Office of Air Quality

STATE OF THE AIR 2018

Arkansas Department of Environmental Quality

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501-682-0744
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https://www.adeq.state.ar.us/air/forms/questions.aspx

FOREWORD

Dear Reader,

On behalf of the Arkansas Department of Environmental Quality (ADEQ) Office of Air Quality (OAQ) team, thank you for taking the time to read OAQ's 2018 State of the Air Report. This report presents data about the air quality in Arkansas and achievements in OAQ program implementation during federal fiscal year (FFY) 2018.

The air we breathe is one of our greatest natural resources. In Arkansas, we are fortunate to enjoy outstanding air quality. We are meeting or beating all federal ambient air quality standards throughout the state. Additionally, reduced pollution is resulting in visibility improvements at our scenic wilderness areas.

At a time of improving air quality, OAQ has also realized greater efficiencies in our permitting program. We have reduced the time necessary for OAQ to issue timely permits that protect the public from pollution-related health risks, the environment from degradation, the permittee from uncertainty, and ADEQ from unwarranted challenge and appeal.

We continue to assert our proper role with the United States Environmental Protection Agency (EPA) in our "cooperative federalism" relationship. I'm happy to report that in FFY 2018, EPA approved a number of our states plans. We're encouraged that EPA is recognizing our efforts and showing the appropriate degree of deference to the State in evaluating our federal submissions.

Again, thank you for taking the time to read the OAQ 2018 State of the Air Report. If you have questions, comments, or concerns, please contact us.

Sincerely,

Stuart L. Spencer
Associate Director, Office of Air Quality

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Introduction to the Office of Air Quality

Who we are

The OAQ consists of four branches: Permits, Compliance, Policy and Planning, and Asbestos and Enforcement. Each branch of the OAQ has specific duties and addresses various aspects of the air program. The OAQ team is composed of scientists, engineers, attorneys, and administrative professionals.

What we do

- Develop and implement programs designed to ensure compliance with federal air quality regulations
- Regulate emissions through a permitting program that sets emission limits protective of public health
- Monitor ambient air quality in Arkansas through deployment and maintenance of a statewide monitoring network
- Investigate complaints and violations of State and federal air quality laws
- Prepare and issue air quality forecasts

BRANCHES

PERMITS

The Permits Branch implements a single-permit system for new and modified facilities that encompasses both State and federal regulatory requirements for stationary sources.

COMPLIANCE

The Compliance Branch investigates whether permitted facilities operate in accordance with State and federal air pollution regulations, as specified in each facility's permit. The Compliance Branch also investigates citizen complaints regarding air pollution and responds to emergency situations

POLICY AND PLANNING

The Policy and Planning Branch is responsible for developing plans to comply with State statutes and federal air regulations. The Policy and Planning Branch also collects technical information on air quality and emissions of air pollutants.

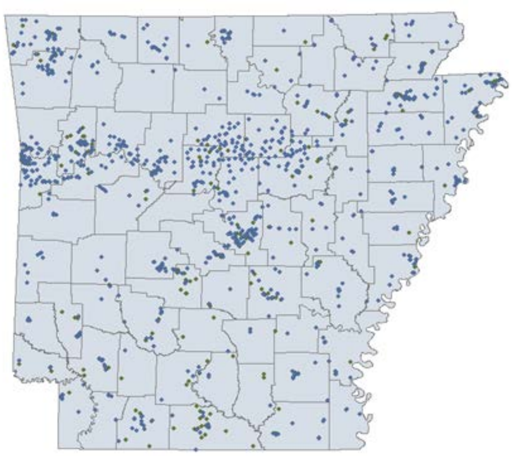
ASBESTOS AND ENFORCEMENT

Two distinct sections make up the Asbestos and Enforcement Branch. Asbestos ensures any demolitions and asbestos-related renovations occur in accordance with Arkansas's asbestos regulation. Enforcement implements and enforces all State and federal air pollution regulatory requirements.

Permits Branch

The Permits Branch implements a single-permit system for new and modified facilities that encompasses both State and federal regulatory requirements for stationary sources. Permits include information on what pollutants are being released, how much may be emitted, and what steps the source's owner or operator is taking to reduce pollution. All permits include a mechanism to demonstrate compliance with the permit conditions. The permitting process ensures that stationary sources will be constructed or modified to operate without resulting in a violation of the Arkansas environmental statutes and regulations and without interfering with the attainment and maintenance of the national ambient air quality standards (NAAQS). Visit our website more information about OAQ's Permits Branch:

https://www.adeq.state.ar.us/air/permits/



Permitted Stationary Sources in Arkansas.

Image Credit: Dwight Burdette

TYPES OF AIR PERMITS

▲ MAJOR SOURCE/TITLE V

For stationary sources of air pollutants that have actual or potential emissions at or above 100 tons per year of any criteria pollutant, ten tons per year for a single hazardous air pollutant (HAP) or twenty-five tons per year for any combination of HAPs. Also for select categories of facilities regardless of emission rates.

▲ MINOR SOURCE

Stationary sources required to obtain a permit under Arkansas Pollution Control and Ecology Commission (APC&EC) regulations, but do not meet any major source thresholds.

▲ GENERAL PERMITS

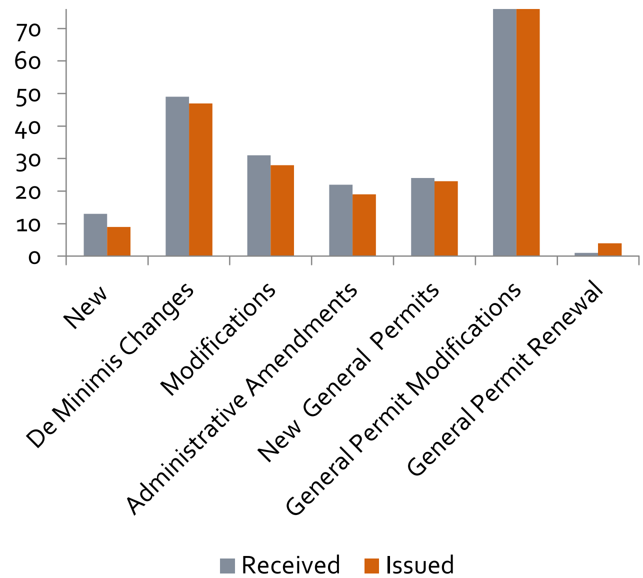
Standardized permits for air curtain incinerators, animal/human remains incinerator facilities, cotton gins, gasoline bulk plants, hot mix asphalt facilities, natural gas compression stations, and rock crushing facilities

Minor Source Permitting Metrics

During FFY 2018, the Permits Branch received 220 minor source permit applications and issued 209 minor source permits. The average processing time for new and modified minor source permits was 136 days.

Figure 1 (right) shows the breakdown in permit activity type of minor source permit applications received and issued.

Figure 1 Number of FFY 2018 Minor Source Permitting Activities

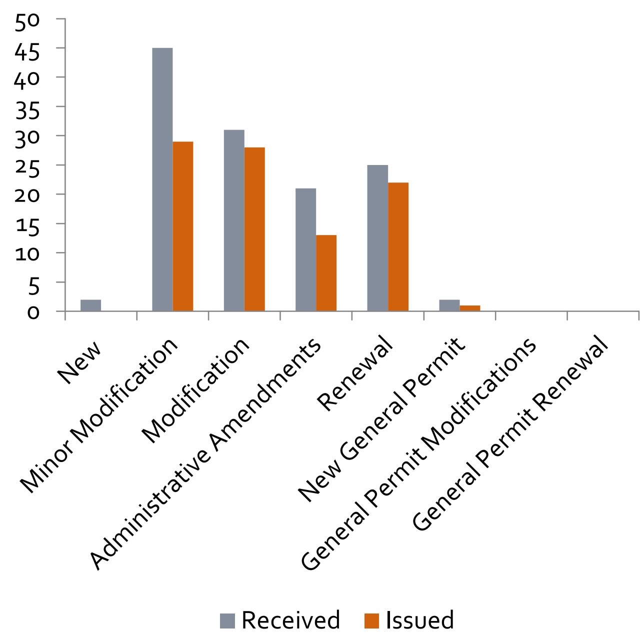


Title V Source Permitting Metrics

During FFY 2018, the Permits Branch received 126 Title V permit applications and issued 93 Title V permits/amendments. The average processing time for a new, renewal or modified Title V permit was 180 days.

Figure 2 (right) shows the breakdown in permit activity type of Title V permit applications received and issued.

Figure 2 Number of FFY 2018 Title V Permitting Activities



During FFY 2018, the Permits Branch implemented measures to improve permitting processes based on a lean event held in December 2017.

Goals developed at the permits lean event included reducing the number of incomplete applications received to thirty-four percent, reducing permit lead times to 180 days, and increasing the number online application submissions to fifty percent.

Figure 3 (right) shows the administrative completeness goal metrics, Figure 4 (bottom left) shows the lead time metrics, and Figure 5 (bottom right) shows the online submission goal metrics for the first three quarters of 2018.

Figure 3 Goal 1: Administratively Incomplete Applications

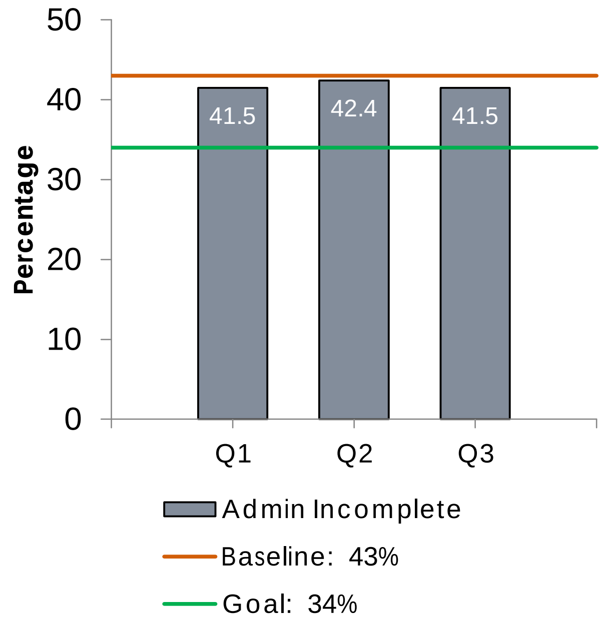


Figure 4 Goal 2: Lead Time by Quarter

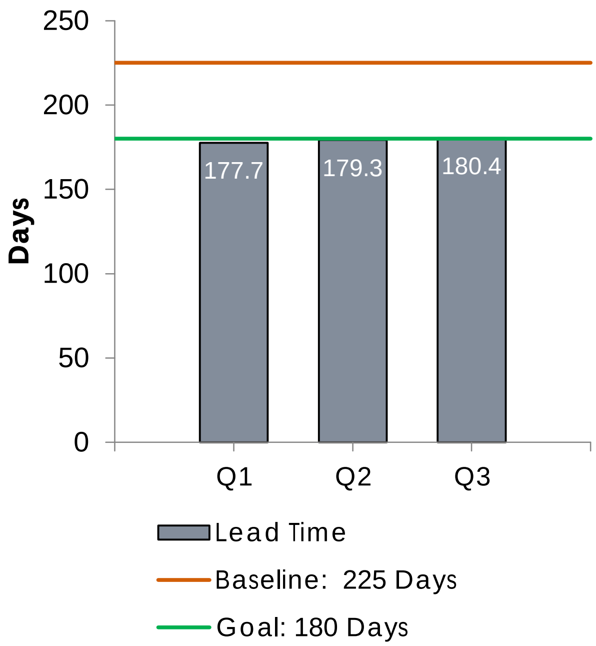
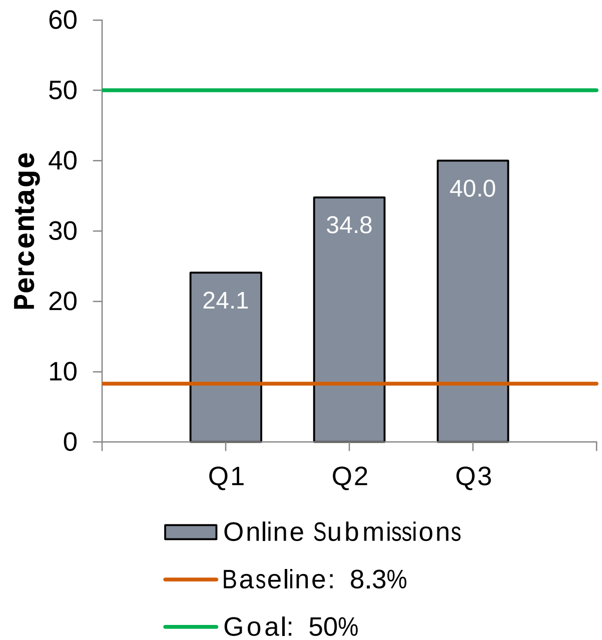


Figure 5 Goal 3: Online Submissions



Title V National Rankings

ADEQ is among the top state regulatory agencies in the nation for timeliness of Title V permit significant modification and renewal issuance.

Delays in issuance may result from late or incomplete applications or other factors that delay the permitting authority's ability to finalize action. The OAQ has engaged in a number of efforts in the past few years to streamline the permitting process to ensure timely issuance of permits.

TITLE V ISSUANCE TIMELINESS

▲ TITLE V RENEWALS

The Clean Air Act considers Title V renewals to be timely if they occur prior to the expiration of the existing permit. Permits that have not been renewed by the expiration date are referred to as "outstanding renewal permits."

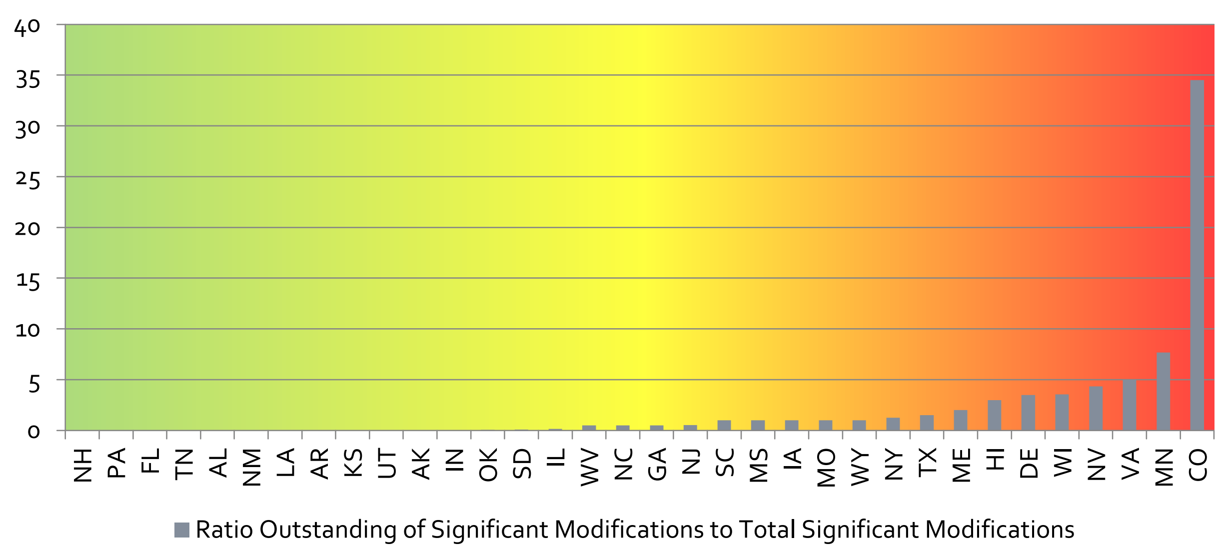
▲ SIGNIFICANT MODIFICATIONS

The Clean Air Act considers Title V significant modifications to be timely if they are issued within 18 months of application submittal.

Title V Significant Modifications Rankings

According to data from the Environmental Protection Agency's (EPA) National Title V Database (January–June 2018), Arkansas is among the top eleven state agencies in timeliness of Title V significant modification issuance. All of Arkansas's Title V significant modification actions for that period were completed within eighteen months.

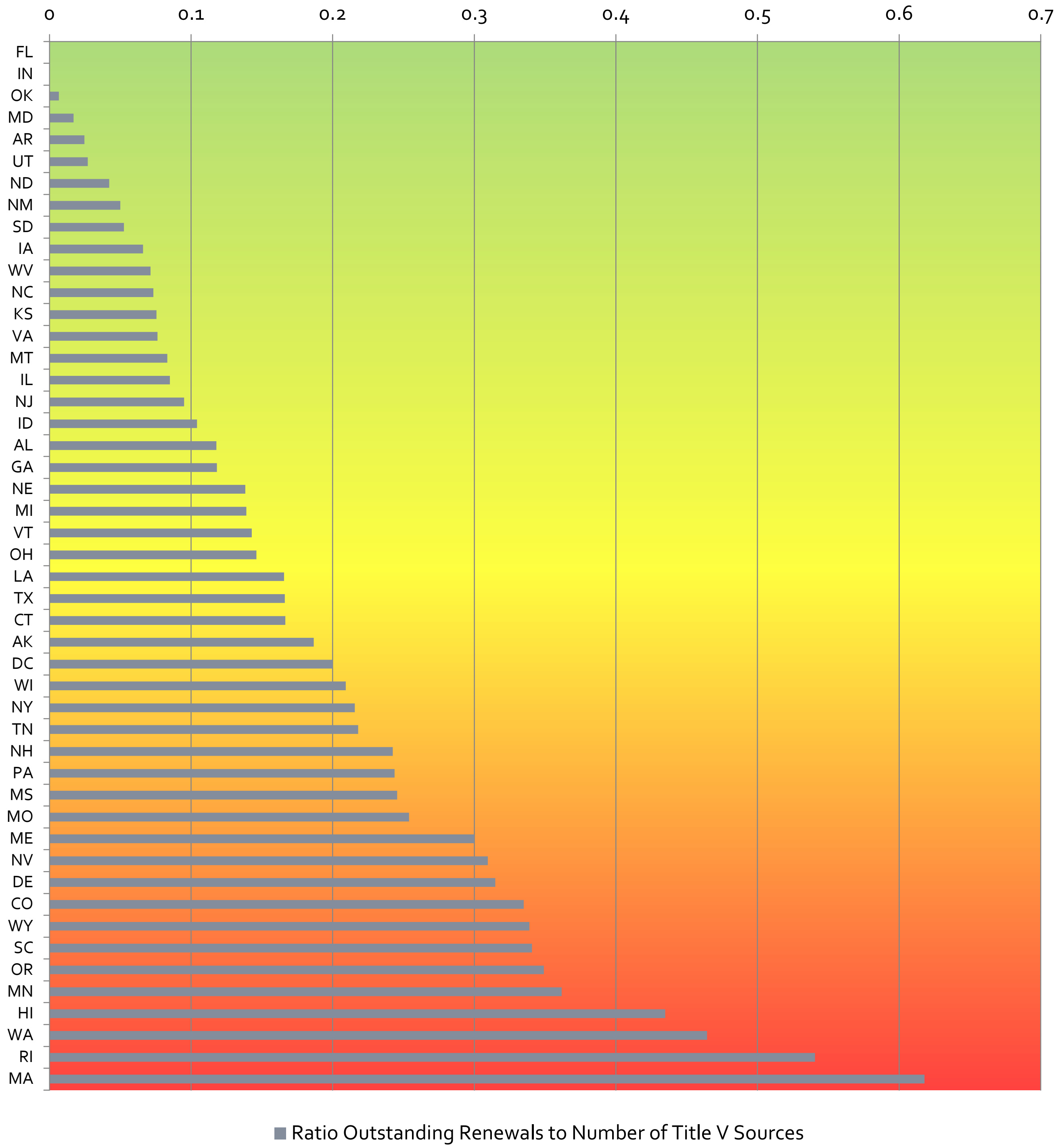
Figure 6 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Significant Modifications



Title V Renewal Rankings

According to data from EPA's National Title V Database (January–June 2018), Arkansas is ranked number 5 in timeliness of Title V renewals among state agencies.

Figure 7 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Renewals



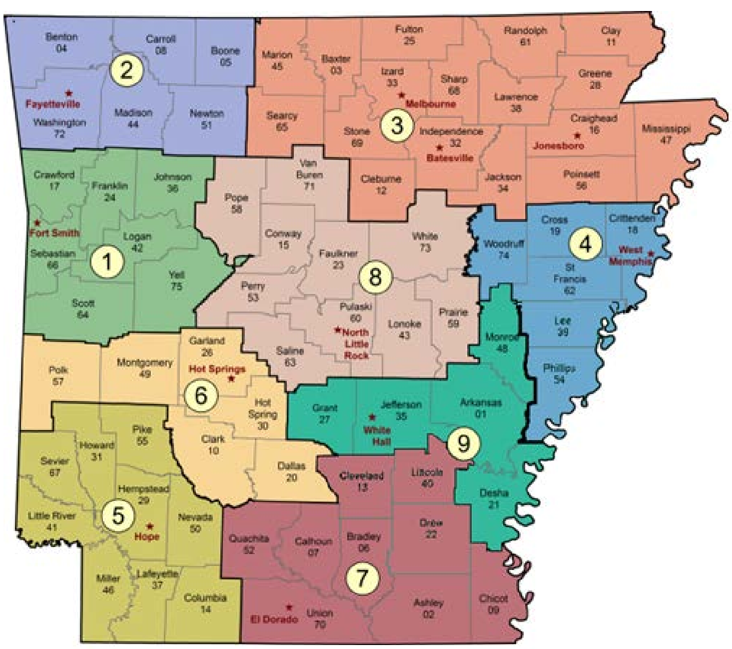
Compliance Branch

The Compliance Branch inspects permitted facilities to document whether owners and operators are complying with State and federal air pollution regulations, as specified in each facility's permit. This is accomplished through unannounced compliance inspections, stack testing, and monitoring and reporting requirements.

The Compliance Branch inspectors also investigate citizen complaints regarding air pollution, respond to emergency situations, and perform pre-assessments of vegetative burn sites.

Arkansas has seventy-five counties, which are divided into nine inspection districts. The compliance districts are shown in the map below and contacts for each district are given in the sidebar to the right. Visit our website more information about OAQ's Compliance Branch:

https://www.adeq.state.ar.us/air/compliance/



INSPECTOR DISTRICT CONTACTS

▲ DISTRICT 1

Stephen Foster 479-424-0333

David Miesner 479-424-0333

▲ DISTRICT 2

Jay Ellis 479-267-0811 ext. 11

Paul Hairston 479-267-0811 ext. 18

▲ DISTRICT 3

Keith Collins 870-793-4762

Coy Dobson 870-935-7221 ext. 11

Mitchel Kennedy 870- 792-4762

Bryant Lamb 870-368-5053

▲ DISTRICT 4

James Starling 870-733-3526

▲ DISTRICT 5

Alex Mathis 870-777-7585

▲ DISTRICT 6

Risa Parker 501-520-5762

▲ DISTRICT 7

Jay Northern 870-862-5941

Tiffany Wooten 870-862-5941

▲ DISTRICT 8

Lori Burke 501-682-0737

Caleb Fielder 501-682-0775

Ronnie McDade 501-682-0962

Mikayla Shaddon 501-682-0808

▲ DISTRICT 9

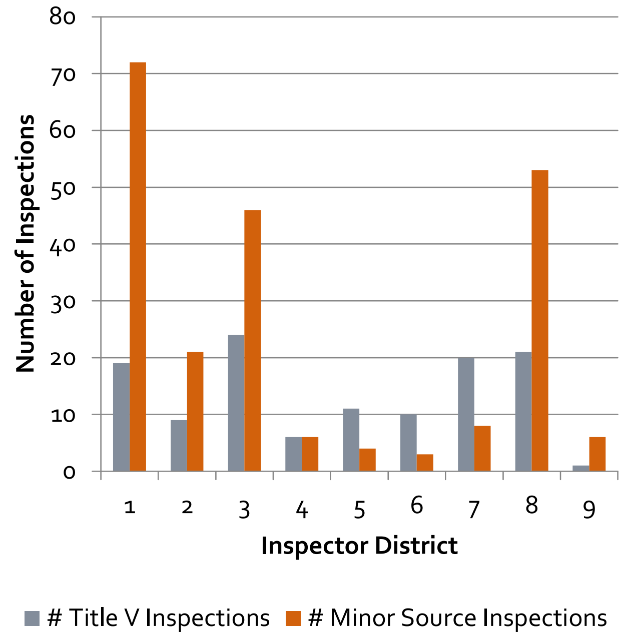
Maurice Carlton II 870-247-5155

Inspections

During FFY 2018, OAQ compliance branch air inspectors performed 284 inspections of minor sources and 123 inspections of Title V sources. Two Title V inspections and sixty-five minor source inspections were not associated with a district.

Inspectors also performed 570 stack test observations and reviewed 294 annual compliance certifications and 588 semi-annual monitoring reports.

Figure 8 FFY 2018 Air Compliance Inspections Per District



Air Pollution Complaints

ADEQ provides citizens with multiple ways to file air pollution complaints, including through the ADEQ website [(https://www.adeq.state.ar.us/complaints/forms/air_complaint.aspx)](https://www.adeq.state.ar.us/complaints/forms/air_complaint.aspx) and via mobile applications.

Download on the App Store   ANDROID APP ON Google play

During FFY 2018, Compliance air inspectors investigated 419 complaints.

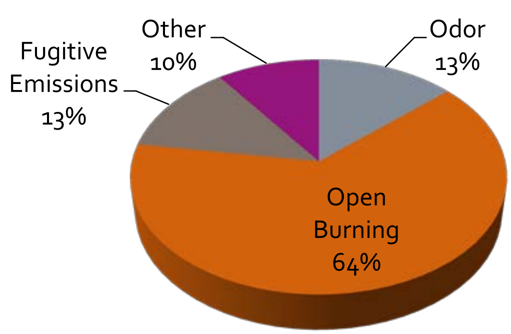
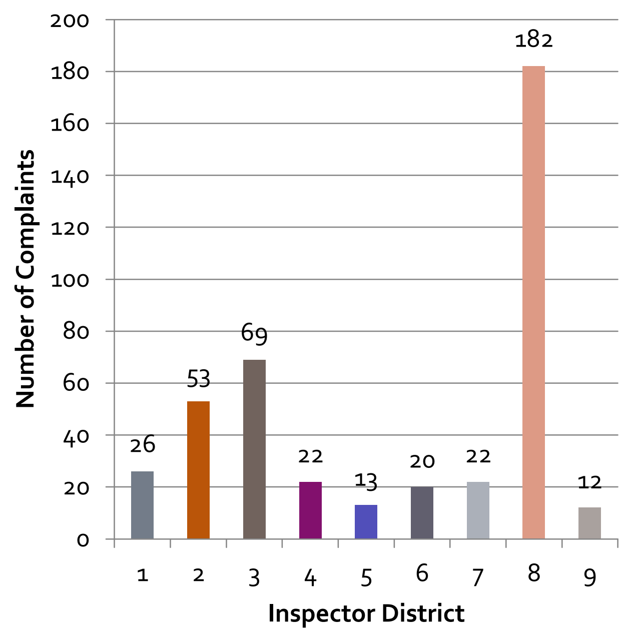
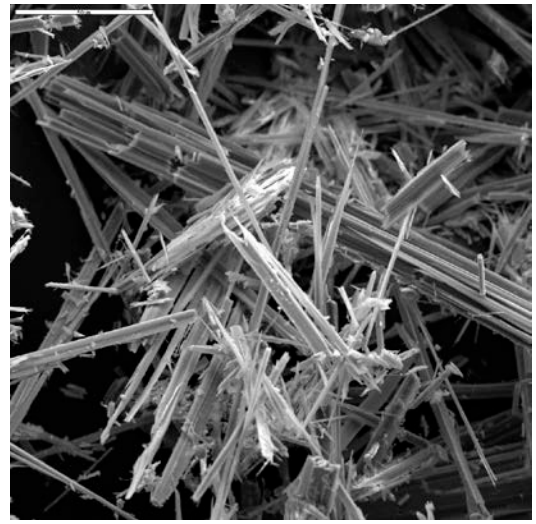


Figure 9 FFY 2018 Complaint Investigations Per District



Asbestos Program



The Asbestos Program ensures compliance with State and federal asbestos rules through complaint investigations, monitoring of demolition and renovation projects, licensing and certifying of asbestos professionals, and conducting outreach demonstrations. Arkansas asbestos regulations are contained in Regulation No. 21. Asbestos is also regulated as a hazardous air pollutant by the United States Environmental Protection Agency.

The Asbestos Program also administers the Arkansas Asbestos Abatement Grant Program, which assists small cities and counties to clean up and stabilize structurally-impaired buildings containing friable asbestos. Visit our website more information about OAQ's Asbestos Program:

https://www.adeq.state.ar.us/air/program/

What is Asbestos?

Asbestos is a naturally occurring mineral substance, which over thousands of years has proven to be very useful and durable. Because of its resistance to heat, asbestos has been used in several commercial applications such as cigarette filters, car brakes, various building materials (insulation, roofing, piping, etc), fire-proof clothing, and stage curtains. While it seemed to be an all-purpose material, asbestos also proved to be detrimental to human health causing diseases such as lung cancer, asbestosis, and mesothelioma. In 1971, the EPA deemed asbestos to be a hazardous air pollutant. In 1993, the APC&EC developed Regulation No. 21, which sets forth regulations pertaining to the handling of asbestos.

Although asbestos is no longer mined in the United States, it still has a variety of uses that are now regulated to ensure public safety. Through education the public is learning to leave undamaged asbestos containing material alone. It poses little harm when the fibers are not disturbed and broken into inhalable pieces that can ultimately attach to the pulmonary system and cause incurable illness.

Complaints

During FFY 2018, Asbestos inspectors investigated sixty-six complaints.

Licenses and Certifications

During FFY 2018, ADEQ issued 1477 asbestos worker certifications, seventy-five contracting firm licenses, fifty-four consulting firm licenses, twenty-three training firm licenses. Figure 10 (top right) shows the certifications issued by type.

Notice of Intent (NOI) Submissions and Inspections

During FFY 2018, ADEQ received 442 NOIs for demolitions and renovations pursuant to Arkansas asbestos rules and performed 306 inspections pursuant to NOIs received. Figure 11 (bottom right) breaks down the type of NOI submissions received and inspections.

Arkansas Asbestos Abatement Grant

Table 1 FFY 2018 Arkansas Asbestos Abatement Grant Recipients

RECIPIENT	USE	AMOUNT
City of Dumas	Abatement Prior to Demolition of Tanenbaum Building	$40,800
City of Eudora	Old John's Campus Upper and Lower Elementary Renovation	$55,932
Dallas County and City of Forsyth	Clean up of condemned nursing facility, Grandma's House, Inc.	$37,500
Total		$145,232

Figure 10 FFY 2018 Asbestos Worker Certifications by Type

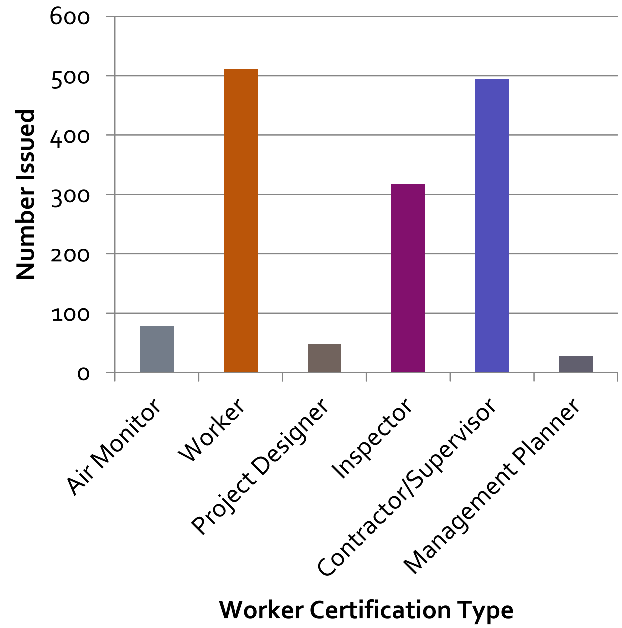
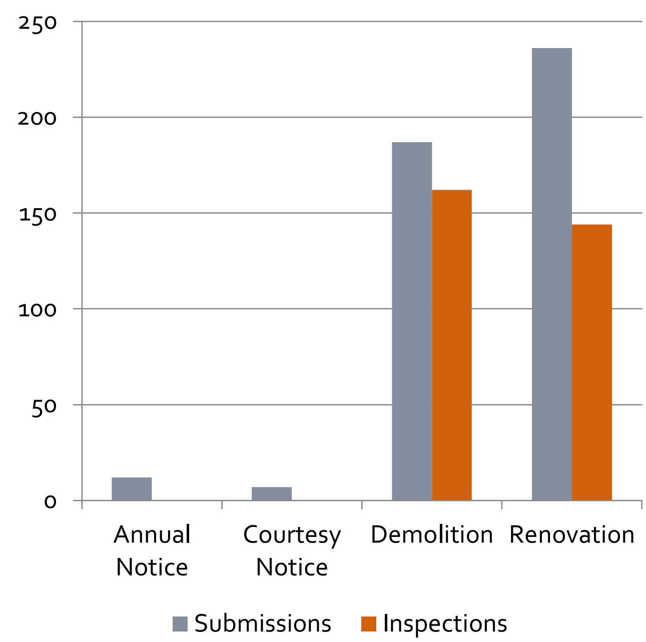


Figure 11 FFY 2018 Asbestos NOI Submissions by Type



Enforcement

The Enforcement Section is responsible for administering consistent, appropriate, and timely enforcement of State and federal air pollution laws and regulations administered by the Department. This section provides support and assistance on OAQ enforcement issues designated for formal and informal enforcement action. These enforcement actions are in response to referrals from the Asbestos Section and the Compliance and Permit Branches. The enforcement process helps facilities achieve successful compliance with State and federal standards and ensures compliance with air pollution laws and regulations. Visit our website more information about OAQ Enforcement:

https://www.adeq.state.ar.us/air/program/

TYPES OF ENFORCEMENT ACTIONS

▲ INFORMAL

Actions taken using a letter detailing violations found of an air permit and/or applicable regulations that do not at that time warrant a formal enforcement action, but require corrective action

▲ FORMAL

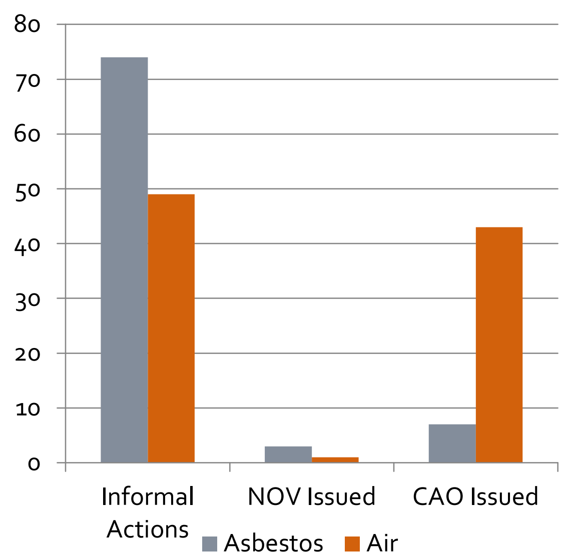
Actions taken using legally-binding consent administrative orders (CAOs) and/or notice of violations (NOVs) that incorporate civil penalties, corrective actions, and other terms

Enforcement Metrics

During FFY 2018, fifty-eight cases were referred to the Enforcement Section. One hundred twenty-three cases were handled informally. Four NOVs and fifty CAOs were issued to resolve formal enforcement actions.

Figure 12 (right) breaks down the types of enforcement actions by media included in OAQ during FFY 2018.

Figure 12 Enforcement Actions Completed in FFY 2018



Policy and Planning Branch

Among other duties, the Policy and Planning Branch is responsible for gathering information on current and projected emissions trends, analyzing air quality data, and developing state plans to help maintain clean air in Arkansas. The Branch also provides technical expertise to the other branches of the Office of Air Quality and helps to educate the public about air quality issues.

Visit our website more information about OAQ's Planning Branch:

https://www.adeq.state.ar.us/air/planning/

CORE RESPONSIBILITIES

- EMISSIONS INVENTORY
- AIR QUALITY MODELING
- AIR QUALITY FORECASTING
- AIR QUALITY MONITORING
- STATE PLAN DEVELOPMENT
- REGULATORY INITITATIVES
- VOLUNTARY EFFORTS

Emissions Inventory

During 2018, the Emissions Inventory team collected and verified submissions of industry emissions data from large stationary sources: Type A and Type B sources. These emissions data must be submitted to EPA for inclusion in the national emissions inventory (NEI).

Sixty-six Type A sources submitted emissions reports during 2018.

One-hundred fourteen Type B sources submitted emissions reports during 2018.

Trends in pollutant emissions reported to the NEI are included in Appendix C. Appendix C also presents trends in carbon dioxide (CO2) emissions tracked by the United States Energy Information Administration.

EMISSIONS REPORTING

TYPE A SOURCE

Permitted to emit ≥ 2500 tons per year of sulfur oxides (SOx), nitrogen oxides (NOx), or carbon monoxide (CO); or

Permitted to emit ≥ 250 tons of volatile organic compounds (VOCs), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), or ammonia (NH_3).

Report emissions every year

TYPE B SOURCE

Permitted to emit ≥ 1000 tons per year of CO;

Permitted to emit ≥ 100 tons per year of SOx, NOx, VOC, PM_{10}, $PM_{2.5}$, or NH_3; or

Have actual lead emissions ≥ 0.5 tons per year

Report emissions every three years

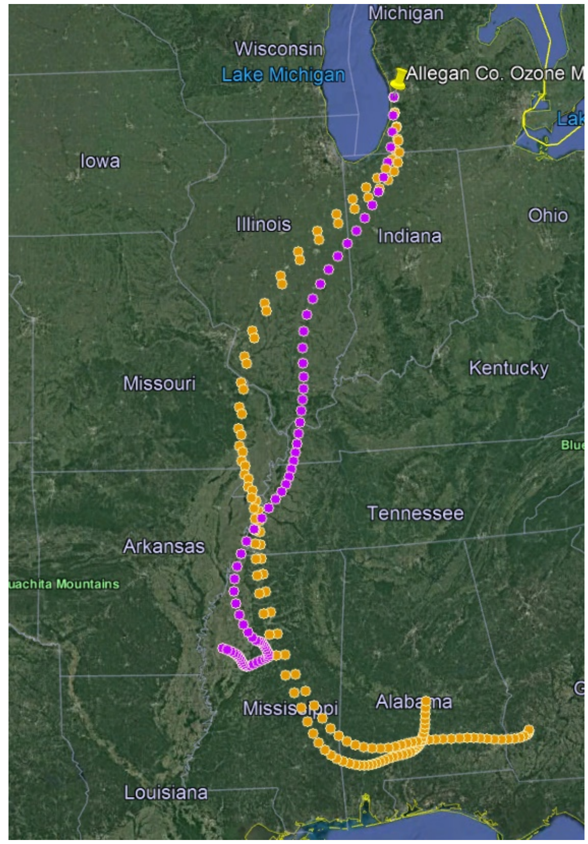
Air Quality Modeling Achievements

In 2018, OAQ engaged in various modeling efforts in support of air quality planning.

For example, OAQ performed AERMOD modeling using prognostic meteorological data to support a request that EPA re-designate Independence County from unclassifiable to attainment/unclassifiable for SO2.

OAQ also performed HYSPLIT air trajectory modeling to support development of a state plan to satisfy "Good Neighbor" obligations for the 2015 ozone NAAQS.

In addition, OAQ collaborated with other states in the Central States Air Resources Agencies to determine what areas influence visibility impairment in specified federal lands like Caney Creek and Upper Buffalo Wilderness Areas for the Regional Haze Program.



HYSPLIT Air Trajectories

Air Quality Forecasting

Policy and Planning Branch technical staff produce air quality forecasts for northwest and central Arkansas. Forecasts are created by using meteorological data and pollutant concentration data to estimate ozone and fine particulate matter. These estimates are then translated into an Air Quality Index (AQI).

The AQI is color-coded to indicate the level of health concerns for the forecasted pollutant concentrations.

AQI Value	Level of Health Concern	Colors
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Ambient air quality monitoring data show that the entire state of Arkansas is in attainment with all NAAQS.

Figure 13 below compares statewide average air quality conditions to the NAAQS. More information about Arkansas's Ambient Air Monitoring Network and trends in criteria pollutant monitoring data and visibility trends are included in Appendix B. OAQ also deploys special purpose air quality monitors from time to time to evaluate specific air quality concerns raised by citizens.

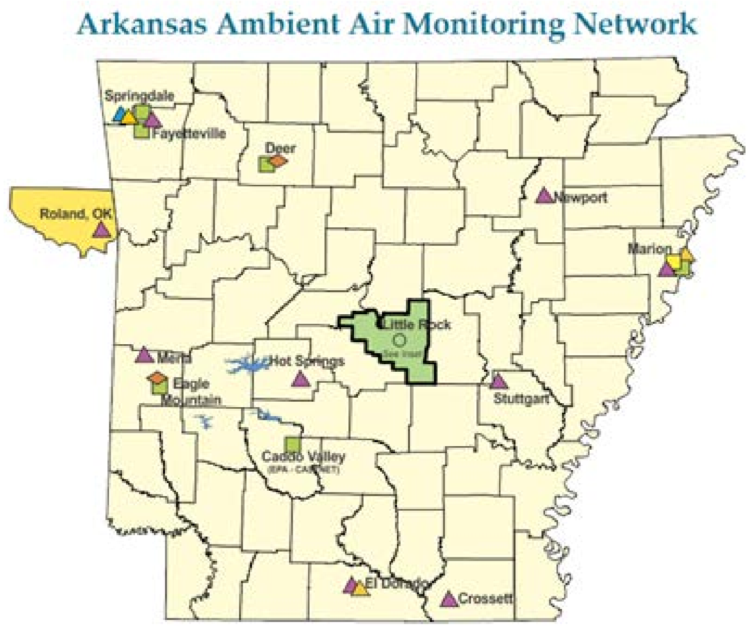
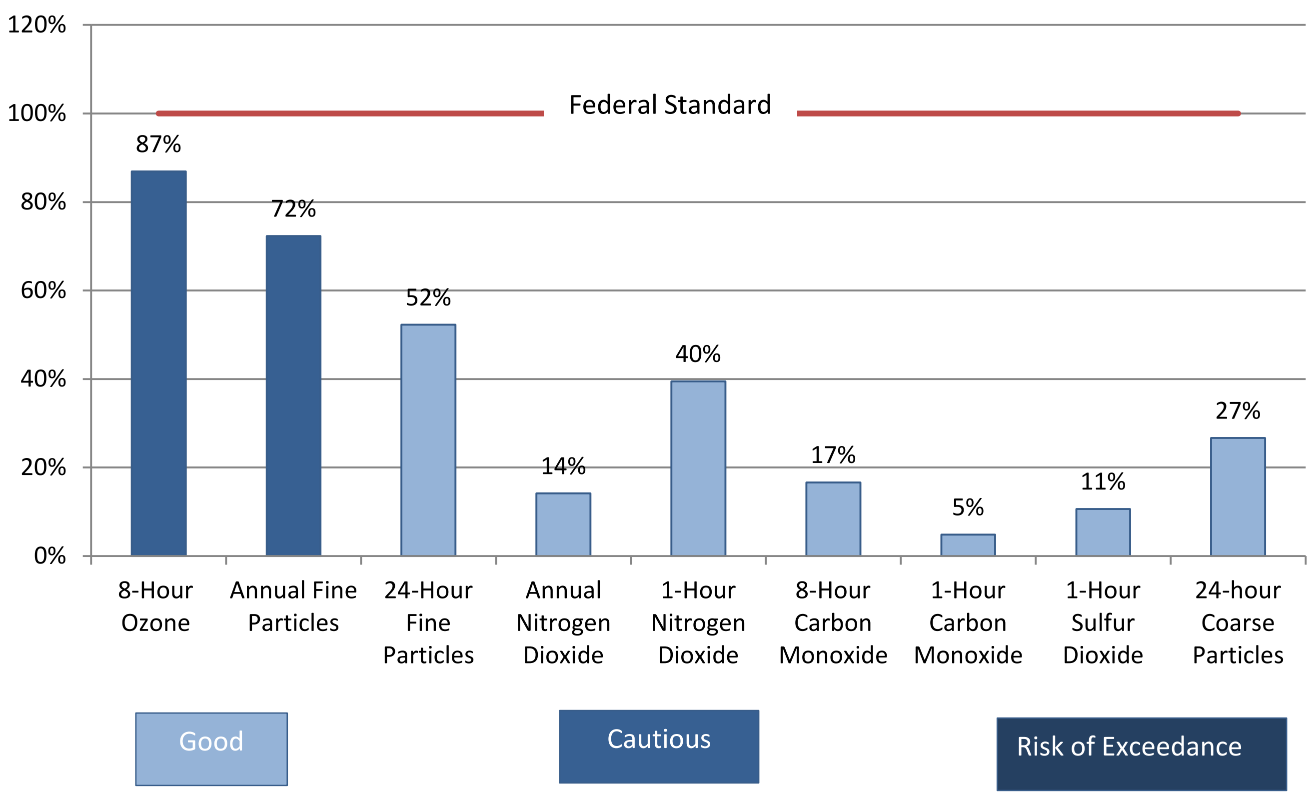


Figure 13 2017 Arkansas Statewide Average Air Quality Compared to the NAAQS



State Plan Development

In FFY 2018, OAQ worked on several state implementation plan (SIP) revisions. The Arkansas SIP demonstrates how the State will implement Clean Air Act requirements under State statutes and regulations. The SIP covers multiple program areas including implementation of NAAQS, addressing interstate pollution transport obligations, and ensuring protection of visibility in designated Class I wilderness areas and national parks.

OAQ staff frequently revises the SIP to comply with new federal regulations and changes to Arkansas law. All SIPs are made available for public comment prior to finalization.

FY 2018 SIP REVISION EFFORTS

▲ PHASE I REGIONAL HAZE

-Addresses NOx controls for power plants

-Finalized October 31, 2017

-EPA approved February 12, 2018

▲ PHASE II REGIONAL HAZE

-Addresses SO2 controls for power plants

-Finalized August 8, 2018

-EPA proposed approval November 30, 2018

▲ PHASE III REGIONAL HAZE

-Addresses requirements for Ashdown Mill

-Proposed October 5, 2018

▲ OZONE INFRASTRUCTURE

-Addresses Clean Air Act 110(a)(1) and (2) requirements for 2015 ozone NAAQS

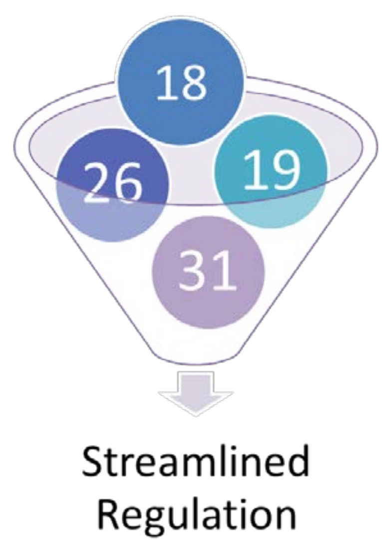
-Non-transport elements proposed October 3, 2018

-Transport proposal under development

Regulatory Initiatives

In FFY 2018, OAQ worked on a proposal before the APC&EC to adopt the 2015 ozone NAAQS into Regulation No. 19. On September 28, 2018, the APC&EC initiated rulemaking based on OAQ's petition. The OAQ anticipates adoption in mid-2019.

Since 2013, OAQ has been engaged in a streamlining project to simplify the APC&EC air regulations, bring them up to date with current state and federal requirements, and repeal or revise outdated provisions. In 2018, OAQ began stakeholder outreach for this project. OAQ is currently engaging with stakeholders to refine a pre-proposal draft released in May 2018.



Fire Policy Forum

On March 29–30, 2018, the Arkansas Department of Environmental Quality hosted Arkansas's inaugural Fire Policy Forum. The meeting brought a diverse group of governmental and private sector entities together to facilitate a vibrant dialogue surrounding the intersection of careful and prudent use of "fire as a land management tool," air quality considerations, and solutions to the challenges of balancing these two necessities.

EPA Region 6 Monitoring Group presentation about EPA Exceptional Events Rule

Volkswagen Environmental Mitigation Trust

During FFY 2018, ADEQ solicited comment on and finalized a beneficiary mitigation plan that describes how the State of Arkansas plans to use funds awarded as a result of the Volkswagen Settlement to reduce NOx emissions in Arkansas. The plan was submitted to the Trustee on June 25, 2018.

ADEQ OAQ and Energy Office staff are working to develop application procedures and scoring criteria for programs included in the beneficiary mitigation plan.

ADEQ PLANNED PROGRAMS UNDER BENEFICIARY MITIGATION PLAN

- ARKANSAS BUS CNG PILOT
  School bus pilot to replace aging diesel buses with new CNG buses
- CLEAN FUELS
  Competitive funding assistance program to repower or replace aging diesel Class 4–8 freight and drayage trucks and buses with new alternative-fueled engines or vehicles
- ELECTRIC VEHICLE INFRASTRUCTURE
  Rebate program for installations of level 2 and DC Fast electric vehicle chargers
- STATE AGENCY FLEET EMISSION REDUCTIONS
  Funding assistance for State agencies to repower or replace aging diesel Class 4 – 8 freight and drayage trucks
- GO RED!
  Volkswagen funds will be used to supplement ADEQ's existing Go RED! program

Go RED!

The Go RED! program is a competitive funding assistance program that awards funding for projects that reduce emissions from diesel engines in Arkansas. Such projects include installation of exhaust controls, engine upgrades, idle reduction technologies, engine replacements, and vehicle/equipment replacements. Public, private, and nonprofit entities in Arkansas are eligible to receive funding assistance.

Table 2 FFY 2018 Go RED! Funding Assistance Recipients

RECIPIENT	PROJECT TYPE	AMOUNT
County Line	Replacement of one school bus	$21,254
Heber Springs	Replacement of one school bus	$18,959
Dover	Replacement of two school buses	$44,414.75
Clinton	Replacement of two school buses	$41,300
Danville	Replacement of one school bus	$21,887
Viola	Replacement of one school bus	$19,509
Horatio	Replacement of one school bus	$22,140
Total		$189,463

Contacts and Acknowledgments

Contacts

We welcome your comments on the information contained in this report to the contacts below.

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Acknowledgements

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Ronald Allen, Lee Anderson, Heinz Braun, David Clark, Brandon Creer, Iqbal Hossan, Kelly Jobe, Demetria Kimbrough, William Montgomery, Iris Pennington, Thomas Rheaume, Stuart Spencer, and Tricia Treece.

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Appendix A National Ambient Air Quality Standards

Introduction

Setting the Standards

The Clean Air Act requires that the United States Environmental Protection Agency (EPA) set national ambient air quality standards (NAAQS) for pollutants that are common to outdoor air and are considered harmful to public health and the environment. These pollutants, which are referred to as "criteria pollutants," include ozone, particulate matter, carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

The EPA Administrator, in consultation with the Clean Air Scientific Advisory Committee, sets primary and secondary NAAQS for each criteria pollutant. The primary NAAQS is set at a level that reduces the risk of harm so as to protect public health, including sensitive populations, with an adequate margin of safety. The secondary NAAQS is set at a level that is protective of the public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Periodic Review

The NAAQS are reviewed every five years to determine whether recent scientific data continue to indicate that the level, form, and averaging time of the current NAAQS are protective of public health. If the data show that the current level of the NAAQS is not protective of public health with an adequate margin of safety, then the EPA must revise the standard.

CRITERIA POLLUTANTS

- CARBON MONOXIDE (CO)
- LEAD
- NITROGEN DIOXIDE (NO_2)
- OZONE
- FINE PARTICULATES ($PM_{2.5}$)
- COARSE PARTICULATES (PM_{10})
- SULFUR DIOXIDE (SO_2)

FEDERAL STATUTORY REQUIREMENTS

- CLEAN AIR ACT § 108
Air Quality and Control Techniques
- CLEAN AIR ACT § 109
National Primary and Secondary Ambient Air Quality Standards
- CLEAN AIR ACT §110
State Implementation Plans for National Ambient Air Quality Standards
- CLEAN AIR ACT §111
Standards of Performance for New Stationary Sources
- CLEAN AIR ACT §§ 160-169B
Prevention of Significant Deterioration
- CLEAN AIR ACT §§ 171-193
Plans for Nonattainment Areas

Implementation

States must develop implementation plans to ensure that all areas of the state attain and maintain any new or revised NAAQS. Areas in which the NAAQS for a particular criteria pollutant is not being met are designated as nonattainment and require additional planning efforts to improve air quality. The Governor makes nonattainment designation recommendations and the EPA promulgates them. EPA classifies nonattainment areas as marginal, moderate, serious, severe, or extreme, based on the severity of the air pollution and the availability and feasibility of pollution control measures. For each nonattainment area, the affected states must develop plans to reduce pollutant levels in the air to achieve attainment with the NAAQS as expeditiously as possible.

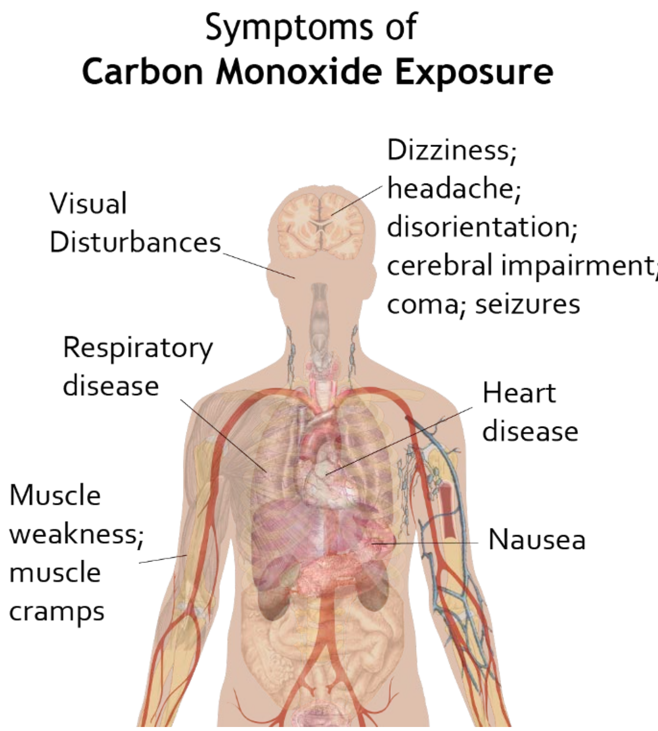
Table A-1 List of Current National Ambient Air Quality Standards

POLLUTANT	PRIMARY/ SECONDARY	AVERAGING TIME	LEVEL	FORM
Carbon Monoxide (CO)	Primary	8-hour	9 parts per million	Not to be exceeded more than once per year
		1-hour	35 parts per million	
Lead	Primary and Secondary	Rolling 3-month average	0.15 micrograms per cubic meter	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1-hour	100 parts per billion	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 parts per billion	Annual mean
Ozone	Primary and Secondary	8-hour	70 parts per billion	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Fine Particulate Matter ($PM_{2.5}$)	Primary	Annual	12 micrograms per cubic meter	Annual mean, averaged over 3 years
	Secondary	Annual	15 micrograms per cubic meter	
	Primary and Secondary	24-hour	350 micrograms per cubic meter	98th percentile, averaged over 3 years
Coarse Particulate Matter (PM_{10})	Primary and Secondary	24-hour	150 micrograms per cubic meter	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	Primary	1-hour	75 parts per billion	99th percentile of 1-hour daily maximum concentration, averaged over 3 years
	Secondary	3-hour	0.5 parts per million	Not to be exceeded more than once per year

CO can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and other tissues. At extremely high levels, CO can cause death.

People with several types of heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can cause them to experience myocardial ischemia (reduced oxygen to the heart), often accompanied by chest pain (angina), when exercising or under increased stress. For these people, short-term CO exposure further exacerbates their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion. The primary NAAQS is set to reduce the acute risks of exposure to carbon monoxide

CO is a colorless, odorless gas emitted from combustion processes. CO is primarily a byproduct of incomplete combustion of fuels such as gasoline, natural gas, oil, coal, and wood. CO emissions in Arkansas come primarily from fires, mobile sources, and biogenic sources.[1] Smaller contributions come from industrial processes, fuel combustion, solvents, and other miscellaneous sources.



SOURCES OF EMISSIONS

- VEHICLES
- FIRE
- POWER PLANTS
- INDUSTRY
- FOSSIL FUEL COMBUSTION

[1] Source: 2014 National Emissions Inventory version 1

Exposures to lead over a long period of time can cause deleterious effects on the central nervous system. Lead exposure is particularly harmful to children because exposure may lead to neurodevelopmental impairment resulting in lowered intelligence quotients (IQ) and behavioral problems. According to the Centers for Disease Control, harmful effects may also result from short-term exposures to very high levels of lead. The NAAQS is set at this level to reduce the risk of long-term health effects due to lead exposure.

Lead is a naturally occurring element that can be found in the air, water, and soil. Although small levels of lead are naturally occurring in soil, lead is also emitted into the air during ore and metals processing and combustion of fuels containing lead.

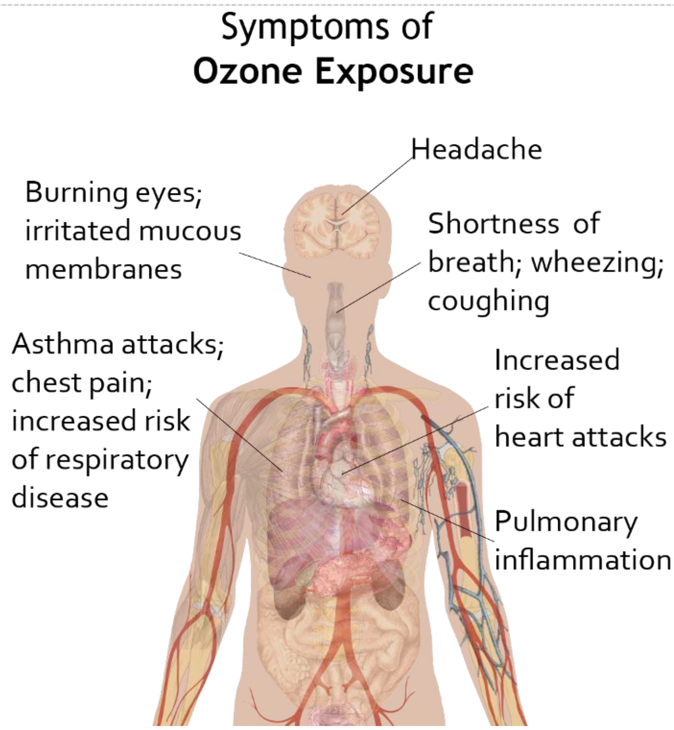
In Arkansas, sixty-six percent of lead emissions come from aircraft running on leaded fuel. The remaining thirty-four percent of lead emissions primarily come from the industrial and electricity sectors. Lead emitted into the air can settle onto surfaces like soil, dust and water where it can remain for long periods because it does not decay or decompose.

SOURCES OF EMISSIONS

- AIRPORTS
- VEHICLES BURNING LEADED FUELS
- ORE AND METALS PROCESSING
- WASTE INCINERATORS
- POWER PLANTS
- LEAD-ACID BATTERY MANUFACTURERS
- LEAD SMELTERS

Ozone

At ground level, ozone is unhealthy to breathe and can trigger various respiratory and cardiovascular health problems. In setting the level of the ozone standard, EPA considers various clinical and epidemiological studies to evaluate what level, averaging time, and form of the standard would be protective of human health and public welfare. The primary NAAQS is set to reduce the risk of acute and chronic health effects due to ozone exposure.



Ozone is ubiquitous in the natural environment. Ozone is formed by photochemical reactions involving nitrogen oxides (NOx), volatile organic compounds (VOCs), and sunlight. The formation of ozone is highly weather dependent, and ozone can be transported long distances by wind.

VOCs can be emitted from both biogenic (naturally occurring in organisms) and anthropogenic (caused by people) sources. In Arkansas, approximately eighty-one percent of VOC emissions come from biogenic sources, particularly trees, and only ten percent of emissions come from sources regulated by State and federal air quality programs. NOx is formed primarily by combustion of fossil fuels.

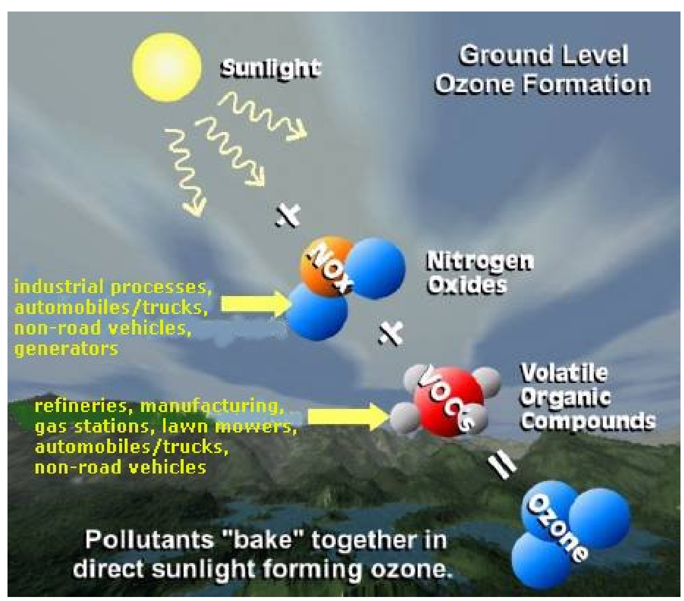
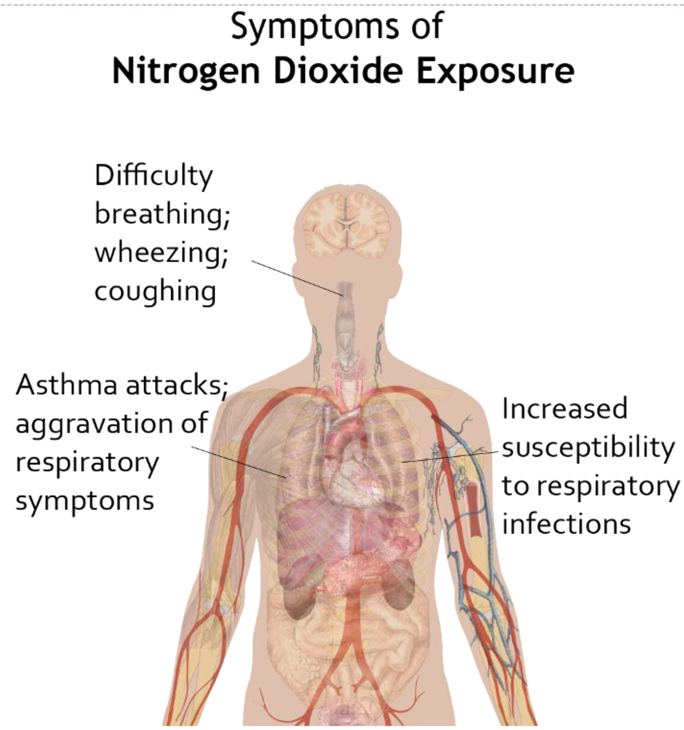


Image Credit: Harris County, Texas

NO_2 is one of a group of highly reactive gases known as "nitrogen oxides," or NOx. Other nitrogen oxides include nitrous acid and nitric acid. EPA's NAAQS uses NO_2 as the indicator for the larger group of NOx. Exposure to NOx occurs through inhalation. Scientific studies link short-term NOx exposures, ranging from thirty minutes to twenty-four hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Also, studies show a connection between breathing short-term elevated NOx concentrations and increased visits to emergency departments and hospital admissions for respiratory issues. This is especially true for people with asthma. The primary NAAQS is set to reduce the risk of acute and chronic health effects due to exposure to NOx.

NOx forms quickly from emissions from cars, trucks, buses, power plants, and off-road equipment. NOx may be transported for long distances and may react with other pollutants or water vapor to form secondary pollutants. NOx emissions in Arkansas result primarily from mobile sources and fuel combustion. Smaller sources include biogenic sources, industrial processes, fires, solvents and other miscellaneous sources.



SOURCES OF EMISSIONS

- VEHICLES
- POWER PLANTS
- OFF-ROAD EQUIPMENT
- INDUSTRY
- FIRES
- FOSSIL FUEL COMBUSTION

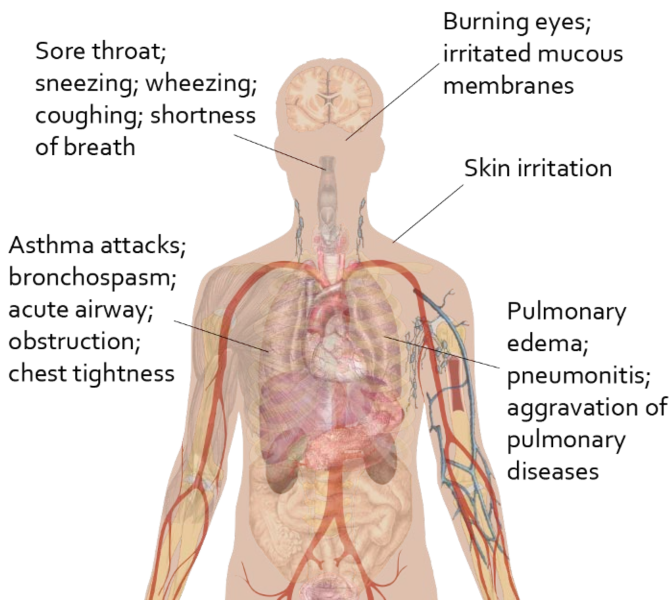
SO_2 is one of a group of highly reactive gases known as "oxides of sulfur." Current scientific evidence links short-term exposures to SO_2, ranging from five minutes to twenty-four hours, with an array of adverse respiratory effects, including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing). The primary NAAQS is set to reduce the risk of acute and chronic health effects due to exposure to SO_2

While SO_2 tends not to be transported long distances in its original form, it does react with other pollutants and water vapor to form fine particulates and acidic aerosols that may be transported long distances. It also contributes to acid rain.

The largest sources of SO_2 emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO_2 emissions include industrial processes, such as extracting metal from ore, and the burning of high sulfur-containing fuels by locomotives, large ships, and nonroad equipment.

SO_2 emissions in Arkansas result primarily from fuel combustion, with much smaller contributions from fires, industrial processes, mobile sources, solvents and other miscellaneous sources.

Symptoms of
Sulfur Dioxide Exposure



SOURCES OF EMISSIONS

- INDUSTRY
- POWER PLANTS
- VEHICLES AND HEAVY EQUIPMENT THAT BURN HIGH SULFUR CONTENT FUELS
- VOLCANOES

There are two size fractions of particulate matter for which EPA sets NAAQS: PM_{10} and $PM_{2.5}$. The primary NAAQS is set to reduce the risk of acute and chronic health effects due to exposure to particulate matter.

PM_{10} particles are small enough to enter the respiratory tract once inhaled. Inhalation of PM_{10} can increase the frequency and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Certain populations may be more sensitive to the effects of particulate pollution than others. These include children, the elderly, exercising adults, and those with pre-existing lung diseases.

$PM_{2.5}$ particles are microscopic solids and liquid droplets that are small enough to penetrate deep into the lungs when inhaled. Scientific studies have linked $PM_{2.5}$ exposure to a number of adverse health effects. These effects include the following: premature death in people with heart or lung disease; nonfatal heart attacks; irregular heartbeat; aggravated asthma; decreased lung function; and increased respiratory symptoms, such as irritation of airways, coughing, and difficulty breathing.

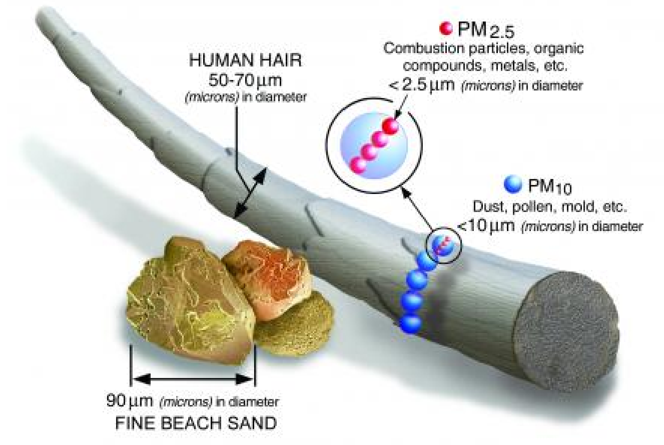


Image Credit: United States Environmental Protection Agency

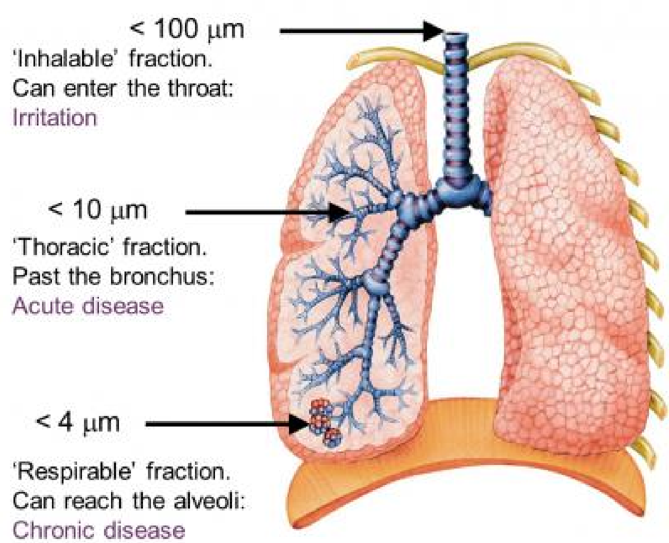
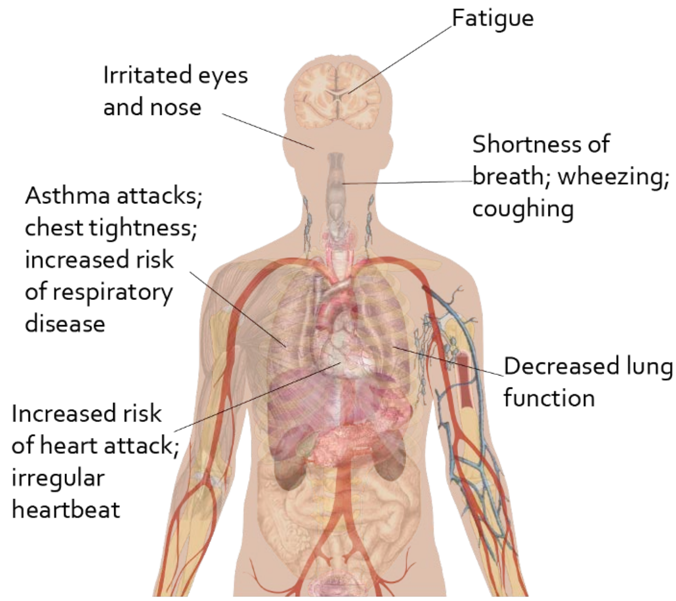


Image Credit: United States Geological Survey

PM$_{10}$ and PM$_{2.5}$ fractions of particulate matter have different physical characteristics and are emitted by different sources. PM$_{10}$ particles originate from a variety of mobile and stationary sources, and their chemical composition varies widely. Actions that generate PM$_{10}$ particles include grinding or crushing operations, mineral processing, agricultural operations, fuel combustion, and fires. PM$_{2.5}$ is emitted directly from diesel engines, smelters, and other combustion sources. PM$_{2.5}$ can also form in the atmosphere due to complex reactions of precursor compounds, such as SO_2 and NOx. PM$_{2.5}$ may be composed of sulfate, nitrate, ammonium, and/or hydrogen ions. It may also contain elemental carbon, metal compounds, organic compounds, and particle-bound water.

PM$_{10}$ particles often settle in areas relatively near their sources. However, smaller PM$_{2.5}$ particles may stay suspended in the atmosphere for long periods of time and may be transported hundreds of miles.

Symptoms of
Particulate Exposure



SOURCES OF EMISSIONS

- FIRE
- POWER PLANTS
- INDUSTRY
- VEHICLES
- AGRICULTURE
- DUST

Appendix B Arkansas Air Quality Monitoring

Introduction

ADEQ has monitored air quality in the State of Arkansas for over thirty-five years. The Department's air monitoring network is composed of various types of intermittent and continuous monitors that are strategically located throughout the state. Using the high-quality information provided by the monitoring network, ADEQ can confirm that air quality programs in the state are adequately protecting public health and that environmental goals are being achieved.

Arkansas's ambient air quality monitoring network is used to determine attainment with the national ambient air quality standards (NAAQS) for the following criteria pollutants: ozone, particulate matter (PM2.5 and PM10), carbon monoxide (CO), sulfur dioxide (SO2), and nitrogen dioxide (NO2). Attainment is determined based on a comparison of time-weighted averages (design values) to the level of the NAAQS.

There are also two particulate matter speciation monitors in Arkansas that are part of the IMPROVE network, which tracks visibility conditions in Class I national parks and wilderness areas. In Arkansas, IMPROVE monitors are located in the Upper Buffalo Wilderness Area and the Caney Creek Wilderness Area.

Table B-1 Pollutants Monitored by Arkansas Ambient Air Quality Network

POLLUTANT	NUMBER OF MONITORS	LOCATIONS
Ozone	8	Clark County Crittenden County Newton County Polk County Pulaski County[2] Washington County[3]
PM10	3	Pulaski County Washington County
PM2.5	12	Arkansas County Ashley County Crittenden County Garland County Jackson County Polk County Pulaski County Union County Washington County
CO	1	Pulaski County
NO_2	2	Crittenden County Pulaski County
SO_2	1	Pulaski County

[2] Pulaski County contains two monitors for Ozone, three for PM2.5, and three for PM10.
[3] Washington County contains two monitors for Ozone.

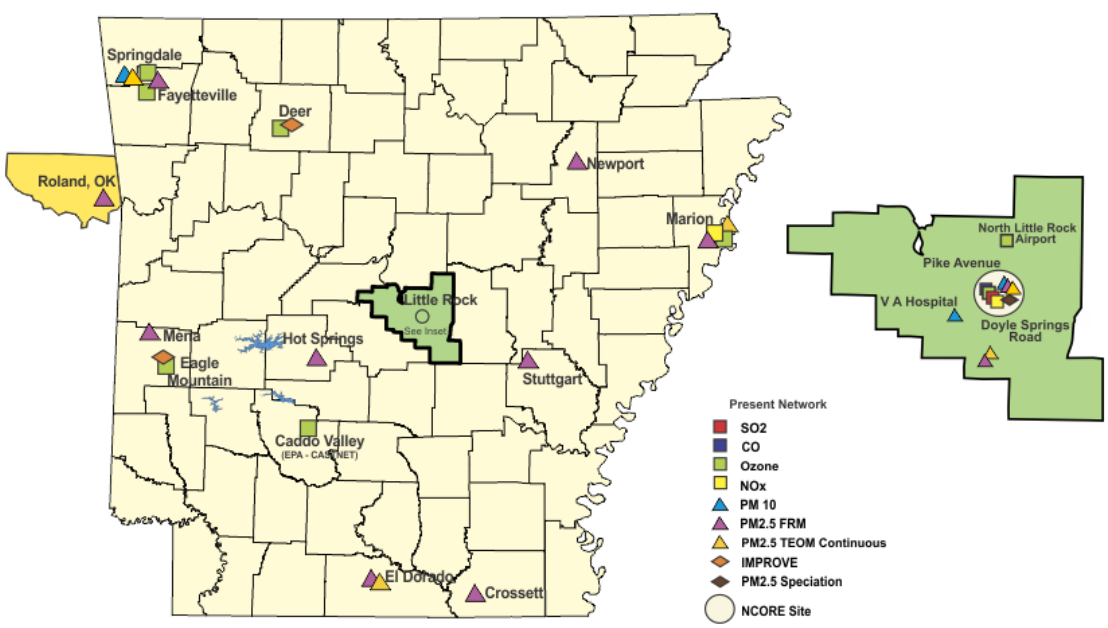
Determining Locations for Ambient Air Monitors

Ambient air monitoring networks are established according to federal requirements based on total population in a metropolitan statistical area and the following factors:

1. Where the highest concentration is expected to occur in the area covered by the monitor (usually determined through modeling);
2. What the expected representative concentrations are in areas of high population density;
3. What impacts on ambient pollution levels significant sources or source categories may have; and
4. What the background concentration levels are.

Arkansas's Ambient Air Monitoring Network is pictured below.

Arkansas Ambient Air Monitoring Network



Periodic Review of Monitoring Network

ADEQ reviews the Arkansas Ambient Air Monitoring Network each year to detail the exact expected operation schedule for each monitor for the coming calendar year. The network is evaluated every five years to determine whether the current number and location of monitors meets ADEQ's environmental monitoring objectives and satisfies federal monitoring requirements for each pollutant.

Carbon Monoxide (CO)

Monitor Network

Pollutant: Carbon Monoxide

Method: Instrumental/Non-Dispersive Infrared Photometry

Data Interval: Hourly

Units: Parts per million (ppm)

Arkansas is in attainment with the primary one-hour and primary eight-hour NAAQS for CO. This attainment status is based on results from the Arkansas CO ambient air monitoring network. No more than one observed ("Obs") average value can exceed the level of the standard for each CO NAAQS. Table B-2 provides a summary of CO monitor activity for 2017. Figures B-1 and B-2 illustrate trends relative to the corresponding NAAQS.

NAAQS DESIGN VALUE

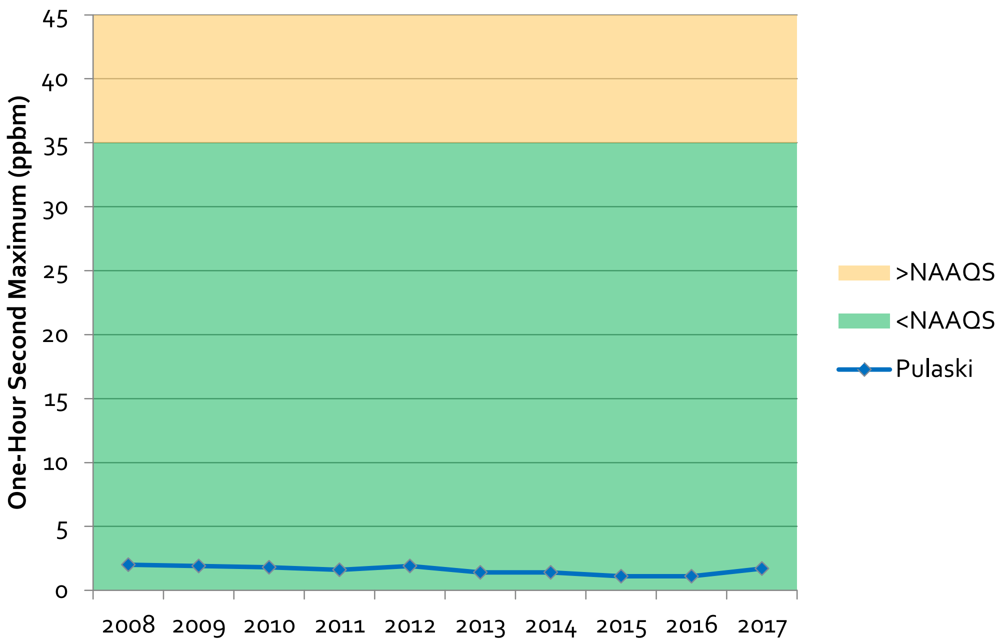
- ONE-HOUR PRIMARY NAAQS
Thirty-five parts per million (35 ppm), not to be exceeded more than once per year
- EIGHT-HOUR PRIMARY NAAQS
Nine parts per million (ppm), not to be exceeded more than once per year
- THERE ARE NO SECONDARY CO NAAQS

Table B-2 2017 Arkansas CO Monitor Values Summary Data

COUNTY	SITE ADDRESS	#OBS	EIGHT-HOUR AVERAGES (ppm)			ONE-HOUR AVERAGES (ppm)		
			1st Max	2nd Max	Obs > 9	1st Max	2nd Max	Obs>35
Pulaski	Pike Ave at River Road, North Little Rock	8707	1.6	1.5	0	1.7	1.7	0

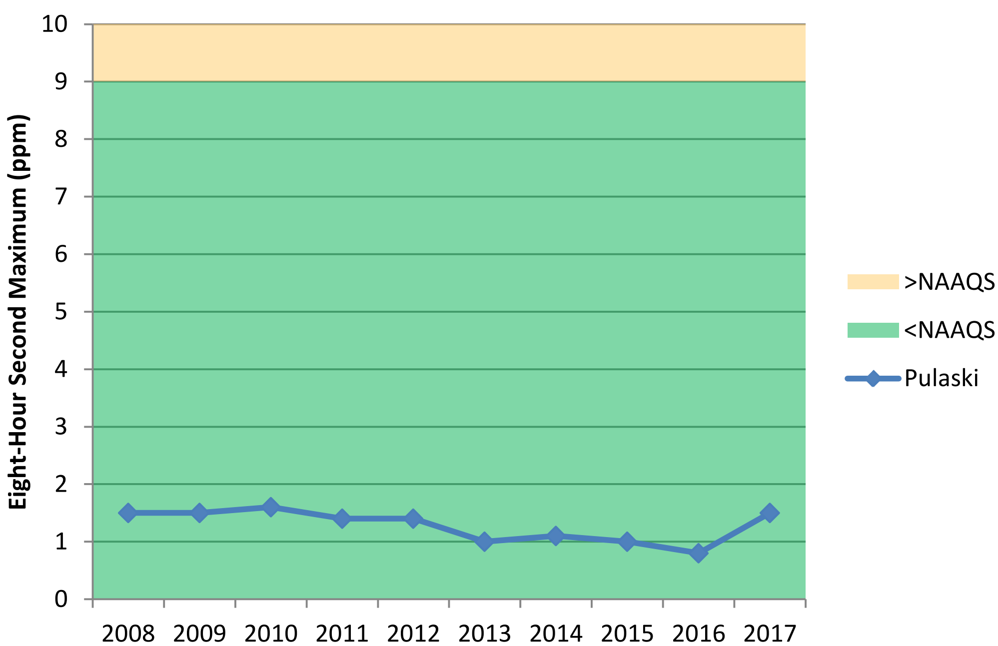
The values contained in the figures below are displayed to the right of the figure along with the slope and R^2 value. The closer the R^2 value is to one, the more confidence we have in the slope's indication of a positive or negative trend.

Figure B-1 Trends in Second Highest Observed One-Hour Average CO Concentration



	PULASKI
2008	2
2009	1.9
2010	1.8
2011	1.6
2012	1.9
2013	1.4
2014	1.4
2015	1.1
2016	1.1
2017	1.7
Slope	-0.0782
R^2	0.5204

Figure B-2 Trends in Second Highest Observed Eight-Hour Average CO Concentration



	PULASKI
2008	1.5
2009	1.5
2010	1.6
2011	1.4
2012	1.4
2013	1
2014	1.1
2015	1
2016	0.8
2017	1.5
Slope	-0.0558
R^2	0.3685

Nitrogen Dioxide (NO_2)

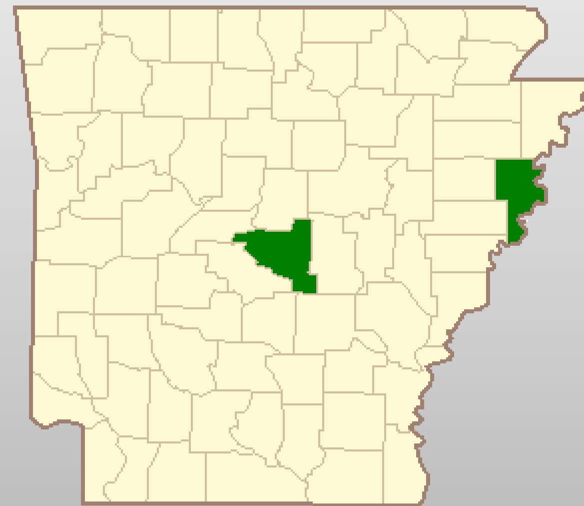
Monitor Network

Pollutant: Nitrogen Dioxide

Method: Instrumental/Gas-Phase Chemiluminescence

Data Interval: Hourly

Units: Parts per billion (ppb)



Arkansas is in attainment with all NO_2 NAAQS. This attainment status is based on results from the Arkansas NO_2 ambient air monitoring network. Table B-3 provides a summary of NO_2 monitor activity for 2017. Figures B-3 and B-4 illustrate trends over the past ten years in nitrogen dioxide design values relative to the corresponding NAAQS.

NAAQS DESIGN VALUE

▲ ONE-HOUR PRIMARY NAAQS

One-hundred parts per billion (100 ppb), ninety-eighth percentile of one-hour daily maximum concentrations averaged over three years

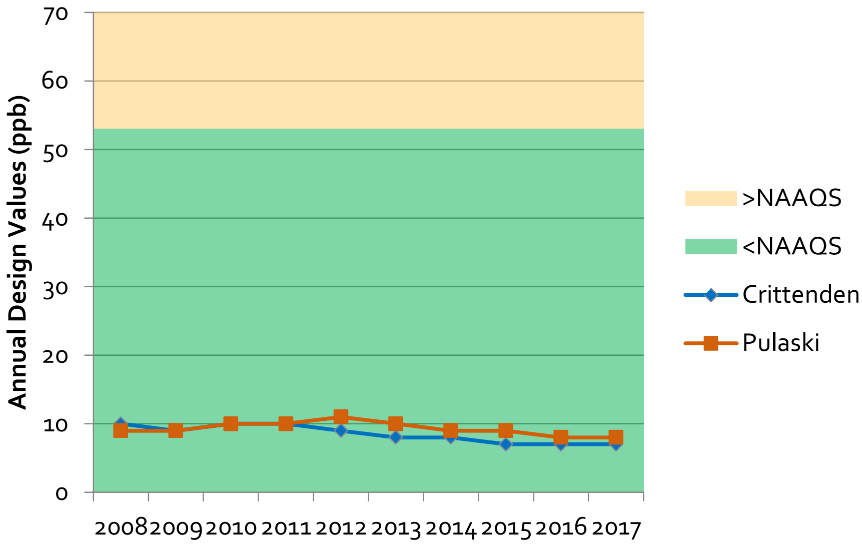
▲ ANNUAL PRIMARY AND SECONDARY NAAQS

Fifty-three parts per billion (53 ppb), annual mean

Table B-3 2017 Arkansas NO_2 Monitor Values Summary Data

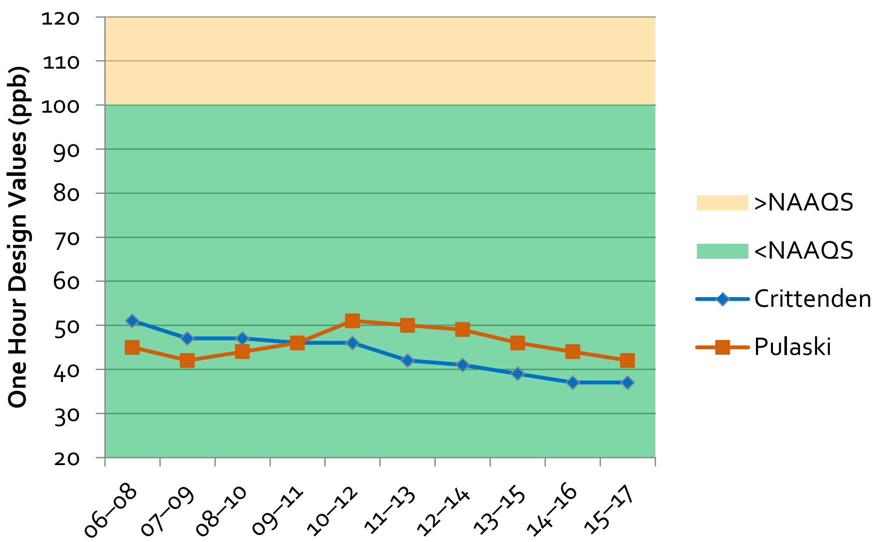
COUNTY	SITE ADDRESS	#OBS	98^{TH} PERCENTILE ONE-HOUR AVERAGE (ppb)	ANNUAL MEAN (ppb)
Pulaski	Pike Ave at River Road, North Little Rock	8695	39	7.6
Crittenden	Lh Polk and Colonial Drive, Marion	8640	37	7.1

Figure B-3 Trends in Annual-Hour Nitrogen Dioxide Design Values



	PULASKI	CRITTENDEN
2008	9	10
2009	9	9
2010	10	10
2011	10	10
2012	11	9
2013	10	8
2014	9	8
2015	9	7
2016	8	7
2017	8	7
Slope	-0.1515	-0.3818
R^2	0.2338	0.8295

Figure B-4 Trends in in One-Hour Nitrogen Dioxide Design Values

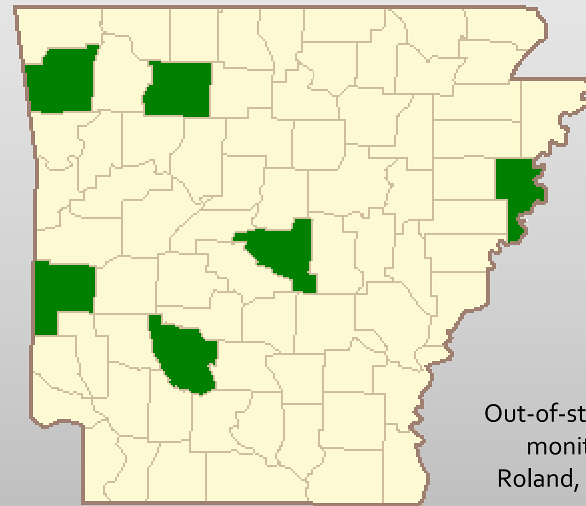


	PULASKI	CRITTENDEN
2008	45	51
2009	42	47
2010	44	47
2011	46	46
2012	51	46
2013	50	42
2014	49	41
2015	46	39
2016	44	37
2017	42	37
Slope	0.0303	-1.5455
R^2	0.0008	0.9561

Ozone

Monitor Network

Pollutant:	Ozone
Method:	Ultra-Violet Photometry
Data Interval:	Hourly
Units:	Parts per million (ppm)



Arkansas is in attainment with the ozone NAAQS. This attainment status is based on results from the Arkansas ozone ambient air monitoring network. Table B-4 provides a summary of ozone monitor activity for 2017. Figure B-5 illustrates trends over the past ten years in ozone design values relative to the NAAQS in effect for that year.

NAAQS DESIGN VALUE

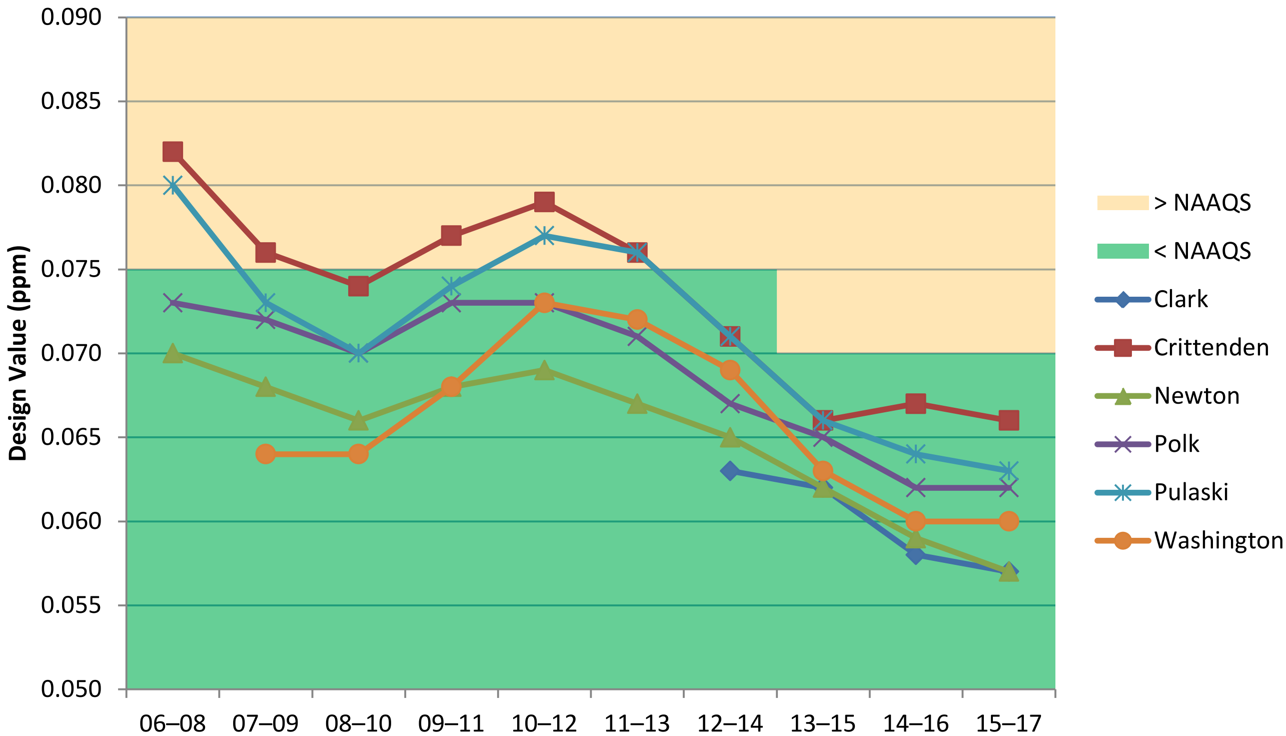
▲ EIGHT-HOUR PRIMARY AND SECONDARY NAAQS

Seventy parts per billion (70 ppb or 0.070 ppm), annual fourth-highest daily maximum eight-hour concentration averaged over three years

Table B-4 2017 Arkansas Ozone Monitor Values Summary Data

COUNTY	SITE ADDRESS	VALID DAYS	DAILY MAXIMUM EIGHT-HOUR AVERAGE (ppm)	
			4TH MAX	OBS > 0.070
Clark	Lower Lake Recreation Area, Caddo Valley	269	0.058	0
Crittenden	Lh Polk And Colonial Drive, Marion	275	0.064	1
Newton	Hwy 16	273	0.056	0
Polk	463 Polk 631, Mena	272	0.061	0
Pulaski	Pike Ave At River Road, North Little Rock	361	0.058	0
Pulaski	Remount Road, North Little Rock	272	0.062	1
Washington	600 South Old Missouri Road, Springdale	275	0.061	0
Washington	429 Ernest Lancaster Dr., Fayetteville	274	0.058	0

Figure B-5 Trends in Eight-Hour Ozone Design Values



COUNTY	05-07	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	SLOPE	R^2
Clark							0.063	0.062	0.058	0.057	-0.0022	0.9308
Crittenden	0.082	0.076	0.074	0.077	0.079	0.076	0.071	0.066	0.067	0.066	-0.0016	0.7547
Newton	0.07	0.068	0.066	0.068	0.069	0.067	0.065	0.062	0.059	0.057	-0.0013	0.7803
Polk	0.073	0.072	0.07	0.073	0.073	0.071	0.067	0.065	0.062	0.062	-0.0013	0.7727
Pulaski	0.08	0.073	0.07	0.074	0.077	0.076	0.071	0.066	0.064	0.063	-0.0015	0.6272
Washington		0.064	0.064	0.068	0.073	0.072	0.069	0.063	0.06	0.06	-0.0007	0.1573

Sulfur Dioxide (SO_2)

Monitor Network

Pollutant:	Sulfur Dioxide
Method:	Instrumental Ultra-Violet Fluorescence
Data Interval:	Hourly
Units:	Parts per billion (ppb)

All areas of Arkansas are designated attainment, attainment/unclassifiable, or unclassifiable with all SO_2 NAAQS. There are no SO_2 nonattainment areas in Arkansas. Attainment status is based on results from the Arkansas SO2 ambient air monitoring network described below and the SO2 designations modeling. Table B-5 provides a summary of SO2 monitor activity for 2017. Figure B-6 illustrates the trend over the past ten years in SO2 design values relative to the primary NAAQS.

NAAQS DESIGN VALUE

▲ ONE-HOUR PRIMARY NAAQS

Seventy-five parts per billion (75 ppb), ninety-ninth percentile of one-hour daily maximum concentrations averaged over three years

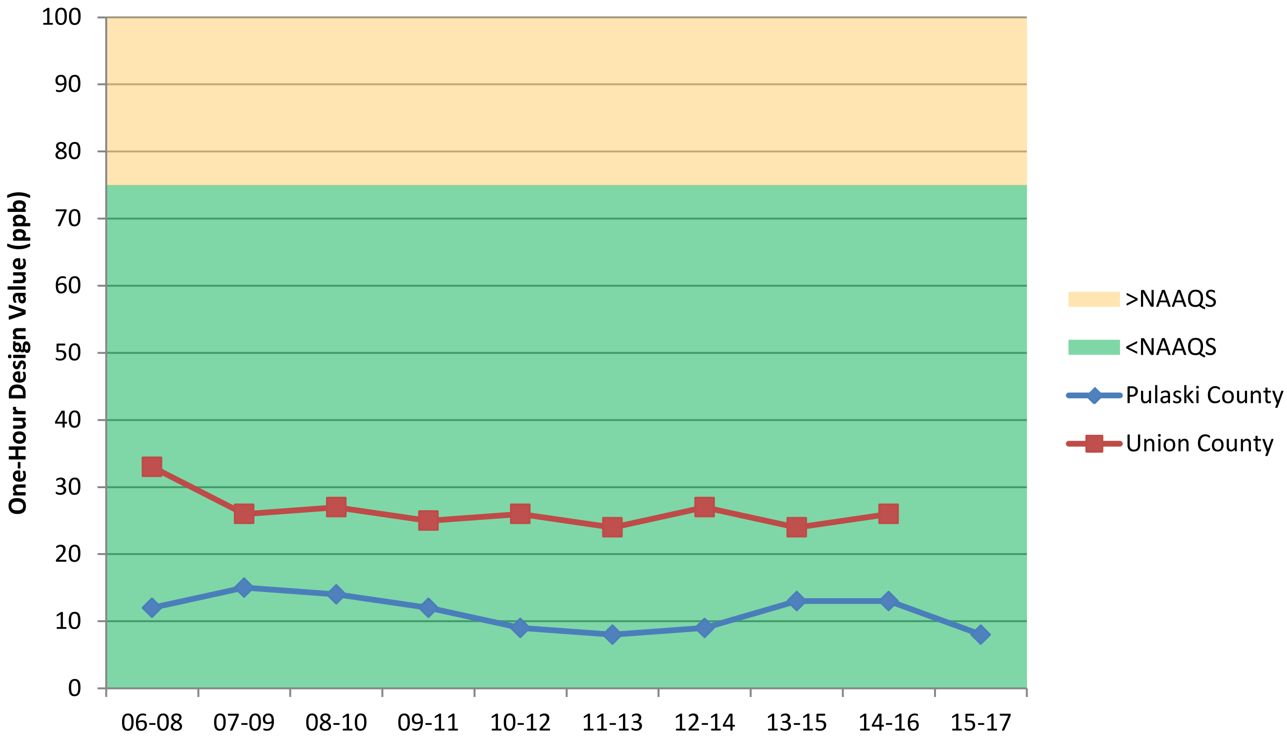
▲ THREE-HOUR SECONDARY NAAQS

One-half part per million (0.5 ppm or 500 ppb), not to be exceeded more than once per year

Table B-5 2017 Arkansas SO_2 Monitor Values Summary Data

COUNTY	SITE ADDRESS	ONE-HOUR	
		# obs	99th Percentile (ppb)
Pulaski	Pike Ave at River Road, North Little Rock	8707	8

Figure B-6Trends in One-Hour SO_2 Design Values



COUNTY	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	15-17	SLOPE	R^2
Pulaski	12	15	14	12	9	8	9	13	13	8	-0.3939	0.213
Union	33	26	27	25	26	24	27	24	26		-0.5833	0.3507

Coarse Particulate Matter (PM10)

Monitor Network

Pollutant: PM10

Method: Gravimetric

Data Interval: Twenty-Four Hour

Units: Micrograms per cubic meter ($\mu g/m^3$)

Arkansas is in attainment with the PM10 NAAQS. This attainment status is based on results from the Arkansas PM10 ambient air monitoring network. Table B-6 provides a summary of PM10 monitor activity for 2017. Figure B-7 illustrates trends over the past ten years in maximum PM10 twenty-four hour concentrations relative to the PM10 NAAQS.

NAAQS DESIGN VALUE

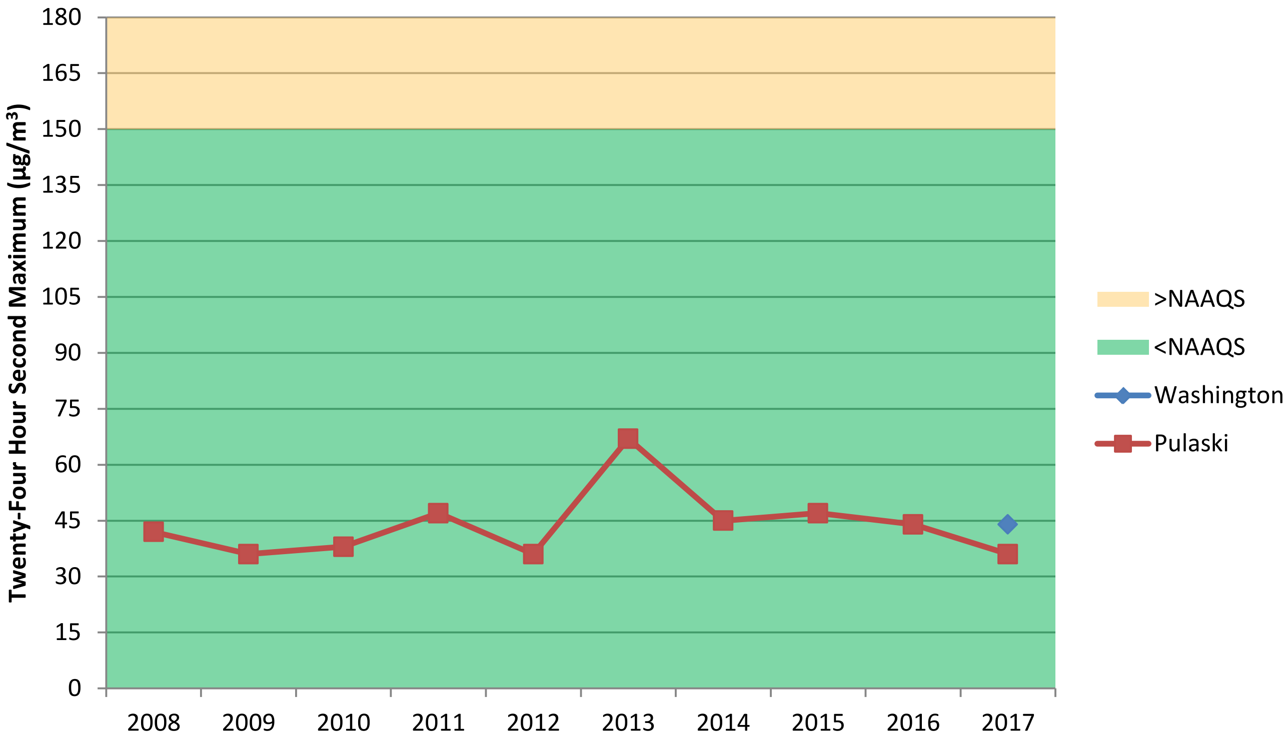
▲ TWENTY-FOUR HOUR PRIMARY AND SECONDARY NAAQS

One-hundred fifty micrograms per cubic meter (150 $\mu g/m^3$), not to be exceeded more than once per year on average over three years

Table B-6 2017 Arkansas Ozone Monitor Values Summary Data

COUNTY	SITE ADDRESS	VALID DAYS	DAILY MAXIMUM AVERAGE (µG/M3)	
			1ST MAX	2ND MAX
Pulaski	Pike Ave At River Road, North Little Rock	61	37	36
Pulaski	Pike Ave At River Road, North Little Rock	29	29	28
Pulaski	Remount Road, North Little Rock	61	36	31

Figure B-7Trends in Twenty-Four-Hour Maximum PM_{10} Concentrations



COUNTY	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	SLOPE	R^2
Pulaski	42	36	38	47	36	67	45	47	44	36	0.4364	0.0202
Washington										44	NA*	NA*

The monitor installed in Washington County is new. Because there are not at least three data points, ADEQ did not perform a trends analysis for this monitor.

Fine Particulate Matter ($PM_{2.5}$)

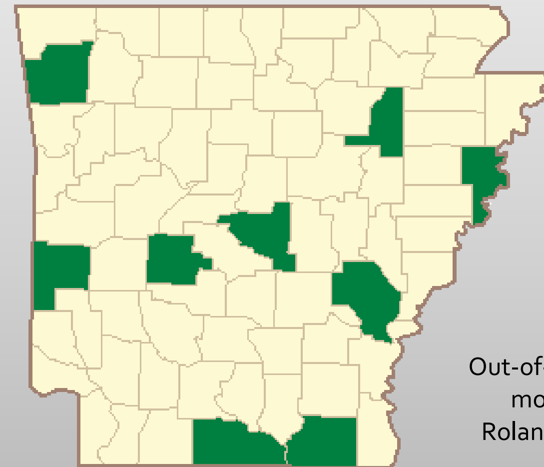
Monitor Network

Pollutant: PM2.5

Method: Gravimetric

Data Interval: Twenty-Four Hour

Units: Micrograms per cubic meter ($\mu g/m^3$)



Out-of-state monitor: Roland, OK

Arkansas is in attainment with all $PM_{2.5}$ NAAQS. This attainment status is based on results from the Arkansas $PM_{2.5}$ ambient air monitoring network. Table B-7 provides a summary of $PM_{2.5}$ monitor activity for 2017. Figures B-8 and B-9 illustrate trends over the past ten years in $PM_{2.5}$ design values relative to the corresponding, concurrent primary NAAQS.

NAAQS DESIGN VALUE

▲ ANNUAL PRIMARY AND NAAQS

Twelve micrograms per cubic meter (12 $\mu g/m^3$), annual mean averaged over three years

▲ ANNUAL SECONDARY NAAQS

Fifteen micrograms per cubic meter (15 $\mu g/m^3$), annual mean averaged over three years

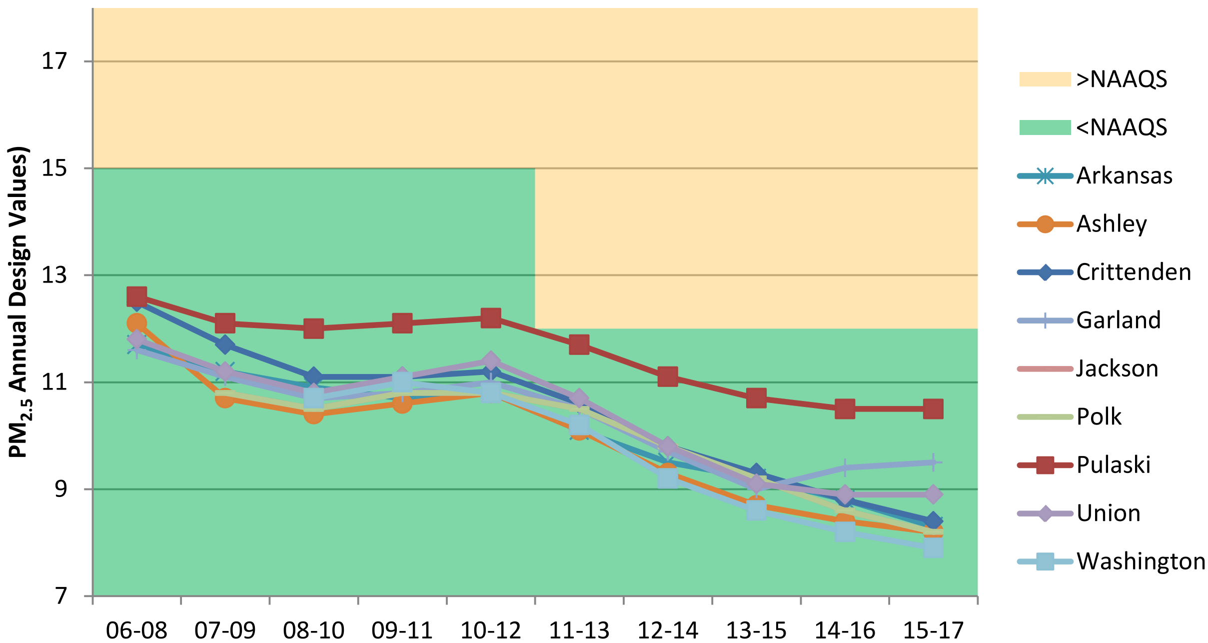
▲ TWENTY-FOUR HOUR PRIMARY AND SECONDARY NAAQS

Thirty-five micrograms per cubic meter (35 $\mu g/m^3$), ninety-eighth percentile, averaged over three years

Table B-7 2017 Arkansas $PM_{2.5}$ Monitor Values Summary Data

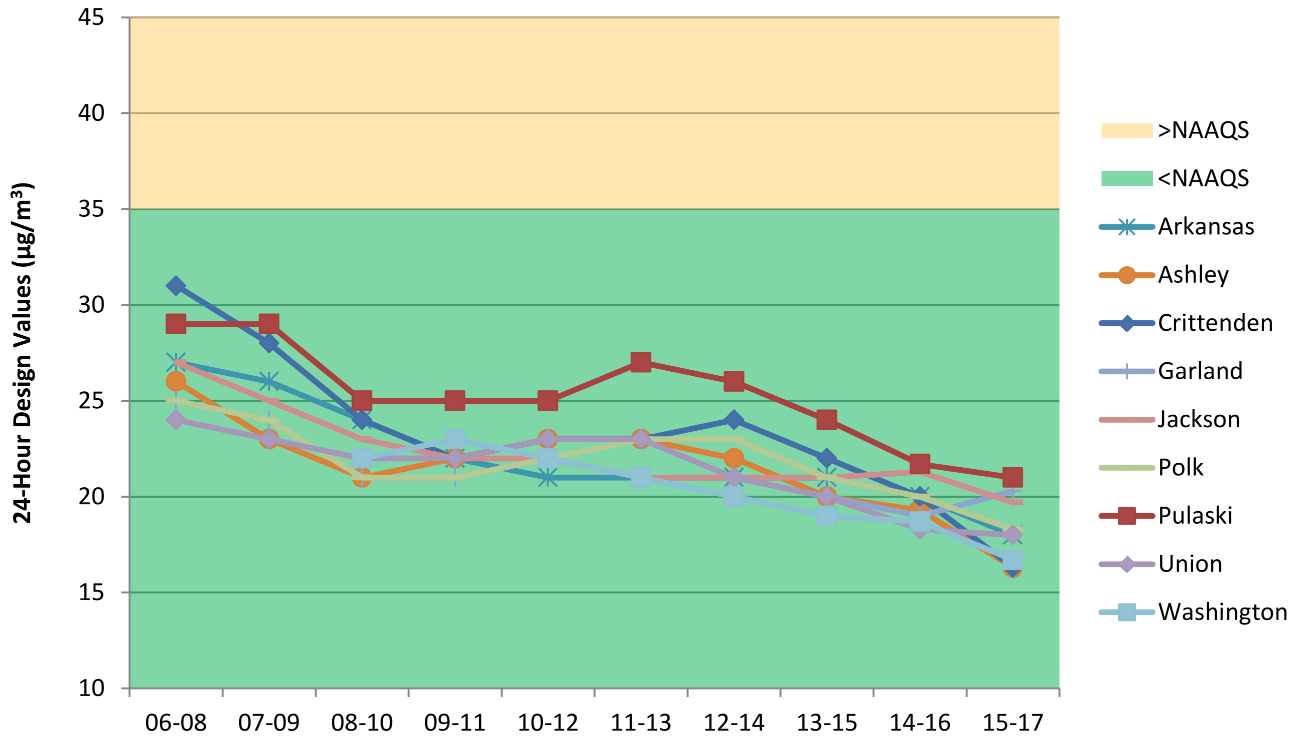
COUNTY	SITE ADDRESS	# OBS	TWENTY-FOUR-HOUR 98TH PERCENTILE (µg/m³)	ANNUAL MEAN (µg/m³)
Arkansas	1703 N Beurkle - Hwy 63, Stuttgart	113	16	7.7
Ashley	1015 Unity Road, Crossett	121	14	8.2
Crittenden	Lh Polk And Colonial Drive, Marion	122	14	8.0
Garland	300 Werner St., Hot Springs	121	17	8.4
Garland	300 Werner St., Hot Springs	29	21	8.8
Jackson	7648 Victory Blvd, Newport	122	18	8.1
Polk	Hornbeck Road, Mena	121	17	8.1
Pulaski	Pike Ave At River Road, North Little Rock	361	18	9.2
Pulaski	Pike Ave At River Road, North Little Rock	30	22	9.9
Pulaski	Doyle Springs Road, Little Rock	121	21	9.6
Union	Union Memorial Hospital, El Dorado	121	18	8.9
Washington	600 South Old Missouri Road, Springdale	121	15	7.8

Figure B-8 Trends in Annual $PM_{2.5}$ Design Values



COUNTY	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	15-17	SLOPE	R^2
Arkansas	11.7	11.2	10.9	10.7	10.8	10.1	9.5	9.2	8.8	8.3	-0.365	0.967
Ashley	12.1	10.7	10.4	10.6	10.8	10.1	9.3	8.7	8.4	8.2	-0.390	0.895
Crittenden	12.5	11.7	11.1	11.1	11.2	10.6	9.8	9.3	8.8	8.4	-0.429	0.955
Garland	11.6	11.1	10.7	10.8	11	10.5	9.7	9	9.4	9.5	-0.261	0.833
Jackson		10.8	10.5	10.8	10.8	10.5	9.8	9.2	8.6	8.2	-0.338	0.835
Polk		10.8	10.5	10.8	10.8	10.5	9.8	9.2	8.6	8.2	-0.338	0.835
Pulaski	12.6	12.1	12	12.1	12.2	11.7	11.1	10.7	10.5	10.5	-0.243	0.888
Union	11.8	11.2	10.8	11.1	11.4	10.7	9.8	9.1	8.9	8.9	-0.335	0.852
Washington			10.7	11	10.8	10.2	9.2	8.6	8.2	7.9	-0.491	0.921

Figure B-9 Trends in Twenty-Four Hour $PM_{2.5}$ Design Values

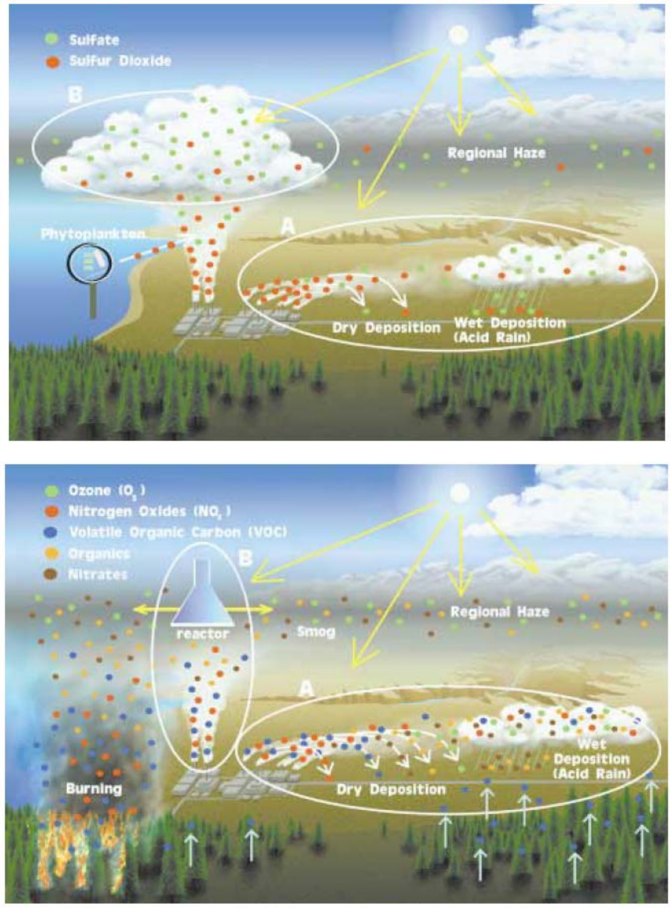


COUNTY	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	15-17	SLOPE	R^2
Arkansas	27	26	24	22	21	21	21	21	20.0	18.0	-0.855	0.874
Ashley	26	23	21	22	23	23	22	20	19.3	16.3	-0.716	0.685
Crittenden	31	28	24	22	23	23	24	22	20.0	16.3	-1.166	0.769
Garland	25	24	21	21	22	21	21	20	19.0	20.3	-0.505	0.709
Jackson	27	25	23	22	22	21	21	21	21.3	19.7	-0.64	0.788
Polk	25	24	21	21	22	23	23	21	20.0	18.3	-0.493	0.566
Pulaski	29	29	25	25	25	27	26	24	21.7	21.0	-0.746	0.716
Union	24	23	22	22	23	23	21	20	18.3	18.0	-0.606	0.787
Washington			22	23	22	21	20	19	18.7	16.7	-0.817	0.908

Regional Haze

The Clean Air Act mandates that the states and federal partners work to restore pristine visibility conditions in designated Class I areas and prevent future visibility impairment. There are 156 Class I areas, which include national parks, wildlife refuges, and wilderness areas. States, EPA, and federal land managers are charged to work together to monitor and address visibility impairment from anthropogenic sources.

The Regional Haze Program was established by EPA pursuant to this Clean Air Act mandate. Under the Regional Haze Regulations, states must develop plans covering ten year periods with the goal of achieving natural visibility conditions at designated Class I areas by 2064.



National Park Service (1999) "Introduction to Visibility"

Interagency Monitoring of Protected Visual Environments Monitoring Network

The IMPROVE network is a long-term monitoring program that tracks changes in visibility. The IMPROVE monitors are capable of speciation of haze-causing pollutants so that the causal mechanism of visibility impairment in each Class I area can be determined.

There are two IMPROVE monitors in Arkansas: one near the Caney Creek Wilderness Area and the other in the Upper Buffalo Wilderness Area.

Forest Service Caney Creek IMPROVE monitor (CACR1)

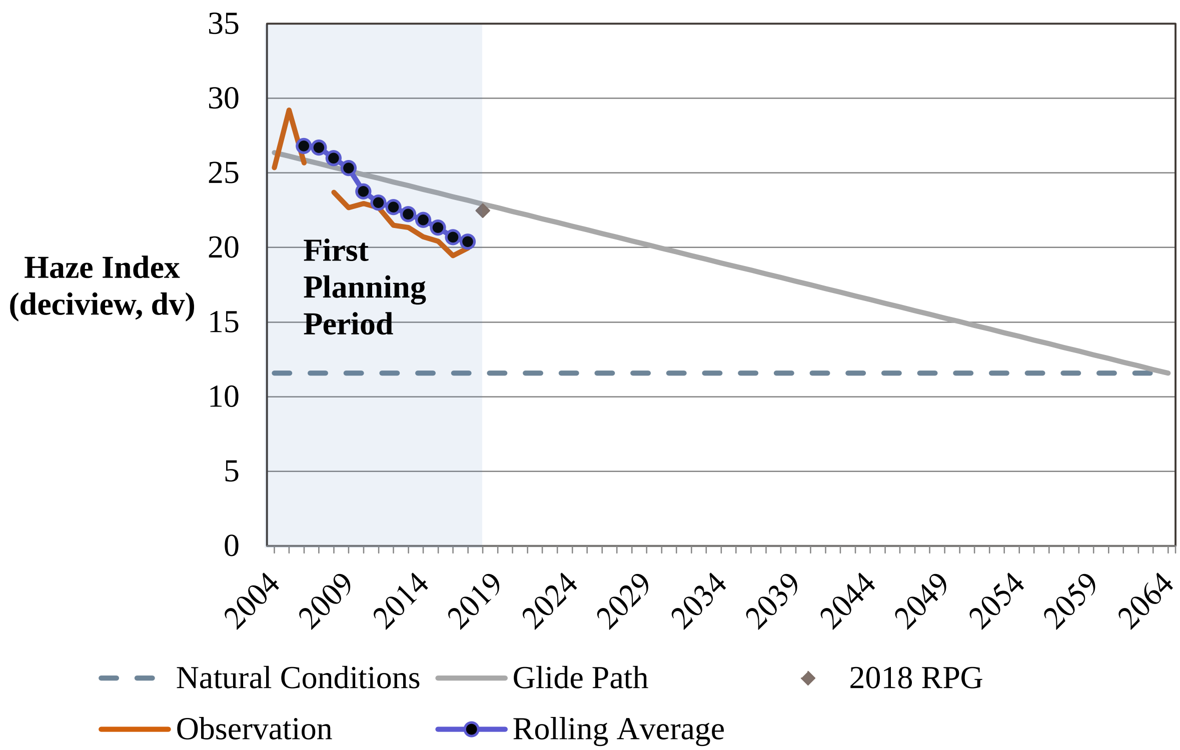
Caney Creek Wilderness Area

Caney Creek – Twenty Percent Haziest Days Natural Conditions Winhaze Visual Air Quality Modeler Model Image

Caney Creek – Twenty Percent Haziest Days 2002 Winhaze Visual Air Quality Modeler Model Image

Visibility in Caney Creek is improving at a faster rate than would be necessary to achieve the goal of natural visibility conditions by 2064 and is on track to beat visibility goals established in Arkansas's Regional Haze plans. This is indicated by the reduction in haze index values (deciviews) on the twenty percent haziest days.

Figure B-10 Visibility Improvement Trends on Twenty Percent Haziest Days at Caney Creek Wilderness Area



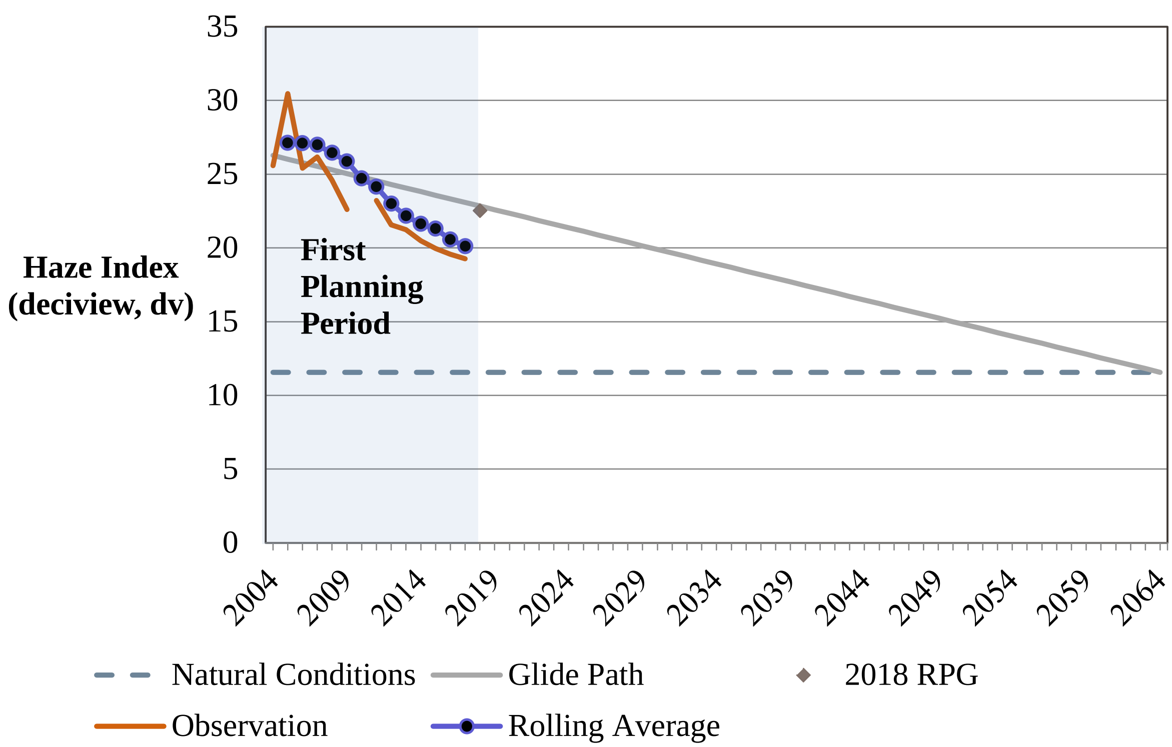
Upper Buffalo Wilderness Area

Upper Buffalo – Twenty Percent Haziest Days Natural Conditions Winhaze Visual Air Quality Modeler Model Image

Upper Buffalo – Twenty Percent Haziest Days 2002 Winhaze Visual Air Quality Modeler Model Image

Visibility in Upper Buffalo is improving at a faster rate than would be necessary to achieve the goal of natural visibility conditions by 2064 and is on track to beat visibility goals established in Arkansas's Regional Haze plans. This is indicated by the reduction in haze index values (deciviews) on the twenty percent haziest days.

Figure B-11 Visibility Improvement Trends on Twenty Percent Haziest Days at Upper Buffalo Wilderness Area



Appendix C Emissions Inventory Trends

National Emissions Inventory

Every three years, the United States Environmental Protection Agency (EPA), in collaboration with the states, collects data on criteria pollutant emissions. EPA publishes the data in the National Emissions Inventory (NEI), which provides information about the estimated emissions of criteria pollutants and their precursors from various source categories. The Arkansas Department of Environmental Quality (ADEQ) provides EPA with emissions estimates reported by larger stationary sources for inclusion in the NEI. EPA estimates emissions from smaller stationary sources, nonpoint sources, biogenic sources, mobile sources, and event sources.

The nonpoint source category includes small stationary sources too small to report as point, as well as biogenic sources—vegetation and other natural sources of emissions. The mobile source category is split into two subcategories: onroad vehicles and nonroad vehicles. Wildfires and prescribed burns fall into the event category.

This Appendix presents trends in anthropogenic emissions for the three most recent NEI years: 2008, 2011, and 2014.

EMISSION SOURCE CATEGORY	EXAMPLES
Point	Larger Stationary Sources
Nonpoint	Residential heating, solvents, agriculture, road dust
Biogenic	Crops, lawns, trees, soils
Onroad	Passenger vehicles, trucks, buses
Nonroad	Aircraft, locomotive, marine vessels
Event	Wildfires, prescribed burns

ANTHROPOGENIC VS NATURAL EMISSIONS

▲ ANTHROPOGENIC SOURCE EMISSIONS

All point sources, nonroad sources, and onroad sources are anthropogenic sources of emissions. Most nonpoint sources, with the exception of biogenic sources, are considered anthropogenic sources.

▲ NATURAL SOURCE EMISSIONS

All biogenic sources are natural sources of emissions. Event sources—such as volcanic emissions, dust storms, and wild-fires—are also natural emissions sources. There is some disagreement as to whether prescribed burns should be considered anthropogenic. For this trends analysis, all event sources are considered natural.

Trends in Anthropogenic Nitrogen Oxides Emissions

Nitrogen oxides (NOx) are precursors for multiple criteria pollutants including ozone and fine particulate matter ($PM_{2.5}$). Approximately eighty-eight percent of total NOx emissions in Arkansas come from anthropogenic sources.[4] The primary anthropogenic contributors to NOx emissions in Arkansas are mobile sources—particularly onroad vehicles—and point sources.

Overall, NOx emissions from anthropogenic sources decreased by eight percent between 2008 and 2014.[5] Onroad NOx emissions decreased by approximately seventeen percent, non-road NOx emissions decreased by twenty-four percent, and point source NOx emissions decreased by two percent between 2008 and 2014. Nonpoint source NOx emissions increased by approximately eighteen percent between 2008 and 2014.

Figure C-1 2014 Relative Contribution of Anthropogenic NOx Emissions in Arkansas by Source Category

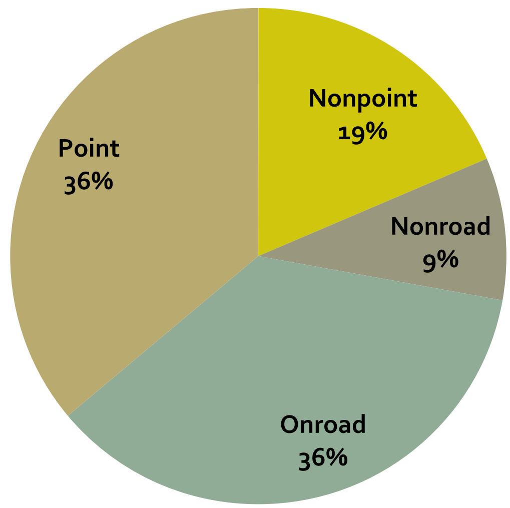
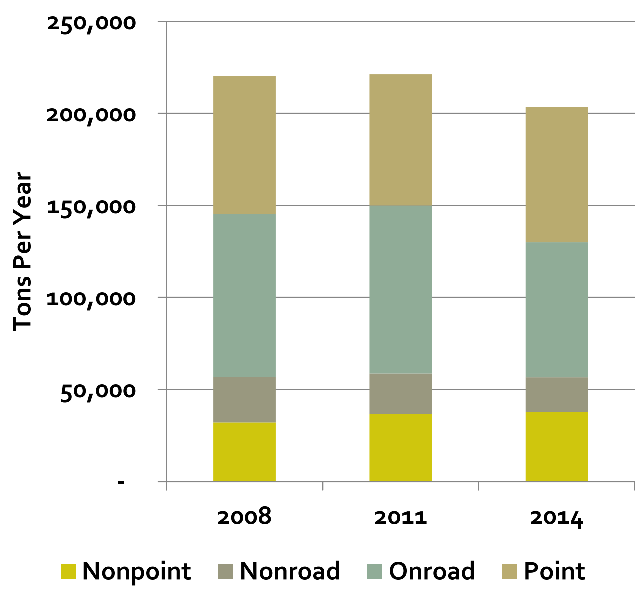


Figure C-2 Trends in Anthropogenic NOx Emissions in Arkansas by Data Category



[4] Source: 2014 National Emissions Inventory version 1

[5] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Volatile Organic Compound Emissions

Volatile organic compounds (VOCs) are precursors for ozone. Only ten percent of total VOC emissions in Arkansas come from anthropogenic sources.[6] Emissions from nonpoint sources comprise the largest portion (fifty-three percent) of the Arkansas anthropogenic VOC emissions inventory.

Overall, VOC emissions from anthropogenic sources in Arkansas decreased by approximately twelve percent between 2008 and 2014.[7] Emissions from nonpoint sources increased by six percent between 2008 and 2014. Emissions from nonroad, onroad, and point sources decreased during the same time period. The largest reduction (thirty-five percent) in emissions occurred in the on-road source category.

Figure C-3 2014 Relative Contribution of Anthropogenic VOC Emissions in Arkansas by Source Category

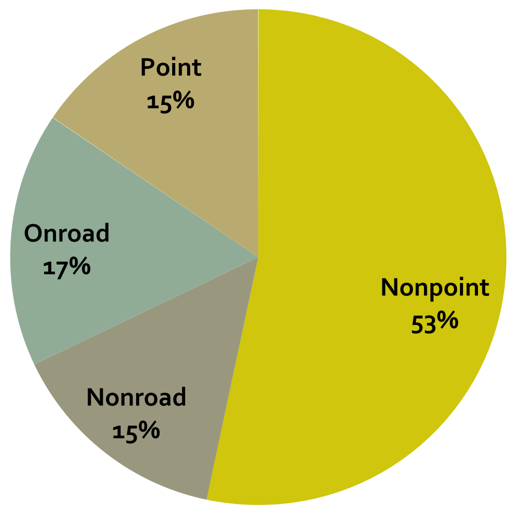
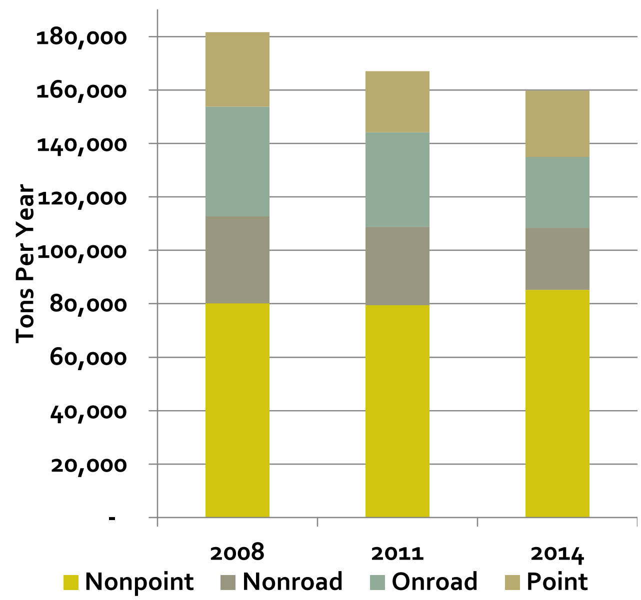


Figure C-4 Trends in Anthropogenic VOC Emissions in Arkansas by Data Category



[6] Source: 2014 National Emissions Inventory version 1

[7] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Overall, CO emissions from anthropogenic sources decreased by thirty-five percent between 2008 and 2014.[8] Onroad and nonroad CO emissions dropped sharply by approximately forty-five percent and thirty percent, respectively. Nonpoint CO emissions decreased by approximately thirteen percent between 2008 and 2014 and point CO emissions decreased by approximately eight percent.

Carbon monoxide (CO) is both a criteria pollutant and a precursor for ozone. Approximately forty-three percent of total Arkansas CO emissions come from anthropogenic sources.[9] Emissions from onroad sources comprise the largest portion (forty-eight percent) of the Arkansas anthropogenic CO emissions inventory.

Figure C-5 2014 Relative Contribution of Anthropogenic CO Emissions in Arkansas by Source Category

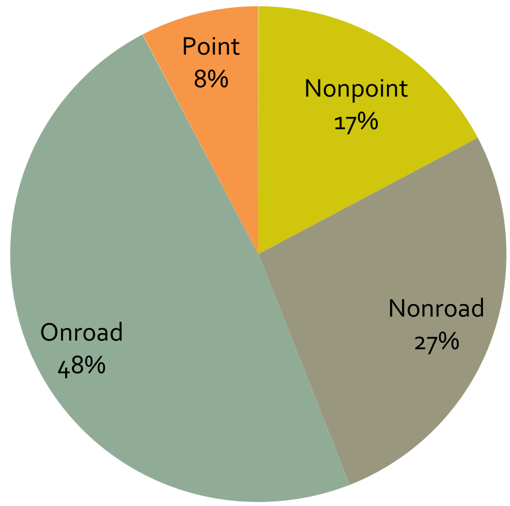
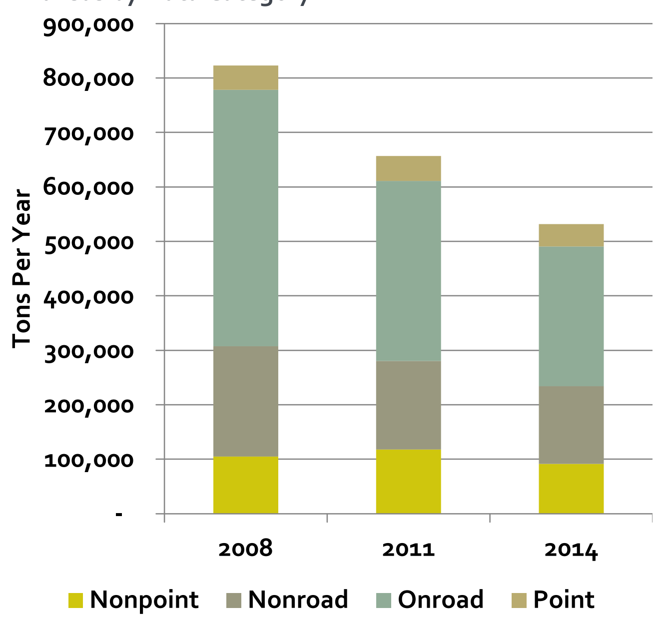


Figure C-6 Trends in Anthropogenic CO Emissions in Arkansas by Data Category



[8] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

[9] Source: 2014 National Emissions Inventory version 1

Overall, SO_2 emissions from anthropogenic sources decreased by approximately three percent between 2008 and 2014. SO_2 emissions from point sources decreased by approximately two percent.[10] SO_2 emissions from onroad sources decreased by fifty-six percent. SO_2 emissions from nonroad sources decreased by ninety-one percent. SO_2 emissions from nonpoint sources increased from 2008 to 2011, but decreased by thirty-nine percent between 2008 and 2014.

Sulfur dioxide (SO_2) is both a criteria pollutant and a precursor for fine particulate matter ($PM_{2.5}$). Virtually all SO_2 emissions come from anthropogenic sources.[11] Emissions from point sources comprise the largest portion (ninety-nine percent) of the Arkansas anthropogenic SO_2 emissions inventory.

Figure C-5 2014 Relative Contribution of Anthropogenic SO_2 Emissions in Arkansas by Source Category

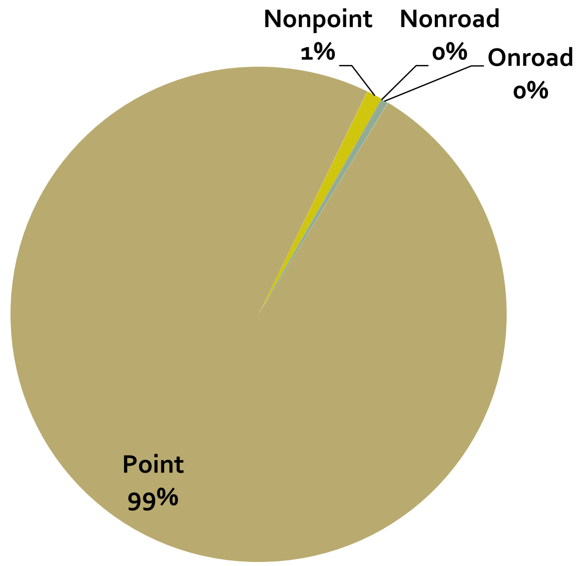
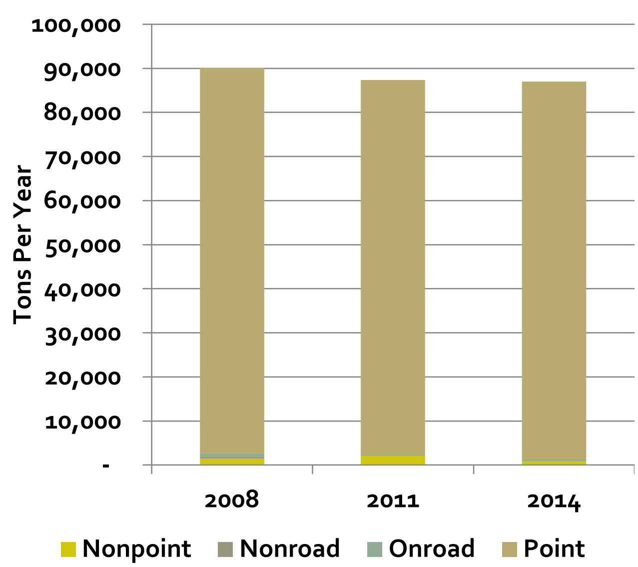


Figure C-6 Trends in Anthropogenic SO_2 Emissions in Arkansas by Data Category



[10] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

[11] Source: 2014 National Emissions Inventory version 1

Trends in Anthropogenic Coarse Particulate Matter Emissions

Coarse particulate matter (PM_{10}) is a criteria pollutant. Approximately ninety-one percent of Arkansas PM_{10} emissions come from anthropogenic sources.[12] Emissions from nonpoint sources comprise the largest portion (ninety-seven percent) of the Arkansas anthropogenic PM_{10} emissions inventory.

Overall, Arkansas experienced approximately a forty-one percent increase in PM_{10} emissions from anthropogenic sources between 2008 and 2014.[13] Emissions from point and nonroad source categories decreased. Nonpoint source emissions increased by forty-three percent and onroad emissions increased by twenty-six percent.

Figure C-7 2014 Relative Contribution of Anthropogenic PM_{10} Emissions in Arkansas by Source Category

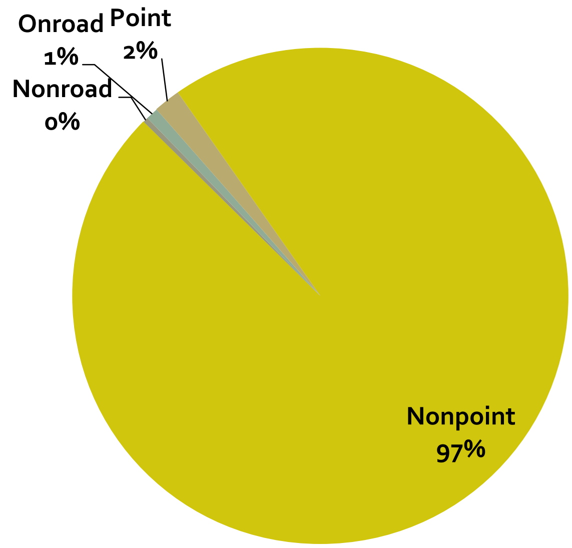
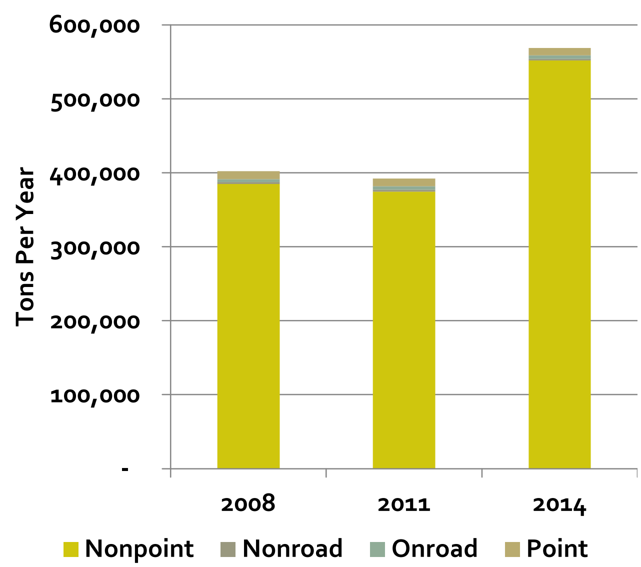


Figure C-8 Trends in Anthropogenic PM_{10} Emissions in Arkansas by Data Category



[12] Source: 2014 National Emissions Inventory version 1
[13] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Primary fine particulate matter (primary $PM_{2.5}$) is the condensable and filterable fraction that is directly emitted from sources. Primary $PM_{2.5}$ does not include secondary $PM_{2.5}$ formed downwind by reactions between precursor pollutants, such as nitrogen oxides (NOx), sulfur dioxide (SO_2), and ammonia (NH_3). Approximately sixty-nine percent of primary $PM_{2.5}$ emissions in Arkansas come from anthropogenic sources.[14] Emissions from nonpoint sources comprise the largest portion of the Arkansas anthropogenic primary $PM_{2.5}$ emissions inventory.

Overall, primary $PM_{2.5}$ emissions increased between 2008 and 2014 as a result of an increase in emission estimates from the nonpoint source category and from two sectors not regulated by ADEQ or EPA: agriculture—crop and livestock dust—and unpaved road dust.[15] Emissions from point, onroad, and nonroad source categories decreased.

Figure C-9 2014 Relative Contribution of Anthropogenic $PM_{2.5}$ Emissions in Arkansas by Data Category

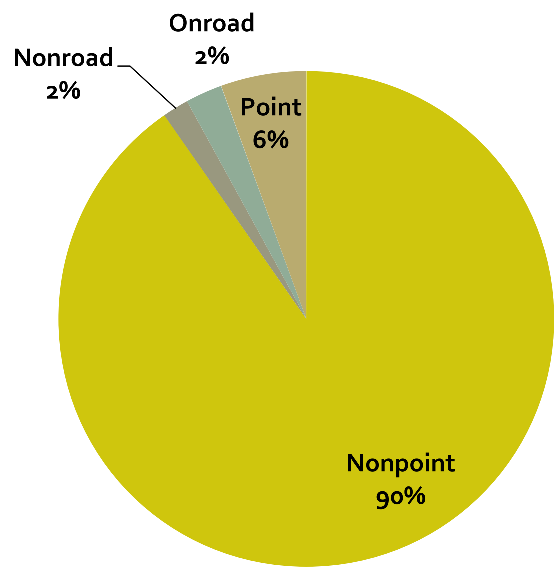
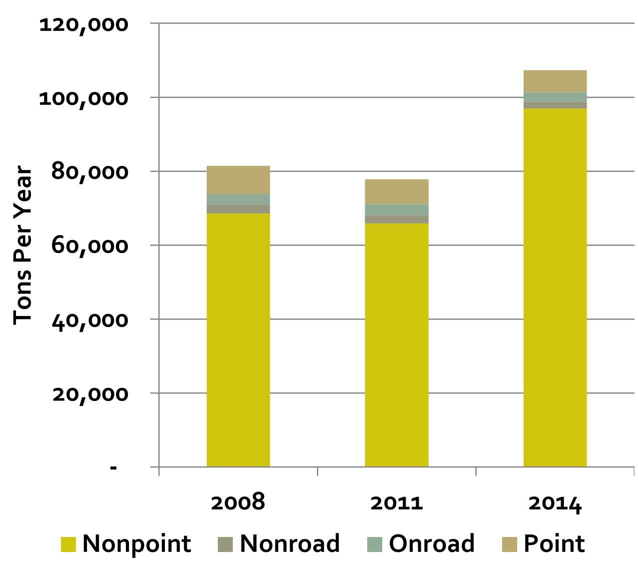


Figure C-10 Trends in Anthropogenic $PM_{2.5}$ Emissions in Arkansas by Source Category



14 Source: 2014 National Emissions Inventory version 1

15 Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Ammonia Emissions

Ammonia (NH_3) is a precursor for fine particulate matter ($PM_{2.5}$). Approximately eighty-nine percent of NH_3 emissions in Arkansas come from anthropogenic sources.[16] Emissions from nonpoint sources comprise the largest portion (ninety-six percent) of the Arkansas anthropogenic NH_3 emissions inventory from source categories regulated by state and federal air quality programs.[17]

Overall, NH_3 emissions from anthropogenic sources decreased by approximately thirty-nine percent between 2008 and 2014. The overall decrease in NH_3 emissions resulted from a forty percent decrease in nonpoint source NH_3 emissions between 2008 and 2014. Onroad sources of NH_3 emissions also decreased between 2008 and 2014. Nonroad and point source emissions increased between 2008 and 2014.

Figure C-11 2014 Relative Contribution of Anthropogenic $PM_{2.5}$ Emissions in Arkansas by Data Category

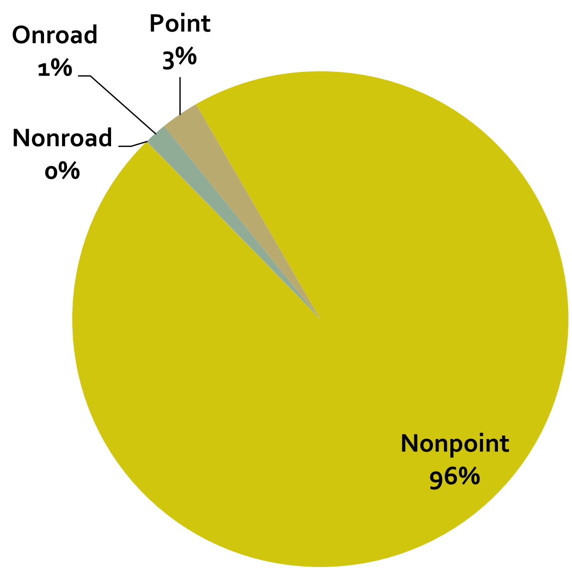
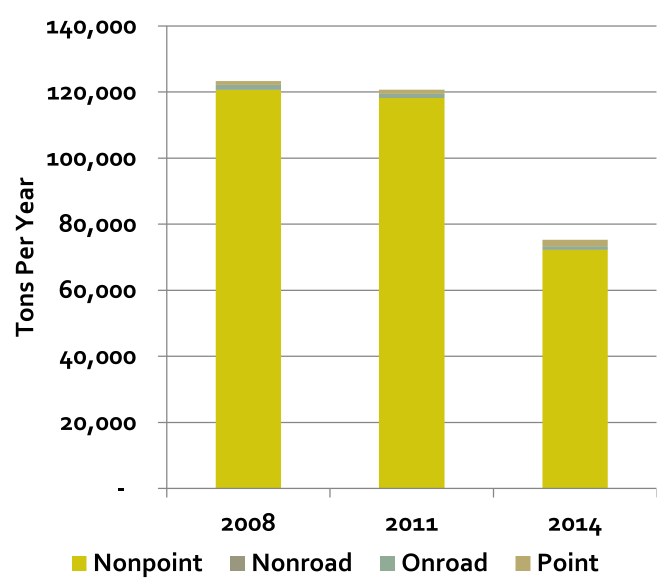


Figure C-12 Trends in Anthropogenic $PM_{2.5}$ Emissions in Arkansas by Data Category



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[16] 2014 National Emissions Inventory version 1
[17] Id.

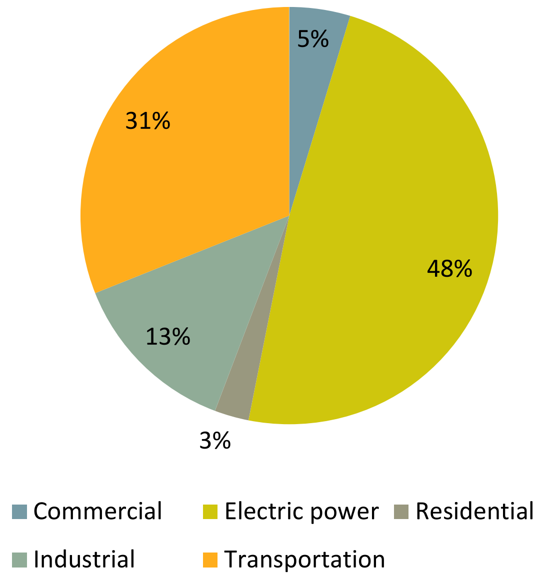
Carbon Dioxide Trends

Carbon dioxide (CO_2) accounts for 81.6% of all United States anthropogenic greenhouse gas emissions.[18] Greenhouse gases trap heat in the atmosphere.

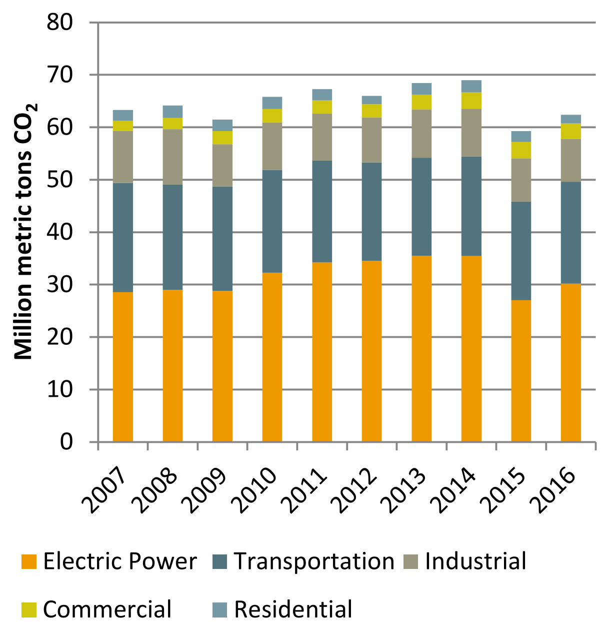
CO_2 is naturally present in the atmosphere, but is also emitted by human activities, including fossil fuel combustion, industrial processes, and land-use changes.

The United States Energy Information Administration (EIA) inventories energy-related CO_2 emissions. In Arkansas, the largest source of anthropogenic CO_2 emissions is the electric power sector followed by the transportation sector. Over the past decade CO_2 emissions from the electric power sector in Arkansas have increased reaching a peak of 35.5 million metric tons in 2014. Emissions from Arkansas's power sector declined in 2015, but began rebounding in 2016. CO_2 emissions from the transportation sector have decreased over the past decade. The industrial sector in Arkansas has also decreased its CO_2 emissions over the past decade. The residential sector and commercial sector make up a much smaller portion of the energy-related CO_2 emissions inventory in Arkansas.

C-13 Arkansas 2016 Relative Carbon Dioxide Emissions By Energy-Related Sector (EIA State Carbon Dioxide Emissions Data)



C-14 2007–2016 Trends in Energy-Related CO2 Emissions in Arkansas (EIA State Carbon Dioxide Emissions Data)

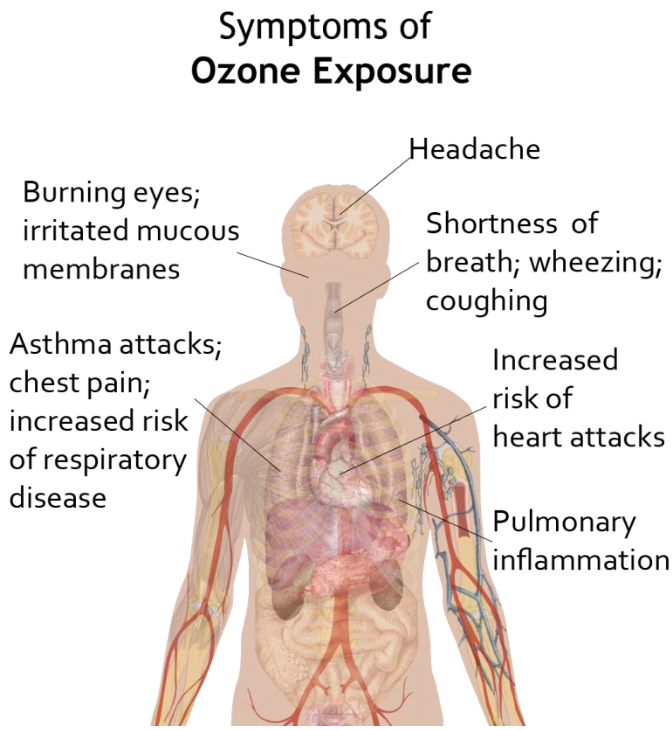


[18] EPA (2016). "Overview of Greenhouse Gases" < https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

Appendix D 2018 Ozone Season Summary

Introduction

Ozone is a gas that can be beneficial or harmful, depending on where it is found. In the stratosphere, ozone forms a protective layer that shields the planet from ultraviolet rays. At ground level, ozone is unhealthy to breathe and can trigger various respiratory and cardiovascular health problems. Ground level ozone also has negative impacts on vegetation and ecosystems.



Ground level ozone is produced via photochemical reactions involving nitrogen oxides (NOx), volatile organic compounds (VOCs), and sunlight. Local meteorology—including temperature, wind speed and direction, humidity, solar radiation, and cloud cover—affects ozone formation.

The United States Environmental Protection Agency (EPA) has established a national ambient air quality standard (NAAQS) for ozone at a level of 70 ppb (0.070 ppm) to protect public health and welfare. The Arkansas Department of Environmental Quality (ADEQ) monitors air quality in Arkansas and implements a permitting program to ensure that sources of precursor compounds, such as NOx and VOCs, do not interfere with attainment and maintenance of the ozone NAAQS.

Ozone Season

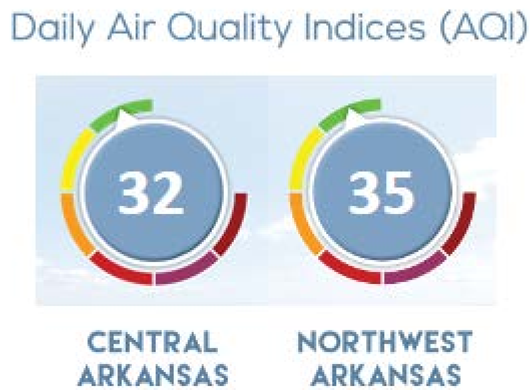
Between May 1 and September 30 each year, conditions are typically more conducive for ozone formation than at other times of the year. This period is known as ozone season.

During the ozone season, ADEQ reports current air quality conditions and forecasts day-ahead air quality conditions for two major metropolitan areas in Arkansas: central Arkansas and northwest Arkansas. The Tennessee Department of Environment and Conservation reports and forecasts conditions in the Memphis metropolitan area, which includes West Memphis, Arkansas.

Current air quality conditions and forecasts are presented to the public in the form of the Air Quality Index (AQI). The AQI ranges from 0–500[19] with an easy-to-recognize color system. The AQI colors are intended to help people to rapidly determine whether air pollutants are reaching unhealthy levels. Current and next-day AQI for central and northwest Arkansas are posted daily on ADEQ's website[20] and reported in the media. AQI for metropolitan areas throughout the nation are posted to EPA's Air Now webpage.[21]

Table D-1 AQI Breakdown for the 8-Hour Ozone NAAQS

INDEX VALUES	8-HOUR OZONE AVERAGE (ppm)	LEVELS OF HEALTH CONCERN
0–50	0.000–0.054	Good
51–100	0.055–0.070	Moderate
101–150	0.071–0.085	Unhealthy for Sensitive Groups
151–200	0.086–0.105	Unhealthy
201–300	0.106–0.200	Very Unhealthy



D-2 Arkansas Yearly Highest Ozone AQI

AQI	DATE
122	6/6/2018
115	6/9/2017
100	6/9/2016
100	6/5/2015
100	7/22/2014

[19] For the 8-hour ozone standard, AQI values above 300 are not calculated.
[20] www.adeq.state.ar.us
[21] www.airnow.gov

Ozone Action Days

Ozone Action Days is a central Arkansas program coordinated through Metroplan and the Central Arkansas Clean Cities Coalition in cooperation with the Arkansas Department of Health, ADEQ, and the Arkansas Department of Transportation.

There are two types of ozone action days:

Ozone Action Advisory—Code Orange

Declared when AQI forecast is code orange (AQI 101–150), indicating that prolonged outdoor exertion is **UNHEALTHY FOR SENSITIVE GROUPS**

Ozone Action Alert—Code Red

Declared when the AQI forecast is code red (AQI 151–200), indicating that prolonged exertion is **UNHEALTHY FOR EVERYONE**

DOs AND DON'Ts FOR OZONE ACTION DAYS

▲ DOs

-Limit driving. Share a ride, carpool, walk, or ride the bus.

-Combine errands.

-Keep your car well-tuned.

-Avoid "jackrabbit" starts (forceful accelerations) or excessive idling.

-Stay indoors as much as possible.

▲ DON'Ts

-Don't do lawn and gardening chores that use gasoline powered equipment.

-Don't use oil-based paints and solvents.

-Don't use products that release fumes or evaporate easily.

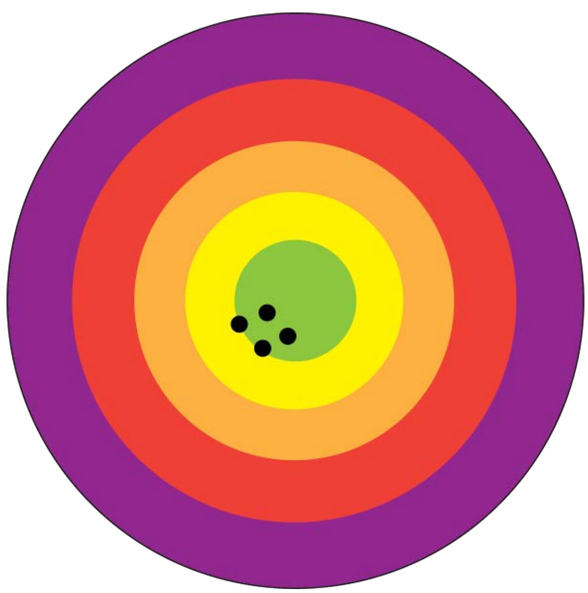
-Don't refuel or if you must refuel, do so after dark and don't fill the tank completely.

-Don't exercise outdoors.

ADEQ 2018 Ozone Forecasting Accuracy

Ozone concentrations are forecasted daily during the ozone season. The ADEQ air quality forecaster estimates ozone concentrations using meteorological data and recent pollutant concentrations.

During 2018, ADEQ correctly forecasted whether the next day would be an ozone action day (**Code Orange** or **Code Red**) ninety-eight percent of the time. ADEQ's accuracy for forecasting whether a day would be good (AQI in Green range) or Moderate (AQI in Yellow range) was seventy-six percent.

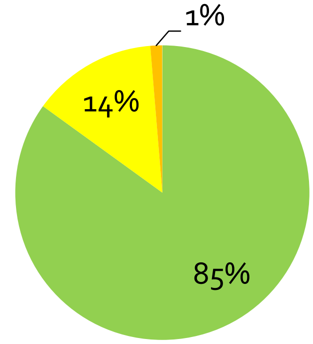


Central Arkansas 2018 Ozone Season Overview

Two ozone monitors collect data to determine the air quality of Central Arkansas. Both are located in North Little Rock.

During ozone season 2018, there were only two **Code Orange** AQI days—June 5th and June 6th—in Central Arkansas based on monitor data. One-hundred thirty days were well below the ozone NAAQS (AQI 0–50, Green). Monitored values for twenty-one days in the 2018 ozone season fell in the AQI range of 51–100 (Yellow).

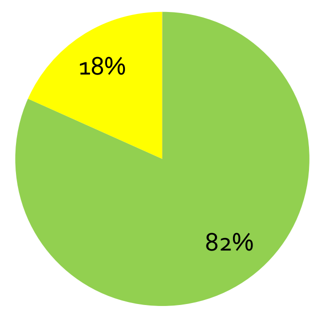
Figure D-1 Central Arkansas 2018 Ozone Season Monitored Days by AQI Color



Northwest Arkansas 2018 Ozone Season Overview

Two ozone monitors in Northwest Arkansas, one in Springdale and the other in Fayetteville collect ozone concentration data for northwest Arkansas. During ozone season 2018, there were no **Code Orange** AQI days, twenty-eight yellow days, and 125 green days based on monitor data.

Figure D-2 Northwest Arkansas 2018 Ozone Season Monitored Days by AQI Color

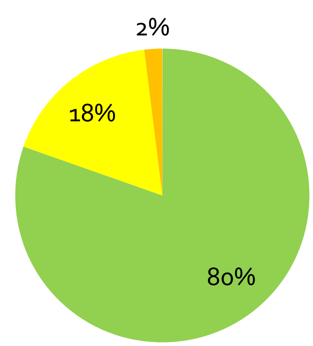


Marion 2018 Ozone Season Overview

There is one ozone monitor located in Marion, Arkansas, which is part of the Memphis metropolitan statistical area.

During the ozone season, Marion had three **Code Orange** AQI days, twenty-seven yellow days, and 123 green days based on monitor data.

Figure D-3 Marion 2018 Ozone Season Monitored Days by AQI Color



2018 Running Design Values

Compliance with the ozone NAAQS is determined based on design values for each monitor. The design value for ozone is the fourth highest eight-hour daily maximum averaged over three years. If the design value for an area is below the level of the NAAQS, the area is said to be in "attainment" with the NAAQS. If the design value is higher than the NAAQS, the area is designated as "nonattainment" and the State must enact emission reduction measures to bring the area back into attainment with the NAAQS. Most monitors are located in metropolitan statistical areas; however, Arkansas does have a few rural monitors to provide data on background conditions.

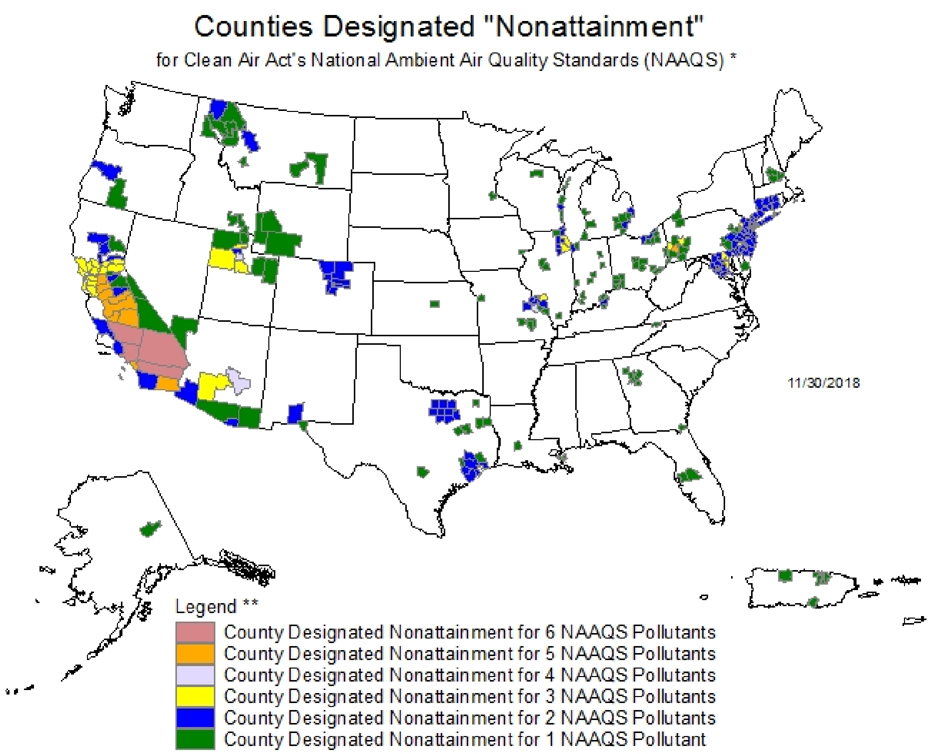
Table D-3 2016–2018 Running Ozone Design Values

MONITORING LOCATION	RUNNING DESIGN VALUE*
Little Rock/North Little Rock/Conway MSA	0.064 ppm
Memphis MSA	0.069 ppm
Fayetteville/Springdale/Rogers MSA	0.060 ppm
Deer	0.058 ppm
Eagle Mountain	0.061 ppm
Caddo Valley	0.058 ppm

*The ozone NAAQS is 0.070 ppm (70 ppb).

Arkansas Ozone Attainment Status

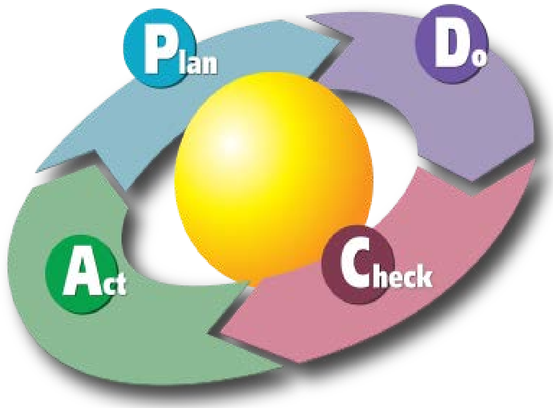
The entire state of Arkansas is in attainment for the 2015 ozone NAAQS and all other NAAQS.



Appendix E Office of Air Quality Federal Fiscal Year 2018 Lean Events

What is a Lean Event?

The Arkansas Department of Environmental Quality (ADEQ) is working to achieve continuous improvement in our work to serve the citizens of Arkansas. As part of our continuous improvement efforts, ADEQ is implementing Lean Six Sigma concepts throughout the agency. Lean Six Sigma is a management practice first introduced in Japan that has been adopted across a broad spectrum of organizations. By implementing certain lean management principles, ADEQ is working to increase the quality of our work and reduce costs.



A lean event (also known as a "Kaizen event") is the beginning of a continuous cycle of planning, implementing, evaluating, and revising product work flows to reduce waste and rework while maintaining or improving product quality. During a lean event, a team creates a plan to improve the work flow for product development. This plan involves identifying the value of the product, evaluating the value of each step in producing the product, challenging the wasted steps, creating a work flow through value added steps, and establishing metrics to evaluate process changes.

The overall goal for ADEQ's lean efforts is to achieve continuous improvement in our mission to protect, enhance, and restore the natural environment for the well-being of all Arkansans by understanding those we serve and creating better, more efficient processes.

On March 22, 2018, ADEQ Office of Air Quality (OAQ) Enforcement staff held a lean event to evaluate improvements to the time it takes to process enforcement orders . This project was a follow-up to a previous multi-media enforcement lean event.

The purpose of this event was to set a new goal for processing enforcement orders by Air Enforcement. An Air-specific goal was necessary because Air Enforcement was already more efficient than any of the other media. Compared to other media, Air Enforcement was fifty percent more efficient, thus making an eighty percent reduction in processing time not feasible.

OPPORTUNITIES FOR IMPROVING METRICS

▲ LEAD TIME ON ENFORCEMENT ORDERS

Baseline average lead time from referral to proposal of enforcement order is eighty-days

1. Identifying Value

The enforcement process has an impact on a wide variety of stakeholders (customers) including citizens, regulated facilities, permit writers, compliance inspectors, and enforcement analysts. Efficiency in the enforcement process reduces uncertainty and may affect future actions by the entities against which OAQ takes enforcement action. OAQ anticipates improved efficiency at ADEQ and streamlining of the enforcement process to result in a more efficient use of staff resources and cost savings for the agency.

2. Mapping the Value Stream

During the March 22, 2018 lean event, the Air Enforcement Lean Team reviewed and made a few changes to the process map developed at the previous process map.

3. Creating Flow

The Air Enforcement Lean Team identified several actions to consider in implementation of improved efficiency. The Lean Team established a monthly meeting schedule with the Legal Branch of the Office of Law and Policy ("Legal"), and created a process wherein Legal notifies Air Enforcement staff when changes or delays occur. In addition, the team collaborated to develop an accountability form and moved the review process to the ePortal online tracking system. Another result of the collaboration involved Legal embossing enforcement orders after OAQ review but before Director review.

4. Establishing Goals

The Air Enforcement Lean Team established a goal to reduce enforcement order processing time by thirty percent. The team developed an action plan to implement the measures identified in the Air Enforcement Lean Event. The sidebars (top right and bottom right) describe the goal and milestones for Air Enforcement.

GOAL

- ENFORCEMENT ACTION PROCESSING TIME

Reduce the average lead time to process an air enforcement action from eighty business days to fifty six business days (thirty percent reduction) by September 30, 2018

5. Seeking Perfection

A quarterly evaluation schedule was implemented to determine progress towards achieving the goal to reduce processing time for enforcement orders. By the end of Q3 2018, the Air Enforcement team had reduced processing time from eighty business days to 21.25 business days, which is an improvement of 73.4%!

MILESTONES

- MONTLHY MEETINGS WITH LEGAL

Starting in May 2018

- IMPLEMENT ACCOUNTABILITY FORM

By March 2018

- CHANGES TO SCHEDULE PROCESS FOR EMBOSSING ORDERS

By May 2018

- IMPLEMENT EPORTAL REVIEW PROCESS

By June 2018

In April 2018, ADEQ Office of Air Quality (OAQ) staff held a lean event to evaluate improvements to Asbestos certification and license processing.

The Asbestos Lean Team consisted of members of the Asbestos section, Fiscal, Solid Waste, and Regulated Storage Tanks. The event was facilitated by Tim Cain.

At this event, the Asbestos Lean Team explored ways to make licensing and certifying of companies and individuals more efficient and cost-effective.

OPPORTUNITIES FOR IMPROVING METRICS

▲ LEAD TIME ON CERTIFICATION PROCESSING

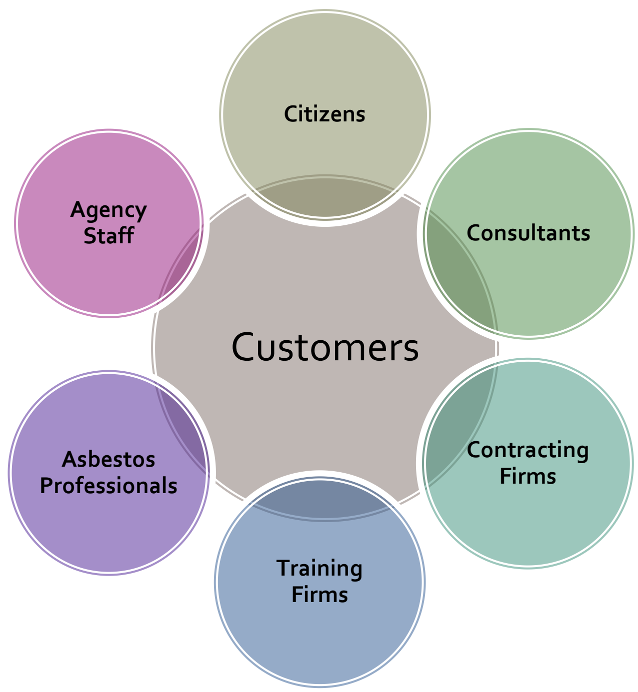
Baseline average lead time to process a complete certification application is 5.7 business days

▲ LEAD TIME ON LICENSE PROCESSING

Baseline average lead time to process a complete license application is 9.6 business days

1. Identifying Value

The Asbestos certification and licensing processes impact a wide variety of stakeholders (customers) including citizens, consultants, contracting firms, training firms, asbestos professionals, agency staff in Fiscal and Asbestos. Licenses and certifications are required for various workers, consultants, contractors, and training firms to perform asbestos renovation and demolition work in the state. Increasing the efficiency of the Asbestos team in processing licenses and certifications produces cost savings for the agency and allows asbestos-related work to proceed sooner.



2. Mapping the Value Stream

During the April 2018 lean event, the Asbestos staff reviewed and made changes to the process map for licenses and certifications. The staff identified parts of the process that caused delays such as the lack a of clear routing process for checks from Fiscal, functionality deficiencies for the Licensing Certification System (LCS), and the lack of a mechanism to ensure that applicants filled out applications completely.

3. Creating Flow

The Asbestos Lean Team identified measures to implement to improve efficiency. These measures included improvements to LCS, directives for how Fiscal handles payments, modification of the walk-in same day process, and development of an online application system.

4. Establishing Pull

The Asbestos Lean Team established goals to reduce certification and license processing time by thirty percent. In addition, the team set qualitative goals including developing a procedure to address incomplete license and/or certification application packets and making the process simpler. The team developed an action plan to establish timeframes for implementation of the measures identified in the Asbestos Event.

The sidebars (top right and bottom right) describe the quantitative goals and milestones for Asbestos.

GOALS

▲ CERTIFICATION PROCESSING TIME

Reduce the average lead time to process certifications from 5.7 to four business days (thirty percent reduction) by November 15, 2018.

▲ LICENSE PROCESSING TIME

Reduce the average lead time to process licenses from 9.6 to 6.7 business days (thirty percent reduction) by November 15, 2018.

5. Seeking Perfection

A quarterly evaluation schedule was established to determine progress towards achieving the goals set in the Asbestos Lean Event. The purpose of this meeting was to evaluate progress toward the goals and to determine whether adjustments are needed.

MILESTONES

▲ COLLECT BASELINE AND NEW METRICS FOR CERTIFICATION AND LICENSING

By August 2018

▲ IMPLEMENT SAME DAY WALK-IN

By May 2018

▲ DEVELOP LICENSING SYSTEM PROGRAM PUNCH LIST

By August 20, 2018