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Wichita Area Ozone Information Meeting

September 4, 2008

Wichita, Kansas

Presented by:

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KDHE - Bureau of Air and Radiation



Presentation Overview

- Designation Process Review
- Wichita MSA Technical Data
- **M**ulti-**C**riteria **I**ntegrated **R**esource **A**ssessment Tool (MIRA)
- 2008 Ozone Season
- Stakeholder Involvement
- Next Steps



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EPA's New Ozone Standard

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



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EPA's Guidance for Boundary Recommendation

- Test #1 – Does a monitor in the metropolitan area violate the standard?
- Test #2 – Do VOC and NO_x 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



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

- The area determination is based on EPA's decision that includes each state's recommendation and supporting documentation
- Area can include more or fewer counties
 - States must document decisions
 - Based on eleven (11) boundary determination criteria



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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)



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Eleven Boundary Criteria (cont.)

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



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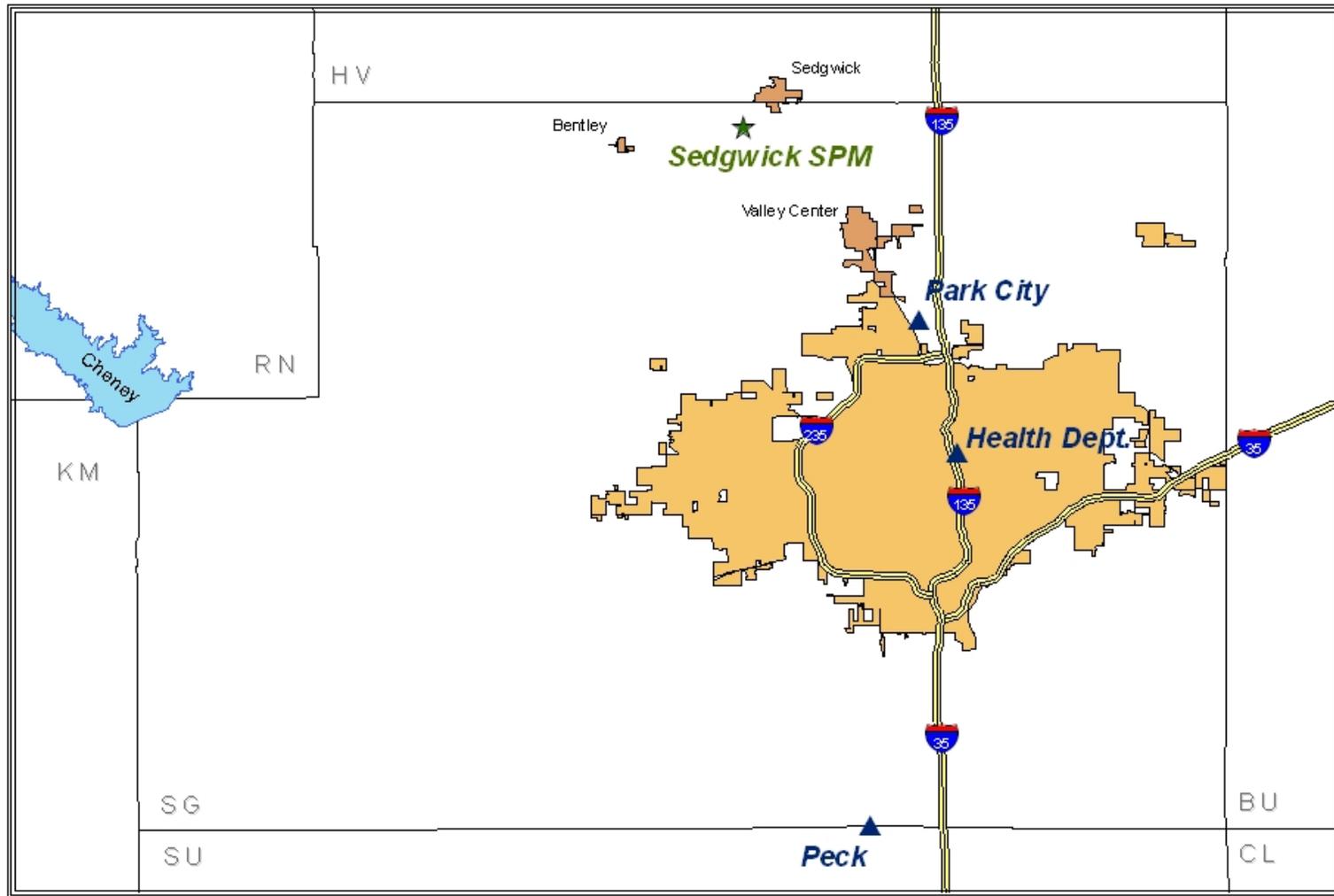
Wichita MSA Data



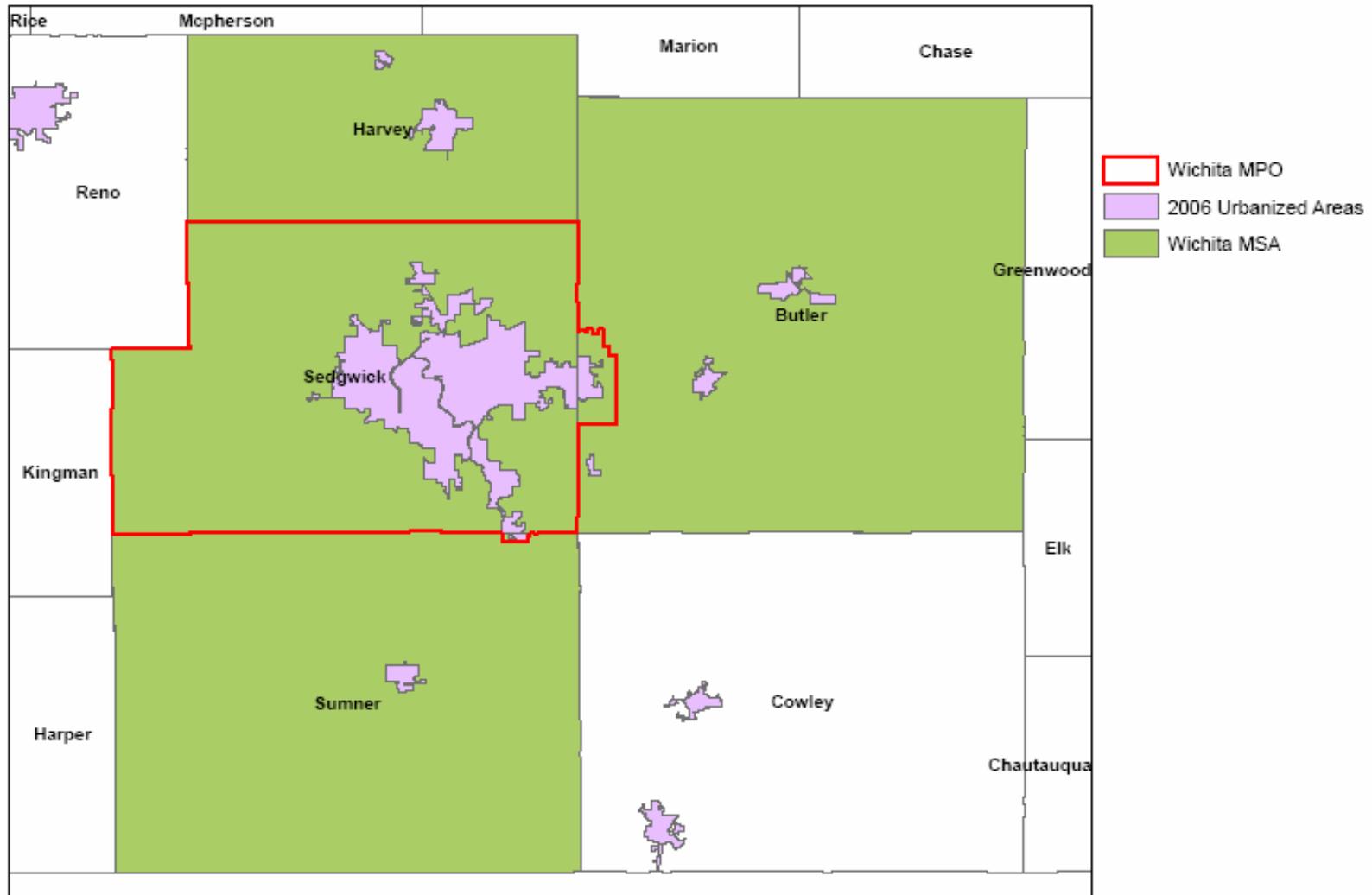
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Wichita MSA O₃ Monitoring Network



Wichita Regional Boundaries: MPO, MSA, 2006 Urbanized Areas

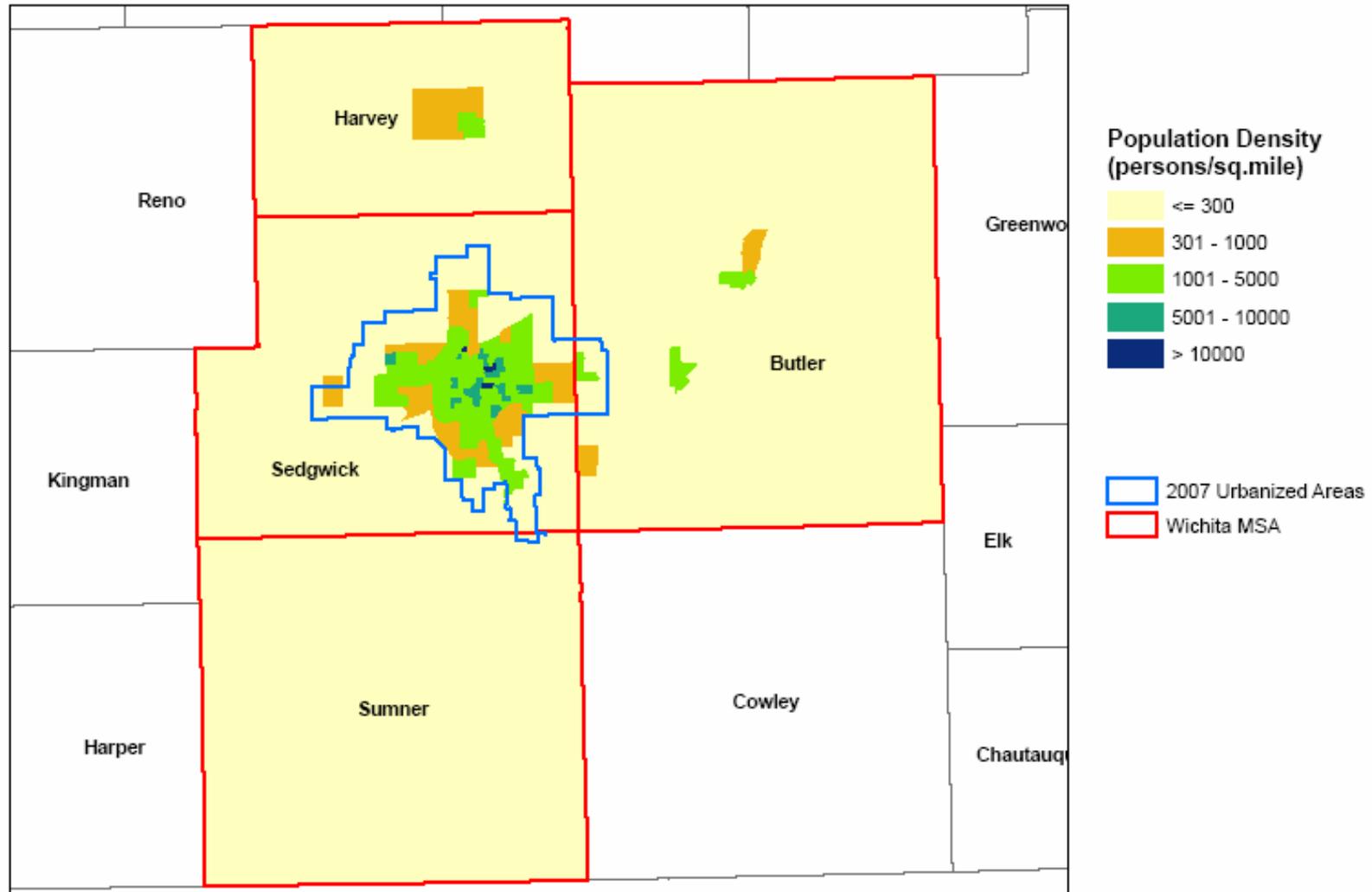


Source: U.S. Census Bureau. City of Wichita, Kansas

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2000 Population Density by Census Tract for Wichita MSA



Source: 2000 Census Bureau Tiger Files

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Wichita MSA Population Growth

County	Persons per square mile 2005	Urban, semi-urban, or rural(1)	Percent rural 2005(2)	2000	2010	2020	2027	Growth 2000-2010	Growth 2000-2010 %	Growth 2000-2020	Growth 2000-2020 %
Sedgwick	469	Urban	11.5%	453,428	481,730	515,403	538,659	28,302	6.2%	61,975	13.7%
Butler	47	Semi-urban	45.0%	59,676	74,565	83,312	87,132	14,889	24.9%	23,636	39.6%
Harvey	63	Semi-urban	35.4%	32,888	34,538	36,311	37,888	1,650	5.0%	3,423	10.4%
Sumner	22	Rural	67.3%	25,966	25,196	24,582	24,283	-770	-3.0%	-1,384	-5.3%

¹ Based on urban = counties with at least 150 persons/square mile and semi-urban = counties with between 40 and 150 persons/square mile in 2005

² Based on portions of county population belonging to entirely rural areas and to towns with less than 2500 persons

Kansas county population 1990-2027 (source: <http://budget.ks.gov/ecodemo.htm>)

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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 Butler County working in Sedgwick County)
 - Number of people working in one county living in another (i.e. people working in Butler County living in Sedgwick County)

Number of Workers who Commute to Work in Sedgwick County

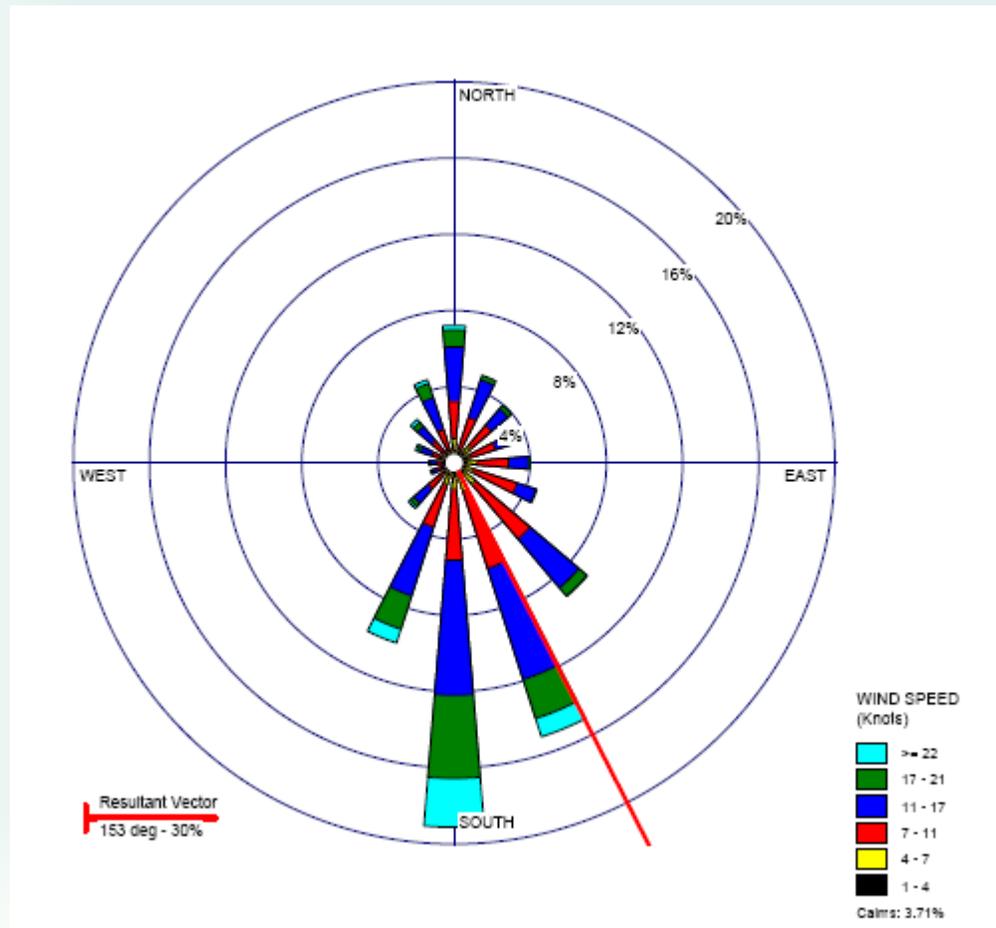


Source: U.S. Census Bureau. 2004 OD (Origin-Destination) Data Obtained from State of Missouri

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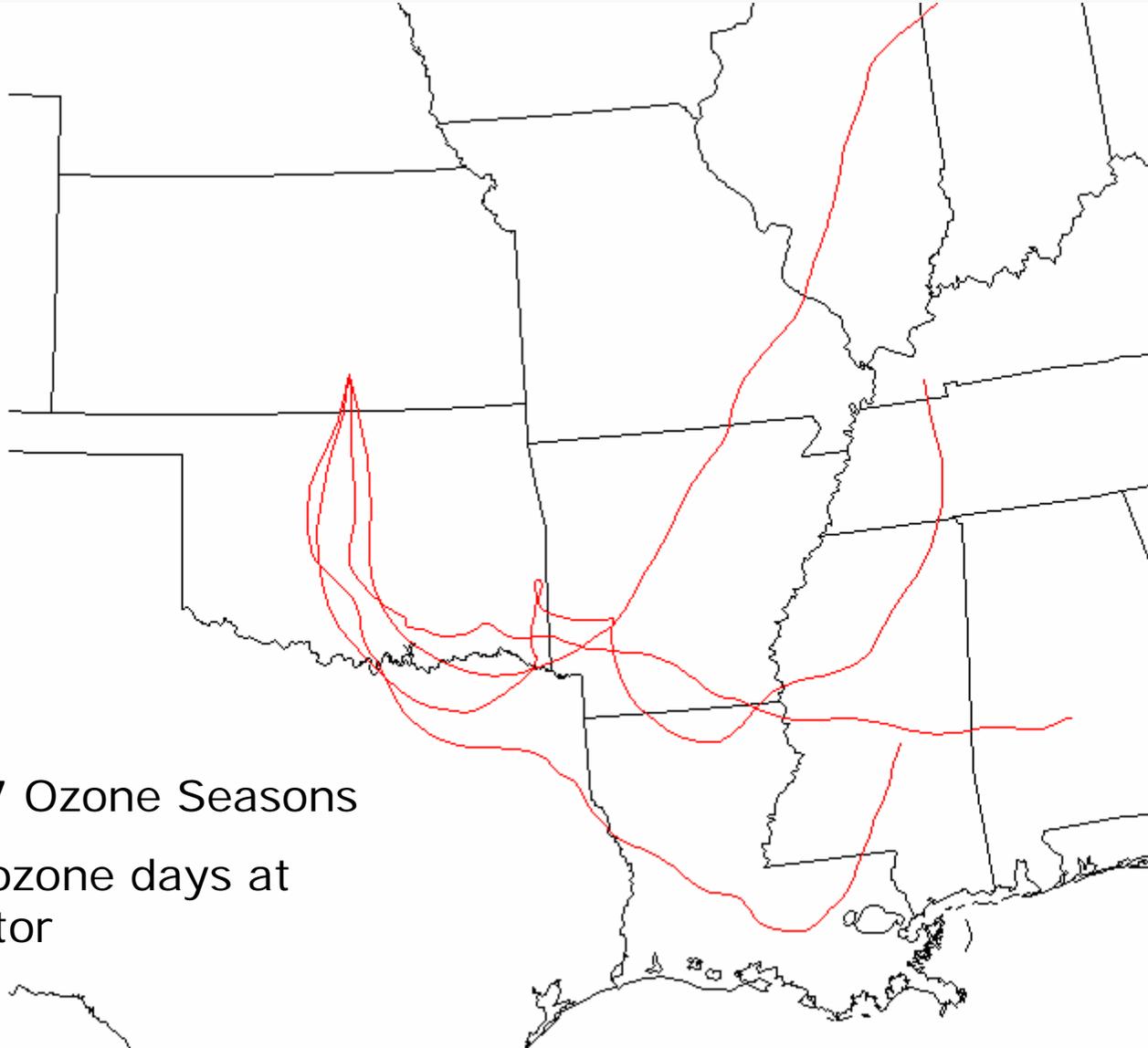
Wichita Mid-Continent Airport Wind Rose April – October (2005-2007) 7am-7pm



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Wichita High Ozone Day Back Trajectories



2005-2007 Ozone Seasons

4 highest ozone days at
Peck monitor

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Multi-Criteria Integrated Resource Assessment Tool (MIRA)



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What is MIRA?

- **M**ulti-**C**riteria **I**ntegrated **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

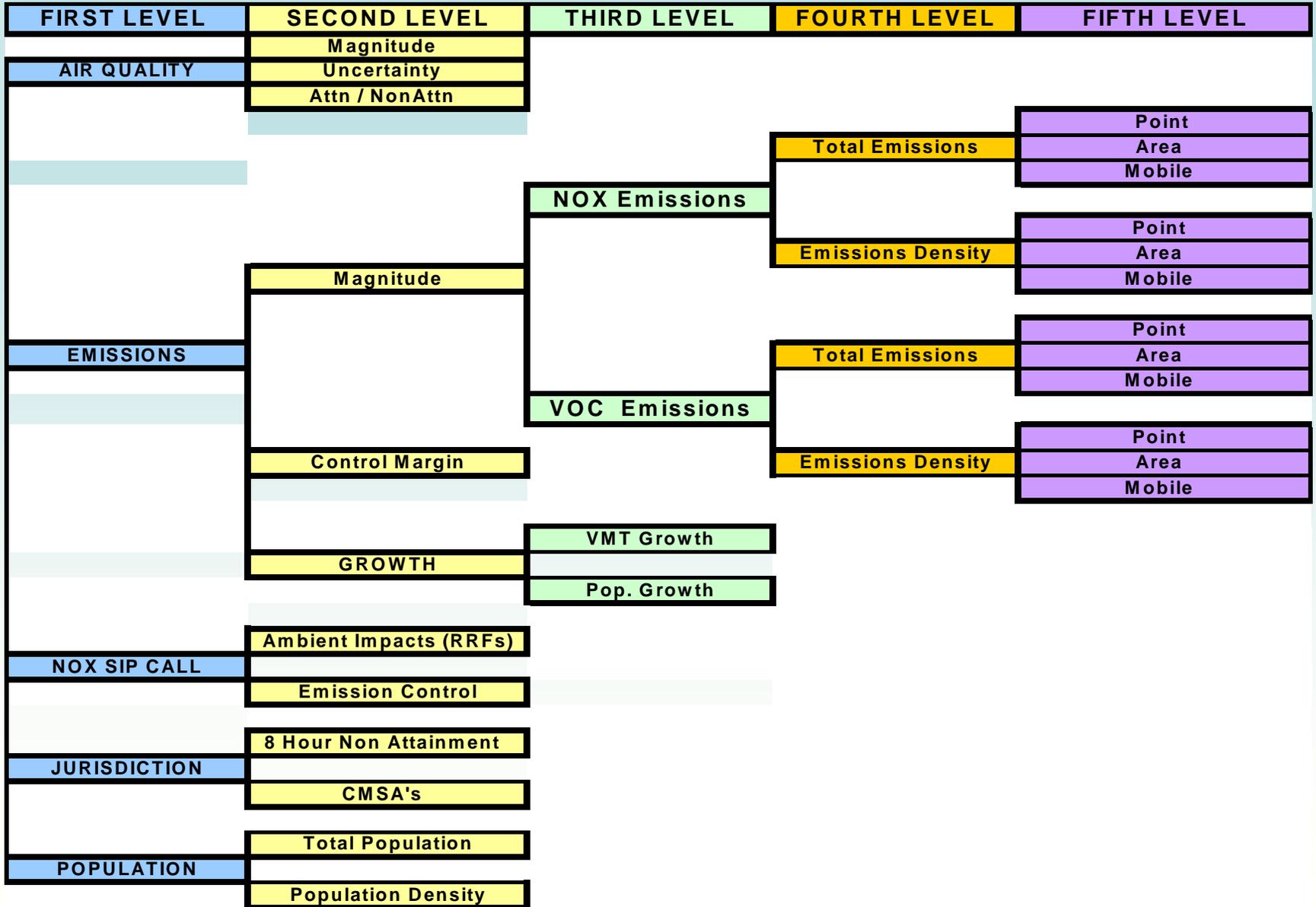
County	Point Emissions				Area Emissions	
	Total VOC	Utility VOC	Total NOx	Utility NOx	VOC	NOx
	(Tons/Yr.)	(Tons/Yr.)	(Tons/Yr.)	(Tons/Yr.)	(Tons/Yr.)	(Tons/Yr.)
Butler	1224	10	2994	128	6220	1389
Harvey	671	0	337	0	970	587
Sedgwick	2131	31	3702	2636	11075	3442
Sumner	2	2	16	16	2269	918



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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%

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	Sedgwick County	6.21	3
4	Clay County	5.12	4
5	Wyandotte County	4.90	5
6	Douglas County	3.97	6
7	Platte County	3.56	7
8	Cass County	3.44	7
9	Leavenworth County	3.31	8
10	Butler County	2.42	9
11	Harvey County	2.30	9
12	Lafayette County	2.20	10
13	Miami County	2.16	10
14	Franklin County	2.07	10
15	Clinton County	2.05	10
16	Ray County	2.01	10
17	Sumner County	1.81	10
18	Bates County	1.74	10
19	Caldwell County	1.67	10
20	Linn County	1.63	10

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Example Output - Emissions

	COUNTIES Ranked from most NA to Least NA	Criteria Sum	10 Bins
1	Johnson County	4.58	1
2	Jackson County	4.53	2
3	Linn County	3.27	5
4	Wyandotte County	3.26	5
5	Sedgwick County	2.92	6
6	Clay County	2.84	6
7	Douglas County	2.77	7
8	Platte County	2.65	7
9	Butler County	2.42	8
10	Miami County	2.25	8
11	Cass County	2.03	9
12	Leavenworth County	1.88	9
13	Franklin County	1.83	9
14	Harvey County	1.82	9
15	Lafayette County	1.81	9
16	Sumner County	1.79	9
17	Ray County	1.63	10
18	Bates County	1.60	10
19	Clinton County	1.43	10
20	Caldwell County	1.35	10

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2008 Ozone Season or What is up with the weather?



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8-Hour Ozone Monitoring Data Wichita Area

Site	4th High (ppm)					Design Value	Design Value	Design Value	Critical Value
	2004	2005	2006	2007	2008**	04-06	05-07	06-08**	2008*
Park City (Sedgwick Co.)	0.063	0.065	0.065	0.059	0.060	0.064	0.063	0.061	0.104
Wichita Health Dept.	0.068	0.074	0.073	0.060	0.067	0.071	0.069	0.066	0.095
Peck (Sumner Co.)	0.052	0.078	0.080	0.070	0.068	0.070	0.076	0.072	0.078

**4th high equal to or higher than this value for the three-year average (design value) > 0.075 ppm*

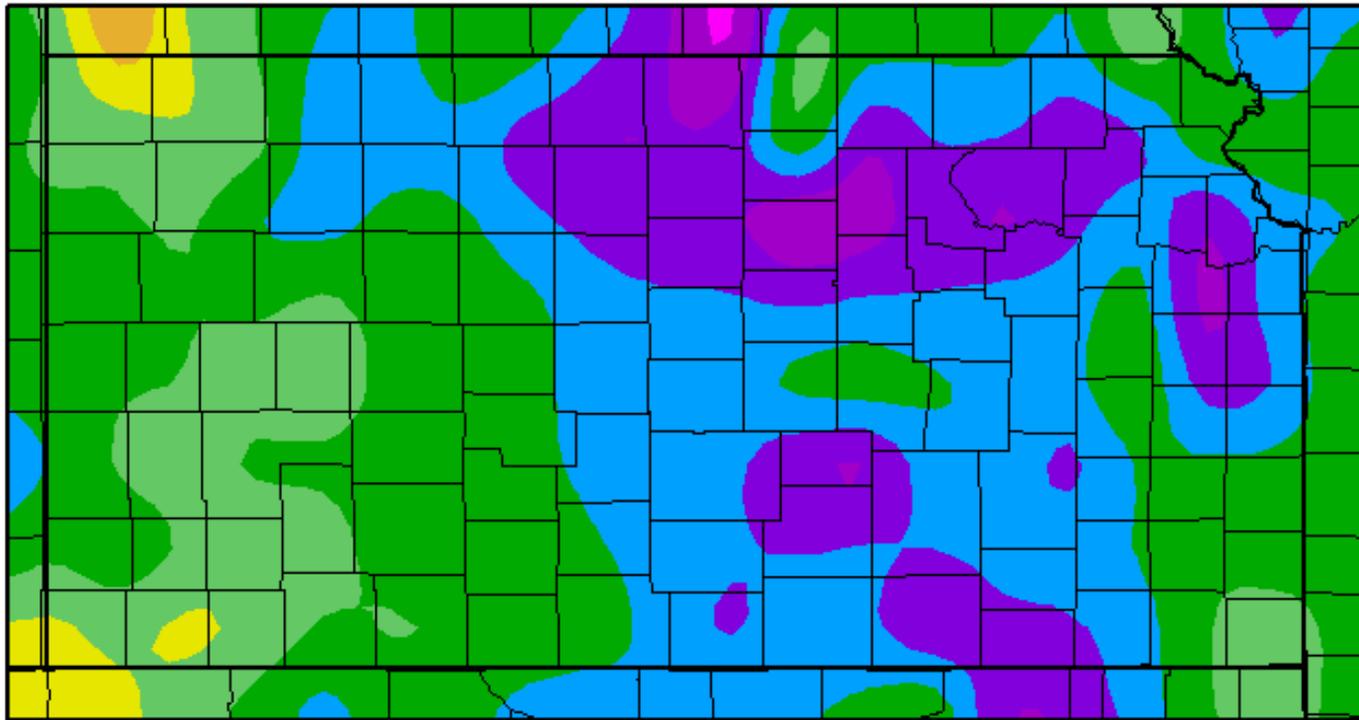
***2008 data through 9/1/2008 - data has not been finalized*



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Departure from Normal Temperature (F)
7/27/2008 - 8/25/2008



Generated 8/26/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

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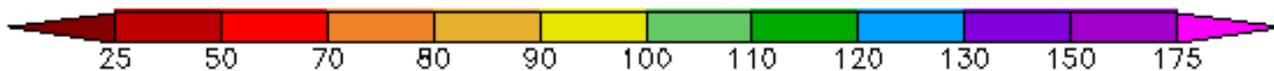
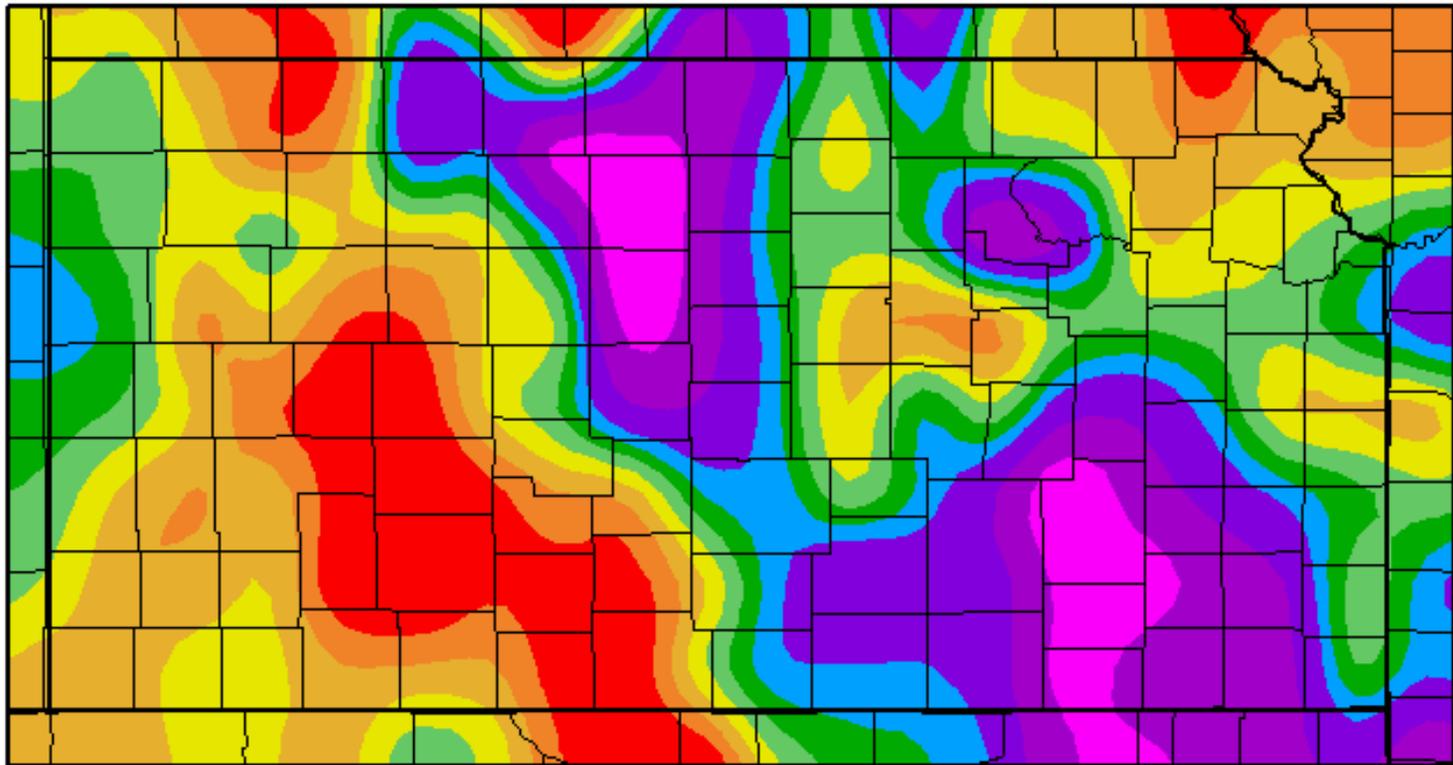
On August 21st 2008, Wichita broke the record from 1961 with 15 consecutive days with a maximum high temperature below 90F in August.

Top 5 consecutive number of days with
Temperatures below 90F in August.

1. 15 days: 2008
2. 14 days: 1961
3. 13 days: 2004 and 1989
4. 12 days: 1996 and 1992
5. 11 days: 1966



Percent of Normal Precipitation (%)
5/28/2008 – 8/25/2008



Generated 8/26/2008 at HPRCC using provisional data.

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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



Next Steps in Designation Process

- Last meeting tentatively expected to be in late October or early November (If needed)
 - Provide draft designation boundaries for areas
 - Designations proposed at that time will not necessarily be final
 - Opportunity to “pre-review” technical data and logic for recommendation
- Ultimately, EPA will make final boundary decision



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Kansas Designation Process

- KDHE will post draft Designation Technical Document and Recommendation on website for comment period– Probably sometime in October (IF NEEDED)
- Will provide electronic copies of draft information to those that request



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How You Can Contribute

- County/area specific
 - Population growth information
 - Economic growth information
 - Commuting patterns
 - Level of interconnectivity with Wichita



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For More Information

- Webpage for ozone designation process
 - <http://www.kdheks.gov/bar/air-monitor/ozone.html>
 - Information on designation process
 - Eleven boundary factors
 - Copies of presentations
 - Provides opportunity for stakeholder input
 - Future meeting announcements



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Questions/Comments?



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