

# Regional Air Quality Planning in the Upper Midwest

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Lake Michigan Air Directors Consortium

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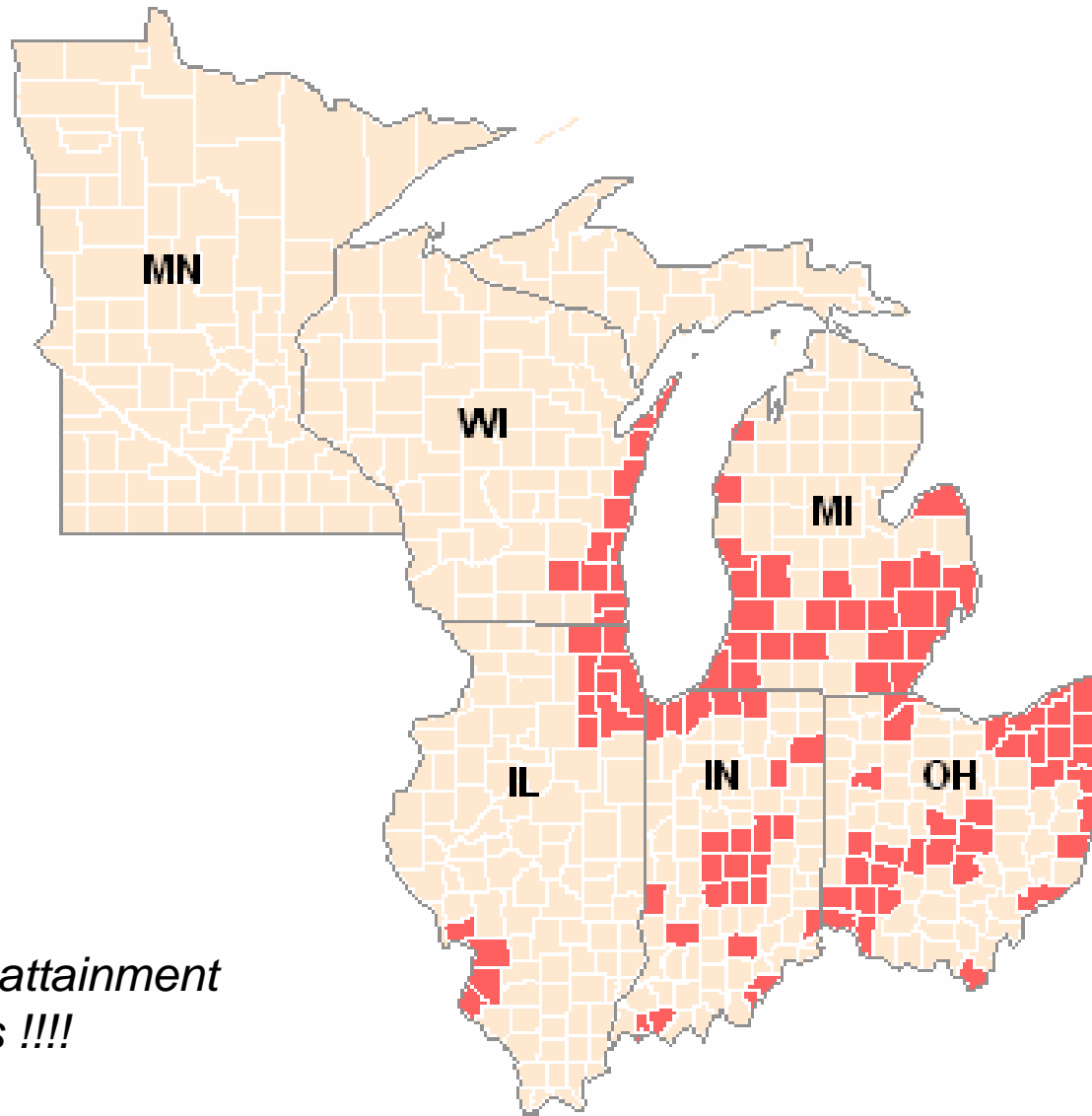
# Overview

- Current Air Quality ( $O_3$ ,  $PM_{2.5}$ , and regional haze)
- Regional Planning Efforts
  - Schedule
  - Organization
  - Preliminary control strategy work

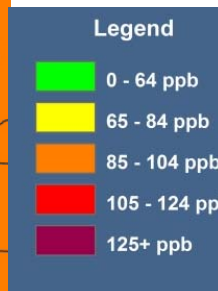
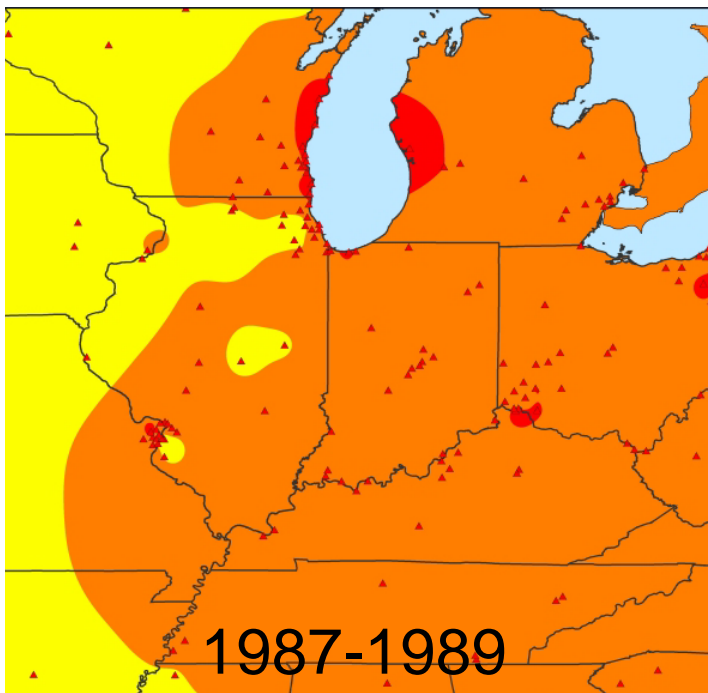
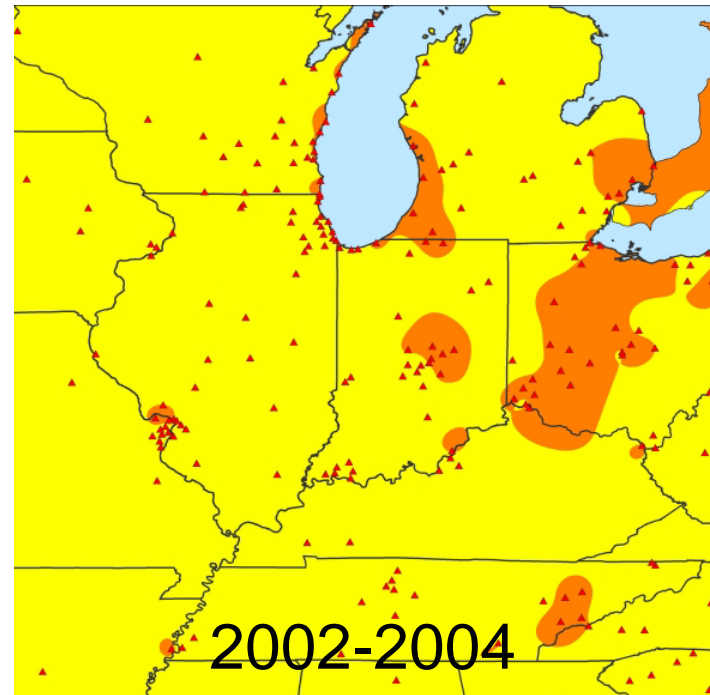
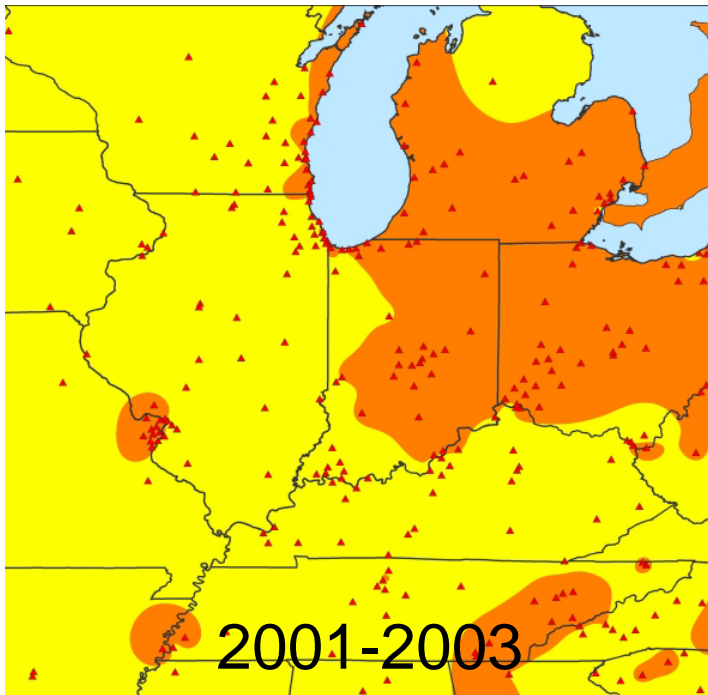
# Current Air Quality

- $O_3$
- $PM_{2.5}$
- Regional Haze

## 8-Hour Ozone Nonattainment Areas (Region V)

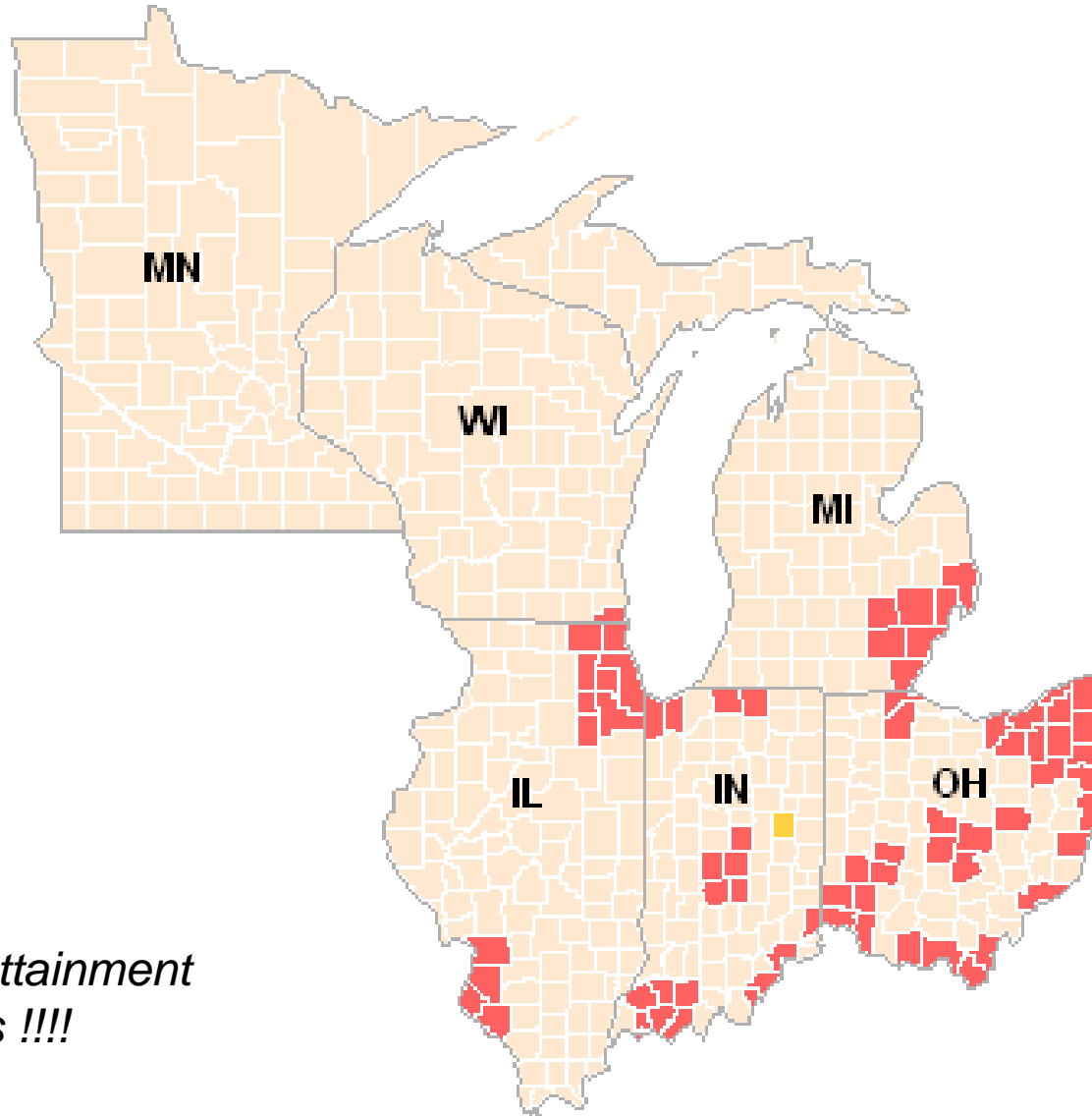


*104 Nonattainment  
Counties !!!!*



# 8-Hour Ozone Trends

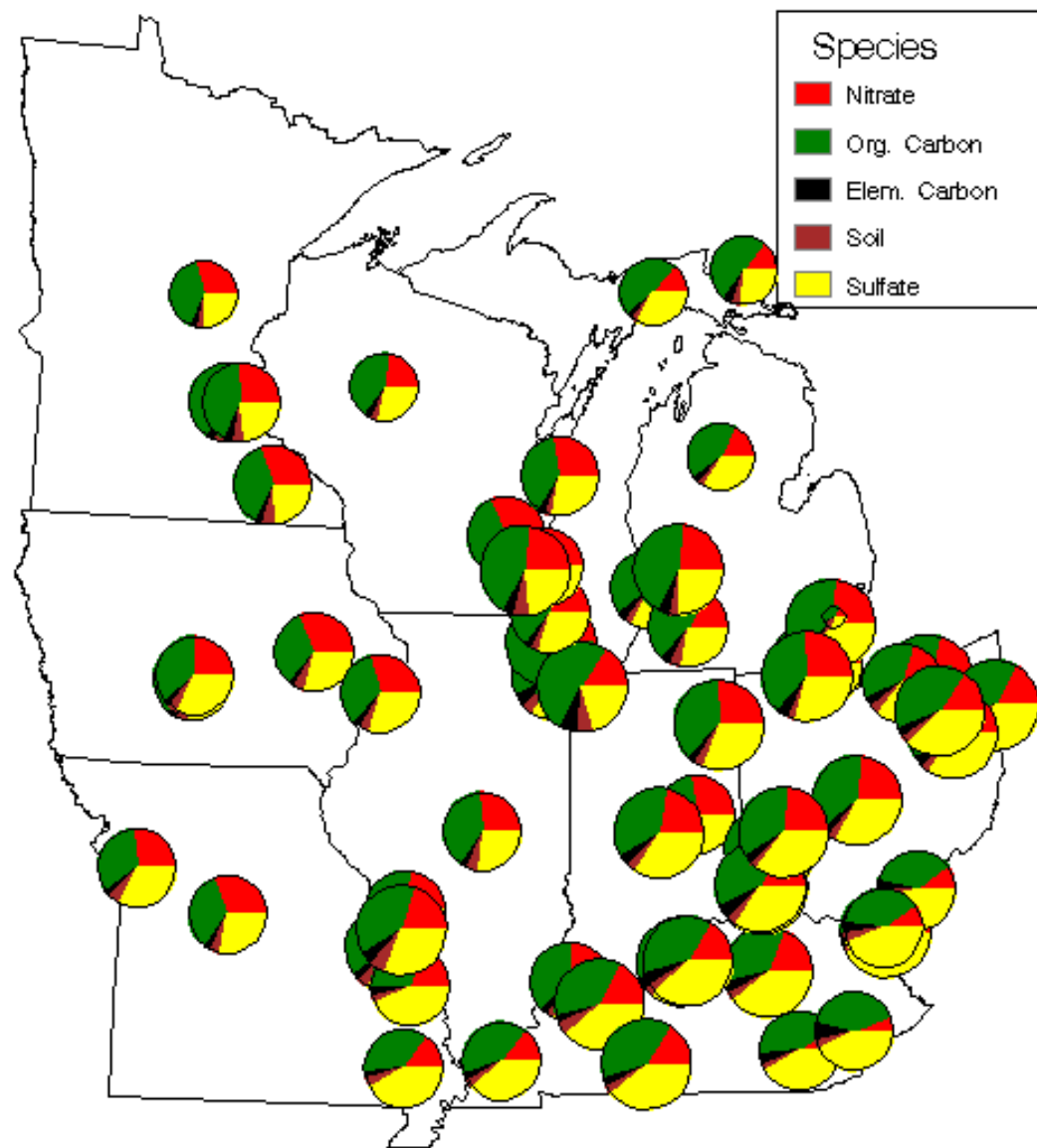
## PM<sub>2.5</sub> Nonattainment Areas (Region V)



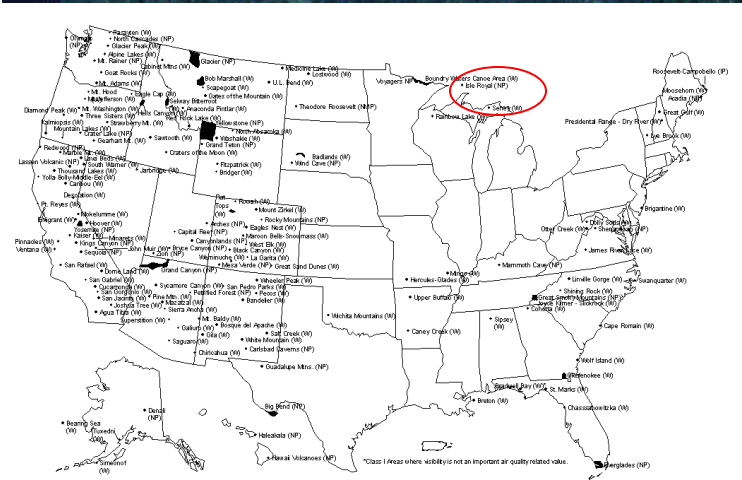
*63 Nonattainment  
Counties !!!!*

# Annual Average Species Contribution to Fine Mass

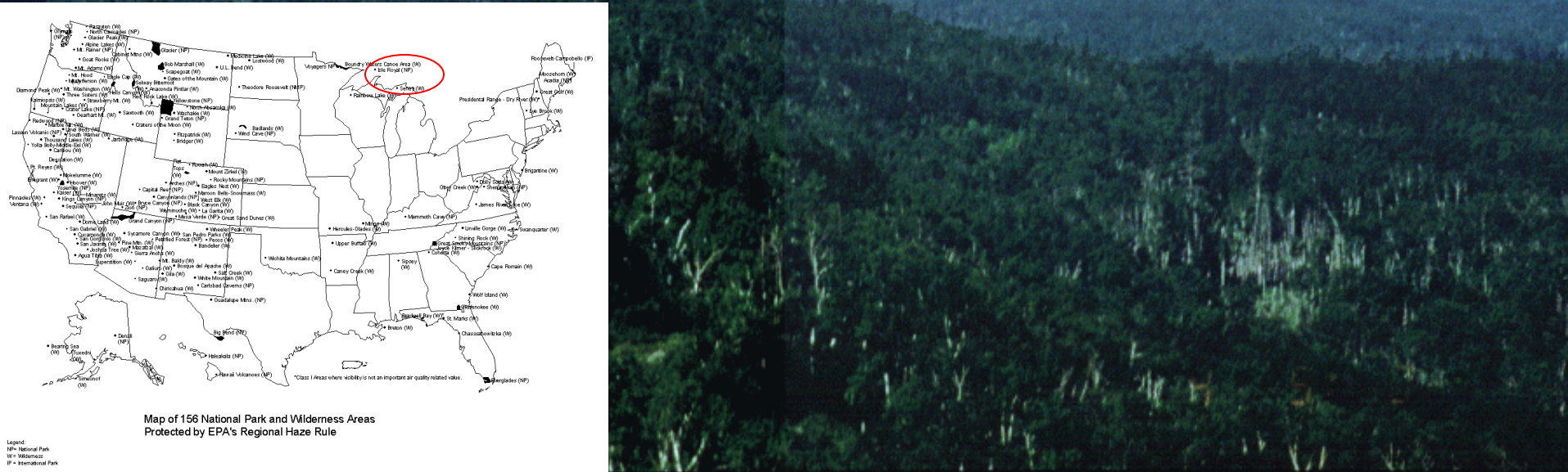
Data from EPA Speciation Network, July 2002—June 2003



# Isle Royale National Park, MI

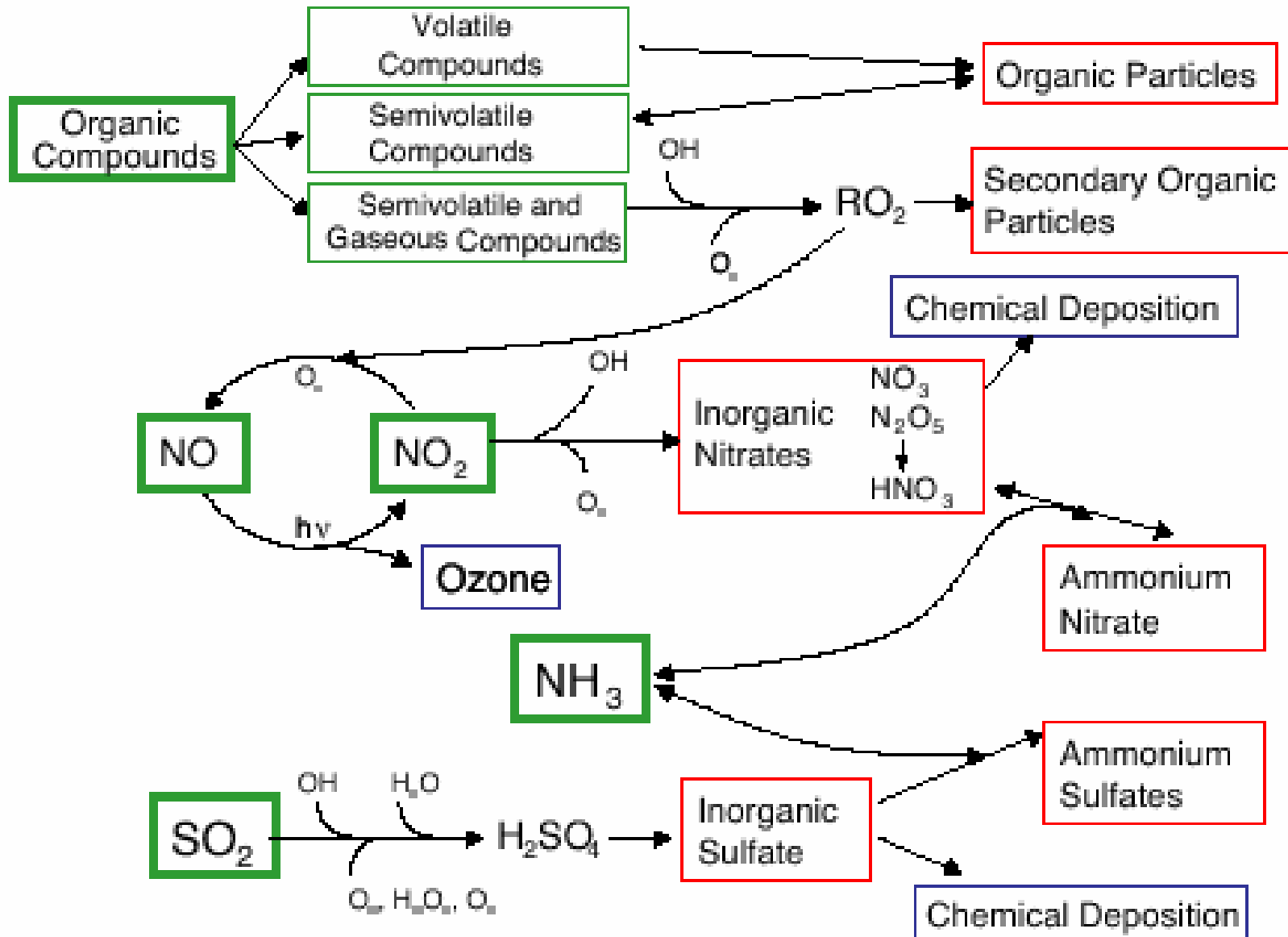


Map of 156 National Park and Wilderness Areas Protected by EPA's Regional Haze Rule





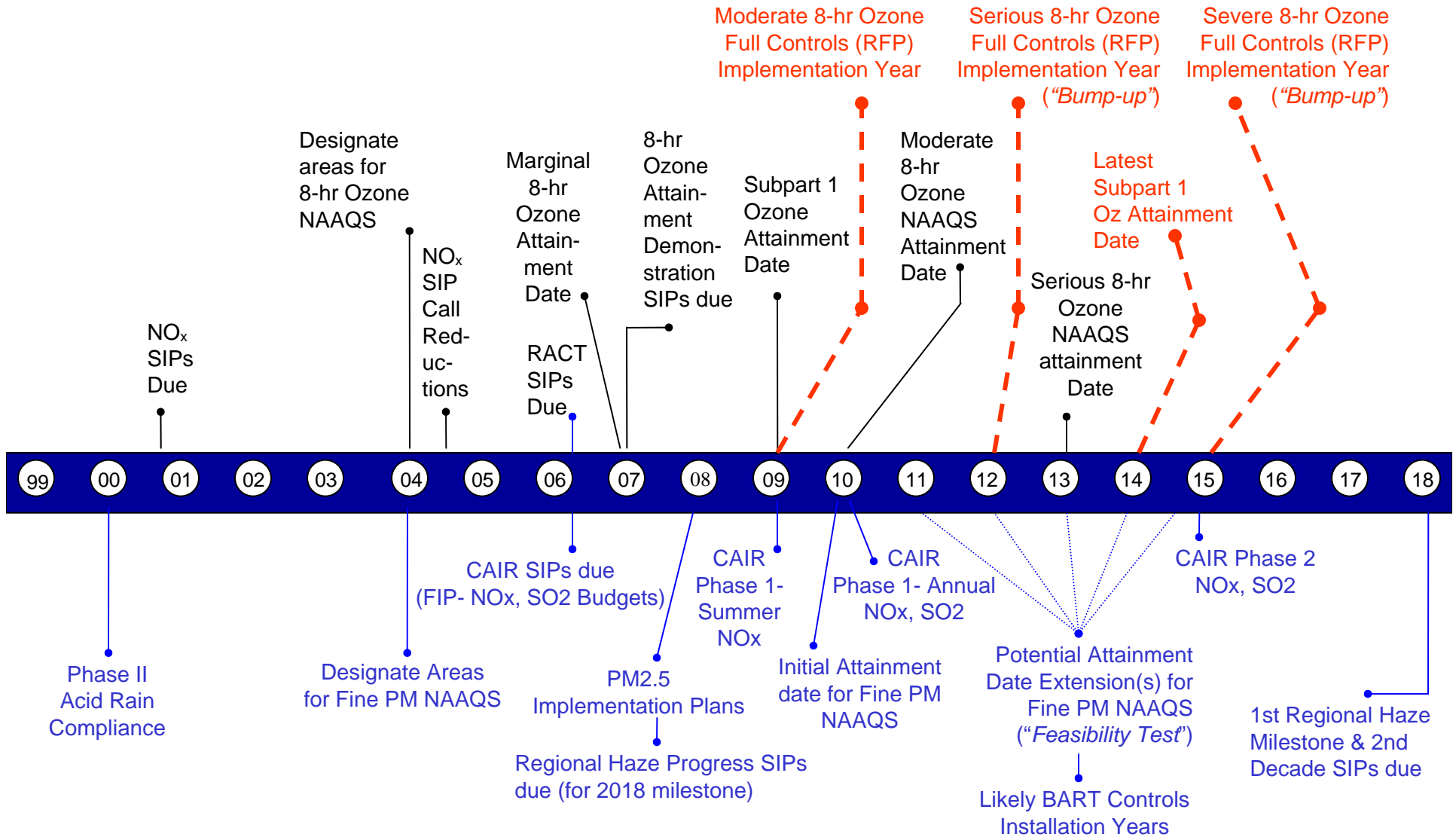
# “One Atmosphere”



# Regional Planning Efforts

- Schedule
- Organization
- Preliminary control strategy work

# Ozone, PM<sub>2.5</sub>, and Regional Haze Schedule (draft)



# SIP Dates

	<b>Ozone</b>	<b>PM<sub>2.5</sub></b>	<b>Haze</b>
Nonattainment Designations	April 15, 2004 <b><i>June 15, 2004</i></b>	Dec 17, 2004 <b><i>April 5, 2005</i></b>	-----
SIPs due	June 2007	April 2008	Dec 2007

# Key Questions

Will “on the books” and “on the way” (CAIR) controls be enough to provide for O<sub>3</sub>/PM<sub>2.5</sub> attainment by 2009 and meet regional haze goals by 2018?

Are we getting as much as we can out of CAIR (e.g., maximize air quality benefits)?

If we need to do more, then what are the regional and local control measure options?

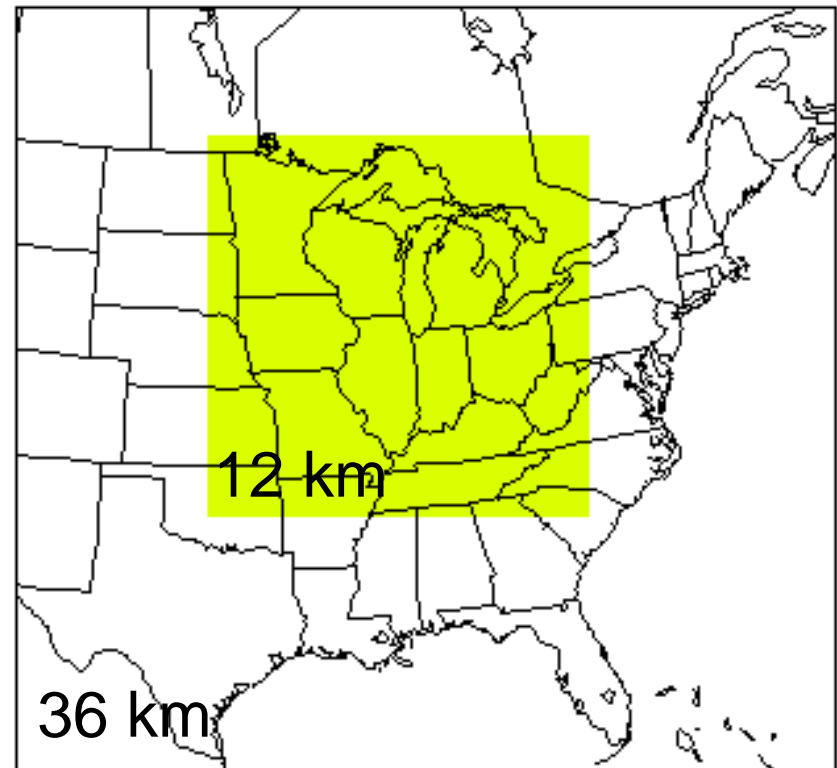
# Technical Analyses: Modeling

Model: CAMx

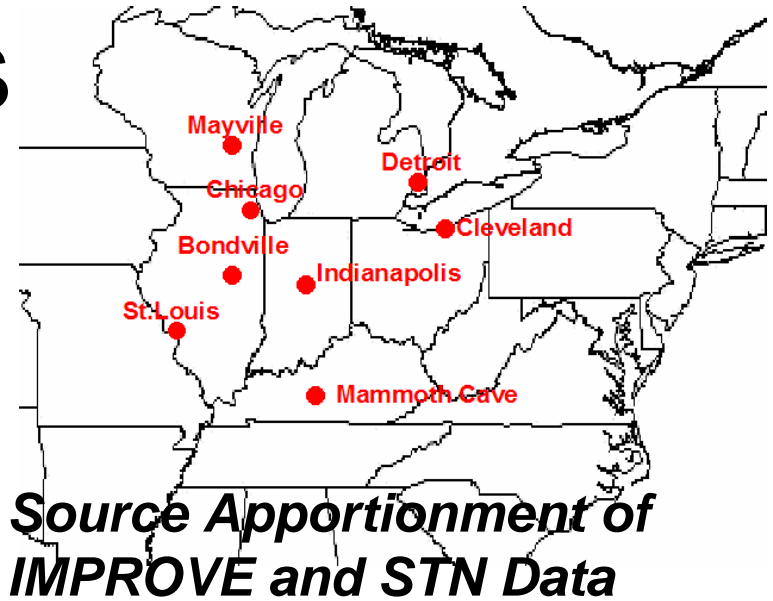
Domain/Grid: Eastern U.S.  
(36 km), Midwest (12 km)

Year: 2002 (full year)  
- PM/haze, 36 km

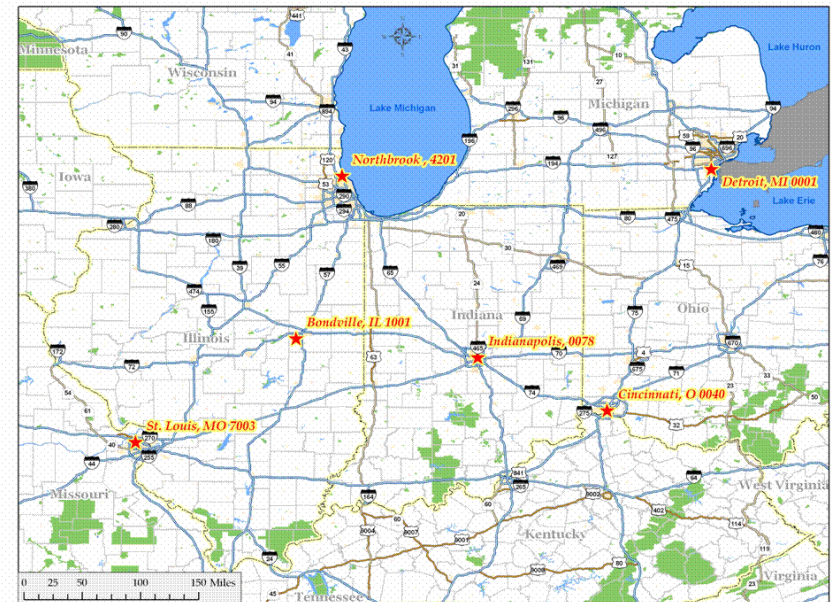
2001, 2002, 2003  
(summer) – O<sub>3</sub>, 12 km



# Technical Analyses Monitoring and Data Analyses



**Regional Ammonia Monitoring**



**Urban Organics Study**

# Control Strategies

- “On the books” (existing)
- “On the way” (new)
  - CAIR
- CAIR + Regional Control Options
  - EGU1, EGU2
  - ICI Boilers
- CAIR + Local Control Options
  - Area Source VOC
  - Fuels Strategy

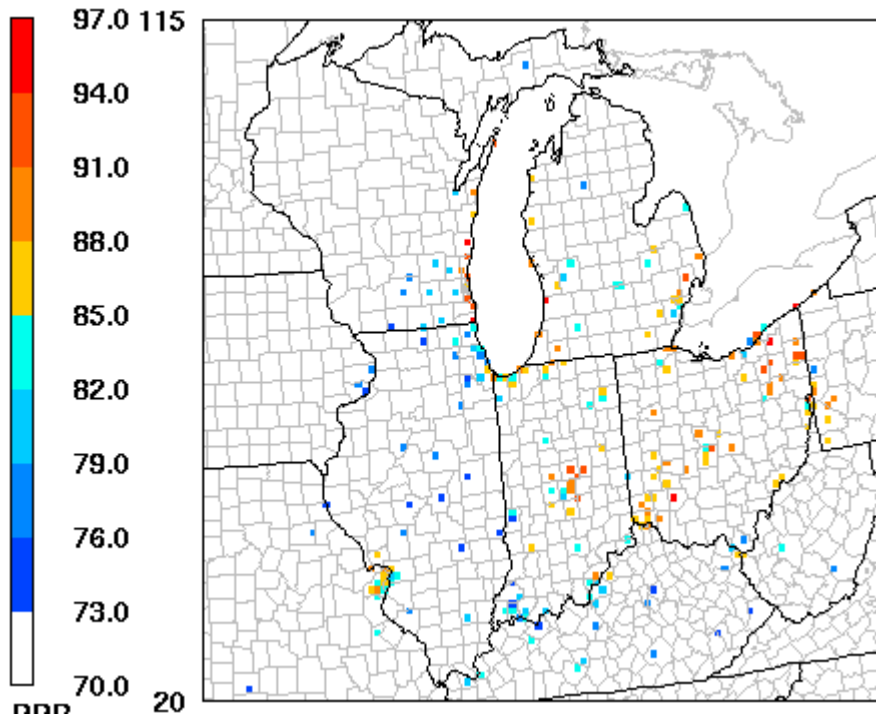


# 2009 “on the books” controls

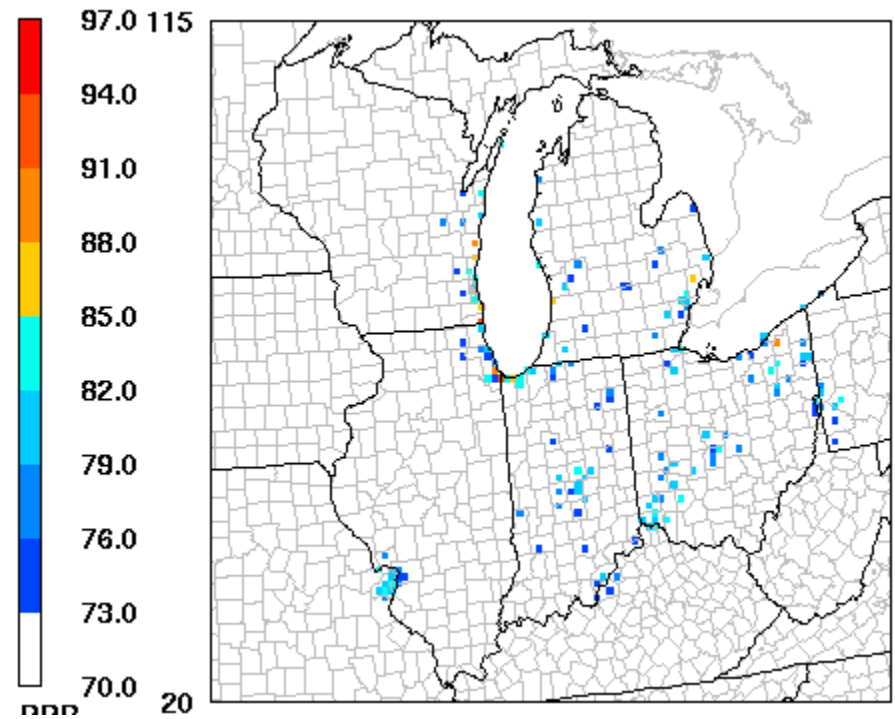
- Current state/local rules to meet 1-hour ozone requirements (e.g., motor vehicle I/M, reformulated gasoline, and NO<sub>x</sub> SIP Call)
- Heavy-duty diesel (2007) engine standard/Low sulfur fuel
- Federal control programs incorporated into NONROAD model (e.g., nonroad diesel rule), plus the evaporative Large Spark Ignition and Recreational Vehicle standards
- Federal railroad/locomotive standards
- Federal commercial marine vessel engine standards
- Tier II/Low sulfur fuel
- Title IV for EGUs (Phases I and II)
- VOC 2-, 4-, 7-, and 10-year MACT standards
- Combustion turbine MACT
- Industrial boiler/process heater/RICE MACT

# Ozone Results

2002 (observed)

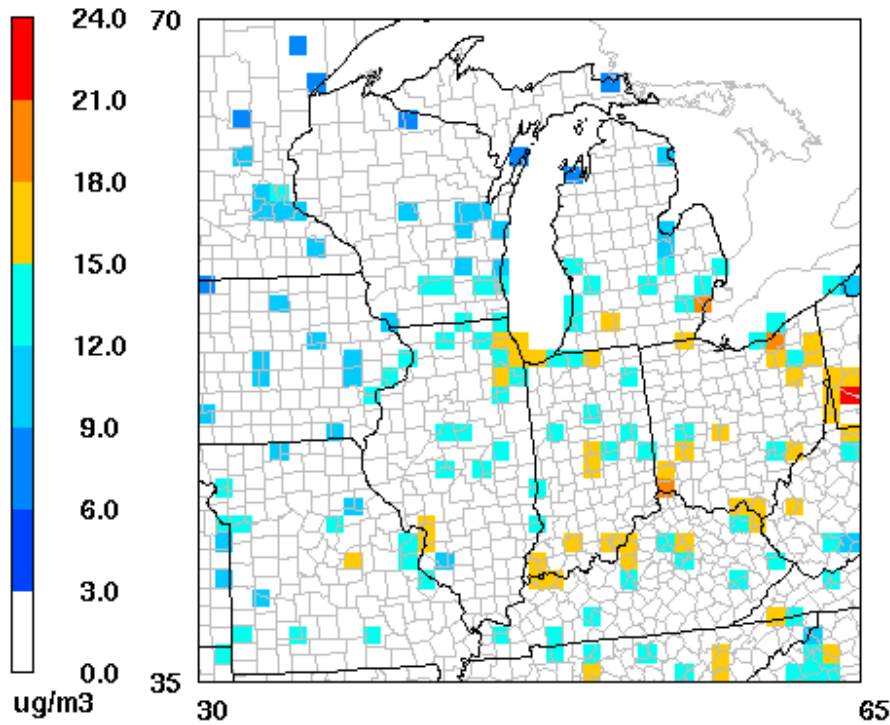


2009 CAIR

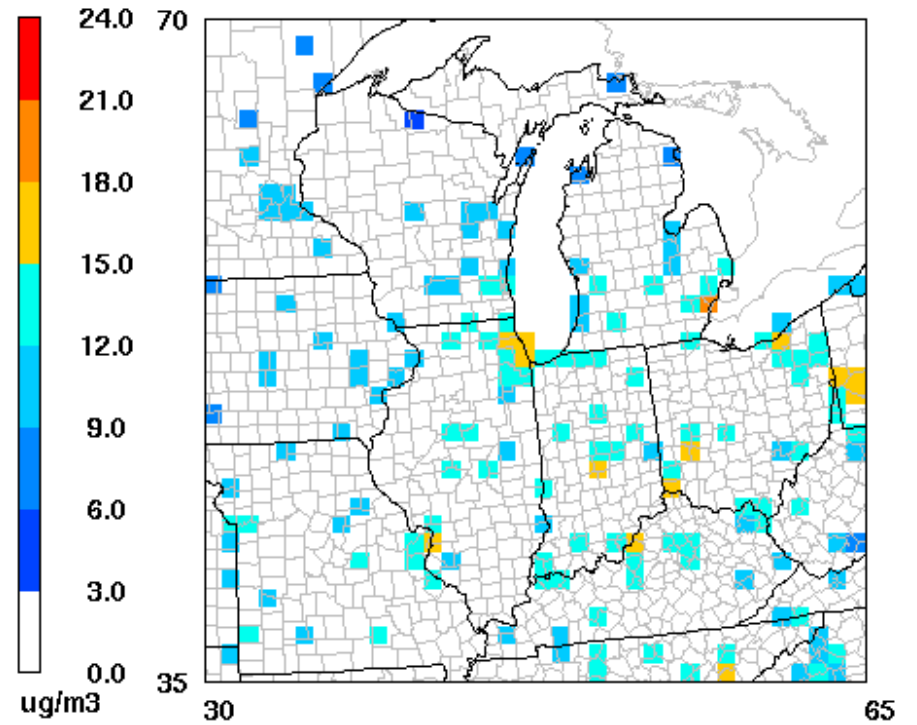


# PM<sub>2.5</sub> Results

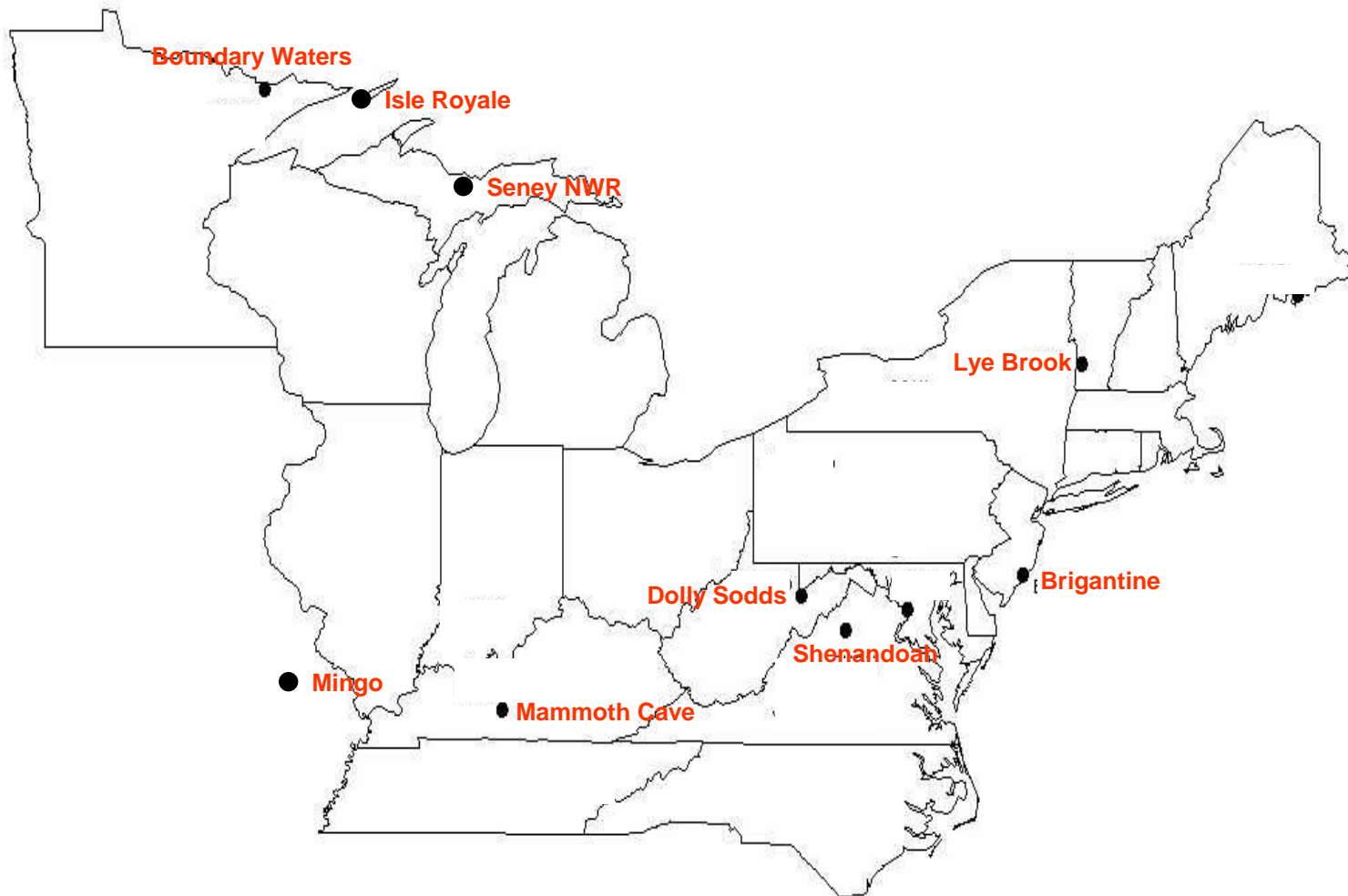
2002 (observed)



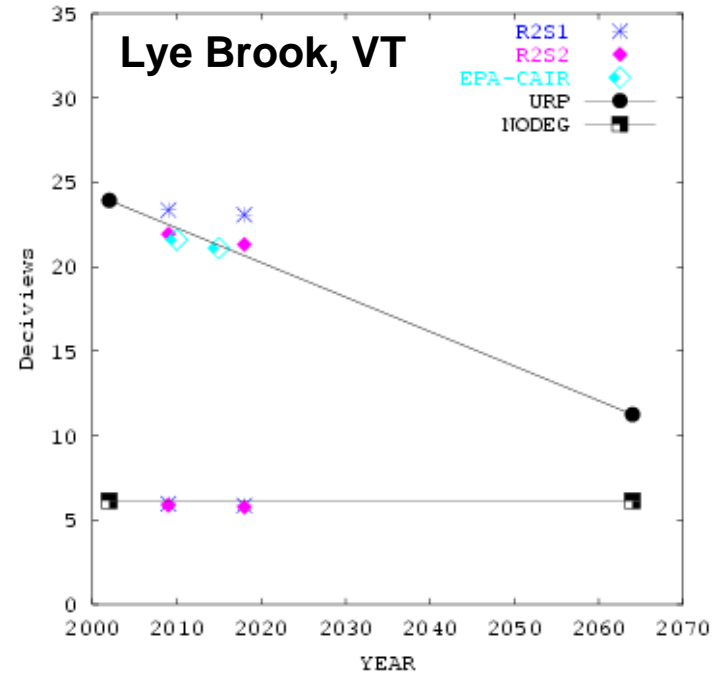
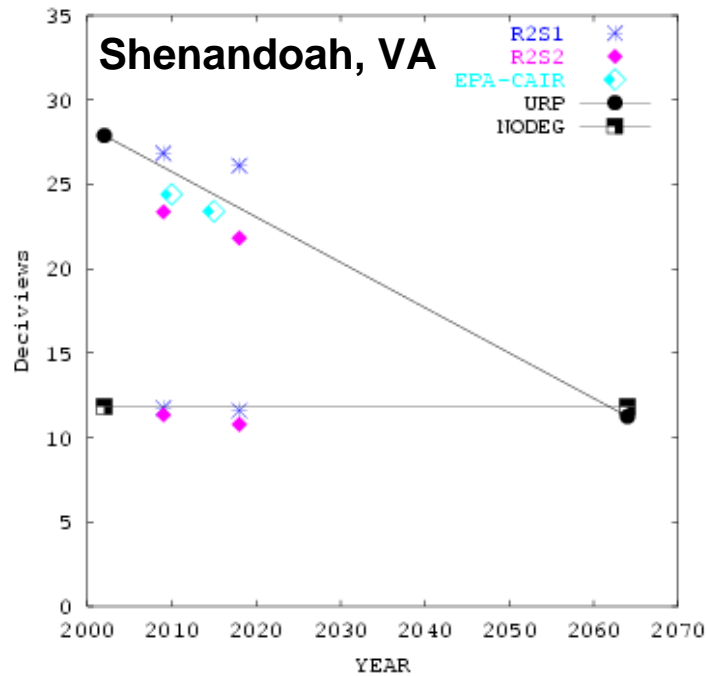
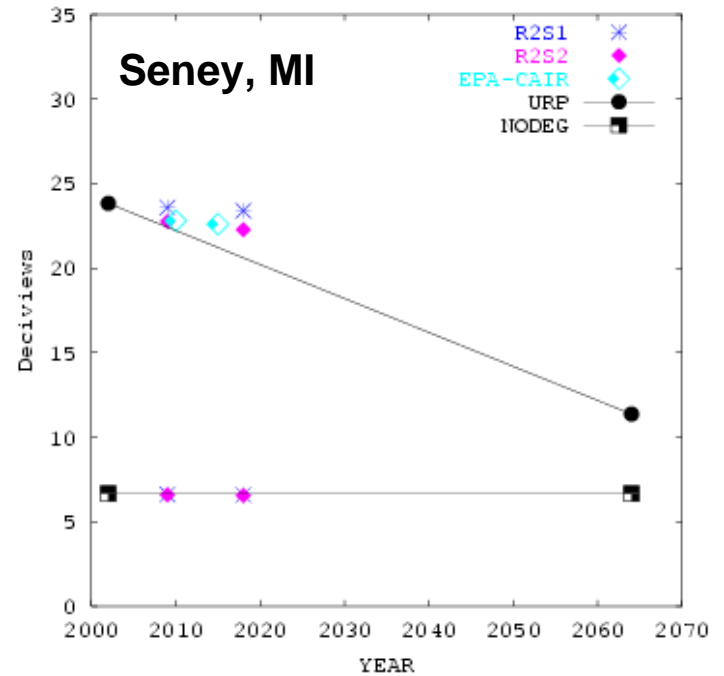
2009 CAIR



# Regional Haze Results

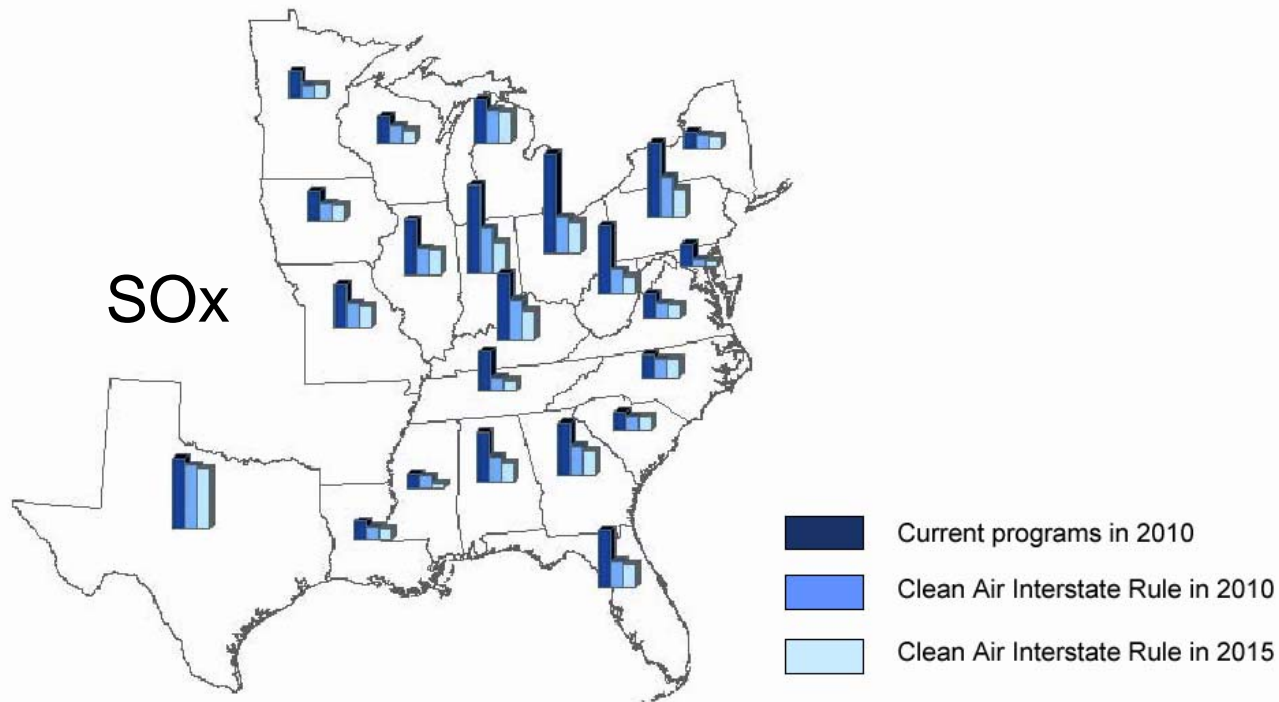


# Regional Haze Results



What will it take to provide for attainment and meet regional haze goals?

# CAIR Implementation: Least-Cost Trading v. Maximum AQ Benefit



# Candidate Control Measures

[http://www.ladco.org/Regional\\_Air\\_Quality.html](http://www.ladco.org/Regional_Air_Quality.html)

- **Stationary Point Sources**

- Electric Generating Units
- Industrial/Commercial/Institutional (ICI) Boilers
- Cement Kilns
- Petroleum Refineries
- Iron & Steel Plants
- Chemical Plants
- Surface Coating
- Degreasing

- **Area Sources**

- Industrial Surface Coating
- Degreasing
- Architectural Coatings
- Portable Fuel Containers
- Consumer Products
- Auto Refinishing
- Gasoline Dispensing Facilities

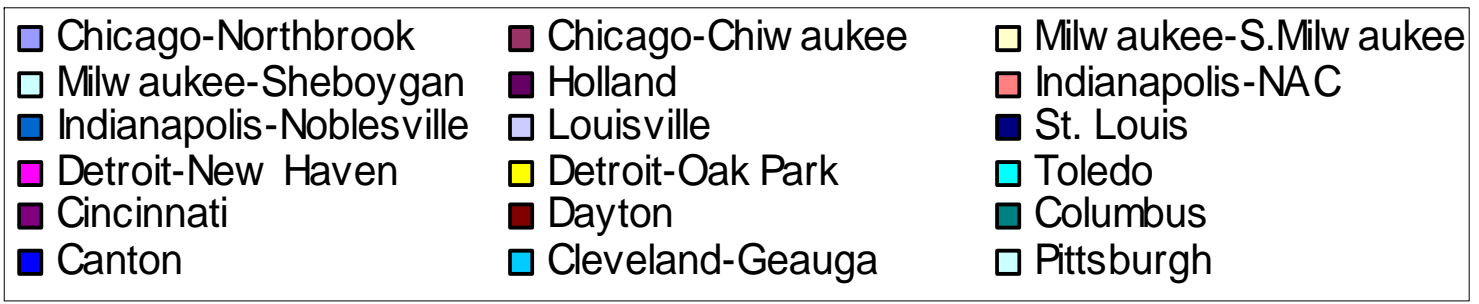
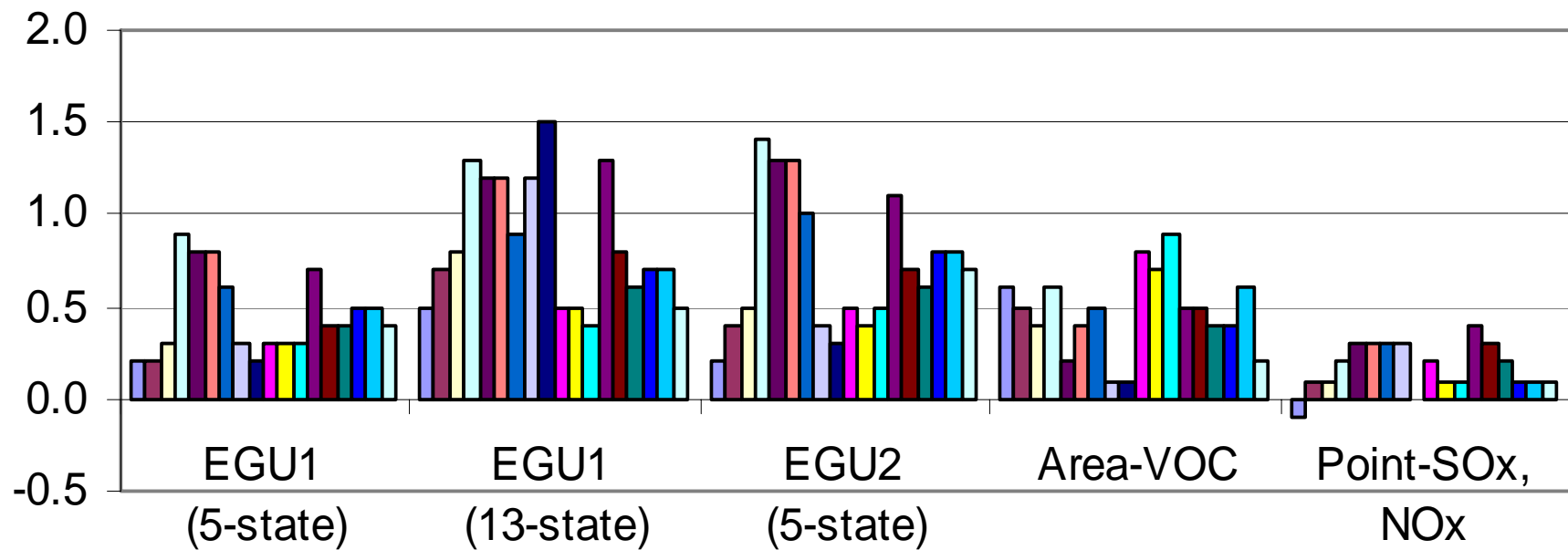


# EGU White Paper

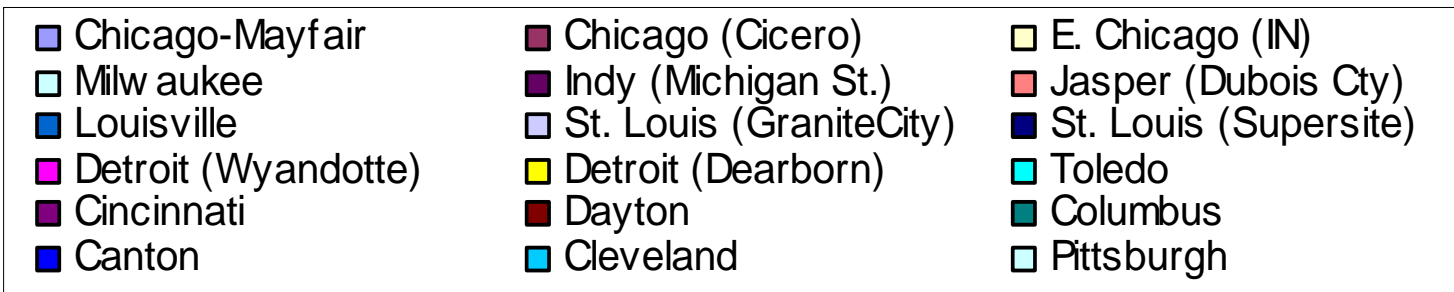
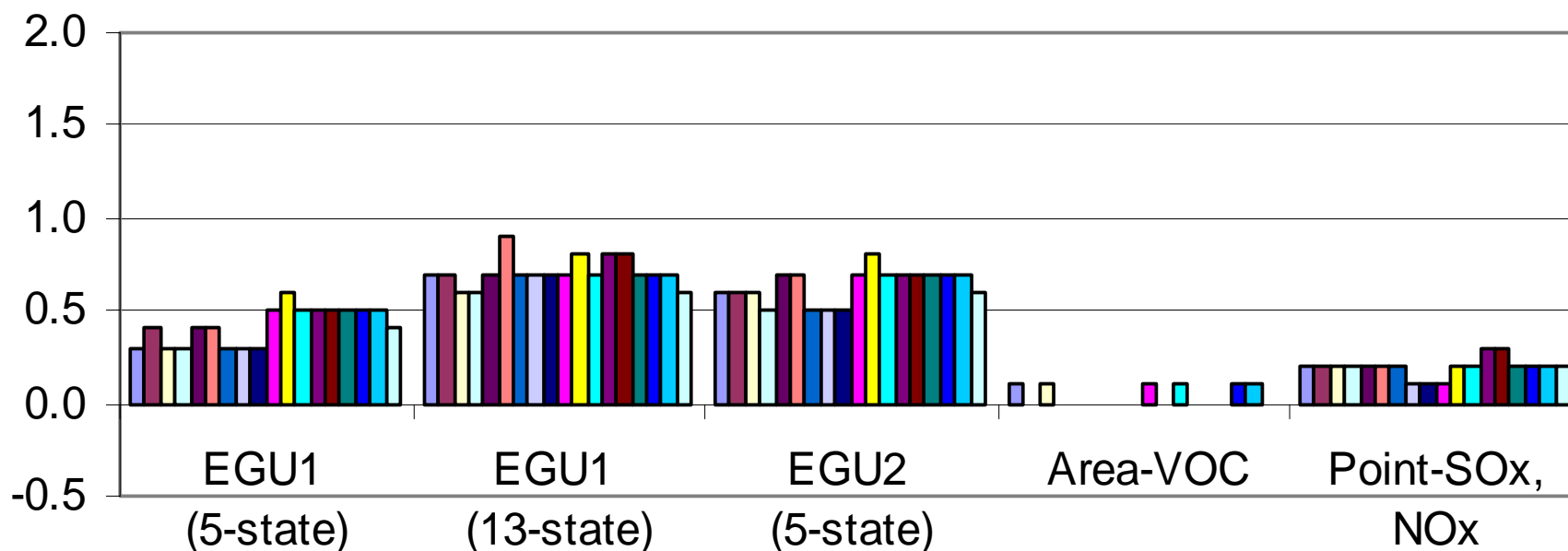
## Regional Emission Levels (lb/MMBTU)

	<u>OTB</u>	<u>CAIR</u>	<u>EGU1</u>	<u>EGU2</u>
SO <sub>2</sub>				
2009	1.14	0.56	0.36	0.24
2013	0.90	0.47	0.15	0.10
NO <sub>x</sub>				
2009	0.31	0.31	0.15	0.12
2013	0.29	0.12	0.10	0.07

# Candidate Control Measures: O<sub>3</sub>



# Candidate Control Measures: PM<sub>2.5</sub>



# What will it take to meet regional haze goals?

Site	Type	DV	Goal	2018 OTB	2018 CAIR	2018 BART	2018 EGU1	2018 EGU1(MW)	2018 EGU2
BOWA1	Worst 20%	20.07	17.78	19.56	18.91	18.84	18.26	<b>17.11</b>	18.14
VOYA2	Worst 20%	18.70	16.74	18.31	17.97	17.95	17.72	<b>16.75</b>	17.68
ISLE1	Worst 20%	20.97	18.45	20.31	19.60	19.43	18.70	<b>18.01</b>	18.52
SENE1	Worst 20%	23.83	20.61	23.39	22.27	22.12	21.33	20.72	21.13
MING1	Worst 20%	27.70	23.46	26.34	23.66	23.56	<b>22.44</b>	<b>21.57</b>	<b>22.13</b>
MACA1	Worst 20%	30.10	25.31	28.71	<b>24.83</b>	<b>24.74</b>	<b>24.19</b>	<b>23.41</b>	<b>24.00</b>
DOSO1	Worst 20%	27.44	23.28	26.10	<b>21.15</b>	<b>21.08</b>	<b>20.69</b>	<b>20.40</b>	<b>20.53</b>
SHEN1	Worst 20%	27.89	23.60	26.10	<b>21.81</b>	<b>21.74</b>	<b>21.11</b>	<b>20.88</b>	<b>20.95</b>
LYBR1	Worst 20%	23.93	20.66	23.07	21.32	21.29	21.03	20.90	20.98
BRIG1	Worst 20%	27.87	23.59	26.85	23.62	<b>23.58</b>	<b>23.25</b>	<b>23.11</b>	<b>23.17</b>

# Summary

- Regional, multi-pollutant planning approach
  - Regional air quality workshops: Nov 17, 2004, Mar 8-9, 2005, June 28-29, 2005
- SIPs for ozone (8-hour) and PM<sub>2.5</sub> due in mid-2007 and early 2008, respectively
  - Need to identify control strategies by late 2005/early 2006
- Modeling shows “on the books” and “on the way” controls will improve air quality, but not enough to meet air quality standards
- Examination of additional, candidate control measures is on-going

# For additional information....

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- [www.ladco.org](http://www.ladco.org)  
[www.ladco.org/Regional\\_Air\\_Quality.html](http://www.ladco.org/Regional_Air_Quality.html)