Appendix E

Central Class I Areas Consultation Plan

UNITED STATES
Central Class I Areas Consultation Plan

Scope

This consultation plan establishes the objectives, activities, and timelines to facilitate stakeholder input for meeting visibility requirements in the federal Regional Haze Rule for the following federal Class I areas:

- Hercules Glades Wilderness Area (Missouri)
- Mingo Wilderness Area (Missouri)
- Caney Creek Wilderness Area (Arkansas)
- Upper Buffalo Wilderness Area (Arkansas)

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 states, tribes, and the 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 Missouri and Arkansas' Class I areas. These state agencies are being given the opportunity to review this analysis and to participate in consultation to develop plans for meeting regional haze reduction requirements for these Class I areas. 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 includes:

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 contribution apportionment
- Emission management strategies

The consultation process will be initiated in early 2007. Draft and final documents will be circulated via email to participating consulting agencies. After the initial kick-off, most consultation discussions will occur through conference calls. However, there will be some instances where a meeting may be desirable (e.g. unresolved issues, complex technical discussions, etc.).

The Missouri Department of Natural Resources' Air Pollution Control Program will work with the Arkansas Department of Environmental Quality and 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 will include supporting materials that describe analytical methods, assumptions, and conclusions that were relied upon in developing the documents. Comments on any draft documents will 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 will be requested to share documentation confirming implementation of emission controls being relied on to meet regional haze Uniform Reasonable Progress (URP) goals.

Documents and consultation logs will be posted on the Missouri Department of Natural Resources' Air Pollution Control Program website 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 Missouri Department of Natural Resources' Air Pollution Control Program will email all consultation participants to inform them that new information has been posted.

MDNR/ADEQ will work with the FLMs and EPA for consultation through conference calls/meeting. 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 cannot agree with the lead agency establishing the reasonable progress goal, then certain actions will be taken to resolve the disagreement. These actions are as follows:

- Discuss position and supporting documentation
- If still unresolved, elevate to necessary decision makers
- If still unresolved, document disagreement by describing issue(s) in a letter to the EPA, including regional offices and the Office of Air Quality Planning and Standards

All issues must be addressed and incorporated into the long-term strategy. These outreach efforts will also be documented in the state implementation plan.

Contact Information

Contact information is provided in Attachment A.

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

Below, in Table 1, is the consultation process timeline that will be used to achieve milestones for consultation on the federal Regional Haze program.

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 Environ/Alpine to conduct the modeling and other technical analyses. Alpine assembled available information that was useful in quantifying the reduction in individual fine particulate aerosol species concentrations needed to

satisfy the 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 US, 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.

Current Regional Haze modeling continues to indicate visibility shortfalls to reaching the necessary URP goals for deciview increments for some of the Central Class I areas in CENRAP. A deciview is a haze index used to quantify incremental changes in visibility perception, where higher deciview values indicate greater levels of visibility impairment. In some of the areas,

Table 1: Consultation Process Timeline

2006 Fall	2006 Winter	2007 Early Spring	2007 Spring	2007 Late Spring	2007 Summer
Develop Baseline and URP Goals →	Develop a Consultation Plan →	Initiate Collaboration with States →	Develop Long Term Strategy (LTS) →	Negotiate Changes to LTS →	Document Consultation
Back trajectory & Factor analysis	Identify issues for discussion	Consultation log	Follow consultation plan	Emission reduction requirements/ strategies	Who met and when (FLM, RPO, EPA) and discussion
Identify probable area of influence	Review baseline, URP goals, and emissions reduction targets	Discuss URP Goals & contributions assessment	Discuss emissions reduction strategies	Emission budget discrepancies	Consultation outcome Issues agreed, disagreed, resolutions
Apportion state contributions	Develop Action items	Follow consultation plan	Consult with FLM & EPA	Tribal Impacts	Justification of LTS
Develop initial emission cuts to meet 2018 URP Goals	Issues for FLM & EPA input	Consult with FLM & EPA (thru RPO?)	Note areas of irreconcilable disagreement	Additional control strategies	
	Timetable for resolution	Evaluate and identify sources upwind (BART, non-BART, CAMR, other)			

URP goals are expected to be met based on modeling results, but consultation may be necessary to ensure that the emission reductions used in the modeling are actually planned to occur.

Individual Class I Area Characteristics

The Central Class I areas each have individual characteristics. Individual examination of each area elicits a greater understanding of how the Regional Haze problem affects each, and what aspects are of greatest significance.

Hercules Glades

Situated in extreme southwest Missouri, Taney County, Hercules Glades is managed by the United States Department of Agriculture (USDA) Forest Service. The area is 12,315 acres and in some of the most rugged hills of the Missouri Ozarks. The closest urban area is the Springfield/Branson metropolitan statistical area, 40 miles to the west/northwest.

Mingo National Wildlife Refuge

The Mingo National Wildlife Refuge is managed by the federal Fish and Wildlife Service. The Refuge is situated in the Mississippi Flyway. Only part of it is a Class I area (7,730 acres). Memphis to the south and St. Louis to the north are some of the largest urban areas nearby, although there are a few smaller population centers mostly to the east. Proximity to sources in the Ohio River Valley is a consideration.

Upper Buffalo National Area

The Upper Buffalo Class I area (2,200 acres) is managed by the National Park Service in conjunction with overseeing the Buffalo National River. This area in north central Arkansas is south of Springfield, Missouri and east of Fayetteville and Fort Smith. It is an area of low mountains and largely forested, with bisecting streams.

Caney Creek Class I Area

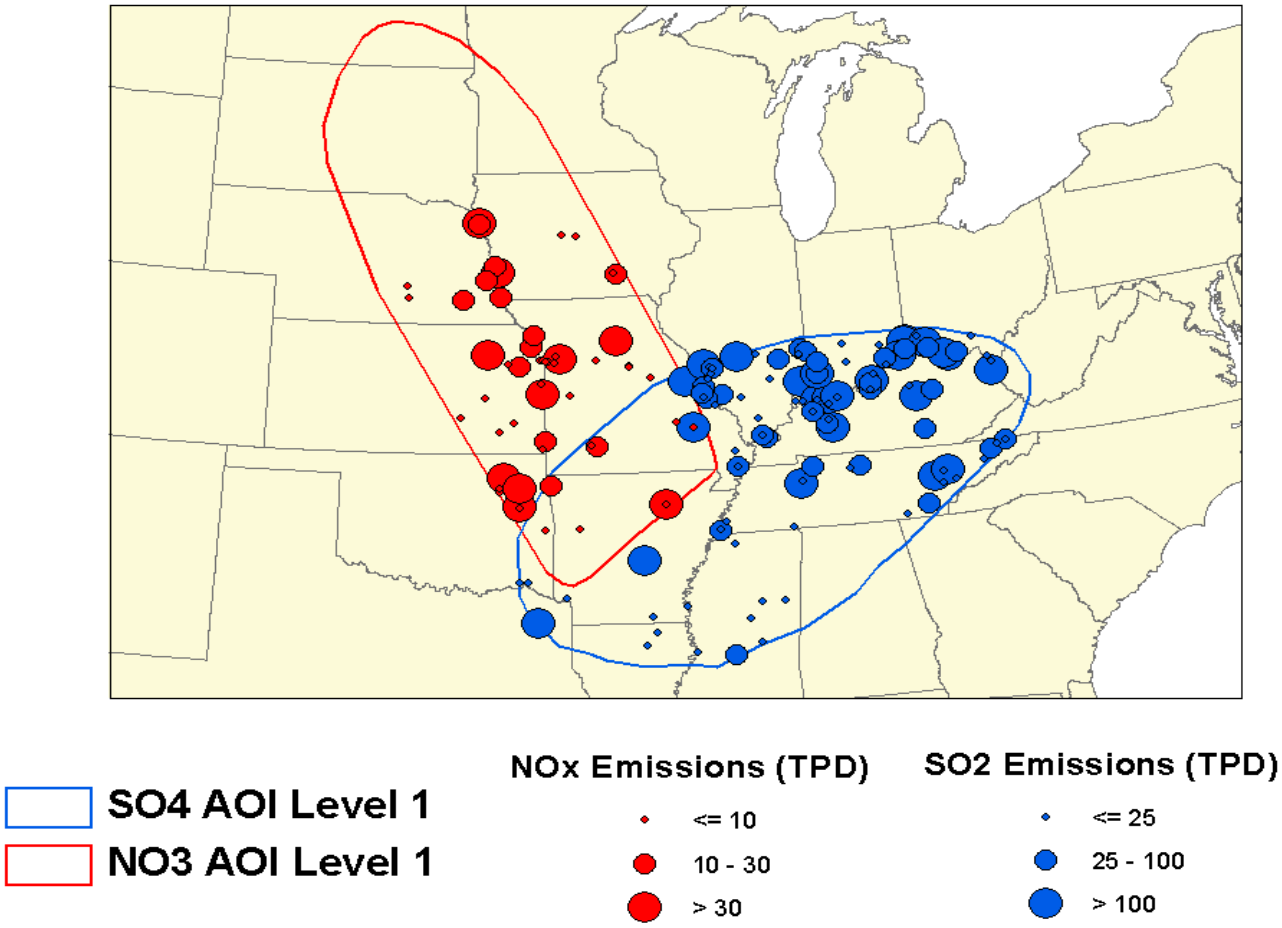
Caney Creek is a 14,460 acre area in the Oachita Mountains of west-southwest Arkansas, the tallest mountain range between the Appalachians and the Rockies. It is south of Fort Smith and west of Little Rock. The area is managed by the USDA Forest Service.

Identification of Source Areas (Areas of Influence)

Source areas must be determined in order to focus the consultation process. That is, locations of significant sources that are likely to affect each Class I area must be identified, and sources within those areas considered for control. 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 large sources which are of interest.

Figure 1 indicates two Level I AOI's for the Central Class I Areas, one for nitrate (NO_3), and a second grouped collectively for sulfate (SO_4), elemental carbon (EC), organic carbon (OC), coarse mass, and fine soil, along with indicators for sources contained in those areas.

Figure 1 – Alpine AOI's for Central Class I Areas



Attachment B identifies total emissions reductions necessary for level 1 AOI's based on control of sulfate and nitrate species across all four Class I areas. Attachment B also includes inventory tables developed listing possible sources where emissions can be reduced in each state to meet the goals. These emissions provide an overall frame of reference for any reductions in those species.

Contributing States

Source apportionments 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 all four Class I Areas. Attachment C provides both model and monitoring data source apportionment results. Attachment D provides a list of results for Q/D (emissions/distance) used as a third analysis measure. All these, along with Alpine sulfate AOI's described above have been analyzed in tables in attachment E to determine a list of contributing states for each Class I area.

Methodology

Table 2 and 3 (for illustration) below indicate the overall (average) significant contributing states to decreased visibility due to sulfate and nitrate precursor emissions at the Mingo Site. A decision on whether a given state was a contributor was based on the combined analysis results of the four approaches, i.e., PMF/Trajectories, AOI, PSAT, and Q/D. If a state is found to be a major contributor in at least 3 of the 4 approaches, it is believed that inclusion of this state is appropriate. All states in red/bold in the Average row are determined to have sources that are significant contributors to decreased visibility.

Specific to each analysis type, inclusion of a state under the PMF/Trajectories approach depended on the level of probability that an air mass originated from the state during the days of high contribution by sulfate or nitrate sources where the emission impact potential was significant. A state with a high potential of emission impact would be considered a significant contributor.

States were included in the AOI listing if they were part of the level 1 group as determined by Alpine Geophysics. This AOI was based primarily on residence time of air masses, along with evaluation of source emissions of, in this case, nitrate and sulfate.

PSAT analysis was determined based on the 2018 Modeled sulfate and nitrate contribution to average extinction for the 20% worst days. Any state with the contribution of 2.0 deciview or higher was identified as a candidate.

Lastly, Q/D was determined by dividing total SO_2 and NO2 precursor emissions for the state by distance from a state geographic centroid. If totals were less than 200, the state was not indicated as a significant contributor under Q/D.

Table 2 – Contributing States for the Mingo Wildlife Refuge Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	**WI**	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	**OH**	**OH**
MI	MI	MI	**MI**	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	**TN**	**TN**
AR	AR	**AR**	AR	AR
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*Informational

State in Red/Bold = Major Contributing States

Table 3 – Contributing States for the Mingo Wildlife Refuge Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	IL	**IL**	**IL**
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	TX	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

*Informational

State in Red/Bold = Major Contributing States

State list

Following are lists of the contributing states for Central Class 1 Areas in Missouri and Arkansas based on the analysis described above;

Hercules Glades

Missouri, Illinois, Indiana, Kentucky, Tennessee, Arkansas, and Texas

Mingo National Wildlife Refuge

Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Arkansas, and Texas

Upper Buffalo National Area

Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Arkansas, Oklahoma, and Texas

Caney Creek Class I Area

Missouri, Illinois, Indiana, Kentucky, Tennessee, Arkansas, Oklahoma, and Texas

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 the attachments to this plan and provide feedback, and to consider necessary controls available that will assist in meeting the goals prescribed by the regional haze requirements. Federally enforceable measures to control emissions and thereby achieve the URP will be our ultimate measure of success.

Proposed Roles and/or responsibilities are as follows:

- Missouri Department of Natural Resources' Air Pollution Control Program
  - Co-lead consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. schedule conference calls/meetings, etc. and lead discussions)
  - Evaluate regional haze modeling for reasonable progress
  - Evaluate emissions data
  - Identify air pollutants for Missouri Class I areas
  - Evaluate back trajectory analysis
  - Evaluate probable source area identifications
  - 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

- Arkansas Department of Environmental Quality
  - Co-lead consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. schedule conference calls/meetings, etc. and lead discussions)
  - Evaluate regional haze modeling for reasonable progress
  - Evaluate emissions data
  - Identify air pollutants for Arkansas Class I areas
  - Evaluate back trajectory analysis
  - Evaluate probable source area identifications
  - Evaluate state contribution apportionment
  - Share upwind source information (including BART, non-BART, CAMR, etc.)
  - Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
  - Document consultation process
- Illinois Environmental Protection Agency, Ohio Environmental Protection Agency, Indiana Department of Environmental Management, Kentucky Department of Environmental Protection, Tennessee Department of Environment and Conservation, Oklahoma Division of Environmental Quality, Iowa Department of Natural Resources, Kansas Department of Health and Environment, Texas Commission on Environmental Quality, and Louisiana Department of Environmental Quality
- United Keetoowah Band of Cherokee Indians in Oklahoma, Eastern Shawnee Tribe of Oklahoma, Alabama Coushatta Tribe of Texas, Sac and Fox Nation of Missouri, Kickapoo Tribe in Kansas, Potawatomi Nation
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (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.)
  - Determine emission management strategies necessary to meet federal Regional Haze Rule requirements
- EPA
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, discussions, etc.)
  - Provide comments on approvability of consultation plan
  - Provide reconciliation on unresolved issues

- FLMs (US Fish and Wildlife Service, National Park Service and the US DA Forest Service)
  - Participate in consultation effort for Central Class I areas (Missouri and Arkansas) (i.e. conference calls/meetings, 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 Central Class I areas (Missouri and Arkansas) (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)

Attachment A

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Attachment B

Table 1. EMISSION REDUCTIONS NEEDED TO MEET THE 2018 RPG IN CENTRAL CLASS I AREAS

			Level 1 AOI		Emissions Reductions Needed (Tons)			
			sulfate/SO2	nitrate/NOx	One pollutant control		Proportionate Controls	
Class I Area	ST	Name	DV	DV	Sulfate	Nitrate	Sulfate	Nitrate
Big Bend Nat'l	TX	BIBE	-0.004	-0.002	133,000	265,000	82,000	10,000
Boundary Wate	MN	BWCA	-0.006	-0.004	91,000	136,000	39,000	51,000
Breton Island	LA	BRET	-0.002	-0.002	96,000	96,000	70,000	9,000
Caney Creek	AR	CACR	-0.002	-0.002	18,000	12,000	11,000	2,000
Guadalupe Mou	TX	GUMO	-0.004	-0.01	147,000	59,000	58,000	7,000
Hercules-Glade	MO	HEGL	-0.002	-0.002	200,000	127,000	113,000	23,000
Mingo	MO	MING	-0.002	-0.002	235,000	149,000	118,000	33,000
Upper Buffalo	AR	UPBU	-0.002	-0.002	112,000	71,000	65,000	11,000
Voyageurs	MN	VOYA2	-0.006	-0.004	43,000	65,000	11,000	24,000
Wichita Mounta	OK	WIMO	-0.001	-0.005	368,000	74,000	158,000	22,000

Table 2. SO4 Inventory Tables For Level I AOI Contributing States

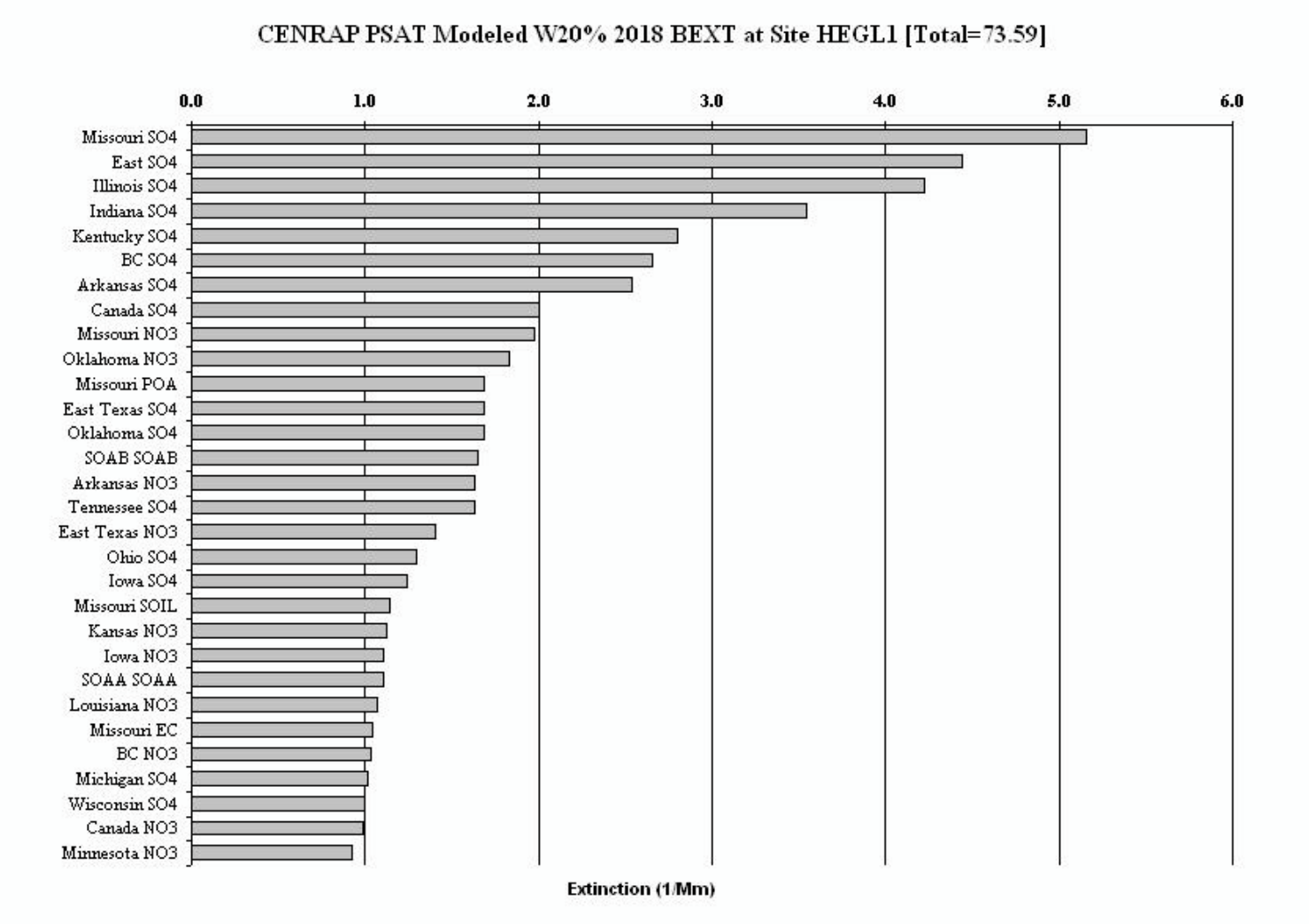
(tons/summer day)

PLANT ID	STATE	PLANT NAME	SIC	SIC DESCRIPTION	SO2_TPD	NOX_TPD
4800310	Texas	FULLERTON GAS PLANT	1321	NATURAL GAS LIQUIDS	6.50599	0.00000
484691	Texas	EI DU PONT DE NEMOURS	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	0.00000	10.33888
470850011	Tennessee	TVA JOHNSONVILLE FOSSIL PLANT	4911	ELECTRIC SERVICES	300.62585	68.40613
470730007	Tennessee	TVA JOHN SEVIER FOSSIL PLANT	4911	ELECTRIC SERVICES	98.99900	28.54810
471650025	Tennessee	TVA GALLATIN FOSSIL PLANT	4911	ELECTRIC SERVICES	94.72930	33.50815
471630003	Tennessee	EASTMAN CHEMICAL COMPANY	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	66.36360	35.39940
4715700528	Tennessee	ALLEN FOSSIL PLANT	4911	ELECTRIC SERVICES	52.32034	40.03523
471610011	Tennessee	TVA CUMBERLAND FOSSIL PLANT	4911	ELECTRIC SERVICES	45.79200	137.25500
471070012	Tennessee	BOWATER NEWSPRINT & DIRECTORY - CALHOUN	2611	PULP MILLS	25.40730	17.57016
470374703700002	Tennessee	E I DUPONT DE NEMOURS & CO INC	2869	INDUSTRIAL ORGANIC CHEMICALS,NEC	18.74385	0.00000
470630197	Tennessee	LIBERTY FIBERS CORPORATION	2823	CELLULOSIC MAN-MADE FIBERS	14.73094	5.63459
470090008	Tennessee	ALUMINUM COMPANY OF AMERICA - SOUTH PLAN	3334	PRIMARY ALUMINUM	11.24313	0.00000
471050081	Tennessee	A.E. STALEY MANUFACTURING COMPANY	2046	WET CORN MILLING	9.40970	5.27573
4715700475	Tennessee	LUCITE INTERNATIONAL INC.	2819	INDUSTRIAL INORGANIC CHEMICALS	9.39796	0.00000
470710002	Tennessee	PACKAGING CORPORATION OF AMERICA	2631	PAPERBOARD MILLS	8.02611	7.42406
4715700045	Tennessee	CARGILL CORN MILLING	2046	WET CORN MILLING	7.53864	0.00000
470653070	Tennessee	SIGNAL MOUNTAIN CEMENT CO.	3241	CEMENT, HYDRAULIC	7.45430	14.19100
470010020	Tennessee	U.S. DEPARTMENT OF ENERGY Y-12 PLANT	3499	FABRICATED METAL PRODUCTS, NEC	6.45058	0.00000
470850010	Tennessee	INLAND PAPERBOARD & PACKAGING INC.	2679	CONVERTED PAPER PRODUCTS, NEC	6.05144	0.00000
471390004	Tennessee	INTERTRADE HOLDINGS INC.	2819	INDUSTRIAL INORGANIC CHEMICALS	5.12497	0.00000
470730026	Tennessee	AFG INDUSTRIES - GREENLAND PLANT	3211	FLAT GLASS	0.00000	5.53680
471630007	Tennessee	SEAMAN CORPORATION	2295	COATED FABRICS, NOT RUBBERIZED	0.00000	13.59050
40097799	Oklahoma	GRAND RIVER DAM AUTH	4911	ELECTRIC SERVICES	43.79260	38.29550
400891733	Oklahoma	WEYERHAEUSER - VALLIANT	2631	PAPERBOARD MILLS	6.85920	8.73920
40031211	Oklahoma	PUBLIC SVC CO OF OK	4911	ELECTRIC SERVICES	0.00000	8.07136
390310616000000	Ohio	CONESVILLE POWER PLANT	4911	ELECTRIC SERVICES	415.59965	80.90937
390251413100008	Ohio	CINERGY CG&E WC BECKJORD STATION	4931	ELEC & OTHER SERVICES COMBINED	189.03354	48.73621
390010701000060	Ohio	DP&L KILLEN GENERATING STATION	4911	ELECTRIC SERVICES	62.09508	24.70857
391390370020002	Ohio	SHELBY MUNICIPAL LIGHT PLANT	4911	ELECTRIC SERVICES	10.97583	0.00000
390690335010105	Ohio	CAMPBELL SOUP COMPANY	2032	CANNED SPECIALTIES	9.19665	0.00000
390030302020012	Ohio	PREMCOR REFINING GROUP	2911	PETROLEUM REFINING	8.63332	5.82966
390611431390903	Ohio	THE PROCTER AND GAMBLE CO.	2841	SOAP AND OTHER DETERGENTS	5.06495	0.00000
3100100042	Nebraska	Whelan Energy Center	4911	ELECTRIC SERVICES	6.04710	0.00000
290990016	Missouri	AMERENUE-RUSH ISLAND PLANT	4911	ELECTRIC SERVICES	61.58000	10.63480
291890010	Missouri	AMERENUE-MERAMEC PLANT	4911	ELECTRIC SERVICES	42.16141	22.98658
291430004	Missouri	ASSOCIATED ELECTRIC COOPERATIVE INC-NEW	4911	ELECTRIC SERVICES	38.72200	98.94600
290990003	Missouri	DOE RUN COMPANY-HERCULANEUM SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	38.52199	0.00000
290830001	Missouri	KANSAS CITY POWER & LIGHT CO-MONTROSE GE	4911	ELECTRIC SERVICES	24.74788	8.80744
290950021	Missouri	TRIGEN ENERGY CORPORATION-GRAND AVENUE S	4911	ELECTRIC SERVICES	23.22464	0.00000
290770005	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-J	4911	ELECTRIC SERVICES	18.58675	19.25697
295100003	Missouri	ANHEUSER-BUSCH INC-ST. LOUIS	2082	MALT BEVERAGES	17.82469	0.00000
291860001	Missouri	MISSISSIPPI LIME COMPANY-MISSISSIPPI LIM	3274	LIME	16.44205	7.57345
290770039	Missouri	CITY UTILITIES OF SPRINGFIELD MISSOURI-S	4911	ELECTRIC SERVICES	11.91107	7.09601
290930009	Missouri	DOE RUN COMPANY-BUICK SMELTER	3339	PRIMARY NONFERROUS METALS, NEC	11.47904	0.00000
291430008	Missouri	NORANDA ALUMINUM INC-NORANDA ALUMINUM IN	3334	PRIMARY ALUMINUM	11.21103	0.00000
291510002	Missouri	CENTRAL ELECTRIC POWER COOPERATIVE-CHAMO	4911	ELECTRIC SERVICES	10.40103	7.95615
291950010	Missouri	MARSHALL MUNICIPAL UTILITIES-MARSHALL MU	4911	ELECTRIC SERVICES	8.36287	0.00000
290190002	Missouri	COLUMBIA MUNICIPAL POWER PLANT-COLUMBIA	4911	ELECTRIC SERVICES	5.23420	0.00000
281212812100036	Mississippi	PURSUE ENERGY CORPORATION THOMASVILLE G	2819	INDUSTRIAL INORGANIC CHEMICALS	33.21600	0.00000
280592805900058	Mississippi	CHEVRON PRODUCTS COMPANY PASCAGOULA REF	2911	PETROLEUM REFINING	15.54386	11.21247
280192801900011	Mississippi	CHOCTAW GENERATION LLP RED HILLS GENERA	4911	ELECTRIC SERVICES	12.12464	0.00000
280232802300031	Mississippi	MAGNOLIA RESOURCES INC PACHUTA HARMONY	1321	NATURAL GAS LIQUIDS	6.16490	0.00000
281372813700025	Mississippi	TRUNKLINE GAS COMPANY INDEPENDENCE COMP	4922	NATURAL GAS TRANSMISSION	0.00000	5.90938
281492814900027	Mississippi	ENTERGY MISSISSIPPI INCBAXTER WILSON PL	4911	ELECTRIC SERVICES	0.00000	21.38220
281512815100048	Mississippi	ENTERGY MISSISSIPPI INC GERALD ANDRUS P	4911	ELECTRIC SERVICES	0.00000	16.13000
220750015	Louisiana	CONOCOPHILLIPS COALLIANCE REFINERY	2911	PETROLEUM REFINING	9.05244	6.99716
220050004	Louisiana	CF INDUSTRIES INC.DONALDSONVILLE NITRO	2873	NITROGENOUS FERTILIZERS	0.00000	9.40132
220710014	Louisiana	ENTERGY NOMICHOUD	4911	ELECTRIC SERVICES	0.00000	12.34510
211772117700006	Kentucky	TVA PARADISE STEAM PLANT	4911	ELECTRIC SERVICES	231.14800	129.45000
210912109100003	Kentucky	WESTERN KY ENERGY CORP COLEMAN STATION	4911	ELECTRIC SERVICES	136.73500	18.52110
210412104100010	Kentucky	KENTUCKY UTILITIES CO GHENT GENERATING S	4911	ELECTRIC SERVICES	128.63700	53.32750
211672116700001	Kentucky	KENTUCKY UTILITIES CO BROWN FACILITY	4911	ELECTRIC SERVICES	126.12264	22.49524
211272112700003	Kentucky	KENTUCKY POWER CO BIG SANDY PLANT	4911	ELECTRIC SERVICES	116.35500	40.56600
211612116100009	Kentucky	EAST KY POWER COOP SPURLOCK ST. MAYSVILL	4911	ELECTRIC SERVICES	114.74800	22.85900
211452114500006	Kentucky	TVA-ENVIRONMENTAL AFFAIRS SHAWNEE PLANT	4911	ELECTRIC SERVICES	93.72150	52.22210
211110127	Kentucky	LOU GAS & ELEC MILL CREEK	4911	ELECTRIC SERVICES	62.90400	40.62600
211992119900005	Kentucky	EAST KY POWER COOP JOHN SHERMAN COOPER P	4911	ELECTRIC SERVICES	60.98100	12.39360
211110126	Kentucky	LOU GAS & ELEC CANE RUN	4911	ELECTRIC SERVICES	41.51100	17.38838
211772117700001	Kentucky	KENTUCKY UTILITIES CO GREEN RIVER STATIO	4911	ELECTRIC SERVICES	36.53400	0.00000
212332123300001-B	Kentucky	WESTERN KY ENERGY CORP REID	4911	ELECTRIC SERVICES	26.99800	0.00000
210492104900003	Kentucky	EAST KY POWER COOP WILLIAM C DALE PLANT	4911	ELECTRIC SERVICES	25.84360	6.17140
211832118300069	Kentucky	WESTERN KY ENERGY CORP WILSON STATION	4911	ELECTRIC SERVICES	24.39500	22.78500
212232122300002	Kentucky	LOUISVILLE GAS & ELECTRIC TRIMBLE CO GEN	4911	ELECTRIC SERVICES	23.13700	14.14800
210592105900027	Kentucky	OWENSBORO MUNICIPAL UTIL ELMER SMITH STA	4911	ELECTRIC SERVICES	19.66360	25.20099

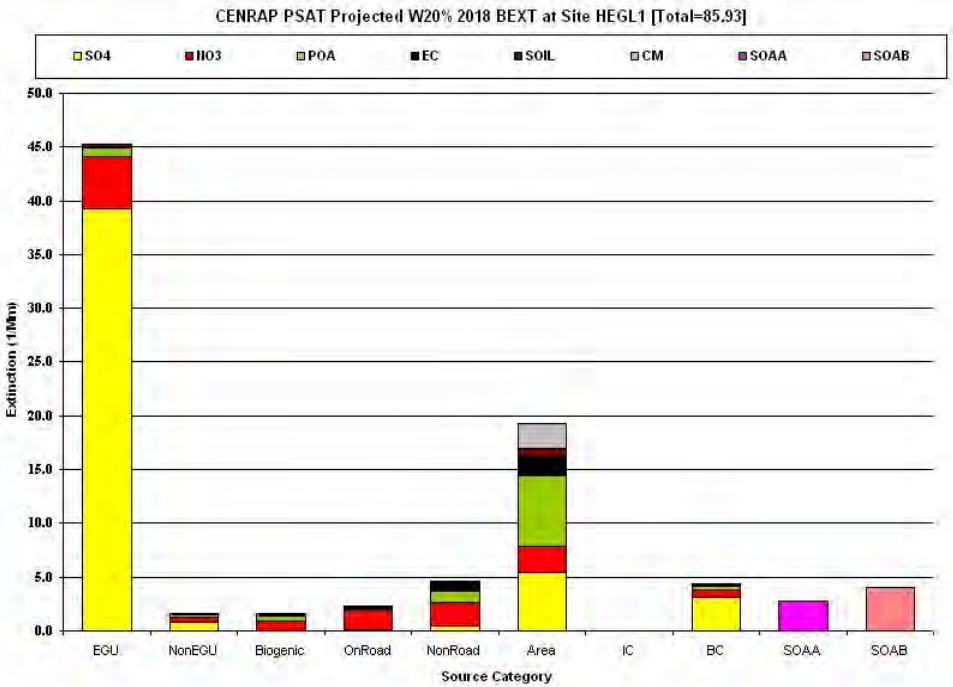
Attachment C – Source Apportionment Analysis

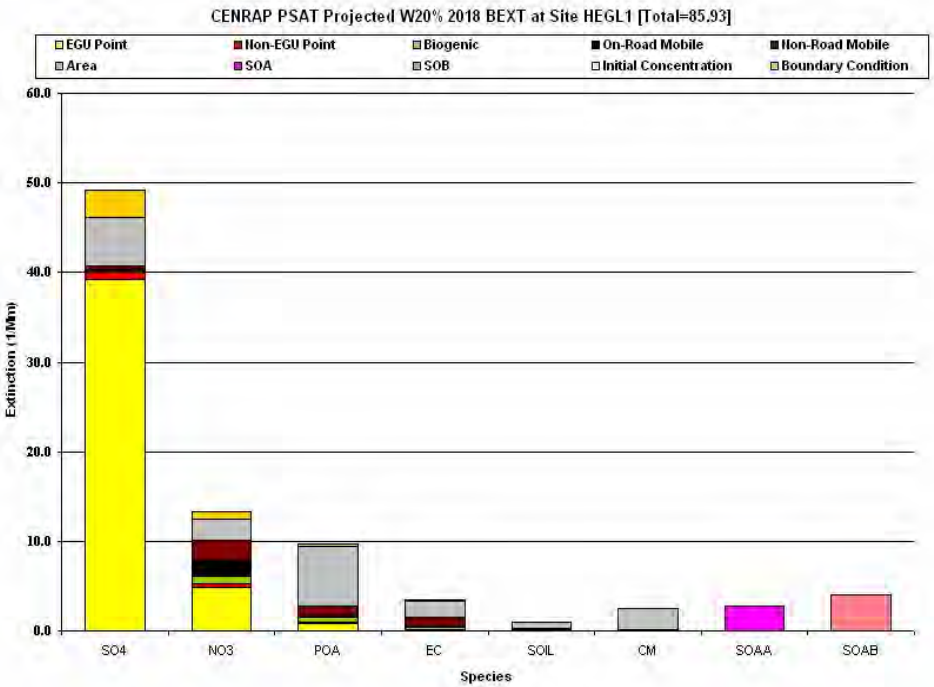
Source Apportionment for the Hercules Glades Class I Area

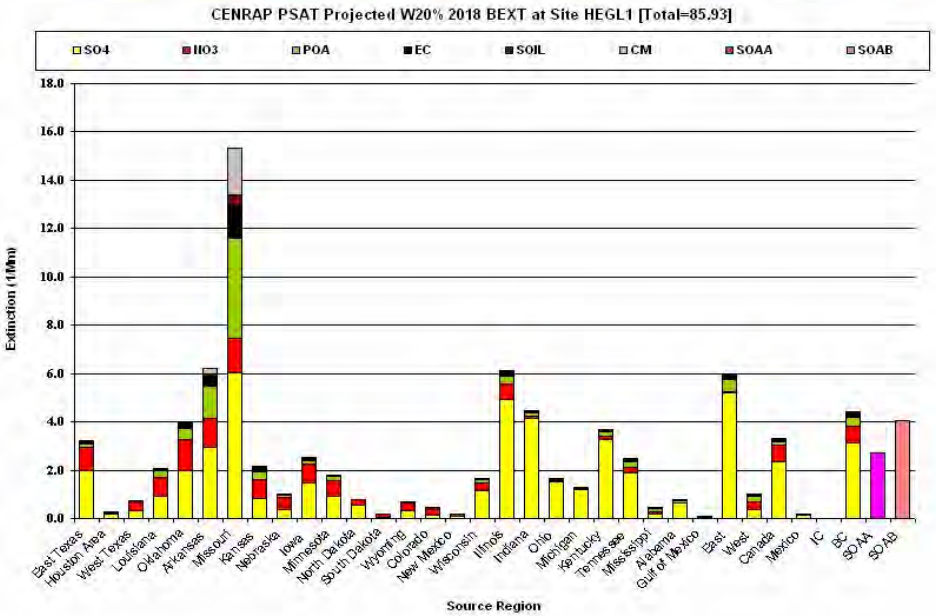
PSAT Model Source Apportionment

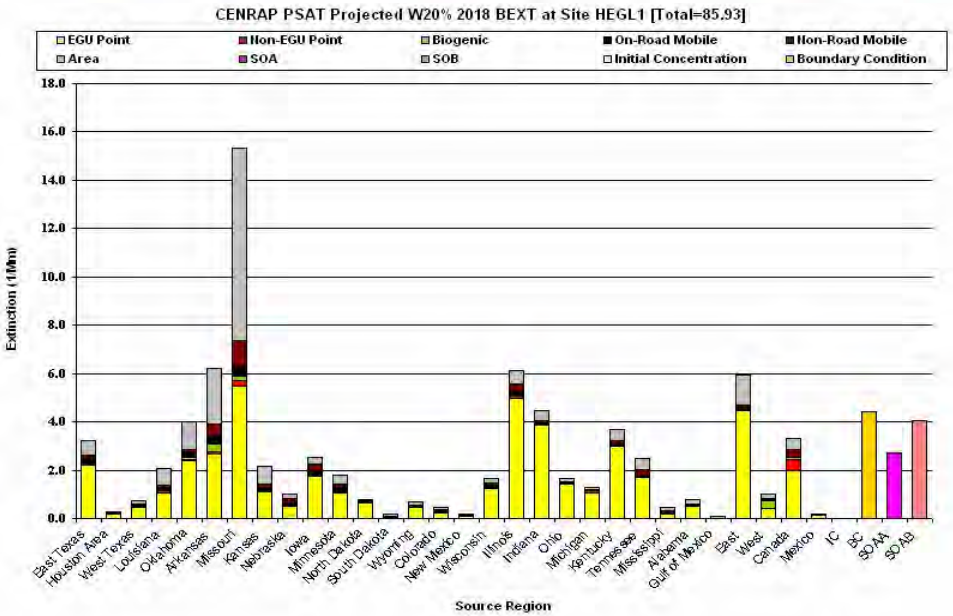


Hercules Glades Projected 2018 – Worst 20%



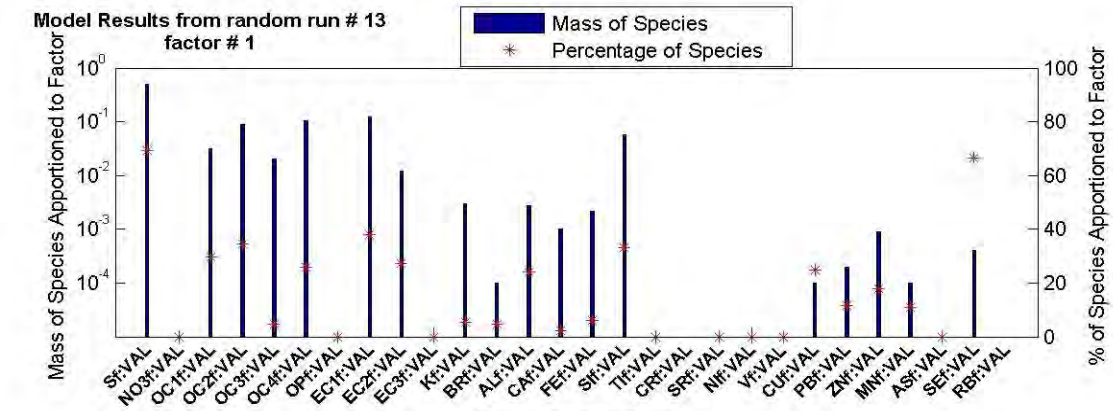


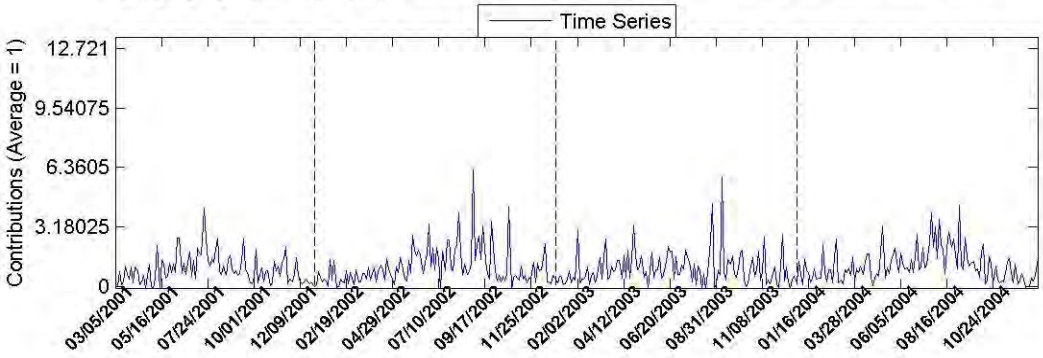




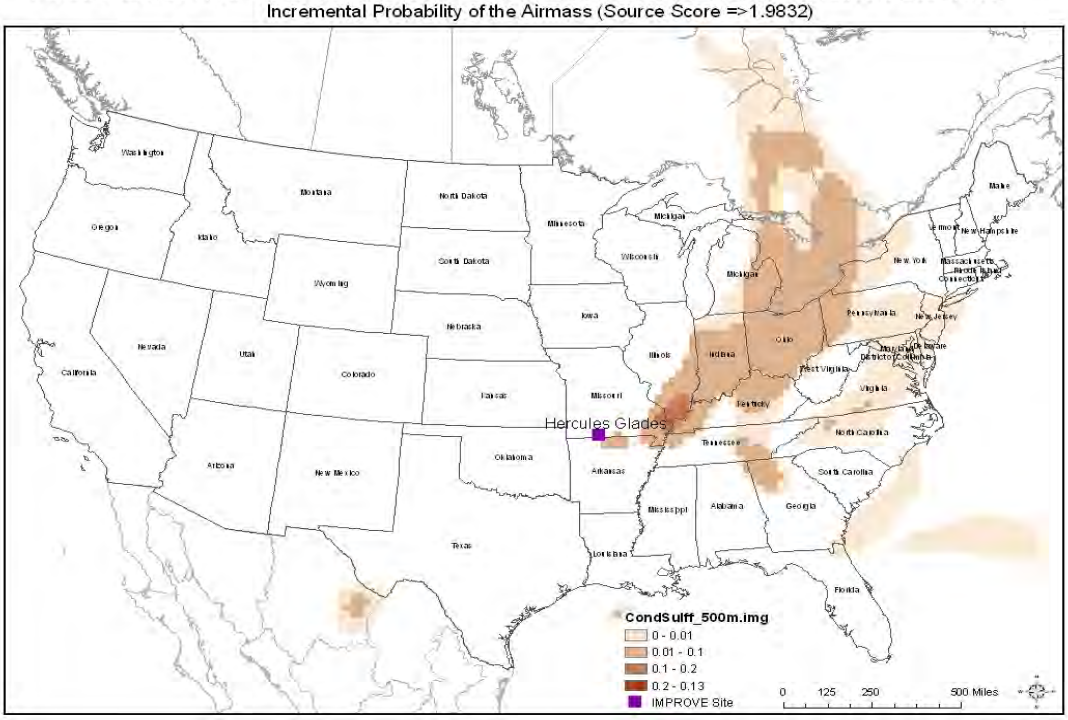
Monitoring Data Source Apportionment

The Coal Combustion Factor at the Hercules Glades Class I Area

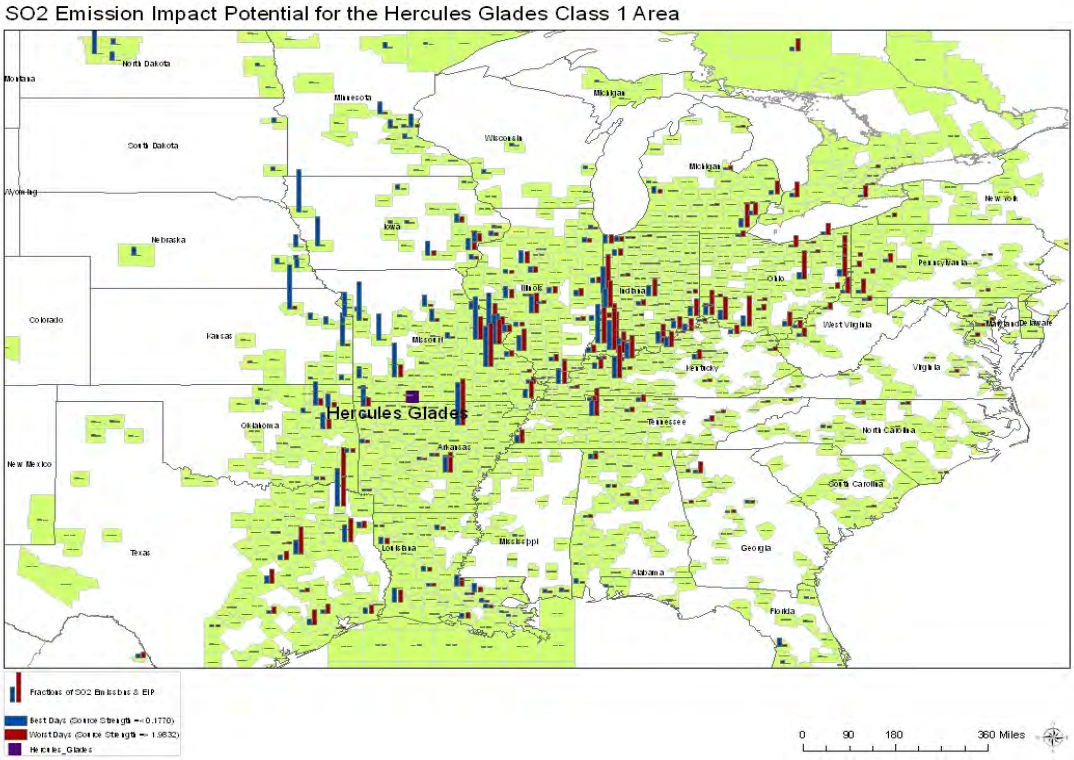


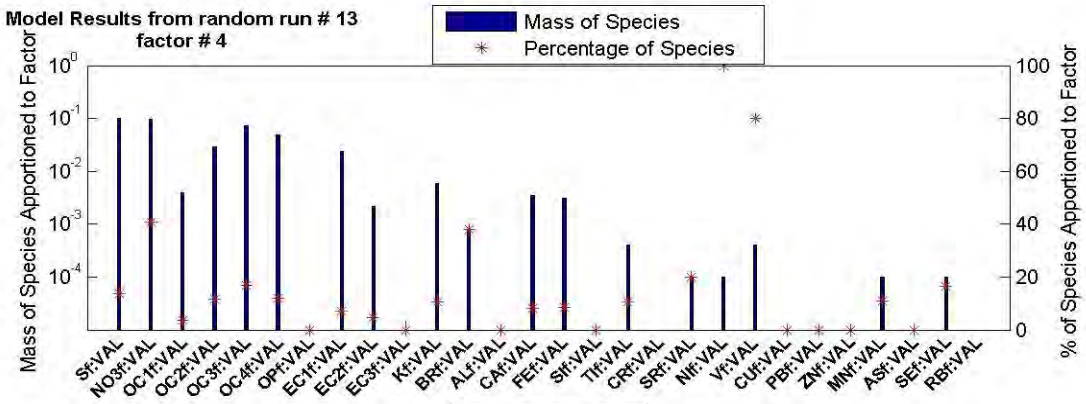


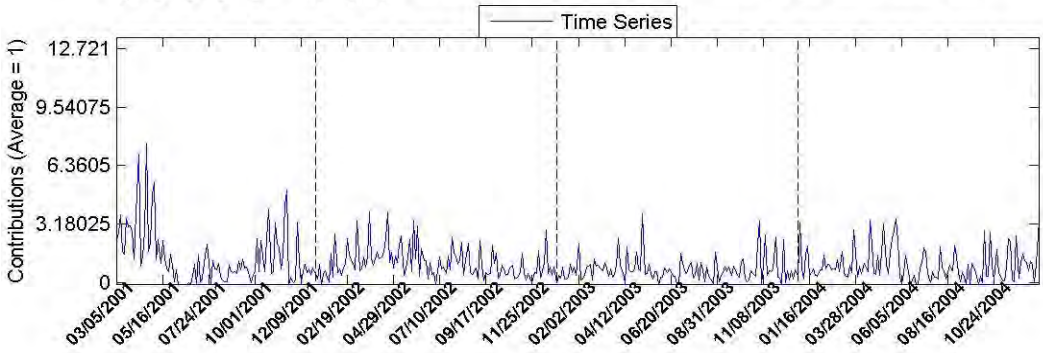
Possible Source Area of the Identified Coal Combustion Factor at the Hercules Glades Class I Area
Incremental Probability of the Airmass (Source Score =>1.9832)



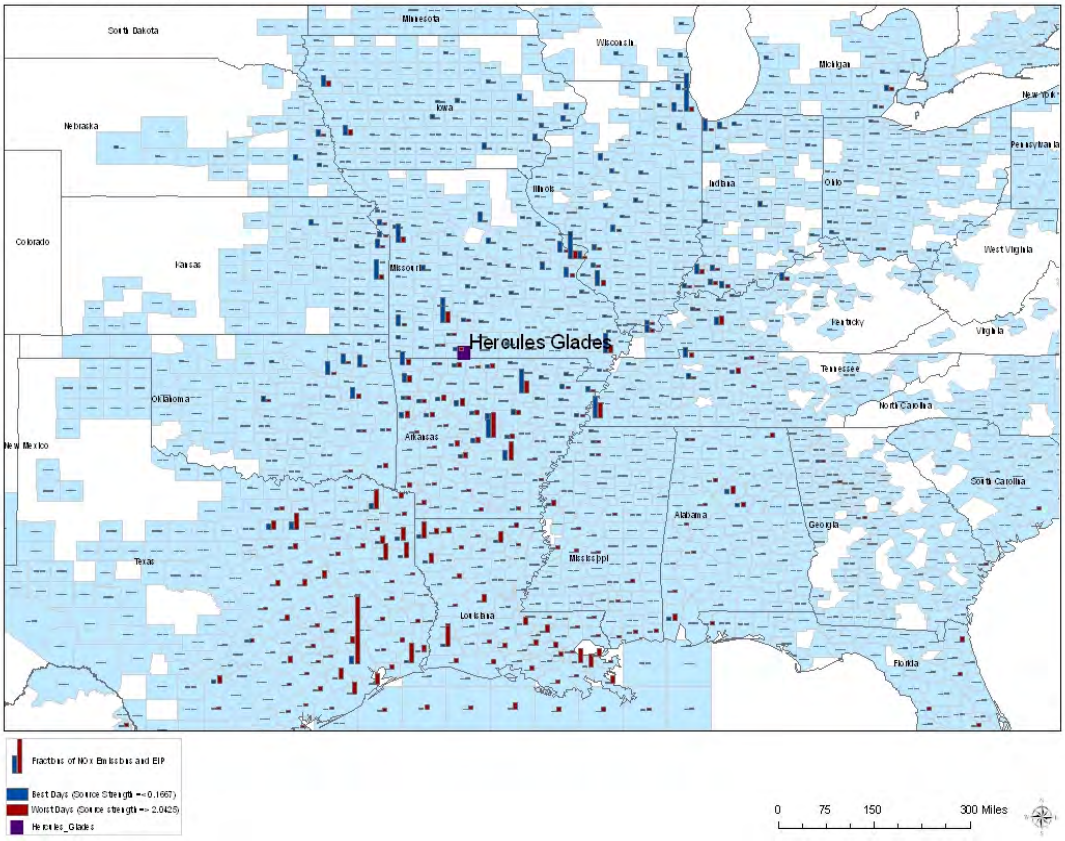
The Secondary Nitrate plus Oil Combustion Factor at the Hercules Glades Class I Area



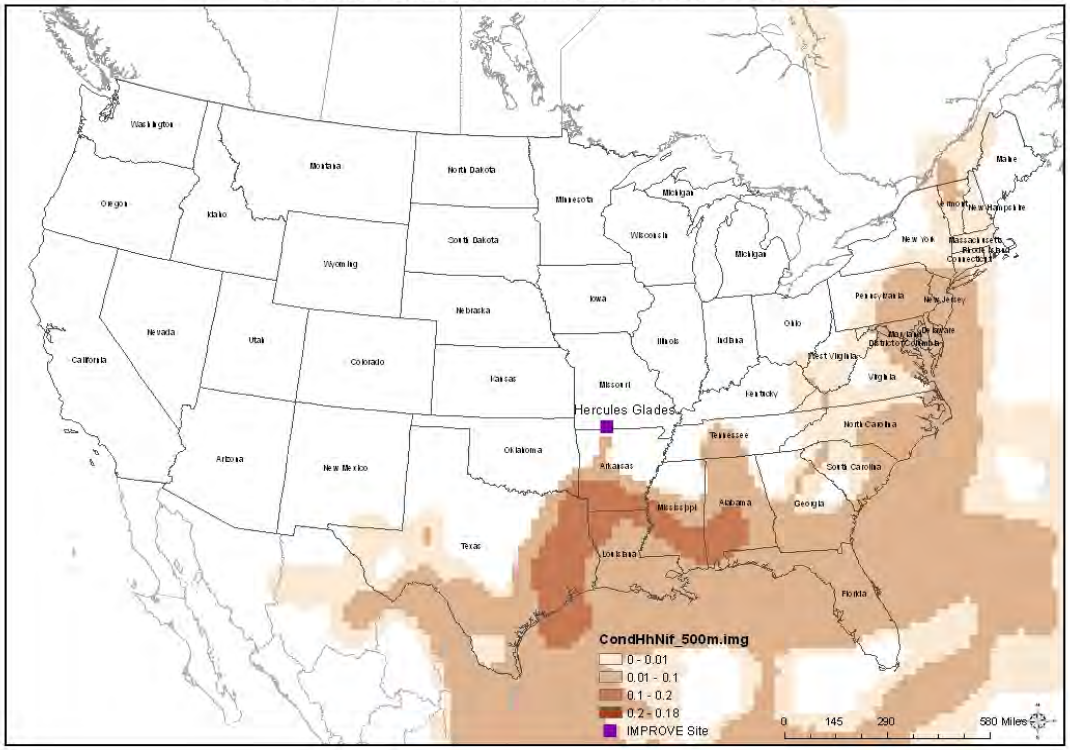




NOx Emission Impact Potential for the Hercules Glades Class I Area

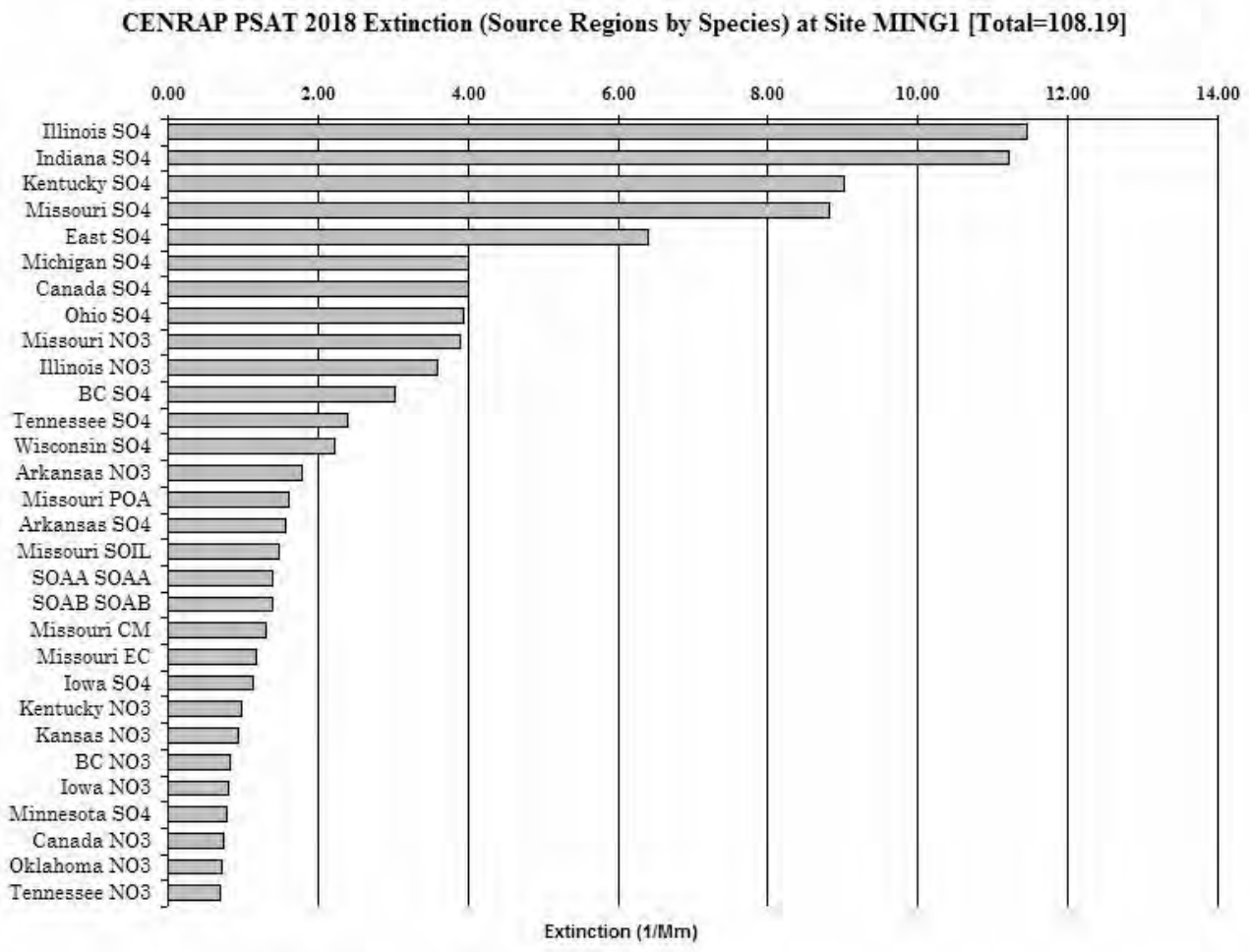


Possible Source Area of the Identified Nitrate Plus Oil Combustion Factor at the Hercules Glades Class I Area
Incremental Probability of the Airmass (Source Score =>2.0435)

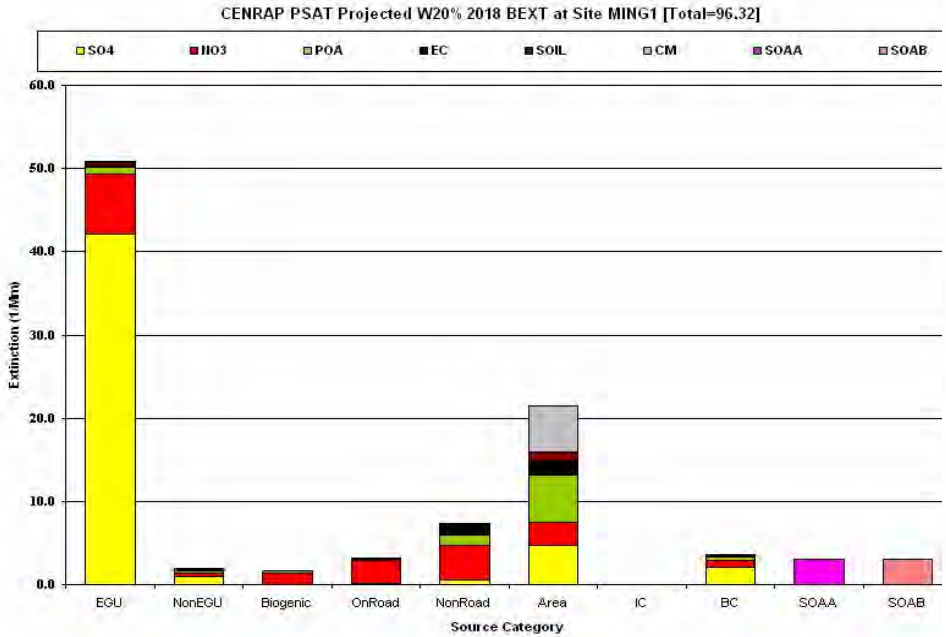


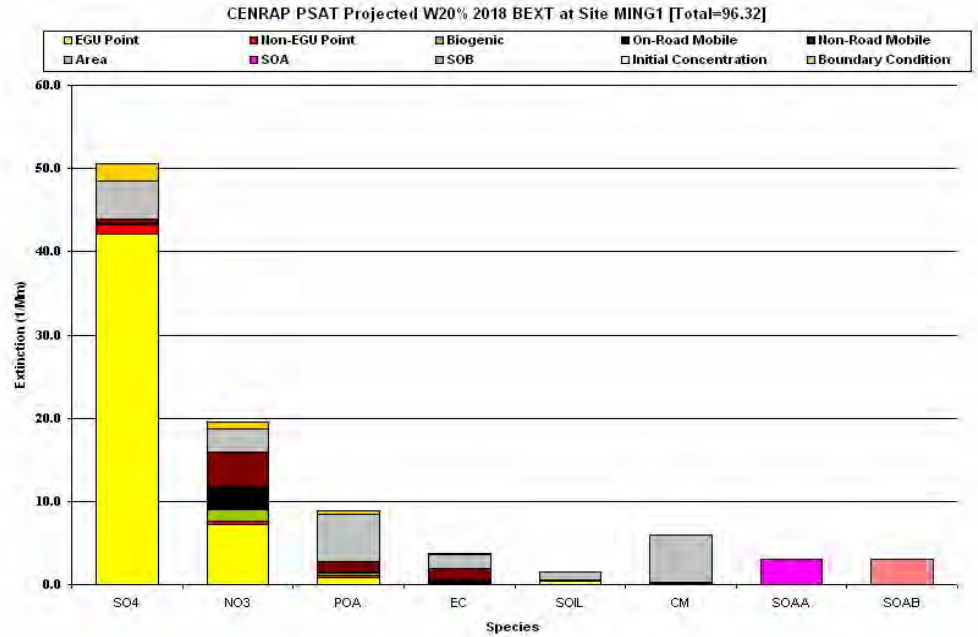
Source Apportionment for the Mingo Class I Area

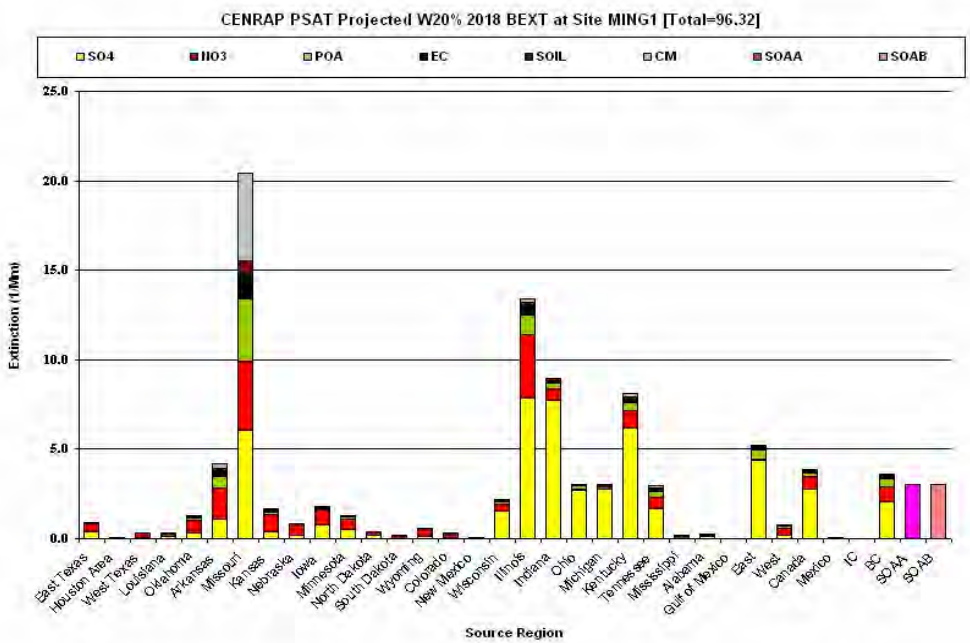
PSAT Model Source Apportionment

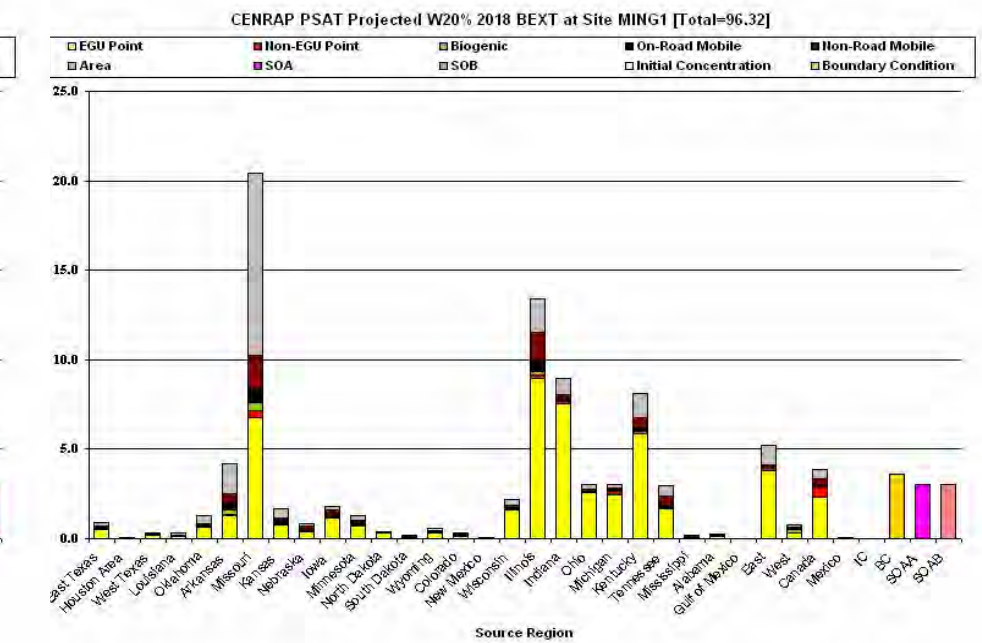


Mingo Projected 2018 – Worst 20%



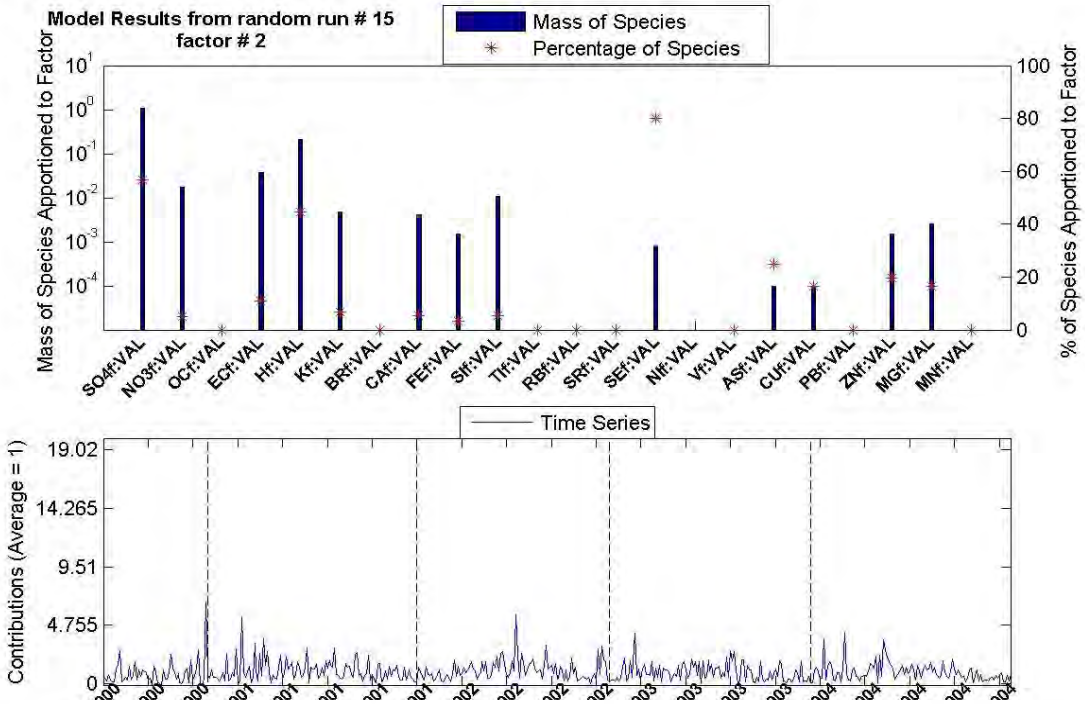




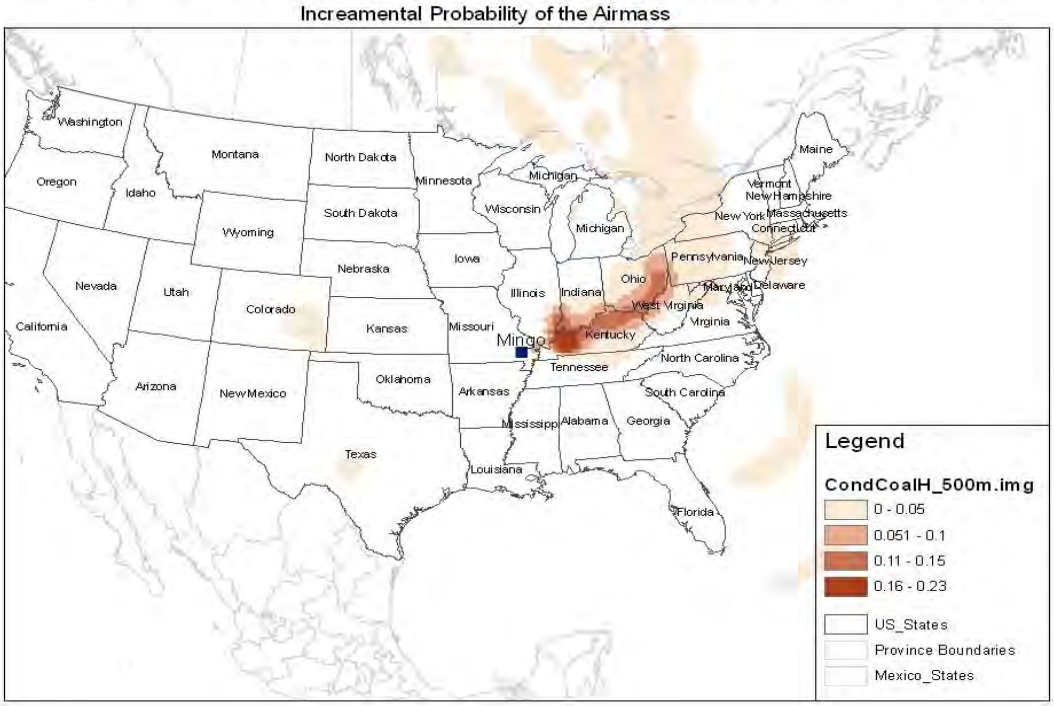


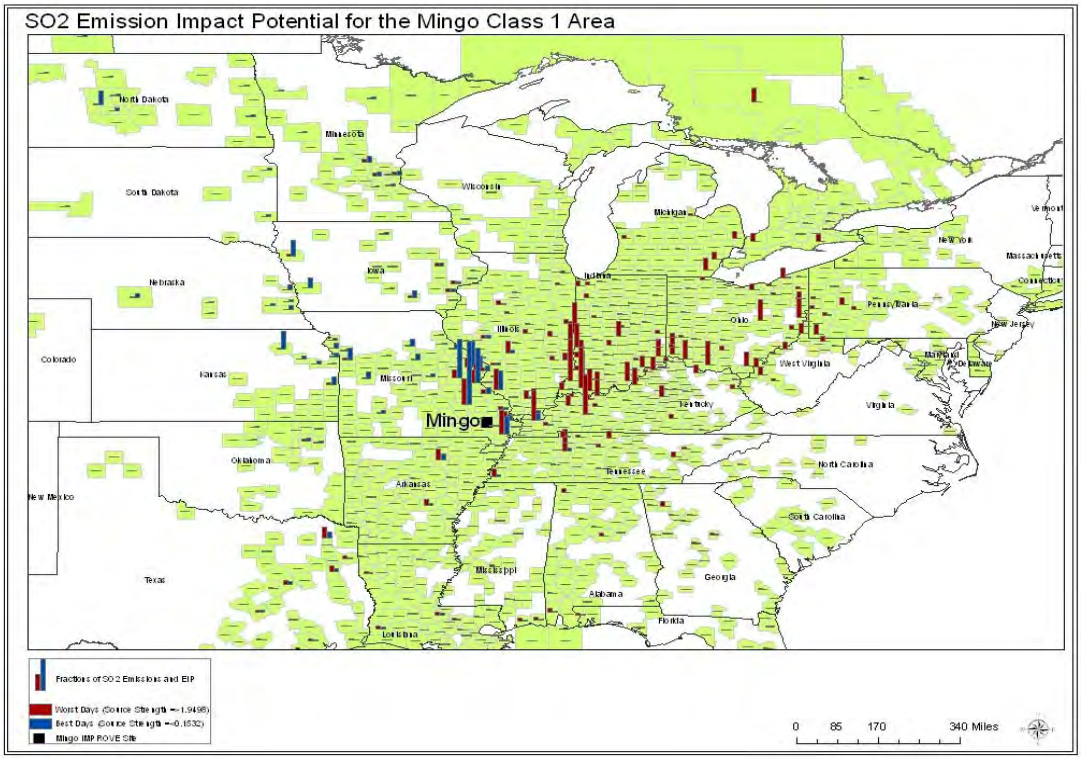
Monitoring Data Source Apportionment

The Coal Combustion Factor at the Mingo Class I Area

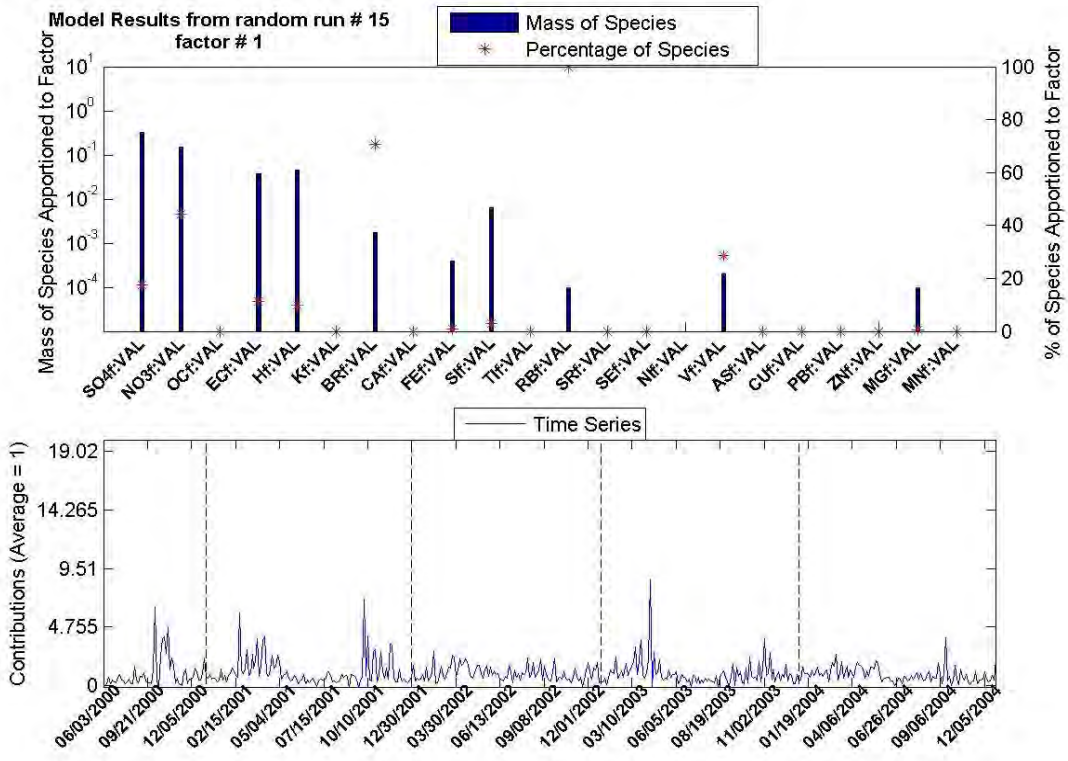


Possible Source Areas of the Identified Sulfate/Coal Combustion Factor at Mingo



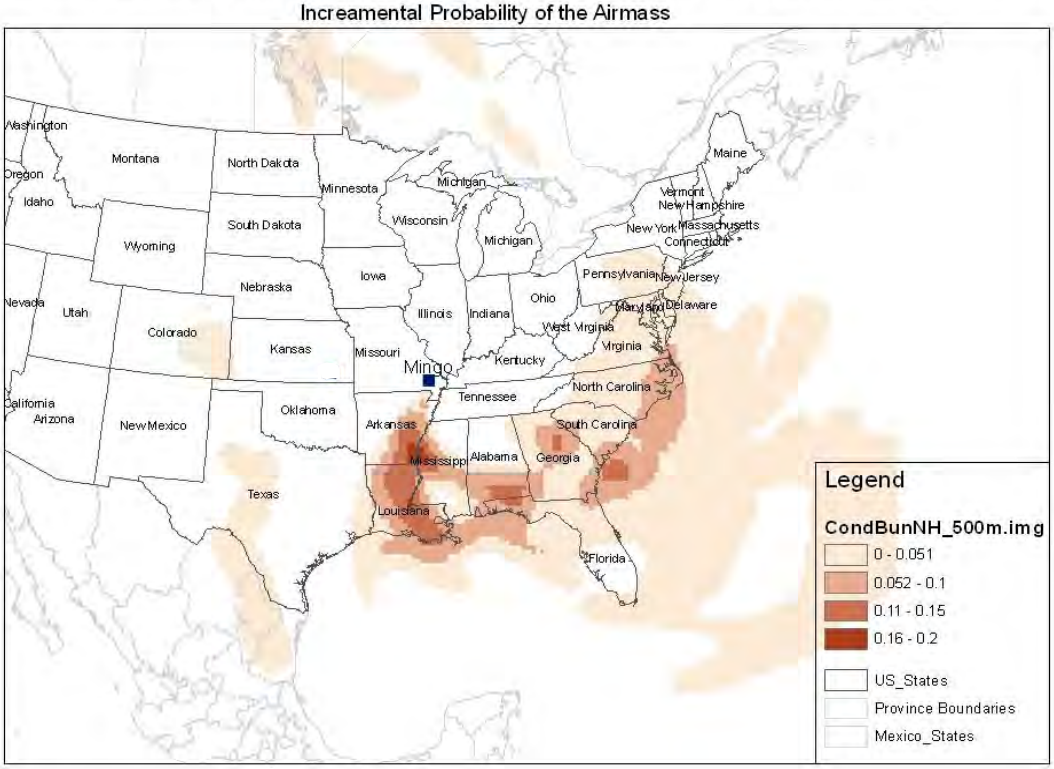


The Nitrate plus Spring Burning Factor at the Mingo Class I Area

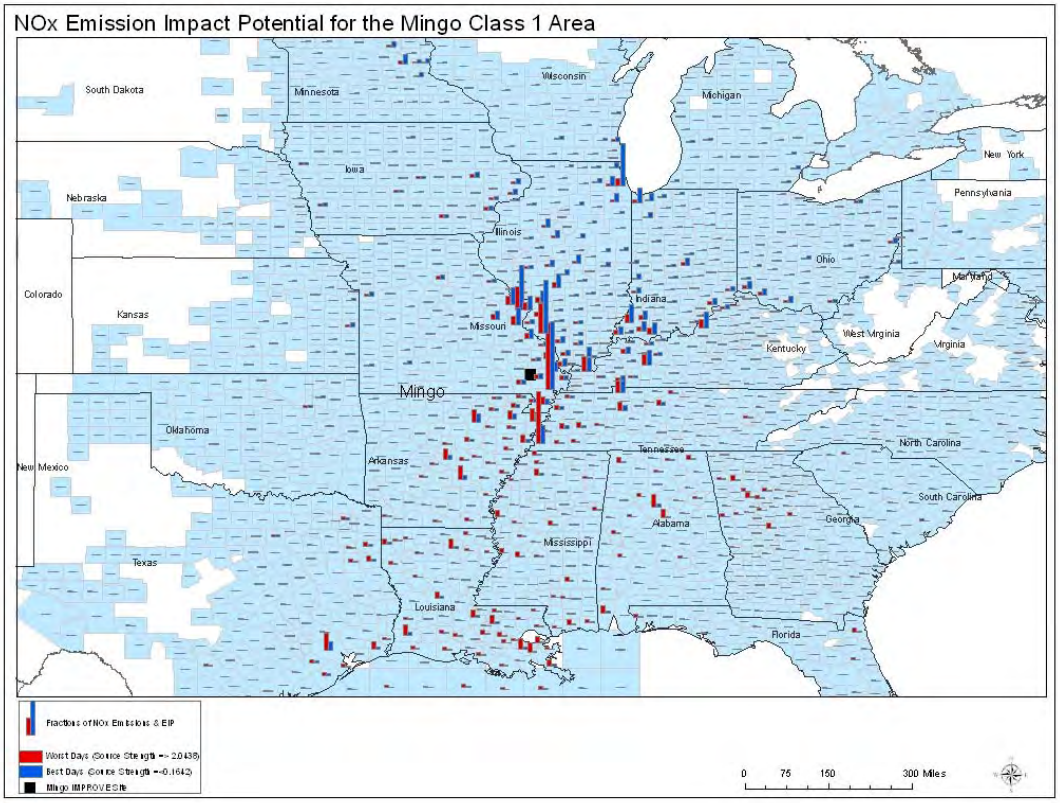


Possible Source Areas of the Identified Burning and Nitrate Factor at Mingo

Increamental Probability of the Airmass

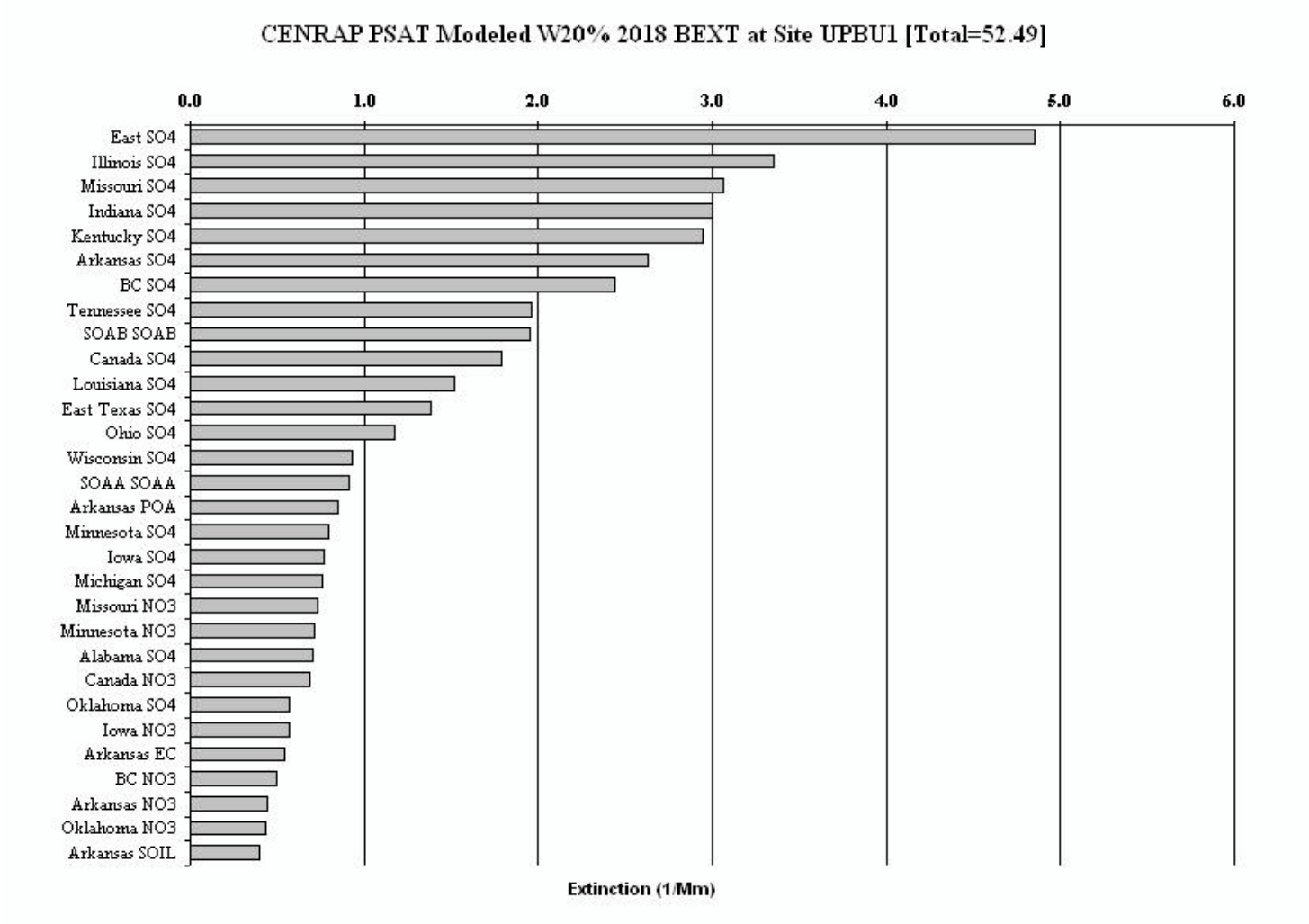


NOx Emission Impact Potential for the Mingo Class 1 Area

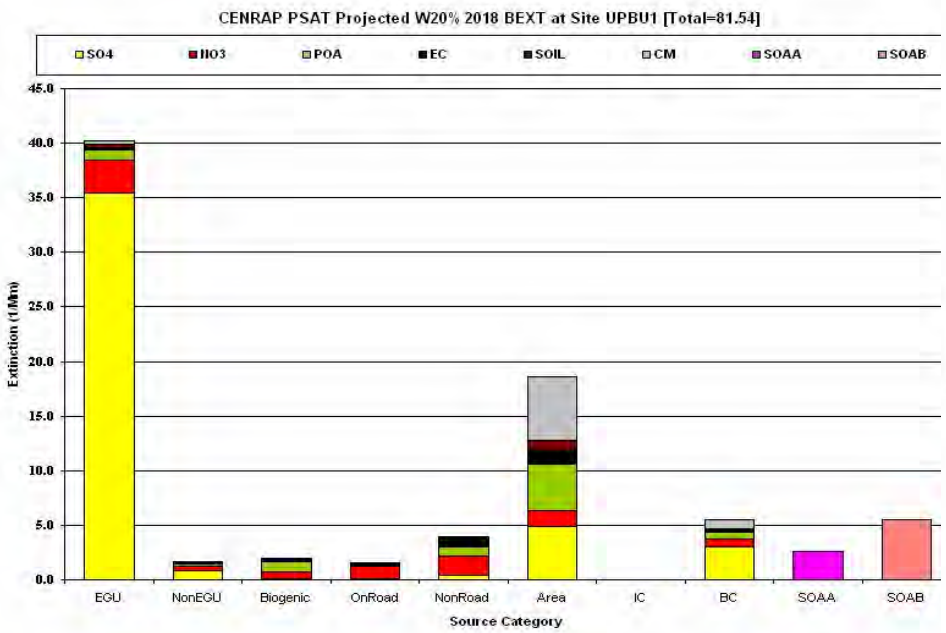


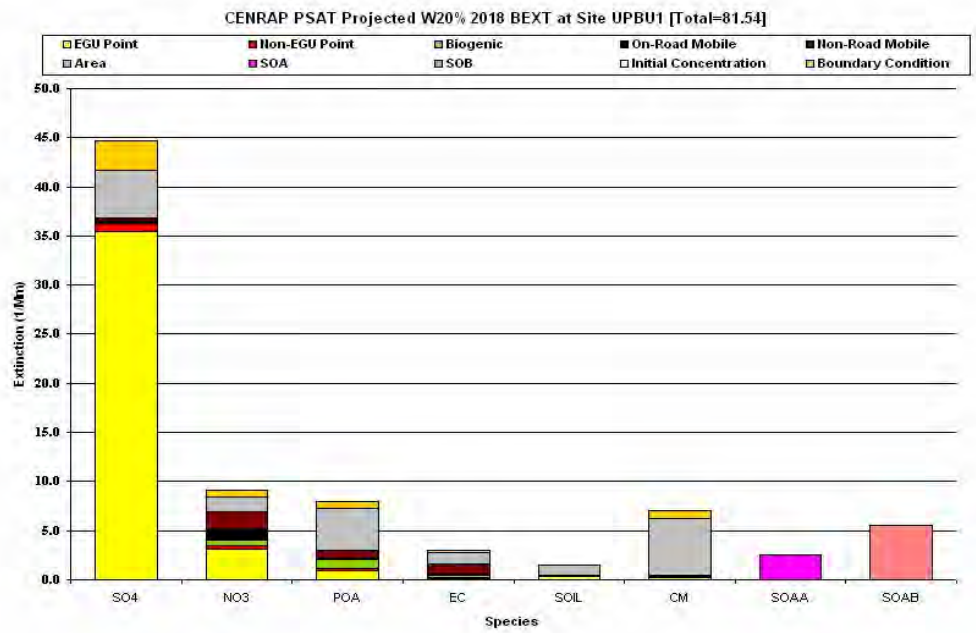
Source Apportionment for the Upper Buffalo Class I Area

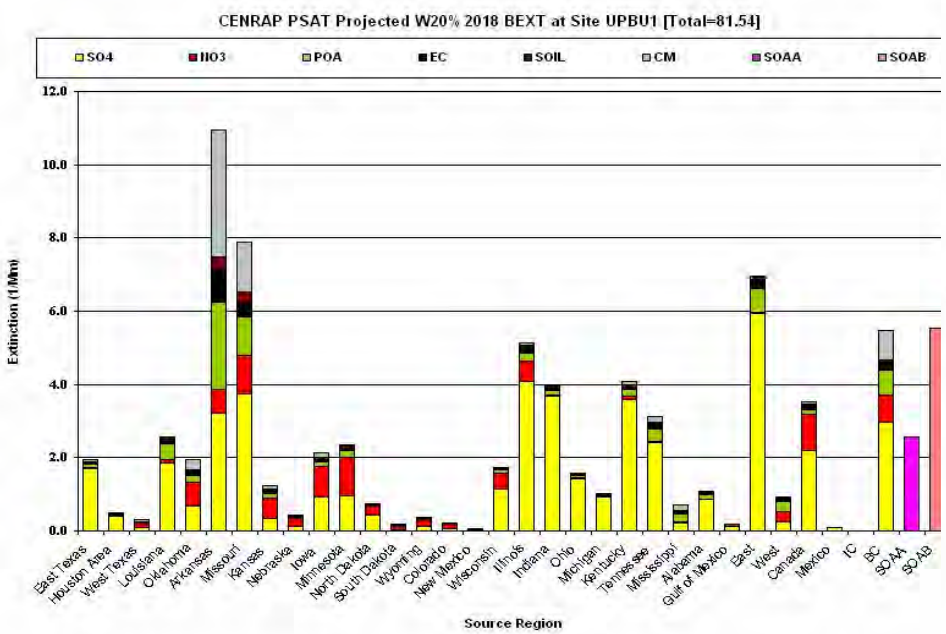
PSAT Model Source Apportionment

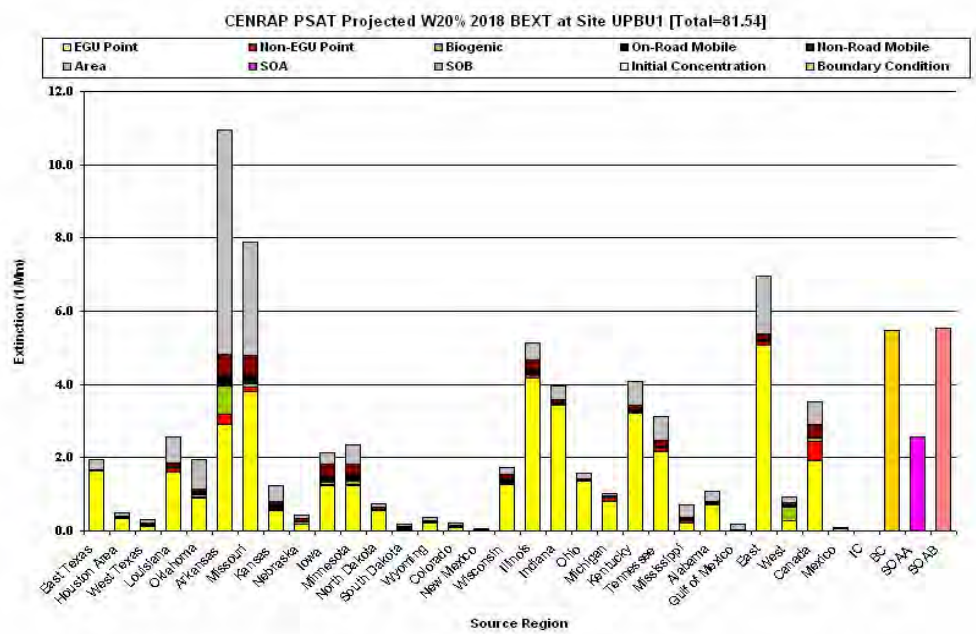


Upper Buffalo Projected 2018 – Worst 20%



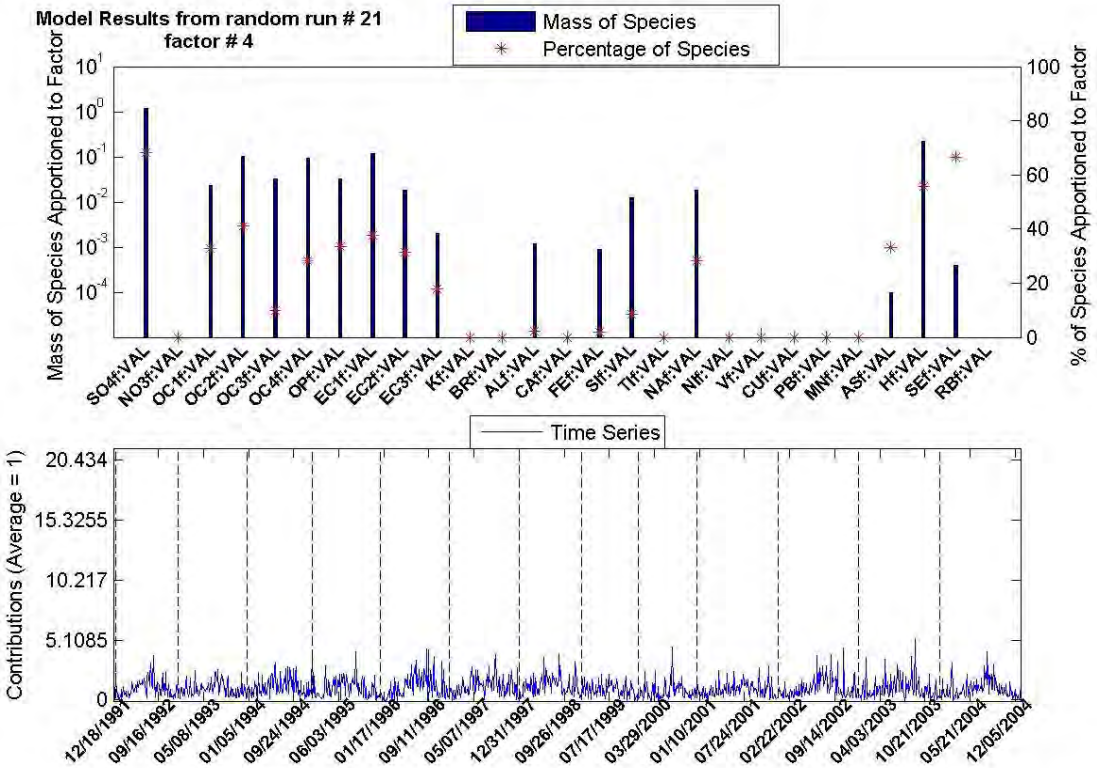






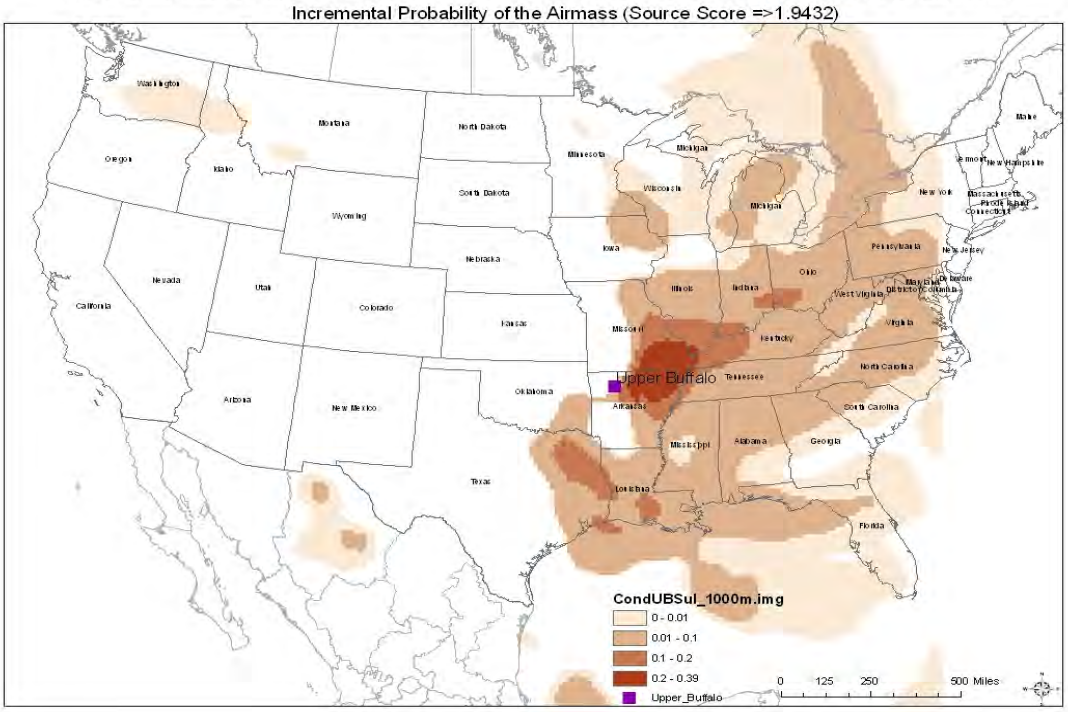
Monitoring Data Source Apportionment

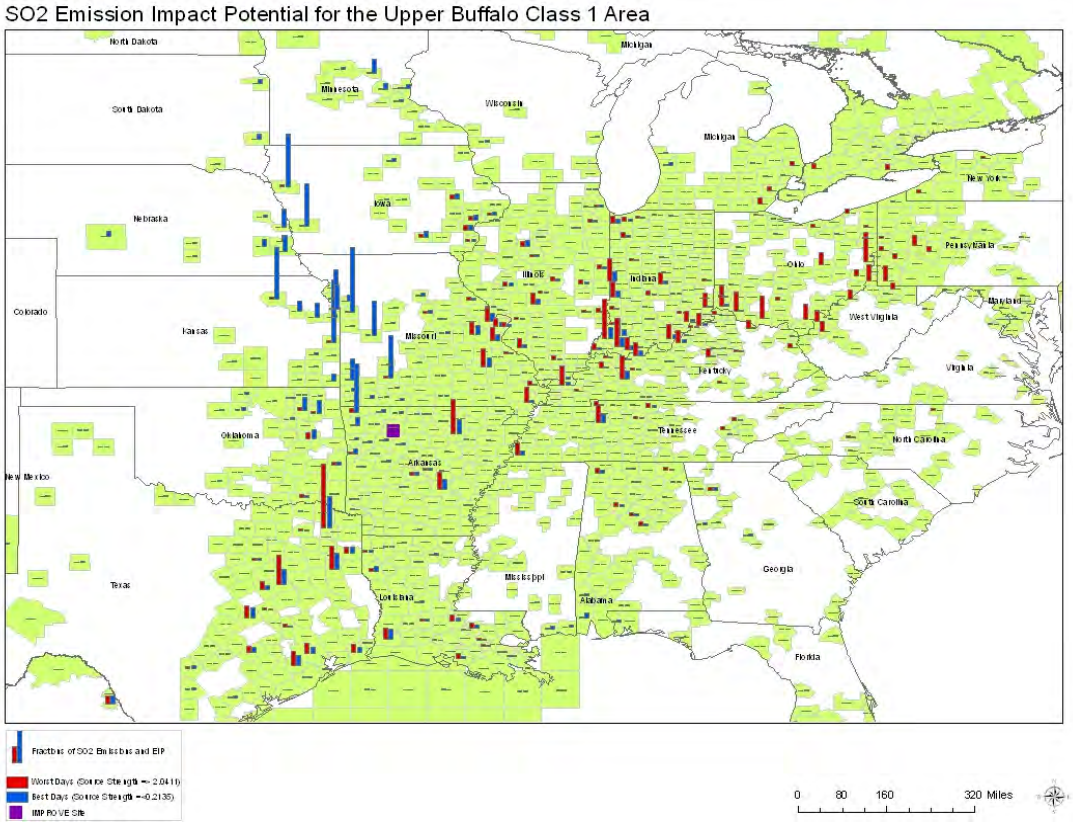
The Coal Combustion Factor at the Upper Buffalo Class I Area



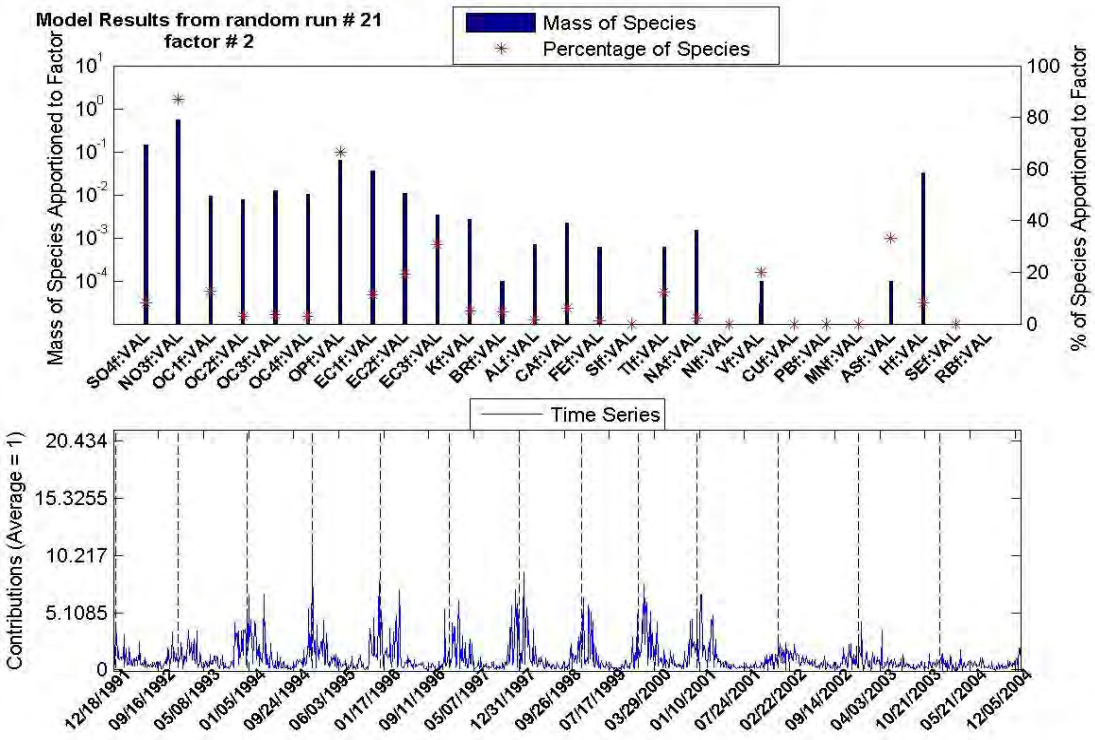
Possible Source Areas of the Identified Coal Combustion Factor at the Upper Buffalo Class I Area

Incremental Probability of the Airmass (Source Score =>1.9432)



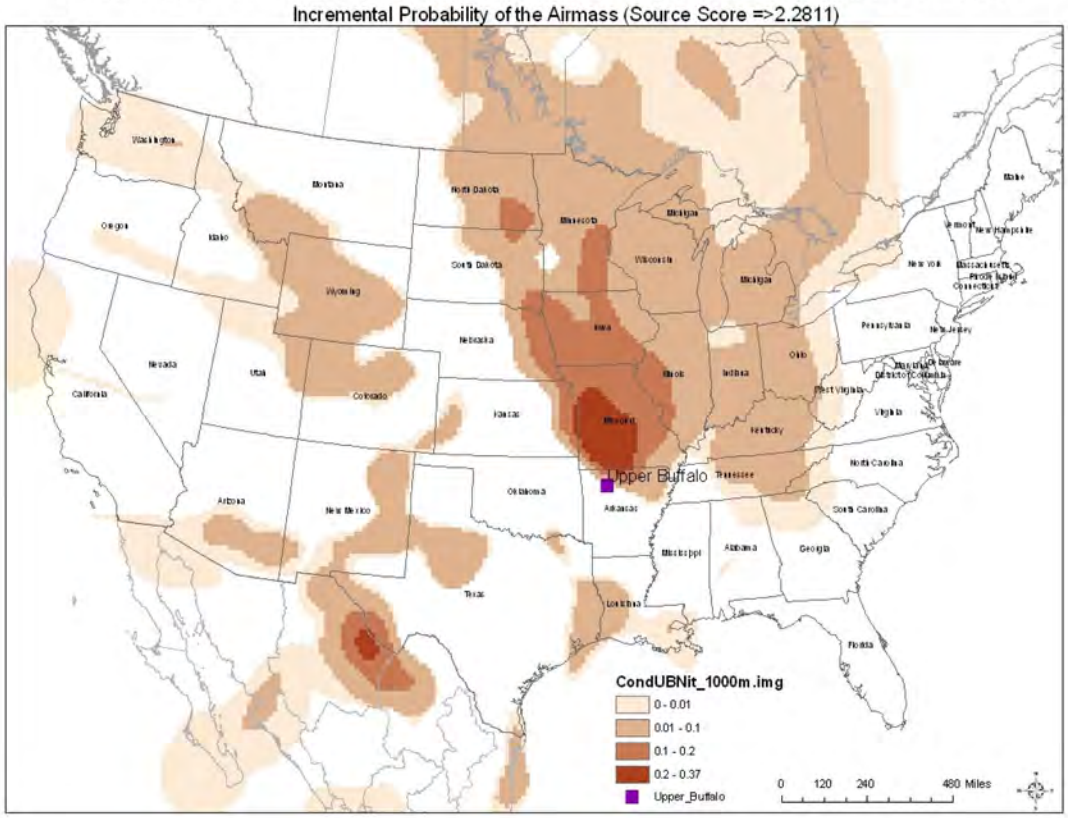


The Secondary Nitrate Factor at the Upper Buffalo Class I Area

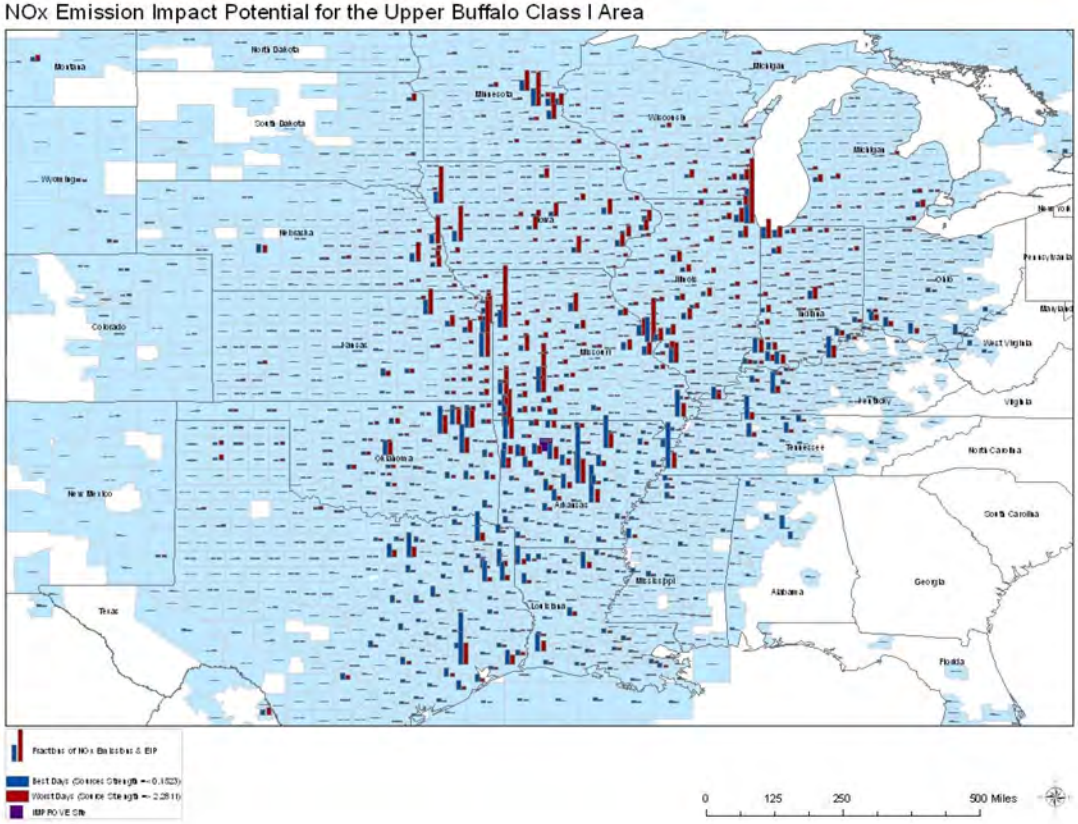


Possible Source Areas of the Identified Secondary Nitrate Factor at the Upper Buffalo Class I Area

Incremental Probability of the Airmass (Source Score =>2.2811)

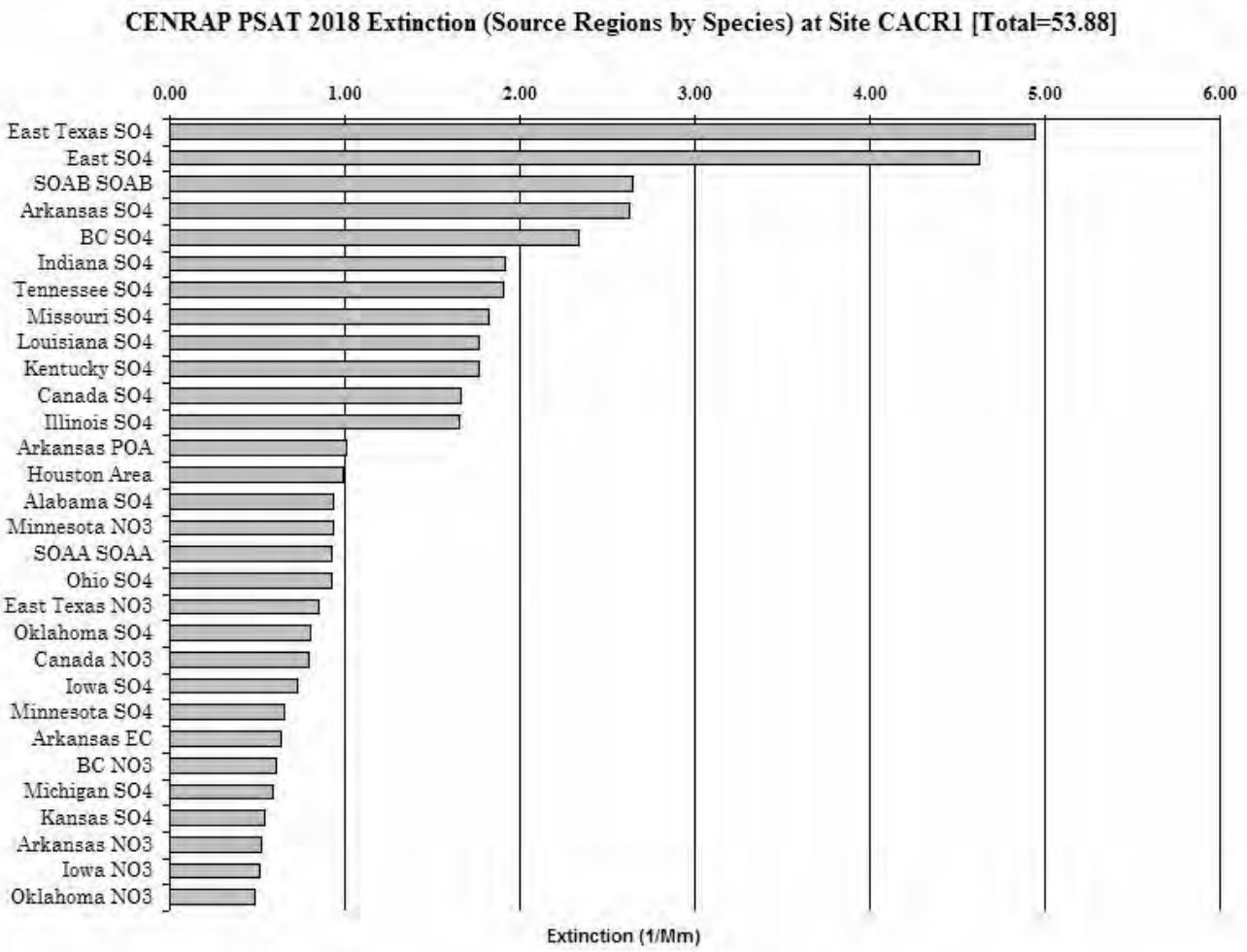


NOx Emission Impact Potential for the Upper Buffalo Class I Area

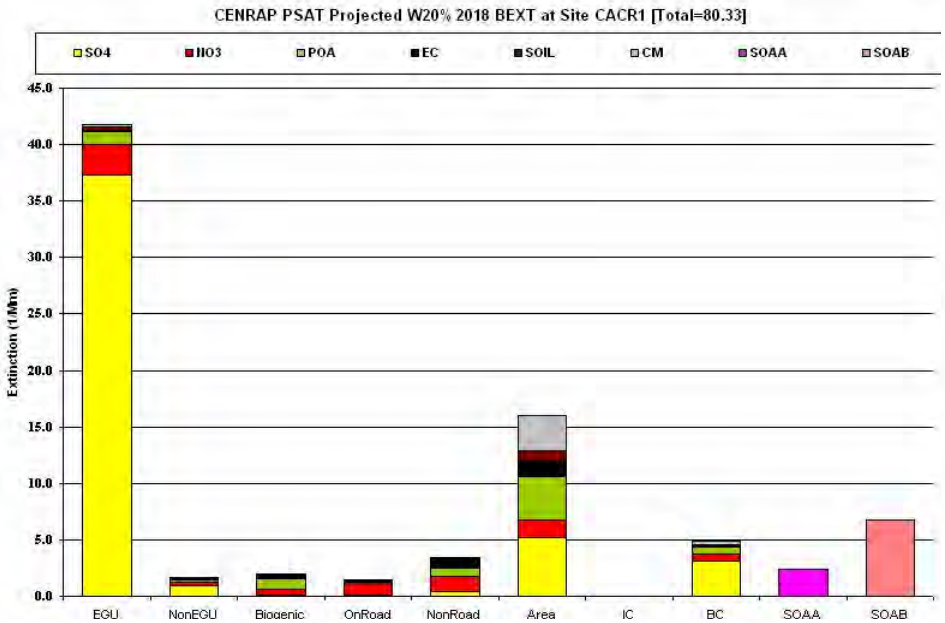


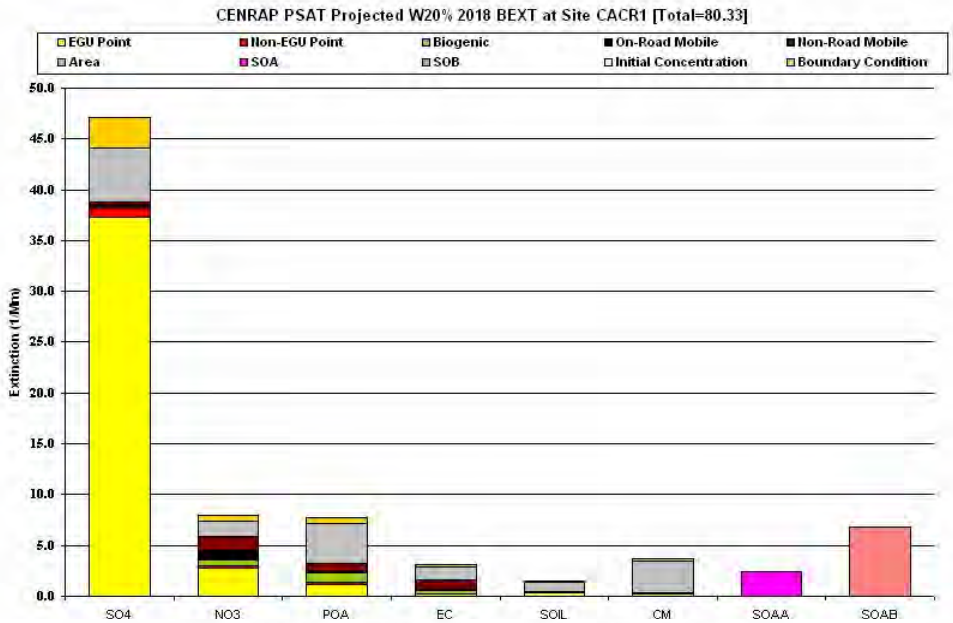
Source Apportionment for the Caney Creek Class I Area

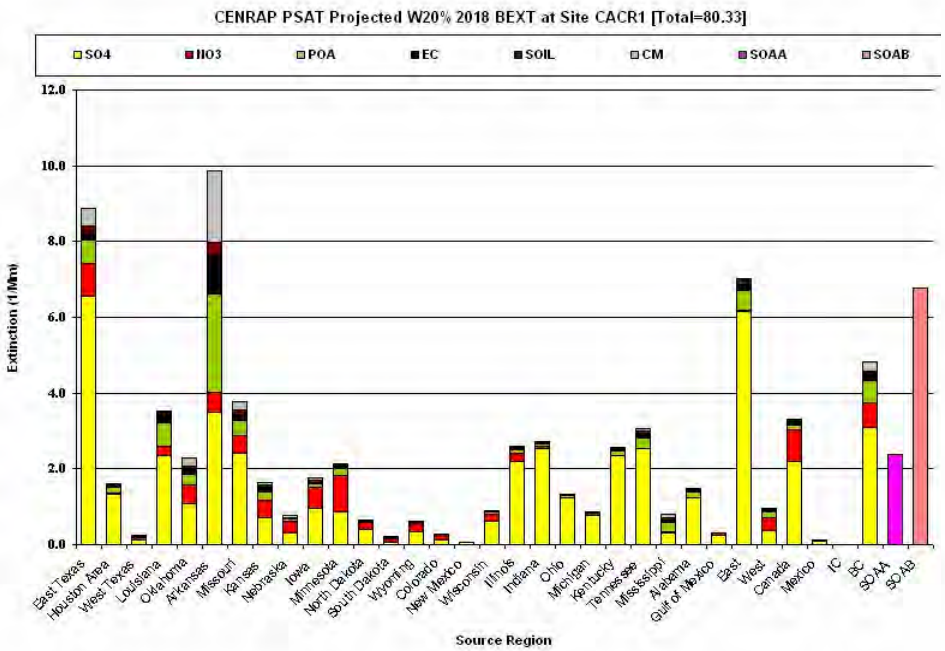
PSAT Model Source Apportionment

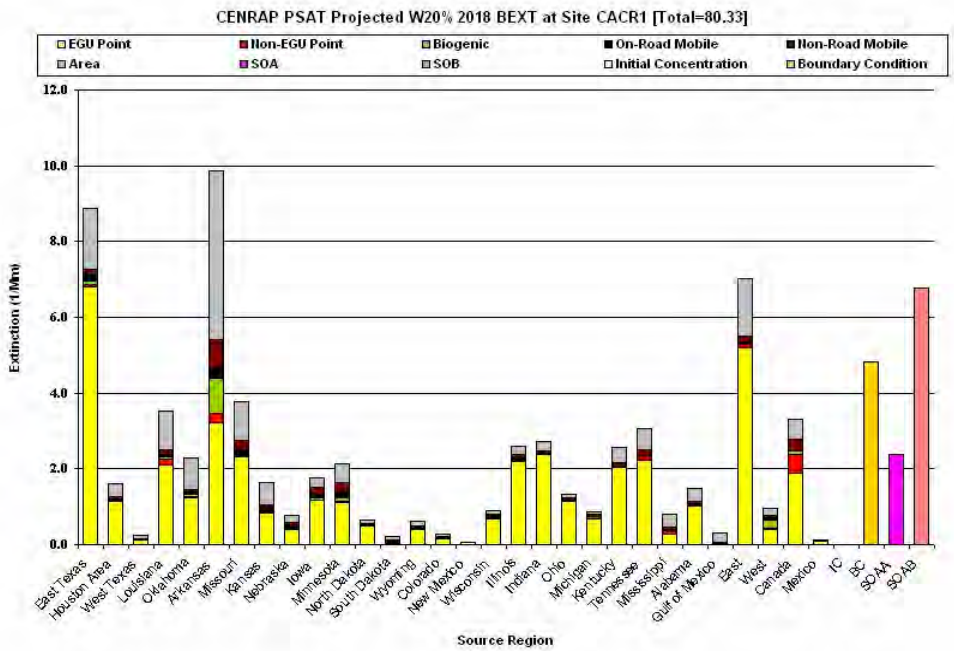


Caney Creek Projected 2018 – Worst 20%



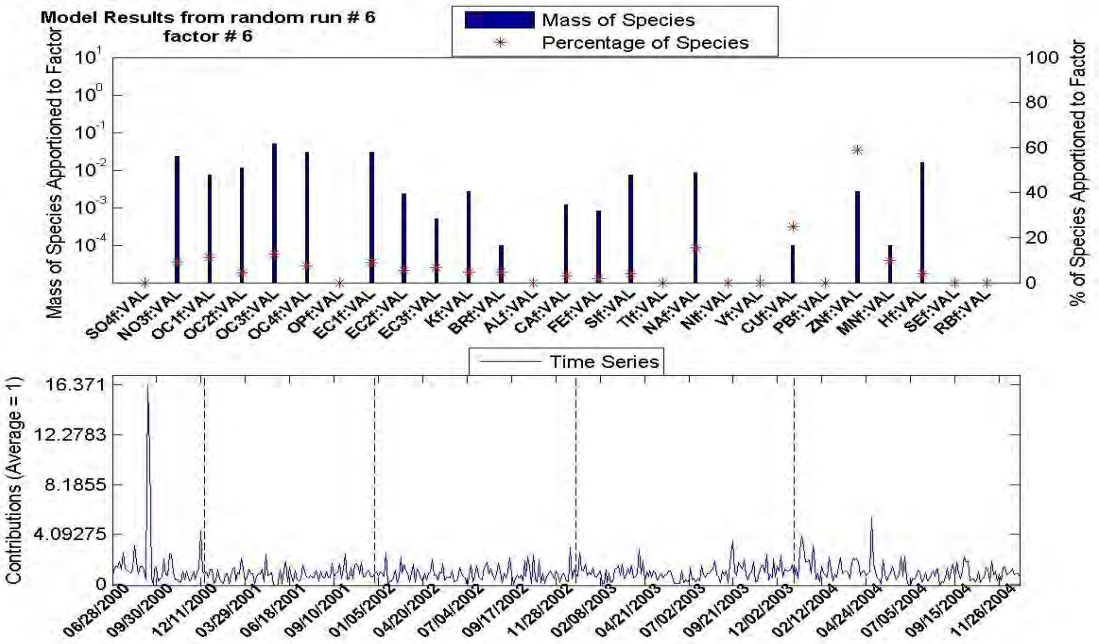


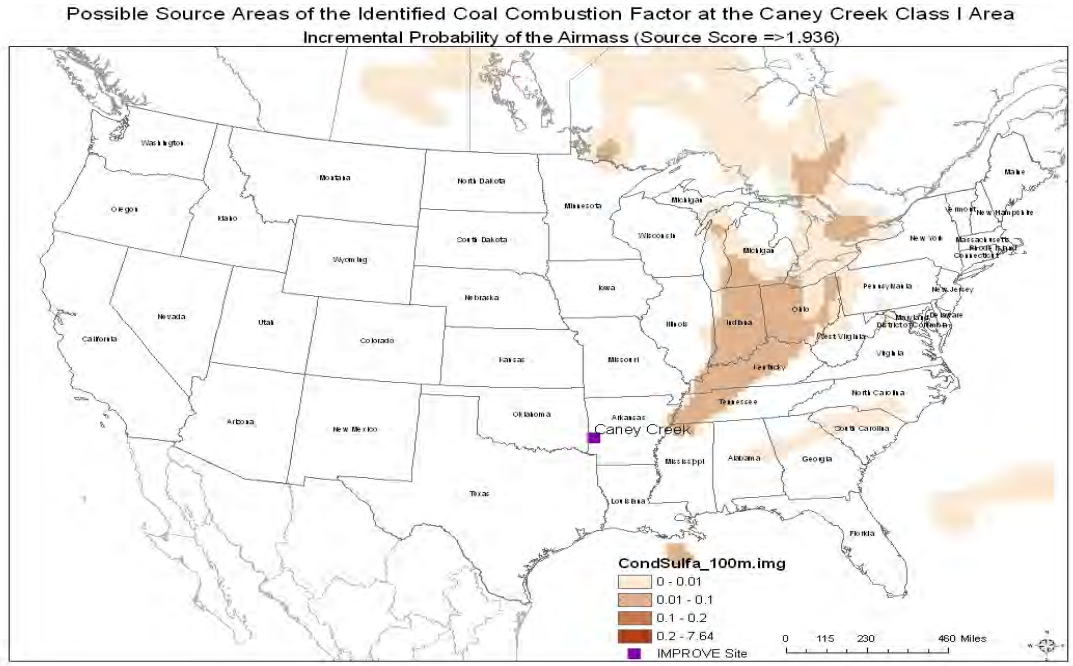


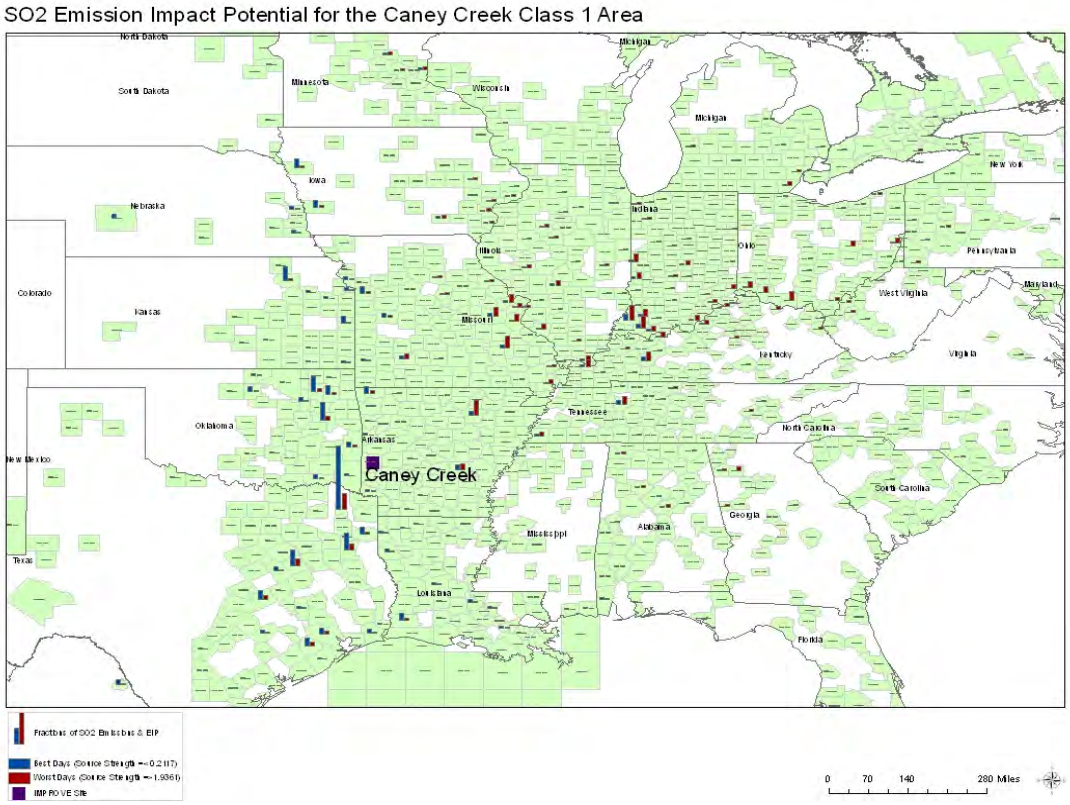


Monitoring Data Source Apportionment

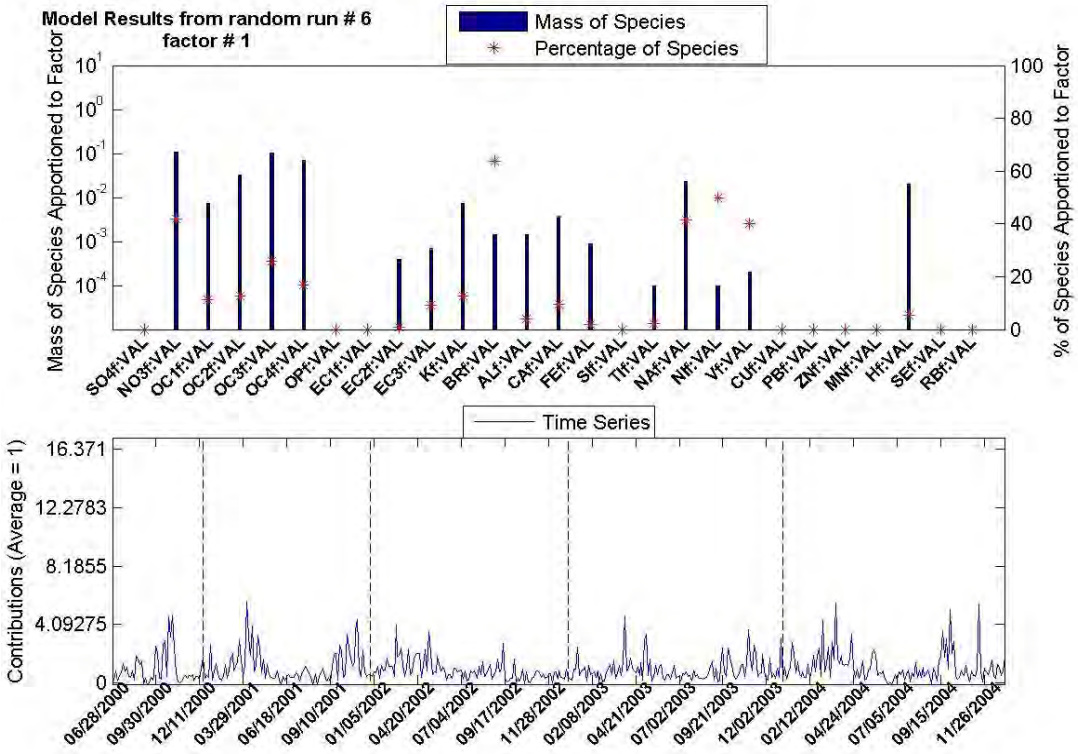
The Coal Combustion Factor at the Caney Creek Class I Area



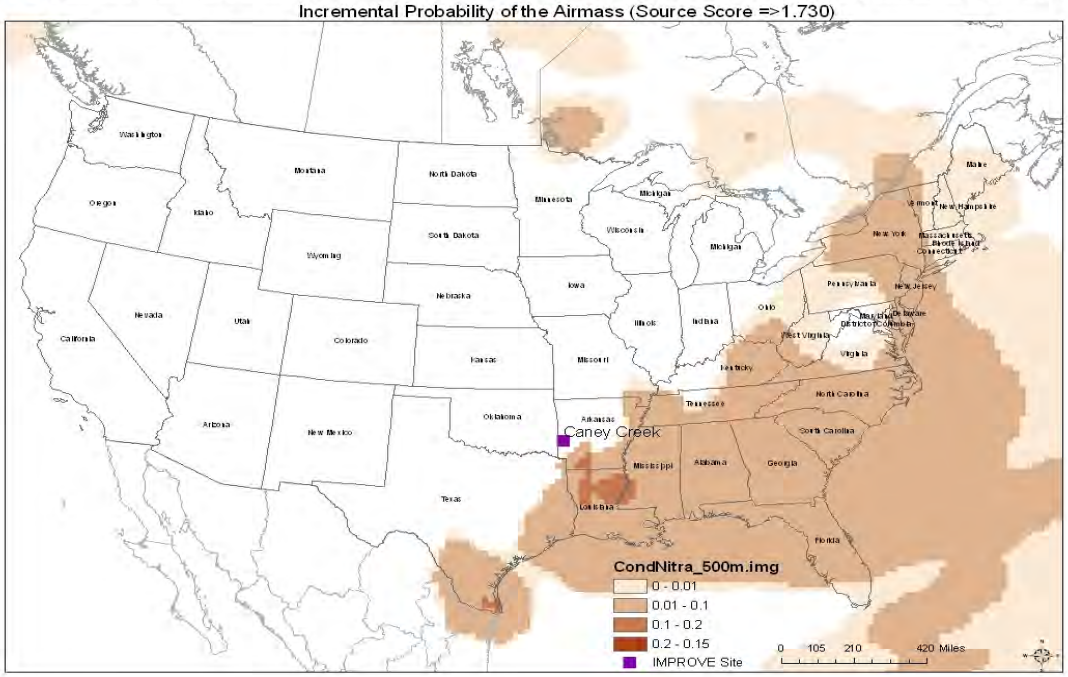




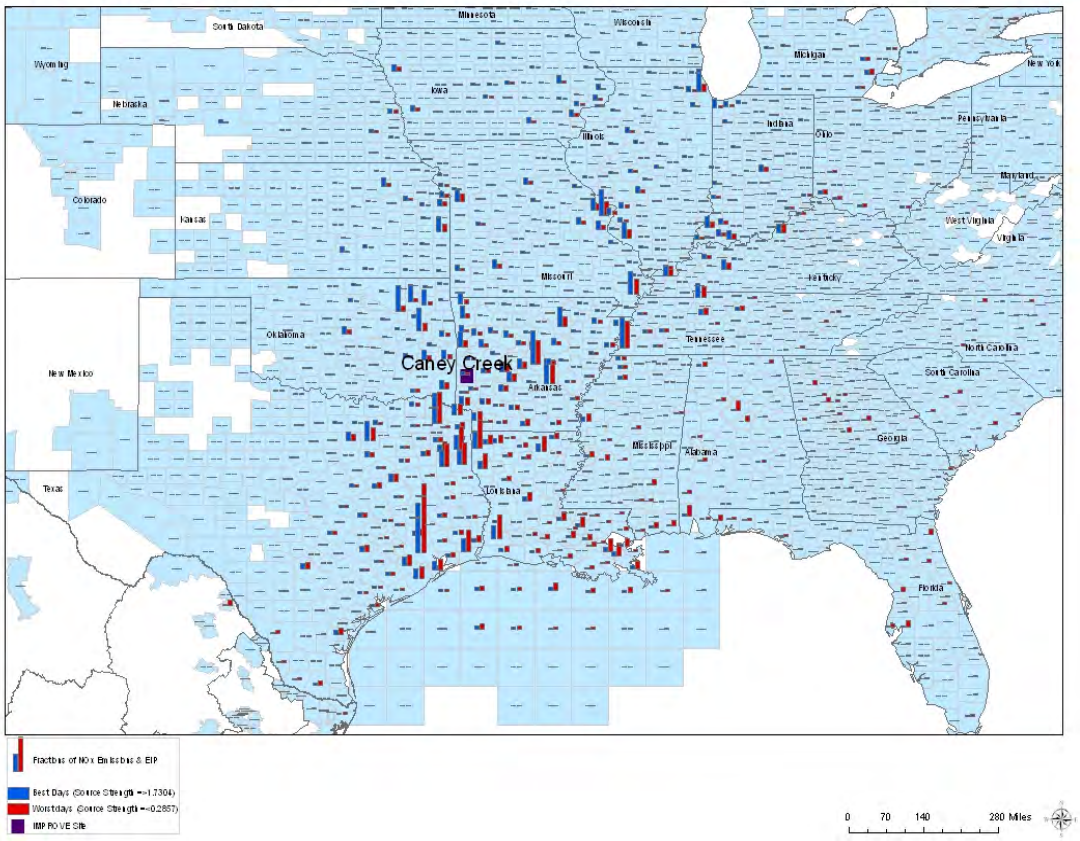
The Secondary Nitrate plus Oil Combustion Factor at the Caney Creek Class I Area



Possible Source Areas of the Identified Nitrate Plus Oil Combustion Factor at the Caney Creek Class I Area
Incremental Probability of the Airmass (Source Score =>1.730)



NOx Emission Impact Potential for the Caney Creek Class 1 Area



Attachment D

StateCo	UPBU/so2Total	UPBU/no2Total	UPBU/so2Max	UPBU/no2Max	StateCo	UPBUso2/no2Total	StateCo	UPBUso2/no2Max
AR	606.3	307.9	247.1	106.8	MO	1,264.1	AR	353.9
IL	518.6	150.6	50.6	14.4	TX	1,254.7	MO	211.9
IN	601.5	172.8	109.2	33.3	AR	914.2	TX	191.5
IA	234.1	72.4	31.7	19.5	OK	777.8	OK	182.7
KS	182.4	200.7	33.9	36.3	IN	774.3	IN	142.5
KY	409.5	96.1	81.8	46.3	LA	746.1	KY	128.1
LA	540.2	205.9	87.9	23.4	IL	669.2	TN	126.0
MS	78.4	48.2	31.4	15.1	KY	505.6	LA	111.3
MO	945.9	318.2	177.3	34.6	TN	435.0	KS	70.2
OH	225.0	56.5	21.7	10.0	KS	383.1	IL	65.0
OK	453.8	324.0	106.0	76.7	IA	306.5	IA	51.2
TN	341.9	93.1	107.2	18.8	OH	281.5	MS	46.5
TX	902.9	351.8	146.1	45.4	MS	126.6	OH	31.7

StateCode	Ming/so2Total	MING/no2Total	MING/so2Max	MING/no2Max	StateCo	MINGso2/no2Total	StateCo	MINGso2/no2Max
AR	365.7	213.0	141.8	87.5	MO	2,450.5	KY	439.9
IL	1,020.0	326.5	198.0	50.8	IN	1,368.2	MO	425.0
IN	1,063.8	304.4	221.2	67.5	IL	1,346.5	IN	288.7
IA	268.5	77.3	35.1	18.4	KY	1,158.6	TN	263.4
KS	136.3	143.7	26.9	28.8	TX	837.9	IL	248.8
KY	906.8	251.8	280.9	159.0	TN	776.4	AR	229.3
LA	442.6	164.1	74.0	19.7	LA	606.7	TX	110.4
MS	77.8	51.3	29.7	15.3	AR	578.7	LA	93.7
MO	1,820.1	630.4	349.8	75.2	OH	401.6	OK	75.0
OH	320.3	81.3	32.9	13.3	OK	347.3	KS	55.7
OK	205.4	141.9	43.5	31.5	IA	345.8	IA	53.5
TN	613.8	162.6	229.7	33.7	KS	280.0	OH	46.2
TX	604.4	233.5	81.9	28.5	MS	129.1	MS	45.0

StateCo	Carc/so2Total	CACR/Total	CACR/so2Max	CACR/Max	StateCo	CACRso2/no2Total	StateCo	CACRso2/no2Max
AR	499.6	269.4	244.8	58.4	TX	1,921.0	TX	371.8
IL	399.4	115.0	37.6	11.1	LA	940.8	AR	303.2
IN	488.6	140.3	87.4	26.7	OK	928.4	OK	181.7
IA	191.3	59.9	26.8	16.3	MO	853.1	MO	139.7
KS	139.8	157.5	27.7	29.7	AR	769.0	LA	134.7
KY	328.9	75.6	60.7	34.4	IN	628.9	IN	114.1
LA	676.3	264.5	106.4	28.3	IL	514.4	TN	101.9
MS	83.5	48.7	34.2	15.9	KY	404.5	KY	95.1
MO	640.9	212.2	120.5	19.2	TN	354.2	KS	57.4
OH	195.8	49.0	18.6	8.9	KS	297.3	MS	50.1
OK	553.5	374.9	114.5	67.2	IA	251.2	IL	48.7
TN	277.3	76.9	86.1	15.8	OH	244.8	IA	43.1
TX	1,381.8	539.2	294.0	77.8	MS	132.2	OH	27.5

Attachment D (cont')

StateCo	Hegl/so2Total	HEGL1/Total	Hegl/so2Max	HEGL1/Max	StateCo	HEGL1so2/no2Total	StateCo	HEGL1so2/no2Max
AR	498.5	254.6	178.5	101.9	MO	1,706.0	MO	309.5
IL	603.4	175.5	57.2	17.8	TX	1,080.6	AR	280.4
IN	666.2	191.5	120.3	36.7	IN	857.7	OK	161.7
IA	267.4	82.0	35.7	22.0	IL	778.9	IN	157.0
KS	214.2	231.3	38.4	41.1	AR	753.1	TX	153.6
KY	448.3	106.2	92.5	52.3	OK	664.6	KY	144.8
LA	475.4	179.2	77.7	20.7	LA	654.6	TN	132.5
MS	71.4	44.2	28.1	13.8	KY	554.5	LA	98.4
MO	1,261.9	444.1	230.6	78.9	KS	445.5	KS	79.5
OH	239.6	60.2	23.2	10.6	TN	445.2	IL	75.0
OK	388.0	276.6	93.8	67.9	IA	349.4	IA	57.7
TN	349.5	95.7	112.8	19.7	OH	299.8	MS	41.9
TX	778.4	302.2	116.3	37.3	MS	115.6	OH	33.8

Attachment E

Table 1 – Contributing States for Hercules Glades Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 2 – Contributing States for Hercules Glades Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	IL	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	**LA**	LA	LA	LA
MS	MS	MS	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 3 – Contributing States for the Mingo Wildlife Refuge Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	**WI**	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	**OH**	**OH**
MI	MI	MI	**MI**	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	**TN**	**TN**
AR	AR	**AR**	AR	AR
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

*state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 4 – Contributing States for the Mingo Wildlife Refuge Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	IL	**IL**	**IL**
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	OK	**OK**	OK	OK
TX	TX	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

* state total > 200 tons/km l

State in Red/Bold = Major Contributing States

Table 5 – Contributing States for the Upper Buffalo National Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	**MO**	**MO**
IL	**IL**	**IL**	**IL**	**IL**
IN	**IN**	**IN**	**IN**	**IN**
OH	**OH**	**OH**	OH	**OH**
MI	MI	MI	MI	MI
KY	**KY**	**KY**	**KY**	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	**TX**	**TX**	TX	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km l

State in Red/Bold = Major Contributing States

Table 6 – Contributing States for the Upper Buffalo National Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	**MN**	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	**IA**	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	**KS**	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	**AR**	**AR**	AR	**AR**
OK	**OK**	**OK**	OK	**OK**
TX	TX	TX	TX	TX
LA	LA	LA	LA	LA
MS	MS	MS	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 7 – Contributing States for the Caney Creek Area Sulfate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	IA	IA	IA
NE	NE	NE	NE	NE
KS	KS	KS	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	**IL**	IL	**IL**
IN	**IN**	**IN**	IN	**IN**
OH	**OH**	**OH**	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	**KY**	KY	**KY**
TN	**TN**	**TN**	TN	**TN**
AR	**AR**	**AR**	**AR**	**AR**
OK	OK	**OK**	OK	OK
TX	TX	**TX**	**TX**	**TX**
LA	LA	LA	LA	LA
MS	MS	**MS**	MS	MS
AL	AL	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States

Table 8 – Contributing States for the Caney Creek Area Nitrate

Q/D*	PMF/ Trajectories	AOI	PSAT	Average
MN	MN	MN	MN	MN
SD	SD	SD	SD	SD
WI	WI	WI	WI	WI
IA	IA	**IA**	IA	IA
NE	NE	**NE**	NE	NE
KS	KS	**KS**	KS	KS
MO	**MO**	**MO**	MO	**MO**
IL	**IL**	IL	IL	IL
IN	**IN**	IN	IN	IN
OH	OH	OH	OH	OH
MI	MI	MI	MI	MI
KY	**KY**	KY	KY	KY
TN	**TN**	TN	TN	TN
AR	AR	**AR**	AR	AR
OK	**OK**	**OK**	OK	**OK**
TX	**TX**	TX	TX	TX
LA	**LA**	LA	LA	LA
MS	**MS**	MS	MS	MS
AL	**AL**	AL	AL	AL

* state total > 200 tons/km

State in Red/Bold = Major Contributing States