

# ADEQ

ARKANSAS  
Department of Environmental Quality

July 16, 2015

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

Dear Mr. Hansen,

The 2015–2016 Annual Network Plan for the Ambient Air Monitoring Network for the State of Arkansas is enclosed, fulfilling the requirement set forth in 40 CFR 58.10. The plan underwent a 30-day public comment period from June 13, 2015 to July 13, 2015. A copy of the public notice proof is attached. There were no comments received by our agency.

Please contact us with comments or questions.

Sincerely,

Stuart Spencer  
Chief, Air Division  
501-682-0750  
spencer@adeq.state.ar.us

Lessie Redican  
Chief, Technical Services Division  
501-682-0937  
redican@adeq.state.ar.us

Enclosure

**ARKANSAS AMBIENT AIR MONITORING NETWORK  
ANNUAL NETWORK PLAN 2015–2016**

Prepared By

Planning & Air Quality Analysis Branch, Air Division  
Air Laboratory Division, Technical Services Division  
Arkansas Department of Environmental Quality  
5301 Northshore Dr., North Little Rock, AR 72118

## Table of Contents

1. Introduction .....	1
2. Population Statistics .....	1
3. ADEQ Monitoring Network.....	2
3.1 Ozone Network .....	5
3.2 Particulate Matter Network .....	7
3.2.1 Fine Particulate Matter (PM <sub>2.5</sub> ).....	7
3.2.2 Particulate Matter (PM <sub>10</sub> ).....	10
3.2.3 Coarse Particulate Matter (PM <sub>10-2.5</sub> ).....	10
3.2.4 Chemical Speciation .....	11
3.3 Sulfur Dioxide Network.....	11
3.4 Nitrogen Dioxide Network.....	12
3.5 Carbon Monoxide Network.....	12
3.6 Lead Network.....	13
3.6.1 Waivers Renewal Requested.....	14
3.6.2 Waivers No Longer Needed.....	16
4. Contact Information .....	21

## List of Tables

Table 1. Population Statistics for Metropolitan Statistical Areas (MSAs) in Arkansas .....	1
Table 2. ADEQ Operated SLAMS Monitor Information .....	3
Table 3. Required Minimum Number of Ozone SLAMS for MSAs in Arkansas.....	5
Table 4. Proposed Schedule and Latest Design Value for ADEQ Ozone Sites .....	5
Table 5. Required Minimum Number of PM <sub>2.5</sub> SLAMS for MSAs in Arkansas.....	7
Table 6. Continuous PM <sub>2.5</sub> AQI Monitoring Site Information .....	8
Table 7. Proposed Schedule and Latest Design Value for ADEQ PM <sub>2.5</sub> Sites .....	9
Table 8. Required Minimum Number of PM <sub>10</sub> SLAMS for MSAs in Arkansas.....	10
Table 9. Proposed Schedule and Latest Estimated Exceedance for ADEQ PM <sub>10</sub> Sites .....	10
Table 10. Required Minimum Number of SO <sub>2</sub> SLAMS for MSAs in Arkansas.....	11
Table 11. Source-Oriented Lead Waiver Status by Facility .....	13

## List of Figures

Figure 1. Map of ADEQ Air Monitoring Network.....	2
Figure 2. Historical 4 <sup>th</sup> Daily Maximum Ozone Concentration for Little Rock MSA Monitors ...	6
Figure 3. Historical PM <sub>2.5</sub> NAAQS (Annual and 24-Hour) for Newport (05-067-0001).....	8
Figure 4. Lead Emissions for Entergy Arkansas, Inc. (Independence Plant) .....	14
Figure 5. Lead Emissions for Entergy Arkansas, Inc. (White Bluff Plant) .....	15
Figure 6. Lead Emissions for Arkansas Steel Associates, LLC .....	16
Figure 7. Lead Emissions for Georgia Pacific, LLC (Crossett Paper Operations).....	17
Figure 8. Lead Emissions for Gerdau MacSteel .....	18
Figure 9. Lead Emissions for Nucor Corporation (Nucor Steel, Arkansas) .....	19
Figure 10. Lead Emissions for Nucor-Yamato Steel Company .....	20

## 1. Introduction

The United States Environmental Protection Agency (EPA) has been responsible for establishing and updating the National Ambient Air Quality Standard (NAAQS) under the Federal Clean Air Act. In accordance with 40 CFR Part 58, Subpart B § 58.10, the State of Arkansas is required to submit an annual air monitoring network plan to EPA:

... the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations...

The State of Arkansas's 2015–2016 Annual Network Plan will be submitted to EPA Region 6 in Dallas, Texas. Federal regulations require that the plan be made available for public inspection for 30 days prior to submission to EPA Region 6.

This network plan provides the framework for the establishment and maintenance of an air quality surveillance system. This plan represents Arkansas Department of Environmental Quality's (ADEQ's) commitment to protect the health of the citizens of Arkansas through ambient air monitoring using the latest and best technology that is commercially available, and to communicate the data collected as quickly and accurately as possible. Any proposed modifications to the network, as determined by the annual network review process each year, will be stated in the document.

## 2. Population Statistics

Minimum monitoring requirements vary for each pollutant and are based on a combination of factors such as population data, previous year's concentration levels, and metropolitan area boundaries. Table 1 contains the population statistics for the Metropolitan Statistical Areas (MSAs) located fully or partially in Arkansas.

**Table 1. Population Statistics for Metropolitan Statistical Areas (MSAs) in Arkansas**

<b>Metropolitan Statistical Area (MSA)</b>	<b>2010 Census</b>
Fayetteville-Springdale-Rogers, AR-MO	463,204
Fort Smith, AR-OK	280,467
Hot Springs, AR	96,024
Jonesboro, AR	121,026
Little Rock-North Little Rock-Conway, AR	699,757
Memphis, TN-MS-AR	1,324,829
Pine Bluff, AR	100,258
Texarkana, TX-AR	149,198

### 3. ADEQ Monitoring Network

ADEQ maintains its ambient air monitoring network in accordance with the quality assurance requirements of 40 CFR Part 58, App. A, designs its network in accordance with App. D, and locates its sites to meet all requirements of App. E. ADEQ operates numerous air monitors at various monitoring sites throughout the State of Arkansas as shown in Figure 1. Monitors operated by ADEQ are currently maintained by the Air Laboratory Division of the Technical Services Division. Data from these monitoring sites are entered into the national Air Quality Systems (AQS) database and made available to the public within 90 days following the end of each calendar quarter. A brief site summary for ADEQ operated monitors is detailed in Table 2. The AQS identification number in column one of Table 2 is a unique site identification number that is assigned to each and every monitoring site in the network.

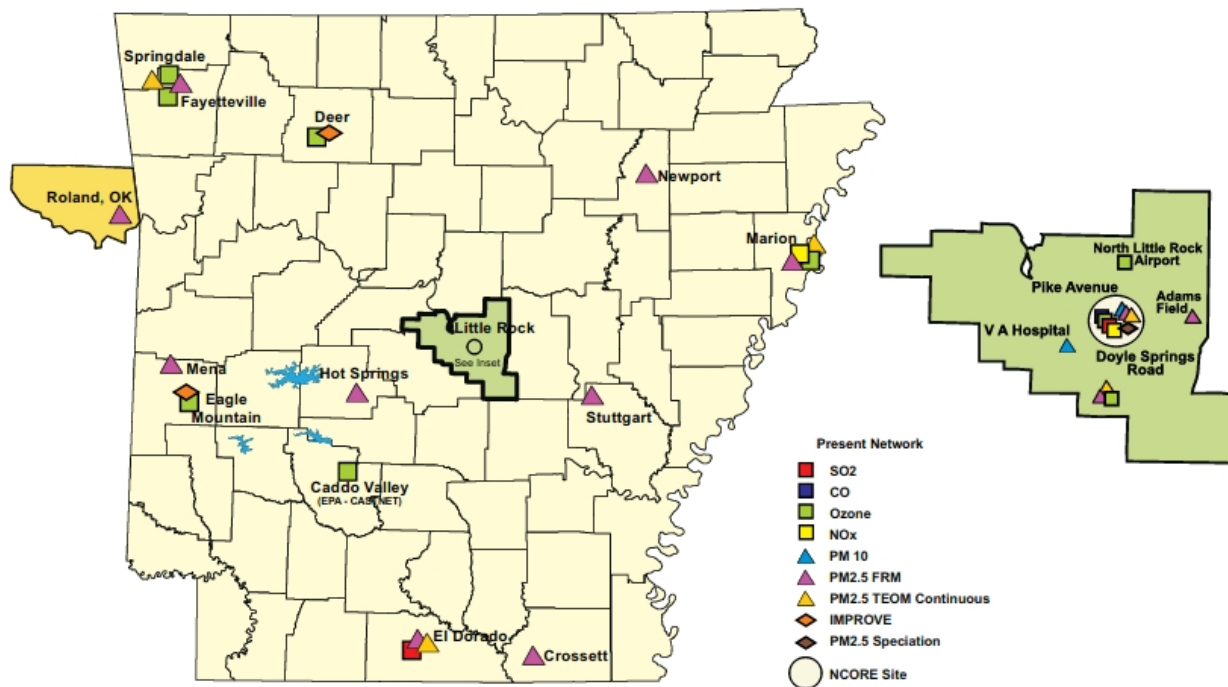


Figure 1. Map of ADEQ Air Monitoring Network

**Table 2. 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 <sub>2.5</sub>	143	R&P 2000 FRM
05-003-0005	Crossett	201 Unity Rd.	33.136708, -91.950233	SLAMS	PM <sub>2.5</sub>	143	R&P 2000 FRM
05-035-0005	Marion	Polk & Colonial Dr.	35.197178, -90.193047	SLAMS SLAMS SLAMS SLAMS	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone NO <sub>2</sub>	143 105	R&P 2000 FRM R&P TEOM UV Photometric Chemiluminescence
05-051-0003	Hot Springs	300 Werner	34.469309, -93.000000	SLAMS	PM <sub>2.5</sub> *	143	R&P 2000 FRM
05-067-0001	Newport	7648 Victory Blvd.	35.638069, -91.189381	SLAMS	PM <sub>2.5</sub>	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 <sub>2.5</sub>	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 SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS SLAMS	PM <sub>2.5</sub> * PM <sub>2.5</sub> PM <sub>10</sub> * PM <sub>10-2.5</sub> * Ozone NO <sub>x</sub> Speciation NO <sub>y</sub> Trace SO <sub>2</sub> Trace CO Pb*	145 105 127 176  810  81	R & P 2025 FRM R&P TEOM Gravimetric Gravimetric/FRM UV Photometric Chemiluminescence Low Volume Chemiluminescence Infrared  Gravimetric
05-119-1002	NLRAP	Remount Rd	34.835606, -92.260425	SLAMS	Ozone		UV Photometric
05-119-1004	Adams Field	1701 S. Bond	34.729486, -92.243431	SLAMS	PM <sub>2.5</sub>	143	R&P 2000 FRM
05-119-1007	VA	4300 Block of West 7 <sup>th</sup>	34.744814, -92.319906	SLAMS	PM10	127	Gravimetric
05-119-1008	DSR	Doyle Springs Rd	34.681225, -92.328539	SLAMS SLAMS SLAMS	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone	143 105	R&P 2025 FRM R&P TEOM UV Photometric
40-135-9021	Roland, OK	207 Cherokee Blvd	35.40814, -94.524413	SLAMS	PM <sub>2.5</sub>	145	R&P 2025 FRM
05-139-0006	El Dorado	Union Memorial Hospital	33.220122, -92.669453	SLAMS SLAMS SLAMS	PM <sub>2.5</sub> PM <sub>2.5</sub> SO <sub>2</sub>	143 105	R&P 2000 FRM R&P TEOM Pulsed Fluorescent
05-143-0005	Springdale	600 S. Old Missouri Rd	36.179617, -94.116611	SLAMS SLAMS SLAMS	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone	145 105	R&P 2025 FRM R&P TEOM UV Photometric
05-143-0006	Fayetteville	429 Ernest Lancaster Dr.	36.011703, -94.167436	SLAMS	Ozone		UV Photometric

\* Collocated Monitors



**Table 2. ADEQ Operated SLAMS Monitor Information (continued)**

AQS ID #	Site Name	Pollutants Measured	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comp.	MSA
05-001-0011	Stuttgart	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Not in a MSA
05-003-0005	Crossett	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Not in a MSA
05-035-0005	Marion	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone NO <sub>2</sub>	Daily 1 in 3 Continuous Continuous Continuous	Regional Transport	Neighborhood Neighborhood Neighborhood Neighborhood Area Wide	Yes No Yes Yes	Memphis
05-051-0003	Hot Springs	PM <sub>2.5</sub> *	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Hot Springs
05-067-0001	Newport	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Not in a MSA
05-101-0002	Deer	Ozone	Continuous	Background	Neighborhood	Yes	Not in a MSA
05-113-0002	Mena	PM <sub>2.5</sub>	Daily 1 in 3	Regional Background	Neighborhood	Yes	Not in a MSA
05-113-0003	Eagle Mtn	Ozone	Continuous	Regional Transport	Neighborhood	Yes	Not in a MSA
05-119-0007	PARR (NCore)	PM <sub>2.5</sub> * PM <sub>2.5</sub> PM <sub>10</sub> * Ozone NO <sub>x</sub> Speciation CO NO <sub>y</sub> Trace SO <sub>2</sub> Trace CO Pb*	Daily 1 in 1 Continuous Daily 1 in 3 Continuous Continuous Daily 1 in 3 Continuous Continuous Continuous Continuous Continuous Daily 1 in 6	Population Exposure Population Exposure Population Exposure Population Exposure Susceptible and Vulnerable Population Exposure Population Exposure Population Exposure Population Exposure Population Exposure Population Exposure Population Exposure Population Exposure	Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood Neighborhood	Yes No Yes Yes Yes No Yes No No Yes No No	Little Rock
05-119-1002	NLRAP	Ozone	Continuous	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1004	Adams Field	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1007	VA	PM <sub>10</sub>	Daily 1 in 6	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1008	DSR	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone	Daily 1 in 3 Continuous Continuous	Population Exposure	Neighborhood Neighborhood Neighborhood	Yes No Yes	Little Rock
40-135-9021	Roland, OK	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Fort Smith
05-139-0006	El Dorado	PM <sub>2.5</sub> PM <sub>2.5</sub> SO <sub>2</sub>	Daily 1 in 3 Continuous Continuous	Population Exposure Population Exposure Population Exposure	Neighborhood Neighborhood Neighborhood	Yes No Yes	Not in a MSA
05-143-0005	Springdale	PM <sub>2.5</sub> PM <sub>2.5</sub> Ozone	Continuous Daily 1 in 3	Population Exposure Population Exposure AQI	Neighborhood Neighborhood	No Yes	Fayetteville
05-143-0006	Fayetteville	Ozone	Continuous	Population Exposure	Neighborhood	Yes	Fayetteville

\* Collocated Monitors

### 3.1 Ozone Network

The required number of ozone monitors for MSAs in Arkansas is listed in Table 3. The minimum number of ozone monitors is determined by the MSA population from the latest Census and the previous year's design value for the area according to Table D-2 of 40 CFR Part 58 App. D § 4.1.

**Table 3. Required Minimum Number of Ozone SLAMS for MSAs in Arkansas**

Metropolitan Statistical Area (MSA)	2010 Census	Monitors Required <sup>1</sup>
Fayetteville-Springdale-Rogers, AR-MO	463,204	2
Fort Smith, AR-OK	280,467	1
Hot Springs, AR	96,024	0
Jonesboro, AR	121,026	0
Little Rock-North Little Rock-Conway, AR	699,757	2
Memphis, TN-MS-AR	1,324,829	2
Pine Bluff, AR	100,258	0
Texarkana, TX-AR	149,198	0

<sup>1</sup> Based on 2014 design value

Arkansas meets or exceeds the SLAMS ozone requirement for each MSA. ADEQ operates three monitors in the Little Rock-North Little Rock-Conway, AR MSA and two in the Fayetteville-Springdale-Rogers, AR-MO MSA. ADEQ only operates one of the five SLAMS ozone monitors in the Memphis, TN-MS-AR MSA, with the other four operated by either Memphis/Shelby County Health Department (MSCHD) or Mississippi Department of Environmental Quality (MDEQ). The required monitor in the Fort Smith, AR-OK MSA is covered by the ozone monitor in Roland, OK, which is operated by Cherokee Nation. 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.

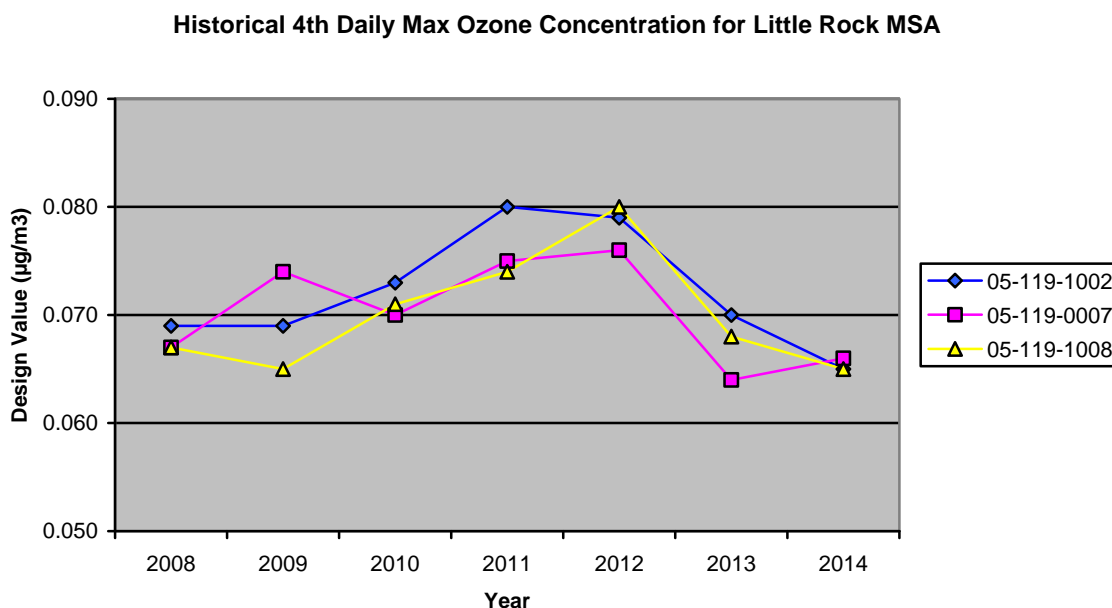
**Table 4. Proposed Schedule and Latest Design Value for ADEQ Ozone Sites**

AQS ID #	Sampling Schedule		8-Hour Ozone (ppm)				
	Current	Proposed	2012	2013	2014	DV	DV % NAAQS
05-035-0005	Continuous	Continuous	0.079	0.067	0.067	0.071	95%
05-101-0002	Continuous	Continuous	0.068	0.064	0.063	0.066	87%
05-113-0003	Continuous	Continuous	0.071	0.065	0.065	0.067	89%
05-119-0007	Continuous	Continuous	0.076	0.064	0.066	0.068	91%
05-119-1002	Continuous	Discontinue	0.079	0.070	0.065	0.071	95%
05-119-1008	Continuous	Continuous	0.080	0.068	0.065	0.071	95%
05-143-0005	Continuous	Continuous	0.076	0.065	0.061	0.067	89%
05-143-0006	Continuous	Continuous	0.079	0.066	0.064	0.069	92%

ADEQ plans to discontinue the ozone monitor at the North Little Rock Airport (05-119-1002) by September 1, 2015 due to the current lease expiration date. ADEQ is unable to enter into an

agreeable long term lease agreement given resource and funding limitations which are beyond agency control. The remaining continuous monitoring network will continue to satisfy EPA monitoring requirements for all MSAs. ADEQ remains focused on maintaining compliance of the NAAQS and based on evaluation of historical data believes that discontinuation of this site will not compromise meaningful and representative data collection needed for implementation of the ozone NAAQS. The North Little Rock Airport monitor data and historical data trends have been consistent with the two other Little Rock-North Little Rock-Conway, AR MSA monitors (Figure 2), one of which is also located on the northern side of Pulaski County. As the number of monitors in the Little Rock-North Little Rock-Conway, AR MSA currently exceeds the monitoring requirement, discontinuation of the North Little Rock Airport monitor will leave the Little Rock-North Little Rock-Conway, AR MSA with two ozone monitors in locations which are most representative of highest population density areas and which will continue to meet the monitoring requirements as set by 40 CFR Part 58 App. D. The additional monitoring equipment will be available to be utilized by ADEQ to conduct special purpose monitoring as needed to inform air quality planning decisions for the Little Rock-North Little Rock-Conway, AR MSA and/or other MSAs.

ADEQ is not proposing any other changes to the monitoring network at this time. ADEQ will re-evaluate the ozone network in the 2016 Annual Network Plan with EPA's finalization of the revised ozone NAAQS in October 2015. Information regarding the SLAMS ozone monitoring sites operated by ADEQ is listed in Table 4.



**Figure 2. Historical 4<sup>th</sup> Daily Maximum Ozone Concentration for Little Rock MSA Monitors**

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

### 3.2 Particulate Matter Network

#### 3.2.1 Fine Particulate Matter (PM<sub>2.5</sub>)

The number of SLAMS PM<sub>2.5</sub> monitors for MSAs in Arkansas is listed in Table 5. According to the criteria listed in Table D-5 of 40 CFR Part 58 App. D § 4.7.1, the number of PM<sub>2.5</sub> monitors is determined by the MSA population from the latest Census and the previous year’s design value for the area.

**Table 5. Required Minimum Number of PM<sub>2.5</sub> SLAMS for MSAs in Arkansas**

Metropolitan Statistical Area (MSA)	2010 Census	Monitors Required <sup>1</sup>
Fayetteville-Springdale-Rogers, AR-MO	463,204	0
Fort Smith, AR-OK	280,467	0
Hot Springs, AR	96,024	0
Jonesboro, AR	121,026	0
Little Rock-North Little Rock-Conway, AR	699,757	2
Memphis, TN-MS-AR	1,324,829	2
Pine Bluff, AR	100,258	0
Texarkana, TX-AR	149,198	0
<sup>1</sup> Based on 2014 design value		

Arkansas has met or exceeded the SLAMS requirement for each MSA. ADEQ operates three monitors in the Little Rock-North Little Rock-Conway, AR MSA. In addition to the one monitor operated by ADEQ in the Memphis, TN-MS-AR MSA, there are three additional SLAMS monitors operated by either MSCHD or MDEQ. The Fayetteville-Springdale-Rogers, AR-MO MSA, Fort Smith, AR-OK MSA, and Hot Springs, AR MSA each have one monitor in operation. In addition, the Texas Commission on Environmental Quality (TCEQ) operates a monitor in Texarkana, TX that covers the Texarkana, TX-AR MSA.

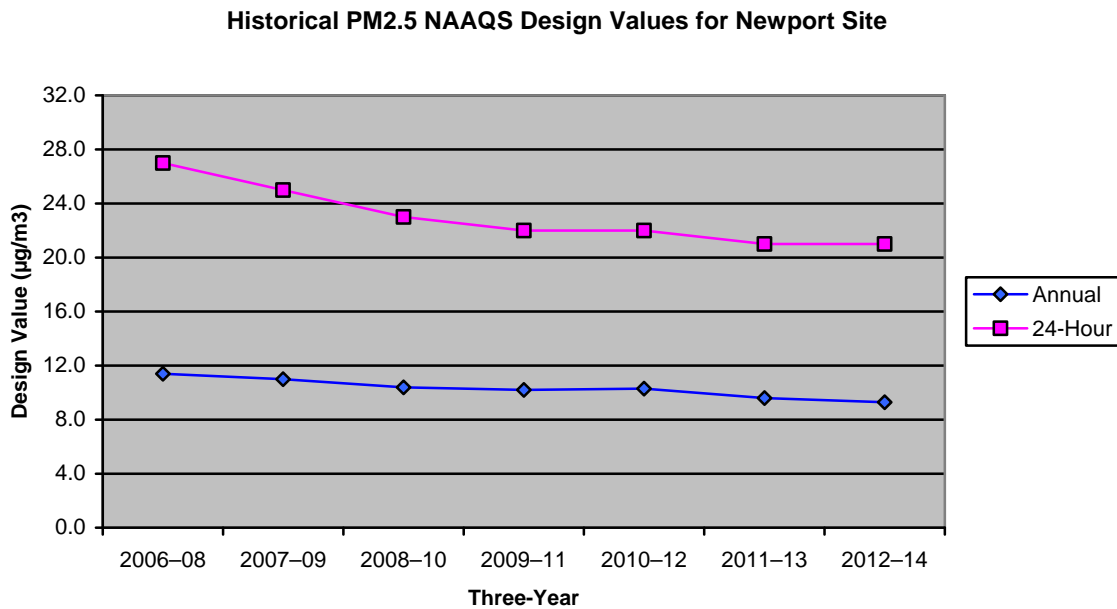
ADEQ also operates an additional five PM<sub>2.5</sub> monitoring sites not located in MSAs. Additional information regarding the PM<sub>2.5</sub> monitoring sites operated by ADEQ is listed in Table 7. The collocated FRM monitors for Hot Springs (05-051-0003) and PARR (05-119-0007) are operating on a 1:12 sampling schedule. In addition, the following sites are collocated with TEOM continuous monitor: Marion (05-035-0005), PARR (05-119-0007), DSR (05-119-1008), El Dorado (05-139-0006), and Springdale (05-143-0005).

Table 6 lists the monitoring sites that are used for daily Air Quality Index (AQI) reporting. The monitors at these locations also report hourly data to the AIRNOW web page to be used for real-time air quality particulate mapping.

**Table 6. Continuous PM<sub>2.5</sub> AQI Monitoring Site Information**

AQS ID #	Site Name	Sampling Frequency
05-143-0005	Springdale	Hourly
05-119-0007	PARR	Hourly

The only change to the PM<sub>2.5</sub> network that ADEQ is proposing is to discontinue the PM<sub>2.5</sub> monitor in Newport (05-067-0001) on January 1, 2016. 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. After analysis, ADEQ believes that removal of the Newport monitor will not compromise the data collection needed for implementation of the PM<sub>2.5</sub> NAAQS, as the Newport monitor have been consistently been under 80 percent for both the annual and 24-hour NAAQS as shown in Figure 3.



**Figure 3. Historical PM<sub>2.5</sub> NAAQS (Annual and 24-Hour) for Newport (05-067-0001)**

**Table 7. Proposed Schedule and Latest Design Value for ADEQ PM<sub>2.5</sub> Sites**

AQS ID #	Sampling Schedule		24-Hour PM <sub>2.5</sub> (µg/m <sup>3</sup> )					Annual PM <sub>2.5</sub> (µg/m <sup>3</sup> )					Collocated with TEOM
	Current	Proposed	2012	2013	2014	DV	DV % NAAQS	2012	2013	2014	DV	DV % NAAQS	
05-001-0011	1:3	1:3	18.5	22.1	22.4	21	60%	10.0	9.5	9.1	9.5	79%	No
05-003-0005	1:3	1:3	21.0	20.6	22.6	21	60%	10.0	9.1	8.6	9.2	77%	No
05-035-0005	1:3	1:3	24.7	21.9	24.7	24	69%	10.0	10.0	9.3	9.8	82%	Yes
05-051-0003	1:3	1:3	22.0	20.3	21.3	21	60%	10.5	9.4	9.1	9.7	81%	No
05-067-0001	1:3	Discontinue	18.6	20.9	23.4 <sup>1</sup>	21	60%	9.4	9.1	9.6 <sup>1</sup>	9.3	78%	No
05-113-0002	1:3	1:3	22.6	22.6	22.0	22	63%	10.0	9.9	9.4	9.8	82%	No
05-119-0007	1:1	1:1	22.6	20.7	21.9	22	63%	11.3	10.4	10.1	10.6	88%	Yes
05-119-1004	1:3	1:3	25.8	28.6	22.1	26	74%	11.1	10.6	9.4	10.4	87%	No
05-119-1008	1:3	1:3	27.1	22.6	23.3	24	69%	11.6	11.0	10.8	11.1	93%	Yes
05-139-0006	1:3	1:3	24.5	20.4	19.0	21	60%	10.9	9.6	9.0	9.8	82%	Yes
05-143-0005	1:3	1:3	20.0	19.6	21.2	20	57%	9.6	9.3	8.7	9.2	77%	Yes
40-135-9021	1:3	1:3	22.2	21.8	22.2	22	63%	10.2	9.7	9.3	9.7	81%	No

<sup>1</sup> Site did not meet data completeness

### 3.2.2 Particulate Matter (PM<sub>10</sub>)

The range of number of SLAMS PM<sub>10</sub> monitors for Arkansas MSA is listed in Table 8, as determined by Table D-4 of 40 CFR Part 58 App. D § 4.6. The range of PM<sub>10</sub> monitors a determined by the population size of the MSA from the latest Census and the previous year's design value for the area.

**Table 8. Required Minimum Number of PM<sub>10</sub> SLAMS for MSAs in Arkansas**

Metropolitan Statistical Area (MSA)	2010 Census	Monitors Required <sup>1</sup>
Fayetteville-Springdale-Rogers, AR-MO	463,204	0–1
Fort Smith, AR-OK	280,467	0–1
Hot Springs, AR	96,024	0
Jonesboro, AR	121,026	0
Little Rock-North Little Rock-Conway, AR	699,757	1–2
Memphis, TN-MS-AR	1,324,829	2–4
Pine Bluff, AR	100,258	0
Texarkana, TX-AR	149,198	0
<sup>1</sup> Based on 2014 design value		

ADEQ is operating two PM<sub>10</sub> monitoring sites, both operating in the Little Rock-North Little Rock-Conway, AR MSA. The PARR site (05-119-0007) also has a collocated PM<sub>10</sub> monitor operating on a 1:12 sampling schedule. The two PM<sub>10</sub> sites in the Memphis, TN-MS-AR MSA are operated by MSCHD.

Information regarding the two existing PM<sub>10</sub> sites operated by ADEQ in the Little Rock-North Little Rock-Conway, AR MSA is located in Table 9. ADEQ will continue to monitor the population using the latest Census for each MSA to determine the number of monitors required as described in 40 CFR 58 App. D § 4.6.

**Table 9. Proposed Schedule and Latest Estimated Exceedance for ADEQ PM<sub>10</sub> Sites**

AQS ID #	Sampling Schedule		Estimated Exceedance				
	Current	Proposed	2012	2013	2014	3-Yr Avg.	% NAAQS
05-119-0007	1:3	1:3	0.0	0.0	0.0	0.0	0%
05-119-1007	1:6	1:6	0.0	0.0	0.0	0.0	0%

### 3.2.3 Coarse Particulate Matter (PM<sub>10-2.5</sub>)

The PM<sub>10-2.5</sub> monitoring is performed at the PARR (05-119-0007) as part of the NCore requirement. The monitor is also operating on a 1:3 sampling schedule as required. No changes are being requested for this monitor.

### 3.2.4 Chemical Speciation

PM<sub>2.5</sub> speciation sampling is performed at the PARR (05-119-0007) as part of the NCore requirement. No changes are being requested for this monitor.

### 3.3 Sulfur Dioxide Network

The minimum number of SLAMS SO<sub>2</sub> monitors for Arkansas core based statistical areas (CBSAs) by the Population Weighted Emissions Index (PWEI) is listed in Table 10, as determined by 40 CFR Part 58 App. D § 4.4.2. The minimum number of SO<sub>2</sub> monitors is determined by CBSA population and the total SO<sub>2</sub> emitted within the CBSA. Population data is based on the most current Census or estimate and emissions data is from the most recent National Emissions Inventory (NEI).

**Table 10. Required Minimum Number of SO<sub>2</sub> SLAMS for MSAs in Arkansas**

Core Based Statistical Area (CBSA)	2014 Estimate	2011 NEI SO <sub>2</sub> Emissions (tpy)	PWEI	Monitors Required
<b>Metropolitan Statistical Area</b>				
Fayetteville-Springdale-Rogers, AR-MO	501,653	9,020	4,525	0
Fort Smith, AR-OK	279,592	4,269	1,193	0
Hot Springs, AR	97,322	85	8	0
Jonesboro, AR	126,764	302	38	0
Little Rock-North Little Rock-Conway, AR	729,135	648	473	0
Memphis, TN-MS-AR	1,343,230	21,205	28,483	1
Pine Bluff, AR	94,716	33,791	3,201	0
Texarkana, TX-AR	149,235	2,444	365	0
<b>Micropolitan Statistical Area</b>				
Arkadelphia, AR	22,576	215	5	0
Batesville, AR	36,959	34,008	1,257	0
Blytheville, AR	44,235	3,696	164	0
Camden, AR	30,030	166	5	0
El Dorado, AR	40,227	398	16	0
Forrest City, AR	26,899	100	3	0
Harrison, AR	45,100	182	8	0
Helena-West Helena, AR	19,930	189	4	0
Magnolia, AR	23,933	1,589	38	0
Malvern, AR	33,368	133	4	0
Mountain Home, AR	40,857	242	10	0
Paragould, AR	43,694	76	3	0
Russellville, AR	85,152	387	33	0
Searcy, AR	78,592	122	10	0



The Memphis, TN-MS-AR CBSA area is the only CBSA that requires a SO<sub>2</sub> monitor. The required SO<sub>2</sub> monitor in the Memphis CBSA is operated by MSCHD. ADEQ will continue to monitor the PWEI value for the Fayetteville-Springdale-Rogers, AR-MO CBSA. ADEQ also operates two additional SO<sub>2</sub> monitoring sites in the state: PARR (05-119-0007) and El Dorado (05-139-0006). EPA Region 6 approved ADEQ's request, from the 2014 Annual Network Plan, to remove the routine SO<sub>2</sub> monitor at site PARR. The routine monitor was removed on January 1, 2015. The trace SO<sub>2</sub> monitor remains in operation as part of the NCore requirement. There are no proposed changes to the SO<sub>2</sub> network at this time.

In addition, if ADEQ opts to characterize areas through monitoring for the 2010 1-hour NAAQS, any additional changes to the SO<sub>2</sub> network will be addressed in the next annual network plan. Source oriented monitors are not required to be operational until January 1, 2017 according to the proposed SO<sub>2</sub> Data Requirements Rule. ADEQ will adjust the timeframe accordingly if the monitor operational date changes in the finalized SO<sub>2</sub> Data Requirements Rule.

### **3.4 Nitrogen Dioxide Network**

There are two NO<sub>2</sub> sites in Arkansas operated by ADEQ: PARR (05-119-007) and Marion (05-035-0005). 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. Memphis, TN-MS-AR MSA is required to have one area-wide NO<sub>2</sub> monitor as the CBSA population exceeded 1,000,000. The PARR site meets the criteria for the RA-40 national requirement for susceptible and vulnerable populations as listed in 40 CFR Part 58, App. D § 4.3.4. There are no proposed changes to ADEQ's NO<sub>2</sub> network at this time.

The near-road NO<sub>2</sub> monitor for the Little Rock-North Little Rock-Conway, AR MSA will be address by ADEQ in the next annual network plan, as the near-road NO<sub>2</sub> monitors are not required to be operational until January 1, 2017. The near-road NO<sub>2</sub> monitor required for the Memphis, TN-MS-AR MSA was addressed by MSCHD and began operating on July 1, 2014.

NO/NO<sub>y</sub> measurements are monitored at the PARR site as part of the NCore requirement. This monitor produces conservative estimates for NO<sub>2</sub> as indicated in 40 CFR Part 58, App. D § 4.3.6.

### **3.5 Carbon Monoxide Network**

ADEQ currently operates one CO monitor at site PARR (05-119-0007), the required trace CO monitor for NCore monitoring. EPA Region 6 approved ADEQ's request, from the 2014 Annual Network Plan, to remove the routine CO monitor at site PARR. The routine monitor was removed on January 1, 2015. There are no proposed changes to the CO network at this time.

The requirement for collocation of a CO monitor at the near-road NO<sub>2</sub> site for the Memphis, TN-MS-AR MSA was addressed by MSCHD.

### 3.6 Lead Network

ADEQ has a lead sampler as part of the NCore monitoring requirement. This site also has a collocated Pb-PM<sub>10</sub> monitor operating on a 1:12 sampling schedule.

ADEQ currently does not have any source-oriented monitors for lead. Source-oriented monitoring is not required if Arkansas facilities are either below half-a-ton per year of actual lead emissions or have active lead waivers. Lead emissions are to be determined based on either the most recent NEI or other scientifically justifiable methods and data, such as the State Emission Inventory (State EI) or the Toxics Release Inventory (TRI). Waivers are also to be renewed every five years in accordance with 40 CFR Part 58.10(d).

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 Quanax Corp. - MacSteel Division)
6. Nucor Corporation (Nucor Steel, Arkansas)
7. Nucor-Yamato Steel Company

ADEQ is only requesting waiver renewals for two facilities: Entergy Arkansas, Inc. (Independence Plant) and Entergy Arkansas, Inc. (White Bluff Plant). In addition, no new waivers are being requested. Waiver renewal status for each facility can be found in Table 11 and in the next two subsections.

**Table 11. Source-Oriented Lead Waiver Status by Facility**

EIS #	Facility Name	2011 NEI	2013 State EI	2013 TRI	Renewal Requested
1083611	Arkansas Steel Associates, LLC	0.10	n/a <sup>1</sup>	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 <sup>1</sup>	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

<sup>1</sup> Facility only required to report triennially

### 3.6.1 Waivers Renewal Requested

#### 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 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). 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 4). 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.

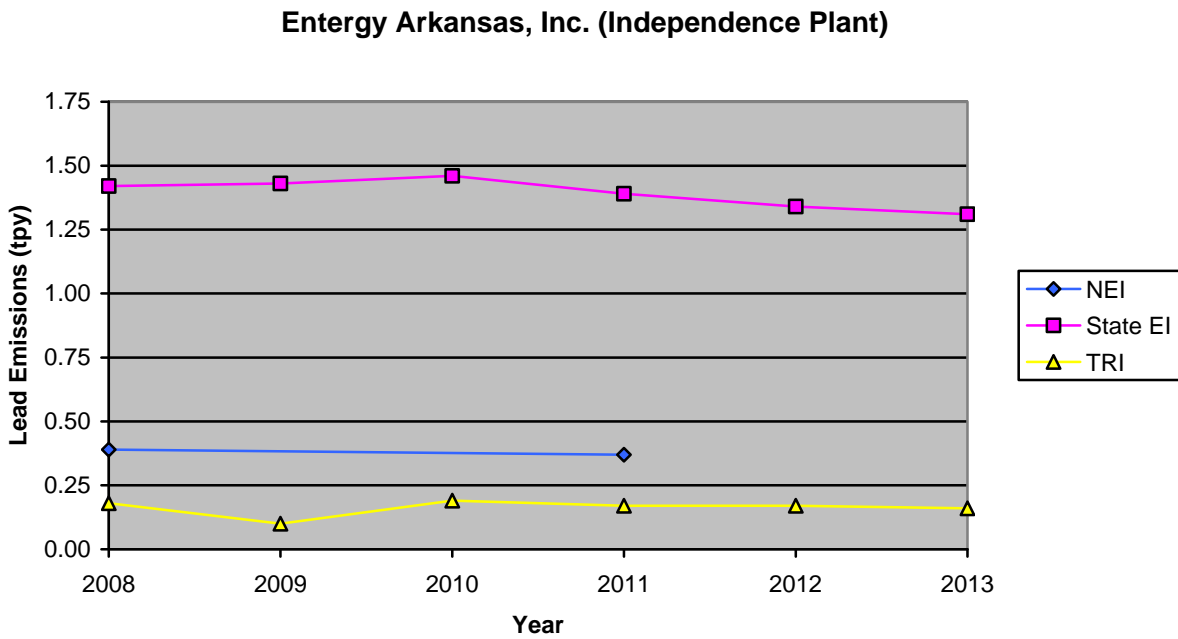
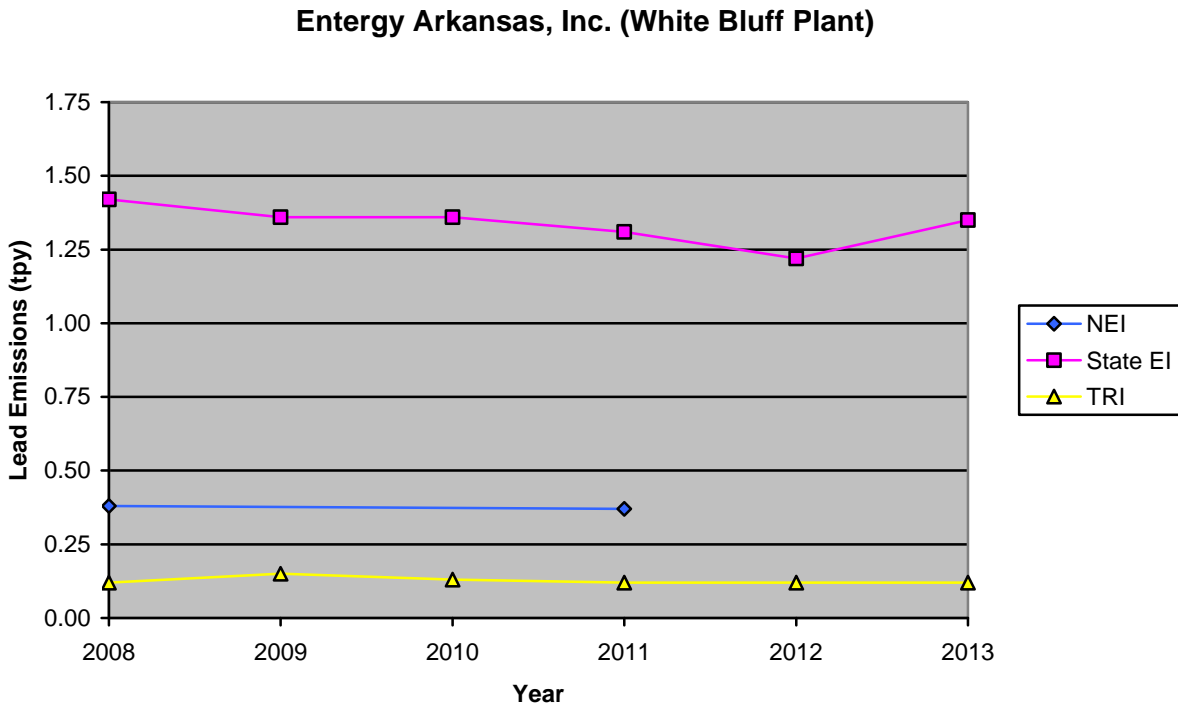


Figure 4. Lead Emissions for Entergy Arkansas, Inc. (Independence Plant)

**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  $0.01 \mu\text{g}/\text{m}^3$ . 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 5). 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.

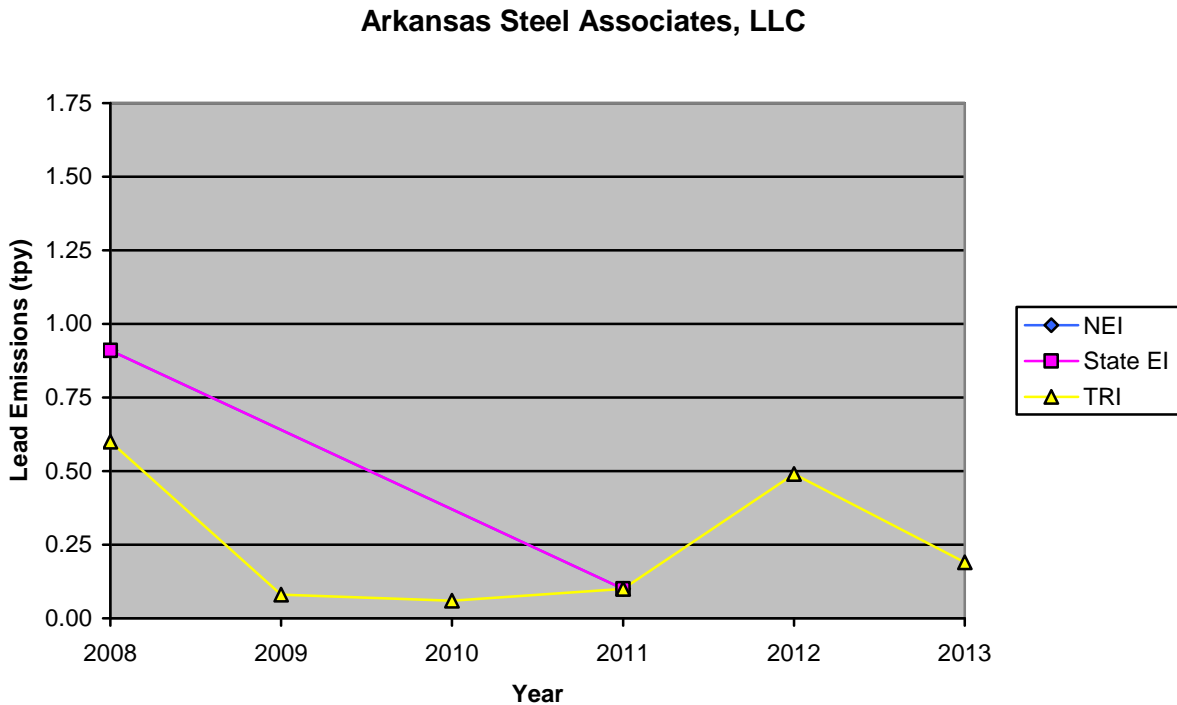


**Figure 5. Lead Emissions for Entergy Arkansas, Inc. (White Bluff Plant)**

### 3.6.2 Waivers No Longer Needed

#### Arkansas Steel Associates, LLC

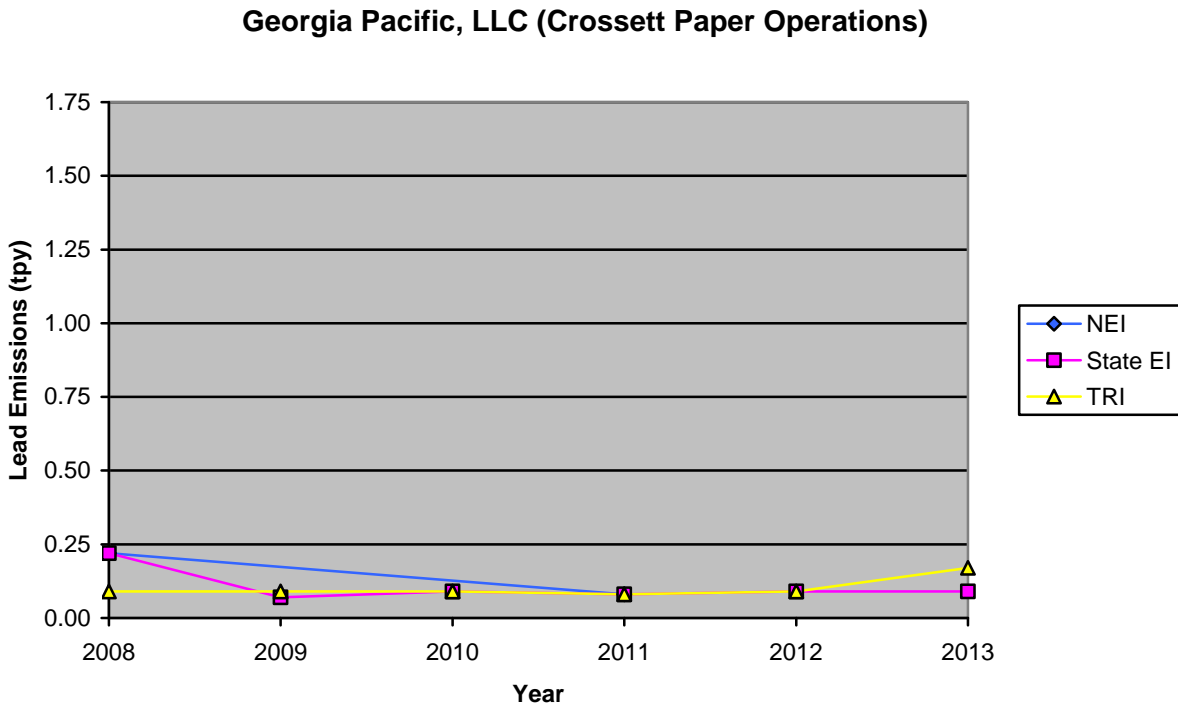
The 2008 NEI lead emissions for Arkansas Steel Associates, LLC was at 0.91 tpy, which prompted ADEQ to request a waiver for source-oriented lead monitoring in 2011. In the initial waiver request, ADEQ modeled to determine the impact the facility had on ambient lead NAAQS. The AERMOD results indicated that the facility contributed to 30.6 percent of the NAAQS with a maximum three-month average concentration level of  $0.046 \mu\text{g}/\text{m}^3$ . 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 as actual emissions have decreased since the 2008 NEI and emissions have remained below the 0.5 tpy threshold since 2009 (Table 11 & Figure 6). Actual lead emissions used for renewal determination included the 2011 NEI, the 2011 State EI, and the 2013 TRI.



**Figure 6. Lead Emissions for Arkansas Steel Associates, LLC**

### **Georgia Pacific, LLC (Crossett Paper Operations)**

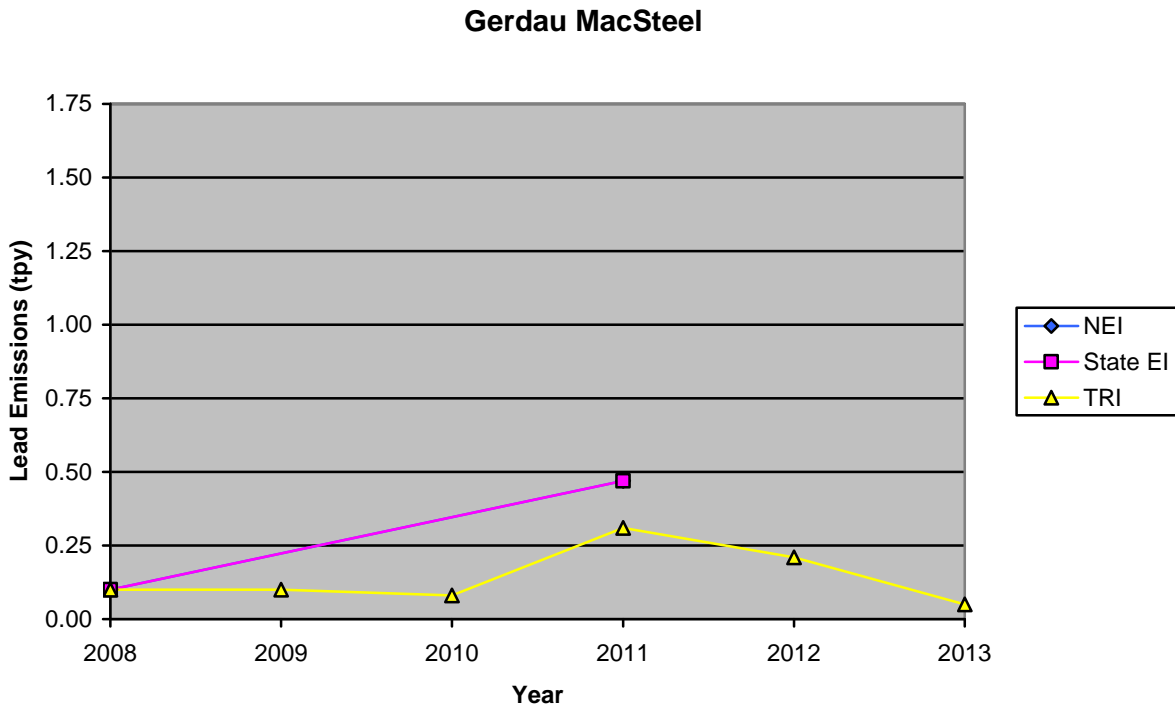
ADEQ requested a waiver for Georgia Pacific, LLC (Crossett Paper Operations) based on the facility's permitted emission of 23.7 tpy, even though a waiver was not required as the facility had a 2008 NEI lead emission of 0.22 tpy. The waiver request for the facility was approved by EPA on January 20, 2011. ADEQ is not requesting to renew the lead waiver for Georgia Pacific, LLC (Crossett Paper Operations) as it is no longer needed as actual emissions have decreased and emissions have remained below the 0.5 tpy threshold (Table 11 & Figure 7). 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 7. Lead Emissions for Georgia Pacific, LLC (Crossett Paper Operations)**

## Gerdau MacSteel

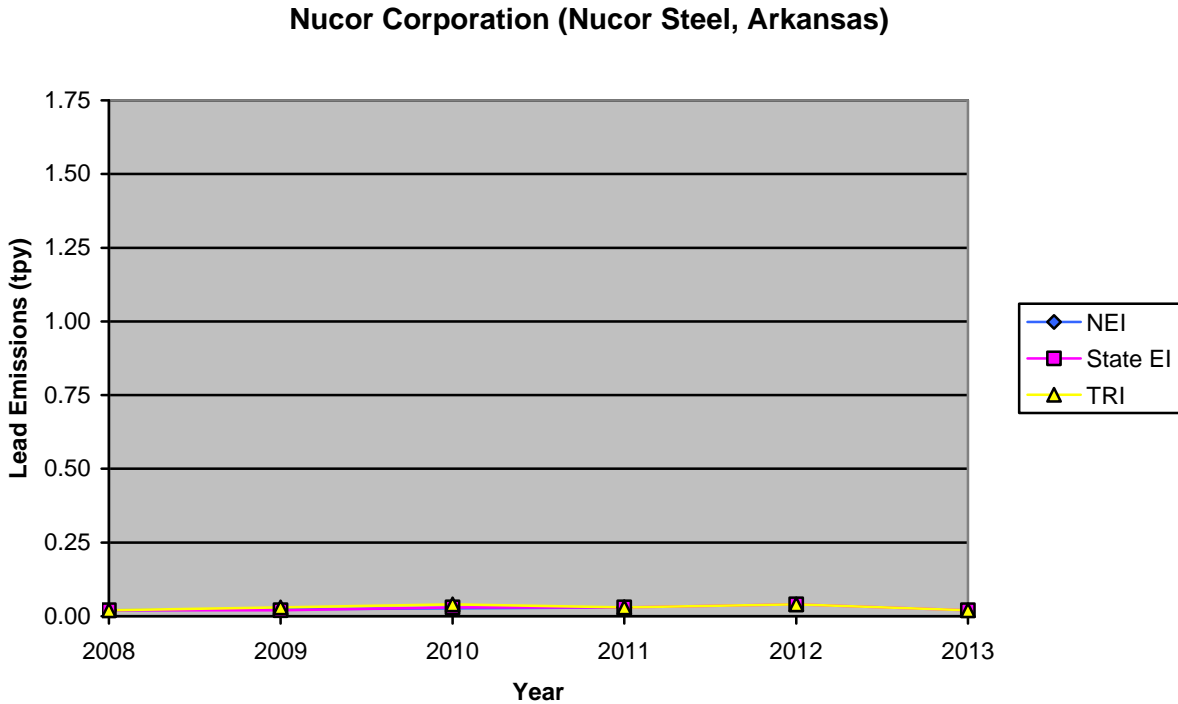
Lead waiver was also requested for Gerdau MacSteel, previously Quanex Corp. - MacSteel Division in the initial waiver request, based on the facility's permitted emission of 1.0 tpy. The facility was not required to have an active waiver as lead emission was below the 0.5 tpy threshold at 0.10 tpy according 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 8). Actual lead emission was determined using the 2011 NEI, the 2011 State EI, and the 2013 TRI.



**Figure 8. 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 9). Lead emissions used for renewal determination included the 2011 NEI, the 2013 State EI, and the 2013 TRI.

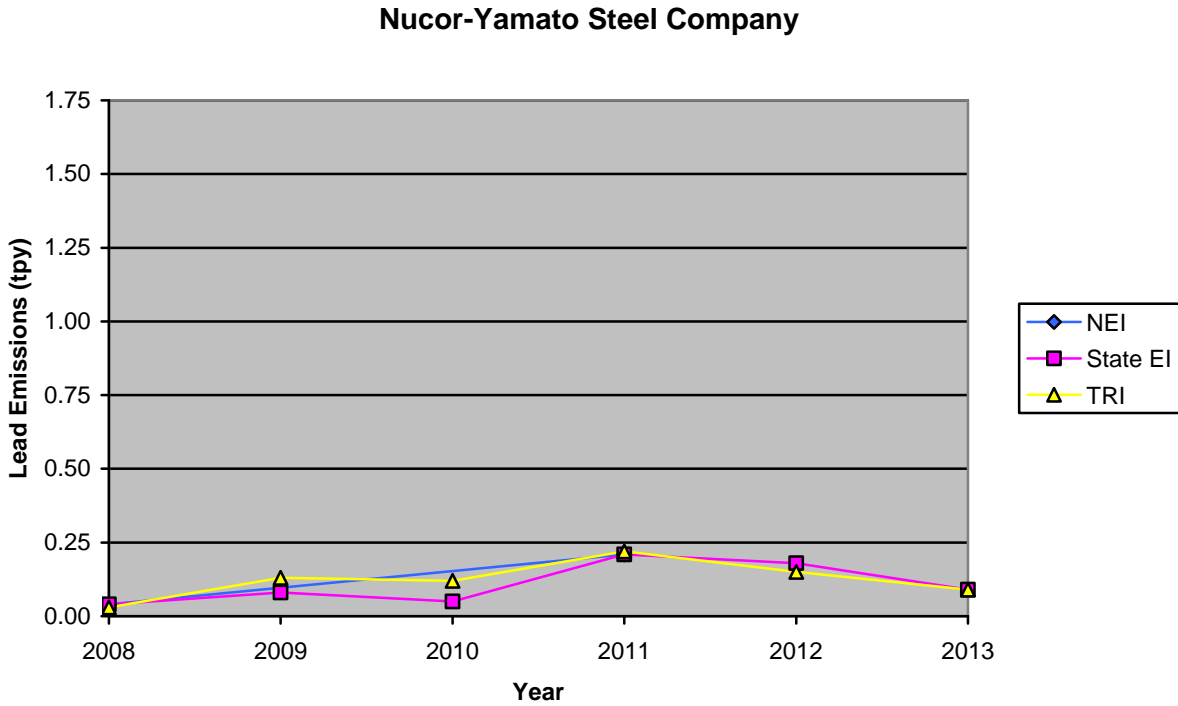


**Figure 9. Lead Emissions for Nucor Corporation (Nucor Steel, Arkansas)**



**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 10). 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 10. Lead Emissions for Nucor-Yamato Steel Company**

#### **4. Contact Information**

Questions concerning lead emissions and waivers should be sent to:

Mark McCorkle  
Arkansas Department of Environmental Quality  
5301 Northshore Dr.  
North Little Rock, AR 72118  
501-682-0736  
[mac@adeq.state.ar.us](mailto:mac@adeq.state.ar.us)

Any other comments or questions should be sent to:

Miriam Talbert - Air Lab Supervisor  
Arkansas Department of Environmental Quality  
5301 Northshore Dr.  
North Little Rock, AR 72118  
501-682-0925  
[miriam@adeq.state.ar.us](mailto:miriam@adeq.state.ar.us)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6  
1445 ROSS AVENUE, SUITE 1200  
DALLAS TX 75202-2733

SEP 04 2015

Mr. Stuart Spencer  
Chief, Air Division  
Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317

Dear Mr. Spencer:

This letter responds to the Arkansas Department of Environmental Quality's (ADEQ) letter dated August 28, 2015, requesting modifications to Arkansas' Ambient Air Monitoring system. The ADEQ is requesting to discontinue the ozone monitor at Doyle Springs Road (Monitor ID: 05-119-1008-44201-1) and the PM<sub>2.5</sub> monitor at Adams Field (Monitor ID: 05-119-1004-88101-1) by December 31, 2015. The U.S. Environmental Protection Agency (EPA) approves this request.

The EPA reviewed the information provided in ADEQ's 2015-2016 Annual Network Plan and the particulate matter and ozone concentrations for the Doyle Springs and Adams Field monitors. The EPA has completed its analysis of this request to ensure it meets the requirements governed by 40 Code of Federal Regulations §58 Appendix D.

- Two ozone monitors are required for the Little Rock Metropolitan Statistical Area (MSA) [see 40 Code of Federal Regulations (CFR) Part 58 Appendix D (4.1)]. This requirement is satisfied with the North Little Rock Airport ozone monitor (maximum ozone site for the MSA) and the PARR ozone monitor (required NCore ozone site). Preliminary 8-hour ozone design values for 2013-2015 (through August 31, 2015) for the Little Rock MSA have North Little Rock Airport at 66 parts per billion (ppb), Doyle Springs Road at 65 ppb and PARR at 63 ppb. The ozone monitor at the Doyle Springs Road site (AQS #05-119-1008) may be decommissioned since it is not the maximum 8-hour ozone concentration site in the Little Rock MSA.
- The Little Rock MSA has three PM<sub>2.5</sub> monitors (Doyle Springs Road, PARR, and Adams Field). One PM<sub>2.5</sub> monitor is required for Little Rock in addition to the required NCore monitor [see 40 CFR Part 58 Appendix D (4.7.1)]. The PARR site has the NCore PM<sub>2.5</sub> monitor. The PM<sub>2.5</sub> monitor at Doyle Springs Road has been the monitor with the highest PM<sub>2.5</sub> readings for the past four years. The Adams Field site has not exceeded the annual PM<sub>2.5</sub> National Ambient Air Quality Standard (NAAQS) or the 24-hour PM<sub>2.5</sub> NAAQS since it began operation in 2000. According to 40 CFR Part 58.14, (c1 and c2), ADEQ may decommission the Adams Field PM<sub>2.5</sub> monitor.

We appreciate the work and effort that the ADEQ continues to complete with their Ambient Air Monitoring system. If you have any questions, please contact me at (214) 665-2172 or Mr. Mark Sather of my staff at (214) 665-8353.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Frances Verhalen".

Frances Verhalen, Chief  
Air Quality Analysis Section

# 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](mailto: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

## Table of Contents

List of Appendices .....	iii
List of Tables.....	iv
List of Figures.....	v
Abbreviations and Acronyms .....	vi
1. Introduction.....	1
2. Evaluation Methods .....	2
2.1. Wind-rose Plots.....	2
2.2. Tile Plot Visualization Tool .....	2
2.3. Monitor-to-Monitor Correlation Matrix Tool .....	2
2.4. Area Served Tool .....	3
2.5. Removal Bias Tool .....	3
2.6. Exceedance Probability Tool .....	3
3. Monitoring Network Assessment .....	4
3.1. Overview of the National Ambient Air Quality Standards .....	4
3.2. Overview of ADEQ's Ambient Air Monitoring Network.....	5
3.3. Population Assessment.....	8
3.4. Meteorological Assessment .....	8
3.5. Ozone Network.....	10
3.5. PM <sub>2.5</sub> Network.....	22
3.6. Lead Network and Waivers.....	33
3.7. Carbon Monoxide Network.....	44
3.8. Nitrogen Dioxide Network .....	47
3.9. PM <sub>10</sub> Network .....	50
3.10. Sulfur Dioxide Network.....	53
4. Conclusion .....	57
Appendix.....	58

## List of Appendices

Appendix 1. Wind-rose Plots .....	59
Appendix 2. Tile Plots of 2009–14 O <sub>3</sub> Daily AQI for Select MSAs .....	75
Appendix 3. Tile Plots of 2009–14 PM <sub>2.5</sub> Daily AQI for Select MSAs.....	79

## List of Tables

Table 1. ADEQ-Operated SLAMS Monitor Information.....	6
Table 2. Average Temperature and Precipitation from 2011–14 .....	8
Table 3. Population of CBSAs Based on Decennial Census and Annual Estimates .....	9
Table 4. SLAMS O <sub>3</sub> Monitoring Requirements (Reproduction of Table D-2).....	10
Table 5. Number of Years of Service for Each ADEQ-Operated O <sub>3</sub> Monitor .....	11
Table 6. Last Five Design Values for the O <sub>3</sub> NAAQS at ADEQ-Operated Sites.....	12
Table 7. SLAMS PM <sub>2.5</sub> Monitoring Requirements (Reproduction of Table D-5).....	22
Table 8. Number of Years of Service for Each ADEQ-Operated PM <sub>2.5</sub> Monitor .....	23
Table 9. Last Five Design Values for the PM <sub>2.5</sub> NAAQS at ADEQ-Operated Sites .....	25
Table 10. Number of Years of Service for Each ADEQ-Operated Pb Monitor .....	33
Table 11. Facilities with Active Lead Waivers and Pb Emissions.....	36
Table 12. Number of Years of Service for the CO Monitor at PARR.....	44
Table 13. Last Five Design Values for the CO NAAQS at PARR .....	45
Table 14. Number of Years of Service for Each ADEQ-Operated NO <sub>2</sub> Monitor .....	47
Table 15. Last Five Design Values for the NO <sub>2</sub> NAAQS at ADEQ-Operated Sites .....	48
Table 16. SLAMS PM <sub>10</sub> Monitoring Requirements (Reproduction of Table D-4).....	50
Table 17. Number of Years of Service for Each ADEQ-Operated PM <sub>10</sub> Monitor .....	50
Table 18. Last Five Estimated Exceedances for the PM <sub>10</sub> NAAQS at ADEQ-Operated Sites.....	51
Table 19. Calculated PWEI for Arkansas CBSAs .....	53
Table 20. Number of Years of Service for Each ADEQ-Operated SO <sub>2</sub> Monitor .....	54
Table 21. Last Five Design Values for the SO <sub>2</sub> NAAQS at ADEQ-Operated Sites.....	55



## List of Figures

Figure 1. Current Primary and Secondary National Ambient Air Quality Standards.....	4
Figure 2. Map of All Monitoring Sites Fully or Partially Operated by ADEQ.....	5
Figure 3. Historical 4 <sup>th</sup> Annual Maximum for ADEQ-Operated O <sub>3</sub> Monitors.....	12
Figure 4. Number of Days with AQI above 100 (O <sub>3</sub> ) .....	13
Figure 5. Ozone Precursor (VOC and NO <sub>x</sub> ) Emission Sources from 2011 NEI.....	14
Figure 6. Correlation Matrix Analysis for Each O <sub>3</sub> Monitor Located in Arkansas.....	15
Figure 7. Area Served Analysis for O <sub>3</sub> Network .....	17
Figure 8. Removal Bias Analysis for ADEQ-Operated O <sub>3</sub> Monitoring Network .....	18
Figure 9. Probability Analysis for the 8-Hour 0.075 ppm O <sub>3</sub> Standard.....	19
Figure 10. Probability Analysis for the Proposed 8-Hour 0.070 ppm O <sub>3</sub> Standard.....	20
Figure 11. Probability Analysis for the Proposed 8-Hour 0.065 ppm O <sub>3</sub> Standard.....	21
Figure 12. Historical Weighted Annual Mean for ADEQ-Operated PM <sub>2.5</sub> Monitors .....	24
Figure 13. Historical Annual 98 <sup>th</sup> Percentile for ADEQ-Operated PM <sub>2.5</sub> Monitors.....	24
Figure 14. Number of Days with AQI above 100 (PM <sub>2.5</sub> ).....	26
Figure 15. PM <sub>2.5</sub> Emission Sources from 2011 NEI.....	27
Figure 16. Correlation Matrix Analysis for Each ADEQ-Operated PM <sub>2.5</sub> Monitor .....	28
Figure 17. Area Served Analysis for PM <sub>2.5</sub> Network.....	30
Figure 18. Removal Bias Analysis for ADEQ-Operated PM <sub>2.5</sub> Monitoring Network.....	31
Figure 19. Probability Analysis for the 24-Hour 35 µg/m <sup>3</sup> PM <sub>2.5</sub> Standard .....	32
Figure 20. Historical Annual 3-Month Average Maximum for Pb at PARR .....	34
Figure 21. Pb Emission Sources from 2011 NEI.....	35
Figure 22. Lead Emissions for Entergy Arkansas, Inc. (Independence Plant) .....	37
Figure 23. Lead Emissions for Entergy Arkansas, Inc. (White Bluff Plant) .....	38
Figure 24. Lead Emissions for Arkansas Steel Associates, LLC .....	39
Figure 25. Lead Emissions for Georgia Pacific, LLC (Crossett Paper Operations).....	40
Figure 26. Lead Emissions for Gerdau MacSteel .....	41
Figure 27. Lead Emissions for Nucor Corporation (Nucor Steel, Arkansas).....	42
Figure 28. Lead Emissions for Nucor-Yamato Steel Company .....	43
Figure 29. Historical Annual 2 <sup>nd</sup> Maximum for Both Primary CO Standard at PARR.....	45
Figure 30. CO Emission Sources from 2011 NEI.....	46
Figure 31. Historical Annual 98 <sup>th</sup> Percentile and Mean for ADEQ-Operated NO <sub>2</sub> Monitors.....	48
Figure 32. NO <sub>x</sub> Emission Sources from 2011 NEI .....	49
Figure 33. Historical Annual Maximum for ADEQ-Operated PM <sub>10</sub> Monitors.....	51
Figure 34. PM <sub>10</sub> Emission Sources from 2011 NEI .....	52
Figure 35. Historical Annual 99 <sup>th</sup> Percentile for ADEQ-Operated SO <sub>2</sub> Monitors .....	54
Figure 36. SO <sub>2</sub> Emission Sources from 2011 NEI .....	56

## 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 <sub>2</sub>	nitrogen dioxide
O <sub>3</sub>	ozone
PARR	Pike Avenue at River Road monitoring site
Pb	Lead
PM	particulate matter
PM <sub>2.5</sub>	particulate matter less than 2.5 micrometers in diameter
PM <sub>10</sub>	particulate matter less than 10 micrometers in diameter
ppb	parts per billion
ppm	parts per million
SLAMS	State and Local Air Monitoring Stations
SO <sub>2</sub>	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
µg/m <sup>3</sup>	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.<sup>1</sup> Other tools used include Lakes Environmental Software's WRPlot View and EPA's Tile Plot Tool.<sup>2,3</sup>

### 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

---

<sup>1</sup> 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/>

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

<sup>3</sup> U.S. Environmental Protection Agency (2015). Visualize Data: Tile Plot. Available from [http://www.epa.gov/airdata/ad\\_viz\\_tile.html](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/m <sup>3</sup> <sup>(1)</sup>	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 <sup>(2)</sup>	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm <sup>(3)</sup>	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particulate Pollution Dec 14, 2012	PM <sub>2.5</sub>	primary	Annual	12 µg/m <sup>3</sup>	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m <sup>3</sup>	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m <sup>3</sup>	98th percentile, averaged over 3 years
	PM <sub>10</sub>	primary and secondary	24-hour	150 µg/m <sup>3</sup>	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 <sup>(4)</sup>	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/m<sup>3</sup> 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 NO<sub>2</sub> 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.

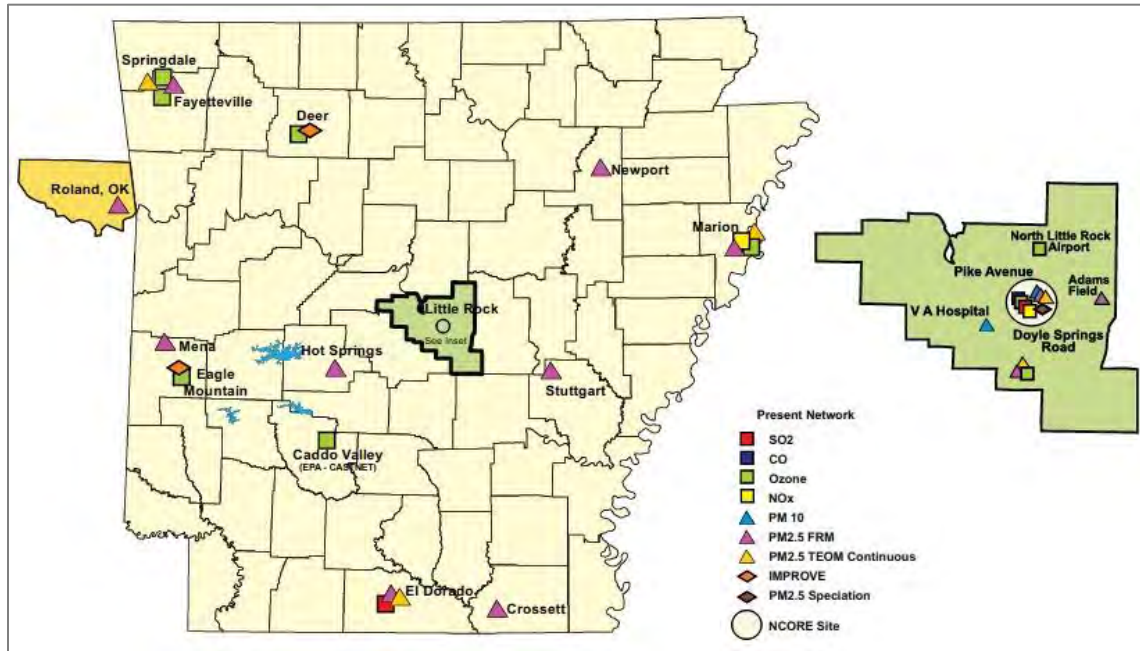
(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO<sub>2</sub> standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where 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<sub>2.5</sub> and PM<sub>10</sub>), 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.<sup>4</sup> The CAA requires EPA to review these standards every five years.

<sup>4</sup> 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<sub>2.5</sub> FRM monitors, five PM<sub>2.5</sub> TEOM monitors, one PM<sub>2.5</sub> speciation monitor, two PM<sub>10</sub> 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.<sup>5</sup>

<sup>5</sup> 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 <sub>2.5</sub>	143	R&P 2000 FRM
05-003-0005	Crossett	201 Unity Rd	33.136708, -91.950233	SLAMS	PM <sub>2.5</sub>	143	R&P 2000 FRM
05-035-0005	Marion	Polk & Colonial Dr	35.197178, -90.193047	SLAMS	PM <sub>2.5</sub>	143	R&P 2000 FRM
				SLAMS	PM <sub>2.5</sub>	105	R&P TEOM
				SLAMS	Ozone		UV Photometric
				SLAMS	NO <sub>2</sub>		Chemiluminescence
05-051-0003	Hot Springs	300 Werner	34.469309, -93.000000	SLAMS	PM <sub>2.5</sub> <sup>1</sup>	143	R&P 2000 FRM
05-067-0001	Newport	7648 Victory Blvd	35.638069, -91.189381	SLAMS	PM <sub>2.5</sub>	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 <sub>2.5</sub>	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 <sub>2.5</sub> <sup>1</sup>	145	R&P 2025 FRM
				SLAMS	PM <sub>2.5</sub>	105	R&P TEOM
				SLAMS	PM <sub>10</sub> <sup>1</sup>	127	Gravimetric
				SLAMS	PM <sub>10-2.5</sub> <sup>1</sup>	176	Gravimetric/FRM
				SLAMS	Ozone		UV Photometric
				SLAMS	NO <sub>x</sub>		Chemiluminescence
				SLAMS	Speciation	810	Low Volume
				SLAMS	NO <sub>y</sub>		Chemiluminescence
				SLAMS	Trace SO <sub>2</sub>		Infrared
				SLAMS	Trace CO	81	
SLAMS	Pb <sup>†</sup>		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 <sub>2.5</sub>	143	R&P 2000 FRM
05-119-1007	VA Hospital	4300 Block of W 7th	34.744814, -92.319906	SLAMS	PM <sub>10</sub>	127	Gravimetric
05-119-1008	DSR	Doyle Springs Rd	34.681225, -92.328539	SLAMS	PM <sub>2.5</sub>	143	R&P 2025 FRM
				SLAMS	PM <sub>2.5</sub>	105	R&P TEOM
				SLAMS	Ozone		UV Photometric
05-139-0006	El Dorado	Union Memorial Hospital	33.220122, -92.669453	SLAMS	PM <sub>2.5</sub>	143	R&P 2000 FRM
				SLAMS	PM <sub>2.5</sub>	105	R&P TEOM
				SLAMS	SO <sub>2</sub>		Pulsed Fluorescent
05-143-0005	Springdale	600 S Old Missouri Rd	36.179617, -94.116611	SLAMS	PM <sub>2.5</sub>	145	R&P 2025 FRM
				SLAMS	PM <sub>2.5</sub>	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 <sub>2.5</sub>	145	R&P 2025 FRM

<sup>1</sup> 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 <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	N/A
05-003-0005	Crossett	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	N/A
05-035-0005	Marion	PM <sub>2.5</sub>	Daily 1 in 3	Regional Transport	Neighborhood	Yes	Memphis
		PM <sub>2.5</sub>	Continuous	Regional Transport	Neighborhood	No	
		Ozone	Continuous		Neighborhood	Yes	
		NO <sub>2</sub>	Continuous		Neighborhood	Yes	
					Area Wide		
05-051-0003	Hot Springs	PM <sub>2.5</sub> <sup>1</sup>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Hot Springs
05-067-0001	Newport	PM <sub>2.5</sub>	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 <sub>2.5</sub>	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 <sub>2.5</sub> <sup>1</sup>	Daily 1 in 1	Population Exposure	Neighborhood	Yes	Little Rock
		PM <sub>2.5</sub>	Continuous	Population Exposure	Neighborhood	No	
		PM <sub>10</sub> <sup>1</sup>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	
		Ozone	Continuous	Population Exposure	Neighborhood	Yes	
		NO <sub>x</sub>	Continuous	Susceptible & Vulnerable Population Exposure	Neighborhood	Yes	
		Speciation	Daily 1 in 3	Population Exposure	Neighborhood	No	
		NO <sub>y</sub>	Continuous	Population Exposure	Neighborhood	No	
		Trace SO <sub>2</sub>	Continuous	Population Exposure	Neighborhood	Yes	
		Trace CO	Continuous	Population Exposure	Neighborhood	No	
		Pb <sup>†</sup>	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 <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1007	VA Hospital	PM <sub>10</sub>	Daily 1 in 6	Population Exposure	Neighborhood	Yes	Little Rock
05-119-1008	DSR	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Little Rock
		PM <sub>2.5</sub>	Continuous		Neighborhood	No	
		Ozone	Continuous		Neighborhood	Yes	
05-139-0006	El Dorado	PM <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	El Dorado
		PM <sub>2.5</sub>	Continuous	Population Exposure	Neighborhood	No	
		SO <sub>2</sub>	Continuous	Population Exposure	Neighborhood	Yes	
05-143-0005	Springdale	PM <sub>2.5</sub>	Continuous	Population Exposure	Neighborhood	No	Fayetteville
		PM <sub>2.5</sub>	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 <sub>2.5</sub>	Daily 1 in 3	Population Exposure	Neighborhood	Yes	Fort Smith

<sup>†</sup> 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  $\mu$ SAs 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**

Location	Temperature (°F)					Precipitation (inches)				
	2011	2012	2013	2014	Normal <sup>1</sup>	2011	2012	2013	2014	Normal <sup>2</sup>
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

<sup>1</sup>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 <sup>1</sup>	Rank	
		2011	2012	2013	2014		Population	% Growth <sup>1</sup>
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

<sup>1</sup> 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<sub>3</sub> Monitoring Requirements (Reproduction of Table D-2)**

<b>MSA Population<sup>1,2</sup></b>	<b>Most Recent 3-Year Design Value Concentration ≥85% of any O<sub>3</sub> NAAQS<sup>3</sup></b>	<b>Most Recent 3-Year Design Value Concentration &lt;85% of any O<sub>3</sub> NAAQS<sup>3,4</sup></b>
>10 million	4	2
4 – 10 million	3	1
350,000 – <4 million	2	1
50,000 – <350,000 <sup>5</sup>	1	0

<sup>1</sup> Minimum monitoring requirement applies to the Metropolitan Statistical Area (MSA)

<sup>2</sup> Population based on latest available census figures

<sup>3</sup> The ozone (O<sub>3</sub>) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50

<sup>4</sup> These minimum monitoring requirements apply in the absence of a design value

<sup>5</sup> 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<sub>3</sub> 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.

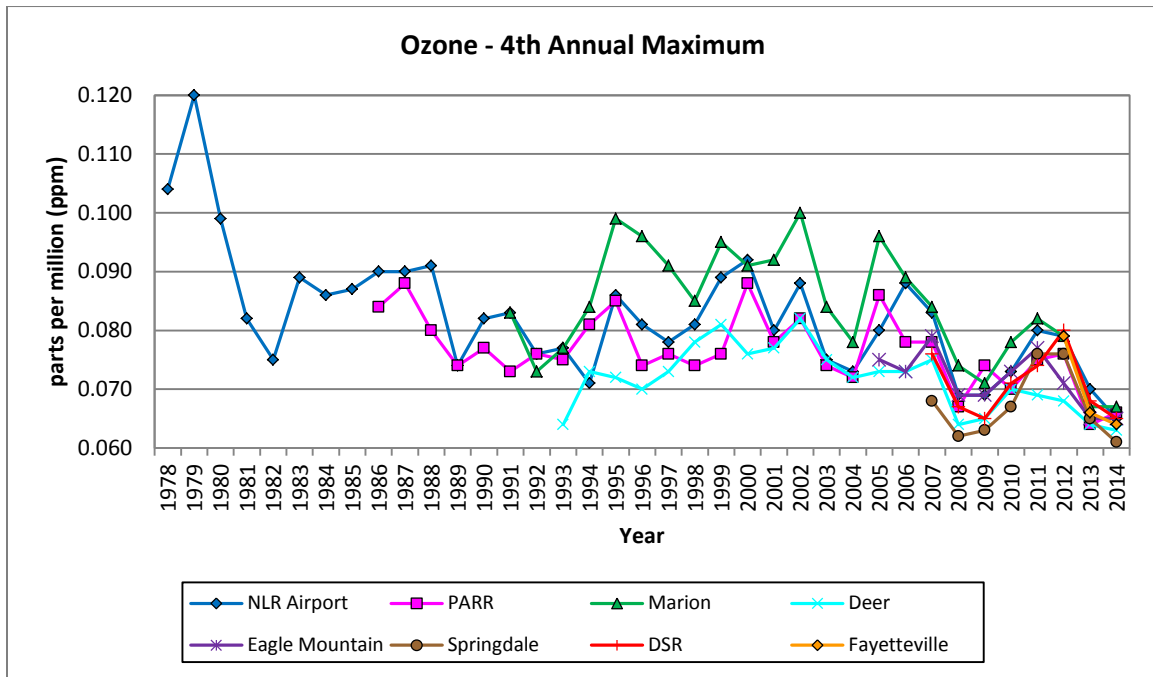


Figure 3. Historical 4<sup>th</sup> Annual Maximum for ADEQ-Operated O<sub>3</sub> Monitors

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<sub>3</sub> NAAQS at ADEQ-Operated Sites

AQS ID	Site Name	8-Hour Design Value (in ppm)				
		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 <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>	0.069

<sup>1</sup> 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.

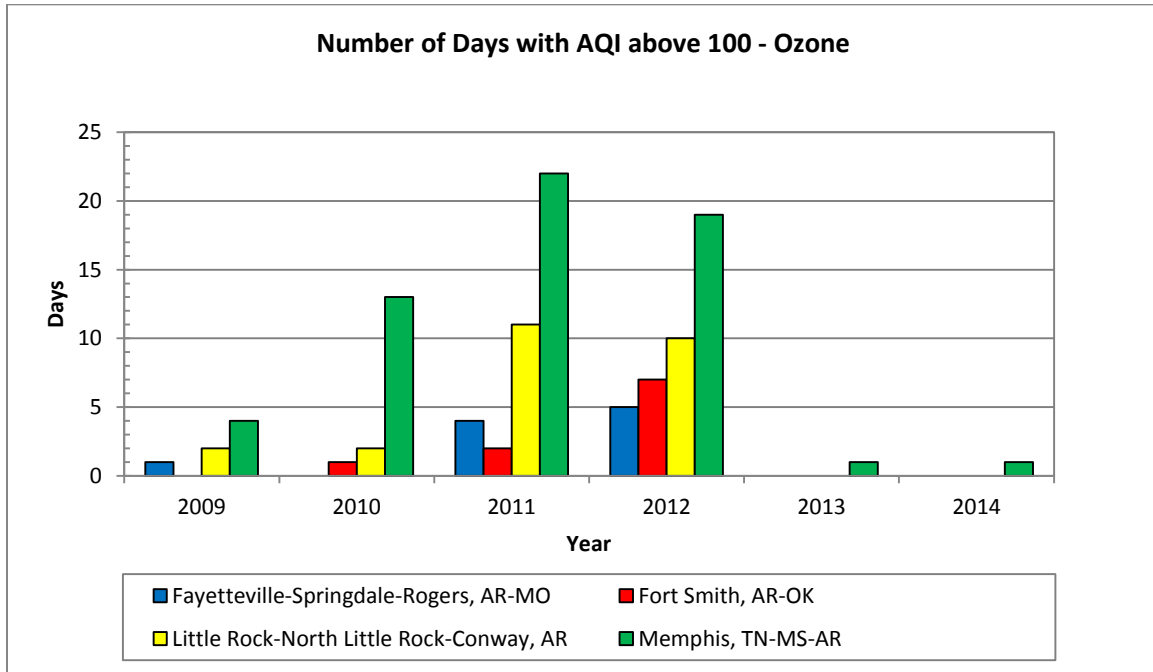


Figure 4. Number of Days with AQI above 100 (O<sub>3</sub>)

### 3.4.4. Emission Sources

Figure 5 depicts the location of the ADEQ and EPA-operated ozone monitors located in Arkansas along with NO<sub>x</sub> and VOCs point sources. NO<sub>x</sub> 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.



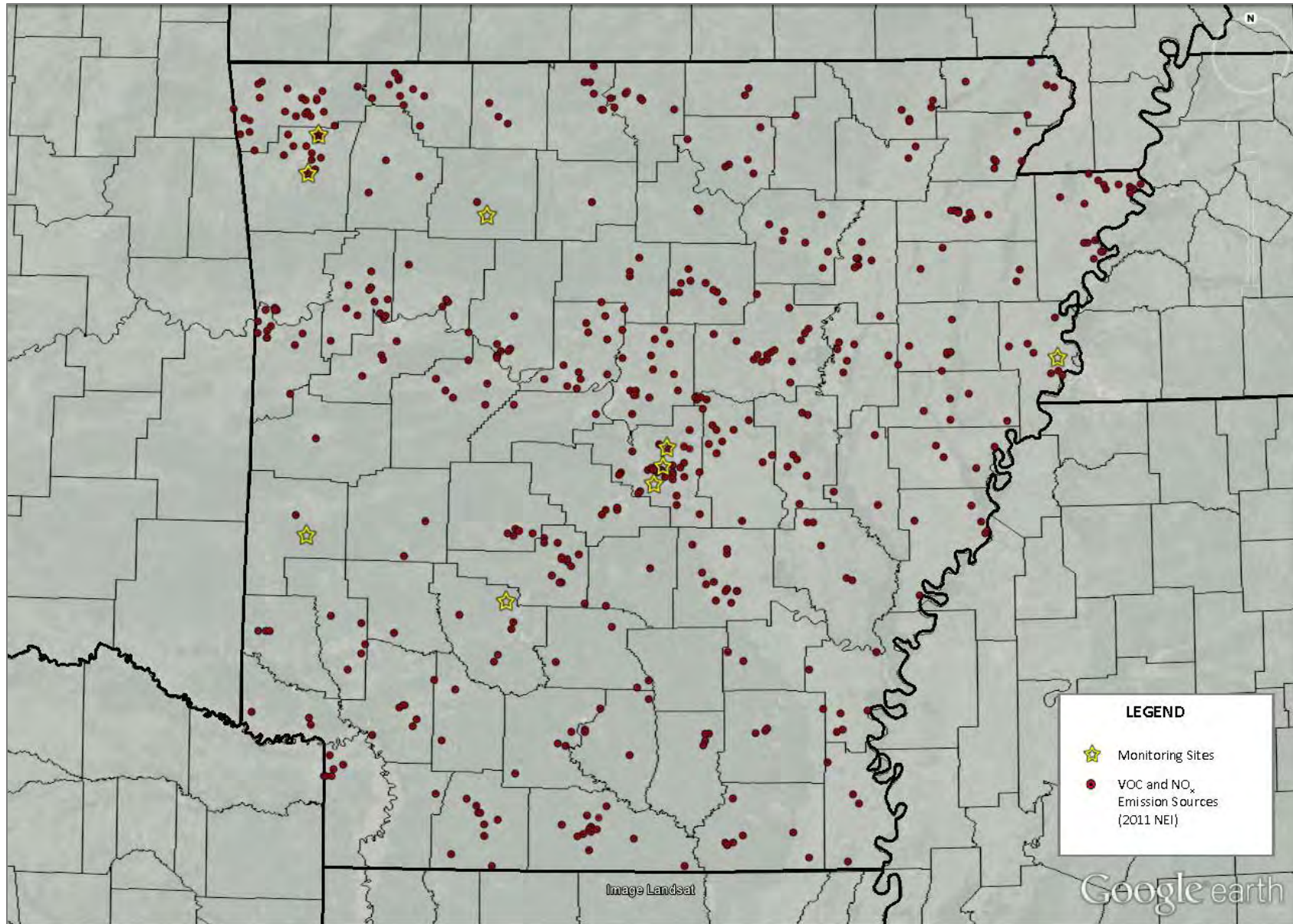


Figure 5. Ozone Precursor (VOC and NO<sub>x</sub>) Emission Sources from 2011 NEI



### 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.

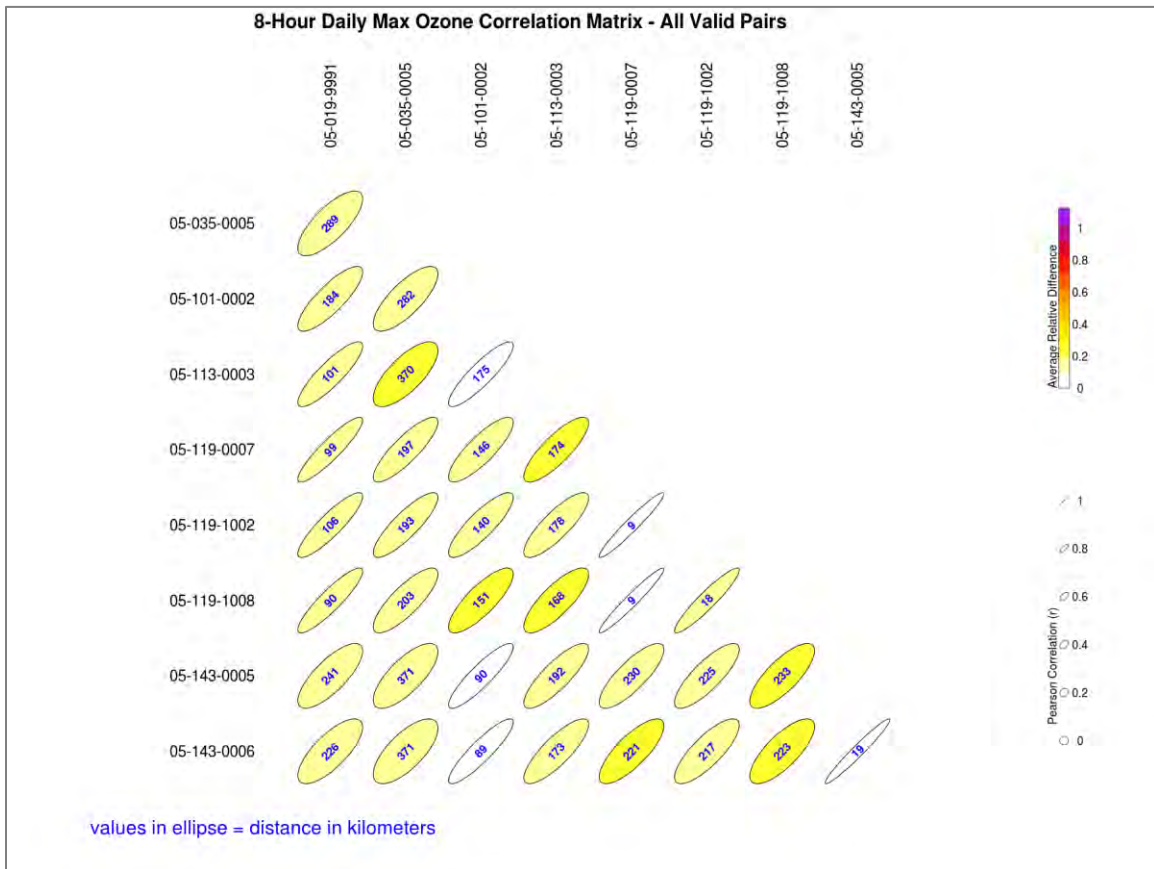


Figure 6. Correlation Matrix Analysis for Each O<sub>3</sub> Monitor Located in Arkansas

#### **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).

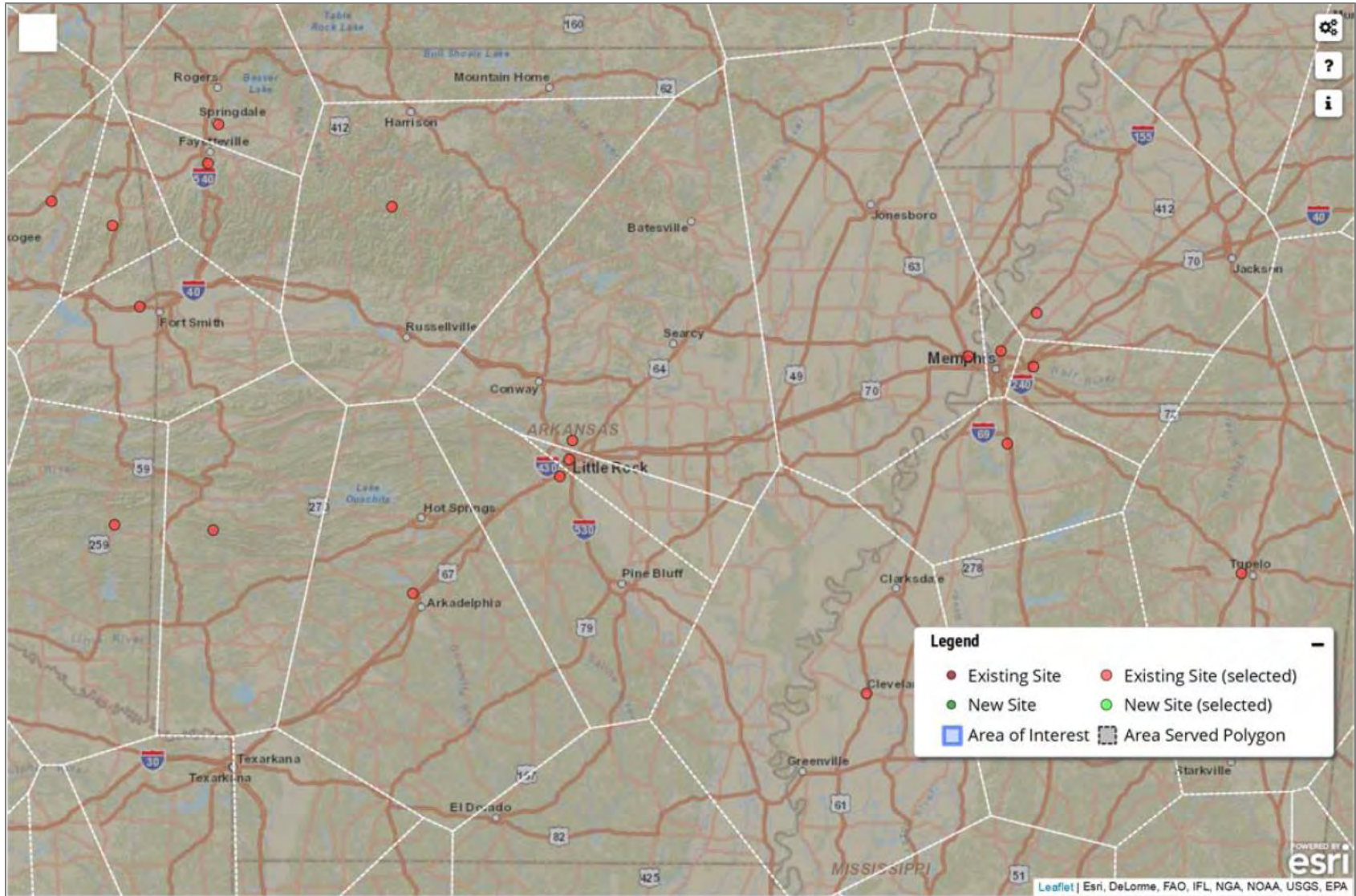


Figure 7. Area Served Analysis for O<sub>3</sub> Network

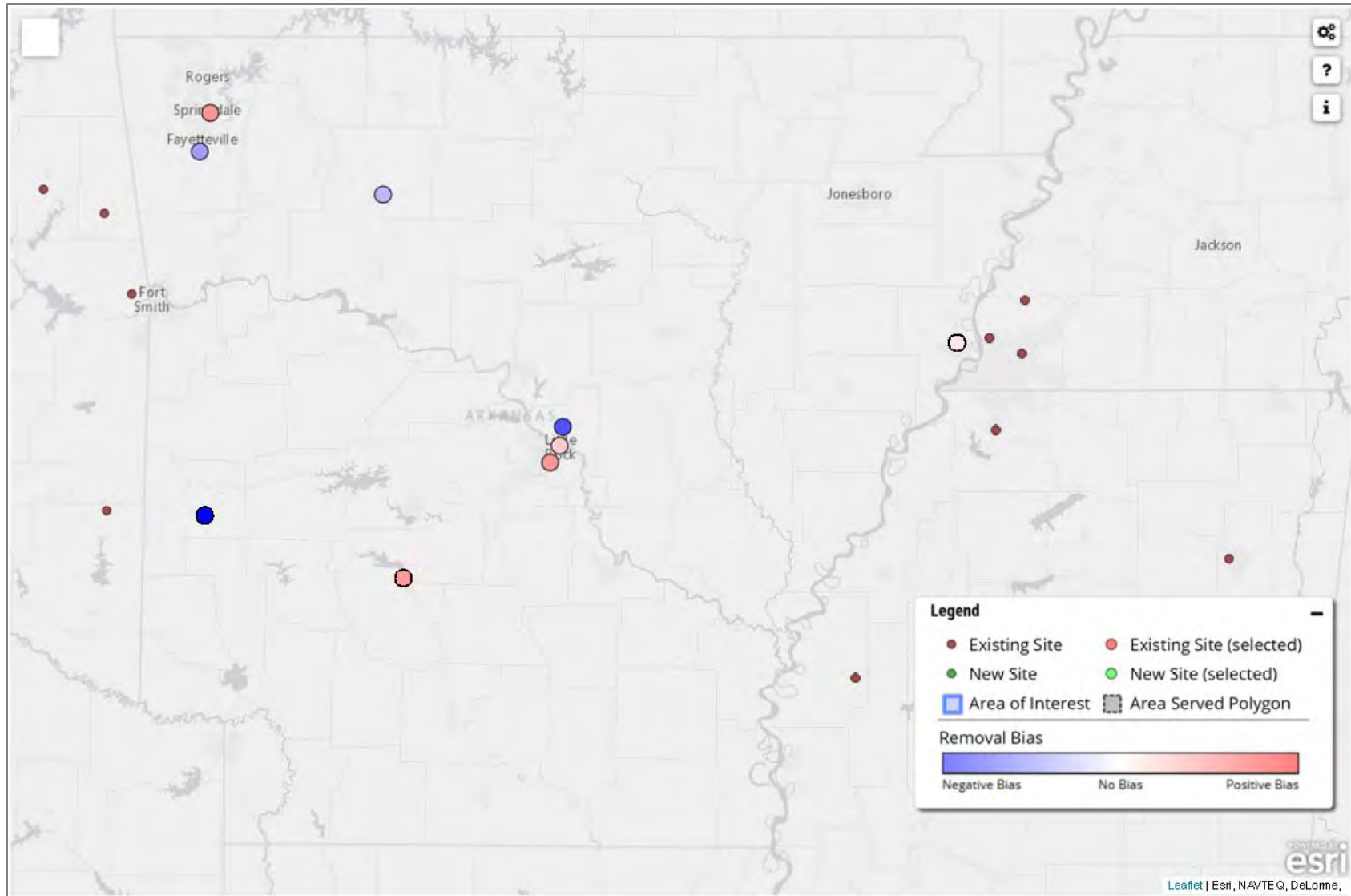


Figure 8. Removal Bias Analysis for ADEQ-Operated O<sub>3</sub> Monitoring Network



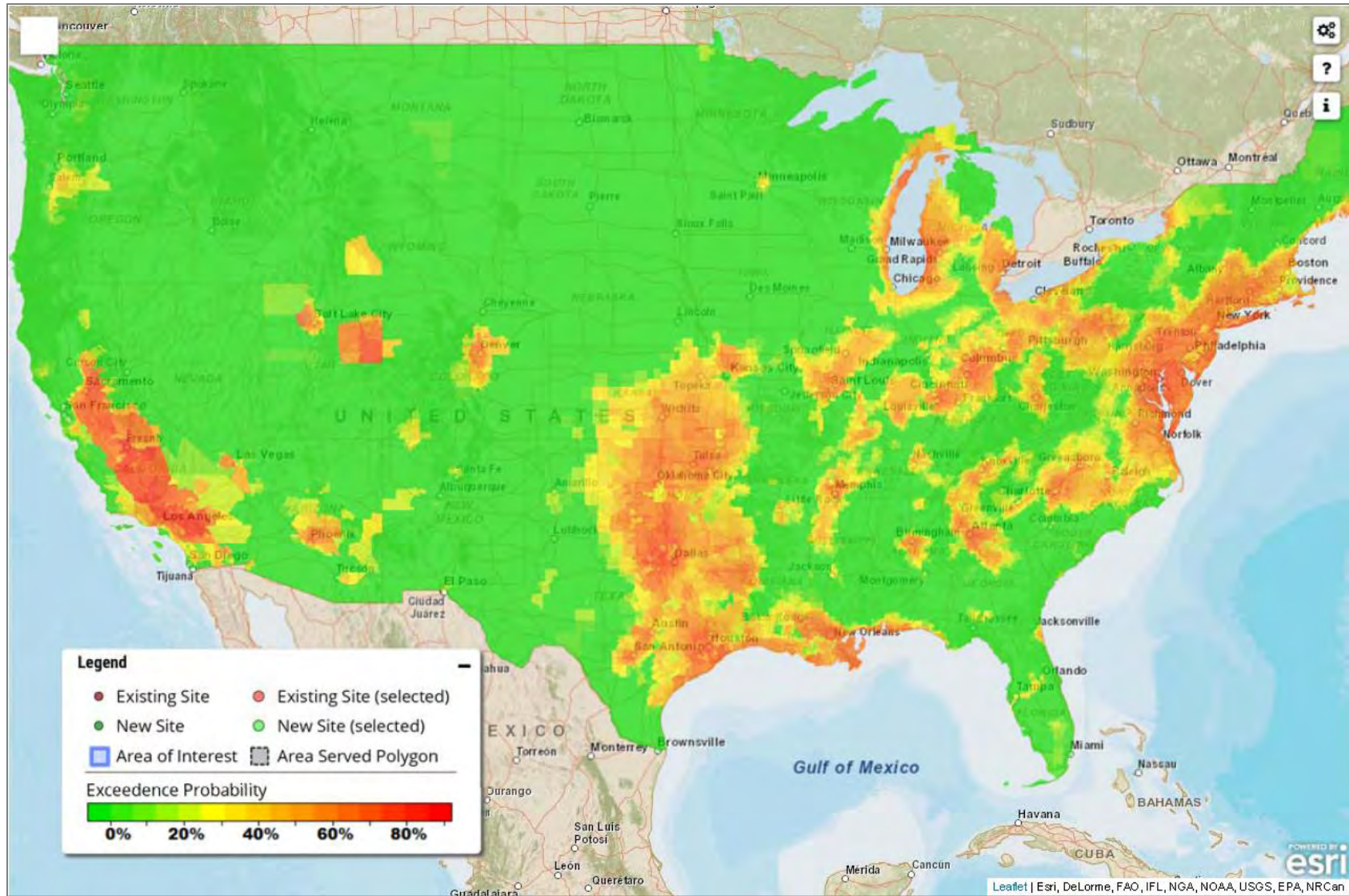


Figure 9. Probability Analysis for the 8-Hour 0.075 ppm O<sub>3</sub> Standard

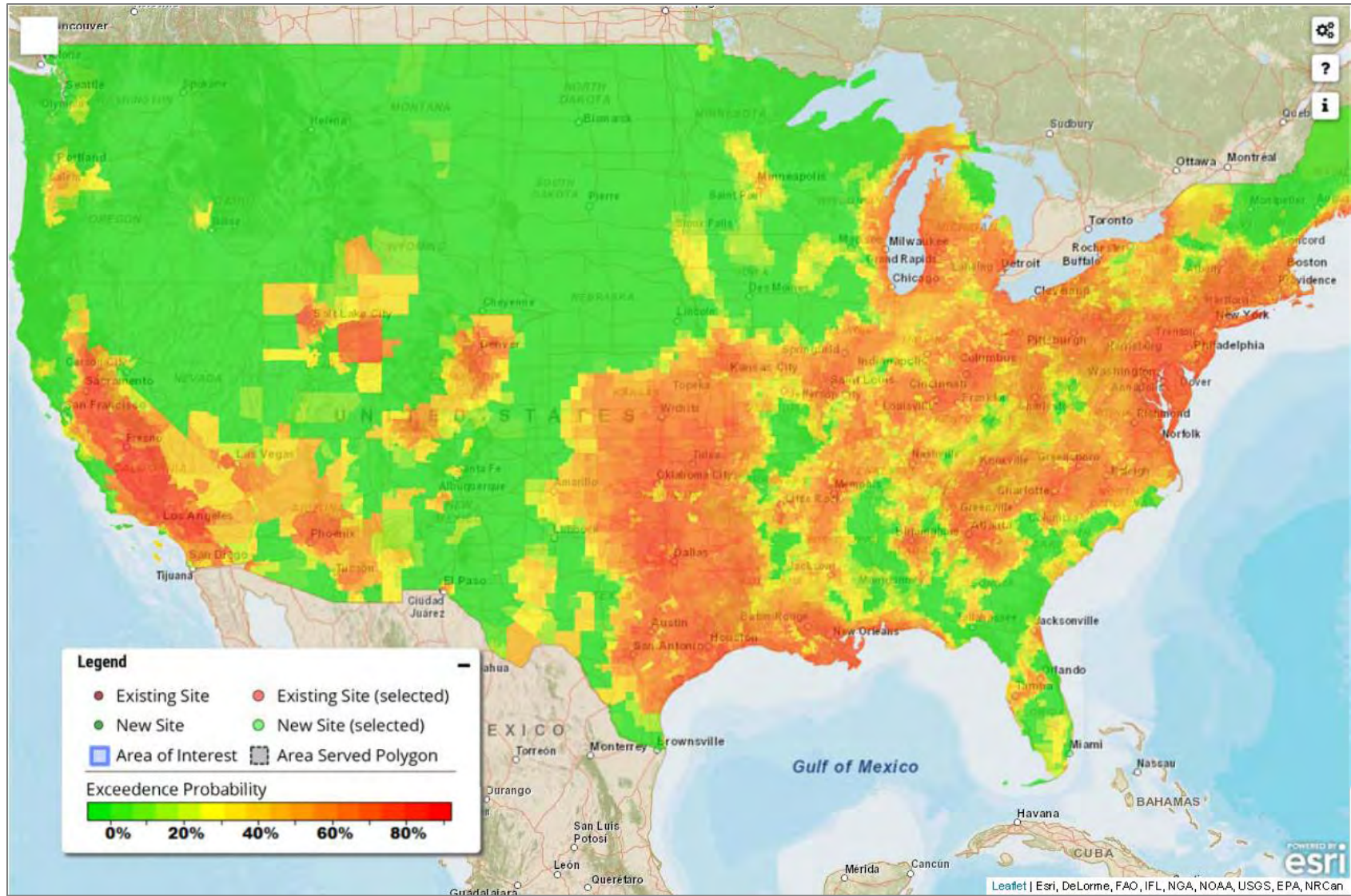


Figure 10. Probability Analysis for the Proposed 8-Hour 0.070 ppm O<sub>3</sub> Standard



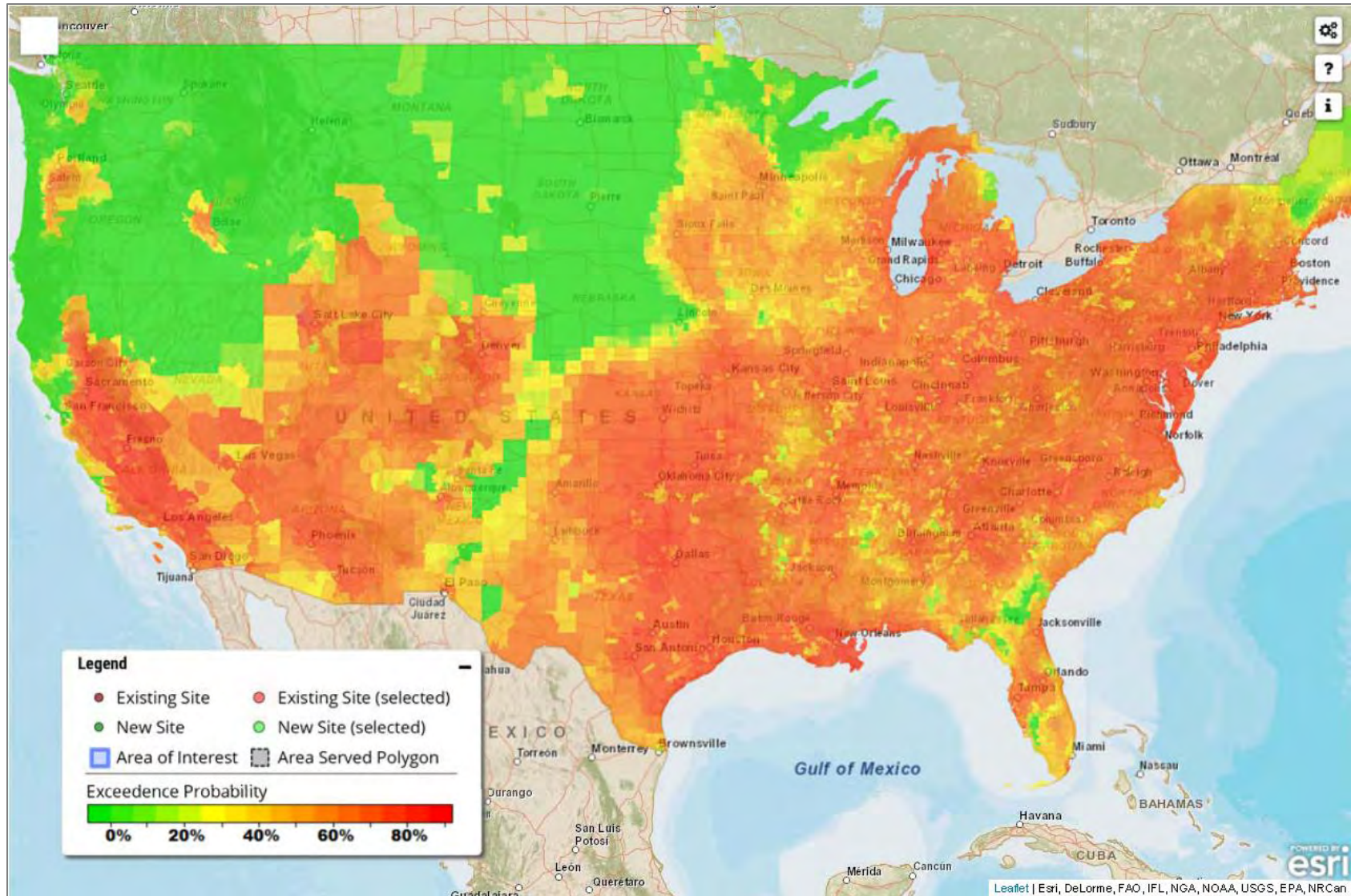


Figure 11. Probability Analysis for the Proposed 8-Hour 0.065 ppm O<sub>3</sub> Standard

### 3.5. PM<sub>2.5</sub> Network

#### 3.5.1. Monitoring Requirement

The monitoring requirement for PM<sub>2.5</sub> 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<sub>2.5</sub> Monitoring Requirements (Reproduction of Table D-5)**

<b>MSA Population<sup>1,2</sup></b>	<b>Most Recent 3-Year Design Value ≥85% of any PM<sub>2.5</sub> NAAQS<sup>3</sup></b>	<b>Most Recent 3-Year Design Value &lt;85% of any PM<sub>2.5</sub> NAAQS<sup>3,4</sup></b>
>1,000,000	3	2
500,000 – 1,000,000	2	1
50,000 – <500,000 <sup>5</sup>	1	0

<sup>1</sup> Minimum monitoring requirement applies to the Metropolitan Statistical Area (MSA)

<sup>2</sup> Population based on latest available census figures

<sup>3</sup> The PM<sub>3.5</sub> National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50

<sup>4</sup> These minimum monitoring requirements apply in the absence of a design value

<sup>5</sup> 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<sub>2.5</sub> design values, the following two MSAs are required to have PM<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> monitors at Adams Field, DSR, and PARR. The PARR monitor also contains a PM<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> monitor is listed in Table 8.



**Table 8. Number of Years of Service for Each ADEQ-Operated PM<sub>2.5</sub> 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 <sup>1</sup>	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

<sup>1</sup> 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<sub>2.5</sub> 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<sub>2.5</sub> NAAQS, as the monitor has been consistently under 80 percent for both the annual and 24-hour standard.

In addition to the Newport PM<sub>2.5</sub> monitoring site, ADEQ requested to discontinue the Adams Field PM<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> 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 PM<sub>2.5</sub> NAAQS and has never exceeded the 2012 NAAQS level of 12.0 µg/m<sup>3</sup> (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<sub>2.5</sub> NAAQS. This request was approved in a letter to ADEQ dated September 4, 2015. ADEQ plans to decommission the PM<sub>2.5</sub> monitor at the Adams Field monitoring site at the end of December 2015.

ADEQ does not anticipate requesting to terminate any other PM<sub>2.5</sub> sites in the near future at the time of this assessment. No new PM<sub>2.5</sub> 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 98<sup>th</sup> 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  $\mu\text{g}/\text{m}^3$  annual NAAQS standard. The 24-hour concentrations have not been above the 35  $\mu\text{g}/\text{m}^3$  24-hour NAAQS standard since 2005.

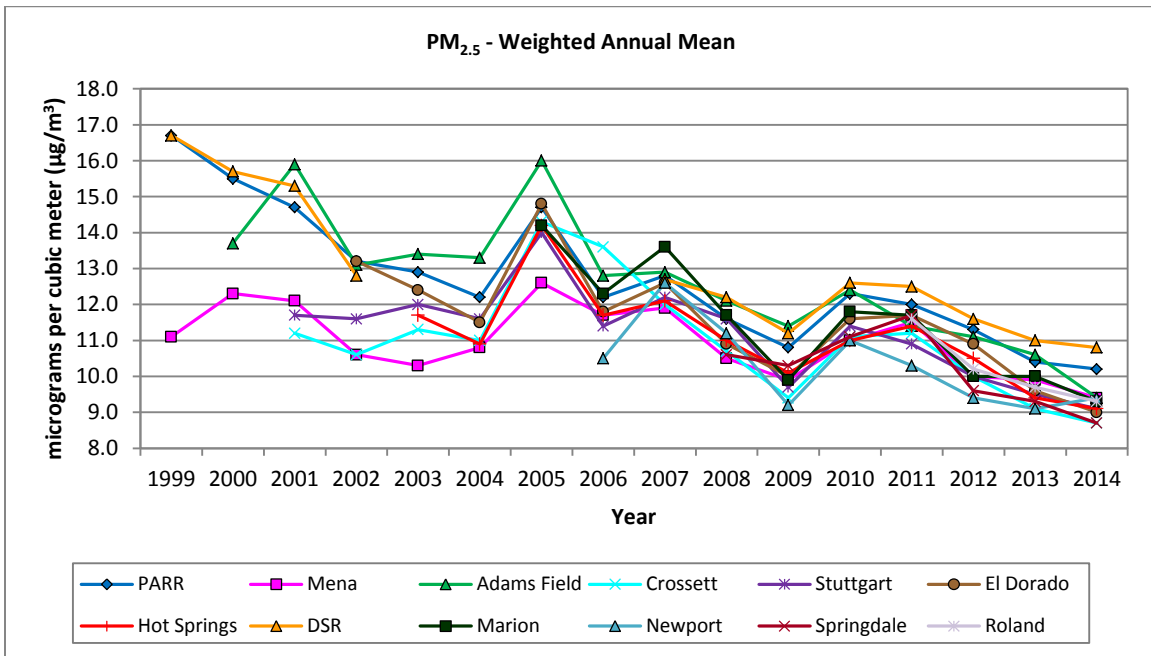


Figure 12. Historical Weighted Annual Mean for ADEQ-Operated PM<sub>2.5</sub> Monitors

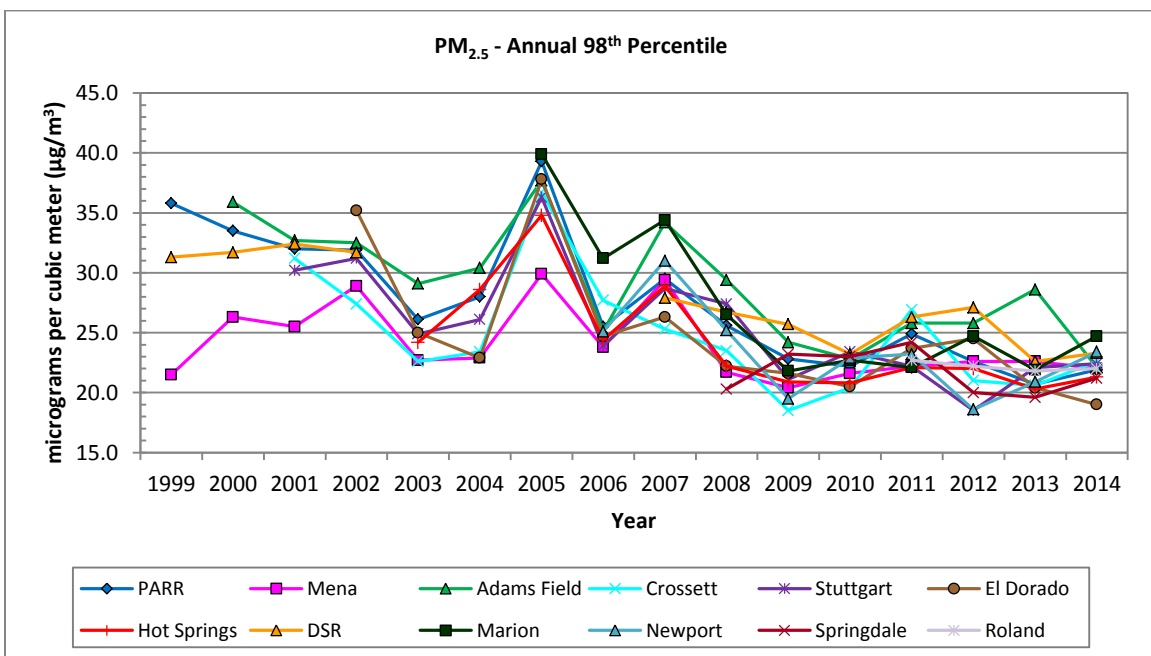


Figure 13. Historical Annual 98<sup>th</sup> Percentile for ADEQ-Operated PM<sub>2.5</sub> Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For the annual PM<sub>2.5</sub> standard, the design value is the three-year average of the weighted annual means; for the 24-hour PM<sub>2.5</sub> standard, the design value is the three-year average of the annual 98<sup>th</sup> percentile 24-hour average concentration. The last five years' worth of design values can be found in Table 9. At all ADEQ-operated PM<sub>2.5</sub> 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<sub>2.5</sub> monitor in Arkansas at DSR. DSR is currently at 90 percent of the annual standard.

**Table 9. Last Five Design Values for the PM<sub>2.5</sub> NAAQS at ADEQ-Operated Sites**

AQS ID	Site Name	Annual Design Value (in µg/m <sup>3</sup> )					24-Hour Design Value (in µg/m <sup>3</sup> )				
		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 <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>	10.5	9.7	n/a <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>	22	22

<sup>1</sup> 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  $12.0 \mu\text{g}/\text{m}^3$ . The number of days with AQI above 100 is displayed in Figure 14, which shows that  $\text{PM}_{2.5}$  has not been a major concern.

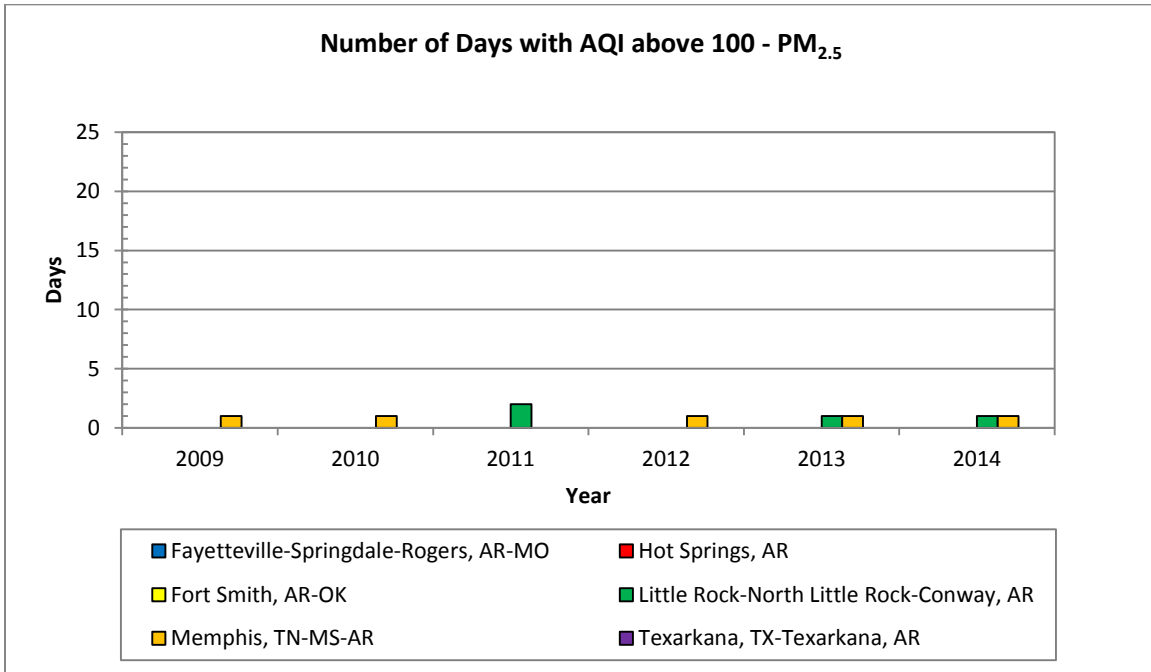


Figure 14. Number of Days with AQI above 100 ( $\text{PM}_{2.5}$ )

### 3.5.4. Emission Sources

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

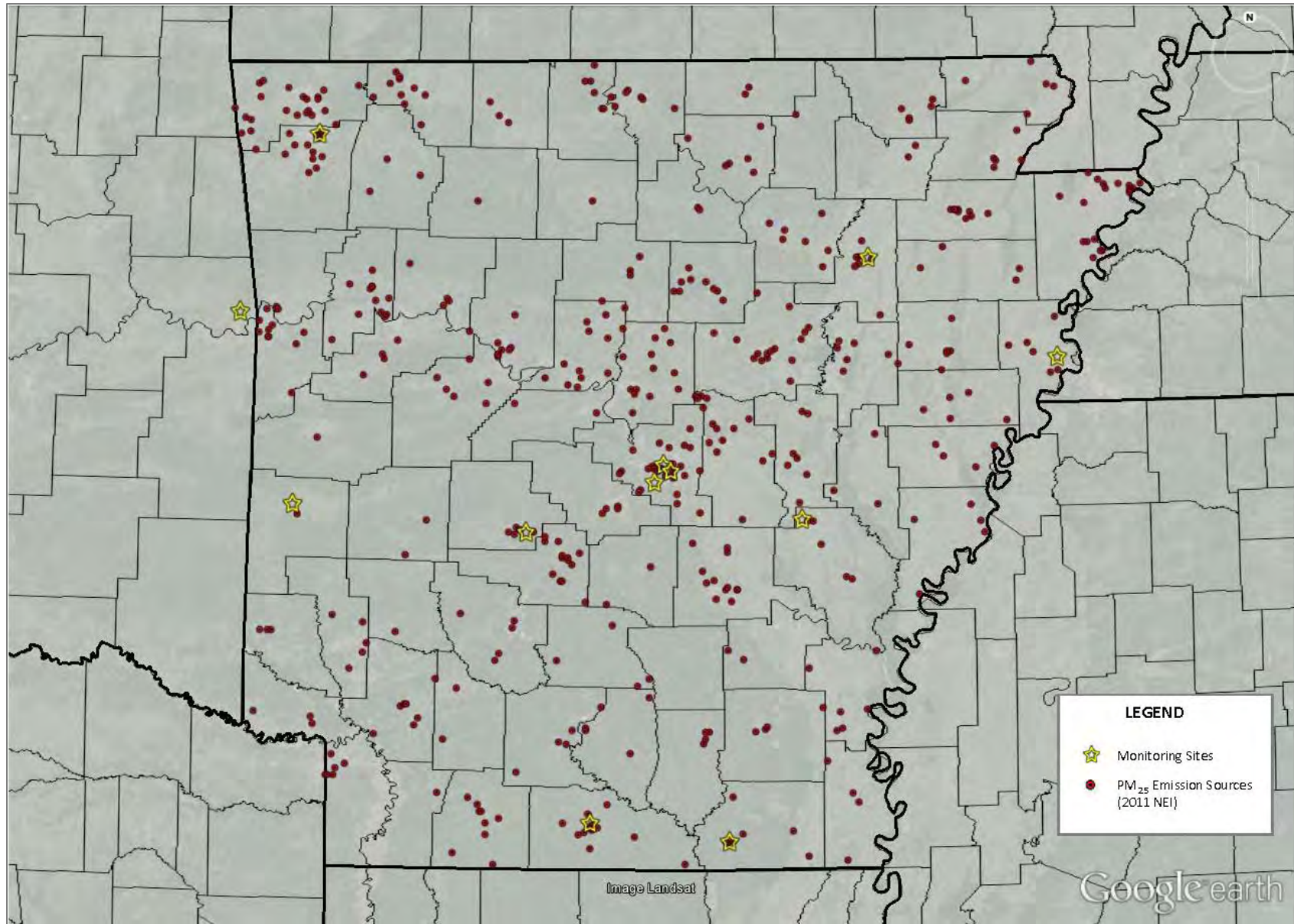
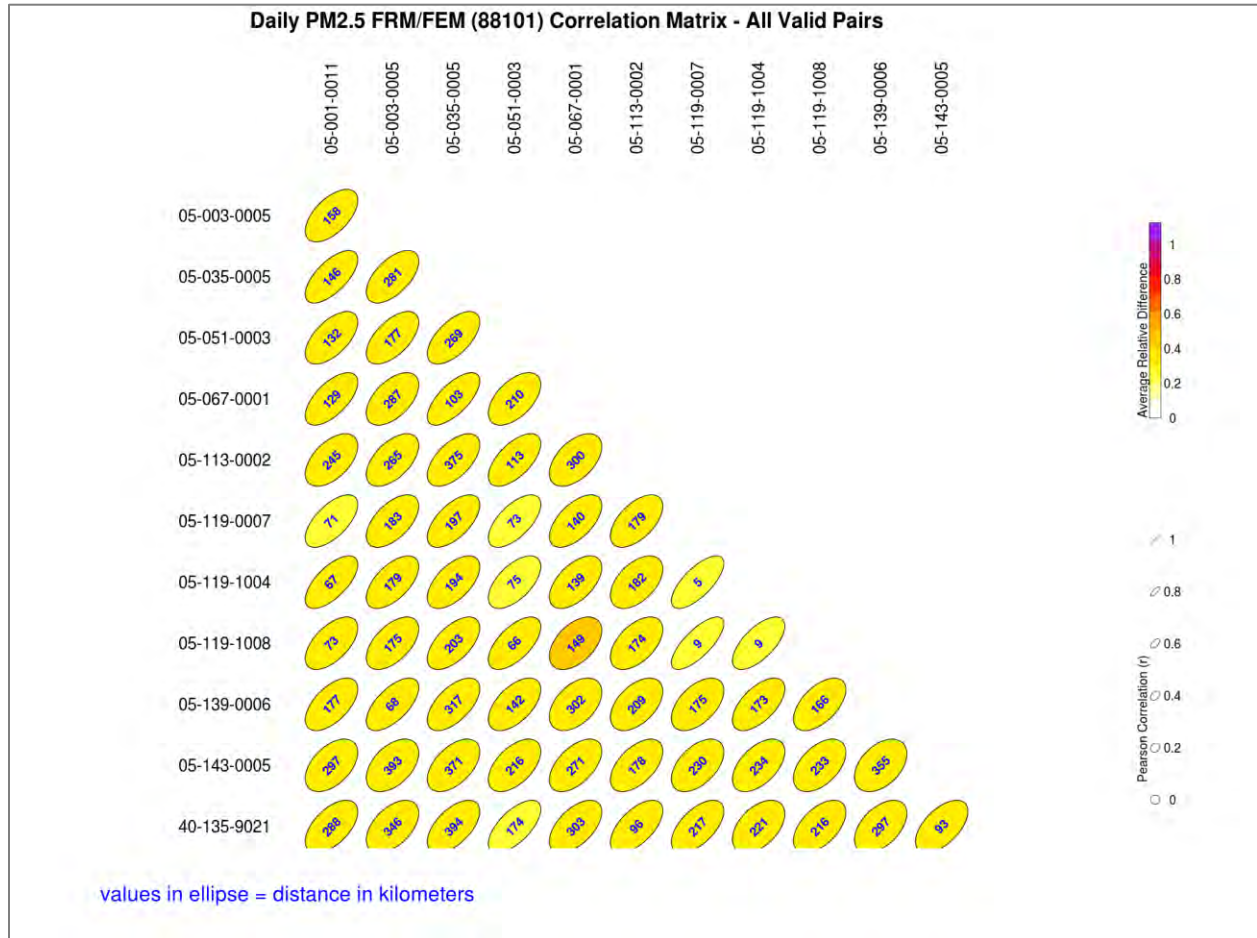


Figure 15. PM<sub>2.5</sub> Emission Sources from 2011 NEI



### 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<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> network: Marion, PARR, DSR, and El Dorado. The mean bias is -0.8913 µg/m<sup>3</sup> for the Marion site, -0.723 µg/m<sup>3</sup> for PARR, -0.6353 µg/m<sup>3</sup> for DSR, and -0.5311 µg/m<sup>3</sup> for El Dorado. Three sites operated by ADEQ in the PM<sub>2.5</sub> 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 µg/m<sup>3</sup>), Hot Springs (mean bias of 0.6425 µg/m<sup>3</sup>), and Newport (mean bias of 0.9203 µg/m<sup>3</sup>).

### 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<sub>2.5</sub> network is adequate and no additional monitors are needed for the network in the immediate future.

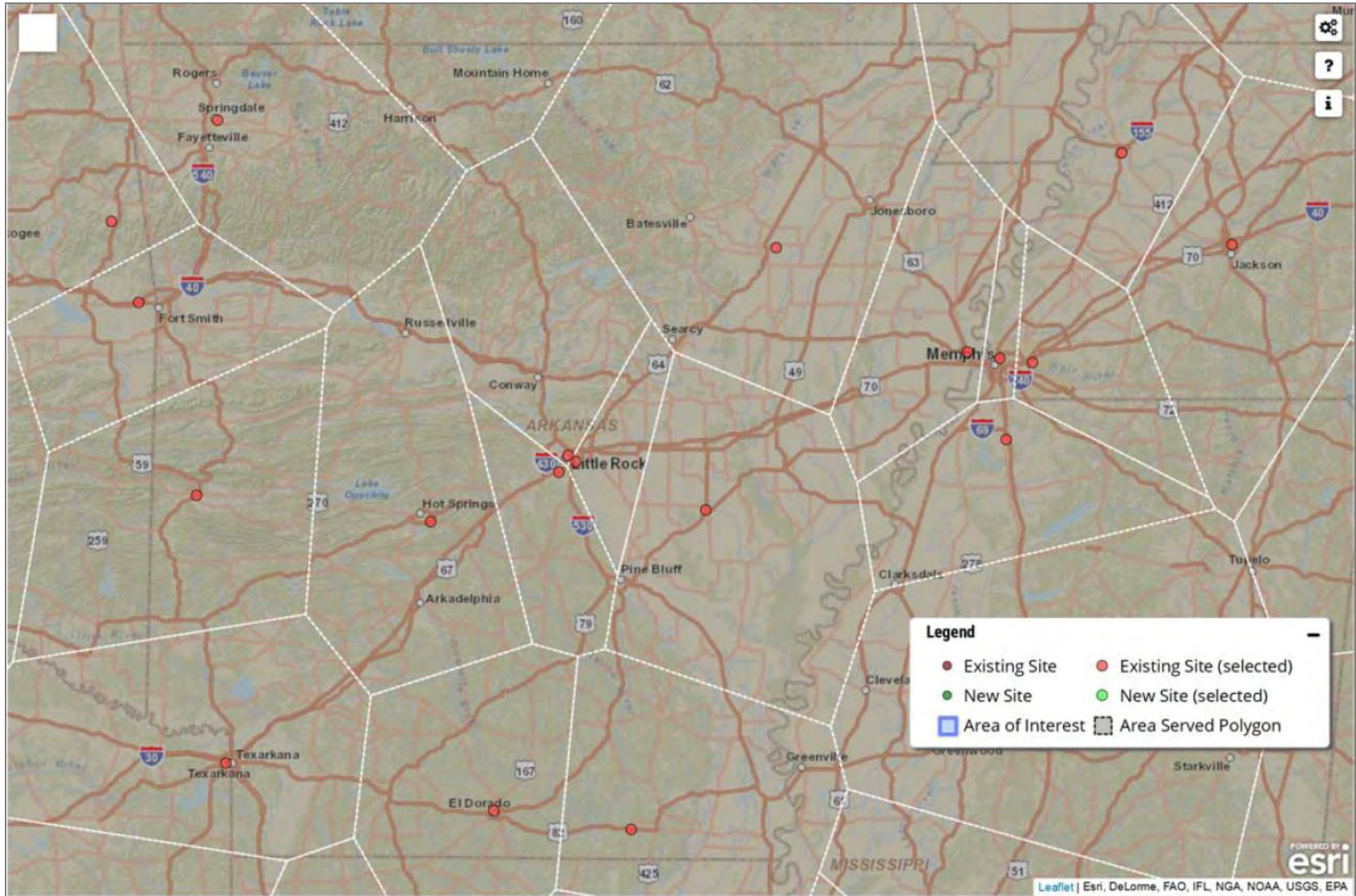


Figure 17. Area Served Analysis for PM<sub>2.5</sub> Network



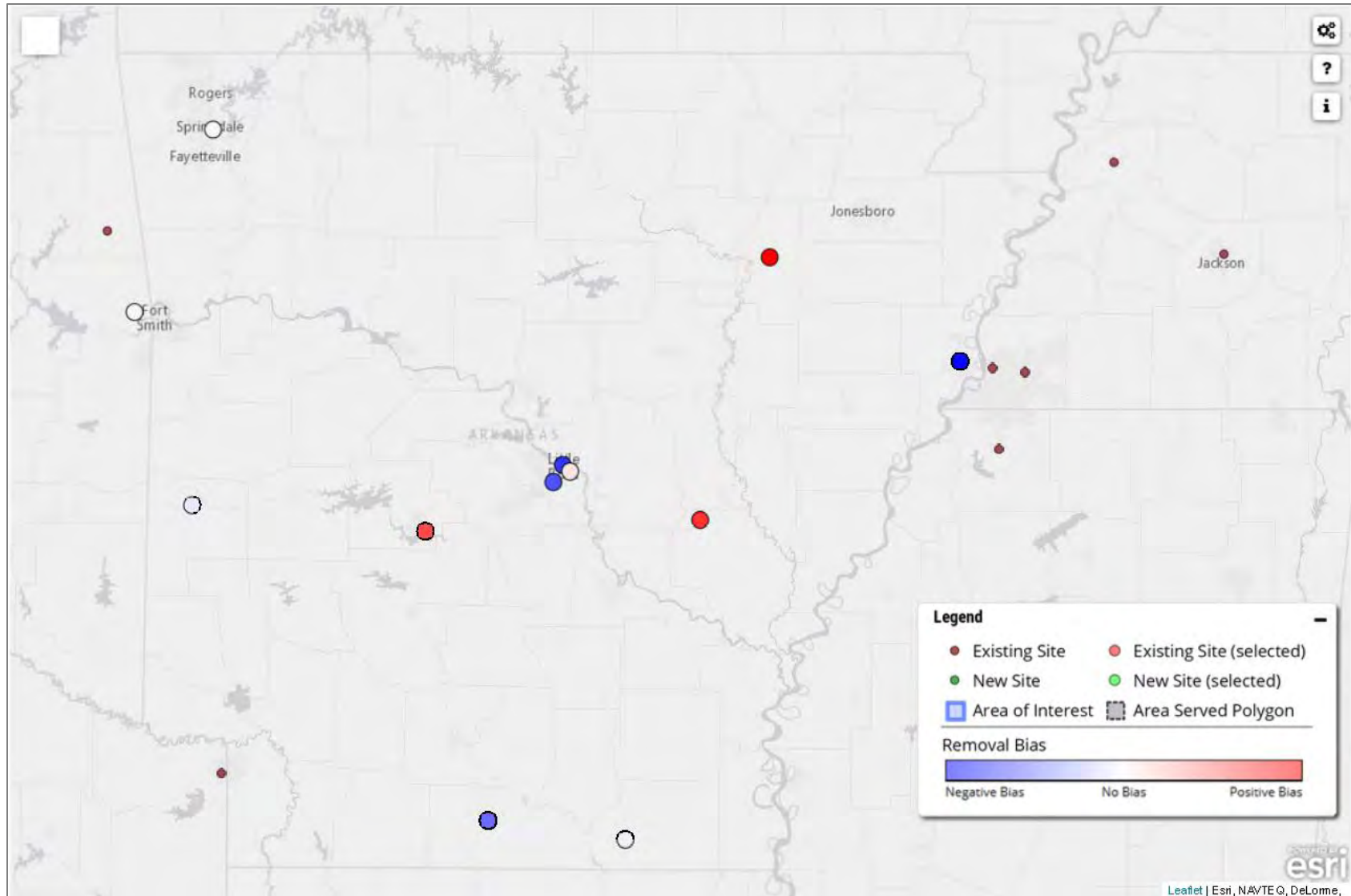


Figure 18. Removal Bias Analysis for ADEQ-Operated PM<sub>2.5</sub> Monitoring Network

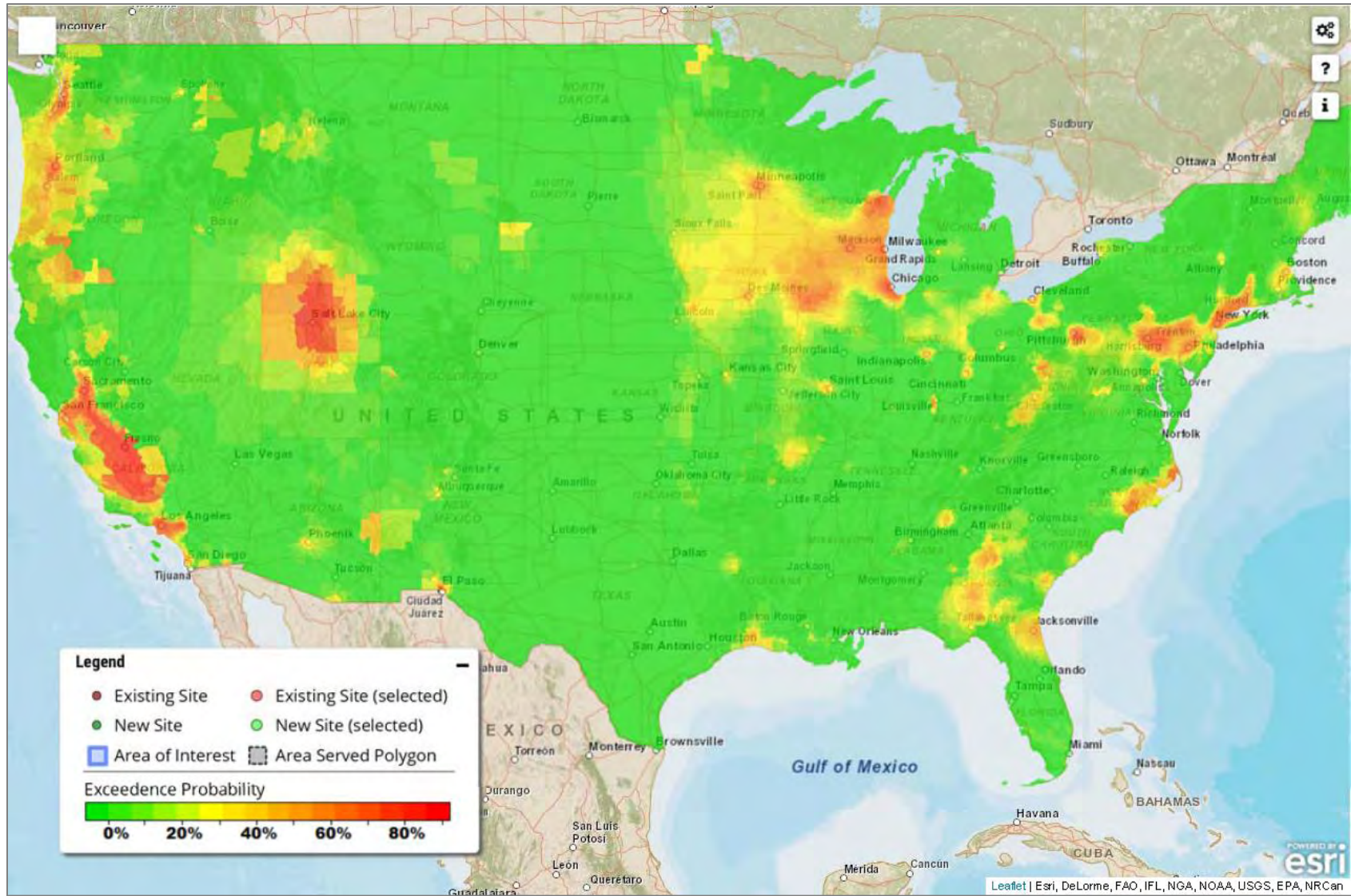


Figure 19. Probability Analysis for the 24-Hour  $35 \mu\text{g}/\text{m}^3$   $\text{PM}_{2.5}$  Standard

### 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 Quanax 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  $0.15 \mu\text{g}/\text{m}^3$  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.

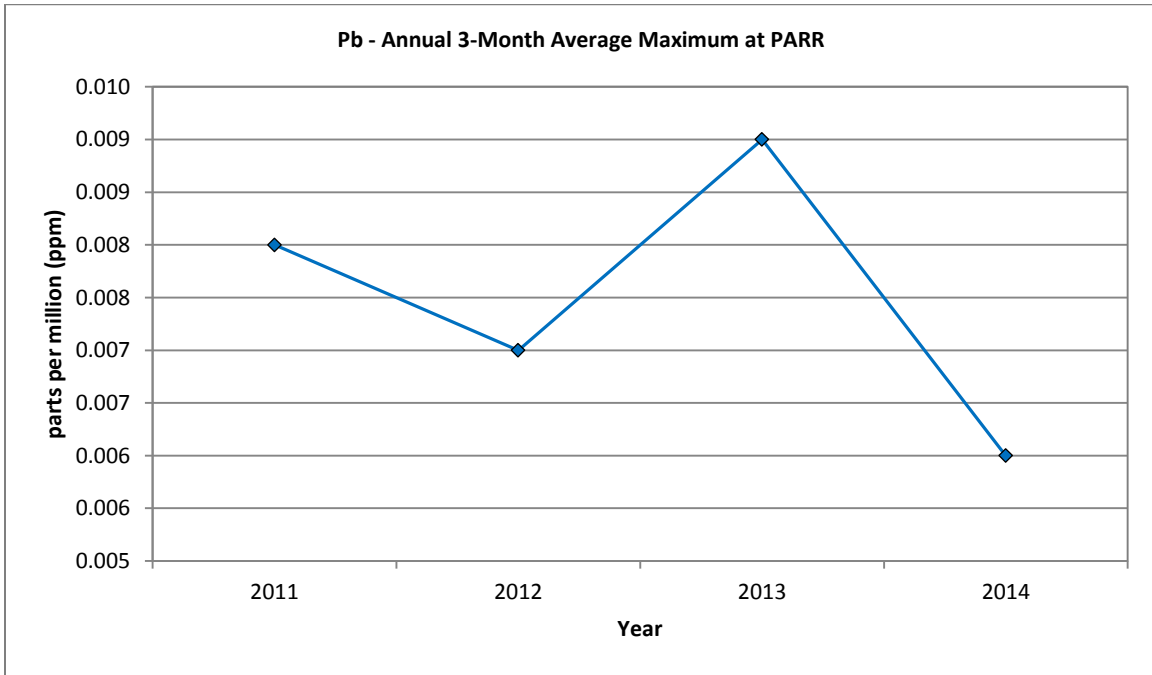


Figure 20. Historical Annual 3-Month Average Maximum for Pb at PARR

### 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.



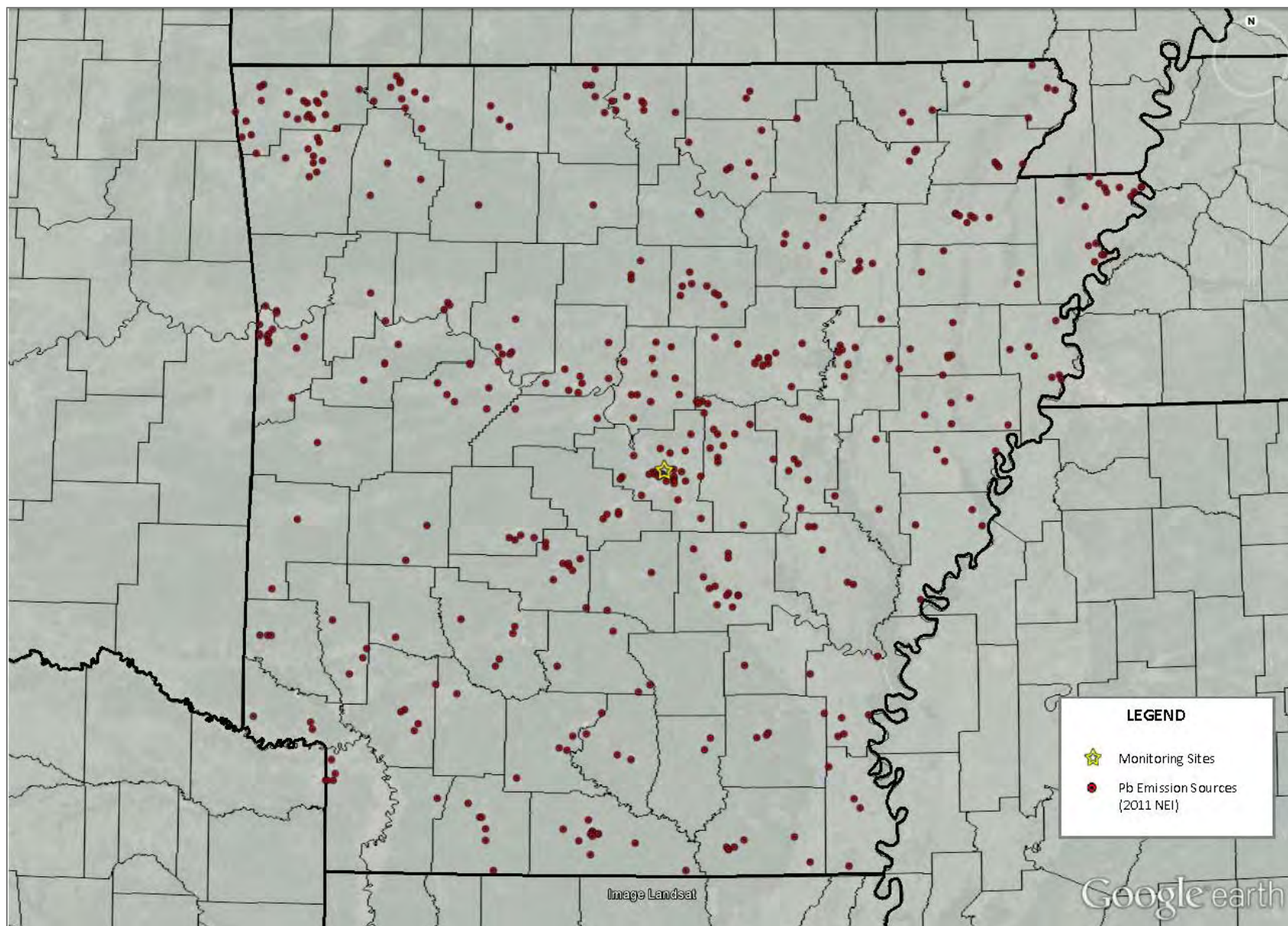


Figure 21. Pb Emission Sources from 2011 NEI

### 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 <sup>1</sup>	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 <sup>1</sup>	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

<sup>1</sup> 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  $0.03 \mu\text{g}/\text{m}^3$ . 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.

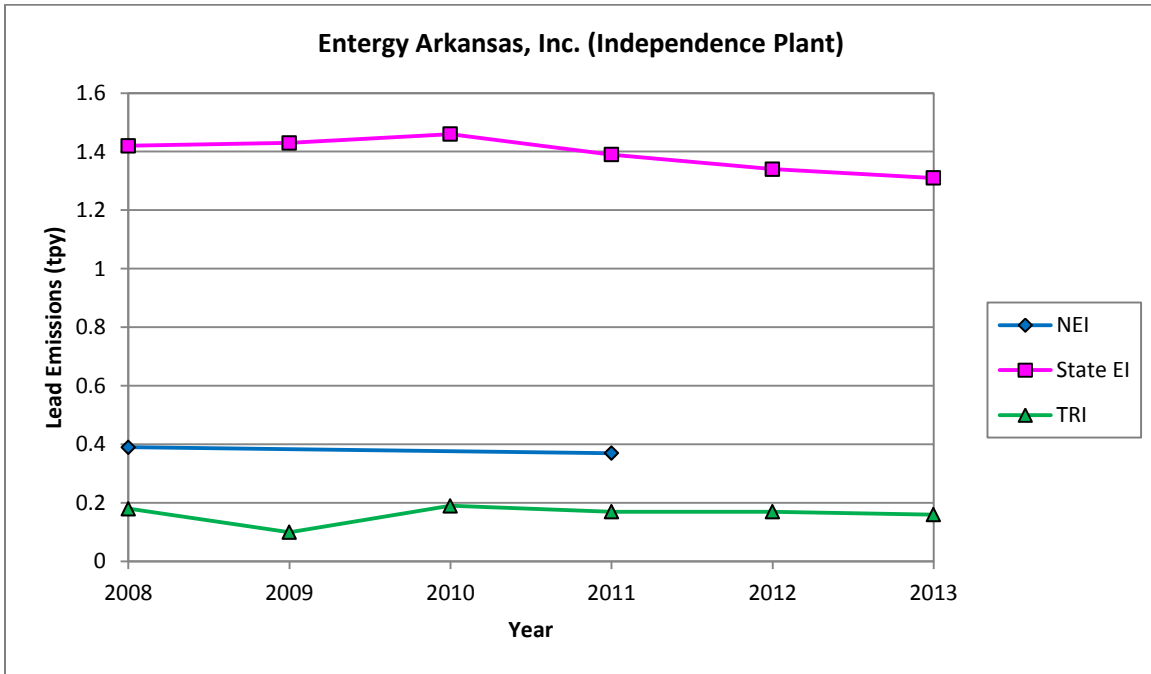


Figure 22. Lead Emissions for Entergy Arkansas, Inc. (Independence Plant)

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  $\mu\text{g}/\text{m}^3$ . 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.

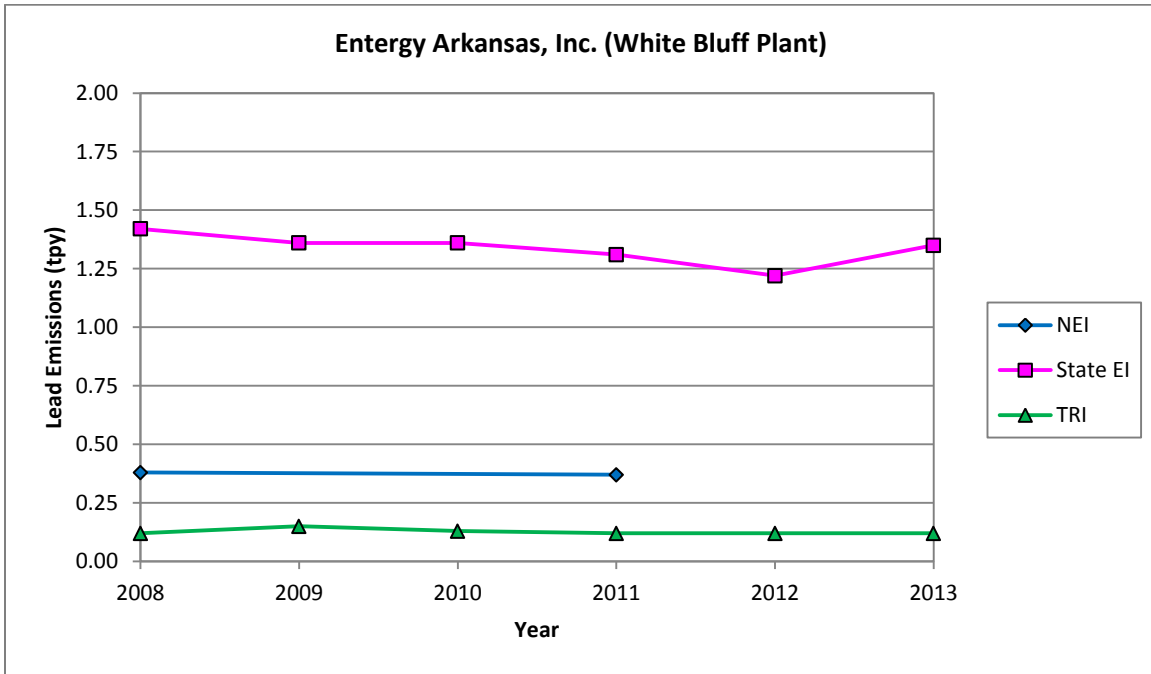
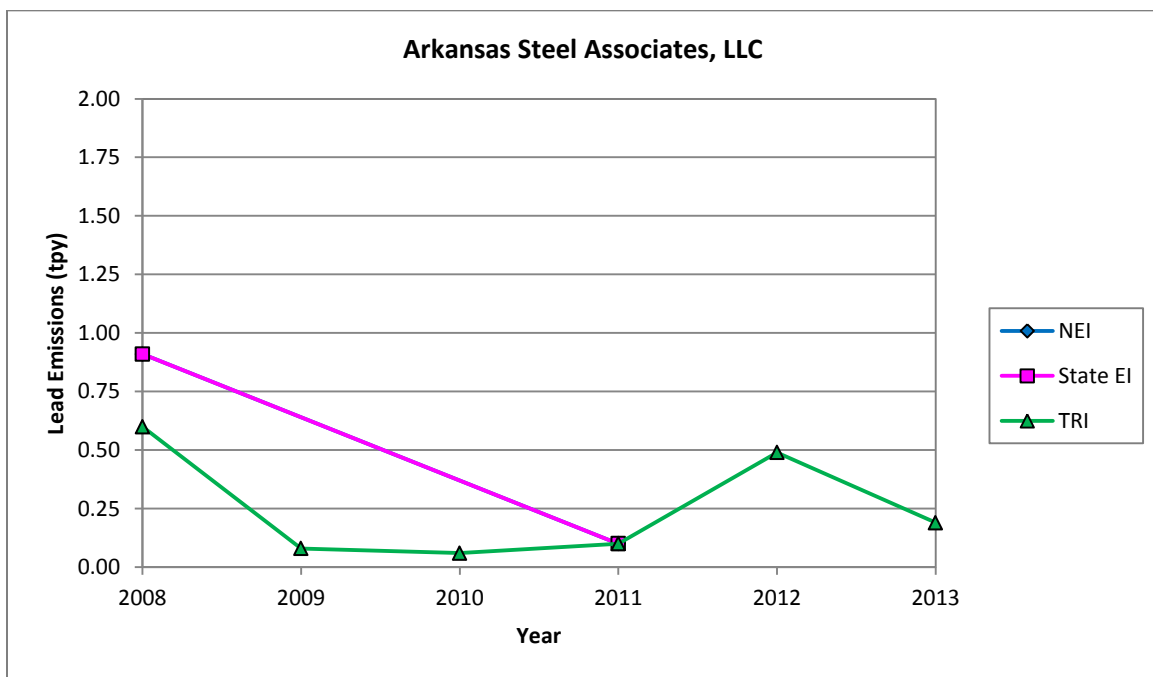


Figure 23. Lead Emissions for Entergy Arkansas, Inc. (White Bluff Plant)



## Arkansas Steel Associates, LLC

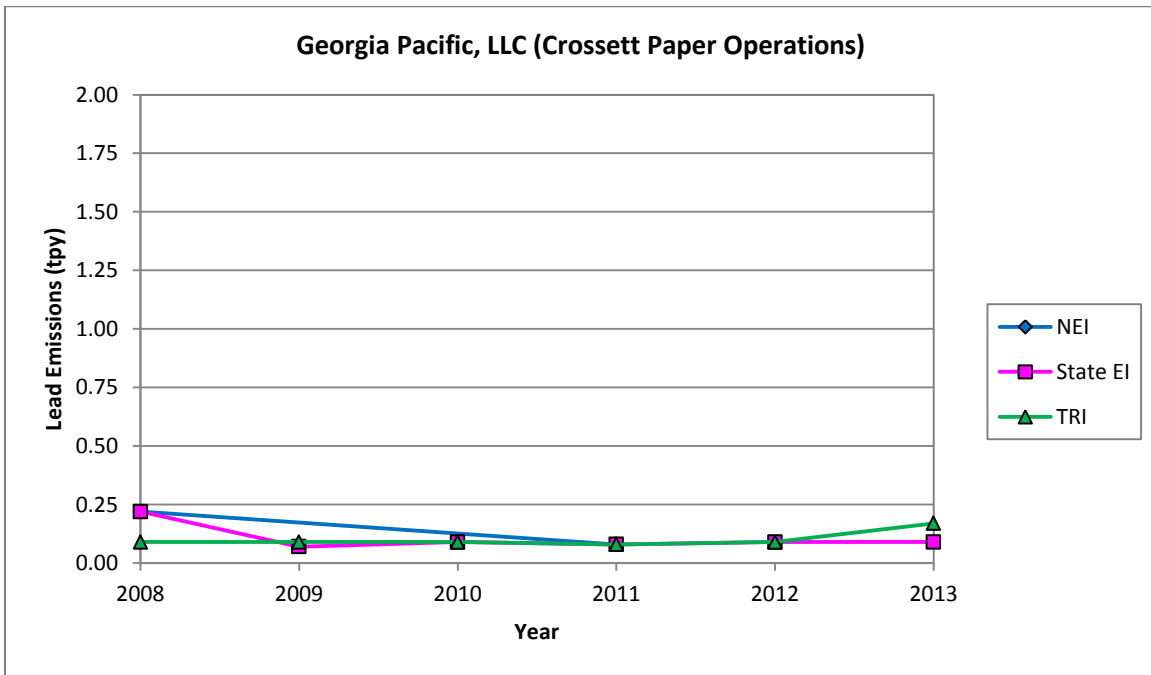
The 2008 NEI lead emissions for Arkansas Steel Associates, LLC was at 0.91 tpy, which prompted ADEQ to request a waiver for source-oriented lead monitoring in 2011. In the initial waiver request, ADEQ modeled to determine the impact the facility had on ambient lead NAAQS. The AERMOD results indicated that the facility contributed to 30.6 percent of the NAAQS with a maximum three-month average concentration level of 0.046  $\mu\text{g}/\text{m}^3$ . 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

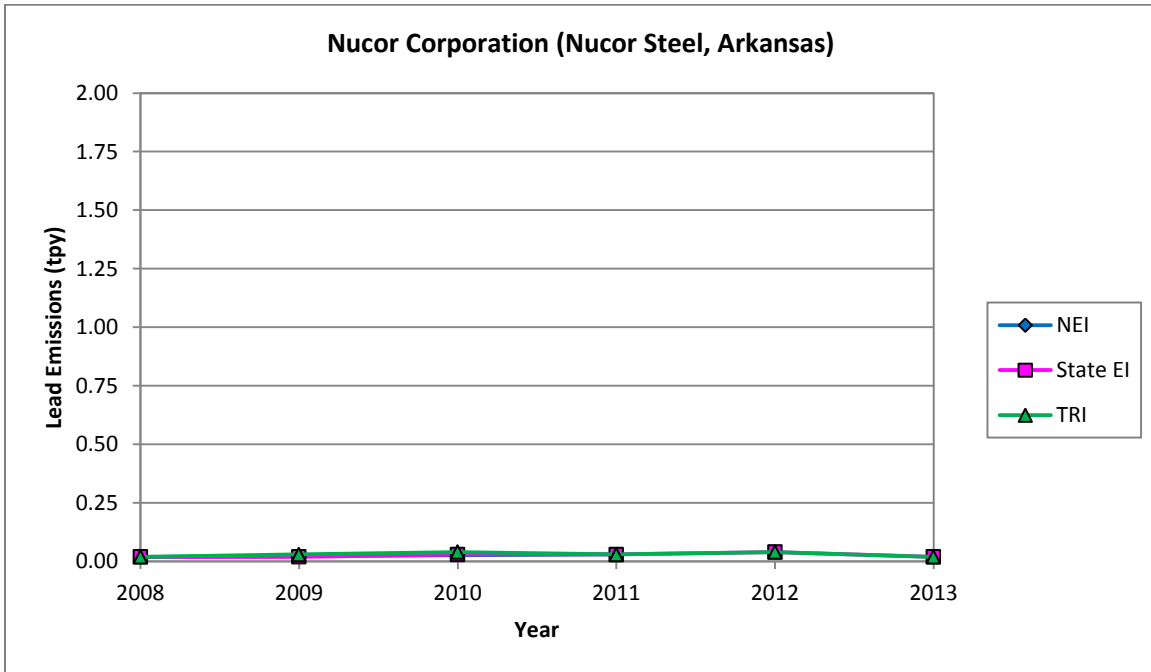
Lead waiver was also requested for Gerdau MacSteel, previously Quanex Corp. - MacSteel Division in the initial waiver request, based on the facility's permitted emission of 1.0 tpy. The facility was not required to have an active waiver as lead emission was below the 0.5 tpy threshold at 0.10 tpy according 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)

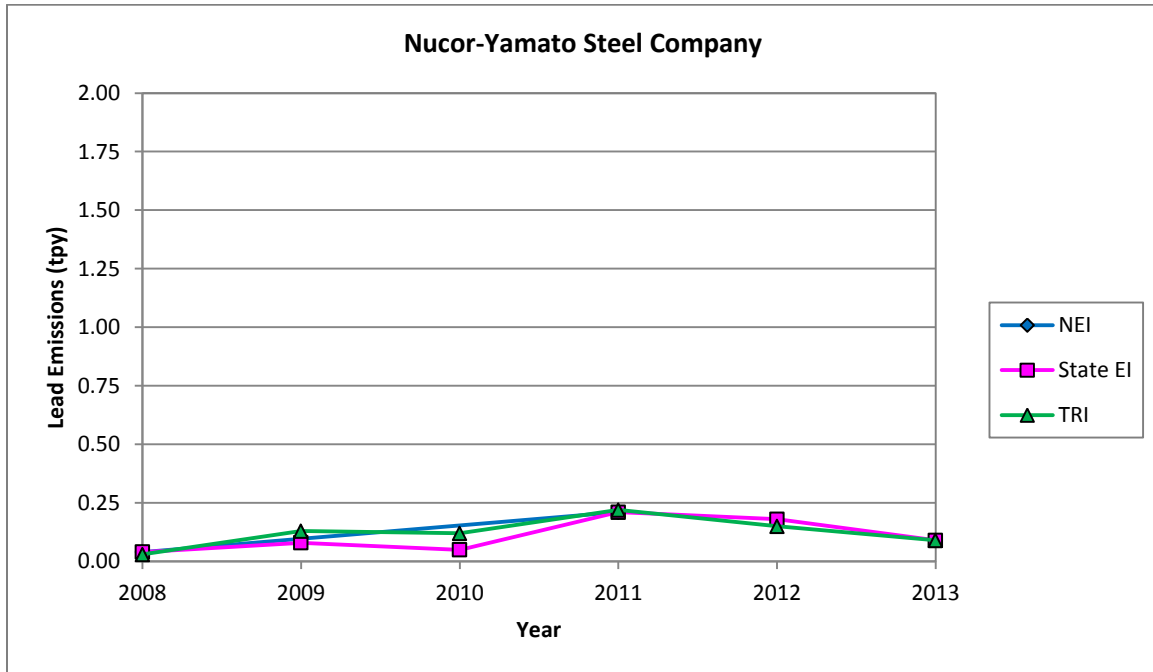
A lead waiver request for Nucor Corporation (Nucor Steel, Arkansas) was based on the facility's permitted lead emission of 3.59 tpy. The facility was not required to have a waiver as actual emission at the time of the initial waiver request was 0.02 tpy, below the 0.5 tpy threshold. The waiver was approved 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<sub>2</sub> 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<sub>2</sub> 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<sub>2.5</sub> monitor is listed in Table 12.

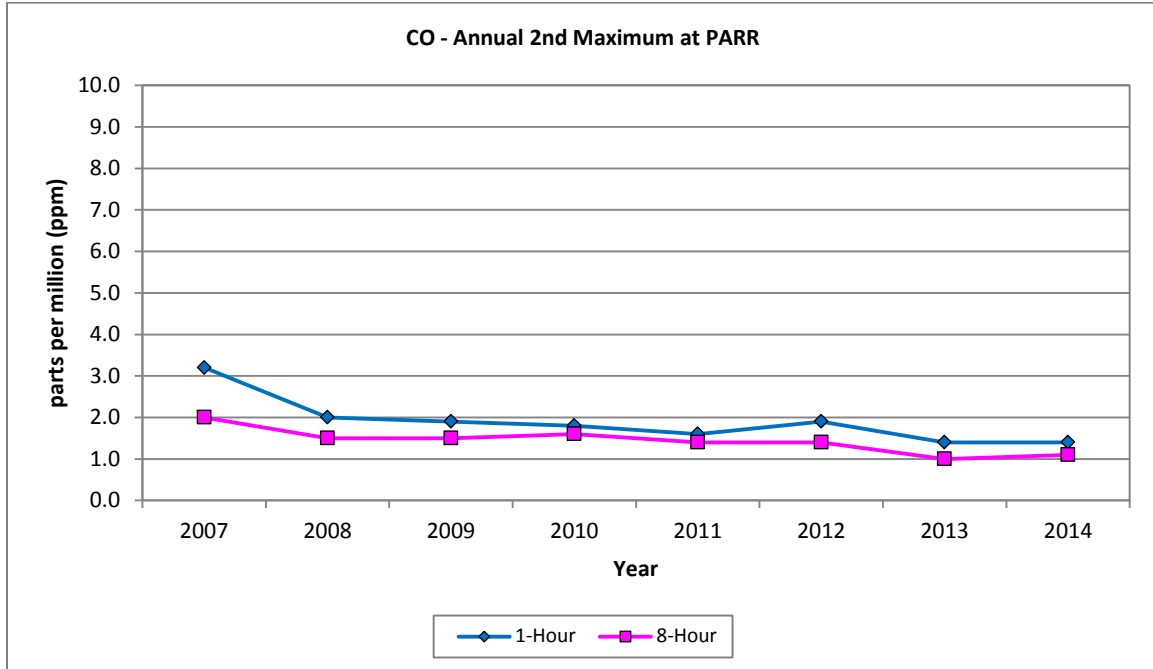
**Table 12. Number of Years of Service for the CO Monitor at PARR**

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 2<sup>nd</sup> 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**

CO NAAQS Standard	Design Value (in ppm)				
	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.

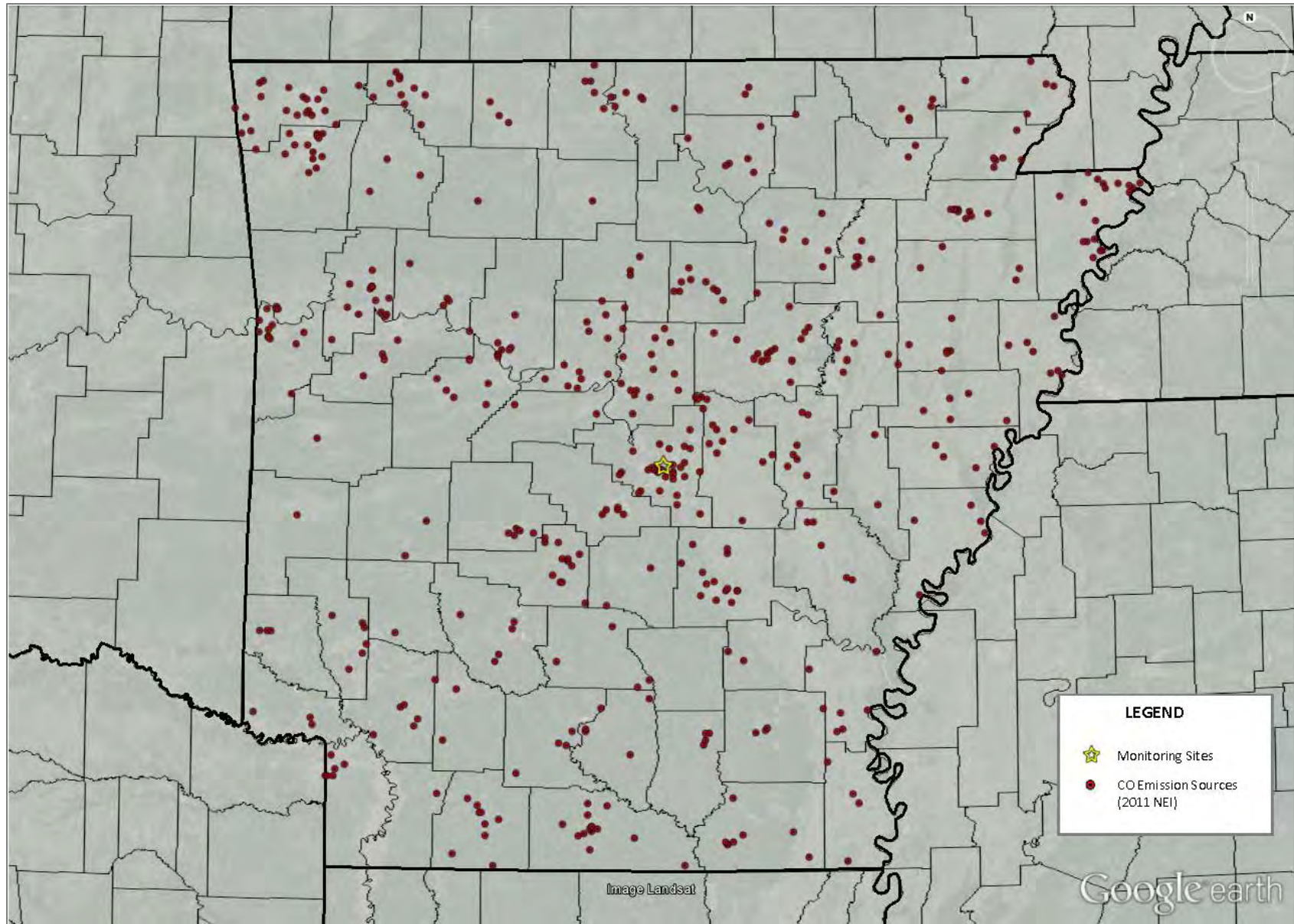


Figure 30. CO Emission Sources from 2011 NEI



### 3.8. Nitrogen Dioxide Network

#### 3.8.1. Monitoring Requirement

The monitoring requirement for NO<sub>2</sub> is described in 40 CFR Part 58 Appendix D § 4.3. A microscale near-road NO<sub>2</sub> monitor is required in each CBSA with a population of 500,000 or more based on the latest Census. An additional near-road NO<sub>2</sub> 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<sub>2</sub> monitoring is required in CBSA with a population of 1,000,000 or more. The Regional Administrator may also require additional NO<sub>2</sub> monitoring to focus to meet the forty additional NO<sub>2</sub> monitoring stations nationwide with an objective to protect susceptible and vulnerable populations.

There are two NO<sub>2</sub> 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<sub>y</sub> as part of the NCore requirements. There is also an NO<sub>2</sub> 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<sub>2</sub> monitor is listed in Table 14.

**Table 14. Number of Years of Service for Each ADEQ-Operated NO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> monitor in the near future as the population continues to grow. ADEQ does not anticipate requesting to terminate any NO<sub>2</sub> 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 98<sup>th</sup> percentile of one-hour daily maximum NO<sub>2</sub> 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.

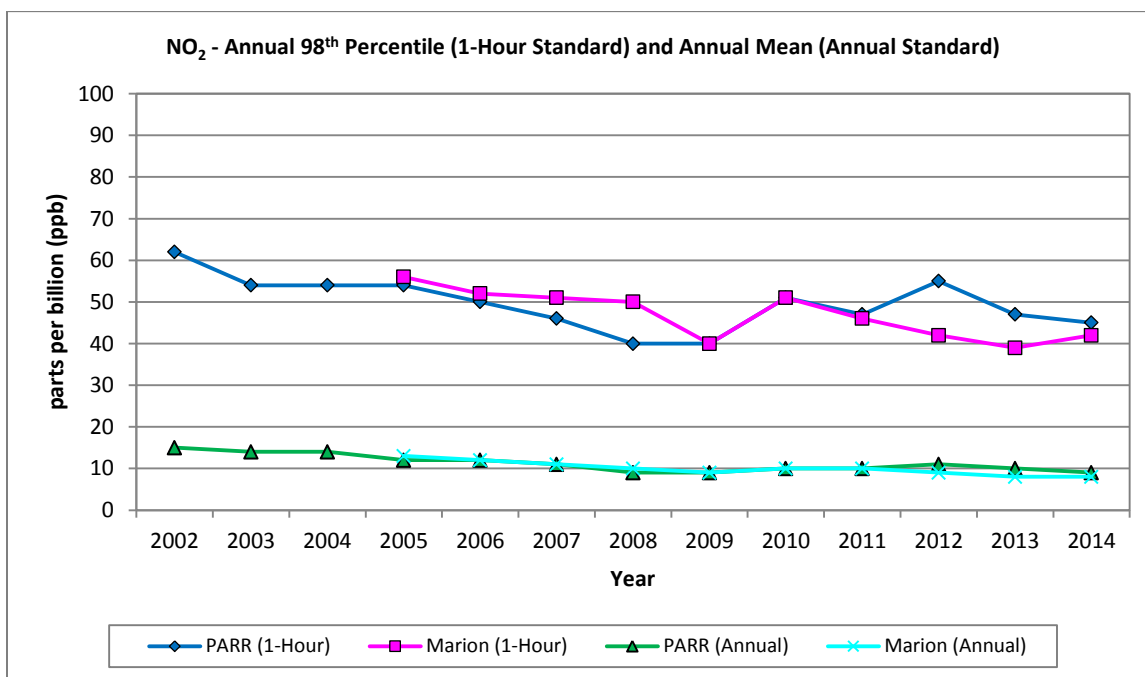


Figure 31. Historical Annual 98<sup>th</sup> Percentile and Mean for ADEQ-Operated NO<sub>2</sub> Monitors

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For NO<sub>2</sub>, the design value for the one-hour standard is the 98<sup>th</sup> percentile of one-hour daily maximum NO<sub>2</sub> 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<sub>2</sub> NAAQS at ADEQ-Operated Sites

AQS ID	Site Name	1-Hour Design Value (in ppb)					Annual Design Value (in ppb)				
		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 <sup>1</sup>	42 <sup>1</sup>	41 <sup>1</sup>	10	10	9 <sup>1</sup>	8	8

<sup>1</sup>Design value not valid

### 3.8.3. Emission Sources

Figure 32 depicts the location of the ADEQ-operated NO<sub>2</sub> monitors along with NO<sub>x</sub> point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

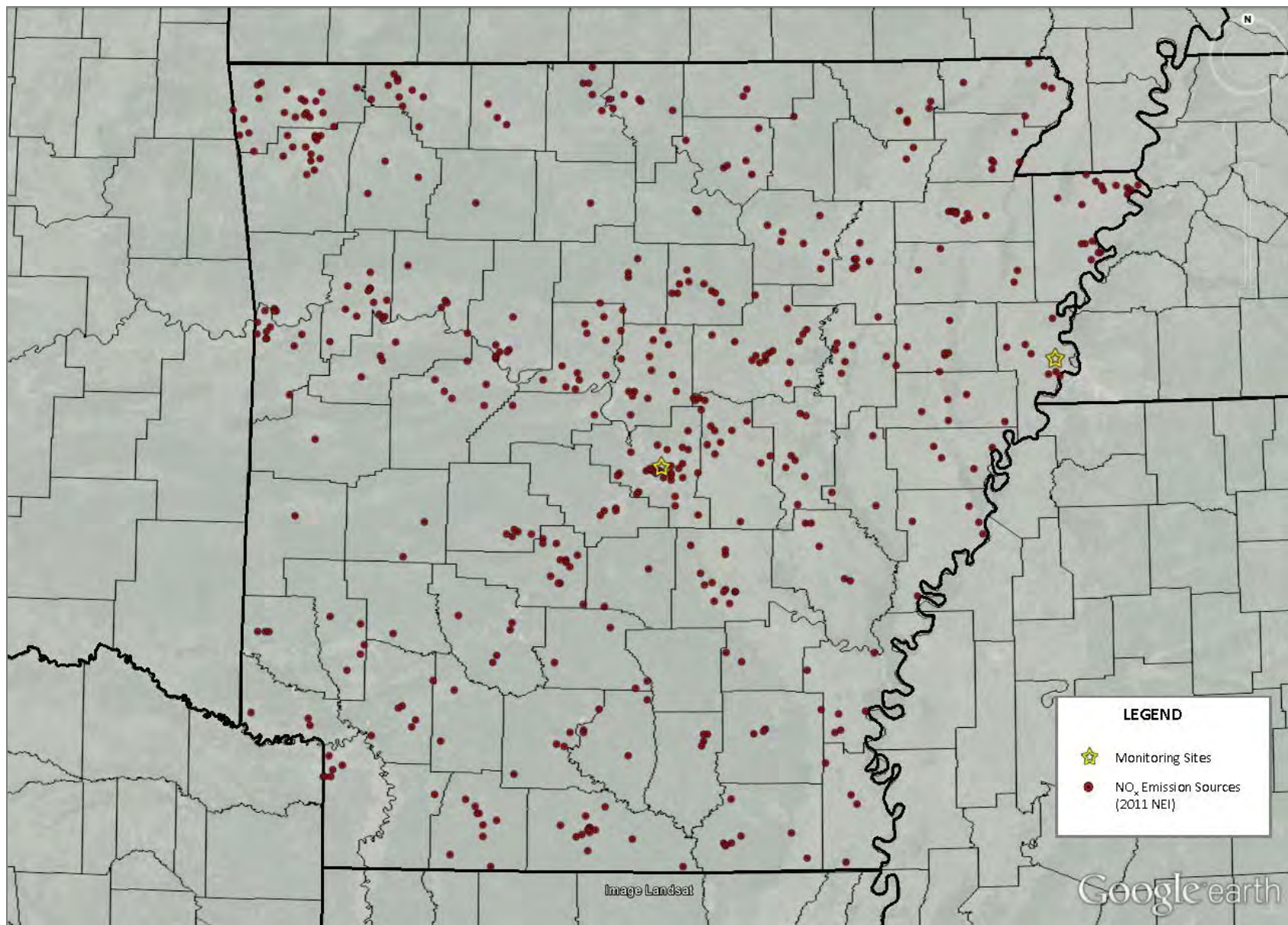


Figure 32. NO<sub>x</sub> Emission Sources from 2011 NEI

### 3.9. PM<sub>10</sub> Network

#### 3.9.1. Monitoring Requirement

The monitoring requirement for PM<sub>10</sub> 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<sub>10</sub> Monitoring Requirements (Reproduction of Table D-4)**

Population Category	High Concentration <sup>1,2</sup>	Medium Concentration <sup>1,3</sup>	Low Concentration <sup>1,4,5</sup>
>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

<sup>1</sup> Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency

<sup>2</sup> High concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations exceeding the PM<sub>10</sub> NAAQS by 20 percent or more

<sup>3</sup> Medium concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations exceeding 80 percent of the PM<sub>10</sub> NAAQS

<sup>4</sup> Low concentration areas are those for which ambient PM<sub>10</sub> data show ambient concentrations less than 80 percent of the PM<sub>10</sub> NAAQS

<sup>5</sup> These minimum monitoring requirements apply in the absence of a design value

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

ADEQ is operating two PM<sub>10</sub> monitoring sites, both operating in the Little Rock-North Little Rock-Conway, AR MSA. The PARR site also has a collocated PM<sub>10</sub> monitor operating. The two PM<sub>10</sub> 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 PM<sub>10</sub> 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<sub>10</sub> monitor is listed in Table 17.

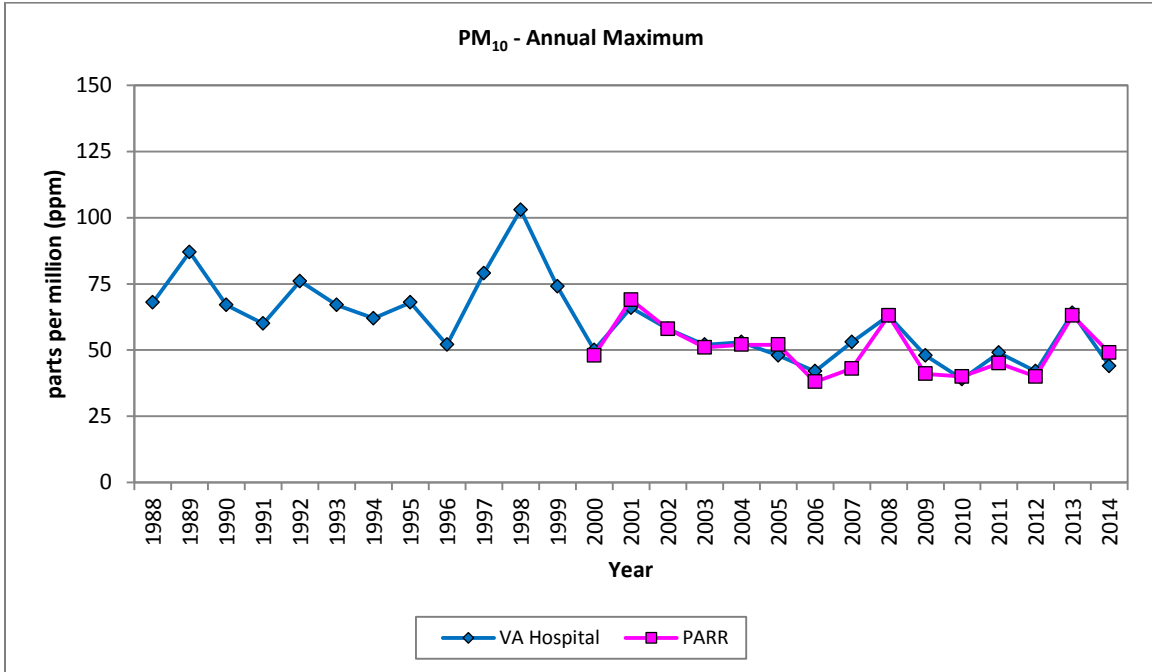
**Table 17. Number of Years of Service for Each ADEQ-Operated PM<sub>10</sub> Monitor**

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<sub>10</sub> monitor at that time. No existing PM<sub>10</sub> 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<sub>10</sub> concentration is displayed in Figure 33.



**Figure 33. Historical Annual Maximum for ADEQ-Operated PM<sub>10</sub> 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<sub>10</sub> NAAQS at ADEQ-Operated Sites**

AQS ID	Site Name	Average Estimated Exceedance				
		2010	2011	2012	2013	2014
05-119-0007	PARR	0	0	0	0	0
05-119-1007	VA Hospital	0 <sup>1</sup>	0 <sup>1</sup>	0	0	0

<sup>1</sup> Average estimated exceedance value not valid

### 3.9.3. Emission Sources

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



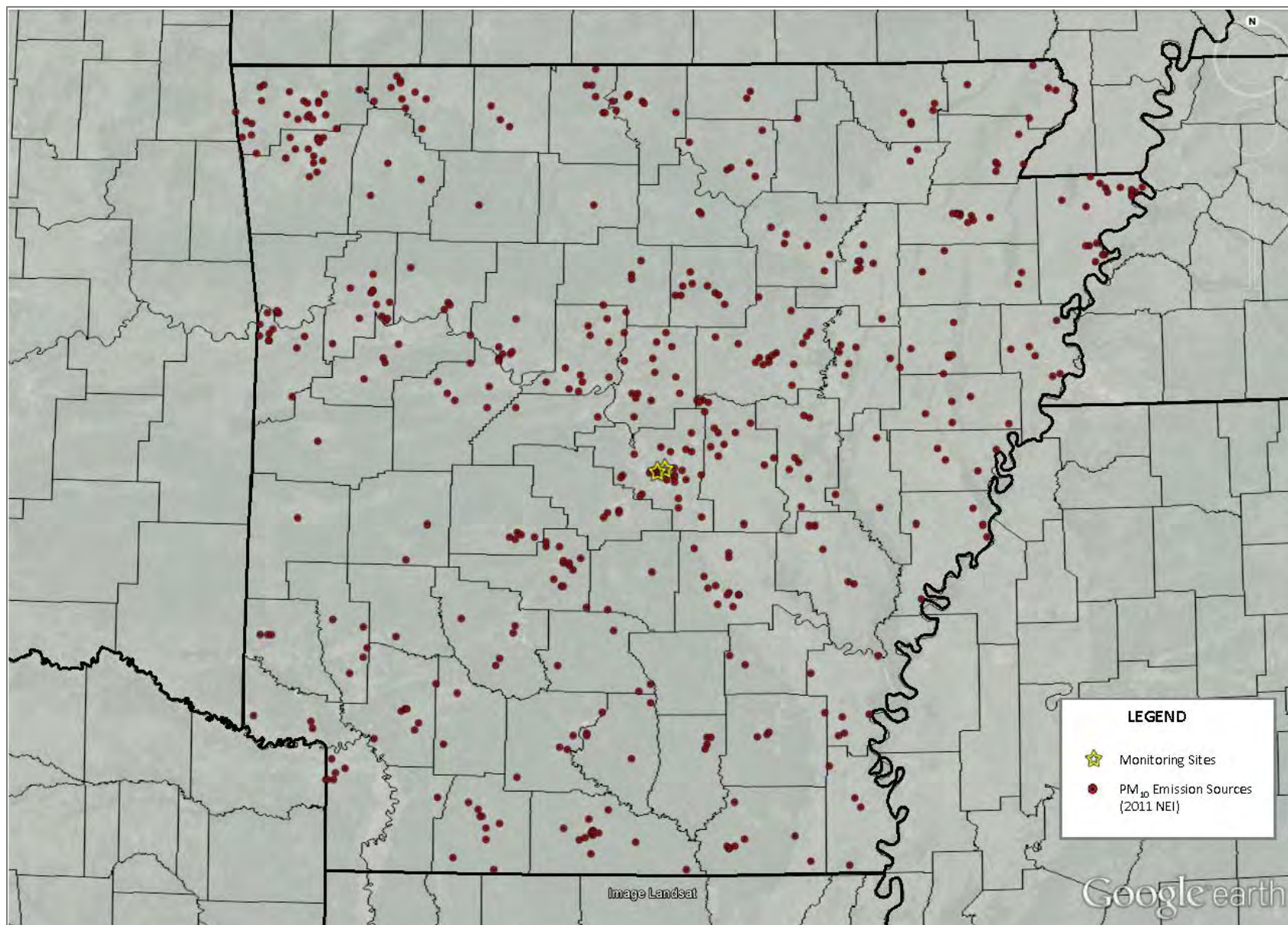


Figure 34. PM<sub>10</sub> Emission Sources from 2011 NEI

### 3.10. Sulfur Dioxide Network

#### 3.10.1. Monitoring Requirement

The monitoring requirements for SO<sub>2</sub> monitors are based on the PWEI threshold as determined by 40 CFR Part 58 Appendix D § 4.4.2. One SO<sub>2</sub> monitor is required for a PWEI between 5,000 and 100,000, two SO<sub>2</sub> monitors are required for a PWEI between 100,000 and 1,000,000, and, three SO<sub>2</sub> 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<sub>2</sub> 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 <sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> monitors at site El Dorado and site PARR. The trace SO<sub>2</sub> monitor at PARR is operational due to NCore requirements. The number of service years for each ADEQ-operated SO<sub>2</sub> monitor is listed in Table 20.



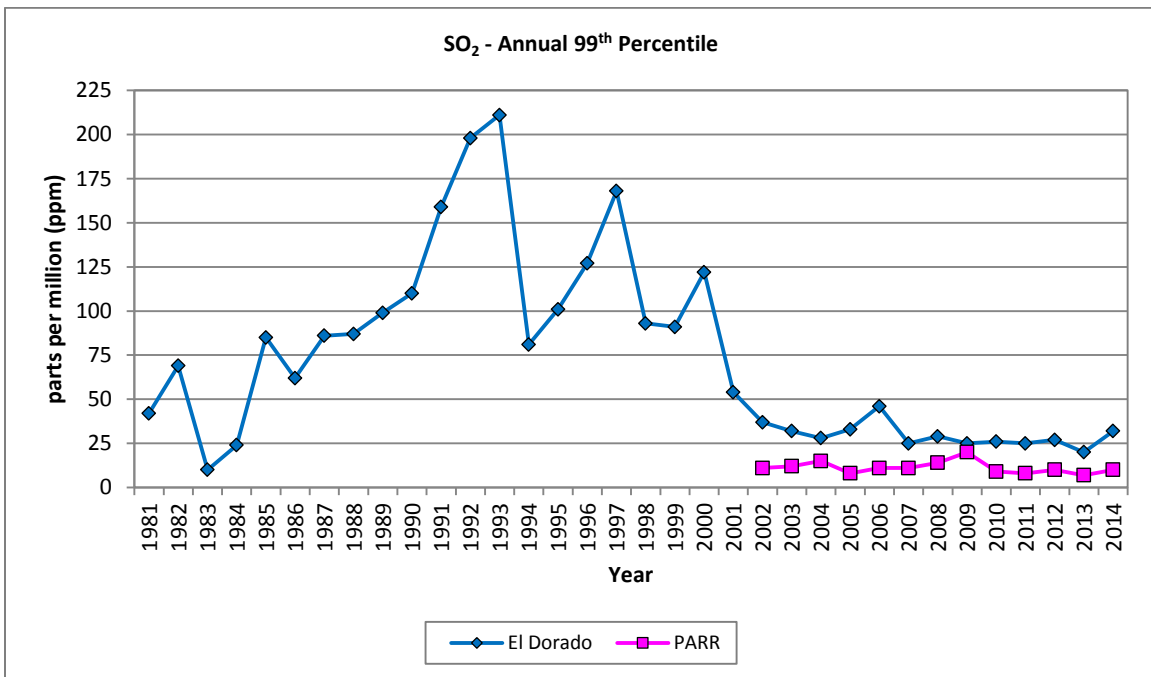
**Table 20. Number of Years of Service for Each ADEQ-Operated SO<sub>2</sub> Monitor**

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<sub>2</sub> 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<sub>2</sub> Data Requirements Rule. ADEQ does not anticipate requesting to terminate any SO<sub>2</sub> 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 99<sup>th</sup> percentile for SO<sub>2</sub> concentration is displayed in Figure 35.



**Figure 35. Historical Annual 99<sup>th</sup> Percentile for ADEQ-Operated SO<sub>2</sub> Monitors**

In order to compare to the NAAQS to determine compliance, design values are calculated for each site. For SO<sub>2</sub>, the design value for the one-hour standard is the 99<sup>th</sup> percentile of one-hour daily maximum SO<sub>2</sub> 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<sub>2</sub> NAAQS at ADEQ-Operated Sites**

AQS ID	Site Name	1-Hour Standard Design Value				
		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<sub>2</sub> monitors along with SO<sub>2</sub> point sources. Point sources plotted are from the 2011 NEI; thus, any new sources will not be depicted on the map.

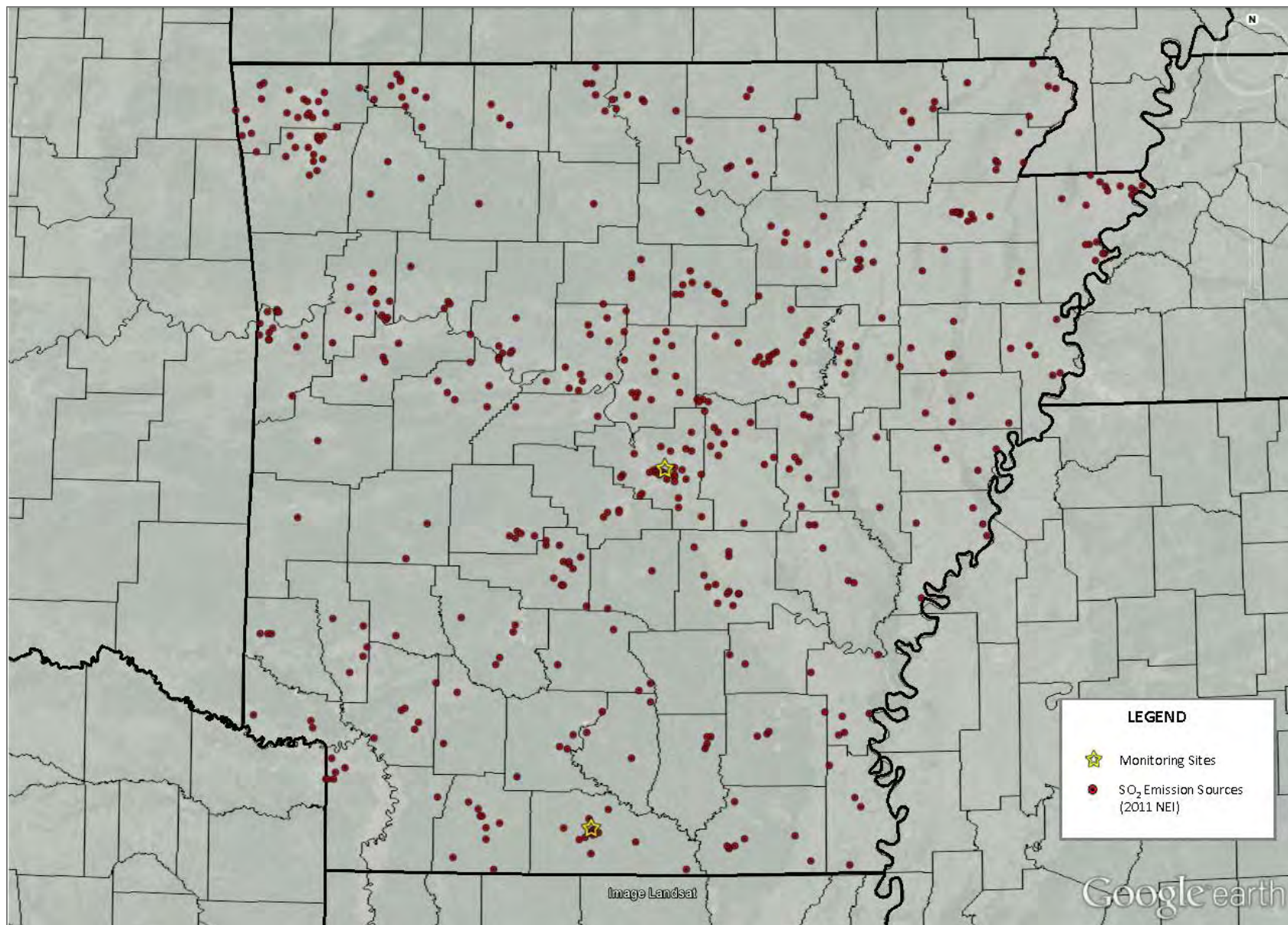


Figure 36. SO<sub>2</sub> Emission Sources from 2011 NEI

#### **4. Conclusion**

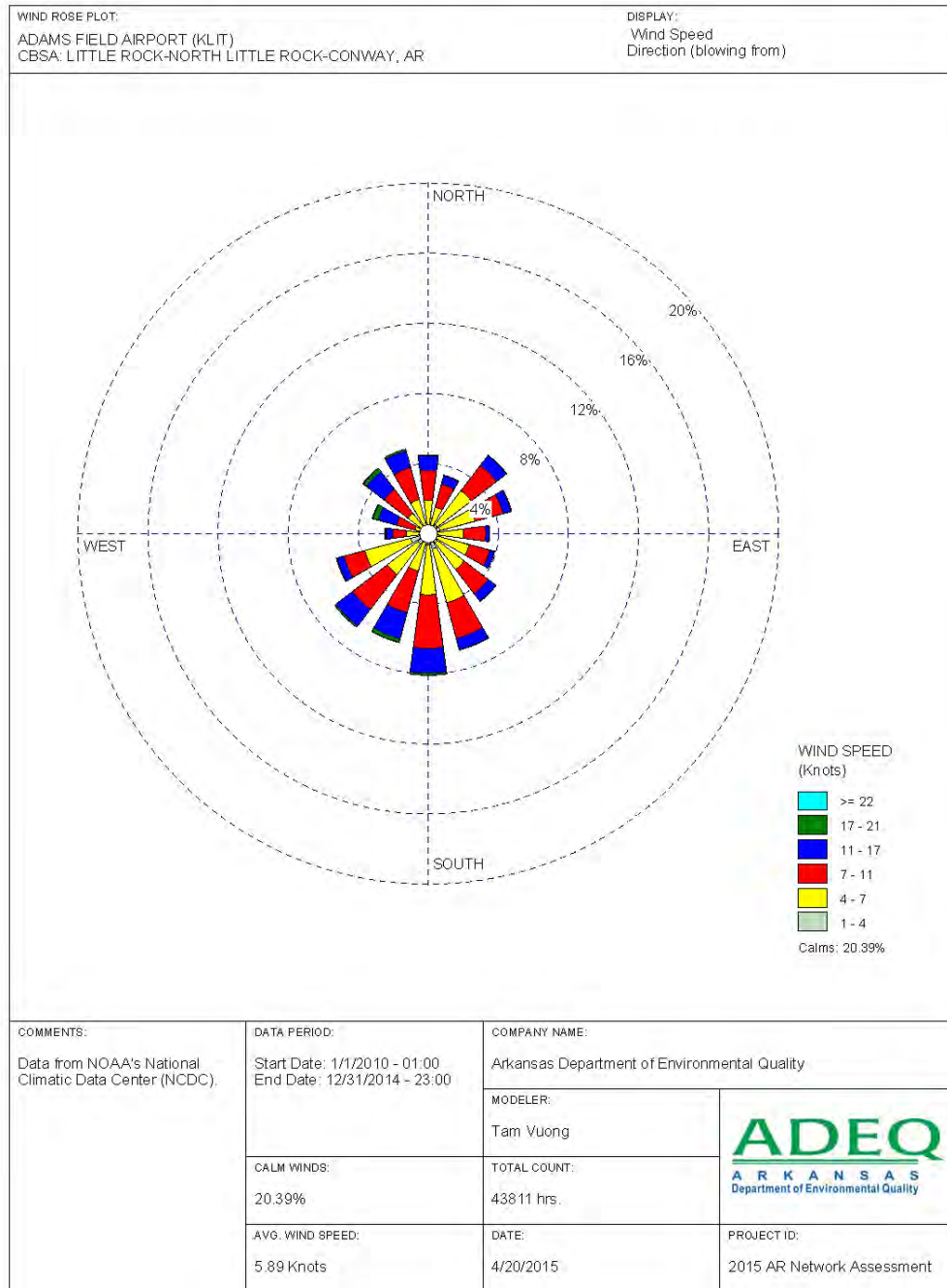
Data from ADEQ's ambient air network complies with all applicable siting requirements and is available for NAAQS compliance determination. All data are validated and uploaded to EPA's AQS database. These data may be used for emissions strategy development, developments of attainment and maintenance plans, 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<sub>2.5</sub> network as both ozone and PM<sub>2.5</sub> 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

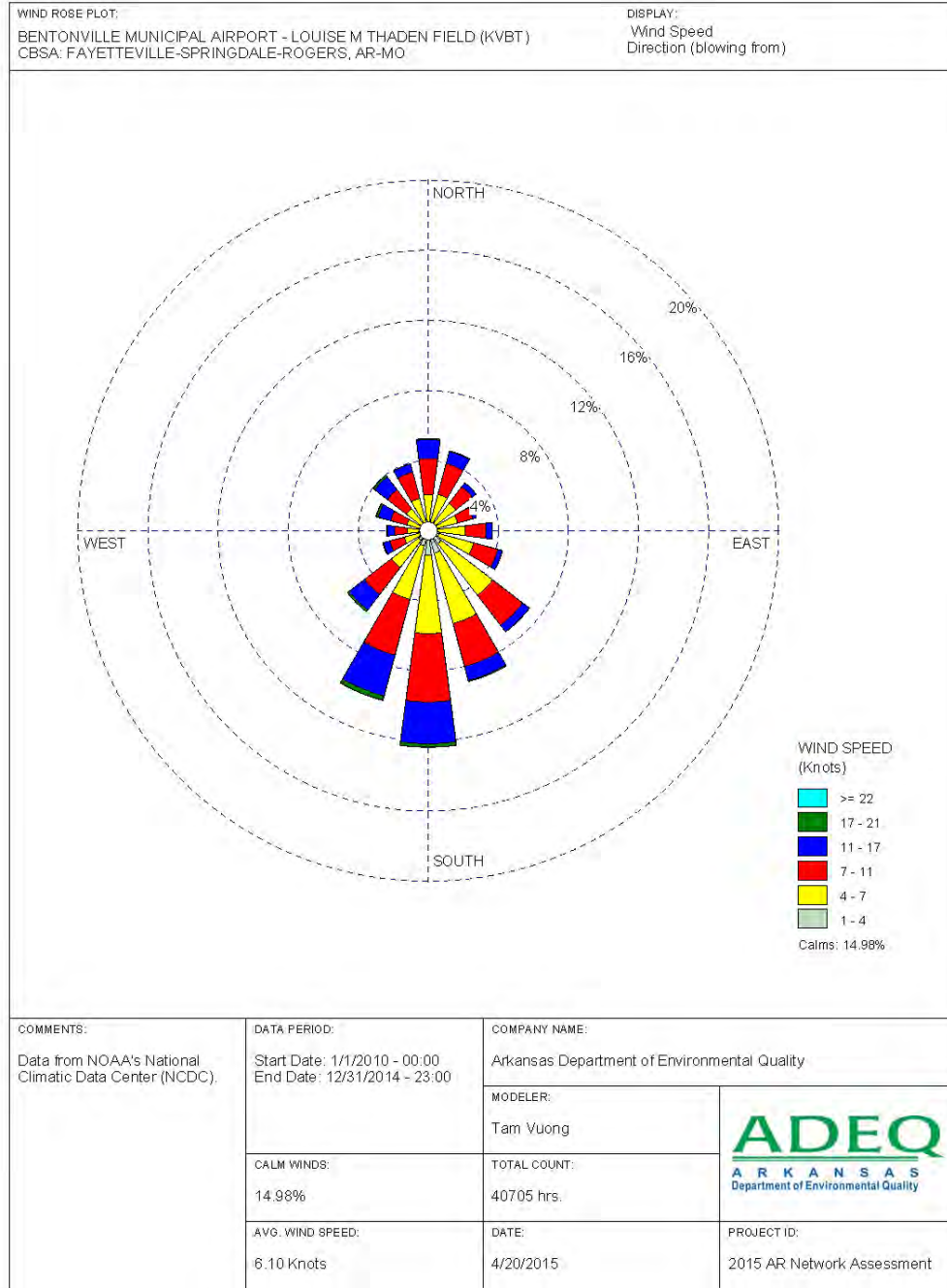
Appendix 1. Wind-rose Plots

Adams Field Airport (KLIT)



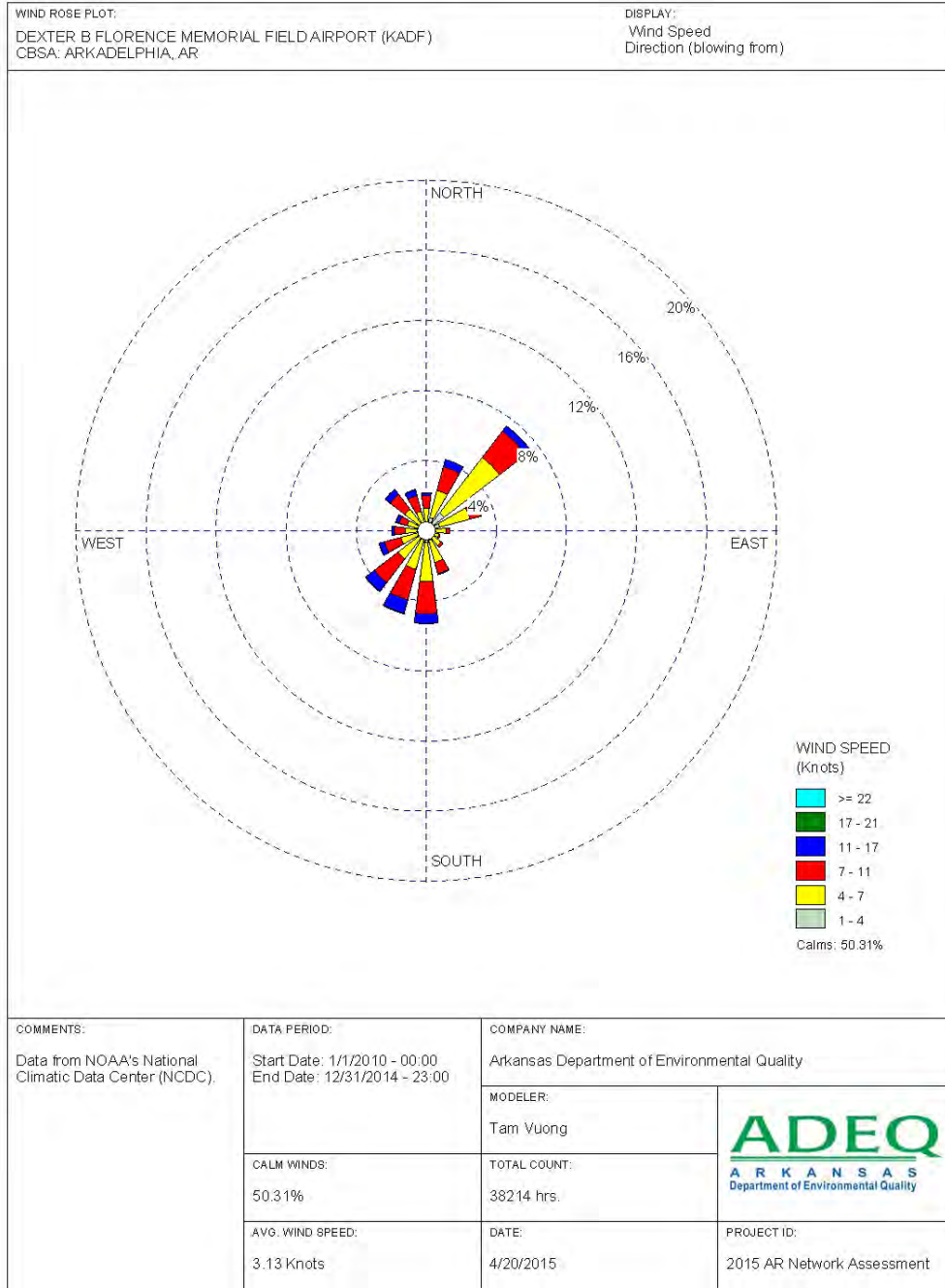
WRPLOT View - Lakes Environmental Software

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



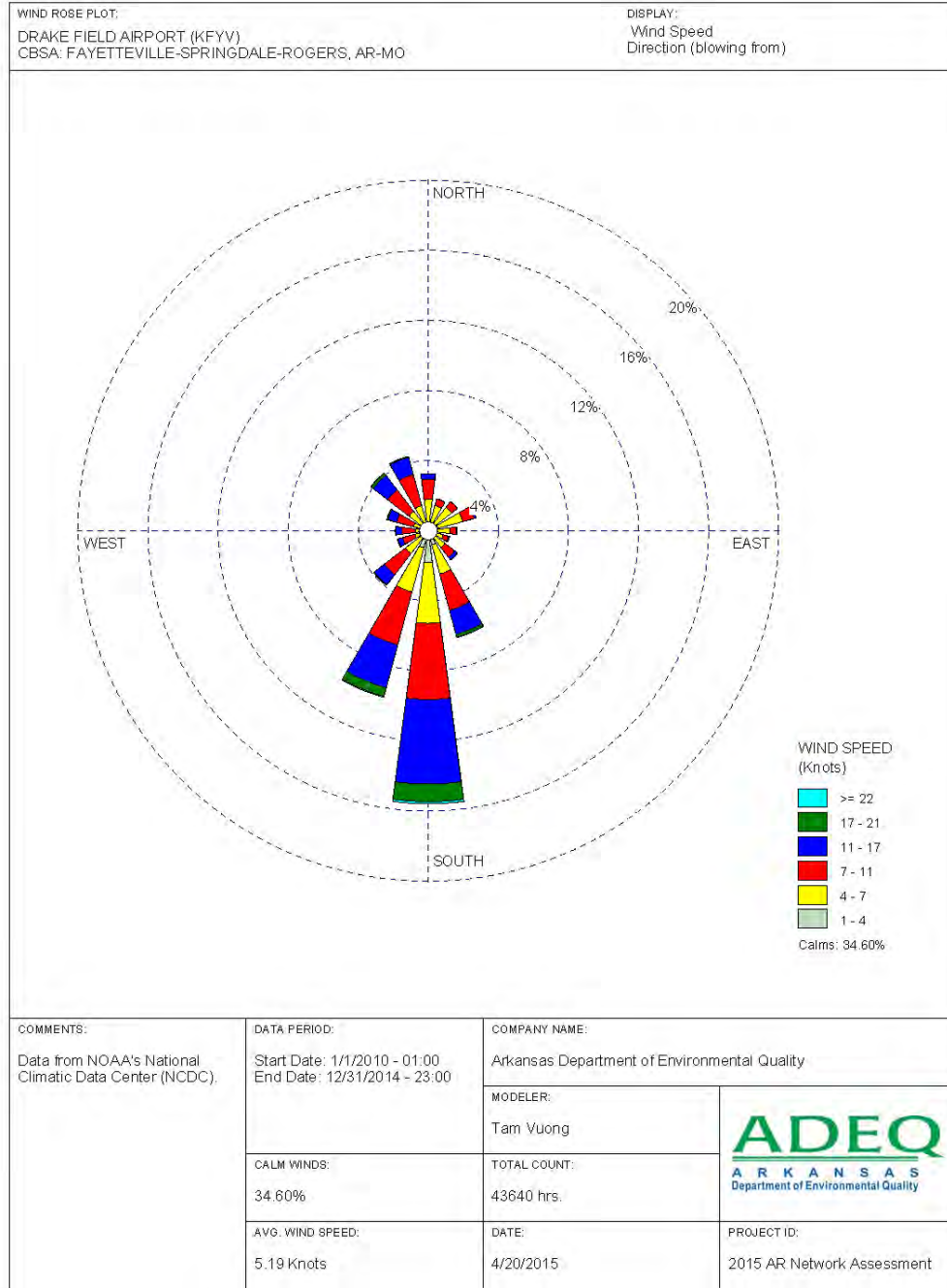


## Dexter B. Florence Memorial Field Airport (KADF)



WRPLOT View - Lakes Environmental Software

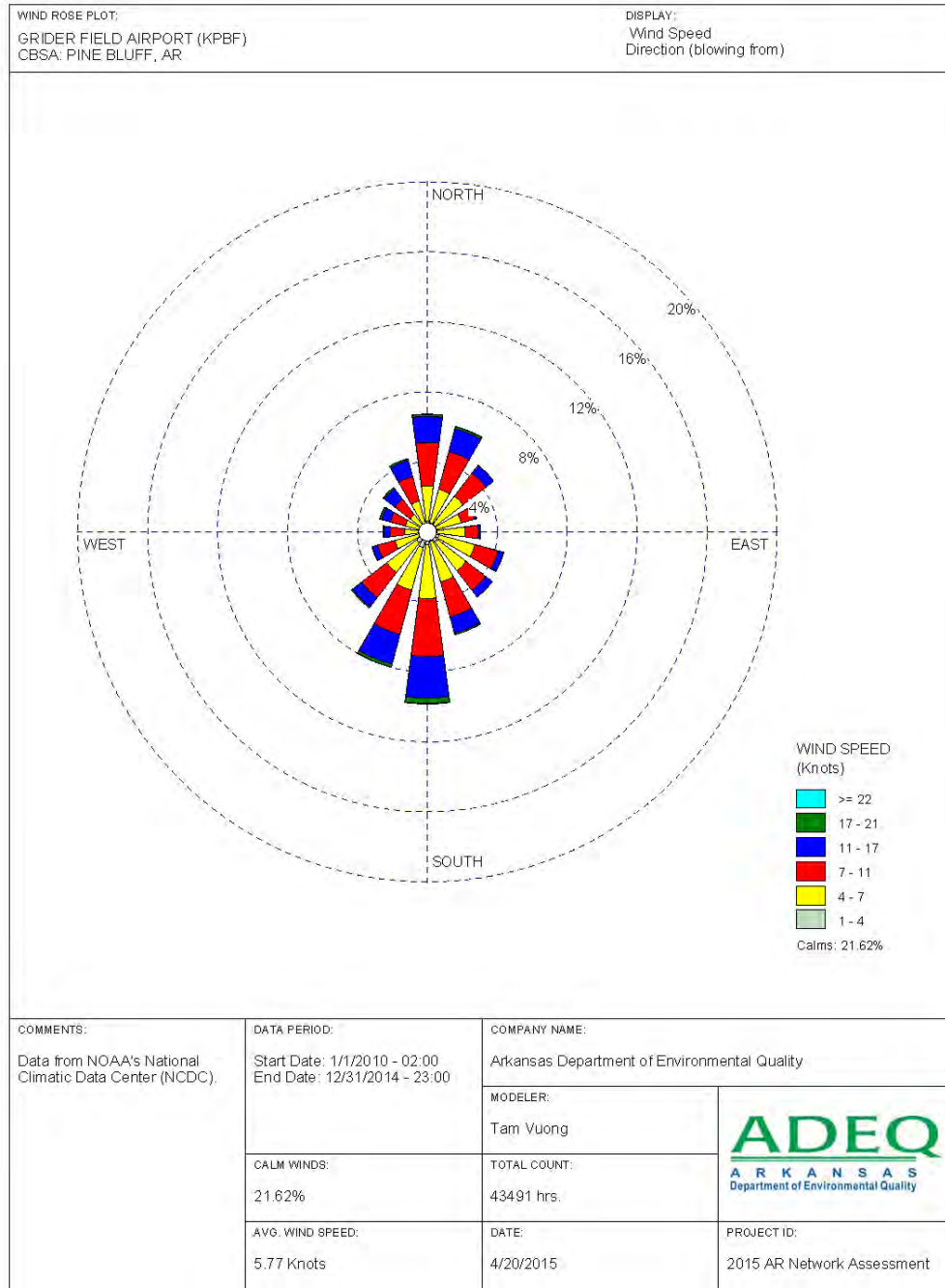
# Drake Field Airport (KFYV)



WRPLOT View - Lakes Environmental Software

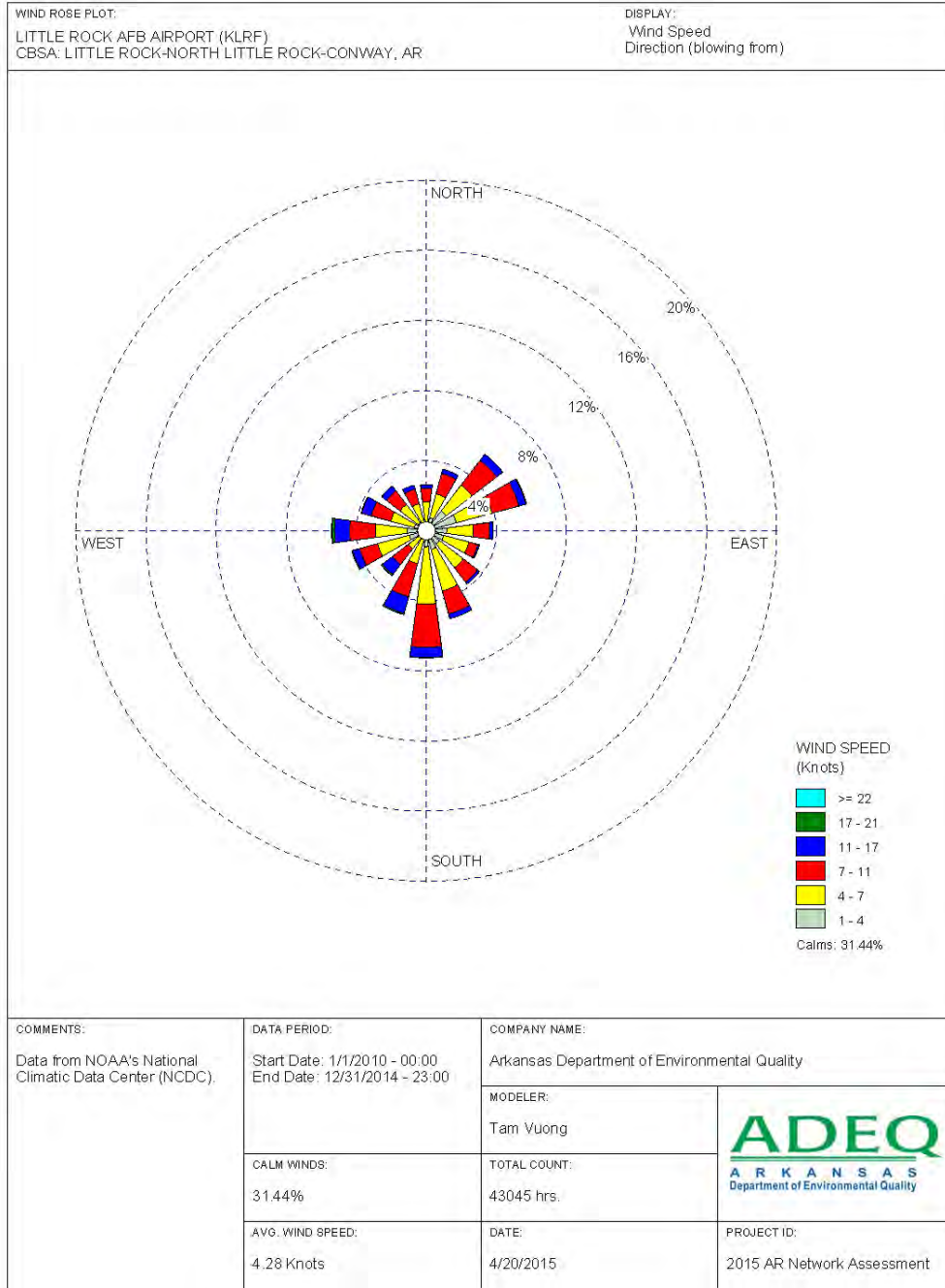


## Grider Field Airport (KPBF)

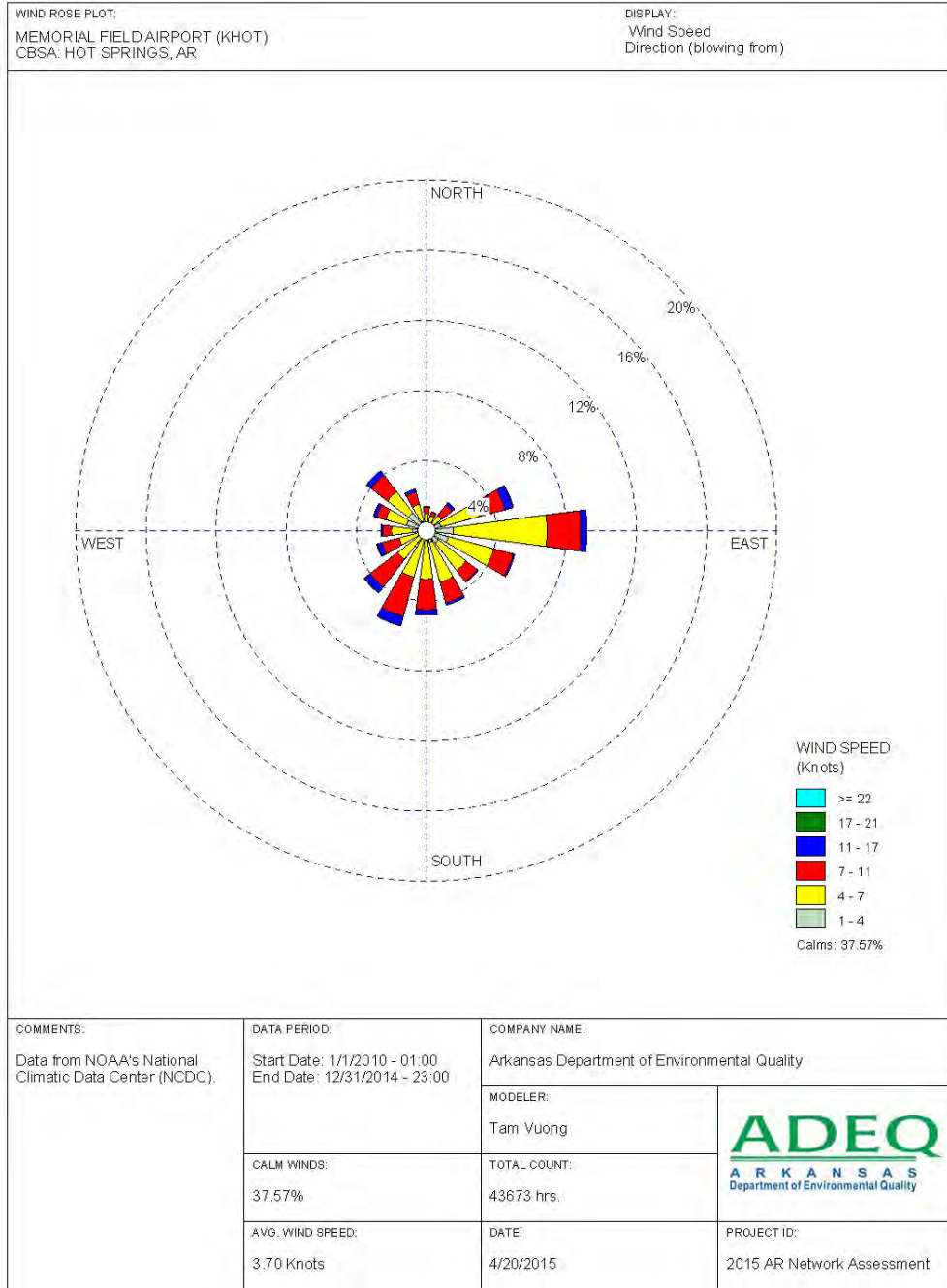


WRPLOT View - Lakes Environmental Software

# Little Rock Air Force Base Airport (KLRF)



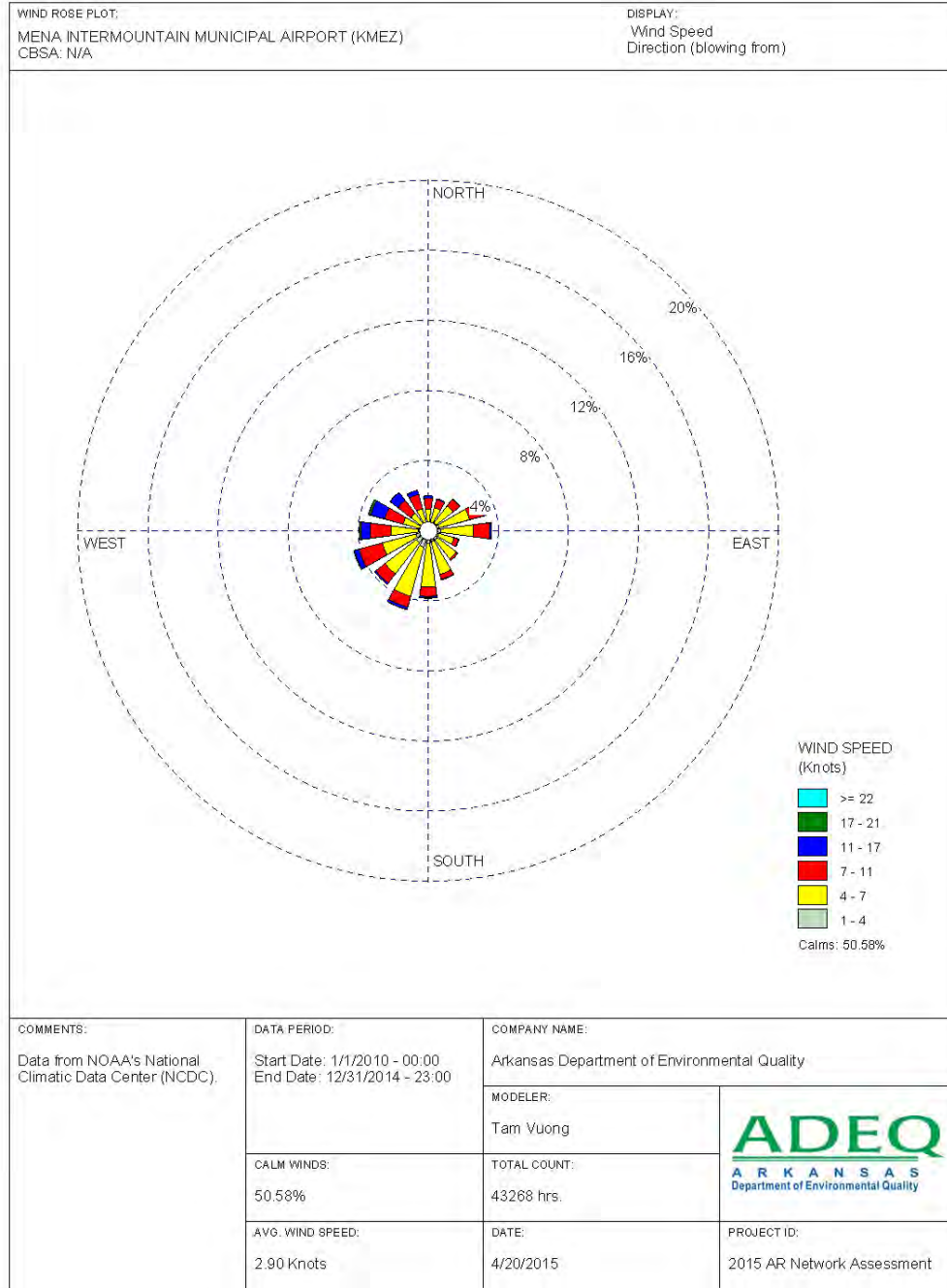
# Memorial Field Airport (KHOT)



WRPLOT View - Lakes Environmental Software



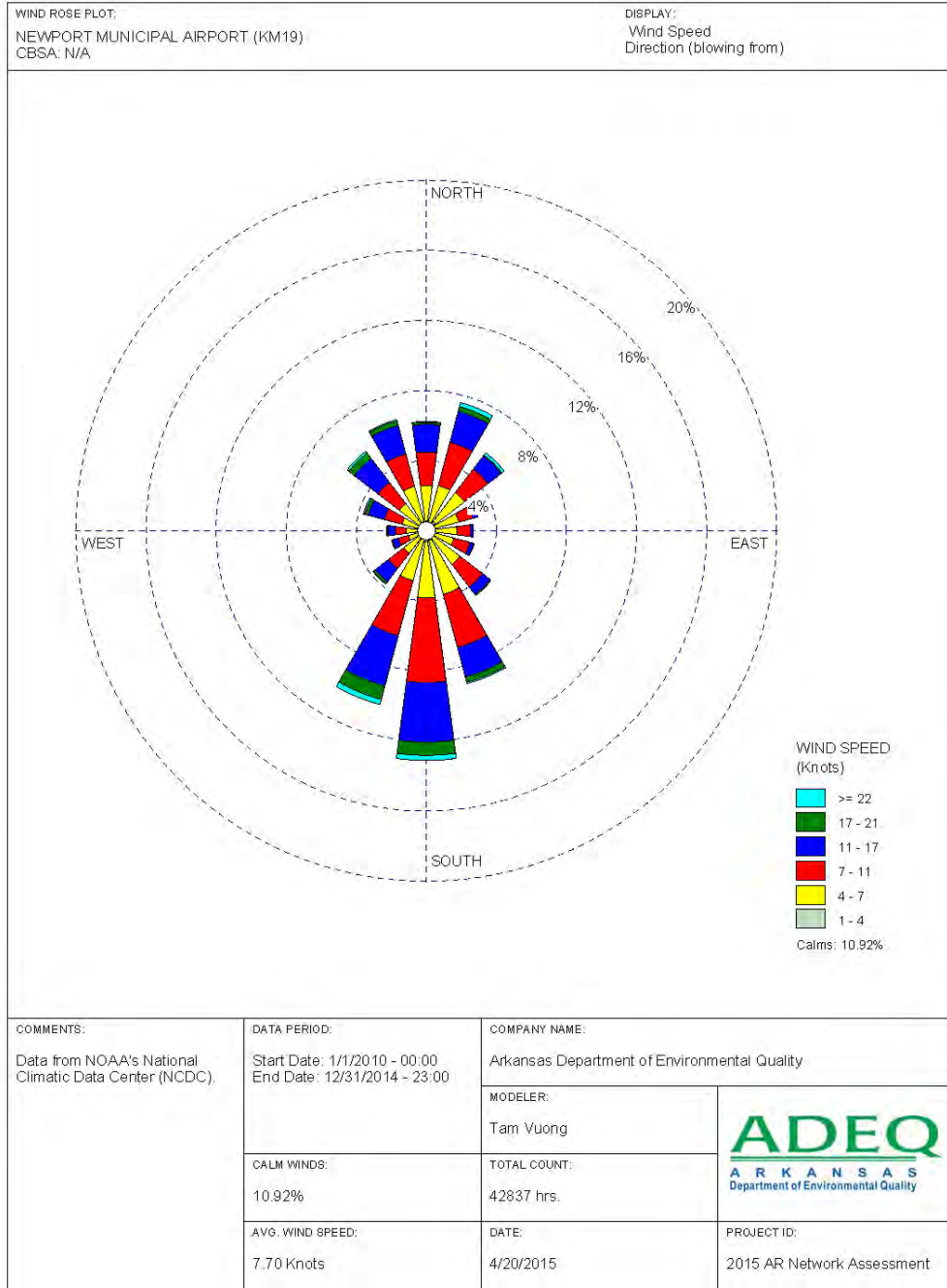
## Mena Intermountain Municipal Airport (KMEZ)



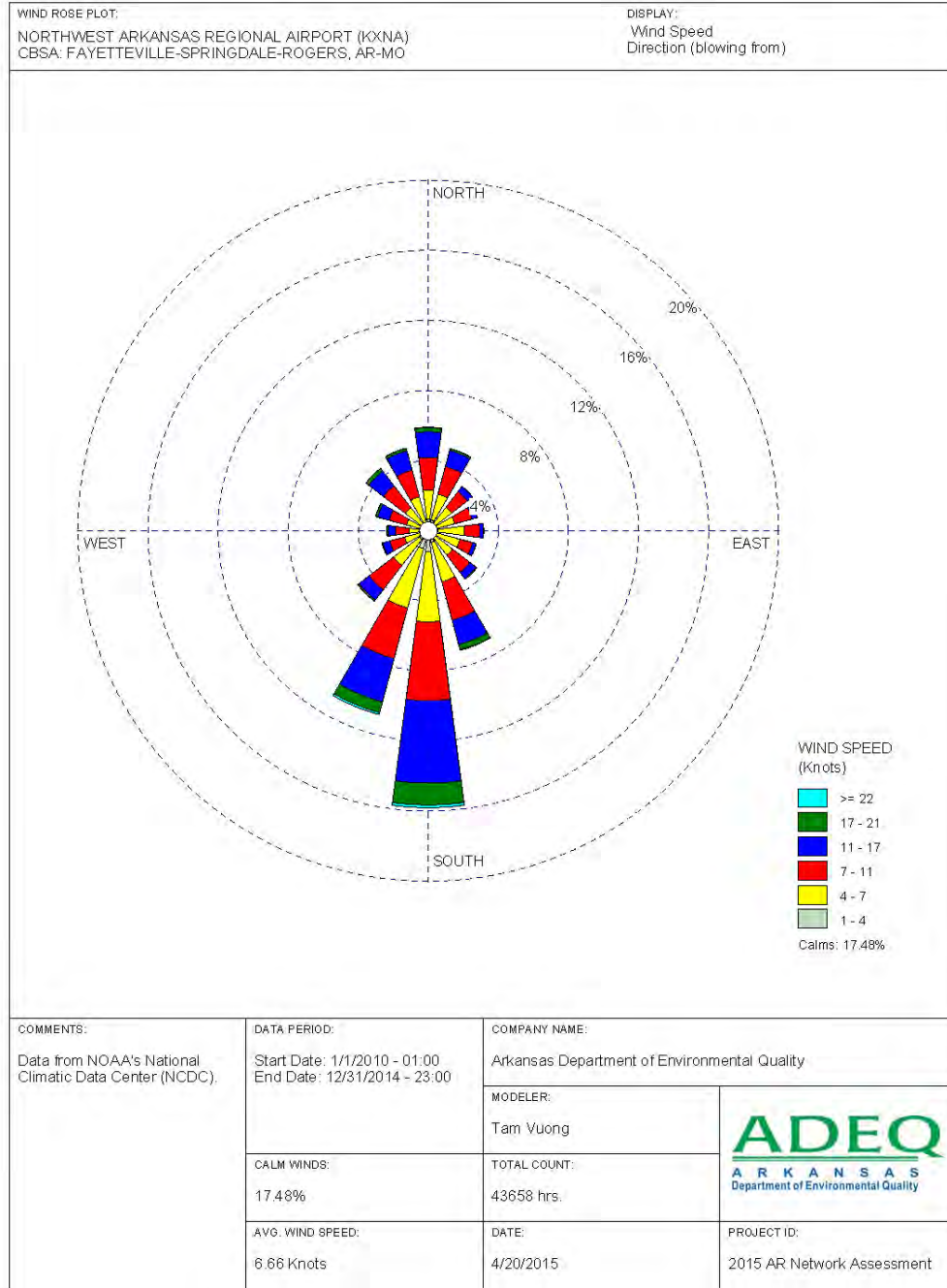
WRPLOT View - Lakes Environmental Software



## Newport Municipal Airport (KM19)

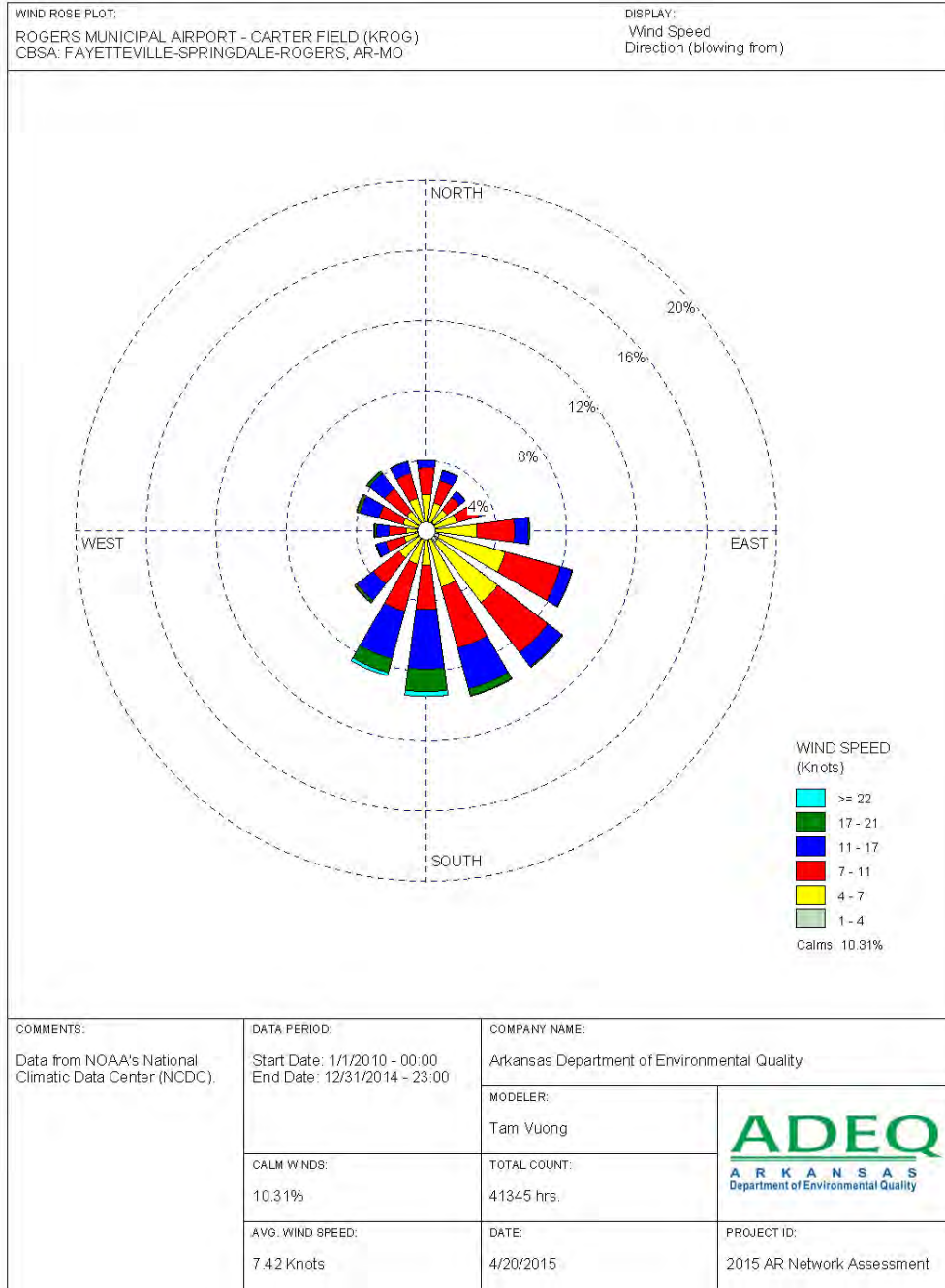


## Northwest Arkansas Regional Airport (KXNA)



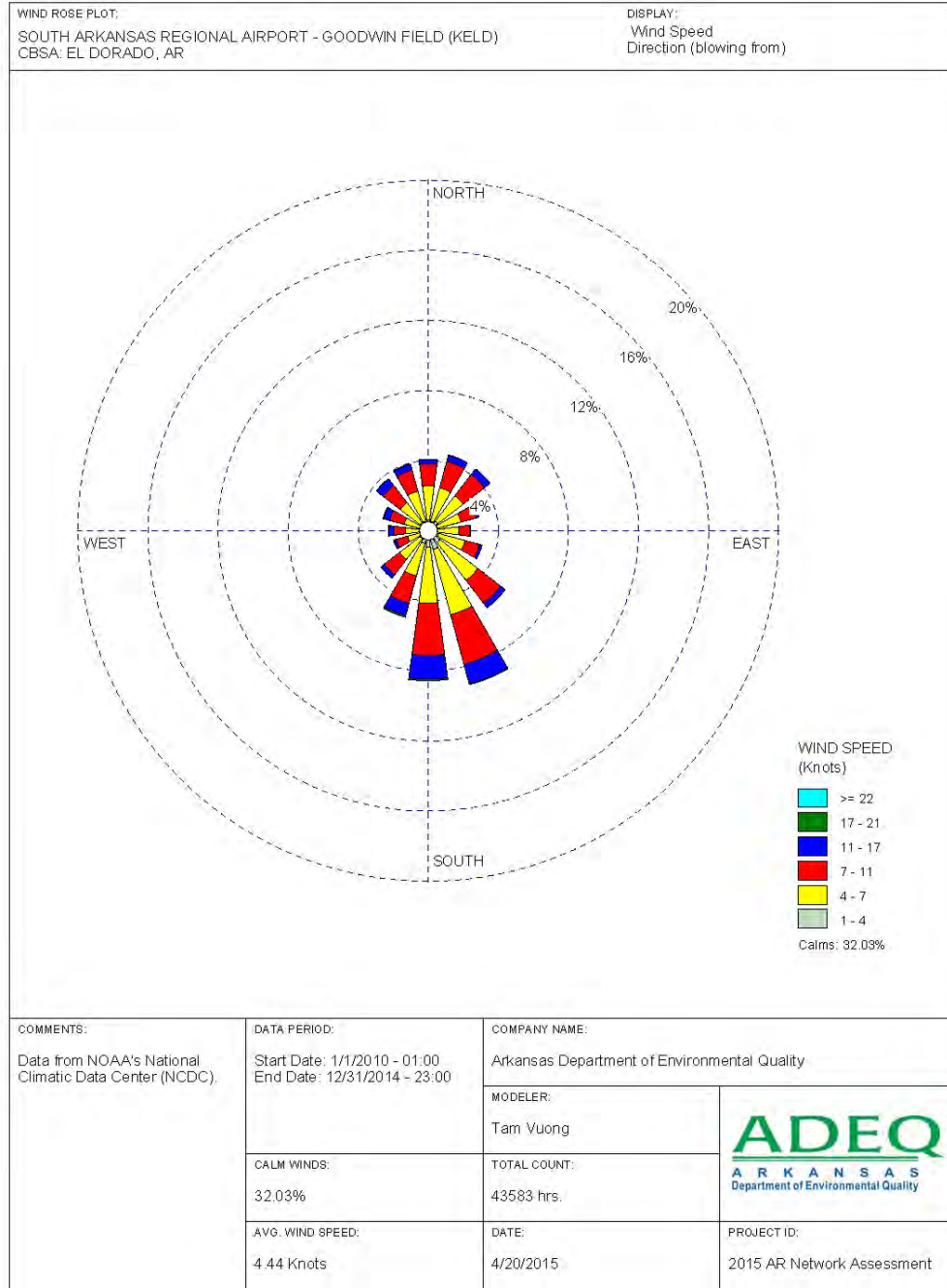
WRPLOT View - Lakes Environmental Software

## Rogers Municipal Airport – Carter Field (KROG)



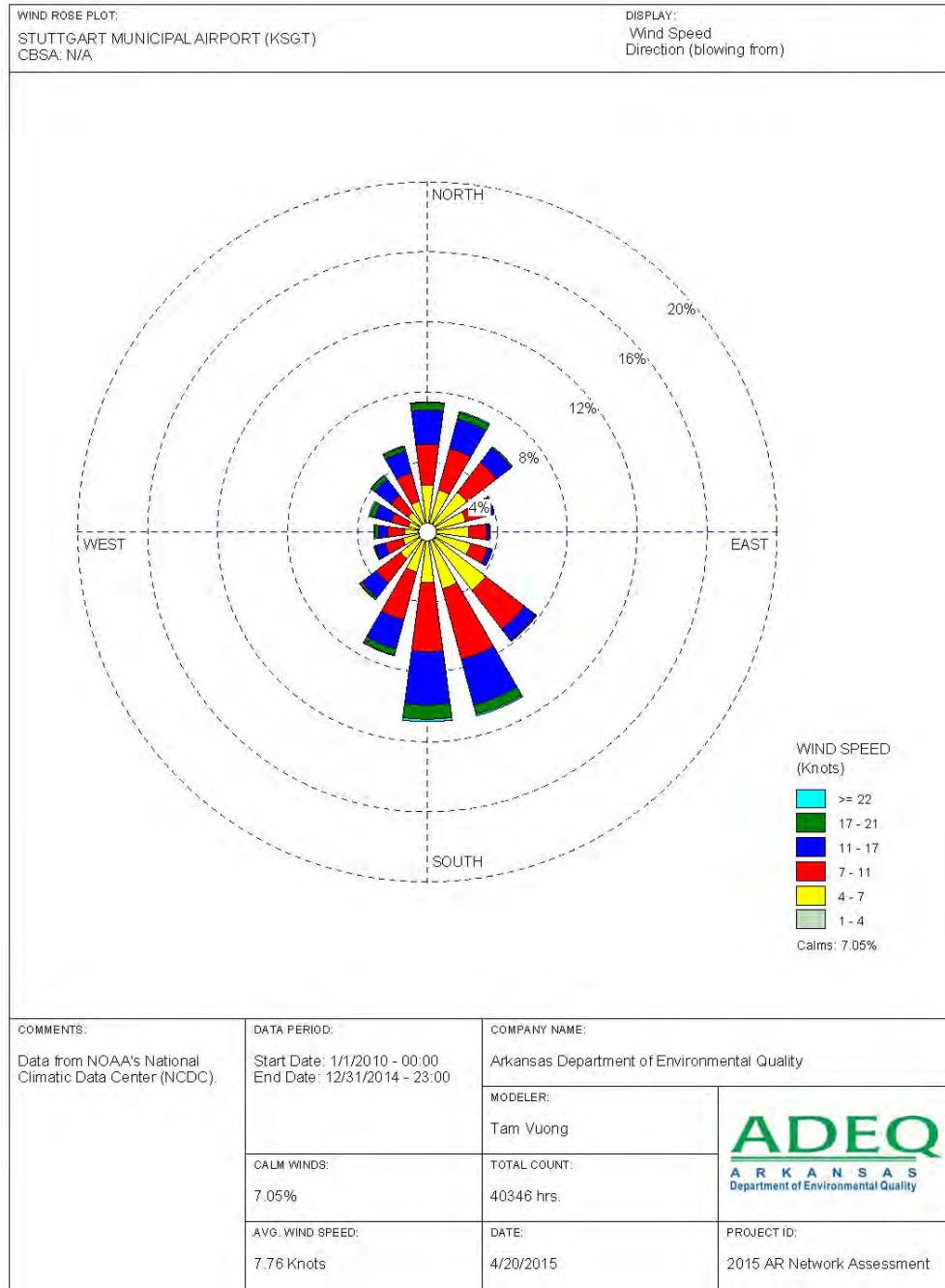
WRPLOT View - Lakes Environmental Software

## South Arkansas Regional Airport – Goodwin Field (KELD)

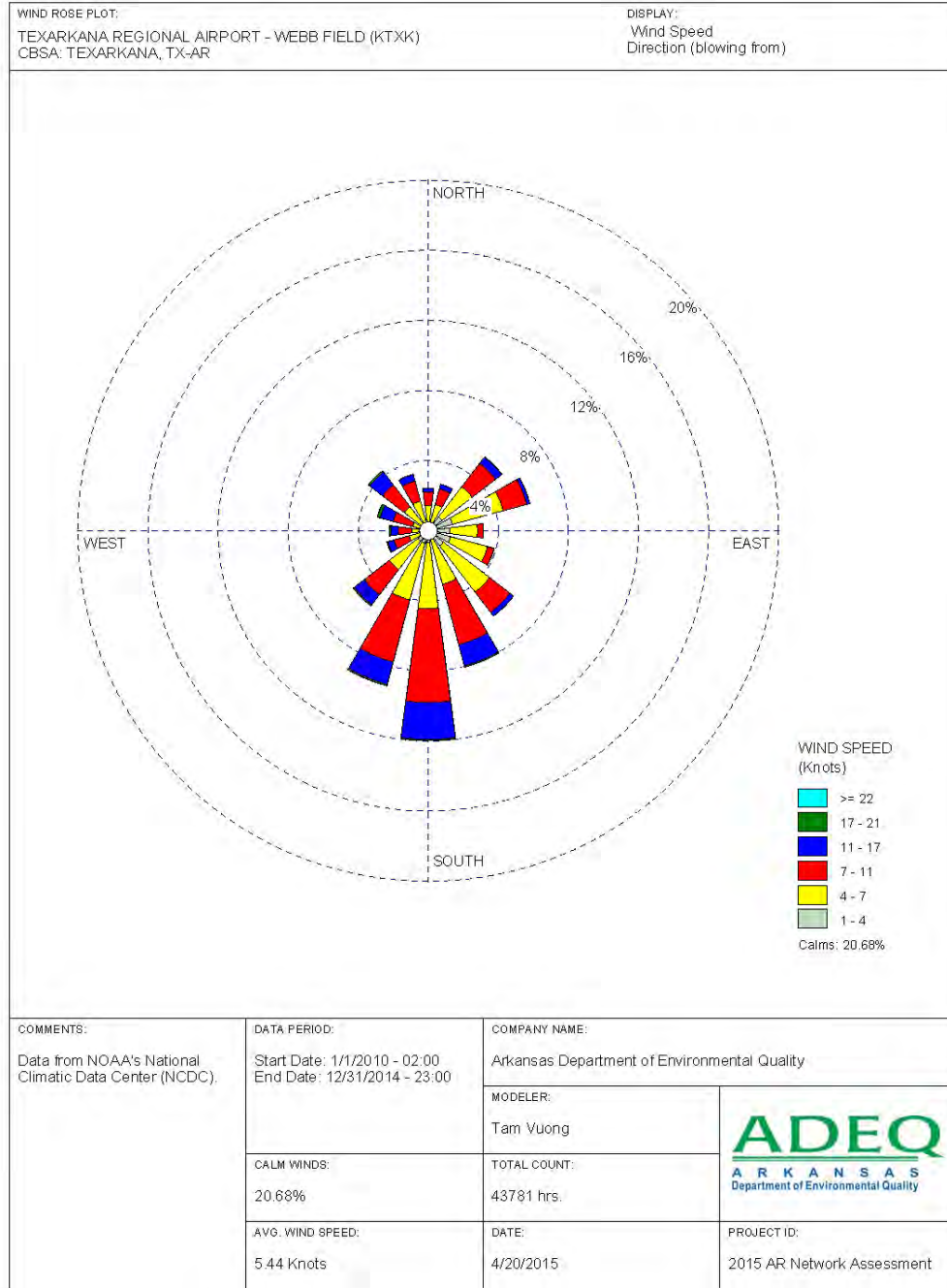


WRPLOT View - Lakes Environmental Software

## Stuttgart Municipal Airport (KSGT)

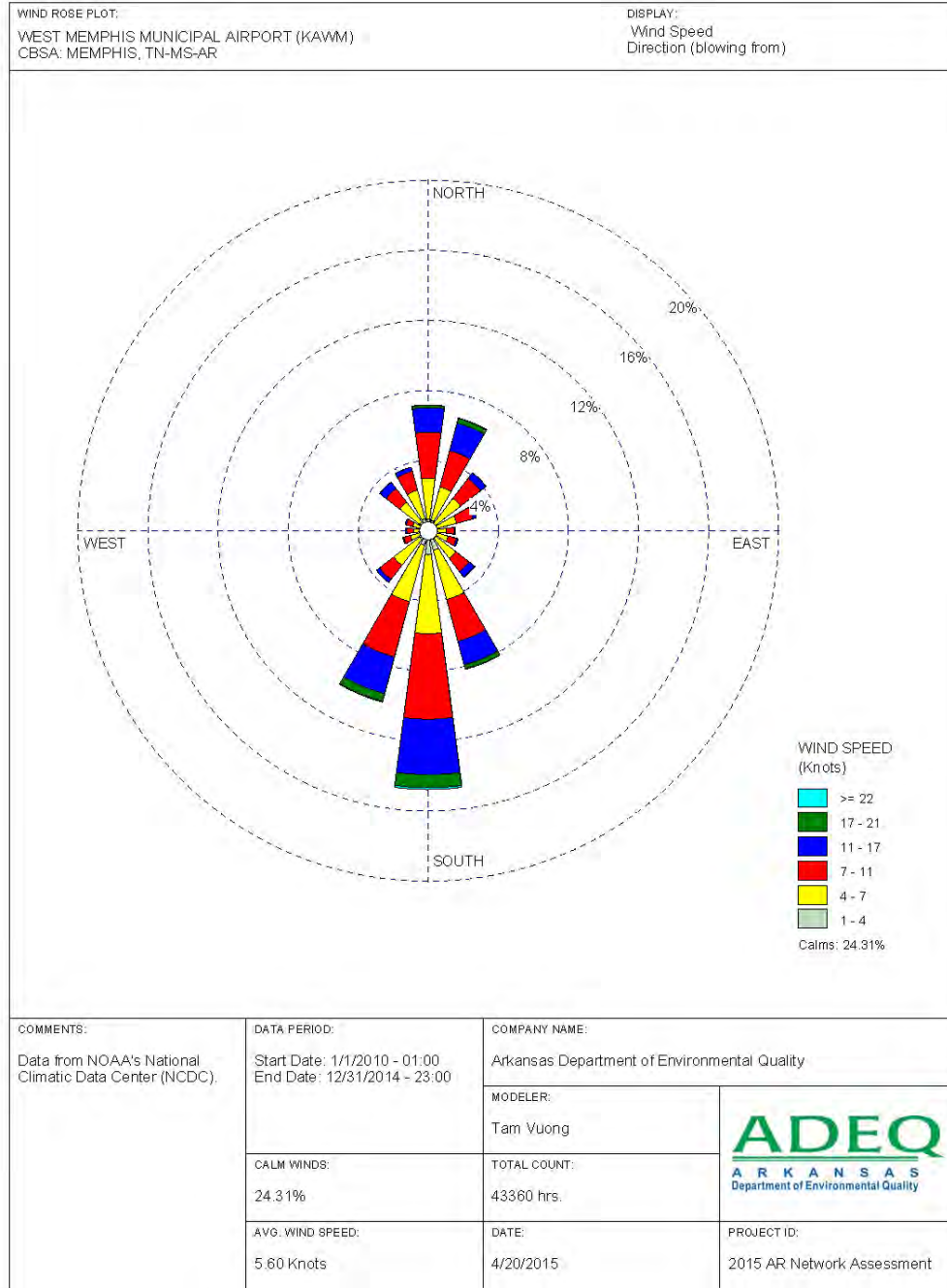


## Texarkana Regional Airport – Webb Field (KTXK)





## West Memphis Municipal Airport (KAWM)



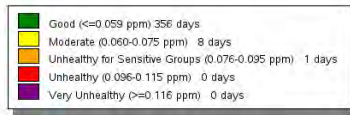
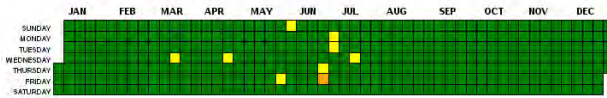
WRPLOT View - Lakes Environmental Software



## Appendix 2. Tile Plots of 2009–14 O<sub>3</sub> Daily AQI for Select MSAs

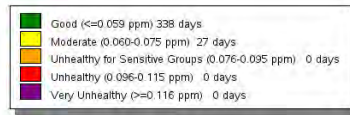
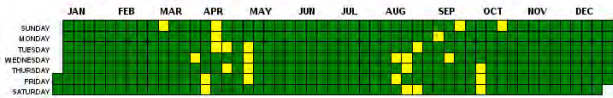
### Fayetteville-Springdale-Rogers, AR-MO MSA

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



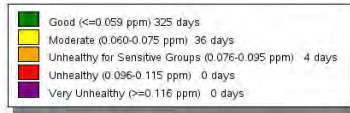
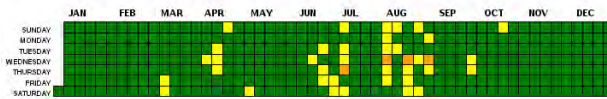
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



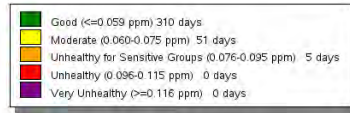
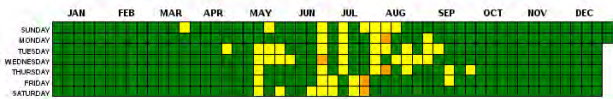
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



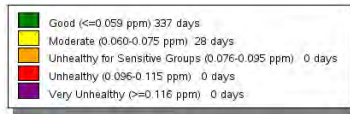
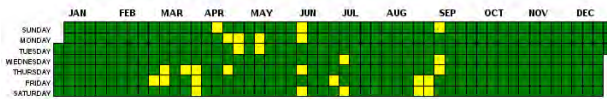
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



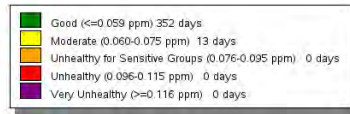
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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

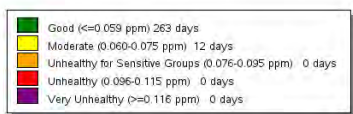
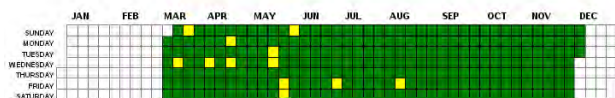
Ozone Daily AQI Values in 2014  
Fayetteville-Springdale-Rogers, AR-MO



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

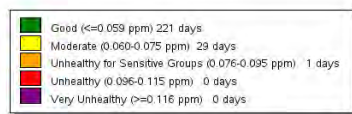
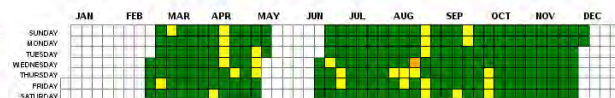
# Fort Smith, AR-OK MSA

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



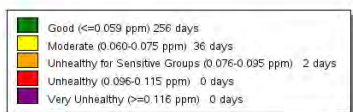
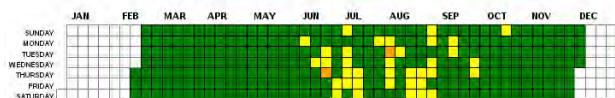
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



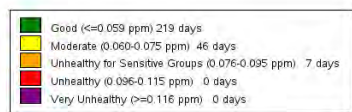
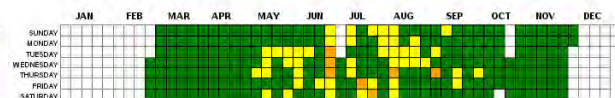
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



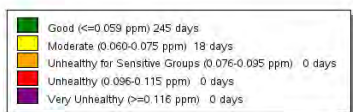
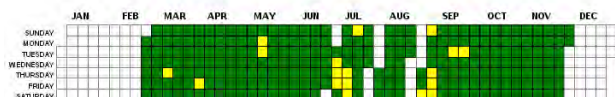
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



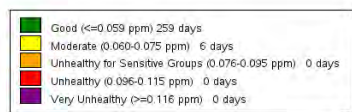
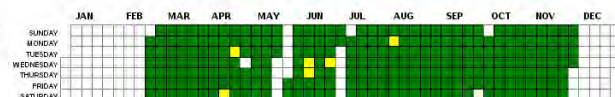
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



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

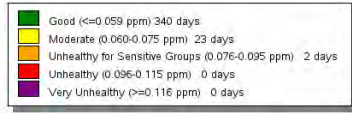
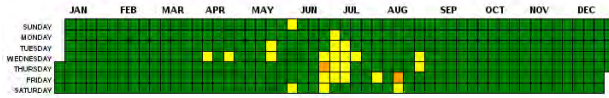
Ozone Daily AQI Values in 2014  
Fort Smith, AR-OK



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

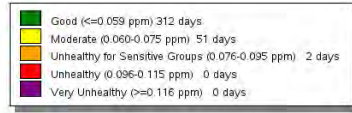
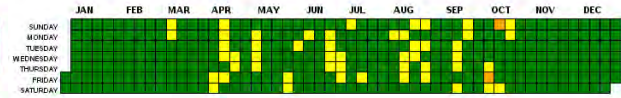
# Little Rock-North Little Rock-Conway, AR MSA

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



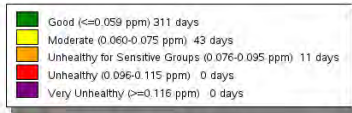
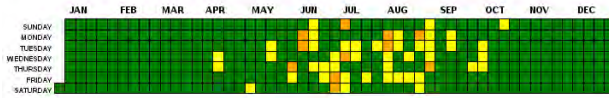
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



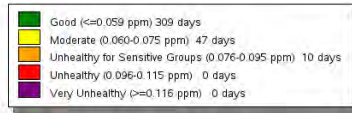
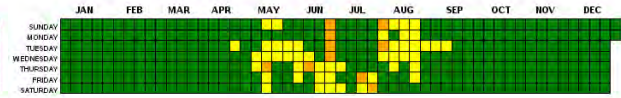
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



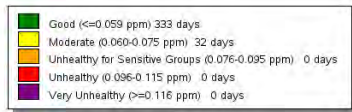
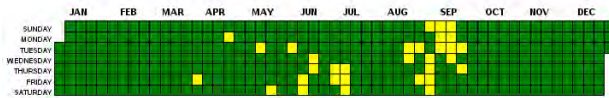
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



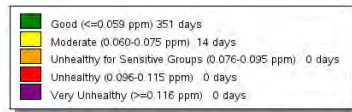
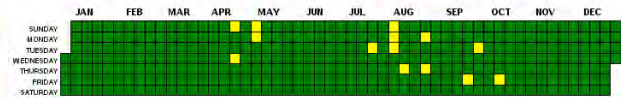
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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

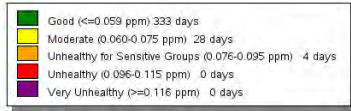
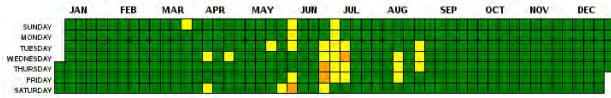


Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015



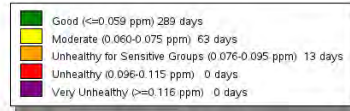
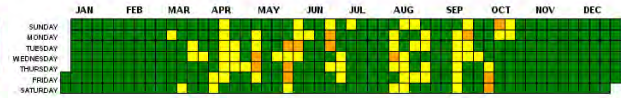
# Memphis, TN-MS-AR MSA

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



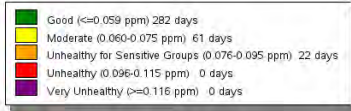
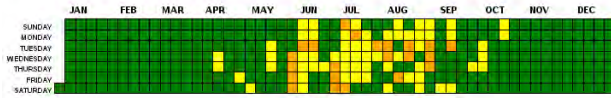
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



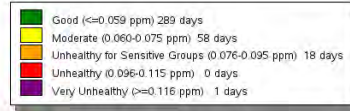
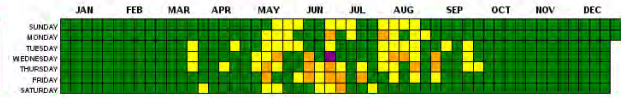
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



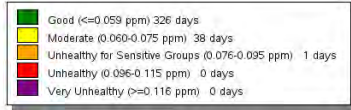
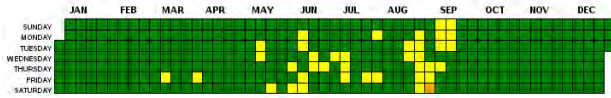
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



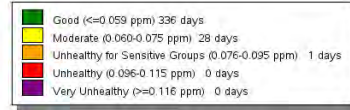
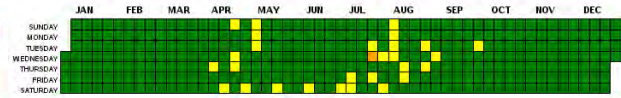
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



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

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

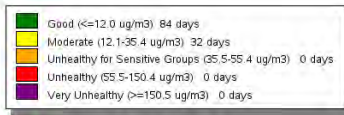
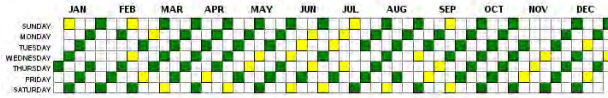


Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

## Appendix 3. Tile Plots of 2009–14 PM<sub>2.5</sub> Daily AQI for Select MSAs

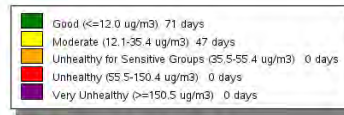
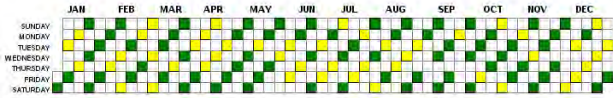
### Fayetteville-Springdale-Rogers, AR-MO MSA

PM<sub>2.5</sub> Daily AQI Values in 2009  
Fayetteville-Springdale-Rogers, AR-MO



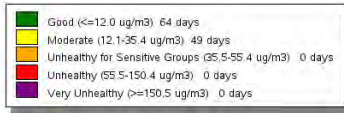
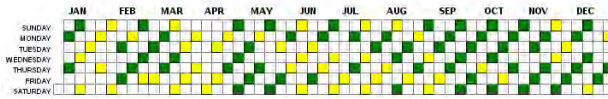
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

PM<sub>2.5</sub> Daily AQI Values in 2010  
Fayetteville-Springdale-Rogers, AR-MO



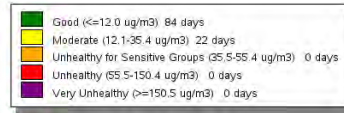
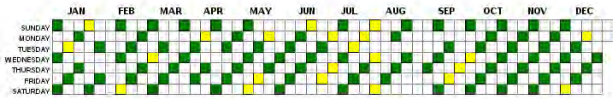
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

PM<sub>2.5</sub> Daily AQI Values in 2011  
Fayetteville-Springdale-Rogers, AR-MO



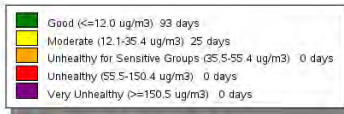
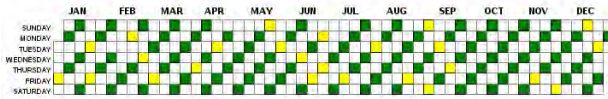
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

PM<sub>2.5</sub> Daily AQI Values in 2012  
Fayetteville-Springdale-Rogers, AR-MO



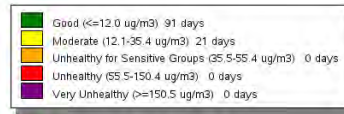
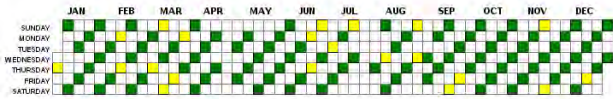
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

PM<sub>2.5</sub> Daily AQI Values in 2013  
Fayetteville-Springdale-Rogers, AR-MO



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

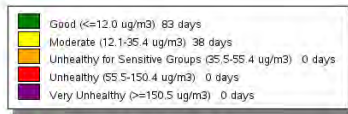
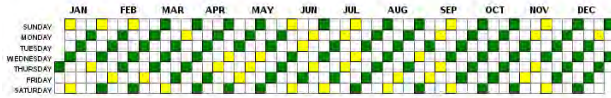
PM<sub>2.5</sub> Daily AQI Values in 2014  
Fayetteville-Springdale-Rogers, AR-MO



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

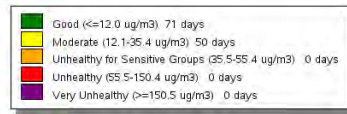
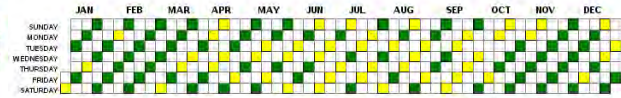
# Hot Springs, AR MSA

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



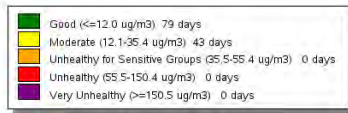
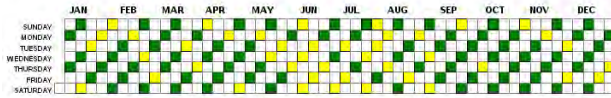
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



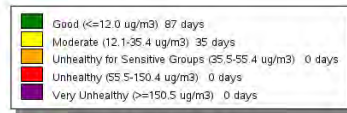
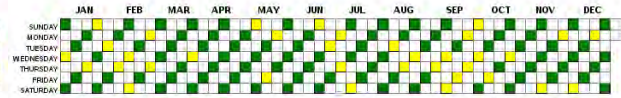
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



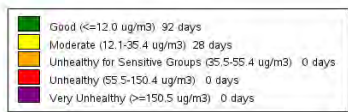
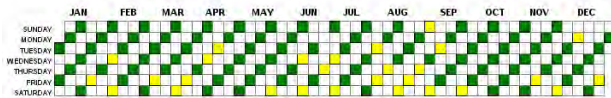
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



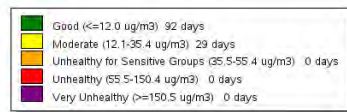
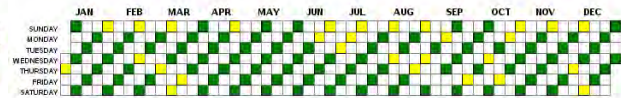
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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

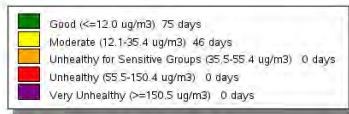
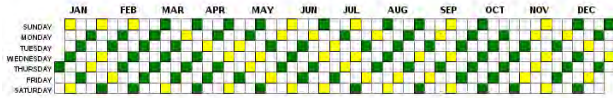


Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015



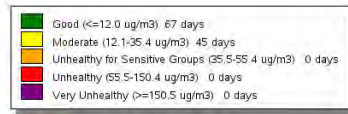
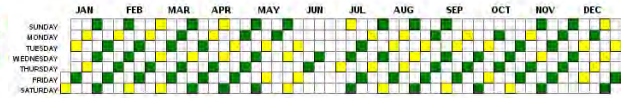
# Fort Smith, AR-OK MSA

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



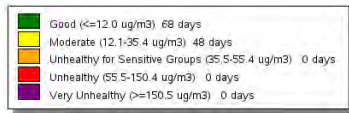
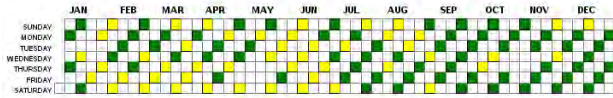
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



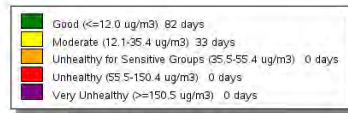
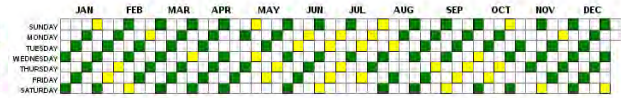
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



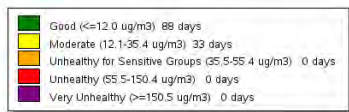
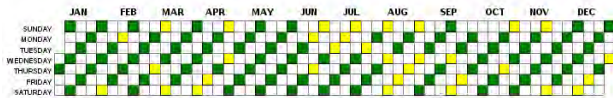
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



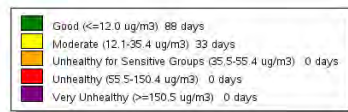
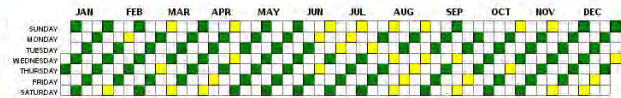
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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

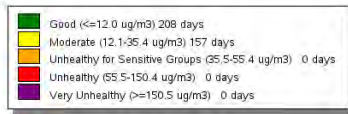
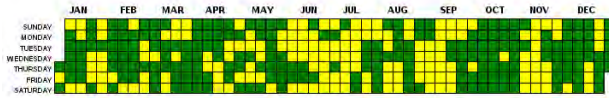


Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015



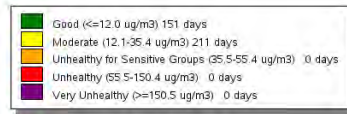
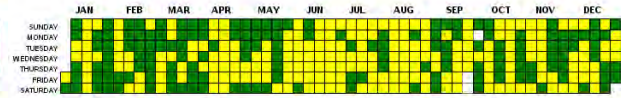
# Little Rock-North Little Rock-Conway, AR MSA

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



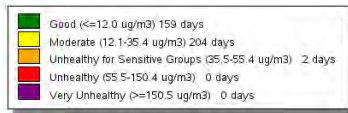
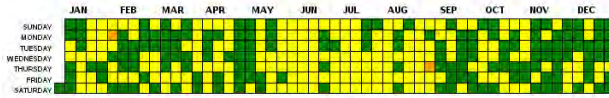
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



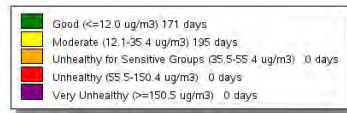
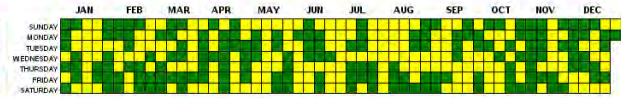
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



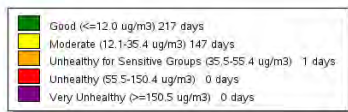
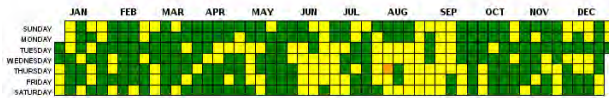
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



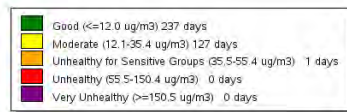
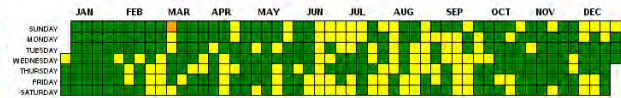
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



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

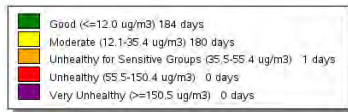
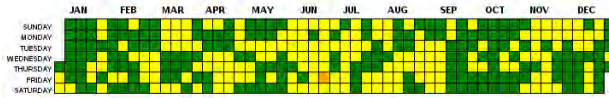
PM2.5 Daily AQI Values in 2014  
Little Rock-North Little Rock-Conway, AR



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

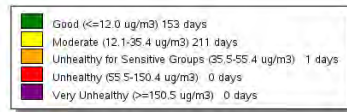
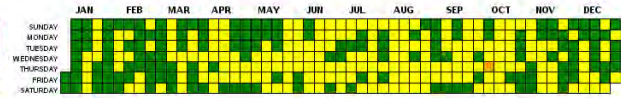
# Memphis, TN-MS-AR MSA

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



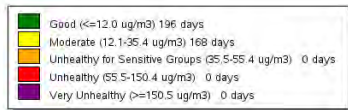
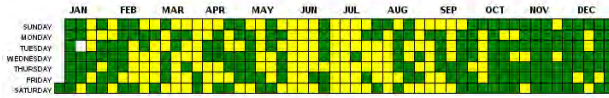
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



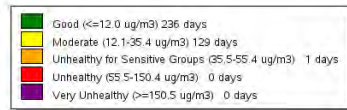
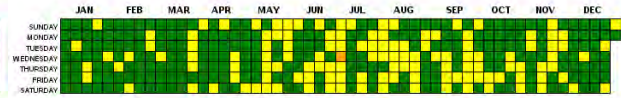
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



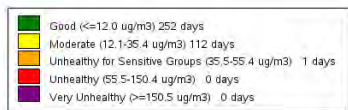
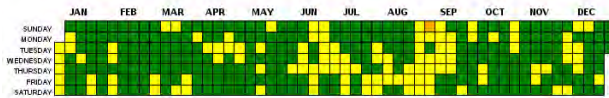
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



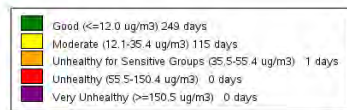
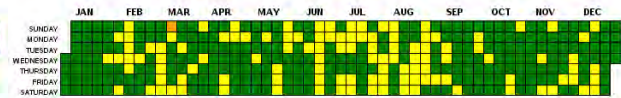
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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

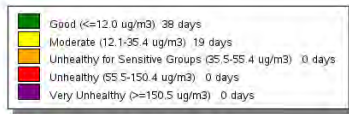
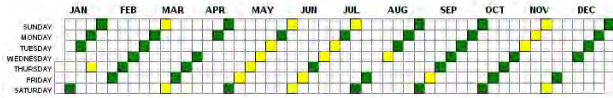
PM2.5 Daily AQI Values in 2014  
Memphis, TN-MS-AR



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

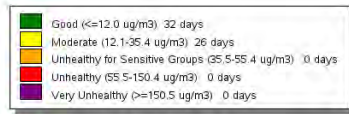
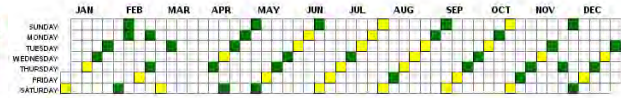
# Texarkana, TX-Texarkana, AR

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



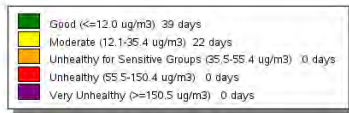
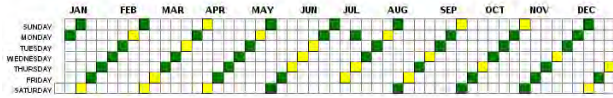
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



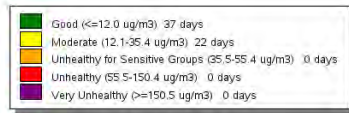
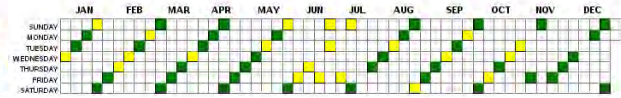
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



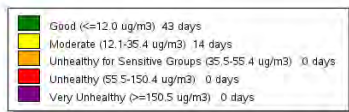
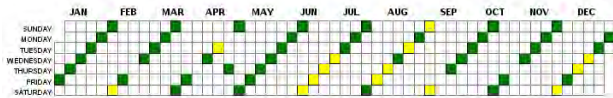
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



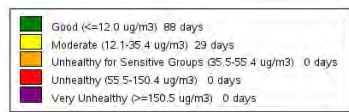
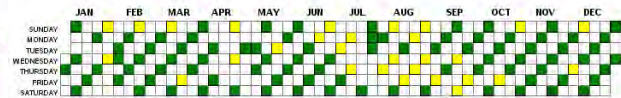
Source: U.S. EPA AirData <<http://www.epa.gov/airdata>>  
Generated: May 22, 2015

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



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



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





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
1445 ROSS AVENUE, SUITE 1200  
DALLAS TX 75202-2733

NOV 16 2015

Ms. Lessie Redican  
Chief, Technical Services Division  
Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317

Dear Ms. Redican:


Thank you for your correspondence dated July 16, 2015, submitting the Arkansas Department of Environmental Quality's (ADEQ) 2015-2016 Annual Monitoring Network Plan (AMNP). Thank you also for your letters of January 1, 2015, August 28, 2015, and November 12, 2015, regarding your air monitoring network. The U.S. Environmental Protection Agency (EPA) has completed its review of the ADEQ's 2015-2016 AMNP to ensure it meets the requirements of 40 Code of Federal Regulations (CFR) Part 58 that are under the oversight of the Regional Administrator. At the EPA Region 6, approval authority for AMNPs is delegated to the Associate Director for Air Programs.

We appreciate your cooperation and work to submit your 2015-2016 network plan. The network assessment process presents an opportunity for the EPA and the ADEQ to collaborate on the air monitoring network design. *See* 40 CFR Part 58 App. D, 1.1.2. I am pleased to inform you that your 2015 ambient air monitoring network plan is approved in accordance with 40 CFR §58.10, except for the request to change the sampling frequency for the collocated Federal Reference Method particulate matter (PM) monitors at the NCore site PARR which will be forwarded to the Office of Air Quality Planning and Standards for Administrator review and approval. Also, your two lead waiver renewal requests are approved. We note that the ADEQ withdrew its request to discontinue the North Little Rock Airport ozone monitor in a letter dated August 28, 2015, and also withdrew its request to discontinue the Newport PM<sub>2.5</sub> monitor in a letter dated November 12, 2015. The November 12, 2015, letter also requests that we approve a systems modification to move the Newport PM<sub>2.5</sub> Monitor to a different location in the same vicinity. We will review this request and respond by separate correspondence. Details of our review of your AMNP are provided in the enclosure.

We look forward to our continued collaborative work with the ADEQ on your 2016-2017 annual monitoring network plan. If you have any questions or if you would like to discuss our comments,

please contact me at (214) 665-7548, or your staff may contact Ms. Frances Verhalen, Air Quality Analysis Section Chief, at (214) 665-2172.

Sincerely,



Mark Hansen  
Associate Director for  
Air Programs

Enclosure

cc: Stuart Spencer  
Chief, Air Division  
Arkansas Department of Environmental Quality (with Enclosure)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 6  
1445 ROSS AVENUE, SUITE 1200  
DALLAS TX 75202-2733

DEC 01 2015

Ms. Lessie Redican  
Chief, Technical Services Division  
Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, Arkansas 72118-5317

Dear Ms. Redican:

This letter is a follow up to our letter dated November 16, 2015, to the Arkansas Department of Environmental Quality's (ADEQ), in response to Arkansas' Annual Monitoring Network Plan (AMNP) for 2015-2016.

In the 2015-2016 AMNP, ADEQ requested to change the sampling frequency to a 12-day schedule for the collocated Federal Reference Method (FRM) sampler of particulate matter of 2.5 microns or less (PM<sub>2.5</sub>) and particulate matter of 10 microns or less (PM<sub>10</sub>) at the National Core multipollutant monitoring site PARR (Air Quality System Site ID: 05-119-0007). For sampling of PM<sub>2.5</sub> and PM<sub>10</sub>, regulatory procedures allow for the collocated audit monitors to operate on a 12-day schedule with at least 25 valid sample pairs a year. See 40 Code of Federal Regulations (CFR) Part 58, Appendix A, Sections 3.2.5.7 and 3.3.1.3. Upon further internal review, we understand this request to not necessitate Administrator approval because it would not modify the primary FRM sampler. The U.S. Environmental Protection Agency approves this requested network change in accordance with 40 CFR Part 58 which allows for the requested sampling frequency.

We appreciate the work and effort that the ADEQ continues to invest in its Ambient Air Monitoring system. If you have any questions, please contact me at (214) 665-2172 or Ms. Ellen Belk of my staff at (214) 665-2164.

Sincerely yours,

A handwritten signature in blue ink that reads "Frances Verhalen".

Frances Verhalen  
Chief  
Air Monitoring/Grants Section