

# Kansas City Area Ozone Designation Process Meeting

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**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES



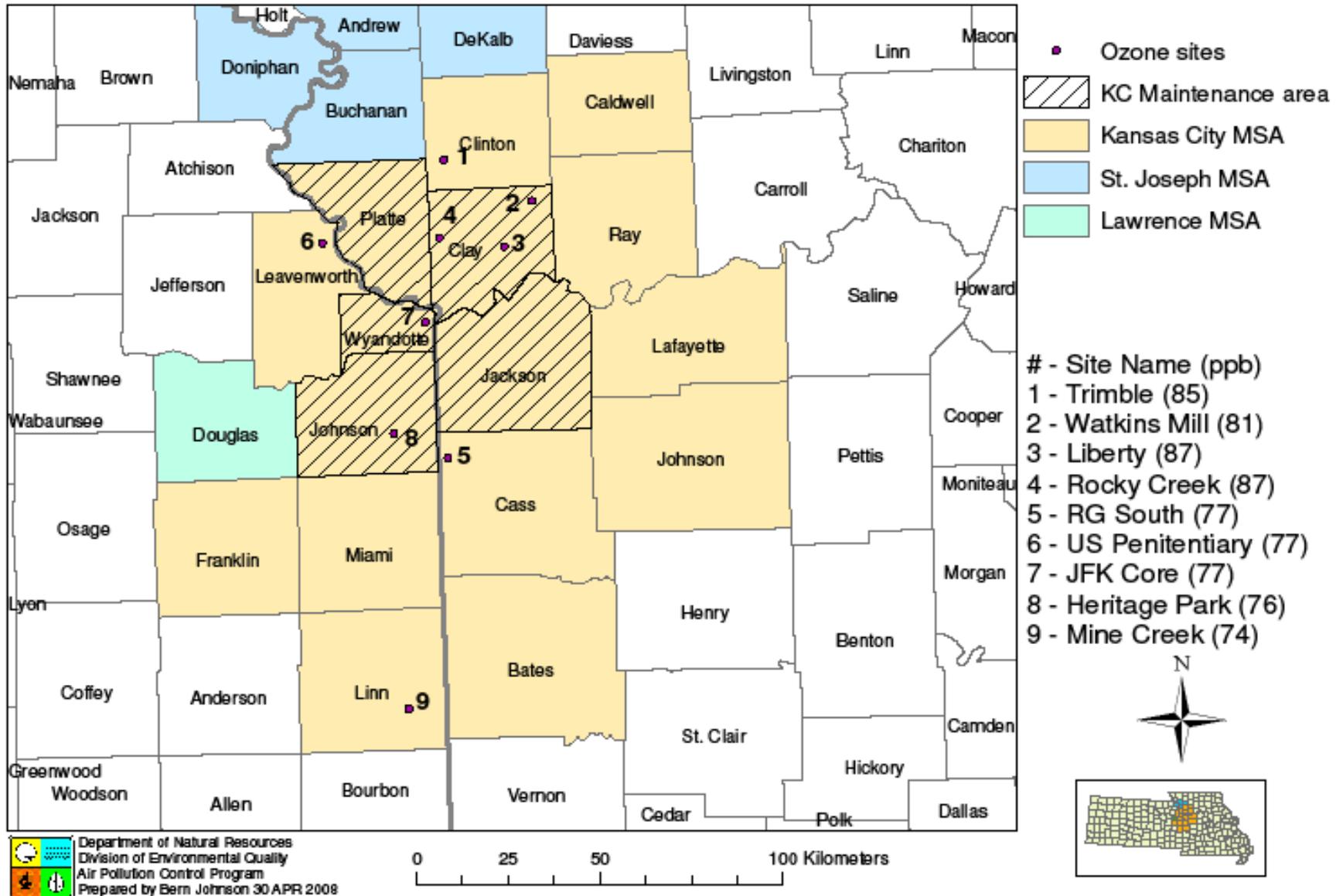
# Presentation Overview

- Designation Process Review
- Kansas Process
- Missouri Summary Information for the Kansas City Area
- Area-Specific Criteria Information
- Stakeholder Involvement

# EPA's New Ozone Standard

- Primary standard – 75 ppb
- Secondary standard – 75 ppb
- Area meets the new standard if design value (average of 4<sup>th</sup> highest 8-hour average at each monitor over three years) is less than or equal to 75 ppb

# 2008 Kansas City Ozone Sites and 05-07 Design Values



# EPA's Guidance for 2003 Boundary Recommendation

- Test #1 – Does a monitor in the area violate the standard?
- Test #2 – Do VOC and NOx emission sources in each county contribute to ozone concentrations over the standard?
- The designation process is not optional; if a monitor violates the standard, then that county is designated nonattainment and other "upwind" counties are also considered based on contribution

# EPA's 2003 Guidance for Boundary Recommendation (cont'd)

- The area determination is based on EPA's decision that includes the state's recommendation and supporting documentation
- Determinations are based on eleven (11) boundary criteria

# Eleven Boundary Criteria

- Emissions and air quality in adjacent areas
- Population density and degree of urbanization (significant difference from surrounding area)
- Ozone monitoring data in surrounding area
- Location of emission sources
- Traffic and commuting patterns
- Expected growth (extent, pattern and rate)

# Eleven Boundary Criteria (cont.)

- Meteorology (weather and transport patterns)
- Geography/topography
- Jurisdictional boundaries (counties, air districts, current nonattainment area)
- Level of control of emission sources
- Regional emission reductions

# Counties with a violating monitor

- Clay, MO (Liberty, Rocky Creek – 87 ppb)
  - Cass, MO (Richards Gebaur South – 77 ppb)
  - Wyandotte, KS (JFK Core – 77 ppb)
  - Johnson, KS (Heritage Park – 76 ppb)
- 
- Clinton, MO (Trimble – 85 ppb)
  - Leavenworth, KS (US Penitentiary – 77 ppb)

# Contribution to Monitored Violations

- Key issues:
- Do VOC and NOx emissions from each county contribute to monitored violations in the area?
- Use eleven EPA criteria to evaluate contribution.

# Kansas Process

# What is MIRA?

- **M**ulti-**C**riteria **R**esource **A**ssessment tool
- Developed by EPA Region III
- Designed to rank elements of environmental sets
- Can include large numbers of diverse criteria
  - Environmental, social, political, and economic data
  - Encourages the inclusion of stakeholder concerns
- Includes expert opinions and value judgments
  - Value judgments are transparent
  - Data & scientific judgments are separated from value judgments
- Designed to reveal the rationale or justification for a decision

# MIRA: General Approach

- Define the question
- Establish problem set: in this case the geographic area
- Establish decision criteria
  - Environmental, social, economic, etc.
  - Quantitative and/or qualitative
- Construct decision tree and weightings

# MIRA Output

- Ranked Problem Set
- GIS Map if problem set elements are spatial
- Criteria Ranking:
  - Can be viewed at any level of the hierarchy

# Eleven Criteria and MIRA Analysis

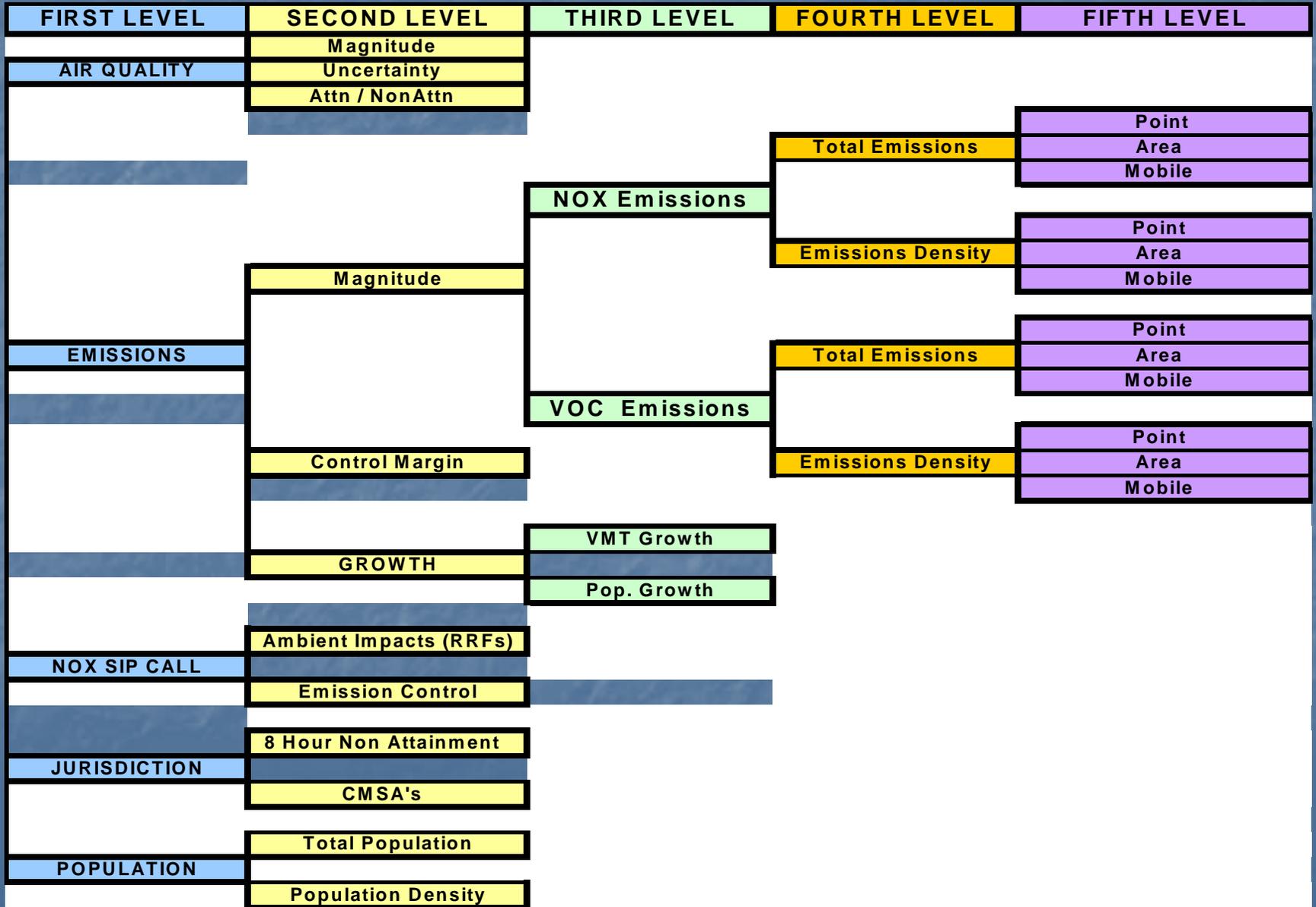
## Comparison of the 11 EPA Guidance Criteria and the MIRA Analytical Criteria

EPA Guidance Memo (3/00)	MIRA Analysis
1. Emissions and air quality in adjacent areas	1. VOC/NOx (Point, area, mobile) emissions and Air quality estimates in all adjacent areas
2. Population density/urbanization	2. Population density/population/CMSA
3. Air quality monitoring data	3. Air quality monitoring data for counties with monitors
4. Emission sources	4. VOC/NOx (point, area, mobile) emissions for all areas
5. Traffic/commuting patterns	5. CMSA, VMT
6. Expected growth	6. VMT and population growth
7. Meteorology	7. Meteorology considered in data for AQ modeling
8. Geography/topography	8. Geography and topography considered in data for AQ modeling
9. Jurisdictional boundaries	9. County, C/MSA, and 8 hour O3 NA areas
10. Level of emission controls	10. Control margin
11. Regional emission reductions	11. NOx SIP call (Relative Reduction Factors)

# Example - Data

County	Point Emissions				Area Emissions	
	Total VOC (Tons/Yr)	Utility VOC (Tons/Yr)	Total NOx (Tons/Yr)	Utility NOx (Tons/Yr)	VOC (Tons/Yr)	NOx (Tons/Yr)
Douglas	239	63	5271	5159	3402	415
Franklin	12	4	70	62	1052	277
Johnson	721	1	1047	20	13609	2465
Leavenworth	160	0	88	0	1304	152
Linn	230	222	29109	29100	639	1501
Miami	179	0	2767	2	741	162
Wyandotte	2385	65	8281	7488	5060	828
Bates	2	0	24	0	722	111
Caldwell	3	0	0	0	318	33
Cass	37	2	139	57	1997	301
Clay	2084	1	1076	881	4959	386
Clinton	1	0	0	0	535	59
Jackson	1473	115	14875	12481	16146	2126
Lafayette	142	3	55	28	939	209
Platte	353	87	8220	8122	1878	616
Ray	14	0	43	0	874	158

# The Decision Tree



# First Level Weighting

■ Air Quality	30%
■ Emissions	30%
■ Jurisdiction	10%
■ Total Population	30%

# Second Level Weighting

- Air Quality
  - Magnitude 30%
  - Uncertainty 40%
  - Att/Non-Att 30%
- Emissions
  - Magnitude 70%
  - Growth 30%
- Population
  - Total Population 50%
  - Population Density 50%

# Third Level Weighting

- Emissions Magnitude
  - NOx Emissions 60%
  - VOC Emissions 40%
- Growth
  - VMT Growth 40%
  - Pop. Growth 60%

# Fourth Level Weighting

- NOx Emissions
  - Total Emissions 50%
  - Emissions Density 50%
- VOC Emissions
  - Total Emissions 50%
  - Emissions Density 50%

# Fifth Level Weighting

## ■ NOx Total Emissions

- Point 33%
- Area 34%
- Mobile 34%

## ■ VOC Total Emissions

- Point 33%
- Area 34%
- Mobile 33%

## ■ NOx Emissions Density

- Point 25%
- Area 40%
- Mobile 35%

## ■ VOC Emissions Density

- Point 25%
- Area 40%
- Mobile 35%

# Example Output - Population

COUNTIES - Ranked from most NA to Least NA		Criteria Sum	10 Bins
1	Jackson County	6.83	1
2	Johnson County	6.56	2
3	Clay County	5.12	4
4	Wyandotte County	4.90	5
5	Douglas County	3.97	6
6	Platte County	3.56	7
7	Cass County	3.44	7
8	Leavenworth County	3.31	8
9	Lafayette County	2.20	10
10	Miami County	2.16	10
11	Franklin County	2.07	10
12	Clinton County	2.05	10
13	Ray County	2.01	10
14	Bates County	1.74	10
15	Caldwell County	1.67	10
16	Linn County	1.63	10

# Example Output - Emissions

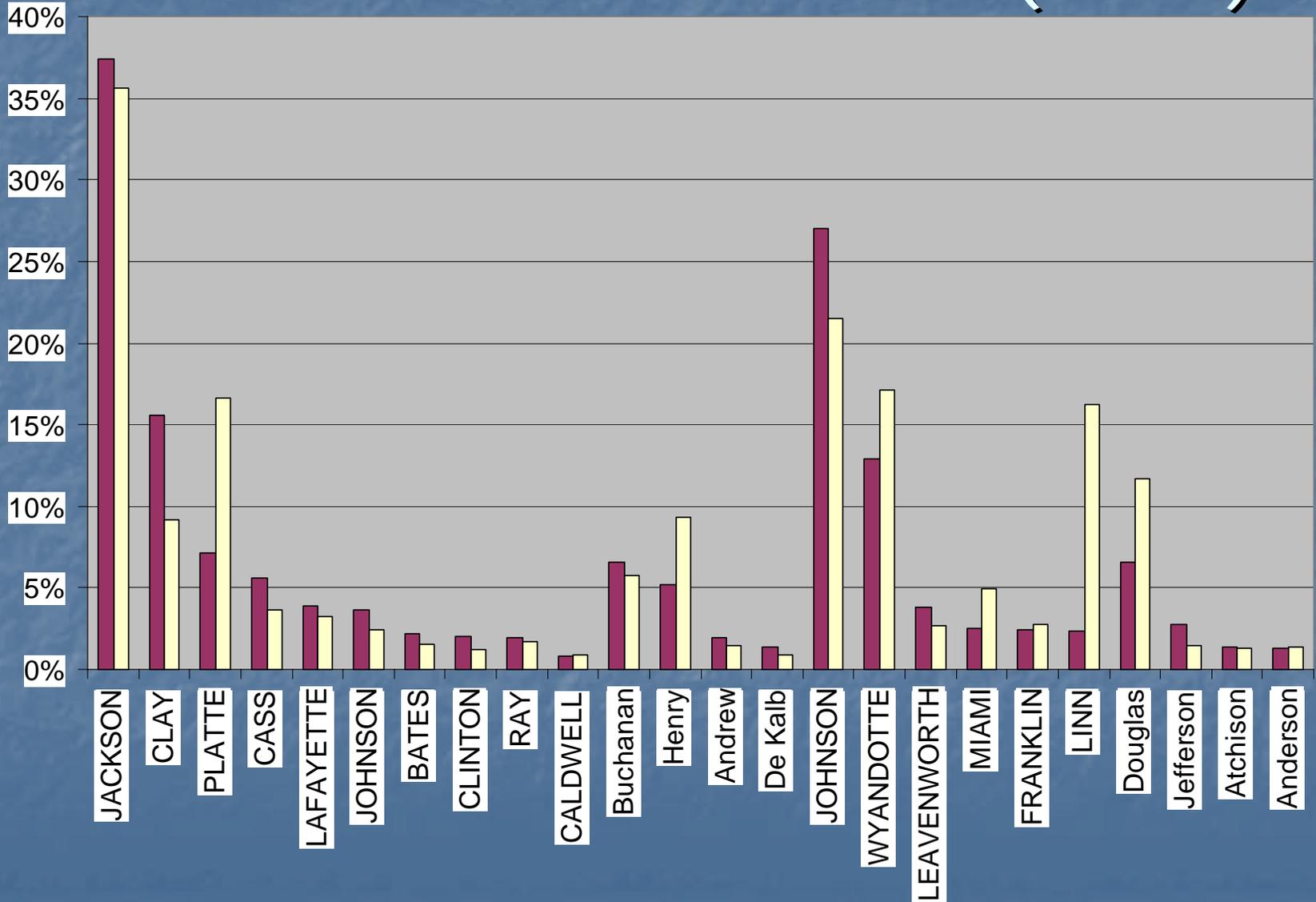
<b>COUNTIES - Ranked from most NA to Least NA</b>		<b>Criteria Sum</b>	<b>10 Bins</b>
1	Johnson County	4.73	1
2	Jackson County	4.69	2
3	Linn County	3.54	4
4	Wyandotte County	3.51	4
5	Clay County	3.13	5
6	Douglas County	3.06	6
7	Platte County	2.96	6
8	Miami County	2.59	7
9	Cass County	2.38	7
10	Leavenworth County	2.24	8
11	Franklin County	2.19	8
12	Lafayette County	2.18	8
13	Bates County	1.98	8
14	Clinton County	1.82	9
15	Caldwell County	1.75	9
16	Ray County	1.00	10

# Missouri Summary Information

# Evaluation Data

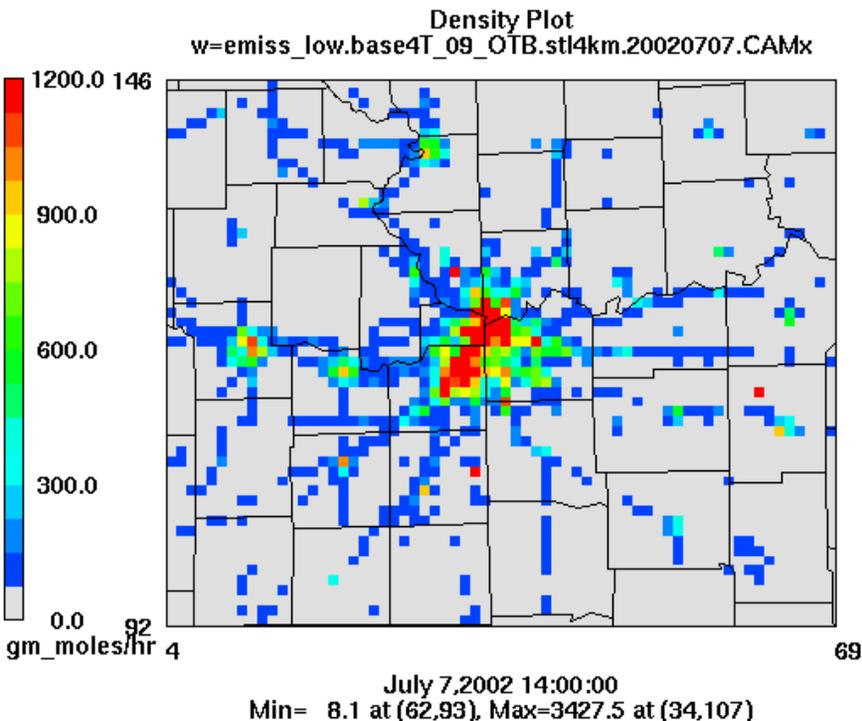
- Emission totals and percentage of overall "area" inventory for each county
- Emission density plots
- Population/Urbanization
- Connectivity
- Growth
- Meteorological

# VOC/NOx - % Main Area (2009)



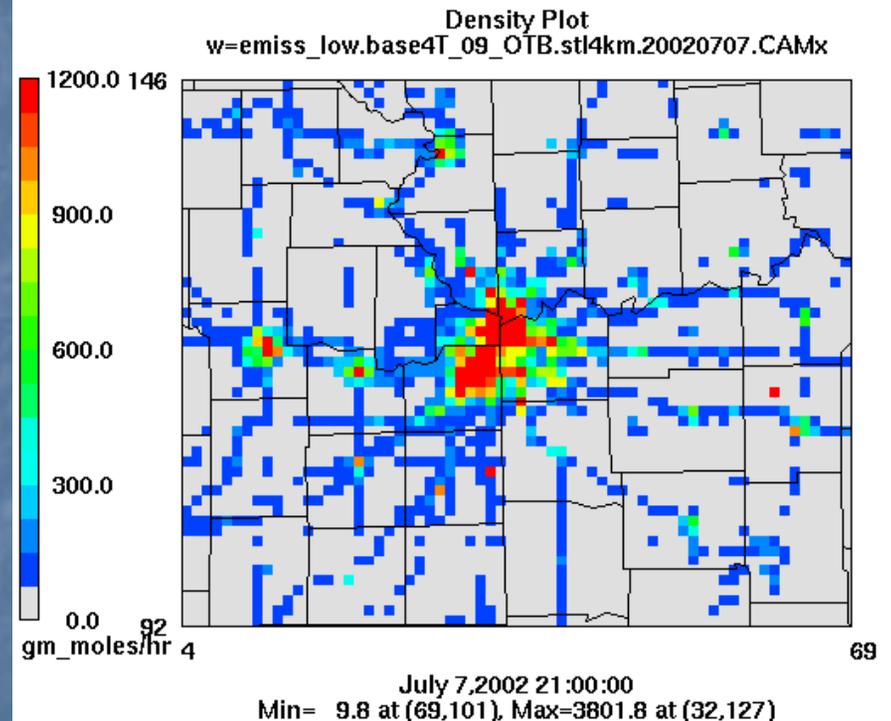
# NOx Emission Density

## Total Low-level NOx Emissions (2009)



July 7, 2002 – 8 AM

## Total Low-level NOx Emissions (2009)

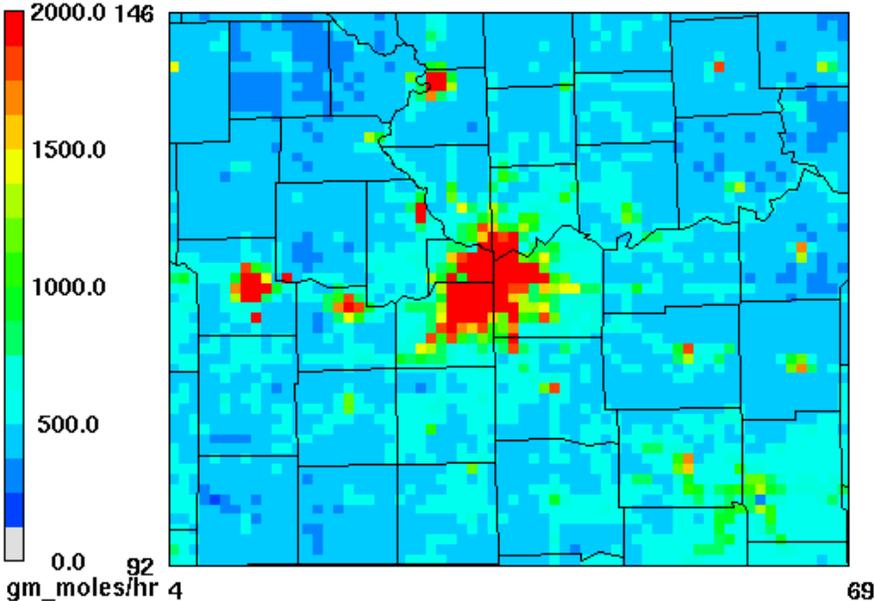


July 7, 2002 – 3 PM

# VOC Emission Density

## Total Low-level VOC Emissions (2009)

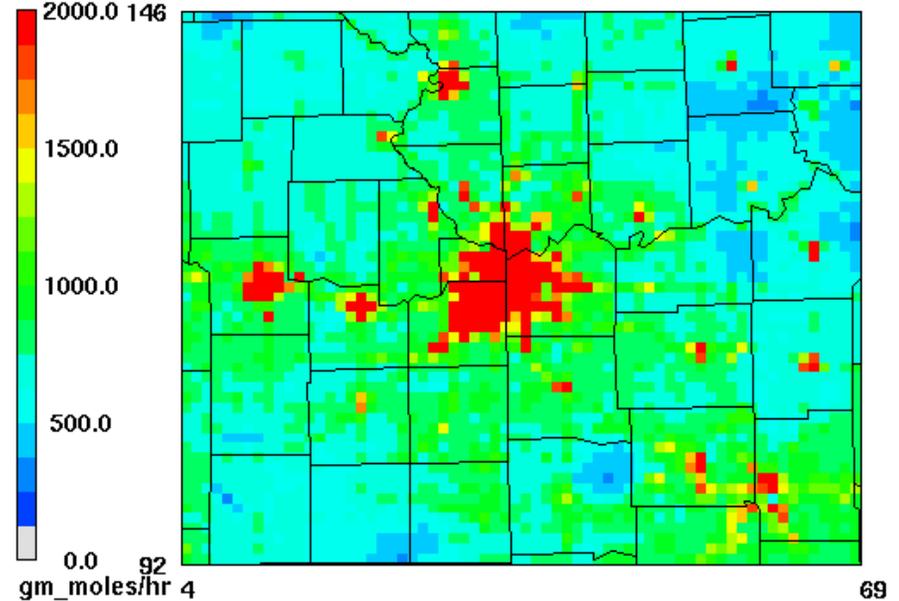
Density Plot (minus ISOP and FORM)  
w=emiss\_low.base4T\_09\_OTB.stl4km.20020707.CAMx



July 7,2002 14:00:00  
Min= 226.7 at (8,98), Max=9422.4 at (35,121)

## Total Low-level VOC Emissions (2009)

Density Plot (minus ISOP and FORM)  
w=emiss\_low.base4T\_09\_OTB.stl4km.20020707.CAMx

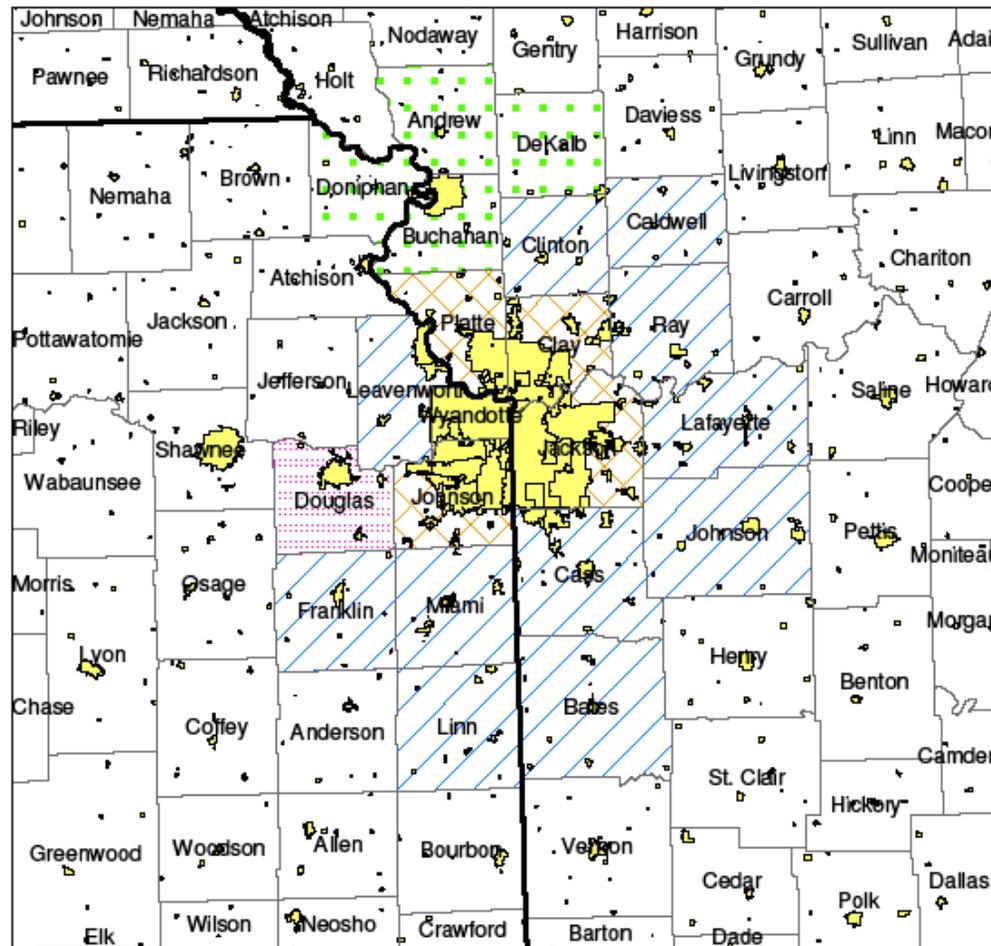


July 7,2002 21:00:00  
Min= 341.9 at (7,146), Max=11756.2 at (35,121)

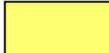
July 7, 2002 – 8 AM

July 7, 2002 – 3 PM

## 2000 Urbanization - Kansas City



0 20 40 80 Kilometers

 Urban Areas



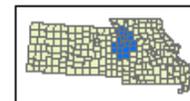
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 Division of Environmental Quality  
 Air Pollution Control Program  
 Prepared by Bern Johnson 9 JUL 2008

 Maintenance area

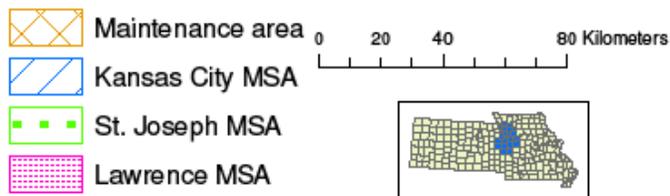
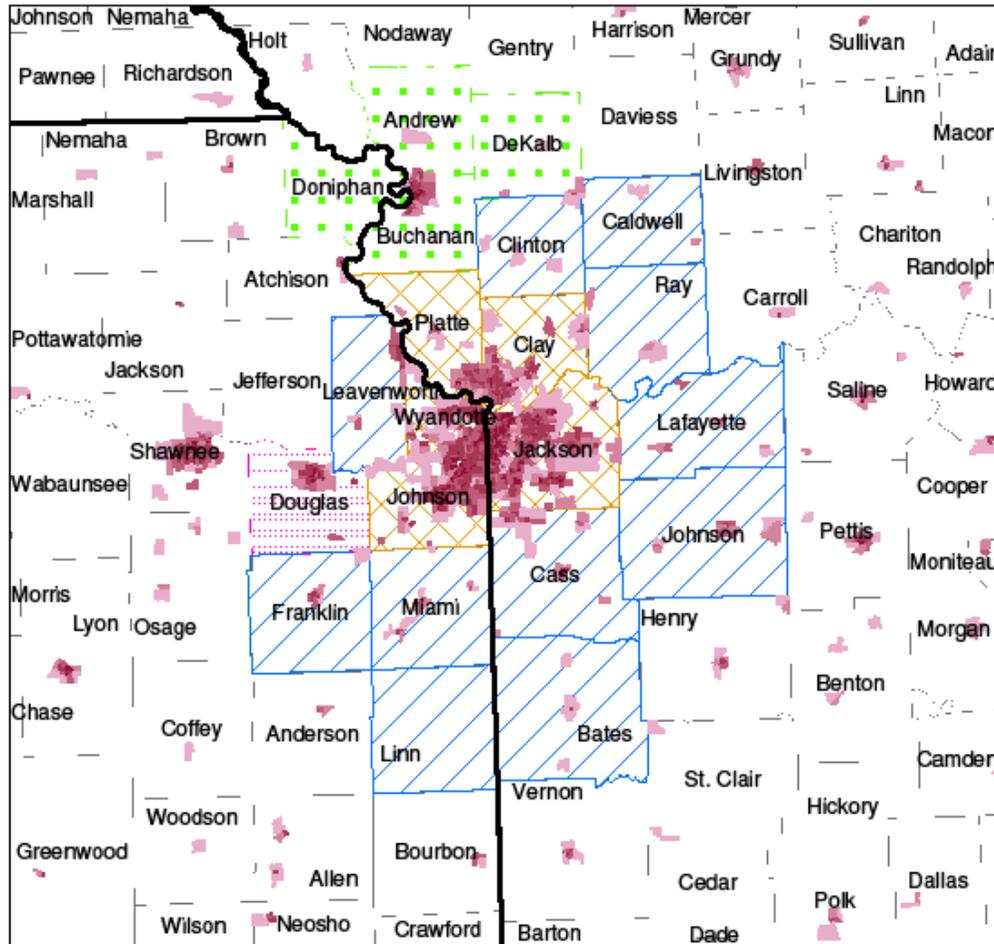
 Kansas City MSA

 St. Joseph MSA

 Lawrence MSA

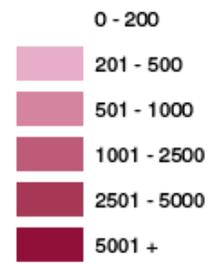


# 2000 Population Density - Kansas City



## Population Density

Persons / sq mile

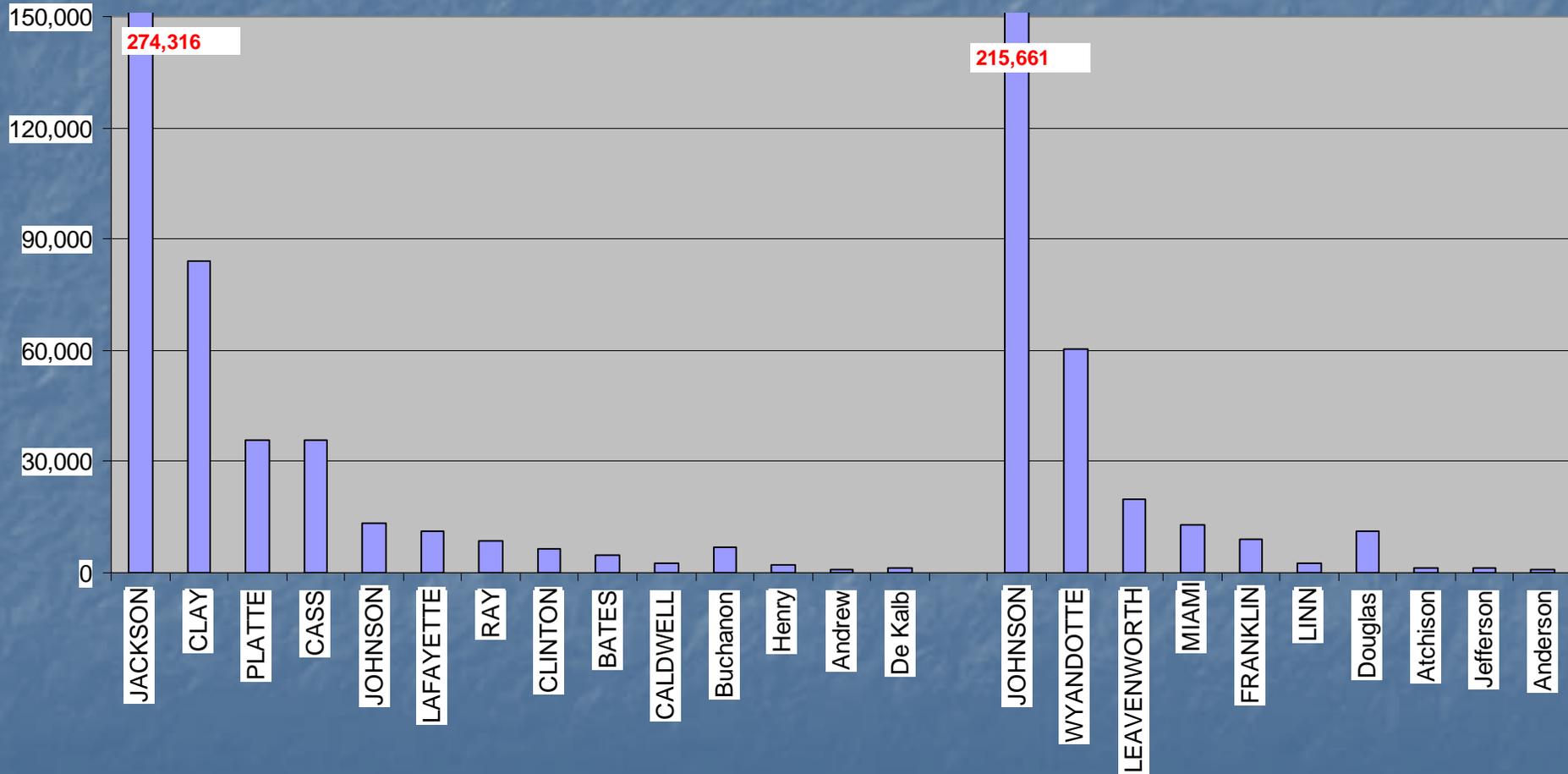



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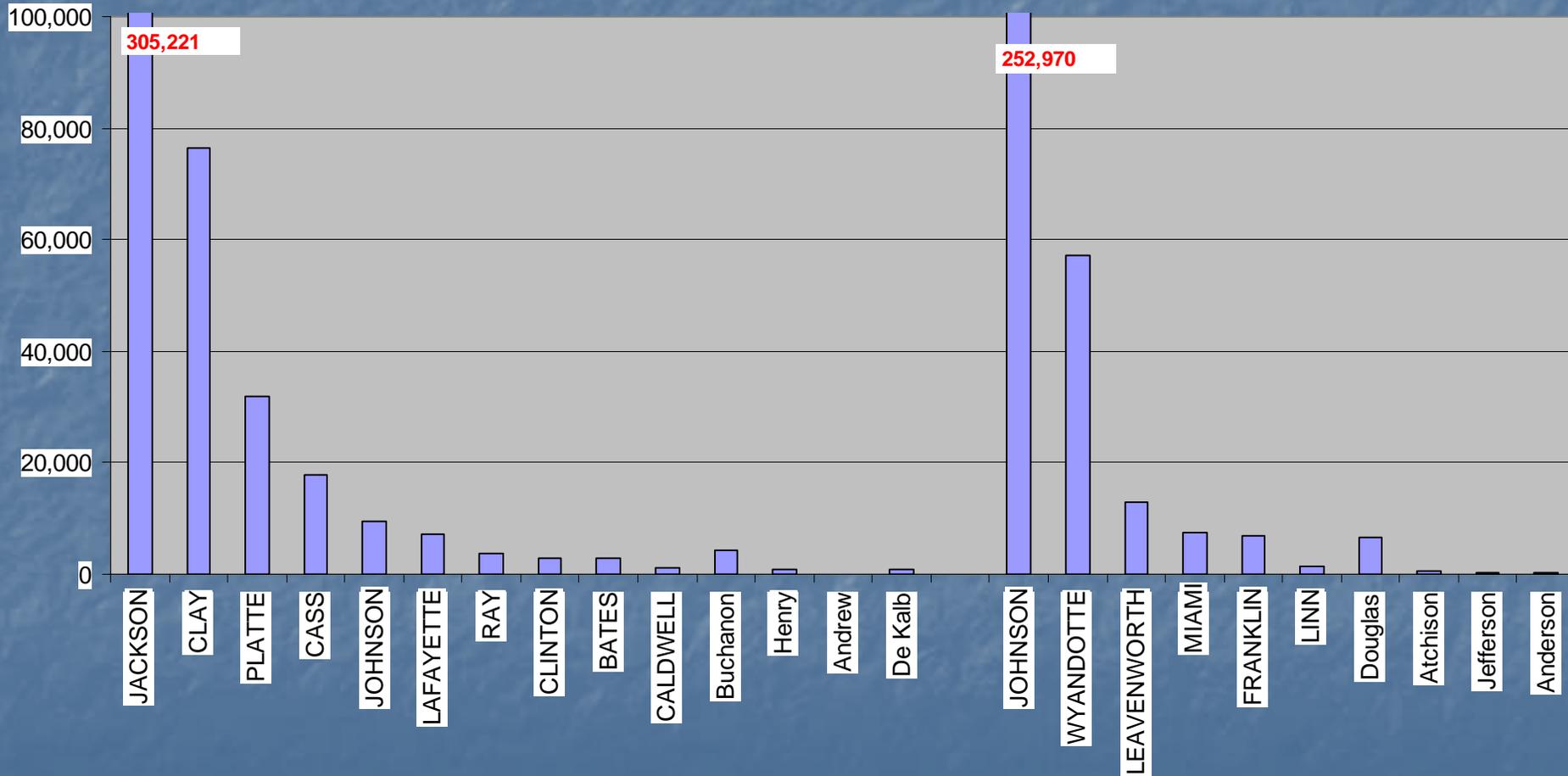
# “Connectivity”

- Two ways to evaluate this:
  - Number of people living in one county working in another (i.e. people living in Wyandotte County working in Jackson County)
  - Number of people working in one county living in another (i.e. people working in Wyandotte County living in Jackson County)

# Work in KC MSA, Live in this County



# Live in KC MSA, Work in this County



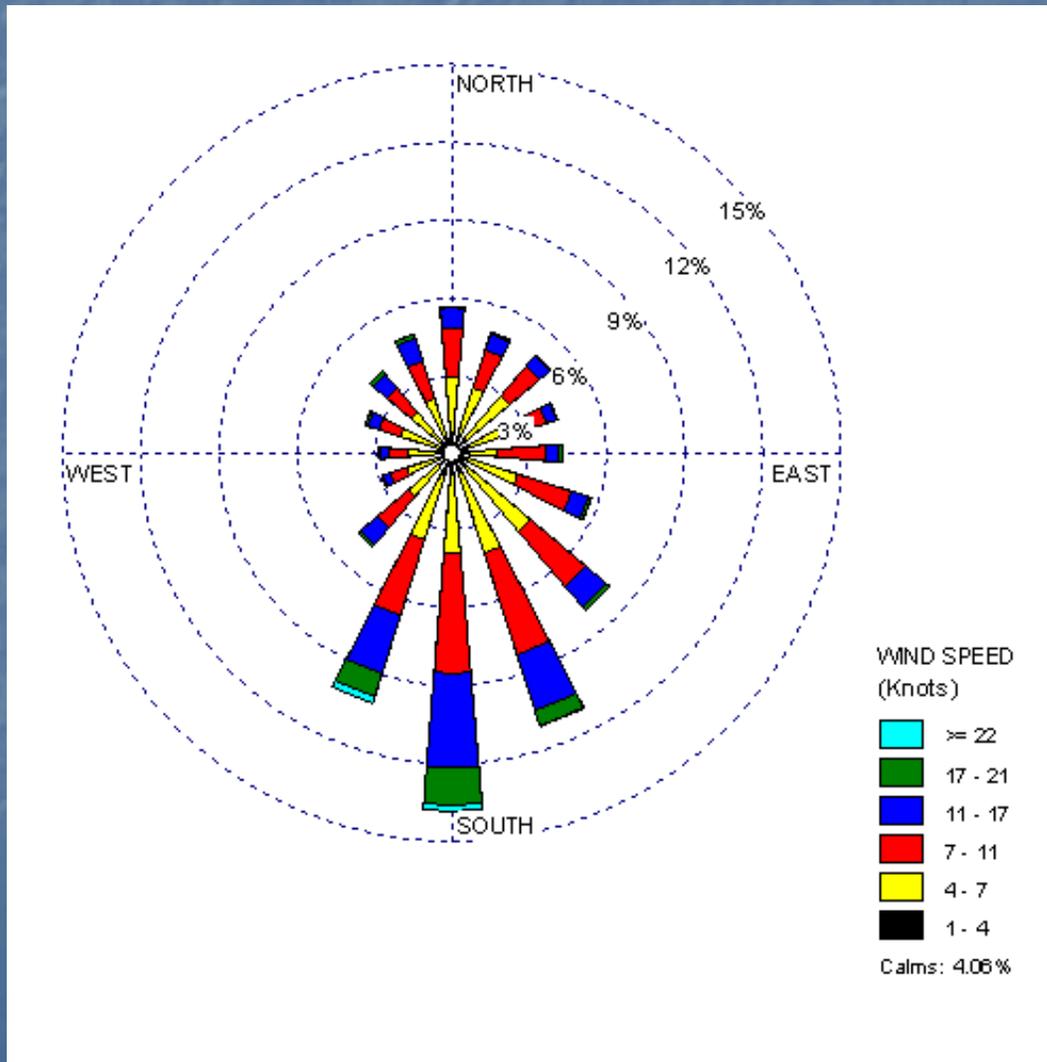
# MO Population Growth

County	2000	2010	2020	2030	00-10 Growth %	00-20 Growth %
<b>JACKSON</b>	654,880	668,867	689,226	714,467	2.1%	5.2%
<b>CLAY</b>	184,006	220,635	261,469	300,021	19.9%	42.1%
<b>PLATTE</b>	73,781	88,964	102,810	114,904	20.6%	39.3%
CASS	82,092	102,491	121,499	136,933	24.8%	48.0%
JOHNSON	48,258	53,390	57,691	61,668	10.6%	19.5%
LAFAYETTE	32,960	32,791	32,869	32,947	-0.5%	-0.3%
RAY	23,354	23,616	24,012	24,435	1.1%	2.8%
CLINTON	18,979	22,015	24,821	27,124	16.0%	30.8%
BATES	16,653	17,232	18,129	18,923	3.5%	8.9%
CALDWELL	8,969	9,342	9,987	10,633	4.2%	11.4%
Buchanan	85,998	87,049	90,380	93,007	1.2%	5.1%
Henry	21,997	22,748	23,568	24,176	3.4%	7.1%
Andrew	16,492	17,099	18,434	19,670	3.7%	11.8%
DeKalb	13,077	12,372	12,564	12,755	-5.4%	-3.9%

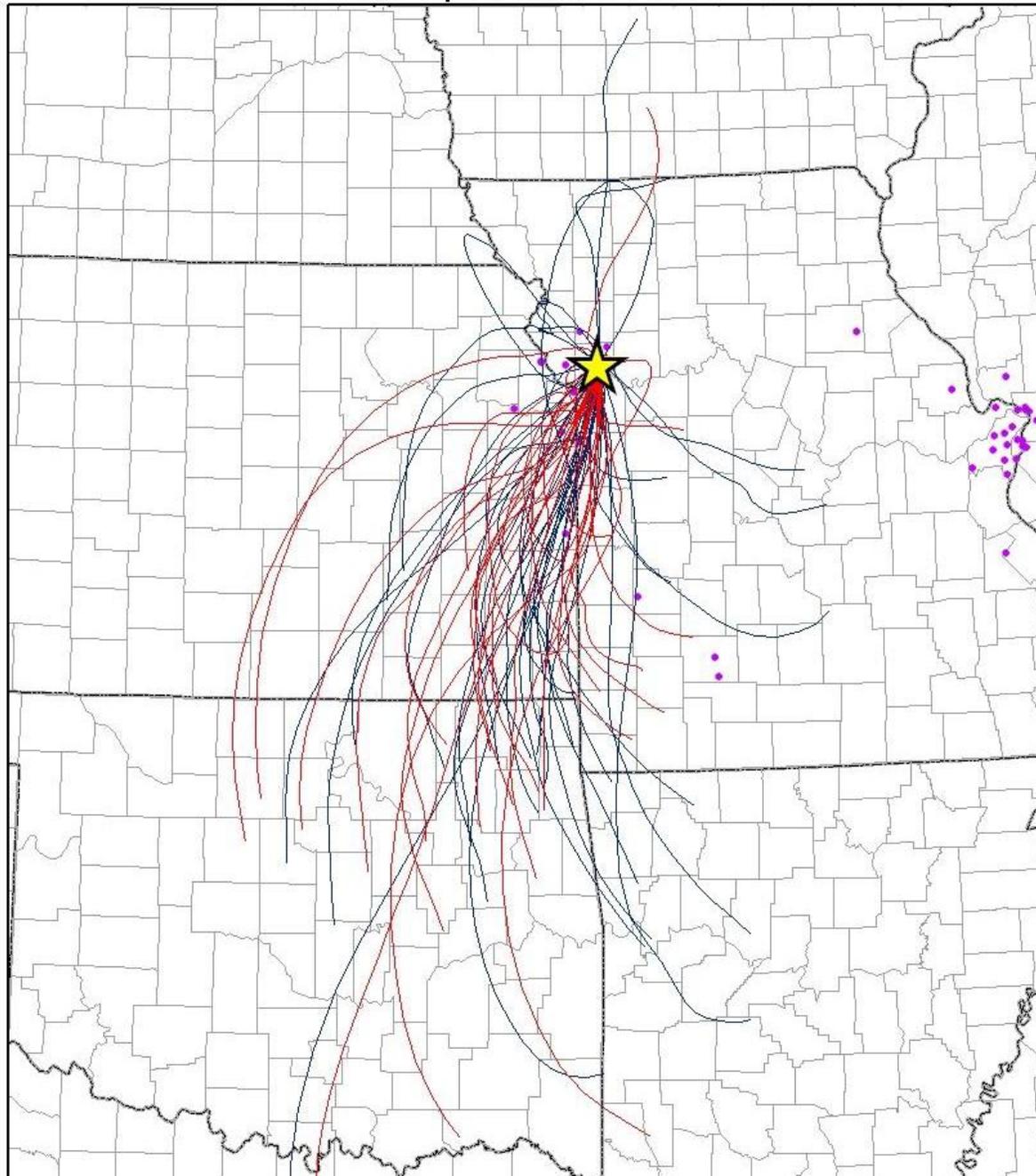
# KS Population Growth

County	2000	2010	2020	2030	00-10 Growth %	00-20 Growth %
<b>JOHNSON</b>	451,479	561,556	701,381	884,894	24.4%	55.4%
<b>WYANDOTTE</b>	157,882	153,838	151,492	151,038	-2.6%	-4.0%
LEAVENWORTH	68,691	77,489	87,741	100,274	12.8%	27.7%
MIAMI	28,351	32,611	37,564	43,595	15.0%	32.5%
FRANKLIN	24,784	26,848	29,282	32,222	8.3%	18.1%
LINN	9,570	10,108	10,679	11,359	5.6%	11.6%
Douglas	99,962	116,671	137,530	164,093	16.7%	37.6%
Jefferson	18,426	19,544	20,818	22,337	6.1%	13.0%
Atchison	16,774	16,836	17,125	17,615	0.4%	2.1%
Anderson	8,110	8,078	8,215	8,478	-0.4%	1.3%

# Kansas City International Wind Rose April – September (2003-2007)

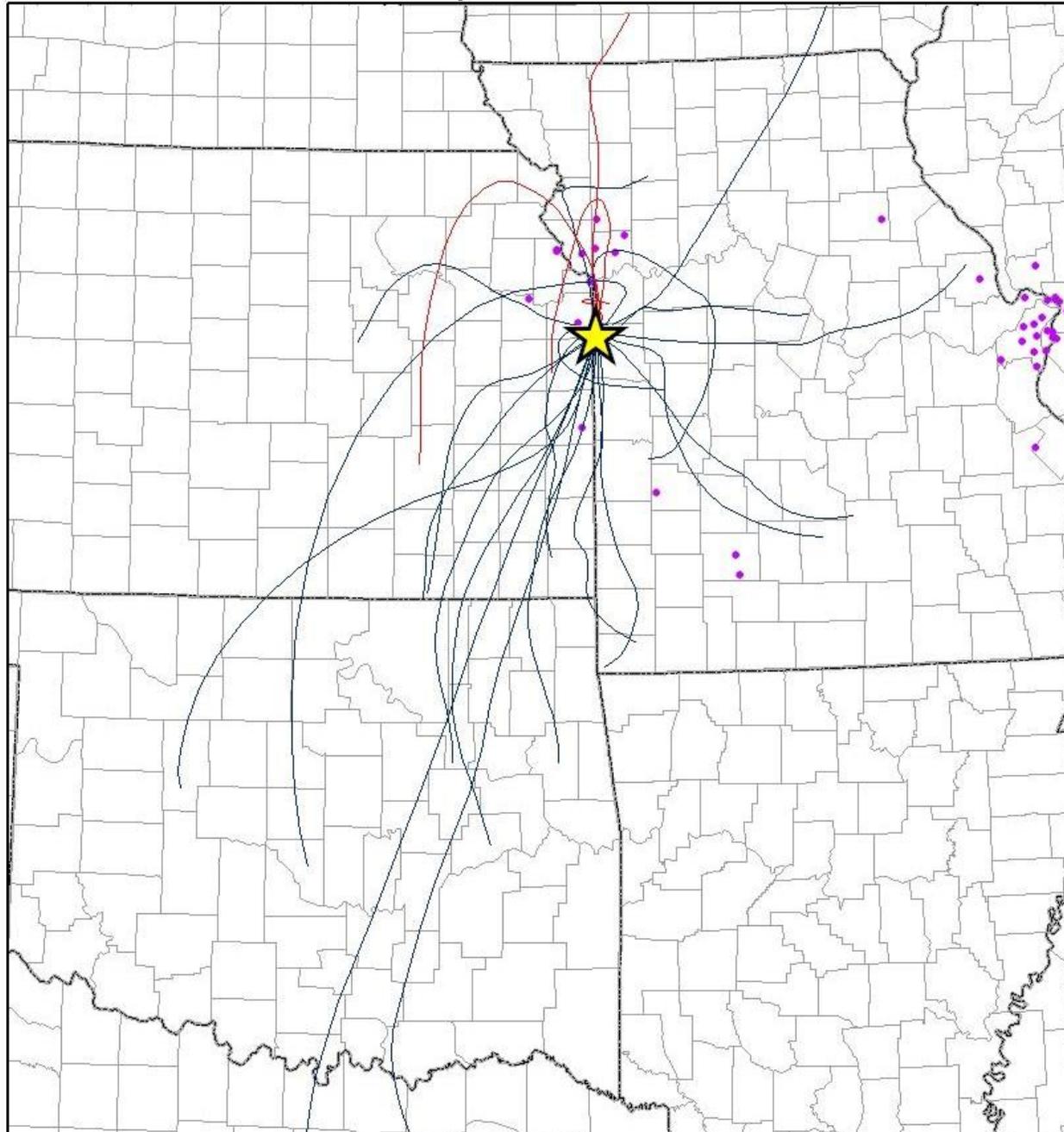


Site: Liberty  
Years of Operation: 2003-2007



Site: RG South

Years of Operation: 2003-2007



# Timeline for Implementation

<u>Milestone</u>	<u>Date</u>
EPA Administrator signed final rule	March 12, 2008
Effective Day of final rule (60 days following the publication in the Federal Register)	June 2008
State provide recommendations on designations to EPA	March 2009 (based on 2005-2007 monitoring data)
Final Designations by EPA	March 2010
Effective Date of Designations	Summer 2010
SIPs Due	Summer 2013
Attainment Dates	2013-2030 depending on severity of problem

# Opportunity for Input

- Review technical information posted on the webpage for ozone designation process
  - <http://www.dnr.mo.gov/env/apcp/ozone/8hourdesignationprocess.htm>
  - <http://www.kdheks.gov/bar/air-monitor/ozone.html>
    - Meteorological data
    - Emission data
    - Commuter data
    - Eleven boundary criteria
    - Population / Growth data
- Provide comments on any data, if necessary (especially on population growth, economic growth/business development)

# Next Steps in Missouri Designation Process

- One additional stakeholder meeting
- Last meeting expected to be late September
  - Provide draft designation boundaries for areas
  - Designations proposed at that time will not necessarily be final
  - Opportunity to review technical data and logic for recommendation
- Ultimately, EPA will make final boundary decision

# Kansas Designation Process

- One additional stakeholder meeting
- Last meeting expected to be late September
  - Provide draft designation boundaries for areas
  - Designations proposed at that time will not necessarily be final
  - Opportunity to review technical data and logic for recommendation
- KDHE will post draft Designation Technical Document and Recommendation on website for comment period– Probably sometime in October
- Will provide electronic copies of draft information to those that request

# Missouri Timeline for Boundary Designation Submission

- Missouri will follow normal MACC adoption process
- Public comment period
  - Comment period to start in late October
- Public hearing
  - December MACC meeting
- MACC adoption of boundary recommendations
  - February MACC meeting

# How You Can Still Contribute!

- County/area specific
  - Population growth information
  - Economic growth information
  - VMT Data/Commuting patterns
    - Level of interconnectivity with Kansas City

# Questions/Comments?

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