STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

SEP 30 2016

Mr. Mark Hague
Regional Administrator
U.S. EPA, Region VII
11201 Renner Boulevard
Lenexa, KS 66219

Dear Mr. Hague:

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) hereby submits the following:

2015 Ozone Standard Area Boundary Designation Recommendation

Through this submittal, the air program is requesting that EPA consider these recommendations during the designation process expected to be completed by October 1, 2017.

The air program is recommending area designations (e.g., nonattainment, attainment/unclassifiable) for the 2015 8-hour ozone standard. The recommendations are based on technical evaluations following EPA's February 2016 *Guidance on Area Designations for the 2015 Revised National Ambient Air Quality Standards*.

The Missouri Air Conservation Commission adopted these recommendations at the September 29, 2016, commission meeting. A public hearing for the proposed recommendations was held on August 25, 2016. A 30-day public comment period opened by July 25, 2016, and closed on September 1, 2016. During the public comment period, the air program received three comments in support of the recommendation, and three comments from the Air Conservation Commissioners. A summary of the comments received and our responses are attached.

In order to comply with Attachment A of the "Regional Consistency for the Administrative Requirements of State Implementation Plan Submittals and the Use of 'Letter Notices'" memo dated April 6, 2011, a searchable pdf version of this document will be emailed to the EPA Regional Office. Within three business days, this complete submittal package will be posted on our website at http://dnr.mo.gov/env/apcp/naaqsboundarydesignations.htm.

Thank you for your attention to this matter. If you have any questions regarding this submittal, please contact Ms. Darcy Bybee with the Missouri Department of Natural Resources' Air

Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Original signed by Kyra L. Moore

Kyra L. Moore
Director

KLM:sac

Enclosures:

Copy of recommendations and appendices
Copy of commission signature page certifying Missouri Air Conservation Commission adoption
Copy of public hearing notices
Copy of public hearing transcript introductory statement
Copy of recommendation for adoption and summary of the comments and responses

c: Missouri Air Conservation Commission
Project# 2015-O3-1 Boundary Recommendation

2015 Ozone Standard
Area Boundary Designation Recommendation

Prepared for the

Missouri Air Conservation Commission

Adoption: September 29, 2016

Missouri Department of Natural Resources

Division of Environmental Quality

Air Pollution Control Program

Jefferson City, Missouri

Project # 2015-O3-1

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1 Purpose

The purpose of this document is to summarize the analysis performed for the 2015 ozone National Ambient Air Quality Standard (NAAQS) in Missouri. The analysis supports a recommendation to EPA for designation of geographic areas in the state for the 2015 8-hour ozone standard. In general, the analysis is based on information collected from the years 2013-2015 and U.S. Environmental Protection Agency's (EPA) February 2016 document, *Guidance on the Area Designations for the 2015 Ozone NAAQS*[1]. This recommendation document addresses all counties in Missouri. Each county is recommended to be designated as either nonattainment or unclassifiable/attainment.

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) intends to submit area designation recommendations to EPA by October 1, 2016. EPA will make a final decision on designations by October 1, 2017. However, if EPA intends to modify the state's recommendations or needs additional technical justification, they will notify the program at least 120 days prior to finalizing the designations, or no later than June 2, 2017.

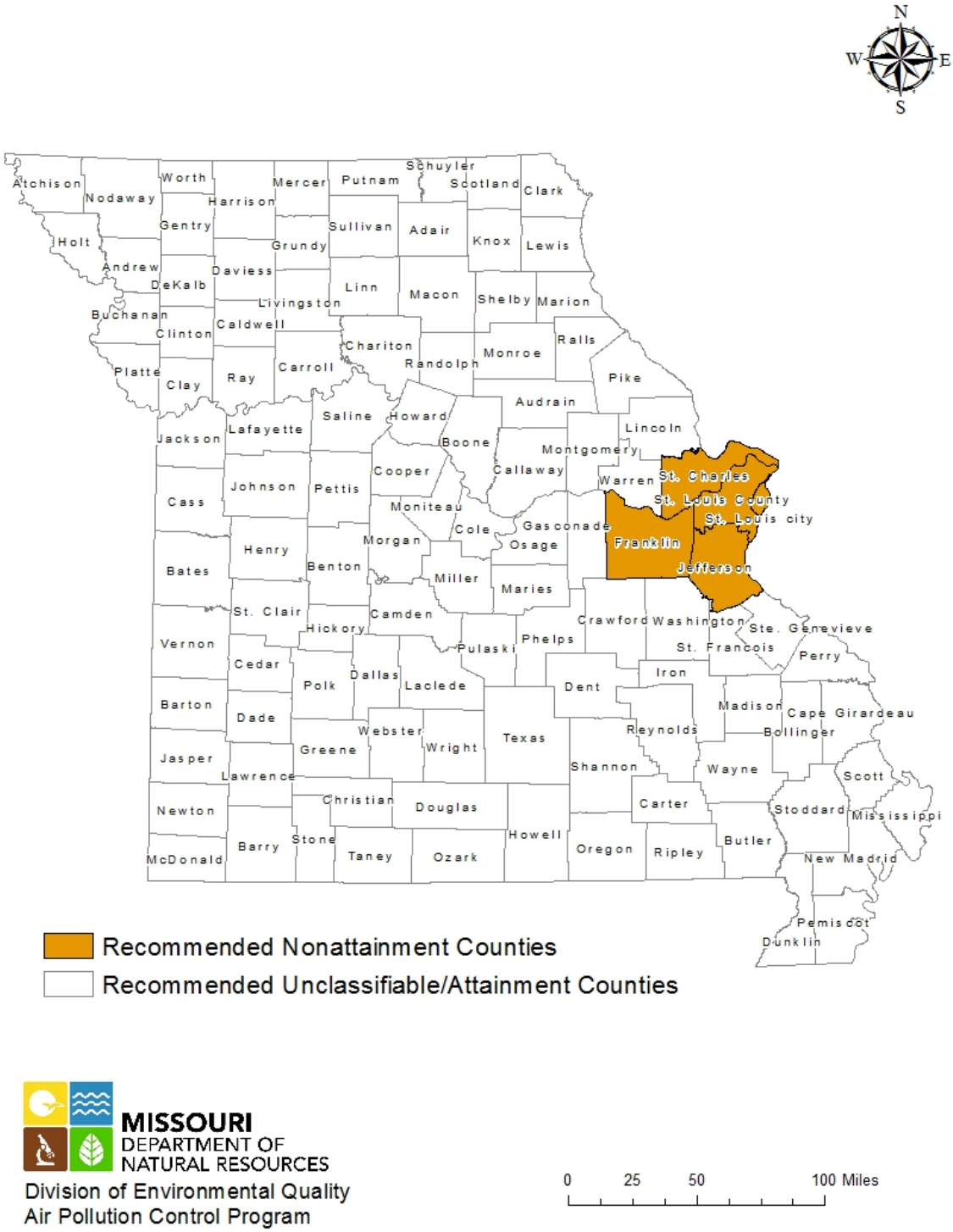
2 Summary of Recommendation

The technical evaluations supporting this recommendation are based on the most recent data available, mostly collected during the 2013-2015 period. One monitor in Missouri (West Alton) located in St. Charles County currently violates the 2015 8-hour ozone NAAQS with a design value of 71 parts per billion (ppb). No other monitors in the state violate the NAAQS. The air program performed a five factor analysis and corresponding technical evaluations to determine a suitable nonattainment boundary. Based on these analyses, the air program is recommending a nonattainment designation for the following counties: Franklin, Jefferson, St. Charles, St. Louis, and the City of St. Louis.

Furthermore, the air program is recommending an unclassifiable/attainment designation for all other counties in Missouri. Table 1 contains the recommended designation classification for each county in Missouri. Figure 1 depicts Missouri's proposed area boundary recommendations for the 2015 ozone standard.

[1] EPA's Guidance on the Area Designations for the 2015 Ozone NAAQS, Feb. 2016. https://www.epa.gov/sites/production/files/2016-02/documents/ozone-designations-guidance-2015.pdf

Figure 1. Missouri 2015 8-Hour Ozone NAAQS Boundary Recommendation



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES
Division of Environmental Quality
Air Pollution Control Program

Table 1. Missouri Classification Recommendations for the 2015 Ozone NAAQS

County	Classification Recommendation
ADAIR	Unclassifiable/Attainment
ANDREW	Unclassifiable/Attainment
ATCHISON	Unclassifiable/Attainment
AUDRAIN	Unclassifiable/Attainment
BARRY	Unclassifiable/Attainment
BARTON	Unclassifiable/Attainment
BATES	Unclassifiable/Attainment
BENTON	Unclassifiable/Attainment
BOLLINGER	Unclassifiable/Attainment
BOONE	Unclassifiable/Attainment
BUCHANAN	Unclassifiable/Attainment
BUTLER	Unclassifiable/Attainment
CALDWELL	Unclassifiable/Attainment
CALLAWAY	Unclassifiable/Attainment
CAMDEN	Unclassifiable/Attainment
CAPE GIRARDEAU	Unclassifiable/Attainment
CARROLL	Unclassifiable/Attainment
CARTER	Unclassifiable/Attainment
CASS	Unclassifiable/Attainment
CEDAR	Unclassifiable/Attainment
CHARITON	Unclassifiable/Attainment
CHRISTIAN	Unclassifiable/Attainment
CLARK	Unclassifiable/Attainment
CLAY	Unclassifiable/Attainment
CLINTON	Unclassifiable/Attainment
COLE	Unclassifiable/Attainment
COOPER	Unclassifiable/Attainment
CRAWFORD	Unclassifiable/Attainment
DADE	Unclassifiable/Attainment
DALLAS	Unclassifiable/Attainment
DAVIESS	Unclassifiable/Attainment
DeKALB	Unclassifiable/Attainment
DENT	Unclassifiable/Attainment
DOUGLAS	Unclassifiable/Attainment
DUNKLIN	Unclassifiable/Attainment
FRANKLIN	Nonattainment
GASCONADE	Unclassifiable/Attainment
GENTRY	Unclassifiable/Attainment
GREENE	Unclassifiable/Attainment
GRUNDY	Unclassifiable/Attainment
HARRISON	Unclassifiable/Attainment
HENRY	Unclassifiable/Attainment
HICKORY	Unclassifiable/Attainment
HOLT	Unclassifiable/Attainment
HOWARD	Unclassifiable/Attainment
HOWELL	Unclassifiable/Attainment
IRON	Unclassifiable/Attainment
JACKSON	Unclassifiable/Attainment
JASPER	Unclassifiable/Attainment
JEFFERSON	Nonattainment
JOHNSON	Unclassifiable/Attainment

County	Classification Recommendation
KNOX	Unclassifiable/Attainment
LACLEDE	Unclassifiable/Attainment
LAFAYETTE	Unclassifiable/Attainment
LAWRENCE	Unclassifiable/Attainment
LEWIS	Unclassifiable/Attainment
LINCOLN	Unclassifiable/Attainment
LINN	Unclassifiable/Attainment
LIVINGSTON	Unclassifiable/Attainment
McDONALD	Unclassifiable/Attainment
MACON	Unclassifiable/Attainment
MADISON	Unclassifiable/Attainment
MARIES	Unclassifiable/Attainment
MARION	Unclassifiable/Attainment
MERCER	Unclassifiable/Attainment
MILLER	Unclassifiable/Attainment
MISSISSIPPI	Unclassifiable/Attainment
MONITEAU	Unclassifiable/Attainment
MONROE	Unclassifiable/Attainment
MONTGOMERY	Unclassifiable/Attainment
MORGAN	Unclassifiable/Attainment
NEW MADRID	Unclassifiable/Attainment
NEWTON	Unclassifiable/Attainment
NODAWAY	Unclassifiable/Attainment
OREGON	Unclassifiable/Attainment
OSAGE	Unclassifiable/Attainment
OZARK	Unclassifiable/Attainment
PEMISCOT	Unclassifiable/Attainment
PERRY	Unclassifiable/Attainment
PETTIS	Unclassifiable/Attainment
PHELPS	Unclassifiable/Attainment
PIKE	Unclassifiable/Attainment
PLATTE	Unclassifiable/Attainment
POLK	Unclassifiable/Attainment
PULASKI	Unclassifiable/Attainment
PUTNAM	Unclassifiable/Attainment
RALLS	Unclassifiable/Attainment
RANDOLPH	Unclassifiable/Attainment
RAY	Unclassifiable/Attainment
REYNOLDS	Unclassifiable/Attainment
RIPLEY	Unclassifiable/Attainment
ST. CHARLES	Nonattainment
ST. CLAIR	Unclassifiable/Attainment
ST. FRANCOIS	Unclassifiable/Attainment
STE. GENEVIEVE	Unclassifiable/Attainment
ST. LOUIS COUNTY	Nonattainment
SALINE	Unclassifiable/Attainment
SCHUYLER	Unclassifiable/Attainment
SCOTLAND	Unclassifiable/Attainment
SCOTT	Unclassifiable/Attainment
SHANNON	Unclassifiable/Attainment
SHELBY	Unclassifiable/Attainment
STODDARD	Unclassifiable/Attainment

County	Classification Recommendation
STONE	Unclassifiable/Attainment
SULLIVAN	Unclassifiable/Attainment
TANEY	Unclassifiable/Attainment
TEXAS	Unclassifiable/Attainment
VERNON	Unclassifiable/Attainment
WARREN	Unclassifiable/Attainment
WASHINGTON	Unclassifiable/Attainment
WAYNE	Unclassifiable/Attainment
WEBSTER	Unclassifiable/Attainment
WORTH	Unclassifiable/Attainment
ST. LOUIS CITY	Nonattainment

3 Background

Ground-level ozone is not emitted directly into the air, but is formed through chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC). Common sources of these precursor emissions include motor vehicles, power plants, industrial boilers, refineries, and chemical plants. These precursor emissions chemically react in the presence of sunlight in the atmosphere to form ozone. Therefore ozone is known as a secondary pollutant. Ozone is also a regional pollutant that can be transported either as precursor emissions or as reacted ozone. Ground-level ozone can aggravate many health problems including asthma. The paramount reason for regulating ozone levels in ambient air is to protect public health and welfare.

On October 1, 2015, EPA promulgated a revision to the NAAQS for ground-level ozone (80 FR 65292, October 26, 2015). EPA strengthened the NAAQS by changing the level of the primary and secondary standards to 70 ppb over an 8-hour averaging period. EPA tightened the standard based on extensive scientific evidence about the effect of ozone on public health and welfare. The form of the standard is based on the average of the last three (3) years' 4th highest maximum daily 8-hour average concentrations. The form of the standard remains the same as the 2008 standard. The St. Louis area has met the 2008 ozone standard of 75 ppb per EPA's Determination of Attainment issued June 27, 2016 (81 FR 41444)

Whenever a NAAQS is revised, the designation process is the first step in addressing the standard. Section 107(d)(1) of the Clean Air Act allows each state to recommend unclassifiable/attainment and nonattainment areas including appropriate boundaries within one year after a NAAQS is established. EPA can then accept the recommendations or make modifications, as it deems necessary. Section 107(d)(1)(A) of the Clean Air Act defines a nonattainment area as any area that does not meet or that contributes to nearby areas not meeting the ambient air quality standard. All other areas should be classified as unclassifiable/attainment.

Missouri's boundary designation recommendations for the 2015 8-hour ozone NAAQS must be submitted to EPA no later than October 1, 2016. The air program's recommendation is based on quality-assured ambient air monitoring data from 2013-2015. EPA will issue final designations for these areas based on quality-assured monitoring data from 2014-2016, no later than October 1, 2017. However, if EPA intends to modify the state's recommendations or needs additional technical justification, they will notify the air program at least 120 days prior to finalizing the designations. EPA has stated that the "120-day" letters will be released no later than June 2, 2017. Table 2 includes an anticipated timeline for the designation process for the 2015 ozone standard.

Upon designation, states will have 18 months to prepare State Implementation Plans (SIPs) to address ozone nonattainment areas. EPA intends to publish an implementation rule and guidance shortly after designations are finalized that will establish requirements and guidelines for ozone nonattainment areas. These rules will address nonattainment area classification methodologies, attainment dates, as well as certain attainment plan and permitting requirements.

Table 2. Anticipated Timeline for 2015 Ozone Standard Designations

Anticipated Timeline for the 2015 Ozone NAAQS Designation Process	
Milestone	**Date**
EPA promulgates 2015 Ozone NAAQS	October 1, 2015
States submit area designation recommendations	October 1, 2016
EPA notifies states regarding any intended modifications to their recommendations (120-day letters)	June 2, 2017
EPA publishes public notice of state recommendations and EPA's intended modification, if any, and public comment period	June 9, 2017
States submit additional information, if any, to respond to EPA's modifications of a recommended designation	August 7 ,2017
EPA promulgates final ozone area designations	October 1, 2017

4 Criteria for Designation

Pursuant to the 2015 ozone designation process, EPA published a guidance document titled "*Guidance on Area Designations for the 2015 Revised Ozone National Ambient Air Quality Standards*" on February 25, 2016. This guidance was written to assist states and tribes in recommending area boundary designations under the 2015 8-hour ozone standard. In the guidance, EPA emphasized it does not intend the Metropolitan Statistical Area (MSA) or Consolidated Metropolitan Statistical Area (CMSA) to serve as the presumptive boundary for 8-hour ozone nonattainment areas. Area-specific analyses may support nonattainment boundaries that are smaller or larger than the MSA or CMSA. Since EPA is not setting a presumptive boundary, the air program has begun the analysis with the existing St. Louis nonattainment area counties in Missouri for the 2008 ozone standard. EPA's guidance recommends that states base their area boundary recommendations on an evaluation of information relevant to five factors:

1. Air Quality Data,
2. Emissions and Emission-Related Data,
    - Population and Degree of Urbanization
    - Traffic and Commuting Patterns
3. Meteorological Data,
4. Geography/Topography, and
5. Jurisdictional Boundaries.

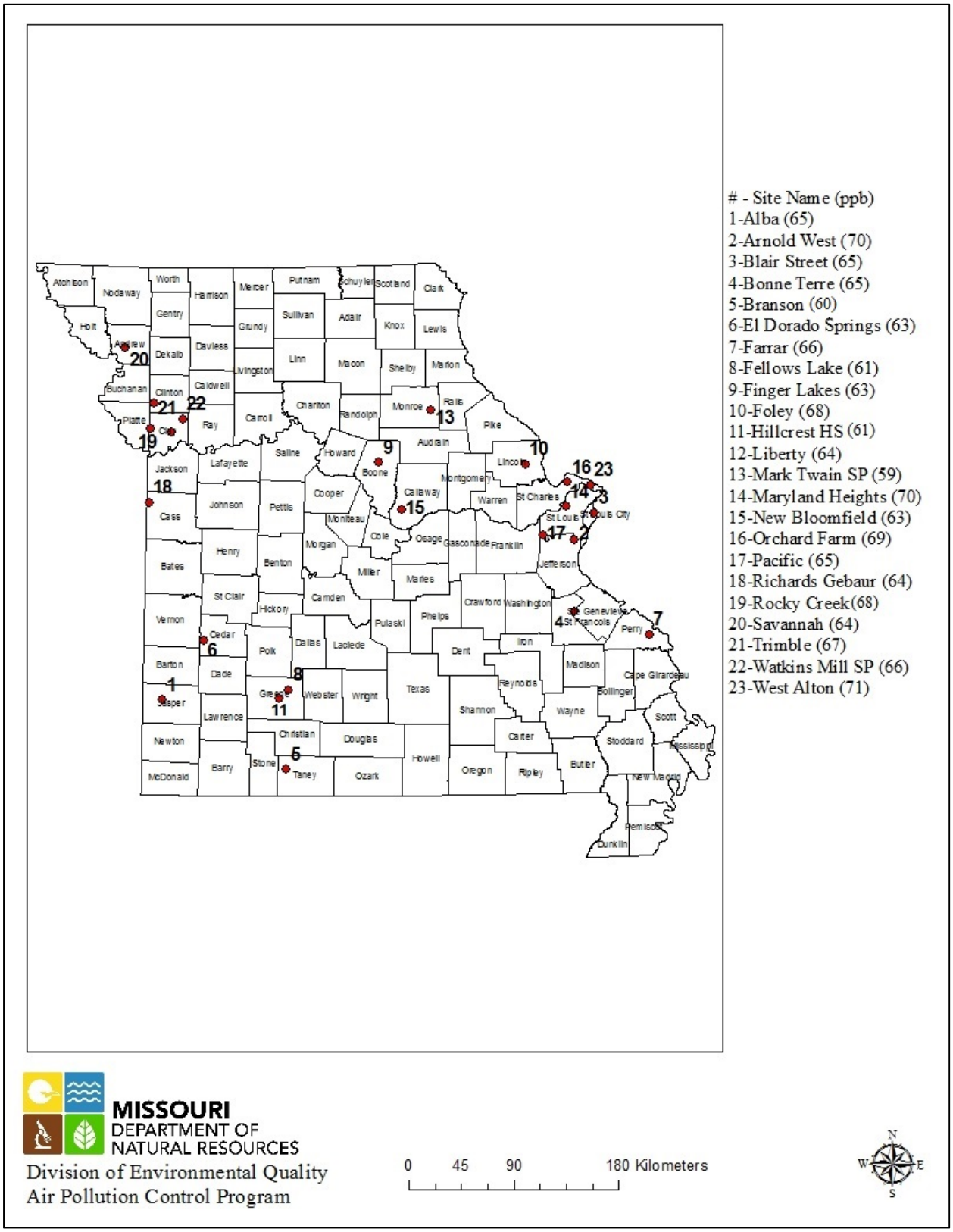
The guidance also indicates that the first step in designations is to identify air quality monitoring sites that show a violation of the 2015 ozone NAAQS. The monitors identified in Table 3, maintained by the air

program, utilize Federal Reference Method (FRM) or Federal Equivalent Method (FEM) equipment and procedures and operate in accordance with 40 CFR Part 58. For this reason, these monitors can be compared to the 2015 NAAQS to determine attainment status. Data from the most recent three-year period of certified ozone season air monitoring data, 2013 through 2015, will be used to compare to the NAAQS. Data through the end of calendar year 2015 has been certified by the air program. Monitoring data for all of the state for 2013 through 2015 is shown in Table 3. All department-maintained ozone monitors are graphically presented in Figure 2.

Table 3. 2013-2015 Missouri Ozone Monitors and Design Values

Monitor Name	Monitor Identifier	County	2013-2015 Design Value (ppb)
Alba	29-097-0004	Jasper	65
Arnold West	29-099-0019	Jefferson	70
Blair Street	29-510-0085	St. Louis City	65
Bonne Terre	29-186-0005	Ste. Genevieve	65
Branson	29-213-0004	Taney	60
El Dorado Springs	29-039-0001	Cedar	63
Farrar	29-157-0001	Perry	66
Fellows Lake	29-077-0042	Greene	61
Finger Lakes	29-019-0011	Boone	63
Foley	29-113-0003	Lincoln	68
Hillcrest High School	29-077-0036	Greene	61
Liberty	29-047-0005	Clay	64
Mark Twain State Park	29-137-0001	Monroe	59
Maryland Heights	29-189-0014	St. Louis	70
New Bloomfield	29-027-0002	Callaway	63
Orchard Farm School	29-183-1004	St. Charles	69
Pacific	29-189-0005	St. Louis	65
Richards Gebaur South	29-037-0003	Cass	64
Rocky Creek	29-047-0006	Clay	68
Savannah	29-003-0001	Andrew	64
Trimble	29-049-0001	Clinton	67
Watkins Mill State Park	29-047-0003	Clay	66
West Alton	29-183-1002	St. Charles	71

Figure 2. Missouri Ozone Monitors and 2013-2015 Design Values



Based on design values for this three-year period, only one monitor in Missouri violates the 2015 ozone NAAQS. The West Alton monitor has a design value of 71 ppb which qualifies as a violation of the 70 ppb standard. The air program developed a weight of evidence analysis, using the five factors, for the violating monitor in Missouri. When examining potential areas for contribution to the violation at West Alton, many areas of the state can be eliminated from consideration due to the distance of emission sources and travel time given the prevailing meteorology of the region. For this boundary recommendation, the St. Louis area, which contains the only violating monitor, is evaluated separately from all other areas of the state.

5 Technical Analysis: St. Louis Area

This evaluation was limited to Missouri counties. Counties or portions of counties that exhibit a pattern of significant contribution were considered for inclusion in a nonattainment area. The air program strived to review contributing factors in a consistent manner, by making the ultimate recommendation decisions in a holistic fashion. As may be seen in the five factor analyses, some factors may argue for inclusion while others for exclusion.

To determine the extent of the nonattainment area boundary for the 2015 ozone standard, the air program began the evaluation with the existing St. Louis nonattainment area for the 2008 ozone standard. This allows for consistency between the 2015 and the 2008 standards and continuity of current rules applicable in these counties. Therefore the air program used the existing St. Louis nonattainment area counties to determine trends, make county comparisons, and to evaluate the technical data in a comprehensive manner. The air program also performed a weight of evidence analysis on surrounding counties for their potential contribution to the violation at the West Alton monitor. The existing St. Louis bi-state nonattainment area consists of 4 counties and 1 city in Missouri and 3 counties in Illinois. The Missouri portion of the St. Louis nonattainment area includes the City of St. Louis and the Counties of Franklin, Jefferson, St. Charles, and St. Louis. The next group of counties reviewed includes the counties surrounding the nonattainment area: Lincoln, Warren, Crawford, Gasconade, St. Francois, Ste. Genevieve, and Washington Counties. Finally, the rest of the state was analyzed based solely on ambient air quality data because no other areas in or nearby the state are violating the 2015 standard.

5.1 Air Quality Data

Air quality data is the primary factor in identifying an area as attaining or not attaining the standard. The air quality data analysis is an examination of available ambient ozone air quality monitoring data, including the annual design value calculated for each area, to determine if the collective area violates the standard based on a 3-year period. The air program is basing boundary recommendations on 2013-2015 certified air quality data.

A violation is based on the average of the last three (3) years' 4th highest maximum daily 8-hour average concentrations. The violation occurs when the three year average concentration is greater than 70 ppb. For the 2013-2015 monitoring period, only the West Alton monitor is in violation of the 2015 8-hour ozone NAAQS with a concentration of 71 ppb, as shown in Table 4. Therefore, St. Charles County is being recommended nonattainment under the "does not meet the standard" provision of Section

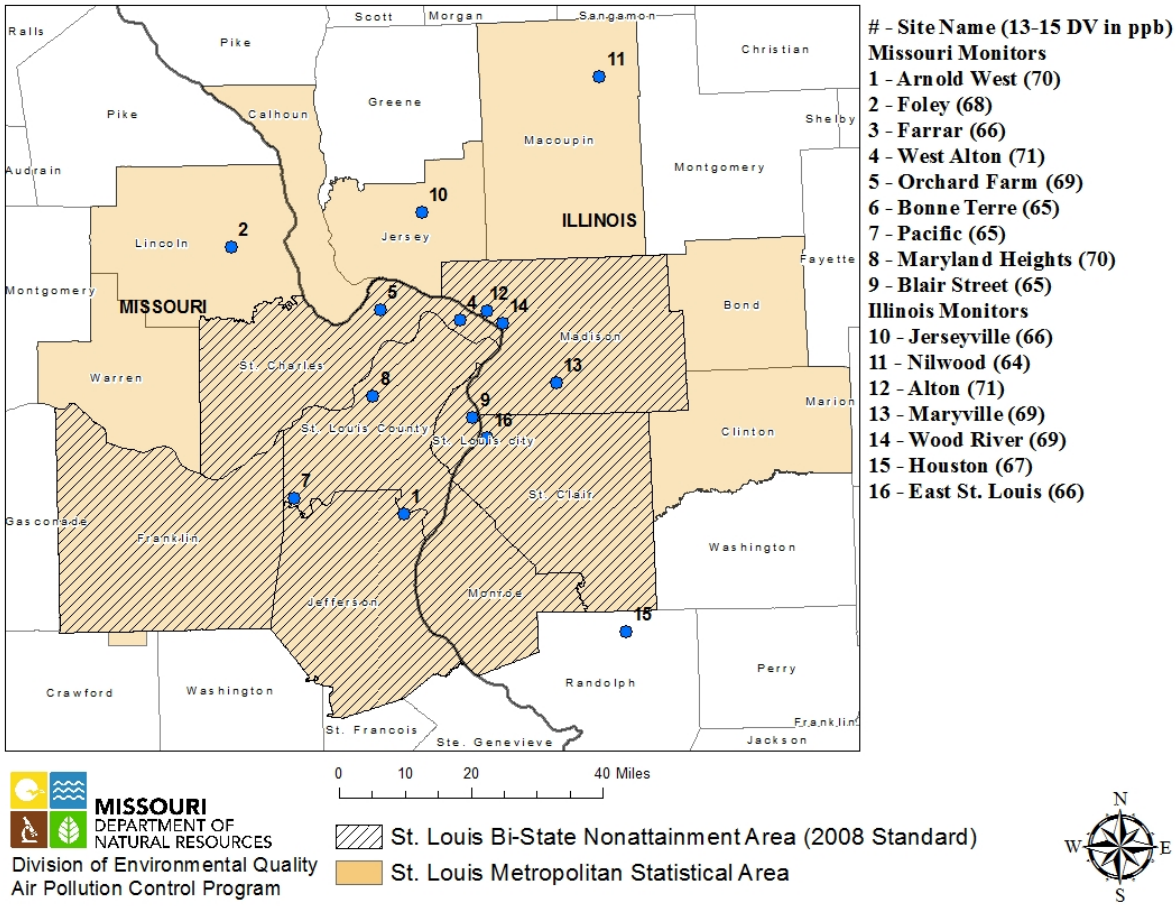
107(d)(1)(A) of the Clean Air Act. St. Charles County is in the current St. Louis 2008 8-hour ozone nonattainment area.

For visual reference, Figure 3 depicts the existing monitors in the St. Louis MSA and current nonattainment area.

Table 4. Ozone Monitors and 2013-2015 Design Values within and near St. Louis

Monitor Name	Monitor Identifier	County Name	2013-2015 Design Value (ppb)
Arnold West	29-099-0019	Jefferson	70
Blair Street	29-510-0085	St. Louis City	65
Bonne Terre	29-186-0005	Ste. Genevieve	65
Farrar	29-157-0001	Perry	66
Foley	29-113-0003	Lincoln	68
Maryland Heights	29-189-0014	St. Louis	70
Orchard Farm School	29-183-1004	St. Charles	69
Pacific	29-189-0005	St. Louis	65
West Alton	29-183-1002	St. Charles	71

Figure 3. St. Louis MSA and Current Nonattainment Area's 2015 Ozone Monitoring Sites and their 2013-2015 Design Values



5.2 Emissions and Emissions-Related Data

The air program evaluated emissions of ozone precursors: oxides of nitrogen (NOX) and volatile organic compounds (VOC), for each county in the Illinois/Missouri St. Louis MSA and surrounding counties. Emissions and emissions-related data can provide information on areas contributing to violating monitors. This section details emission information for the St. Louis area by county and source sector. Population, mobile emissions, and travel patterns correlate to precursor emission and thereby ozone levels. The tables contained in this section detail recent trends in these categories as well as projected growth where applicable.

The emissions inventories referenced in this section for Missouri and Illinois were generated for submission to EPA for the 2014 National Emissions Inventory (NEI). Mobile source emissions in Missouri and Illinois were calculated by the Missouri Department of Natural Resources and the Illinois EPA, respectively. MOVES2014 was used to estimate emissions for the onroad and nonroad mobile source categories. County-specific data obtained from the Missouri Department of Transportation for vehicle miles travelled (VMT) was converted into model input. Additional data was developed from 2014 inspection and maintenance program compliance rates in the St. Louis area. Age distributions for light duty passenger vehicles were developed from a dataset of registered vehicles statewide as of 2014.

The air program evaluated the population and vehicle use characteristics and trends of the area as indicators of probable location and magnitude of non-point source emissions. These include ozone-precursor emissions from on and off road vehicles and engines, consumer products and services, and residential fuel combustion. Areas of dense population or commercial development are typically an indicator of area source and mobile source NO_x and VOC emissions that may contribute to ozone formation. Urbanization is also used to identify areas with anthropogenic emission sources that emit ozone precursors.

The air program evaluated commuting patterns of residents in the area, as well as total VMT for each county. In combination with population and population density, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation.

Table 5 summarizes emissions by county, along with population, employment, and VMT data. This information provides perspective on the largest counties by number of people, emissions contribution, and travel and commuting patterns. Data for counties in Illinois are provided for informational purposes only. Data for counties adjacent to the 2008 ozone nonattainment area are examined in detail in section 7. Other eastern Missouri counties like Pike, Montgomery, Perry, Scott, and Cape Girardeau that are not adjacent to the 2008 ozone nonattainment area are not examined in detail and are provided for informational purposes only. The existing nonattainment area counties are highlighted in bold.

Table 5. St. Louis Area Emission and Emission Related Data by County for 2014

	2014 Total VOC (TPD)	2014 Total Nox (TPD)	2007 Population	2014 Population	2014 Employment	2014 Million VMT per year	NAA VOC %	NAA NOx %	Pop. Growth 2007-14	Employment % (NAA)
St. Louis	112.75	146.54	995,118	1,001,876	605,721	11,274.9	50.5%	43.3%	0.7%	48.3%
St. Louis City	19.72	19.98	350,759	317,419	233,310	1,837.9	8.8%	5.9%	-9.5%	18.6%
St. Charles	24.24	41.64	343,952	379,493	130,895	3,581.9	10.9%	12.3%	10.3%	10.4%
Jefferson	12.78	31.81	216,076	222,716	48,319	2,238.5	5.7%	9.4%	3.1%	3.9%
Franklin	10.80	30.40	100,045	102,084	36,371	1,532.0	4.8%	9.0%	2.0%	2.9%
Lincoln	3.69	4.79	51,528	54,249	11,342	572.9	1.7%	1.4%	5.3%	0.9%
Warren	2.94	3.10	30,467	33,253	7,114	634.7	1.3%	0.9%	9.1%	0.6%
NAA TOTAL (MO)	180.30	270.37	2,005,950	2,023,588	1,054,616	20,465.3	80.8%	79.9%	0.9%	84.1%
MSA TOTAL (MO)	186.93	278.26	2,087,945	2,111,090	1,073,072	21,672.9	83.7%	82.3%	1.1%	85.6%
Madison (IL)	24.01	40.43	267,347	266,560	100,403	2,935.5	10.8%	12.0%	-0.3%	8.0%
St. Clair (IL)	15.69	20.18	261,316	265,729	89,725	2,749.0	7.0%	6.0%	1.7%	7.2%
Monroe (IL)	3.28	7.28	32,372	33,722	8,646	368.2	1.5%	2.2%	4.2%	0.7%
Jersey (IL)	2.55	2.77	22,455	22,571	5,007	196.2	1.1%	0.8%	0.5%	0.4%
Macoupin (IL)	4.50	4.62	48,235	46,453	10,086	406.2	2.0%	1.4%	-3.7%	0.8%
Clinton (IL)	6.77	13.54	36,450	37,857	12,683	391.2	3.0%	4.0%	3.9%	1.0%
Bond (IL)	2.33	2.92	18,103	17,269	4,926	291.6	1.0%	0.9%	-4.6%	0.4%
Calhoun (IL)	2.83	3.15	5,167	4,956	816	35.7	1.3%	0.9%	-4.1%	0.1%
NAA TOTAL (IL)	42.98	67.88	561,035	566,011	198,774	6,052.7	19.2%	20.1%	0.9%	15.9%
MSA TOTAL (IL)	61.96	94.88	691,445	695,117	232,292	7,373.6	27.7%	28.1%	0.5%	18.5%
NAA TOTAL	223.27	338.26	2,566,985	2,589,599	1,253,390	26,517.9	100.0%	100.0%	0.9%	100.0%
MSA TOTAL	248.88	373.15	2,779,390	2,806,207	1,305,364	29,046.5			1.0%	
	2014 Total VOC (TPD)	**2014 Total Nox (TPD)**	**2007 Population**	**2014 Population**	**2014 Employment**	**2014 Million VMT per year**	**NAA VOC %**	**NAA NOx %**	**Pop. Growth 2007-14**	**Employment % (NAA)**
Ste. Genenvieve	2.03	24.54	17,841	17,914	5,759	407.8	0.9%	7.3%	0.4%	0.5%
St. Francois	3.84	5.48	62,810	65,960	24,098	578.8	1.7%	1.6%	5.0%	1.9%
Pike	2.12	9.20	18,471	18,541	6,401	823.46	0.9%	2.7%	0.4%	0.5%
Crawford*	3.83	3.33	24,076	24,650	7,056	566.8	1.7%	1.0%	2.4%	0.6%
Montgomery	1.53	3.66	11,920	11,841	2,854	469.1	0.7%	1.1%	-0.7%	0.2%
Gasconade	1.53	2.12	15,399	14,866	5,734	96.8	0.7%	0.6%	-3.5%	0.5%
Perry	2.89	3.00	18,794	19,202	10,142	334.9	1.3%	0.9%	2.2%	0.8%
Scott	3.62	5.61	40,735	38,903	15,135	522.6	1.6%	1.7%	-4.5%	1.2%
Cape Girardeau	6.59	9.99	72,740	78,043	39,767	788.3	3.0%	3.0%	7.3%	3.2%
Washington	1.34	1.32	24,317	25,077	5,008	218.1	0.6%	0.4%	3.1%	0.4%
Randolph (IL)	5.36	21.24	32,760	32,869	13,068	269.0	2.4%	6.3%	0.3%	1.0%
Montgomery (IL)	4.13	10.15	29,810	29,359	8,802	495.4	1.8%	3.0%	-1.5%	0.7%
Washington (IL)	3.86	11.59	14,769	14,337	5,860	377.8	1.7%	3.4%	-2.9%	0.5%
Greene (IL)	2.10	2.35	13,890	13,434	2,414	112.0	0.9%	0.7%	-3.3%	0.2%

* portion of county in MSA

Table 6 gives additional details on the calculation of population growth expected through year 2030 as summarized in Table 5.

Table 6. Population Growth Data

County	2000	2010	2020	2030	10-20 Growth %	10-30 Growth %
ST. LOUIS	1,016,300	987,799	967,196	956,817	-2.09%	-3.14%
ST. LOUIS CITY	348,189	350,800	350,385	349,004	-0.12%	-0.51%
ST. CHARLES	283,893	364,607	439,068	499,126	20.42%	36.89%
JEFFERSON	198,099	222,183	244,003	260,276	9.82%	17.14%
FRANKLIN	93,807	102,419	110,704	117,122	8.09%	14.36%
LINCOLN	38,944	56,010	74,529	91,294	33.06%	63.00%
WARREN	24,525	32,377	40,174	46,241	24.08%	42.82%
WASHINGTON	23,344	24,789	26,294	27,294	6.07%	10.11%
Crawford	22,804	24,608	26,561	27,895	7.94%	13.36%
St. Francois	55,641	64,538	69,815	73,382	8.18%	13.70%
Pike	18,351	18,589	18,669	18,728	0.43%	0.75%
Ste. Genevieve	17,842	17,899	18,161	18,426	1.46%	2.94%
Gasconade	15,342	15,611	15,890	15,921	1.79%	1.99%
Montgomery	12,136	11,881	11,727	11,513	-1.30%	-3.10%
Perry	18,132	18,948	20,100	21,164	6.08%	11.70%
Cape Girardeau	68,693	74,106	79,916	84,612	7.84%	14.18%
Scott	40,422	40,646	40,948	41,076	0.74%	1.06%
MADISON	259,391	267,588	285,586	296,342	6.73%	10.75%
ST. CLAIR	256,532	254,235	253,924	243,453	-0.12%	-4.24%
MONROE	27,667	32,920	38,754	43,111	17.72%	30.96%
JERSEY	21,706	24,334	28,280	31,071	16.22%	27.69%
MACOUPIN	49,103	51,161	55,948	59,442	9.36%	16.19%
CLINTON	35,593	40,058	43,075	44,621	7.53%	11.39%
BOND	17,664	17,804	19,154	20,064	7.58%	12.69%
CALHOUN	5,084	5,018	5,260	5,572	4.82%	11.04%
Randolph	33,951	34,432	35,743	37,004	3.81%	7.47%
Montgomery	30,704	30,729	31,744	33,124	3.30%	7.79%
Washington	15,178	15,805	16,534	16,793	4.61%	6.25%
Greene	14,791	14,641	14,872	14,958	1.58%	2.17%

Table 7 details commuting data across the bi-state area, including county-by-county total number of employed people commuting from their county of residence to their county of work. This information is useful in determining connectivity between counties. Examining commuting patterns helps to identify where mobile source emissions are likely the highest.

Table 7. 2014 Place of Residence/Employment Matrix

Missouri Residence	Employment (MO) Crawford	Franklin	Gasconade	Jefferson	Lincoln	Montgomery	Perry	Cape Girardeau	Pike
ST. LOUIS	128	2,870	151	8,031	342	43	125	1024	163
ST. CHARLES	66	1,758	90	1,649	1,806	104	99	557	153
ST. LOUIS CITY	22	460	43	1,541	71	12	34	323	57
JEFFERSON	79	1,942	60	26,526	106	8	146	361	39
FRANKLIN	864	20,359	747	1,429	156	57	47	139	129
LINCOLN	70	403	25	312	6,309	91	24	81	324
WARREN	55	972	113	185	516	213	7	45	77
WASHINGTON	110	608	37	852	34	5	8	8	12
Crawford	3,565	1443	160	183	21	11	6	13	14
St. Francois	34	228	13	1,598	18	4	357	506	19
Ste. Genevieve	10	45	4	766	0	1	660	294	3
Pike	7	149	11	10	418	50	0	8	3,436
Gasconade	146	1,084	2,633	100	27	127	1	10	8
Perry	13	58	3	177	10	0	5,452	1,169	33
Scott	1	44	9	72	3	1	75	4,091	3
Cape Girardeau	23	145	18	438	22	2	899	22,357	19
Montgomery	5	199	304	9	156	1,576	0	3	72
Missouri NAA	1,159	27,389	1,091	39,176	2,481	224	451	2,404	541
Missouri MSA	1,284	28,764	1,229	39,673	9,306	528	482	2,530	942
Total Missouri	5,198	32,767	4,421	43,878	10,015	2,305	7,940	30,989	4,561

Illinois Residence	Crawford	Franklin	Gasconade	Jefferson	Lincoln	Montgomery	Perry	Cape Girardeau	Pike
MADISON	17	139	11	439	52	10	13	85	15
ST. CLAIR	16	133	14	523	41	4	36	112	14
MONROE	0	35	1	314	2	1	9	6	1
JERSEY	0	11	1	32	6	0	1	5	0
MACOUPIN	2	18	2	6	17	2	0	2	22
CLINTON	2	18	0	61	6	1	5	21	3
BOND	1	0	0	2	4	1	4	4	1
CALHOUN	0	1	0	1	6	0	0	0	35
Randolph	**0**	**2**	**1**	57	1	0	434	31	0
Montgomery	0	2	0	3	2	0	2	6	0
Washington	0	3	0	13	0	0	13	7	0
Greene	0	6	0	8	5	0	0	0	8
Illinois NAA	33	307	26	1,276	95	15	58	203	30
Illinois MSA	38	355	29	1,378	134	19	68	235	91
Total Illinois	38	368	30	1,459	142	19	517	279	99
Total NAA	1,192	27,696	1,117	40,452	2,576	239	509	2,607	571
Total MSA	1,322	29,119	1,258	41,051	9,440	547	550	2,765	1,033
Grand Total	5,236	33,135	4,451	45,337	10,157	2,324	8,457	31,268	4,660
Total Employees	7,056	36,371	5,734	48,319	11,342	2,854	10,142	39,767	6,401

Missouri Residence	Employment (MO) St. Charles	St. Francois	Ste. Genevieve	St. Louis	Warren	Scott	Washington	St. Louis City	Missouri Total	All Residents Working in MO
ST. LOUIS	25,903	642	122	293,306	386	185	128	89,054	422,603	439,416
ST. CHARLES	68,025	276	32	87,771	1,228	83	55	14,754	178,506	187,503
ST. LOUIS CITY	4,076	167	26	61,938	89	70	40	58,786	127,755	132,422
JEFFERSON	3,552	1,160	405	49,086	101	59	342	14,166	98,138	103,652
FRANKLIN	2,700	175	8	14,002	450	13	86	2,850	44,211	47,302
LINCOLN	6,814	93	9	6,575	602	13	32	1,108	22,885	24,537
WARREN	6,313	56	1	3,841	2,814	7	24	795	16,034	14,256
WASHINGTON	223	1,353	61	946	22	13	2,520	97	6,909	8,775
Crawford	185	98	12	759	19	7	42	106	6,644	9,223
St. Francois	373	13,285	453	2,214	14	173	743	968	21,000	24,024
Ste. Genevieve	108	1,007	3,526	814	3	50	44	338	7,673	8,336
Pike	586	4	0	466	52	0	1	75	5,273	6,401
Gasconade	121	74	9	503	65	7	15	76	5,006	6,715
Perry	91	211	363	548	4	116	19	235	8,502	9,195
Scott	99	135	17	385	3	7,095	14	147	12,194	16,008
Cape Girardeau	438	401	103	2,353	19	1,709	66	948	29,960	33,431
Montgomery	470	2	0	310	323	1	3	44	3,477	4,940
Missouri NAA	104,256	2,420	593	506,103	2,254	410	651	179,610	871,213	910,295
Missouri MSA	117,383	2,569	603	516,519	5,670	430	707	181,513	910,132	949,088
Total Missouri	120,077	19,139	5,147	525,817	6,194	9,601	4,174	184,547	1,016,770	1,076,136

Illinois Residence	St. Charles	St. Francois	Ste. Genevieve	St. Louis	Warren	Scott	Washington	St. Louis City	Missouri Total	All Residents Working in MO
MADISON	1,885	73	27	17,104	26	21	11	11,776	31,704	33,087
ST. CLAIR	1,123	80	22	13,893	16	21	12	14,193	30,253	31,614
MONROE	263	18	12	4,158	4	2	2	2,308	7,136	7,290
JERSEY	176	3	2	1,214	5	2	0	449	1,907	2,037
MACOUPIN	246	8	2	1,063	5	2	0	658	2,055	2,122
CLINTON	146	11	9	1,031	3	3	0	921	2,241	2,448
BOND	17	0	0	101	0	1	0	45	181	203
CALHOUN	122	1	0	305	1	0	0	135	607	609
Randolph	21	5	58	417	0	2	1	385	1,415	1,439
Montgomery	15	1	1	118	0	0	0	101	251	289
Washington	12	1	3	163	0	1	1	211	428	444
Greene	104	2	0	257	1	0	0	104	495	521
Illinois NAA	3,271	171	61	35,155	46	44	25	28,277	69,093	71,991
Illinois MSA	3,978	194	74	38,869	60	52	25	30,485	76,084	79,410
Total Illinois	4,130	203	136	39,824	61	55	27	31,286	78,673	82,103
Total NAA	107,527	2,591	654	541,258	2,300	454	676	207,887	940,306	982,286
Total MSA	121,361	2,763	677	555,388	5,730	482	732	211,998	986,216	1,028,498
Grand Total	124,207	19,342	5,283	565,641	6,255	9,656	4,201	215,833	1,095,443	1,158,239
Total Employees	130,895	24,098	5,759	605,721	7,114	15,135	5,008	233,310	1,195,026	

Missouri Residence		Employment (IL)							
		Bond	Calhoun	Clinton	Greene	Jersey	Macoupin	Madison	Monroe
	ST. LOUIS	60	5	54	9	71	30	4,096	423
	ST. CHARLES	16	4	24	4	54	16	1,004	51
	ST. LOUIS CITY	14	0	23	4	11	22	1,419	196
	JEFFERSON	13	1	19	2	2	7	484	117
	FRANKLIN	6	5	0	2	10	7	160	37
	LINCOLN	2	1	1	2	2	2	86	5
	WARREN	0	2	1	0	6	0	50	4
	WASHINGTON	1	0	1	0	0	1	2	1
	Crawford	1	0	0	0	0	0	4	4
	St. Francois	3	0	7	0	0	1	38	17
	Ste. Genevieve	1	0	0	0	0	0	14	15
	Pike	0	6	0	3	0	0	5	1
	Gasconade	0	0	0	0	0	0	0	1
	Perry	0	0	1	0	0	1	9	12
	Scott	2	0	0	0	0	0	4	1
	Cape Girardeau	4	0	8	0	1	1	40	14
	Montgomery	0	0	0	7	1	1	2	0
	Missouri NAA	109	15	120	21	148	82	7,163	824
	Missouri MSA	111	18	122	23	156	84	7,299	833
	Total Missouri	123	24	139	33	158	89	7,417	899

Illinois Residence		Employment (IL)							
		Bond	Calhoun	Clinton	Greene	Jersey	Macoupin	Madison	Monroe
	MADISON	537	20	855	113	676	826	55,905	386
	ST. CLAIR	102	1	970	21	108	148	11,556	1,399
	MONROE	14	0	77	3	22	18	834	4,276
	JERSEY	22	71	52	169	2,594	361	2,930	45
	MACOUPIN	74	7	57	125	254	5,961	3,926	26
	CLINTON	366	1	6,338	2	33	32	1,726	78
	BOND	2,408	2	359	4	12	71	1,167	10
	CALHOUN	11	533	3	108	185	62	515	3
	Randolph	42	0	164	1	16	28	475	511
	Montgomery	240	5	85	11	37	553	681	13
	Washington	19	0	364	0	2	7	277	37
	Greene	21	54	15	1,380	321	185	635	6
	Illinois NAA	653	21	1,902	137	806	992	68,295	6,061
	Illinois MSA	3,534	635	8,711	545	3,884	7,479	78,559	6,223
	Total Illinois	3,856	694	9,339	1,937	4,260	8,252	80,627	6,790
	Total NAA	762	36	2,022	158	954	1,074	75,458	6,885
	Total MSA	3,645	653	8,833	568	4,040	7,563	85,858	7,056
	Grand Total	3,979	718	9,478	1,970	4,418	8,341	88,044	7,689
	Total Employees	4,926	816	12,683	2,414	5,007	10,086	100,403	8,646

Missouri Residence		Employment (IL) Montgomery	Randolph	St. Clair	Washington	Illinois Total	All Residents Working in IL
	ST. LOUIS	16	53	3,275	38	8,130	10,996
	ST. CHARLES	19	12	572	7	1,783	2,575
	ST. LOUIS CITY	8	17	1,649	7	3,370	4,269
	JEFFERSON	1	46	944	2	1,638	2,165
	FRANKLIN	5	4	106	1	343	562
	LINCOLN	3	3	42	0	149	272
	WARREN	1	0	31	2	97	179
	WASHINGTON	0	0	4	0	10	22
	Crawford	0	1	5	0	15	28
	St. Francois	3	33	165	12	279	497
	Ste. Genevieve	0	35	102	11	178	252
	Pike	0	1	0	0	16	192
	Gasconade	1	0	1	0	3	11
	Perry	1	142	77	6	249	337
	Scott	0	5	6	0	18	103
	Cape Girardeau	1	53	183	12	317	802
	Montgomery	0	1	2	0	14	86
	Missouri NAA	49	132	6,546	55	15,264	20,567
	Missouri MSA	53	135	6,619	57	15,510	21,018
	Total Missouri	59	406	7,164	98	16,609	23,348

Illinois Residence		Employment (IL) Montgomery	Randolph	St. Clair	Washington	Illinois Total	All Residents Working in IL
	MADISON	396	246	12,741	101	72,802	84,154
	ST. CLAIR	169	868	48,682	397	64,421	75,482
	MONROE	21	628	2,642	44	8,579	10,092
	JERSEY	46	19	453	6	6,768	7,726
	MACOUPIN	973	22	674	6	12,105	18,716
	CLINTON	51	179	2,486	473	11,765	14,461
	BOND	162	30	246	33	4,504	6,658
	CALHOUN	58	2	60	2	1,542	2,223
	Randolph	56	6,274	1,575	210	9,352	11,988
	Montgomery	4,608	26	253	23	6,535	10,593
	Washington	18	202	848	2,663	4,437	6,387
	Greene	71	7	155	5	2,855	5,381
	Illinois NAA	586	1,742	64,065	542	145,802	169,728
	Illinois MSA	1,876	1,994	67,984	1,062	182,486	219,512
	Total Illinois	6,629	8,503	70,815	3,963	205,665	253,861
	Total NAA	635	1,874	70,611	597	161,066	190,295
	Total MSA	1,929	2,129	74,603	1,119	197,996	240,530
	Grand Total	6,688	8,909	77,979	4,061	222,274	277,209
	Total Employees	8,802	13,068	89,725	5,860	262,436	

Missouri Residence		Area Total	All Residents Work in IL&MO	% Work in NAA	% Work in MSA	% Work in NAA+County	% Work in County	# Working in NAA	# Working in MSA
	ST. LOUIS	430,733	450,412	94.79%	95.00%	94.79%	65.12%	426,958	427,906
	ST. CHARLES	180,289	190,078	92.37%	94.03%	92.37%	35.79%	175,584	178,732
	ST. LOUIS CITY	131,125	136,691	95.15%	95.32%	95.15%	43.01%	130,065	130,295
	JEFFERSON	99,776	105,817	91.49%	91.73%	91.49%	25.07%	96,817	97,066
	FRANKLIN	44,554	47,864	87.00%	88.33%	87.00%	42.54%	41,643	42,277
	LINCOLN	23,034	24,809	61.85%	89.74%	87.28%	25.43%	15,345	22,264
	WARREN	16,131	14,435	84.45%	107.59%	103.95%	19.49%	12,191	15,530
	WASHINGTON	6,919	8,797	31.07%	31.74%	59.71%	28.65%	2,733	2,792
	Crawford	6,659	9,251	29.07%	29.51%	67.60%	38.54%	2,689	2,730
	St. Francois	21,279	24,521	22.84%	23.02%	77.02%	54.18%	5,601	5,644
	Ste. Genevieve	7,851	8,588	25.64%	25.69%	66.70%	41.06%	2,202	2,206
	Pike	5,289	6,593	19.60%	26.82%	71.71%	52.12%	1,292	1,768
	Gasconade	5,009	6,726	28.04%	29.41%	67.19%	39.15%	1,886	1,978
	Perry	8,751	9,532	12.66%	12.83%	69.86%	57.20%	1,207	1,223
	Scott	12,212	16,111	4.70%	4.75%	48.74%	44.04%	758	766
	Cape Girardeau	30,277	34,233	13.32%	13.48%	78.63%	65.31%	4,559	4,614
	Montgomery	3,491	5,026	20.61%	30.18%	51.97%	31.36%	1,036	1,517
	Missouri NAA	886,477	930,862					871,067	876,276
	Missouri MSA	925,642	970,106					898,759	914,226
	Total Missouri	1,033,379	1,099,484	83.92%	94.30%			922,566	939,308

Illinois Residence		Area Total	All Residents Work in IL&MO	% Work in NAA	% Work in MSA	% Work in NAA+County	% Work in County	# Working in NAA	# Working in MSA
	MADISON	104,506	117,241	85.61%	88.17%	85.61%	47.68%	100,375	103,378
	ST. CLAIR	94,674	107,096	85.44%	86.73%	85.44%	45.46%	91,502	92,900
	MONROE	15,715	17,382	85.32%	86.11%	85.32%	24.60%	14,830	14,969
	JERSEY	8,675	9,763	54.39%	86.25%	80.96%	26.57%	5,310	8,421
	MACOUPIN	14,160	20,838	31.75%	62.35%	60.36%	28.61%	6,617	12,992
	CLINTON	14,006	16,909	38.25%	78.34%	75.73%	37.48%	6,467	13,246
	BOND	4,685	6,861	23.15%	64.77%	58.24%	35.10%	1,588	4,444
	CALHOUN	2,149	2,832	40.32%	68.61%	59.15%	18.82%	1,142	1,943
	Randolph	10,767	13,427	25.64%	27.51%	72.37%	46.73%	3,443	3,695
	Montgomery	6,786	10,882	10.90%	19.37%	53.24%	42.35%	1,186	2,108
	Washington	4,865	6,831	22.90%	28.63%	61.88%	38.98%	1,564	1,957
	Greene	3,350	5,902	21.60%	31.80%	44.98%	23.38%	1,275	1,877
	Illinois NAA	214,895	241,719					206,707	211,247
	Illinois MSA	258,570	298,922					227,831	252,293
	Total Illinois	284,338	335,964	71.30%	84.40%			235,299	261,930
	Total NAA		1,172,581						
	Total MSA		1,269,028						
	Grand Total		1,435,448	80.97%	91.97%			1,157,865	1,201,238

Figure 4 is a graphical representation of the population density in and near the St. Louis area. Generally, areas with higher density have more anthropogenic emissions, both from mobile and point sources, but also the miscellaneous nonpoint sources like gas stations, residential solvent usage, etc. The most densely populated areas are in St. Louis City and St. Louis, St. Charles, and Jefferson counties.

Figure 4. Population Density in the St. Louis Area in 2012

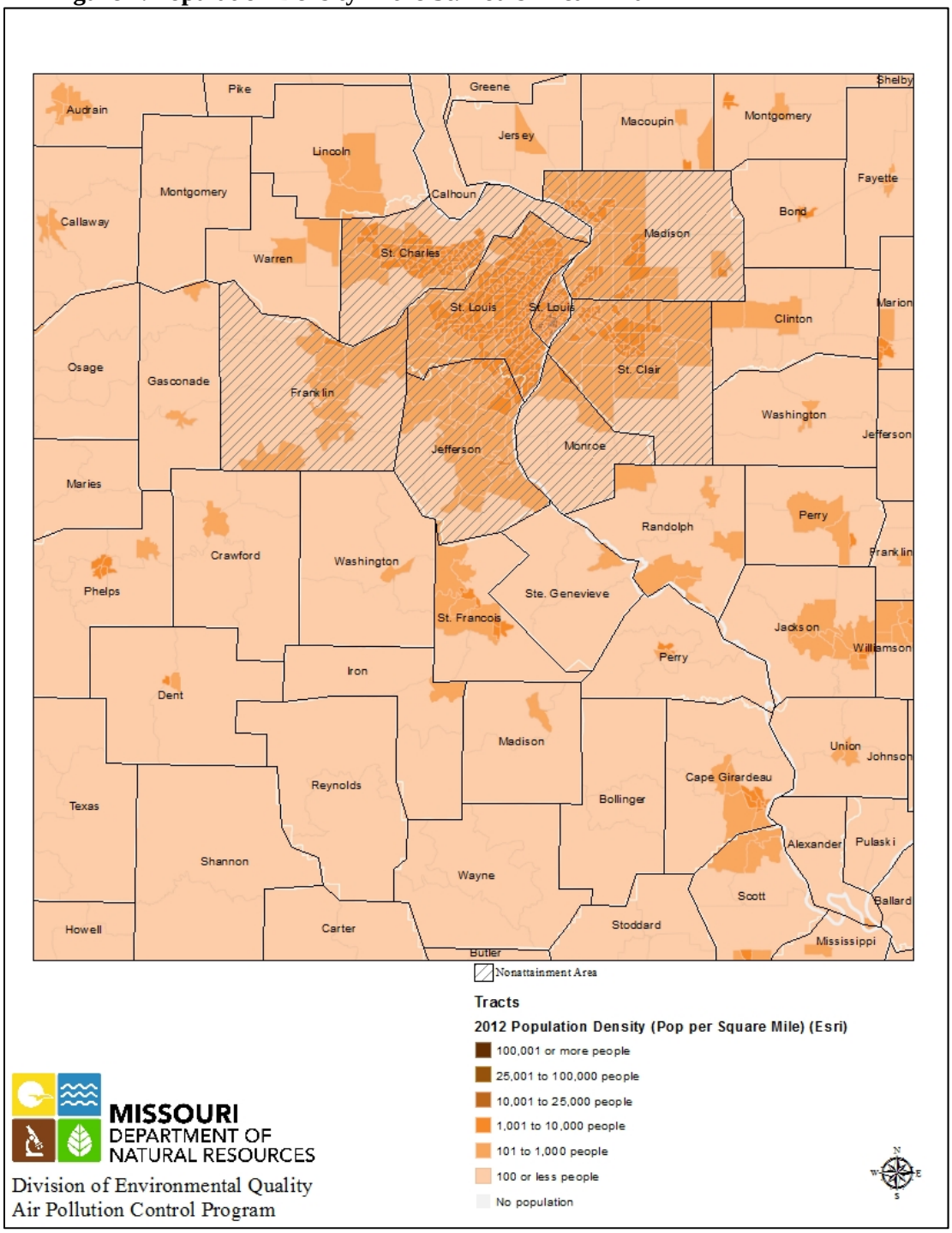


Figure 5 shows the urban nature of the St. Louis area. Counties that are mostly pink are the most developed. These urbanized areas correspond to the population density shown in Figure 5. The most urbanized areas are St. Louis City, and St. Louis, St. Charles, and Jefferson counties.

Figure 5. Urbanization in the St. Louis Area in 2014

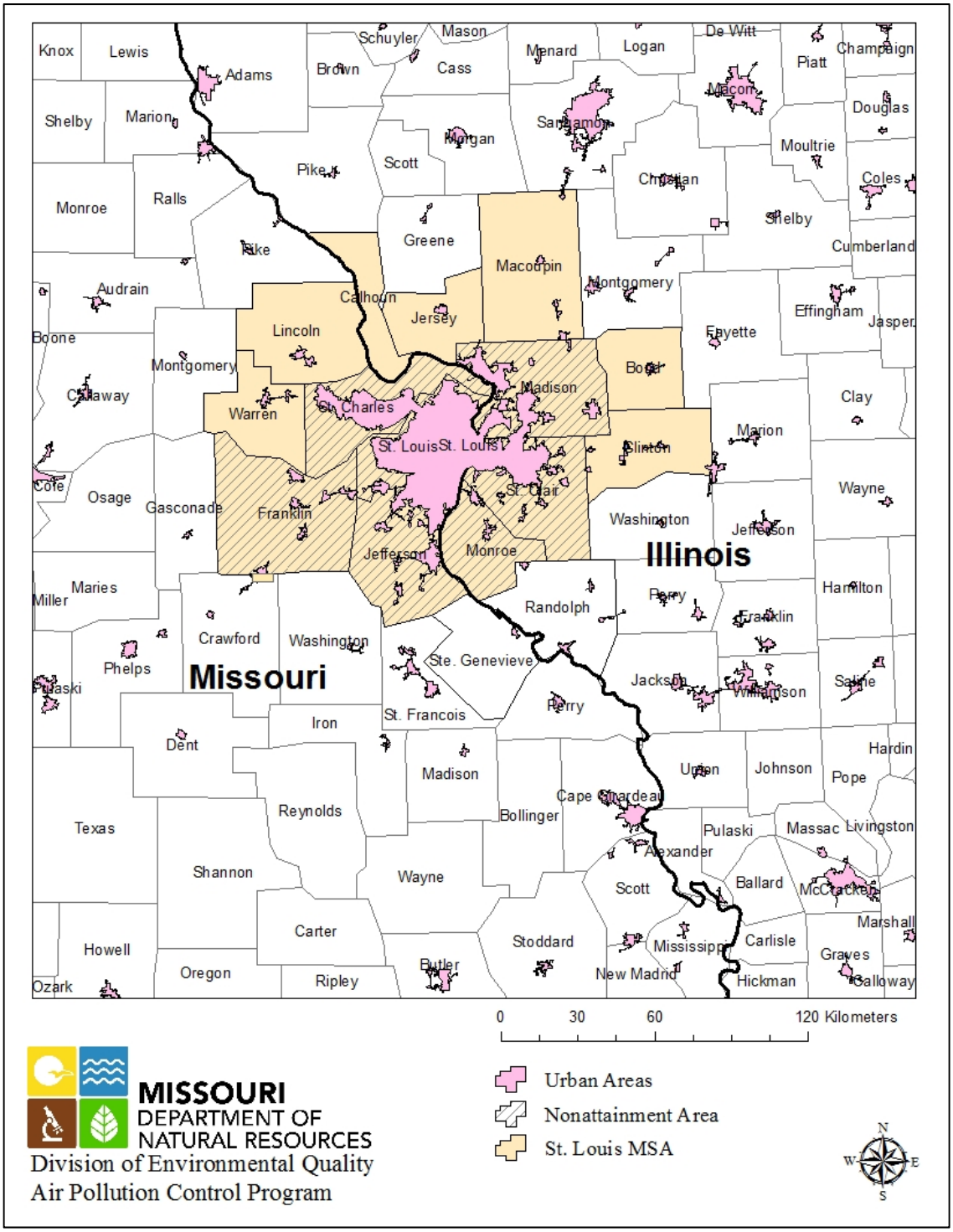


Figure 6 depicts the locations of point sources of emissions, including large permitted facilities such as electric-generating power plants and manufacturing plants. The mapped sources are sized and sorted by color to easily differentiate the sources' emissions levels. For example, the largest red and orange circles represent the largest sources such as coal-fired power plants, while the smaller circles represent the numerous smaller emission sources in the area.

Figure 6. 2014 NO_x Emissions from Point Sources

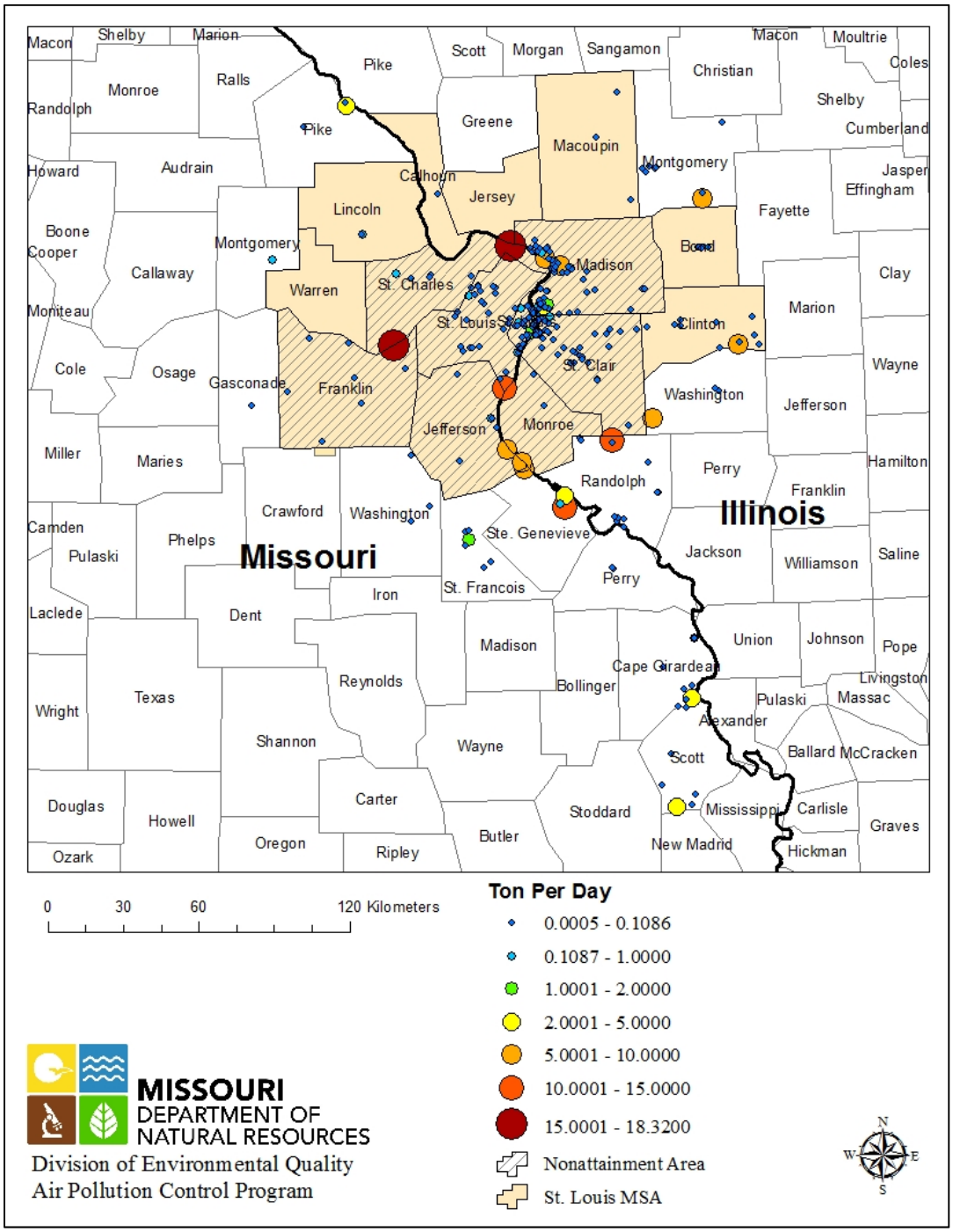
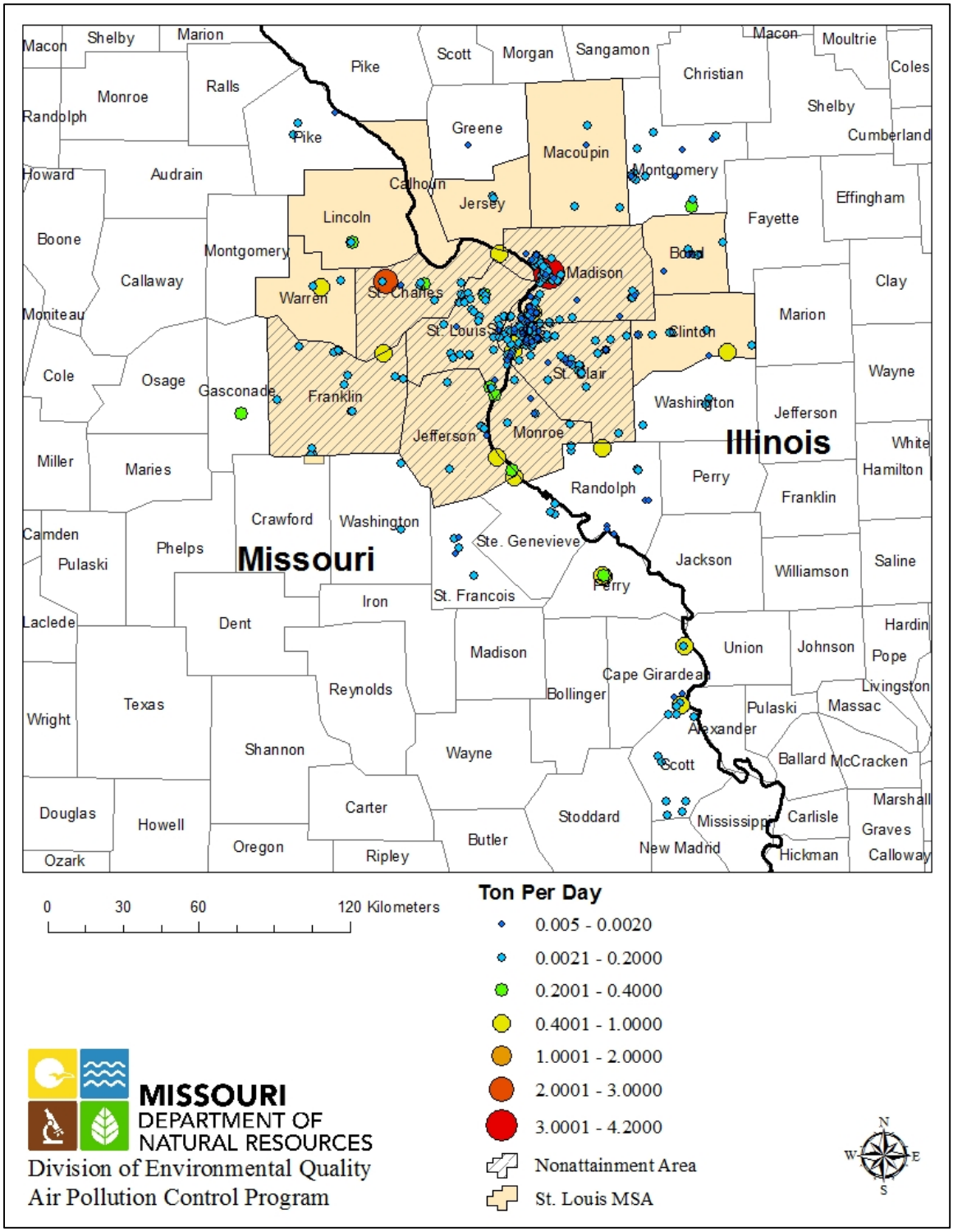


Figure 7 shows the many VOC point sources in the St. Louis area. The largest circles are major VOC emitters like automobile manufacturing plants and oil refineries, while the smaller circles are other permitted sources.

Figure 7. 2014 VOC Emissions from Point Sources



5.3 Meteorological Analysis

Meteorological data analysis provides insight into the transport of emissions, especially when that transport affects downwind monitors. Examining the possible contribution of upwind emission sources to downwind monitors can be done through simple emissions and single-location wind velocity data. The air program also performed more sophisticated analyses to account for more complex transport situations, including regimes where vertical motion and long distance transport could be significant.

The HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) modeling system produces trajectories indicating the path air parcels traveled over a given time and geography. The trajectories use meteorological data and mathematical equations to simulate atmospheric transport. The chosen model options do not explicitly include emissions or the chemical transformation of pollutants, so an examination of emission sources is needed in conjunction with HYSPLIT trajectory reviews. In this analysis, monitor locations on days where the maximum 8-hour ozone concentration exceeds the NAAQS (an exceedance) are used as the endpoint for HYSPLIT trajectories to determine possible source regions for contributing emissions.

All trajectories were generated following EPA's Designation Guidance memorandum, including the use of EDAS 40 km meteorological data, choosing three heights (100 m, 500 m, and 1,000 m), and using an end time of 0000 Universal Coordinated Time (UTC) that corresponds to 7pm central daylight time. The end time around sunset is typically near the end of the 8-hour period of maximum ozone concentration. The trajectories go back in time for 24 hours, because the areas considered for direct contribution to a violating monitor are typically within travel distances and times around one day given commonly observed wind speeds.

HYSPLIT trajectories were created for the design value monitors for both the Missouri and Illinois side of the St. Louis areas. For the Missouri side, the design value monitor at West Alton is the endpoint for HYSPLIT trajectories on all days where the daily maximum 8-hour ozone concentration was 70 ppb or greater from 2013 to 2015 (14 dates). The program also created trajectories from the design value monitor in Illinois, Alton, where the daily maximum 8-hour ozone concentration was 70 ppb or greater (14 dates) to assess possible contributions from Missouri. Of the modeled days for West Alton, the Alton monitor was also modeled for the same day ten out of fourteen times as concentrations are similar due to their close proximity. The days examined for trajectories also show exceedances at other monitor locations in St. Louis, including Arnold West, Maryland Heights, and Orchard Farm. The dates examined through HYSPLIT trajectories are listed in Table 8.

Table 8. Monitor Exceedance Dates Modeled with HYSPLIT

Monitor Name	Exceedance Date	Highest 8-hour Ozone Monitor Value (ppb)
West Alton	18-Jul-2013	88
	06-Sep-2013	80
	20-Jun-2013	71
	19-Jul-2013	71
	04-Aug-2014	78
	03-Aug-2014	75
	21-Jul-2014	73

Monitor Name	Exceedance Date	Highest 8-hour Ozone Monitor Value (ppb)
	22-Jul-2014	72
	20-Apr-2014	71
	25-Aug-2014	71
	24-Jul-2015	72
	05-Sep-2015	71
	14-Aug-2015	70
	01-Sep-2015	70
Alton (IL)	18-Jul-2013	78
	06-Sep-2013	75
	09-Sep-2013	74
	05-Jun-2013	72
	19-Jul-2013	70
	04-Aug-2014	80
	25-Aug-2014	74
	22-Jul-2014	74
	26-Sep-2014	72
	03-Aug-2014	71
	21-Jul-2014	70
	14-Aug-2015	74
	04-Sep-2015	71
	24-Jul-2015	71
Arnold West	06-Sep-2013	79
Orchard Farm	06-Sep-2013	85
Maryland Heights	06-Sep-2013	85

The combination of back trajectories for West Alton is shown in Figure 8 from HYSPLIT model runs provided by EPA's Ozone Designations Mapping Tool (https://www.epa.gov/ozone-designations/ozone-designations-guidance-and-data). The combination of back trajectories for Alton (IL) is shown in in Figure 9. Detailed daily back trajectories for each date above are contained in Appendix A.

Figure 8. West Alton Combined HYSPLIT Trajectories

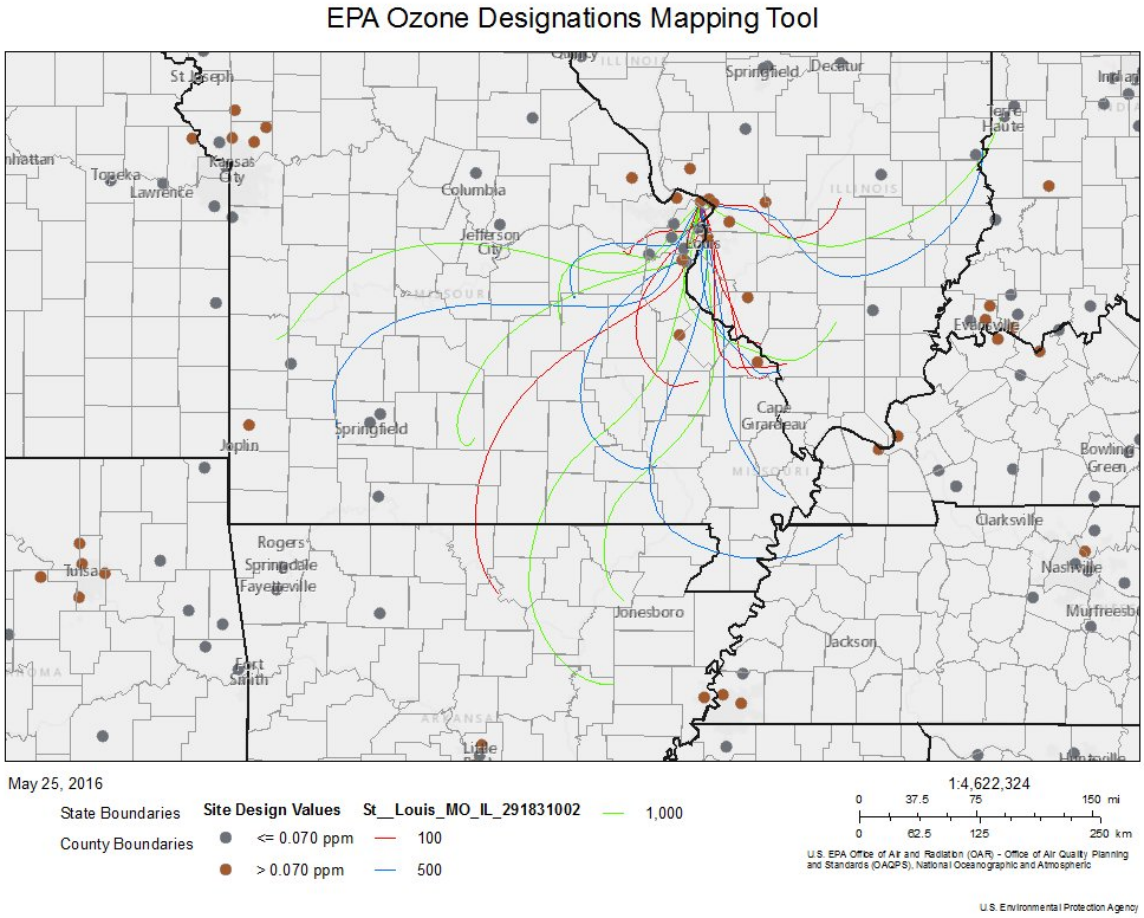
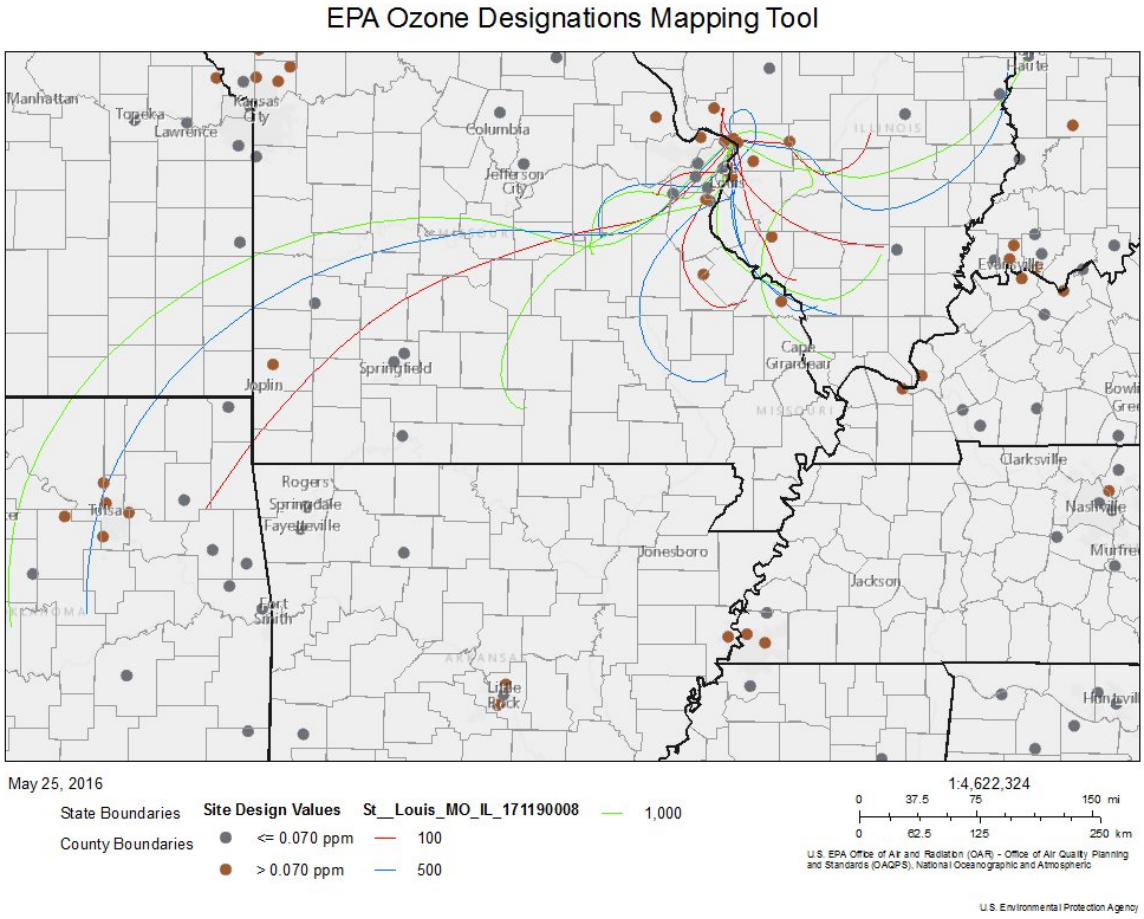


Figure 9. Alton (IL) Combined HYSPLIT Trajectories



A common feature to both sets of trajectories is a distinct curve to the right that corresponds to the typical meteorological conditions in the summer months with anti-cyclonic flow around an area of high pressure southeast of St. Louis. The wind flow around the high pressure area creates a clockwise flow with a right turn of air parcels as they move around the high pressure system. The surface weather maps for three selected days with highest overall concentrations and number of monitors at or above 70 ppb are shown in Figures 10, 11, and 12. These maps depict conditions observed at the end of the peak 8-hour ozone concentrations. There is a surface high pressure area east or south of St. Louis on each of these days. The spacing of isobars of equal pressure, indicated by solid red lines, is large. This indicates that pressure differences are small and winds are light. The combination of light southerly flow from the St. Louis area toward the West Alton and Alton monitors is a typical meteorological setup for high ozone concentrations, along with sunny skies that typically accompany high pressure.

Figure 10. Surface Weather Map for July 18, 2013

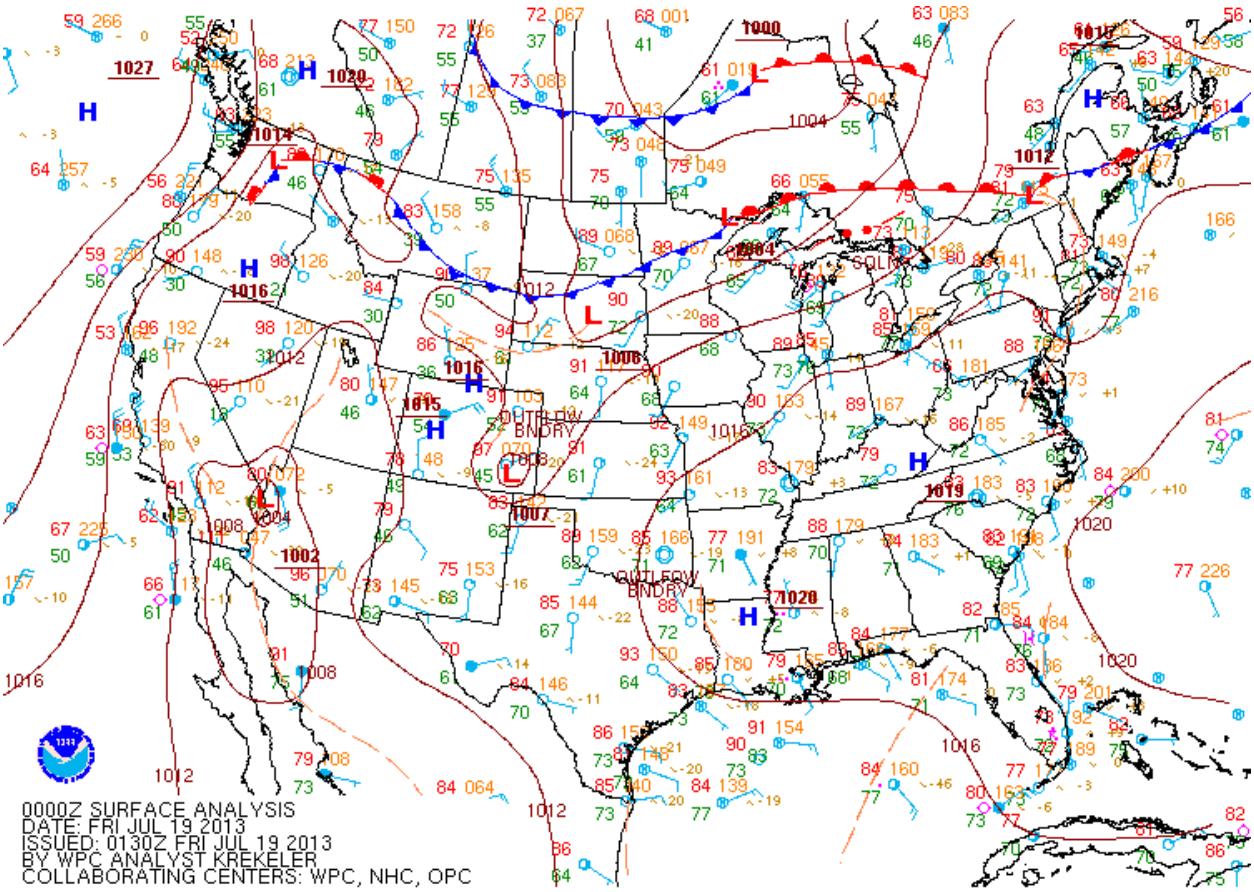


Figure 11. Surface Weather Map for September 6, 2013

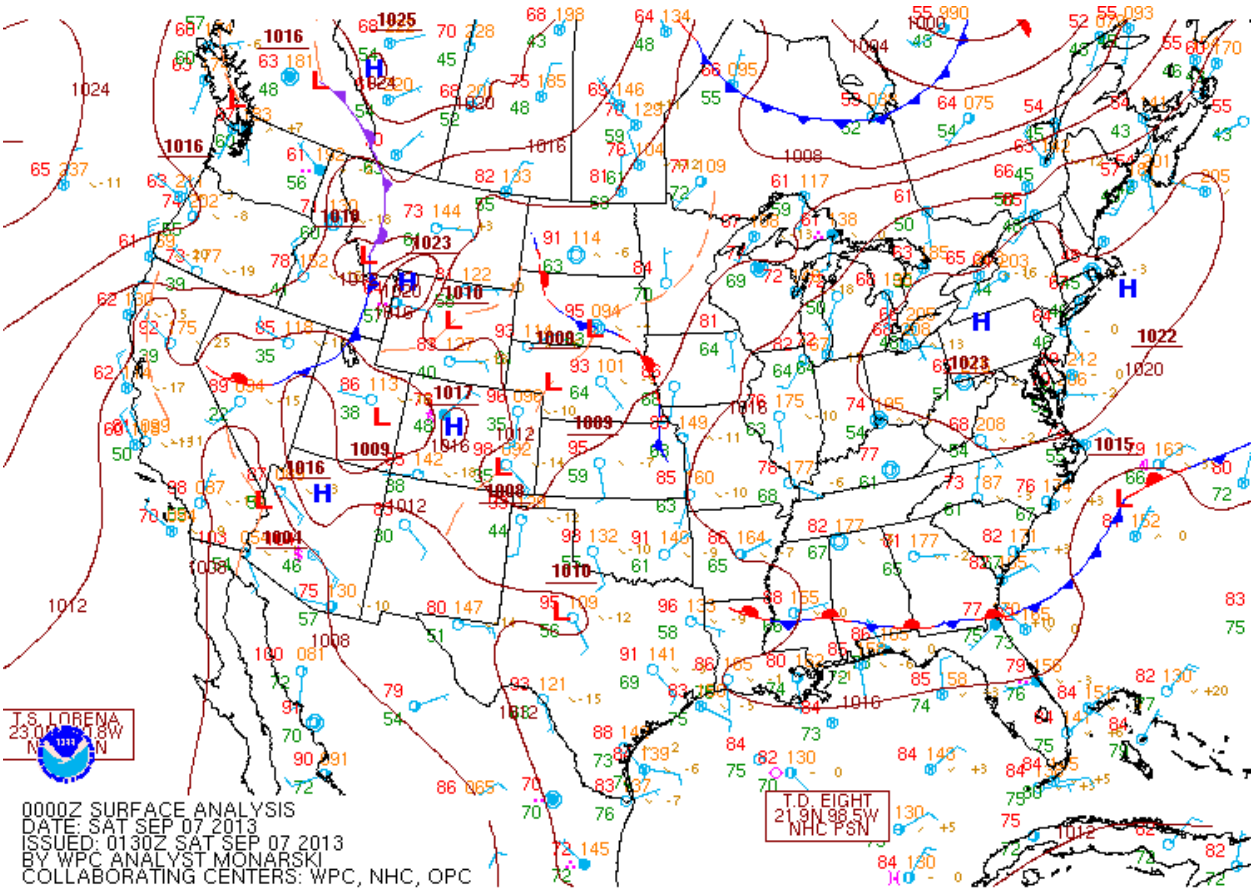
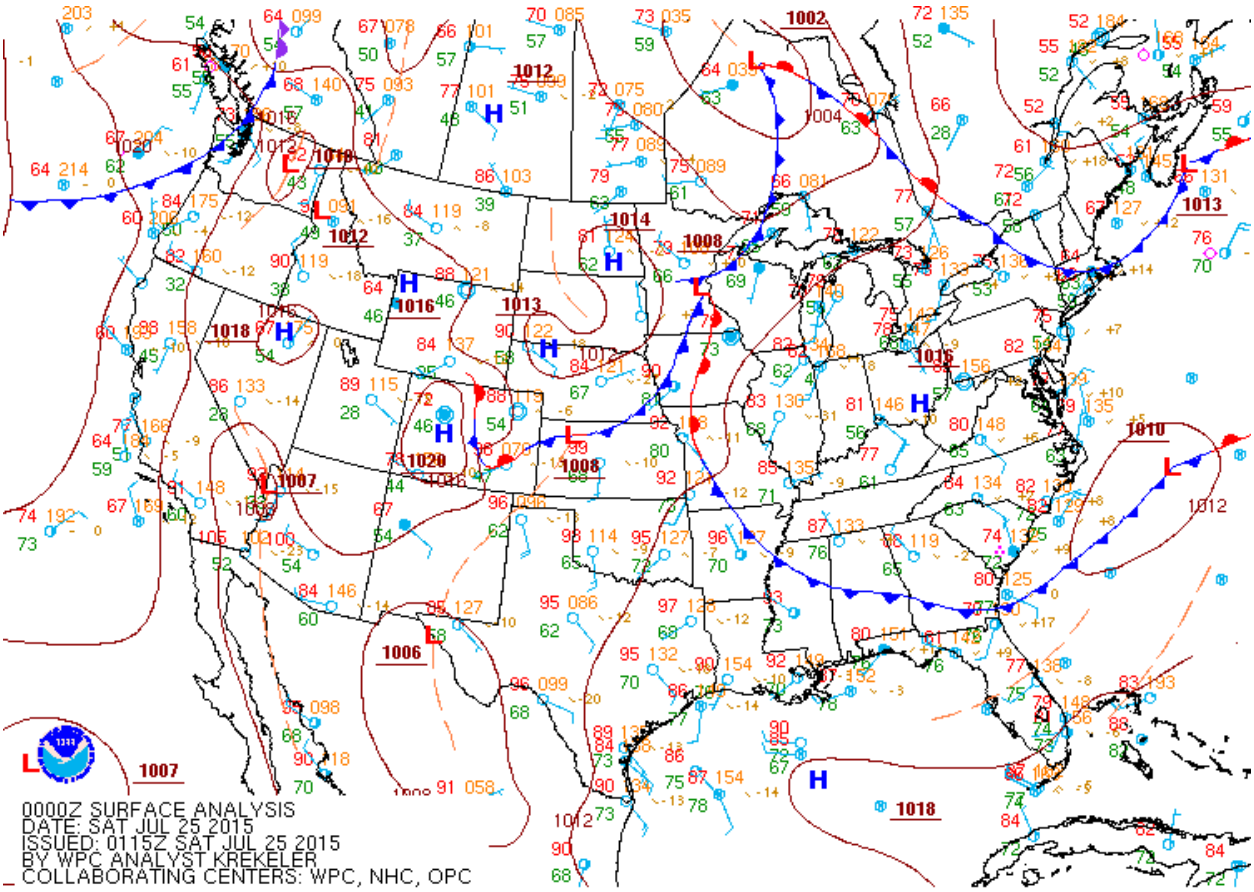


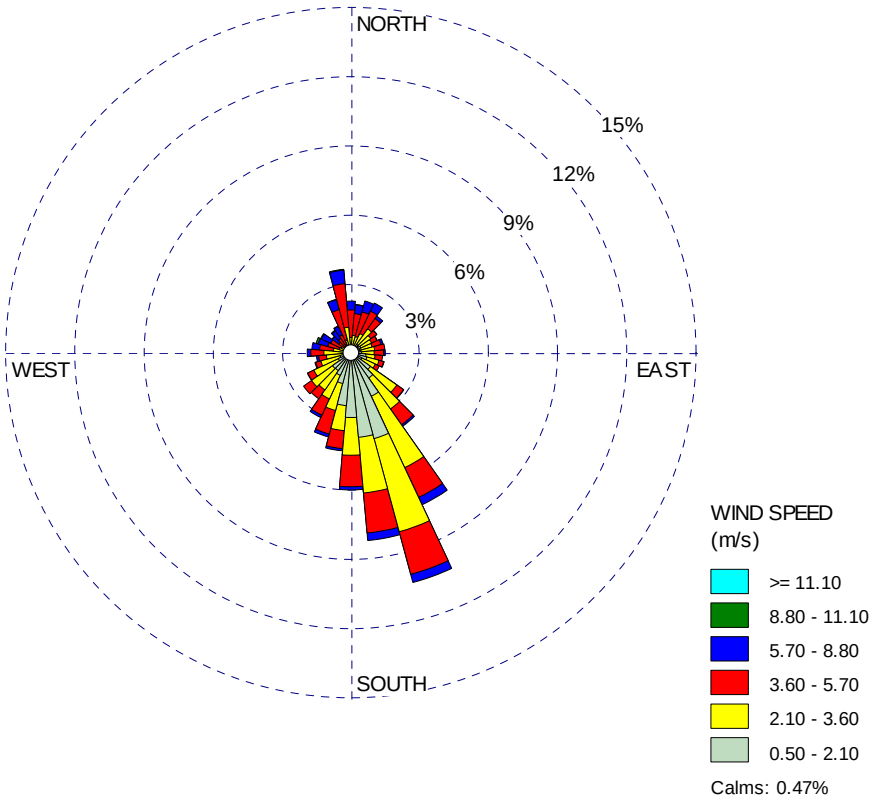
Figure 12. Surface Weather Map for July 24, 2015



The trajectories on these days with highest ozone concentrations at either the West Alton or Alton monitors north of St. Louis originate or pass over the city itself, coming generally from the south. When viewed with respect to precursor emissions shown in Figures 6 and 7, the trajectories indicate that the source emissions from St. Louis likely contribute to the highest monitored ozone concentration days at West Alton and Alton. Conversely, the trajectories indicate that sources to the north of West Alton and Alton are likely not contributing to high ozone concentrations as few trajectories pass over this region. Precursor emissions are also sparse in the counties north of these monitors according to Figures 6 and 7.

Local surface weather data is collected by the National Weather Service (NWS) at many larger airports and is used for a variety of purposes, including source specific modeling. One of the airports in the St. Louis region, the Downtown St. Louis Airport (or Cahokia) was also evaluated to further support the trends detailed above. The wind rose included in Figure 13 details the frequency of winds from each direction and wind speed. The wind rose represents the 2015 ozone season, April 1, 2015 through October 31, 2015. This wind rose also indicates that St. Louis area experiences predominant winds from the south.

Figure 13. Downtown St. Louis Airport (Cahokia) Wind Rose: April 1, 2015 - October 31, 2015



5.4 Geography and Topography Considerations

The geography and topography analysis examines physical features of the land that could affect the formation and distribution of ozone. Mountains or other physical features may influence the fate and transport of emissions and ozone concentrations. Valley-type topographical features can cause local stagnation episodes where vertical temperature inversions effectively “trap” air pollution. Under these conditions, emissions can accumulate leading to periods of elevated ozone concentrations. Inversions can be limited in their extent and only impact a small area. If exceedances are associated with temperature inversions, the affected areas may need to be separated from areas high enough in altitude to not experience such an event.

The St. Louis area is not adjacent to mountain ranges or topographic features that affect the large scale airflow patterns. Likewise, there are no valleys capable of trapping pollution for long periods due to steep terrain. St. Louis is located at the confluence of the Missouri and Mississippi rivers, and they are the most significant topographic feature of the area. The rivers have carved out a shallow and wide river valley over the years that channel winds along the valley at airport meteorological stations. These valley effects do not cause the trapping of pollutants and do not cause the long term buildup of pollutants seen in more extreme topographically influenced areas of the country.

The West Alton monitor, the design value monitor for the St. Louis area, is located in the Mississippi river valley. Monitors not located in the river valley include Arnold West, Maryland Heights, and Orchard Farm. These other locations have experienced single-day 8-hour ozone concentrations of 85 ppb, similar to the highest single day reading at West Alton of 88 ppb. If topography was a driving factor for ozone concentrations at West Alton, a pattern of either significantly higher concentrations or number of exceedance days would emerge. Given that winds in St. Louis can drive ozone concentrations of similar magnitude to monitors in or out of the river valley, prevailing winds are more of an influence on ozone than the topography of the St. Louis area.

5.5 Jurisdictional Boundaries

The St. Louis area contains the violating monitor and contributing areas, and appropriate jurisdictional boundaries are chosen with regard to future nonattainment area planning and enforcement tasks. The air program has historically chosen county-level boundaries for ozone standard actions. County boundaries were chosen in the establishment of the 2008 St. Louis ozone nonattainment boundary. Many of the emission inventory sectors are estimated at the county level, such as nonpoint and mobile sources. Likewise, many existing regulations apply to entire counties in the St. Louis area with respect to previous ozone standards. The St. Louis Inspection and Maintenance program applies to vehicles registered in the five-county St. Louis 2008 ozone nonattainment area, and no partial counties are included in that area. Because of the existing precedent of using county boundaries for ozone designation boundaries, the air program will continue to examine potential nonattainment areas on the county level within Missouri.

6 Recommendation for Nonattainment Counties

6.1 City of St. Louis

The following factor analysis supports a recommendation of nonattainment for the City of St. Louis:

- Air Quality Data: there are no violating monitors in the city.
- Emissions: the city has the third largest emissions for VOC (19.7 TPD) and fifth largest emissions for NO_x (19.9 TPD) in the area.
- Emissions-related data: the city is the third largest for population in the area (317,419), and has the fourth largest VMT in the area (1.8 billion VMT per year).
- Meteorological Data: analysis of HYSPLIT trajectories demonstrate frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: St. Louis City is within the current 2008 ozone nonattainment area.

6.2 St. Louis County

The following factor analysis supports a recommendation of nonattainment for St. Louis County:

- Air Quality Data: there are no violating monitors in the county.
- Emissions: the county has the largest emissions for VOC (112.8 TPD) and NO_x (146.5 TPD) in the area.
- Emissions-related data: the county has the largest population in the area (1,001,876), and the largest VMT in the area (11.3 billion VMT/year).
- Meteorological Data: analysis of HYSPLIT trajectories demonstrate frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: St. Louis County is within the current 2008 ozone nonattainment area.

6.3 St. Charles County

The following factor analysis supports a recommendation of nonattainment for St. Charles County:

- Air Quality Data: the violating monitor at West Alton is in the county.
- Emissions: the county has the second largest emissions for NO_x (41.6 TPD) and second largest for VOC (24.2 TPD) in the area.
- Emissions-related data: the county is the second largest for population in the area (379,493), and has the second largest VMT in the area (3.6 billion VMT/year). Population growth is projected at almost 38% and is largest in the area.
- Meteorological Data: analysis of HYSPLIT trajectories demonstrate frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: St. Charles County is within the current 2008 ozone nonattainment area.

6.4 Franklin County

The following factor analysis supports a recommendation of nonattainment for Franklin County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions over 40 tons per day.
- Emissions-related data: the county population is 102,084 and has the fifth largest VMT in the area (1.5 billion VMT per year). Population growth in Franklin county is projected at 14% between 2010 and 2030, the third highest in the area.
- Meteorological Data: analysis of HYSPLIT trajectories demonstrate frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: Franklin County is within the current 2008 ozone nonattainment area.

6.5 Jefferson County

The following factor analysis supports a recommendation of nonattainment for Jefferson County:

- Air Quality Data: there are no violating monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions over 40 tons per day.
- Emissions-related data: the county population is 222,716 and has the third largest VMT in the area (2.2 billion VMT per year). Population growth in Jefferson county is projected at 17% between 2010 and 2030, the second highest of the counties in the area.

- Meteorological Data: analysis of HYSPLIT trajectories demonstrate frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: Jefferson County is within the current 2008 ozone nonattainment area.

7 Recommendations for Unclassifiable/Attainment Counties

Section 107(d)(1)(A) of the Clean Air Act defines a nonattainment area as any area that does not meet or that contributes to nearby areas not meeting the ambient air quality standard. All other areas will be classified in accordance with the boundary recommendation guidance that states once EPA has determined the boundaries for nonattainment, they intend to designate the remainder of the state as unclassifiable/attainment. EPA expects to continue the use of the unclassifiable/attainment designation from previous ozone NAAQS, meaning that areas without monitors and those with monitors indicating no violations (that do not contribute to nearby violations) will be designated unclassifiable/attainment. For this reason, the air program recommends unclassifiable/attainment for all counties not included in the proposed nonattainment area, as discussed in Section 6.

Counties Surrounding the St. Louis Area

7.1 Lincoln County

The following factor analysis supports a recommendation of unclassifiable/attainment for Lincoln County:

- Air Quality Data: there is a monitor in the county, but it is not violating the 2015 ozone standard.
- Emissions: the county has combined NO_x and VOC emissions under 9 tons per day which is less than one fourth of the emissions from the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 55,000 which is just over half the population of the smallest population county recommended for nonattainment. VMT is near 0.5 billion per year which is about one third of the VMT from the county with lowest travel recommended for nonattainment. Commuting data shows that just over 15,000 people in the county travel into the St. Louis current nonattainment counties for work. The comparison to the next highest number of workers in the nonattainment area, Franklin County at over 40,000 people, shows that Lincoln County is not highly connected to the nonattainment area via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories do not support contribution to the exceeding monitor.
- Jurisdictional Boundaries: Lincoln County is adjacent to the current 2008 ozone nonattainment area.

7.2 Warren County

The following factor analysis supports a recommendation of unclassifiable/attainment for Warren County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions under 5 tons per day which is less than one sixth of the emissions from the smallest emitting county recommended for nonattainment.

- Emissions-related data: the county population is under 35,000 which is near one third of the population of the smallest population county recommended for nonattainment. VMT is near 0.6 billion per year which is less than half the VMT from the county with the lowest travel recommended for nonattainment. Commuting data shows that just over 12,000 people in the county travel into the St. Louis current nonattainment counties for work. Again, this low number of workers traveling into the current nonattainment area shows that Warren County is not highly connected to the nonattainment area via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories does not support contribution to the exceeding monitor.
- Jurisdictional Boundaries: Warren County is adjacent to the current 2008 ozone nonattainment area.

7.3 Gasconade County

The following factor analysis supports a recommendation of unclassifiable/attainment for Gasconade County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_X and VOC emissions under 4 tons per day which is one tenth of the emissions from the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 15,000 which is an order of magnitude smaller than the smallest population county recommended for nonattainment. VMT is near 0.1 billion per year which is also an order of magnitude smaller than the lowest travel county recommended for nonattainment. Commuting data shows that under 2,000 people in the county travel into the St. Louis current nonattainment counties for work. Again, this low number of workers traveling into the current nonattainment area shows that Gasconade County is not highly connected to the nonattainment area via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories does not support contribution to the exceeding monitor.
- Jurisdictional Boundaries: Gasconade County is adjacent to the current 2008 ozone nonattainment area.

7.4 Crawford County

The following factor analysis supports a recommendation of unclassifiable/attainment for Crawford County: (all information is for the entirety of the county, not the small portion of the county that is included in the St. Louis MSA)

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_X and VOC emissions under 7 tons per day which is under one quarter of the emissions from the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 25,000, only one quarter of the population of the smallest population county recommended for nonattainment. VMT is near 0.5 billion per year which is one third of the lowest travel county recommended for nonattainment. Commuting data shows that under 2,700 people in the county travel into the St. Louis current nonattainment

county for work. Again, this low number of workers traveling into the current nonattainment area shows that Crawford County is not highly connected to the nonattainment area via commuters.

- Meteorological Data: analysis of HYSPLIT trajectories do support some directional contribution to the exceeding monitor, but the low emissions from the county support only a small contribution to overall emission precursors in the recommended nonattainment area.
- Jurisdictional Boundaries: Crawford County is adjacent to the current 2008 ozone nonattainment area. A small portion of the northeast corner of Crawford County is within the St. Louis MSA.

7.5 Washington County

The following factor analysis supports a recommendation of unclassifiable/attainment for Washington County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_X and VOC emissions under 3 tons per day which is an order of magnitude smaller than the county with lowest emissions recommended for nonattainment.
- Emissions-related data: the county population is under 26,000 which is one quarter of the population of the smallest county recommended for nonattainment. VMT is under 0.3 billion per year which is one fifth the least traveled county recommended for nonattainment. Commuting data shows that under 2,800 people in the county travel into the St. Louis current nonattainment counties for work. Again, this low number of workers traveling into the current nonattainment area shows that Washington County is not highly connected to the nonattainment area via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories support directional contribution to the exceeding monitor, but the low emissions from the county support only a small contribution to overall emission precursors in the recommended nonattainment area.
- Jurisdictional Boundaries: Washington County is adjacent to the current 2008 ozone nonattainment area.

7.6 St. Francois County

The following factor analysis supports a recommendation of unclassifiable/attainment for St. Francois County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions under 9 tons per day which is under one quarter of the emissions of the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 66,000 which is one third less than the population of the smallest county recommended for nonattainment. VMT is near 0.6 billion per year which is one third of the least travelled county recommended for nonattainment. Commuting data shows that under 5,700 people in the county travel into the St. Louis current nonattainment counties for work. Again, this low number of workers traveling into the current nonattainment area shows that St. Francois County is not highly connected to the nonattainment area via commuters.

- Meteorological Data: analysis of HYSPLIT trajectories support directional contribution to the exceeding monitor, though the low emissions from the county support only a small contribution to overall emission precursors in the recommended nonattainment area.
- Jurisdictional Boundaries: St. Francois County is adjacent to the current 2008 ozone nonattainment area.

7.7 Ste. Genevieve County

The following factor analysis supports a recommendation of unclassifiable/attainment for Ste. Genevieve County:

- Air Quality Data: there is a monitor in the county, but it is not violating the 2015 ozone standard.
- Emissions: the county has combined NO_x and VOC emissions under 27 tons per day which is the highest of the counties adjacent to the nonattainment recommended counties. However, the total emissions are less than the 40 ton per day amount from Franklin County that is the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 18,000 which is less than one fifth the population of the smallest county recommended for nonattainment. VMT is near 0.4 billion per year which is less than less than one third of the least traveled county recommended for nonattainment. Commuting data shows that under 2,300 people in the county travel into the St. Louis current nonattainment counties for work. Again, this low number of workers traveling into the current nonattainment area shows that Ste. Genevieve County is not highly connected to the nonattainment area via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories support directional contribution to the exceeding monitor, though the magnitude of emissions is smaller than those recommended for nonattainment. The additional distance from Ste. Genevieve County to the violating monitor support only minimal contribution of ozone precursors to the recommended nonattainment area.
- Jurisdictional Boundaries: Ste. Genevieve County is adjacent to the current 2008 ozone nonattainment area.

7.8 All other Counties of the State

There are no violating monitors in the rest of the state. The counties adjacent to the recommended nonattainment area have been evaluated above and determined to minimally contribute to the violating monitor. The air program therefore concludes that the remaining counties in Missouri are not reasonably contributing to the violating monitor and are recommended for unclassifiable/attainment designation.

The Missouri Air Conservation Commission **ADOPTS** the following action on this 29th day of September, 2016:

2015 Ozone Standard Area Boundary Designation Recommendation.

Original signed by

Gary J Pendergrass, Chairman

David C Zimmermann, Vice Chairman

Mark Garnett, Member

John R. Jones, Member

_____, Member

_____, Member

_____, Member

_____, Member

State Plan Actions

On Public Notice

Area Boundary Recommendation for the 2015 Ozone Standard

In 2015, the U.S. Environmental Protection Agency (EPA) strengthened the 8-hour ozone National Ambient Air Quality Standard (NAAQS) to 70 parts per billion. Missouri is submitting to EPA boundary designation recommendations for this revised standard in accordance with the Clean Air Act and following EPA's Area Designations Memorandum (February 25, 2016). Nonattainment recommendations are for areas with monitored violations based on 2013 to 2015 data and areas contributing to the violations. All other areas of the state are recommended for an attainment/unclassifiable designation. The air program intends to submit this recommendation to EPA by October 2016, and EPA will designate areas by October 2017. This action will not be submitted for inclusion in the Missouri State Implementation Plan.

Area Boundary Recommendation

Appendix A

Submit Comments Now

A public hearing is scheduled for this boundary recommendation on August 25, 2016. Comments about this plan action will be accepted through close of business on September 1, 2016.

Missouri State Implementation Plan Revision - Redesignation Request and Maintenance Plan for the St. Louis (MO) 2008 Ozone Standard Nonattainment Area

This SIP revision addresses redesignation requirements, per the Clean Air Act, for the St. Louis (MO) nonattainment area under the 2008 ozone standard. The St. Louis (MO) area counties of Franklin, Jefferson, St. Louis, and St. Charles as well as the city of St. Louis were designated nonattainment by the U.S. Environmental Protection Agency (EPA) on May 21, 2012, and monitoring data for 2013 to 2015 show the area has attained the standard of 75 parts per billion. The SIP revision includes a maintenance plan to demonstrate the St.Louis (MO) area will continue to meet the standard in future years as outlined in emission inventory projections, contingency measures, and motor vehicle budgets. Redesignation to attainment will occur when EPA gives final approval of this plan.

Redesignation Request and Maintenance Plan for the St. Louis (MO) 2008 Ozone Standard Nonattainment Area

Appendix A and B
Appendix C and D
Appendix E and F

Submit Comments Now

A public hearing is scheduled for this plan action on July 28, 2016. Comments about this plan action will be accepted through close of business on August 4, 2016.

Proposed for Adoption

None at this time.

Program Home Page
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Clean Power Plan
Forms and Applications
Gateway Vehicle Inspection Program
Laws and Regulations
NAAQS Boundary Designations
Ozone
Permits
Publications and Reports
Public Notices-Comment Periods
QAPP Template
Air Pollution Compliance/Regulatory Assistance
State Plans
Vapor Recovery Information and Compliance Requirements

Contact Information

Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102
800-361-4827
573-751-4817

Contact Us

Report an Environmental Concern

Meet the Air Pollution Control Program Director

Bechtel, Cheri

From:	Missouri DNR <MODNR@public.govdelivery.com>
Sent:	Monday, July 25, 2016 2:21 PM
To:	Nahach, Lisa; Bastian, Tom; Moore, Kyra; Bybee, Darcy; Payne, Stan; Bungart, Renee; wendy.vit@dnr.mo.gov; Alexander, Jennifer; Bechtel, Cheri; Deidrick, Steph
Subject:	Courtesy Copy: Missouri Air Conservation Commission - August 25, 2016 Public Hearing

This is a courtesy copy of an email bulletin sent by Cheri Bechtel.

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MISSOURI DEPARTMENT OF NATURAL RESOURCES

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SHARE

MISSOURI AIR CONSERVATION COMMISSION
WILL HOLD PUBLIC HEARING

JEFFERSON CITY, MO -- The Missouri Air Conservation Commission will hold a public hearing on Thursday, August 25, 2016 beginning at 9 a.m. at the St. Louis Regional Office, 7545 S Lindbergh, Suite 220, DESE Conference Room, St. Louis, Missouri. The commission will hear testimony related to the following proposed action(s):

* Area Boundary Recommendation for the 2015 Ozone Standard

In 2015, the U.S. Environmental Protection Agency strengthened the 8-hour ozone National Ambient Air Quality Standard to 70 parts per billion. Missouri is submitting to EPA boundary designation recommendations for this revised standard in accordance with the Clean Air Act and following EPA's Area Designations Memorandum. Nonattainment recommendations are for areas with monitored violations based on 2013 to 2015 data and areas contributing to the violations. All other areas of the state are recommended for an attainment/unclassifiable designation. The air program intends to submit this recommendation to EPA by October 2016, and EPA will designate areas by October 2017. This action will not be submitted for inclusion in the Missouri State Implementation Plan.

Documents for the above item(s) will be available for review at the Missouri Department of Natural Resources, Air Pollution Control Program, 1659 Elm Street, Jefferson City, (573) 751-4817 and in the Public Notices section of the program web site http://dnr.mo.gov/env/apcp/public-notices.htm. This information will be available at least 30 days prior to the public hearing date.

The department will accept written or email comments for the record until 5 p.m. on September 1, 2016. Please send written comments to Chief, Air Quality Planning Section, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176. Email comments may be submitted via the program web site noted

above. All written and email comments and public hearing testimony will be equally considered.

Citizens wishing to speak at the public hearing should notify the secretary to the Missouri Air Conservation Commission, Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, Missouri 65102-0176, or telephone (573) 751-7840 or fill out a sign in sheet on the day of the hearing. The department requests persons intending to give verbal presentations also provide a written copy of their testimony to the commission secretary at the time of the public hearing.

Persons with disabilities requiring special services or accommodations to attend the meeting can make arrangements by calling the program directly at (573) 751-4817, the Division of Environmental Quality's toll free number at (800) 361-4827, or by writing two weeks in advance of the meeting to: Missouri Department of Natural Resources, Air Conservation Commission Secretary, P.O. Box 176, Jefferson City, MO 65102. Hearing impaired persons may contact the program through Relay Missouri, (800) 735-2966.\TTY.

You are subscribed to the Air Public Notices topic for Missouri Department of Natural Resources. This information has recently been updated, and is now available at the link below. Thank you for your interest in the Air Public Notices.

http://dnr.mo.gov/env/apcp/stateplanrevisions.htm

Update your subscriptions, modify your password or email address, or stop subscriptions at any time on your Subscriber Preferences Page. You will need to use your email address to log in. If you have questions or problems with the subscription service, please contact subscriberhelp.govdelivery.com.

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MISSOURI DEPARTMENT OF NATURAL RESOURCES

AIR CONSERVATION COMMISSION

PUBIC HEARING

THIS IS THE TRANSCRIPTION OF THE MISSOURI AIR CONSERVATION COMMISSION MEETING PUBLIC HEARING on August 25, 2016, between the hours of 9:03 in the forenoon and 9:17 in the forenoon of that day, at St. Louis Regional Office, 7545 South Lindbergh, Suite 220, St. Louis, Missouri, by Julie A. Sievers, Missouri CCR 755, Illinois CSR 085.003850, a Certified Court Reporter within and for the State of Missouri.

(Deposition commenced at 9:03 a.m.)

* * * * *

PUBIC HEARING

* * * * *

MR. PENDERGRASS: The hearing will come to order. Let the record show that the following Commissioners are present: Jack Baker, Mark Garnett, Gary Pendergrass, David Zimmermann, and Jake Jones.

The Air Conservation Commission of the State of Missouri has called this public hearing pursuant to Section 643.070, Revised Statutes of Missouri EPA promulgated Rule 40 CFR 51.102, for the purpose of hearing testimony related to Area Boundary Recommendation for the 2015 Ozone Standard.

The hearing record will close at 5:00 p.m. on September 1, 2016.

Anyone who has not been scheduled to appear but who wishes to be heard should indicate that you wish to speak on the sign-in sheets available at the door.

Section 643.100 of the Missouri Statutes provides that all oral testimony be given under oath. Accordingly, when you are called to testify, please present yourself to the court reporter first

Chairman, this concludes my testimony.

MR. PENDERGRASS: Stacy Allen.

(Whereupon the witness was sworn in by the Court Reporter.)

* * * * *

STACY ALLEN,

of lawful age, being produced, sworn and examined deposes and says:

MS. ALLEN: Mr. Chairman, members of the Commission, my name is Stacy Allen. I'm employed as an environmental scientist with the Missouri Department of Natural Resources Air Pollution Control Program. I work at 1659 East Elm Street in Jefferson City, Missouri.

I am here today to present testimony on the 2015 Ozone Standard Proposed Area Boundary Designation Recommendation, and my testimony corresponds to the presentation's slides before you. The summary of the recommendation starts on Page 78 of the briefing document.

As you are aware, we are in the process of requesting an update to our status for the St. Louis area for the 2008 ozone standard which we will present to you later in today's meeting. This boundary recommendation is in response to the U.S.

RECOMMENDATION FOR ADOPTION

2015 OZONE STANDARD AREA
BOUNDARY DESIGNATION RECOMMENDATION

On August 25, 2016, the Missouri Air Conservation Commission held a public hearing for the 2015 Ozone Standard Proposed Area Boundary Designation Recommendation. A summary of comments received and the air program's corresponding responses is included on the following page. The air program finalized the state's area boundary recommendations based on consideration of comments received.

In 2015, the U.S. Environmental Protection Agency (EPA) strengthened the 8-hour ozone National Ambient Air Quality Standard (NAAQS) to 70 parts per billion. Missouri is submitting to EPA boundary designation recommendations for this revised standard in accordance with the Clean Air Act and following EPA's Area Designations Memorandum (February 25, 2016). Nonattainment recommendations are for areas with monitored violations based on 2013 to 2015 data and areas contributing to the violations. All other areas of the state are recommended for an attainment/unclassifiable designation.

The state's recommendation has not been reprinted in the briefing document due to its volume. However, the Summary of Recommendation is included for reference. The entire document is available for review at the Missouri Department of Natural Resources' Air Pollution Control Program, 1659 East Elm Street, Jefferson City, Missouri, 65101, (573)751-4817. It is also available online at http://dnr.mo.gov/env/apcp/stateplanrevisions.htm.

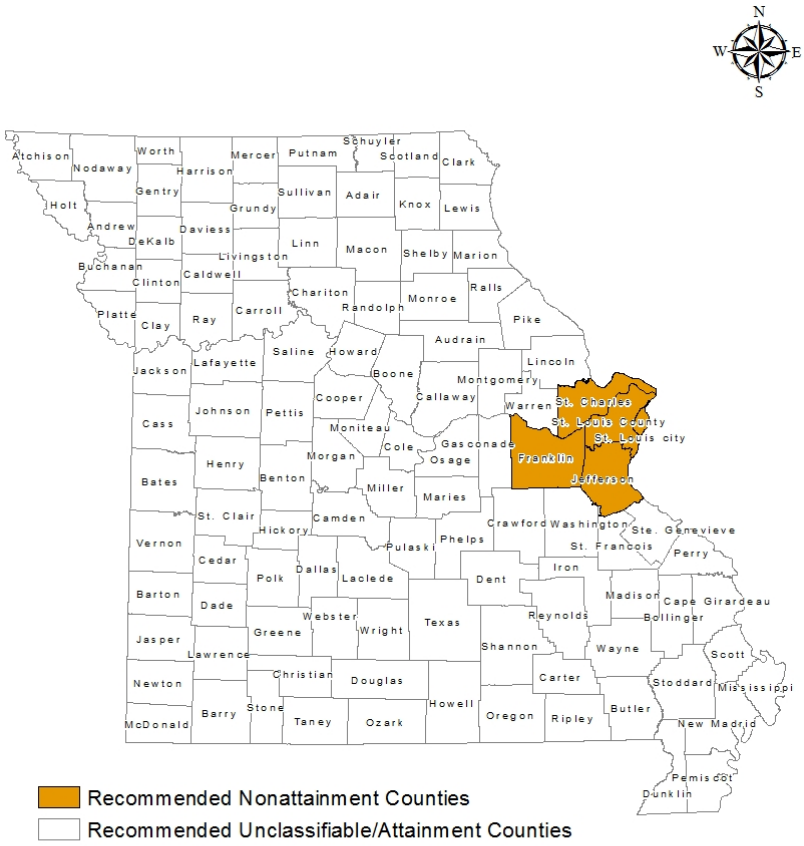
The air program recommends the commission adopt the state's boundary recommendation. If the commission adopts this recommendation, the department will submit it to the EPA for consideration during the designation process. EPA will make a final decision on designations by October 2017. This recommendation will not be included in the Missouri State Implementation Plan.

Summary of Recommendation

The technical evaluations supporting this recommendation are based on the most recent data available, mostly collected during the 2013-2015 period. One monitor in Missouri (West Alton) located in St. Charles County currently violates the 2015 8-hour ozone NAAQS with a design value of 71 parts per billion (ppb). No other monitors in the state violate the NAAQS. The air program performed a five factor analysis and corresponding technical evaluations to determine a suitable nonattainment boundary. Based on these analyses, the air program is recommending a nonattainment designation for the following counties: Franklin, Jefferson, St. Charles, St. Louis, and the City of St. Louis.

Furthermore, the air program is recommending an unclassifiable/attainment designation for all other counties in Missouri. Table 1 contains the recommended designation classification for each county in Missouri. Figure 1 depicts Missouri's proposed area boundary recommendations for the 2015 ozone standard.

Figure 1. Missouri 2015 8-Hour Ozone NAAQS Boundary Recommendation



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES
Division of Environmental Quality
Air Pollution Control Program

Table 1. Missouri Classification Recommendations for the 2015 Ozone NAAQS

County	Classification Recommendation
ADAIR	Unclassifiable/Attainment
ANDREW	Unclassifiable/Attainment
ATCHISON	Unclassifiable/Attainment
AUDRAIN	Unclassifiable/Attainment
BARRY	Unclassifiable/Attainment
BARTON	Unclassifiable/Attainment
BATES	Unclassifiable/Attainment
BENTON	Unclassifiable/Attainment
BOLLINGER	Unclassifiable/Attainment
BOONE	Unclassifiable/Attainment
BUCHANAN	Unclassifiable/Attainment
BUTLER	Unclassifiable/Attainment
CALDWELL	Unclassifiable/Attainment
CALLAWAY	Unclassifiable/Attainment
CAMDEN	Unclassifiable/Attainment
CAPE GIRARDEAU	Unclassifiable/Attainment
CARROLL	Unclassifiable/Attainment
CARTER	Unclassifiable/Attainment
CASS	Unclassifiable/Attainment
CEDAR	Unclassifiable/Attainment
CHARITON	Unclassifiable/Attainment
CHRISTIAN	Unclassifiable/Attainment
CLARK	Unclassifiable/Attainment
CLAY	Unclassifiable/Attainment
CLINTON	Unclassifiable/Attainment
COLE	Unclassifiable/Attainment
COOPER	Unclassifiable/Attainment
CRAWFORD	Unclassifiable/Attainment
DADE	Unclassifiable/Attainment
DALLAS	Unclassifiable/Attainment
DAVIESS	Unclassifiable/Attainment
DeKALB	Unclassifiable/Attainment
DENT	Unclassifiable/Attainment
DOUGLAS	Unclassifiable/Attainment
DUNKLIN	Unclassifiable/Attainment
FRANKLIN	Nonattainment
GASCONADE	Unclassifiable/Attainment
GENTRY	Unclassifiable/Attainment
GREENE	Unclassifiable/Attainment
GRUNDY	Unclassifiable/Attainment
HARRISON	Unclassifiable/Attainment
HENRY	Unclassifiable/Attainment
HICKORY	Unclassifiable/Attainment
HOLT	Unclassifiable/Attainment
HOWARD	Unclassifiable/Attainment
HOWELL	Unclassifiable/Attainment
IRON	Unclassifiable/Attainment
JACKSON	Unclassifiable/Attainment

County	Classification Recommendation
JASPER	Unclassifiable/Attainment
JEFFERSON	Nonattainment
JOHNSON	Unclassifiable/Attainment
KNOX	Unclassifiable/Attainment
LACLEDE	Unclassifiable/Attainment
LAFAYETTE	Unclassifiable/Attainment
LAWRENCE	Unclassifiable/Attainment
LEWIS	Unclassifiable/Attainment
LINCOLN	Unclassifiable/Attainment
LINN	Unclassifiable/Attainment
LIVINGSTON	Unclassifiable/Attainment
McDONALD	Unclassifiable/Attainment
MACON	Unclassifiable/Attainment
MADISON	Unclassifiable/Attainment
MARIES	Unclassifiable/Attainment
MARION	Unclassifiable/Attainment
MERCER	Unclassifiable/Attainment
MILLER	Unclassifiable/Attainment
MISSISSIPPI	Unclassifiable/Attainment
MONITEAU	Unclassifiable/Attainment
MONROE	Unclassifiable/Attainment
MONTGOMERY	Unclassifiable/Attainment
MORGAN	Unclassifiable/Attainment
NEW MADRID	Unclassifiable/Attainment
NEWTON	Unclassifiable/Attainment
NODAWAY	Unclassifiable/Attainment
OREGON	Unclassifiable/Attainment
OSAGE	Unclassifiable/Attainment
OZARK	Unclassifiable/Attainment
PEMISCOT	Unclassifiable/Attainment
PERRY	Unclassifiable/Attainment
PETTIS	Unclassifiable/Attainment
PHELPS	Unclassifiable/Attainment
PIKE	Unclassifiable/Attainment
PLATTE	Unclassifiable/Attainment
POLK	Unclassifiable/Attainment
PULASKI	Unclassifiable/Attainment
PUTNAM	Unclassifiable/Attainment
RALLS	Unclassifiable/Attainment
RANDOLPH	Unclassifiable/Attainment
RAY	Unclassifiable/Attainment
REYNOLDS	Unclassifiable/Attainment
RIPLEY	Unclassifiable/Attainment
ST. CHARLES	Nonattainment
ST. CLAIR	Unclassifiable/Attainment
ST. FRANCOIS	Unclassifiable/Attainment
STE. GENEVIEVE	Unclassifiable/Attainment
ST. LOUIS COUNTY	Nonattainment
SALINE	Unclassifiable/Attainment

County	Classification Recommendation
SCHUYLER	Unclassifiable/Attainment
SCOTLAND	Unclassifiable/Attainment
SCOTT	Unclassifiable/Attainment
SHANNON	Unclassifiable/Attainment
SHELBY	Unclassifiable/Attainment
STODDARD	Unclassifiable/Attainment
STONE	Unclassifiable/Attainment
SULLIVAN	Unclassifiable/Attainment
TANEY	Unclassifiable/Attainment
TEXAS	Unclassifiable/Attainment
VERNON	Unclassifiable/Attainment
WARREN	Unclassifiable/Attainment
WASHINGTON	Unclassifiable/Attainment
WAYNE	Unclassifiable/Attainment
WEBSTER	Unclassifiable/Attainment
WORTH	Unclassifiable/Attainment
ST. LOUIS CITY	Nonattainment

COMMENTS AND RESPONSES ON –

2015 OZONE STANDARD PROPOSED AREA BOUNDARY DESIGNATION RECOMMENDATION

The public comment period for the 2015 Ozone Standard Proposed Area Boundary Designation Recommendation opened on July 25, 2016 and closed on September 1, 2016. Revisions to the proposed recommendation were made as a result of comments.

The following is a summary of comments received and the Missouri Department of Natural Resources' Air Pollution Control Program's (air program's) corresponding responses.

SUMMARY OF COMMENTS: During the public comment period, the air program received comments from the following sources: Mississippi Lime Company, the Southeast Missouri Regional Planning & Economic Development Commission, Jack Jones and David Zimmerman of the Missouri Air Conservation Commission, and the St. Louis Regional Chamber's Energy and Environment Council Air Committee. Comments from the Air Conservation Commissioners were received at the public hearing before the Missouri Air Conservation Commission on August 25, 2016. All other comments were received in writing.

COMMENT #1: Comments in support of the proposed area boundary recommendation were received from Mississippi Lime Company, the Southeast Missouri Regional Planning & Economic Development Commission, and the St. Louis Regional Chamber's Energy and Environment Council Air Committee.

RESPONSE: The air program appreciates support from the various commenters for the boundary recommendation. No changes are made to the document as a result of these comments.

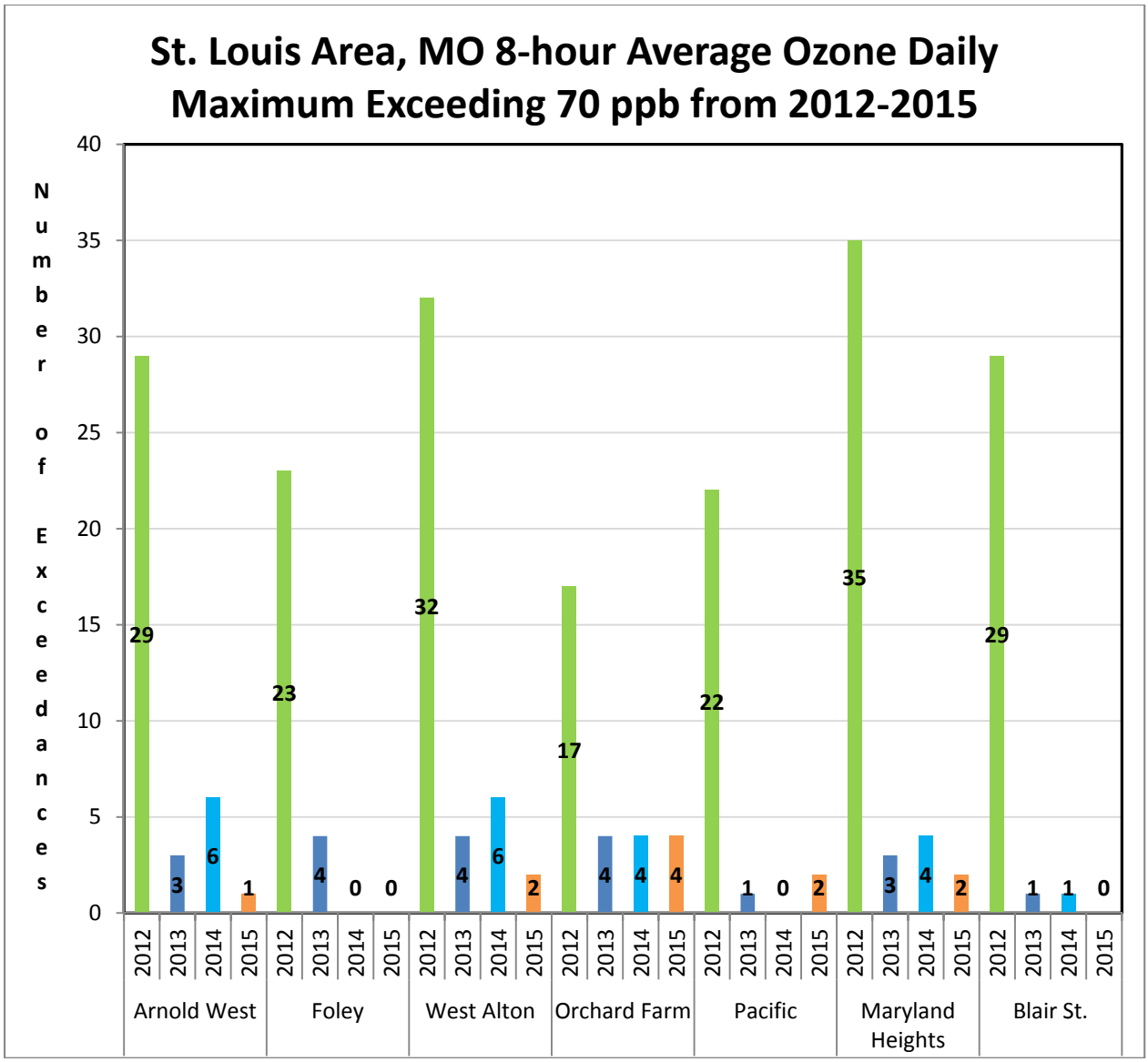
COMMENT #2: Mr. Jack Jones, Missouri Air Conservation Commissioner, requested clarification on how the monitoring data is used to develop averages for each site.

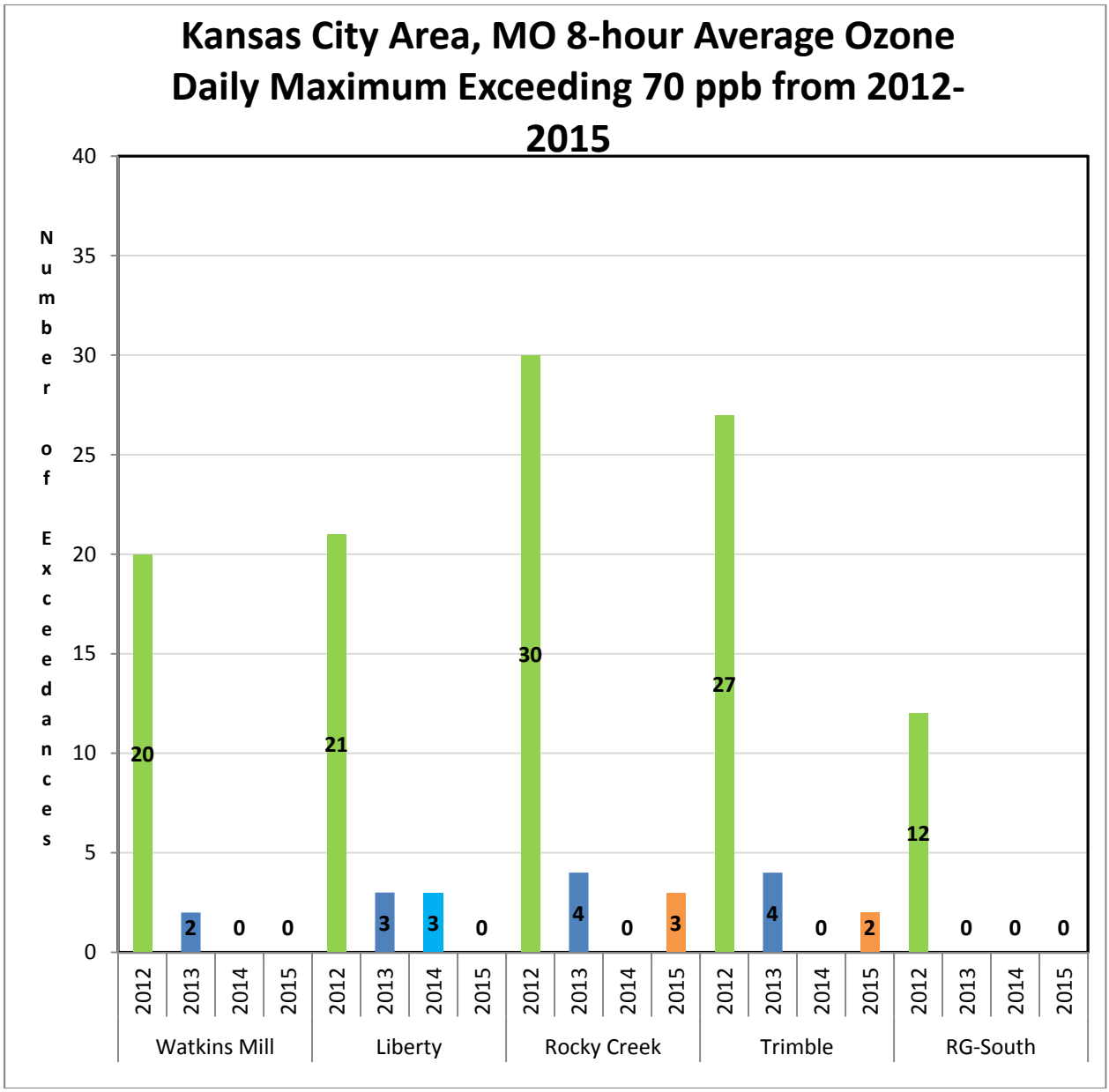
RESPONSE: Ozone monitors measure ozone concentrations continuously and report 1-hour ozone concentrations for each hour of a 24-hour day. There are 214 days in the ozone season (April 1st to October 31st) so, assuming all measurements are complete and valid, each ozone monitor produces a maximum of 5,136 1-hour averages which are used to calculate the 8-hour averages. Starting in 2017, the ozone season is extended by one month to begin March 1st, and a maximum of 5,880 1-hour averages will be used to calculate the 8-hour averages. After ranking the daily maximum design value at each location for each year, only the fourth highest 8-hour average is used for each of the three years to calculate the design value for a single monitor. More detailed data handling requirements may be found in Appendix U to Part 50—Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone: http://www.ecfr.gov/cgi-bin/text-idx?SID=25e3d80b585590754a98c5e8d2fb29af&mc=true&node=ap40.2.50_119.u&rgn=div9

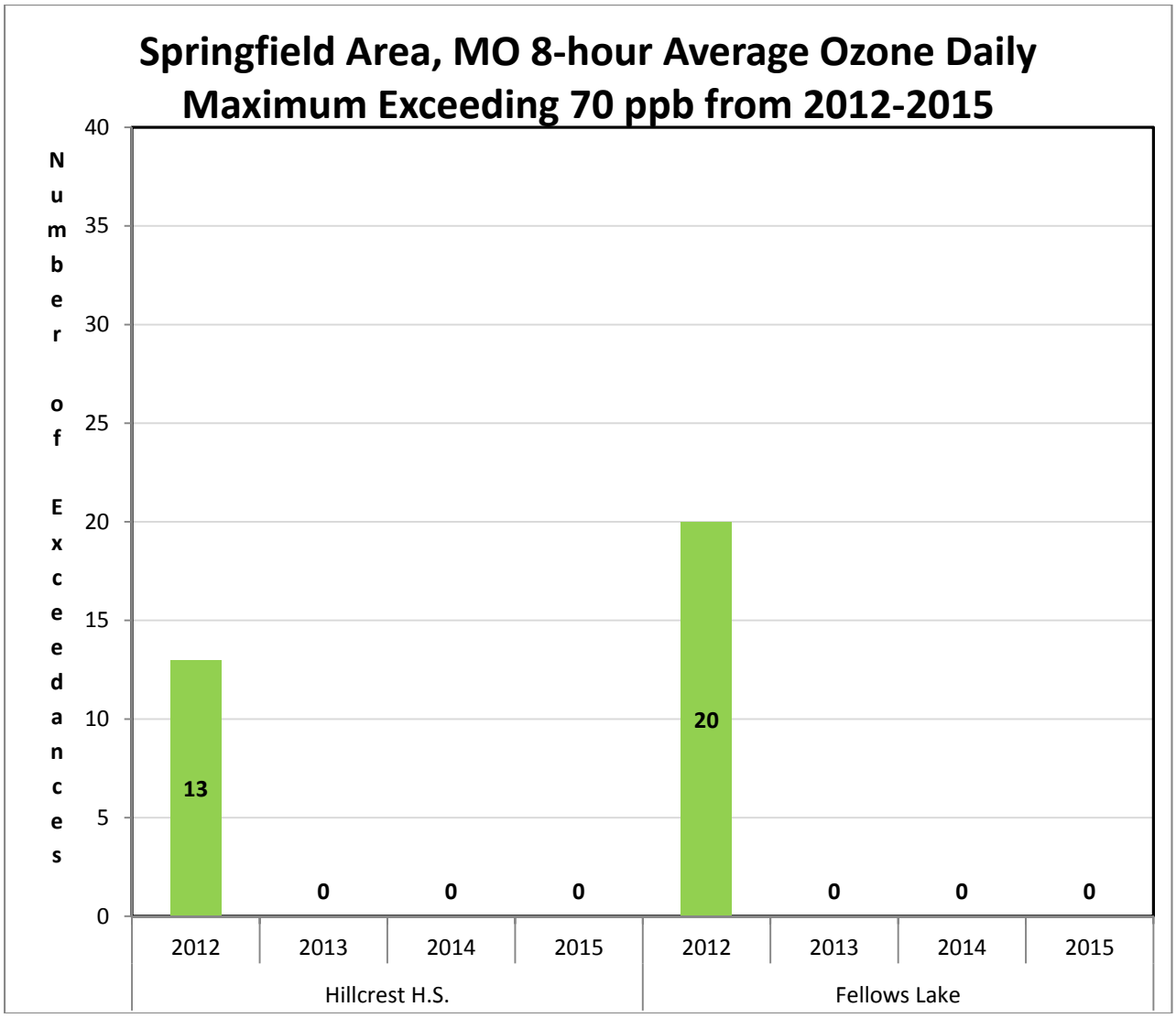
In response to the commissioners' inquiries, the air program reviewed the monitoring data in the recommendation. During the review, the air program updated three design values in Table 3 and Figure 2 to match the certified 2013-2015 design values (Branson, Hillcrest, and Rocky Creek values revised upward by one part per billion each). The revised document contains the updated design values but the boundary recommendation remains unchanged. Further information on the design values and exceedance days can be found in Section 4, Table 3 and Section 5.3, Table 8, respectively. The exceedance days in Table 8 for the West Alton and Alton monitors are comprehensive for the 2013 to 2015 period as these monitors violate the 2015 ozone standard. The exceedance dates for Arnold West, Orchard Farm, and Maryland Heights are listed only because the exceedance occurred on the same day as a West Alton exceedance. There are additional exceedances at St. Louis area monitors not listed in Table 8, but they are not listed because back trajectories are not needed for all exceedance dates at all monitor sites, only dates at violating monitors.

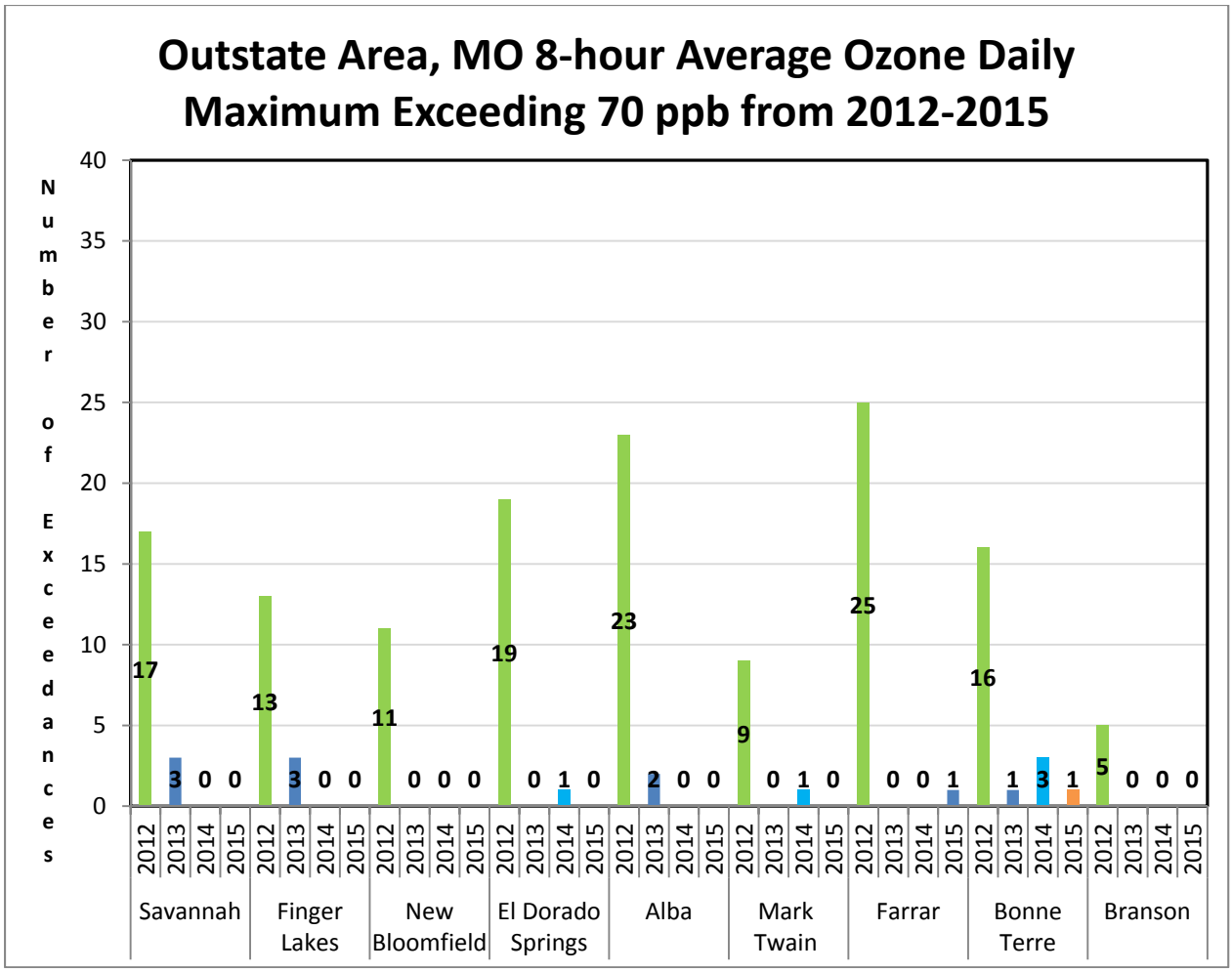
COMMENT #3: Mr. Jack Jones, Missouri Air Conservation Commissioner, requested histograms of the data for each of the monitoring sites along with information on exceedance days.

RESPONSE: In response to the request, the air program's monitoring staff compiled histograms for monitor locations in the St. Louis area, Kansas City area, Springfield area, and outstate Missouri. The histograms display the number of days per year where the maximum daily 8-hour average ozone concentration exceeds 70 parts per billion (ppb). The days of exceedance are calculated against the 2015 ozone standard of 70 ppb for all years to examine the trend in exceedances over time. For all monitor locations, the 2012 year showed the most exceedances of 70 ppb due to summer drought conditions. Since 2012, all locations have experienced less than 10 exceedances of 70 ppb per year.


St. Louis Area, MO 8-hour Average Ozone Daily Maximum Exceeding 70 ppb from 2012-2015
Number of Exceedances
40
35
30
25
20
15
10
5
0
29
3
6
1
23
4
0
0
32
4
6
2
17
4
4
4
22
1
0
2
35
3
4
2
29
1
1
0
2012
2013
2014
2015
Arnold West
Foley
West Alton
Orchard Farm
Pacific
Maryland Heights
Blair St.


Kansas City Area, MO 8-hour Average Ozone Daily Maximum Exceeding 70 ppb from 2012-2015
Number of Exceedances
40
35
30
25
20
15
10
5
0
20
2
0
0
21
3
3
0
30
4
0
3
27
4
0
2
12
0
0
0
2012
2013
2014
2015
Watkins Mill
Liberty
Rocky Creek
Trimble
RG-South


Springfield Area, MO 8-hour Average Ozone Daily Maximum Exceeding 70 ppb from 2012-2015
Number of Exceedances
40
35
30
25
20
15
10
5
0
13
0
0
0
20
0
0
0
2012
2013
2014
2015
2012
2013
2014
2015
Hillcrest H.S.
Fellows Lake



COMMENT #4: Mr. David Zimmerman, Missouri Air Conservation Commissioner, requested a comparison of the design values for the 2015 ozone standard (70 ppb) to those for the 2008 standard (75 ppb), specifically on a per-year basis from 2008 forward.

RESPONSE: In response to the request, the air program is providing this graph to demonstrate ozone monitoring trends for the St. Louis area, the Kansas City area and outstate Missouri (Mark Twain State Park). The design values at the end of the 2008 ozone season were 85 and 81 ppb, respectively, for the highest design value monitors in St. Louis and Kansas City. At the end of 2015, the design values have decreased to 71 ppb for St. Louis and 68 ppb for Kansas City. Over the same time period, the design value for the rural Mark Twain State Park monitor decreased from 71 ppb to 59 ppb. Additional information regarding monitoring and design value trends may be found in the 2016 Air Quality Report presented to the commission on March 31, 2016: http://dnr.mo.gov/env/apcp/docs/presentation-airqualityanalysisreport-march312016.pdf

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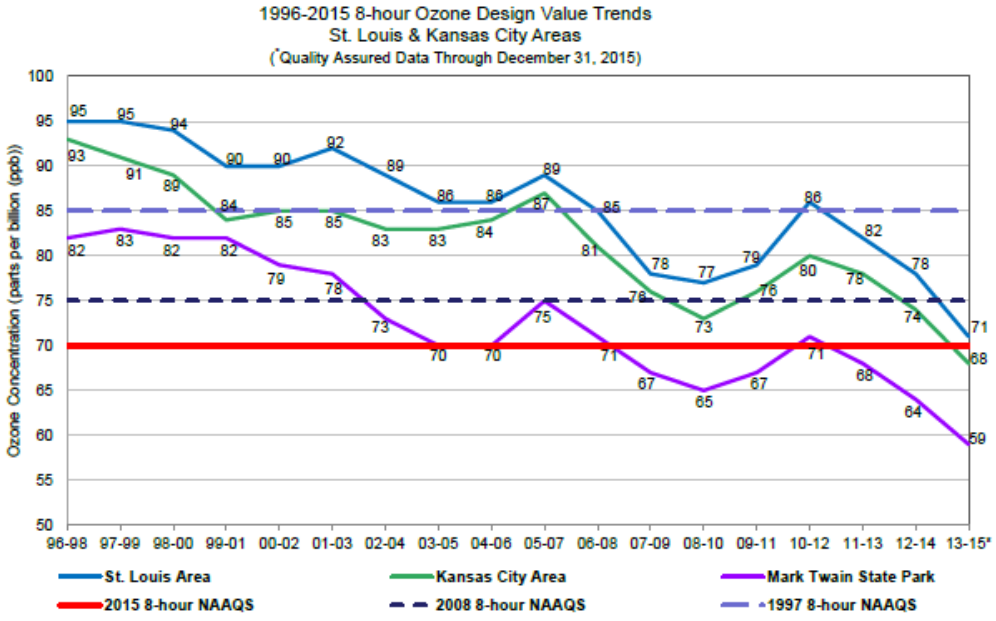
Ozone (O_3) Ambient Air Monitoring