Oklahoma's

Wichita Mountains Wilderness Area

Regional Haze Planning

The Air Quality Division of the Department of Environmental Quality
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Oklahoma's Wichita Mountains Wilderness Area
has been declared a mandatory Federal Class I Area.
It is contained by the Wichita Mountains National Wildlife Refuge
and is managed by the United States Fish and Wildlife Service.
The area consists of North Mountain and Charons Garden Wilderness Areas.
It is in Comanche County near the Ft. Sill Military Reservation, an Army training base.
The City of Lawton is the closest population center and is located 22 miles southeast of the Refuge.

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"The prevention of any future, and the remedying of any existing, impairment to visibility."

Consultation: The Plan

Scope

This consultation plan establishes the objectives and activities to facilitate stakeholder input for meeting visibility requirements in the federal Regional Haze Rule for Oklahoma's Wichita Mountains Wilderness Area.

Background

The U.S. Environmental Protection Agency (EPA) promulgated the federal Regional Haze Rule on July 1, 1999. The federal Regional Haze Rule and the Clean Air Act require consultation between the state and Federal Land Managers (FLM) for managing Class I areas. Since regional haze often results from pollution emitted across broad regions, this multi-state planning effort will help in developing the most cost-effective controls for regional haze. This consultation process will provide a coordinated effort to achieve the federal visibility requirements and aid in developing regional strategies for meeting progress goals.

Plan Objectives

This consultation plan provides state air quality agencies with technical information including emission sources, modeling analysis and source apportionment for Oklahoma's Class I area. These state agencies are being given the opportunity to review this analysis and to particpate in consultation to develop plans for meeting regional haze reduction requirements for this Class I area. Regional Planning Organizations (RPOs), FLMs and the EPA will also be contacted with the opportunity to participate in the development of actions and control strategies for meeting the federal Regional Haze Rule requirements. This plan addresses:

1. Consultation Process
2. Technical Analyses
3. Agency Roles/Responsibilities

1. Consultation Process

Consultation discussion will focus on the primary reasonable progress issues including:

- **Source area identifications**
- **State contributions apportionment**
- **Emission management strategies**

The consultation process will be initiated mid-2007. Draft and final documents will be circulated via email to participating agencies. The initial consultation will be with tribal leaders of Oklahoma and will be held at Department of Environmental Quality headquarters. Documents for this meeting will be provided in printed form and delivered via U.S. Postal Service. All subsequent consultation discussions will include contributing states, designated federal land management officials, appropriate EPA and tribal representatives and will be conducted as conference calls. There may be some instances where a meeting may be desireable (e.g. unresolved issues, complex technical discussions, etc.).

Representatives of the Air Quality Division of the Oklahoma Department of Environmental Quality (DEQ) will work with the Central States Regional Air Partnership (CENRAP) to set up conference calls/meetings for the consultation process. Technical documents will be provided for discussion before conference calls or meetings.

Draft and final documents may include supporting materials that describe analytical methods, assumptions, and conclusions that were relied upon in developing the documents. Comments on any draft documents may be requested from the consultation group members.

All consultation activities will be documented, including who participated in consultation discussions and on what dates, outcomes of consultation discussions (issues agreed, disagreed, resolutions) and justification for long term strategy. Each contributing state or tribe may be requested to share documentation confirming implementation of emission controls being relied on to meet regional haze goals.

Documents and consultation logs will be posted on the Oklahoma DEQ Air Quality Division & CENRAP websites for public viewing. All conference call/meeting minutes will also be posted on the agency website. When new documents are posted on the website, the DEQ will email all consultation participants to inform them that new information has been posted. The DEQ will work with the FLMs and EPA for consultation through conference calls/ meetings. This will include an opportunity for consultation with FLMs in person and at least 60 days prior to holding any public hearing on a state implementation plan as required by federal rule.

Action Items

- **Participate in kick-off**
- **Comment on the draft consultation plan**
- **Confirm emissions inventory and planned control activities**
- **Develop/share individual state timelines for control implementation**
- **Develop/share control progress**
- **Other actions as needed**

Reconciliation of Unresolved Issues

If a contributing state/tribe does not agree with the Oklahoma DEQ regarding reasonable progress goals, then certain actions may be taken to resolve the disagreement including discussions of positions and supporting documentation. If still unresolved, the issues may be elevated to necessary decision makers. An attempt will be made to address all issues to be incorporated into the long-term strategy and the state implementation plan.

Contact Information

Contact information is provided at the end of this document.

Continued Consultation

Consultation between the States and the FLMs will continue as the federal Regional Haze program progresses. The consultation will continue in a similar manner via participation in an RPO. This effort will include development and review of SIP revisions and 5-year progress reports. It will also provide for consideration of any other programs that are implemented and have the potential to contribute to impairment of visibility in Class I areas.

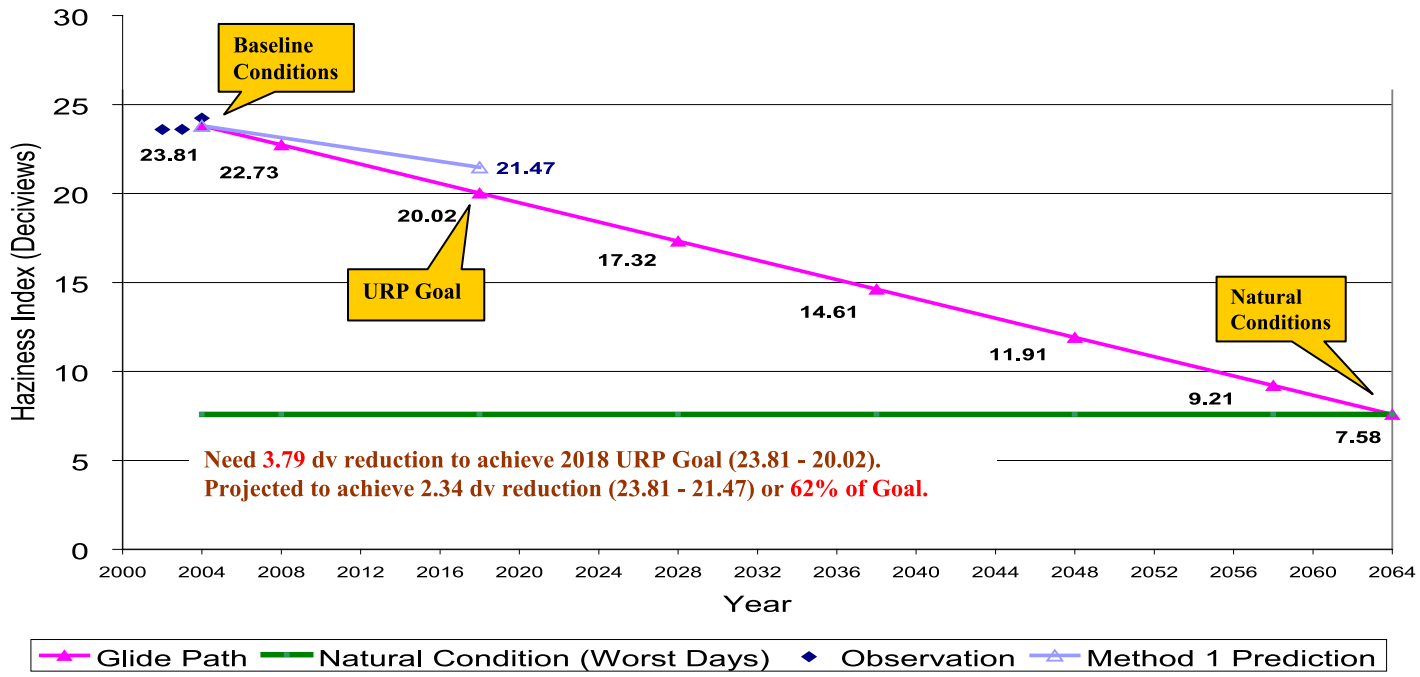
Consultation Timeline

Consultations will begin in the summer of 2007 and meetings will be completed near summer's end. The initial SIP completion date is dictated by the deadline for draft submission of the SIP to FLMs at least 60 days prior to the EPA submittal deadline.

2. Technical Analyses

In assisting the states/tribes in developing regional haze control strategies for Class I areas within CENRAP states and tribes, CENRAP has contracted with Environ/ Alpine to conduct the modeling and other technical analyses. Contractors assembled available information that was useful in quantifying the reduction in individual fine particulate aerosol species concentrations needed to satisfy the Uniform Rate of Progress (URP) goals. Pertinent "attribution of haze" documents were evaluated. These documents include CENRAP Comprehensive Air Quality Model with extensions (CAMx)/Community Multiscale Air Quality (CMAQ) modeling system visibility modeling results, fine particulate modeling results for the central U.S., and other technical reports, papers, and analyses bearing directly on the quantification of emissions-source/visibility-receptor impacts at the ten CENRAP Class I and twelve adjoining areas.

Figure 1. 2018 URP Goal for Wichita Mountans (WIMO) and New Improve Algorithm (NIA) - 20% Worst Days



Environ/UCR CENRAP Modeling Results, June 6, 2007

Current Regional Haze modeling continues to indicate visibility shortfalls in reaching the necessary URP goals for deciview increments for the Wichita Mountains Wilderness Area. Oklahoma DEQ is evaluating alternative glide path scenarios including the assumptive value for natural background conditions given Oklahoma's proximity to the line dividing east from west. Thus far, no scenario has resulted in Oklahoma meeting its glide path goal for 2018 through reevaluation of background levels or controlling emissions within state borders. Source Apportionment Modeling used to apportion culpability to individual source categories and geographic regions indicates that removal of the impact of all point sources within Oklahoma would not result in our achieving the 2018 reduction goal.

The glide path in **Figure 1** illustrates the calculated 2018 URP goal as expressed by the New Improve Algorithm (NIA). Average baseline conditions were monitored to be 23.81 deciviews (dv). EPA determined natural conditions as 7.58 dv. The goal for 2018 is 20.02 dv. Modeling projections for 2018 indicate that conditions in this Class I Area will be 21.47 dv or 2.34 dv above the glide path, 38 per cent short of the goal.

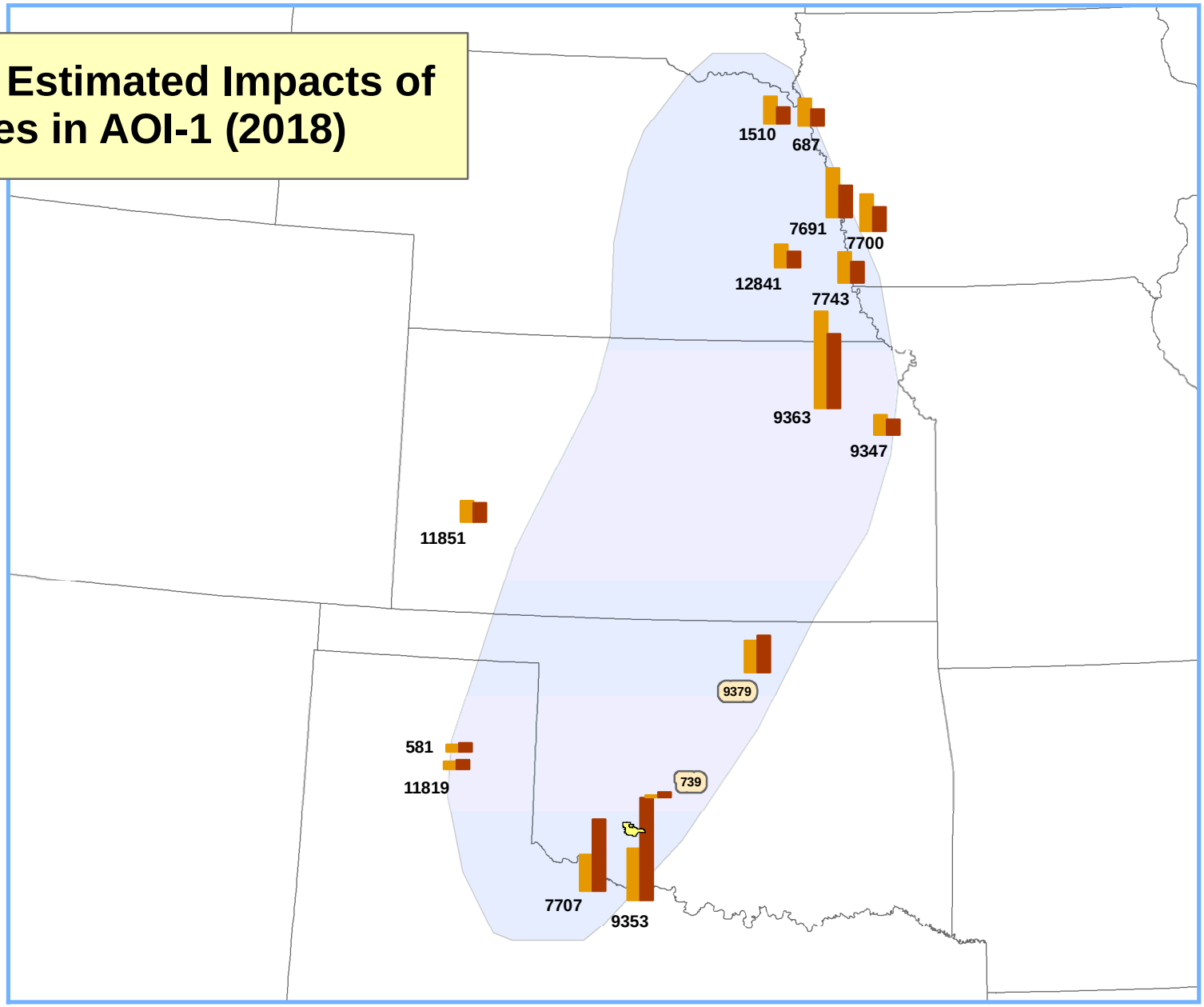
Identification of Source Areas (Areas of Influence)

Alpine, under its contract to CENRAP, identified Areas of Influence (AOIs) using a variety of data and analyses. In combining the AOI information with emission inventories for the areas, we are able to identify a number of sources which are of interest. While DEQ is focusing on the sources in the Level I AOI, we are also interested in any reductions outside that area that will have positive impacts on the Wichita Mountains Class I Area.

Figure 2 on page 8 is a map of the emissions and estimated impacts of Level I AOI for the Wichita Mountains Wilderness Area for oxides of nitrogen (NOx) emission sources. It includes the location of large NOx point sources and their projected 2018 emissions and estimated impacts. **Table 1** lists the identification number, state, facility and industrial classification for those sources. The sources are correlated by emissions and relative impact.

Figure 3 on page 10 is a map of the emissions and estimated impacts of Level I AOI for the Wichita Mountains Wilderness Area for sulfur dioxide (SO_2) emission sources. It includes the location of large SO_2 point sources and their projected 2018 emissions and estimated impacts. **Table 2** lists the identification number, state, facility and industrial classification for those sources. The sources are correlated by emissions and relative impact.

Emissions and Estimated Impacts of NO_x Sources in AOI-1 (2018)



Legend

- WIMO
- BART
- NO_x AOI

NO_x % of Total

- EMISSIONS
- IMPACT

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

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June 25, 2007

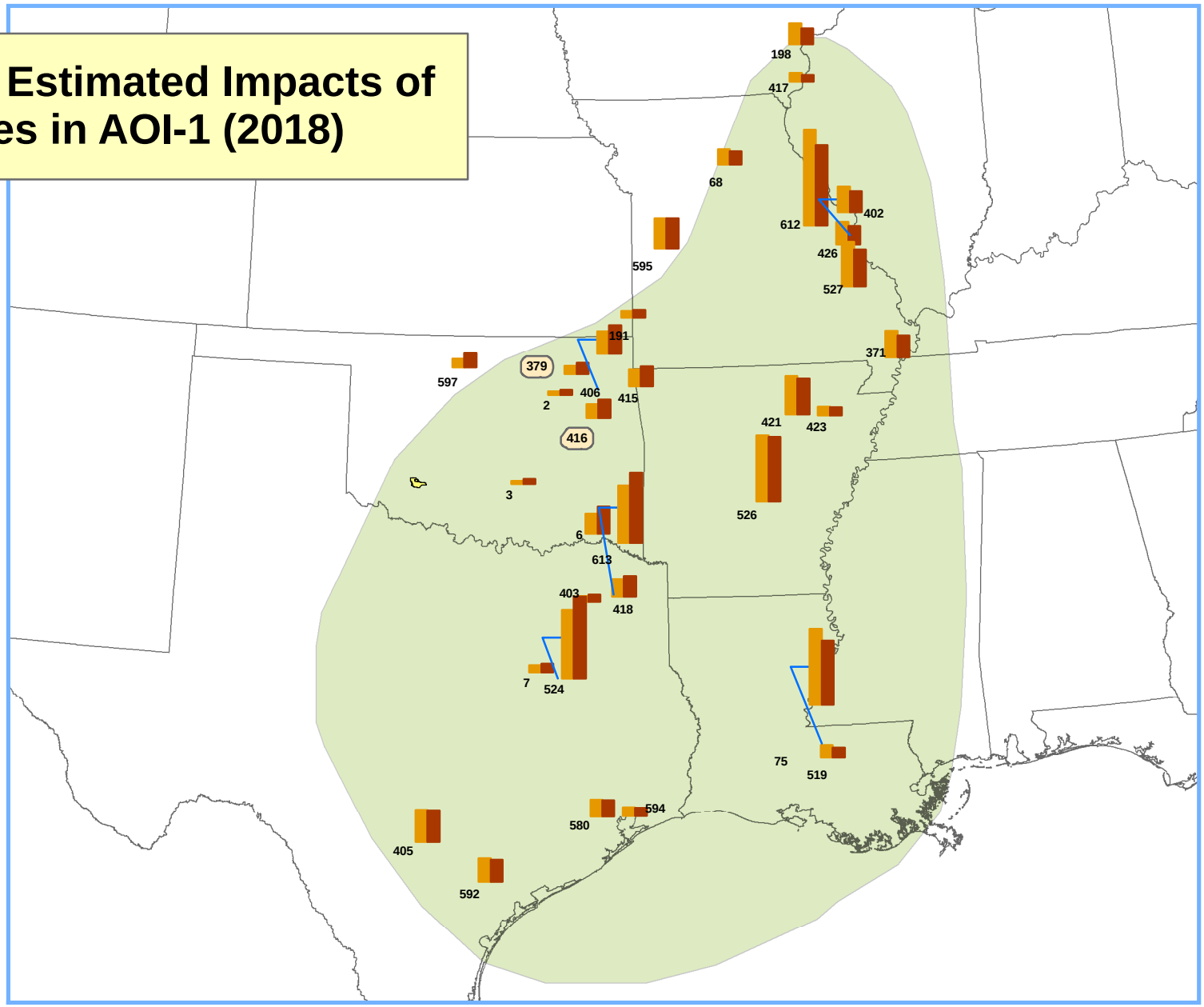
*AOI provided by Alpine Geophysics

Table 1. Correlated Point Sources for NO_x in AOI-1 (2018)

NOx Sources in AOI-1 (2018)				
ID	State	County	Plant Name	Industrial Code Description
687	Iowa	Woodbury	MIDAMERICAN ENERGY CO. - GEORGE NEAL SOU	Electric Services
1510	Iowa	Woodbury	MIDAMERICAN ENERGY CO. - GEORGE NEAL NOR	Electric Services
7700	Iowa	Pottawattamie	MIDAMERICAN ENERGY CO. - COUNCIL BLUFFS	Electric Services
9347	Kansas	Douglas	WESTAR ENERGY, INC.	Electric Services
9363	Kansas	Pottawatomie	WESTAR ENERGY, INC.	Electric Services
11851	Kansas	Finney	SUNFLOWER ELECTRIC POWER CORPORATION	Electric Services
7691	Nebraska	Douglas	OMAHA PUBLIC POWER DISTRICT - NORTH OMAH	Electric Services
7743	Nebraska	Otoe	OPPD NEBRASKA CITY STATION	Electric Services
12841	Nebraska	Lancaster	NPPD Sheldon Station	Electric Services
739	Oklahoma	Caddo	PUBLIC SVC CO OF OK	Electric Services
9379	Oklahoma	Noble	OG&E	Electric Services
581	Texas	Gray	PAMPA PLANT	Carbon Black
7707	Texas	Wilbarger	OKLAUNION POWER STATION	Electric Services
9353	Texas	Wichita	WORKS NO 4	Flat Glass
11819	Texas	Gray	CHEMICAL MANUFACTURING	Industrial Organic Chemicals, NEC

Figure 3. Emissions and Estimated Impacts of SO_2 Sources in AOI-1

Emissions and Estimated Impacts of SO_2 Sources in AOI-1 (2018)



Legend

- WIMO
- SO_2 AOI
- BART

SO_2 % of Total

- EMISSIONS
- IMPACT

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***AOI provided by Alpine Geophysics**

Table 2. Correlated Point Sources for SO_2 in AOI-1 (2018)

SO_2 Sources in AOI-1 (2018)				
ID	**State**	**County**	**Plant Name**	**Industrial Code Description**
415	Arkansas	Benton	SWEPCO-FLINT CREEK POWER PLANT	Electric Services
421	Arkansas	Independence	ENTERGY ARK-INDEPENDENCE	Electric Services
423	Arkansas	Independence	EASTMAN CHEMICAL COMPANY-ARK EASTMAN DIV	Industrial Organic Chemicals, NEC
526	Arkansas	Jefferson	ENTERGY ARK-WHITE BLUFF	Electric Services
198	Iowa	Louisa	MIDAMERICAN ENERGY CO. - LOUISA STATION	Electric Services
417	Iowa	Des Moines	IPL - BURLINGTON GENERATING STATION	Electric Services
75	Louisiana	Pointe Coupee	LA GENERATING LLC/BIG CAJUN 2 PWR PLNT	Electric Services
519	Louisiana	E Baton Rouge	RHODIA INC/BR FAC	Industrial Organic Chemicals, NEC
68	Missouri	Randolph	ASSOCIATED ELECTRIC COOPERATIVE INC-THOM	Electric Services
191	Missouri	Jasper	EMPIRE DISTRICT ELECTRIC CO-ASBURY PLANT	Electric Services
371	Missouri	New Madrid	ASSOCIATED ELECTRIC COOPERATIVE INC-NEW	Electric Services
402	Missouri	St. Louis	AMERENUE-MERAMEC PLANT	Electric Services
426	Missouri	Jefferson	DOE RUN COMPANY-HERCULANEUM SMELTER	Primary Smelting and Refining of Nonferrous Metals, Except Copper
527	Missouri	Jefferson	AMERENUE-RUSH ISLAND PLANT	Electric Services
595	Missouri	Henry	KANSAS CITY POWER & LIGHT CO-MONTROSE GE	Electric Services
612	Missouri	Franklin	AMERENUE-LABADIE PLANT	Electric Services

SO_2 Sources in AOI-1 (2018)				
ID	State	County	Plant Name	Industrial Code Description
2	Oklahoma	Tulsa	SINCLAIR OIL CORP	Petroleum Refining
3	Oklahoma	Pontotoc	HOLCIM US INC	Cement, Hydraulic
6	Oklahoma	Choctaw	WESTERN FARMERS ELEC COOP	Electric Services
379	Oklahoma	Rogers	PUBLIC SVC CO OF OK	Electric Services
406	Oklahoma	Mayes	GRAND RIVER DAM AUTH	Electric Services
416	Oklahoma	Muskogee	OG&E	Electric Services
597	Oklahoma	Garfield	GREAT LAKES CARBON CORP	Products of Petroleum and Coal, NEC
7	Texas	Navarro	STREETMAN PLANT	Minerals and Earths, Ground or Otherwise Treated
403	Texas	Hopkins	COMO PLT	Natural Gas Liquids
405	Texas	Bexar	SOMMERS DEELY SPRUCE PWR	Electric Services
418	Texas	Titus	WELSH POWER PLANT	Electric Services
524	Texas	Freestone	BIG BROWN	Electric Services
580	Texas	Harris	HOUSTON PLANT	Industrial Inorganic Chemicals, NEC
592	Texas	Goliad	COLETO CREEK PLANT	Electric Services
594	Texas	Harris	DEER PARK PLANT	Petroleum Refining
613	Texas	Titus	MONTICELLO STM ELE STN	Electric Services

Contributing States

Source apportionment analyses have recently been conducted on modeling (using Particulate Matter Source Apportionment Technology; PSAT, a source apportionment tool implemented in CAMx) and monitoring data (using positive matrix factorization; PMF/Trajectories) for Wichita Mountains Wilderness Area.

Figure 4 on page 14 illustrates the source categories and geographic regions of particulates that reduce visibility at the Wichita Mountains in Oklahoma. Texas contributes more than one-quarter of these particulates, half of that from elevated point sources. Elevated point sources--mostly in Louisiana, Oklahoma, Missouri, Kansas, Illinois, Ohio, Kentucky, Tennessee, Alabama, other Eastern states, Canada, and Mexico--cause almost one-third of visibility reduction. Area sources in Oklahoma, Texas and Kansas add a further sixth. On-road and non-road mobile sources in Texas and Oklahoma also contribute significantly. The Wichita Mountains Wilderness Area receives more than one-sixth of its regional haze from biogenic sources, overseas sources, and secondary organic aerosols. Other non-elevated point sources make a relatively minute contribution to visibility degradation.

Figure 5 on page 15 illustrates the same scenario circa 2018. Texas, Louisiana, Arkansas, Missouri, Kansas, Nebraska, Iowa, and Minnesota continue to show contributions greater than one inverse megameter of light extinction, the point Oklahoma has designated as significant in developing its contributor list.

State List

The following states are projected to contribute greater than one inverse megameter of light extinction in the 2018 model to the Wichita Mountains Wilderness Area and will be asked to participate in the consultation process for that federal Class I area:

Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Texas

Figure 4. Particulate Source Apportionment 2002

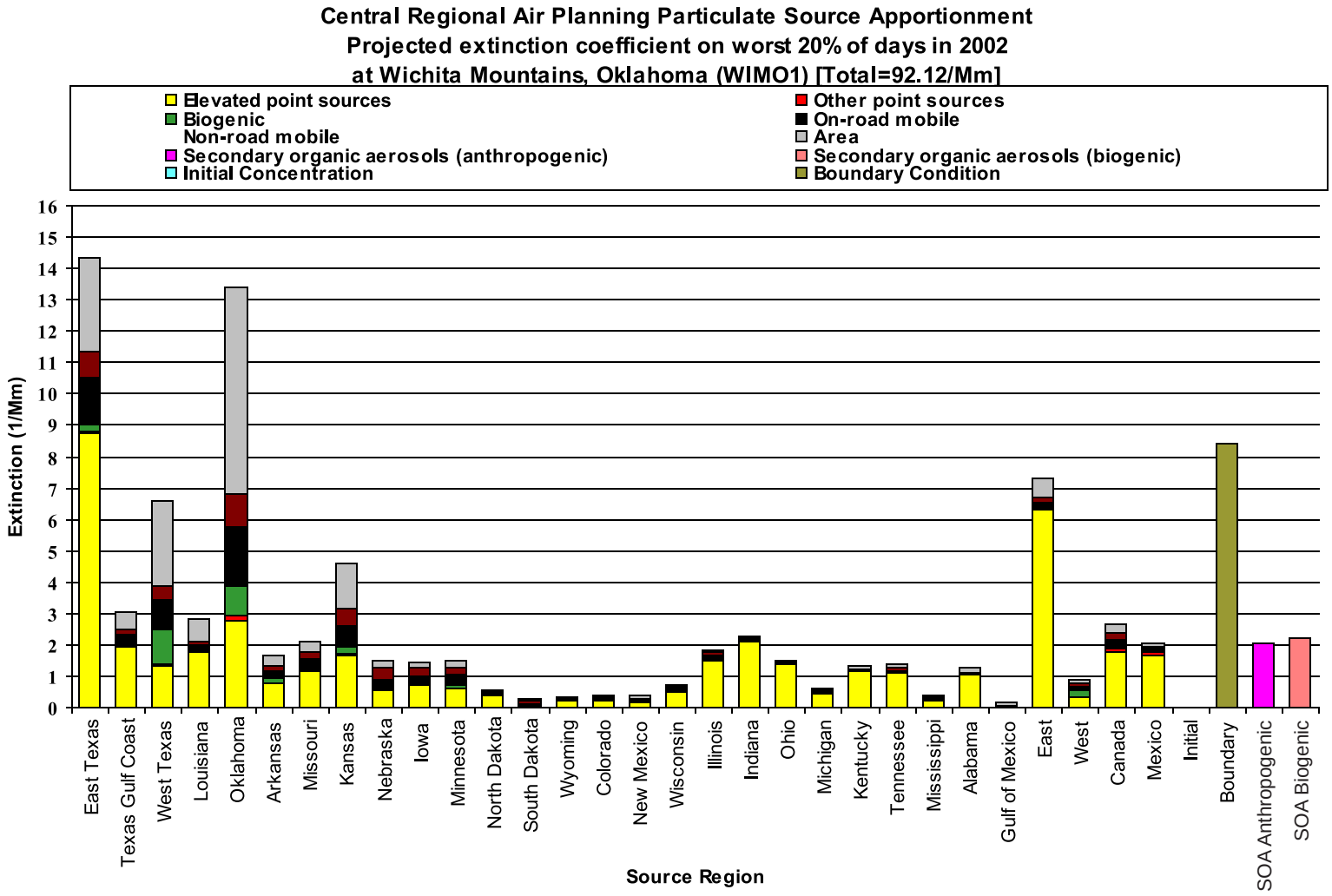
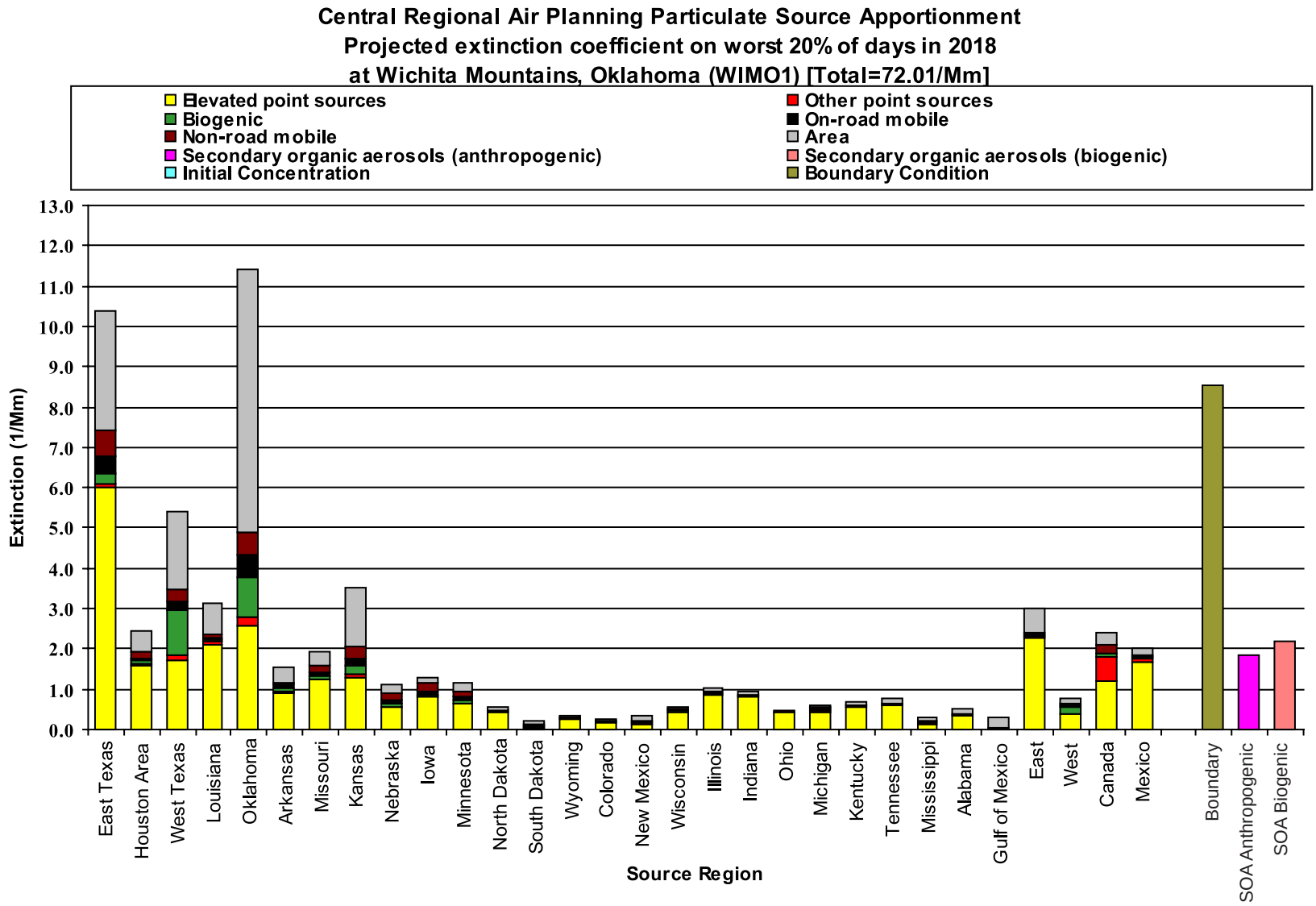


Figure 5. Correlated Point Sources for NO_x in AOI-1 (2018)



3. Agency Roles/Responsibilities

The agencies listed in this section are being requested to participate in the consultation process for the federal Regional Haze Rule. Part of this process is the opportunity for States to review the foregoing analysis and provide feedback and to consider necessary controls available that will assist in meeting the goals prescribed by the Regional Haze requirements.

Proposed roles and/or responsibilities are as follows:
Oklahoma Department of Environmental Quality Air Quality Division

- Lead consultation effort for Central Class I area (schedule conference calls/meetings, etc. and lead discussions)
- Evaluate regional haze modeling for reasonable progress
- Evaluate emissions data
- Identify air pollutants for Oklahoma Class I area
- Evaluate back trajectory analysis
- Evaluate probable source area identification
- Evaluate state contribution apportionment
- Share upwind source information (including Best Achievable Retrofit Technology (BART), non-BART, Clean Air Mercury Rule (CAMR), etc.)
- Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
- Provide detailed description of methods used in the SIP to calculate baseline, natural condition, and uniform rate (including supporting documentation for any methods that are not previously established, documented, or supported)
- Document consultation process

State Agencies

Arkansas Department of Environmental Quality
Iowa Department of Natural Resources
Kansas Department of Health and Environment
Louisiana Department of Environmental Quality
Missouri Department of Natural Resources
Nebraska Department of Environmental Quality
Texas Commission of Environmental Quality
Minnesota Pollution Control Agency

- Participate in consultation effort for Wichita Mountain Wilderness Area (i.e. conference calls/meetings, discussions, etc.)
- Provide feedback on reasonable progress analysis (modeling, emissions data, back trajectory, source area identifications, state contribution apportionment)
- Share upwind source information (including BART, non-BART, CAMR, etc.)
- Comment on emission management strategies necessary to meet federal Regional Haze Rule requirements

Tribal Entities

Absentee-Shawnee Tribe of Indians of Oklahoma
Alabama-Quassarte Tribal Town
Apache Tribe of Oklahoma
Caddo Indian Tribe of Oklahoma
Cherokee Nation
Cheyenne-Arapaho Tribes of Oklahoma
Chickasaw Nation
Choctaw Nation of Oklahoma
Citizen Potawatomi Nation
Comanche Nation of Oklahoma
Delaware Nation (West)
Eastern Shawnee Tribe of Oklahoma
Fort Sill Apache Tribe of Oklahoma
Iowa Tribe of Oklahoma
Kaw Nation
Kialegee Tribal Town
Kickapoo Tribe of Oklahoma
Kiowa Indian Tribe of Oklahoma
Miami Tribe of Oklahoma
Modoc Tribe of Oklahoma
Muscogee (Creek) Nation
Osage Nation
Otoe-Missouria Tribe of Oklahoma
Ottawa Tribe of Oklahoma
Pawnee Nation of Oklahoma
Peoria Tribe of Indians of Oklahoma
Ponca Tribe of Indians of Oklahoma
Quapaw Tribe of Oklahoma
Sac & Fox Nation
Seminole Nation of Oklahoma
Seneca-Cayuga Tribe of Oklahoma
Shawnee Tribe
Thlopthlocco Tribal Town
Tonkawa Tribe of Indians of Oklahoma
United Keetoowah Band of Cherokee Indians of Oklahoma
Wichita and Affiliated Tribes
Wyandotte Nation
Inter Tribal Environmental Council of OK

- Participate in consultation effort for Wichita Mountain Wilderness Area (i.e. conference calls/meetings, discussions, etc.)
- Provide feedback on reasonable progress analysis (modeling, emissions data, back trajectory, source area identifications, state contribution apportionment)
- Share upwind source information (including BART, non-BART, CAMR, etc.)
- Comment on emission management strategies necessary to meet federal Regional Haze Rule requirements

FLMs (US Fish and Wildlife Service, National Park Service and the USDA Forest Service)

- Participate in consultation effort for Wichita Mountains Wilderness Area (i.e. conference calls/meeting, discussions, etc.)
- Provide feedback on reasonable progress analysis (modeling, emissions data, back trajectory, source area identifications, state contribution apportionment)
- Provide feedback on controls necessary to meet federal Regional Haze Rule requirements

Regional Planning Organization

- Participate in consultation effort for Wichita Mountain Wilderness Area (i.e. conference calls/meetings, discussions, etc.)
- Provide updates and summaries of any work in process (e.g. development of baselines and natural conditions, inventories, modeling efforts and contribution assessments)

Reference List

Oklahoma DEQ Air Quality Division	www.deq.state.ok.us/AQDnew
CENRAP (PSAT Viz Tool 27/April 2007)	www.cenrap.org/projects.asp
CENRAP (PSAT Modeling Results & Alternative Uniform Rate of Progress Glide Paths)	www.cenrap.org/reports_presentations.asp

Contact Information

States

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Tribal

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Cherokee Nation
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Tahlequah, OK 74465
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Cheyenne-Arapaho Tribes of Oklahoma
P.O. Box 38
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Tribal

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