

**Chicago, IL-IN-WI Nonattainment Area
Final Area Designations for the
2015 Ozone National Ambient Air Quality Standards
Technical Support Document (TSD) for Counties Remanded to EPA**

1.0 Summary

This technical support document (TSD) describes EPA’s final designations for the Chicago, IL-IN-WI area in Illinois, Indiana, and Wisconsin as nonattainment for the 2015 ozone National Ambient Air Quality Standards (NAAQS).

On October 1, 2015, EPA promulgated revised primary and secondary ozone national ambient air quality standards (NAAQS (80 FR 65292, October 26, 2015)). In that action, EPA strengthened both standards to a level of 0.070 parts per million (ppm), while retaining their indicators, averaging times, and forms. EPA revised the ozone standards based on an integrated assessment of an extensive body of new scientific evidence, which substantially strengthens our knowledge regarding ozone-related health and welfare effects, the results of exposure and risk analyses, the advice of the Clean Air Scientific Advisory Committee and consideration of public comments.

Following promulgation of a new or revised NAAQS, the Clean Air Act (CAA) requires EPA to determine if areas in the country meet the new standards. Accordingly, EPA designated all areas of the country as to whether they met, or did not meet, the NAAQS. EPA designated areas for the 2015 Ozone NAAQS in 3 rounds, resulting in 52 nonattainment areas. These are described below:

- Round 1- November 6, 2017: EPA designated 2,646 counties, 2 separate tribal areas and 5 territories as Attainment/Unclassifiable. We also designated 1 Unclassifiable area.
- Round 2- April 30, 2018: EPA designated 51 Nonattainment areas, 1 Unclassifiable area, and all remaining areas as Attainment/Unclassifiable, except for the 8 counties in the San Antonio, TX area.
- Round 3- July 17, 2018: EPA designated 1 county in the San Antonio area as Nonattainment and the other 7 counties as Attainment/Unclassifiable.

Challenges to EPA’s Designations

Multiple petitioners (several environmental and public health advocacy groups, 3 local government agencies, and the State of Illinois) filed six petitions for review challenging EPA’s 2015 ozone NAAQS designations promulgated on April 30, 2018. The District of Columbia Circuit Court consolidated the petitions into a single case, *Clean Wisconsin v. EPA* (No. 18-1203).

- Collectively, the petitioners challenged aspects of EPA’s final designations associated with 9 nonattainment areas, and involving 17 counties.
- Petitioners primarily argued that EPA improperly designated counties (in whole or part) as attainment that should have been designated as nonattainment based on contributions to nearby counties with violating monitors.
- In its brief, EPA requested voluntary remand of the final designation decisions for 10 counties associated with 4 nonattainment areas to further review those designations.

Court Decision

On July 10, 2020, the District of Columbia Circuit Court issued its decision on the April 30, 2018, designations. The Court granted EPA’s request for voluntary remand, as well as remanding a number of other areas to the Agency. In total, the Court remanded 16 counties in 9 nonattainment areas back to EPA. The Court did not vacate the existing designations, but required EPA to “issue revised designations as expeditiously as practicable.”

The Court granted EPA’s request for voluntary remand for McHenry County in Illinois, Porter County in Indiana, and Kenosha County in Wisconsin. In light of the Court decision, EPA re-evaluated the existing technical record for McHenry, IL, Porter, IN, and Kenosha, WI for data and information that was used for the initial April 2018 designations. Based on EPA’s technical re-analysis as described in this TSD, EPA is modifying the initial air quality designation for McHenry, IL, Porter, IN, and Kenosha, WI. Table 1 shows EPA’s 2018 designation and the final modification to that designation. EPA must designate an area nonattainment if it has an air quality monitor that is violating the standard or if it has sources of emissions that are contributing to a violation of the NAAQS in a nearby area. Detailed descriptions of the nonattainment boundary for McHenry, IL, Porter, IN, and Kenosha, WI are found in the supporting technical analysis below.

Table 1. Chicago, IL-IN-WI Recommended Nonattainment Areas and the EPA’s Final Designated Nonattainment Areas for the 2015 Ozone NAAQS

Area	State's Recommended Nonattainment Counties	EPA’s Intended Nonattainment Counties (December 22, 2017)	EPA’s Final Nonattainment Counties (April 30, 2018)	EPA’s Final Nonattainment Counties – Remand Response (January 2021)
Chicago, IL-IN-WI (IL)	Cook DuPage Grundy (partial) Kane Kendall (partial) Lake McHenry ¹ Will	Cook DuPage Grundy (partial) Kane Kendall (partial) Lake McHenry Will	Cook DuPage Grundy (partial) Kane Kendall (partial) Lake Will	Cook DuPage Grundy (partial) Kane Kendall (partial) Lake McHenry Will
Chicago, IL-IN-WI (IN)	None – recommended attainment	Lake Porter	Lake (partial)	Lake (partial) Porter (partial)

¹ On September 30, 2016, Illinois submitted the state’s recommendation that a designation of nonattainment for McHenry County would be appropriate. After EPA released its intended designations, Illinois submitted a letter on April 26, 2018, notifying EPA that it “it would seem appropriate to consider a designation of attainment” for McHenry County. EPA does not believe that the letter Illinois sent in April 2018 constituted an updated recommendation from the state. This is supported by the fact that Illinois was among the Petitioners seeking a remand of the April 2018 McHenry County attainment designation. As such, EPA is relying on Illinois’ September 30, 2016, recommendation that McHenry County be designated as nonattainment.

Chicago, IL-IN-WI (WI)	None – recommended attainment	Kenosha (partial – inclusive and east of I-94)	Kenosha (partial – inclusive and east of 88th Ave)	Kenosha (partial – inclusive and east of I-94)
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2.0 Nonattainment Area Analyses and Boundary Determination

EPA re-evaluated the designations for McHenry, IL, Porter, IN, and Kenosha, WI considering the specific facts and circumstances of the area using data available at the time of the original designation in April 2018. In accordance with the CAA section 107(d), EPA is designating as nonattainment the areas with the monitors that are violating the 2015 ozone NAAQS and nearby areas with emissions sources (i.e., stationary, mobile, and/or area sources) that contribute to the violations. As described in EPA’s designations guidance for the 2015 NAAQS (hereafter referred to as the “ozone designations guidance”² after identifying each monitor indicating a violation of the ozone NAAQS in an area, EPA analyzed those nearby areas with emissions potentially contributing to the violating area. In guidance issued in February 2016, EPA provided that using the Core Based Statistical Area (CBSA) or Combined Statistical Area (CSA)³ as a starting point for the contribution analysis is a reasonable approach to ensure that the nearby areas most likely to contribute to a violating area are evaluated. The area-specific analyses may support nonattainment boundaries that are smaller or larger than the CBSA or CSA.

As noted above, EPA completed initial area designations in three separate rounds. In accordance with the Court’s decision, EPA has re-evaluated the designations for McHenry, IL, Porter, IN, and Kenosha, WI consistent with the designations guidance (and EPA’s past practice) regarding the scope of the area EPA would analyze in determining nonattainment boundaries for the ozone NAAQS as outlined above. The Technical Analysis section below contains EPA’s re-analysis of the existing technical record for the Chicago, IL-IN-WI area.

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

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

Master Legend

Ozone monitoring site with 2014-2016 design value

- No valid value
- 0 - 0.070 parts per million (ppm)
- 0.071 and above


National Emissions Inventory (NEI) 2014 v1


- Large Point Sources (VOC or NO_x >= 100 gross tons)
- ★ Small Point Sources


Hysplit

Elevation (Meters)

- ~ 100
- ~ 500
- ~ 1,000


 EPA's Final Nonattainment Area Boundary

 Federal American Indian Reservations and Off Reservation Lands

 State Boundaries



 County Boundaries

 CSAs - Combined Statistical Areas

 CBSAs - Metropolitan Statistical Areas

 CBSAs - Micropolitan Statistical Areas






NAAAs-8 Hour Ozone (1997 NAAQS)

-  Maintenance (NAAQS revoked)
-  Nonattainment (NAAQS revoked)






NAAAs-8 Hour Ozone (2008 NAAQS)

-  Nonattainment
-  Maintenance






County Population (2010)

-  > 5,194,675 to 9,818,605
-  > 2,035,210 to 5,194,675
-  > 744,344 to 2,035,210
-  > 220,000 to 744,344
-  0 to 220,000

Census Tracts Population (2012)

-  0 to 2,825
-  > 2,825 to 4,481
-  > 4,481 to 6,373
-  > 6,373 to 10,145
-  > 10,145 to 39,143

Vehicle Miles Traveled - 2014

-  0 - 36,071,088
-  36,071,088.01 - 52,484,020
-  52,484,020.01 - 88,659,368
-  88,659,368.01 - 204,018,496
-  204,018,496.01 - 5,247,588,352

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

3.0 Technical Analysis for Chicago, IL-IN-WI Nonattainment Area

This technical analysis identifies any monitors in the Chicago, IL-IN-WI area that violate the 2015 ozone NAAQS. It also provides EPA's re-evaluation of McHenry, IL, Porter, IN, and Kenosha, WI to determine whether these counties have emissions sources that potentially contribute to ambient ozone concentrations at nearby violating monitors in the area, based on the weight-of-evidence of the five factors recommended in EPA's ozone designations guidance and any other relevant information. In re-analyzing the designations for McHenry, IL, Porter, IN, and Kenosha, WI, EPA used the technical data and information available at the time of the initial air quality designations.

EPA's area of analysis is the Chicago-Naperville, IL-IN-WI CSA, which includes the following 19 counties: Bureau, Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, LaSalle, McHenry, Putnam, and Will in Illinois, Jasper, Lake, LaPorte, Newton, and Porter in Indiana, and Kenosha in Wisconsin. The EPA applied the five factors recommended in its guidance to the area of analysis to determine the nonattainment boundary.

The five factors recommended in the EPA's guidance are:

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

Figure 1 is a map of the EPA's nonattainment boundary for the Chicago, IL-IN-WI nonattainment area. The map shows the location of the ambient air quality monitors, county, and other jurisdictional boundaries.

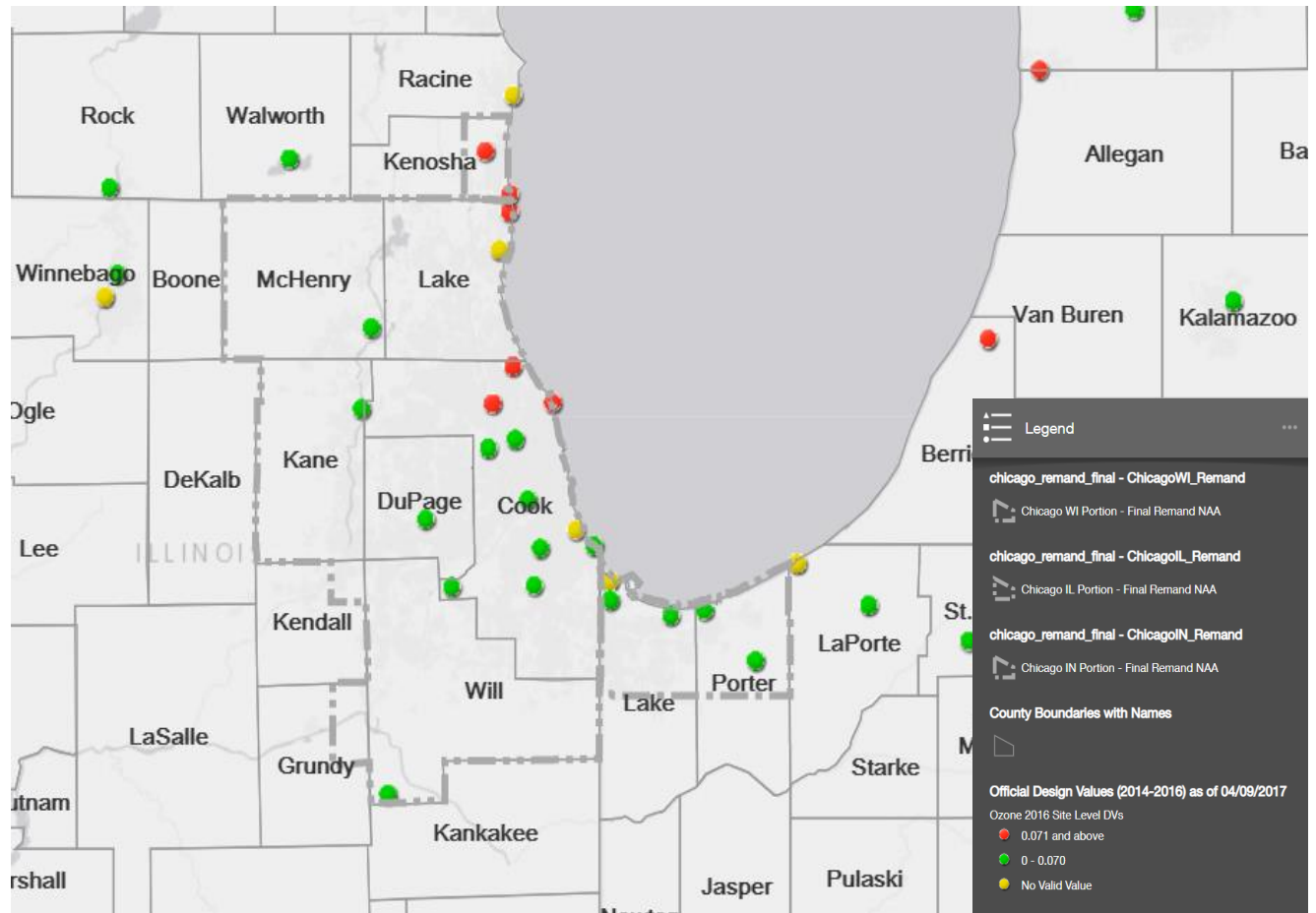
For purposes of the 1997 ozone NAAQS, the Chicago-Gary-Lake County, IL-IN nonattainment area included the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will and the partial counties of Grundy and Kendall in Illinois, and the entire counties of Lake and Porter in Indiana. For purposes of the 1997 ozone NAAQS, Kenosha County in Wisconsin was designated as part of the Milwaukee-Racine, WI nonattainment area.

For purposes of the 2008 ozone NAAQS, the Chicago-Naperville, IL-IN-WI nonattainment area included the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will and portions of Grundy and Kendall Counties in Illinois, the entire counties of Lake and Porter in Indiana, and a portion of Kenosha County in Wisconsin.

For purposes of the 1997 and 2008 ozone NAAQS, the partial counties in Illinois are defined as Aux Sable Township and Goose Lake Township in Grundy County, and Oswego Township in Kendall County. For purposes of the 2008 ozone NAAQS, the partial county in Wisconsin is defined as the portion of Kenosha County bounded by the Lake Michigan shoreline on the East, the Kenosha County

boundary on the North, the Kenosha County boundary on the South, and the I-94 corridor (including the entire corridor) on the West.

Figure 1. EPA's Nonattainment Boundaries for the Chicago, IL-IN-WI Area (2014 -2016 Design Values)



The EPA must designate as nonattainment any area that violates the NAAQS and any nearby areas that contribute to the violation in the violating area. Cook County and Lake County in Illinois and Kenosha County in Wisconsin each have at least one monitor in violation of the 2015 ozone NAAQS, therefore these counties are included in the final nonattainment area. The EPA's analysis finds that the counties of DuPage, Grundy (partial), Kane, Kendall (partial), McHenry, and Will in Illinois, and Lake (partial) and Porter (partial) in Indiana, contribute to the violating area. The following sections describe the five factor analysis EPA used to identify the areas that contribute to the violations. While the factors are presented individually, they are not independent. The five factor analysis process carefully considers the interconnections among the different factors and the dependence of each factor on one or more of the others, such as the interaction between emissions and meteorology for the area being evaluated.

Factor Assessment

Factor 1: Air Quality Data

The EPA considered 8-hour ozone design values in ppm for air quality monitors in the Chicago-Naperville, IL-IN-WI CSA based on data for the most recent three-year period (i.e., the design value, or DV) with fully-certified air quality data. As described in the EPA's ozone designations guidance, EPA evaluates areas using the most recent complete three consecutive calendar years of quality-assured, certified air quality data in the EPA Air Quality System (AQS). In accordance with 40 CFR 58.15, states are required to certify their air monitoring data for the previous year by May 1 of each year. Some states may choose to certify air quality data prior to the certification deadline (i.e., "early-certify") so that the EPA can rely on the newer data for designations. For purposes of responding to the court's remanded designations, EPA is considering the most recent air quality monitoring data that was available at the time of EPA's finalization of designations in April 2018. For the three states that comprise a portion of the Chicago-Naperville, IL-IN-WI CSA, only Illinois chose to early-certify 2017 data before the May 1, 2018 deadline. Illinois certified 2017 data on February 28, 2018, and the EPA concurred on March 30, 2018. The 2015-2017 design values for counties in the Illinois portion of the Chicago-Naperville, IL-IN-WI CSA show violations of the NAAQS in Cook County and Lake County in Illinois, and no violations in other counties in the CSA; this is not a change from the 2014-2016 data for Illinois, which also showed violations in only these two Illinois counties within the CSA. Therefore, the early certified data would not result in a change to the designations for those counties.

The design value is the 3-year average of the annual 4th highest daily maximum 8-hour average ozone concentration.⁴ The 2015 NAAQS are met when the design value is 0.070 ppm or less. Only ozone measurement data collected in accordance with the quality assurance (QA) requirements using approved (FRM/FEM) monitors are used for NAAQS compliance determinations.⁵ The EPA uses FRM/FEM measurement data residing in the EPA's Air Quality System (AQS) database to calculate the ozone design values. Individual violations of the 2015 ozone NAAQS that the EPA determines have been caused by an exceptional event that meets the administrative and technical criteria in the Exceptional Events Rule⁶ are not included in these calculations. Whenever several monitors are located in a county (or designated nonattainment area), the design value for the county or area is determined by the monitor with the highest valid design value. The presence of one or more violating monitors (i.e. monitors with design values greater than 0.070 ppm) in a county or other geographic area forms the basis for designating that county or area as nonattainment. The remaining four factors are then used as the technical basis for determining the spatial extent of the designated nonattainment area surrounding the violating monitor(s) based on a consideration of what nearby areas are contributing to a violation of the NAAQS.

⁴ The specific methodology for calculating the ozone design values, including computational formulas and data completeness requirements, is described in 40 CFR part 50, appendix U.

⁵ The QA requirements for ozone monitoring data are specified in 40 CFR part 58, appendix A. The performance test requirements for candidate FEMs are provided in 40 CFR part 53, subpart B.

⁶ The EPA finalized the rule on the Treatment of Data Influenced by Exceptional Events (81 FR 68513) and the guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events in September of 2016. For more information, see <https://www.epa.gov/air-quality-analysis/exceptional-events-rule-and-guidance>.

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

The 2014-2016 design values for counties in the Chicago, IL-IN-WI nonattainment area and nearby surrounding area are shown in Table 2.

Table 2. 2014-2016 Air Quality Data (all values in ppm)^a

County, State	State Recommended Nonattainment?	AQS Site ID	2014-2016 DV	2014 4 th highest daily max value	2015 4 th highest daily max value	2016 4 th highest daily max value
Bureau, IL	No	No monitor	N/A			
Cook, IL	Yes	170310001	0.069	0.066	0.066	0.075
		170310032	0.070	0.067	0.066	0.077
		170310076	0.069	0.067	0.065	0.075
		170311003	0.069	0.065	0.068	0.075
		170311601	0.069	0.070	0.066	0.073
		170313103	0.062	0.063	0.058	0.067
		170314002	0.066	0.063	0.061	0.076
		170314007	0.071	0.069	0.068	0.076
		170314201	0.071	0.068	0.068	0.079
		170317002	0.072	0.072	0.070	0.076
DeKalb, IL	No	No monitor	N/A			
DuPage, IL	Yes	170436001	0.068	0.064	0.067	0.074
Grundy, IL	Yes (partial)	No monitor	N/A			
Kane, IL	Yes	170890005	0.068	0.066	0.065	0.074
Kankakee, IL	No	No monitor	N/A			
Kendall, IL	Yes (partial)	No monitor	N/A			
Lake, IL	Yes	170971007	0.073	0.073	0.070	0.077
LaSalle, IL	No	No monitor	N/A			
McHenry, IL	Yes	171110001	0.068	0.067	0.064	0.073
Putnam, IL	No	No monitor	N/A			
Will, IL	Yes	171971011	0.064	0.064	0.064	0.064
Jasper, IN	No	No monitor	N/A			

Lake, IN	No	180890022	0.067	0.067	0.064	0.070
		180890030	N/A	0.065	0.070	N/A
		180892008	0.065	0.067	0.060	0.068
LaPorte, IN	No	180910005	N/A	0.070	0.067	N/A
		180910010	0.063	0.061	0.061	0.068
Newton, IN	No	No monitor	N/A			
Porter, IN	No	181270024	0.069	0.071	0.066	0.070
		181270026	0.066	0.067	0.060	0.071
Kenosha, WI	No	550590019	0.077	0.076	0.075	0.080
	No	550590025	0.071	0.070	0.068	0.076

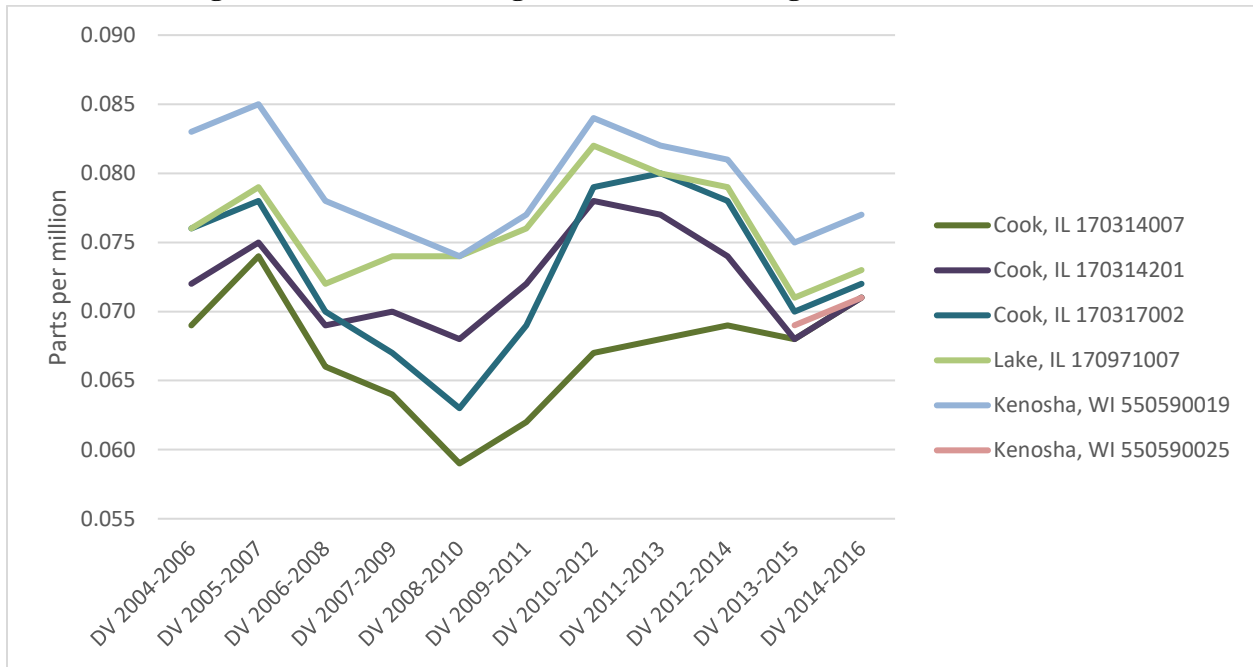
^a The highest design value in each county is indicated in bold type.

N/A means that the monitor did not meet the completeness criteria described in 40 CFR, part 50, Appendix U, or no data exists for the county.

Cook County and Lake County in Illinois and Kenosha County in Wisconsin show a violation of the 2015 ozone NAAQS, therefore these counties or parts of 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 in the area of analysis 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.

Figure 1, shown previously, identifies the Chicago, IL-IN-WI final nonattainment area and the violating monitors. Table 2 identifies the 2014-2016 design values for all monitors in the area of analysis and Figure 2 shows the historical trend of design values for the violating monitors. As indicated on the map, there are three violating monitors located in Cook County in Illinois and one violating monitor located in Lake County in Illinois. There are two violating monitors located in Kenosha County in Wisconsin. To the west, southwest, south, and southeast of the violating monitors, there are 16 monitors in the Chicago-Naperville, IL-IN-WI CSA that are not violating for the 2015 NAAQ. As shown in Figure 2, the violating monitors in the Chicago-Naperville, IL-IN-WI CSA show fluctuations, but an overall downward trend over the last decade, though there has been a small uptick based on the 2014-2016 design value.

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



Under section 107(d) of the CAA, EPA must designate as nonattainment any area with at least one monitor that is violating the 2015 ozone NAAQS. In the Illinois portion of the Chicago-Naperville, IL-IN-WI CSA, violating monitors are located in Cook County and Lake County. In its September 30, 2016 letter, Illinois recommended that the entirety of these counties be designated as nonattainment for the 2015 ozone NAAQS, and EPA is not modifying this recommendation. In the Wisconsin portion of the Chicago-Naperville, IL-IN-WI CSA, two monitors in Kenosha County are violating the standard based on data from 2014-2016. In its September 21, 2016 letter, Wisconsin recommended that the entire state be designated as attainment for the 2015 ozone NAAQS. However, EPA must designate as nonattainment the area that includes the violating monitors in Kenosha County, and EPA is therefore designating as nonattainment the same partial county area surrounding the monitors that was designated as nonattainment for the 2008 ozone NAAQS. The remaining counties in the CSA are evaluated for contribution to violating monitors using the weight-of-evidence of the five factors.

Factor 2: Emissions and Emissions-Related Data

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

Emissions Data

The EPA reviewed data from the 2014 National Emissions Inventory (NEI). For each county in the area of analysis, the EPA examined the magnitude of large sources (NO_x or VOC emissions greater than 100 tons per year) and small point sources and the magnitude of county-level emissions reported in the NEI. These county-level emissions represent the sum of emissions from the following general source

categories: point sources, non-point (i.e., area) sources, non-road mobile, on-road mobile, and fires. Emissions levels from sources in a nearby area indicate the potential for the area to contribute to monitored violations.

Table 3 provides a county-level emissions summary of NO_x and VOC (given in tons per year (tpy)) emissions for the area of analysis considered for inclusion in the Chicago, IL-IN-WI nonattainment area.

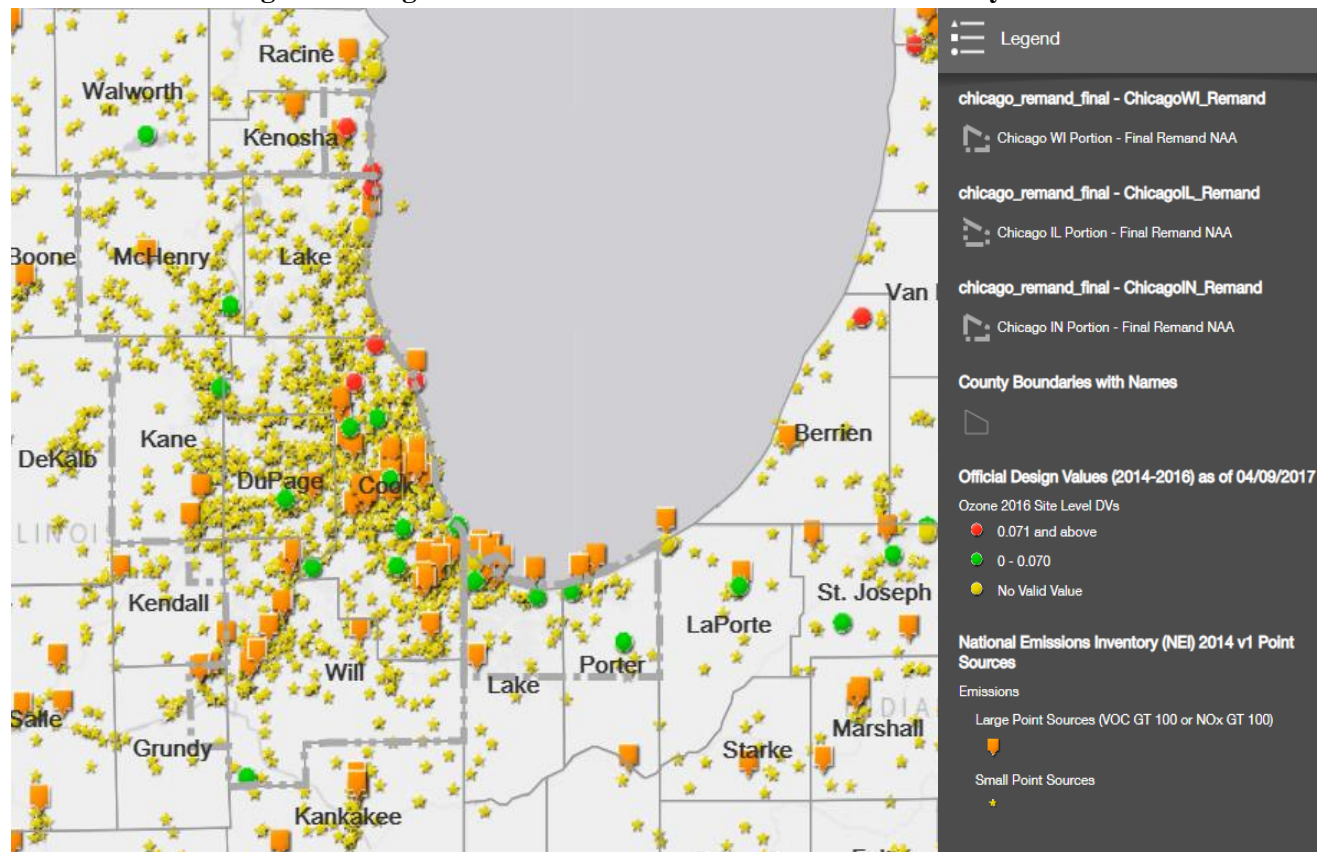
Table 3. Total County-Level NO_x and VOC Emissions

County	State Recommended Nonattainment?	Total NO _x (tpy)	Total VOC (tpy)
Cook, IL	Yes	95,864	86,253
Lake, IN	No	28,923	15,309
Will, IL	Yes	23,750	14,607
DuPage, IL	Yes	22,000	19,742
Lake, IL	Yes	17,615	15,143
Porter, IN	No	16,649	6,090
Kane, IL	Yes	11,335	10,533
Jasper, IN	No	10,212	1,999
La Salle, IL	No	7,992	5,073
La Porte, IN	No	7,586	4,534
McHenry, IL	Yes	6,675	6,353
Kenosha, WI	No	6,034	3,290
Kankakee, IL	No	4,053	4,216
Grundy, IL	Yes (partial)*	3,582	2,120
DeKalb, IL	No	3,391	3,288
Kendall, IL	Yes (partial)*	3,025	3,251
Bureau, IL	No	2,676	1,818
Putnam, IL	No	2,127	718
Newton, IN	No	952	1,838
Area wide:		274,440	206,171

* For state recommended partial counties, the emissions shown are for the entire county.

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

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



The 15 Illinois counties in the CSA account for 74% of all NO_x emissions in the CSA, as well as 84% of all VOC emissions in the CSA. The five Indiana counties in the CSA account for 23% and 14% of total CSA NO_x and VOC emissions, respectively; a majority of NO_x and VOC emissions from the Indiana portion of the CSA come from Lake County and Porter County. Kenosha County in Wisconsin accounts for 2% of both total NO_x and total VOC emissions in the CSA.

Cook County in Illinois has significantly higher emissions than all of the other counties. NO_x emissions in Cook County are over 95,000 tpy and are 3 to 5 times greater than those in counties with the next highest NO_x emissions – DuPage and Will in Illinois and Lake in Indiana. VOC emissions in Cook County are over 86,000 tpy and are 4 to 6 times greater than those in the counties with the next highest VOC emissions – DuPage, Lake and Will in Illinois and Lake in Indiana. Kane and Lake Counties in Illinois and Jasper and Porter Counties in Illinois also have relatively high NO_x emissions of over 10,000 tpy, and Kane County in Illinois has VOC emissions exceeding 10,000 tpy.

Point sources in Lake and Porter Counties in Indiana are concentrated in the northern portions of each county. EPA’s partial-county nonattainment area in Lake County, IN captures 98% of NO_x emissions and 99% of VOC emissions from the county’s point sources. EPA’s partial-county nonattainment area in Porter County, IN captures 100% of NO_x emissions and 100% of VOC emissions from the county’s point sources.

LaSalle and McHenry Counties in Illinois and LaPorte County in Indiana emit between approximately 6,600 to 7,900 tpy NO_x and approximately 6,300 and 5,000 tpy VOC. DeKalb, Grundy, Kankakee, and Kendall in Illinois, LaPorte in Indiana, and Kenosha in Wisconsin all emit between approximately 3,000 to 6,000 tpy of NO_x, and 2,100 to 6,000 tpy of VOC.

The lowest emissions in the CSA are from Bureau and Putnam in Illinois and Newton in Indiana, with all three counties emitting under 3,000 tpy of NO_x and 1,900 tpy of VOC.

Population density and degree of urbanization

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

Table 4. Population and Growth

County	State Recommended Nonattainment?	2010 Population	2015 Population	2015 Population Density (per sq. mi.)	Absolute change in population (2010-2015)	Population % change (2010-2015)
Cook, IL	Yes	5,194,675	5,238,216	5,541	43,541	1%
DuPage, IL	Yes	916,924	933,736	2,851	16,812	2%
Lake, IL	Yes	703,462	703,910	1,587	448	0%
Will, IL	Yes	677,560	687,263	821	9,703	1%
Kane, IL	Yes	515,269	530,847	1,021	15,578	3%

Lake, IN	No	496,005	487,865	978	-8,140	-2%
McHenry, IL	Yes	308,760	307,343	510	-1,417	0%
Kenosha, WI	No	166,426	168,437	619	2,011	1%
Porter, IN	No	164,343	167,688	401	3,345	2%
Kendall, IL	Yes (partial)*	114,736	123,355	385	8,619	8%
LaSalle, IL	No	113,924	111,333	98	-2,591	-2%
LaPorte, IN	No	111,467	110,884	185	-583	-1%
Kankakee, IL	No	113,449	110,879	164	-2,570	-2%
DeKalb, IL	No	105,160	104,352	165	-808	-1%
Grundy, IL	Yes (partial)*	50,063	50,541	121	478	1%
Bureau, IL	No	34,978	33,587	39	-1,391	-4%
Jasper, IN	No	33,478	33,470	60	-8	0%
Newton, IN	No	14,244	14,008	35	-236	-2%
Putnam, IL	No	6,006	5,644	35	-362	-6%
Area wide:		9,840,929	9,923,358	933	82,429	1%

* For state recommended partial counties, the population shown is for the entire county.

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

The total population of Cook County is more than 5 times greater than that of DuPage County, Illinois, which has the second highest population. The population density of Cook County is almost twice that of DuPage County, Illinois, which is the next most densely populated county in the area of analysis.

DuPage, Kane, Lake, McHenry, and Will in Illinois all have relatively high populations in excess of 300,000, with population densities ranging from approximately 500 to 2800. Lake County in Indiana is

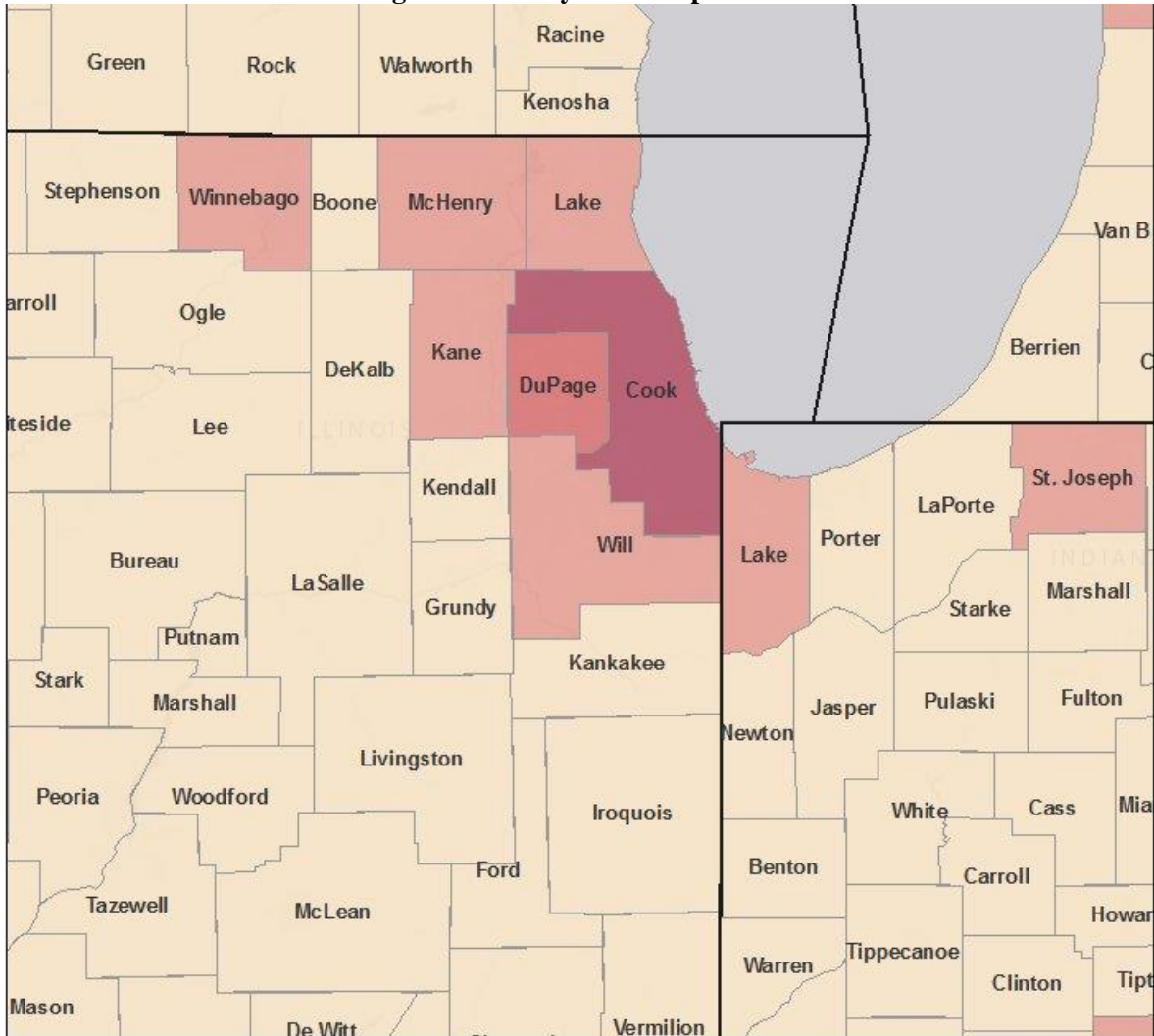
similar in terms of total population and population density. Kendall County in Illinois, Porter County in Indiana, and Kenosha County in Wisconsin all have moderately high population densities (between about 380 and 600) and have populations over 100,000.

The fastest-growing county in the CSA is Kendall in Illinois, with an increase in population of 8% between 2010 and 2015. Growth in most of the remaining counties has been relatively stagnant, ranging from a slight decline of 2% to minor growth of 3%. Two of the least populated counties have seen a more significant decline of 4% in Bureau, Illinois and 6% in Putnam, Illinois.

Because EPA has designated several partial counties for previous ozone standards and the State recommended and/or EPA is designating partial counties for the 2015 ozone standard, EPA examined total population for those portions of the counties that had previously been included as part of the nonattainment area for previous standards. For purposes of the 1997 ozone NAAQS, 2008 ozone NAAQS, as well as the 2015 ozone NAAQS, the partial counties in Illinois are defined as Aux Sable Township and Goose Lake Township in Grundy County, and Oswego Township in Kendall County. Using 2010 data from American FactFinder provided by the U.S. Census Bureau, the most recent township-level data available, Aux Sable Township and Goose Lake Township together account for 14,735 of the total 50,063 people in Grundy County, or 29% of the county population. Oswego Township accounts for 50,870 of the 114,736 total people in Kendall County, or 44% of the county population. For purposes of the 2008 ozone NAAQS as well as the 2015 ozone NAAQS, the partial county in Wisconsin is defined as the portion of Kenosha County bounded by the Lake Michigan shoreline on the East, the Kenosha County boundary on the North, the Kenosha County boundary on the South, and the I-94 corridor (including the entire corridor) on the West. Using 2010 data from American FactFinder provided by the U.S. Census Bureau, the most recent census tract-level data available, Kenosha census tracts 1 through 26, which are roughly contiguous with this partial county area, together account for 127,931 of the total 166,426 people in Kenosha County, or 77% of the county population.

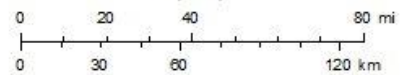
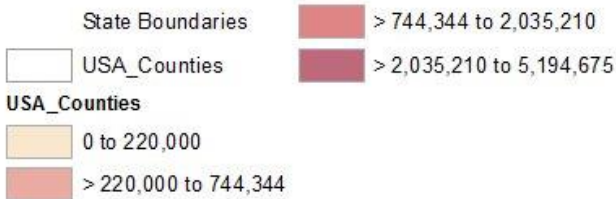
For purposes of the 2015 ozone NAAQS, the partial Lake County in Indiana is defined by North, Calumet, Hobart, St. John, and Ross townships. Using 2010 data from American FactFinder provided by the U.S. Census Bureau, these 5 townships account for 425,748 of the total 484,564 population of Lake County, or 88%. For purposes of the 2015 ozone NAAQS, the partial Porter County in Indiana is defined by Center, Jackson, Liberty, Pine, Portage, Union, Washington, and Westchester townships. Using 2010 data from American FactFinder provided by the U.S. Census Bureau, these eight townships account for 140,700 of the total 164,343 population of Porter County, or 86%.

Figure 4. County-Level Population



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Standards (OAQPS), U.S. Census Bureau | Map Service: USEPA Office of Environmental Information (OEI). Data: USEPA Office of Environmental Information (OEI), US Census Bureau | Source: U.S. Census Bureau |
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Traffic and Vehicle Miles Travelled (VMT)

The EPA evaluated the commuting patterns of residents, as well as the total vehicle miles traveled (VMT) for each county in the area of analysis. In combination with the population/population density data and the location of main transportation arteries, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and high VMT and/or high number of commuters indicates the presence of motor vehicle emissions that may contribute to violations of the NAAQS. Rapid population or VMT growth in a county on the urban perimeter may signify increasing integration with the core urban area, and thus could indicate that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. In addition to

VMT, the EPA evaluated worker data collected by the U.S. Census Bureau⁷ for the area of analysis. Table 5 shows the traffic and commuting pattern data, including total VMT for each county in the area of analysis, number of residents who work in each county, number of residents that work in counties with violating monitor(s), and the percent of residents working in counties with violating monitor(s). The data in Table 5 are 2014 data.

Table 5. Traffic and Commuting Patterns.

County	State Recommended Nonattainment?	2014 Total VMT (Million Miles)	Number of County Residents Who Work	Number Commuting to or Within Counties with Violating Monitor(s)	Percentage Commuting to or Within Counties with Violating Monitor(s)
Cook, IL	Yes	30,968	2,281,855	1,880,913	82.4%
DuPage, IL	Yes	8,432	473,828	196,322	41.4%
Will, IL	Yes	5,991	328,451	119,431	36.4%
Lake, IN	No	5,784	206,639	41,770	20.2%
Lake, IL	Yes	5,773	315,423	266,440	84.5%
Kane, IL	Yes	3,825	237,495	74,361	31.3%
McHenry, IL	Yes	2,345	155,466	65,714	42.3%
Porter, IN	No	2,120	79,113	5,027	6.4%
LaPorte, IN	No	1,628	47,902	1,345	2.8%
LaSalle, IL	No	1,356	50,930	4,896	9.6%
Kenosha, WI	No	1,313	80,194	50,036	62.4%
Kankakee, IL	No	980	47,850	9,677	20.2%
DeKalb, IL	No	899	44,297	5,093	11.5%
Jasper, IN	No	809	15,981	479	3.0%
Kendall, IL	Yes (partial)*	777	63,080	16,638	26.4%
Grundy, IL	Yes (partial)*	711	25,581	5,508	21.5%
Bureau, IL	No	540	16,440	873	5.3%
Newton, IN	No	246	6,625	269	4.1%

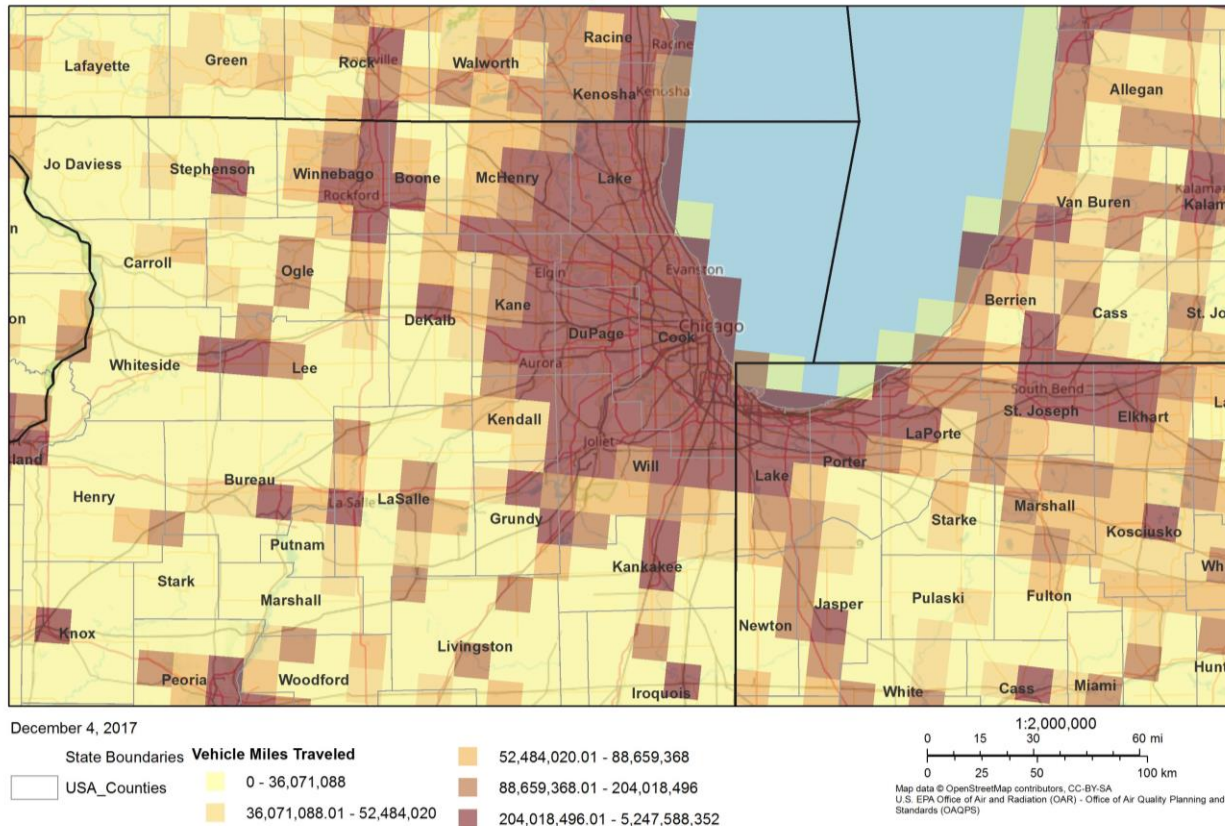
⁷ The worker data can be accessed at: <http://onthemap.ces.census.gov/>.

Putnam, IL	No	66	2,932	145	4.9%
Total:		74,563	4,480,082	2,744,937	61.3%

* For state recommended partial counties, the data provided are for the entire county.
 Counties with a monitor(s) violating the NAAQS are indicated in bold.

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

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



Office of Air Quality Planning and Standards (OAQPS), U.S. Census Bureau | Map Service: USEPA Office of Environmental Information (OEI), Data: USEPA Office of Environmental Information (OEI), US Census Bureau | Source: U.S. Census Bureau | Map data © OpenStreetMap contributors, CC-BY-SA | Web AppBuilder for ArcGIS

Commuting data is drawn from On the Map from the U.S. Census Bureau.

Cook County in Illinois has most traffic in the CSA, with annual VMT above 30 billion. DuPage County in Illinois ranks second in the CSA, with annual VMT above 8 billion. Will and Lake Counties in Illinois and Lake County in Indiana all have annual VMT between 5 billion and 6 billion. Kane, McHenry, and LaSalle Counties in Illinois, Porter and LaPorte Counties in Indiana, and Kenosha County in Wisconsin all have annual VMT between 1 billion and 4 billion. The other counties in the CSA have annual VMT below 1 billion. Within the CSA, monitors violating the 2015 ozone NAAQS are located in Cook and Lake Counties in Illinois and Kenosha County in Wisconsin. DuPage, Grundy, Kane, Kankakee, Kendall, McHenry, and Will in Illinois, and Lake in Indiana all report that at least 20% of workers commute to or within a county in the CSA with a violating monitor.

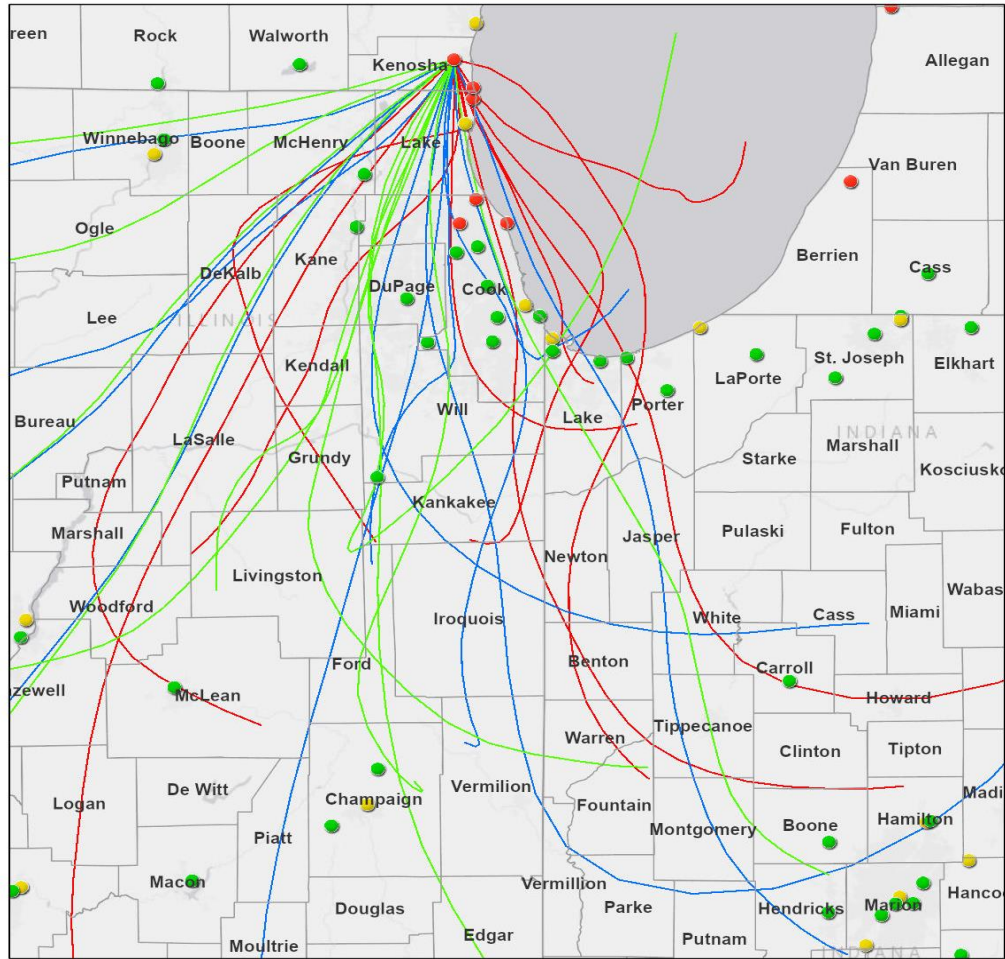
For Lake and Porter counties in Indiana, roadways and VMT are clustered in the northern portions of each county. The partial-county Lake and Porter nonattainment boundaries contain the counties' major east-west expressways, including the I-90 and I-94 corridors. As shown in Figure 5 above, the densest VMT – with twelve-kilometer gridded cells above 204 million – are concentrated in the northern portions of each county. The portions of Lake and Porter counties with densest VMT are captured by EPA's partial-county nonattainment boundaries.

For Kenosha County in Wisconsin, the primary highway corridor in the county is I-94. In defining the partial-county nonattainment boundary to include the I-94 corridor, EPA is able to capture these denser vehicular emissions within the nonattainment area.

Factor 3: Meteorology

Evaluation of meteorological data helps to assess the fate and transport of emissions contributing to ozone concentrations and to identify areas potentially contributing to the monitored violations. Results of meteorological data analysis may inform the determination of nonattainment area boundaries. In order to determine how meteorological conditions, including, but not limited to, weather, transport patterns, and stagnation conditions, could affect the fate and transport of ozone and precursor emissions from sources in the area. The EPA evaluated 2014-2016 HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) trajectories at 100, 500, and 1000 meters above ground level (AGL) that illustrate the three-dimensional paths traveled by air parcels to a violating monitor. Figures 6a through 6f show the 24-hour HYSPLIT back trajectories for each exceedance day (i.e., daily maximum 8-hour values that exceed the 2015 ozone NAAQS) for each of the violating monitors.

Figure 6a. HYSPLIT Back Trajectories for Kenosha County (Monitor ID 550590025)



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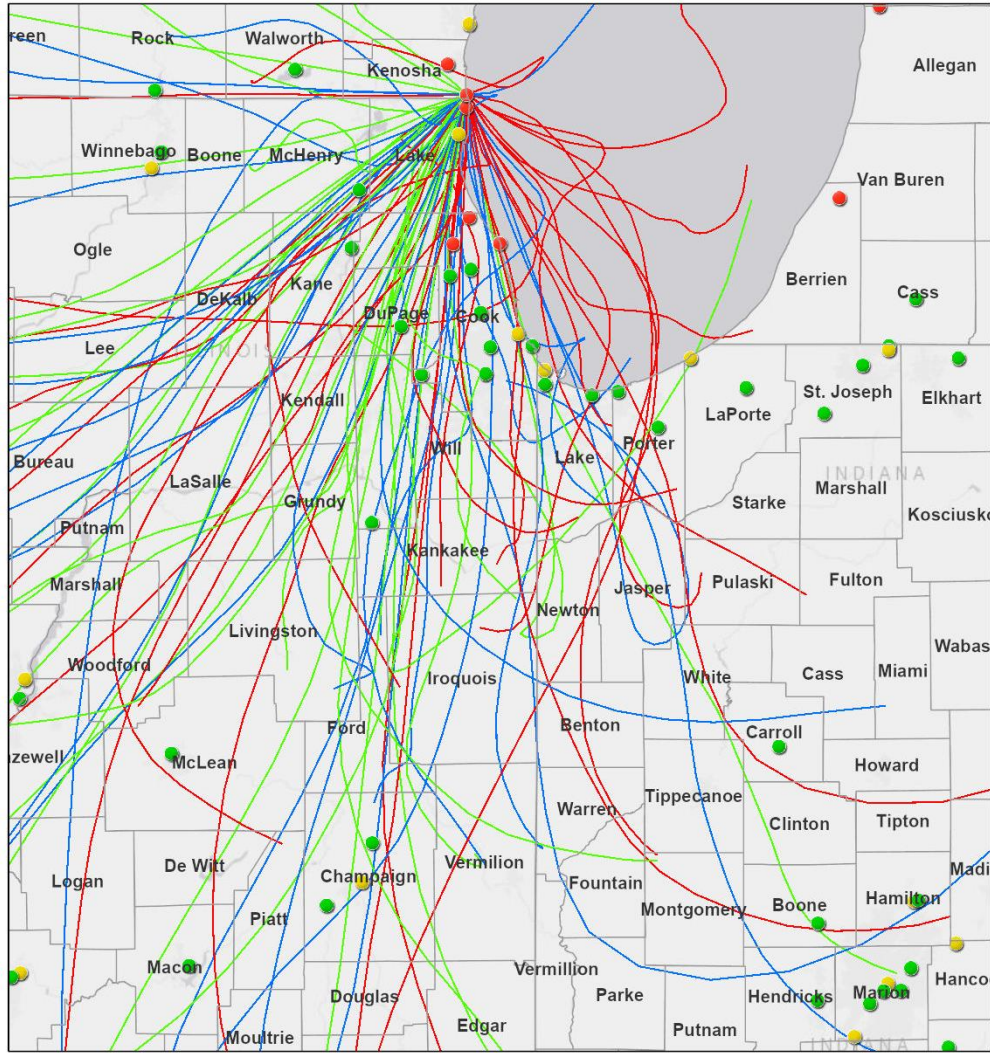
- County Boundaries with Names
- No Valid Value
- 0.071 and above
- 0 - 0.070
- 100
- 500
- 1,000

0 15 30 60 mi
0 20 40 80 km

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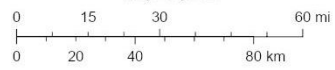
Figure 6b. HYSPLIT Back Trajectories for Kenosha County (Monitor ID 550590019)



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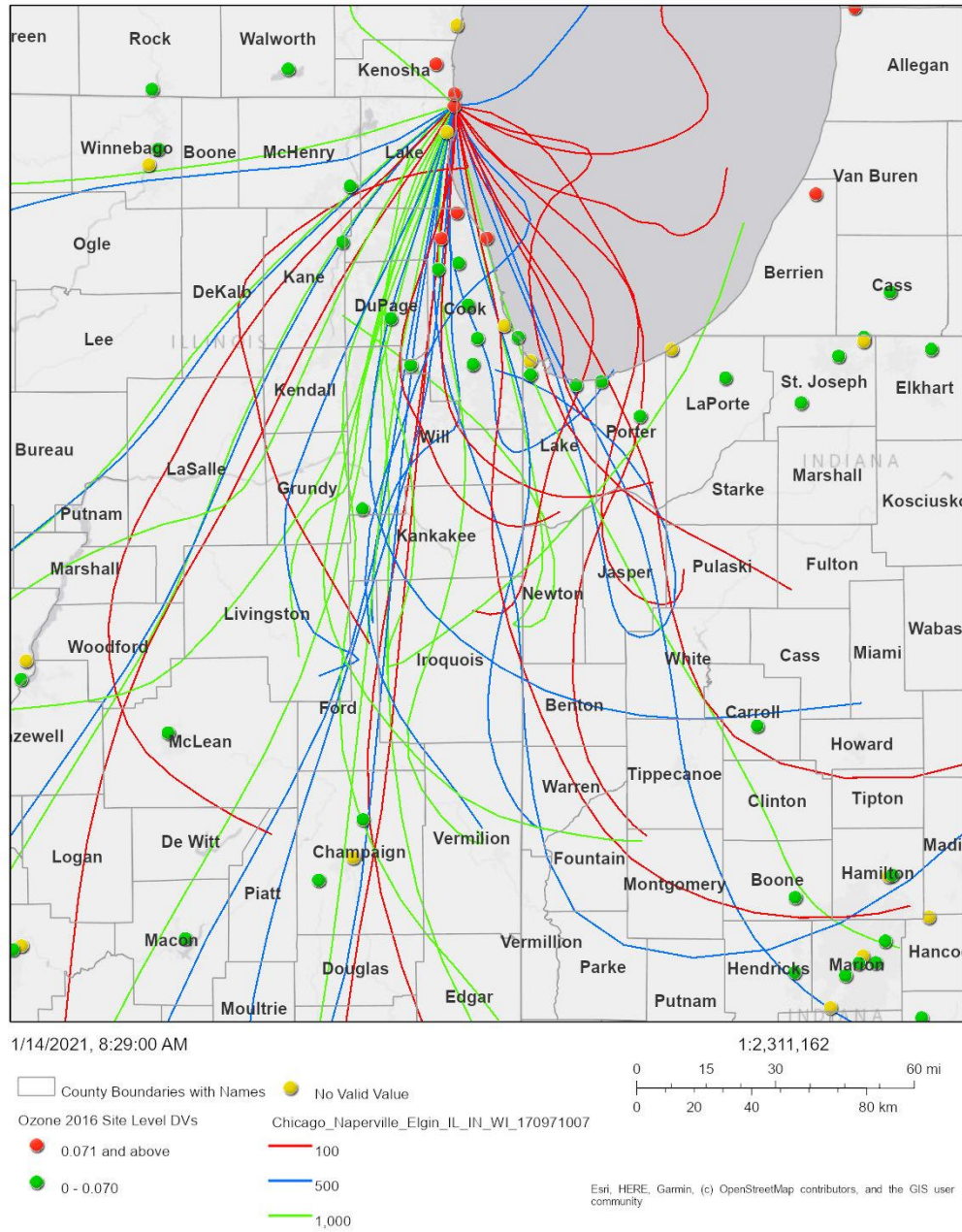
- County Boundaries with Names
- No Valid Value
- Ozone 2016 Site Level DVs > 0.071 and above
- Ozone 2016 Site Level DVs 0 - 0.070
- Chicago_Naperville_Elgin_IL_IN_WI_550590019 100
- Chicago_Naperville_Elgin_IL_IN_WI_550590019 500
- Chicago_Naperville_Elgin_IL_IN_WI_550590019 1,000



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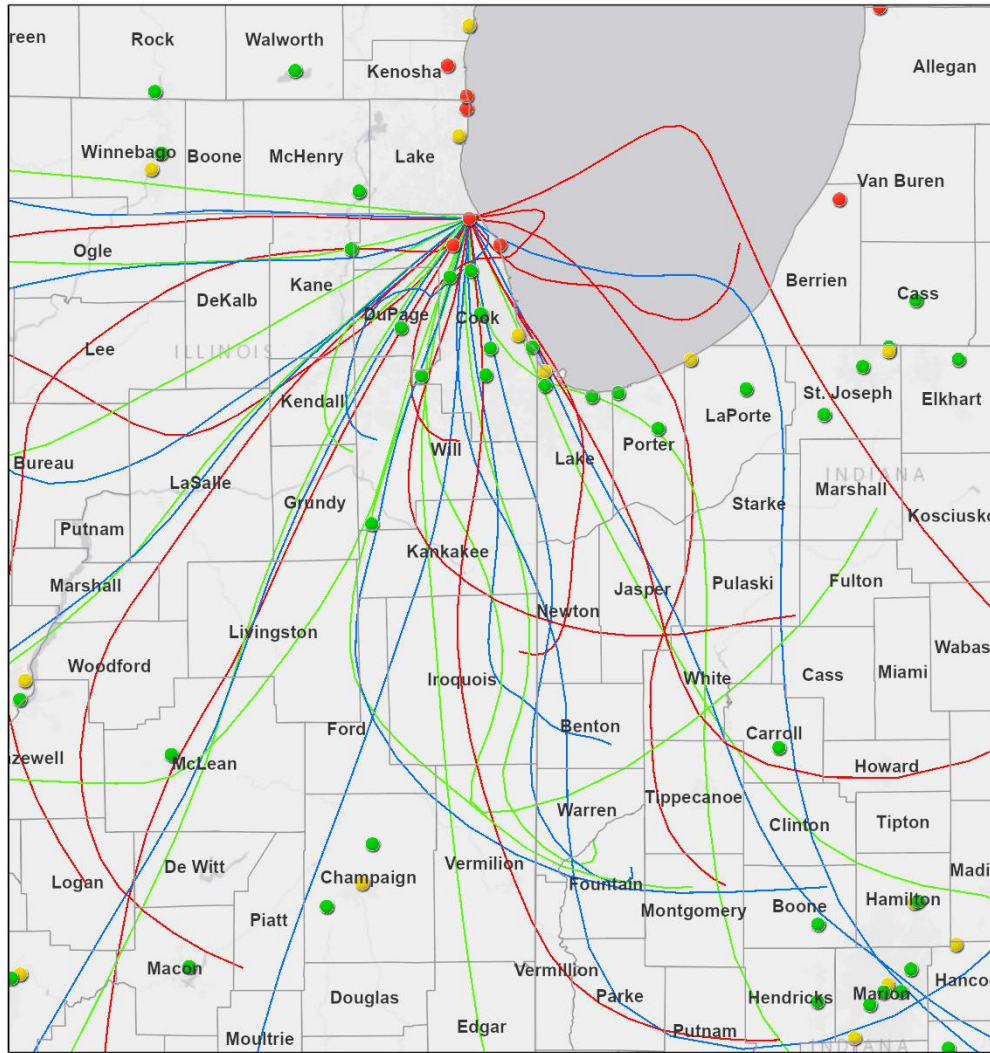
Figure 6c. HYSPLIT Back Trajectories for Lake County (Monitor ID 170971007)



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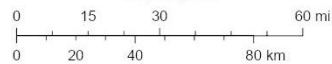
Figure 6d. HYSPLIT Back Trajectories for Cook County (Monitor ID 170314201)



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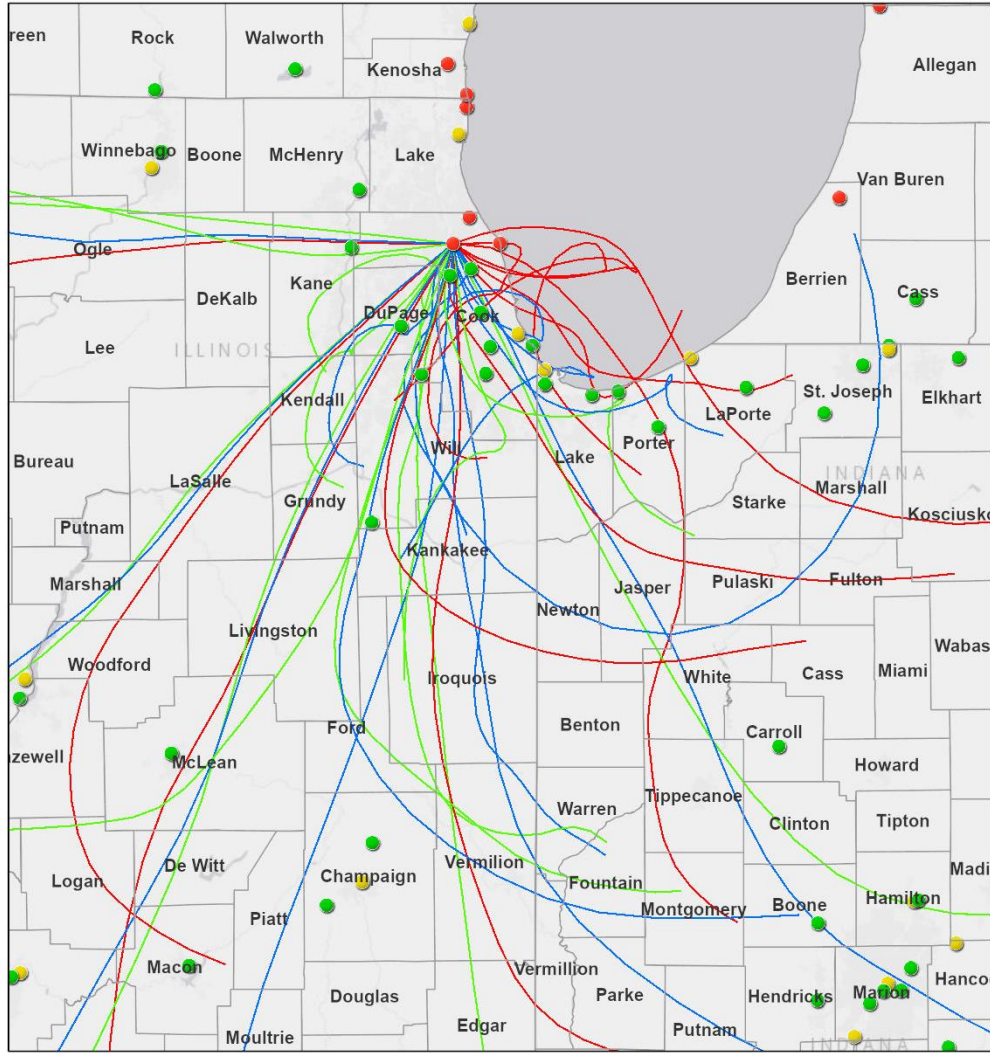
- County Boundaries with Names
- No Valid Value
- Ozone 2016 Site Level DVs
- Chicago_Naperville_Elgin_IL_IN_WI_170314201
- 0 - 0.070
- 100
- 500
- 1,000



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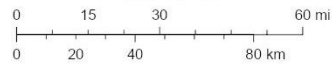
Figure 6e. HYSPLIT Back Trajectories for Cook County (Monitor ID 170314007)



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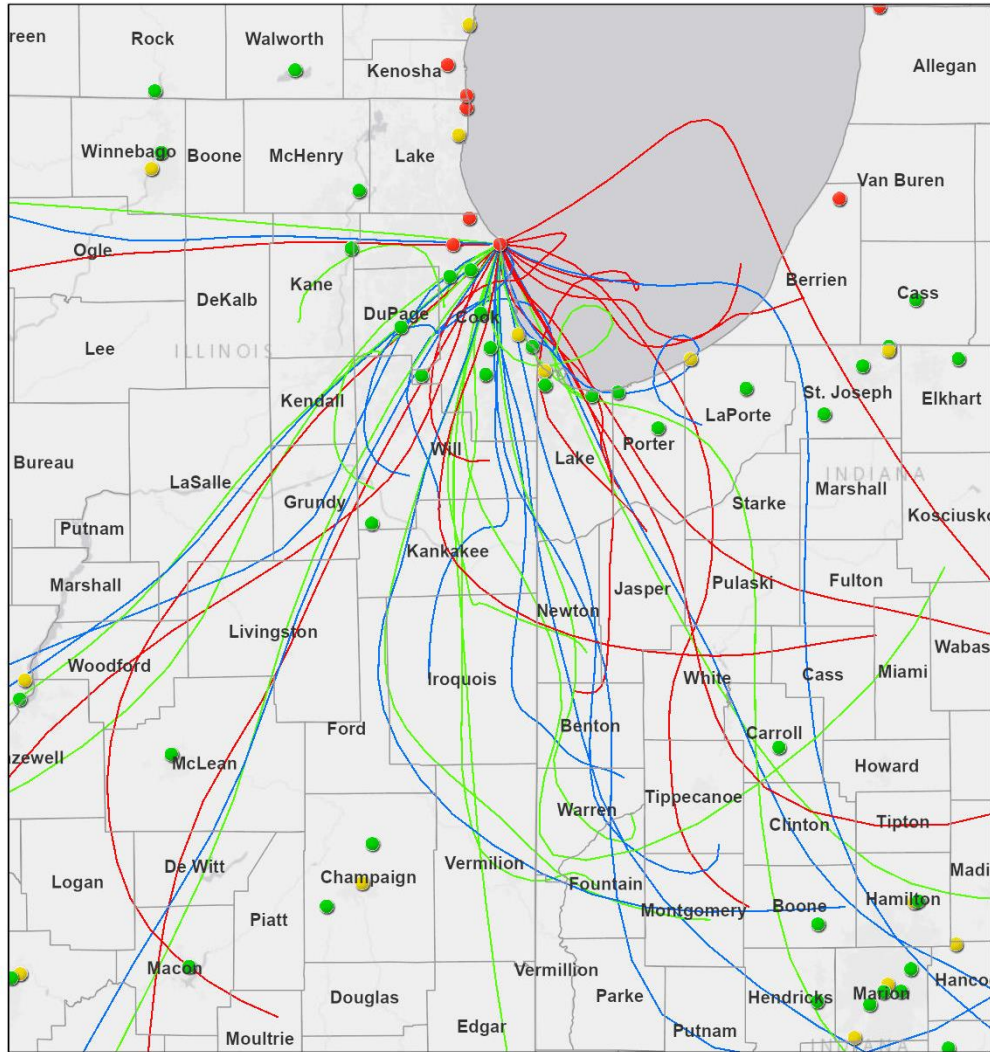
- County Boundaries with Names
- No Valid Value
- Ozone 2016 Site Level DVs
- 0.071 and above
- 0 - 0.070
- Chicago_Naperville_Elgin_IL_IN_WI_170314007 100
- 500
- 1,000



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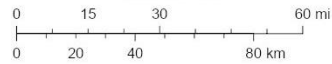
Figure 6f. HYSPLIT Back Trajectories for Cook County (Monitor ID 170317002)



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- County Boundaries with Names
- No Valid Value
- Ozone 2016 Site Level DVs
- Chicago_Naperville_Elgin_IL_IN_WI_170317002
- 0.071 and above
- 0 - 0.070
- 100
- 500
- 1,000



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HYSPLIT back trajectories show that transport winds blew predominantly from the west, southwest, south, and southeast during times when the violating monitors in the Chicago-Naperville, IL-IN-WI CSA measured exceedances of the 2015 ozone NAAQS. Figure 6 shows the densest pattern of back trajectories across Cook, DuPage, Lake, and Will in Illinois. Moderately dense trajectories are also present over DeKalb, Grundy, Kane, Kankakee, Kendall, LaSalle, and McHenry in Illinois and Jasper, Lake, Porter, and Newton in Indiana. The least dense trajectories in the CSA pass over Bureau and Putnam in Illinois, LaPorte in Indiana, and Kenosha in Wisconsin.

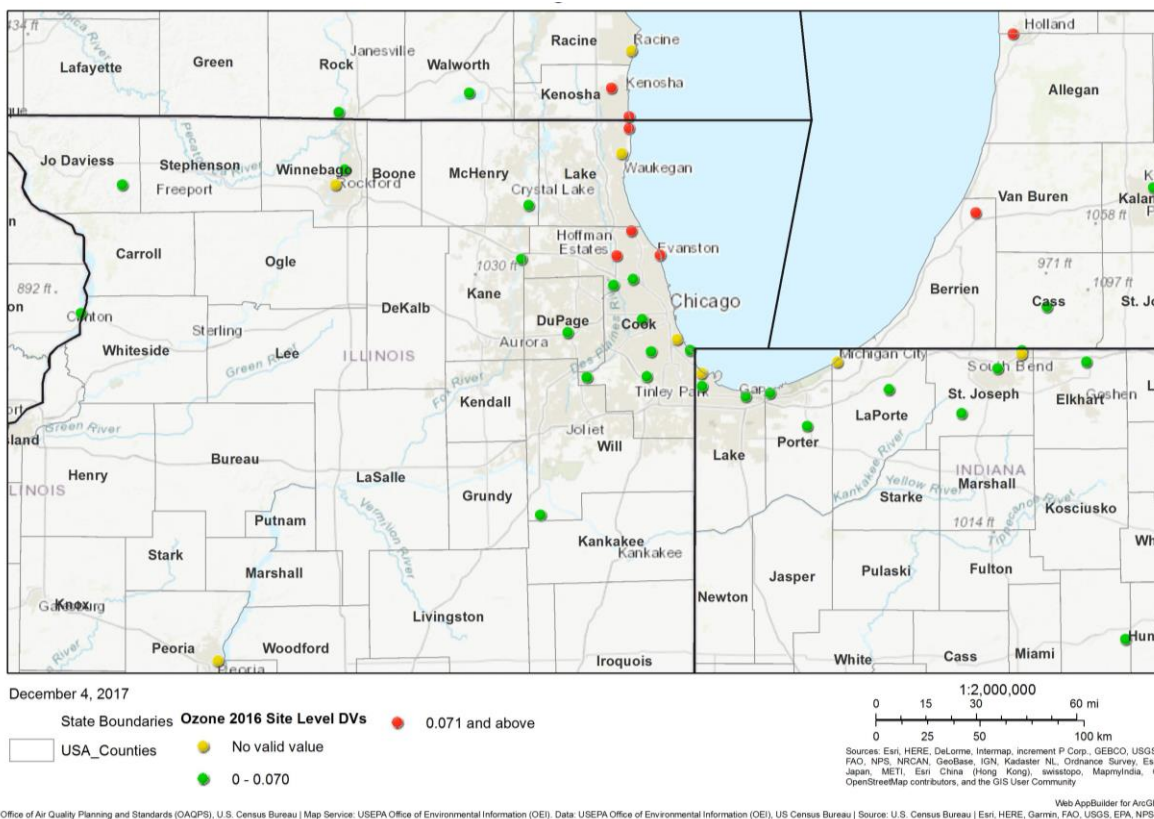
Factor 4: Geography/topography

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

The EPA used geography/topography analysis to evaluate the physical features of the land that might affect the airshed and, therefore, the distribution of ozone over the area. Figure 7 illustrates the physical features in the area of analysis.

The Chicago-Naperville, IL-IN-WI CSA borders Lake Michigan. Transport of emissions and formation of ozone in the CSA is influenced by the “lake effect”, which is the offshore flow of polluted air from the Chicago area to locations over the lake at night and the subsequent onshore flow of polluted air from over Lake Michigan back onto land locations in afternoon hours due to temperature differences between the lake surface and the onshore surface. HYSPLIT back trajectories illustrate this effect, and show in particular how ozone and precursor emissions from the Indiana portion of the CSA can follow a low-altitude path across Lake Michigan and along the Lake Michigan shoreline to contribute to exceedances at the three violating monitors in Cook County, the two additional violating monitors along the Lake Michigan shoreline on either side of the Illinois-Wisconsin border, and the sixth violating monitor located further northwest into Kenosha County in Wisconsin.

Figure 7. Topographic Illustration of the Physical Features



Factor 5: Jurisdictional boundaries

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

The Chicago, IL-IN-WI area has previously established nonattainment boundaries associated with the 1997 and 2008 ozone NAAQS. For the 1997 area, this boundary included the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will in Illinois, the entire counties of Lake and Porter in Indiana, and parts of Grundy and Kendall in Illinois. For the 2008 area, this boundary included the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will in Illinois, the entire counties of Lake and Porter in Indiana, parts of Grundy and Kendall in Illinois, and parts of Kenosha in Wisconsin. Illinois has recommended the same boundary for the Illinois portion of the area for the 2015 ozone NAAQS. Indiana and Wisconsin have each recommended that the entirety of their state be designated attainment for the 2015 ozone NAAQS.

For purposes of the 1997 and 2008 ozone NAAQS, the partial counties in Illinois are defined as Aux Sable Township and Goose Lake Township in Grundy County, and Oswego Township in Kendall County. For purposes of the 2008 ozone NAAQS, the partial county in Wisconsin is defined as the portion of Kenosha County bounded by the Lake Michigan shoreline on the East, the Kenosha County boundary on the North, the Kenosha County boundary on the South, and the I-94 corridor (including the entire corridor) on the West.

Conclusion for Chicago, IL-IN-WI Area

The EPA applied the five-factor analysis to the 19 counties in the Chicago-Naperville, IL-IN-WI CSA: Bureau, Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, LaSalle, McHenry, Putnam, and Will in Illinois, Jasper, Lake, LaPorte, Newton, and Porter in Indiana, and Kenosha in Wisconsin.

For the Illinois and Wisconsin portions of the Chicago area, EPA is designating as nonattainment the same counties and partial counties that were designated as nonattainment for the 2008 ozone NAAQS. For Illinois, these are the same counties and partial counties that were recommended by the state for nonattainment designation. For the Wisconsin portion of the Chicago area, EPA's designation of the same partial-county nonattainment boundary used for the 2008 ozone NAAQS is a departure from Wisconsin's recommendation that the entire state be designated attainment for the 2015 ozone NAAQS. For the Indiana portion of the Chicago area, EPA is modifying the state's recommendation and departing from the boundary for the 2008 ozone NAAQS by designating as nonattainment a portion of both Lake and Porter counties.

Air quality monitors in Cook County and Lake County in Illinois indicate violations of the 2015 ozone NAAQS based on the most recent air quality data available at the time of EPA's final designations, and Illinois recommended that the entirety of these counties be designated nonattainment; therefore, these counties are included in the intended nonattainment area.

Air quality monitors in Kenosha County in Wisconsin indicate a violation of the 2015 ozone NAAQS based on the 2016 design values. The EPA is including the same partial county area surrounding the monitor that was designated as nonattainment for the 2008 ozone NAAQS in the intended nonattainment area. This partial county area contains approximately 77% of the total county population, and it contains the I-94 corridor, which is the primary highway corridor in the county. HYSPLIT back trajectories to violating monitors in the area of analysis indicate that air masses predominantly traveled from the west, southwest, south, and southeast during times when the monitors measured exceedances of the 2015 ozone NAAQS; there were far fewer trajectories crossing the western portion of Kenosha County compared to the rest of the area of analysis. Therefore, EPA does not intend to include the remaining areas of Kenosha County in the Chicago, IL-IN-WI nonattainment area for the 2015 ozone NAAQS.

Of the remaining 16 counties in the CSA without violating monitors, DuPage, Kane, and Will in Illinois and Lake and Porter in Indiana have the highest NO_x emissions. These five counties, plus McHenry in Illinois, also have the highest VOC emissions. These same six counties also have the most traffic, with VMT above 2 billion, and the highest populations, with over 150,000 people. Meteorological analysis shows that emissions from these areas are capable of transporting to the locations of the violating monitors on the days that the monitored ozone values exceed the standard. The EPA's evaluation of these factors indicates that these areas contribute to the ozone concentrations in violation of the 2015 ozone NAAQS through emissions from point and non-point sources and from commuters into the counties with violating monitors. Therefore, the EPA is including

DuPage, Kane, McHenry, and Will in Illinois and Lake and Porter in Indiana in the nonattainment area for the 2015 ozone NAAQS.

In Lake County, Indiana, the five townships of Calumet, Hobart, North, Ross, and St. John together account for 425,748 of the county's total 484,564 people, or 88% of the county population, using 2010 data from American FactFinder provided by the U.S. Census Bureau, the most recent township-level data available. These five townships together account for 98% of NO_x emissions from point sources and 99% of VOC emissions from point sources in Lake County, Indiana.

In Porter County, Indiana, the eight townships of Center, Jackson, Liberty, Pine, Portage, Union, Washington, and Westchester together account for 140,700 of the county's total 164,343 population, or 86% of the population, using 2010 data from American FactFinder provided by the U.S. Census Bureau. These eight townships together account for 100% of NO_x emissions from point sources and 100% of VOC emissions from point sources in Porter County, Indiana.

EPA's partial-county designation in Lake County, Indiana was the only challenged designation to be upheld by the court as part of the *Clean Wisconsin* case. In EPA's re-evaluation of the technical record with respect to the remanded counties, EPA carefully considered the court's discussion for Lake County, Indiana. The court found that EPA provided a reasoned explanation for its partial-county designation in Lake County, because in the final TSD for the Chicago area EPA explained that emissions in the county are clustered in the northern townships EPA designated nonattainment: the partial-county area contained 88% of the county's population, 98% of its NO_x point-source emissions, and 99% of its point-source VOC emissions. EPA's re-evaluation of the technical record finds that Porter County, Indiana shares many similarities to neighboring Lake County, Indiana. In particular, moderately dense HYSPLIT trajectories pass through both counties, which shows a potential for emissions to contribute to nonattainment at the violating monitors. Further, both counties have their point sources and populations clustered in their respective northern halves. Designating as nonattainment the northern eight townships of Porter County, Indiana will capture a similar percentage of countywide emissions and population as EPA's partial-county area in neighboring Lake County, Indiana, in line with the court's reasoning.

Illinois recommended that Sable Township and Goose Lake Township in Grundy County and Oswego Township in Kendall County be designated as nonattainment for the 2015 ozone NAAQS. Grundy County and Kendall County have emissions that are relatively low for the area, with Grundy County ranking 14th for NO_x emissions and 15th for VOC emissions, and Kendall County ranking 16th for NO_x emissions and 14th for VOC emissions, out of the 19 counties in the CSA. However, a significant number of HYSPLIT back trajectories cross Grundy and Kendall Counties, showing that emissions from these counties can contribute to exceedances at the violating monitors. These counties also have ties to the CSA, with over 21% of workers commuting to a county with a violating monitor. The townships defining the partial-county areas are located in the northeast parts of both Grundy County and Kendall County, comprising the portions of these counties most contiguous to the urban area of the CSA. Based on the evidence, EPA does not believe that it should modify the state's recommendation that Sable Township and Goose Lake Township in Grundy County and Oswego Township in Kendall County be designated as nonattainment for the 2015 ozone NAAQS as part of the Chicago area, and that the remaining areas in Grundy County and Kendall County not be included as part of the nonattainment area for the 2015 ozone NAAQS.

Jasper County in Indiana has relatively high NO_x emissions, ranking 8th in the CSA, and there are a significant number of HYSPLIT back trajectories that pass through Jasper County. However, Jasper County ranks near the bottom for most of the remaining factors, including 16th (out of 19 counties) in the CSA for both VOC emissions

and population density. The population of Jasper County decreased between 2010 and 2015. Only 3% of Jasper County workers commute to a county with a violating monitor, which ranks Jasper County 18th in the CSA. Considering the five factors, the EPA does not intend to modify Indiana's recommendation that Jasper County not be included as part of the Chicago nonattainment area.

Very few HYSPLIT back trajectories pass through LaPorte County in Indiana. In addition, LaPorte County has limited ties to the urban core with only 2.8% of LaPorte workers commuting to a county with a violating monitor; this ranks 19th in the 19-county CSA. For the other factors, LaPorte ranks toward the middle or lower end of the 19 counties. Newton County in Indiana has very low NO_x emissions, ranking 19th in the CSA, and low VOC emissions, ranking 17th in the CSA. Only 4.1% of Newton workers commute to a county with a violating monitor, ranking 17th in the CSA. The EPA does not intend to modify Indiana's recommendation that LaPorte County and Newton County not be included as part of the Chicago nonattainment area.

LaSalle in Illinois has NO_x and VOC emissions both ranking 9th in the CSA, and Bureau and Putnam in Illinois rank in the bottom three CSA counties for both NO_x and VOC emissions. These three neighboring counties are predominantly rural, with population densities ranking 17th, 18th, and 15th, respectively. DeKalb and Kankakee in Illinois have NO_x emissions ranking 15th and 13th, respectively, and VOC emissions ranking 13th and 11th, respectively; these emissions are below average for the CSA. Their population densities rank 12th and 13th, respectively, which are also below average for the CSA. HYSPLIT back trajectories through these counties are relatively modest. The EPA does not intend to modify Illinois's recommendation that Bureau, DeKalb, Kankakee, LaSalle, and Putnam Counties not be included as part of the Chicago nonattainment area.

Cook, DuPage, Grundy, Kane, Kendall, Lake, McHenry, and Will in Illinois, Lake and Porter in Indiana, and Kenosha in Wisconsin together account for 86% of all NO_x emissions in the CSA and 89% of all VOC emissions in the CSA. These same 11 counties together account for 95% of total population in the CSA, as well as 110% of population growth in the CSA; this figure is above 100% because the other eight counties in the CSA have lost population overall. These 11 counties together account for 91% of VMT in the CSA, and are home to 99% of workers in the CSA who commute to or within a county with a violating monitor.

Based on the assessment of factors described above, the EPA is designating the following counties as part of the Chicago, IL-IN-WI nonattainment area: the entire counties of Cook, DuPage, Kane, Lake, McHenry, and Will in Illinois, portions of Lake and Porter in Indiana, parts of Grundy and Kendall in Illinois, and parts of Kenosha in Wisconsin.