHenry, and Will Counties have comparatively large populations and population densities and, therefore, are more urbanized than the other Illinois counties in this CSA. This

indicates that the population-related VOC and NOx emissions in these counties are relatively high. In addition, the population change levels for 2000-2010 in Kane, Kendall, Lake, McHenry, and Will Counties significantly exceed those of other Illinois counties in the CSA, suggesting that these "fast growing" counties are becoming increasingly urbanized and integrated with the urban core of the Chicago-Naperville-Michigan City, IL-IN-WI CSA. This further indicates that the population-related emission contributions from these counties are increasing compared to those from other counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA.

The population densities of DeKalb, Grundy, and Kankakee Counties are relatively small compared to those of other counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA, indicating that the population-related VOC and NOx emissions in these counties contribute significantly less to high ozone concentrations in this CSA.

Indiana:

In the Indiana portion of the Chicago-Naperville-Michigan City, IL-IN-WI CSA, the populations and population densities of Lake, Porter, and La Porte Counties are significantly larger than those of Jasper and Newton Counties. This indicates that population-related VOC and NOx emissions in Jasper and Newton Counties contribute less to high ozone concentrations in this CSA.

The population and population density of La Porte County are comparable to those DeKalb and Kankakee Counties in Illinois, indicating that the population-related VOC and NOx emissions in this county contribute significantly less to high ozone concentrations in this CSA.

Finally, it is concluded that the population-related emissions of Lake and Porter Counties are more significant, from an ozone formation standpoint, than those of other counties in the Indiana portion of the Chicago-Naperville-Michigan City, IL-IN-WI CSA, indicating that population-related VOC and NOx emissions in these counties do contribute significantly to high ozone concentrations in this CSA.

Wisconsin:

Kenosha County has a moderately low 2010 population compared to those of higher populated counties in the Chicago-Naperville-

Michigan City, IL-IN-WI CSA. However, the population density of Kenosha County is relatively high, showing that this county is significantly urbanized and that population-related VOC and NOx emissions in this county can significantly contribute to high downwind ozone concentrations.

Traffic and Commuting Patterns

EPA evaluated the total VMT for each county in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. In combination with the population/population density data and the location of main transportation arteries (see the above area map), this information helps identify the probable location of non-point source emissions. A county with high VMT is generally an integral part of the urban area and indicates the presence of relatively high motor vehicle (on-road mobile source) emissions that may significantly contribute to ozone formation and transport in the urban area. This implies that this county should be included in the ozone nonattainment area, particularly if the VOC and/or NOx emissions in this county are a significant portion of the total emissions in the area (in the CSA/CBSA).

Table 5 shows the traffic levels, total 2008 VMT, in each county in the Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Table 5. Traffic Levels in the Chicago-Naperville-Michigan City, IL-IN-WI CSA

State/County	State Recommended Nonattainment?	2008 VMT (million miles)*
Illinois:		
Cook	Yes	32,755
DeKalb	No	883
DuPage	Yes	8,443
Grundy	Yes (partial)	678
Kane	Yes	3,628
Kankakee	No	945
Kendall	Yes (partial)	769
Lake	Yes	5,638
McHenry	Yes	2,169
Will	Yes	5,713
Indiana:		
Jasper	No	732
Lake	Yes	4,915
La Porte	No	936
Newton	No	219
Porter	No	1,640
Wisconsin:		
Kenosha	No	1,354

***** Mobile source VMT are those input into the NEI version 1.6 used to compute the mobile source portion of the NEI emissions summarized above in Table 3.

VMT Observations By State

Illinois:

For Illinois, the VMT data show that VMT levels in Cook County are significantly higher than those for other counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. The VMT levels for DuPage, Kane, Lake, McHenry, and Will Counties are comparatively higher than those of the other Illinois counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA and, cumulatively, are a significant portion of the total VMT for the Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Indiana:

For Indiana, the VMT data show that VMT levels in Lake and Porter Counties are comparatively higher than those of the other Indiana counties in the Chicago-Naperville-Michigan City, IL-IN-WI CSA, and, cumulatively, are a significant portion of the total VMT for the Chicago-Naperville-Michigan City, IL-IN-WI CSA.

Wisconsin:

The VMT level in Kenosha County is similar to the VMT level in Porter County, Indiana. This indicates that the ozone impact of mobile source emissions in Kenosha County should be similar to that of Porter County.

Factor 3: Meteorology (Weather/Transport Patterns)

EPA evaluated available meteorological data to help determine how meteorological conditions, particularly transport conditions, affect the fate and transport of ozone and ozone precursors contributing to ozone formation in the Chicago-Naperville-Michigan City, IL-IN-WI CSA. The data available for this evaluation were presented by the States of Illinois and Wisconsin as part of their March 2009 ozone designation recommendation submittals. Indiana conducted no meteorological analyses to assess the impacts of transported ozone and ozone precursors for monitors outside of Indiana, and presented minimal discussions on pollutant transport for ozone monitors inside of Indiana.

In Illinois' March 9, 2009 ozone designation recommendation submittal, the IEPA notes that the predominant wind direction across the State is from south/southwest, with an average wind speed of approximately 11 miles per hour. The State notes that ozone monitors in the Chicago area that exceed the 2008 8-hour ozone standard based on 2006-2008 data show strong evidence of regional (i.e., longer-range) contributions to high ozone levels. The State also presents a pollution wind rose (direction percent frequency) for days in 2006-2008 with peak 8-hour ozone concentrations exceeding 75 ppb, with wind data collected at the Alsip monitoring site (Cook County). These data show that, on high ozone days, the wind blew from the south through southwest. Some high ozone day winds were also recorded with winds from east-northeast through south-southeast and west-southwest through west. Virtually no high ozone day wind directions were recorded for wind directions for west-northwest through northeast.

In Wisconsin's March 12, 2009 ozone designation recommendation submittal technical support document, the Wisconsin Department of Natural Resources (WDNR) summarized the wind directions for days (2006-2008) when 1-hour ozone concentrations at the Chiwaukee Prairie monitoring site in Kenosha County exceeded 75 ppb. This analysis indicated that, on 57.9 percent of these high ozone days winds were from the southeast through south, which is where the Chicago-Gary-Lake County, IL-IN ozone nonattainment area for the 1997 8-hour ozone standard is located. On 15.8 percent of the high ozone days, winds were from the southwest, indicating that emissions in Walworth County contributed to the high ozone concentrations in Kenosha County.

Factor 4: Geography/Topography (Mountain Ranges or Other Air Basin Boundaries)

The geography/topography analysis evaluates the physical features of the land that might affect the air-shed, and, therefore, the distribution of ozone over the area.

The Chicago-Naperville-Michigan City, IL-IN-WI CSA does not have any geographical or topographical barriers significantly limiting air pollution transport within its air-shed. Therefore, this factor did not play a significant role in this evaluation.

Factor 5: Jurisdictional Boundaries

Once we identified the general area that we anticipated we would recommend as nonattainment for the 2008 8-hour ozone NAAQS, we then considered existing jurisdictional boundaries for purposes of providing a clearly defined legal boundary and to help identify the area appropriate for carrying out the air quality planning and enforcement functions for an ozone nonattainment area. Examples of jurisdictional boundaries include existing or prior nonattainment boundaries, air district boundaries, township boundaries, areas covered by metropolitan planning organizations, state lines, and Reservation boundaries. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be considered.

The Chicago-Naperville-Michigan City, IL-IN-WI CSA has previously established ozone nonattainment boundaries associated with both the 1-hour and 8-hour ozone NAAQS. The Chicago nonattainment boundary for the 1-hour ozone NAAQS included Cook, DuPage, Kane, Lake, McHenry, and Will Counties and Lake and Porter Counties in Indiana in their entireties and partial counties for Grundy (Aux Sable and Goose Lake Townships) and Kendall (Oswego Township) Counties in Illinois. Kenosha County, Wisconsin was part of the Milwaukee 1-hour ozone nonattainment area. All of these areas were designated as nonattainment for the 1997 8-hour ozone NAAQS.

Illinois has recommended that the same full and partial counties in Illinois be included as part of the Chicago nonattainment area for the 2008 8-hour ozone NAAQS. Indiana has recommended that only Lake County be designated as nonattainment for the 2008 ozone NAAQS. Finally, Wisconsin has recommended that Kenosha County be designated as attainment for the 2008 8-hour ozone NAAQS.

Conclusion

Illinois:

Based on the assessment of factors described above, EPA intends to include the following Illinois counties and partial counties in the Chicago-Naperville, IL-IN-WI ozone nonattainment area: Cook, DuPage, Kane, Lake, McHenry, and Will Counties in their entirety; and, Oswego Township in Kendall County, and Aux Sable and Goose Lake Townships in Grundy County. Based on the levels of VOC and NOx emissions, and other emissions-related data, including population and VMT levels, it is concluded that Cook,

DuPage, Kane, Lake, McHenry, and Will Counties are significant sources of emissions that contribute to the high ozone levels at the Zion monitor. Based on the State of Illinois' recommendation and on historical nonattainment boundary considerations, we also intend to include Oswego Township in Kendall County and Aux Sable and Goose Lake Townships in Grundy County as part of the Chicago-Naperville, IL-IN-WI ozone nonattainment area for the 2008 8-hour ozone standard.

Based on our analysis of the factors above, especially considering the emissions-related factors, we intend to designate the remaining Illinois counties, including the remaining portions of Kendall and Grundy Counties, in the Chicago-Naperville-Michigan City, IL-IN-WI CSA as attainment for the 2008 8-hour ozone NAAQS.

Indiana:

Based on the assessment of factors described above, EPA intends to include Lake, Jasper, and Porter Counties in the Chicago-Naperville, IL-IN-WI nonattainment area for the 2008 8-hour ozone NAAQS. This is based on the high emissions in these counties that contribute to high ozone concentrations at the Zion monitor. Meteorology on high ozone days in Chicago area favor the transport of ozone and ozone precursor emissions from these counties to the Zion monitor and other downwind portions of the Chicago area.

The low emissions and emissions-related population and VMT data of Newton County favor the exclusion of this county from the nonattainment area. It is concluded that emissions from this county do not significantly contribute to the high ozone concentrations at the Zion monitor.

The VOC and NOx emissions of La Porte County are significantly lower than those of Lake and Porter Counties and those of recommended nonattainment counties in Illinois. In addition, it is recognized that historically La Porte County has been designated as a separate nonattainment area for the 1997 8-hour ozone standard. Based collectively on these factors, we intend to not include La Porte County in the Chicago-Naperville, IL-IN-WI ozone nonattainment area for the 2008 8-hour ozone NAAQS.

Wisconsin:

Kenosha County presents a more unique situation for this designation analysis. The VOC and NOx emissions in Kenosha

County are relatively low and similar to those for counties recommended for exclusion from the intended ozone nonattainment area. In addition, it is noted that Illinois' and Wisconsin's wind direction analyses for high ozone days indicate that Kenosha County emissions are probably downwind of the violating Zion, Illinois monitor on high ozone days. These conclusions would support the exclusion of Kenosha County from the intended ozone nonattainment area.

Nonetheless, it is also recognized that the Chiwaukee Prairie monitoring site in Kenosha County has historically been the high downwind ozone monitoring site for the Chicago region. Chiwaukee Prairie ozone design values were used to establish the classification for the Chicago-Gary-Lake County, IL-IN ozone nonattainment area under both the 1997 8-hour ozone standard and the 1-hour ozone standard.

Based on the above considerations, at this time we are notifying the State of Wisconsin that we intend to include Kenosha in the Chicago-Naperville, IL-IN-WI ozone nonattainment area for the 2008 8-hour ozone standard. If the State of Wisconsin submits certified data for 2009-2011 showing that Kenosha County is actually attaining the 2008 8-hour ozone standard, EPA's conclusion regarding the designation for Kenosha County should be revisited.

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

SUMMARY

The table below identifies the areas and associated counties in Ohio that EPA intends to designate as nonattainment for the 2008 ozone National Ambient Air Quality Standards (NAAQS).[1] In accordance with section 107(d) of the CAA, EPA must designate an area (county or part of a county) as "nonattainment" if it is violating the 2008 ozone NAAQS or if it is contributing to a violation of the 2008 ozone NAAQS in a nearby area. The technical analyses supporting the boundaries for the nonattainment areas are provided below.

Table 1. Intended Ozone Nonattainment Areas in Ohio

Area	Ohio Recommended Nonattainment Counties	EPA's Intended Nonattainment Counties
Nonattainment Areas †		
Cincinnati-Middletown-Wilmington, OH-KY-IN ‡	Butler Clermont Clinton Hamilton Warren	Butler Clermont Clinton Hamilton Warren
Cleveland-Akron-Lorain, OH	Ashtabula Cuyahoga Geauga Lake Lorain Medina Portage Summit	Ashtabula Cuyahoga Geauga Lake Lorain Medina Portage Summit
Columbus, OH	Delaware Fairfield Franklin Knox Licking Madison	Delaware Fairfield Franklin Knox Licking Madison

[1] The primary 8-hour hour ozone standard, set to protect human health, was revised on March 27, 2008 (73 FR 16436) from 0.08 parts per million (ppm) to 0.075 ppm. The secondary ozone standard, set to protect human welfare and the environment, was revised to be consistent with the primary ozone standard in all respects.

† Nonattainment for both primary and secondary 2008 8-hour ozone standards.

‡ Cincinnati-Middletown-Wilmington, OH-KY-IN is a multi-state nonattainment area. Table 2 below identifies the counties in Ohio and in other states that EPA intends to designate as part of the nonattainment area.

EPA intends to designate the remaining counties in Ohio that are not listed in Table 1 above as "unclassifiable/attainment" for the 2008 ozone NAAQS.

The analysis below provides the basis for the intended nonattainment area boundaries. It relies on our analysis of whether and which monitors are recording violations of the 2008 ozone NAAQS, based on certified air quality monitoring data from 2008-2010 and on an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas based on a weight-of-evidence analysis considering the factors identified below. EPA issued guidance on December 4, 2008 that identified these factors as ones EPA would consider in determining nonattainment area boundaries, and recommended that states consider these factors in making their designation recommendations to EPA.[2]

1. Air quality data (including the ozone design value calculated for each Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitor in the area);

2. Emissions and emissions-related data (including location of sources, population, amount of emissions and emission controls, and growth patterns);

3. Meteorology (weather/transport patterns);

4. Geography and topography (mountain ranges and other basin boundaries affecting ozone levels and ozone precursor transport); and,

5. Jurisdictional boundaries (e.g. counties, air districts, existing ozone nonattainment areas, Indian country,

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

Metropolitan Planning Organization (MPOs) and their covered area).

Ground-level ozone is generally not emitted directly into the air, but is created by chemical reactions involving Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) in the presence of sunlight.[3] Because NOx and VOC emissions from a broad range of sources over a wide area typically contribute to violations of the ozone standards, EPA believes it is important to consider whether there are contributing emissions from a broad geographic area. Accordingly, EPA chose to examine the 5 factors with respect to the larger of the Combined Statistical Area (CSA) or Core Based Statistical Area (CBSA) associated with the violating monitor(s).[4] All data and information used by EPA in this evaluation are the latest available to EPA and/or provided to EPA by states or tribes.

In EPA's designations guidance for the 2008 ozone NAAQS, EPA recommended examining CSA/CBSAs because certain factors used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 ozone NAAQS. Congress required a similar approach in 1990 for areas classified as serious and above for the 1-hour ozone standard and EPA used the same approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's September 4, 2008 guidance recommends using the boundary of the county containing the violating monitor as the starting point for considering the nonattainment area's boundary.

Technical Analysis for Cincinnati-Middletown-Wilmington, OH-KY-IN

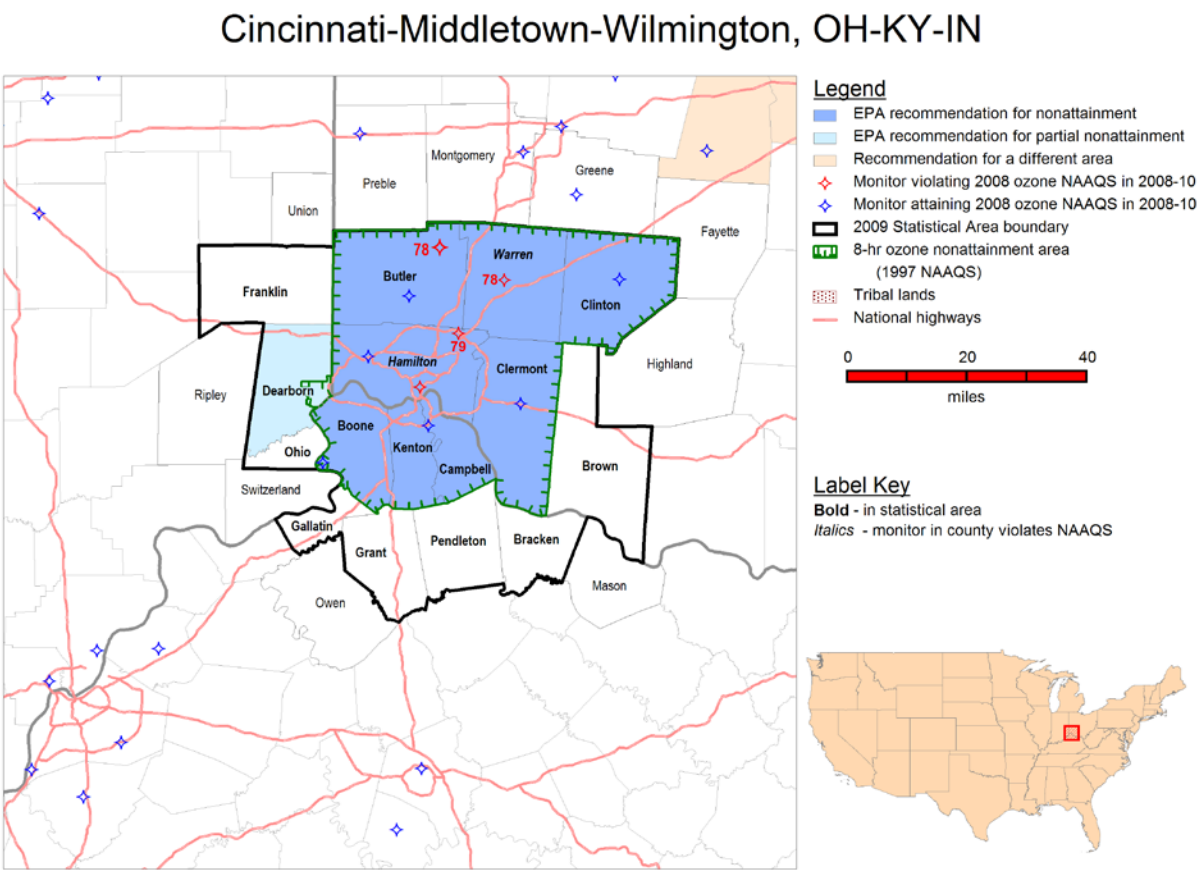
Figure 1 is a map of the Cincinnati-Middletown-Wilmington, OH-KY-IN intended nonattainment area. The map provides other relevant information, including the locations and ozone design values (violating monitors only) of air quality monitors, county and other jurisdictional boundaries, existing maintenance boundary for the 1997 ozone NAAQS, Cincinnati-Middletown-

[3] Peak ozone concentrations generally occur downwind of source areas on relatively sunny days with high temperatures and relatively low wind speeds.

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

Wilmington, OH-KY-IN CSA boundary, and major transportation arteries.

Figure 1. Cincinnati-Middletown-Wilmington, OH-KY-IN Area



For purposes of the 1997 ozone NAAQS, as noted in Figure 1, portions of this area were designated nonattainment and subsequently redesignated to attainment (maintenance). The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire counties of Butler, Clermont, Clinton, Hamilton, and Warren in Ohio and Boone, Campbell, and Kenton in Kentucky and part of Dearborn County (Lawrenceburg Township) in Indiana.

In March 2009, Ohio recommended that Butler, Clermont, Clinton, Hamilton, and Warren Counties be designated as “nonattainment” for the 2008 ozone NAAQS based on air quality data from 2006-2008. In March 2009, Kentucky recommended that Boone, Campbell, and Kenton Counties be designated as nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008.

Additionally, Indiana, in March 2009, recommended that each county in the Indiana portion of the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA be designated as "attainment" for the 2008 ozone NAAQS. In October 2011, Kentucky submitted an update to their 2009 recommendation, and revised their recommendation to "attainment" designations for each county in the State.[5]

The ozone data reflected in Figure 1 and summarized below are from FEM monitors sited and operated in accordance with 40 CFR part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate the counties in Ohio and Kentucky and the partial county in Indiana identified in Table 2 below as "nonattainment" for the 2008 ozone NAAQS as part of the Cincinnati-Middletown-Wilmington, OH-KY-IN nonattainment area.

Table 2. EPA's Intended Nonattainment Counties for the Cincinnati-Middletown-Wilmington, OH-KY-IN Ozone Nonattainment Area

Cincinnati-Middletown-Wilmington, OH-KY-IN	State-Recommended Nonattainment Counties	EPA Intended Nonattainment Counties
Indiana	None	Dearborn-Partial
Kentucky	None	Boone Campbell Kenton
Ohio	Butler Clermont Clinton Hamilton Warren	Butler Clermont Clinton Hamilton Warren

Factor Assessment

Factor 1: Air Quality Data

[5] Letters from Leonard K, Peters, Kentucky Energy and Environmental Cabinet Secretary to A. Stanley Meiburg and Gwendolyn Keyes Fleming regarding the initial and updated nonattainment boundary recommendations for the 2008 8-hour ozone standard for Kentucky(October 13, 2011 and March 12, 2009, respectively); Letter from Chris Korleski, Director, State of Ohio Environmental Protection Agency, to Lynn Buhl, Regional Administrator, U.S. Environmental Protection Agency, Region 5, regarding initial nonattainment boundary recommendations for Ohio for the 2008 ozone NAAQS (March 9, 2009); Letter from Thomas W. Easterly, Commissioner, Indiana Department of Environmental Management, to Bharat Mathur, Deputy Regional Administrator, U.S. Environmental Protection Agency, Region 5, regarding the initial nonattainment boundary recommendations for the 2008 ozone NAAQS for Indiana.

For this factor, we considered 8-hour ozone design values (in ppm) for air quality monitors in counties in the Cincinnati-Middleton-Wilmington, OH-KY-IN CSA based on data for the 2008-2010 period, which are the most recent years with fully-certified air quality data. A monitor's design value is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour ozone concentrations, averaged over 3 years is 0.075 ppm or less. A design values is valid only if minimum data completeness requirements are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the design value for the county or area is determined by the monitor with the highest individual design value.

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

The 2008-2010 ozone design values for monitors and counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA are shown in Table 3.

Table 3. Ozone Air Quality Data for the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA

State/County	Site Number	2008-2010 8-hour Ozone Design Values (ppm)
Ohio:		
Butler	390170018	**0.078†**
Butler	390170004	0.073
Clermont	390250022	0.071
Clinton	390271002	0.074
Hamilton	390610040	**0.076†**
Hamilton	390610010	0.073

Hamilton	390610006	**0.079†**
Warren	391650007	**0.078†**
Kentucky:		
Boone	210150003	0.065
Campbell	210373002	0.072

† Monitored violation of the 2008 ozone NAAQS.

Butler, Hamilton, and Warren Counties in Ohio show violations of the 2008 ozone NAAQS. Therefore, these counties are included in the intended ozone nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight-of-evidence of the five factors and other relevant information to determine whether it contributes to the nearby violation.

Please note that the state of Ohio, in its March 9, 2009 area designation recommendations and accompanying technical support documentation, based its recommendations on 2006-2008 ozone data. Since these data no longer cover the most recent 3-year period with quality-assured, state-certified data and have been supplanted by the more current 2008-2010 ozone data, we are not reviewing the older ozone data covered by the state of Ohio.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions for ozone precursors (VOC and NOx) and other emissions-related data that provide information on area contributions to ozone standard violations.

Emissions Data

EPA evaluated county-level emission data for NOx and VOC derived from the 2008 National Emissions Inventory (NEI), version 1.5. These are the most recently available NEI emissions data. (See http://www.epa.gov/ttn/chief/net/2008inventory.html) Significant emission levels in a nearby area indicate the potential for the area to contribute to the observed ozone standard violation.

Table 4 shows the 2008 emissions of VOC and NOx (tons per year (tpy)) for all counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. This table also indicates which of the counties were recommended to be nonattainment for the 2008 ozone NAAQS by their respective states.

Table 4. Total 2008 VOC and NOx Emissions (tons/year) in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA

State/County	State Recommended Nonattainment?	VOC Emissions (tpy)	NOx Emissions (tpy)
Indiana:			
Dearborn	No	3,572	11,637
Franklin	No	1,097	862
Ohio	No	210	259
Kentucky:			
Boone	No	4,332	8,848
Bracken	No	361	760
Campbell	No	2,260	2,697
Gallatin	No	671	1,634
Grant	No	1,148	1,623
Kenton	No	3,901	4,095
Pendleton	No	608	1,394
Ohio:			
Brown	No	1,720	1,430
Butler	Yes	10,813	12,600
Clermont	Yes	5,809	28,461
Clinton	Yes	2,618	2,941
Hamilton	Yes	26,816	38,664
Warren	Yes	5,618	6,027
CSA Total		71,554	123,933

Emissions Observations By State

Ohio:

From the Ohio emissions data in Table 4, it can be seen that comparatively high 2008 VOC and NOx emissions in the vicinity of the violating counties originate in the following counties: Butler, Clermont, Hamilton, and Warren. Emissions from these counties in 2008 account for 68.6 percent of the VOC emissions and 69.2 percent of the NOx emissions for the entire Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

The VOC and NOx emissions from Brown and Clinton Counties, Ohio are significantly smaller than those originating in the higher emitting counties elsewhere in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. This supports the exclusion of Brown County from the recommended ozone nonattainment area for the 2008 8-hour ozone NAAQS, but not the exclusion of Clinton County based on consideration of jurisdictional boundaries (see the discussion of Factor 5 below).

Indiana:

From the Indiana emissions data in Table 4, it can be seen that comparatively high 2008 VOC and NOx emissions in the vicinity of the violating counties originate from Dearborn County. Emissions from this county in 2008 account for 5.0 percent of the VOC emissions and 9.4 percent of the NOx emissions for the entire Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. The majority of these emissions come from the American Electric Power (AEP) - Tanner's Creek Generating Station located in the Lawrenceburg Township, adjacent to the recommended nonattainment area.

The VOC and NOx emissions from Franklin and Ohio Counties in Indiana are comparatively smaller than those originating in the higher emitting counties elsewhere in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. This supports the exclusion of these counties from the recommended ozone nonattainment area for the 2008 8-hour ozone NAAQS.

Kentucky:

Based on the 2008 NEI, 62 percent of Boone County's NOx emissions are from point sources, and 21 percent of Boone County's NOx emissions from mobile sources. Less than 5 percent of Campbell County's NOx emissions are from point sources, and 57 percent of Campbell County's NOX emissions are from mobile sources. Kenton County also has less than 5 percent of its NOx emission from point sources, but 63 percent of Kenton County's NOX emissions are from mobile sources. Boone County has 29 percent of its VOC emission coming from area sources and 23 percent of its VOC emissions from mobile sources. Campbell County has 35 percent of its VOC emissions coming from area sources and 43 percent of VOC emissions from mobile sources. Kenton County has 38 percent of its VOC emission coming from area sources and 41 percent of its VOC emissions from mobile sources.

The VOC and NOx emissions from Bracken, Gallatin, Grant, and Pendleton Counties, Kentucky are considerably less than those originating in the higher emitting counties elsewhere in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. This would support the exclusion of these counties from the recommended ozone nonattainment area for the 2008 8-hour ozone NAAQS.

Population, Population Density, and Degree of Urbanization

EPA evaluated the population and vehicle use characteristics and population trends of the area as indicators of the probable

location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions that may contribute to violating ozone monitors. Rapid population or Vehicle Miles Traveled (VMT) growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that it may be appropriate to include this county in the ozone nonattainment area, particularly if this county already has moderate or higher VOC and/or NOx emissions. Table 5 shows the 2010 population, population density, and population growth information for each county in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Table 5. Population and Population Growth in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA

State/County	State Recommended Nonattainment	2010 Population	2010 Population Density (1,000 per square mile)	Change in Population (2000-2010)	Population Percent Change (2000-2010)
Indiana:					
Dearborn	No	50,047	0.16	3,702	+8
Franklin	No	23,087	0.06	866	+4
Ohio	No	6,128	0.07	492	+9
Kentucky:					
Boone	No	118,811	0.46	31,811	+37
Bracken	No	8,488	0.04	211	+3
Campbell	No	90,336	0.57	1,680	+2
Gallatin	No	8,589	0.08	705	+9
Grant	No	24,662	0.09	2,115	+9
Kenton	No	159,720	0.97	8,032	+5
Pendleton	No	14,877	0.05	389	+3
Ohio:					
Brown	No	44,846	0.09	2,263	+5
Butler	Yes	368,130	0.78	34,447	+10
Clermont	Yes	197,363	0.43	18,733	+10
Clinton	Yes	42,040	0.10	1,378	+3
Hamilton	Yes	802,374	1.94	-41,916	-5
Warren	Yes	212,693	0.52	52,006	+32
Area-wide		2,172,191	0.45	116,914	+6

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011. (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.ST05&prodType=table)

Population Observations By State

Ohio:

For Ohio, the population data show that Butler, Clermont, Hamilton, and Warren Counties have comparatively large populations and population densities and are densely populated. This implies that the population-related VOC and NOx emissions in these counties are relatively high. In addition, the population change percentages in Butler, Clermont, and Warren Counties between 2000 and 2010 exceed the population change percentage for the entire Cincinnati-Middletown-Wilmington, OH-KY-IN area, implying that the population-related emission contributions from these counties are increasing compared to those from other counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN area.

Indiana:

The populations of the Indiana counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA are smaller than those of the Ohio counties and larger Kentucky counties in this CSA, but Dearborn County has a moderate population implying moderate population-related VOC and NOx emissions. In addition, the population change percentage change from 2000 to 2010 in Dearborn County is greater than the population change percentage for the entire Cincinnati-Middletown-Wilmington, OH-KY-IN CSA, implying that the population-related emission contribution from this county may be increasing relative to those from other counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN area. Ohio County, Indiana also has a greater population change percentage as well, but the lower population in this county causes this change to be less significant.

Kentucky:

For Kentucky, Boone, Campbell, and Kenton Counties have relatively high populations and population densities when compared to the rest of the CSA. Bracken, Gallatin, Grant and Pendleton Counties are smaller when compared to the counties included in the non-attainment recommendation. Boone County at 37 percent growth and Warren County at 32 percent growth had the highest percentage of population growth for any of the counties in the Cincinnati-Middletown-Wilmington CSA. Other counties in this CSA did not have as large of a population percentage change, with their growth rates ranging from a 2 to 10 percent

increase. Hamilton County population decreased by 5 percent from 2000-2010.

Traffic and Commuting Patterns

EPA evaluated the total VMT for each county in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. In combination with the population/population density data and the location of main transportation arteries (see above area map), this information helps identify the probable location of non-point source emissions. A county with high VMT is generally an integral part of an urban area and indicates the presence of relatively high motor vehicle emissions that may significantly contribute to ozone formation and transport that contributes to nonattainment in the urban area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and suggests that this county should be included in the ozone nonattainment area, particularly if the VOC and/or NOx emissions in this county are a significant portion of the total emissions in the nonattainment area.

Table 6 shows the traffic levels, total 2008 VMT, in each county in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Table 6. Traffic Levels in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA

State/County	State Recommended Nonattainment	2008 VMT* (million miles)
Indiana:		
Dearborn	No	904
Franklin	No	316
Ohio	No	63
Kentucky:		
Boone	No	1,095
Bracken	No	89
Campbell	No	1,005
Gallatin	No	278
Grant	No	432
Kenton	No	1,669
Pendleton	No	182
Ohio:		
Brown	No	413
Butler	Yes	2,469
Clermont	Yes	1,464
Clinton	Yes	655
Hamilton	Yes	7,391
Warren	Yes	1,640

Area-wide	20,063

* MOBILE model VMT are those input into the NEI version 1.5 use to compute the mobile source portion of the NEI emissions summarized above in Table 4.

VMT Observations By State

Ohio:

For Ohio, the VMT data show that VMT levels in Butler, Clermont, Hamilton, and Warren Counties are comparatively higher than those in Brown and Clinton Counties and, accumulatively, are a significant portion of the total VMT for the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Indiana:

For Indiana, the data show that VMT level in Dearborn County is a comparatively high portion of the total VMT for the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Kentucky:

The VMT data show that VMT levels in Boone, Campbell, and Kenton Counties are larger than those in Bracken, Gallatin, Grant, and Pendleton Counties and, accumulatively, are a large portion of the total VMT for the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Additional Emissions-Related Data Discussed in Ohio's March 9, 2009 Designation Recommendation Submittal

The State of Ohio, through the Ohio Environmental Protection Agency (OEPA), has provided a detailed discussion of the county-specific VOC and NOx emissions, populations, and traffic and commuting patterns for the Ohio counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. These data support our conclusions discussed above, but also allow us to further refine our decisions for Factor 2 for the Ohio portion of the CSA. This is particularly true for growth in county populations and traffic levels and the inter-county impact of commuter traffic.

With regard to emissions, Ohio clearly shows that both VOC and NOx daily emissions in Brown County are considerably lower than many other counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. This confirms our conclusions that Brown County

emissions are relatively low and would not support inclusion of this county in the ozone nonattainment area.

Ohio has projected county-populations through 2030. These population projections show that populations in Clinton and Brown Counties will remain comparatively low through 2030. Whereas, the populations of Butler, Clermont, Hamilton, and Warren Counties will either significantly increase or will remain relatively high through 2030.

Estimated daily VMT in Brown County are shown to be largely unchanged beginning in 2001 through 2007, and daily VMT in Hamilton County are estimated to be similarly unchanged between 1990 and 2007. In contrast, daily VMT levels have shown significant growth trends in Butler, Clinton, Clermont, and Warren Counties between 1990 and 2007.

The State of Ohio notes that the vast majority of workers traveling out of county from Butler, Warren, and Clermont Counties commute to Hamilton County. This conclusion is supported by tabulated inter-county commuter numbers and percentages in Ohio' March 9, 2009 submittal. It is also noted that approximately 15 percent of the Hamilton County workers commute outside of the county, with the majority traveling to Butler County, with significant numbers of commuters also traveling from Hamilton County to Warren and Clermont Counties. The commuter numbers for Brown County show a much smaller number commuters traveling to or from other counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA.

Considering all of the information provided by the State of Ohio supports the conclusion that there is strong urban integration of Butler, Clermont, Hamilton, and Warren Counties. In contrast, Clinton and Brown Counties are not significantly integrated with the Cincinnati urban area. This favors the exclusion of Brown County from the Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area for the 2008 ozone NAAQS. Clinton County, however, cannot be excluded from the ozone nonattainment area due to jurisdictional boundary considerations, as discussed for Factor 5 below.

Factor 3: Meteorology (Weather/Transport Patterns)

EPA evaluated available meteorological data to help determine how meteorological conditions, particularly transport conditions, affect the fate and transport of ozone and ozone precursors contributing to ozone formation in the Cincinnati-

Middletown-Wilmington, OH-KY-IN CSA. The wind direction percentages show that there is no "preferred" wind direction during the summertime. Transport winds can and do blow from all directions into the counties with the recorded violations of the 2008 ozone NAAQS. There is, however, an indication that winds from south-southwest and west-southwest (collectively, the southwest quadrant) may be more prevalent than winds from other wind directions during the summertime in all three ozone standard violation counties.

Factor 4: Geography/Topography (Mountain Ranges or Other Air Basin Boundaries)

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

The Cincinnati-Middletown-Wilmington, OH-KY-IN CSA does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in this evaluation.

Factor 5: Jurisdictional Boundaries

Once we identified the general area that we anticipated we would recommend as nonattainment for the 2008 ozone NAAQS, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the area appropriate for carrying out the air quality planning and enforcement functions for an ozone nonattainment area. Examples of jurisdictional boundaries include existing/prior nonattainment boundaries for ozone or other urban-scale pollutants, county boundaries, air district boundaries, township boundaries, areas covered by metropolitan planning organizations, state lines, and Reservation boundaries. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be considered.

The Cincinnati-Middletown-Wilmington, OH-KY-IN area has previously established nonattainment boundaries associated with the both the 1-hour ozone and 1997 8-hour ozone NAAQS. The Cincinnati nonattainment boundary for the 1-hour ozone NAAQS included Boone, Campbell and Kenton Counties in their entireties in Kentucky; Butler, Clermont, Hamilton and Warren Counties in

their entireties in Ohio. Whereas the Cincinnati nonattainment boundary for the 1997 8-hour ozone NAAQS included Boone, Campbell and Kenton Counties in their entireties in Kentucky, Butler, Clermont, Clinton, Hamilton and Warren Counties in their entireties in Ohio, and a portion of Dearborn County (Lawrenceburg Township) in Indiana. Kentucky and Indiana have recommended a different nonattainment boundary for the 2008 ozone NAAQS for their portion of this area. Ohio recommended the same boundary as the 1997 ozone NAAQS nonattainment boundary for their portion of this area. With the exception of those counties (and partial county) that comprise the 1997 8-hour ozone boundary for this area, we believe that the remainder of the counties in the CSA do not contribute to the violations at the monitors in this area and, therefore, are not necessary for consideration as part of the nonattainment area.

Conclusion

Ohio:

Based on the assessment of factors described above, EPA has preliminarily concluded that the following Ohio counties should be included in the Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area because they are either violating the 2008 ozone NAAQS or contributing to a violation of the 2008 ozone NAAQS within this preliminary nonattainment area: Butler; Clermont; Clinton; Hamilton; and, Warren.

Table 8a summarizes which factors, discussed above, support the inclusion of each Ohio county in the intended nonattainment area for the 2008 ozone NAAQS. Note that Table 8a covers all Ohio counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA, but that not all of these counties are included in the preliminary nonattainment area for the 2008 ozone NAAQS.

Table 8a. Factors Supporting Inclusion of Ohio Counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN Ozone Nonattainment Area for the 2008 Ozone NAAQS

County	Violates Ozone Standard	High Emissions Population and Traffic Levels	Meteorology Favors Emissions Impact on Violating Monitor	Geography Favors High Ozone or Emissions Impact on Violating Monitor	Jurisdictional Basis for Inclusion In Nonattainment Area
Butler	X	X	X	NA	X
Clermont		X	X	NA	X

Clinton			X	NA	X
Hamilton	X	X	X	NA	X
Warren	X	X	X	NA	X

The results in the above table show that Butler, Hamilton, and Warren Counties, at minimum, should be included in the ozone nonattainment area based on air quality data. In addition, these counties also have comparatively high VOC and NOx emissions, populations (high population-related emissions), and traffic levels (traffic-related emissions), which favor their inclusion in the ozone nonattainment area.

Clermont County has comparatively high VOC and NOx emissions and relatively high populations and traffic levels, which, based on meteorological considerations, can also contribute to the monitored ozone standard violations in EPA's intended ozone nonattainment area. Therefore, Clermont County should also be included in the preliminary ozone nonattainment area.

Clinton County has no monitored ozone standard violations and generally lacks the higher VOC and NOx emissions and high population and traffic levels of the other Ohio counties discussed above. Therefore, these factors do not favor the inclusion of Clinton County in the intended ozone nonattainment area. However, it is noted that Clinton County has historically been included in the Cincinnati ozone nonattainment area for the 1997 ozone NAAQS. In addition, the State of Ohio, in its March 9, 2009 ozone designation submittal, has recommended that Clinton County should be included in the ozone nonattainment area for the 2008 ozone NAAQS. Based on the jurisdictional factor and the State's recommendation, we are including Clinton County in the intended, preliminary Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area for the 2008 ozone NAAQS.

Finally, it is noted Brown County lacks ozone standard violations, and the comparatively high emissions, populations, and traffic levels of other Ohio counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA. In addition, this county was not included in the nonattainment area for the 1997 ozone NAAQS and Ohio has not recommended the inclusion of this county in the ozone nonattainment area for the 2008 ozone NAAQS. Based on all of these factors and facts, we are not including Brown County in the intended Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area for the 2008 ozone NAAQS.

Indiana:

Based on the assessment of factors described above, EPA has preliminarily concluded that the following Indiana county should be included in the Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area because they are either violating the 2008 ozone NAAQS or contributing to a violation of the 2008 ozone NAAQS within this preliminary nonattainment area: Lawrence Township in Dearborn County.

Table 8b summarizes which factors, discussed above, support the inclusion of each Indiana county in the intended nonattainment area for the 2008 ozone NAAQS. Note that Table 8b covers all Indiana counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA, but that not all of these counties are included in the preliminary nonattainment area for the 2008 ozone NAAQS.

Table 8b. Factors Supporting Inclusion of Indiana Counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN Ozone Nonattainment Area for the 2008 Ozone NAAQS

County	Monitored Violation for Ozone Standard	High Emissions Population and Traffic Levels	Meteorology Favors Emissions Impact on Violating Monitor	Geography Favors High Ozone or Emissions Impact on Violating Monitor	Jurisdictional Basis for Inclusion In Nonattainment Area
Dearborn - Partial		X	X	NA	X

EPA has preliminarily concluded that Franklin and Ohio Counties are not expected to contribute to the ozone standard violations in the recommended Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area. The areas are mostly rural with no point source emissions and minimal amounts of nonpoint source and mobile emissions. Franklin and Ohio Counties were not included in the Cincinnati ozone nonattainment area for the 1997 ozone NAAQS. EPA has preliminarily concluded that Franklin and Ohio Counties are to be excluded from the proposed nonattainment area.

Lawrenceburg Township in Dearborn County contains the American Electric Power (AEP) – Tanner's Creek Generating Station and has high NOx and VOC emissions. Dearborn County also has the potential to have moderate mobile source and population related VOC and NOx emissions. The inclusion of Lawrenceburg Township in the Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area would be consistent with the ozone nonattainment area for the 1997 ozone NAAQS. Lawrenceburg Township contains the only major stationary source in the Indiana portion of Cincinnati-Middletown-Wilmington, OH-KY-IN CSA and accounts for the majority of the VOC and NOx emissions

in the Indiana portion of this area. The remainder of Dearborn County is fairly rural and is similar to Franklin and Ohio Counties. The inclusion of the Lawrenceburg Township portion of Dearborn County, Indiana in the intended Cincinnati-Middletown-Wilmington, OH-KY-IN nonattainment area for the 2008 ozone NAAQS is sufficient to account for the contribution of this county.

Kentucky:

Table 8c summarizes which factors discussed above support the inclusion of Kentucky counties in the intended nonattainment area for the 2008 ozone NAAQS. Note that Table 8c covers all Kentucky counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN CSA, but that not all of these counties are included in the preliminary nonattainment area for the 2008 ozone NAAQS.

Table 8c. Factors Supporting Inclusion of Kentucky Counties in the Cincinnati-Middletown-Wilmington, OH-KY-IN Ozone Nonattainment Area for the 2008 Ozone NAAQS

County	Monitored Violation for Ozone Standard	High Emissions Population and Traffic Levels	Meteorology Favors Emissions Impact on Violating Monitor	Geography Favors High Ozone or Emissions Impact on Violating Monitor	Jurisdictional Basis for Inclusion In Nonattainment Area
Boone		X	X	NA	X
Campbell		X	X	NA	X
Kenton		X	X	NA	X

For Kentucky, based on the assessment of factors described above, EPA has preliminarily concluded that the following counties, Boone, Campbell and Kenton, should be included as part of the Cincinnati-Middletown-Wilmington nonattainment area because they are contributing to a violation in a nearby area. Source category emissions data indicate that mobile sources and area sources are not the primary contributors of NOx to ozone formation in the Cincinnati-Middletown -Wilmington area. The analysis reveals that mobile emissions make up approximately 28 percent of the total NOx in the Cincinnati-Middletown-Wilmington area, and area sources make up approximately 12 percent of the total NOx emissions in the Cincinnati-Middletown -Wilmington area. The total of mobile sources and area sources make up approximately 40 percent of the total NOx emissions in the Cincinnati area. However, VOC emissions in Cincinnati-Middletown-Wilmington area are high for area and mobile sources. The analysis reveals that mobile emissions make up approximately 37 percent of the total VOC in the Cincinnati-Middletown-Wilmington area, and area sources make up approximately 38 percent of the total VOC emissions in the Cincinnati area. The

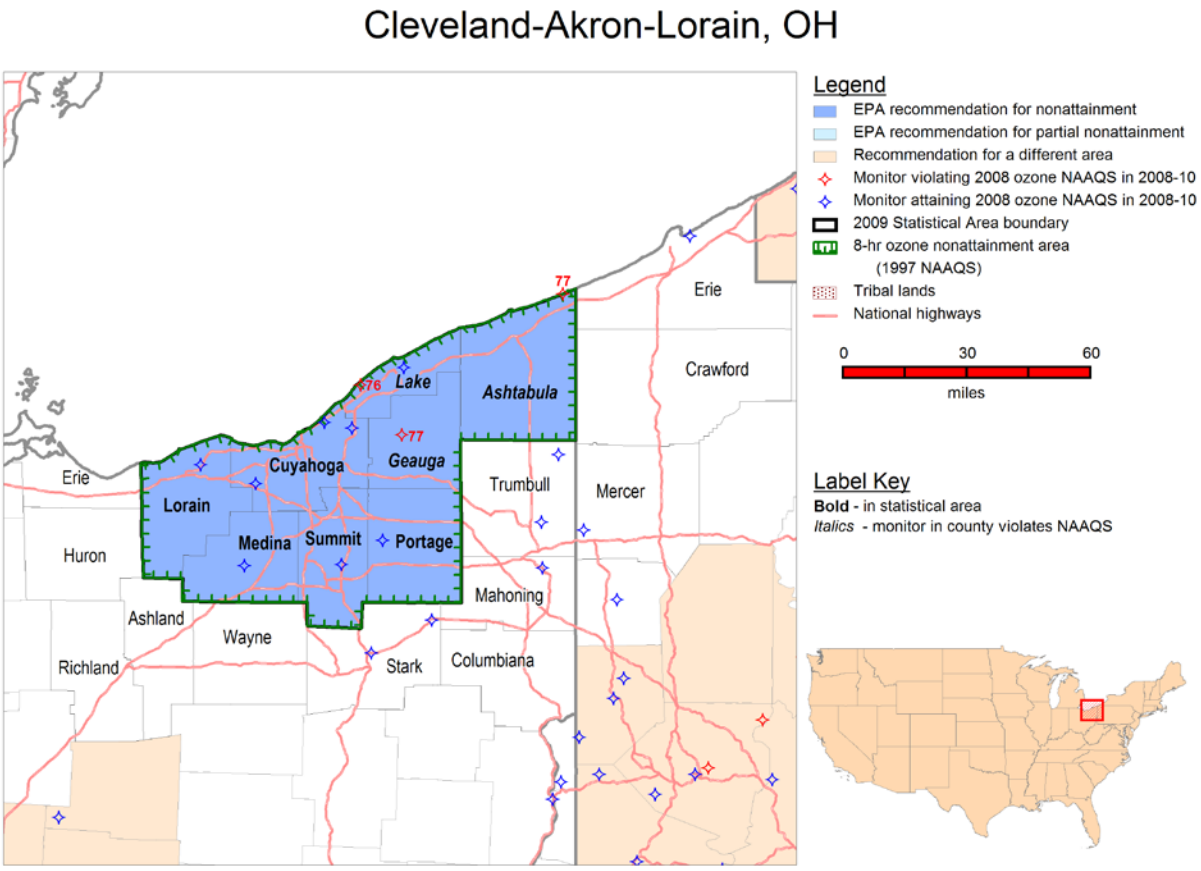
total of mobile sources and area sources make up approximately 75 percent of the total VOC emissions in the Cincinnati-Middletown-Wilmington area. Point sources in the area make up approximately 50 percent of the total NOx emissions and approximatley10 percent of the total VOC emissions in the Cincinnati-Middletown-Wilmington Area.

Boone, Campbell, and Kenton counties' NOx and VOC precursor emissions, high VMT along with population growth suggest that these counties should be considered for inclusion in the Cincinnati-Middletown-Wilmington, OH-KY-IN ozone nonattainment area.

Technical Analysis for Cleveland-Akron-Elyria, OH

Figure 2 is a map of the intended Cleveland-Akron-Elyria, OH ozone nonattainment area for the 2008 ozone NAAQS. The map provides other relevant information, including the locations and ozone design values of air quality monitors recording violations of the 2008 ozone NAAQS, county and other jurisdictional boundaries, existing maintenance boundary for the 1997 ozone NAAQS, Cleveland-Akron-Elyria, OH CSA boundary and major transportation arteries.

Figure 2. Cleveland-Akron-Elyria, OH Area



For purposes of the 1997 ozone NAAQS, as noted in Figure 2, portions of this area were designated nonattainment and subsequently redesignated to attainment (maintenance). The boundary for the nonattainment area for the 1997 ozone NAAQS included all Ohio counties in the Cleveland-Akron-Elyria, OH CSA. In March 2009, Ohio recommended that the same counties in Ohio be designated as nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008. These data are from monitors sited and operated in accordance with 40 CFR part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate the same 8 counties in Ohio (identified in Table 9 below) as "nonattainment" for the 2008 ozone NAAQS for the Cleveland-Akron-Elyria, OH nonattainment area.

Table 9. EPA's Intended Nonattainment Counties for the Cleveland-Akron-Elyria, OH Ozone Nonattainment Area

State-Recommended Nonattainment	EPA Intended Nonattainment Counties

Counties in Ohio	in Ohio
Ashtabula	Ashtabula
Cuyahoga	Cuyahoga
Geauga	Geauga
Lake	Lake
Lorain	Lorain
Medina	Medina
Portage	Portage
Summit	Summit

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in ppm) for air quality monitors in counties in the Cleveland-Akron-Elyria, OH CSA based on data for the 2008-2010 period, which are the most recent years with fully-certified air quality data. As discussed above, a monitor's design value is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour ozone concentrations, averaged over 3 years is 0.075 ppm or less. A design value is valid only if minimum data completeness requirements are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the design value for the county or area is determined by the monitor with the highest individual design value.

The 2008-2010 ozone design values for ozone monitors in the Cleveland-Akron-Elyria, OH CSA are shown in Table 10.

Table 10. Ozone Air Quality Data for the Cleveland-Akron-Elyria, OH CSA

County	Site Number	2008-2010 8-Hour Ozone Design Values (ppm)
Ashtabula	390071001	**0.077**†
Cuyahoga	390350064	0.068
Cuyahoga	390350034	0.075
Cuyahoga	390355002	0.075
Geauga	390550004	**0.077**†
Lake	390850003	**0.076**†
Lorain	390930018	0.070
Medina	391030004	0.070

Portage	391331001	0.067
Summit	391530020	0.075

† Monitored violation of the 2008 ozone NAAQS.

From Table 10, it can be seen that Ashtabula, Geauga, and Lake Counties in Ohio show violations of the 2008 ozone NAAQS for the period of 2008-2010. Therefore, these counties must be included in the ozone nonattainment area. As noted above, a county (or partial county) must also be designated nonattainment if it contributes to an air quality standard violation in a nearby area. Each county in the Cleveland-Akron-Elyria, OH CSA has been evaluated, as discussed below, based on the five factors summarized above and other relevant information to determine whether it contributed to the violations of the 2008 ozone NAAQS in Ashtabula, Geauga, and Lake Counties.

Please note that the State of Ohio, in its March 9, 2009 area designation recommendations and accompanying technical support documentation, based its area recommendations on 2006-2008 ozone data. Since these data no longer cover the most recent 3-year period with quality-assured, state-certified data and have been supplanted by the more current 2008-2010 ozone data, we are not reviewing the older ozone data covered by the state of Ohio.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions for VOC and NOx and other emissions-related data (primarily county population, population density, and traffic levels, and projected growth rates for county populations) that provide information on area contributions to local ozone standard violations.

Emissions Data

EPA evaluated county-level emission data for NOx and VOC derived from the 2008 NEI, version 1.5. These are the most recently available NEI emissions data. (See http://www.epa.gov/ttn/chief/net/2008inventory.html) Significant emission levels in a nearby area indicate the potential for the area to contribute to the observed ozone standard violation.

Table 11 shows the 2008 emissions of NOx and VOC (tons per year) for all counties in the Cleveland-Akron-Elyria, OH CSA. This table also indicates which of the counties were recommended to be nonattainment for the 2008 ozone NAAQS by the State of Ohio.

Table 11. Total 2008 VOC and NOx Emissions (tons/year) in the Cleveland-Akron-Elyria, OH CSA

State/County	State Recommended Nonattainment?	VOC Emissions (tpy)	NOx Emissions (tpy)
Ohio:			
Ashtabula	Yes	10,411	9,860
Cuyahoga	Yes	42,981	38,698
Geauga	Yes	3,891	2,237
Lake	Yes	10,382	19,286
Lorain	Yes	11,646	15,261
Medina	Yes	5,918	5,101
Portage	Yes	6,137	5,656
Summit	Yes	18,699	14,924
CSA Total		110,065	111,022

From the emissions data in Table 11, it can be seen that comparatively high 2008 VOC and NOx emissions in the vicinity of the violating counties originate in the following counties: Ashtabula, Cuyahoga, Lake, Lorain, and Summit. Emissions from these counties in 2008 account for 85.5 percent of the VOC emissions and 88.3 percent of NOx emissions for the entire Cleveland-Akron-Elyria, OH CSA.

The VOC and NOx emissions from Geauga, Medina, and Portage Counties are significantly smaller than those originating in the higher emitting counties within the Cleveland-Akron-Elyria, OH CSA. Note, however, that the collective emissions from these "lower emission" counties does constitute 12 to 15 percent of the CSA total emissions. So, even though individual VOC and NOx emissions are relatively low in the low emissions counties, their collective emission levels are equivalent to the emission levels for counties we are intending to include in the nonattainment area for the 2008 ozone NAAQS. On this basis, we conclude that these counties may have the potential to contribute to ozone standard violations in the Cleveland-Akron-Elyria, OH area.

Population, Population Density, and Degree of Urbanizaion

EPA evaluated the population and vehicle use characteristics and population trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emission from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions, which can contribute to local and downwind high ozone concentrations. Rapid population

or VMT growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that it may be appropriate to include this county in the ozone nonattainment area, particularly if this county already has moderate or higher VOC and/or NOx emissions.

Table 12 shows the 2010 population, population density, and population growth information for each county in the Cleveland-Akron-Elyria, OH CSA.

Table 12. Population and Population Growth in the Cleveland-Akron-Elyria, OH CSA

State/County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1,000 per square mile)	Change in Population (2000-2010)	Population Percent Change (2000-2010)
Ohio:					
Ashtabula	Yes	101,497	0.14	-1,249	-1
Cuyahoga	Yes	1,280,122	2.79	-111,989	-8
Geauga	Yes	93,389	0.23	2,180	2
Lake	Yes	230,041	0.99	2,385	1
Lorain	Yes	301,356	0.61	16,224	6
Medina	Yes	172,332	0.41	20,496	13
Portage	Yes	161,419	0.32	9,036	6
Summit	Yes	541,781	1.29	-1,797	0
Area Totals		**2,881,937**	**0.79**	**-64,714**	**-2**

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011. (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.ST05&proType=table)

The population data show that Cuyahoga, Lake, Lorain, Medina, Portage, and Summit Counties have comparatively high populations and population densities. This implies that these counties are generally urbanized and relatively integrated with the urban core of the Cleveland-Akron-Elyria, OH CSA. It also implies that the population-related VOC and NOx emissions in these counties are comparatively high and contribute to the ozone standard violations in the Cleveland-Akron-Elyria, OH CSA.

The counties that experienced the largest population growth for the 2000-2010 period are Lorain and Medina. As noted above, this implies an increasing integration of these counties with the urban core of the Cleveland-Akron-Elyria, OH CSA, and favors the inclusion of these counties in the ozone nonattainment area.

Although some counties, to the contrary are experiencing population declines (Cuyahoga and Summit Counties), their base populations remain high, implying that they should not be excluded from the ozone nonattainment area.

Traffic and Commuting Patterns

EPA evaluated the total VMT for each county in the Cleveland-Akron-Elyria, OH CSA. In combination with the county-specific population/population density data and the locations of the main transportation arteries (see above), this information helps identify the probable locations of non-point source emissions. A county with high VMT is generally an integral part of an urban area and indicates the presence of relatively high motor vehicle emissions that may significantly contribute to ozone formation and transport that contributes to ozone standard violations in or downwind of the urban area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that this county should be included in the ozone nonattainment area, particularly if the VOC and/or NOx emissions in this county are a significant portion of the total emissions in the nonattainment area.

Table 13 show the traffic levels, 2008 VMT, in each county in the Cleveland-Akron-Elyria, OH CSA.

Table 13. Traffic Levels in the Cleveland-Akron-Elyria, OH CSA

State/County	State Recommended Nonattainment?	2008 VMT (million miles)
Ohio:		
Ashtabula	Yes	1,039
Cuyahoga	Yes	10,148
Geauga	Yes	736
Lake	Yes	2,111
Lorain	Yes	2,359
Medina	Yes	1,532
Portage	Yes	1,651
Summit	Yes	5,471
Area Total		25,048

The VMT data show that VMT levels in all counties, with the exception of Geauga County, are relatively high. This implies that mobile source emissions in these counties are comparatively high and contribute to ozone standard violations in the Cleveland-Akron-Elyria, OH area.

VMT in Geauga County are comparatively lower than those in other counties in this area. This, however, does not imply that this county should be excluded from the ozone nonattainment area since this county has a monitored violation of the 2008 ozone NAAQS.

Additional Emissions-Related Data Discussed in Ohio's March 9, 2009 Designation Recommendation Submittal

OEPA has provided typical daily, county-specific total VOC and NOx emissions for 2005 and 2009 for each of the counties in the Cleveland-Akron-Elyria, OH CSA. These data confirm the conclusions we have drawn above using county-specific annual emissions.

OEPA has provided population projections through 2030 for each of the counties in the CSA. These data show significant population growth trends in Geauga, Lake, Lorain, Medina, Portage, and Wayne Counties. Populations are projected to be substantially unchanged in Ashtabula and Summit Counties through 2030. Populations are projected to decline over time in Cuyahoga County, however, the population in this county is projected to remain above 1 million through 2030.

OEPA provided graphs of daily VMT levels plotted for the period of 1990-2007 for each of the counties in the CSA. This visual VMT trend information shows that daily VMT grew moderately during the 1990-2007 period for Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit Counties.

OEPA provided inter-county commuter numbers and percentages for each of the counties in the Cleveland-Akron-Elyria, OH CSA. These numbers show a strong inter-county commuting pattern throughout the CSA.

Collectively, the OEPA-supplied population and traffic data support the conclusion that all of the counties in the Cleveland-Akron-Elyria, OH CSA, with the exception of Ashtabula County, are relatively integrated with the urban, industrial core of this area. Therefore, these data support including Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit Counties in the Cleveland-Akron-Elyria, OH ozone nonattainment area. As noted elsewhere in this technical review, Ashtabula County must be included in this ozone nonattainment area as the result of its monitored violation of the 2008 ozone NAAQS.

Factor 3: Meteorology (Weather/Transport Patterns)

EPA evaluated available meteorological data to help determine how meteorological conditions, particularly transport conditions, affect the fate and transport of ozone and ozone precursors contributing to ozone formation in the Cleveland-Akron-Elyria, OH CSA. EPA examined the frequency distribution of wind directions for the four seasons of the year by averaging National Weather Service direction-sorted wind directions for each county for a 30 year period. To apply the results of this data analysis to the Cleveland-Akron-Elyria, OH CSA, we have considered the wind direction (direction from which winds are blowing, reflecting directions to potential source areas) frequencies during the summer months (June-August) for the three Ohio counties with recorded violations of the 2008 ozone NAAQS (See Table 10). Therefore, we have considered wind direction distributions for Ashtabula, Cuyahoga, and Geauga Counties in Ohio.

Table 14 shows the summertime 30-year averaged percentages of wind directions (winds blowing into the subject county from the specified wind direction sector) for the three ozone standard violation counties in the Cleveland-Akron-Elyria, OH CSA.

Table 14. Averaged Summertime Wind Direction Percentages for Ozone Standard Violation Counties in the Cleveland-Akron-Elyria, OH CSA

Wind Direction	Ashtabula County	Geauga County	Lake County
North-Northeast	10.1	13.4	14.8
East-Northeast	7.1	6.1	5.5
East-Southeast	8.5	8.3	6.9
South-Southeast	10.1	9.5	9.7
South-Southwest	25.1	24.8	26.8
West-Southwest	15.8	16.6	16.2
West-Northwest	13.2	10.9	10.2
North-Northwest	10.1	10.3	10.0

The wind direction percentages show that there is no single “preferred” wind direction during the summertime, when the highest ozone concentrations are generally monitored. Transport winds can and do blow from all directions in the counties with the recorded violations of the 2008 ozone NAAQS. There is, however, an indication that winds from the south-southwest and west-southwest may be more prevalent than winds from other wind directions during the summertime in all three ozone standard violation counties.

Unfortunately, EPA's wind direction percentage data do little to shed light on which counties in the Cleveland-Akron-Elyria, OH CSA are the most important from an ozone and ozone precursor transport standpoint. The wind directions considered have not been sorted based on peak ozone concentrations or specifically for high ozone days, the timing of peak ozone concentrations, wind speeds, or other factors that could have been used to isolate the most critical ozone precursor source areas.

Factor 4: Geography/Topography (Mountain Ranges or Other Air Basin Boundaries)

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

The Cleveland-Akron-Elyria, OH CSA does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in this evaluation.

Factor 5: Jurisdictional Boundaries

Once we identified the general area that we anticipated we would recommend as nonattainment for the 2008 ozone NAAQS, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the area appropriate for carrying out the air quality planning and enforcement functions for an ozone nonattainment area. Examples of jurisdictional boundaries include existing/prior nonattainment boundaries for ozone or other urban-scale pollutants, county boundaries, air district boundaries, township boundaries, areas covered by metropolitan planning organizations, state lines, and Reservation boundaries. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be considered.

The portion of the Cleveland-Akron-Elyria, OH CSA that we are considering as designating as nonattainment for the 2008 ozone NAAQS has a previously established nonattainment boundary associated with the 1997 8-hour ozone NAAQS. The State of Ohio has recommended the same counties (as included in the 1997 8-hour ozone nonattainment area) in Ohio to be included in the boundary of the nonattainment area for the 2008 ozone NAAQS. The prior inclusion of these counties in the ozone nonattainment

area for the 1997 ozone NAAQS forms the primary jurisdictional basis for the inclusion of these counties in the nonattainment area for the 2008 ozone NAAQS.

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following Ohio counties should be included in the Cleveland-Akron-Elyria, OH ozone nonattainment area because they are either violating the 2008 ozone NAAQS or are contributing to a violation of the 2008 ozone NAAQS within this preliminary nonattainment area: Ashtabula; Cuyahoga; Geauga; Lake; Lorain; Medina; Portage; and, Summit.

Table 15 summarizes which factors discussed above support the inclusion of each Ohio county in the preliminary nonattainment area for the 2008 ozone NAAQS.

Table 15. Factors Supporting Inclusion of Ohio Counties in the Cleveland-Akron-Elyria, OH Ozone Nonattainment Area for the 2008 Ozone NAAQS

County	Violates Ozone Standard	High Emissions Population and Traffic Levels	Meteorology Favors Emissions Impact on Violating Monitor	Geography Favors High Ozone or Emissions Impact on Violating Monitor	Jurisdictional Basis for Inclusion In Nonattainment Area
Ashtabula	X	X	X	NA	X
Cuyahoga		X	X	NA	X
Geauga	X		X	NA	X
Lake	X	X	X	NA	X
Lorain		X	X	NA	X
Medina		X	X	NA	X
Portage		X	X	NA	X
Summit		X	X	NA	X

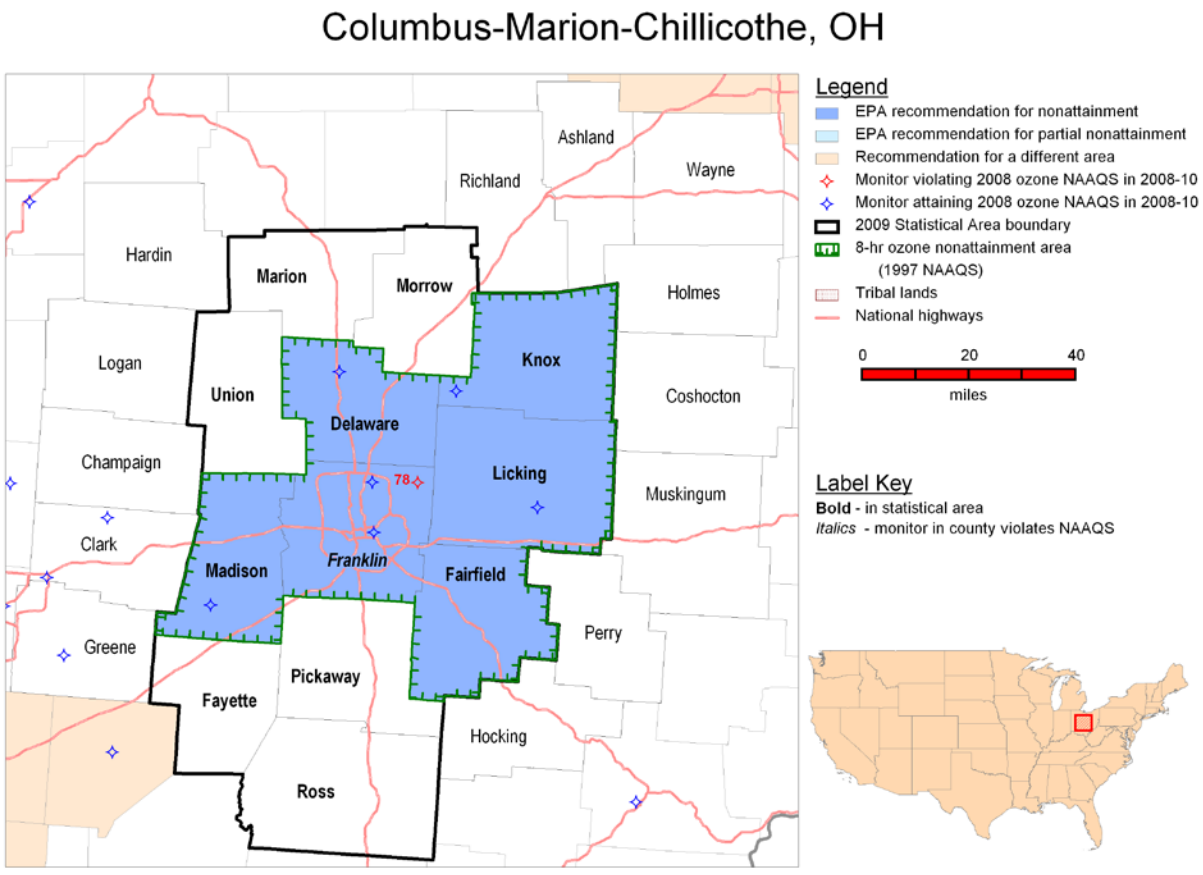
The results in the above table show that all counties in the Cleveland-Akron-Elyria, OH CSA should be included in the Cleveland-Akron-Elyria, OH nonattainment area for the 2008 ozone NAAQS. Ashtabula, Geauga, and Lake Counties have monitored violations of the 2008 ozone NAAQS. All counties, except Geauga County, have high emissions or emissions-related data (population, population growth, and/or traffic levels) that support inclusion in the nonattainment area. Finally, all of these counties are recommended for inclusion in the ozone nonattainment area by the State of Ohio and were included in the ozone nonattainment area for the 1997 ozone NAAQS.

Based on these factors, we conclude that the entire Cleveland-Akron-Elyria, OH CSA should be included in the Cleveland-Akron-Elyria, OH nonattainment area for the 2008 ozone NAAQS.

Technical Analysis for Columbus-Marion-Chillicothe, OH

Figure 3 is a map of the intended Columbus, OH ozone nonattainment area for the 2008 ozone NAAQS. The map provides other relevant information, including the locations and ozone design values of air quality monitors recording violations of the 2008 ozone NAAQS, county and other jurisdictional boundaries, existing maintenance boundary for the 1997 ozone NAAQS, Columbus-Marion-Chillicothe, OH CSA boundary and major transportation arteries.

Figure 3. Columbus-Marion-Chillicothe, OH Area



For purposes of the 1997 ozone NAAQS, as noted in Figure 3, portions of this area were designated nonattainment and subsequently redesignated to attainment (maintenance). The

boundary for the nonattainment area for the 1997 ozone NAAQS included only a portion of the Columbus-Marion-Chillicothe, OH CSA. In March 2009, Ohio recommended that the same counties (the same counties included in the nonattainment area for the 1997 ozone NAAQS) in Ohio be designated as nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008 and other considerations. The 2006-2008 ozone data are from monitors sited and operated in accordance with 40 CFR part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate the same 6 counties in Ohio (identified in Table 16 below) as "nonattainment" for the 2008 ozone NAAQS as part of the Columbus, OH nonattainment area.

Table 16. EPA's Intended Designated Nonattainment Counties for the Columbus, OH Ozone Nonattainment Area

State-Recommended Nonattainment Counties in Ohio	EPA Intended Nonattainment Counties in Ohio
Delaware	Delaware
Fairfield	Fairfield
Franklin	Franklin
Knox	Knox
Licking	Licking
Madison	Madison

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values (in ppm) for air quality monitors in counties in the Columbus-Marion-Chillicothe, OH CSA based on data for the 2008-2010 period, which are the most recent years with fully-certified air quality data. As discussed above, a monitor's design value is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour ozone concentrations, averaged over 3 years is 0.075 ppm or less. A design value is valid only if minimum data completeness requirements are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county or area (or a designated nonattainment area or maintenance area), the design value for the county or area is determined by the monitor with the highest individual design value.

The ozone design values for ozone monitors in the Columbus-Marion-Chillicothe, OH CSA are shown in Table 17.

Table 17. Ozone Air Quality Data for the Columbus-Marion-Chillicothe, OH CSA

State/County	Site Number	2008-2010 8-Hour Ozone Design Values (ppm)
Delaware	390410002	0.073
Franklin	390490081	0.069
Franklin	390490037	0.071
Franklin	390490029	**0.078**†
Knox	390830002	0.071
Licking	390890005	0.072
Madison	390970007	0.070

† Monitored violation of the 2008 ozone NAAQS.

From Table 17, it can be seen that Franklin County is the only county in the Columbus-Marion-Chillicothe, OH CSA with a monitored violation of the 2008 ozone NAAQS for the period of 2008-2010. Therefore, at minimum, Franklin County must be included in the ozone nonattainment area. As noted above, a county (or partial county) must also be designated nonattainment if it contributes to an air quality violation in a nearby area (to the violation of the 2008 ozone NAAQS recorded in Franklin County). Each county in the Columbus-Marion-Chillicothe, OH CSA has been evaluated, as discussed below, based on the five factors discussed above and other relevant information to determine whether it contributed to the violation of the 2008 ozone NAAQS in Franklin County.

Please note that the State of Ohio, in its March 9, 2009 area designation recommendations and accompanying technical support documentation, based its area recommendations on 2006-2008 ozone data. Since these data no longer cover the most recent 3-year period with quality-assured, state-certified data and have been supplanted by the more current 2008-2010 ozone data, we are not reviewing the older ozone data covered by the state of Ohio.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions for VOC and NOx and other emissions-related data (primarily county population, population density, and traffic levels, and projected growth rates for these emissions-related data) that provide information on area contributions to local ozone standard violations.

EPA's Accumulated Emissions and Emissions-Related Data

Emissions Data

EPA evaluated county-level emission data for NOx and VOC derived from the 2008 NEI, version 1.5. These are the most recently available NEI emissions data. (See http://www.epa.gov/ttn/chief/net/2008inventory.html) Significant emission levels in a nearby area (in a county near to a county with a violating ozone monitor) indicate the potential for the area to contribute to the observed ozone standard violation.

Table 18 shows the 2008 emissions of NOx and VOC (in tons per year) for all counties in the Columbus-Marion-Chillicothe, OH CSA. This table also indicates which of the counties were recommended to be nonattainment for the 2008 ozone NAAQS by the State of Ohio.

Table 18. Total 2008 VOC and NOx Emissions (tons/year) in the Cleveland-Akron-Elyria, OH CSA

State/County	State Recommended Nonattainment?	VOC Emissions (tpy)	NOx Emissions (tpy)
Ohio:			
Delaware	Yes	5,686	5,655
Fairfield	Yes	4,459	4,915
Fayette	No	1,887	1,981
Franklin	Yes	38,690	32,092
Knox	Yes	2,324	1,539
Licking	Yes	7,016	6,008
Madison	Yes	2,373	2,809
Marion	No	3,588	3,509
Morrow	No	1,983	2,190
Pickaway	No	2,969	3,919
Ross	No	3,292	5,010
Union	No	3,404	2,413
CSA Total		77,671	72,041

From the emissions data in Table 18, it can be seen that the VOC and NOx emissions in the Columbus-Marion-Chillicothe, OH CSA are dominated by those in Franklin County. The VOC emissions in Franklin County are 49.8 percent of the CSA total, and the NOx emissions in Franklin County are 44.5 percent of the CSA total. All other counties in this CSA have significantly lower and similar (to each other) VOC and NOx emissions. However, the accumulative VOC and NOx emissions in these remaining counties is a significant portion of the total VOC and NOx emissions in the CSA.

The high emissions in Franklin County, along with the monitored violation of the 2008 ozone NAAQS in this county, implies that Franklin County should be part of the nonattainment area for the 2008 ozone NAAQS. The VOC and NOx emissions for the remaining counties in the Columbus-Marion-Chillicothe, OH CSA do not provide a definitive basis for inclusion or exclusion from the nonattainment area. Note that the counties Ohio is recommending for exclusion from the nonattainment area have similar VOC and NOx emissions to many of the Ohio-recommended nonattainment counties in the Columbus-Marion-Chillicothe, OH CSA.

Population, Population Density, and Degree of Urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NOx and VOC emissions, which can contribute to local and downwind high ozone concentrations. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that it may be appropriate to include this county in the ozone nonattainment area, particularly if this county already has moderate or higher VOC and/or NOx emissions.

Table 19 shows the 2010 population, population density, and population growth information for each county in the Columbus-Marion-Chillicothe, OH CSA.

Table 19. Population and Population Growth in the Columbus-Marion-Chillicothe, OH CSA

State/County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1,000 per square mile)	Change in Population (2000-2010)	Population Percent Change (2000-2010)
Ohio:					
Delaware	Yes	174,214	0.38	62,504	56
Fairfield	Yes	146,156	0.29	22,736	18
Fayette	No	29,030	0.07	595	2
Franklin	Yes	1,163,414	2.14	91,127	8
Knox	Yes	60,921	0.12	6,278	11
Licking	Yes	166,492	0.24	20,421	14
Madison	Yes	43,435	0.09	3,223	8

Marion	No	66,501	0.16	351	1
Morrow	No	34,827	0.09	3,033	10
Pickaway	No	55,698	0.11	2,882	5
Ross	No	78,064	0.11	4,614	6
Union	No	52.300	0.12	11,105	27
CSA Totals		2,071,052	0.34	228,869	12

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

The population data show that half of the 2010 population and almost half of the 2000-2010 population growth in the Columbus-Marion-Chillicothe, OH CSA can be found in Franklin County. Comparatively large 2010 populations and 2000-2010 population growths can also be found in Delaware, Fairfield, and Licking Counties. The 2010 populations in the remaining counties in the CSA are comparatively smaller. Union County has a comparativley high population growth percentage, however, its 2010 population is small compared to those of Delaware, Fairfield, Franklin, and Licking Counties. Finally, the 2010 populations and 2000-2010 population growths of Fayette and Marion Counties are comparatively lower than those of other counties in the Columbus-Marion-Chillicothe, OH CSA.

Traffic and Commuting Patterns

EPA evaluated the commuting patterns of residents in the Columbus-Marion-Chillicothe, OH CSA. In combination with the county-specific population/population density data and the locations of the main transportation arteries (see above), this information helps identify the probable locations of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of relatively high motor vehicle emissions that may significantly contribute to ozone standard violations in or downwind of the urban area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the urban core area, and indicates that this county should be included in the ozone nonattainment area, particularly if the VOC and/or NOx emissions in this county are a significant portion of the total emissions in the nonattainment area.

Table 20 shows the traffic levels, 2008 VMT, in each county in the Columbus-Marion-Chillicothe, OH CSA.

Table 20. Traffic Levels in the Columbus-Marion-Chillicothe, OH CSA

State/County	State Recommended Nonattainment?	2008 VMT (million miles)
Ohio:		
Delaware	Yes	1,530
Fairfield	Yes	1,035
Fayette	No	505
Franklin	Yes	10,645
Knox	Yes	397
Licking	Yes	1,780
Madison	Yes	704
Marion	No	629
Morrow	No	605
Pickaway	No	648
Ross	No	772
Union	No	630
CSA Total		19,881

The VMT data show that county-specific VMT levels are the highest in Delaware, Franklin, Fairfield, and Licking Counties. These VMT account for 75.4 percent of the total VMT in the Columbus-Marion-Chillicothe, OH CSA.

The VMT data plus the population data in Table 19 indicate that Delaware, Fairfield, Franklin, and Licking Counties are relatively urbanized with significant population- and traffic-related emissions that contributed to the ozone standard violation in Franklin County. This contribution is much smaller for the remaining counties in the Columbus-Marion-Chillicothe, OH CSA.

Additional Emissions-Related Data Discussed in Ohio's March 9, 2009 Designation Recommendation Submittal

OEPA has provided typical daily, county-specific total VOC and NOx emissions for 2005 and 2009 for each of the counties in the Columbus-Marion-Chillicothe, OH CSA. These data confirm the conclusions we have drawn above using county-specific annual emissions.

OEPA has provided population projections through 2030 for each of the counties in the CSA. Populations are projected to increase significantly in Delaware, Fairfield, Franklin, Licking, Medina, Morrow, Pickaway, Ross, and Union Counties. Populations are projected to increase moderately in Fayette and Marion Counties. Populations are expected to decline in Knox County.

OEPA provided graphs of daily VMT levels plotted for the period of 1990-2007 for each of the counties in the CSA. This visual VMT trend information shows that daily VMT grew significantly during the 1990-2007 period for Delaware, Fairfield, Franklin, Licking and Morrow Counties. The VMT trend information shows that daily VMT grew moderately during the 1990-2007 period for Knox, Marion, Pickaway (VMT levels remained substantially unchanged after 1999 in this county), and Ross Counties.

OEPA provided inter-county commuter numbers and percentages for each of the counties in the Columbus-Marion-Chillicothe, OH CSA. These numbers show a moderate to high inter-county commuting pattern between Franklin County and other counties (with the exceptions of Fayette, Knox, Ross, Marion, and Morrow Counties) in the Columbus-Marion-Chillicothe, OH CSA. Inter-county commuter numbers between other counties (other than Franklin County) in the CSA are moderate to small.

Collectively, the OEPA-supplied population and traffic/commuter data show moderate integration between Franklin, Delaware, Fairfield, Licking, Medina, Morrow, Pickaway, Ross, and Union Counties. Less integration is apparent between Franklin, Fayette, Knox, and Marion Counties. This implies that, from an emissions standpoint, the Columbus, OH ozone nonattainment area should include Delaware, Fairfield, Franklin, Licking, Medina, Morrow, Pickaway, Ross, and Union Counties. Remaining counties in the CSA could be excluded on the basis that their emissions are not significant contributors to the monitored violations of the 2008 ozone NAAQS in Franklin County.

Factor 3: Meteorology (Weather/Transport Patterns)

EPA's Accumulated Meteorological Data

EPA evaluated available meteorological data to help determine how meteorological conditions, particularly transport conditions, affect the fate and transport of ozone and ozone precursors contributing to ozone formation in the Columbus-Mario-Chillicothe, OH CSA. EPA examined the frequency distribution of wind directions for the four seasons of the year by averaging National Weather Service direction-sorted wind directions for each county for a 30-year period. To apply the results of this data analysis to the Columbus-Marion-Chillicothe, OH CSA, we have considered the wind direction (direction from which winds are blowing, reflecting directions to potential source areas) frequencies during the summer months (June-August) for Franklin County, which is the only county in

the CSA with a monitored violation of the 2008 ozone NAAQS (See Table 17).

Table 21 shows the summertime 30-year averaged percentages of wind directions (winds blowing into the subject county from the specified wind direction sector) for Franklin County.

Table 21. Averaged Summertime Wind Direction Percentages For Franklin County

Wind Direction	Franklin County
North-Northeast	15.3
East-Northeast	9.6
East-Southeast	11.4
South-Southeast	12.0
South-Southwest	22.0
West-Southwest	11.0
West-Northwest	9.7
North-Northwest	9.0

The wind direction percentages show that there is no single "preferred" wind direction during the summertime, when the highest ozone concentrations are generally monitored. Winds from south-southwest may be more prevalent than the winds from other wind directions during the summertime.

Unfortunately, EPA's wind direction percentage data do little to shed light on which counties in the Columbus-Marion-Chillicothe, OH CSA are the most important from an ozone and ozone precursor transport standpoint. The wind directions considered have not been sorted based on peak ozone concentrations or specifically for high ozone days, the timing of peak ozone concentrations, wind speeds, or other factors that could have been used to isolate the most critical ozone precursor source areas.

Factor 4: Geography/Topography (Mountain Ranges or Other Air Basin Boundaries)

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

The Columbus-Marion-Chillicothe, OH CSA does not have any geographical or topographical barriers significantly limiting air pollution transport within its air shed. Therefore, this factor did not play a significant role in this evaluation.

Factor 5: Jurisdictional Boundaries

Once we identified the general area that we anticipated we would recommend as nonattainment for the 2008 ozone NAAQS, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the area appropriate for carrying out the air quality planning and enforcement functions for an ozone nonattainment area. Examples of jurisdictional boundaries include existing/prior nonattainment boundaries for ozone or other urban-scale pollutants, county boundaries, air district boundaries, township boundaries, areas covered by metropolitan planning organizations, state lines, and Reservation boundaries. Where existing jurisdictional boundaries are not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates may be considered.

The portion of the Columbus-Marion-Chillicothe, OH CSA that we are considering for designation as nonattainment for the 2008 ozone NAAQS has a previously established nonattainment boundary associated with the 1997 8-hour ozone NAAQS. The State of Ohio has recommended the same counties (as included in the 1997 8-hour ozone nonattainment area) in Ohio be included in the boundary of the nonattainment area for the 2008 ozone NAAQS. The prior inclusion of these counties in the ozone nonattainment area for the 1997 ozone NAAQS forms the primary jurisdictional basis for the inclusion of these counties in the nonattainment area for the 2008 ozone NAAQS.

Conclusion

Based on the assessment of factors described above, EPA has preliminarily concluded that the following Ohio counties should be included in the Columbus, OH ozone nonattainment area because they are either violating the 2008 ozone NAAQS or are contributing to a violation of the 2008 ozone NAAQS within this intended ozone nonattainment area: Delaware; Fairfield; Franklin; Knox; Licking; and, Madison.

Table 22 summarizes which factors discussed above support the inclusion of each Ohio county in the Columbus, OH preliminary nonattainment area for the 2008 ozone NAAQS.

Table 22. Factors Supporting Inclusion of Ohio Counties in the Columbus, OH Ozone Nonattainment Area for the 2008 Ozone NAAQS

County	Violates	High	Meteorology	Geography	Jurisdictional

	Ozone Standard	Emissions Population and Traffic Levels	Favors Emissions Impact on Violating Monitor	Favors High Ozone or Emissions Impact on Violating Monitor	Basis for Inclusion In Nonattainment Area
Delaware		X	X	NA	X
Fairfield		X	X	NA	X
Franklin	X	X	X	NA	X
Knox			X	NA	X
Licking		X	X	NA	X
Madison			X	NA	X

The results in the above table show that Delaware, Fairfield, Franklin and Licking Counties should be included in the Columbus, OH ozone nonattainment area on the bases of a violation of the 2008 ozone NAAQS and/or significant emissions that contribute to the violation of the 2008 ozone NAAQS.

The issue is less clear for Knox and Madison Counties due to the lack of a monitored ozone standard violation and relatively low VOC and NOx emissions, populations, and traffic levels in these counties. The only bases for including these counties in the intended, preliminary ozone nonattainment area for the 2008 ozone NAAQS are the facts that the State of Ohio has recommended their inclusion in the nonattainment area and that these counties were included in the nonattainment area for the 2007 ozone NAAQS. Based on these facts, we agree with the State of Ohio that these counties should also be included in the Columbus, OH nonattainment area.

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

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

Intended Nonattainment Areas in Louisiana

Area	Louisiana's Recommended Nonattainment Parishes	EPA's Intended Nonattainment Parishes
Baton Rouge-Pierre Part, LA	East Baton Rouge	Ascension East Baton Rouge Iberville Livingston West Baton Rouge

EPA intends to designate the remaining parishes in Louisiana that are not listed in the table above as "unclassifiable/attainment" for the 2008 ozone NAAQS.

The analysis below provides the basis for intended nonattainment area boundaries. It relies on our analysis of whether and which monitors are violating the 2008 ozone NAAQS, based on certified air quality monitoring data from 2008-2010 and an evaluation of whether nearby areas are contributing to such violations. EPA has evaluated contributions from nearby areas based on a weight of evidence analysis considering the factors identified below. EPA issued guidance on December 4, 2008 that identified these factors as ones EPA would consider in determining nonattainment area boundaries and recommended that states consider these factors in making their designations recommendations to EPA.[1]

1. Air quality data (including the design value calculated for each FRM or FEM[2] monitor in the area);
2. Emissions and emissions-related data (including location of sources and population, amount of emissions and emissions controls, and urban growth patterns);
3. Meteorology (weather/transport patterns);
4. Geography and topography (mountain ranges or other basin boundaries);
5. Jurisdictional boundaries (e.g., parishes, air districts, existing nonattainment areas, Indian country, metropolitan planning organizations (MPOs))

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

[2] FRM refers to Federal Reference Method, and FEM refers to Federal Equivalent Method. FRM monitors utilize a chemi-luminescent technique to measure ozone, while many FEM monitors use a technique involving ultraviolet photometry. FEM methods began to be developed in the late 1970's and early1980's and are now the most widely utilized methods for monitoring ozone levels. Refer to 40 CFR Part 53 for a more detailed description of FEM and FRM methods. http://www.epa.gov/ttnamti1/files/ambient/criteria/reference-equivalent-methods-list.pdf

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

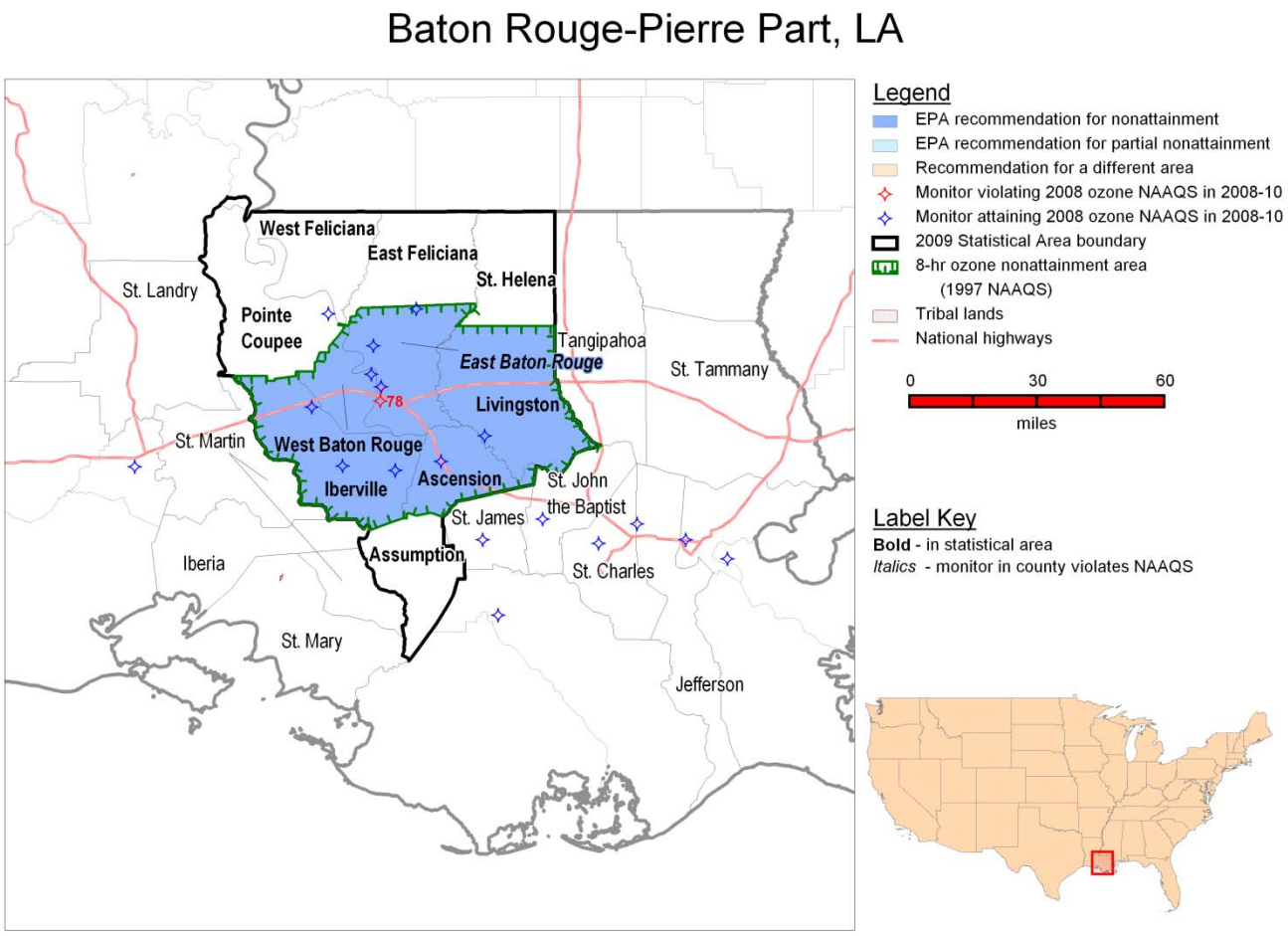
In EPA's designations guidance for the 2008 ozone NAAQS EPA recommended examining CSA/CBSAs because certain factors used to establish CSAs and CBSAs are similar to the factors EPA is using in this technical analysis to determine if a nearby area is contributing to a violation of the 2008 ozone NAAQS. Congress required a similar approach in 1990 for areas classified as serious or above for the 1-hour ozone standard and EPA used the same basic approach in the designation process for the 1997 ozone NAAQS. Where a violating monitor is not located in a CSA or CBSA, EPA's guidance recommended using the boundary of the parish containing the violating monitor as the starting point for considering the nonattainment area's boundary.

Technical Analysis for Baton Rouge-Pierre Part

Figure 1 is a map of the Baton Rouge-Pierre Part intended nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, parish and other jurisdictional boundaries, relevant statistical area boundaries, the nonattainment area boundary for the 1997 ozone NAAQS, and major transportation arteries.

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

Figure 1: Intended Baton Rouge-Pierre Part nonattainment area.



For purposes of the 1997 8-hour ozone NAAQS, this area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entire parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge.

In March 2009,[4] Louisiana recommended that eleven parishes throughout the state, including East Baton Rouge Parish, be designated as nonattainment for the 2008 ozone NAAQS based on air quality data from 2006-2008. In January 2011[5], Louisiana provided a revised recommendation that only East Baton Rouge Parish be designated nonattainment. This revised recommendation was based on air quality data from 2008-2010, which was obtained from Federal Equivalent Method (FEM) monitors sited and operated in accordance with 40 CFR Part 58.

After considering these recommendations and based on EPA's technical analysis described below, EPA intends to designate five (5) parishes in Louisiana (identified in Table 1 below) as “nonattainment” for the 2008 ozone NAAQS as part of the Baton Rouge nonattainment area.

[4] Initial 2008 ozone NAAQS designation recommendation letter from Secretary Leggett to Acting Regional Administrator Starfield, dated March 12, 2009.
[5] Updated ozone designation letter from Secretary Hatch to Regional Administrator Armendariz, dated January 25, 2011.

Table 1. Louisiana's Recommended and EPA's Intended Designated Nonattainment Parishes for Baton Rouge-Pierre Part.

Baton Rouge-Pierre Part	State-Recommended Nonattainment Parishes	EPA Intended Nonattainment Parishes
Louisiana	East Baton Rouge	Ascension East Baton Rouge Iberville Livingston West Baton Rouge

Factor Assessment

Factor 1: Air Quality Data

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

The 2010 DVs for the ozone NAAQS for parishes in Baton Rouge and nearby surrounding area are shown in Table 2.

Table 2. Air Quality Data.

Parish	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Ascension, LA	No	75
Assumption, LA	No	--
East Baton Rouge, LA	Yes	78
East Feliciano, LA	No	--
Iberville, LA	No	73
Livingston, LA	No	75
Pointe Coupee, LA	No	75
St. Helena, LA	No	--
West Baton Rouge, LA	No	71
West Feliciano, LA	No	--

Ambient monitoring in East Baton Rouge Parish indicates a violation of the 2008 ozone NAAQS, therefore this parish is included in the nonattainment area. A parish (or partial parish) must also be designated nonattainment if it contributes to a violation in a nearby area. Each parish without a violating monitor that is located near a parish with a violating monitor has been evaluated, as discussed below, based on the five factors and other relevant information to determine whether it contributes to the nearby violation. EPA also notes that, in addition to the violating monitor in East Baton Rouge Parish, ambient

monitors in three parishes in the Baton Rouge area, Ascension Parish, Livingston Parish, and Pointe Coupee Parish, indicate design values just under the nonattainment threshold.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

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

Table 3 shows emissions of NO_x and VOC (given in tons per year) for violating and nearby parishes that we considered for inclusion in the Baton Rouge-Pierre Part intended nonattainment area.

Table 3. Total 2008 NO_x and VOC Emissions.

Parish	State Recommended Nonattainment?	NO_x (tpy)	VOC (tpy)
Ascension, LA	No	14,128	13,524
Assumption, LA	No	1,654	2,008
East Baton Rouge, LA	Yes	21,863	24,473
East Feliciana, LA	No	1,142	1,631
Iberville, LA	No	14,818	10,152
Livingston, LA	No	3,087	4,780
Pointe Coupee, LA	No	15,733	2,560
St. Helena, LA	No	1,154	1,001
West Baton Rouge, LA	No	9,268	3,467
West Feliciana, LA	No	1,107	793
	Area-wide:	83,954	64,389

Five parishes in the CBSA are characterized by comparatively high emissions of NOx, which exceed 9,000 tons per year, and three parishes have comparatively high VOC emissions in excess of 10,000 tons per year. Collectively, the parishes of Ascension, East Baton Rouge, Iberville, Pointe Coupee, and West Baton Rouge contribute 90 percent of the NOx emissions for the ten-parish area. Similarly, Ascension, East Baton Rouge, and Iberville Parishes collectively contribute 75 percent of the ten-parish area's VOC emissions. The relatively high emissions of ozone precursors in these parishes is a factor that EPA considered in evaluating their possible inclusion in the Baton Rouge-Pierre Part nonattainment area.

In our analysis of the emissions data for the area, we took note that the NOx emissions from Pointe Coupee are primarily from a single point source that is already well-controlled and may undergo further emissions reductions resulting from implementation of regional air quality measures such as CSAPR.

The remaining parishes are characterized by comparatively low NOx and VOC emissions, in the range of 1,000 to 5,000 tons per year.

Population density and degree of urbanization

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO_x and VOC emissions that may contribute to ozone formation that contributes to nonattainment in the area. Rapid population or VMT growth (see below) in a parish on the urban perimeter signifies increasing integration with the core urban area, and indicates that it may be appropriate to include the area associated with area source and mobile source emissions as part of the nonattainment area. Table 4 shows the population, population density, and population growth information for each parish in the area.

Table 4. Population and Growth.

Parish	State Recommended Nonattainment?	2010 Population	2010 Population Density (1,000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Ascension, LA	No	107,215	0.35	29,937	39
Assumption, LA	No	23,421	0.06	42	0
East Baton Rouge, LA	Yes	440,171	0.93	27,281	7
East Feliciana, LA	No	20,267	0.04	(1,098)	(5)
Iberville, LA	No	33,387	0.05	72	0
Livingston, LA	No	128,026	0.18	35,496	38
Pointe Coupee, LA	No	22,802	0.04	46	0
St. Helena, LA	No	11,203	0.03	695	7
West Baton Rouge, LA	No	23,788	0.12	2,224	10
West Feliciana, LA	No	15,625	0.04	488	3
	Area-wide:	825,905	0.18	95,183	13

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

The 2010 Census data indicates that the population of the Baton Rouge area is centered around the parishes of Ascension, East Baton Rouge, and Livingston; each of these parishes is characterized by population counts in excess of 100,000 people and population densities greater than 150 people per square mile. Although West Baton Rouge has a lower population count than Ascension, East Baton Rouge, and Livingston, it does have a population density of 120 people per square mile, which is similar to that of the larger parishes.

Three of the parishes, Ascension, Livingston, and West Baton Rouge, have undergone increases in population of 10 percent or more since the 2000 Census was taken. The growth in population in these three parishes accounts for almost all the total population growth for the area.

The presence of large populations, and high population density, is an indicator of high area and mobile source emissions of ozone precursors that may contribute to observed violations of the 2008 ozone NAAQS in this area, which argues for inclusion of these parishes in the nonattainment area. The remaining parishes are mostly rural with little urbanization.

The attachment to this document contains Figure 2, Baton Rouge Ozone and Ozone Precursor Monitoring Network, and Figure 3, Population Density Change Percentage Between 2000 and 2010 Census for Baton Rouge Ozone and Ozone Precursor Monitoring Network, which present graphical information on population density and growth for the Baton Rouge area.

Traffic and commuting patterns

EPA evaluated the commuting patterns of residents in the area, as well as the total Vehicle Miles Traveled (VMT) for each parish. In combination with the population/population density data and the location of main transportation arteries (see above), this information helps identify the probable location of non-point source emissions. A parish with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation that contributes to nonattainment in the area. Rapid population or VMT growth in a parish on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows traffic and commuting pattern data, including total 2008 VMT and 10-year VMT growth, and the total vehicle miles traveled (VMT) for each parish.

Table 5. Traffic and Commuting Patterns (As Indicated by VMT).

Parish	State Recommended Nonattainment?	2008 VMT* (million miles)	% Change in VMT (2002 – 2008)
Ascension, LA	No	1,141	+28
Assumption, LA	No	261	+54
East Baton Rouge, LA	Yes	3,572	+19
East Feliciana, LA	No	225	-19
Iberville, LA	No	516	+28
Livingston, LA	No	1,287	+12
Pointe Coupee, LA	No	289	+25
St. Helena, LA	No	136	+8
West Baton Rouge, LA	No	596	+102
West Feliciana, LA	No	160	-33
	Area-wide:	8,183	---

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

Five of the parishes in the Baton Rouge area are characterized by comparatively high VMT. These parishes are: Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge. Collectively these five parishes account for 87 percent of the total VMT for the area. Because motor vehicle emissions can contribute significantly to an area's NOx emissions inventory, indicators such as high VMT and growth in VMT argue for inclusion of these parishes in the nonattainment area designation. The parishes of East Feliciana and Pointe Coupee are characterized by low total VMTs, relative to the core parishes discussed above.

Factor 3: Meteorology (weather/transport patterns)

EPA evaluated available meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation. We conducted an analysis of back trajectories to assess where air masses originated when ozone exceedances (greater than 75 ppb) occur in the Baton Rouge area. We used the NOAA HYSPLIT model to assess all exceedances at the Design Value monitor for the area, the LSU monitor, for the years 2008 to 2010 and also evaluated 2006 and 2007.

The attachments to this document contain Figures 2 and 4. Figure 2, Baton Rouge Ozone and Ozone Precursor Monitoring Network, presents locations of major stationary sources, and locations of ambient monitors with their design values. Figure 4, Baton Rouge Ozone and Ozone Precursor Monitoring Network with Wind Trajectories, includes an overlay of the back trajectories (on Figure 2), which characterizes where the centerline of the air mass originated for the 24 hours preceding the afternoon of the violation. An examination of the 24-hour back trajectories for the recent 3 years of violations of the 75 ppb standard at the LSU monitor indicates that emissions from Pointe Coupee Parish do not appear to contribute to observed violations of the 2008 ozone NAAQS in East Baton Rouge Parish for days with ozone concentrations above 75 ppb at the LSU site for the three-year period from 2008-2010. For the 2008-10 back trajectories, only one back-trajectory traverses through the southwest edge of the Pointe Coupee Parish, where no major sources are present. For this one back trajectory, it does not appear that the one major source, a power plant in the northeast part of the Parish, could contribute based on the trajectory. Normally when we are developing a conceptual model understanding of what yields ozone exceedances in an area we will evaluate 5 to 10 years worth of meteorological data. Therefore we decided to evaluate all days that had ozone exceedances at LSU monitor for the 2006-2007 period as well. Looking back a little further to the 2006-2007 period, there were two days out of 25 with back trajectories that traversed Pointe Coupee Parish, but for the five-year 2006-2010 time period only 5 percent of all days with ozone concentrations greater than 75 ppb at the LSU site had wind back trajectories that went back through Pointe Coupee Parish.

Conversely, examination of the back trajectory data depicted in Figure 4 indicates that emissions from Ascension, Iberville, Livingston, Pointe Coupee, and West Baton Rouge Parishes could contribute at times to nonattainment in East Baton Rouge Parish. We note that the back trajectories passed through the Pointe Coupee Parish only 5% of the time.

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

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

Factor 5: Jurisdictional boundaries

Once we identified the general areas we anticipated we would recommend should be included in the nonattainment area, we then considered existing jurisdictional boundaries for the purposes of providing a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment area boundaries for ozone or other urban-scale pollutants, parish lines, air district boundaries, township boundaries, areas covered by a metropolitan planning organization, state lines, Reservation boundaries, and urban growth boundaries. Where existing jurisdictional boundaries were not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates were considered.

The Baton Rouge area has previously established nonattainment boundaries associated with the 1-hour and 1997 8-hour ozone NAAQS, the latter of which encompassed all of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge Parishes. Louisiana has recommended a different boundary for the 2008 ozone NAAQS, limiting their recommended nonattainment area to East Baton Rouge Parish, which has the only ambient monitor indicating a violation of the 2008 ozone standard. For evaluation of the boundary for the 2008 ozone nonattainment area, EPA gave strong consideration to the nonattainment area boundary for the 1997 ozone standard.

Conclusion

Based on the assessment of the factors described above, EPA has preliminarily concluded that the following parishes should be included as part of the Baton Rouge-Pierre Part nonattainment area because they are either violating the 2008 ozone NAAQS or contributing to a violation in a nearby area: Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge Parishes. These are the same parishes that were included in the Baton Rouge-Pierre Part nonattainment area for the 1997 ozone NAAQS. The air quality monitors in East Baton Rouge Parish indicate a violation of the 2008 ozone NAAQS based on the 2010 design value; therefore this parish is included in the nonattainment area.

Ascension, Iberville, Livingston, and West Baton Rouge are nearby parishes that do not have monitors indicating a violation of the NAAQS, but EPA has preliminarily concluded that these parishes contribute, through emissions from point sources and non-point sources (e.g., vehicles and other small area sources), to the ozone concentrations in violation of the 2008 ozone NAAQS in East Baton Rouge Parish.

Ascension, East Baton Rouge, Iberville, Livingston, Pointe Coupee, and West Baton Rouge Parishes have among the highest NOx and VOC emissions in the area. Pointe Coupee Parish is not being preliminarily proposed for inclusion in the 2008 ozone nonattainment area because analysis of back trajectory meteorological data indicate that the transport of emissions from Pointe Coupee Parish do not contribute very often to observed violations of 2008 ozone NAAQS in East Baton Rouge Parish. We note that, other than the large power plant point source, the Pointe Coupee Parish ranks low on the other factors of population, and VMT. We also note that most of the emissions of NOx from Pointe Coupee are emitted by a single point source that is already well-controlled and that will likely further reduce emissions to comply with future regional air quality measures like CSAPR. In past attainment demonstration SIPs for the Baton Rouge area, Louisiana has controlled point sources outside the Baton Rouge nonattainment are when it determined it was needed. Overall, Pointe Coupee parish does not rank high on factors other than point source emissions that will be further reduced in the future and could be

even further controlled by the state if the state finds it necessary, therefore our preliminary conclusion is to not include the Pointe Coupee Parish in the Baton Rouge Pierre Part nonattainment area for the 2008

Finally, the parishes of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge are the most densely populated in the Baton Rouge area. Collectively, these five parishes account for almost all of the VMT within East Baton Rouge Parish.

ATTACHMENTS

Figure 2. Baton Rouge Ozone and Ozone Precursor Monitoring Network, with Population Density.

Figure 3. Population Density Change Percentage Between 2000 and 2010 Census for Baton Rouge Ozone and Ozone Precursor Monitoring Network.

Figure 4. Overlay of 24-hour HYSPLIT back trajectories of all 75 ppb exceedances at the LSU monitor for the 2006-2010 period.

Figure 2 - Baton Rouge Ozone and Ozone Precursor Monitoring Network., with Population Density

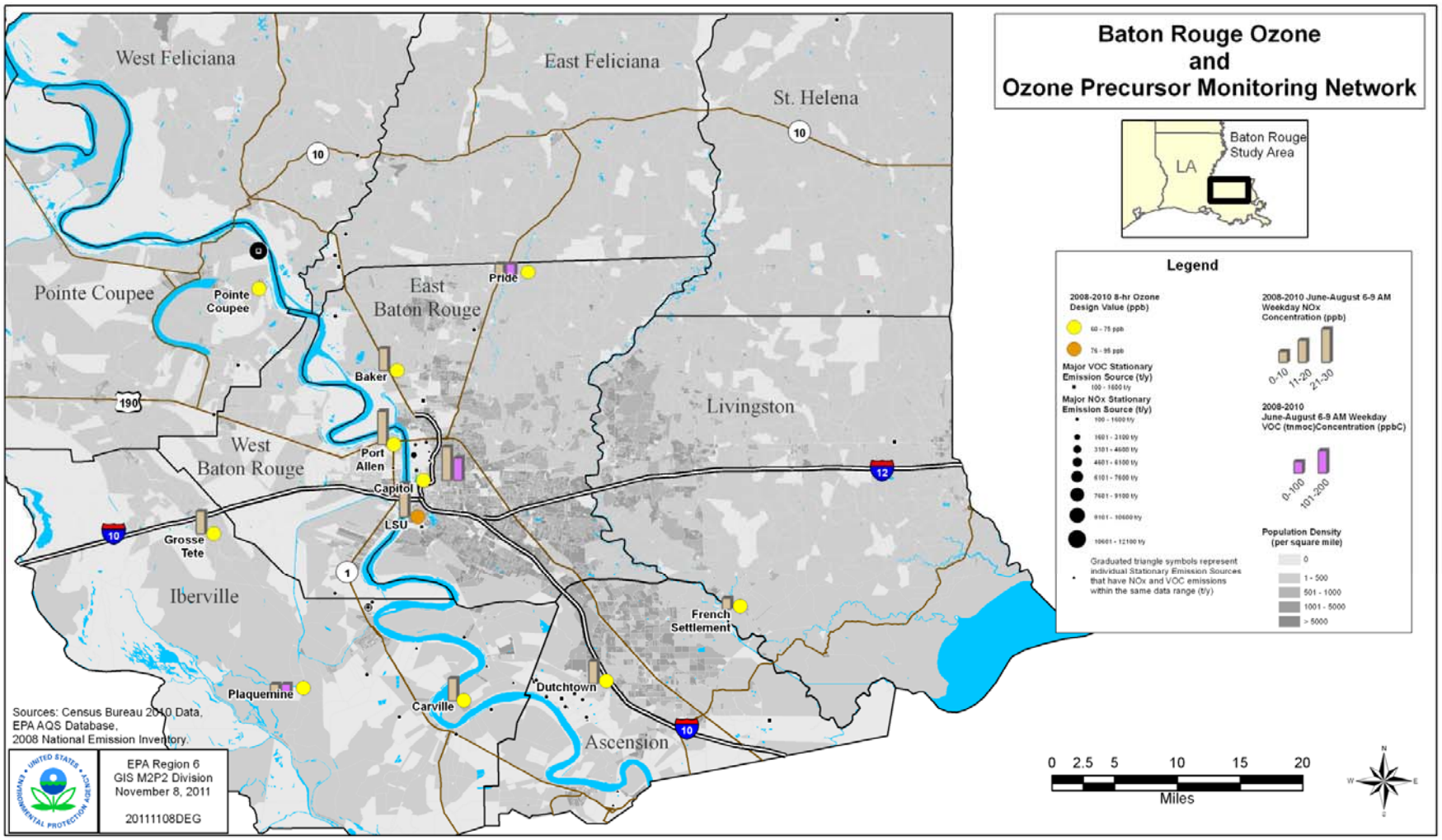


Figure 3 - Population Density Change Percentage Between 2000 and 2010 Census for Baton Rouge Ozone and Ozone Precursor Monitoring Network.

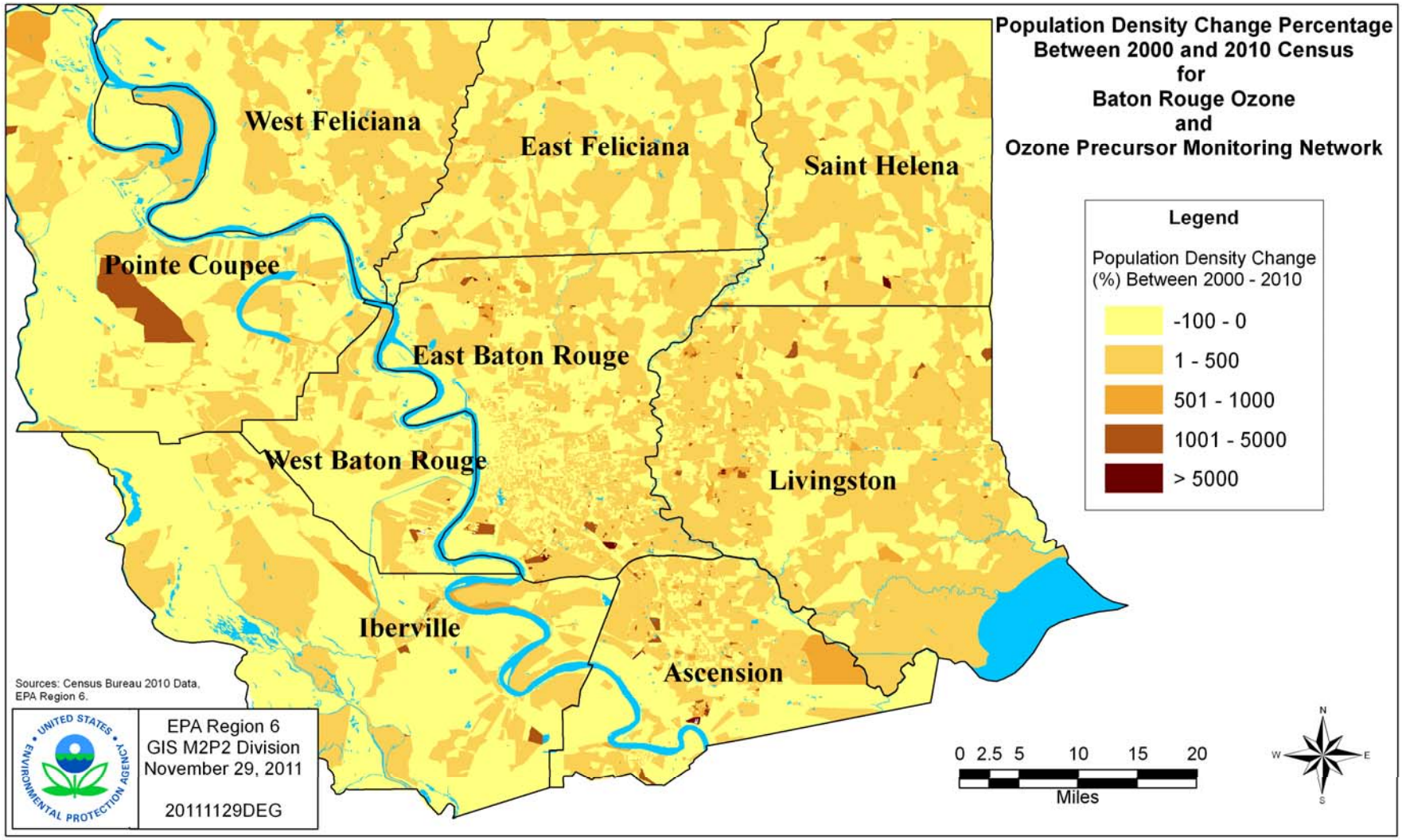
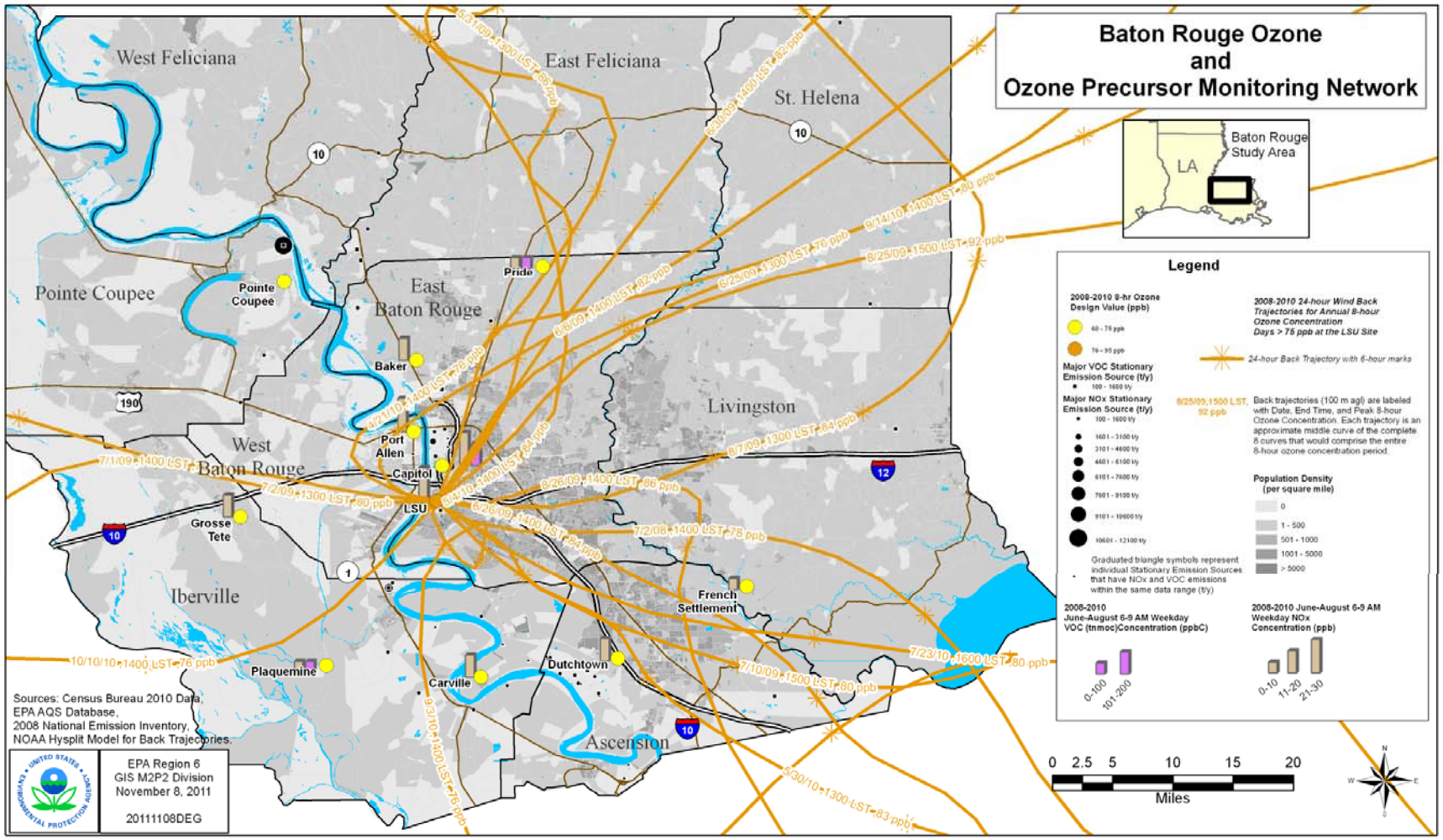


Figure 4 – Overlay of 24-hour HYSPLIT back trajectories of all 75 ppb exceedances at the LSU monitor for the 2008-2010 period.



Appendix F

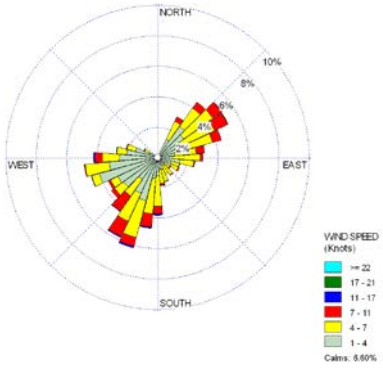
Northwest Indiana, Wind and Pollution Rose Analysis

Meteorological Analysis for Lake, Porter and Jasper Counties, Indiana

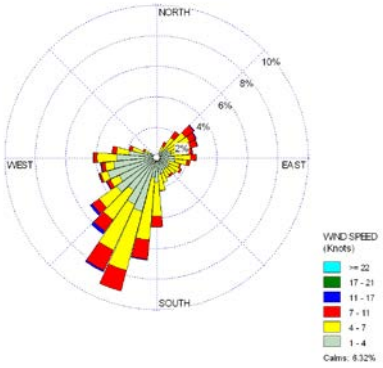
Wind Rose Analysis

Meteorological conditions are one of the most important factors that influence ozone development and transport. Wind roses help to determine the variation in wind direction and speed throughout a period of time, and for purposes of an air quality analysis, show the direction in which emissions travel downwind. Wind direction and wind speed information was collected at the Northern Indiana Public Service Company R. M. Schahfer Generating Station (NIPSCO - Schahfer) (monitor ID 18-073-0004), near Wheatfield, Jasper County, Indiana. Scalar measurements were retrieved for every hour from January 1, 2009 through December 31, 2011. Wind data was collected from the Gary Automated Surface Observing Station (ASOS). This information was formatted and input in order to be analyzed by the Lake Environmental WRPLOT View Wind Rose Plots for Meteorological Data, Version 6.5.1. The resulting wind roses shown below from the three years of ozone season wind roses that include wind directions and speeds from May, June, July, August, and September from 2009, 2010, and 2011. The frequency distribution from each year is listed in Tables 1 and 2

Jasper Co. - 2009



Jasper Co. - 2010



Jasper Co. - 2011

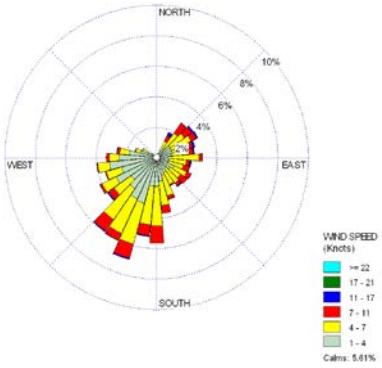


Table 1 – Jasper County Wind Rose Frequency Distribution for the Ozone Season

Year	North 337.5°- 22.5 °	Northeast 22.5° - 67.5°	East 67.5°- 112.5 °	Southeast 112.5°- 157.5 °	South 157.5°- 202.5 °	Southwest 202.5°- 247.5 °	West 247.5°- 292.5 °	Northwest 292.5 °- 337.5°
2009	0.0%	19.4%	12.6%	6.2%	16.6%	20.2%	16.7%	1.7%
2010	0.1%	10.2%	10.6%	7.4%	22.2%	26.4%	15.2%	1.6%
2011	0.3%	11.3%	11.7%	10.7%	22.0%	22.4%	13.8%	1.9%

The ozone season (May – September) frequency distribution from each year shows winds recorded at the NIPSCO - Schahfer meteorological station in Jasper

County, Indiana are predominately from the south and southwest. It can be reasoned that emissions from NIPSCO - Schahfer would be blown downwind to the north and northeast of Jasper County, Indiana and not directly impact the Lake Michigan area a majority of the time. The lake breeze effect is quite evident at the Gary ASOS station with the Gary ASOS wind roses below showing a predominately north and northeast wind direction. It should be noted that the Gary ASOS station only collects meteorological information from 4 AM to 9 PM daily.

Gary ASOS- 2009 **Gary ASOS- 2010** **Gary ASOS- 2011**

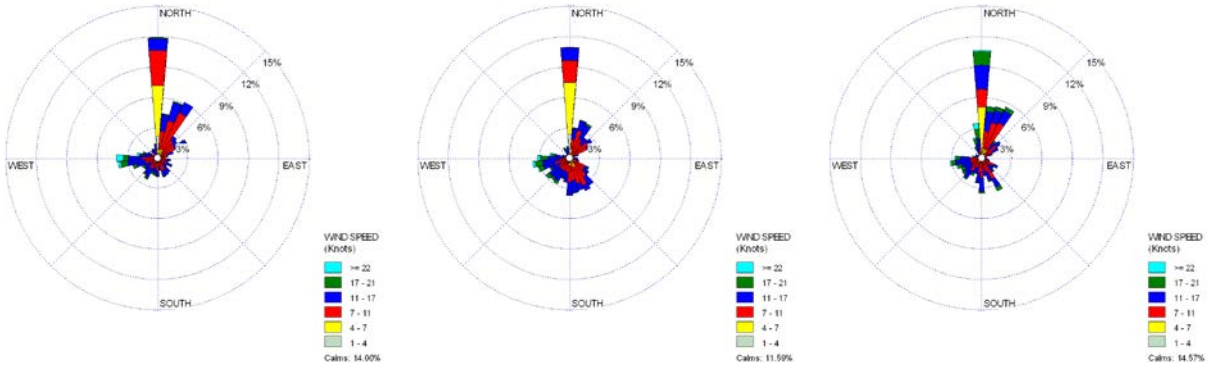


Table 2 - Lake County Wind Rose Frequency Distribution for the Ozone Season

Year	North 337.5°- 22.5°	Northeast 22.5° - 67.5°	East 67.5°- 112.5°	Southeast 112.5°- 157.5°	South 157.5°- 202.5°	Southwest 202.5°- 247.5°	West 247.5°- 292.5°	Northwest 292.5°- 337.5°
2009	23.3%	16.3%	5.2%	7.0%	7.9%	9.3%	13.1%	3.9%
2010	19.0%	12.6%	3.2%	13.0%	13.6%	11.9%	12.0%	3.1%
2011	25.1%	13.6%	3.1%	9.6%	10.9%	10.5%	9.2%	3.5%

Highest Ozone Day Analysis

Daily wind roses and pollution roses were created, as well as forward and backward trajectories, as part of this analysis. Pollution roses are wind roses in which the wind speeds are substituted with the hourly ozone concentrations. The pollution rose shows the wind directions with the highest ozone concentrations, thus indicating whether a lake breeze developed during the day. Lake breezes were evident with higher ozone from surface winds from the southeast. Lake breezes form during sunny days when the sun heats land surfaces at a quicker pace than large bodies of water, such as Lake Michigan. This contrast in air temperature between land and water produces rising, less dense air over the land and creates winds off the lake. This lake breeze phenomenon occurs in the early afternoon and can last for several hours, pulling ozone and ozone precursors inland until the land begins to cool in the evening and the lake breeze diminishes.

Trajectories were created using the National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory - Hybrid Single Particle Lagrangian

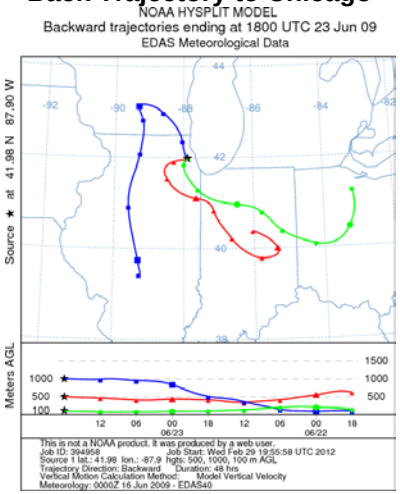
Integrated Trajectory Model (HYSPLIT). Forty km gridded meteorological data was input to determine the trajectory directions and heights. The backward trajectories were run from the Chicago area and show from where the air came from two days prior to an 8-hour ozone exceedance day at the Zion, Illinois monitor. The forward trajectories were created from the nearest surface weather station to Jasper County, Indiana, which was the Valparaiso ASOS (approximately 20 miles north of Wheatfield, Jasper County, Indiana) and Gary ASOS station located in Lake County, Indiana. Both stations' wind data show the direction that air over Northwest Indiana travels the day before an 8-hour ozone exceedance day at Zion, Illinois occurred. The four highest monitored ozone days at the Zion, Illinois ozone monitor from 2009 to 2011 are listed in Table 3.

Table 3 – Annual Four Highest Monitor Value Dates

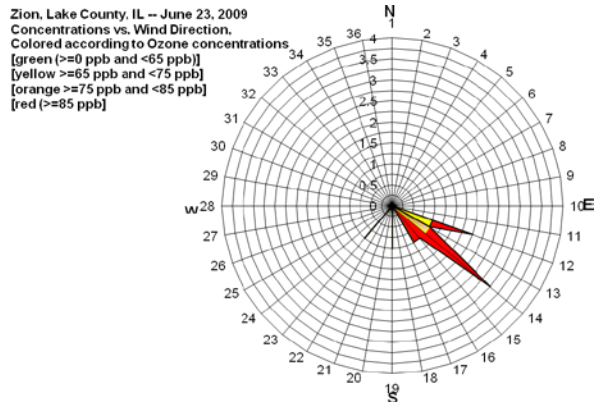
Year	1st High	2nd High	3rd High	4th High
2009	June 23	June 24	May 21	August 15
2010	May 30	July 3	May 24	August 19
2011	September 1	July 9	June 30	July 10

Four Highest Ozone Days at Zion, Illinois Monitor in 2009
June 23, 2009: Zion, Illinois => 86 ppb

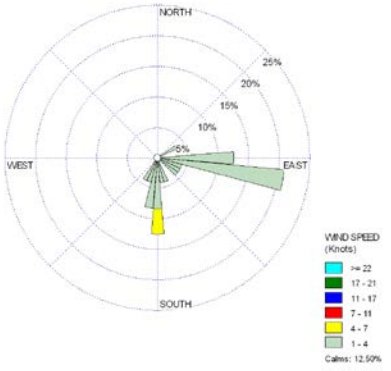
Back Trajectory to Chicago



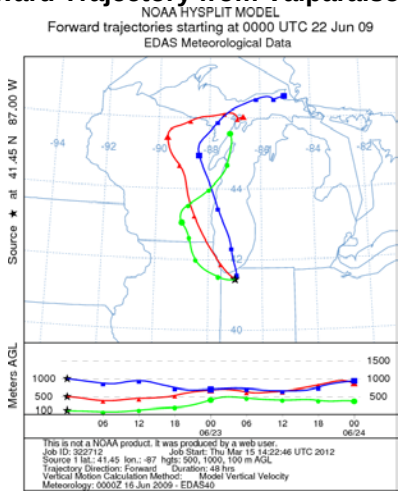
Pollution Rose at Zion Monitor



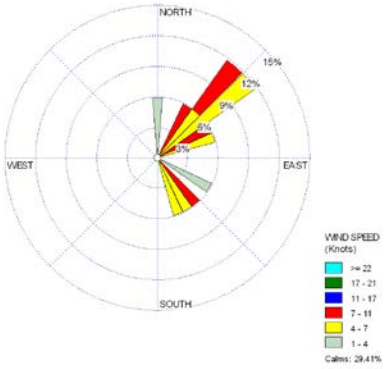
Daily Wind Rose – Schahfer Met. Tower



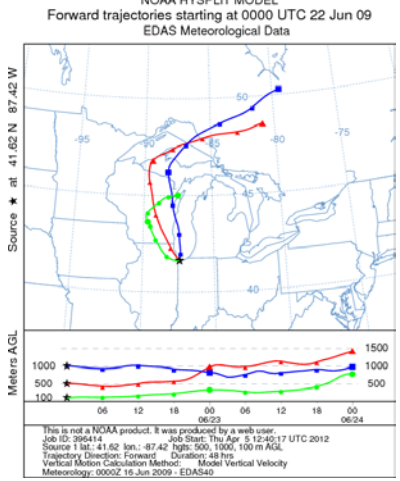
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station



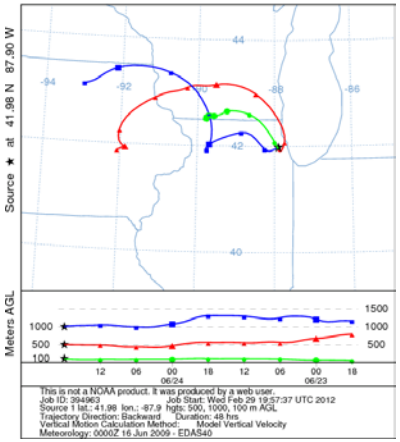
Forward Trajectory from Gary



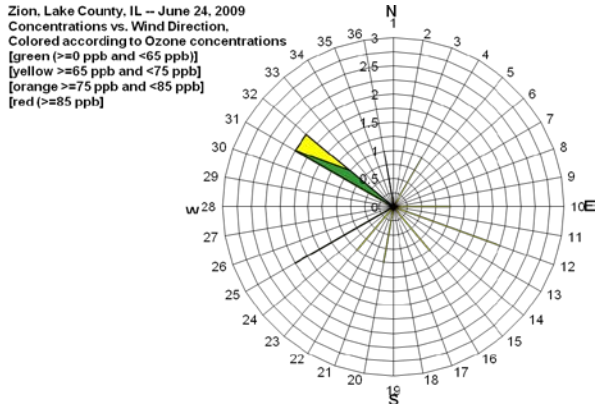
Four Highest Ozone Days at Zion, Illinois Monitor in 2009

June 24, 2009: Zion, Illinois => 78 ppb

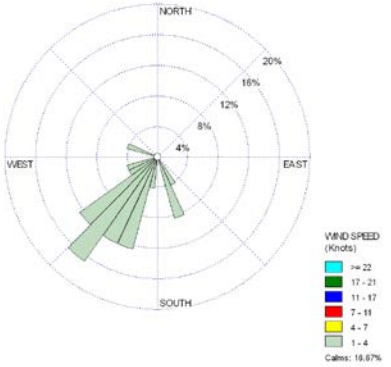
Back Trajectory to Chicago



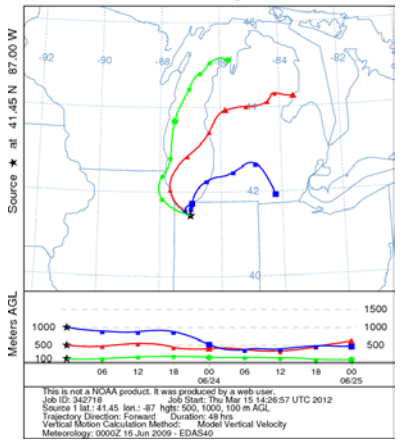
Pollution Rose at Zion Monitor



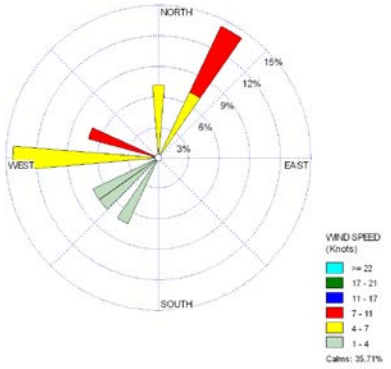
Daily Wind Rose – Schahfer Met. Tower



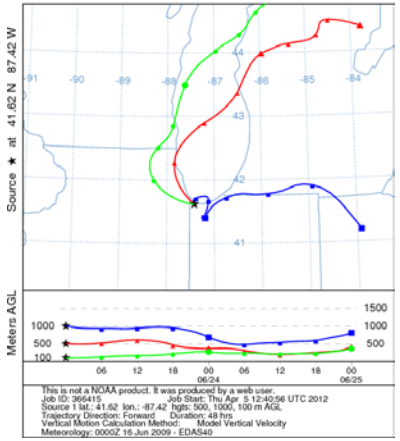
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

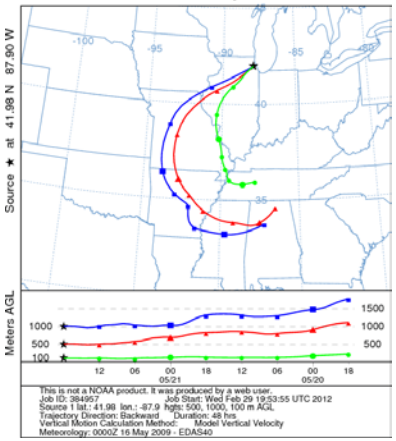


Forward Trajectory from Gary

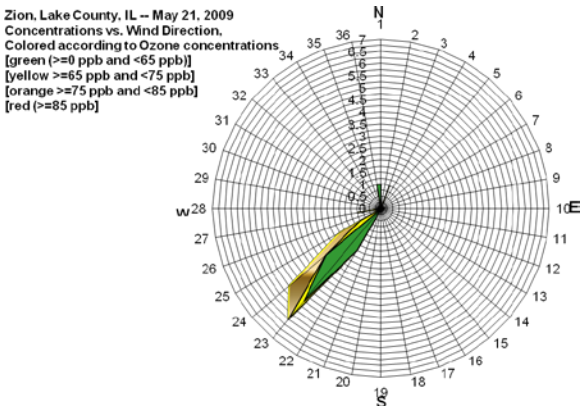


Four Highest Ozone Days at Zion, Illinois Monitor in 2009
May 21, 2009: Zion, Illinois => 75 ppb

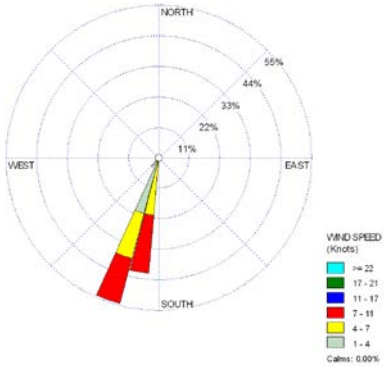
Back Trajectory to Chicago



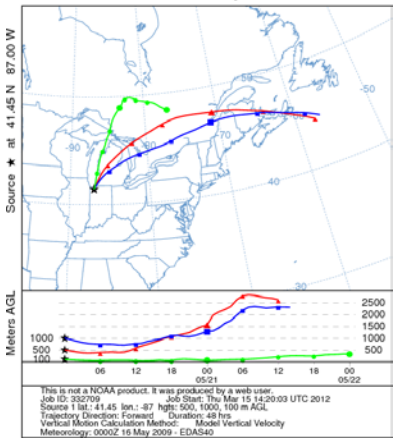
Pollution Rose at Zion Monitor



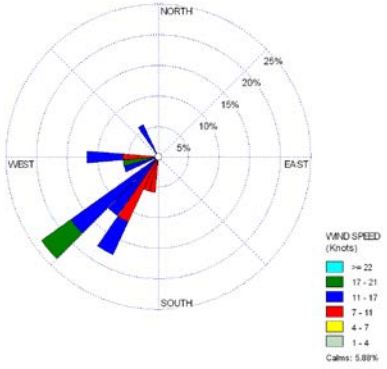
Daily Wind Rose – Schahfer Met. Tower



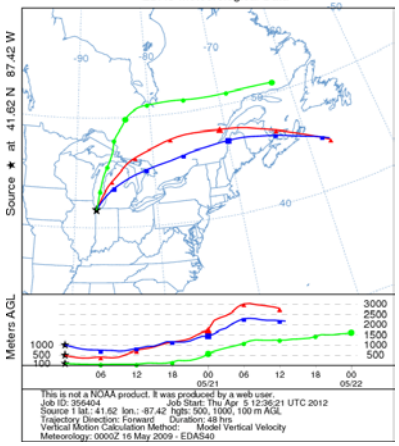
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

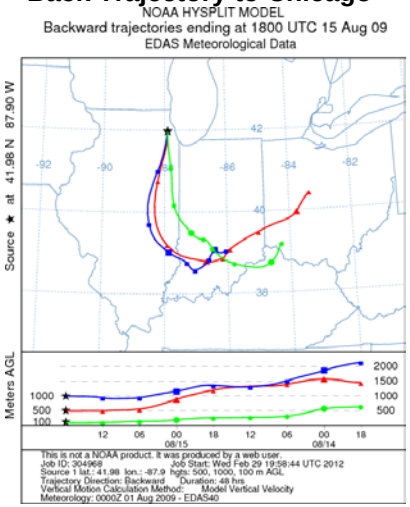


Forward Trajectory from Gary



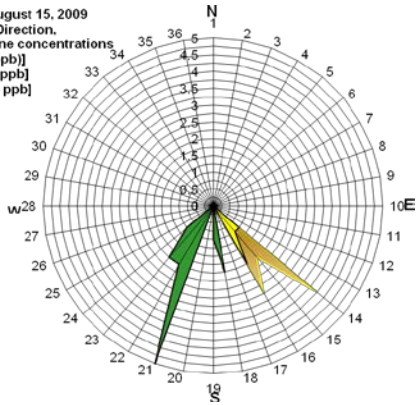
Four Highest Ozone Days at Zion, Illinois Monitor in 2009
August 15, 2009: Zion, Illinois => 75 ppb

Back Trajectory to Chicago

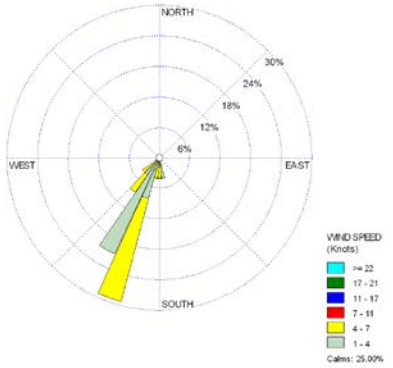


Pollution Rose at Zion Monitor

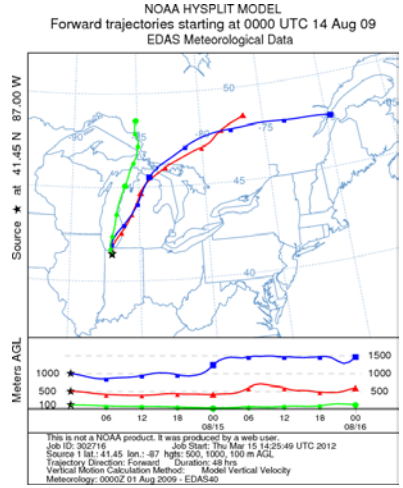
Zion, Lake County, IL -- August 15, 2009
Concentrations vs. Wind Direction.
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb)]



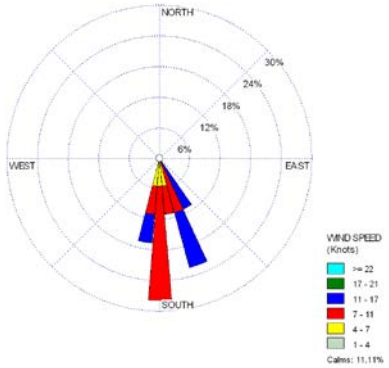
Daily Wind Rose – Schahfer Met. Tower



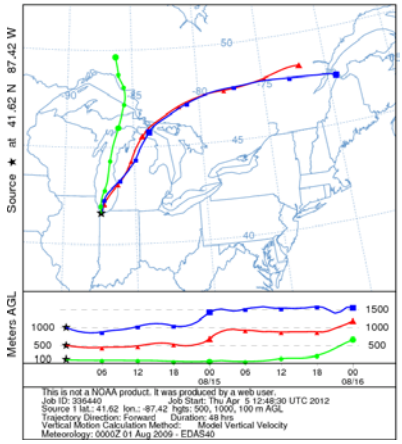
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

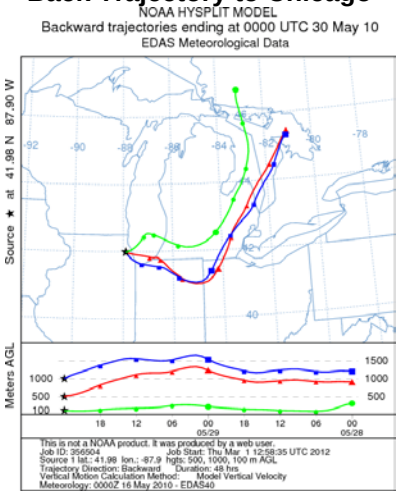


Forward Trajectory from Gary



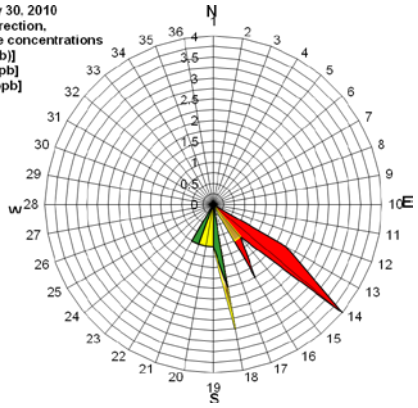
Four Highest Ozone Days at Zion, Illinois Monitor in 2010
May 30, 2010: Zion => 88 ppb

Back Trajectory to Chicago

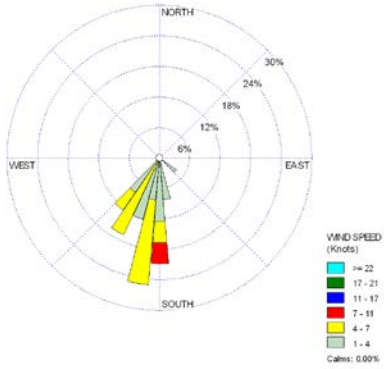


Pollution Rose at Zion Monitor

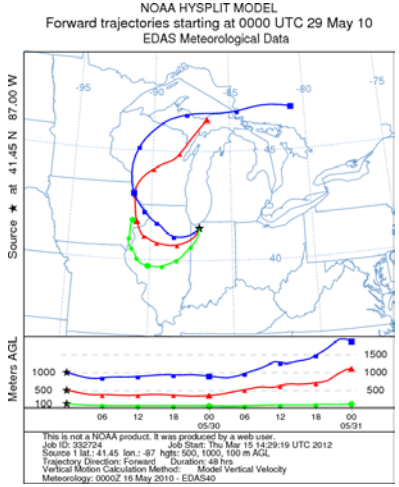
Zion, Lake County, IL -- May 30, 2010
Concentrations vs. Wind Direction.
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb]



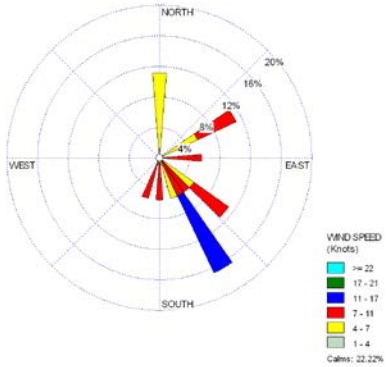
Daily Wind Rose – Schahfer Met. Tower



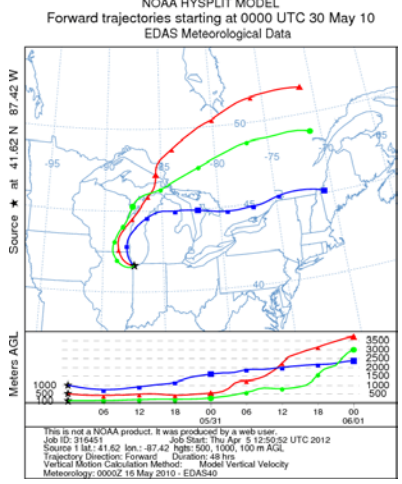
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

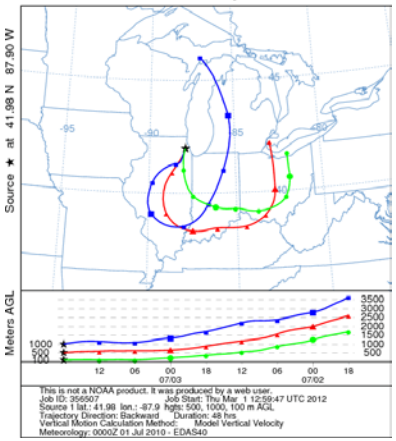


Forward Trajectory from Gary



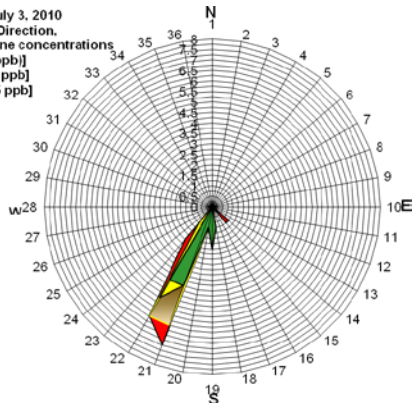
Four Highest Ozone Days at Zion, Illinois Monitor in 2010
July 3, 2010: Zion, Illinois => 84 ppb

Back Trajectory to Chicago

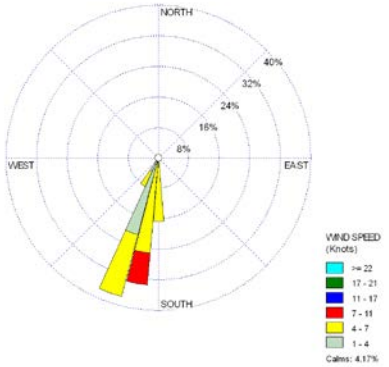


Pollution Rose at Zion Monitor

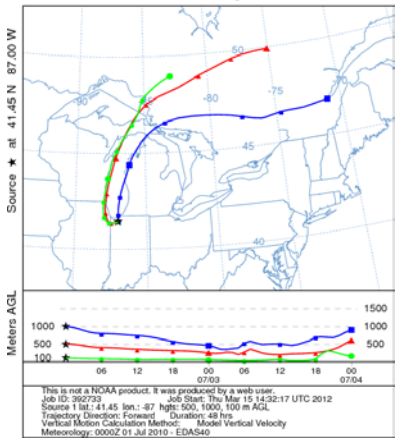
Zion, Lake County, IL -- July 3, 2010
Concentrations vs. Wind Direction.
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb]



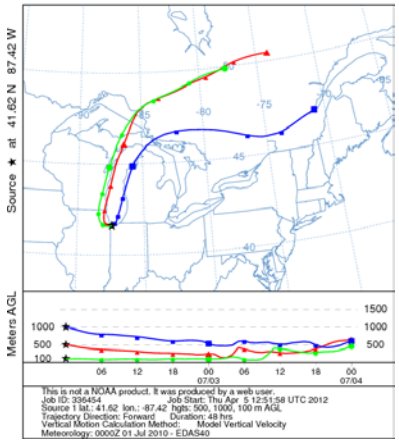
Daily Wind Rose – Schahfer Met. Tower



Forward Trajectory from Valparaiso

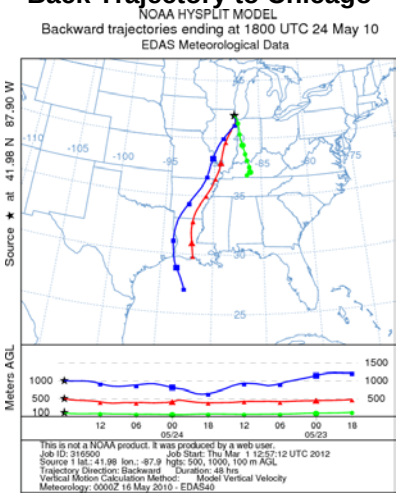


Forward Trajectory from Gary



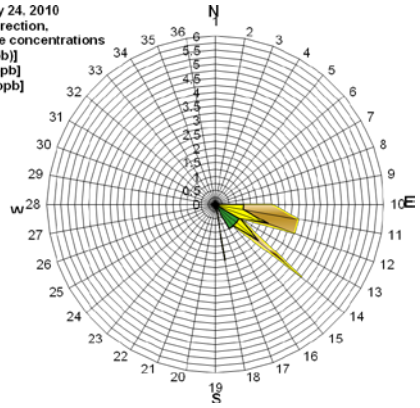
Four Highest Ozone Days at Zion, Illinois Monitor in 2010
May 24, 2010: Zion, Illinois => 78 ppb

Back Trajectory to Chicago

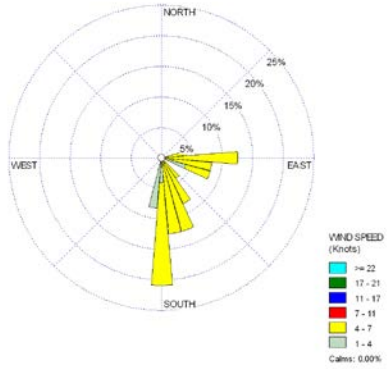


Pollution Rose at Zion Monitor

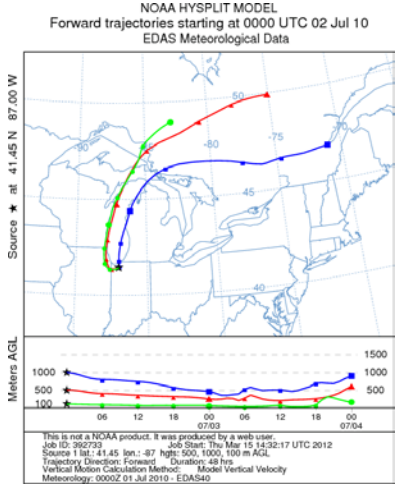
Zion, Lake County, IL -- May 24, 2010
Concentrations vs. Wind Direction.
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb)]



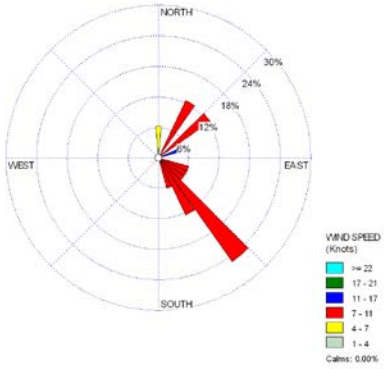
Daily Wind Rose – Schahfer Met. Tower



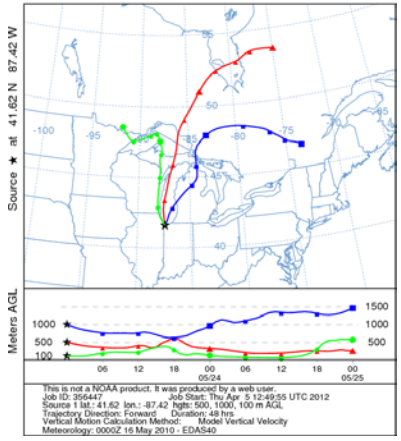
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

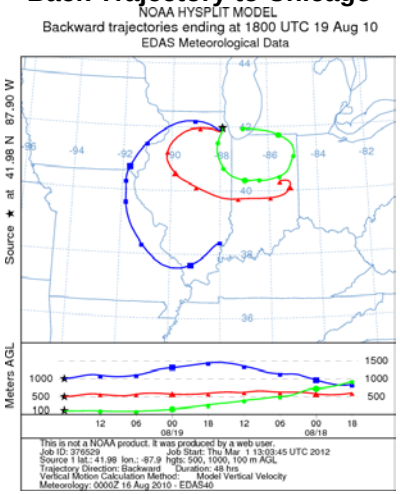


Forward Trajectory from Gary

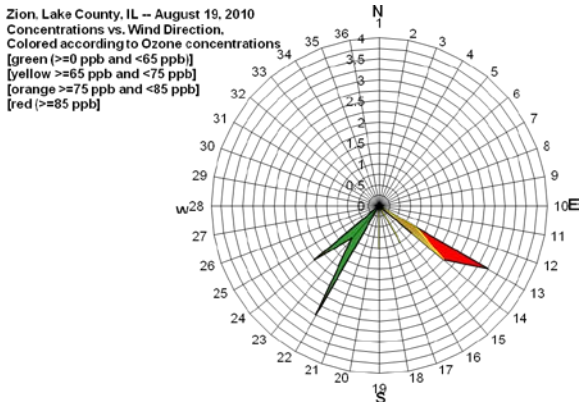


Four Highest Ozone Days at Zion, Illinois Monitor in 2010
August 19, 2010: Zion, Illinois => 78 ppb

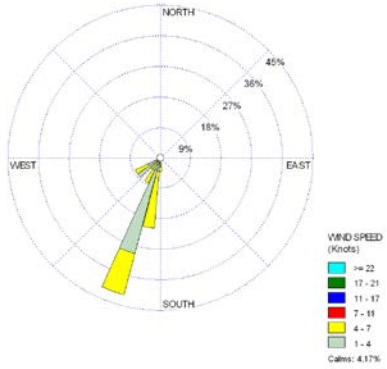
Back Trajectory to Chicago



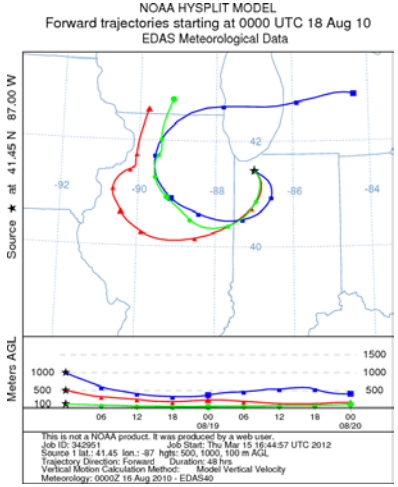
Pollution Rose at Zion Monitor



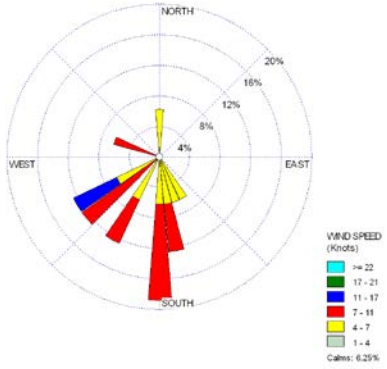
Daily Wind Rose – Schahfer Met. Tower



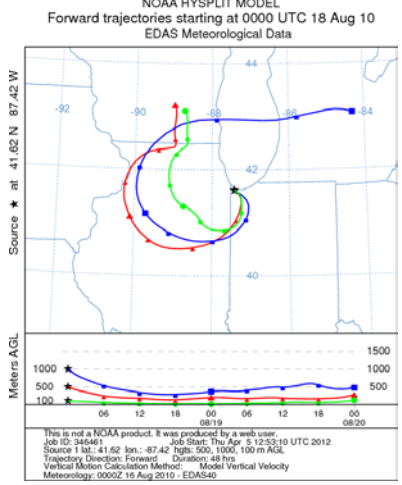
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

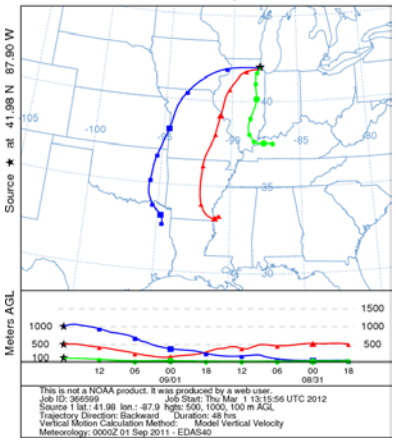


Forward Trajectory from Gary



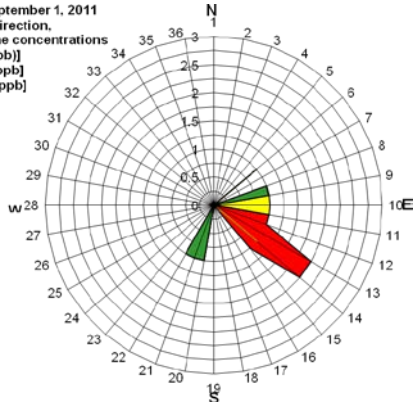
Four Highest Ozone Days at Zion, Illinois Monitor in 2011
September 1, 2011: Zion, Illinois => 95 ppb

Back Trajectory to Chicago

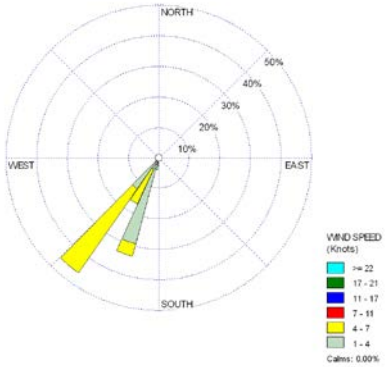


Pollution Rose at Zion Monitor

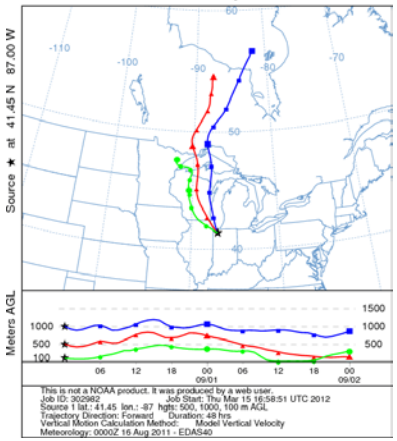
Zion, Lake County, IL -- September 1, 2011
Concentrations vs. Wind Direction,
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb]



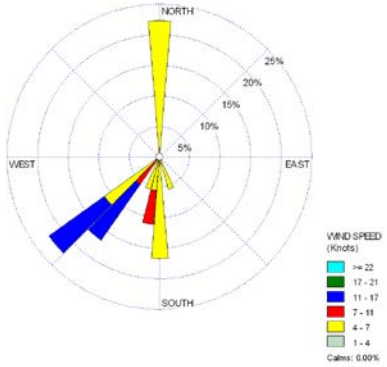
Daily Wind Rose – Schahfer Met. Tower



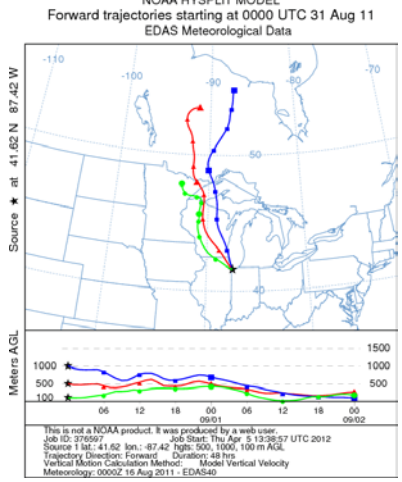
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

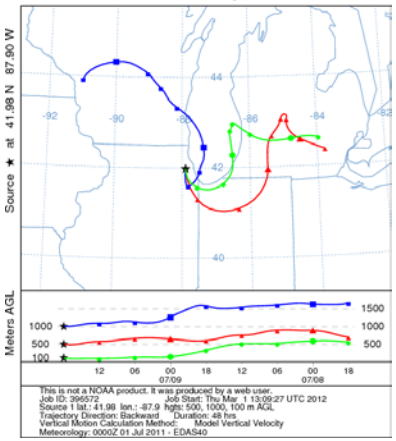


Forward Trajectory from Gary



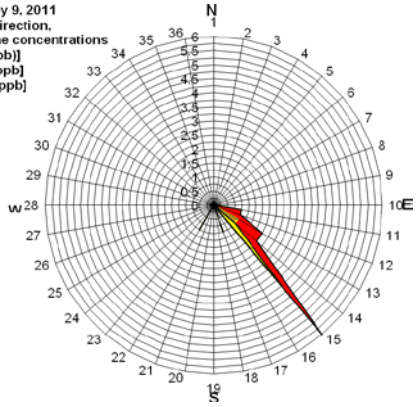
Four Highest Ozone Days at Zion, Illinois Monitor in 2011
July 9, 2011: Zion, Illinois => 85 ppb

Back Trajectory to Chicago

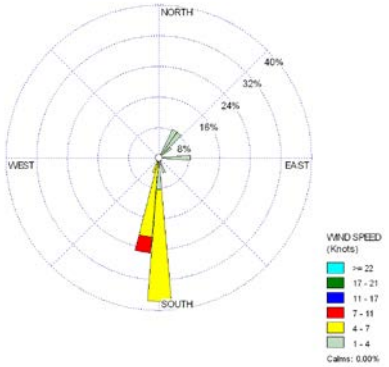


Pollution Rose at Zion Monitor

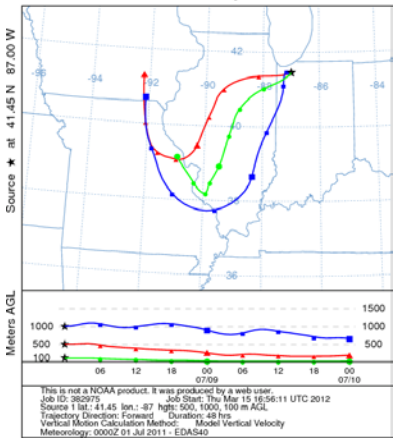
Zion, Lake County, IL -- July 9, 2011
Concentrations vs. Wind Direction,
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb]



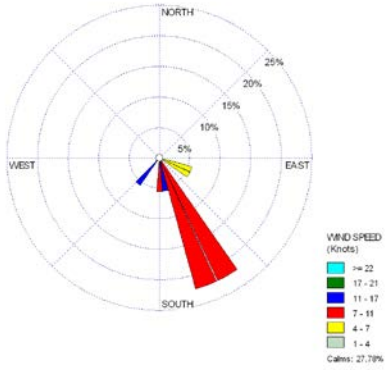
Daily Wind Rose – Schahfer Met. Tower



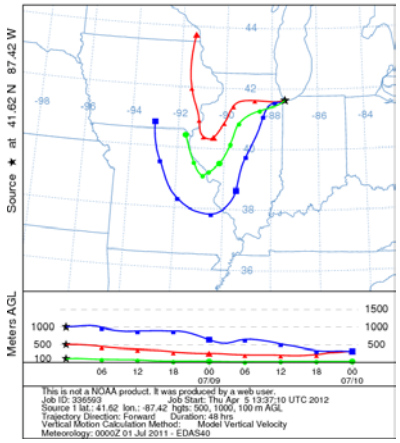
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

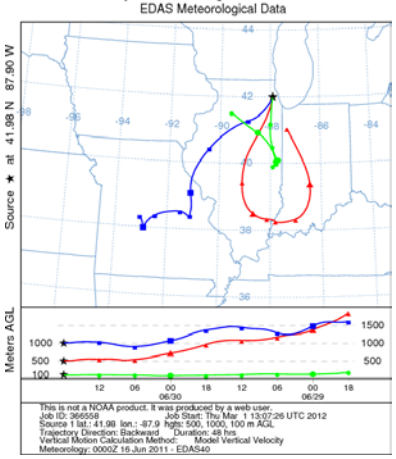


Forward Trajectory from Gary



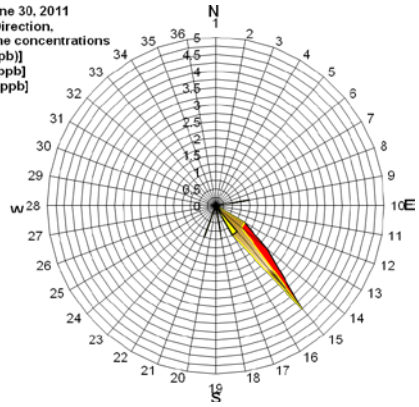
Four Highest Ozone Days at Zion, Illinois Monitor in 2011
June 30, 2011: Zion, Illinois => 83 ppb

Back Trajectory to Chicago

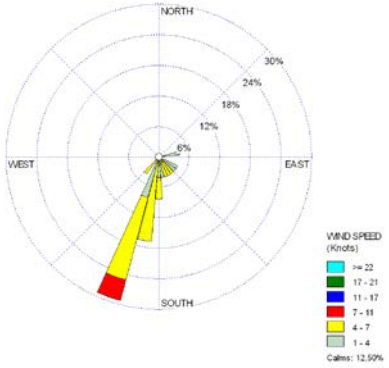


Pollution Rose at Zion Monitor

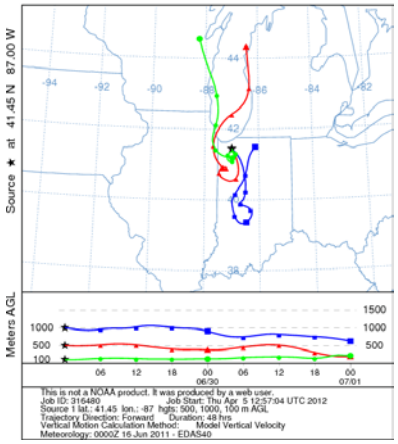
Zion, Lake County, IL -- June 30, 2011
Concentrations vs. Wind Direction,
Colored according to Ozone concentrations
[green (>=0 ppb and <65 ppb)]
[yellow >=65 ppb and <75 ppb]
[orange >=75 ppb and <85 ppb]
[red (>=85 ppb]



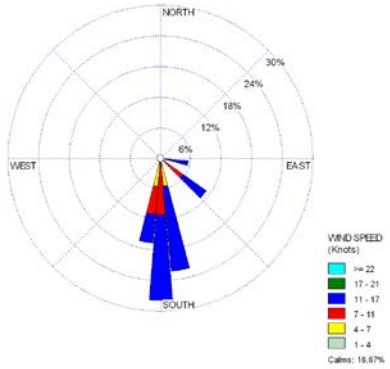
Daily Wind Rose – Schahfer Met. Tower



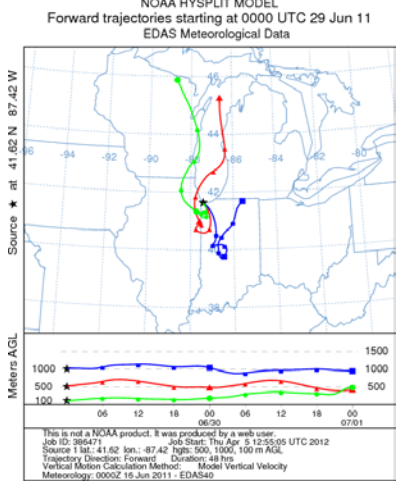
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station

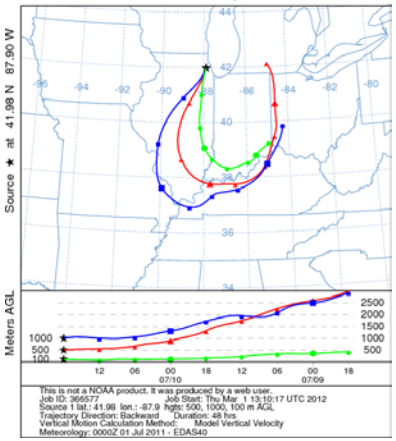


Forward Trajectory from Gary

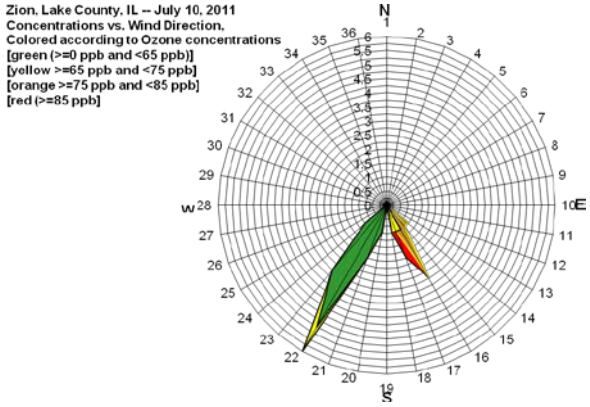


Four Highest Ozone Days at Zion, Illinois Monitor in 2011
July 10, 2011: Zion, Illinois => 76 ppb

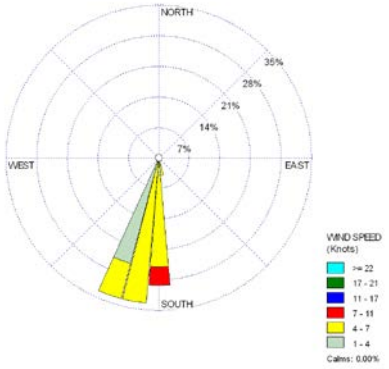
Back Trajectory to Chicago



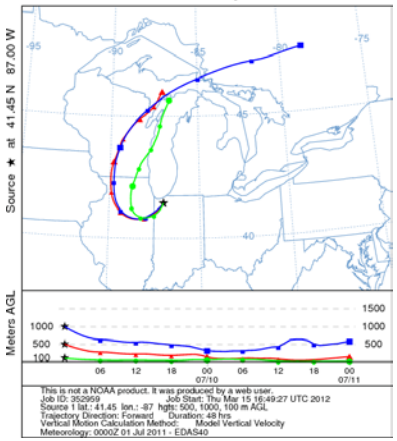
Pollution Rose at Zion Monitor



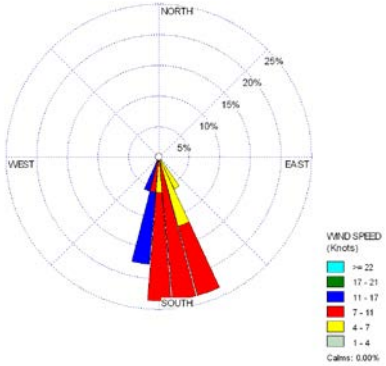
Daily Wind Rose – Schahfer Met. Tower



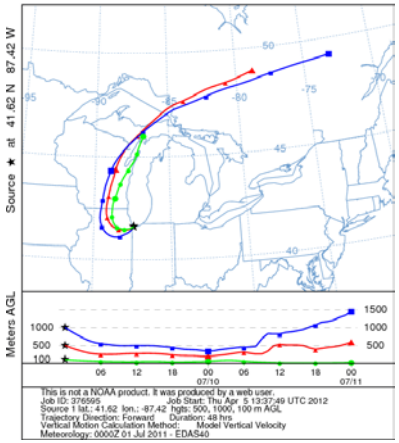
Forward Trajectory from Valparaiso



Daily Wind Rose – Gary ASOS Station



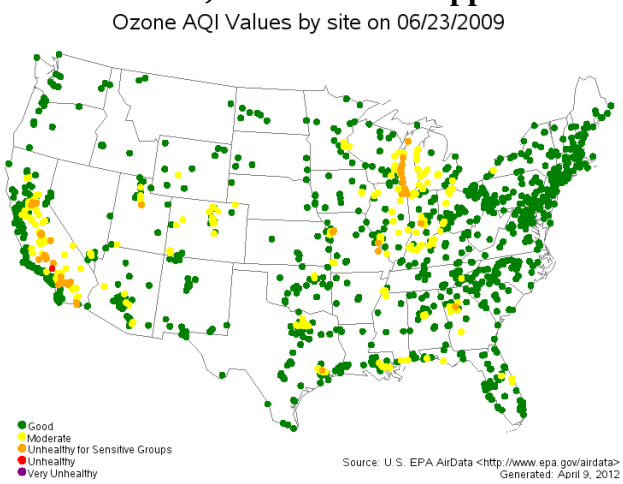
Forward Trajectory from Gary



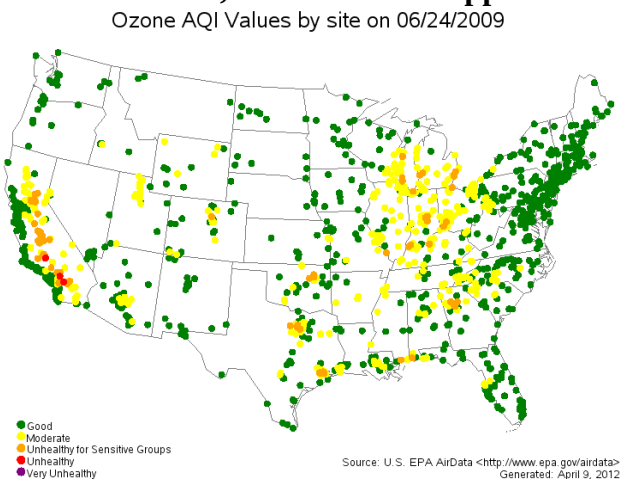
Charts 1 - 3 are AIRNOW depictions of the four highest days for the Zion, Illinois, monitor site in 2009, 2010 and 2011, respectively. These charts demonstrate a clear "lake effect" for these key days in all three years, and further support that the impact of total NO_x and VOC emissions to the Lake Michigan airshed plays a significant role in the monitor readings at the Zion, Illinois, monitor site.

Chart 1 – 2009 AIRNOW Depiction of Four Highest Monitor Value Days

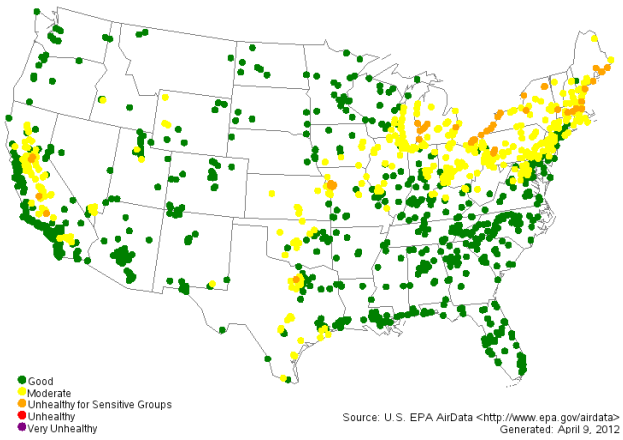
June 23, 2009 Zion => 86 ppb



June 24, 2009 Zion => 78 ppb



May 23, 2009 Zion => 75 ppb



August 15, 2009 Zion => 75 ppb

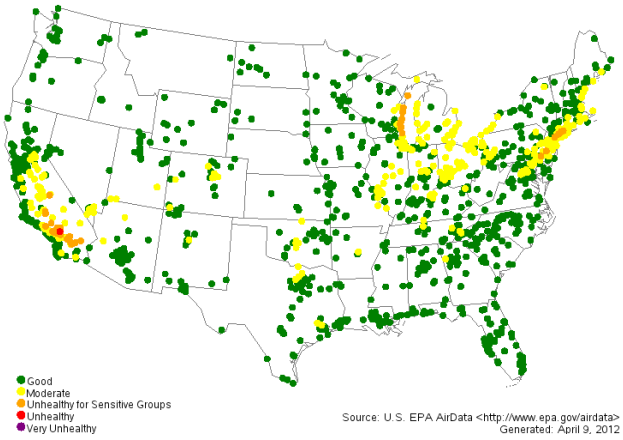
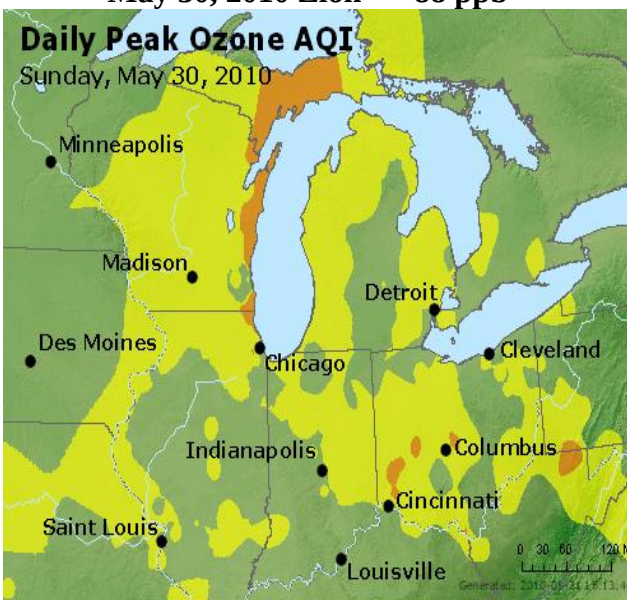
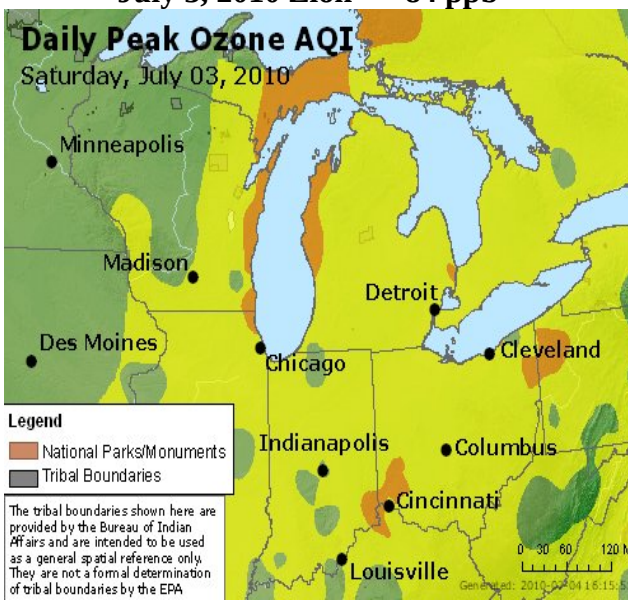


Chart 2 – 2010 AIRNOW Depiction of Four Highest Monitor Value Days

May 30, 2010 Zion => 88 ppb



July 3, 2010 Zion => 84 ppb



May 24, 2010 Zion => 78 ppb

August 19, 2010 Zion => 78 ppb

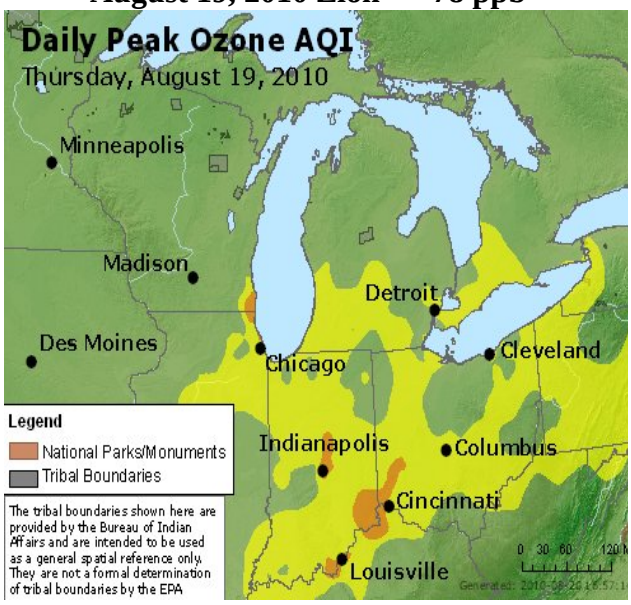
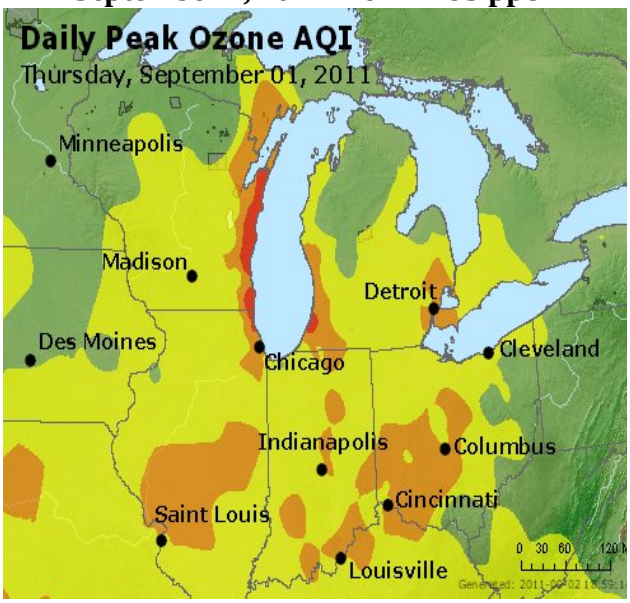


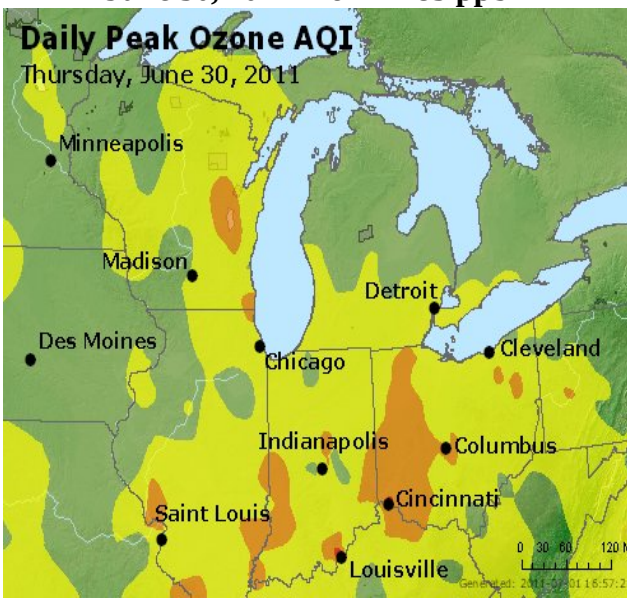
Chart 3 – 2011 AIRNOW Depiction of Four Highest Monitor Value Days

September 1, 2011 Zion => 95 ppb

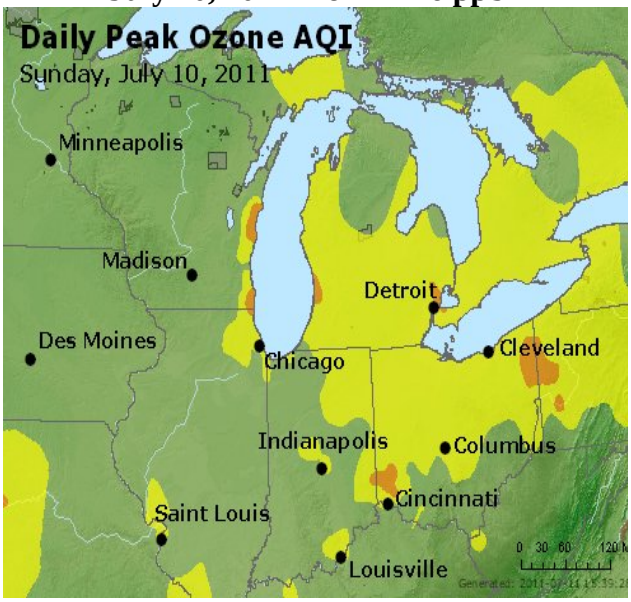


July 9, 2011 Zion => 85 ppb

June 30, 2011 Zion => 85 ppb



July 10, 2011 Zion => 76 ppb



Summary of Meteorological Conditions for Northwest Indiana

The wind roses, pollution roses, and forward and backward trajectory analyses indicate that a clear majority of the wind direction was from the south and southwest. Under these predominant wind conditions, emissions from Lake, Porter and Jasper Counties, Indiana would be blown north and northeast, away from the Lake Michigan airshed and would not impact ozone concentrations in the Chicago nonattainment area.

On the days when high ozone concentrations occurred at the Zion, Illinois ozone monitor, there was a definite signature of a lake breeze, pulling ozone and ozone precursors from off the lake to the ozone monitor. While Lake, Porter Jasper Counties, Indiana emissions may impact the area on certain days, the percentage of emissions compared to the rest of the Lake Michigan airshed is small, as shown in LADCO's OSAT modeling results for each of the Northwest Indiana counties. Therefore, IDEM contends that Lake, Porter and Jasper Counties should not be considered a significant contributor to ozone concentrations at the Zion ozone monitor in Lake County, Illinois.

Enclosure 2

Indiana Ozone Monitoring Data Summary

(January 1, 2000 through December 31, 2011)

Note: Prior to 2008, the 8-hour ozone standard was 0.08 parts per million (ppm). Attainment was determined by the average of the 4th highest ozone values over a three-year period. A value of 0.085 ppm or above was in violation of the standard. Beginning in 2008, the ozone standard was lowered to 0.075 ppm. Attainment is determined by the average of the 4th highest ozone values over a three-year period. A value of 0.076 ppm or above is a violation of the standard.

			4th Highest Ozone Value (ppm)												Three-Year Design Value (ppm)									
County	Site #	Site Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10	09-11
Allen	180030002	Leo	0.091	0.082	0.093	0.090	0.073	0.086	0.073	0.077	0.066	0.065	0.065	0.070	0.088	0.088	0.085	0.083	0.077	0.078	0.072	0.069	0.065	0.066
Allen	180030004	Beacon St	0.081	0.074	0.097	0.084	0.069	0.076	0.071	0.080	0.069	0.065	0.068	0.072	0.084	0.085	0.083	0.076	0.072	0.075	0.073	0.071	0.067	0.068
Boone	180110001	Whitestown	0.082	0.084	0.099	0.088	0.072	0.082	0.080	0.083	0.073	0.069	0.072	0.071	0.088	0.090	0.086	0.080	0.078	0.081	0.078	0.075	0.071	0.070
Carroll	180150002	Flora		0.079	0.096	0.079	0.071	0.075	0.073	0.078	0.065	0.063	0.072	0.068	0.087 [2]	0.084	0.082	0.075	0.073	0.075	0.072	0.068	0.066	0.067
Clark *	180190003/8	Charlestown / State Park	0.085	0.086	0.100	0.090	0.074	0.080	0.079	0.090	0.075	0.067	0.077	0.082	0.090	0.092	0.088	0.081	0.077	0.083	0.081	0.077	0.073	0.075
Delaware	180350010	Albany		0.084	0.095	0.085	0.070	0.081	0.072	0.079	0.062	0.068	0.067	0.070	0.089 [2]	0.088	0.083	0.078	0.074	0.077	0.071	0.069	0.065	0.068
Elkhart	180390007	Bristol			0.099	0.087	0.077	0.086	0.067	0.082	0.068	0.061	0.065	0.072	0.099 [1]	0.093 [2]	0.087	0.083	0.076	0.078	0.072	0.070	0.064	0.066
Floyd	180431004	New Albany	0.077	0.076	0.097	0.086	0.071	0.080	0.076	0.082	0.075	0.063	0.072	0.080	0.083	0.086	0.084	0.079	0.075	0.079	0.077	0.073	0.070	0.071
Greene	180550001	Plummer	0.090	0.085	0.093	0.088	0.073	0.079	0.076	0.084	0.072	0.068	0.074	0.080	0.089	0.088	0.084	0.080	0.076	0.079	0.077	0.074	0.071	0.074
Hamilton **	180570005/6	Noblesville	0.090	0.088	0.101	0.101	0.075	0.087	0.077	0.084	0.073	0.071	0.072	0.071	0.093	0.096	0.092	0.087	0.079	0.082	0.078	0.076	0.072	0.071
Hancock	180590003	Fortville	0.086	0.089	0.101	0.092	0.072	0.080	0.075	0.081	0.074	0.068	0.071	0.068	0.092	0.094	0.088	0.081	0.075	0.078	0.076	0.074	0.071	0.069
Hendricks	180630004	Avon	0.087	0.083	0.095	0.079	0.071	0.078	0.073	0.079	0.068	0.070	0.067	0.068	0.088	0.085	0.081	0.076	0.074	0.076	0.073	0.072	0.068	0.068
Huntington	180690002	Roanoke	0.087	0.082	0.089	0.083	0.069	0.078	0.072	0.078	0.060	0.062	0.062	0.069	0.086	0.084	0.080	0.076	0.073	0.076	0.070	0.066	0.061	0.064
Jackson	180710001	Brownstown	0.082	0.084	0.090	0.082	0.068	0.077	0.075	0.078	0.070	0.063	0.069	0.067	0.085	0.085	0.080	0.075	0.073	0.076	0.074	0.070	0.067	0.066
Johnson	180810002	Trafalgar	0.084	0.082	0.097	0.080	0.073	0.077	0.078	0.080	0.069	0.071	0.070	0.068	0.087	0.086	0.083	0.076	0.076	0.078	0.075	0.073	0.070	0.069
Lake	180890022	Gary IITRI	0.075	0.083	0.094	0.076	0.064	0.089	0.073	0.085	0.062	0.058	0.064	0.066	0.084	0.084	0.078	0.076	0.075	0.082	0.073	0.068	0.061	0.062
Lake	180890024	Lowell	0.075	0.077	0.086	0.081									0.079	0.081								
Lake	180890030	Whiting					0.064	0.088	0.081	0.088	0.062	0.062	0.069	0.069			0.064 [1]	0.076 [2]	0.077	0.085	0.077	0.070	0.064	0.066
Lake	180892006	Hammond	0.086	0.090	0.101	0.081	0.067	0.087	0.075	0.077	0.068	0.065	0.069	0.072	0.092	0.090	0.083	0.078	0.076	0.079	0.073	0.070	0.067	0.068
LaPorte	180910005	Michigan City	0.080	0.090	0.107	0.082	0.070	0.084	0.075	0.073	0.059	0.066	0.070	0.080	0.092	0.093	0.086	0.078	0.076	0.077	0.069	0.066	0.065	0.072
LaPorte	180910010	LaPorte	0.074	0.079	0.100	0.084	0.068	0.089	0.069	0.078	0.065	0.063	0.067	0.070	0.084	0.087	0.084	0.080	0.075	0.078	0.070	0.068	0.065	0.066
Madison	180950010	Emporia	0.080	0.090	0.104	0.091	0.072	0.078	0.072	0.078	0.065	0.064	0.065	0.071	0.091	0.095	0.089	0.080	0.074	0.076	0.072	0.069	0.064	0.066
Marion	180970042	Mann Road		0.078	0.093	0.074	0.065	0.076	0.074	0.080					0.084	0.082	0.077	0.072	0.072	0.077				
Marion	180970050	Fort Harrison	0.083	0.087	0.100	0.091	0.073	0.080	0.076	0.083	0.075	0.073	0.072	0.077	0.090	0.092	0.088	0.081	0.076	0.079	0.078	0.077	0.073	0.074
Marion	180970057	Harding Street	0.078	0.081	0.099	0.075	0.066	0.081	0.076	0.076	0.067	0.067	0.068	0.068	0.086	0.085	0.080	0.074	0.074	0.077	0.073	0.070	0.067	0.067
Marion	180970073	E 16th St	0.082	0.081	0.106	0.082	0.071	0.080	0.072	0.080	0.066	0.065	0.066	0.075	0.089	0.089	0.086	0.077	0.074	0.077	0.072	0.070	0.065	0.068
Marion	180970078	Washington Park										0.067	0.064	0.072								0.067 [1]	0.065 [2]	0.067
Morgan	181090005	Monrovia	0.088	0.082	0.094	0.081	0.072	0.078	0.077	0.084	0.069	0.069	0.063	0.072	0.088	0.085	0.082	0.077	0.075	0.079	0.076	0.074	0.067	0.068
Perry	181230009	Leopold					0.078	0.086	0.079	0.080	0.073	0.065	0.072	0.074			0.078 [1]	0.082 [2]	0.081	0.081	0.077	0.072	0.070	0.070
Porter	181270020	Dunes National Lakeshore	0.071	0.082	0.097	0.079									0.083	0.086								
Porter	181270024	Ogden Dunes	0.085	0.085	0.101	0.077	0.069	0.090	0.070	0.084	0.069	0.067	0.067	0.068	0.090	0.087	0.082	0.078	0.076	0.081	0.074	0.073	0.067	0.067
Porter	181270026	Valparaiso	0.082	0.077	0.100	0.082	0.072	0.078	0.071	0.080	0.061	0.064	0.061	0.063	0.086	0.086	0.084	0.077	0.073	0.076	0.070	0.068	0.062	0.062
Posey	181290003	St. Phillips	0.085	0.079	0.097	0.077	0.071	0.077	0.058	0.080	0.069	0.067	0.069	0.076	0.087	0.084	0.081	0.075	0.068	0.071	0.069	0.072	0.068	0.070
St Joseph	181410010	Potato Creek	0.079	0.078	0.092	0.081	0.073	0.078	0.069	0.075	0.063	0.060	0.060	0.064	0.083	0.083	0.082	0.077	0.073	0.074	0.069	0.066	0.061	0.061
St Joseph ***	181411008/15	Angela & Eddy / Shields Dr	0.081	0.082	0.100	0.082	0.072	0.084	0.063	0.067	0.058	0.059	0.061	0.073	0.087	0.088	0.084	0.079	0.073	0.071	0.062	0.061	0.059	0.064
St Joseph	181411007	Granger	0.078	0.089	0.104	0.086	0.076	0.086	0.070	0.082	0.069	0.062	0.060	0.071	0.090	0.093	0.088	0.082	0.077	0.079	0.073	0.071	0.063	0.064
Shelby	181450001	Fairland	0.087	0.093	0.101	0.089	0.071	0.080	0.073	0.082	0.070	0.075	0.067	0.075	0.093	0.094	0.087	0.080	0.074	0.078	0.075	0.075	0.070	0.072
Vanderburgh ****	181630012/21	Buena Vista	0.081	0.073	0.095	0.081	0.072	0.080	0.075	0.085	0.074	0.061	0.064	0.077	0.083	0.083	0.082	0.077	0.075	0.080	0.078	0.073	0.066	0.067
Vanderburgh	181630013	Inglefield	0.075	0.072	0.086	0.075	0.058	0.056	0.081	0.088	0.072	0.068	0.071	0.072	0.077	0.077	0.073	0.063	0.065	0.075	0.080	0.076	0.070	0.070
Vigo	181670018	Terre Haute	0.075	0.082	0.082	0.066	0.057	0.064	0.060	0.077	0.059	0.058	0.063	0.067	0.079	0.076	0.068	0.062	0.060	0.067	0.065	0.064	0.060	0.062
Vigo	181670024	Sandcut		0.083	0.099	0.080	0.072	0.076	0.072	0.073	0.066	0.061	0.063	0.070	0.091 [2]	0.087	0.083	0.076	0.073	0.073	0.070	0.066	0.063	0.064
Warrick	181730002	Yankeetown	0.077	0.081	0.094	0.082	0.074								0.084	0.085	0.083							
Warrick	181730008	Boonville	0.073	0.078	0.091	0.076	0.073	0.080	0.078	0.083	0.071	0.064	0.071	0.075	0.080	0.081	0.080	0.076	0.077	0.080	0.077	0.072	0.068	0.070
Warrick	181730009	Lynville	0.077	0.075	0.090	0.078	0.066	0.076	0.070	0.080	0.064	0.064	0.070	0.072	0.080	0.081	0.078	0.073	0.070	0.075	0.071	0.069	0.066	0.068
Warrick	181730011	Dayville						0.077	0.078	0.076	0.060	0.057	0.070	0.072				0.077 [1]	0.077 [2]	0.077	0.071	0.064	0.062	0.066

Prior to 2008, Red Numbers are 4th High Values >= 0.085 ppm
Beginning 2008, Red Numbers are 4th High Values >= 0.076 ppm

[1] **One year of Data**
[2] **Two Years of Data**

Prior to 2008 Design Value Above 0.085 ppm
Beginning 2008 Design Value Above 0.076 ppm

* Clark County ozone monitor was moved from Charlestown to Charlestown State Park in 2007. The 2005-2007 and 2006-2008 Design Values are calculated from both monitoring sites.

**Hamilton County - Noblesville ozone monitor was moved from Field Drive to 10th Street in April 2007 and then moved from 10th Street to 191st Street on May 13, 2010. The 2008-2010 Design Value is calculated from both the 10th Street and 191st Street monitoring sites.

***St Joseph ozone monitor was moved from Angela & Eddy to Shields Drive on June 1, 2006. The 2004-2006 and 2005-2007 Design Values are calculated from both monitoring sites. 2006-2008 Design Value is calculated from Shields Dr only.

****Vanderburgh County - Evansville ozone monitor was moved from Mill Road to Buena Vista on July 10, 2010. The 2008-2010 Design Value is calculated from both monitoring sites.

Enclosure 3
List of Indiana Counties with Final Ozone Designation Recommendations

County (Monitor ID)	2009-2011 Design Value (ppm)	Attainment Status for 1997 Ozone NAAQS	Indiana's Initial Recommendation for 2008 Ozone NAAQS	U.S. EPA's Proposed Designations for 2008 Ozone NAAQS	Indiana's Updated Recommendations for 2008 Ozone NAAQS
Allen (180030002)	0.066	Attainment with a Maintenance Plan (Redesignation effective 2-12-07)	Attainment	Attainment	Attainment
Allen (180030004)	0.068				
Boone (180110001)	0.070	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Nonattainment	Attainment	Attainment
Carroll (180150002)	0.067	Attainment/Unclassifiable	Attainment	Attainment	Attainment
Clark (180190003/8)	0.075	Attainment with a Maintenance Plan (Redesignation effective 7-19-07)	Nonattainment	Attainment	Attainment
Dearborn (No monitor)	N/A	Attainment with a Maitenance Plan (Redesignation effective 5-11-10)	Attainment/Unclassifiable	Nonattainment	Nonattainment (Lawrenceburg Township)
Delaware (180350010)	0.068	Attainment with a Maitenance Plan (Redesignation effective 1-3-06)	Attainment	Attainment	Attainment
Elkhart (180390007)	0.066	Attainment with a Maintenance Plan (Redesignation effective 7-19-07)	Attainment	Attainment	Attainment
Floyd (180431004)	0.071	Attainment with a Maintenance Plan (Redesignation effective 7-19-07)	Nonattainment	Attainment	Attainment
Greene (180550001)	0.074	Attainment with a Maintenance Plan (Redesignation effective 12-29-05)	Nonattainment	Attainment	Attainment
Hamilton (180570005/6)	0.071	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Nonattainment	Attainment	Attainment
Hancock (180590003)	0.069	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Nonattainment	Attainment	Attainment
Hendricks (180630004)	0.068	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Attainment	Attainment	Attainment
Huntington (180690002)	0.064	Attainment/Unclassifiable	Attainment	Attainment	Attainment
Jackson (180710001)	0.066	Attainment with a Maintenance Plan (Redesignation effective 12-29-05)	Attainment	Attainment	Attainment
Jasper (No monitor)	N/A	Attainment/Unclassifiable	Attainment/Unclassifiable	Nonattainment	Attainment
Johnson (180810002)	0.069	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Attainment	Attainment	Attainment
Lake (180890022)	0.062	Attainment with a Maintenance Plan (Redesignation effective 5-11-10)	Nonattainment	Nonattainment	Attainment
Lake (180890030)	0.066				
Lake (180892006)	0.068				
LaPorte (180910005)	0.072	Attainment with a Maintenance Plan (Redesignation effective 7-19-07)	Attainment	Attainment	Attainment
LaPorte (180910010)	0.066				
Madison (180950010)	0.066	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Attainment	Attainment	Attainment

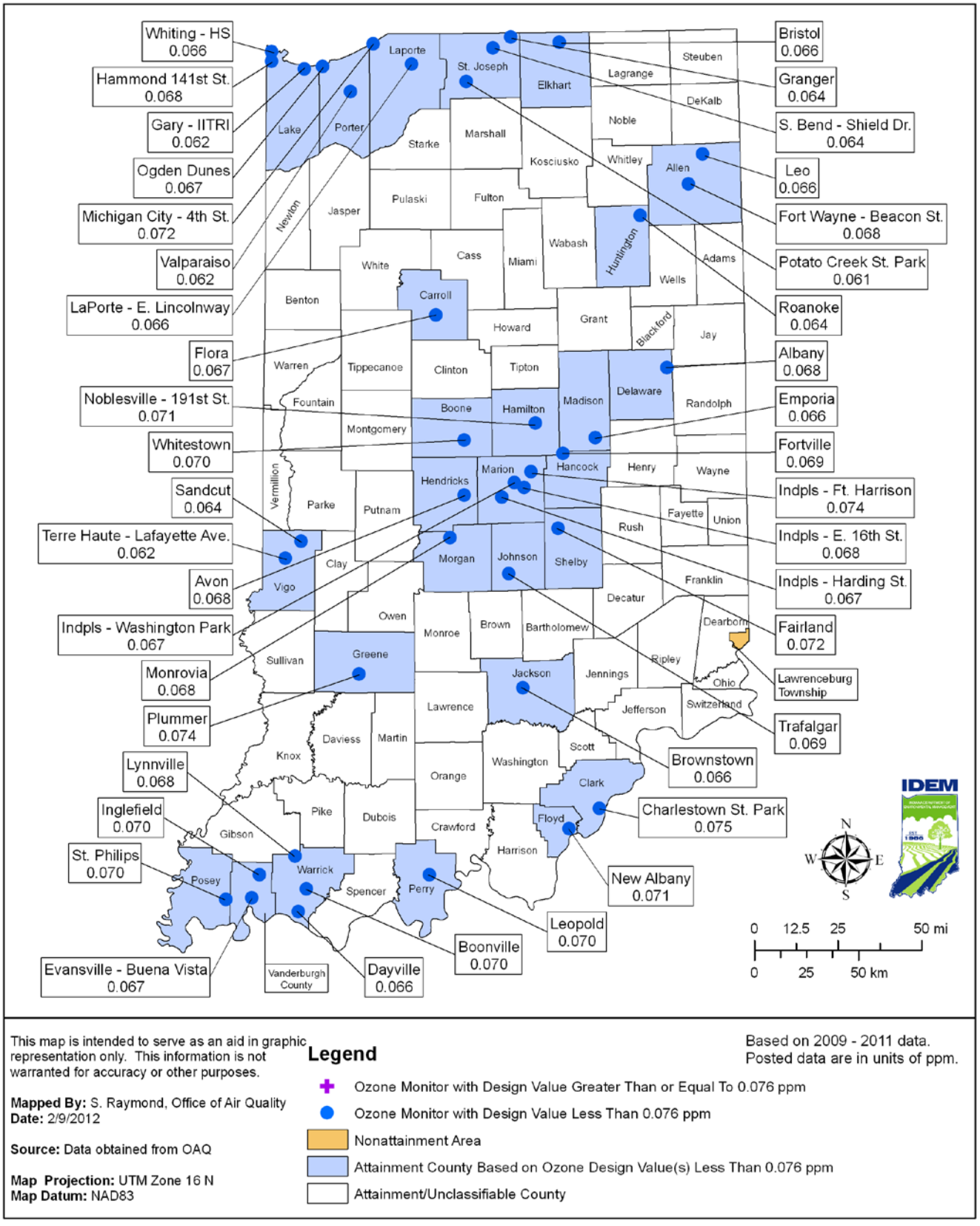
Enclosure 3
List of Indiana Counties with Final Ozone Designation Recommendations

County (Monitor ID)	2009-2011 Design Value (ppm)	Attainment Status for 1997 Ozone NAAQS	Indiana's Initial Recommendation for 2008 Ozone NAAQS	U.S. EPA's Propsoed Designations for 2008 Ozone NAAQS	Indiana's Updated Recommendations for 2008 Ozone NAAQS
Marion (180970050)	0.074	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Nonattainment	Attainment	Attainment
Marion (180970057)	0.067				
Marion (180970073)	0.068				
Marion (180970078)	0.067				
Morgan (181090005)	0.068	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Nonattainment	Attainment	Attainment
Perry (181230009)	0.070	Attainment/Unclassifiable	Nonattainment	Attainment	Attainment
Porter (181270024)	0.067	Attainment with a Maintenance Plan (Redesignation effective 5-11-10)	Attainment	Nonattainment	Attainment
Porter (181270026)	0.062				
Posey (181290003)	0.070	Attainment/Unclassifiable	Attainment	Attainment	Attainment
St Joseph (181410010)	0.061	Attainment with a Maintenance Plan (Redesignation effective 7-19-07)	Attainment	Attainment	Attainment
St Joseph (181410008/15)	0.064				
St Joseph (181411007)	0.064				
Shelby (181450001)	0.072	Attainment with a Maintenance Plan (Redesignation effective 10-19-07)	Attainment	Attainment	Attainment
Vanderburgh (181630012/21)	0.067	Attainment with a Maintenance Plan (Redesignation effective 1-30-06)	Nonattainment	Attainment	Attainment
Vanderburgh (181630013)	0.070				
Vigo (181670018)	0.062	Attainment with a Maintenance Plan (Redesignation effective 2-6-06)	Attainment	Attainment	Attainment
Vigo (181670024)	0.064				
Warrick (181730008)	0.070	Attainment with a Maintenance Plan (Redesignation effective 1-30-06)	Nonattainment	Attainment	Attainment
Warrick (181730009)	0.068				
Warrick (181730011)	0.066				

Note: Indiana's initial recommendation for the 2008 8-hour ozone NAAQS was sent to U.S. EPA on March 11, 2009. The March 11, 2009 recommendations for nonattainment areas were based on quality assured 2006 through 2008 monitor values. Indiana's updated recommendations for the 2008 8-hour ozone NAAQS are based on 2009 through 2011 monitor values.

Enclosure 4

Map of Indiana Counties with Final Ozone Designation Recommendations



This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

Mapped By: S. Raymond, Office of Air Quality
Date: 2/9/2012

Source: Data obtained from OAQ

Map Projection: UTM Zone 16 N
Map Datum: NAD83

Legend

Based on 2009 - 2011 data.
Posted data are in units of ppm.

- Ozone Monitor with Design Value Greater Than or Equal To 0.076 ppm
- Ozone Monitor with Design Value Less Than 0.076 ppm
- Nonattainment Area
- Attainment County Based on Ozone Design Value(s) Less Than 0.076 ppm
- Attainment/Unclassifiable County

Update on 120-Day Response Package

DELONEY, SCOTT to: Edward Doty, Douglas Aburano, John Mooney

05/07/2012 08:31 AM

1 attachment

IL_VET_modeling_results.doc

Gentlemen, we discovered an oversight with a component of the technical information provided to you. In a rush to initiate and compile modeling results per agency direction, there was confusion over how to apply cuts to the Illinois portion of the mobile source inventory. What should have been 50% of the total reductions achieved from the I/M program, scaled to 35%, was instead applied as percentages to the total mobile source inventory.

After recognizing this, we applied the appropriate fractions (percentage reductions). These fractions or reduction percentages derive from the tailpipe study for Lake and Porter counties. The total reductions achieved were divided into the total mobile source inventory for the same time period (2008 tons/tons). The total reductions of VOC achieved by testing 1976 and newer vehicles through 2008 is 35% of the total mobile source inventory, and for NOx it is 9.2%. These percentages were then applied to the Illinois portion of the mobile source inventory, and CAMx was rerun the same as before. These percentages seemed reasonable and conservative because even though the fleet mix is different for Illinois, a larger portion of the fleet was subjected to I/M previously (1968 model year and newer as opposed to 1976 and newer). The impact at the Zion site is an increase in ozone concentrations of 1.4 ppb.

As a result, the points made originally by the agency remain valid. I am attaching a summary of the most recent exercise we completed for your records.

Scott Deloney
Air Programs Branch
Office of Air Quality
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(317) 233-5694

Table 1 – Results of Northeast Illinois VET Runs for 9.2% NO_x, 35% VOC

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference/ ozone impact (ppm)
170971007	Lake	Zion, IL	0.982	0.0780	0.0766	0.0014
180890022	Lake	Gary	0.980	0.0777	0.0761	0.0016
180890030	Lake	Whiting	0.978	0.0793	0.0776	0.0017
180892008	Lake	Hammond	0.978	0.0777	0.0760	0.0017
181270024	Porter	Ogden Dunes	0.987	0.0783	0.0773	0.0010
181270026	Porter	Valparaiso	0.986	0.0753	0.0743	0.0010

Table 2 – Results of Northeast Illinois VET Runs for 35% NO_x, 35% VOC

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference /ozone impact (ppm)
170971007	Lake	Zion, IL	0.966	0.0780	0.0753	0.0027
180890022	Lake	Gary	1.021	0.0777	0.0793	+0.0016
180890030	Lake	Whiting	1.002	0.0793	0.0795	+0.0002
180892008	Lake	Hammond	1.002	0.0777	0.0778	+0.0001
181270024	Porter	Ogden Dunes	1.047	0.0783	0.0820	+0.0037
181270026	Porter	Valparaiso	1.013	0.0753	0.0763	+0.001

Table 3 – Results of Northeast Illinois VET Runs for 35% NO_x

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference /ozone impact (ppm)
170971007	Lake	Zion, IL	0.968	0.0780	0.0755	0.0025
180890022	Lake	Gary	1.036	0.0777	0.0805	+0.0028
180890030	Lake	Whiting	1.015	0.0793	0.0805	+0.0012
180892008	Lake	Hammond	1.015	0.0777	0.0788	+0.0011
181270024	Porter	Ogden Dunes	1.063	0.0783	0.0833	+0.005
181270026	Porter	Valparaiso	1.027	0.0753	0.0771	+0.0018

Table 4 – Results of Northeast Illinois VET Runs for 35% VOC

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference /ozone impact (ppm)
170971007	Lake	Zion, IL	0.984	0.0780	0.0768	0.0012
180890022	Lake	Gary	1.007	0.0777	0.0782	+0.0005
180890030	Lake	Whiting	0.998	0.0793	0.0792	0.0002
180892008	Lake	Hammond	0.998	0.0777	0.0775	0.0002
181270024	Porter	Ogden Dunes	1.027	0.0783	0.0804	+0.0021
181270026	Porter	Valparaiso	1.014	0.0753	0.0764	+0.0011

Table 5 – Results of Northeast Illinois VET Runs for 3% NO_x, 12% VOC

Monitor ID	County	Site	Relative Response Factor	2003-2007 Modeled Design Value (ppm)	2003-2007 Modeled Chicago VET Design Value (ppm)	2003-2007 Modeled Difference /ozone impact (ppm)
170971007	Lake	Zion, IL	0.997	0.0780	0.0778	0.0002
180890022	Lake	Gary	1.000	0.0777	0.0777	0.0000
180890030	Lake	Whiting	0.999	0.0793	0.0793	0.0000
180892008	Lake	Hammond	0.999	0.0777	0.0776	0.0001
181270024	Porter	Ogden Dunes	1.002	0.0783	0.0785	+0.0002
181270026	Porter	Valparaiso	1.000	0.0753	0.0753	0.0000