

APPENDIX A

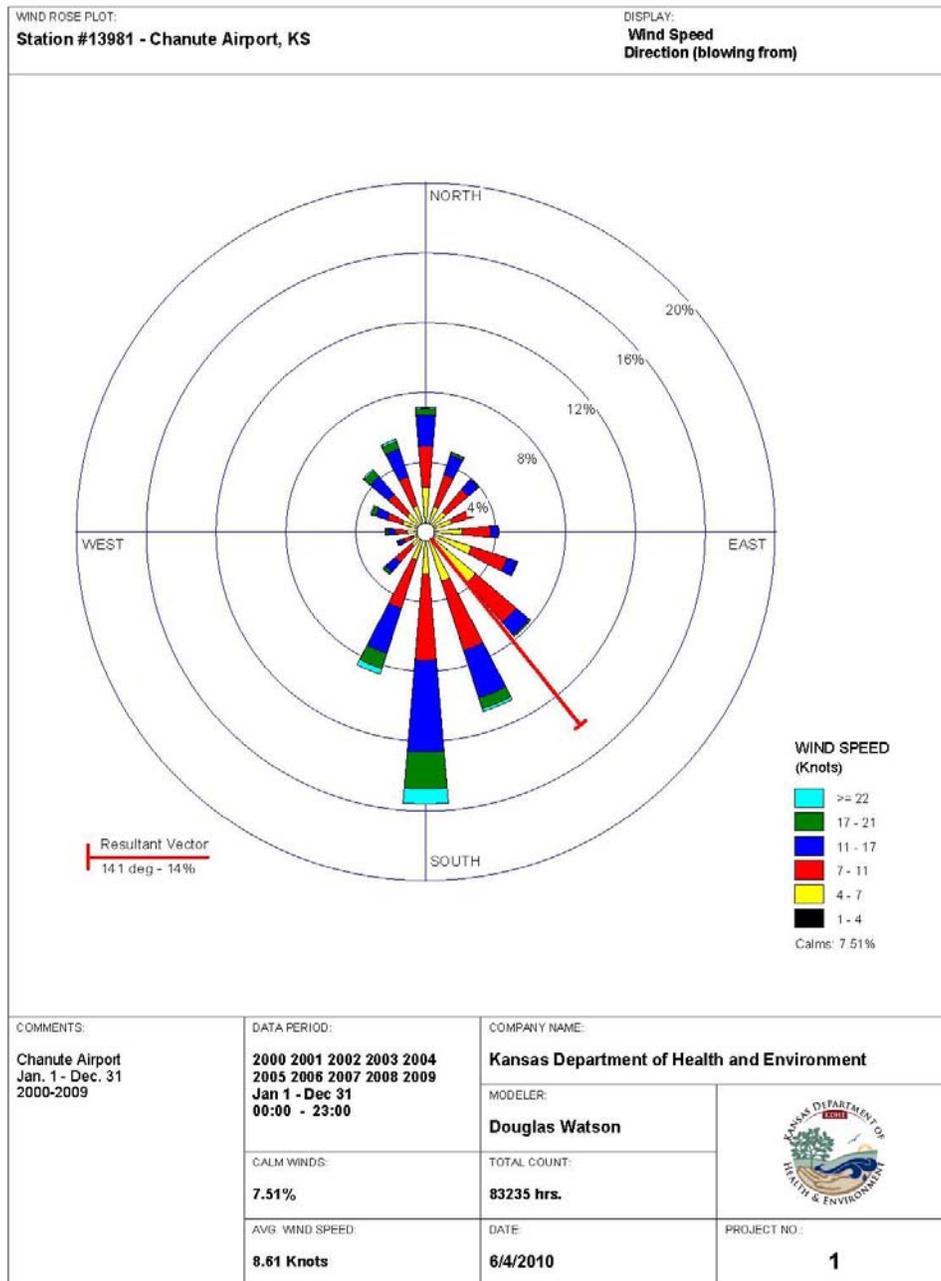


Figure 1. Chanute ASOS Wind Rose 2000 – 2009

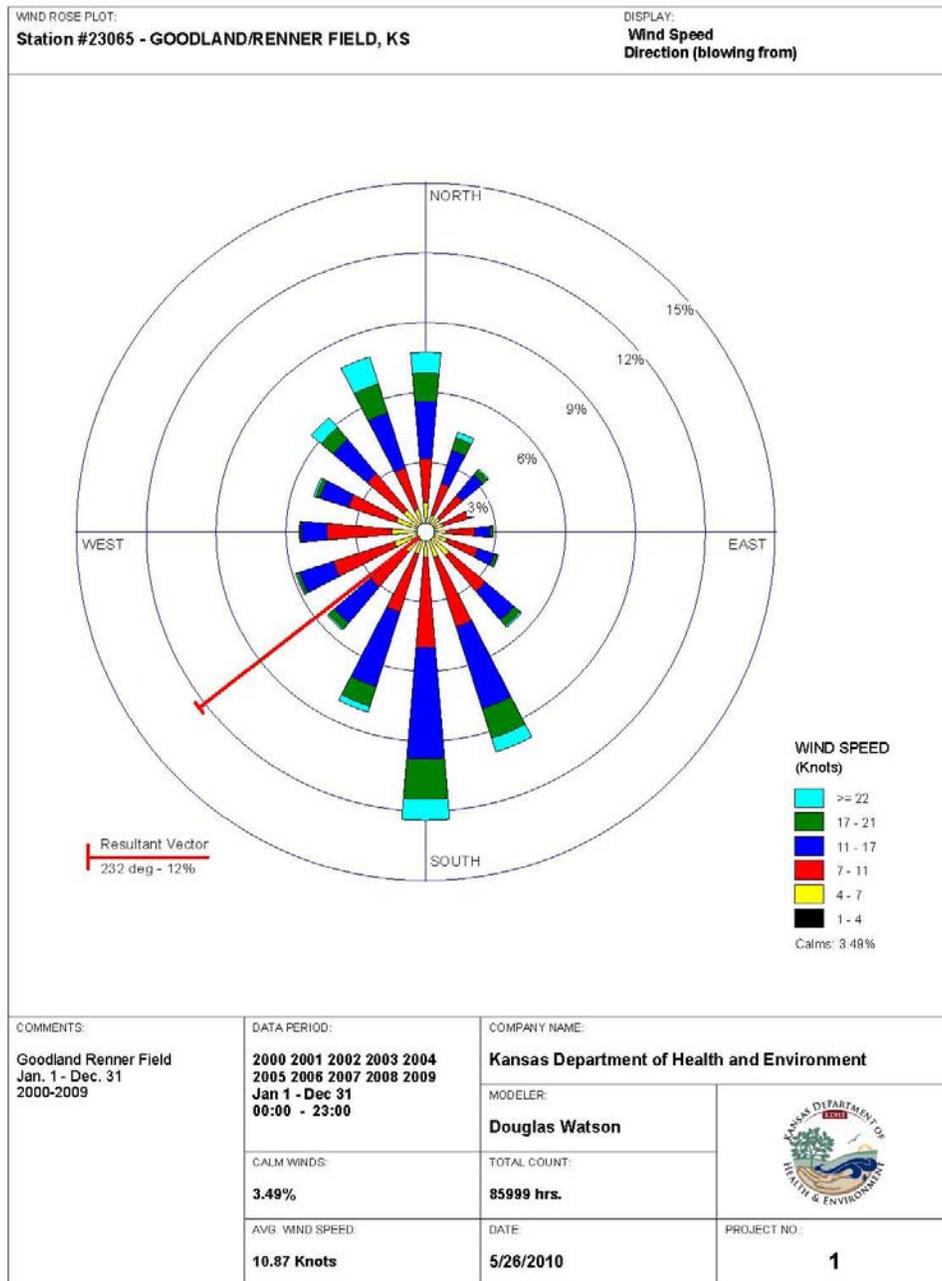
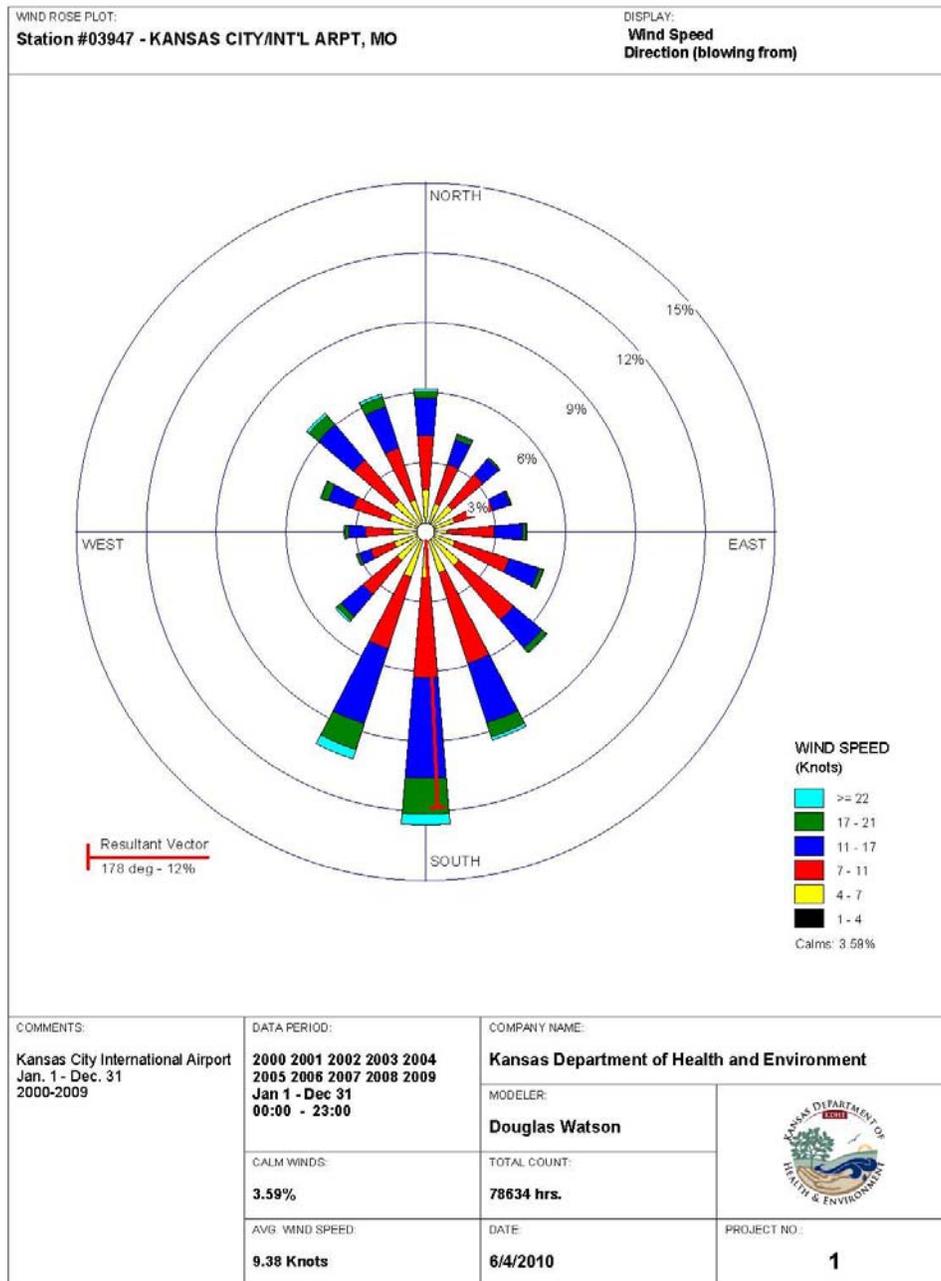


Figure 2. Goodland ASOS Wind Rose 2000 – 2009



WRPLOT View - Lakes Environmental Software

Figure 3. Kansas City ASOS Wind Rose 2000 – 2009

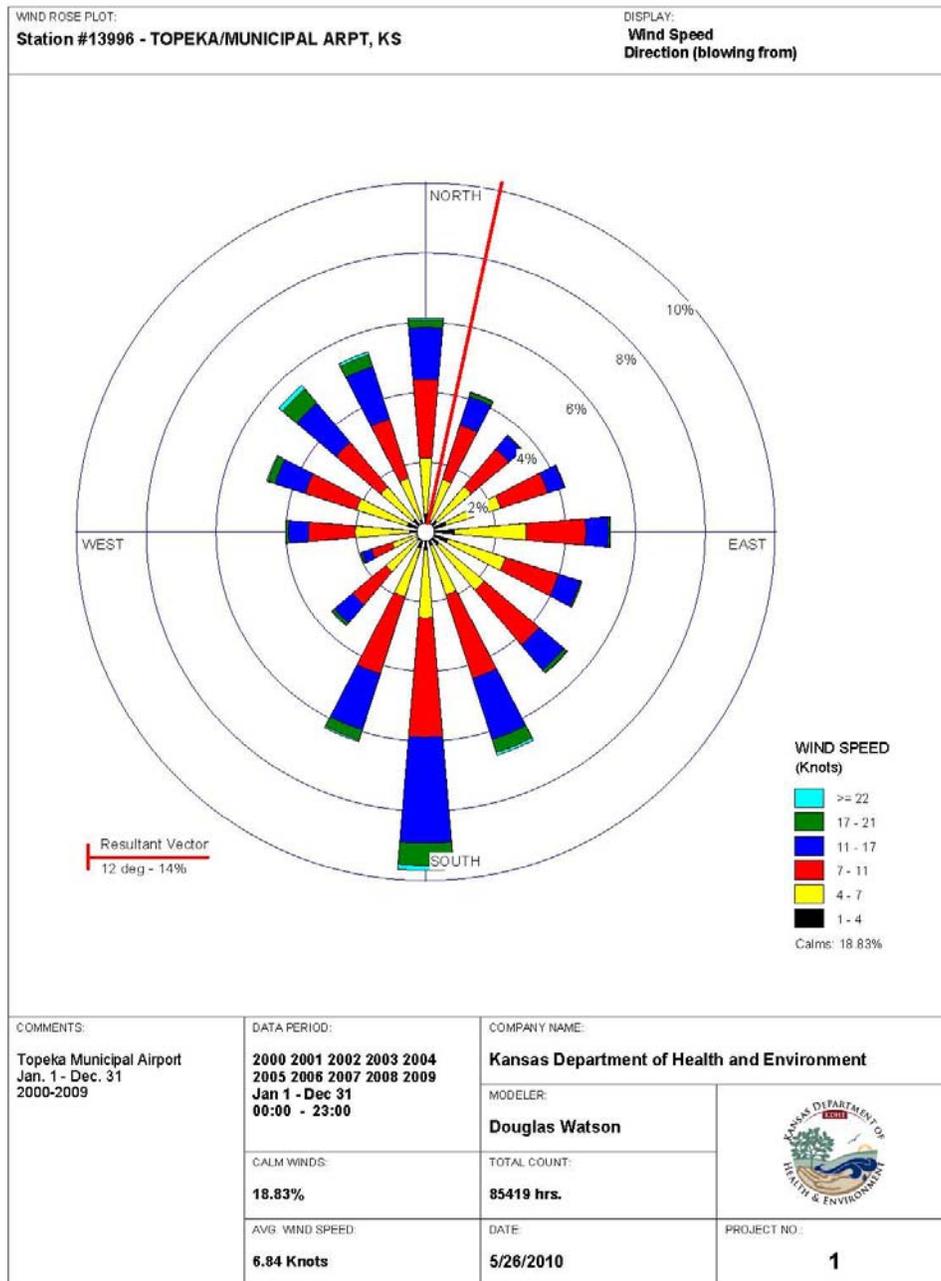


Figure 4. Topeka ASOS Wind Rose 2000 – 2009

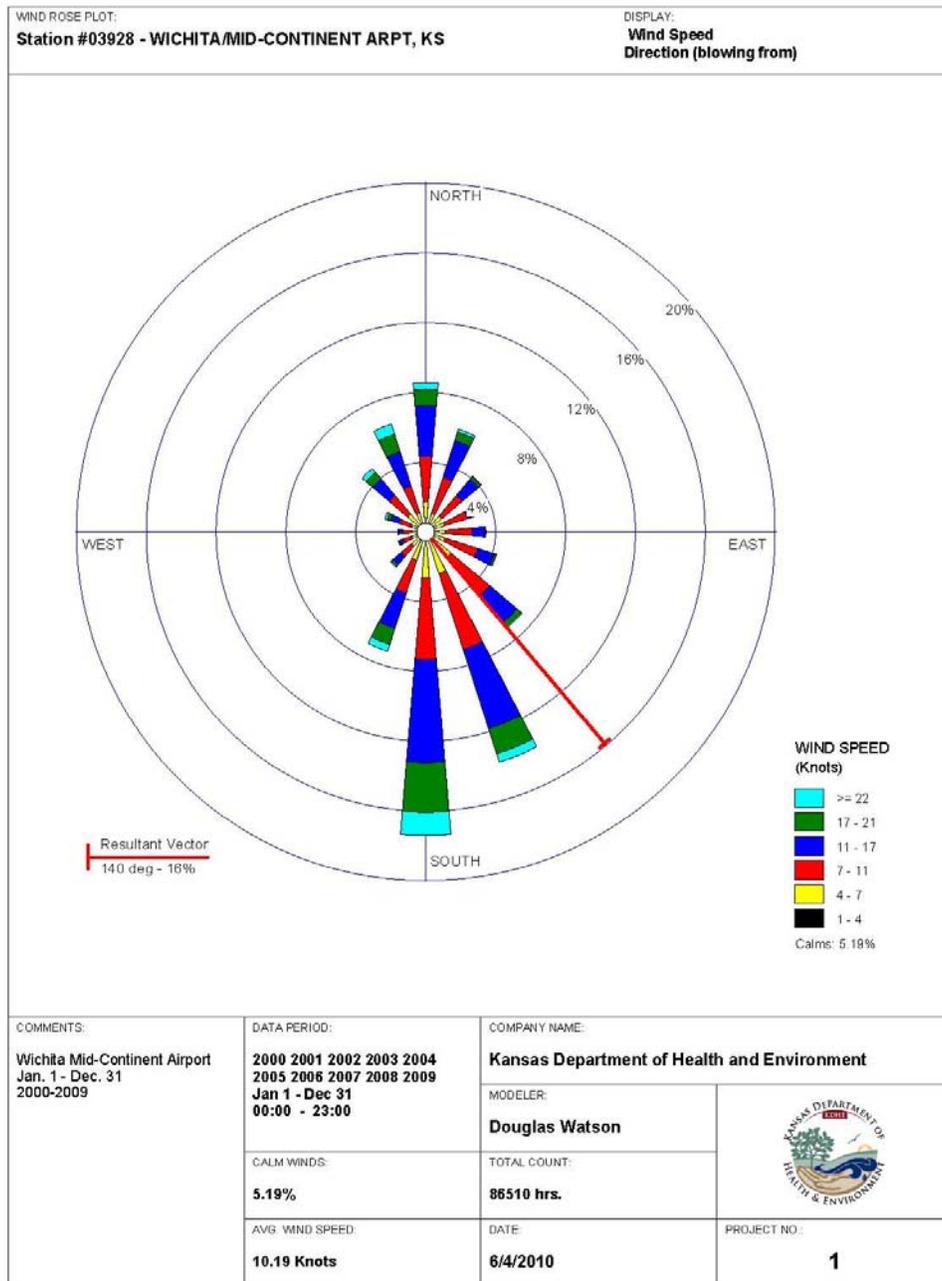


Figure 5. Wichita ASOS Wind Rose 2000 – 2009

APPENDIX B

Kansas MSA and CSA Population Data

Metropolitan Statistical Area	1-Jul-09 Estimate	2000 Population	Percent Change (2000–2009)
Topeka MSA	228,692	224,551	1.84%
Manhattan MSA	123,086	108,999	12.92%
Kansas City MSA	2,067,585	1,836,038	12.61%
Wichita MSA	612,683	571,166	7.27%
Lawrence MSA	116,383	99,962	16.43%

Combined Statistical Area	1-Jul-09 Estimate	2000 Population	Percent Change (2000–2009)
Kansas City-Overland Park-Kansas City CSA	2,136,653	1,901,070	12.39%
Wichita-Winfield CSA	646,317	607,457	6.40%

http://en.wikipedia.org/wiki/Table_of_United_States_Metropolitan_Statistical_Areas

http://en.wikipedia.org/wiki/Table_of_United_States_Combined_Statistical_Areas

APPENDIX C

Kansas Micropolitan Statistical Areas Population Data

Micropolitan Statistical Area	1-Jul-09 Estimate	2000 Population	Percent Change (2000–2009)
Atchison μSA	16,411	16,774	-2.16%
Coffeyville μSA	34,254	36,252	-5.51%
Dodge City μSA	33,692	32,458	3.80%
Emporia μSA	36,399	38,965	-6.59%
Garden City μSA	42,074	40,523	3.83%
Great Bend μSA	27,464	28,205	-2.63%
Hays μSA	27,739	27,507	0.84%
Hutchinson μSA	63,357	64,790	-2.21%
Liberal μSA	23,013	22,510	2.23%
McPherson μSA	28,866	29,554	-2.33%
Parsons μSA	21,776	22,835	-4.64%
Pittsburg μSA	38,869	38,242	1.64%
Salina μSA	60,338	59,760	0.97%
Winfield μSA	33,634	36,291	-7.32%

http://en.wikipedia.org/wiki/Table_of_United_States_Micropolitan_Statistical_Areas

APPENDIX D

The following contains a table of the latest emission inventory for individual sources in the state and a map of Title V and PSD permitted facility source locations in the state.

2008 Title V Facility Level Emissions (tons/yr)

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
0010004	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	10.30	0.29	0.15	0.15	0.00	2.66	0.02
0010009	MONARCH CEMENT COMPANY (THE)	3241	1,647.35	47.51	3.63	130.67	4.72	917.66	23.68
0010042	ALLEN COUNTY LANDFILL	4953	0.37	0.68	1.32	2.14	0.13	6.86	0.60
0030009	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	107.49	12.25	1.77	1.77	0.00	16.68	4.91
0030017	ASTRO TRUCK COVERS, INC.	3792	0.20	35.84	0.02	0.02	0.00	0.04	15.05
0050002	MGP INGREDIENTS, INC.	2085	61.13	78.02	9.48	114.50	12.92	70.84	10.12
0050020	BRADKEN - ATCHISON/ST. JOSEPH INC	3325	32.52	342.22	97.97	233.66	9.26	291.81	17.31
0050022	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	4.48	0.07	0.02	0.02	0.00	7.34	0.04
0070016	ONEOK FIELD SERVICES COMPANY, LLC	1311	234.79	21.20	4.14	4.14	0.07	67.74	6.77
0070048	ONEOK FIELD SERVICES COMPANY, LLC	1311	202.66	67.64	1.48	1.48	0.06	93.22	6.86
0090002	MID-KANSAS ELECTRIC COMPANY LLC -GREAT BEND STATION	4911	149.50	3.84	5.31	5.31	0.40	16.76	1.53
0090031	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	633.46	45.98	6.22	6.22	0.09	137.76	9.59
0090069	GLASS KING MANUFACTURING COMPANY	3089	0.00	4.51	0.00	0.11	0.00	0.00	4.60
0090070	MCDONALD TANK & EQUIPMENT COMPANY	3089	0.00	10.85	0.00	0.00	0.00	0.00	10.85
0110014	PEERLESS PRODUCTS, INC.	3442	0.00	45.71	0.00	0.00	0.00	0.00	25.68
0150004	FRONTIER EL DORADO REFINING COMPANY	2911	1,161.35	894.49	497.41	497.42	1,529.79	643.60	49.62
0150009	AUGUSTA MUNICIPAL POWER PLANT (#1)	4911	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0150010	AUGUSTA MUNICIPAL POWER PLANT (#2)	4911	6.42	0.48	0.13	0.14	0.01	2.76	0.03
0150027	SHERWIN-WILLIAMS COMPANY (THE)	2851	1.54	22.24	1.75	1.75	0.01	1.29	9.19
0150029	ENBRIDGE PIPELINES (OZARK) LLC	4612	0.00	76.54	0.00	0.00	0.00	0.00	4.75
0150041	BUTLER COUNTY SANITARY LANDFILL	4953	1.80	8.81	0.00	13.41	0.00	33.76	1.59
0210002	EMPIRE DISTRICT ELECTRIC COMPANY (THE)	4911	1,086.00	10.79	24.63	98.41	5,556.00	119.73	35.12
0210023	EVONIK-JAYHAWK FINE CHEMICALS	2869	201.05	36.78	1.14	1.14	0.33	10.42	3.36
0210026	BAGCRAFT PAPERCON	2673	0.67	15.99	0.05	0.05	0.00	0.56	0.00

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
0210028	WHEATLAND LANDFILL, L.L.C.	4953	2.98	1.07	1.28	1.43	1.16	55.82	1.16
0210043	PRESTIGE CABINETS INC.	2434	0.00	20.60	0.00	1.28	0.00	0.00	3.62
0230013	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	247.66	10.38	3.77	3.77	0.00	30.20	6.07
0250015	DCP MIDSTREAM, LP	4922	217.31	45.23	1.99	1.99	0.02	154.64	2.84
0250016	DCP MIDSTREAM, LP	4922	224.62	52.84	1.76	1.76	0.04	174.45	2.73
0270001	NORTHERN NATURAL GAS COMPANY	4922	431.13	31.74	7.74	7.74	2.27	81.15	5.88
0270007	CLAY CENTER PUBLIC UTILITIES	4911	5.53	0.50	0.12	0.13	0.03	2.92	0.00
0290009	CLOUD CERAMICS (DIV. GENERAL FINANCE)	3251	14.02	2.16	0.00	42.34	26.84	48.07	10.95
0290010	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	357.86	9.47	3.35	3.35	0.39	82.67	3.30
0290028	NUSTAR PIPELINE OPERATING PARTNERSHIP L.P.	5171	0.00	111.27	0.00	0.00	0.00	0.00	6.57
0330001	ANR PIPELINE COMPANY	4922	0.18	0.03	0.00	0.00	0.00	0.08	0.00
0350012	WINFIELD MUNICIPAL POWER PLANT	4911	4.40	0.09	0.12	0.12	0.01	1.32	0.00
0350031	GE ENGINE SERVICES, INC - STROTHER SOUTH	3724	63.83	79.34	3.12	3.12	5.25	29.51	1.50
0350032	GREIF, INC.	3412	0.66	69.24	0.05	0.05	0.00	0.55	16.29
0350036	COFFEYVILLE RESOURCES CRUDE TRANSPORTATI	4612	0.00	181.18	0.00	0.00	0.00	0.00	14.23
0370031	KENDALL PACKAGING CORP.	2759	0.00	95.89	0.00	0.00	0.00	0.00	0.00
0370039	OAK GROVE LANDFILL	4953	10.19	2.61	1.37	14.89	2.13	54.56	0.66
0410008	ANR PIPELINE COMPANY	4922	578.50	18.14	1.54	1.54	0.09	28.68	10.29
0410017	WESTAR ENERGY, INC.	4911	12.79	0.08	0.26	0.26	0.14	3.28	0.00
0430001	MAGELLAN PIPELINE COMPANY, L.P.	5171	0.00	88.87	0.00	0.00	0.00	0.00	4.61
0450006	API FOILS	3497	1.30	15.61	0.10	0.23	0.01	1.09	5.34
0450013	ICL PERFORMANCE PRODUCTS, LP	2819	34.65	1.91	12.24	63.18	0.21	29.10	0.56
0450014	WESTAR ENERGY, INC.	4911	4,315.97	70.82	703.39	1,018.28	2,704.16	589.62	15.26
0450055	CHEMTRADE LOGISTICS PHOSPHORUS SPECIALTIES,LLC	2819	0.55	0.03	0.04	4.20	4.11	0.46	0.00
0470012	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	2.17	0.32	0.06	0.06	0.02	1.28	0.00
0510056	HESS SERVICES INC	3089	0.00	34.90	0.91	14.42	0.00	0.00	31.36
0530001	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	8.13	1.56	0.16	0.16	0.07	4.96	0.00
0530002	ONEOK FIELD SERVICES COMPANY, LLC	1321	69.12	338.15	13.52	17.25	1.63	74.20	23.08
0530004	ACME BRICK COMPANY	3251	4.42	0.30	0.00	10.99	8.47	15.16	6.82

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
0550009	WTG HUGOTON, LP	4922	34.19	5.30	0.40	0.40	0.03	34.15	1.25
0550023	SUNFLOWER ELECTRIC POWER CORPORATION	4911	4,514.94	5.23	57.84	138.84	1,955.73	480.80	4.60
0550024	WTG HUGOTON, LP	4922	485.49	32.44	0.18	0.18	0.09	70.78	10.00
0550026	SUNFLOWER ELECTRIC POWER CORPORATION	4911	133.79	2.08	3.24	3.24	0.27	16.67	1.96
0550043	TYSON FRESH MEATS, INC.	2011	55.62	29.73	45.47	50.72	0.48	56.73	0.94
0550054	EXXONMOBIL PRODUCTION COMPANY	1311	22.55	3.23	0.00	0.26	0.02	14.83	1.41
0550055	PALMER MANUFACTURING AND TANK, INC.	3443	0.00	59.04	0.00	3.75	0.00	0.00	48.08
0550062	WESTERN PLAINS REGIONAL LANDFILL	4953	0.02	1.16	0.63	4.80	0.00	0.11	0.61
0550085	KINDER MORGAN INTERSTATE GAS TRANS	4922	961.26	46.42	9.45	9.45	0.18	65.29	15.26
0570001	MID-KANSAS ELECTRIC COMPANY LLC -FORT DODGE STATION	4911	365.40	13.20	18.25	18.25	1.50	201.67	4.50
0570003	KOCH NITROGEN COMPANY, LLC	2873	801.63	80.17	220.45	220.45	0.77	271.86	78.39
0570012	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	308.56	62.33	1.12	1.12	0.32	45.74	3.98
0570013	NATIONAL BEEF PACKING COMPANY, L.L.C.	2011	54.68	21.23	62.67	65.39	0.59	59.24	0.96
0570030	CARGILL MEAT SOLUTIONS	2011	13.94	1.53	53.08	53.08	51.93	23.37	0.00
0590006	OTTAWA MUNICIPAL POWER PLANT	4911	34.46	2.25	0.69	0.71	0.11	13.77	0.00
0590018	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	8.65	2.80	0.62	0.38	0.00	2.28	0.00
0590022	QUEST PIPELINES (KPC), LP	4922	3.78	0.05	0.03	0.03	0.00	5.85	0.00
0590035	SCHUFF STEEL MIDWEST	3441	1.99	24.60	0.36	0.87	0.11	0.70	11.79
0670007	COLUMBIAN CHEMICALS COMPANY	2895	402.77	38.55	0.00	16.58	2,060.39	1,090.84	4.73
0670008	EXXONMOBIL PRODUCTION COMPANY	1311	201.34	13.12	5.00	5.00	0.06	37.32	7.78
0670017	PIONEER NATURAL RESOURCES USA, INC.	4922	49.10	4.98	0.78	0.78	0.03	55.99	2.77
0670023	BP AMERICA PRODUCTION COMPANY	4922	60.29	25.86	0.01	0.01	0.06	59.18	11.03
0670024	BP AMERICA PRODUCTION COMPANY	4922	41.51	19.12	0.01	0.01	0.06	58.19	12.06
0670025	DCP MIDSTREAM, LP	4922	767.52	99.59	11.71	11.71	0.14	93.61	20.18
0670026	DCP MIDSTREAM, LP	4922	206.37	22.70	2.68	2.68	0.06	187.98	2.60
0670029	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	190.05	16.13	3.52	3.52	0.00	48.44	1.40
0670030	BP AMERICA PRODUCTION COMPANY	1311	331.38	23.54	2.46	2.82	0.06	41.50	11.89
0670031	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0670032	BP AMERICA PRODUCTION COMPANY	1311	901.74	65.31	6.85	7.57	0.22	132.75	36.56

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
0670035	ONEOK FIELD SERVICES COMPANY, LLC	4922	1,002.22	106.10	15.27	15.27	0.19	122.04	26.82
0670045	EXXONMOBIL PRODUCTION COMPANY	1311	21.35	3.10	0.25	0.25	0.01	14.04	1.33
0670046	EXXONMOBIL PRODUCTION COMPANY	4922	31.67	4.51	0.37	0.37	0.02	20.82	1.97
0670048	OXY USA, INC.	4922	29.84	17.21	0.00	0.00	0.00	42.63	0.00
0670049	PIONEER NATURAL RESOURCES USA, INC.	1321	671.56	157.86	9.00	9.00	4.55	632.04	42.13
0690011	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	174.78	18.15	2.66	2.66	0.00	21.31	4.05
0730014	QUEST PIPELINES (KPC), LP	4922	16.69	0.22	0.14	0.14	0.00	25.81	0.00
0750006	KINDER MORGAN INTERSTATE GAS TRANS	4922	125.56	16.54	0.11	0.11	0.05	24.25	3.05
0750009	REGENCY GAS SERVICES	4922	123.85	7.62	0.40	0.40	0.00	16.81	0.76
0750012	ONEOK FIELD SERVICES COMPANY, LLC	1311	187.98	39.59	3.78	3.78	0.05	69.28	8.49
0770001	ONEOK FIELD SERVICES COMPANY, LLC	4922	600.73	23.51	9.50	9.50	0.52	73.73	14.35
0770002	ANTHONY MUNICIPAL POWER PLANT	4911	27.30	2.02	0.56	0.58	0.03	11.73	0.00
0770038	PLUMB THICKET LANDFILL	4953	0.00	3.33	1.83	17.25	0.00	0.00	1.78
0790001	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	352.76	16.06	5.38	5.38	0.00	43.10	8.59
0790021	AGCO CORPORATION	3523	11.40	83.34	0.90	5.39	0.07	7.68	8.59
0790045	MID CONTINENT CABINETRY	2434	1.73	186.82	0.13	0.41	0.01	1.46	28.03
0810004	REGENCY FIELD SERVICES, LLC	4922	736.54	45.33	2.41	2.41	0.00	100.00	4.50
0810007	ONEOK FIELD SERVICES COMPANY, LLC	4922	153.26	43.16	5.21	5.21	0.16	214.61	8.44
0810012	BP AMERICA PRODUCTION COMPANY	1311	504.34	36.00	3.76	3.78	0.15	95.74	24.71
0810015	DCP MIDSTREAM, LP	4922	548.82	66.37	6.85	6.85	0.12	369.94	6.48
0870025	HAMM SANITARY LANDFILL	4953	0.00	7.20	6.10	25.22	4.41	0.00	8.54
0910010	SPX COOLING TECHNOLOGIES, INC.	3089	1.19	144.94	0.03	0.41	0.01	0.29	9.07
0910055	ROBBIE MANUFACTURING, INC.	2759	0.77	142.95	0.06	0.06	0.00	0.65	0.00
0910057	AGC FLAT GLASS NORTH AMERICA, INC.	3211	883.24	9.74	0.00	64.86	223.86	171.11	1.16
0910074	PACKAGING PRODUCTS CORPORATION, LLC	2759	0.52	101.77	0.04	0.04	0.00	0.44	0.00
0910084	VITA CRAFT CORPORATION	3469	0.00	0.00	0.00	92.03	0.00	0.00	14.50
0910117	DEFFENBAUGH INDUSTRIES, INC.	4953	11.25	28.78	4.65	5.28	8.36	205.20	12.13
0910174	KANSAS CITY POWER & LIGHT CO.-WEST GARDNER	4911	12.34	0.99	0.89	0.89	0.28	7.05	0.00
0910249	ENGINEERED AIR	3585	0.00	14.93	0.00	0.00	0.00	0.00	7.10

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
0930005	REGENCY GAS SERVICES	4922	279.65	17.21	0.91	0.91	0.00	37.97	1.71
0930008	WTG HUGOTON, LP	4922	172.01	46.51	0.67	0.67	0.05	315.19	3.45
0930010	BP AMERICA PRODUCTION COMPANY	1311	678.67	45.78	4.97	5.69	0.14	109.76	29.17
0930012	KINDER MORGAN INTERSTATE GAS TRANS	4922	671.52	27.78	0.10	0.13	0.12	72.00	7.51
0930017	REGENCY GAS SERVICES	4922	350.92	21.60	1.15	1.15	0.00	47.64	2.15
0937003	REGENCY GAS SERVICES	1321	331.31	20.39	1.08	1.08	0.00	44.98	2.03
0937055	COLORADO INTERSTATE GAS COMPANY	4922	509.27	19.28	7.76	7.76	0.09	62.01	12.60
0950002	ONEOK FIELD SERVICES COMPANY, LLC	1321	857.59	75.51	2.37	2.37	0.13	178.49	10.53
0950004	KINGMAN MUNICIPAL POWER PLANT	4911	34.45	2.45	0.96	1.03	0.01	16.49	0.31
0950023	KANSAS GAS SERVICE	4922	91.69	7.28	1.40	1.40	0.02	11.16	2.21
0950043	ONEOK FIELD SERVICES COMPANY, LLC	1311	40.83	9.74	0.36	0.36	0.01	68.66	1.31
0970009	ANR PIPELINE COMPANY	4922	659.29	19.06	1.60	1.60	0.09	28.29	11.58
0970010	NORTHERN NATURAL GAS COMPANY	4922	876.97	1,392.03	9.22	9.33	0.18	108.81	42.68
0970011	PANHANDLE EASTERN PIPE LINE COMPANY	4922	1,350.31	49.76	9.58	9.58	0.62	148.77	25.75
0970019	ONEOK FIELD SERVICES COMPANY, LLC	1311	73.17	4.97	0.64	0.64	0.02	123.17	1.04
0970024	ONEOK FIELD SERVICES COMPANY, LLC	1311	68.21	4.96	0.60	0.60	0.02	114.82	1.00
0990001	WESTAR ENERGY, INC.	4911	3.18	0.16	0.20	0.20	0.01	0.63	0.00
0990010	KANSAS ARMY AMMUNITION PLANT	3489	10.96	0.07	1.54	2.20	58.56	1.39	0.00
0990037	COLUMBIAN TECTANK	3443	3.75	110.05	10.16	12.50	0.02	1.95	8.00
0990041	GRANDVIEW PRODUCTS COMPANY, INC.	2434	0.00	150.08	0.00	0.48	0.00	0.00	39.03
1030011	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	20.14	1.05	0.31	0.31	0.00	2.51	0.44
1030016	HALLMARK CARDS, INC.	2679	2.13	38.59	0.16	0.16	0.01	1.79	0.92
1030019	FBOP LEAVENWORTH	9223	5.75	8.62	0.43	0.44	0.10	4.30	0.00
1070005	KANSAS CITY POWER & LIGHT CO.	4911	10,988.30	251.74	222.38	487.72	23,375.52	1,496.31	142.16
1110006	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	261.20	11.24	3.98	3.98	0.00	31.86	6.26
1110007	PANHANDLE EASTERN PIPE LINE COMPANY	4922	1,107.95	62.46	19.14	19.14	1.88	213.89	25.48
1110008	BUNGE NORTH AMERICA, INC.	2075	31.34	241.99	10.86	39.39	0.19	26.32	149.76
1110014	TYSON FRESH MEATS, INC.	2011	13.78	2.16	2.86	3.27	0.09	12.00	0.02
1110036	CAMOPLAST ROCKLAND LIMITED	3061	1.97	7.78	0.15	0.30	0.01	1.65	11.42

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
1110046	WESTAR ENERGY, INC.	4911	68.45	2.28	7.17	7.17	0.53	89.04	1.93
1130003	NATIONAL COOP. REFINERY ASSN.	2911	1,351.13	621.19	114.97	151.79	458.57	637.59	86.84
1130014	MCPHERSON BOARD OF PUBLIC UTILITIES	4911	3.23	0.27	0.06	0.06	0.00	0.70	0.00
1130019	MID-CONTINENT FRACTIONATION AND STORAGE, LLC	1321	328.26	17.42	11.61	11.61	1.86	150.90	4.46
1130036	JOHNS MANVILLE INTERNATIONAL, INC.	3296	16.16	91.19	158.41	158.41	0.69	685.85	0.92
1130046	MCPHERSON BOARD OF PUBLIC UTILITIES	4911	9.27	0.19	0.47	0.47	0.03	2.14	0.00
1170021	GEORGIA-PACIFIC GYPSUM LLC	3275	21.46	3.50	2.14	102.07	0.13	18.02	0.00
1190014	ANR PIPELINE COMPANY	4922	186.70	5.42	0.47	0.47	0.03	10.48	3.26
1190025	PANHANDLE EASTERN PIPE LINE COMPANY	4922	328.52	22.88	5.24	5.24	0.08	43.07	12.82
1210003	CONOCO PHILLIPS PIPE LINE CO.-PAOLA STAT	4613	37.71	47.90	0.09	0.14	0.05	53.25	0.00
1210015	PANHANDLE EASTERN PIPE LINE COMPANY	4922	2,045.05	80.07	31.16	31.16	0.38	249.30	49.03
1210017	MAGELLAN PIPELINE COMPANY, L.P.	4613	12.95	1.12	0.25	0.26	0.08	5.56	0.00
1210030	KANSAS CITY POWER & LIGHT CO.- OSAWATOMIE	4911	0.61	0.03	0.03	0.03	0.01	0.24	0.00
1230012	BELOIT MUNICIPAL POWER PLANT	4911	9.35	0.69	0.19	0.20	3.27	4.02	0.00
1250002	COFFEYVILLE MUNICIPAL LIGHT & POWER	4911	0.57	0.01	0.02	0.02	0.00	0.17	0.00
1250003	COFFEYVILLE RESOURCES REFIN. & MKTNG.	2911	823.06	1,136.24	166.78	166.78	504.89	819.53	35.86
1250005	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	476.96	19.55	6.54	6.54	0.00	58.98	11.26
1250007	ACME FOUNDRY, INC.	3321	6.93	136.37	2.05	25.53	13.80	232.93	4.89
1250020	MFG CONSTRUCTION PRODUCTS, INC	3089	0.00	16.39	0.00	0.00	0.00	0.00	16.39
1250049	CLEAN HARBORS PPM, LLC	4953	0.92	0.05	0.17	3.48	0.01	0.77	51.84
1250056	MAGELLAN PIPELINE COMPANY, L.P.	4613	95.14	7.33	1.96	2.02	0.60	40.88	0.00
1250059	COFFEYVILLE RESOURCES CRUDE TRANSPORTATI	4612	0.00	174.16	0.00	0.00	0.00	0.00	15.83
1250063	CESSNA AIRCRAFT COMPANY	3721	4.23	37.20	0.46	0.46	0.02	0.59	2.79
1250079	COFFEYVILLE RESOURCES NITROGEN FERT.	2873	78.22	42.11	14.52	17.49	143.35	580.60	41.47
1290005	REGENCY FIELD SERVICES, LLC	4922	219.95	13.82	0.72	0.72	0.00	29.86	1.36
1290006	REGENCY FIELD SERVICES, LLC	1311	88.75	4.72	0.64	0.64	0.00	18.97	0.50
1290008	WTG HUGOTON, LP	4922	122.86	15.26	0.53	0.53	0.03	206.76	5.65
1290011	DCP MIDSTREAM, LP	4922	229.77	39.28	3.51	3.51	0.04	28.07	4.82
1290012	ANADARKO GATHERING COMPANY LLC	4922	141.50	6.72	1.25	1.25	0.04	116.68	2.09

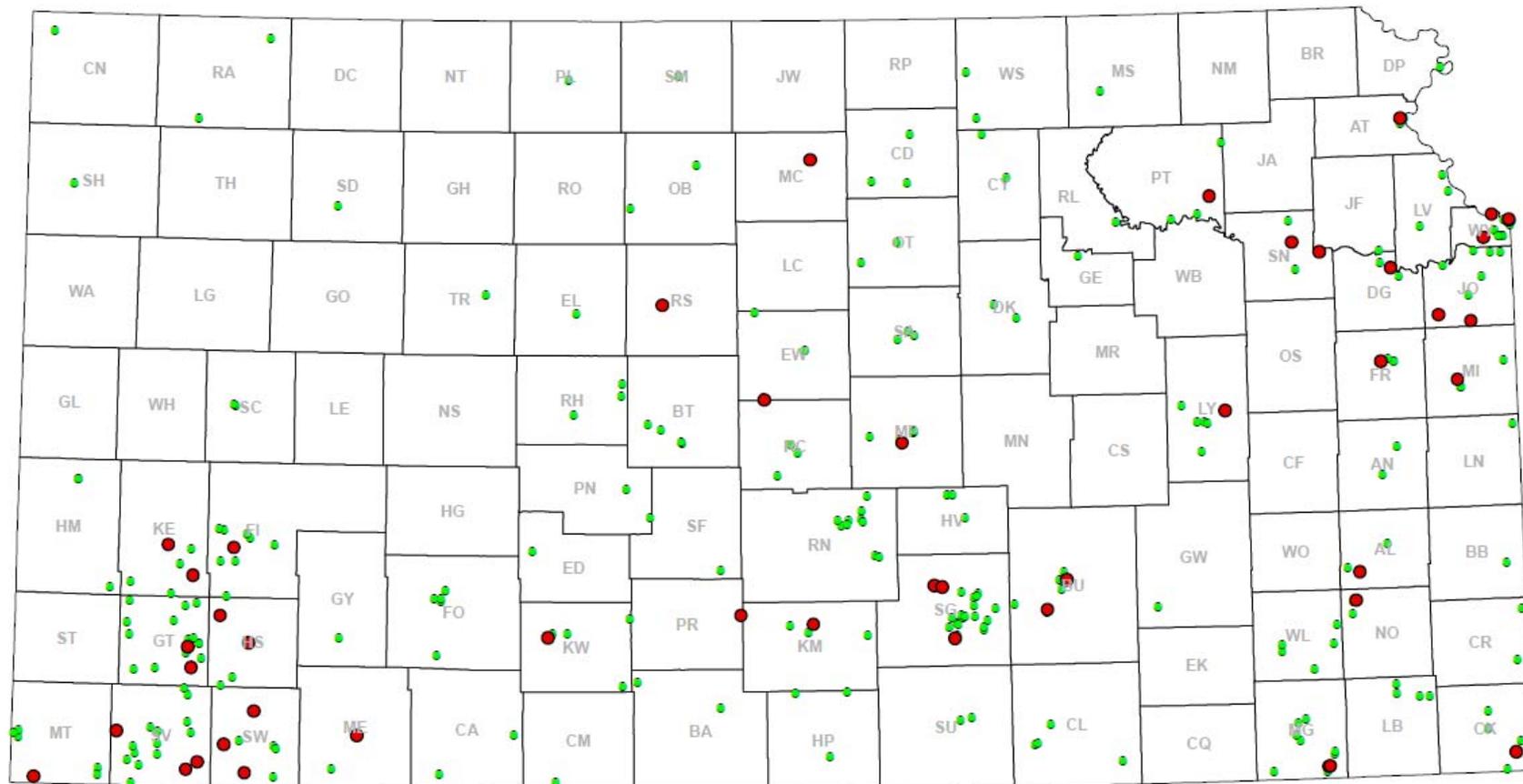
Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
1297127	COLORADO INTERSTATE GAS COMPANY	4922	481.07	14.49	1.80	1.80	0.07	39.95	7.21
1330001	ASH GROVE CEMENT COMPANY	3241	1,872.79	24.56	18.14	253.67	79.02	302.72	97.57
1330027	HBD INDUSTRIES, INC.	3444	0.32	5.05	0.02	0.02	0.00	0.27	5.03
1330028	CITY OF CHANUTE ELEC. DEPT., PLANT #3	4911	52.03	3.85	1.07	1.10	0.04	22.33	0.00
1330030	CITY OF CHANUTE ELEC. DEPT., PLANT #2	4911	11.73	0.29	0.74	0.74	0.07	2.02	0.00
1410020	KINDER MORGAN INTERSTATE GAS TRANS	4922	41.71	51.26	1.74	1.74	0.08	106.01	11.95
1410023	OSBORNE INDUSTRIES, INC.	3089	0.00	4.43	0.00	0.00	0.00	0.00	4.41
1430001	NORTHERN NATURAL GAS COMPANY	4922	152.88	7.89	3.15	3.15	1.63	39.18	0.34
1430022	DAK PLASTICS, INC.	3089	0.00	24.92	0.00	0.00	0.00	0.00	24.92
1450016	NORTHERN NATURAL GAS COMPANY	4922	121.95	3.26	2.61	2.61	1.33	32.22	0.27
1450039	HANSON ENGINEERING, L.C.	1311	0.11	0.01	0.01	0.01	6.26	0.09	0.00
1470001	COFFEYVILLE RESOURCES TERMINAL LLC	5171	9.61	118.88	0.76	0.76	0.06	6.53	8.18
1490001	WESTAR ENERGY, INC.	4911	19,818.34	264.42	581.58	1,409.08	47,934.13	4,112.25	81.09
1490012	WAMEGO MUNICIPAL POWER PLANT	4911	18.44	1.34	0.55	0.57	0.03	7.62	0.00
1490016	ANR PIPELINE COMPANY	4922	414.58	15.58	1.31	1.31	0.05	54.89	10.34
1490020	THE ONYX COLLECTION, INC.	3088	0.00	64.61	0.00	0.00	0.00	0.00	64.61
1510018	NORTHERN NATURAL GAS COMPANY	4922	34.75	16.87	1.19	1.19	0.08	8.50	1.61
1530014	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	250.90	10.50	3.83	3.83	0.00	30.62	6.14
1530019	KINDER MORGAN INTERSTATE GAS TRANS	4922	23.68	30.69	1.04	1.04	0.05	63.43	7.28
1550008	PANHANDLE EASTERN PIPE LINE COMPANY	4922	2,275.75	82.13	25.08	25.08	0.40	245.68	49.30
1550009	KRAUSE CORPORATION, INC.	3523	1.11	30.33	0.00	0.33	0.00	0.00	7.76
1550011	ONEOK HYDROCARBON L.P.	1321	63.91	188.07	4.31	4.31	1.76	56.99	3.66
1550033	WESTAR ENERGY, INC.	4911	396.96	9.04	11.89	11.89	1.09	131.83	0.27
1550063	SONOCO-HUTCHINSON, LLC	2631	72.38	10.50	1.96	1.96	0.16	21.71	0.00
1550066	NUSTAR PIPELINE OPERATING PARTNERSHIP L.P.	5171	0.79	66.27	0.00	0.00	0.00	1.98	4.37
1550071	COLLINS BUS CORPORATION	3713	1.05	58.20	0.08	0.81	0.01	0.88	5.48
1550086	HAVEN STEEL PRODUCTS, INC.	3499	2.91	12.56	0.22	0.22	0.02	2.44	0.20
1550110	RENO COUNTY MUNICIPAL SOLID WASTE LANDFILL	4953	0.36	9.78	0.00	0.10	0.09	3.46	8.14
1550122	ADE-WIFCO STEEL PRODUCTS INC	3448	0.00	26.20	0.00	7.61	0.00	0.00	5.03

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
1590005	NORTH AMERICAN SALT COMPANY	2899	49.90	2.74	6.85	44.02	0.30	41.91	0.90
1590007	NORTHERN NATURAL GAS COMPANY	4922	1,544.03	93.18	8.88	8.88	5.37	141.79	29.79
1590008	ANR PIPELINE COMPANY	4922	300.10	10.41	0.89	0.89	0.05	25.29	6.30
1590015	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	103.27	4.10	1.58	1.58	0.00	12.72	2.53
1610001	FORT RILEY, ARMY	9711	53.56	127.44	6.20	6.21	6.10	35.61	53.62
1610007	KANSAS STATE UNIVERSITY	8221	8.12	1.91	2.64	2.64	0.21	29.23	0.61
1650004	LINDE GLOBAL HELIUM	2813	24.32	0.38	0.30	0.30	0.01	39.89	0.00
1650016	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	250.67	10.49	3.82	3.82	0.00	30.61	6.15
1650023	KBK INDUSTRIES, LLC	3089	0.00	105.14	0.00	0.00	0.00	0.00	105.14
1670005	RUSSELL MUNICIPAL POWER PLANT	4911	1.15	0.52	0.00	0.20	0.01	0.47	0.00
1690037	CRESTWOOD, INC.	2434	0.00	37.59	0.00	1.88	0.00	0.00	6.07
1690050	SCHWANS GLOBAL SUPPLY CHAIN, INC. (TONYS PIZZA)	2038	10.92	263.22	0.83	0.83	0.07	9.17	0.00
1690059	SALINA MUNICIPAL SOLID WASTE LANDFILL	4953	0.01	6.89	1.57	11.35	0.00	0.00	4.51
1710011	ONEOK FIELD SERVICES COMPANY, LLC	1321	86.24	26.22	0.22	0.22	0.01	7.93	1.63
1710025	KINDER MORGAN INTERSTATE GAS TRANS	4922	83.74	20.94	6.08	6.08	0.09	71.16	9.78
1730006	GREDE FOUNDRIES, INC.	3321	2.29	48.96	17.72	67.99	0.34	1.76	4.96
1730012	WESTAR ENERGY, INC.	4911	865.36	17.99	25.17	25.17	2.07	281.90	0.84
1730014	WESTAR ENERGY, INC.	4911	372.54	7.90	10.85	10.85	0.91	119.88	0.01
1730019	CESSNA AIRCRAFT COMPANY - MID-CONTINENT	3721	21.39	157.08	10.14	10.14	0.12	11.73	24.35
1730022	HAWKER BEECHCRAFT CORPORATION	3721	32.07	113.87	2.42	7.43	2.31	26.71	24.83
1730023	AIR PRODUCTS MANUFACTURING CORP.	2869	24.71	44.57	1.10	1.19	0.09	16.69	5.19
1730029	CARGILL, INC.	2075	52.50	247.19	44.97	48.17	0.32	44.10	7.57
1730045	CONOCOPHILLIPS PIPE LINE CO.	5171	0.80	58.84	0.00	0.00	0.01	1.57	0.00
1730052	LEARJET, INC.	3721	5.14	71.37	0.29	0.33	0.03	1.26	16.21
1730055	BOEING INTEGRATED DEFENSE SYSTEMS, WICHITA	3721	11.30	13.23	1.19	4.44	0.24	10.64	2.96
1730058	YORK UNITARY PRODUCTS	3585	0.16	24.40	0.01	0.01	0.00	0.13	0.00
1730059	CNH AMERICA, LLC	3531	27.35	89.54	1.87	4.98	1.69	7.03	8.52
1730068	COLEMAN CO., INC. THE	3999	7.27	54.75	0.55	5.85	0.04	6.70	7.67
1730070	OXYCHEM - WICHITA PLANT	2812	504.15	22.79	13.88	105.53	1.10	153.10	20.41

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
1890015	ANADARKO GATHERING COMPANY LLC	4922	526.11	79.86	8.28	8.28	0.19	180.53	19.05
1890023	EXXONMOBIL PRODUCTION COMPANY	1311	10.17	0.65	0.25	0.25	0.00	1.85	0.29
1890024	EXXONMOBIL PRODUCTION COMPANY	1311	127.26	7.98	3.17	3.17	0.04	23.16	3.62
1890025	WTG HUGOTON, LP	4922	126.13	13.83	2.14	2.14	0.03	37.85	3.34
1890032	WTG HUGOTON, LP	4922	46.45	2.29	0.28	0.28	0.01	66.57	0.72
1890038	OXY USA, INC.	1311	249.98	18.77	0.06	0.06	0.04	148.63	1.38
1890044	ANADARKO GATHERING COMPANY LLC	4922	69.55	0.08	0.31	0.31	0.00	5.02	0.45
1890046	WTG HUGOTON, LP	4922	166.91	15.90	4.00	4.00	0.03	42.10	3.13
1890050	DORCHESTER MINERALS OPERATING LP	1311	44.96	15.90	0.40	0.40	0.01	69.41	1.63
1890051	ANADARKO GATHERING COMPANY LLC	4922	134.06	33.31	3.15	3.15	0.17	138.95	9.65
1890054	WTG HUGOTON, LP	4922	102.89	35.87	0.00	0.00	0.02	102.89	2.92
1890198	ANADARKO GATHERING COMPANY LLC	4922	142.89	1.75	0.26	0.26	0.02	7.94	0.79
1910019	WELLINGTON MUNICIPAL POWER PLANT	4911	0.88	0.03	0.03	0.03	0.57	0.36	0.00
1910056	WELLINGTON CITY POWER PLANT, GAS TURBINE	4911	1.90	0.03	0.10	0.10	0.01	0.44	0.00
1950011	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.	4922	252.49	10.56	3.85	3.85	0.00	30.84	6.18
2010001	NATURAL GAS PIPELINE COMPANY OF AMERICA	4922	52.29	10.34	0.66	0.66	0.33	31.29	0.00
2010012	MID-KANSAS ELECTRIC COMPANY LLC -CLIFTON STATION	4911	0.28	0.01	0.00	0.01	0.02	0.07	0.00
2050037	COBALT BOATS, LLC	3732	0.00	132.32	18.53	18.53	0.00	0.00	108.73
2050045	BLUESTEM PIPELINE, LLC	1311	177.61	54.01	0.00	0.00	0.00	100.87	1.05
2050055	BLUESTEM PIPELINE, LLC	1311	66.72	46.99	0.00	0.00	0.00	78.77	6.88
2057022	LAFARGE MIDWEST, INC.	3241	1,920.65	5.58	0.00	19.97	412.39	89.01	20.24
2057039	SYSTECH ENVIRONMENTAL CORP.	4953	20.56	27.86	0.00	0.00	0.00	7.24	8.23
2090001	CERTAINTED CORPORATION	3296	64.20	60.17	0.97	68.01	0.24	89.80	23.55
2090003	FOREST VIEW LANDFILL, LLC	4953	8.79	1.72	3.74	3.74	3.08	164.81	2.74
2090008	BOARD OF PUBLIC UTILITIES - NEARMAN	4911	3,526.37	32.25	34.35	93.68	5,992.03	269.26	16.48
2090009	AMSTED RAIL COMPANY, INC.	3462	42.28	37.35	31.46	57.12	9.32	229.61	8.95
2090010	OWENS CORNING INSULATING SYSTEMS, LLC	3296	218.67	98.75	178.13	211.07	36.31	114.70	63.00
2090039	PQ CORPORATION	2819	90.84	13.68	4.69	17.71	0.55	43.42	8.05
2090046	GENERAL MOTORS LLC	3711	37.36	934.08	3.57	29.95	0.39	14.11	37.22

Facility ID	NAME	SIC	NO _x	VOC	PM _{2.5}	PM ₁₀	SO _x	CO	HAPs
2090048	BOARD OF PUBLIC UTILITIES - QUINDARO	4911	3,416.05	29.83	21.98	47.62	3,901.87	174.53	2.19
2090049	BOARD OF PUBLIC UTILITIES - KAW	4911	0.12	0.01	0.01	0.01	0.00	0.09	0.00
2090060	MAGELLAN PIPELINE COMPANY, L.P.	5171	11.99	212.83	0.00	24.00	0.00	32.13	10.95
2090063	SINCLAIR TRANSPORTATION COMPANY	5171	1.98	90.09	0.00	0.00	0.00	2.46	3.39
2090075	CONOCOPHILLIPS PIPE LINE - KANSAS CITY TERMINAL	5171	4.22	62.29	0.00	0.00	0.05	2.52	0.51
2090194	STERICYCLE, INC.	4953	11.09	0.44	0.82	1.39	1.18	0.01	0.00

Title V (green) and PSD (red) permitted facility source locations.



Source: KDHE Emission Inventory and Compliance database (May, 5th 2010)

APPENDIX E

Mercury Deposition Monitoring in Kansas: Network Report



Our Vision – Healthier Kansans living in safe and sustainable environments.

December 10, 2009

**Kansas Department of Health and Environment
Bureau of Air
1000 SW Jackson – Suite 310
Topeka, KS 66612-1366**

Mercury Deposition Monitoring in Kansas: Network Report

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Mercury Deposition Monitoring in Kansas: Network Report

Summary of Mercury Deposition Network Development and Monitoring

Introduction

KSA 75-5673 requires that the Kansas Department of Health and Environment (KDHE) establish a statewide mercury deposition network consisting of at least six monitoring sites. Monitoring for a period of time long enough to determine trends (five or more years) is also specified.

The network has been designed to assure compatibility with the national Mercury Deposition Network (MDN). The MDN, coordinated through the National Atmospheric Deposition Program (NADP), is designed to study and quantify the atmospheric fate and deposition of mercury. The MDN collects weekly samples of wet deposition (rain and snow) for analysis to determine total mercury.

Discussion of Factors Affecting Mercury Deposition

Most mercury in the atmosphere is present as elemental mercury (Hg^0). Some of this mercury is converted to reactive gaseous mercury (Hg^{2+}), which is the predominant form flushed from the atmosphere by precipitation. It is generally believed that most atmospheric Hg^{2+} is in the form of mercuric chloride (HgCl_2). In general, concentration and deposition amounts are higher during the warmer months.

Seasonal variation occurs for several reasons:

- 1) Higher temperatures and faster reaction rates cause more rapid chemical conversion.
- 2) More oxidants, such as ozone (O_3) and hydroxyl ions (OH^-), that can convert Hg^0 to Hg^{2+} are present.
- 3) Higher concentrations of Hg^0 are present in the atmosphere (due to higher emissions from increased power generation, etc.).
- 4) More precipitation generally occurs and flushes more mercury out of the air more efficiently.
- 5) The atmosphere contains particulate matter, and therefore, more mercury to be flushed.

There are three factors which affect deposition of atmospheric mercury at any given location. These are:

- 1) **Concentration**, which is affected by local, regional and global sources.

The total amount of mercury from non-local sources circulating freely in the Earth's atmosphere at any given time constitutes the "global pool" of mercury. It is estimated that 95 per cent of the global pool is Hg^0 , and this mercury circulates for a period estimated at between 6 months to 2 years. Local contributions to mercury concentrations vary considerably across the planet and within the United States, depending upon the distance from the point of measurement to local and regional sources. Much of a local mercury contribution impacts local and/or regional deposition, especially if it is emitted in a reactive form (e.g., Hg^{2+}).

- 2) **Precipitation**, which removes mercury from the atmosphere.

Precipitation essentially "flushes" mercury from the atmosphere. It is this mercury that is measured to determine our deposition data. In general, mercury concentrations appear to be higher when it

begins to rain or snow, and lower at the end of a precipitation event. This is most evident during periods of prolonged precipitation (i.e., over a period of several hours to several days).

3) **Location** with regard to proximity of local sources.

As stated above (Factor 1), local mercury concentrations vary considerably across the planet and within the United States, depending upon the distance from the point of measurement to local and regional sources. This factor also varies with wind direction, i.e., whether the sampling point is upwind or downwind of such sources at the time of sampling. In general, the closer a monitor is to a source, provided that it is downwind of that source, the higher the mercury concentration.

Atmospheric mercury concentrations also tend to be higher at positions near to and downwind of emitting sources. This is described as “local influence” with regard to higher mercury concentration and deposition measurements. These are the local contributions described above (under Factor 1) which impact local and/or regional deposition. Across Kansas, there can also be dramatic shifts in sources of the air coming in from out of state. For example, southeast Kansas is much more likely to receive tropical air from the south. Out west, flow is dominated by the flows from farther west (i.e., Pacific air, continental air, etc). This can exert a significant influence on what the atmosphere contains and what gets flushed out. Kansas sources include electrical generating units, cement kilns and mining operations. We do not yet have enough data to see whether effects of local and/or regional influences apply to Kansas, but this may become evident after several years of sampling.

National Mercury Deposition Network Data

The purpose of the MDN is to collect mercury deposition data over a long period of time to monitor trends in the levels of mercury deposited over the earth’s surface. Short term data analysis is difficult because of seasonal and year to year variability in precipitation amounts and mercury concentrations.

Quality assurance of MDN data occurs at two levels. All data are first reviewed by the national contract laboratory for completeness and accuracy, and assigned codes for samples that were mishandled, contaminated, or affected by equipment malfunction. The final laboratory data set is then forwarded to the national MDN Program Office for final quality assurance before generation of annual concentration and deposition maps and posting to the Web.

Data generated by the Kansas Mercury Deposition Network will be posted to the KDHE Web site as available and annually to a national database. Total mercury results are reported as:

- 1) Concentration, expressed in nanograms of mercury per liter (ng/L) of precipitation collected.

This is the amount of mercury present in the water collected by the sampler. Concentration measurements provide a long-term record of mercury levels in precipitation across the United States.

- 2) Total precipitation depth collected, expressed in millimeters (mm).

This is the depth of snow or rain collected, which when multiplied by the concentration, gives total deposition of mercury to the surface. (See #3)

- 3) Deposition, expressed in micrograms of mercury per square meter ($\mu\text{g}/\text{m}^2$).

This is the amount of mercury deposited by precipitation on each square meter of ground at the sampling site. The deposition numbers are important because they provide annual estimates of the amount of mercury loaded onto the surface of the earth in the vicinity of each sampling site. It is a

portion of this mercury which enters bodies of water and ultimately enters the food chain through aquatic systems.

National mercury data are summarized for each year by calculating the annual values from each site and plotting the information on a national map. The most recent national average concentration and total deposition maps (for calendar year 2008) appear in Figures 3 and 4. It is expected that all six Kansas sites will have collected enough data to appear on the 2009 maps, which are scheduled for publication by September 2010. A set of these MDN maps, dating back to 1998, can be found at <http://nadp.sws.uiuc.edu/mdn/maps/>.

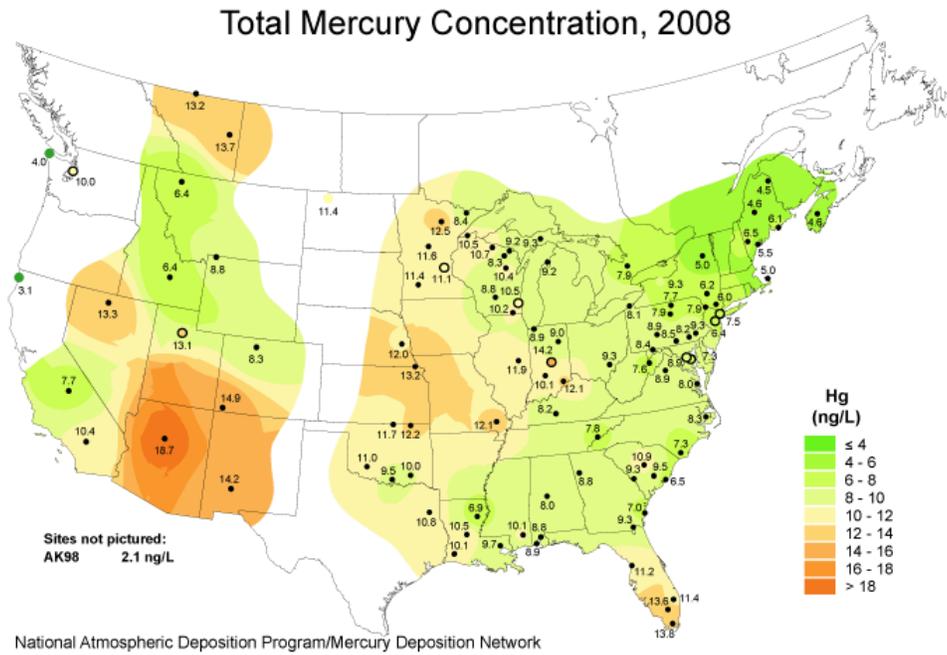


Figure 1

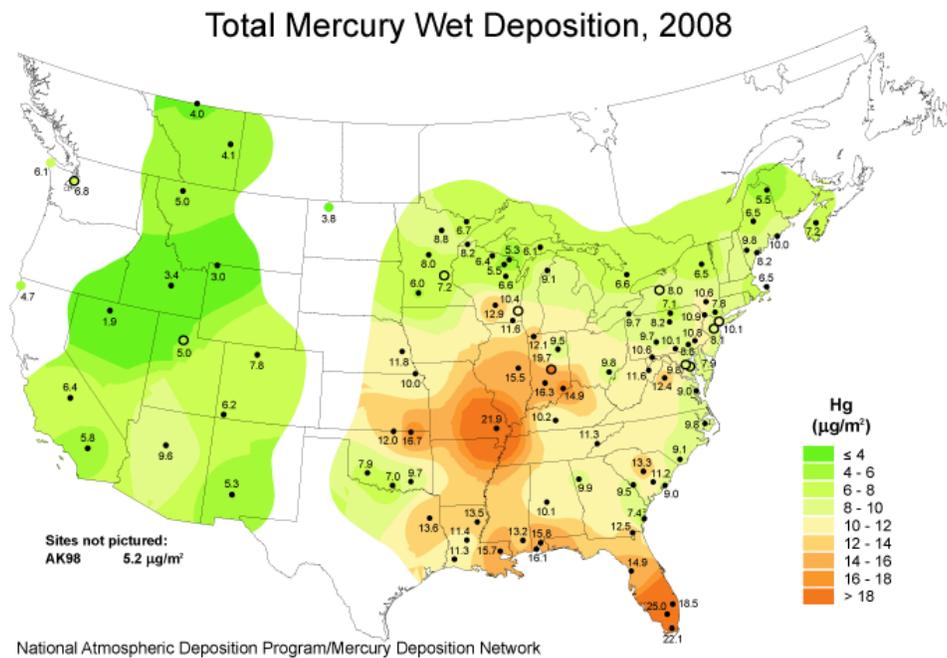


Figure 2

Description of the Kansas Mercury Wet Deposition Network

The complete Kansas Mercury Wet Deposition Monitoring Network (KMDN) consists of six sites distributed across the state. The locations of existing and future sites in the states of Nebraska and Oklahoma were also taken into consideration to optimize regional mercury network coverage. A map of the network appears below in Figure 3.



Figure 3. Kansas Mercury Deposition Network and sites in Nebraska and Oklahoma

Each site was chosen to meet particular criteria. Specific regional and local siting criteria must be met before any site is accepted into the national MDN. A major consideration, at both the state and national levels, was relatively even distribution of monitoring sites across Kansas. Some other considerations, especially of interest from the State's perspective, were distance and direction to potential sources of airborne mercury, proximity to fish tissue monitoring locations, and distance to neighboring state boundaries. Mercury deposition sampling locations in the States of Oklahoma and Nebraska also affected placement of samplers in the network.

Kansas Deposition Data for 2009

Sampling at all sites is performed on a weekly basis, with sample retrieval every Tuesday. Clean sample glassware is installed for collection of the next week's sample at the time of the operator's site visit. All samples are sent to a national contract laboratory utilized by the MDN. Sample analysis and coordination through this national cooperative research program are performed under contract.

All currently available data from the KMDN appears below in Table 1. Preliminary data has been obtained through August 2009. These data sets have not been subjected to complete quality assurance procedures. The "raw" data may contain some values that could later be invalidated, but little change is expected and general conclusions can be made. The values shown are mercury deposition amounts expressed in $\mu\text{g}/\text{m}^2$ per month. The annual mercury deposition maps (example in Figure 2 above) will express mercury deposition as $\mu\text{g}/\text{m}^2$ per year. Monthly plots of mercury deposition at these sites in Kansas appear below as Figures 4 – 9.

Table 1. Kansas Mercury Wet Deposition Data (Preliminary): Jan. – Aug. 2009 ($\mu\text{g}/\text{m}^2$ per month)

Site	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total $\mu\text{g}/\text{m}^2$
Sac & Fox Nation	0.05	0.13	0.86	1.68	0.57	3.79	0.88	1.32					9.3
Glen Elder State Park	0.00	0.05	0.25	0.67	0.69	1.86	2.69	0.93					7.2
Lake Scott State Park	0.03	0.05	0.05	1.27	0.49	0.99	1.44	1.09					5.4
Big Brutus	0.04	0.24	1.47	1.08	1.93	1.91	2.25	1.67					10.6
Cimarron National Grassland	0.00	0.10	0.56	0.40	0.03	0.27	1.25	1.29					3.9
Coffey County Lake	0.00	0.43	0.97	2.81	1.26	2.31	1.40	0.88					10.1

The year to date totals in the above table shows mercury deposition values with variations that we expect to see. KS03, KS04, and KS05 show higher deposition values that could be attributed to their location to possible Kansas sources as well as variations in precipitation and wind patterns. Direct conclusions can not be made as this is preliminary data and more data is needed from each site.

Sac and Fox Nation – KS03

The first operational site in the network is at Reserve, KS. This site is located at an existing ambient air monitoring station belonging to and operated by the Sac and Fox Nation of Missouri in Kansas and Nebraska. The Tribe's environmental department is operating the sampler under contract with KDHE. The KS03 site is downwind of coal fired electric generating units (EGUs).

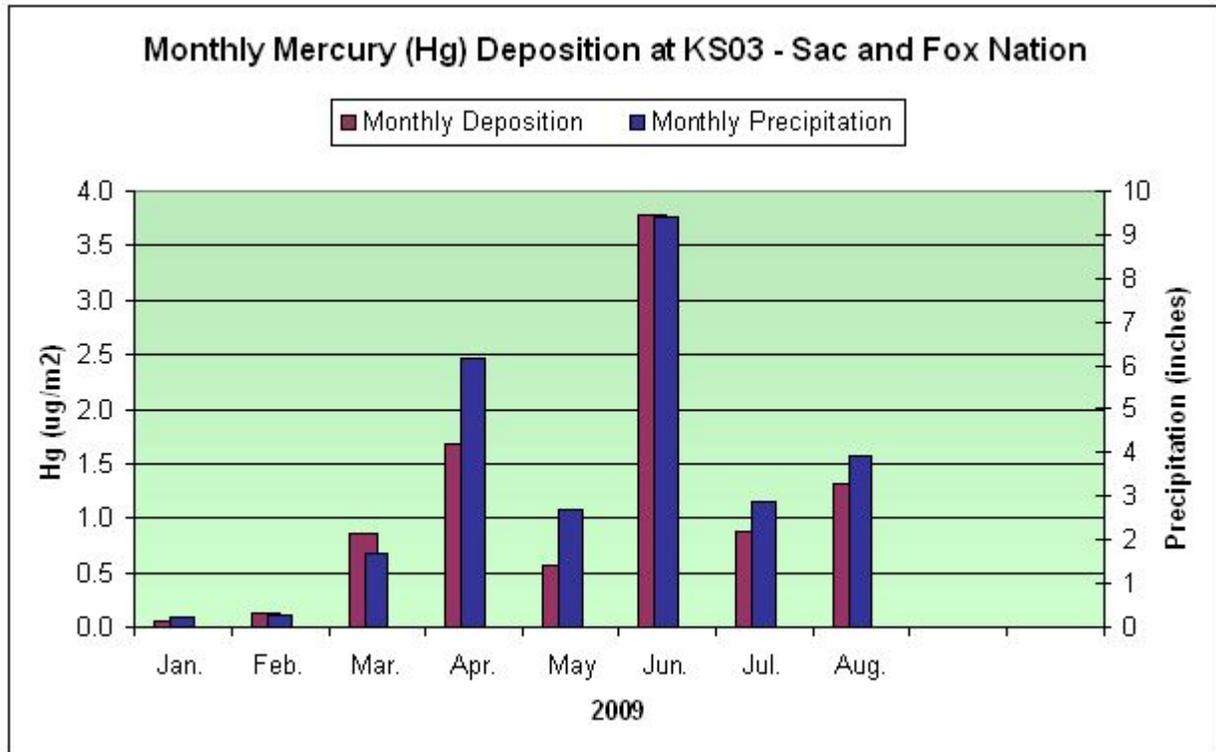


Figure 4

This graph shows monthly mercury deposition and monthly precipitation totals. It can be seen that the months during which higher deposition values occurred were also months in which precipitation amounts were higher. Barring seasonal variations in meteorological conditions, it appears those months when precipitation events have large amounts of rain; the results show precipitation volume higher than wet deposition. In comparing with Glen Elder State Park in north central Kansas, there is a 2 ug/m² difference in total wet deposition so far in 2009, while there is a 4 ug/m² difference compared with Lake Scott State Park in western Kansas.

Glen Elder State Park – KS24

The Kansas Department of Wildlife and Parks (KDWP) hosts two sites. The first site is at Glen Elder State Park, between Glen Elder and Cawker City, KS. This site fills in a gap in the north central part of the state and is in proximity to fish tissue sampling in alternate years. KS24 is operated by KDWP personnel.

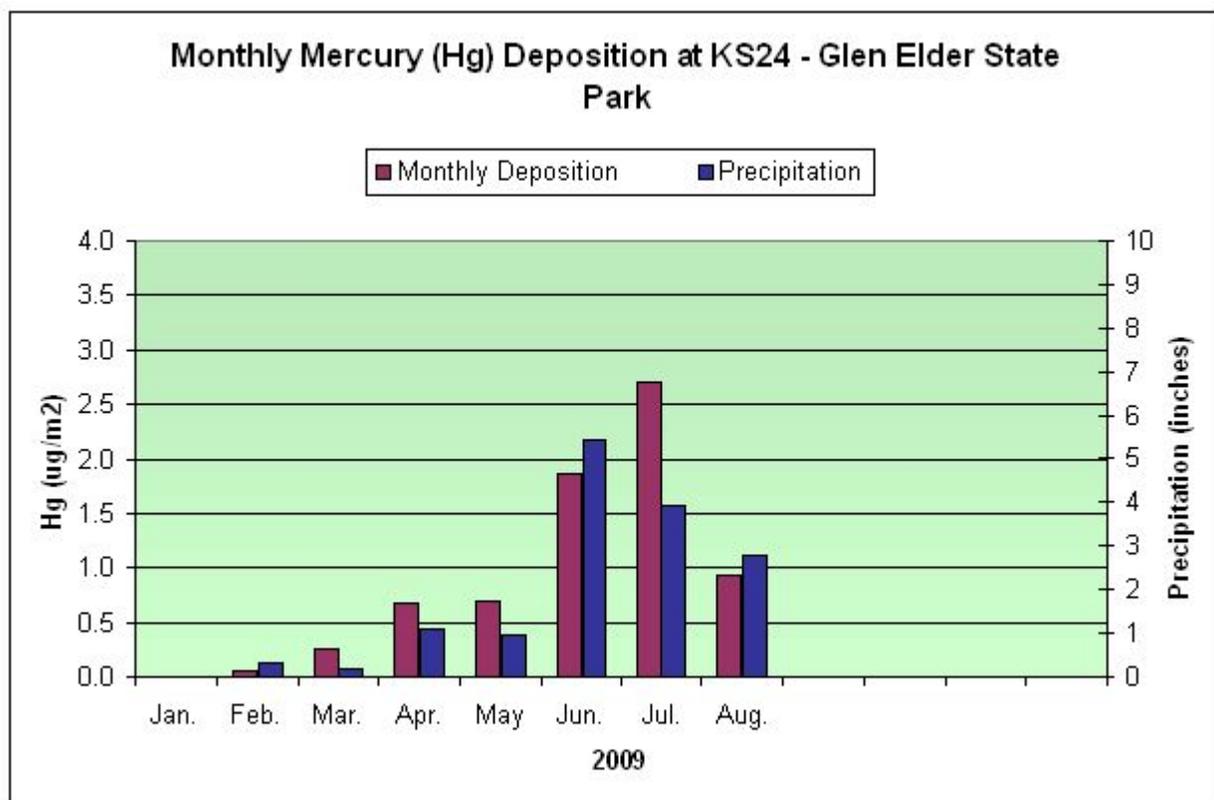


Figure 5

Less seasonal variation is evident in the graph of data from the site at Glen Elder State Park (KS24) presented in Figure 5. In this case, deposition values do not consistently vary with precipitation amounts. This difference in seasonality may be due, in part, to differences in precipitation patterns and amounts from site to site across Kansas. The direction and distance to various emission sources with regard to prevailing winds may also play a significant role. In comparing with our Coffey County Lake and Big Brutus sites, where precipitation events are more abundant, Glen Elder State Park shows a total wet deposition that is noticeably less.

Lake Scott State Park – KS32

The second KDWP site is located north of Scott City, KS, at Lake Scott State Park. This site is an existing National Atmospheric Deposition Program (NADP) and National Trends Network (NTN) site operated by an independent contract operator. It has no urban influences and is downwind of a Kansas coal fired electric generating unit (EGU).

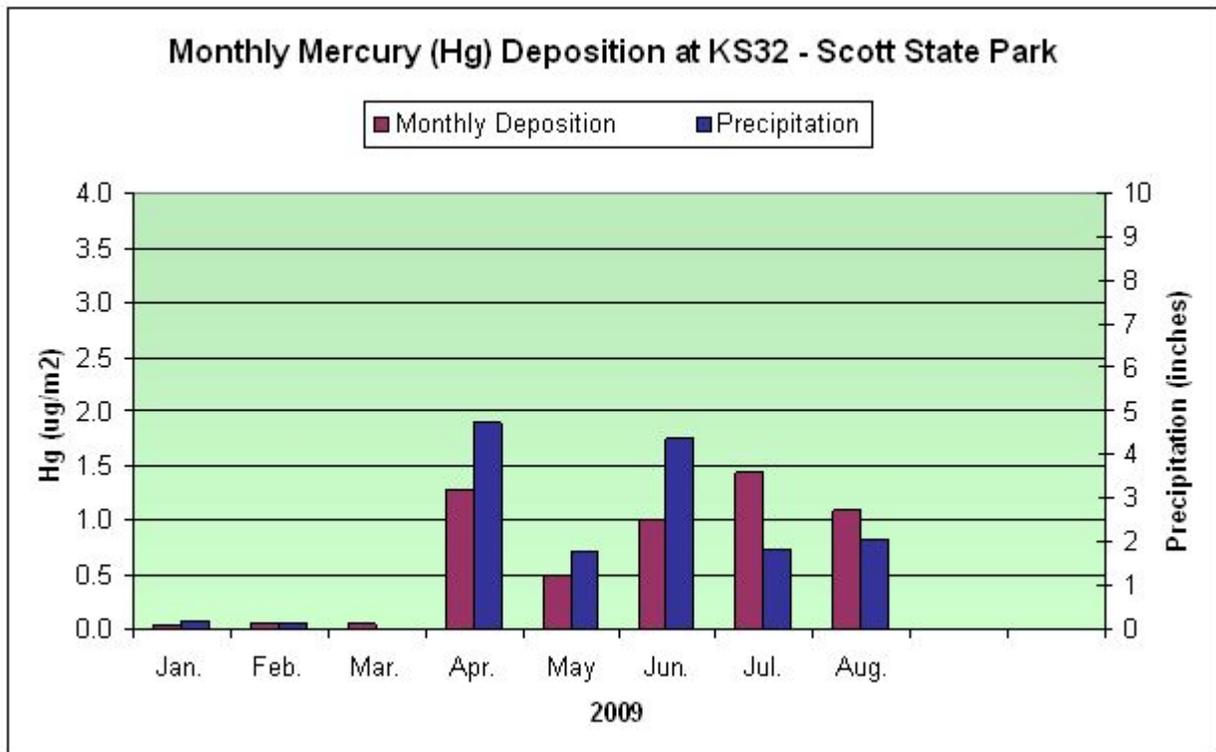


Figure 6

A seasonal pattern related to precipitation is evident in the graph of data from the Scott State Park site (KS32) presented in Figure 6. This site shows an early pattern of wet deposition closely following precipitation amounts in which the higher volume of rain results in higher precipitation than wet deposition. It also shows wet deposition in July and August that do not consistently follow precipitation volume. This could be caused by the actual precipitation event and the direction and distance to various emission sources with regard to prevailing winds. The Lake Scott State Park site compares closer with the Cimarron National Grassland site, in south western Kansas, with a wet deposition of between 4.0 ug/m² and 5.5 ug/m² than with our Coffey County and Big Brutus sites, in south eastern Kansas, with a wet deposition of around 10 ug/m² so far in 2009.

Big Brutus, Inc – KS04

The fourth KMDN site is located near West Mineral, KS, at the Big Brutus Museum. This site is in proximity to an interpolated “hot spot” on national MDN maps. It is downwind of Kansas cement kilns and is hosted and operated by Big Brutus, Inc.

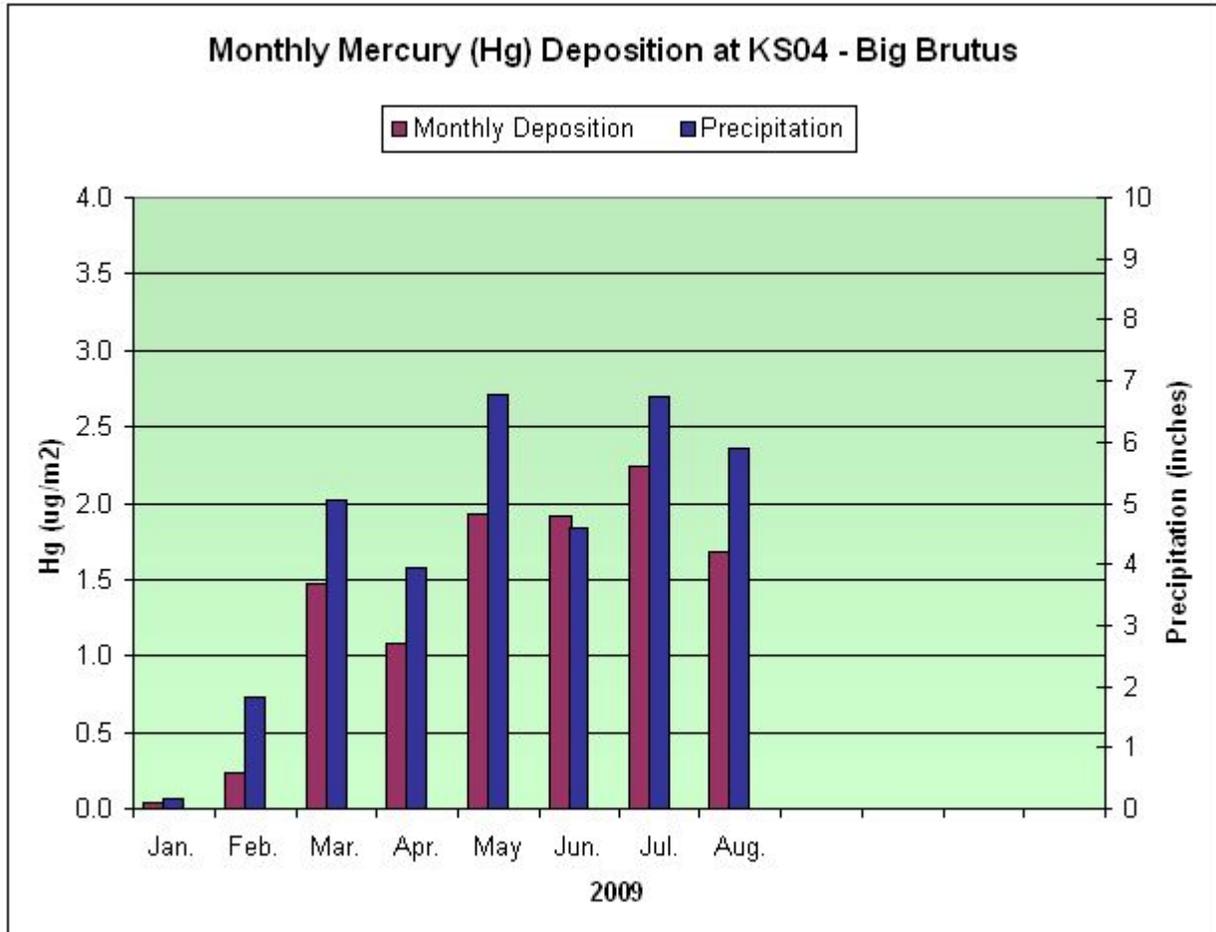


Figure 7

Seasonal variability is evident in the graph of data from the Big Brutus site (KS04) presented in Figure 7. It can be seen that the months during which higher deposition values occurred were also months in which precipitation amounts were higher. Barring seasonal variations in meteorological conditions, it appears those months when precipitation events have large amounts of rain; the results show precipitation volume higher than wet deposition. Consistent with our other eastern Kansas sites, the Big Brutus site shows higher wet deposition of mercury than our western sites.

Coffey County Lake – KS05

The fifth KMDN site is located at Coffey County Lake (Wolf Creek). This site is downwind of Kansas cement kilns and is a potential fish tissue sampling site. KS05 is operated by KDHE ambient air monitoring field staff.

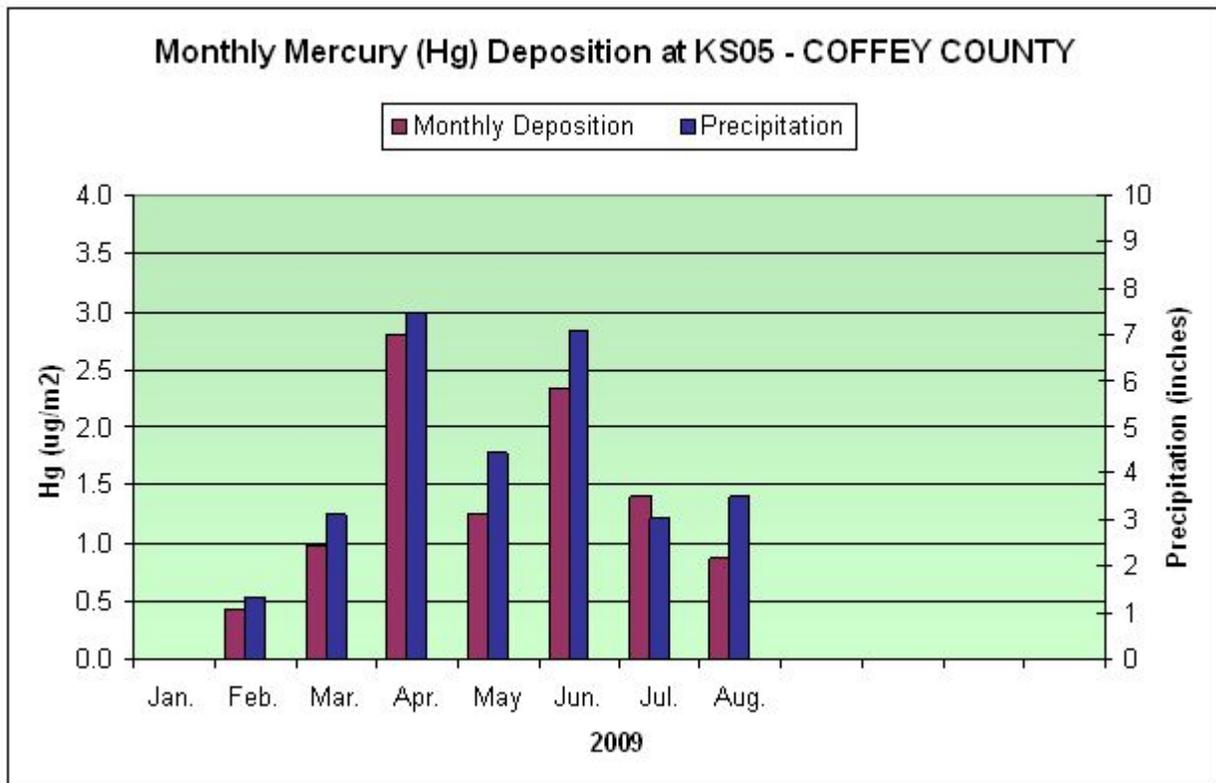


Figure 8

Seasonal variability is evident in the graph of data from the Coffey County Lake, site (KS05) presented in Figure 8. This site shows a pattern of wet deposition closely following precipitation amounts in which the higher volume of rain results in higher precipitation than wet deposition. Coffey County Lake has a higher wet deposition of mercury so far in 2009 than Glen Elder State Park, which has higher wet deposition than Lake Scott State Park.

Cimarron National Grassland – KS99

The United States Department of Agriculture hosts the sixth and final KMDN site, which is located at the Cimarron National Grassland near Elkhart, KS. This site is a remote site with no urban influences and gap fills the national network around Kansas, Oklahoma, and Colorado. KS99 is operated by personnel at the Cimarron National Grassland.

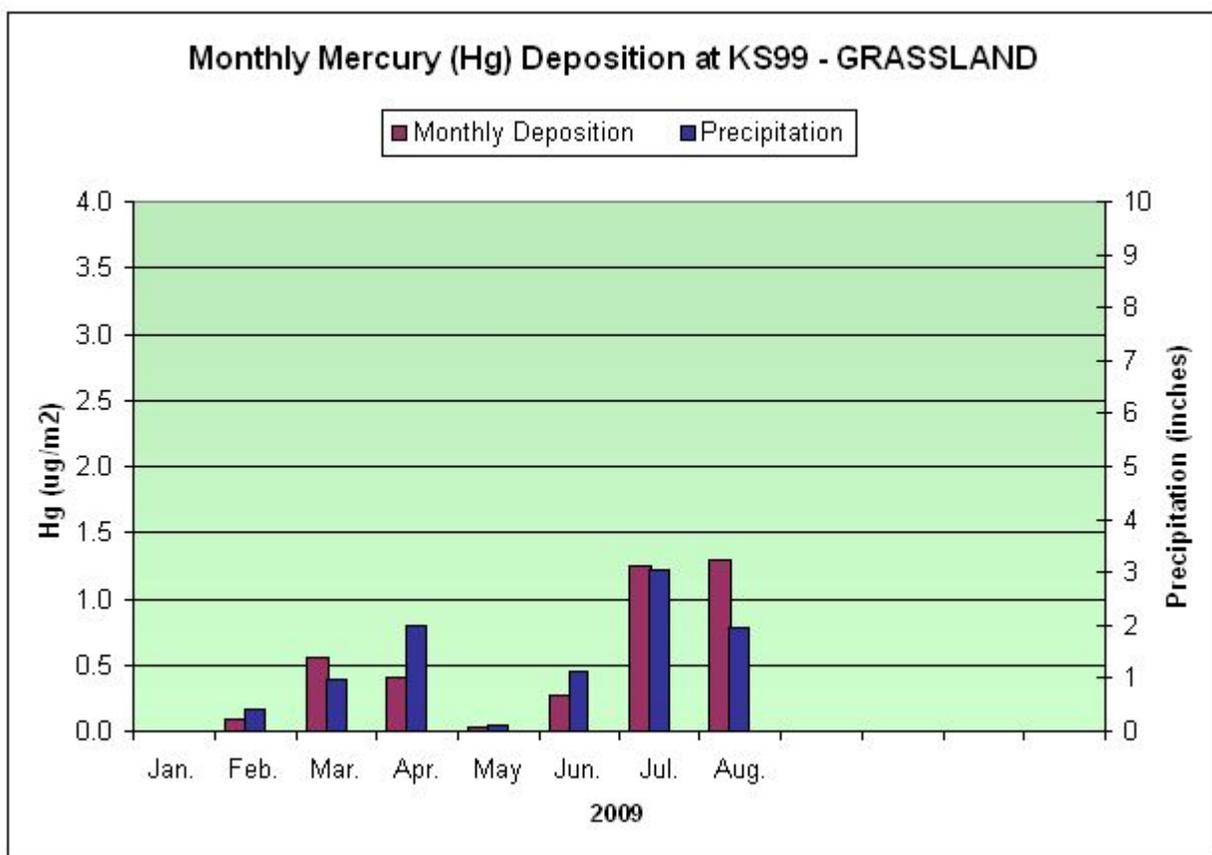


Figure 9

Less seasonal variation is evident in the graph of data from the site at Cimarron National Grassland (KS99) presented in Figure 9. In this case, deposition values do not consistently vary with precipitation amounts. This difference in seasonality may be due, in part, to differences in precipitation patterns and amounts from site to site across Kansas. Compared to the other five Kansas sites, Cimarron National Grasslands has less wet deposition of mercury so far in 2009. With the small amount of data collected, it's hard to determine any conclusions.

Network Cost Analysis

Costs associated with the KMDN are presented in Table 2 below. All costs are covered by Air Fee Fund revenues. This table is divided into a section for network development, and a section for the cost of the operation in 2009. The costs associated with network development include all capital equipment purchases as well as site preparation costs. This is the first year we had all six sites in operation, so the 2010 operating cost will be similar to the 2009 total.

Table 2. Kansas Mercury Wet Deposition Network Costs

Kansas Mercury Deposition Network Development Costs: June 1, 2007 – Dec. 31, 2008					
Cost Category	Item Description	Cost Each	Qty.	Total Cost	Category Totals
Salaries and Fringes				\$35,537	\$35,537
Equipment	MDN Collector	\$4,748	6	\$28,488	
	Digital Precipitation Gauge	\$5,640	5	\$28,200	
	Precipitation Gauge Windscreen	\$640	1	\$640	
	Communications Device (PDA)	\$300	6	\$1,800	
	Total Capital Equipment				\$59,128
Training	On-site MDN Training	\$1,400	1	\$1,400	
	Total Training				\$1,400
Site Development	Material	\$300	6	\$1,800	
	Travel (Average = \$0.45/mile)	\$0.45	6,996	\$3,148	
	Installation of Electrical Service			\$1,010	
	Total Site Development				\$5,958
Total Network Development Cost					\$102,023
Kansas Mercury Deposition Network Operating Costs: Jan. 1, 2009 – Dec. 31, 2009					
Cost Category	Item Description	Category Totals			
Salaries and Fringes		\$28,909			
Supplies	Low toxicity antifreeze	\$33			
Operator and Site Use Fees		\$22,500			
Travel	Travel (\$0.505/mile)	\$254			
Shipping	Samples to Laboratory	\$15,000			
Laboratory Analysis	Mercury Analysis	\$66,432			
Total Operating Cost					\$133,128

Looking Ahead

Next year will represent the second full year of sampling across the entire KMDN. It is expected that all six Kansas sites will have collected enough data to appear on the 2009 national MDN maps, which are scheduled for publication by September 2010. After several years of data have accumulated, it should be possible to begin to evaluate trends in atmospheric mercury concentrations over Kansas. If certain sampling sites appear as “hot spots” with concentrations or deposition levels that are significantly higher than surrounding sites, possible contributing sources and atmospheric conditions will be evaluated.

APPENDIX F

Figure A.1. Correlation Matrix for 2005 O₃ Measurements in Kansas

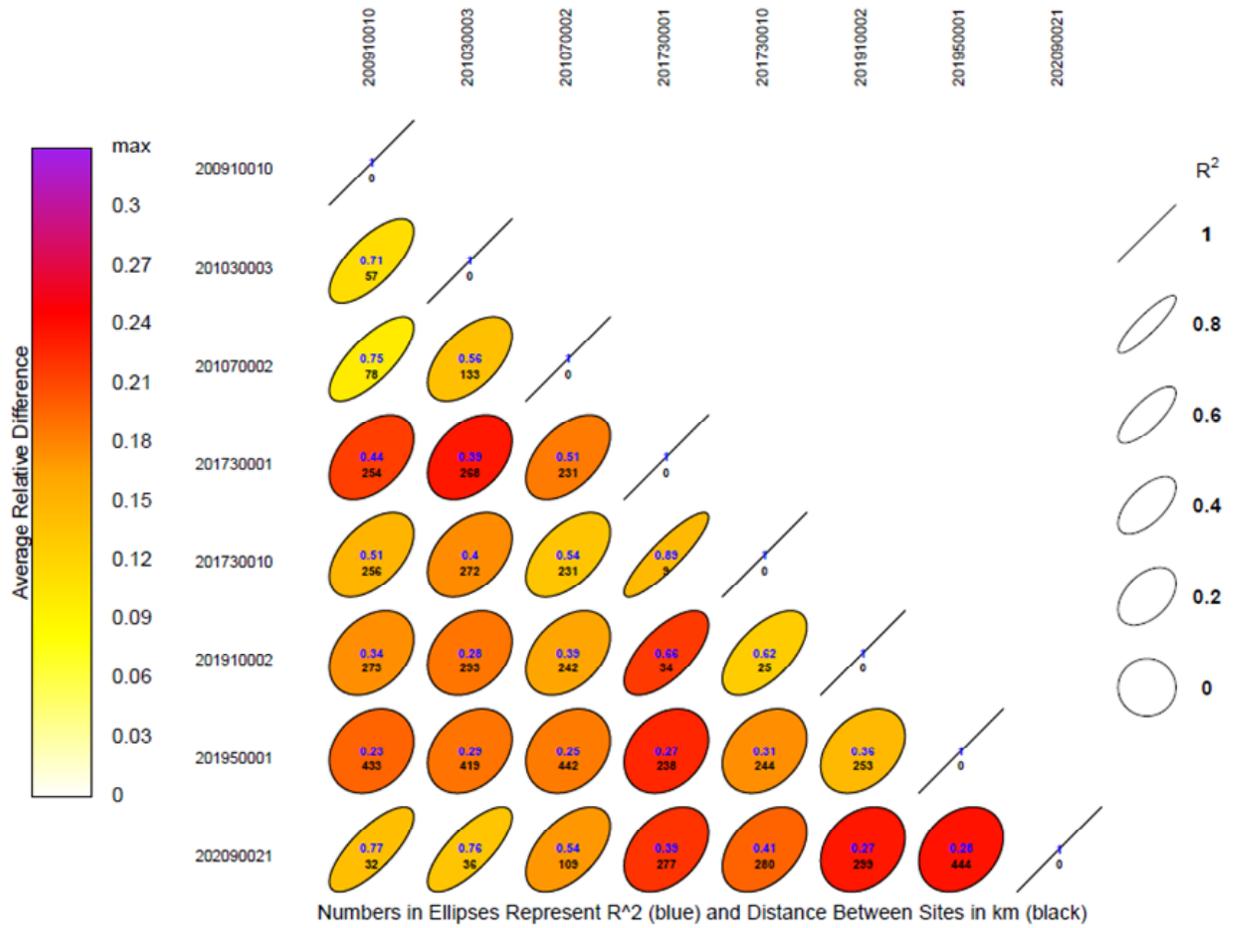


Figure A.2. Correlation Matrix for 2006 O₃ Measurements in Kansas

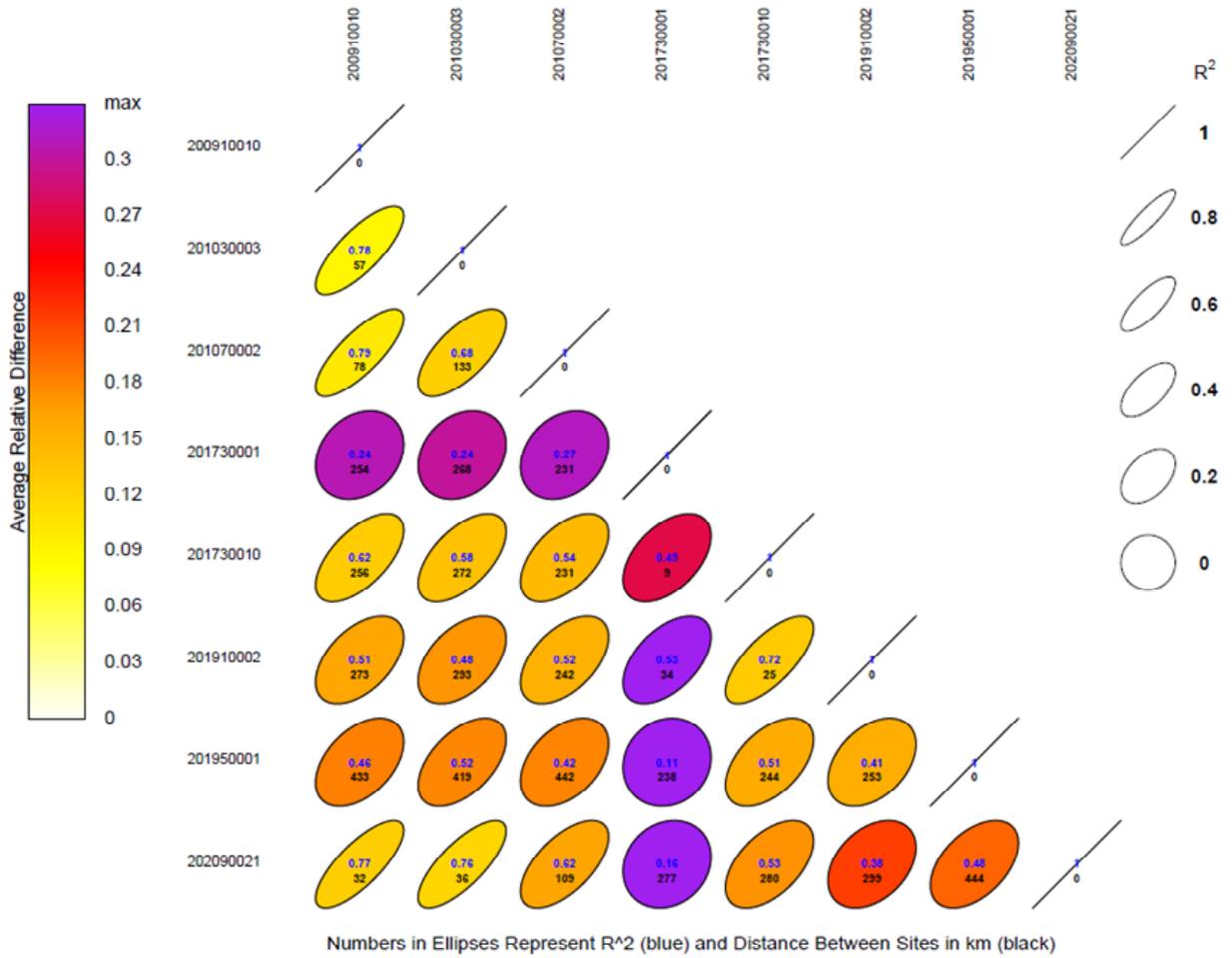
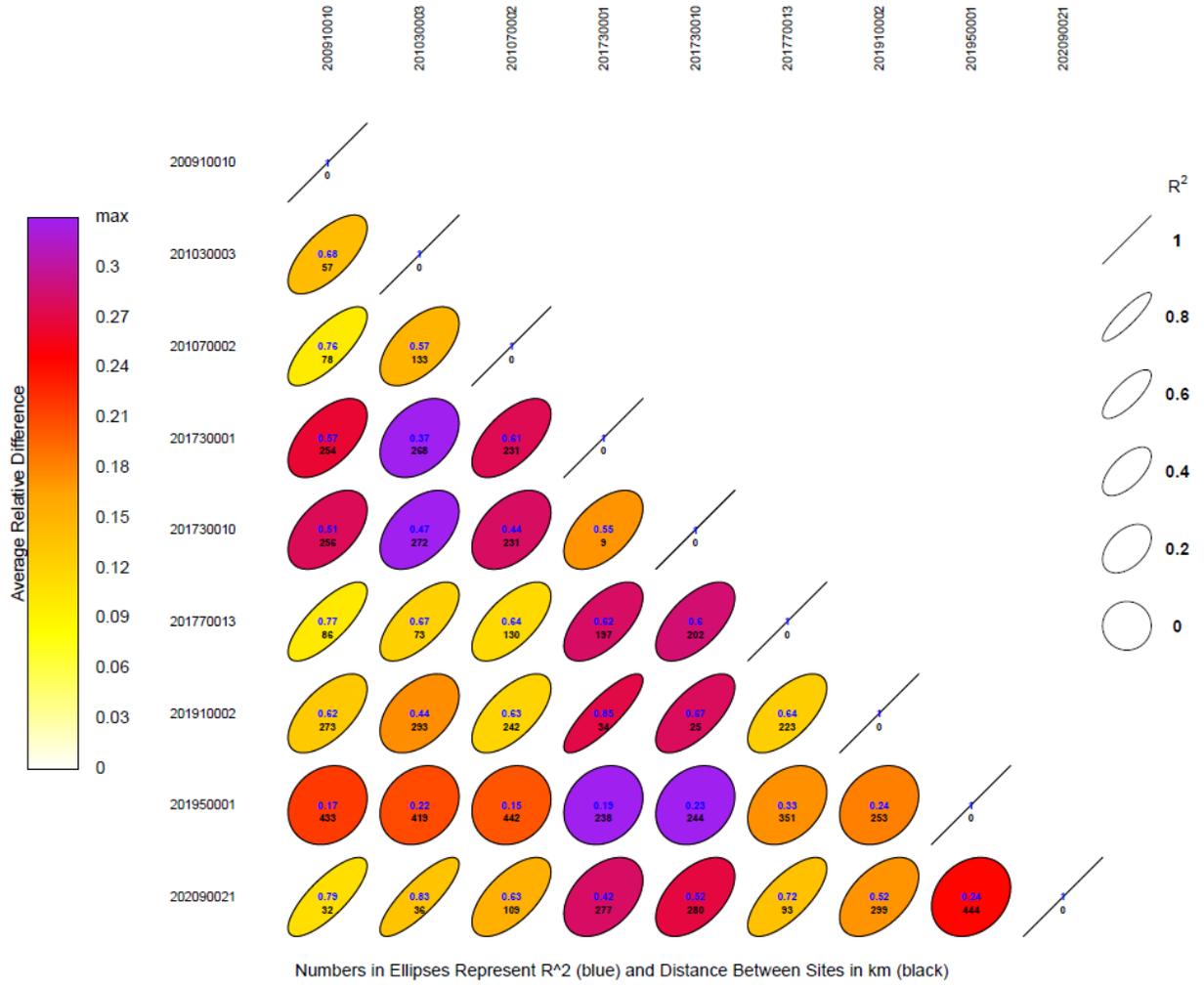


Figure A.3. Correlation Matrix for 2007 O₃ Measurements in Kansas



APPENDIX G

Figure B.1. Correlation Matrix for 2005 PM_{2.5} Measurements in Kansas

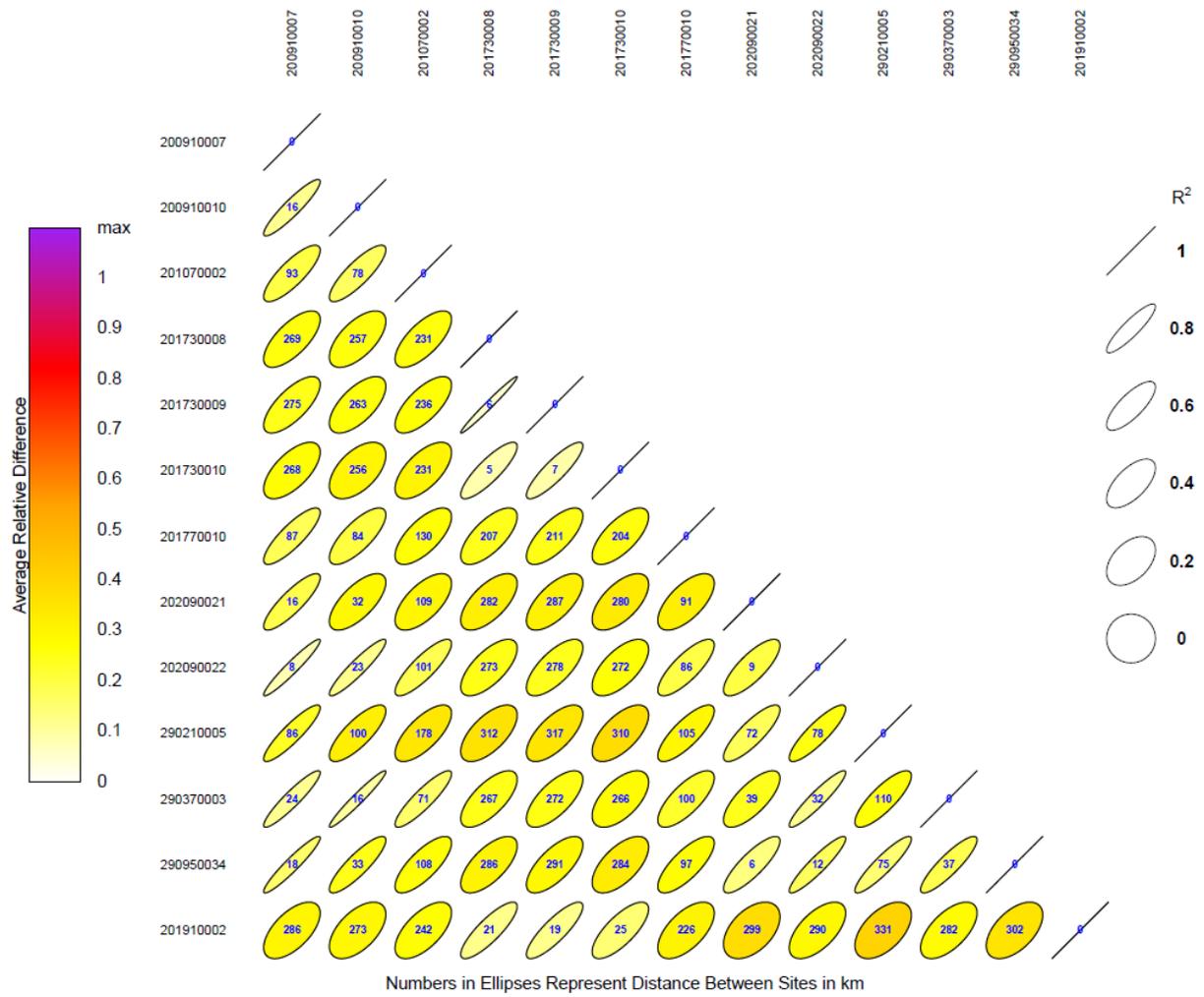


Figure B.2. Correlation Matrix for 2006 PM_{2.5} Measurements in Kansas

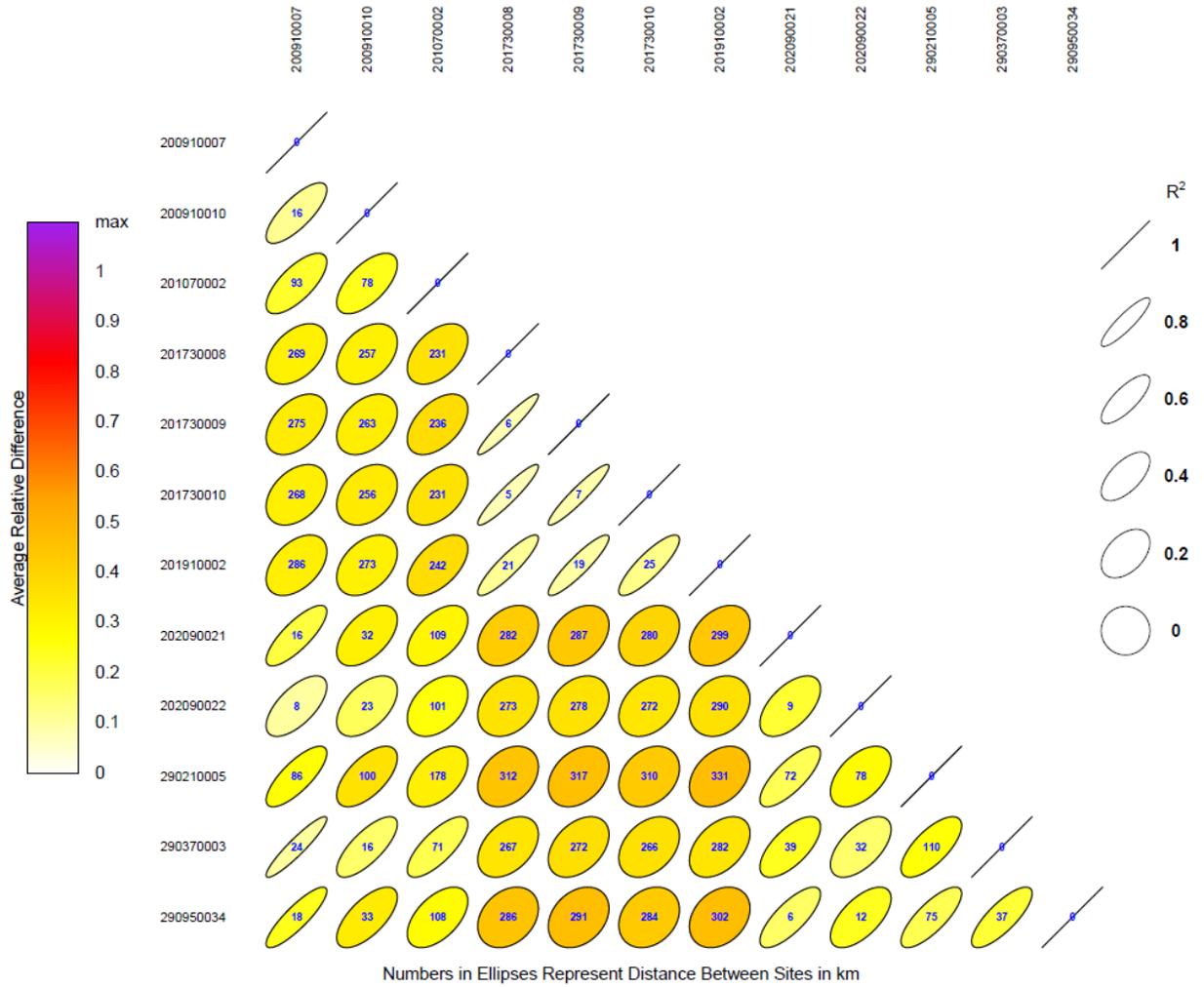
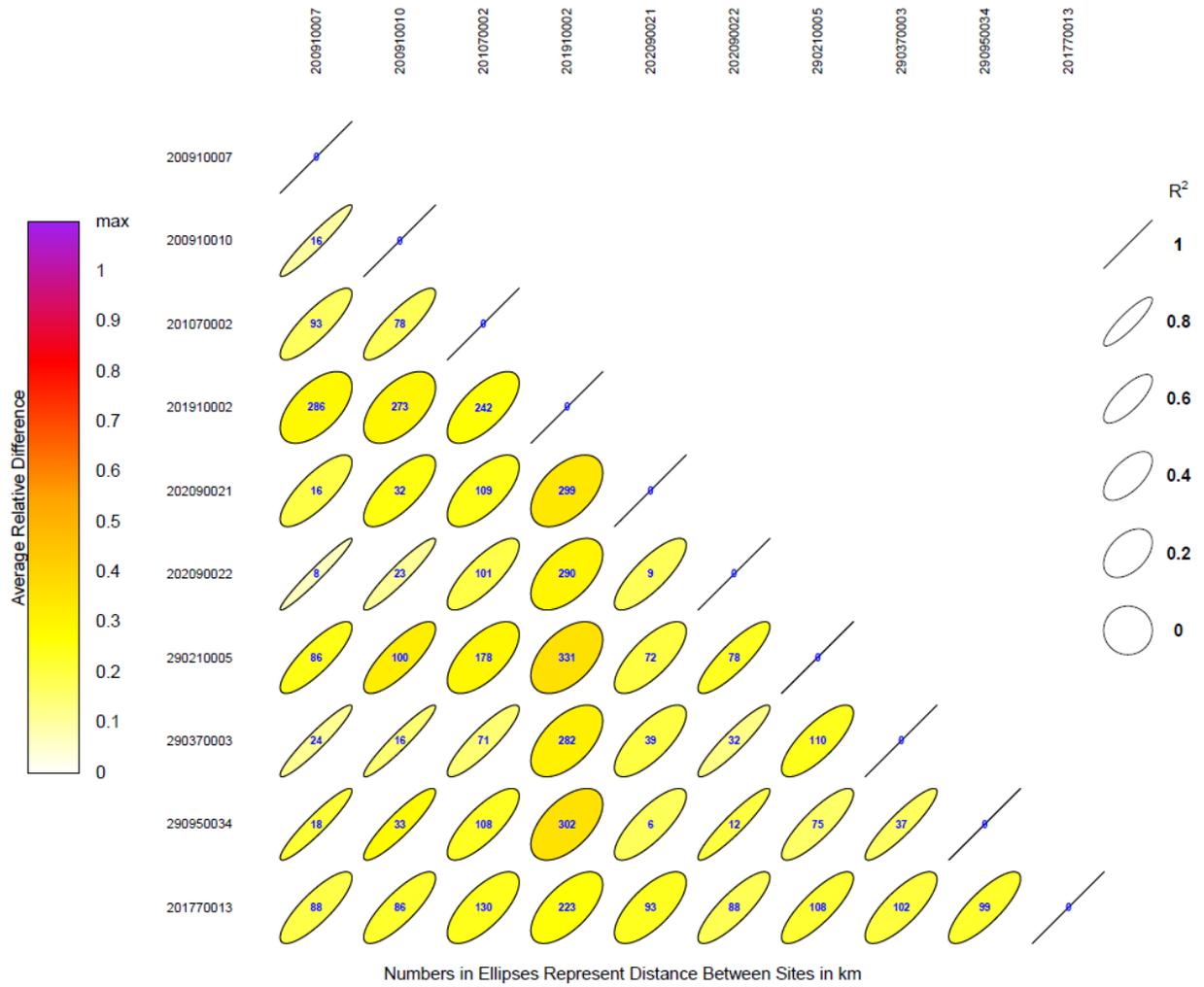


Figure B.3. Correlation Matrix for 2007 PM_{2.5} Measurements in Kansas



APPENDIX H

Figure A.1. Correlation Matrix for 2005 PM₁₀ Measurements in Kansas

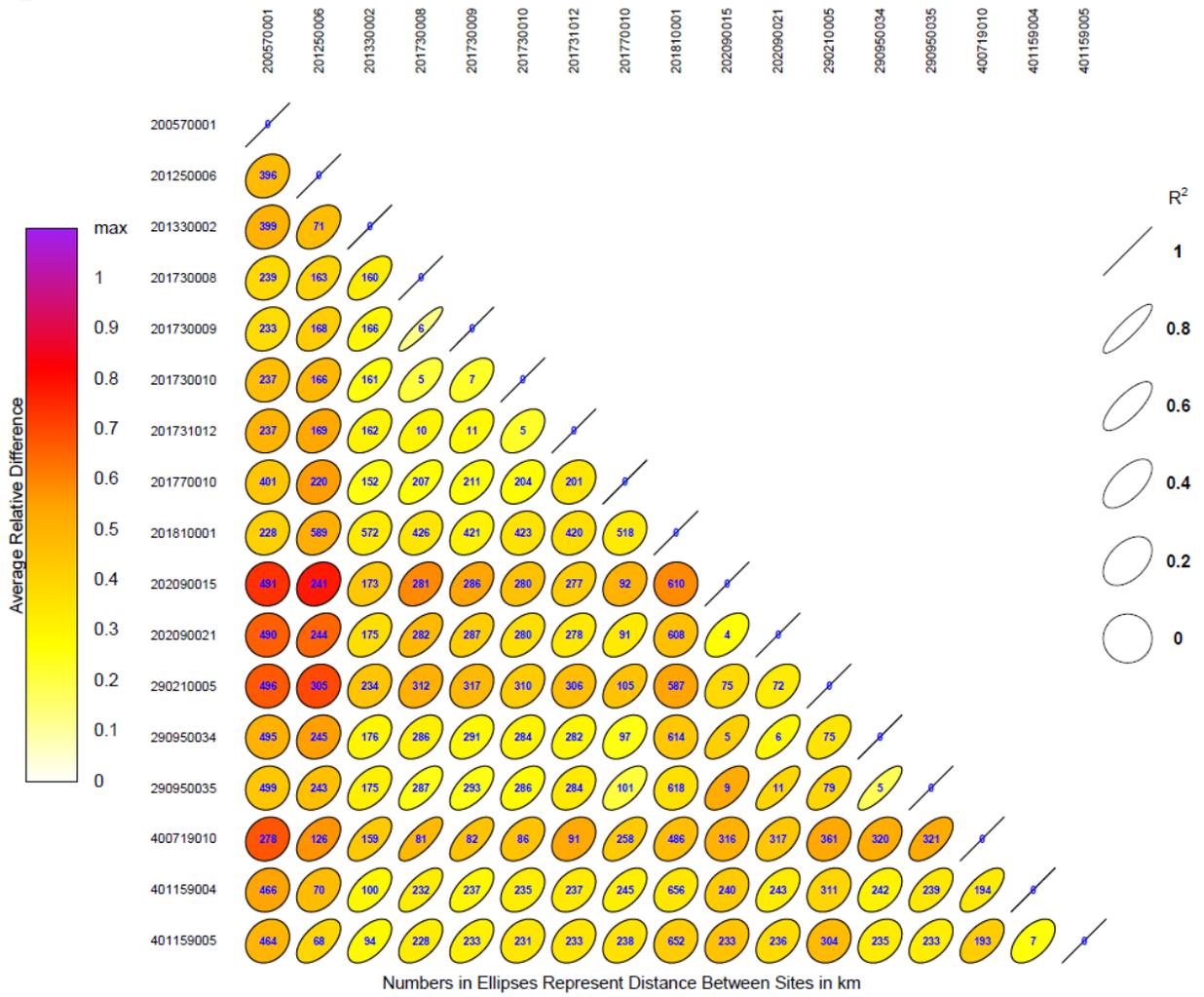


Figure A.2. Correlation Matrix for 2006 PM₁₀ Measurements in Kansas

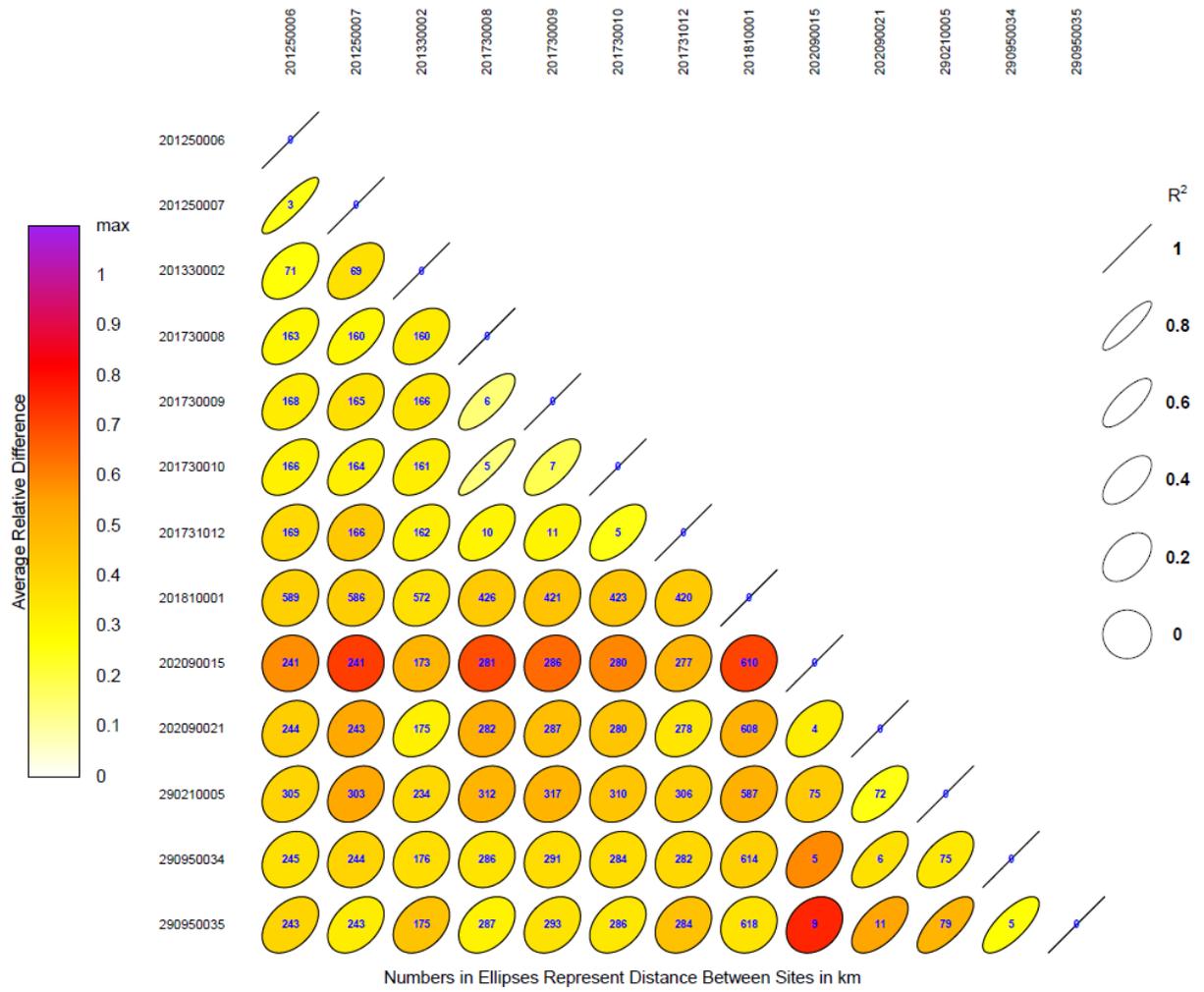
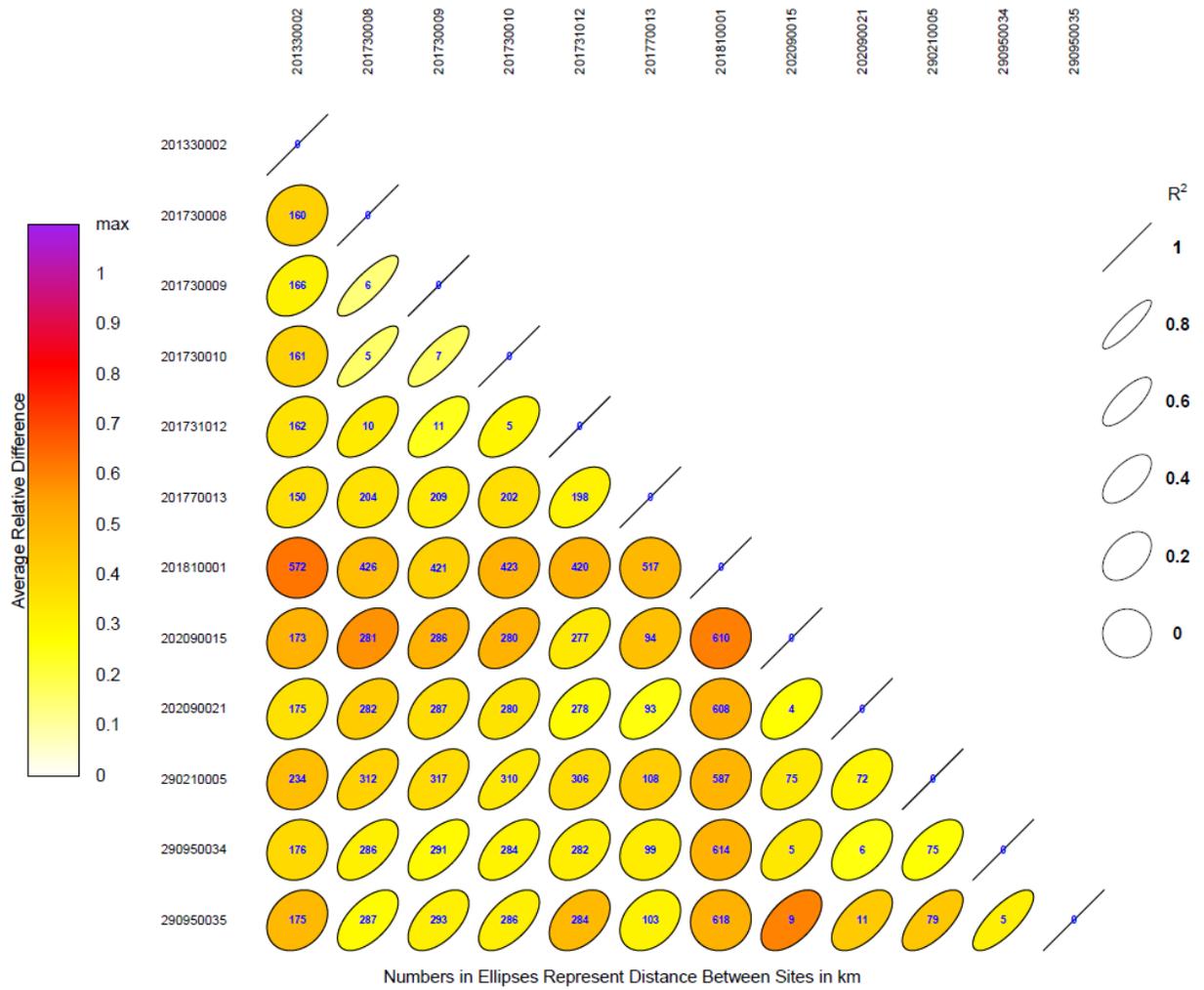
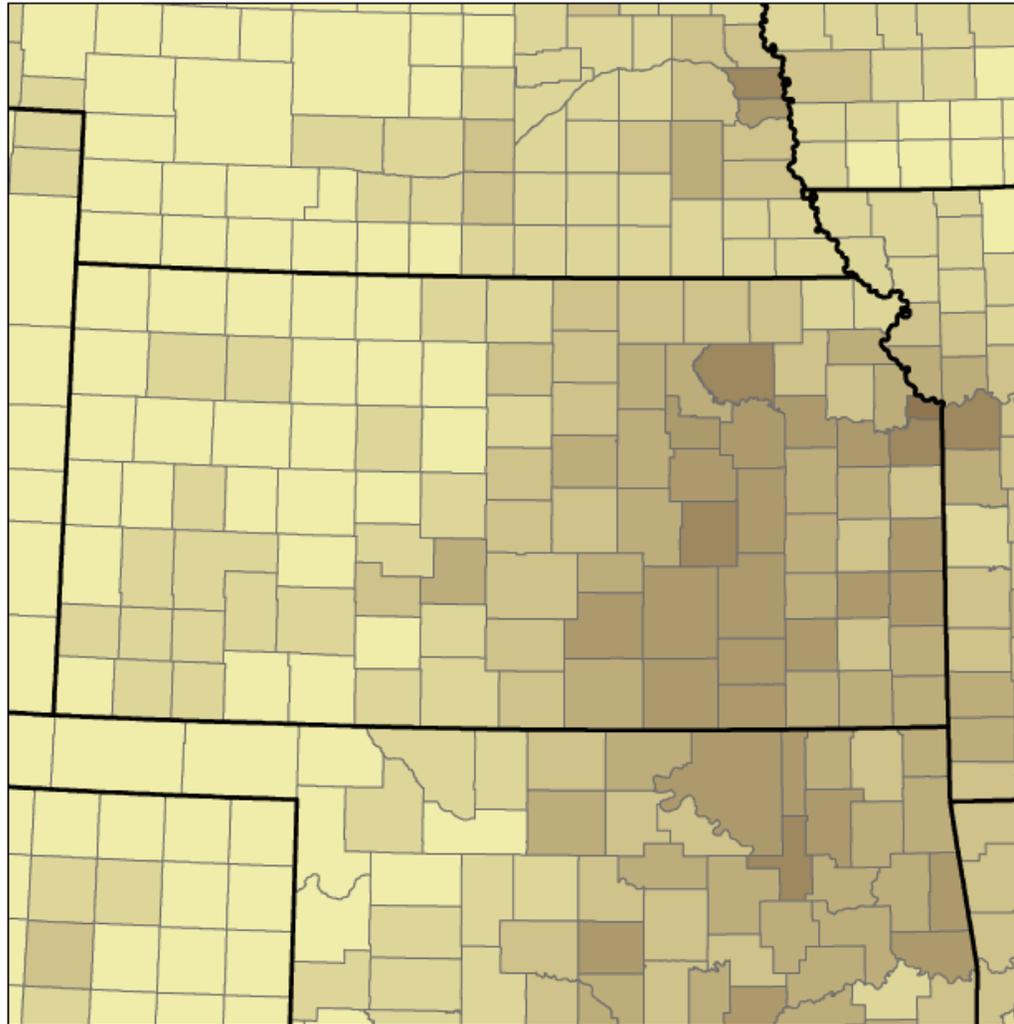


Figure A.3. Correlation Matrix for 2007 PM₁₀ Measurements in Kansas



APPENDIX I

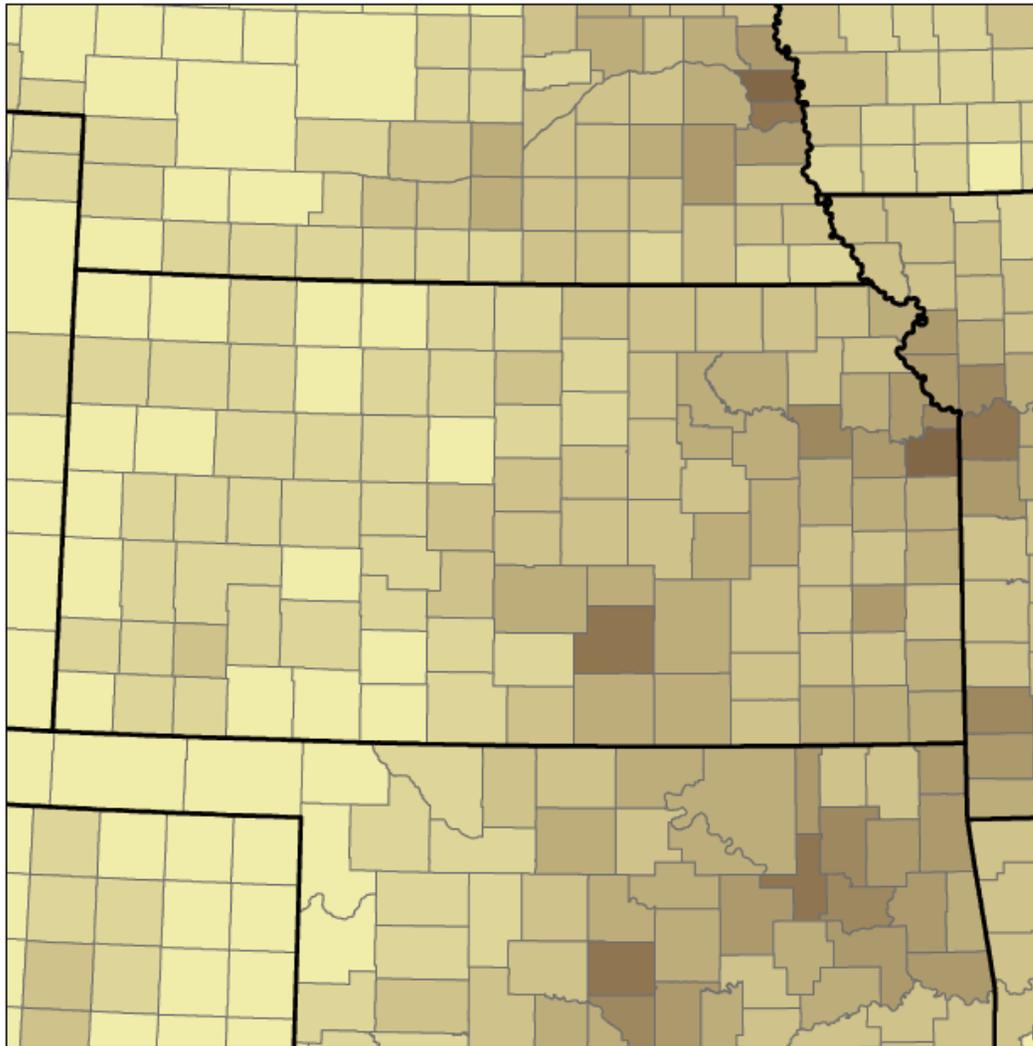
2005 PM_{2.5} Emissions Density



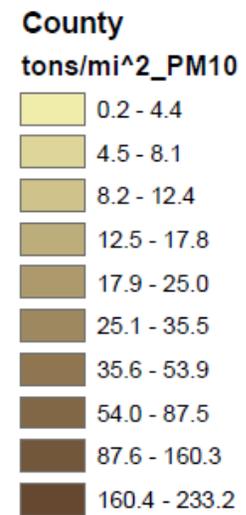
PM_{2.5} Emissions (tons/mi²)

County	
tons/mi ² _PM25	
0.0 - 1.0	
1.1 - 1.8	
1.9 - 2.9	
3.0 - 4.4	
4.5 - 6.7	
6.8 - 10.0	
10.1 - 14.1	
14.2 - 20.6	
20.7 - 45.9	
46.0 - 139.1	

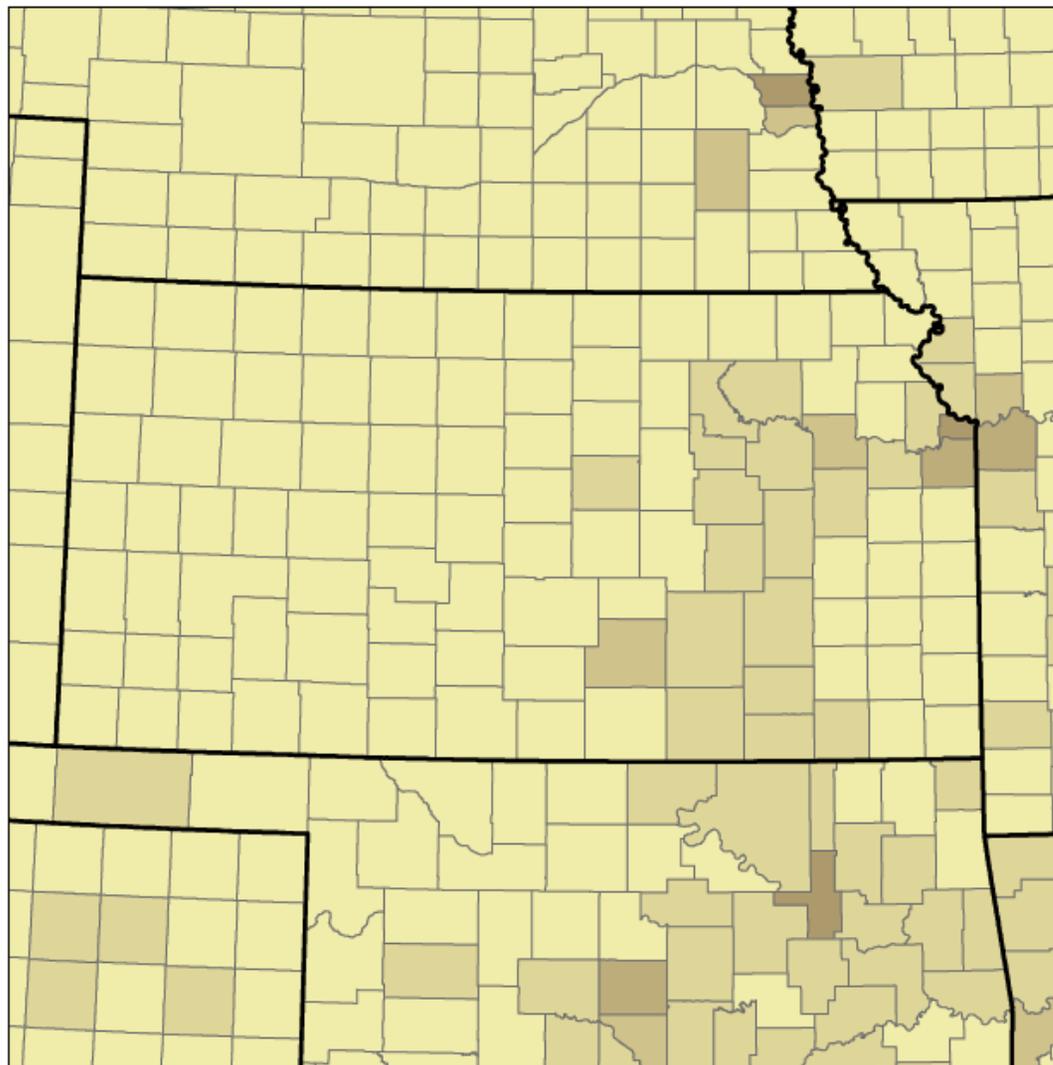
2005 PM₁₀ Emission Density



PM10 Emissions (tons/mi²)



2005 VOC Emissions Density



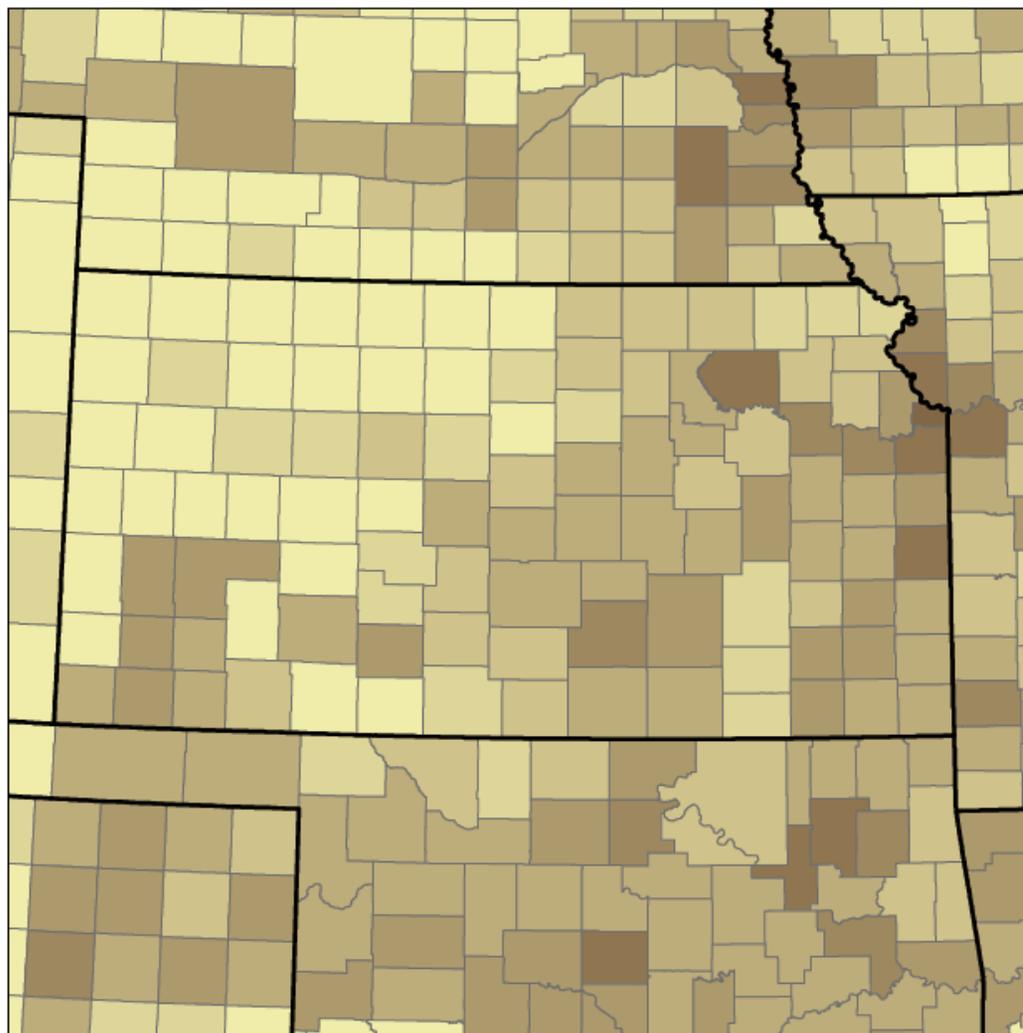
VOC Emissions (tons/mi²)

County

tons/mi²_VOC

0.0 - 5.6
5.7 - 14.0
14.1 - 28.4
28.5 - 50.4
50.5 - 86.0
86.1 - 133.5
133.6 - 234.5
234.6 - 462.1
462.2 - 751.6
751.7 - 1530.0

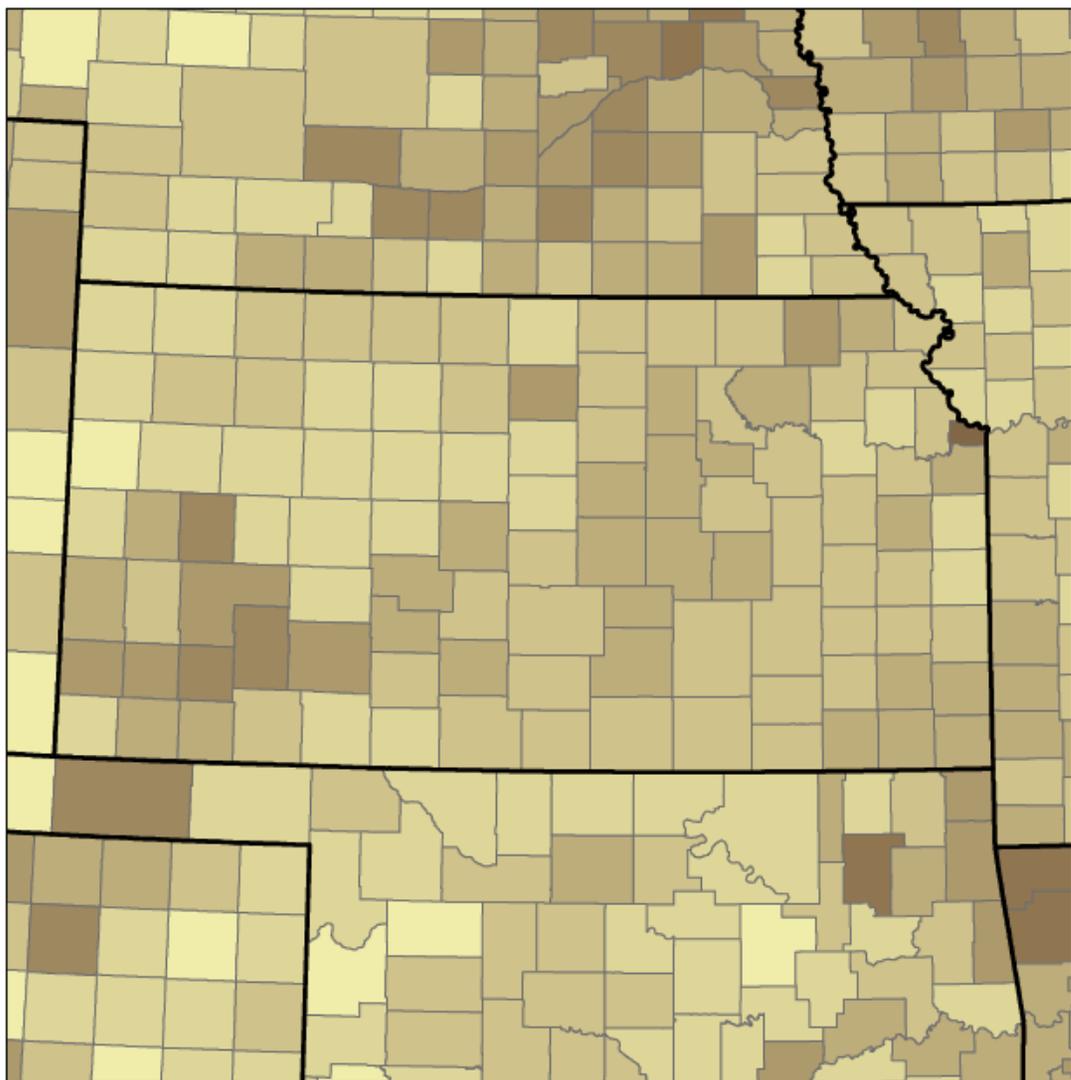
NO_x Emissions Density



NO_x Emissions (tons/mi²)

County	
tons/mi ² _NO _x	
0.0 - 1.2	
1.3 - 1.7	
1.8 - 2.9	
3.0 - 6.0	
6.1 - 13.6	
13.7 - 32.8	
32.9 - 80.9	
81.0 - 201.5	
201.6 - 503.9	
504.0 - 1,262.3	

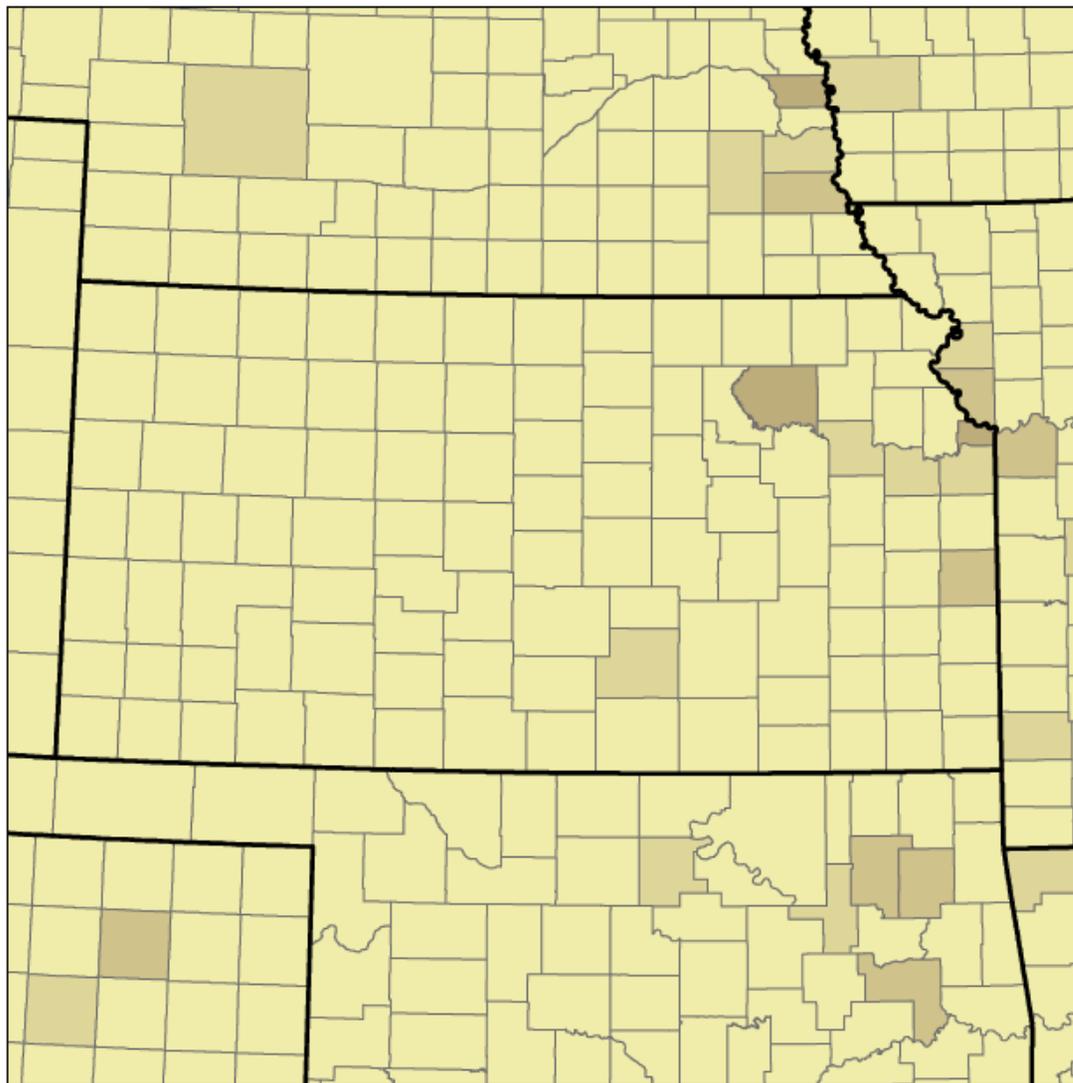
NH₃ Emissions Density



NH₃ Emissions (tons/mi²)

County	
tons/mi ² _NH3	
	0.0 - 0.7
	0.8 - 1.5
	1.6 - 2.4
	2.5 - 3.5
	3.6 - 5.1
	5.2 - 8.1
	8.2 - 12.8
	12.9 - 22.8
	22.9 - 37.7
	37.8 - 97.7

SO₂ Emissions Density



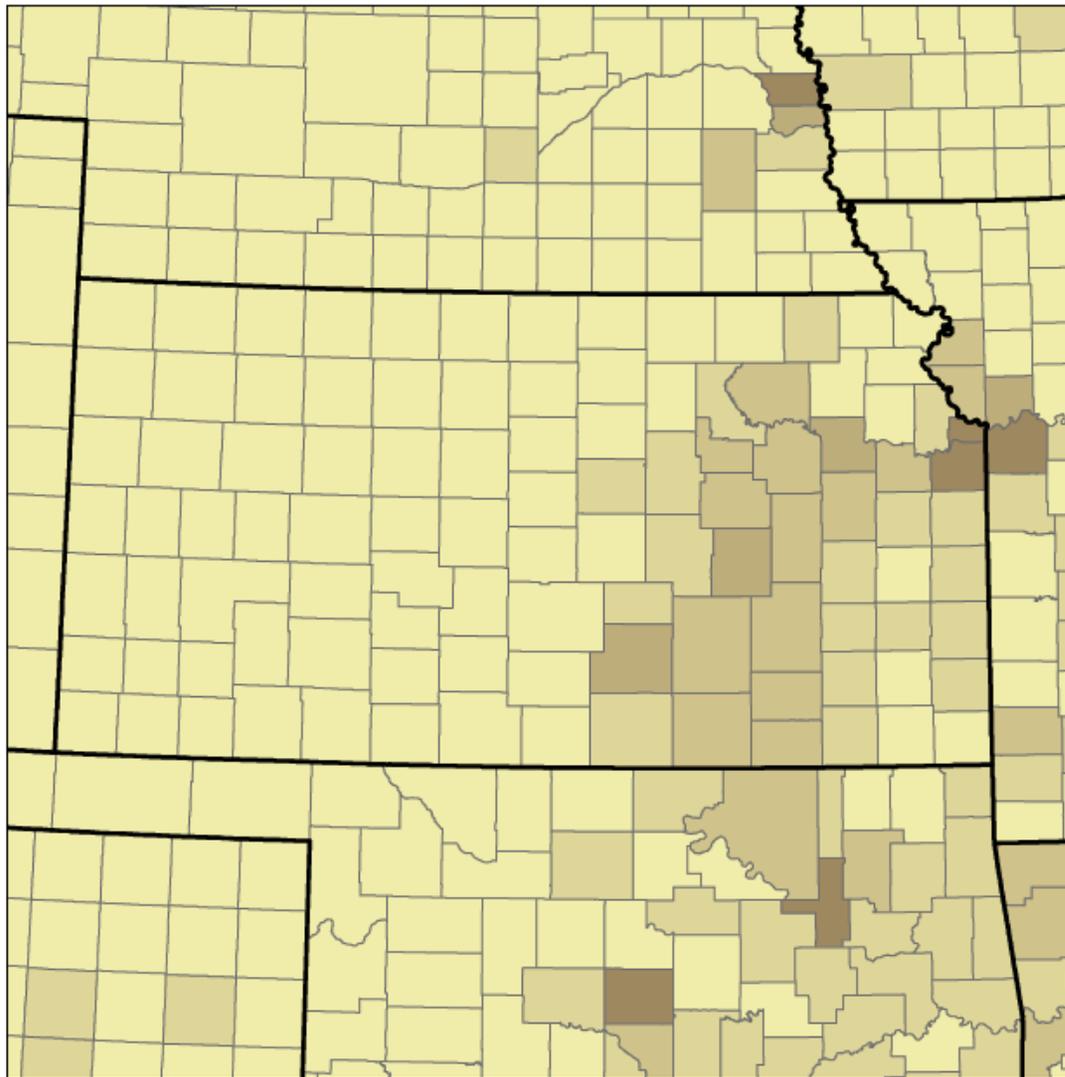
SO₂ Emissions (tons/mi²)

County

tons/mi²_SO₂

- 0.0 - 8.2
- 8.3 - 28.8
- 28.9 - 63.7
- 63.8 - 124.5
- 124.6 - 191.3
- 191.4 - 264.8
- 264.9 - 444.2
- 444.3 - 613.5
- 613.6 - 1116.4
- 1116.5 - 2091.1

CO Emissions Density



CO Emissions (tons/mi²)

County

tons/mi²_CO

