

Kansas Smoke Management Advisory Committee

**Meeting 1 – Newton, Kansas
April 9, 2010**

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Kansas Department of Health and Environment



Goals of Meeting #1

- Provide information to participants about air quality issues from Flint Hills burning
- Listen to concerns regarding all aspects of the issue
- Build consensus on a path forward
- Establish next meeting date and location

Air Quality and Flint Hills Burning

- History of the Flint Hills air quality issue
- Ozone and Particulate Matter (PM)
 - Health Effects
 - Standards
- New Ozone Standard
- Monitoring and Emissions Data
- Kansas City and Wichita Status
- Nonattainment Designation and its Impacts

History of the Flint Hills Issue

- 2003 burning caused ozone exceedances in KC and elsewhere
- EPA and KDHE have met with Ag officials from late 2003 through present
 - KLA, Farm Bureau, KSU researchers, KSU extension, NRCS, DoA, Prescribed Fire Council and more
- Research, education, outreach and field training have been primary outcomes to date
- EPA denied KDHE request to flag 2009 data due to the lack of a smoke management plan



Sunlight

Ground Level Ozone Formation



Nitrogen Oxides



Volatile Organic Compounds



Ozone

Pollutants "bake" together in direct sunlight forming ozone.

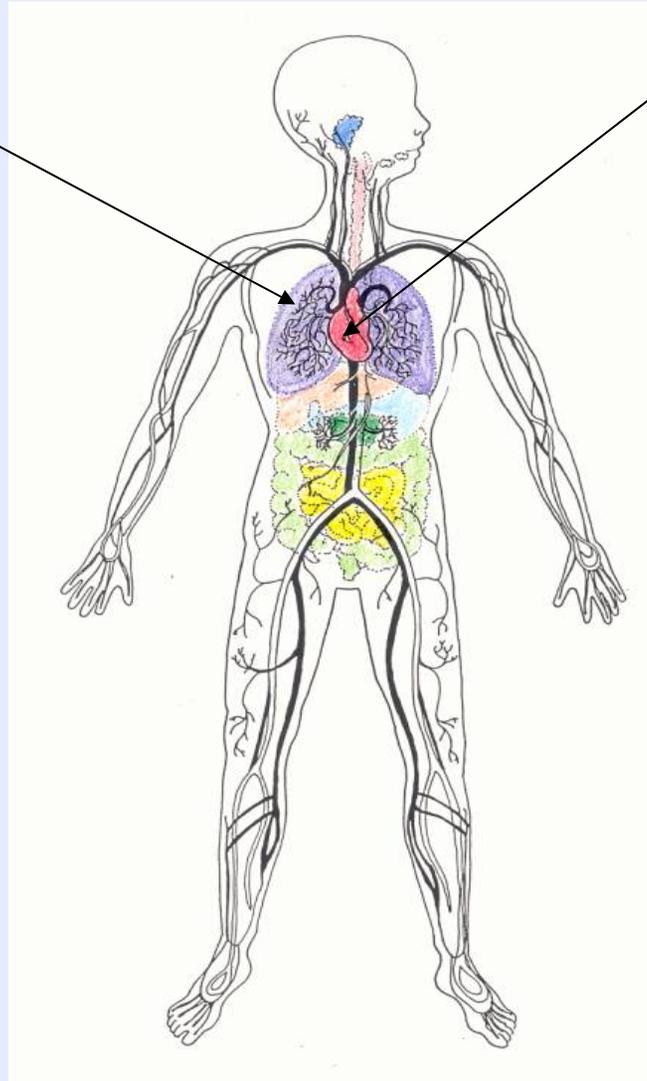
Ozone and PM – Health Effects

Respiratory:

Coughing, wheezing,
reduced lung
function

Reduced resistance
to infection

Aggravation of
asthma, emphysema
and bronchitis



Cardiovascular:

Inflammation

Heart failure

Cardiac arrhythmia

Hardening of the
arteries

Stroke

Heart attack

Ozone and PM – Health Effects

- These health effects lead to:
 - Increased medication use among asthmatics,
 - More frequent doctors visits and school absences
 - Increased emergency room visits and hospital admissions, and
 - Increased risk of premature death in people with heart and lung disease
- At-risk groups include:
 - People with lung disease (asthma, emphysema or chronic obstructive pulmonary disease)
 - Children and older adults
 - People who are active outdoors, including children and outdoor workers

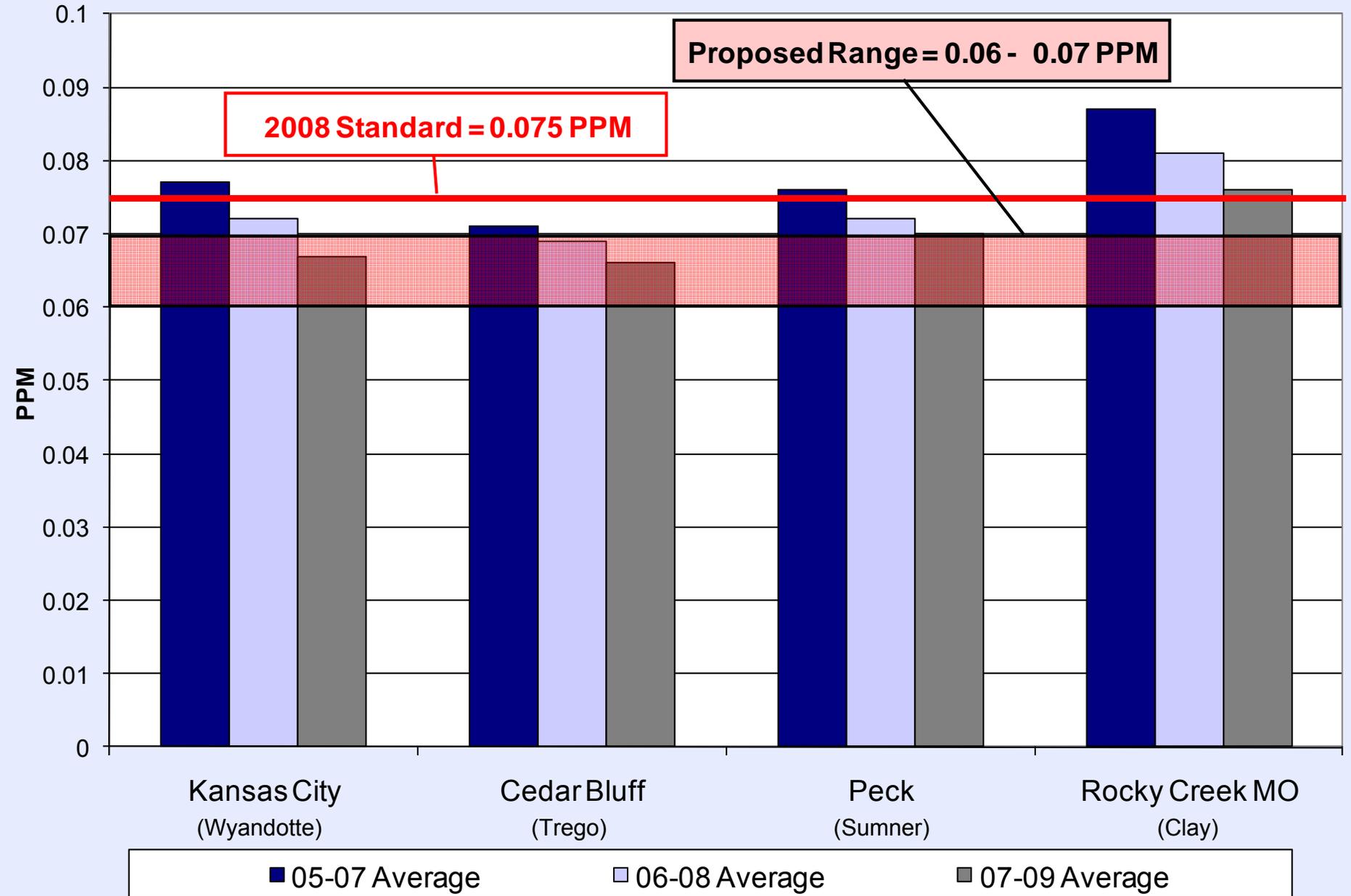
Particulate Matter Standards

- September 21, 2006 – EPA promulgated new standard for particulate matter
- $PM_{2.5}$ – fine particles < 2.5 micrometers in diameter
 - EPA strengthened 24-hour standard from 1997 level of 65 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) to $35 \mu\text{g}/\text{m}^3$
 - Retained current annual standard at $15\mu\text{g}/\text{m}^3$
- PM_{10} – particles < 10 micrometers in diameter
 - Retained existing national 24-hour standard of $150\mu\text{g}/\text{m}^3$
 - Revoked the annual standard

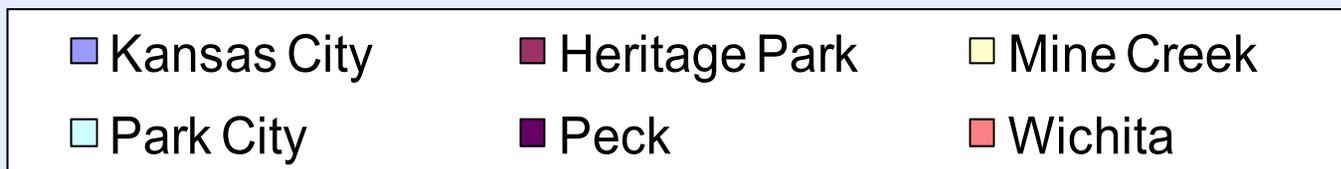
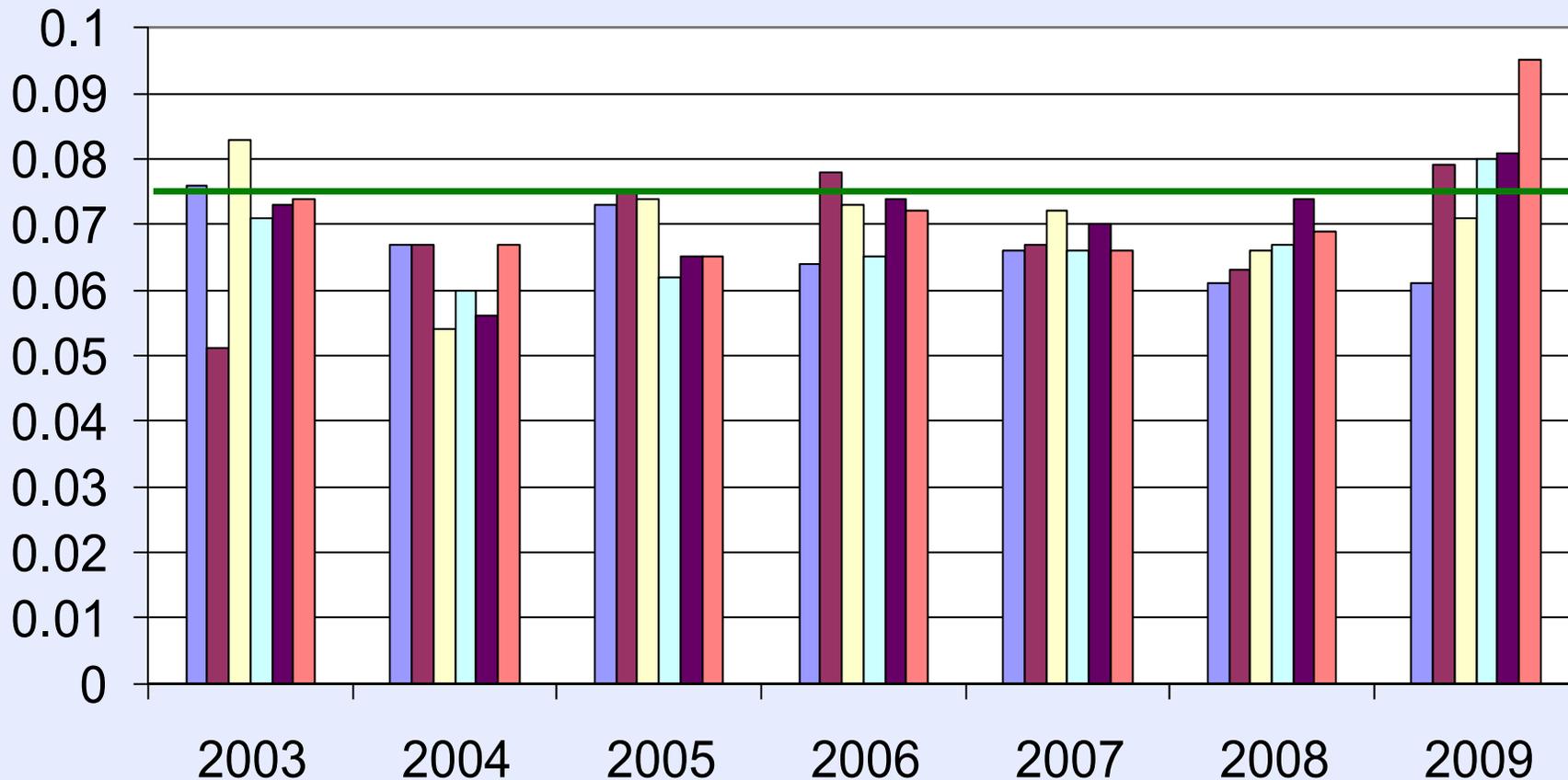
Ozone Standard

- Revised in 1997
 - 8-hour standard of 0.084 ppm
- Revised in 2008
 - 8-hour standard of 0.075 ppm
 - Primary standard equals secondary standard
 - Form: 3 year average of the 4th highest daily maximum 8-hr average ozone concentration
- January 6, 2010 – **Proposed** new 8-hour standard
 - primary “health” standard 0.060-0.070 ppm
 - secondary “welfare” standard 7-15 ppm-hours
 - Will require new monitoring locations

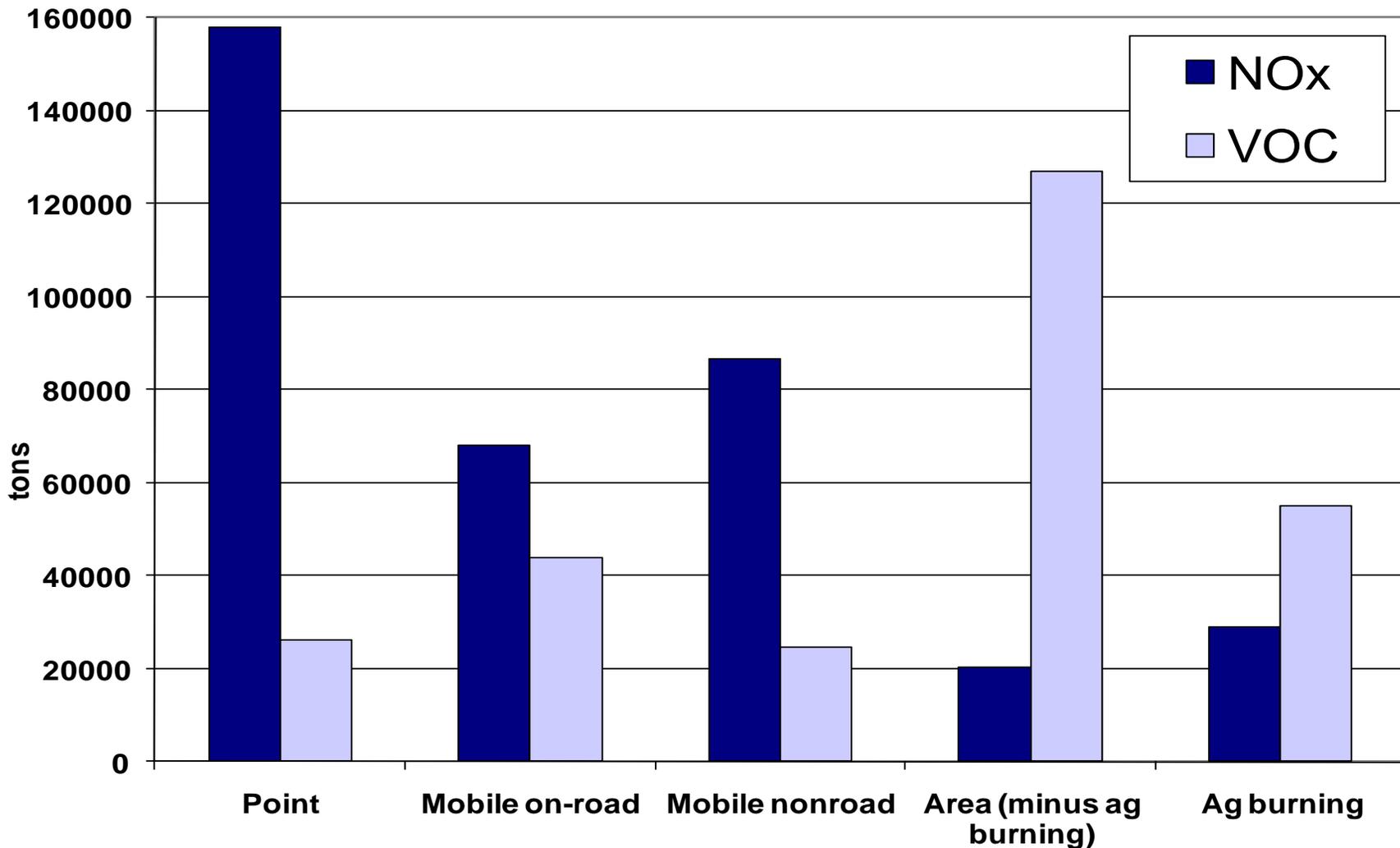
Kansas Ozone Data



April 8-Hour Ozone Maximum Values



2005 Kansas Man-Made Emissions of NOx and VOCs



Source: KDHE and USEPA 2005 NEI Data

Kansas Ozone Status

- KC violated the 2008 - 0.075 ppm standard
 - Standard under reconsideration by EPA
- KDHE in final stages of adopting new rules for industry and trucks in KC
- Wichita met 0.075 ppm standard
- 2008 and 2009 were relatively good years for ozone due to cool summers
- Highest readings during entire 2009 ozone season for KC and Wichita were due to burning
- KDHE will recommend counties for designation to be included in ozone planning area

Designation Process

- Governor makes recommendations to EPA
 - Recommendation Principles
 - Does a monitor in a county violate the standard?
 - Do emission sources in a county contribute to violations in a “nearby” area?
 - Designation Criteria
 - Emissions: source location, level of control, transport
 - Population density, growth, traffic and urbanization
 - Monitoring data in surrounding area
 - Geography, topography, meteorology

Nonattainment Impacts

- State Implementation Plan (SIP) preparation
 - Enhanced emissions inventory
 - Additional photochemical modeling
- Transportation plan conformity with SIP
- Curtails economic development
- New rules to reduce NO_x and VOCs emissions
- Potential sanctions for failure to meet standard
- Increased cost for fuel, electricity, consumer products, etc.
- Citizens breathing polluted air

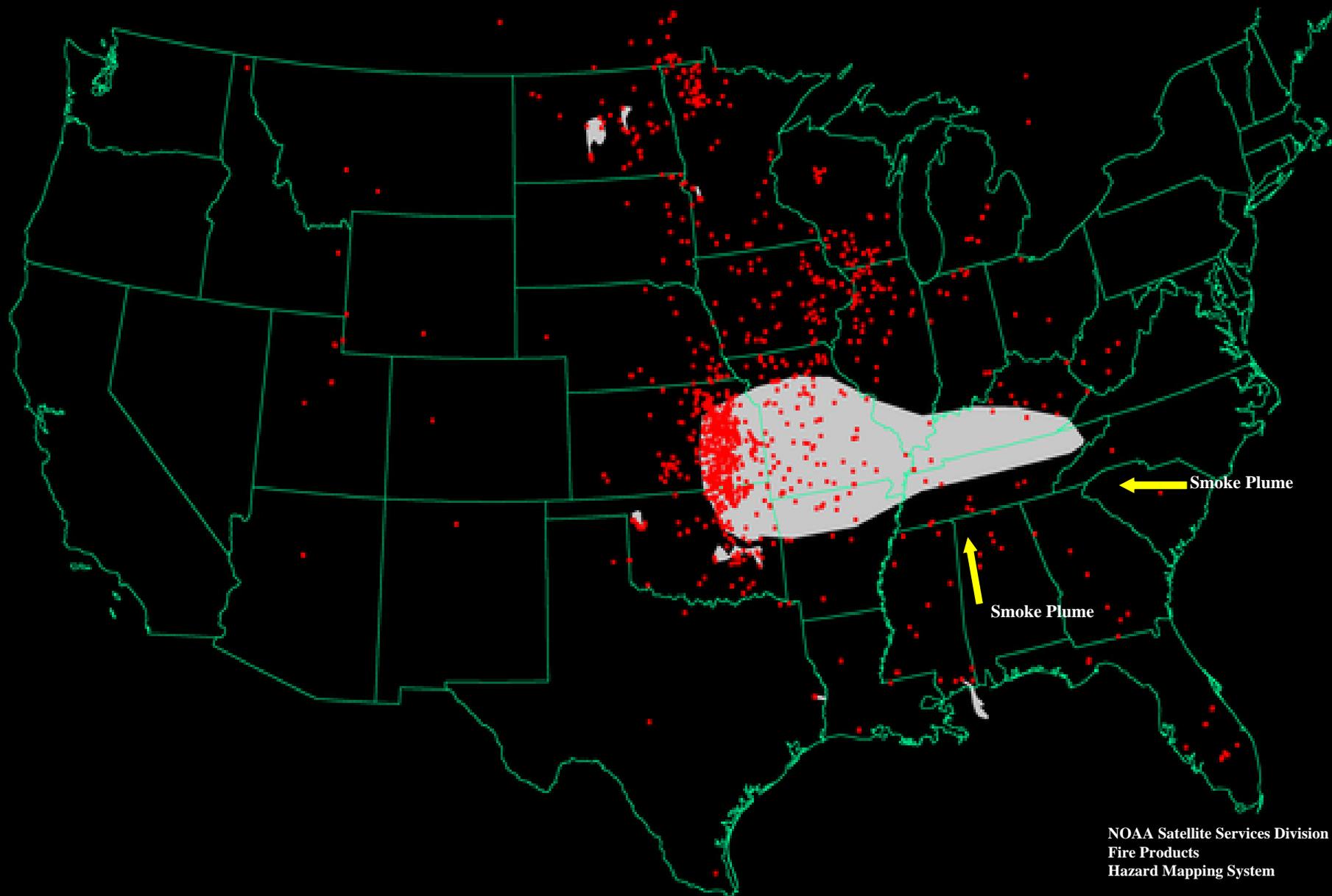
Flint Hills Smoke Events

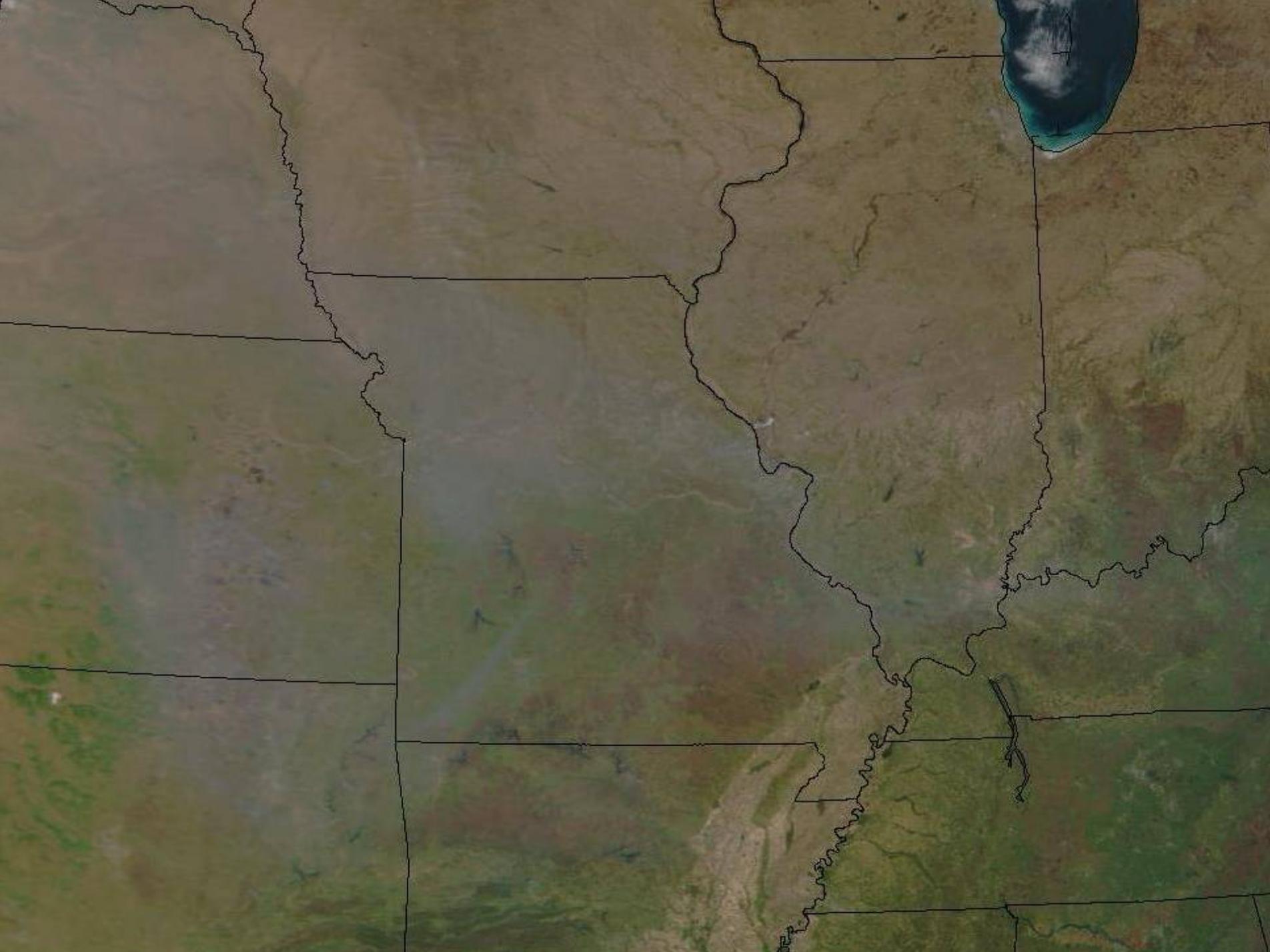
- Satellite Imagery
- Monitoring Results
- Impacts on Other States

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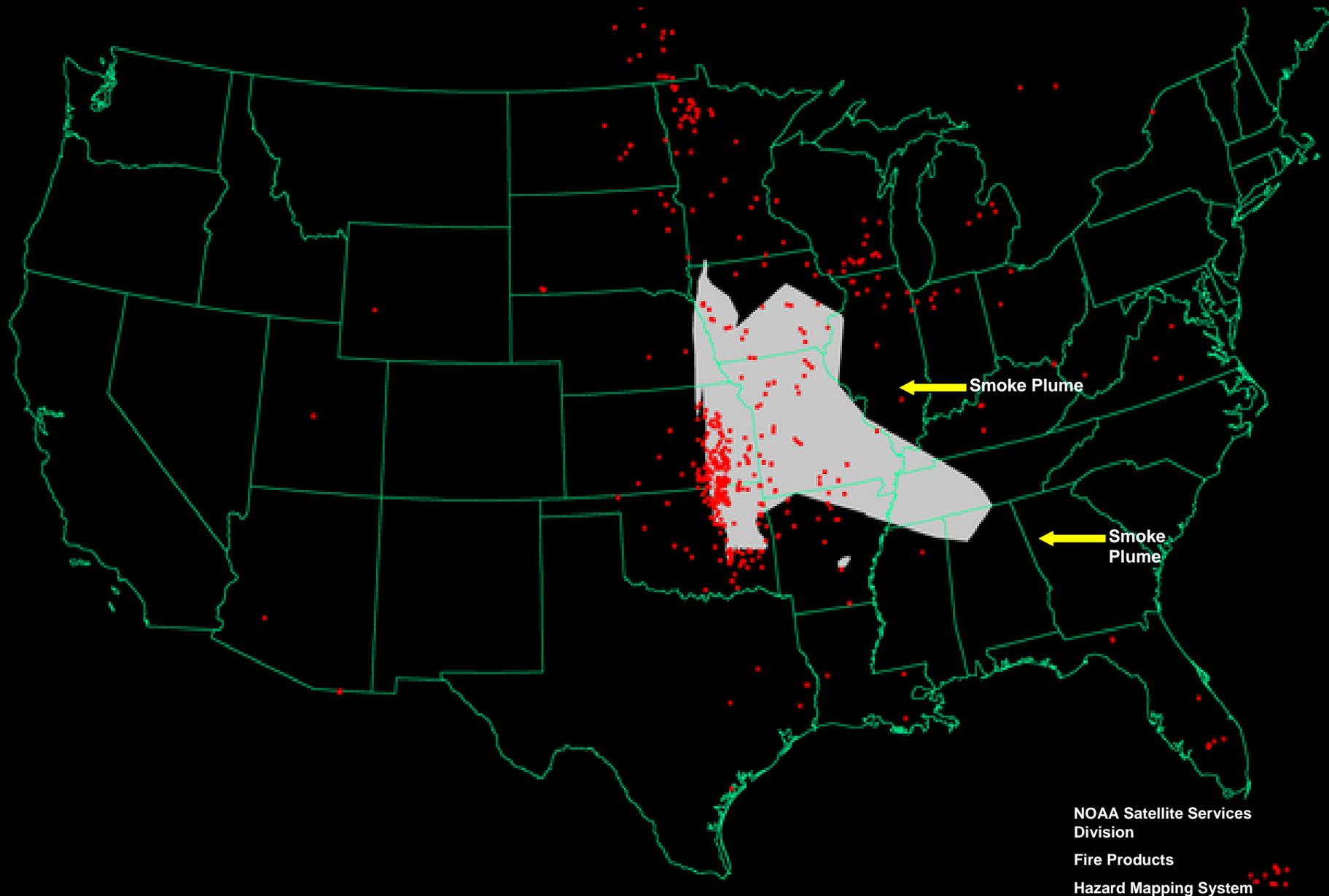


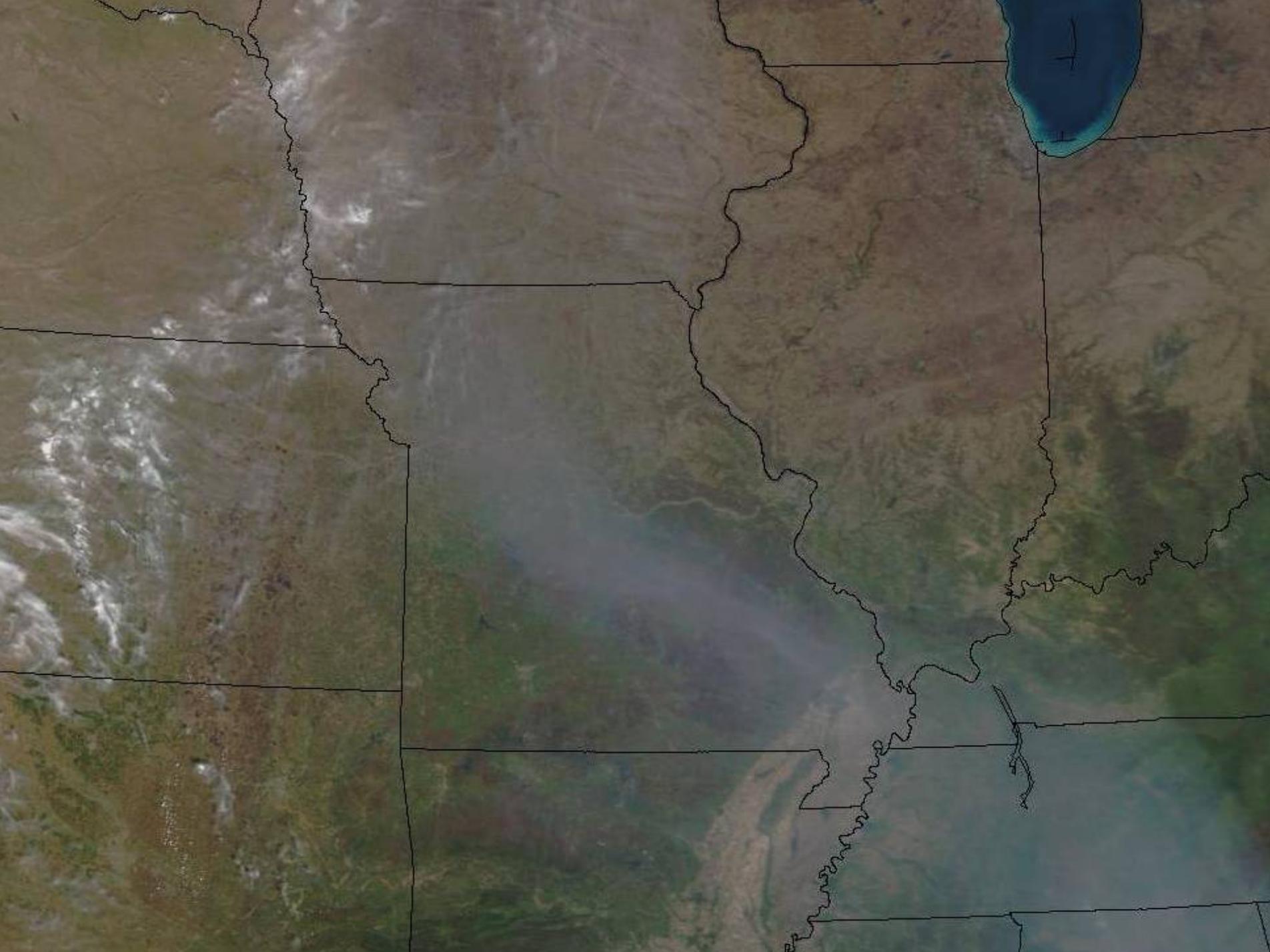
April 12, 2003 – Rangeland Fires and Smoke Plume



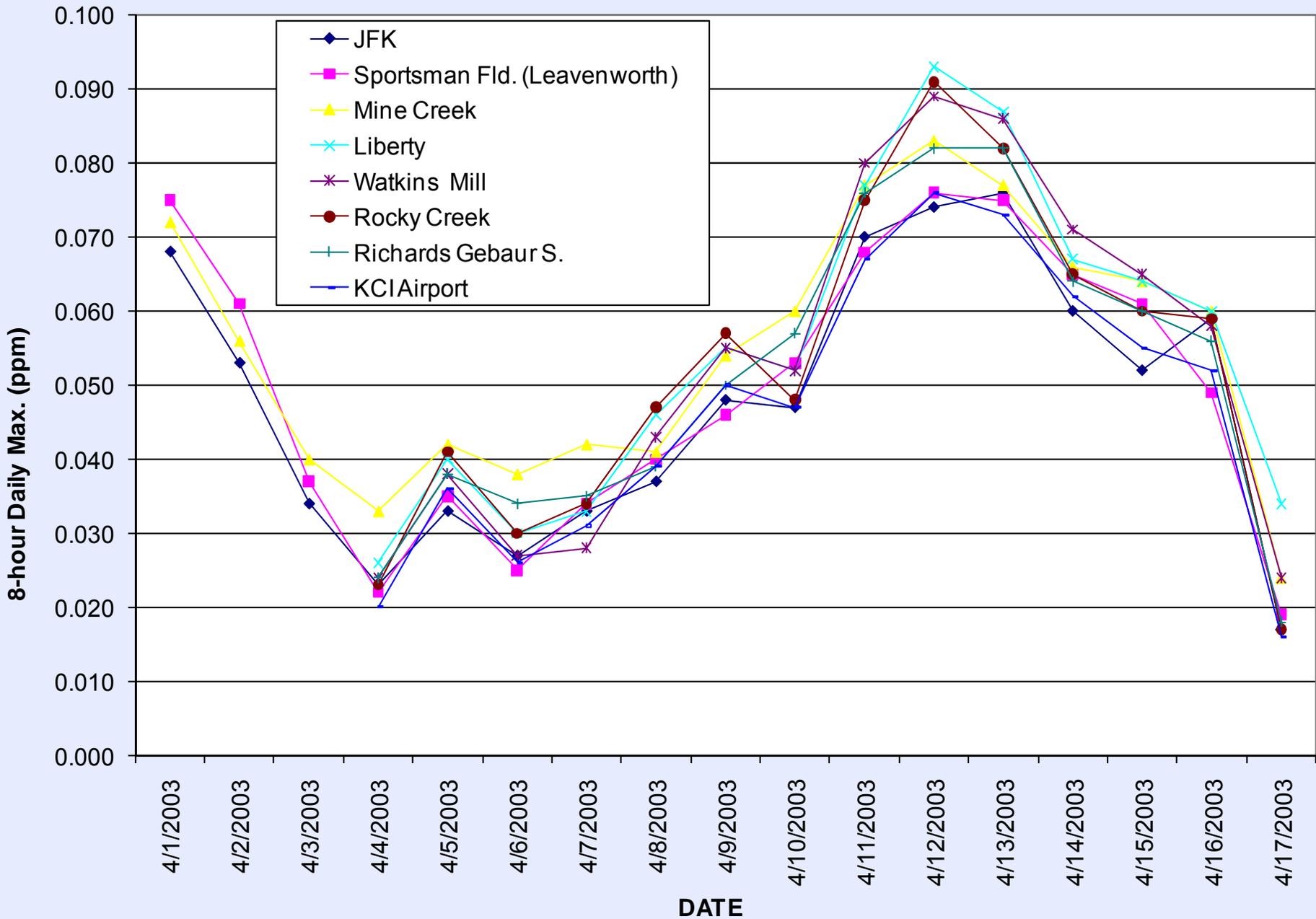


April 13, 2003 – Rangeland Fires and Smoke Plume



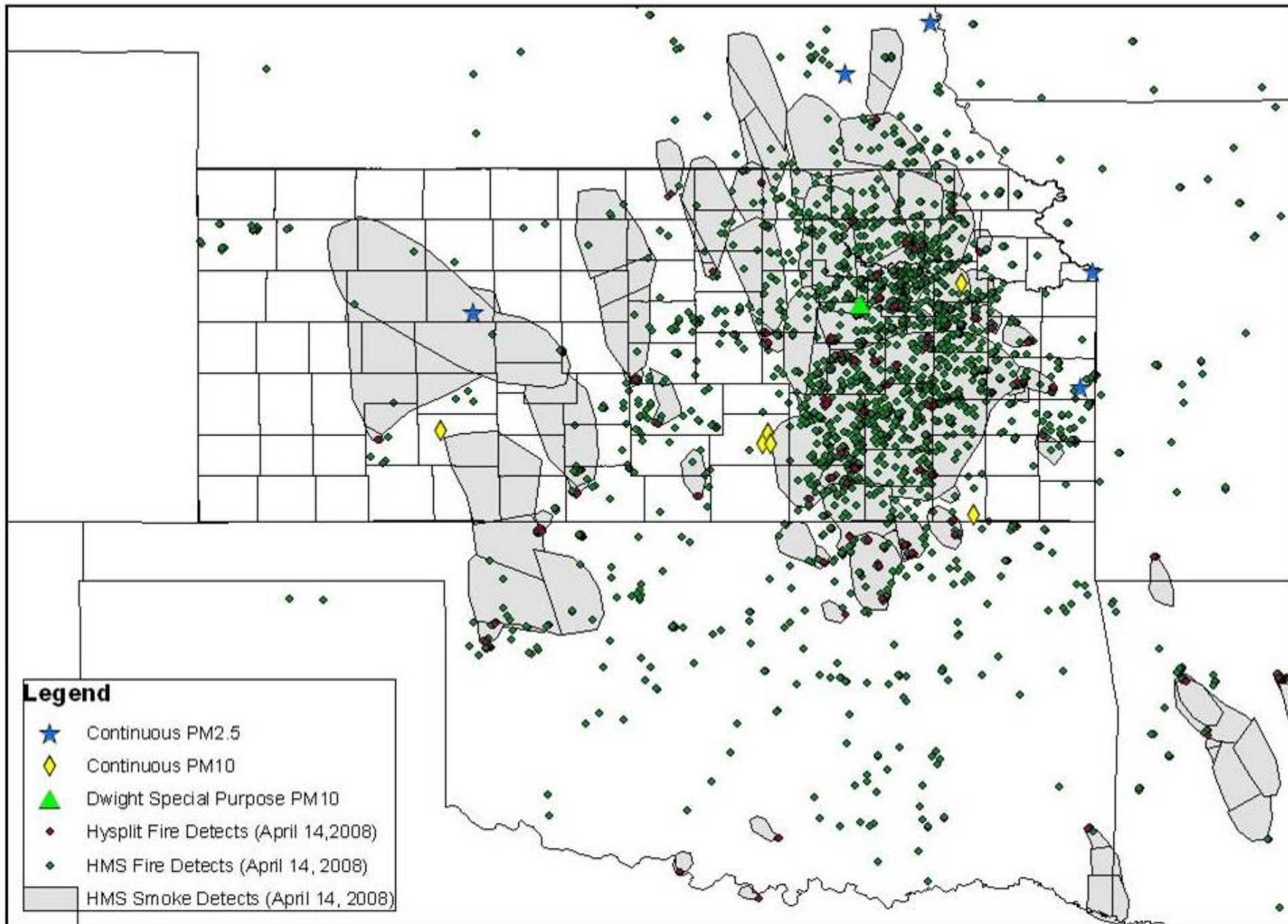


2003 Ozone Season Daily Summary - 8-hour Daily Max.



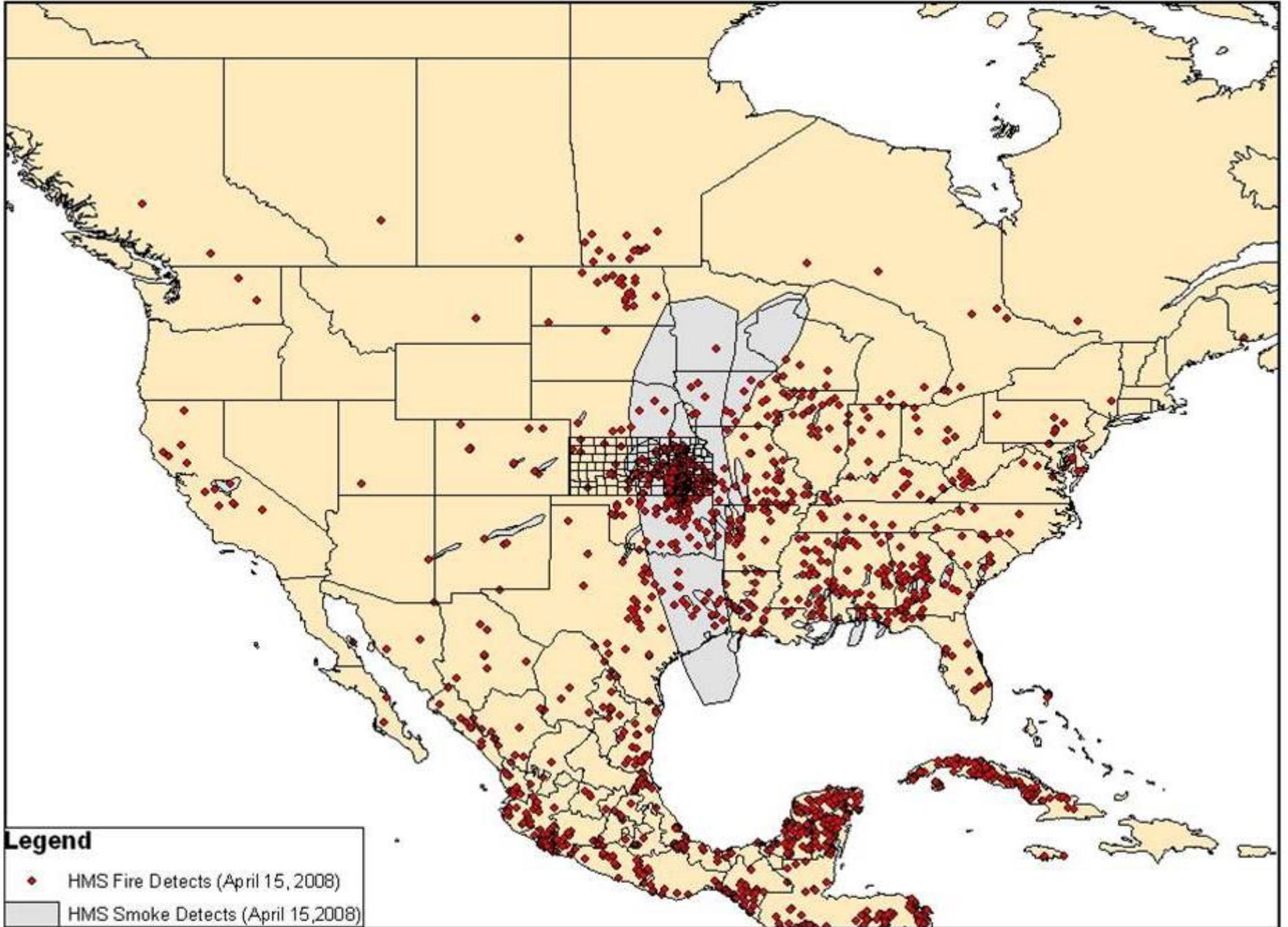
Analyzed Smoke/Fire Locations

April 14, 2008

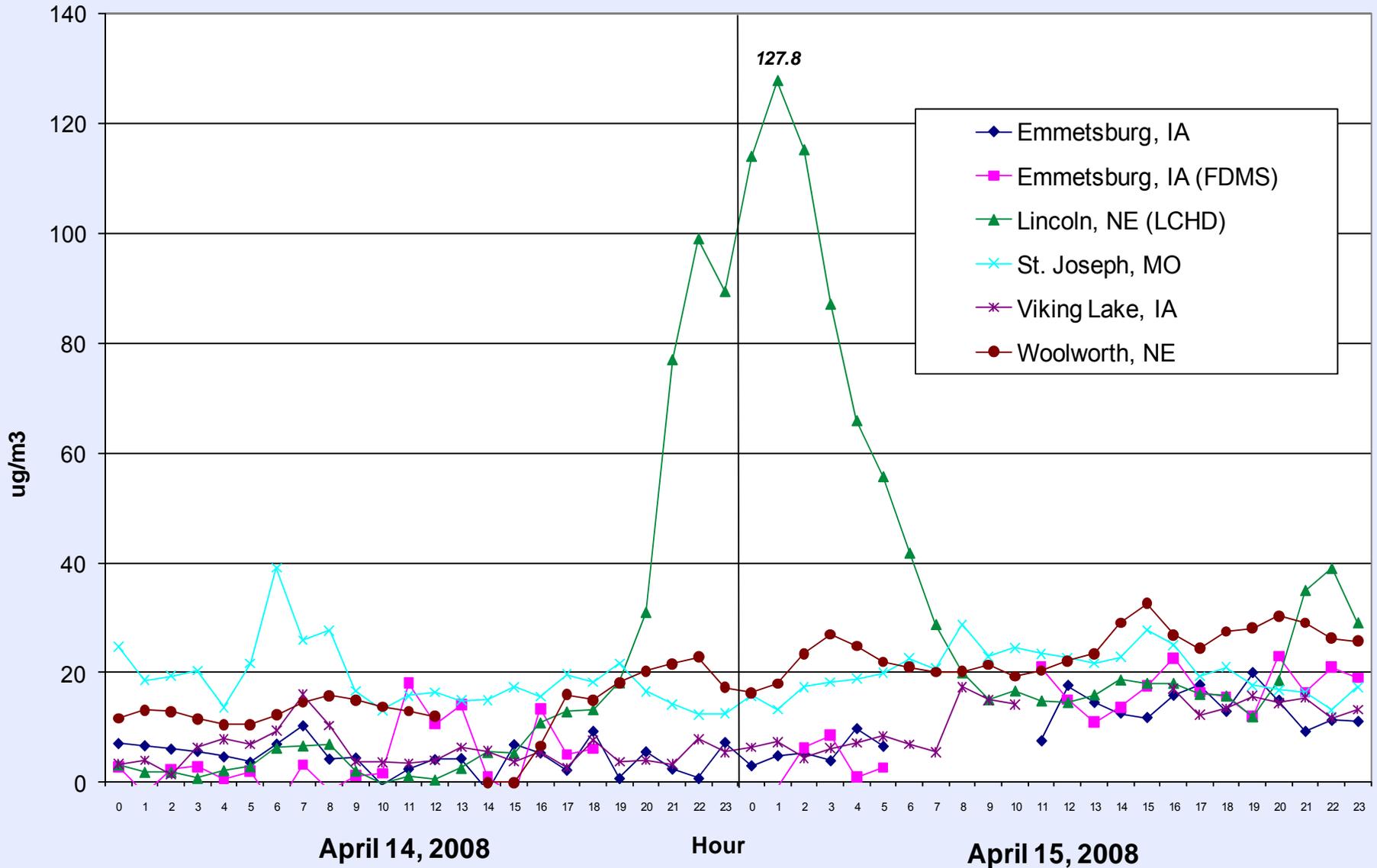


Analyzed Smoke/Fire Locations

April 15, 2008

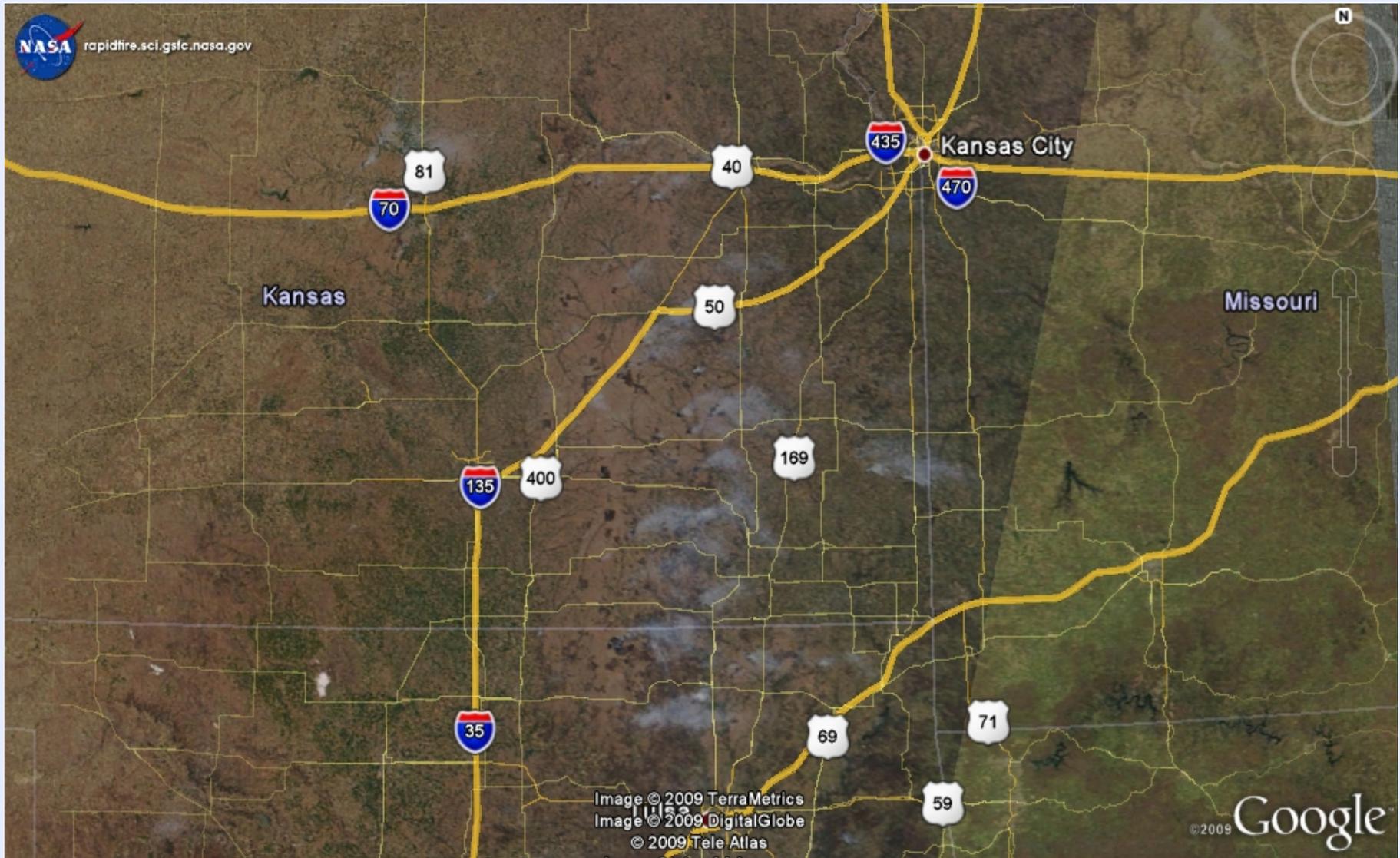


Out of State PM_{2.5}



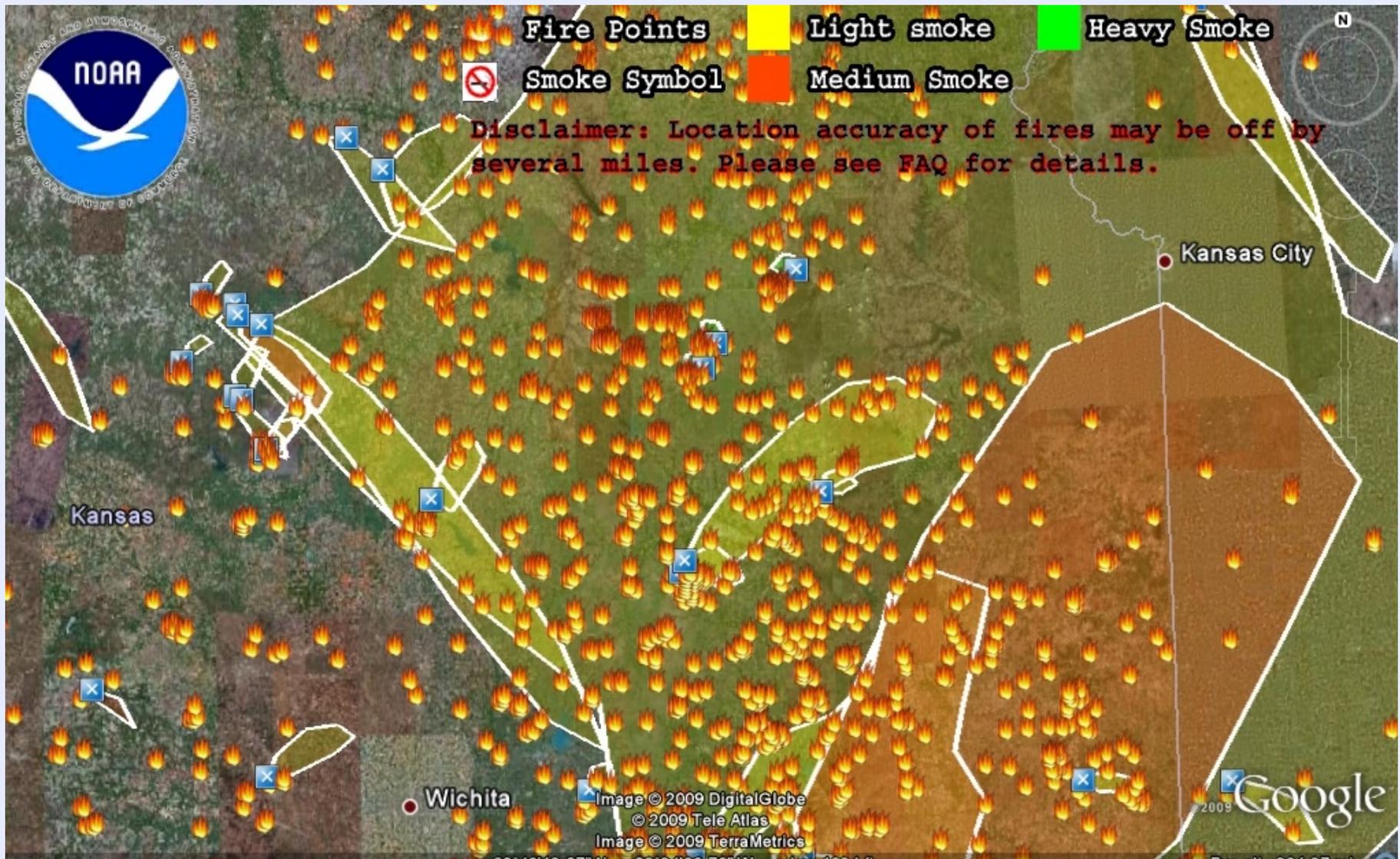
Continuous PM_{2.5} data downloaded from <http://www.airnowtech.org>
Data has not gone through final QA/QC and should be considered preliminary

April 7, 2009 Smoke Plumes



April 7, 2009

Fire and Smoke Plumes



April 7, 2009 – Ozone (ppm)

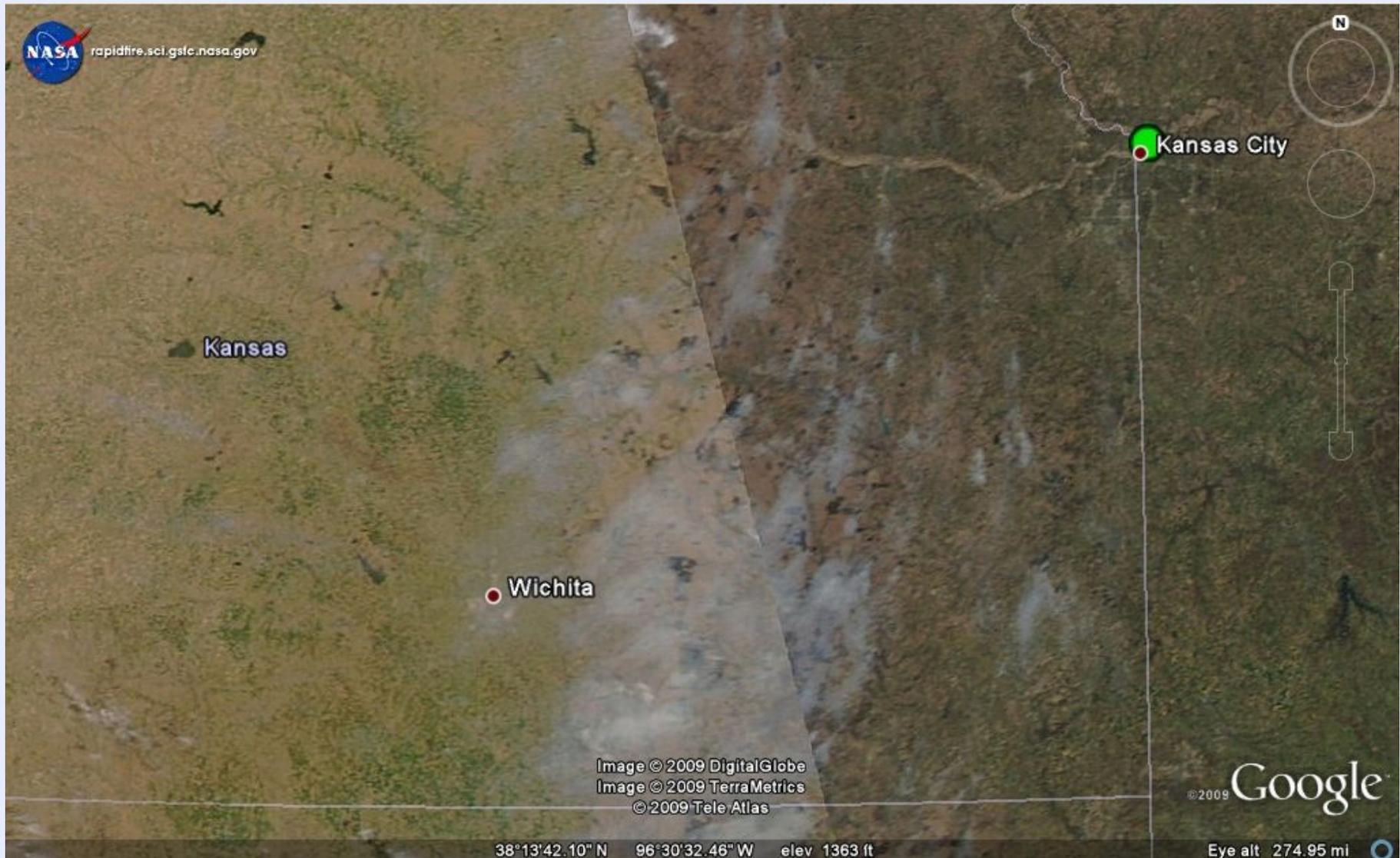
KC Area Sites		Wichita Sites	
JFK:	0.061	Health Dept.:	0.048
<i>Heritage Park:</i>	<i>0.079</i>	Park City:	0.044
Leavenworth	0.064	Sedgwick:	0.050
Mine Creek	0.071	Peck:	0.051

8 Hour Standard: 0.075 PPM

April 7, 2009 – Particulate Matter

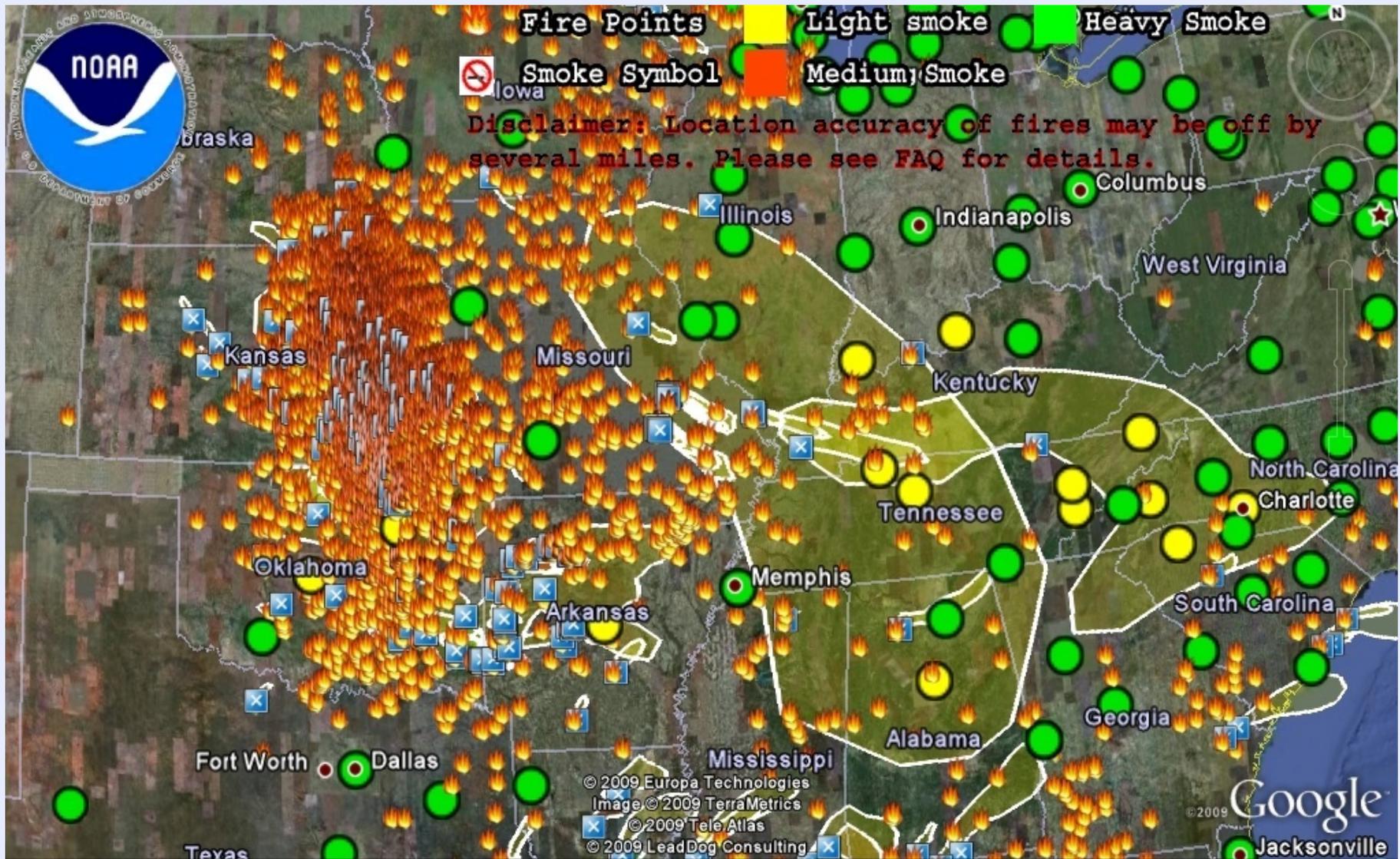
KC Area Sites PM 2.5	Wichita Sites – PM10
JFK 138.5 $\mu\text{g}/\text{m}^3$	Health Dept 53.5 $\mu\text{g}/\text{m}^3$
Mine Creek 106.3 $\mu\text{g}/\text{m}^3$	Glen & Pawnee 54.8 $\mu\text{g}/\text{m}^3$
	K96 & Hydraulic 44.6 $\mu\text{g}/\text{m}^3$
	G.Wash & Skinner 55.8 $\mu\text{g}/\text{m}^3$

April 8, 2009 Smoke Plumes



April 8, 2009

Fire and Smoke Plumes



April 8, 2009 – Ozone (ppm)

KC Area Sites		Wichita Sites	
JFK:	0.051	<i>Health Dept.:</i>	<i>0.095</i>
Heritage Park:	0.054	<i>Park City:</i>	<i>0.080</i>
Leavenworth	0.054	<i>Sedgwick:</i>	<i>0.081</i>
Mine Creek	0.061	<i>Peck:</i>	<i>0.081</i>

8 Hour Standard: 0.075 PPM

April 8, 2009 – Particulate Matter

KC Area Sites PM 2.5		Wichita Sites – PM10	
JFK	123.5 $\mu\text{g}/\text{m}^3$	Health Dept	186.2 $\mu\text{g}/\text{m}^3$
Mine Creek	72.1 $\mu\text{g}/\text{m}^3$	Glen & Pawnee	182.1 $\mu\text{g}/\text{m}^3$
		K96 & Hydraulic	163.4 $\mu\text{g}/\text{m}^3$
		G.Wash & Skinner	204.3 $\mu\text{g}/\text{m}^3$

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Smoke Management Plan Process

- State of Kansas Law and Regulations
- Exceptional Events
- Wildland and Prescribed Fires
- Why do a Smoke Management Plan (SMP)?
- EPA Smoke Management Plan Guidance
- Other State SMP links

Relevant Kansas Law

65-3005. Powers of the Secretary. The secretary shall have the power to... adopt regulations.....control air pollution.... encourage local units of government to handle air pollution problems

...the standards so established **shall not be any more stringent, restrictive or expansive** than those required under the federal clean air act, (**HB 2369** amendment)

65-3010. Emission control requirements.

The secretary shall establish emission control requirements, and requirements for open burning...

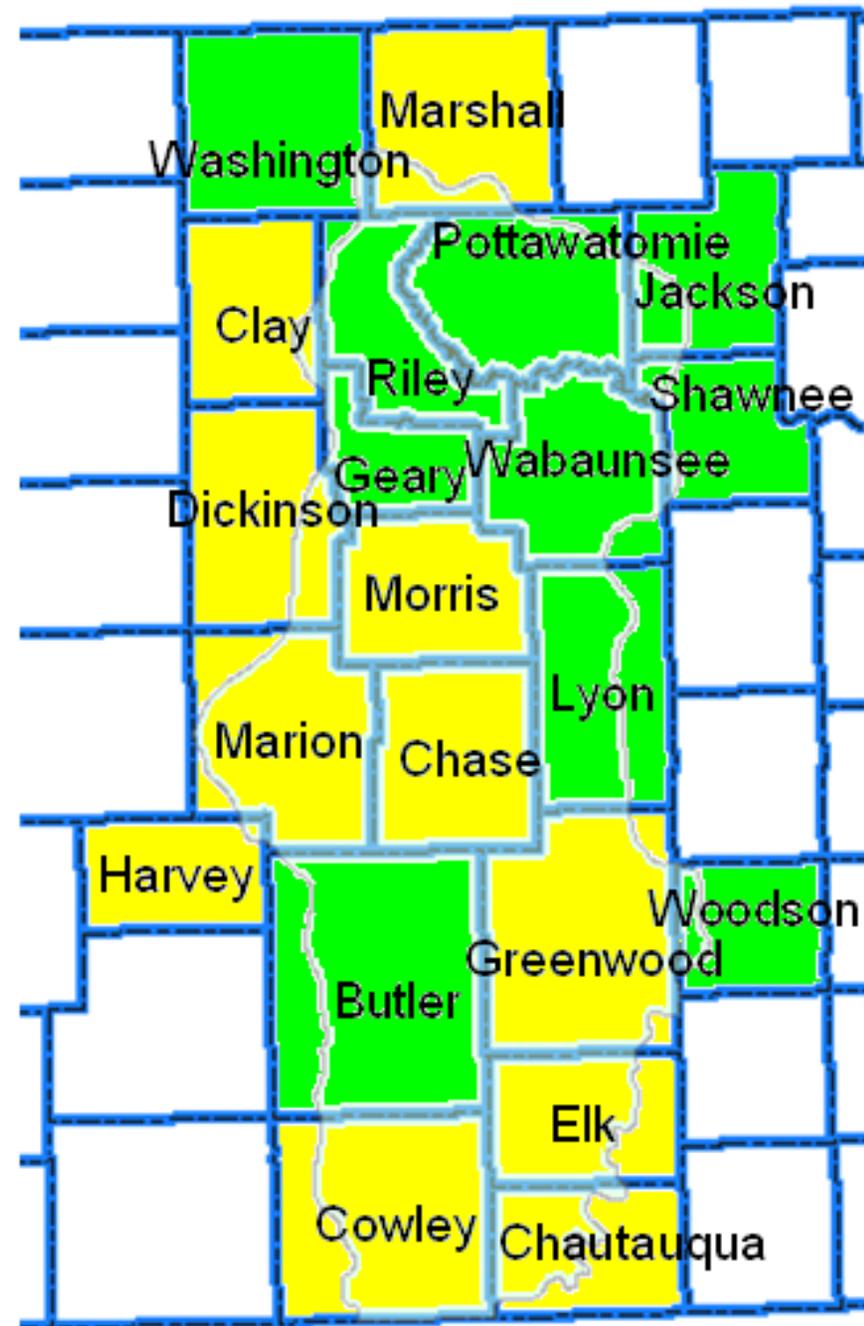
Relevant Kansas Regulations

- **28-19-645. Open burning prohibited**
- **28-19-647. Exceptions to prohibition on open burning.**
.....open burning for the purpose of crop, range, pasture, wildlife or watershed management in accordance with K.A.R. 28-19-648
- **28-19-648. Agricultural open burning.** (a) Open burning of vegetation.....shall be exempt.....provided that the following conditions are met:
....notify the local fire control authority.....unless the appropriate local governing body has established a policy that notification is not required;

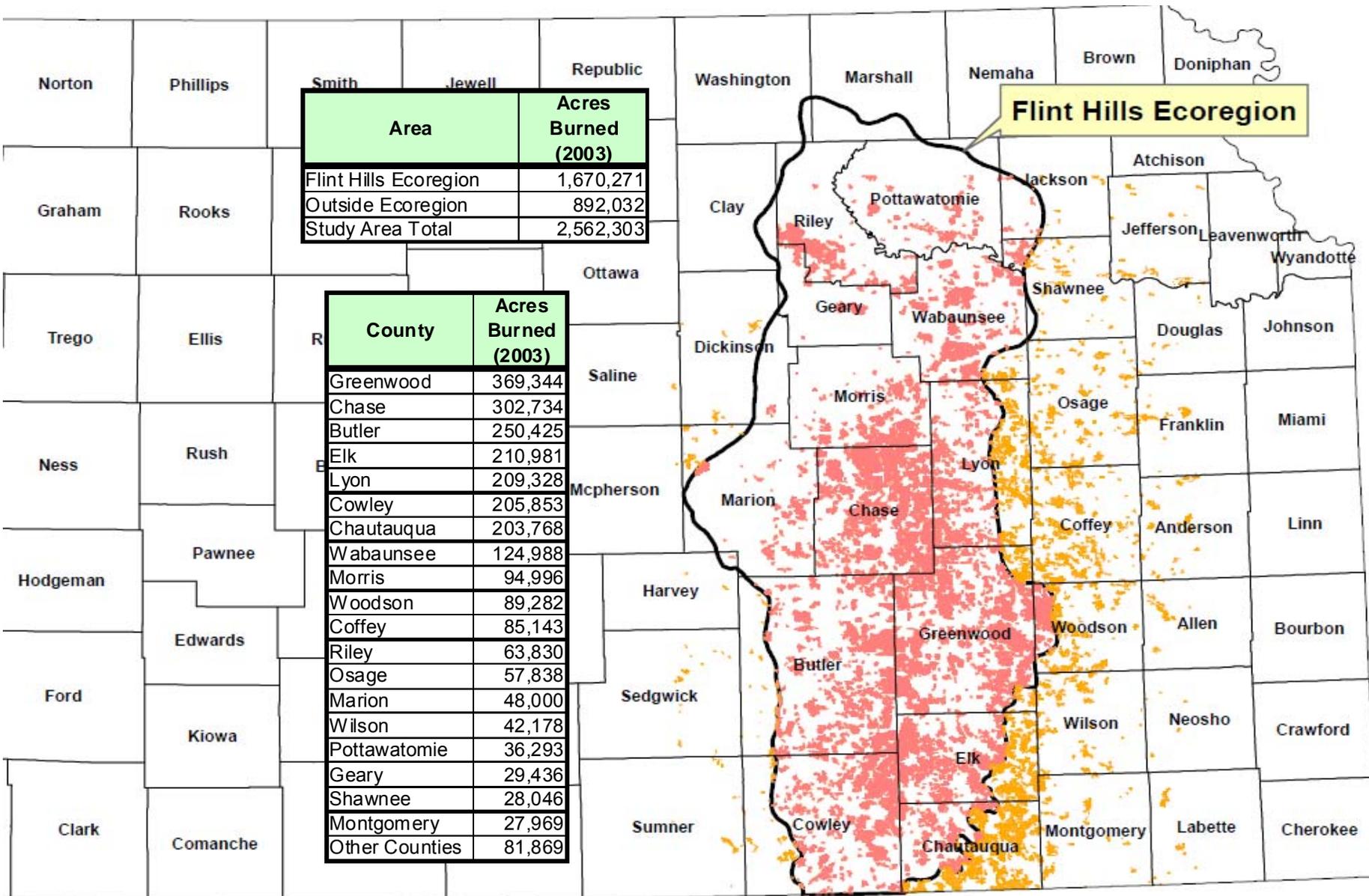
Burning Notification/Approval Requirements in the Flint Hills Ecoregion

Counties that require
notification only: 11

Counties that require
notification and approval:
10



2003 Rangeland Burning



EPA's Exceptional Event Rule

- Definition of Exceptional Event (40 CFR 50.1):
 - Affects air quality;
 - Is not reasonably controllable or preventable;
 - Is an event that is caused by human activity that is unlikely to recur at a particular location, or is a natural event; and
 - Is determined by EPA through the process established in the rule.
- Examples: Structural fires, fireworks, natural events and prescribed fires...

EPA's Exceptional Event Rule

- Prescribed Fire Criteria (40 CFR 50.14):
 - Meets the definition of exceptional event; and
 - State has certified to EPA that it has adopted and is implementing a Smoke Management Program; or
 - State has ensured that the burner employed basic smoke management practices
 - Preamble of March 2007 revision of this rule states that approval will require a Smoke Management Plan [72 FR 13567]

Procedure for Excluding Air Quality Data

- States must:
 - Flag the data in the Air Quality System database
 - Flagged data must meet criteria for exceptional event;
 - Submit documentation demonstrating exceedence
 - Emissions related to the event were transported in the direction of violating monitor
 - Size of the affected area
 - Relationship in time between event, transport and recorded concentrations
- EPA must:
 - Concur on the flag for the data to be excluded from regulatory decisions

2009 Attempt to Flag Data

- June 19, 2009 – KDHE sent a letter of intent to EPA to flag ozone and PM data due to prescribed burning in the Flint Hills
- KDHE submitted technical documentation to EPA including satellite images, monitoring and meteorological data, and news articles.
- December 23, 2009 – KDHE received a letter from EPA denying KDHE’s flagging of data request stating:

“One of the most significant requirements that has not been addressed is the implementation of the requisite smoke management program (SMP) or best management burn practices required under 50.14 for prescribed burns.”

EPA's Wildland and Prescribed Fire Guidance

- 1998 Interim Air Quality Policy for Wildland and Prescribed Fires
 - Outlines the responsibilities of land owners and State air quality managers
 - Coordinate fire activities,
 - Minimize air pollutant emissions,
 - Manage smoke from wildland and prescribed fires, and
 - Establish emergency action programs
- EPA working on revised guidance document

Why do a smoke management plan?

- To reduce the impact of emissions from range fires on the public health
- To ensure that the national air quality standards are met
- To ensure that the Flint Hills counties are not designated as part of a Wichita or KC non-attainment area
- To be eligible for an exceptional event flag in the event of an exceedance

Smoke Management Plan Requirements

- Reduce impacts of prescribed and wildland fire on public health, safety and visibility
- Authorization/restrictions on burning
 - Based on meteorological conditions
- Minimize Air Pollution Emissions
- Public Education and Awareness
- Enforcement
- Program Evaluation

Congress

Clean Air Act Section 109
Authority For National Ambient Air Quality Standards

EPA

40 C.F.R. Part 50 – National Ambient Air Quality Standards

Flint Hills Burning

Exceedance or Violation of NAAQS

Smoke Management Plan

EPA

KDHE

§51.14 Exceptional
Events Rule

Request to Flag
Data

*No Smoke
Management
Plan*

Possible EPA Approval

Flint Hills Burning influenced data excluded
from use in determinations of exceedances
and NAAQS violations

Goals of SMP Development Process

- In place by 2011 burn season
- Fully transparent
- Includes all perspectives
- Draws on all available technical expertise
- Final plan that works

Some Questions to Be Answered

- Who will participate in drafting the plan?
- What counties will be in the planning area?
- What are the approval/restriction criteria?
- How will the plan be implemented?
- Who will enforce the plan?
- Who will evaluate the plan?

Smoke Management Plan Links

- Oregon
- http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/smp/smokemgt_onthe_web.asp
- Minnesota
- <http://files.dnr.state.mn.us/forestry/wildfire/rxfire/minnesotasmokemanagementplan.pdf>
- Missouri
- <http://www.dnr.mo.gov/ENV/apcp/docs/smokesip-1.pdf>
- Arkansas
- http://www.forestry.state.ar.us/manage/smoke_management.pdf
- Illinois
- <http://www.epa.state.il.us/public-notice/2008/smoke-management-plan/final-smoke-management-plan.pdf>

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