ADEQ

ARKANSAS
Department of Environmental Quality

October 13, 2015

Mr. Mark Hansen
Acting Associate Director for Air Programs
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Five-Year Network Assessment for the State of Arkansas

Dear Mr. Hansen:

The Arkansas Department of Environmental Quality is required to submit every five-years an assessment of the air quality surveillance system for the State of Arkansas to the U.S. Environmental Protection Agency.

The 2015 Five-Year Network Assessment for the State of Arkansas is enclosed and fulfills the requirement in accordance with 40 C.F.R. 58.10(d). This assessment details the anticipated changes that will be made between 2016 and 2020. In addition, the network assessment also contains information regarding existing and new lead waivers as required under 40 C.F.R. 58 Appendix D 4.2(a)(ii).

If you have any questions regarding the network assessment, please contact me by phone at (501) 682-0750 or e-mail at spencer@adeq.state.ar.us.

Sincerely,

Stuart Spencer
Chief – Air Division

Enclosure – Five-Year Network Assessment for the State of Arkansas

State of Arkansas
2015 Five-Year Network Assessment

Prepared By:

Planning & Air Quality Analysis Branch, Air Division

Arkansas Department of Environmental Quality

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Abbreviations and Acronyms

ADEQ	Arkansas Department of Environmental Quality
AQI	Air Quality Index
AQS	Air Quality System
CAA	Clean Air Act
CASTNET	Clean Air Status and Trends Network
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	carbon monoxide
DSR	Doyle Springs Road monitoring site
DV	design value
EPA	Environmental Protection Agency
FRM	Federal Reference Method
GHCN	Global Historical Climatology Network
IMPROVE	Interagency Monitoring of Protected Visual Environments
LADCO	Lake Michigan Air Directors Consortium
MDEQ	Mississippi Department of Environmental Quality
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-pollutant Network
NEI	National Emissions Inventory
NO_2	nitrogen dioxide
O_3	ozone
PARR	Pike Avenue at River Road monitoring site
Pb	Lead
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PM_{10}	particulate matter less than 10 micrometers in diameter
ppb	parts per billion
ppm	parts per million
SLAMS	State and Local Air Monitoring Stations
SO_2	sulfur dioxide
State EI	State Emissions Inventory
TCEQ	Texas Commission on Environmental Quality
TEOM	tapered element oscillating microbalance
tpy	tons per year
TRI	Toxics Release Inventory
$\mu g/m^3$	micrograms per cubic meter
µMSA	Micropolitan Statistical Area

1. Introduction

In accordance with 40 CFR Part 58, Subpart B § 58.10, the State of Arkansas is required to submit a five-year ambient air monitoring network assessment to the United States Environmental Protection Agency by July 1, 2015. The State of Arkansas's 2015 Five-Year Network Assessment will be submitted to EPA Region 6 in Dallas, Texas.

The Arkansas Department of Environmental Quality has monitored air quality in the State of Arkansas for over thirty-five years. The list of air contaminants that are currently being monitored has grown to more than nine different parameters at this time. The Department's air monitoring network is composed of various types of intermittent and continuous monitors that are strategically located throughout the state. Site selection of these monitors is done in a manner ensuring that the data from the monitors contains the quality of information that can give assurances that public health is being protected and that environmental quality goals are being achieved.

This report is an assessment of the monitoring network and the anticipated changes that will be needed between 2016 and 2020, focusing on ozone, particulate matter, and lead. Ozone and particulate matter are a key focus in this assessment as these two criteria pollutants have been areas of concern in Arkansas. In addition, the lead network is detailed in-depth as lead waivers are to be renewed every five-years in the Five-Year Network Assessment as specified in 40 CFR Part 58.10(d). The other criteria pollutants are also discussed in this assessment, but not as in-depth. Specific changes to the monitoring network are detailed in a separate document (the Annual Network Plan). The data generated from the monitoring network is used for a broad range of regulatory and research purposes, as well as to inform the public of the status of air quality within the state.

2. Evaluation Methods

Some of the tools used in the analyses were developed by a LADCO workgroup. The backbone of LADCO's Network Assessment Tool is the statistical computing software R and is an update to the original Network Assessment Tool developed by Michael Rizzo for the 2010 Five-Year Network Assessment.[1] Other tools used include Lakes Environmental Software's WRPlot View and EPA's Tile Plot Tool.[2,3]

2.1. Wind-rose Plots

Wind-rose plots were generated from meteorological data collected between January 1, 2010 and December 31, 2014 from the National Climatic Data Center. Plots were created using the WRPlot View software. The plots display total observation count, average wind speed, percentage of calm winds, and winds blowing from a particular direction.

2.2. Tile Plot Visualization Tool

Tile plots generated from EPA's Tile Plot Tool plots daily AQI values for a specific location and time period. Tile plots were generated for MSAs in Arkansas for each year from 2009 through 2014. Each square in the tile plot represents one day of the year and is color-coded based on the AQI level where: green represents good air quality (AQI between 0 and 50), yellow represents moderate air quality (AQI between 51 and 100), orange represents unhealthy for sensitive groups (AQI between 101 and 150), red represents unhealthy for all population (AQI between 151 and 200), purple represents very unhealthy (AQI between 201 and 300), and maroon represents hazardous (AQI between 301 and 500).

2.3. Monitor-to-Monitor Correlation Matrix Tool

Correlation analysis was performed for the ozone monitoring network and fine particulate matter monitoring network using the Correlation Matrix Tool developed by LADCO. The Correlation Matrix Tool generates an image that depicts the Pearson's correlation, relative difference, and distance between pairing of sites for each monitor in the network. The shape of the ellipse in the image represents the Pearson correlation. The correlation between any two sites quantitatively describes the degree of relatedness between measurements made at those two sites. The color of the ellipse represents the average relative difference of measurements between any two sites. The purpose of performing this analysis is to provide a means of revealing possibly redundant monitoring sites that could then be retired or removed. Redundant sites would exhibit fairly high correlation of 0.6 or

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[1] Bailey, E., Byers, N., Kenski, D., & McMahon, C. (2015). NetAssess: Ambient Air Monitoring Network Assessment Tools (Version 0.6b). Available from https://ebailey78.shinyapps.io/NetAssessApp/

[2] Lakes Environmental Software (2011). WRPLOT View: Wind Rose Plots for Meteorological Data (Version 7.0.0). Available from http://www.weblakes.com/products/wrplot/

[3] U.S. Environmental Protection Agency (2015). Visualize Data: Tile Plot. Available from http://www.epa.gov/airdata/ad_viz_tile.html

higher and could have low average relative difference despite the distance between them. The Correlation Matrix Tool uses daily summary pollutant data for ozone and fine particulate matter collected from January 1, 2011 through December 31, 2013.

2.4. Area Served Tool

The area served analysis was performed for the ozone monitoring network and fine particulate matter network using the Area Served Tool in LADCO's Network Assessment Tool. This tool uses a spatial analysis technique known as Voronoi or Thiessen polygons to show the area represented by the monitoring sites. The size and shape of each polygon is dependent on the proximity of the nearest neighbors to a particular site.

2.5. Removal Bias Tool

Removal bias analysis was performed for the ozone monitoring network and fine particulate matter monitoring network using the Removal Bias Tool developed by LADCO. The Removal Bias Tool consists of a series of static analyses and an interactive tool meant to aid in determining redundant sites and act as a means of validating a network after sites have been chosen for removal. A positive average bias would mean that if the site being examined was removed, the neighboring site would indicate that the estimated concentration would be larger than the measured concentration. Likewise, a negative average bias would suggest that the estimated concentration at the location of the site being removed is smaller than the actual measured concentration.

2.6. Exceedance Probability Tool

The Exceedance Probability Tool was developed by LADCO and allows spatial comparison regarding the probability of daily values exceeding a certain threshold. This tool does not show the probability of violating the standards but provides information about the spatial distribution of the highest daily values, providing a probability map of areas where it is expected to observe similar extreme values.

3. Monitoring Network Assessment

3.1. Overview of the National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 µg/m³ (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution Dec 14, 2012	$PM_{2.5}$	primary	Annual	12 µg/m³	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m³	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m³	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Figure 1. Current Primary and Secondary National Ambient Air Quality Standards

The NAAQS are established by EPA as directed by the federal Clean Air Act (CAA). The CAA established two types of standards: primary and secondary. The primary standards set limits to protect public health, while the secondary standards set limits to protect public welfare. The six criteria air pollutant outlined in the NAAQS are carbon monoxide, lead, nitrogen oxides, ozone, particulate matter ($PM_{2.5}$ and PM_{10}), and sulfur dioxide. The current standards for each NAAQS criteria pollutants can be found on EPA's website and is also displayed in Figure 1.[4] The CAA requires EPA to review these standards every five years.

[4] U.S. Environmental Protection Agency. (2014, October 21). *National Ambient Air Quality Standards (NAAQS).* Retrieved June 4, 2015, from http://www.epa.gov/air/criteria.html

3.2. Overview of ADEQ's Ambient Air Monitoring Network

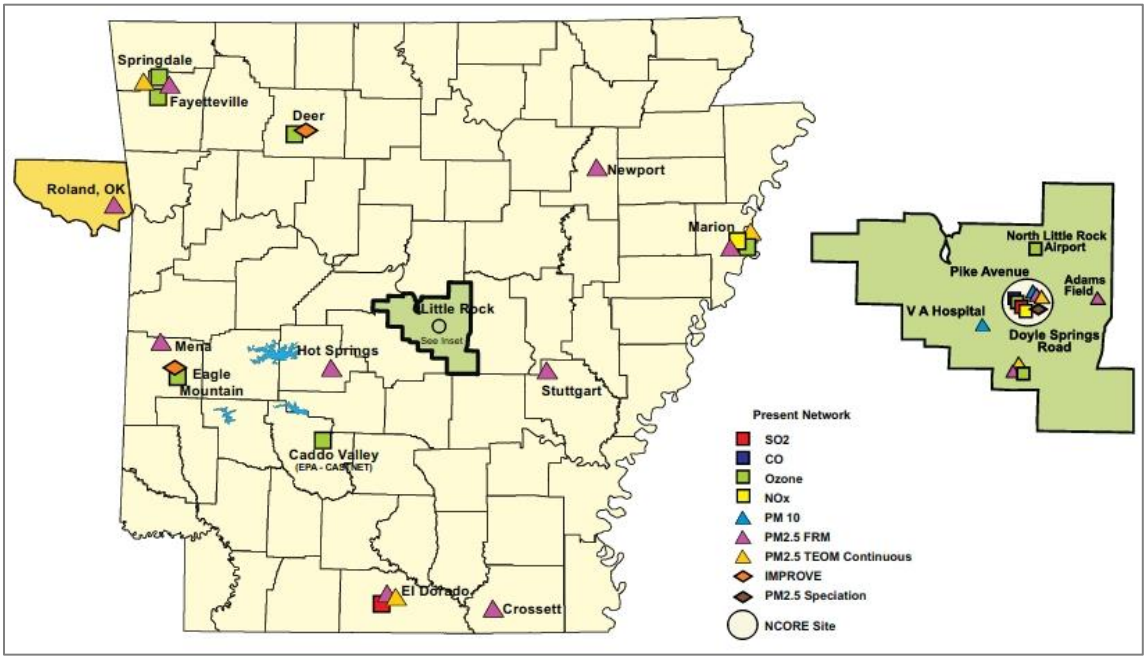


Figure 2. Map of All Monitoring Sites Fully or Partially Operated by ADEQ

ADEQ's monitoring network consists of one NCore monitoring station at PARR and sixteen other SLAMS as displayed in Figure 2. The state's NCore site is located near the center of Pulaski County. The Roland, OK site also contains monitors operated by Cherokee Nation. The number of each type of monitor operated by ADEQ is as follows: one carbon monoxide monitor, one surrogate lead (Pb) monitor (see Section 3.6 for more details), two nitrogen oxides monitors, eight ozone monitors, twelve $PM_{2.5}$ FRM monitors, five $PM_{2.5}$ TEOM monitors, one $PM_{2.5}$ speciation monitor, two PM_{10} monitors, two sulfur dioxide monitors, and two IMPROVE monitors.

A more in-depth analysis, which includes monitoring objectives and spatial scale of each ADEQ monitoring site and monitors located at each site, is displayed in Table 1. The spatial scale of representativeness is described in terms of approximate physical dimensions: microscale (several meters to 100 meters), middle (100 meters to 0.5 kilometers), neighborhood (0.5 to 4 kilometers), urban scale (4 to 50 kilometers), regional (tens to hundreds of kilometers), and national and global.

Most ADEQ monitors are located in urbanized areas. These monitors support characterization of air quality in areas with highly susceptible individuals. For instance, ADEQ operates seven monitoring sites in or near the area of Benton County, Pulaski County, and Washington County, which have the highest number of asthmatics according to the 2010 county-level Behavioral Risk Factor Surveillance System (BRFSS) conducted by the Arkansas Center for Health Statistics.[5]

[5] Arkansas Department of Health. (n.d.). 2010 County Estimates (BRFSS). Retrieved June, 4, 2015, from http://www.healthy.arkansas.gov/programsServices/healthStatistics/Brfss/Documents/DataStatistics/County%20Data/2010/Asthma.pdf

Table 1. ADEQ-Operated SLAMS Monitor Information

AQS ID #	Site Name	Address/Location	Latitude, Longitude	Station Type	Pollutants Measured	Method Code	Sampling Method
05-001-0011	Stuttgart	1703 N Beurkle	34.518392, -91.558822	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
05-003-0005	Crossett	201 Unity Rd	33.136708, -91.950233	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
05-035-0005	Marion	Polk & Colonial Dr	35.197178, -90.193047	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
				SLAMS	$PM_{2.5}$	105	R&P TEOM
				SLAMS	Ozone		UV Photometric
				SLAMS	NO_2		Chemiluminescence
05-051-0003	Hot Springs	300 Werner	34.469309, -93.000000	SLAMS	$PM_{2.5}$ [1]	143	R&P 2000 FRM
05-067-0001	Newport	7648 Victory Blvd	35.638069, -91.189381	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
05-101-0002	Deer	Hwy 16	35.832633, -93.208072	SLAMS	Ozone		UV Photometric
05-113-0002	Mena	Hornbeck Rd	34.583581, -94.226019	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
05-113-0003	Eagle Mtn	463 Polk 631	34.454428, -94.143317	SLAMS	Ozone		UV Photometric
05-119-0007	PARR (NCore)	Pike Ave at River Road	34.756072, -92.281139	SLAMS	$PM_{2.5}$ [1]	145	R&P 2025 FRM
				SLAMS	$PM_{2.5}$	105	R&P TEOM
				SLAMS	PM_{10} [1]	127	Gravimetric
				SLAMS	$PM_{10\text{-}2.5}$ [1]	176	Gravimetric/FRM
				SLAMS	Ozone		UV Photometric
				SLAMS	NO_x		Chemiluminescence
				SLAMS	Speciation	810	Low Volume
				SLAMS	NO_y		Chemiluminescence
				SLAMS	Trace SO_2		Infrared
				SLAMS	Trace CO	81	
				SLAMS	$Pb^{\dagger}$		Gravimetric
05-119-1002	NLR Airport	Remount Rd	34.835606, -92.260425	SLAMS	Ozone		UV Photometric
05-119-1004	Adams Field	1701 S Bond	34.729486, -92.243431	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
05-119-1007	VA Hospital	4300 Block of W 7th	34.744814, -92.319906	SLAMS	PM_{10}	127	Gravimetric
05-119-1008	DSR	Doyle Springs Rd	34.681225, -92.328539	SLAMS	$PM_{2.5}$	143	R&P 2025 FRM
				SLAMS	$PM_{2.5}$	105	R&P TEOM
				SLAMS	Ozone		UV Photometric
05-139-0006	El Dorado	Union Memorial Hospital	33.220122, -92.669453	SLAMS	$PM_{2.5}$	143	R&P 2000 FRM
				SLAMS	$PM_{2.5}$	105	R&P TEOM
				SLAMS	SO_2		Pulsed Fluorescent
05-143-0005	Springdale	600 S Old Missouri Rd	36.179617, -94.116611	SLAMS	$PM_{2.5}$	145	R&P 2025 FRM
				SLAMS	$PM_{2.5}$	105	R&P TEOM
				SLAMS	Ozone		UV Photometric
05-143-0006	Fayetteville	429 Ernest Lancaster Dr	36.011703, -94.167436	SLAMS	Ozone		UV Photometric
40-135-9021	Roland, OK	207 Cherokee Blvd	35.40814, -94.524413	SLAMS	$PM_{2.5}$	145	R&P 2025 FRM

[1] Collocated monitors

Table 1. ADEQ-Operated SLAMS Monitor Information (Continued)

AQS ID #	Site Name	Pollutants Measured	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comp.	CBSA
05-001-0011	Stuttgart	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	N/A
05-003-0005	Crossett	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	N/A
05-035-0005	Marion	$PM_{2.5}$	Daily 1 in 3	Regional Transport	Neighborhood	Yes	Memphis
		$PM_{2.5}$	Continuous	Regional Transport	Neighborhood	No	
		Ozone	Continuous		Neighborhood	Yes	
		NO_2	Continuous		Neighborhood	Yes	
					Area Wide		
05-051-0003	Hot Springs	$PM_{2.5}$[1]	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Hot Springs
05-067-0001	Newport	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	N/A
05-101-0002	Deer	Ozone	Continuous	Background	Neighborhood	Yes	N/A
05-113-0002	Mena	$PM_{2.5}$	Daily 1 in 3	Regional Background	Neighborhood	Yes	N/A
05-113-0003	Eagle Mtn	Ozone	Continuous	Regional Transport	Neighborhood	Yes	N/A
05-119-0007	PARR (NCore)	$PM_{2.5}$[1]	Daily 1 in 1	Population Exposure	Neighborhood	Yes	Little Rock
		$PM_{2.5}$	Continuous	Population Exposure	Neighborhood	No	
		PM_{10}[1]	Daily 1 in 3	Population Exposure	Neighborhood	Yes	
		Ozone	Continuous	Population Exposure	Neighborhood	Yes	
		NO_x	Continuous	Susceptible & Vulnerable Population Exposure	Neighborhood	Yes	
		Speciation	Daily 1 in 3	Population Exposure	Neighborhood	No	
		NO_y	Continuous	Population Exposure	Neighborhood	No	
		Trace SO_2	Continuous	Population Exposure	Neighborhood	Yes	
		Trace CO	Continuous	Population Exposure	Neighborhood	No	
		Pb[†]	Daily 1 in 6	Population Exposure	Neighborhood	No	
05-119-1002	NLR Airport	Ozone	Continuous	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1004	Adams Field	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1007	VA Hospital	PM_{10}	Daily 1 in 6	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1008	DSR	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Little Rock
		$PM_{2.5}$	Continuous		Neighborhood	No	
		Ozone	Continuous		Neighborhood	Yes	
05-139-0006	El Dorado	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	El Dorado
		$PM_{2.5}$	Continuous	Population Exposure	Neighborhood	No	
		SO_2	Continuous	Population Exposure	Neighborhood	Yes	
05-143-0005	Springdale	$PM_{2.5}$	Continuous	Population Exposure	Neighborhood	No	Fayetteville
		$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	
		Ozone		AQI			
05-143-0006	Fayetteville	Ozone	Continuous	Population Exposure	Neighborhood	Yes	Fayetteville
40-135-9021	Roland, OK	$PM_{2.5}$	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Fort Smith

[1] Collocated monitors

3.3. Population Assessment

Overall, the population of Arkansas continues to increase since the 2010 Census. Six of the eight MSAs and five of the fourteen μSAs have seen increases in population since the 2010 Census (Table 3). The Memphis, TN-MS-AR MSA is the most populous MSA located fully or partially in Arkansas with a total population of 1,343,230 according to the 2014 annual estimate. The Little Rock-North Little Rock-Conway, AR MSA also saw an increase with a population of 729,135. The Fayetteville-Springdale-Rogers, AR-MO MSA has seen the largest growth, growing 8.3% since the 2010 Census. ADEQ anticipates that the population for these three MSAs will continue to increase in the next five years.

3.4. Meteorological Assessment

Air pollution concentrations are influenced by the climate. Historical temperature and precipitation were assessed for the Little Rock-North Little Rock-Conway, AR MSA, Fort Smith, AR-OK MSA, and the Memphis, TN-MS-AR MSA from data collected in the U.S. Climate Divisional Database (Table 2). The Little Rock-North Little Rock-Conway, AR MSA historical weather data was collected from Adams Field (GHCN ID: USW00013963), the Fort Smith, AR-OK MSA was from the Fort Smith Regional Airport (GHCN ID: USW00013964), and the Memphis, TN-MS-AR MSA was collected from the Memphis International Airport (GHCN ID: USW00013893).

Table 2. Average Temperature and Precipitation from 2011–14

	Temperature (°F)					Precipitation (inches)				
Location	**2011**	**2012**	**2013**	**2014**	**Normal[1]**	**2011**	**2012**	**2013**	**2014**	**Normal[2]**
Little Rock, AR	64.0	65.7	61.9	61.0	62.6	60.23	42.26	52.82	48.14	49.76
Fort Smith, AR	64.3	66.1	61.8	60.7	61.6	46.56	33.96	47.08	42.16	45.42
Memphis, TN	64.0	65.9	62.1	61.3	63.0	58.38	36.92	59.46	57.66	53.67

[1] Normal reading is the mean temperature/precipitation from the 30-year base period (1981–2010)

Adams Field experienced warmer temperatures in 2011 and 2012 than the normal average and cooler temperatures in 2013 and 2014. This trend in 2011 and 2012 can also be seen at the Fort Smith Regional Airport and the Memphis International Airport. Precipitation for all three areas has been near the normal average for the last two years after experiencing lower precipitation in 2012. Although temperature and precipitation can affect ozone concentration, these do not play a significant role in the siting of monitoring locations.

Wind direction and speed is a more important aspect of climate used in the network assessment. Wind-rose plots were created as described in Section 2.1 and can be found in Appendix 1. The prevailing winds in Arkansas are predominantly southerly, with the exception of Hot Springs, AR MSA where the prevailing winds are easterly.

Table 3. Population of CBSAs Based on Decennial Census and Annual Estimates

CBSA	2010 Census	Annual Estimates				% Growth[1]	Rank	
		2011	2012	2013	2014		Population	% Growth[1]
Memphis, TN-MS-AR	1,324,829	1,332,790	1,340,755	1,341,710	1,343,230	1.39%	1	7
Little Rock-North Little Rock-Conway, AR	699,799	710,759	717,703	724,335	729,135	4.19%	2	3
Fayetteville-Springdale-Rogers, AR-MO	463,207	474,222	483,029	492,375	501,653	8.30%	3	1
Fort Smith, AR-OK	280,515	281,012	280,704	279,930	279,592	-0.33%	4	13
Texarkana, TX-Texarkana, AR	149,195	149,561	149,610	149,563	149,235	0.03%	5	11
Jonesboro, AR	121,026	122,840	124,228	125,869	126,764	4.74%	6	2
Hot Springs, AR	96,156	96,837	97,065	97,322	96,024	1.35%	7	8
Pine Bluff, AR	100,258	99,001	97,344	95,689	94,716	-5.53%	8	21
Russellville, AR	83,939	84,604	84,528	84,554	85,152	1.45%	9	6
Searcy, AR	77,076	78,132	78,652	78,661	78,592	1.97%	10	5
Harrison, AR	45,233	45,314	45,417	45,457	45,100	-0.29%	11	12
Blytheville, AR	46,480	46,035	45,550	44,734	44,235	-4.83%	12	20
Paragould, AR	42,090	42,731	43,158	43,072	43,694	3.81%	13	4
Mountain Home, AR	41,513	41,287	41,077	40,996	40,857	-1.58%	14	14
El Dorado, AR	41,639	41,386	40,904	40,675	40,227	-3.39%	15	17
Batesville, AR	36,647	36,803	36,905	36,843	36,959	0.85%	16	10
Malvern, AR	32,923	33,047	33,386	33,440	33,368	1.35%	17	9
Camden, AR	31,489	31,026	30,710	30,232	30,030	-4.63%	18	18
Forrest City, AR	28,258	27,952	27,883	27,302	26,899	-4.81%	19	19
Magnolia, AR	24,552	24,670	24,401	24,266	23,933	-2.52%	20	16
Arkadelphia, AR	22,995	22,953	22,822	22,697	22,576	-1.82%	21	15
Helena-West Helena, AR	21,757	21,419	20,772	20,426	19,930	-8.40%	22	22

[1] Percent growth between the 2010 decennial Census and the 2014 annual estimate

3.5. Ozone Network

3.4.1. Monitoring Requirements

The monitoring requirement for ozone is listed in Table D-2 of 40 CFR Part 58 Appendix D § 4.1 and is reproduced in Table 4. The number of sites required in the network is based on the MSA population from the latest decennial Census and most recent design value.

Table 4. SLAMS O_3 Monitoring Requirements (Reproduction of Table D-2)

MSA Population[1,2]	Most Recent 3-Year Design Value Concentration ≥85% of any O_3 NAAQS[3]	Most Recent 3-Year Design Value Concentration <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4 – 10 million	3	1
350,000 – <4 million	2	1
50,000 – <350,000[5]	1	0

[1] Minimum monitoring requirement applies to the Metropolitan Statistical Area (MSA)
[2] Population based on latest available census figures
[3] The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50
[4] These minimum monitoring requirements apply in the absence of a design value
[5] Metropolitan Statistical Areas (MSA) must contain an urbanized area of 50,000 or more population

Based on the latest decennial Census and the 2014 ozone design values, the following four MSAs are required to have ozone monitors: (1) Fayetteville-Springdale-Rogers, AR-MO MSA, (2) Fort Smith, AR-OK MSA, (3) Little Rock-North Little Rock-Conway, AR MSA, and (4) Memphis, TN-MS-AR MSA.

ADEQ currently operates three monitors in the Little Rock-North Little Rock-Conway, AR MSA and two in the Fayetteville-Springdale-Rogers, AR-MO MSA. ADEQ also operates one of the five SLAMS ozone monitors in the Memphis, TN-MS-AR MSA, with the other four operated by either Shelby County Health Department (47-157-0021, 47-157-0075, and 47-157-1004) or MDEQ (28-033-0002). The monitor requirement in the Fort Smith, AR-OK MSA is covered by the ozone monitor in Roland, OK, which is operated by Cherokee Nation (40-135-9021). There are two additional SLAMS ozone monitors in the rural areas of Deer and Eagle Mountain which are used to enhance EPA's AirNow ozone mapping program and to determine background and transport ozone. The number of service years for each ADEQ-operated ozone monitor is listed in Table 5.

Table 5. Number of Years of Service for Each ADEQ-Operated O_3 Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-1002	NLR Airport	Pulaski	07/29/1977	37.9	1
05-119-0007	PARR	Pulaski	04/01/1986	29.2	2
05-035-0005	Marion	Crittenden	02/25/1991	24.3	3
05-101-0002	Deer	Newton	11/01/1992	22.6	4
05-113-0003	Eagle Mountain	Polk	10/01/2004	10.7	5
05-143-0005	Springdale	Washington	10/01/2006	8.7	6
05-119-1008	DSR	Pulaski	01/01/2007	8.4	7
05-143-0006	Fayetteville	Washington	03/01/2012	3.3	8

In a letter to U.S. EPA Region 6 dated August 28, 2015, ADEQ withdrew its request to discontinue the NLR Airport monitoring site that was proposed in the 2015 Annual Network Plan. In the same letter, after consultation with U.S. EPA Region 6 staff, ADEQ submitted a request to discontinue the ozone monitor at the DSR monitoring site. Elimination of the DSR ozone monitor would not have a negative effect on data users for several reasons: (1) the monitor has consistently not been the highest reading monitor in the Little Rock area, (2) the monitor has never exceeded the 2008 eight-hour ozone standard, and (3) the monitoring site was established in 2007 and does not have numerous historical data points compared to the NLR Airport monitoring site or the PARR monitoring site. ADEQ remains focused on maintaining compliance of the NAAQS and asserts that discontinuation of the DSR site will not compromise the data collection needed for implementation of the ozone NAAQS. This request was approved in a letter to ADEQ dated September 4, 2015. ADEQ plans to decommission the ozone monitor at the DSR monitoring site at the end of December 2015.

ADEQ does not anticipate requesting to terminate any other ozone monitoring sites in the near future at the time of this assessment. No new ozone monitoring sites are anticipated in the near future at the time of assessment.

In addition to the SLAMS network, EPA operates one ozone monitor in Caddo Valley (05-019-9991) as part of CASTNET. This monitor is compliant with the regulatory requirements in 40 CFR Parts 50, 53, and 58; consequently, ozone measurements from this site may also be used to determine if an area meets, or exceeds, the NAAQS.

3.4.2. Trend Analysis

A historical graph of the annual fourth-maximum ozone concentrations is shown in Figure 3.

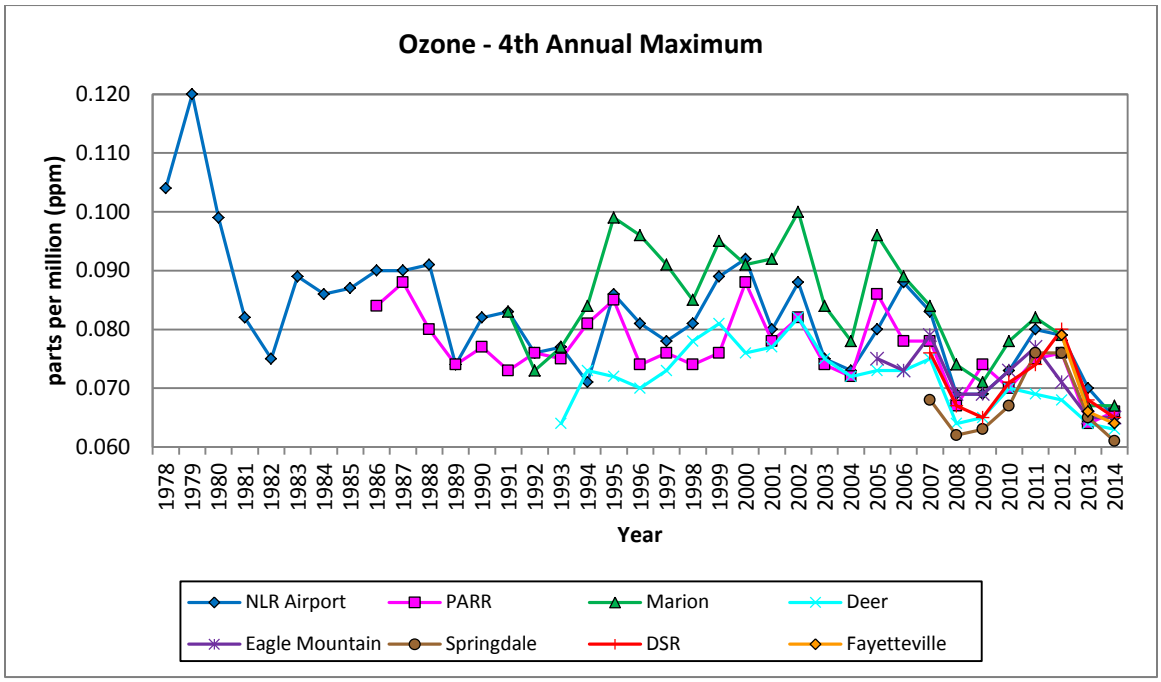


Figure 3. Historical 4th Annual Maximum for ADEQ-Operated O_3 Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For ozone, the design value is simply the three-year average of annual fourth-highest daily maximum eight-hour ozone concentration. The last five years' worth of design values can be found in Table 6. At all eight ADEQ-operated ozone monitoring site, the latest design value is below the current 0.075 ppm standard. ADEQ anticipates the ozone design values to decrease for the 2015 design value year since the high values that occurred in 2012 will not be used in the calculations of the 2015 design value.

Table 6. Last Five Design Values for the O_3 NAAQS at ADEQ-Operated Sites

		8-Hour Design Value (in ppm)				
AQS ID	**Site Name**	**2010**	**2011**	**2012**	**2013**	**2014**
05-035-0005	Marion	0.074	0.077	0.079	0.076	0.071
05-101-0002	Deer	0.066	0.068	0.069	0.067	0.065
05-113-0003	Eagle Mountain	0.070	0.073	0.073	0.071	0.067
05-119-0007	PARR	0.070	0.073	0.073	0.071	0.068
05-119-1002	NLR Airport	0.070	0.074	0.077	0.076	0.071
05-119-1008	DSR	0.067	0.070	0.075	0.074	0.071
05-143-0005	Springdale	0.064	0.068	0.073	0.072	0.067
05-143-0006	Fayetteville	n/a[1]	n/a[1]	n/a[1]	n/a[1]	0.069

[1] Fayetteville (05-143-0006) began operation in 2012, therefore it did not have three-year's worth of data for design value calculations until 2014

3.4.3. AQI Trend Analysis

Tile plots for four Arkansas MSAs were created from EPA's Tile Plot Visualization Tool. Information regarding the EPA tool can be found in Section 2.2 of this document and the tile plots generated can be found in Appendix 2. The four MSAs are (1) Fayetteville-Springdale-Rogers, AR-MO MSA, (2) Fort Smith, AR-OK MSA, (3) Little Rock-North Little Rock-Conway, AR MSA, and (4) Memphis, TN-MS-AR MSA. An AQI of 101 or higher is equivalent to exceeding the current eight-hour standard of 0.075 ppm. The number of days with AQI above 100 is displayed in Figure 4, which shows a decrease since 2012.

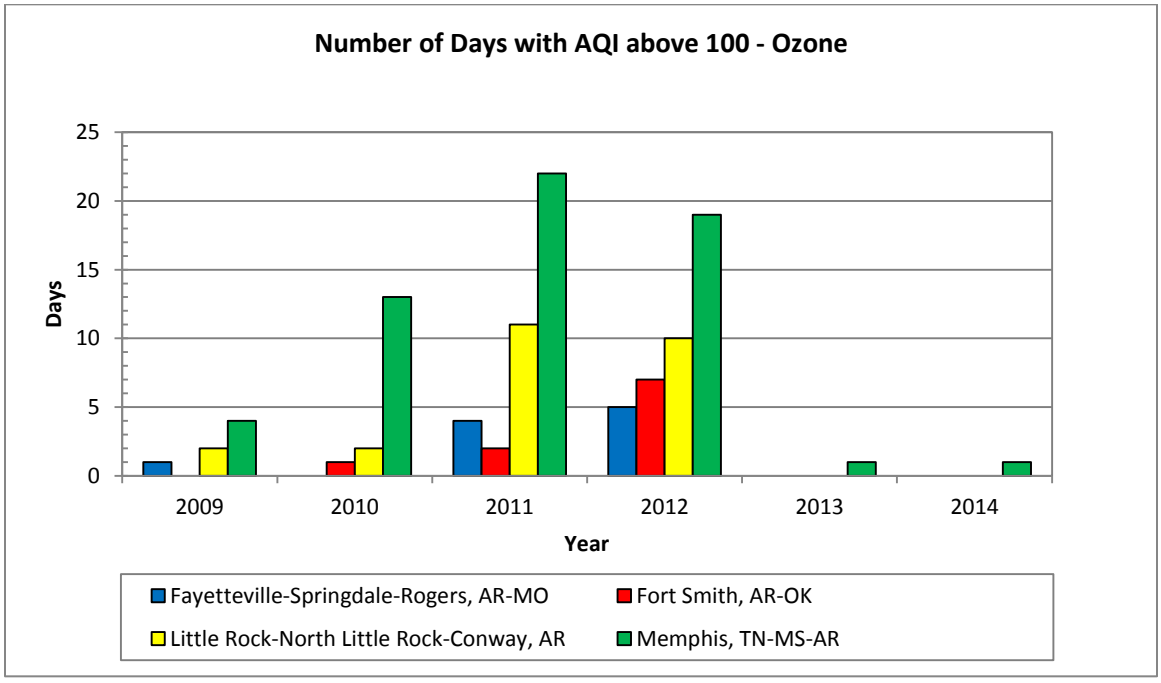


Figure 4. Number of Days with AQI above 100 (O_3)

3.4.4. Emission Sources

Figure 5 depicts the location of the ADEQ and EPA-operated ozone monitors located in Arkansas along with NO_X and VOCs point sources. NO_X and VOCs are important precursors to the formation of ozone. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

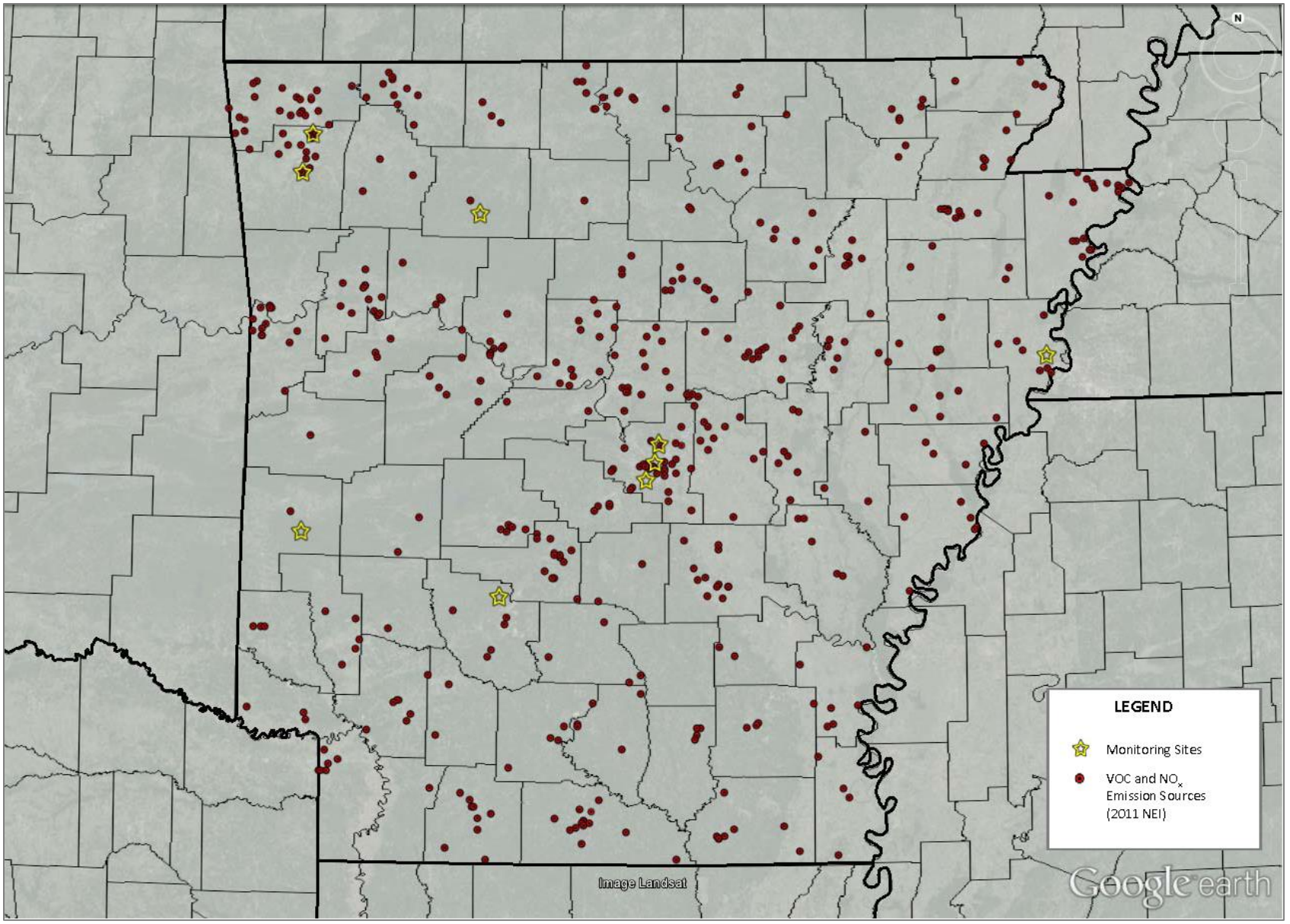


Figure 5. Ozone Precursor (VOC and NO_X) Emission Sources from 2011 NEI

3.4.5. Monitor-to-Monitor Correlation Analysis

Information regarding the monitor-to-monitor correlation analysis used in this section can be found in Section 2.3 of this document. Figure 6 displays the correlation matrix and depicts the pairing of each ozone monitor in Arkansas. Analysis of the results show that with the exception of the three ozone monitors in the Little Rock-North Little Rock-Conway, AR MSA and the two monitors in the Fayetteville-Springdale-Rogers, AR-MO MSA, all other ozone monitors are located sufficient distance way from each other and do not exhibit a correlation factor of 0.6 or higher. Due to the high correlation between NLR Airport and DSR and between NLR Airport and PARR, the NLR Airport ozone monitor could be removed due to redundancy.

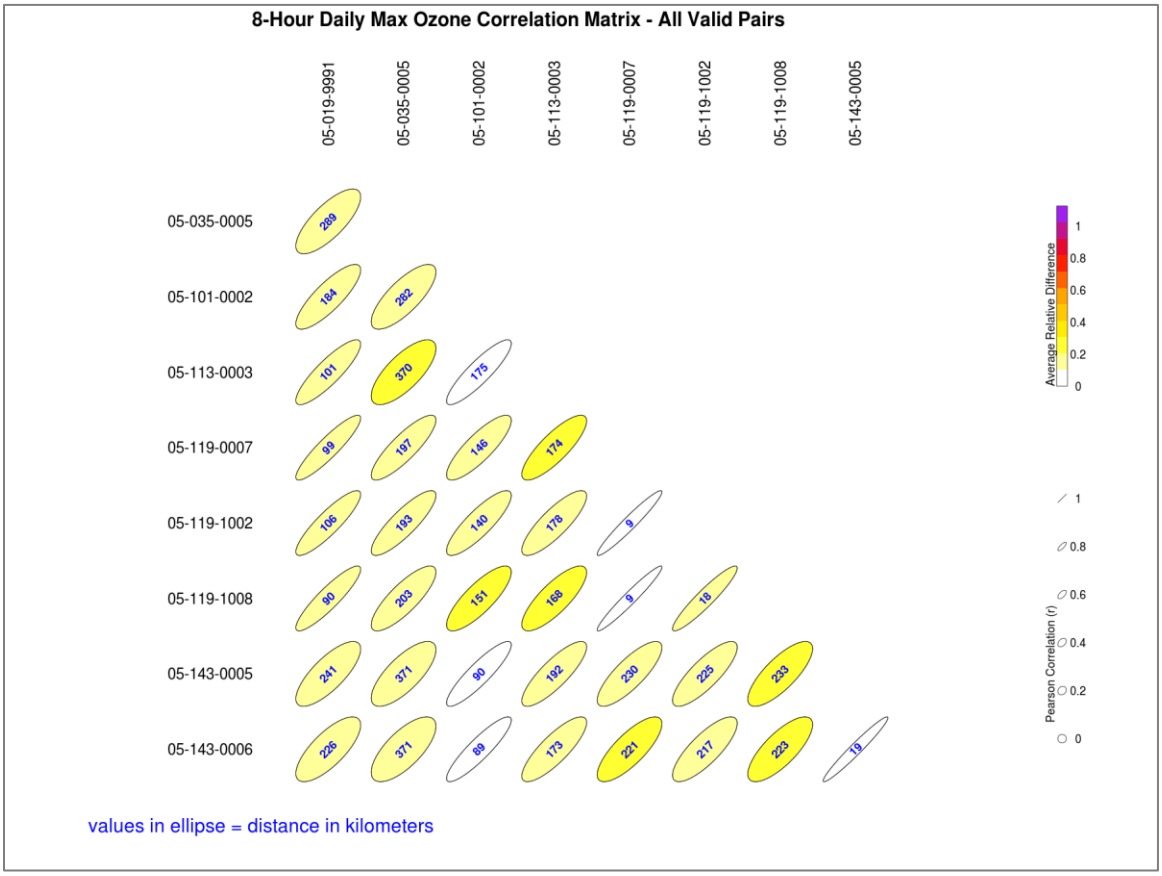


Figure 6. Correlation Matrix Analysis for Each O_3 Monitor Located in Arkansas

3.4.6. Area Served Analysis

Information regarding the analysis of the area served used in this section can be found in Section 2.4 of this document. The current ozone network operated by ADEQ, along with the one CASTNET regulatory monitor operated by EPA, does not cover all of the areas within the boundaries of the state and requires the incorporation of additional monitors located in adjacent states in order to cover all of Arkansas (Figure 7).

3.4.7. Removal Bias Analysis

Information regarding the removal bias analysis used in this section can be found in Section 2.5 of this document. The removal bias analysis for the ozone network can be found in Figure 8. There is a negative mean bias of -0.0027 ppm at NLR Airport. The DSR site has a positive mean bias (0.0016 ppm) and can be considered a candidate to be removed pending further analysis and meeting the minimum number of SLAMS sites.

3.4.8. Exceedance Probability Analysis

Information regarding the exceedance probability analysis used in this section can be found in Section 2.6 of this document. Exceedance probability analysis was conducted for the current eight-hour primary ozone standard of 0.075 ppm (Figure 9), the higher range of the proposed eight-hour primary ozone standard of 0.070 ppm (Figure 10), and the lower range of the proposed eight-hour primary ozone standard of 0.065 ppm (Figure 11).

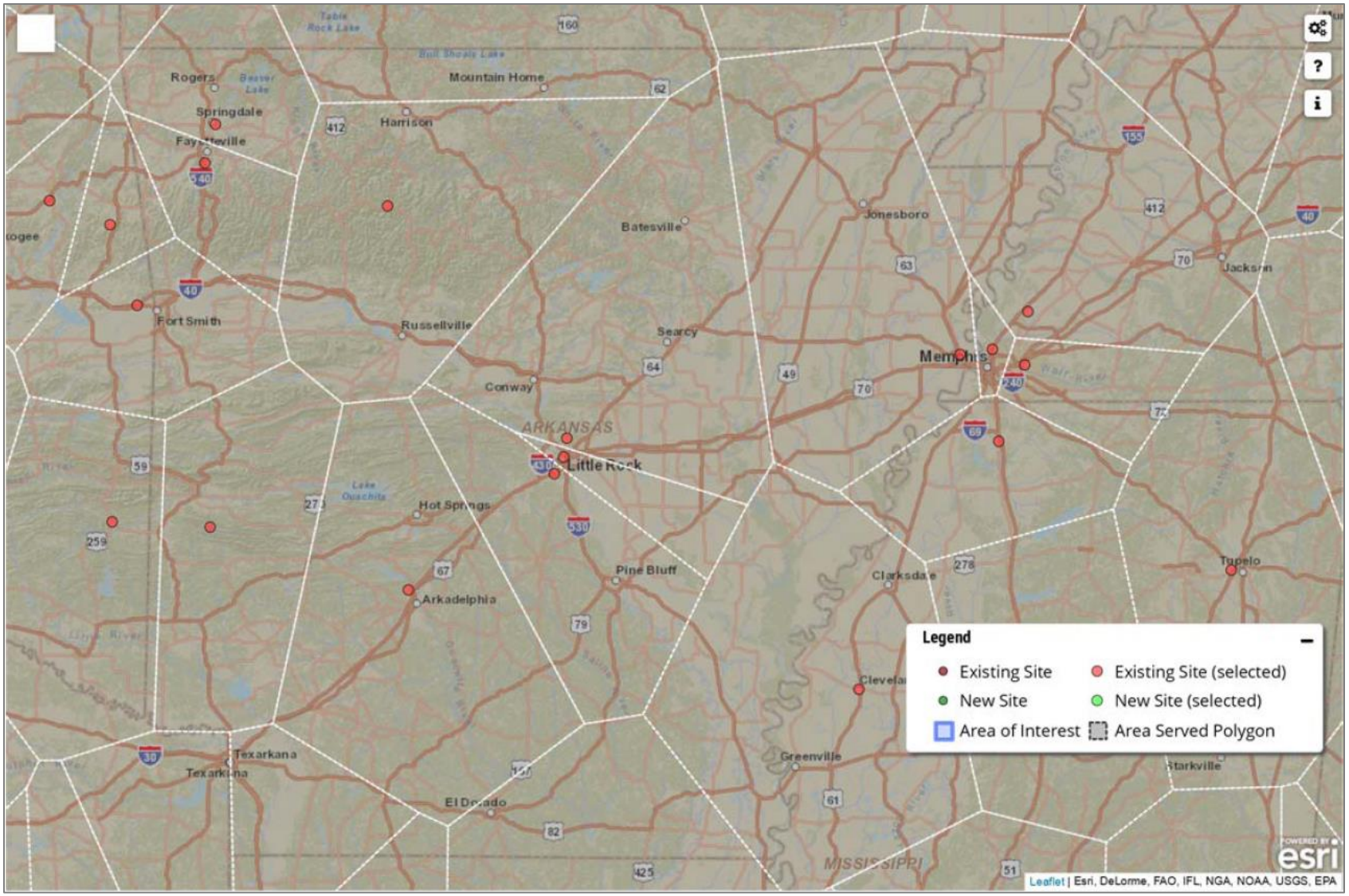


Figure 7. Area Served Analysis for O_3 Network

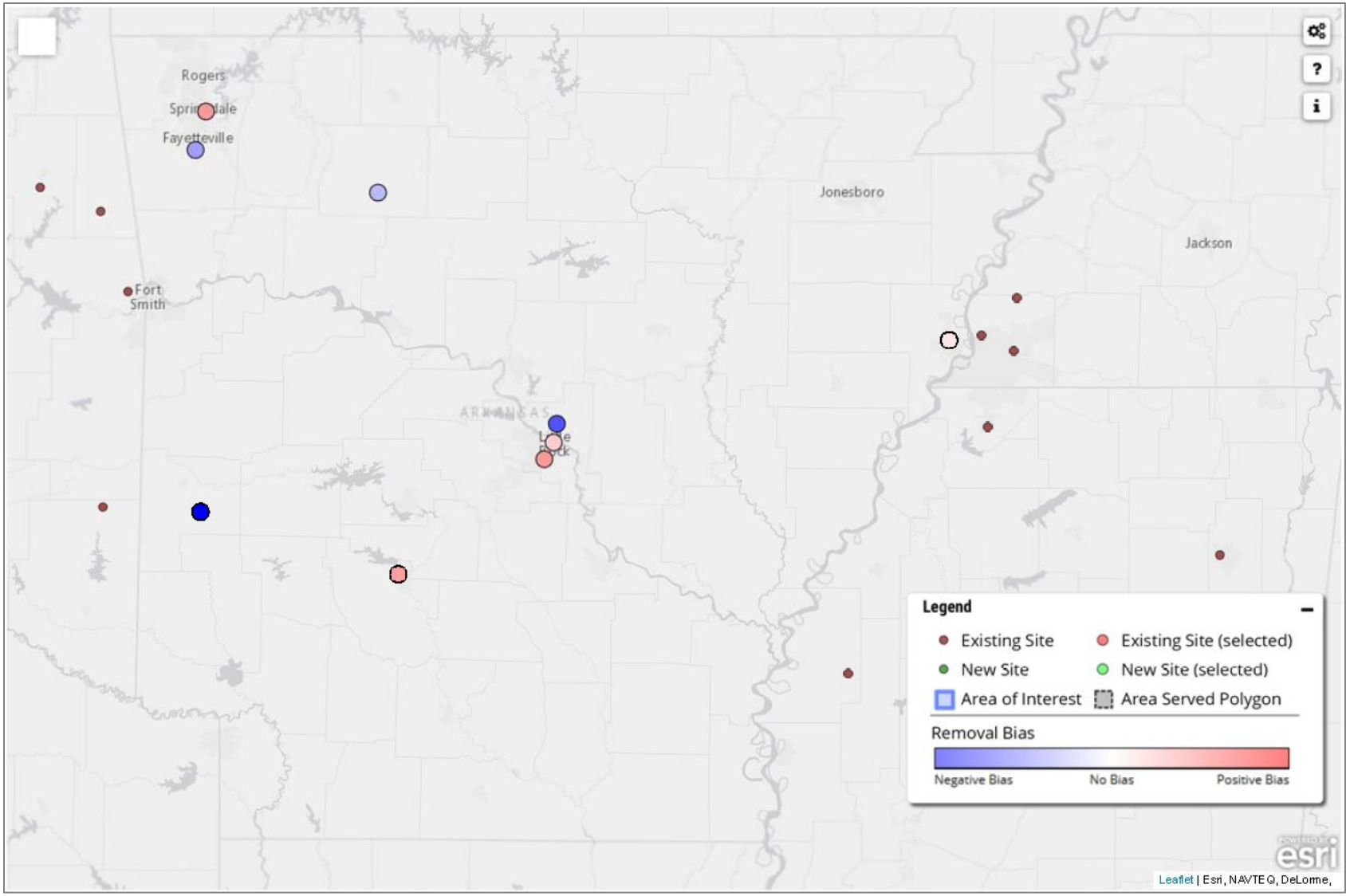


Figure 8. Removal Bias Analysis for ADEQ-Operated O_3 Monitoring Network

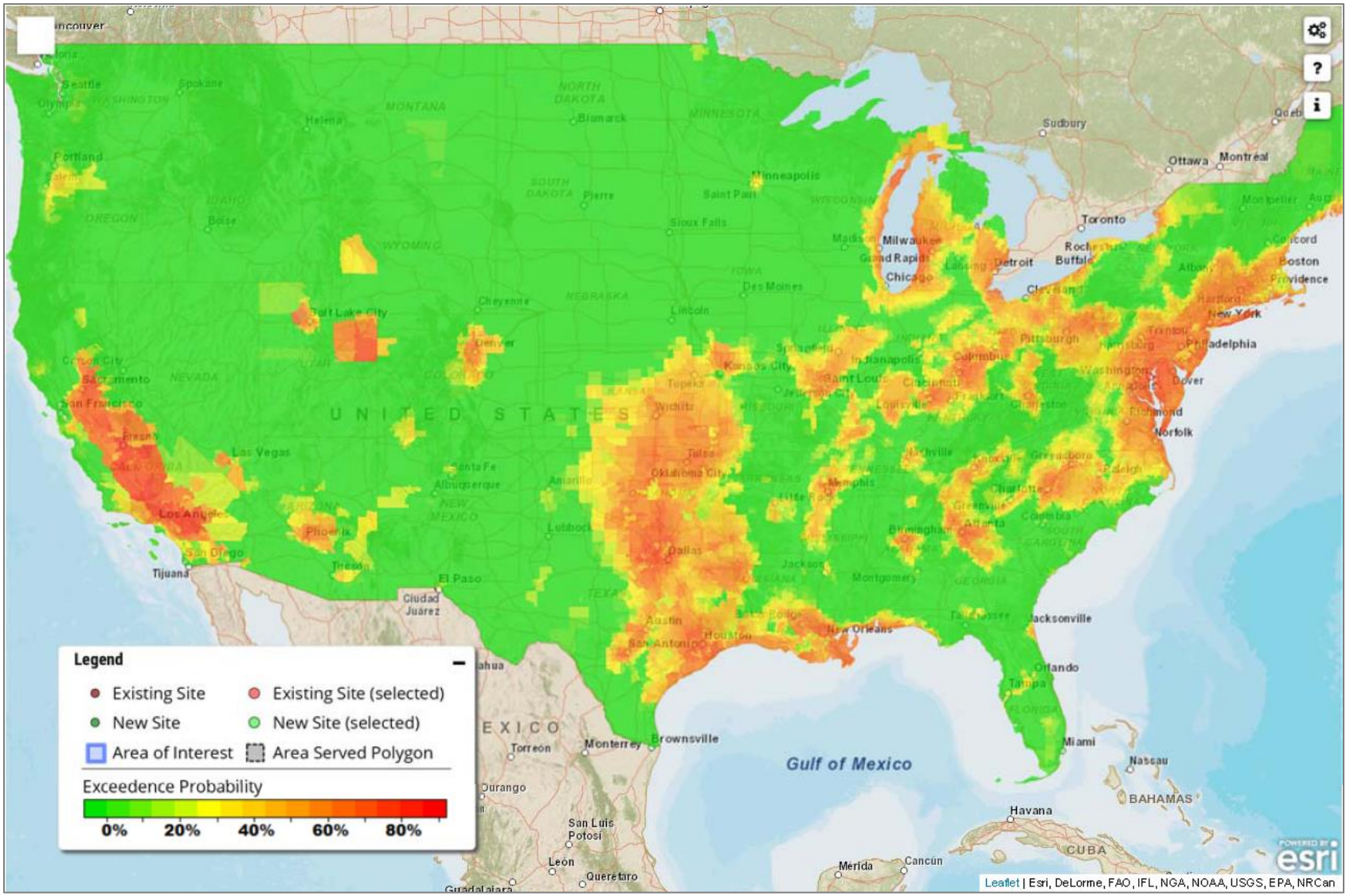


Figure 9. Probability Analysis for the 8-Hour 0.075 ppm O_3 Standard

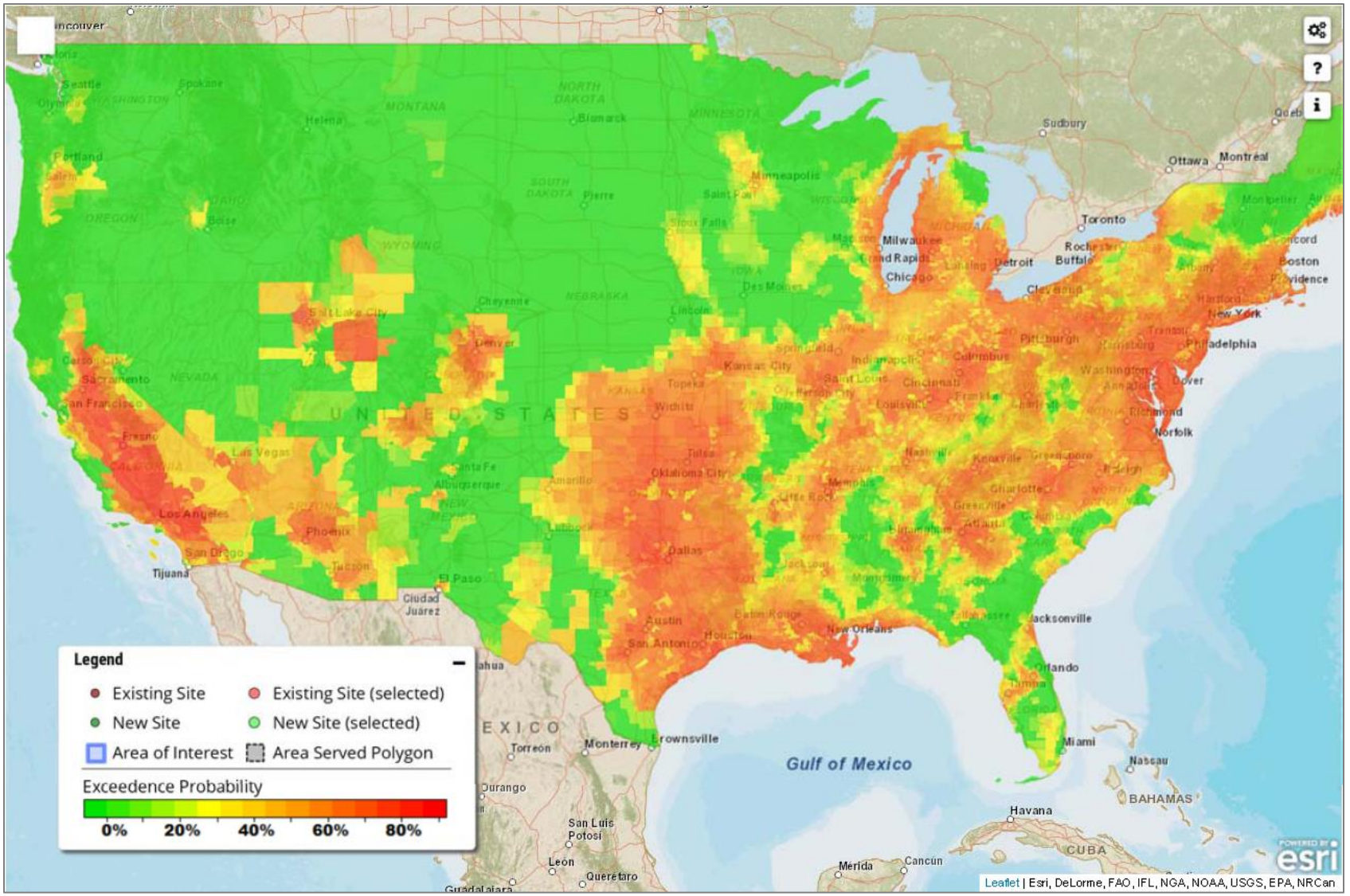


Figure 10. Probability Analysis for the Proposed 8-Hour 0.070 ppm O_3 Standard

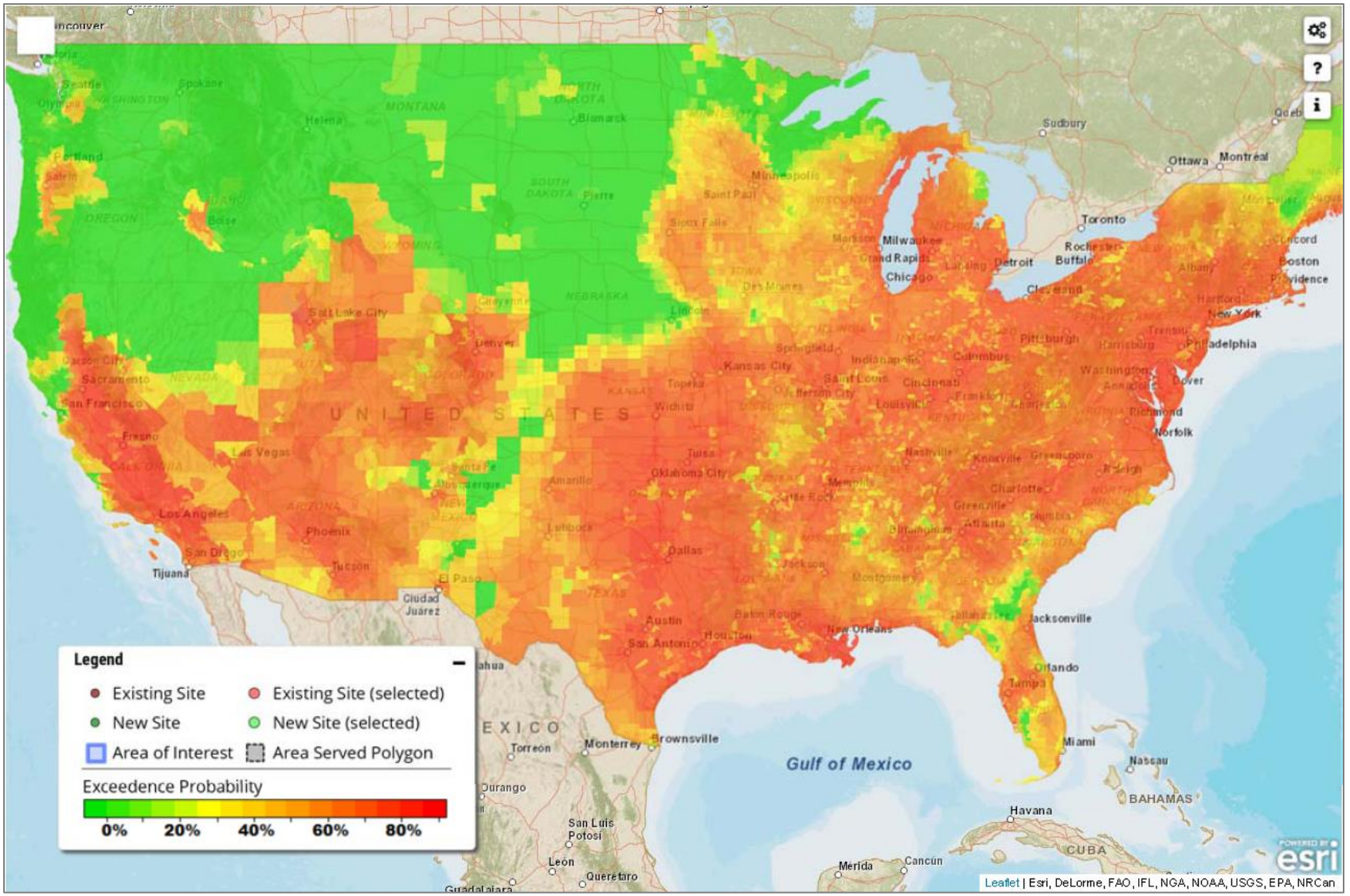


Figure 11. Probability Analysis for the Proposed 8-Hour 0.065 ppm O_3 Standard

3.5. $PM_{2.5}$ Network

3.5.1. Monitoring Requirement

The monitoring requirement for $PM_{2.5}$ is listed in Table D-5 of 40 CFR Part 58 Appendix D § 4.7.1, and is reproduced in Table 7. The number of sites required in the network is based on the MSA population from the latest decennial Census and most recent design value for the MSA.

Table 7. SLAMS $PM_{2.5}$ Monitoring Requirements (Reproduction of Table D-5)

MSA Population[1,2]	Most Recent 3-Year Design Value ≥85% of any $PM_{2.5}$ NAAQS[3]	Most Recent 3-Year Design Value <85% of any $PM_{2.5}$ NAAQS[3,4]
>1,000,000	3	2
500,000 – 1,000,000	2	1
50,000 – <500,000[5]	1	0

[1] Minimum monitoring requirement applies to the Metropolitan Statistical Area (MSA)
[2] Population based on latest available census figures
[3] The $PM_{3.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50
[4] These minimum monitoring requirements apply in the absence of a design value
[5] Metropolitan Statistical Areas (MSA) must contain an urbanized area of 50,000 or more population

Based on the latest decennial Census and the 2014 $PM_{2.5}$ design values, the following two MSAs are required to have $PM_{2.5}$ monitors: (1) Little Rock-North Little Rock-Conway, AR MSA and (2) Memphis, TN-MS-AR MSA.

ADEQ operates one of the four SLAMS $PM_{2.5}$ monitors in the Memphis, TN-MS-AR MSA, with the other three operated by either Shelby County Health Department (47-157-0047 and 47-157-0075) or MDEQ (28-033-0002). In the Little Rock-North Little Rock-Conway, AR MSA, ADEQ operates three $PM_{2.5}$ monitors at Adams Field, DSR, and PARR. The PARR monitor also contains a $PM_{2.5}$ speciation monitor as part of the NCore requirement. The Fayetteville-Springdale-Rogers, AR-MO MSA, Fort Smith, AR-OK MSA, and Hot Springs, AR MSA each have one SLAMS monitor in operation. In addition, the TCEQ operates a monitor in Texarkana, TX that covers the Texarkana, TX-Texarkana, AR MSA (48-037-0004). ADEQ also operates an additional five $PM_{2.5}$ monitoring sites not located in MSAs. In addition, Hot Springs and PARR are collocated with another FRM monitor. Marion, PARR, DSR, El Dorado, and Springdale are collocated with a TEOM monitor. The number of service years for each ADEQ-operated $PM_{2.5}$ monitor is listed in Table 8.

Table 8. Number of Years of Service for Each ADEQ-Operated $PM_{2.5}$ Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-0007	PARR	Pulaski	01/22/1999	16.4	1
05-113-0002	Mena	Polk	03/30/1999	16.2	2
05-119-1004	Adams Field	Pulaski	09/08/2000	14.8	3
05-003-0005	Crossett	Ashley	05/07/2001	14.1	4
05-001-0011	Stuttgart	Arkansas	08/10/2001	13.8	5
05-139-0006	El Dorado	Union	07/01/2002	12.9	6
05-051-0003	Hot Springs	Garland	02/05/2003	12.3	7
05-119-1008[1]	DSR	Pulaski	04/02/1999	12.1	8
05-035-0005	Marion	Crittenden	01/01/2005	10.4	9
05-067-0001	Newport	Jackson	01/01/2006	9.4	10
05-143-0005	Springdale	Washington	01/01/2008	7.4	11
40-135-9021	Roland	Sequoyah (OK)	01/01/2011	4.4	12

[1] DSR (05-119-1008) was not operational from 2003-2006 and this is reflected in the number of years in service

In the 2015 Annual Network Plan, ADEQ proposed for the discontinuation of the Newport $PM_{2.5}$ monitoring site. ADEQ is proposing the removal of the monitor due to problems with electricity at the site; in addition, the current location will in the near future no longer meet EPA's siting criteria due to tree growth on adjacent property. Discontinuation of the monitor may have impact on data users or health studies using data from the monitor as the next nearest monitor is approximately 60 miles southeast of the Newport site. However, ADEQ asserts that removal of the Newport site will not compromise the data collection needed for implementation of the $PM_{2.5}$ NAAQS, as the monitor has been consistently under 80 percent for both the annual and 24-hour standard.

In addition to the Newport $PM_{2.5}$ monitoring site, ADEQ requested to discontinue the Adams Field $PM_{2.5}$ monitoring site in a letter to U.S. EPA Region 6 dated August 28, 2015. ADEQ requested to discontinue the Adams Field site in order to reduce the cost associated to maintain and operate the $PM_{2.5}$ monitor and to reduce the number of site visits by ADEQ personnel. Elimination of this monitoring site should not have a negative impact on data users or health studies using data from the monitor as there are two other $PM_{2.5}$ monitors in the Little Rock-North Little Rock-Conway, AR MSA as required in 40 CFR Part 58 Appendix D § 4.7.1. Also, the Adams Field site is not the highest reading monitor for the annual PM2.5 NAAQS and has never exceeded the 2012 NAAQS level of 12.0 $\mu g/m^3$ (see Figure 12 on page 24 and Table 9 on page 25). ADEQ asserts that the removal of the Adams Field site will not compromise the data collection needed for implementation of the $PM_{2.5}$ NAAQS. This request was approved in a letter to ADEQ dated September 4, 2015. ADEQ plans to decommission the $PM_{2.5}$ monitor at the Adams Field monitoring site at the end of December 2015.

ADEQ does not anticipate requesting to terminate any other $PM_{2.5}$ sites in the near future at the time of this assessment. No new $PM_{2.5}$ monitors are anticipated in the near future at the time of assessment.

3.5.2. Trend Analysis

A historical graph displaying the weighted annual mean and annual 98th percentile can be found in Figure 12 and Figure 13, respectively. As shown in these figures, the weighted annual mean has decreased since 2010, with all monitors reporting an annual concentration less than the 12.0 µg/m³ annual NAAQS standard. The 24-hour concentrations have not been above the 35 µg/m³ 24-hour NAAQS standard since 2005.

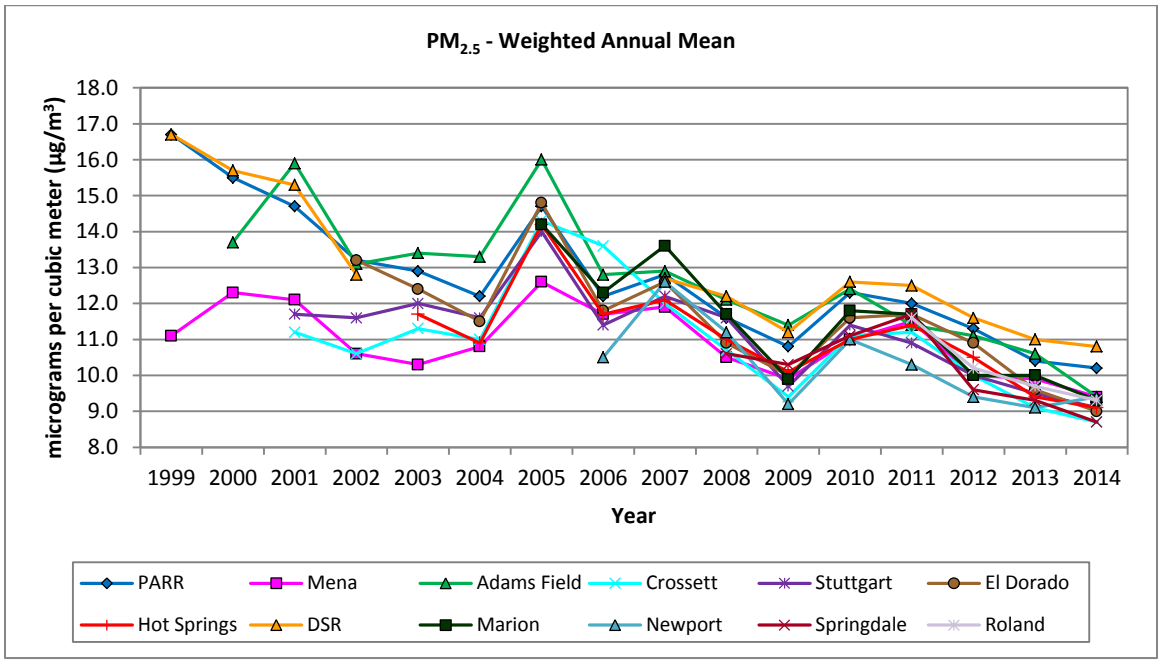


Figure 12. Historical Weighted Annual Mean for ADEQ-Operated $PM_{2.5}$ Monitors

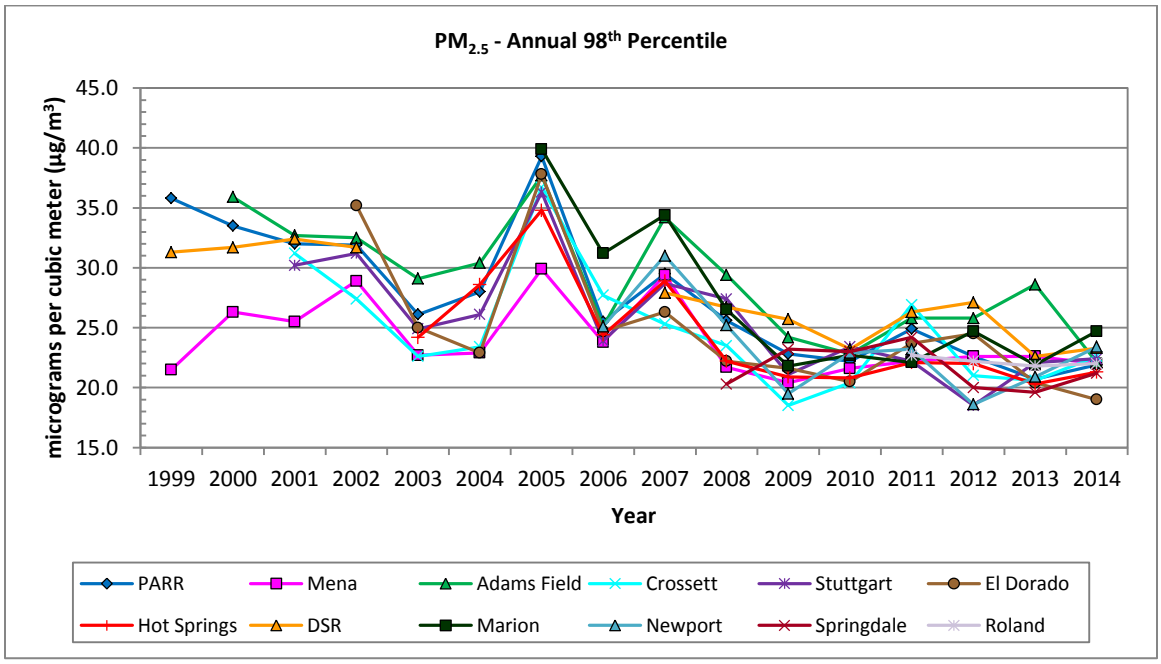


Figure 13. Historical Annual 98th Percentile for ADEQ-Operated $PM_{2.5}$ Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For the annual $PM_{2.5}$ standard, the design value is the three-year average of the weighted annual means; for the 24-hour $PM_{2.5}$ standard, the design value is the three-year average of the annual 98th percentile 24-hour average concentration. The last five years' worth of design values can be found in Table 9. At all ADEQ-operated $PM_{2.5}$ monitoring sites, the latest design values are below the annual and 24-hour standards. Although the weighted annual has continued to decline, the Little Rock-North Little Rock-Conway, AR MSA remains a concern as it has the highest reporting $PM_{2.5}$ monitor in Arkansas at DSR. DSR is currently at 90 percent of the annual standard.

Table 9. Last Five Design Values for the $PM_{2.5}$ NAAQS at ADEQ-Operated Sites

		Annual Design Value (in µg/m^3)					24-Hour Design Value (in µg/m^3)				
AQS ID	**Site Name**	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
05-001-0011	Stuttgart	10.9	10.7	10.8	10.1	9.5	24	22	21	21	21
05-003-0005	Crossett	10.4	10.6	10.8	10.1	9.2	21	22	23	23	21
05-035-0005	Marion	11.1	11.1	11.2	10.6	9.8	24	22	23	23	24
05-051-0003	Hot Springs	10.7	10.8	11.0	10.5	9.7	21	21	22	21	21
05-067-0001	Newport	10.4	10.2	10.3	9.6	9.3	23	22	22	21	21
05-113-0002	Mena	10.4	10.8	10.8	10.5	9.8	21	21	22	22	22
05-119-0007	PARR	11.6	11.7	11.9	11.2	10.6	24	23	23	23	22
05-119-1004	Adams Field	12.0	11.8	11.7	11.1	10.4	25	24	25	27	26
05-119-1008	DSR	12.0	12.1	12.2	11.7	11.1	25	25	26	25	24
05-139-0006	El Dorado	10.9	11.1	11.4	10.7	9.8	21	22	23	23	21
05-143-0005	Springdale	10.7	11.0	10.8	10.2	9.2	22	23	22	21	20
40-135-9021	Roland	n/a[1]	n/a[1]	n/a[1]	10.5	9.7	n/a[1]	n/a[1]	n/a[1]	22	22

[1] Roland (40-135-9021) began operation in 2011, therefore it did not have three-year's worth of data for design value calculations until 2013

3.5.3. AQI Trend Analysis

Tile plots for six Arkansas MSAs were created from EPA's Tile Plot Visualization Tool. Information regarding the EPA tool can be found in Section 2.2 of this document and the tile plots generated can be found in Appendix 3. The four MSAs are (1) Fayetteville-Springdale-Rogers, AR-MO MSA, (2) Hot Springs, AR MSA, (3) Fort Smith, AR-OK MSA, (4) Little Rock-North Little Rock-Conway, AR MSA, (5) Memphis, TN-MS-AR MSA, and (6) Texarkana, TX-Texarkana, AR MSA. An AQI of 101 or higher is equivalent to exceeding the current annual standard of 12.0 µg/m^3. The number of days with AQI above 100 is displayed in Figure 14, which shows that $PM_{2.5}$ has not been a major concern.

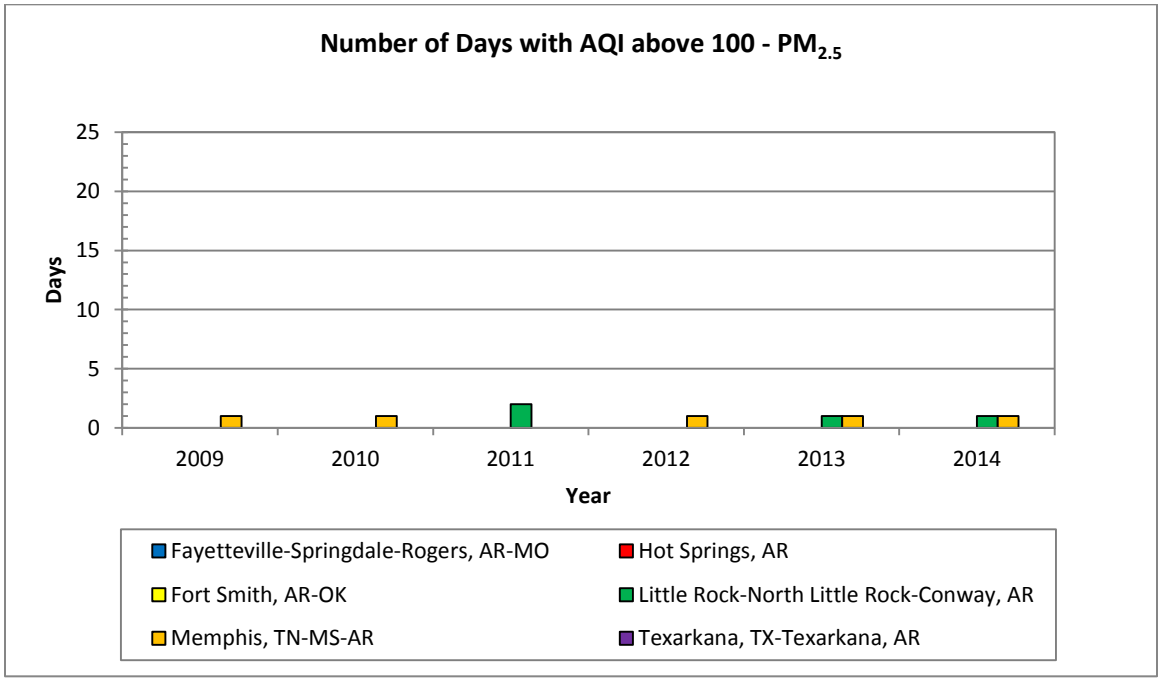


Figure 14. Number of Days with AQI above 100 ($PM_{2.5}$)

3.5.4. Emission Sources

Figure 15 depicts the location of the ADEQ-operated $PM_{2.5}$ monitors along with $PM_{2.5}$ point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

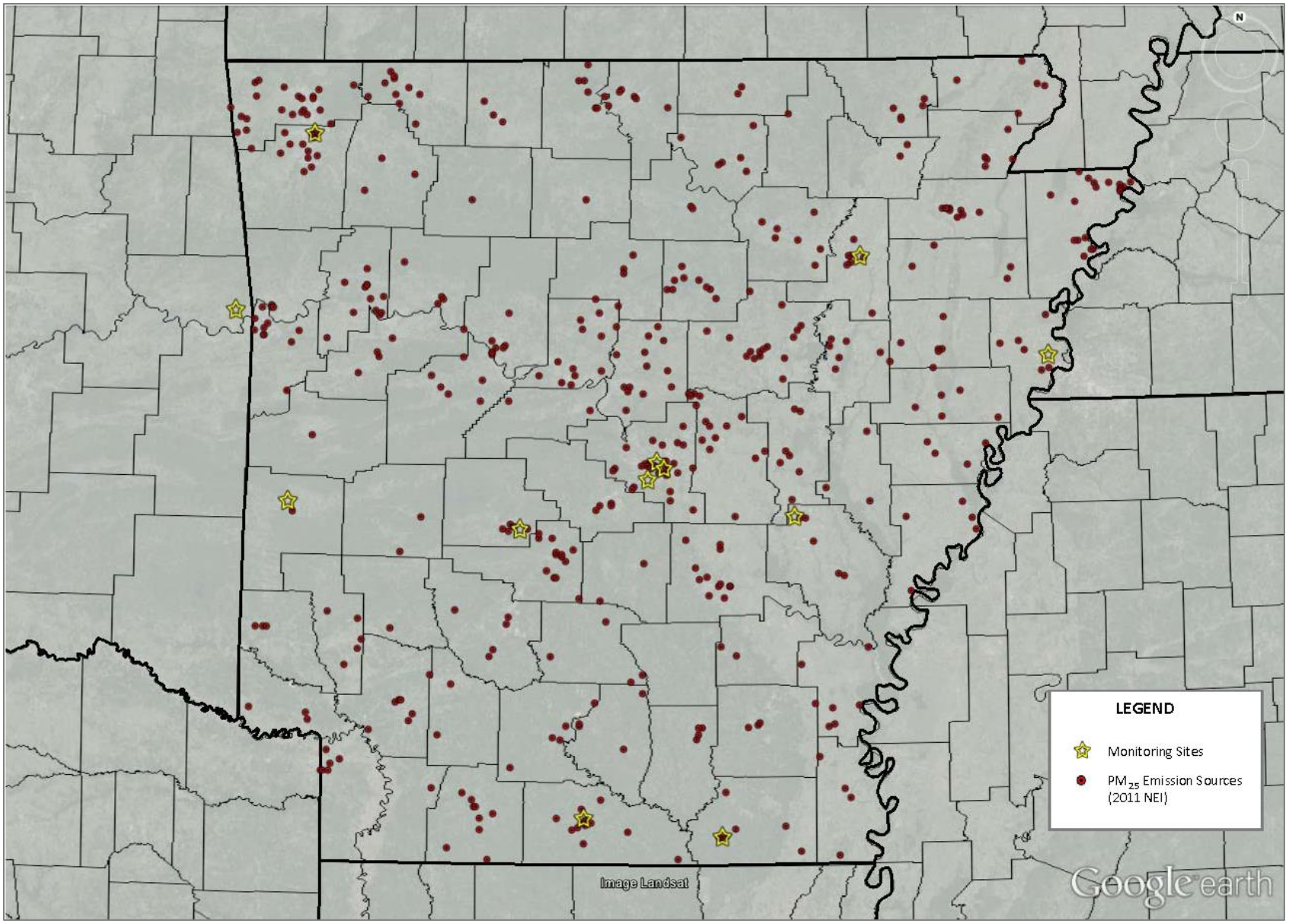


Figure 15. $PM_{2.5}$ Emission Sources from 2011 NEI

3.5.5. Monitor-to-Monitor Correlation

Information regarding the monitor-to-monitor correlation analysis used in this section can be found in Section 2.3 of this document. Analysis of the results show that all $PM_{2.5}$ monitors, with possibly the exception of the monitors located in Pulaski County, are located sufficient distance way from each other and do not exhibit a correlation factor of 0.6 or higher as indicated in Figure 16.

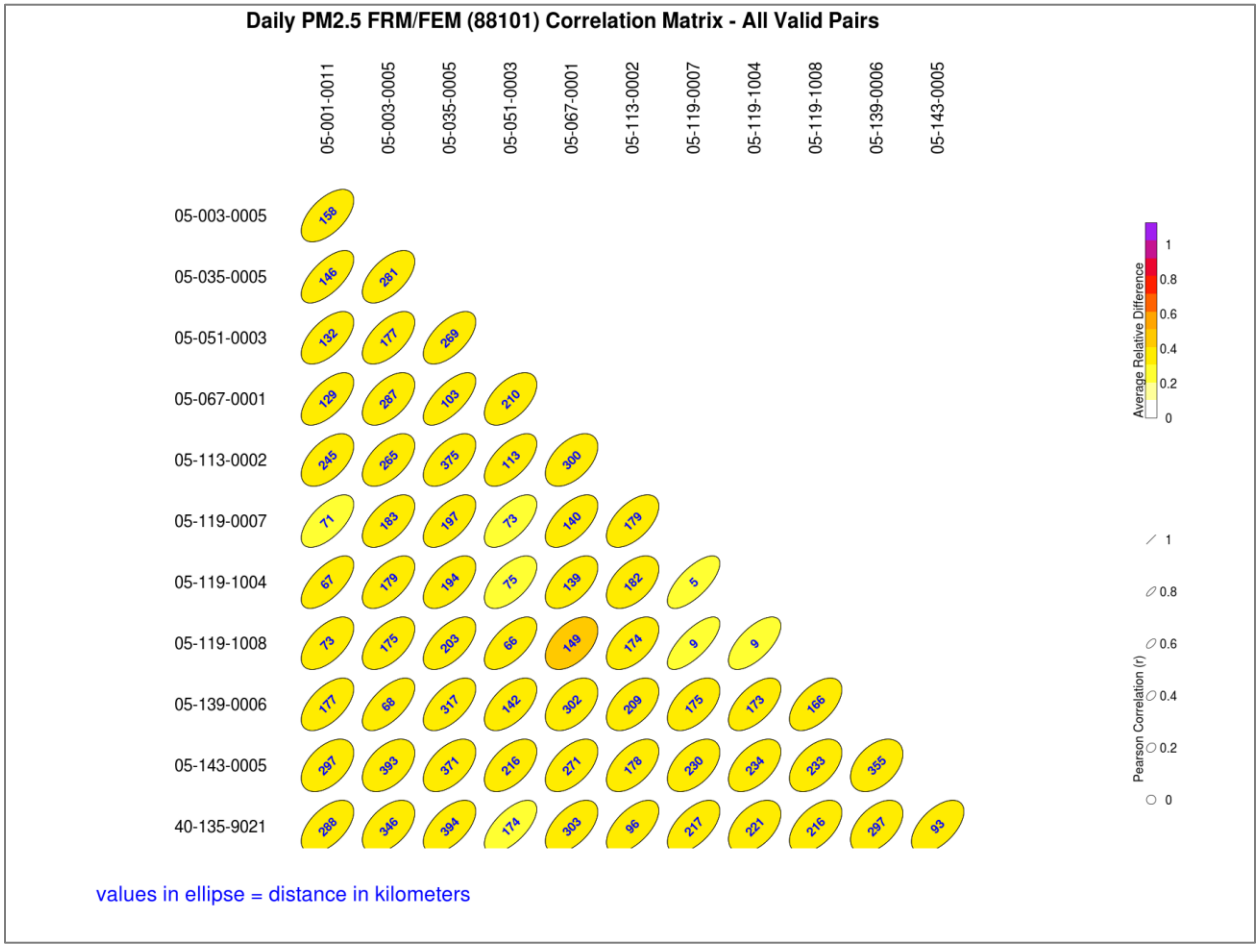


Figure 16. Correlation Matrix Analysis for Each ADEQ-Operated $PM_{2.5}$ Monitor

3.5.6. Area Served Analysis

Information regarding the analysis of the area served used in this section can be found in Section 2.4 of this document. The current $PM_{2.5}$ network operated by ADEQ does not cover all of the areas within the boundaries of the state and requires incorporation of additional monitors that are located in adjacent states (Figure 17). A significant portion of the urban areas in the southwestern areas of Arkansas is served by a monitor operated by TCEQ in Texarkana, TX.

3.5.7. Removal Bias Analysis

Information regarding the removal bias analysis used in this section can be found in Section 2.5 of this document. Figure 18 displays four sites that have high negative bias in the $PM_{2.5}$ network: Marion, PARR, DSR, and El Dorado. The mean bias is -0.8913 $\mu g/m^3$ for the Marion site, -0.723 $\mu g/m^3$ for PARR, -0.6353 $\mu g/m^3$ for DSR, and -0.5311 $\mu g/m^3$ for El Dorado. Three sites operated by ADEQ in the $PM_{2.5}$ network have positive bias and could be candidates for removal pending further analyses as well as meeting the minimum number of SLAMS sites. The three sites with positive bias are Stuttgart (mean bias of 0.7307 $\mu g/m^3$), Hot Springs (mean bias of 0.6425 $\mu g/m^3$), and Newport (mean bias of 0.9203 $\mu g/m^3$).

3.5.8. Exceedance Probability Analysis

Information regarding the exceedance probability analysis used in this section can be found in Section 2.6 of this document. Exceedance probability analysis was conducted for the current 24-hour standard (Figure 19). This figure shows that the existing $PM_{2.5}$ network is adequate and no additional monitors are needed for the network in the immediate future.

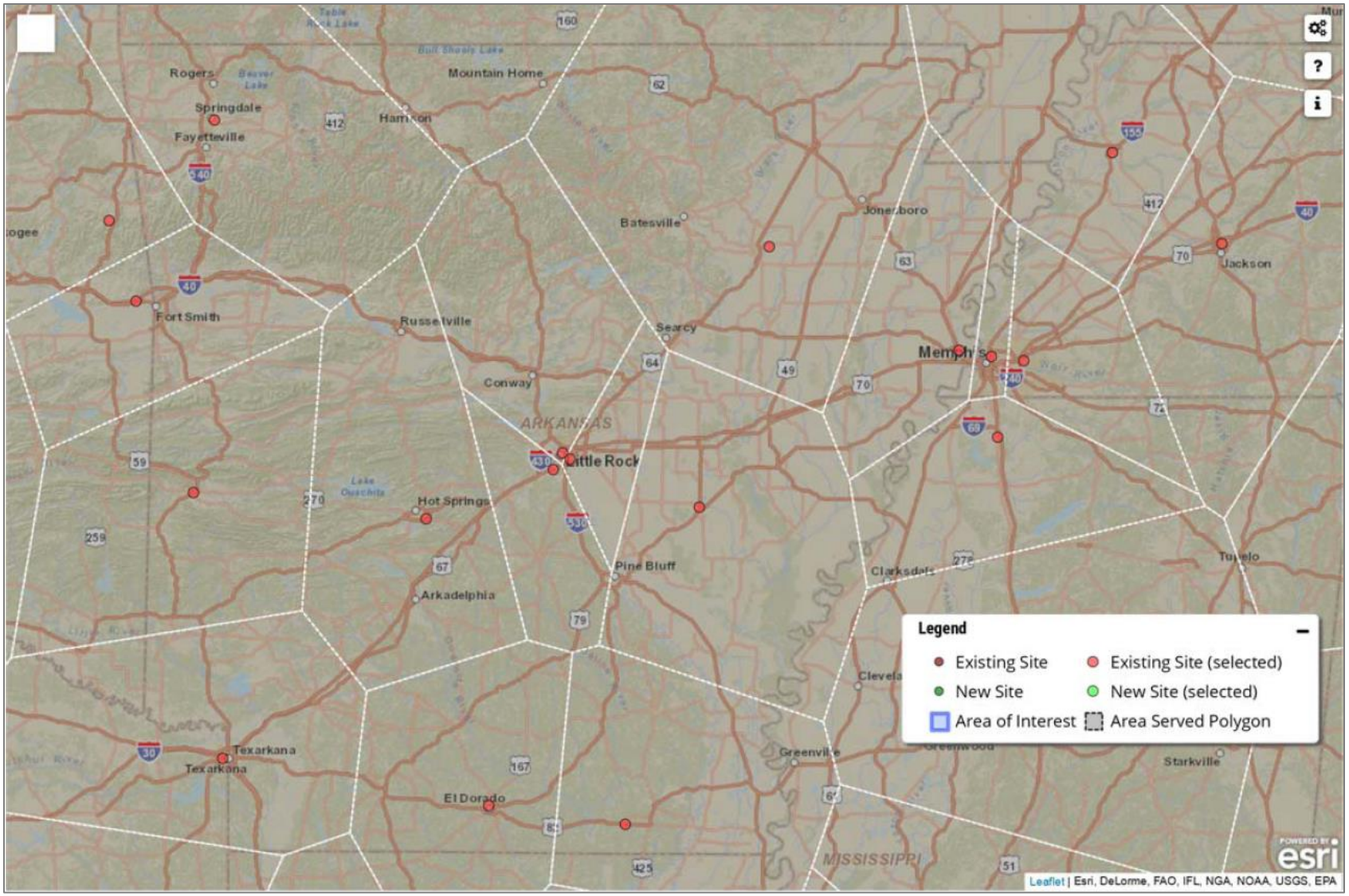


Figure 17. Area Served Analysis for $PM_{2.5}$ Network

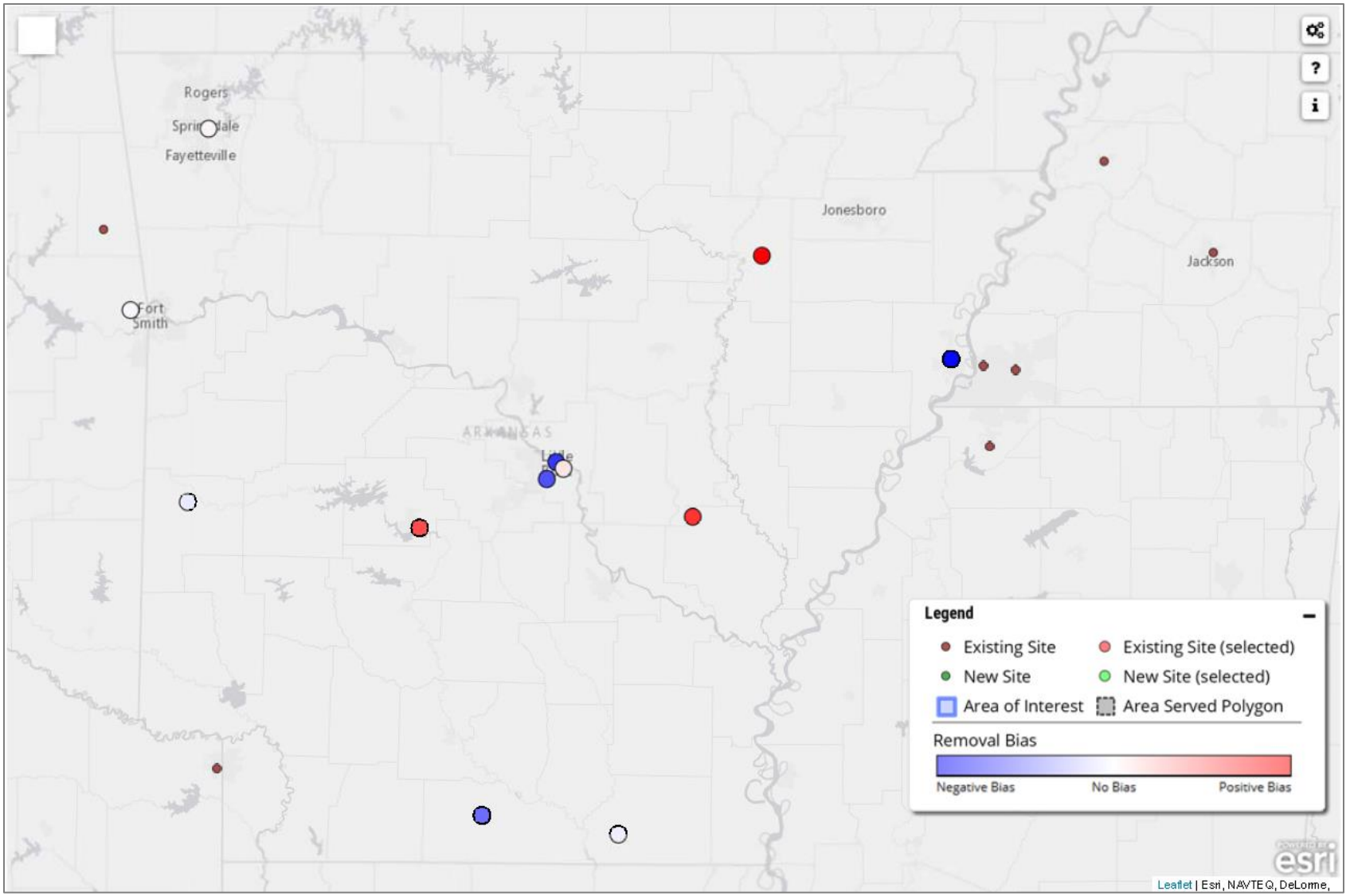


Figure 18. Removal Bias Analysis for ADEQ-Operated $PM_{2.5}$ Monitoring Network

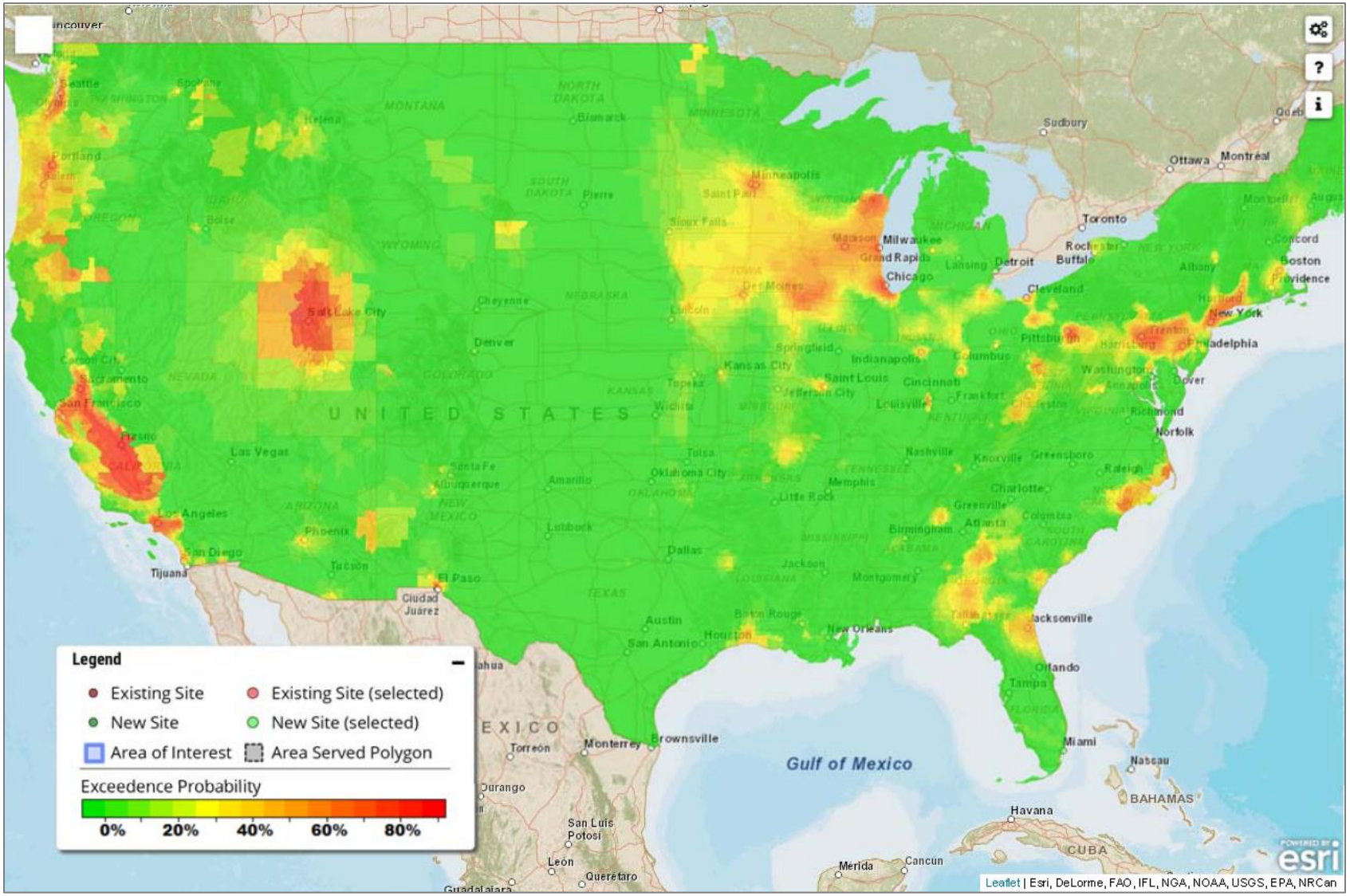


Figure 19. Probability Analysis for the 24-Hour 35 µg/m³ $PM_{2.5}$ Standard

3.6. Lead Network and Waivers

3.6.1. Monitoring Requirement

The monitoring requirement for lead is described in 40 CFR Part 58 Appendix D § 4.5. The requirement states that source-oriented monitoring is required for non-airport sources that emits more than half-a-ton per year in actual emissions. For airport sources, the threshold for source-oriented monitoring is one tpy or more of actual emissions. Lead emissions are to be determined based on either the most recent NEI or other scientifically justifiable methods and data, such as the State EI or the TRI. However, the Regional Administrator may waive this requirement if local agencies can demonstrate that lead sources would not contribute to a maximum lead concentration in excess of 50 percent of the NAAQS.

ADEQ currently does not have any source-oriented monitors for lead as all Arkansas facilities are either (1) below 0.5 tpy of actual emissions, or (2) have active lead waivers. Seven facilities in Arkansas have active waivers:

1. Arkansas Steel Associates, LLC
2. Entergy Arkansas, Inc. (Independence Plant)
3. Entergy Arkansas, Inc. (White Bluff Plant)
4. Georgia Pacific, LLC (Crossett Paper Operations)
5. Gerdau MacSteel (formerly Quanex Corp. - MacSteel Division)
6. Nucor Corporation (Nucor Steel, Arkansas)
7. Nucor-Yamato Steel Company

ADEQ does operate one lead monitor at PARR as part of the NCore program. The lead monitor is a surrogate for elemental lead in total suspended particulate and can only be used to show a violation in the lead NAAQS and cannot be used to show that the lead NAAQS was met. The number of service years for the ADEQ-operated lead monitor is listed in Table 10.

Table 10. Number of Years of Service for Each ADEQ-Operated Pb Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-0007	PARR	Pulaski	12/29/2011	3.5	1

ADEQ does not anticipate terminating the existing lead monitoring sites or adding any additional sites in the near future at the time of assessment; therefore, there should be no impacts on data users or health studies.

3.6.2. Trend Analysis

A historical graph displaying the annual 3-month average maximum values can be found in Figure 20. The lead concentration levels are well below the NAAQS level of 0.15 µg/m^3 since ADEQ started surrogate lead monitoring at PARR in 2011. As stated before, PARR is a surrogate for elemental lead in total suspended particulate; therefore, we can only use the data to show a violation in the lead NAAQS, which did not occur.

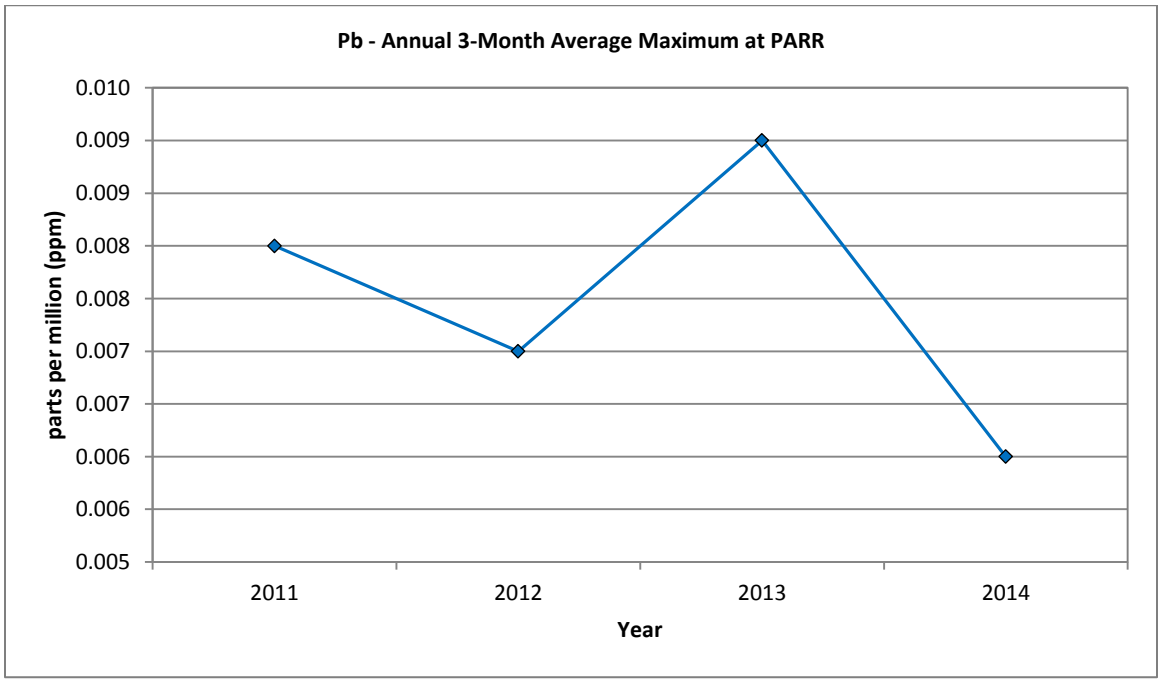


Figure 20. Historical Annual 3-Month Average Maximum for Pb at PARR

3.6.3. Emission Sources

Figure 21 depicts the location of the ADEQ-operated lead monitors along with lead point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

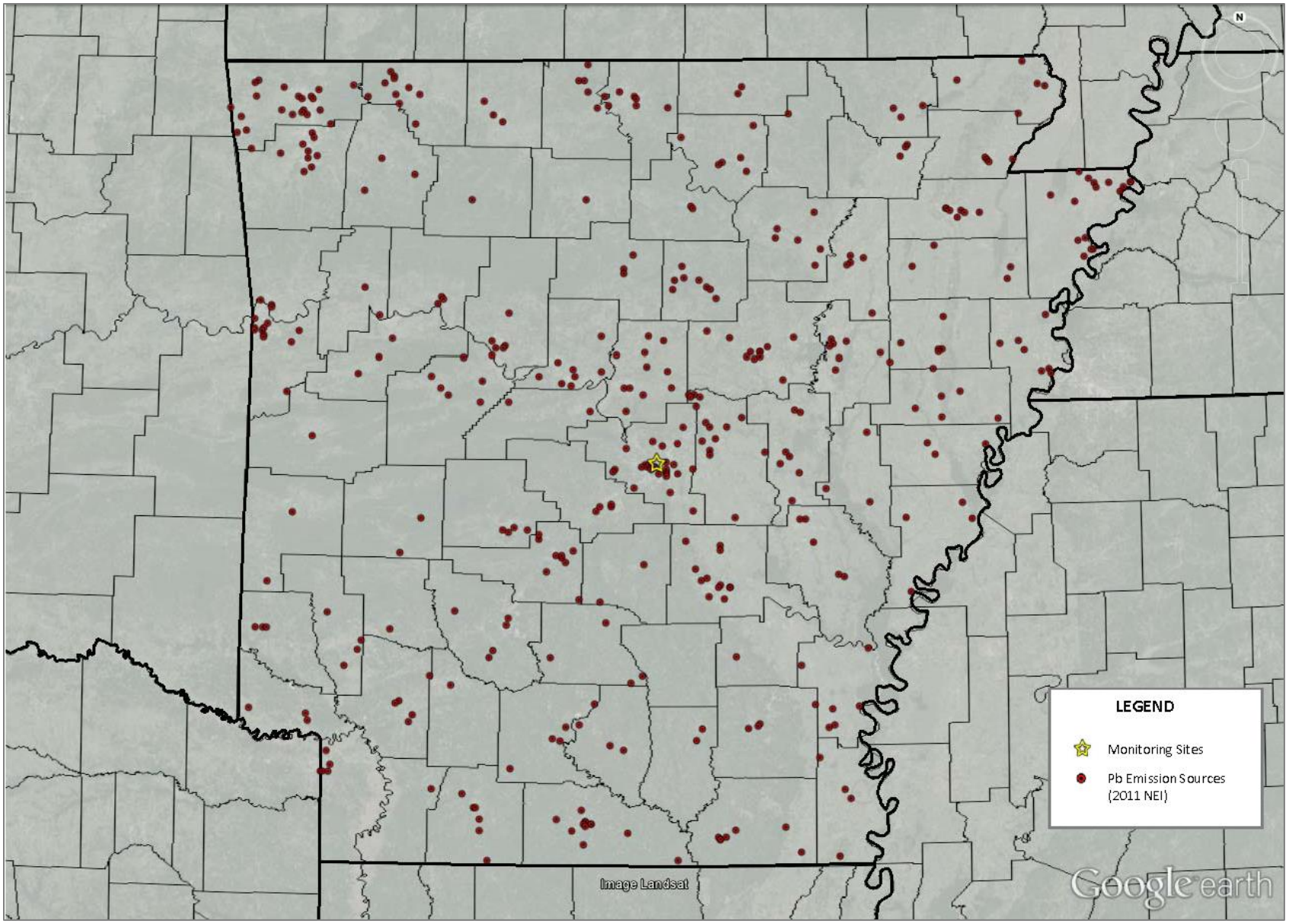


Figure 21. Pb Emission Sources from 2011 NEI

3.6.4. Lead Waiver Renewals

Table 11 details the seven facilities with active lead waivers. Waivers are to be renewed every five years with the Five-Year Network Assessment in accordance with 40 CFR Part 58.10(d). ADEQ is only requesting waiver renewals for two facilities: Entergy Arkansas, Inc. (Independence Plant) and Entergy Arkansas, Inc. (White Bluff Plant). The five other facilities with active waivers have been under the half-a-ton a year threshold that requires either source-oriented monitoring or an active lead waiver, therefore ADEQ is not requesting to renew these waivers as they are no longer needed. In addition, no new facility waivers are being requested. The following pages in this section will list the seven facilities with active lead waivers, detailing the original information provided for the initial waiver request, the latest facility emissions, any new facility modifications, and any additional information that could impact the facility's waiver status.

Table 11. Facilities with Active Lead Waivers and Pb Emissions

EIS #	Facility Name	Lead Emissions (in tpy)			Renewal Request
		2011 NEI	2013 State EI	2013 TRI	
1083611	Arkansas Steel Associates, LLC	0.10	n/a[1]	0.19	No
1083411	Entergy Arkansas, Inc. (Independence Plant)	0.37	1.31	0.16	Yes
893911	Entergy Arkansas, Inc. (White Bluff Plant)	0.37	1.35	0.12	Yes
1091211	Georgia Pacific, LLC (Crossett Paper Operations)	0.08	0.09	0.17	No
976111	Gerdau MacSteel	0.47	n/a[1]	0.05	No
1084511	Nucor Corporation (Nucor Steel, Arkansas)	0.03	0.02	0.02	No
1008911	Nucor-Yamato Steel Company	0.21	0.09	0.09	No

[1] Facility only required to report triennially

Entergy Arkansas, Inc. (Independence Plant)

A lead waiver for Entergy Arkansas, Inc. (Independence Plant) was approved by EPA on January 20, 2011, based on AERMOD modeling results that indicated a maximum three-month average concentration level of 0.03 µg/m^3. A waiver was requested as lead emissions for the facility was at 1.42 tpy based on the 2008 State EI. ADEQ is requesting to renew the lead waiver for the Entergy Arkansas, Inc. (Independence Plant) due to lead emissions level of 1.31 tpy according to the 2013 State EI (Table 11 & Figure 22). There have been no significant changes to the facility or its lead emission level since the initial waiver request; therefore no new modeling was conducted.

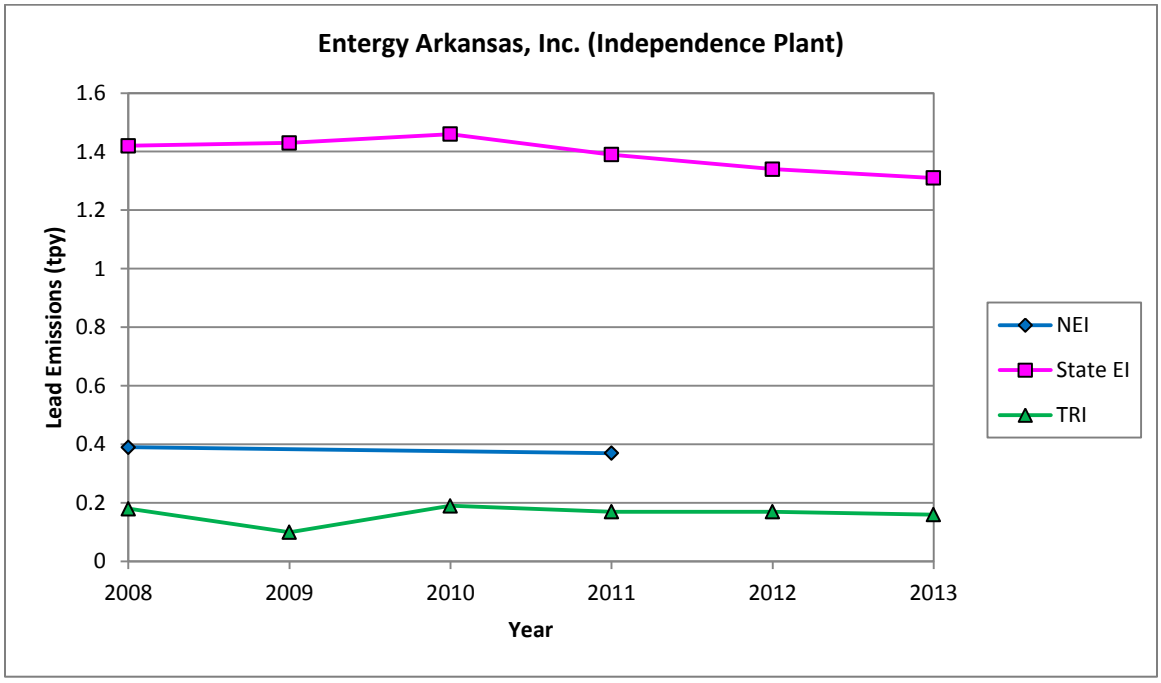


Figure 22. Lead Emissions for Entergy Arkansas, Inc. (Independence Plant)

Entergy Arkansas, Inc. (White Bluff Plant)

A lead waiver was also requested for Entergy Arkansas, Inc. (White Bluff Plant) based on the 2008 State EI level of 1.43 tpy and was subsequently approved by EPA on January 20, 2011. The approval was also based on AERMOD results, which indicated a maximum three-month average concentration level less than 0.01 $\mu g/m^3$. ADEQ is requesting to renew the lead waiver for Entergy Arkansas, Inc. (White Bluff Plant) due to lead emissions level of 1.35 tpy according to the 2013 State EI (Table 11 & Figure 23). There have been no significant changes to the facility or its lead emission level since the initial waiver request; therefore no new modeling was conducted.

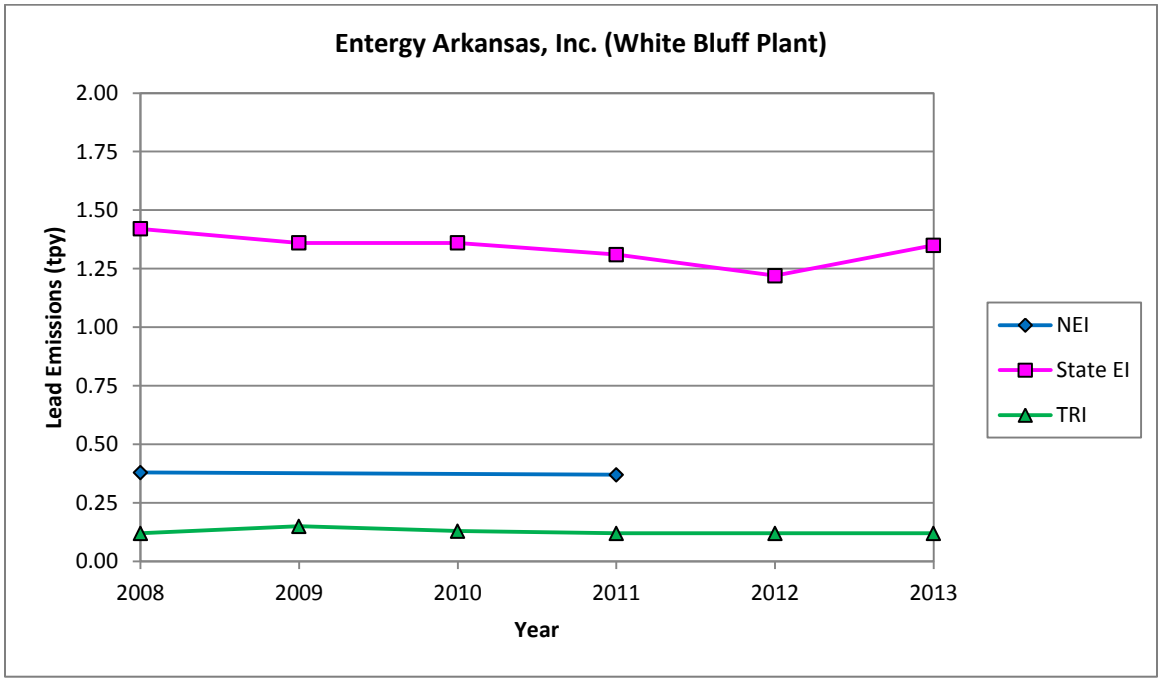


Figure 23. Lead Emissions for Entergy Arkansas, Inc. (White Bluff Plant)

Arkansas Steel Associates, LLC

The 2008 NEI lead emissions for Arkansas Steel Associates, LLC was at 0.91 tpy, which prompted ADEQ to request a waiver for source-oriented lead monitoring in 2011. In the initial waiver request, ADEQ modeled to determine the impact the facility had on ambient lead NAAQS. The AERMOD results indicated that the facility contributed to 30.6 percent of the NAAQS with a maximum three-month average concentration level of 0.046 µg/m^3. The waiver request for the facility was approved on July 13, 2012. ADEQ is not requesting to renew the lead waiver for Arkansas Steel Associates, LLC as it is no longer needed since actual emissions have decreased since the 2008 NEI and emissions have remained below the 0.5 tpy threshold since 2009 (Table 11 & Figure 24). Actual lead emissions used for renewal determination included the 2011 NEI, the 2011 State EI, and the 2013 TRI. Note that the NEI and State EI lines in Figure 24 overlaps with one another.

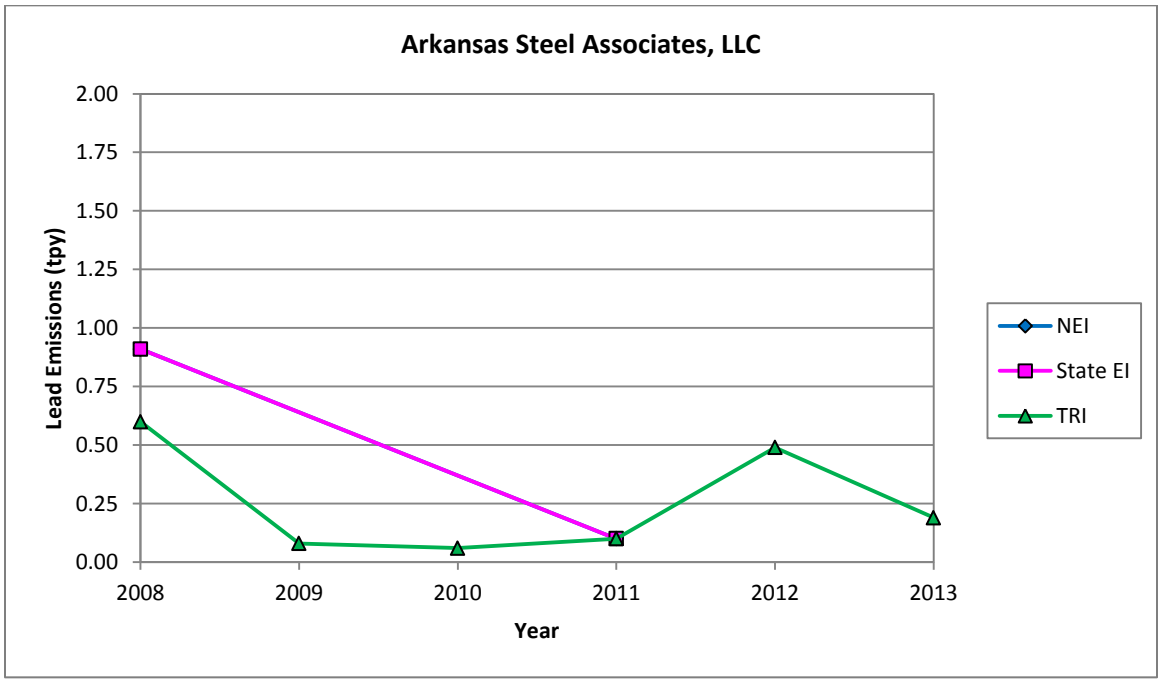


Figure 24. Lead Emissions for Arkansas Steel Associates, LLC

Georgia Pacific, LLC (Crossett Paper Operations)

ADEQ requested a waiver for Georgia Pacific, LLC (Crossett Paper Operations) based on the facility's permitted emission of 23.7 tpy, even though a waiver was not required as the facility had a 2008 NEI lead emission of 0.22 tpy. The waiver request for the facility was approved by EPA on January 20, 2011. ADEQ is not requesting to renew the lead waiver for Georgia Pacific, LLC (Crossett Paper Operations) as it is no longer needed since actual emissions have decreased and emissions have remained below the 0.5 tpy threshold (Table 11 & Figure 25). In addition, the facility permitted emission was reduced to 0.53 tpy. Actual lead emissions used for renewal determination included the 2011 NEI, the 2013 State EI, and the 2013 TRI.

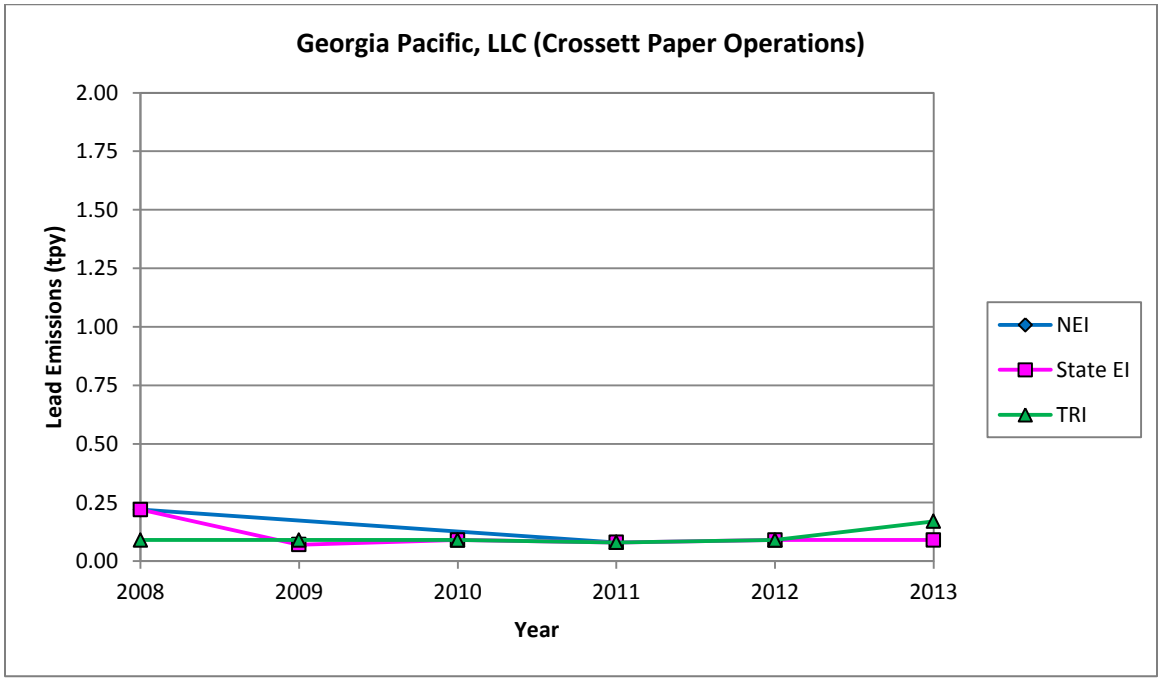


Figure 25. Lead Emissions for Georgia Pacific, LLC (Crossett Paper Operations)

Gerdau MacSteel

Lead waiver was also requested for Gerdau MacSteel, previously Quanex Corp. - MacSteel Division in the initial waiver request, based on the facility's permitted emission of 1.0 tpy. The facility was not required to have an active waiver as lead emission was below the 0.5 tpy threshold at 0.10 tpy according to the 2008 NEI. EPA approved the waiver request for the facility on January 20, 2011. ADEQ is not requesting to renew the lead waiver for Gerdau MacSteel as it is no longer needed due to actual emissions remaining below the 0.5 tpy threshold (Table 11 & Figure 26). Actual lead emission was determined using the 2011 NEI, the 2011 State EI, and the 2013 TRI. Note that the NEI and State EI lines in Figure 26 overlaps with one another.

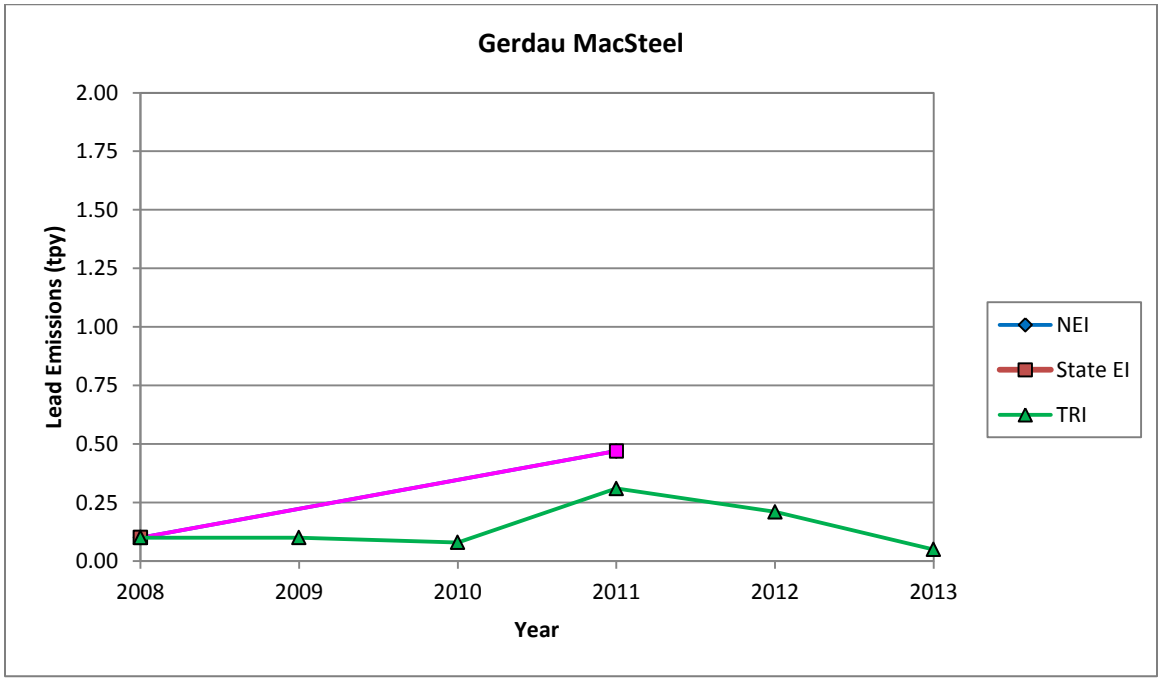


Figure 26. Lead Emissions for Gerdau MacSteel

Nucor Corporation (Nucor Steel, Arkansas)

A lead waiver request for Nucor Corporation (Nucor Steel, Arkansas) was based on the facility's permitted lead emission of 3.59 tpy. The facility was not required to have a waiver as actual emission at the time of the initial waiver request was 0.02 tpy, below the 0.5 tpy threshold. The waiver was approved on January 20, 2011. ADEQ is not requesting to renew the lead waiver for Nucor Corporation (Nucor Steel, Arkansas) as it is no longer needed due to actual emissions remaining below the 0.5 tpy threshold (Table 11 & Figure 27). Lead emissions used for renewal determination included the 2011 NEI, the 2013 State EI, and the 2013 TRI.

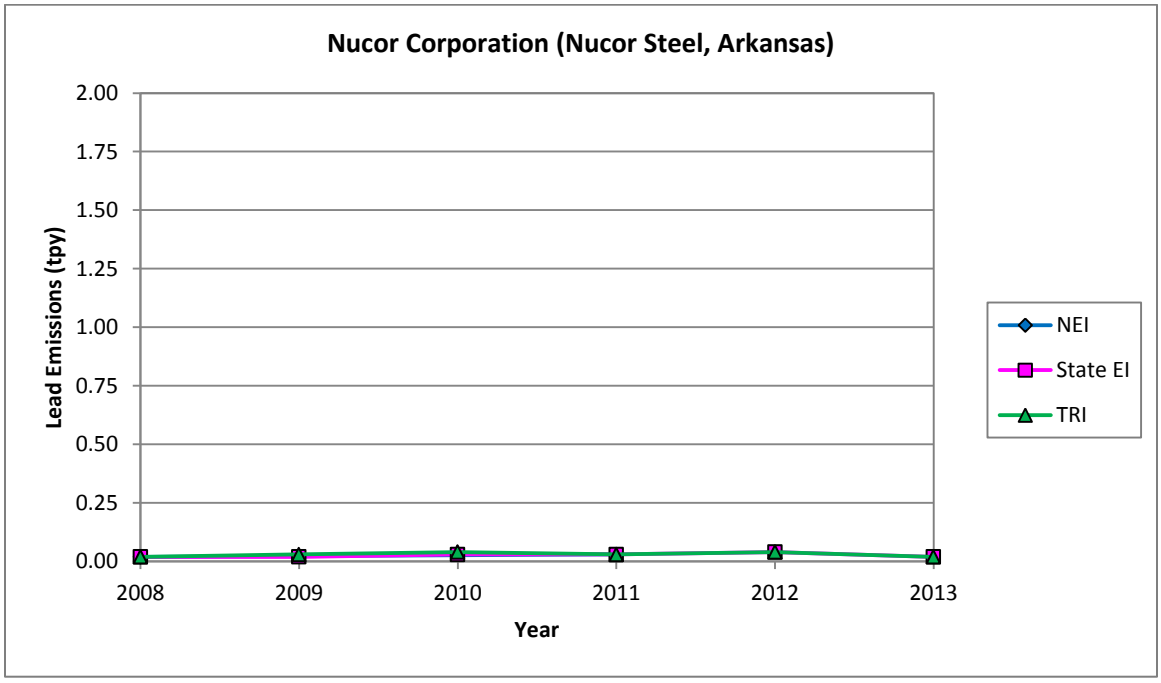


Figure 27. Lead Emissions for Nucor Corporation (Nucor Steel, Arkansas)

Nucor-Yamato Steel Company

ADEQ is not requesting a waiver renewal for Nucor-Yamato Steel Company, as a waiver is no longer needed due to actual emissions remaining below the 0.5 tpy threshold (Table 11 & Figure 28). Lead emissions were determined from the 2011 NEI, the 2013 State EI, and the 2013 TRI. ADEQ submitted the initial waiver request for the facility based on the permitted emission level of 2.2 tpy and was subsequently approved on January 20, 2011; however, the facility was not required to have a waiver as actual emission at the time of the waiver request was at 0.10 tpy according to the 2008 NEI.

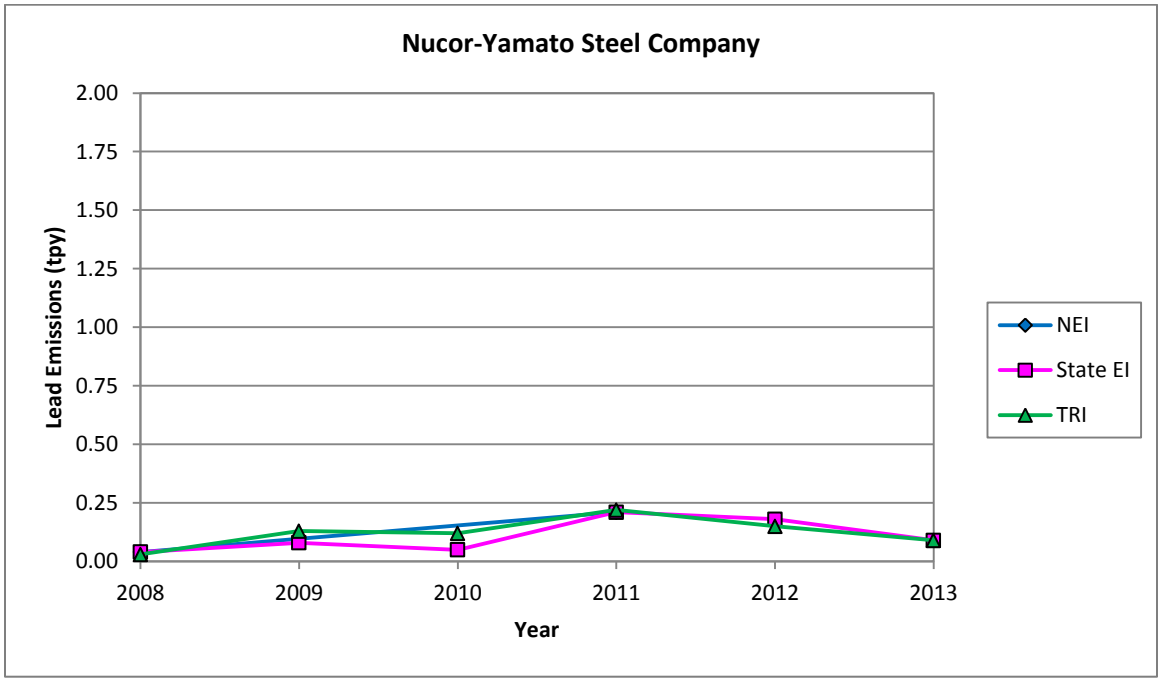


Figure 28. Lead Emissions for Nucor-Yamato Steel Company

3.7. Carbon Monoxide Network

3.7.1. Monitoring Requirement

The monitoring requirement for carbon monoxide is described in 40 CFR Part 58 Appendix D § 4.2. One carbon monoxide monitor is required to operate collocated with a near-road NO_2 monitor in CBSAs with a population of 1,000,000 or greater. In addition, the Regional Administrator, in collaboration with the states, may require additional carbon monoxide monitors above this requirement.

ADEQ currently operates one carbon monoxide monitor at site PARR, which is the required trace CO monitor for NCore monitoring. The requirement for collocation of a carbon monoxide monitor at the near-road NO_2 site for the Memphis, TN-MS-AR MSA is addressed by Shelby County Health Department (47-157-0100). In addition, Shelby County Health Department operates two other carbon monoxide monitors in the Memphis, TN-MS-AR MSA (47-157-0024 and 47-157-0075). The number of service years for the ADEQ-operated $PM_{2.5}$ monitor is listed in Table 12.

Table 12. Number of Years of Service for the CO Monitor at PARR

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-0007	PARR	Pulaski	01/01/2007	8.4	1

ADEQ does not anticipate terminating the existing carbon monoxide monitoring sites or adding any additional sites in the near future at the time of assessment; therefore, there should be no impacts on data users or health studies.

3.7.2. Trend Analysis

A historical graph displaying the annual second maximum at PARR for both the one-hour and eight-hour standard can be found in Figure 29.

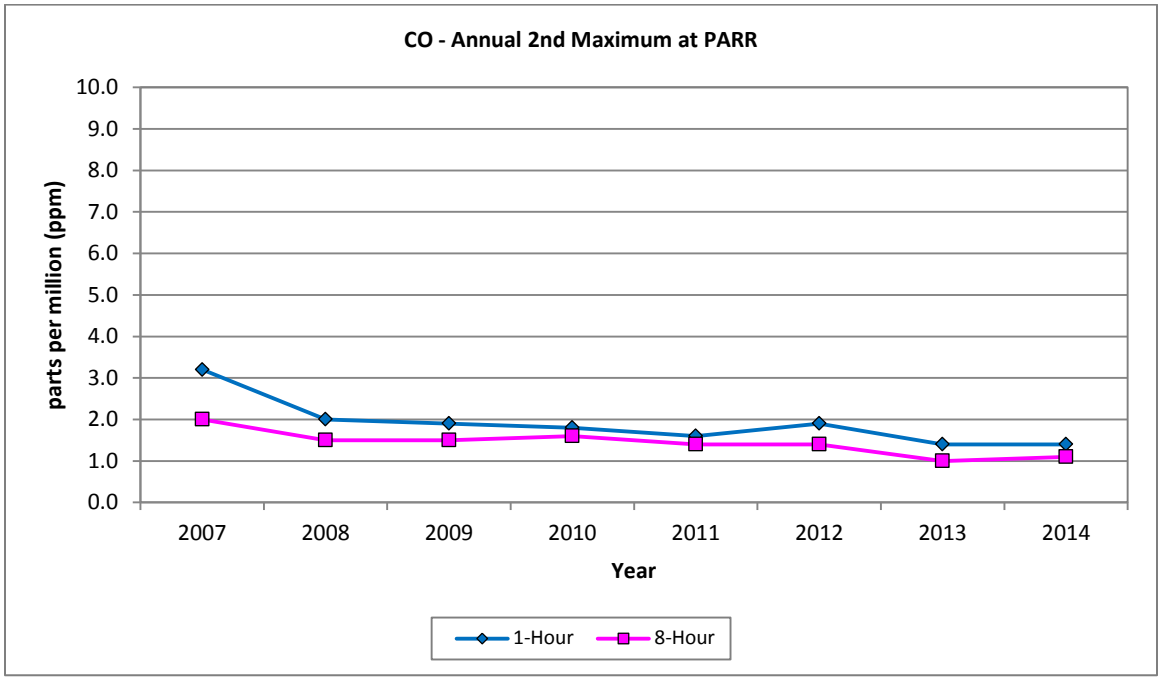


Figure 29. Historical Annual 2nd Maximum for Both Primary CO Standard at PARR

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For carbon monoxide, the design value for the one-hour standard is the highest annual second-maximum non-overlapping one-hour concentration during the most recent two years; the design value for the eight-hour standard is the highest second-maximum non-overlapping eight-hour concentration during the most recent two years. The last five years' worth of design values can be found in Table 13. For both standards, historically the design value has been well below the standards. The latest design values at PARR are 4 percent of the one-hour NAAQS level of 35 ppm and 12.2 percent of the eight-hour NAAQS level of 9 ppm. ADEQ anticipates the design values to remain near these levels and will not be a major issue for Arkansas.

Table 13. Last Five Design Values for the CO NAAQS at PARR

	Design Value (in ppm)				
CO NAAQS Standard	**2010**	**2011**	**2012**	**2013**	**2014**
1-Hour Standard	1.9	1.8	1.9	1.9	1.4
8-Hour Standard	1.6	1.6	1.4	1.4	1.1

3.7.3. Emission Sources

Figure 30 depicts the location of the ADEQ-operated carbon monoxide monitors along with carbon monoxide point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

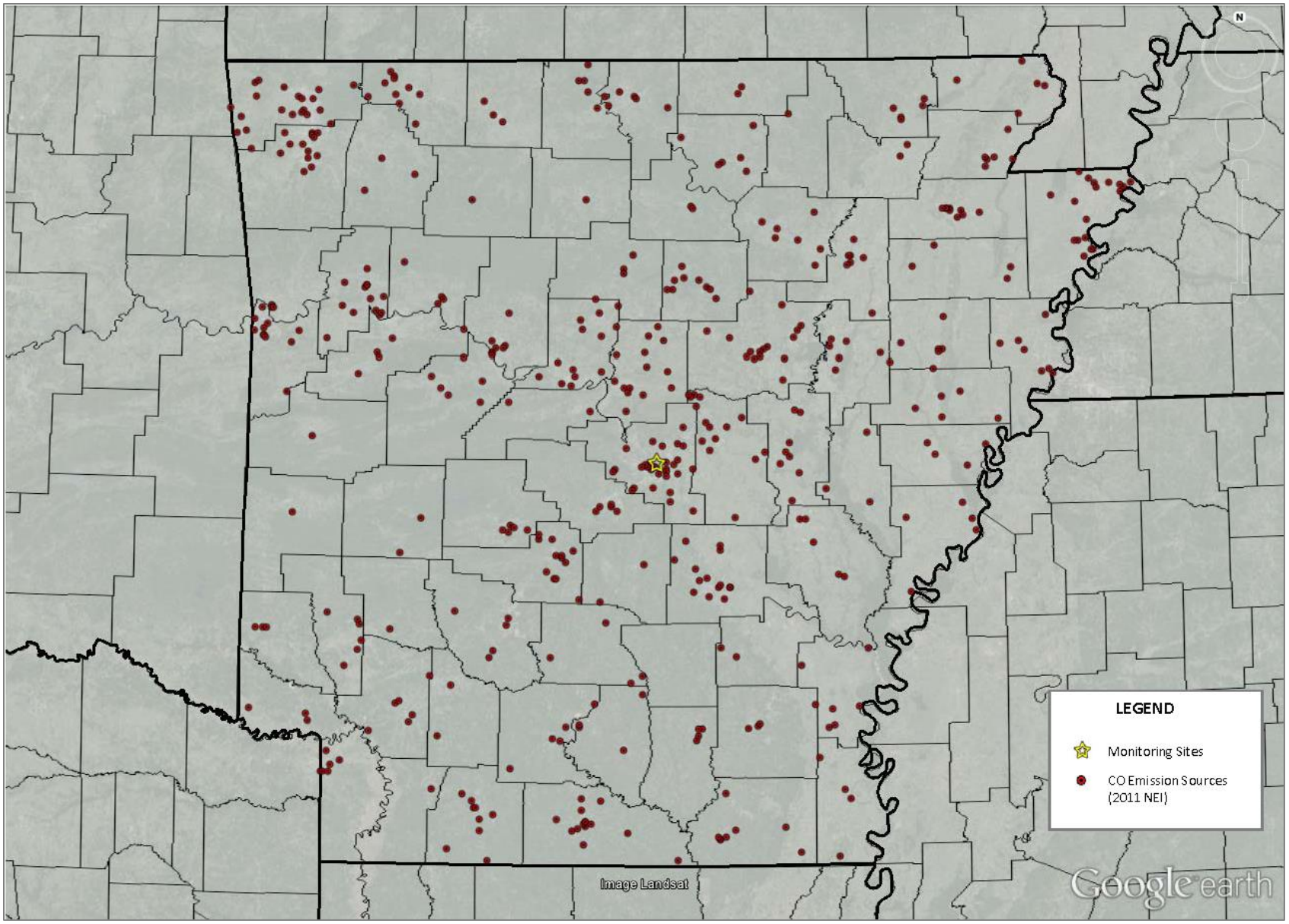


Figure 30. CO Emission Sources from 2011 NEI

3.8. Nitrogen Dioxide Network

3.8.1. Monitoring Requirement

The monitoring requirement for NO_2 is described in 40 CFR Part 58 Appendix D § 4.3. A microscale near-road NO_2 monitor is required in each CBSA with a population of 500,000 or more based on the latest Census. An additional near-road NO_2 monitor is required if one of the following criteria is met: (1) CBSA population of 2,500,000 or more, or (2) CBSA population of 500,000 or more and a road segment with an annual average daily traffic (AADT) count of 250,000 or more. In addition, area-wide NO_2 monitoring is required in CBSA with a population of 1,000,000 or more. The Regional Administrator may also require additional NO_2 monitoring to focus to meet the forty additional NO_2 monitoring stations nationwide with an objective to protect susceptible and vulnerable populations.

There are two NO_2 sites in Arkansas operated by ADEQ: PARR and Marion. The Marion monitor operated by ADEQ was approved by EPA Region 6 to fulfill the area-wide requirement for the Memphis, TN-MS-AR MSA. Area-wide requirement is determined by population size of the CBSA. The PARR site meets the criteria for the RA-40 national requirement for susceptible and vulnerable populations as listed in 40 CFR Part 58 Appendix D § 4.3.4. The PARR site also measures NO/NO_y as part of the NCore requirements. There is also an NO_2 monitor operated by Cherokee Nation that covers the Fort Smith, AR-OK MSA (40-135-9021). The number of service years for each ADEQ-operated NO_2 monitor is listed in Table 14.

Table 14. Number of Years of Service for Each ADEQ-Operated NO_2 Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-0007	PARR	Pulaski	01/01/2002	13.4	1
05-035-0005	Marion	Crittenden	04/01/2005	10.2	2

ADEQ anticipates adding a near-road NO_2 monitor for the Little Rock-North Little Rock-Conway, AR MSA, which will be address by ADEQ in the next annual network plan since the near-road NO_2 monitors are not required to be operational until January 1, 2017. The Fayetteville-Springdale-Rogers, AR-MO MSA may be required to have a near-road NO_2 monitor in the near future as the population continues to grow. ADEQ does not anticipate requesting to terminate any NO_2 monitoring sites in the near future at the time of this assessment; therefore, there should be no impacts on data users or health studies.

3.8.2. Trend Analysis

A historical graph displaying the 98th percentile of one-hour daily maximum NO_2 concentration for the one-hour standard and annual mean for the annual standard for monitoring sites PARR and Marion can be found in Figure 31.

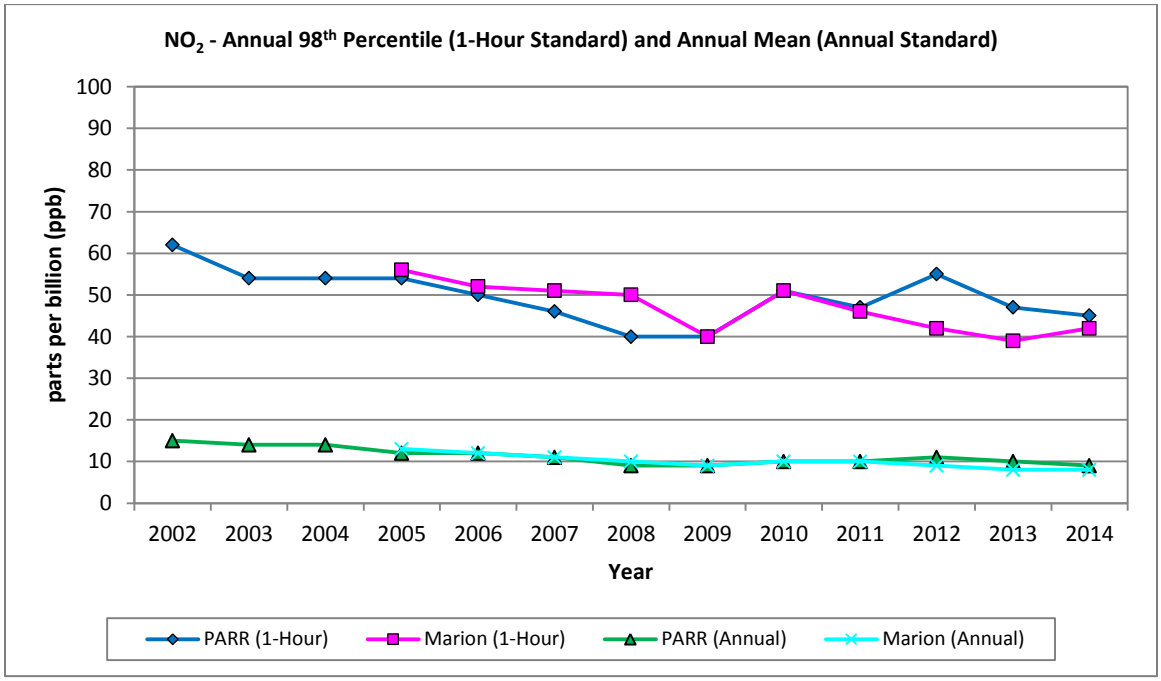


Figure 31. Historical Annual 98th Percentile and Mean for ADEQ-Operated NO_2 Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For NO_2, the design value for the one-hour standard is the 98th percentile of one-hour daily maximum NO_2 concentrations averaged over three years; the design value for the annual standard is the annual mean. The last five years' worth of design values can be found in Table 15. Historically the design values have been well below both the one-hour standard of 100 ppb and the annual standard of 0.053 ppm. ADEQ anticipates the design values to remain near these levels and will not be a major issue for Arkansas.

Table 15. Last Five Design Values for the NO_2 NAAQS at ADEQ-Operated Sites

		1-Hour Design Value (in ppb)					Annual Design Value (in ppb)				
AQS ID	**Site Name**	**2010**	**2011**	**2012**	**2013**	**2014**	**2010**	**2011**	**2012**	**2013**	**2014**
05-119-0007	PARR	44	46	51	50	49	10	10	11	10	9
05-035-0005	Marion	47	46	46[1]	42[1]	41[1]	10	10	9[1]	8	8

[1] Design value not valid

3.8.3. Emission Sources

Figure 32 depicts the location of the ADEQ-operated NO_2 monitors along with NO_X point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

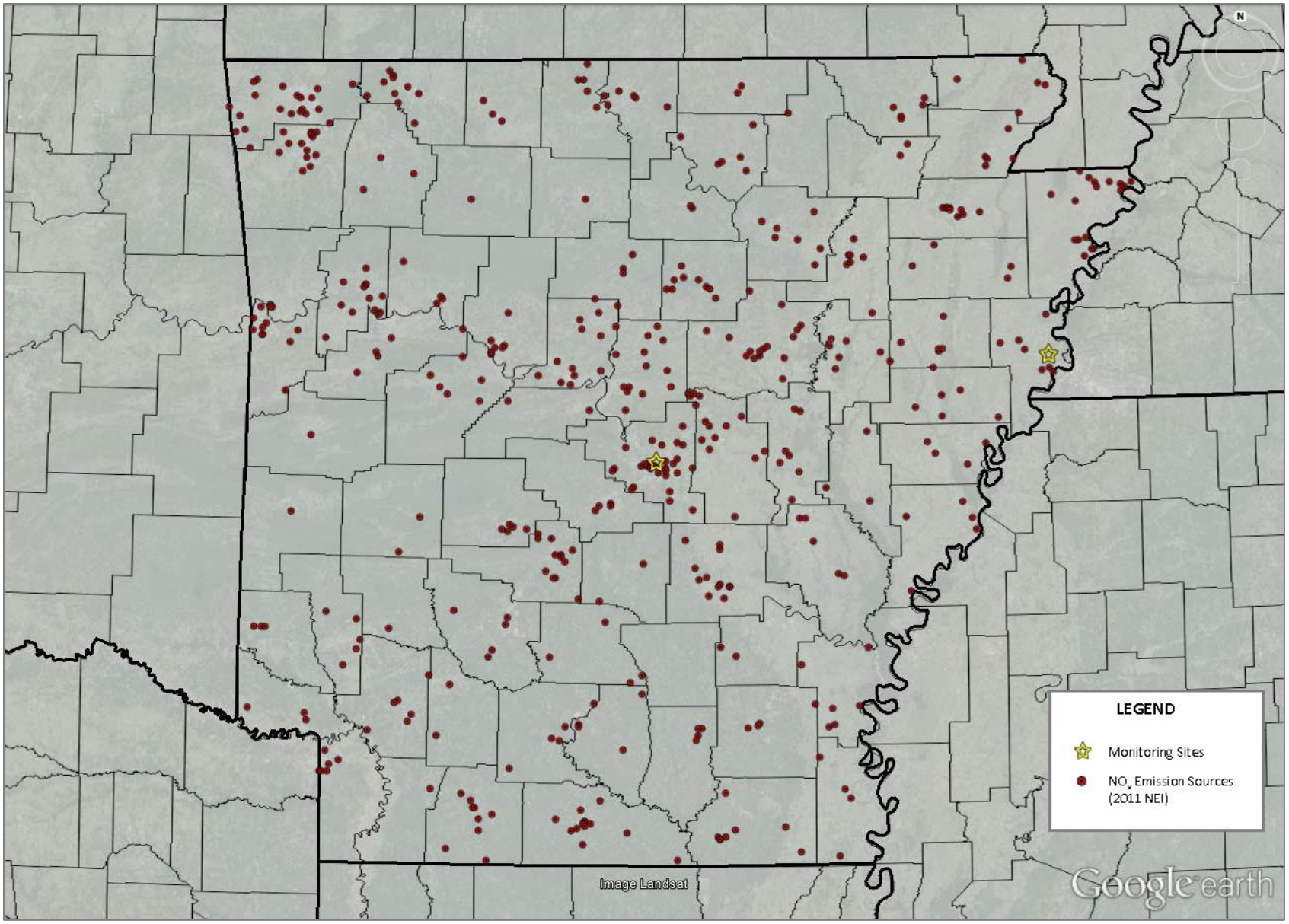


Figure 32. NO_X Emission Sources from 2011 NEI

3.9. PM_{10} Network

3.9.1. Monitoring Requirement

The monitoring requirement for PM_{10} is listed in Table D-4 of 40 CFR Part 58 Appendix D § 4.6, and is reproduced in Table 16. The number of sites required in the network is based on the MSA population from the latest decennial Census and most recent design value for the MSA.

Table 16. SLAMS PM_{10} Monitoring Requirements (Reproduction of Table D-4)

Population Category	High Concentration[1,2]	Medium Concentration[1,3]	Low Concentration[1,4,5]
>1,000,000	6–10	4–8	2–4
500,000 – 1,000,000	4–8	2–4	1–2
250,000 – 500,000	3–4	1–2	0–1
100,000 – 250,000	1–2	0–1	0

[1] Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency
[2] High concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding the PM_{10} NAAQS by 20 percent or more
[3] Medium concentration areas are those for which ambient PM_{10} data show ambient concentrations exceeding 80 percent of the PM_{10} NAAQS
[4] Low concentration areas are those for which ambient PM_{10} data show ambient concentrations less than 80 percent of the PM_{10} NAAQS
[5] These minimum monitoring requirements apply in the absence of a design value

Based on the latest decennial Census and the 2014 PM_{10} design values, the following two MSAs are required to have PM_{10} monitors: (1) Little Rock-North Little Rock-Conway, AR MSA and (2) Memphis, TN-MS-AR MSA.

ADEQ is operating two PM_{10} monitoring sites, both operating in the Little Rock-North Little Rock-Conway, AR MSA. The PARR site also has a collocated PM_{10} monitor operating. The two PM_{10} sites in the Memphis, TN-MS-AR MSA are operated by Shelby County Health Department as part of their monitoring network (47-157-0016 and 47-157-0024). There is also a PM10 monitor operated by Cherokee Nation that covers the Fort Smith, AR-OK MSA (40-135-9021). The number of service years for each ADEQ-operated PM_{10} monitor is listed in Table 17.

Table 17. Number of Years of Service for Each ADEQ-Operated PM_{10} Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-119-1007	VA Hospital	Pulaski	01/01/1988	27.4	1
05-119-0007	PARR	Pulaski	03/10/2000	15.3	2

ADEQ anticipates that the Fayetteville-Springdale-Rogers, AR-MO MSA will exceed the 500,000 threshold by the next decennial Census in 2020 and may require a PM_{10} monitor at that time. No existing PM_{10} monitoring sites are anticipated to be discontinued at the time of this assessment; therefore, there should be no impacts on data users or health studies.

3.9.2. Trend Analysis

A historical graph displaying the annual 24-hour average maximum PM_{10} concentration is displayed in Figure 33.

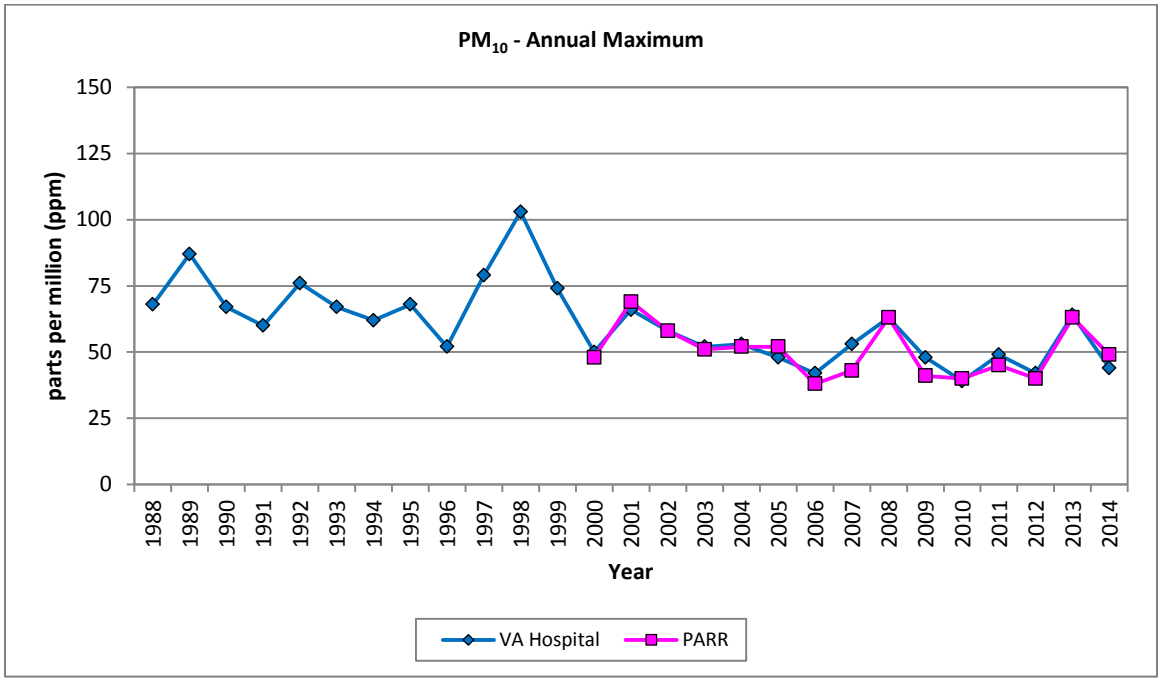


Figure 33. Historical Annual Maximum for ADEQ-Operated PM_{10} Monitors

In order to compare to the NAAQS to determine compliance, the average estimated number of exceedances over the most recent three years has to be calculated. Calculations instructions for the average number of exceedance can be found in 40 CFR Part 50 Appendix K § 3.1. Violation of the NAAQS is when the average estimated number of exceedance is more than one per year. The last five years' worth of design values can be found in Table 18. ADEQ anticipates the design values to remain near these levels and will not be a major issue for Arkansas.

Table 18. Last Five Estimated Exceedances for the PM_{10} NAAQS at ADEQ-Operated Sites

		Average Estimated Exceedance				
AQS ID	**Site Name**	**2010**	**2011**	**2012**	**2013**	**2014**
05-119-0007	PARR	0	0	0	0	0
05-119-1007	VA Hospital	0[1]	0[1]	0	0	0

[1] Average estimated exceedance value not valid

3.9.3. Emission Sources

Figure 34 depicts the location of the ADEQ-operated PM_{10} monitors along with PM_{10} point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

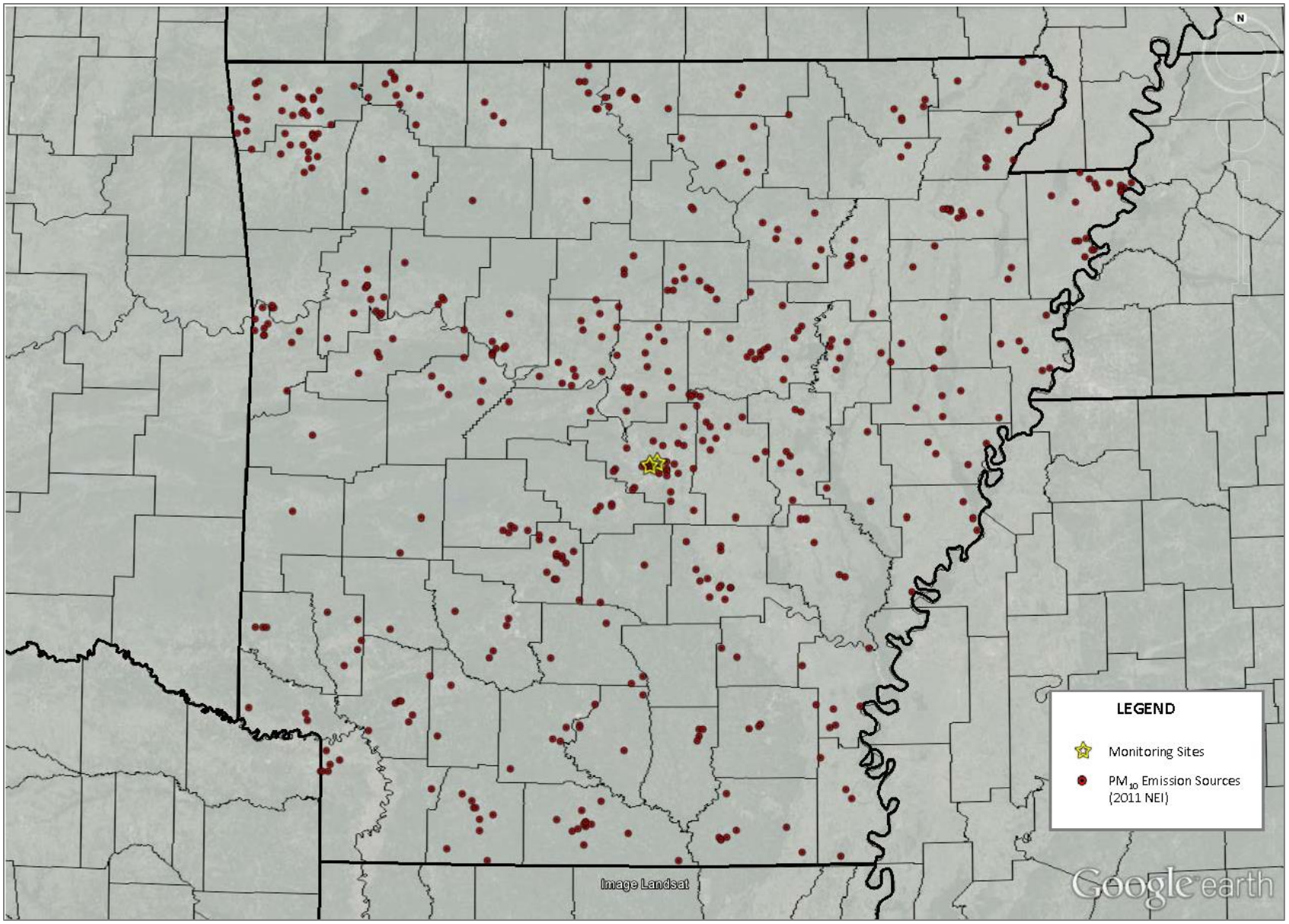


Figure 34. PM_{10} Emission Sources from 2011 NEI

3.10. Sulfur Dioxide Network

3.10.1. Monitoring Requirement

The monitoring requirements for SO_2 monitors are based on the PWEI threshold as determined by 40 CFR Part 58 Appendix D § 4.4.2. One SO_2 monitor is required for a PWEI between 5,000 and 100,000, two SO_2 monitors are required for a PWEI between 100,000 and 1,000,000, and, three SO_2 monitors are required for PWEI greater than 1,000,000. The PWEI is calculated by multiplying the CBSA population by the total amount of SO_2 in tpy emitted within the CBSA and dividing the product by 1,000,000. The CBSA population is from the latest Census or estimate and emissions data is from the most recent NEI. The calculated PWEI for each Arkansas CBSA is displayed in Table 19.

Table 19. Calculated PWEI for Arkansas CBSAs

Core Based Statistical Area (CBSA)	2014 Estimate	SO_2 Emissions (tpy)	PWEI
Arkadelphia, AR	22,576	215	5
Batesville, AR	36,959	34,008	1,257
Blytheville, AR	44,235	3,696	164
Camden, AR	30,030	166	5
El Dorado, AR	40,227	398	16
Fayetteville-Springdale-Rogers, AR-MO	501,653	9,020	4,525
Forrest City, AR	26,899	100	3
Fort Smith, AR-OK	279,592	4,269	1,193
Harrison, AR	45,100	182	8
Helena-West Helena, AR	19,930	189	4
Hot Springs, AR	97,322	85	8
Jonesboro, AR	126,764	302	38
Little Rock-North Little Rock-Conway, AR	729,135	648	473
Magnolia, AR	23,933	1,589	38
Malvern, AR	33,368	133	4
Memphis, TN-MS-AR	1,343,230	21,205	28,483
Mountain Home, AR	40,857	242	10
Paragould, AR	43,694	76	3
Pine Bluff, AR	94,716	33,791	3,201
Russellville, AR	85,152	387	33
Searcy, AR	78,592	122	10
Texarkana, TX-Texarkana, AR	149,235	2,444	365

The required SO_2 monitor in the Memphis CBSA is operated by Shelby County Health Department as part of their monitoring network (47-157-0075). ADEQ operates two SO_2 monitors at site El Dorado and site PARR. The trace SO_2 monitor at PARR is operational due to NCore requirements. The number of service years for each ADEQ-operated SO_2 monitor is listed in Table 20.

Table 20. Number of Years of Service for Each ADEQ-Operated SO_2 Monitor

AQS ID	Site Name	County	Monitor Start Date	Service Years	Rank
05-139-0006	El Dorado	Union	07/01/1981	33.9	1
05-119-0007	PARR	Pulaski	01/01/2002	13.4	2

Additional SO_2 monitors maybe required in the future, pending ADEQ's decision on modeling versus monitoring for the 2010 one-hour NAAQS. Source-oriented monitors are not required to be operational until January 1, 2017, according to the finalized SO_2 Data Requirements Rule. ADEQ does not anticipate requesting to terminate any SO_2 monitoring sites in the near future at the time of this assessment; therefore, there should be no impacts on data users or health studies.

3.10.2. Trend Analysis

A historical graph displaying the annual 99th percentile for SO_2 concentration is displayed in Figure 35.

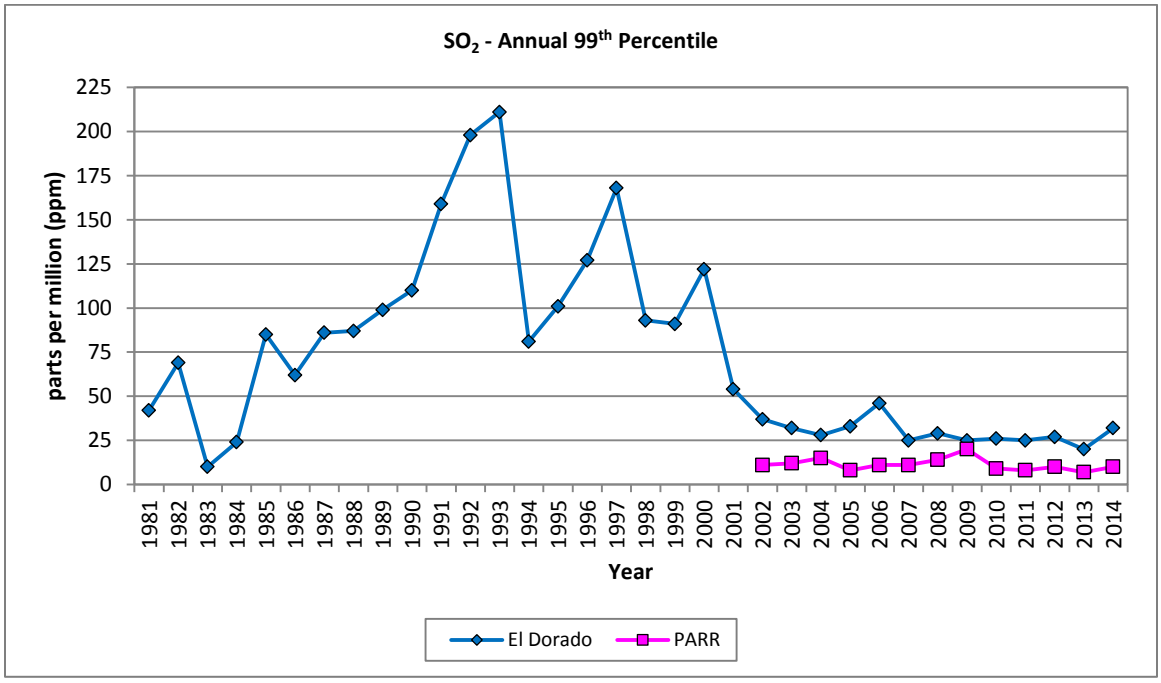


Figure 35. Historical Annual 99th Percentile for ADEQ-Operated SO_2 Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For SO_2, the design value for the one-hour standard is the 99th percentile of one-hour daily maximum SO_2 concentrations averaged over three years. The last five years' worth of design values can be found in Table 21. Historically the design values have been well below both the one-hour standard of 75 ppb. ADEQ anticipates the design values to remain near these levels and will not be a major issue for Arkansas.

Table 21. Last Five Design Values for the SO_2 NAAQS at ADEQ-Operated Sites

		1-Hour Standard Design Value				
AQS ID	**Site Name**	**2010**	**2011**	**2012**	**2013**	**2014**
05-119-0007	PARR	14	12	9	8	9
05-139-0006	El Dorado	27	25	26	24	27

3.10.3. Emission Sources

Figure 36 depicts the location of the ADEQ-operated SO_2 monitors along with SO_2 point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

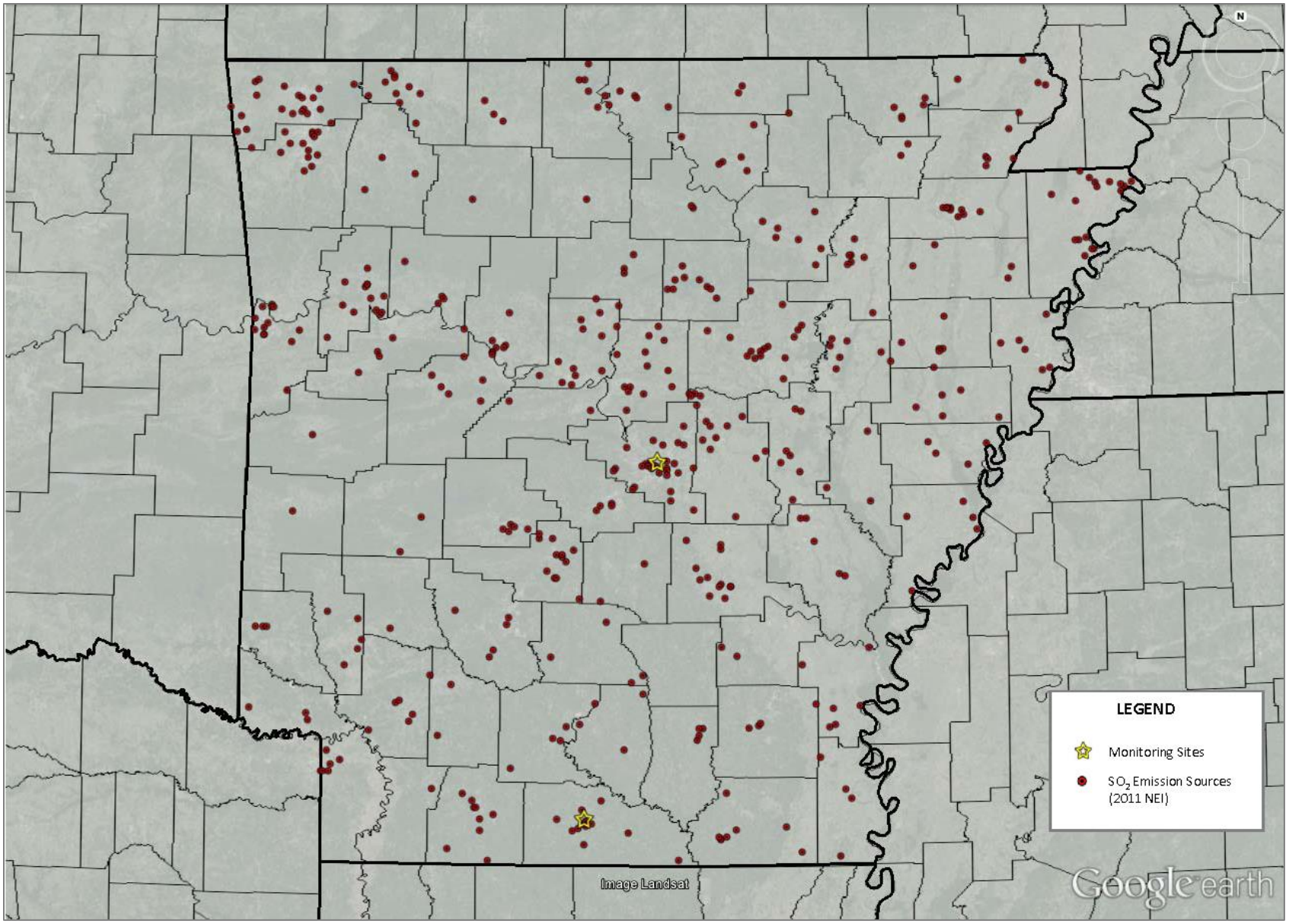


Figure 36. SO_2 Emission Sources from 2011 NEI

4. Conclusion

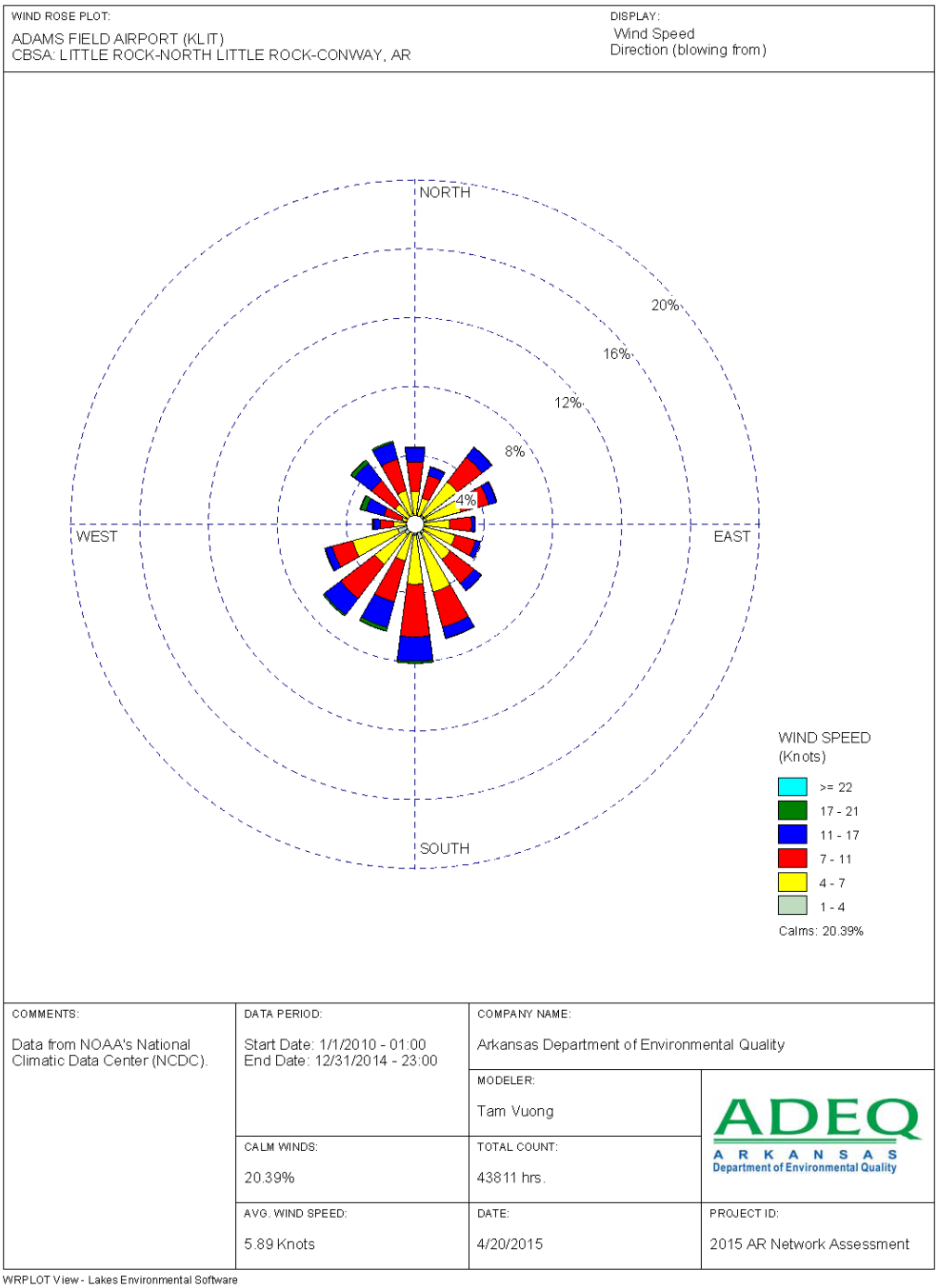
Data from ADEQ's ambient air network complies with all applicable siting requirements and is available for NAAQS compliance determination. All data are validated and uploaded to EPA's AQS database. These data may be used for emissions strategy development, developments of attainment and maintenance plans, and tracking trends in air pollution control measures. In addition, data from the network can be used by researchers working on health effects assessment as these data are available to the public.

The highest priority for ADEQ in regards to the ambient air network is the ozone and $PM_{2.5}$ network as both ozone and $PM_{2.5}$ have remained near the current NAAQS at several monitoring sites in the past five years. The existing monitoring network is sufficient to adequately characterize and evaluate air quality in Arkansas. ADEQ will continually evaluate the need for additional monitoring.

Appendix

Appendix 1. Wind-rose Plots

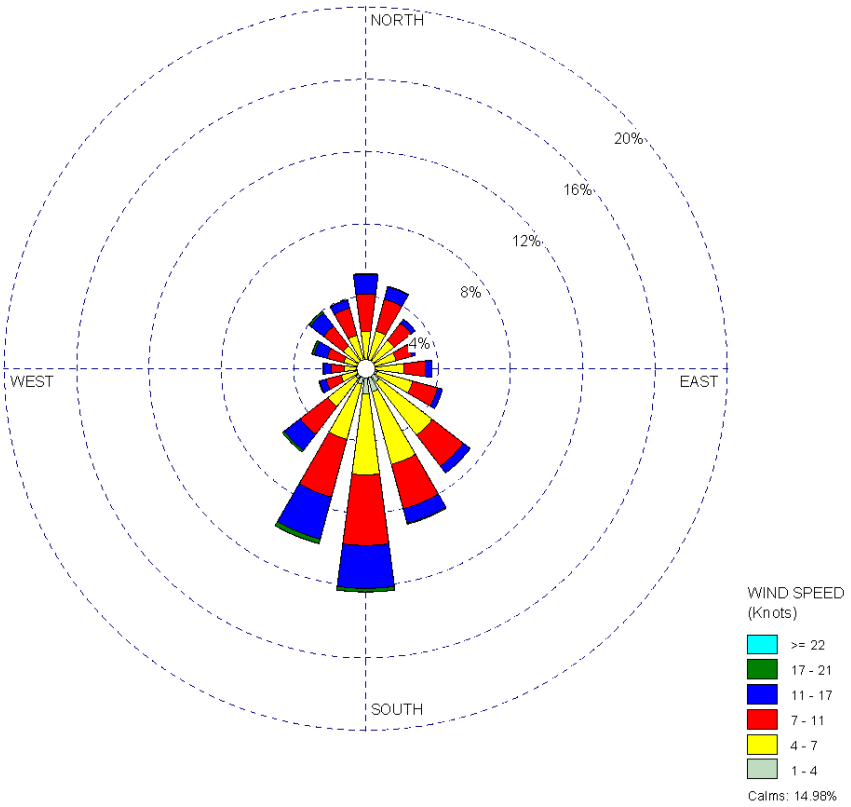
Adams Field Airport (KLIT)



Bentonville Municipal Airport – Louise M. Thaden Field (KVBT)

WIND ROSE PLOT:
BENTONVILLE MUNICIPAL AIRPORT - LOUISE M THADEN FIELD (KVBT)
CBSA: FAYETTEVILLE-SPRINGDALE-ROGERS, AR-MO

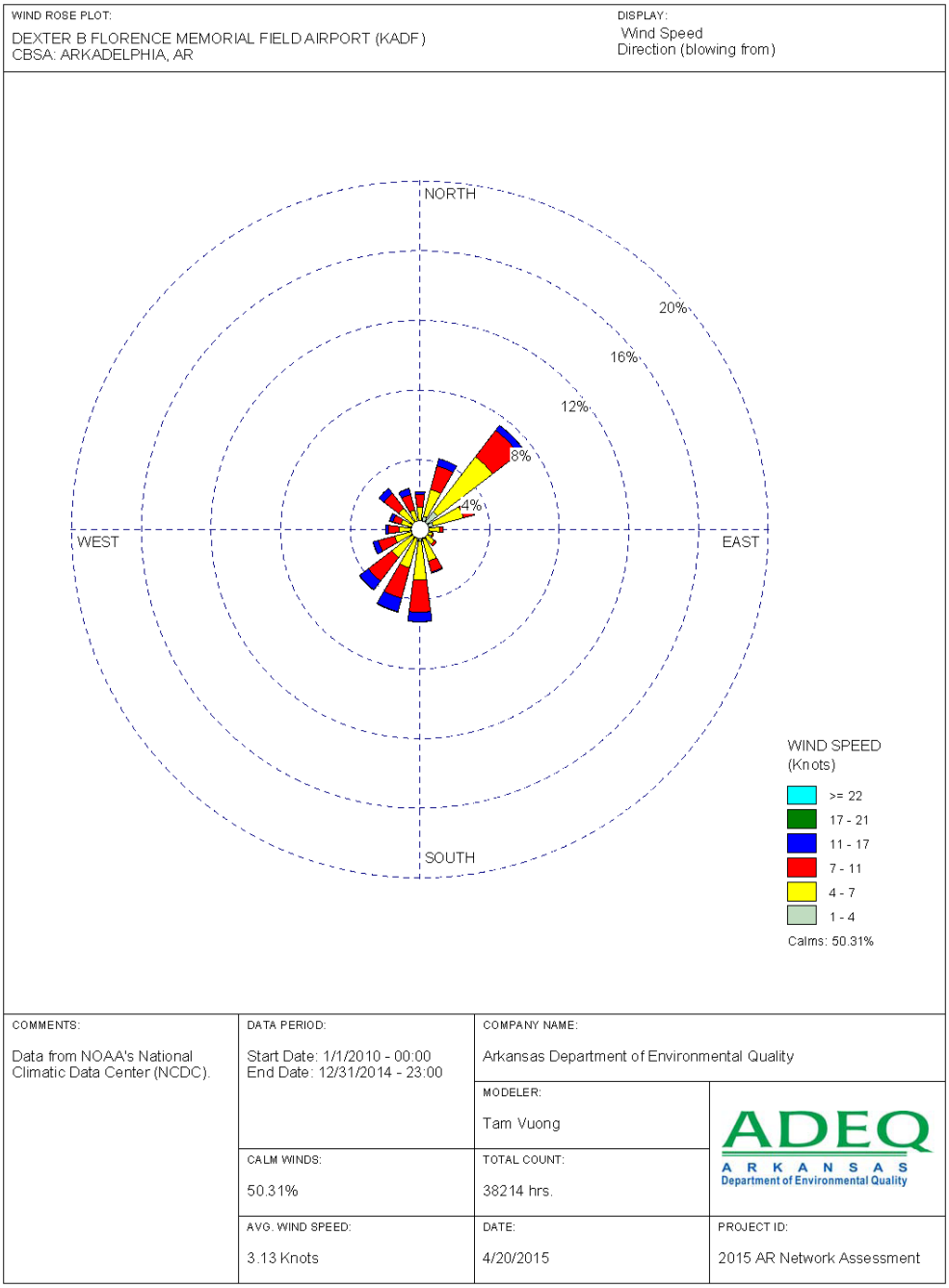
DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 14.98%	TOTAL COUNT: 40705 hrs.	
	AVG. WIND SPEED: 6.10 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

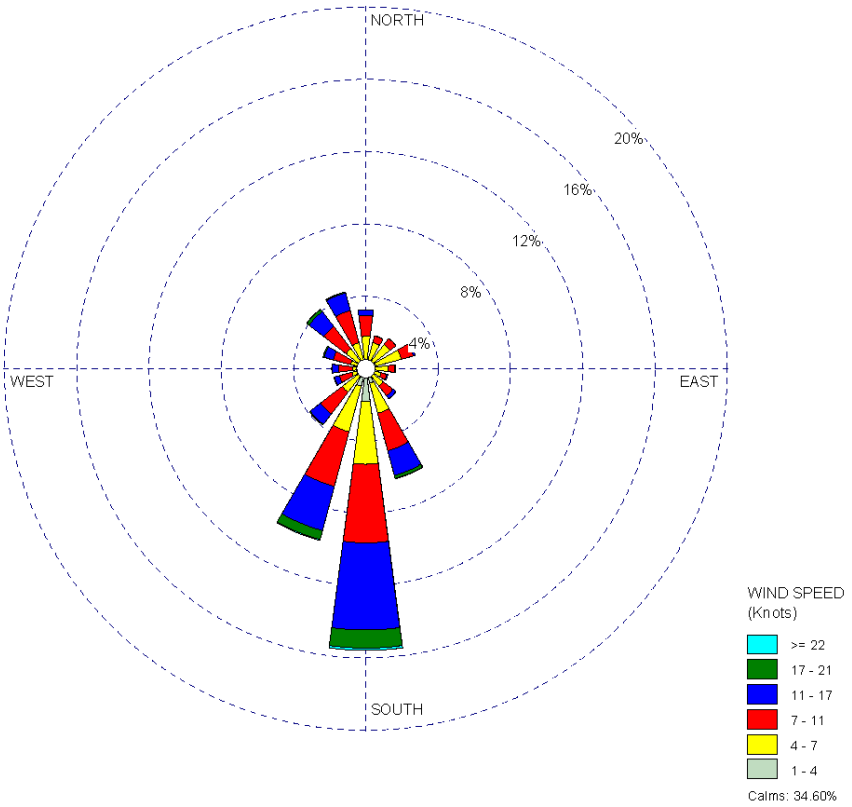
Dexter B. Florence Memorial Field Airport (KADF)



Drake Field Airport (KFYV)

WIND ROSE PLOT:
DRAKE FIELD AIRPORT (KFYV)
CBSA: FAYETTEVILLE-SPRINGDALE-ROGERS, AR-MO

DISPLAY:
Wind Speed
Direction (blowing from)



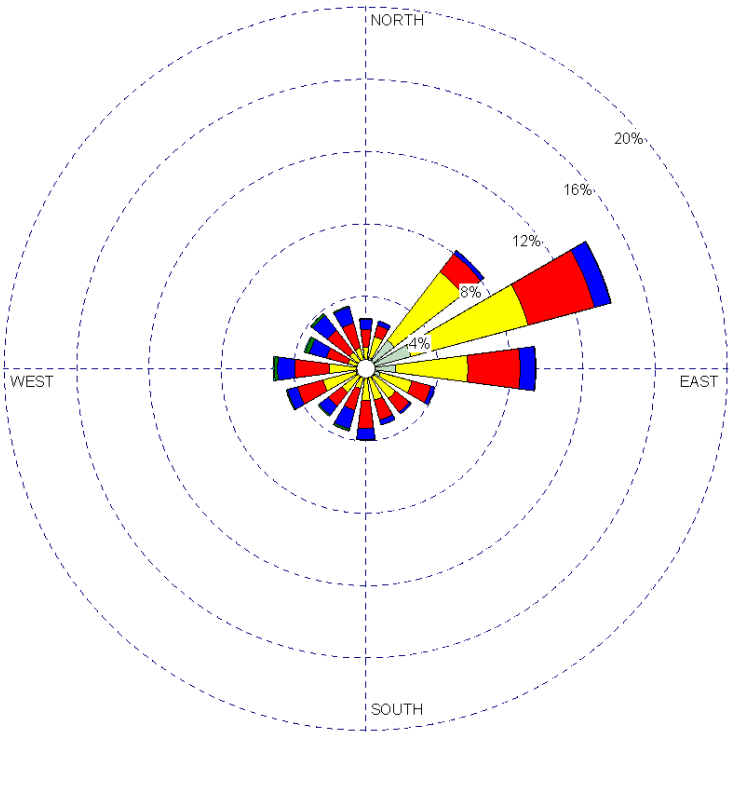
COMMENTS: Data from NOAA's National Climatic Data Center (NCDC).	DATA PERIOD: Start Date: 1/1/2010 - 01:00 End Date: 12/31/2014 - 23:00	COMPANY NAME: Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 34.60%	TOTAL COUNT: 43640 hrs.	
	AVG. WIND SPEED: 5.19 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Fort Smith Regional Airport (KFSM)

WIND ROSE PLOT:
FORT SMITH REGIONAL AIRPORT (KFSM)
CBSA: FORT SMITH, AR-OK

DISPLAY:
Wind Speed
Direction (blowing from)



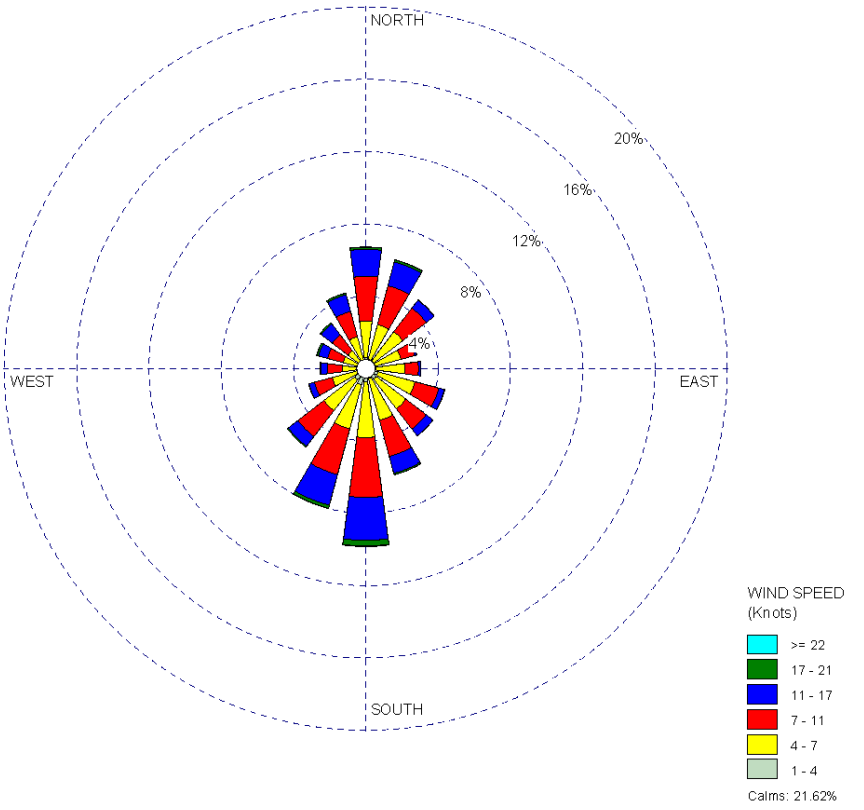
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 21.18%	TOTAL COUNT: 43784 hrs.	
	AVG. WIND SPEED: 5.42 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Grider Field Airport (KPBF)

WIND ROSE PLOT:
GRIDER FIELD AIRPORT (KPBF)
CBSA: PINE BLUFF, AR

DISPLAY:
Wind Speed
Direction (blowing from)



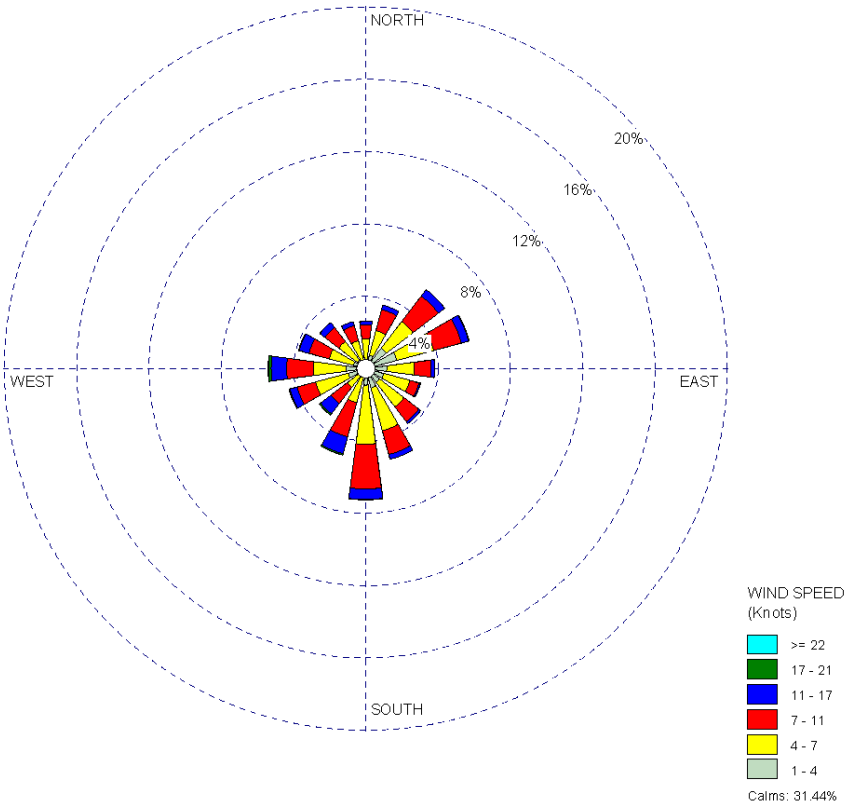
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 02:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 21.62%	TOTAL COUNT: 43491 hrs.	
	AVG. WIND SPEED: 5.77 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Little Rock Air Force Base Airport (KLRF)

WIND ROSE PLOT:
LITTLE ROCK AFB AIRPORT (KLRF)
CBSA: LITTLE ROCK-NORTH LITTLE ROCK-CONWAY, AR

DISPLAY:
Wind Speed
Direction (blowing from)



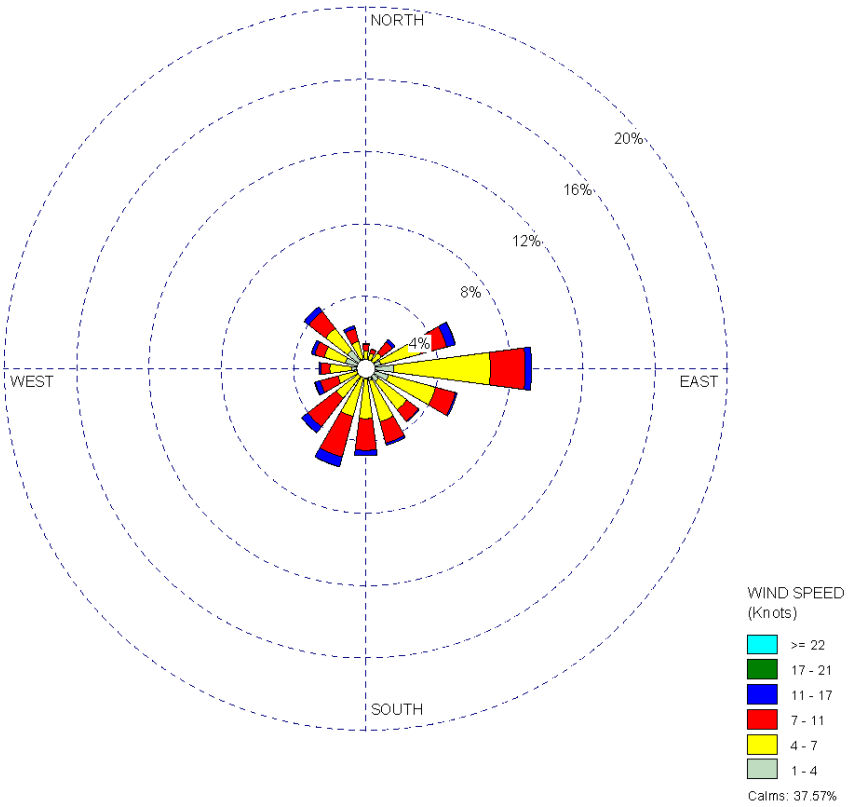
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 31.44%	TOTAL COUNT: 43045 hrs.	
	AVG. WIND SPEED: 4.28 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Memorial Field Airport (KHOT)

WIND ROSE PLOT:
MEMORIAL FIELD AIRPORT (KHOT)
CBSA: HOT SPRINGS, AR

DISPLAY:
Wind Speed
Direction (blowing from)



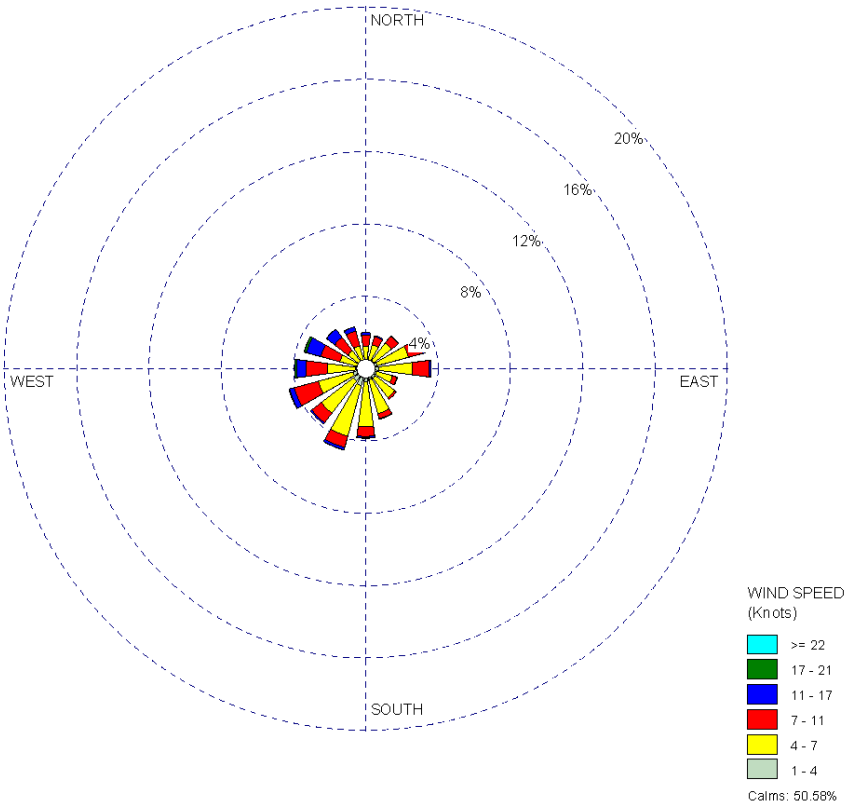
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 01:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 37.57%	TOTAL COUNT: 43673 hrs.	
	AVG. WIND SPEED: 3.70 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Mena Intermountain Municipal Airport (KMEZ)

WIND ROSE PLOT:
MENA INTERMOUNTAIN MUNICIPAL AIRPORT (KMEZ)
CBSA: N/A

DISPLAY:
Wind Speed
Direction (blowing from)



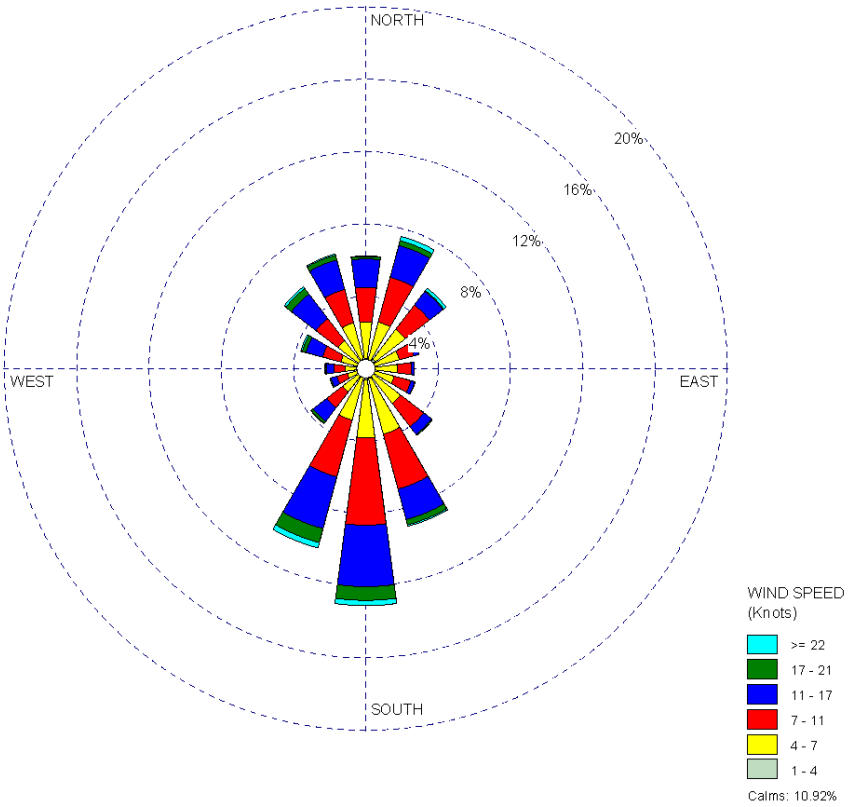
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 50.58%	TOTAL COUNT: 43268 hrs.	
	AVG. WIND SPEED: 2.90 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Newport Municipal Airport (KM19)

WIND ROSE PLOT:
NEWPORT MUNICIPAL AIRPORT (KM19)
CBSA: N/A

DISPLAY:
Wind Speed
Direction (blowing from)



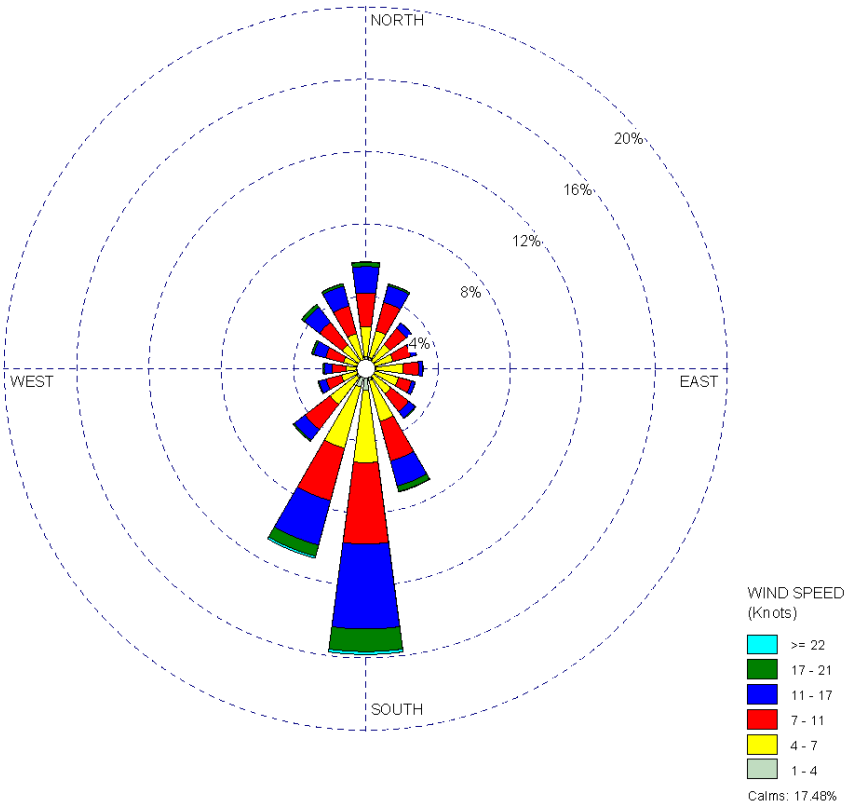
COMMENTS: Data from NOAA's National Climatic Data Center (NCDC).	DATA PERIOD: Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	COMPANY NAME: Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 10.92%	TOTAL COUNT: 42837 hrs.	
	AVG. WIND SPEED: 7.70 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Northwest Arkansas Regional Airport (KXNA)

WIND ROSE PLOT:
NORTHWEST ARKANSAS REGIONAL AIRPORT (KXNA)
CBSA: FAYETTEVILLE-SPRINGDALE-ROGERS, AR-MO

DISPLAY:
Wind Speed
Direction (blowing from)



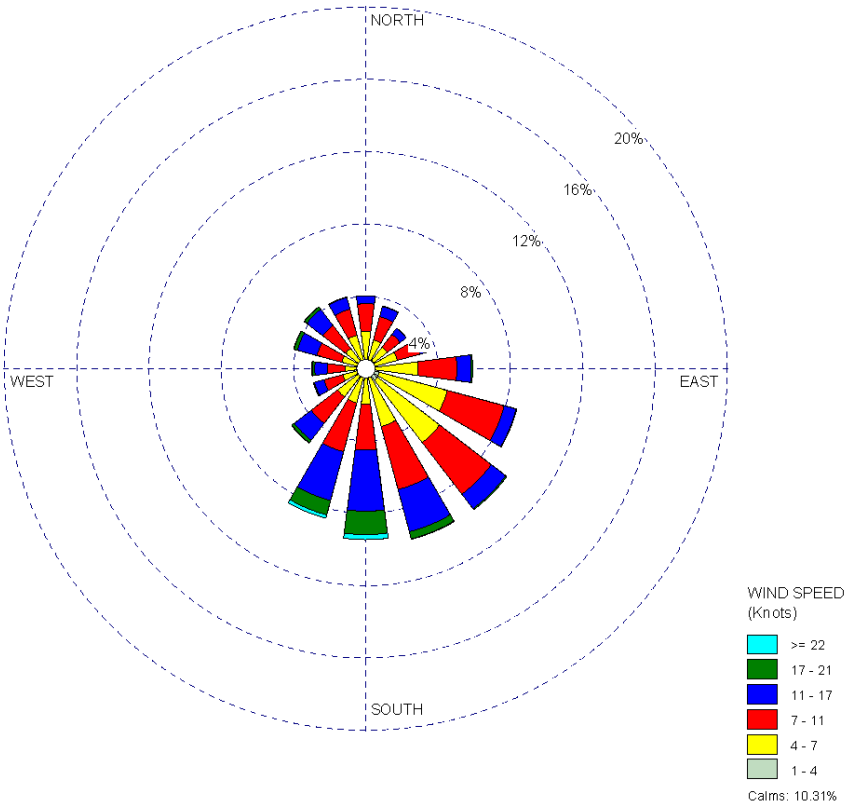
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 01:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 17.48%	TOTAL COUNT: 43658 hrs.	
	AVG. WIND SPEED: 6.66 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Rogers Municipal Airport – Carter Field (KROG)

WIND ROSE PLOT:
ROGERS MUNICIPAL AIRPORT - CARTER FIELD (KROG)
CBSA: FAYETTEVILLE-SPRINGDALE-ROGERS, AR-MO

DISPLAY:
Wind Speed
Direction (blowing from)



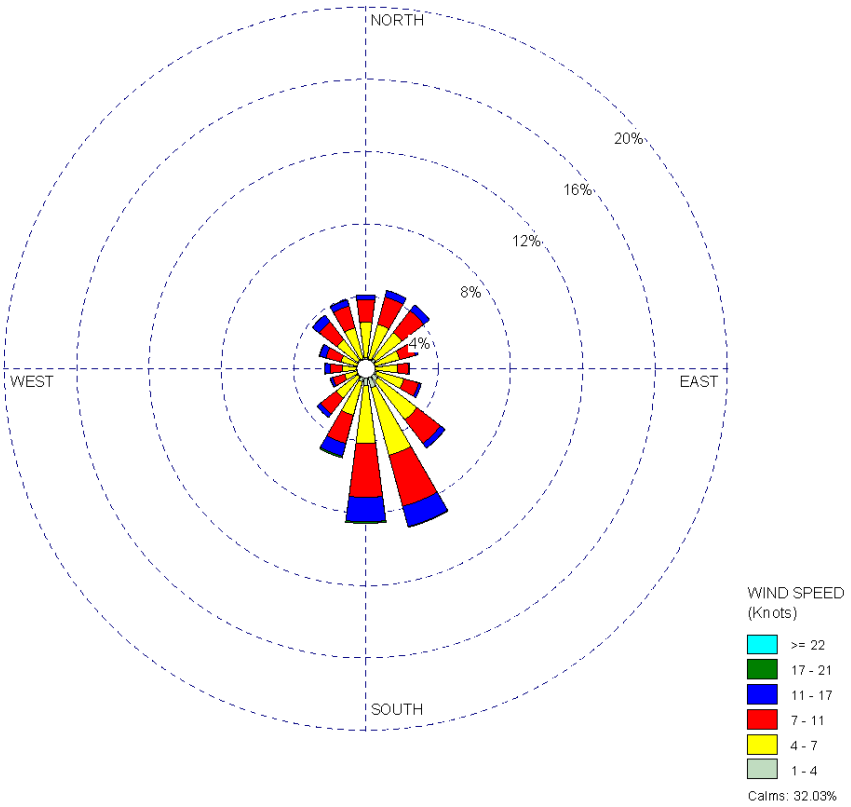
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 10.31%	TOTAL COUNT: 41345 hrs.	
	AVG. WIND SPEED: 7.42 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

South Arkansas Regional Airport – Goodwin Field (KELD)

WIND ROSE PLOT:
SOUTH ARKANSAS REGIONAL AIRPORT - GOODWIN FIELD (KELD)
CBSA: EL DORADO, AR

DISPLAY:
Wind Speed
Direction (blowing from)



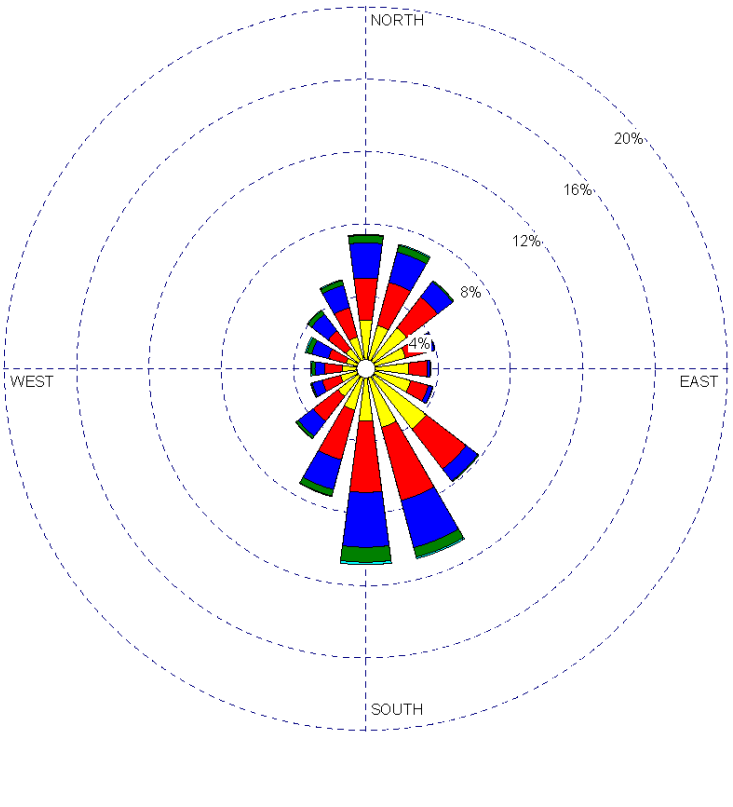
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 01:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 32.03%	TOTAL COUNT: 43583 hrs.	
	AVG. WIND SPEED: 4.44 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Stuttgart Municipal Airport (KSGT)

WIND ROSE PLOT:
STUTTGART MUNICIPAL AIRPORT (KSGT)
CBSA: N/A

DISPLAY:
Wind Speed
Direction (blowing from)



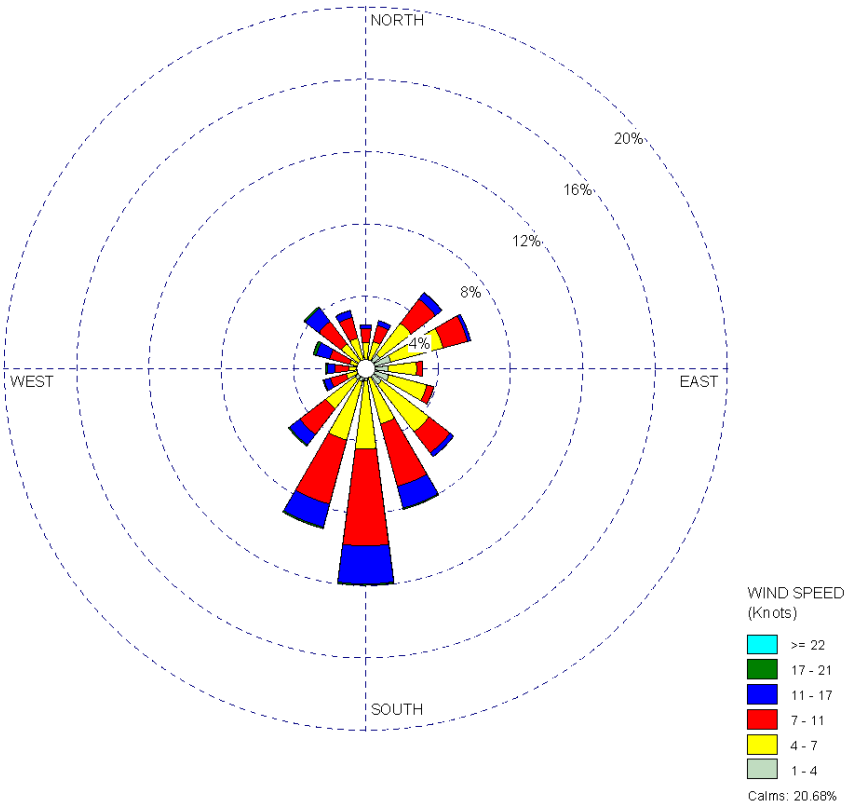
COMMENTS: Data from NOAA's National Climatic Data Center (NCDC).	DATA PERIOD: Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00	COMPANY NAME: Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 7.05%	TOTAL COUNT: 40346 hrs.	
	AVG. WIND SPEED: 7.76 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Texarkana Regional Airport – Webb Field (KTXK)

WIND ROSE PLOT:
TEXARKANA REGIONAL AIRPORT - WEBB FIELD (KTXK)
CBSA: TEXARKANA, TX-AR

DISPLAY:
Wind Speed
Direction (blowing from)



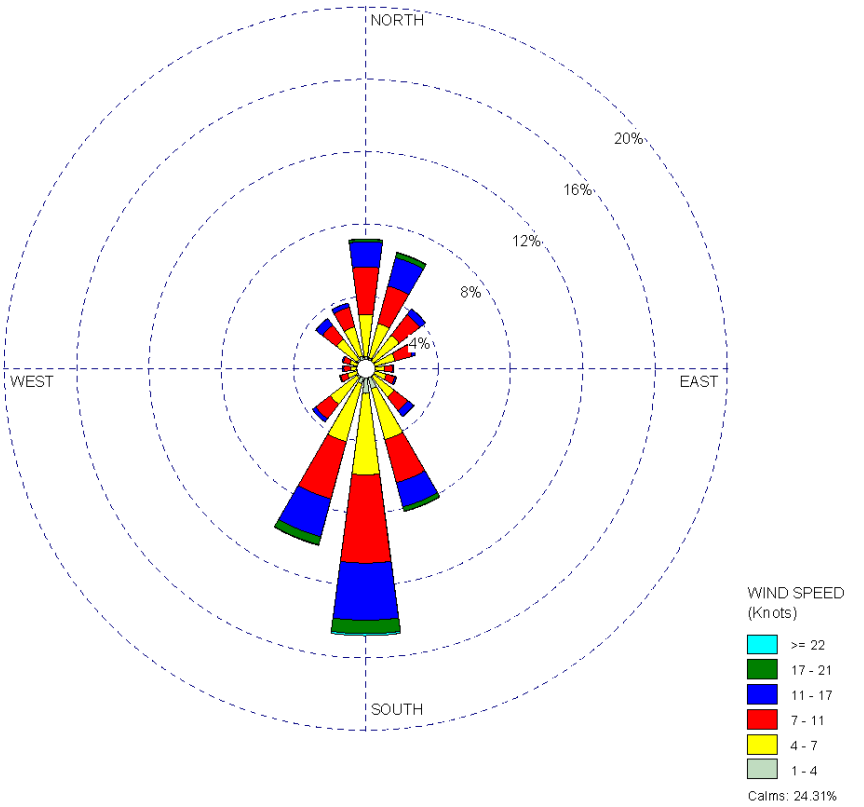
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 02:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 20.68%	TOTAL COUNT: 43781 hrs.	
	AVG. WIND SPEED: 5.44 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

West Memphis Municipal Airport (KAWM)

WIND ROSE PLOT:
WEST MEMPHIS MUNICIPAL AIRPORT (KAWM)
CBSA: MEMPHIS, TN-MS-AR

DISPLAY:
Wind Speed
Direction (blowing from)



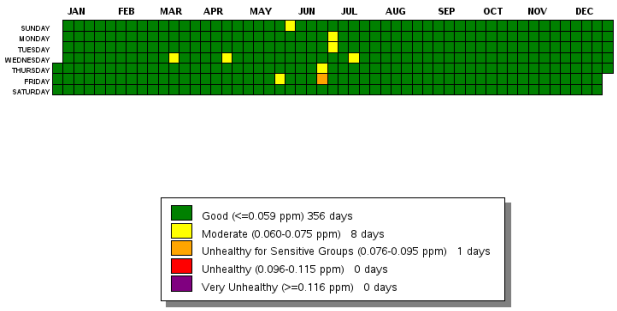
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Data from NOAA's National Climatic Data Center (NCDC).	Start Date: 1/1/2010 - 01:00 End Date: 12/31/2014 - 23:00	Arkansas Department of Environmental Quality	
		MODELER: Tam Vuong	ADEQ ARKANSAS Department of Environmental Quality
	CALM WINDS: 24.31%	TOTAL COUNT: 43360 hrs.	
	AVG. WIND SPEED: 5.60 Knots	DATE: 4/20/2015	PROJECT ID: 2015 AR Network Assessment

WRPLOT View - Lakes Environmental Software

Appendix 2. Tile Plots of 2009–14 O_3 Daily AQI for Select MSAs

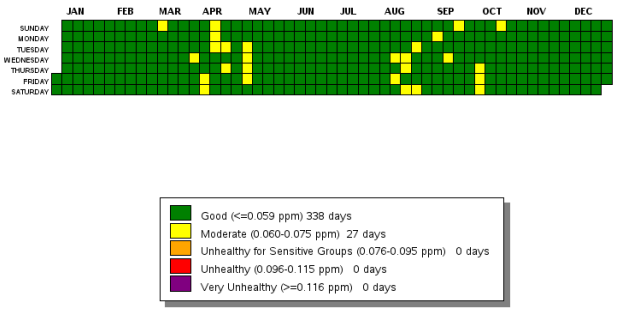
Fayetteville-Springdale-Rogers, AR-MO MSA

Ozone Daily AQI Values in 2009
Fayetteville-Springdale-Rogers, AR-MO



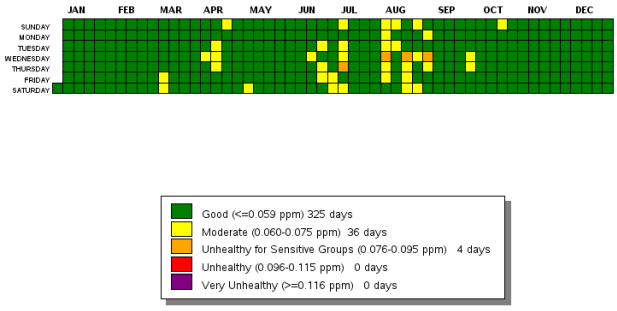
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2010
Fayetteville-Springdale-Rogers, AR-MO



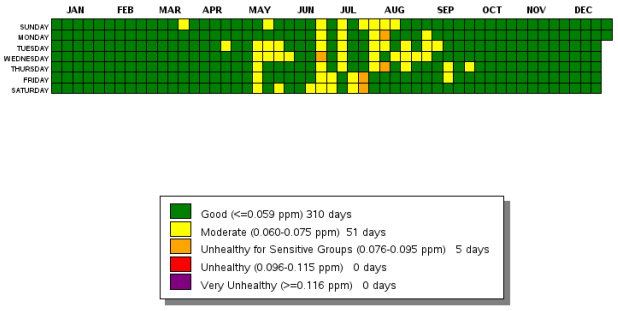
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2011
Fayetteville-Springdale-Rogers, AR-MO



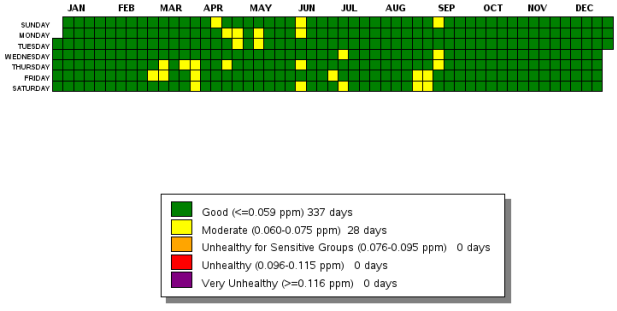
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2012
Fayetteville-Springdale-Rogers, AR-MO



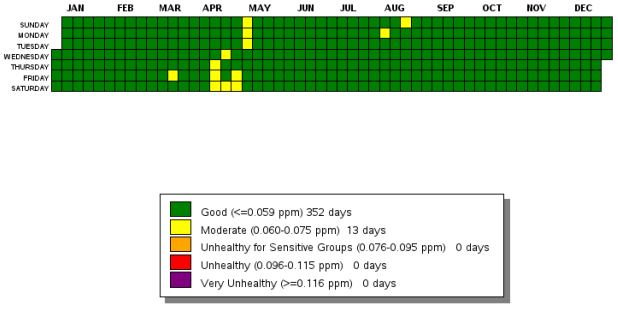
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2013
Fayetteville-Springdale-Rogers, AR-MO



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

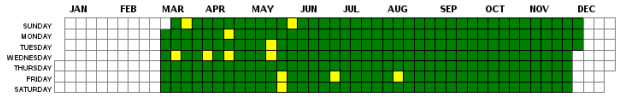
Ozone Daily AQI Values in 2014
Fayetteville-Springdale-Rogers, AR-MO



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Fort Smith, AR-OK MSA

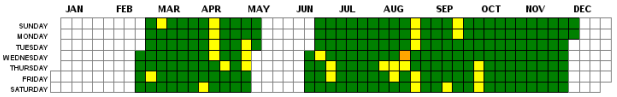
Ozone Daily AQI Values in 2009
Fort Smith, AR-OK



Good (<=0.059 ppm) 263 days
Moderate (0.060-0.075 ppm) 12 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 0 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

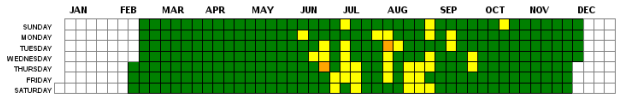
Ozone Daily AQI Values in 2010
Fort Smith, AR-OK



Good (<=0.059 ppm) 221 days
Moderate (0.060-0.075 ppm) 29 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 1 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

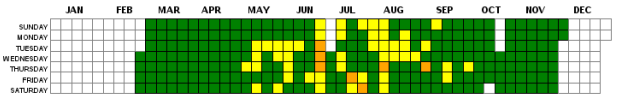
Ozone Daily AQI Values in 2011
Fort Smith, AR-OK



Good (<=0.059 ppm) 256 days
Moderate (0.060-0.075 ppm) 36 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 2 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

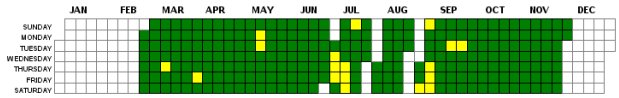
Ozone Daily AQI Values in 2012
Fort Smith, AR-OK



Good (<=0.059 ppm) 219 days
Moderate (0.060-0.075 ppm) 46 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 7 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

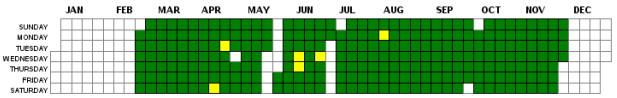
Ozone Daily AQI Values in 2013
Fort Smith, AR-OK



Good (<=0.059 ppm) 245 days
Moderate (0.060-0.075 ppm) 18 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 0 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2014
Fort Smith, AR-OK

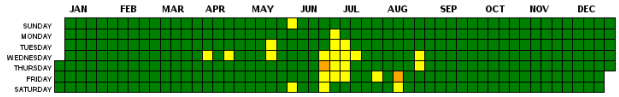


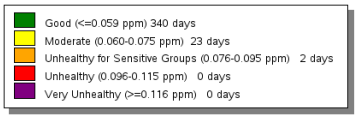
Good (<=0.059 ppm) 259 days
Moderate (0.060-0.075 ppm) 6 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 0 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Little Rock-North Little Rock-Conway, AR MSA

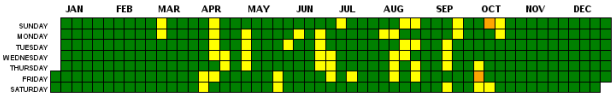
Ozone Daily AQI Values in 2009
Little Rock-North Little Rock-Conway, AR

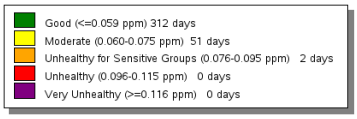




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

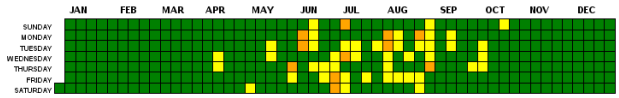
Ozone Daily AQI Values in 2010
Little Rock-North Little Rock-Conway, AR

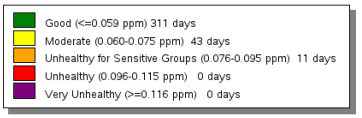




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

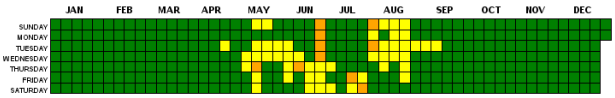
Ozone Daily AQI Values in 2011
Little Rock-North Little Rock-Conway, AR

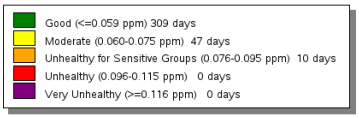




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

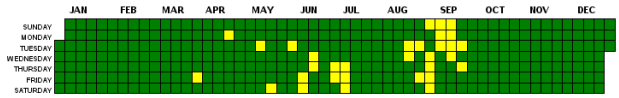
Ozone Daily AQI Values in 2012
Little Rock-North Little Rock-Conway, AR

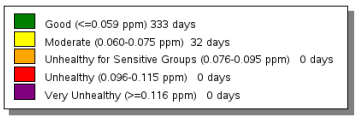




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

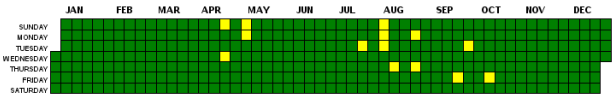
Ozone Daily AQI Values in 2013
Little Rock-North Little Rock-Conway, AR

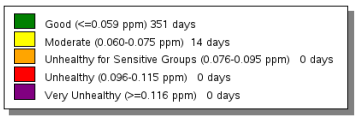




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2014
Little Rock-North Little Rock-Conway, AR

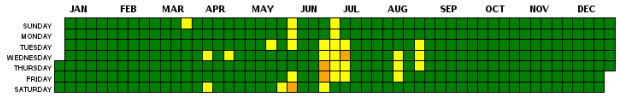




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Memphis, TN-MS-AR MSA

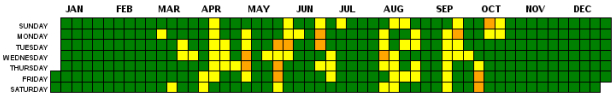
Ozone Daily AQI Values in 2009
Memphis, TN-MS-AR



Good (<=0.059 ppm) 333 days
Moderate (0.060-0.075 ppm) 28 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 4 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

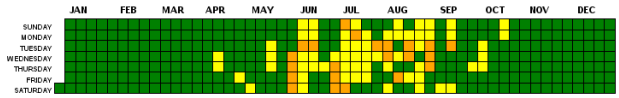
Ozone Daily AQI Values in 2010
Memphis, TN-MS-AR



Good (<=0.059 ppm) 289 days
Moderate (0.060-0.075 ppm) 63 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 13 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

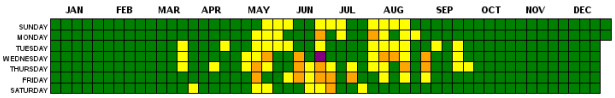
Ozone Daily AQI Values in 2011
Memphis, TN-MS-AR



Good (<=0.059 ppm) 282 days
Moderate (0.060-0.075 ppm) 61 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 22 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

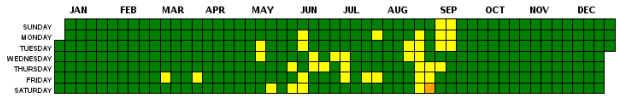
Ozone Daily AQI Values in 2012
Memphis, TN-MS-AR



Good (<=0.059 ppm) 289 days
Moderate (0.060-0.075 ppm) 58 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 18 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 1 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

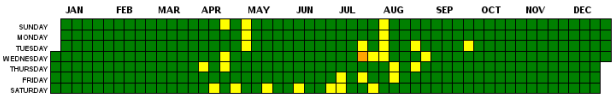
Ozone Daily AQI Values in 2013
Memphis, TN-MS-AR



Good (<=0.059 ppm) 326 days
Moderate (0.060-0.075 ppm) 38 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 1 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Ozone Daily AQI Values in 2014
Memphis, TN-MS-AR



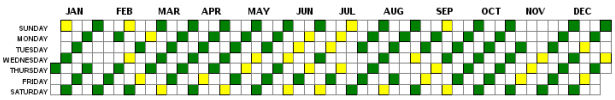
Good (<=0.059 ppm) 336 days
Moderate (0.060-0.075 ppm) 28 days
Unhealthy for Sensitive Groups (0.076-0.095 ppm) 1 days
Unhealthy (0.096-0.115 ppm) 0 days
Very Unhealthy (>=0.116 ppm) 0 days

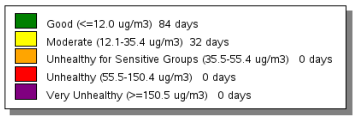
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Appendix 3. Tile Plots of 2009–14 $PM_{2.5}$ Daily AQI for Select MSAs

Fayetteville-Springdale-Rogers, AR-MO MSA

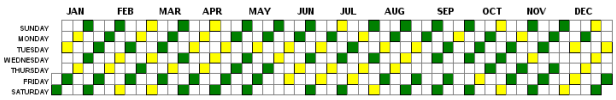
PM2.5 Daily AQI Values in 2009
Fayetteville-Springdale-Rogers, AR-MO

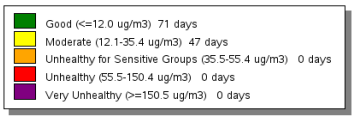




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

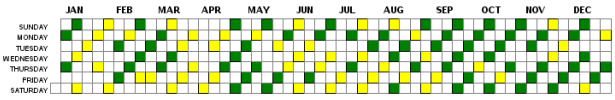
PM2.5 Daily AQI Values in 2010
Fayetteville-Springdale-Rogers, AR-MO

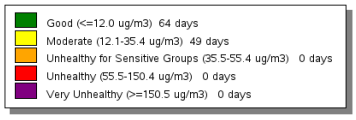




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

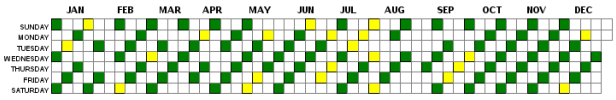
PM2.5 Daily AQI Values in 2011
Fayetteville-Springdale-Rogers, AR-MO

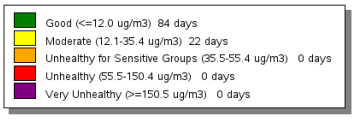




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

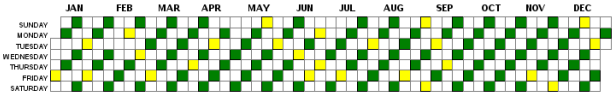
PM2.5 Daily AQI Values in 2012
Fayetteville-Springdale-Rogers, AR-MO

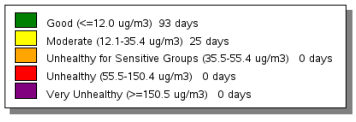




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

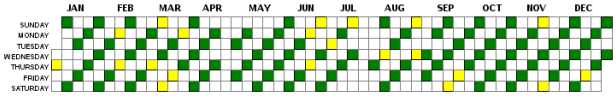
PM2.5 Daily AQI Values in 2013
Fayetteville-Springdale-Rogers, AR-MO

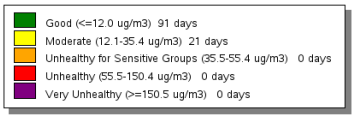




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2014
Fayetteville-Springdale-Rogers, AR-MO

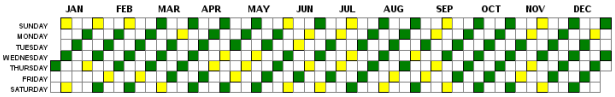


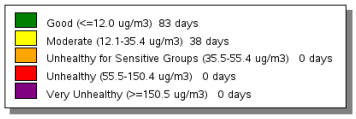


Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Hot Springs, AR MSA

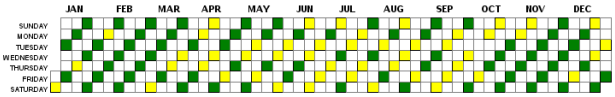
PM2.5 Daily AQI Values in 2009
Hot Springs, AR

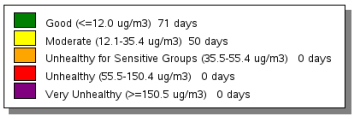




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

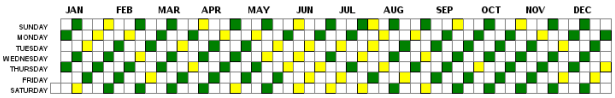
PM2.5 Daily AQI Values in 2010
Hot Springs, AR

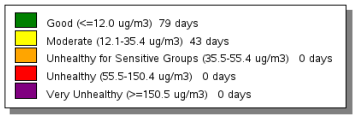




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

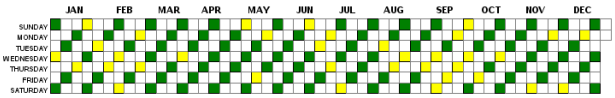
PM2.5 Daily AQI Values in 2011
Hot Springs, AR

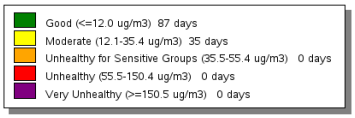




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

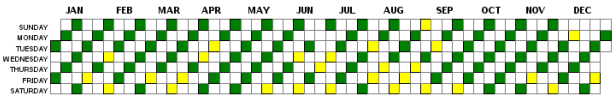
PM2.5 Daily AQI Values in 2012
Hot Springs, AR

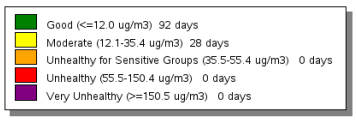




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

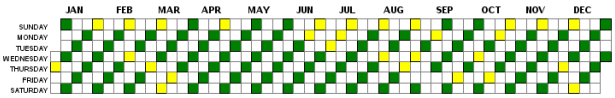
PM2.5 Daily AQI Values in 2013
Hot Springs, AR

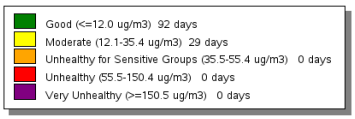




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2014
Hot Springs, AR

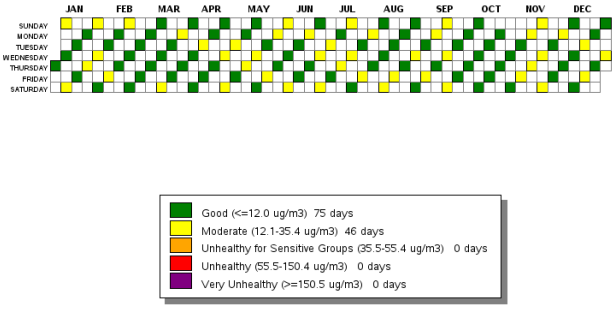




Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

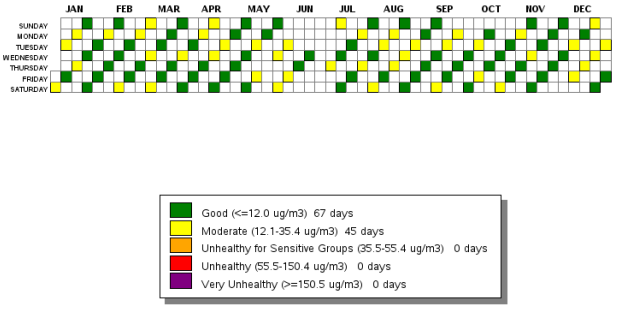
Fort Smith, AR-OK MSA

PM2.5 Daily AQI Values in 2009
Fort Smith, AR-OK



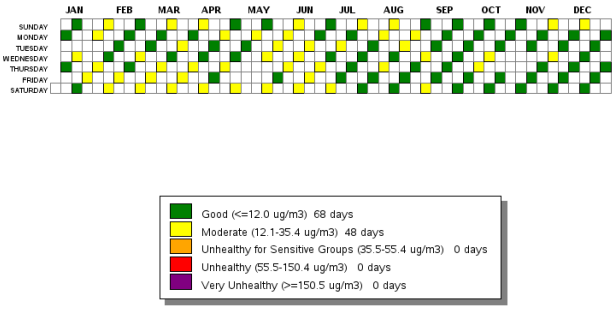
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2010
Fort Smith, AR-OK



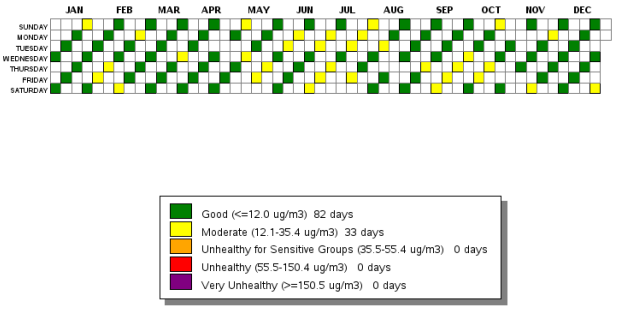
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2011
Fort Smith, AR-OK



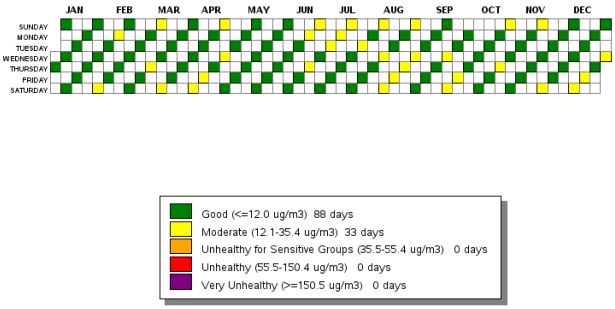
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2012
Fort Smith, AR-OK



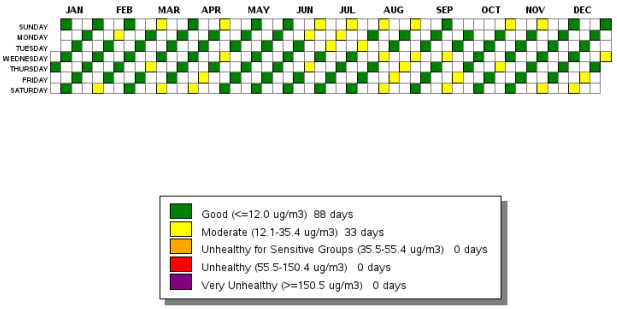
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2014
Fort Smith, AR-OK



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

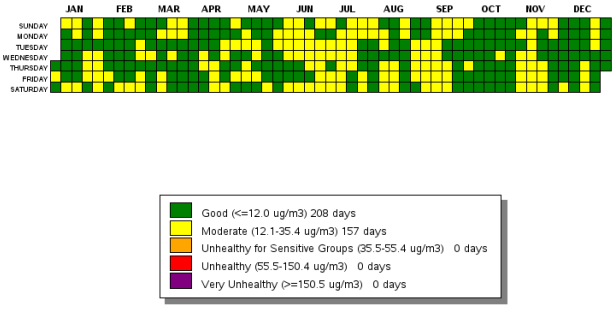
PM2.5 Daily AQI Values in 2014
Fort Smith, AR-OK



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Little Rock-North Little Rock-Conway, AR MSA

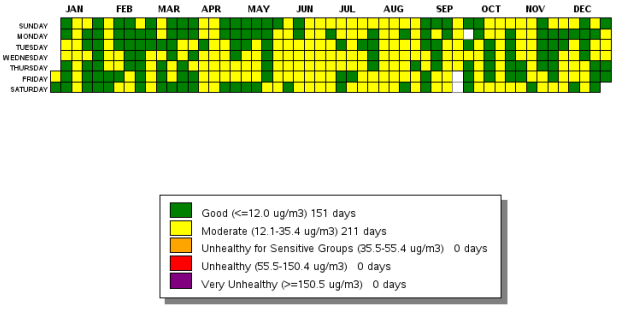
PM2.5 Daily AQI Values in 2009
Little Rock-North Little Rock-Conway, AR



Good (<=12.0 ug/m3) 208 days
Moderate (12.1-35.4 ug/m3) 157 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

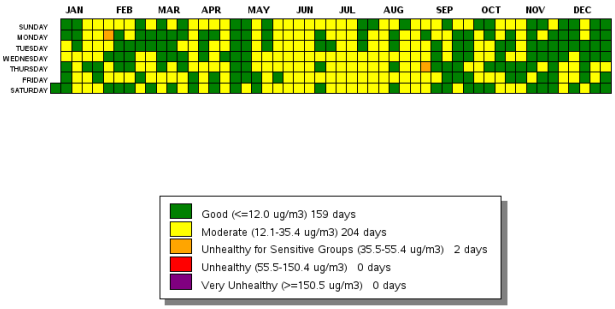
PM2.5 Daily AQI Values in 2010
Little Rock-North Little Rock-Conway, AR



Good (<=12.0 ug/m3) 151 days
Moderate (12.1-35.4 ug/m3) 211 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

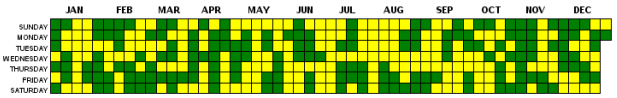
PM2.5 Daily AQI Values in 2011
Little Rock-North Little Rock-Conway, AR



Good (<=12.0 ug/m3) 159 days
Moderate (12.1-35.4 ug/m3) 204 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 2 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

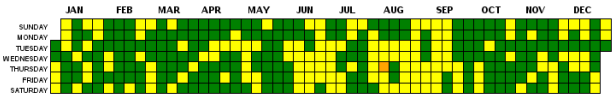
PM2.5 Daily AQI Values in 2012
Little Rock-North Little Rock-Conway, AR



Good (<=12.0 ug/m3) 171 days
Moderate (12.1-35.4 ug/m3) 195 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

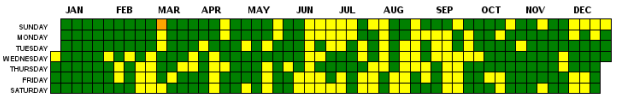
PM2.5 Daily AQI Values in 2013
Little Rock-North Little Rock-Conway, AR



Good (<=12.0 ug/m3) 217 days
Moderate (12.1-35.4 ug/m3) 147 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 1 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2014
Little Rock-North Little Rock-Conway, AR

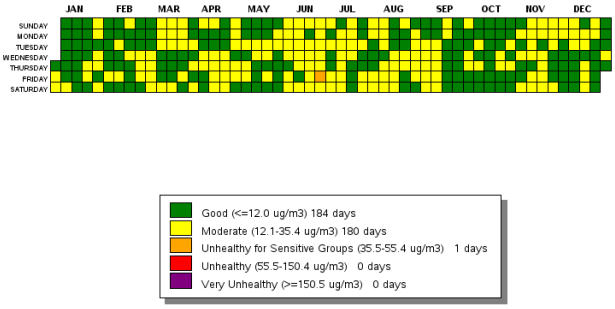


Good (<=12.0 ug/m3) 237 days
Moderate (12.1-35.4 ug/m3) 127 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 1 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

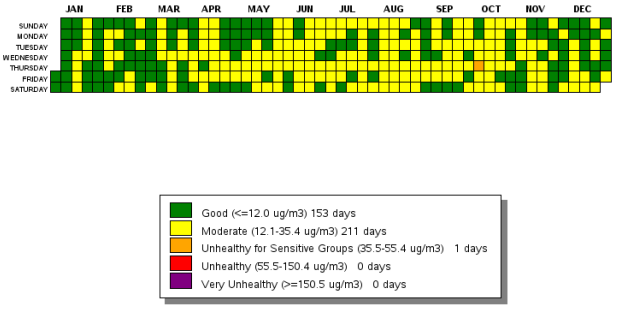
Memphis, TN-MS-AR MSA

PM2.5 Daily AQI Values in 2009
Memphis, TN-MS-AR



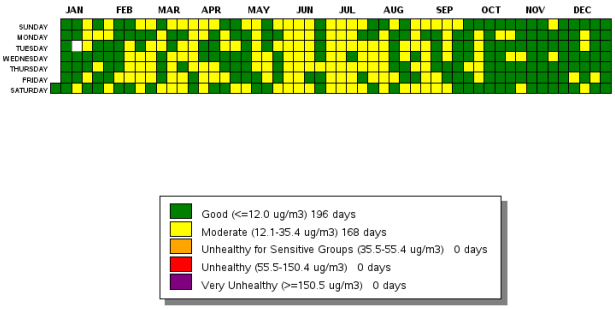
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2010
Memphis, TN-MS-AR



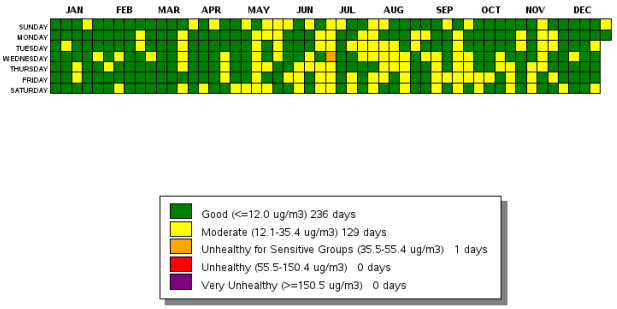
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2011
Memphis, TN-MS-AR



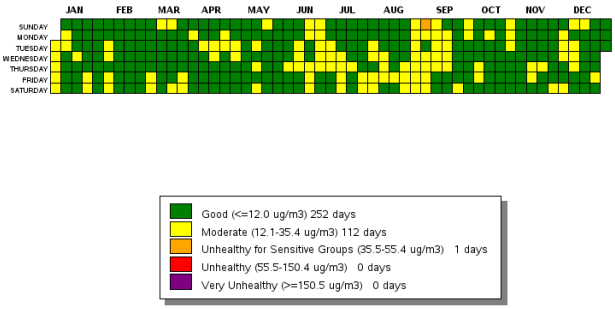
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2012
Memphis, TN-MS-AR



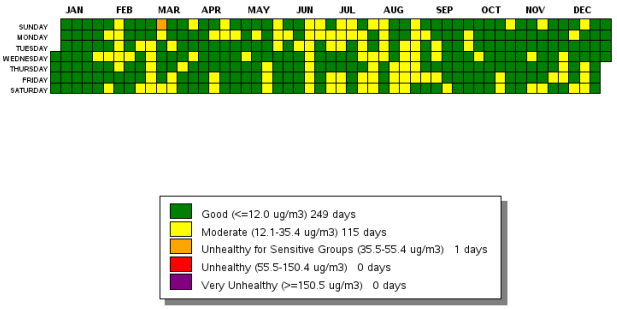
Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2013
Memphis, TN-MS-AR



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

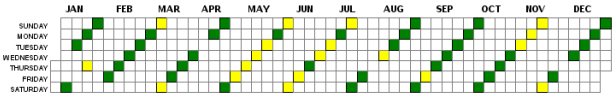
PM2.5 Daily AQI Values in 2014
Memphis, TN-MS-AR



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

Texarkana, TX-Texarkana, AR

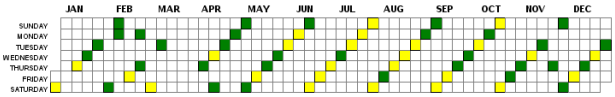
PM2.5 Daily AQI Values in 2009
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 38 days
Moderate (12.1-35.4 ug/m3) 19 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

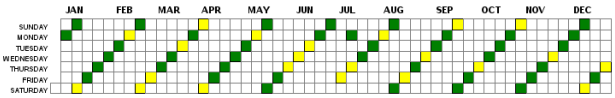
PM2.5 Daily AQI Values in 2010
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 32 days
Moderate (12.1-35.4 ug/m3) 26 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

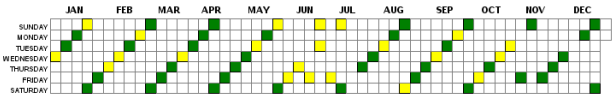
PM2.5 Daily AQI Values in 2011
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 39 days
Moderate (12.1-35.4 ug/m3) 22 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

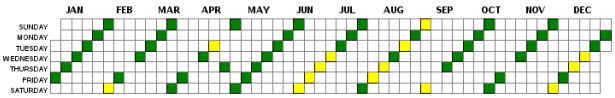
PM2.5 Daily AQI Values in 2012
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 37 days
Moderate (12.1-35.4 ug/m3) 22 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

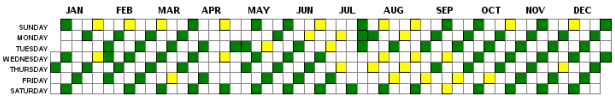
PM2.5 Daily AQI Values in 2013
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 43 days
Moderate (12.1-35.4 ug/m3) 14 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015

PM2.5 Daily AQI Values in 2014
Texarkana, TX-Texarkana, AR



Good (<=12.0 ug/m3) 88 days
Moderate (12.1-35.4 ug/m3) 29 days
Unhealthy for Sensitive Groups (35.5-55.4 ug/m3) 0 days
Unhealthy (55.5-150.4 ug/m3) 0 days
Very Unhealthy (>=150.5 ug/m3) 0 days

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 22, 2015