

Air Quality Analyses

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Lake Michigan Air Directors Consortium

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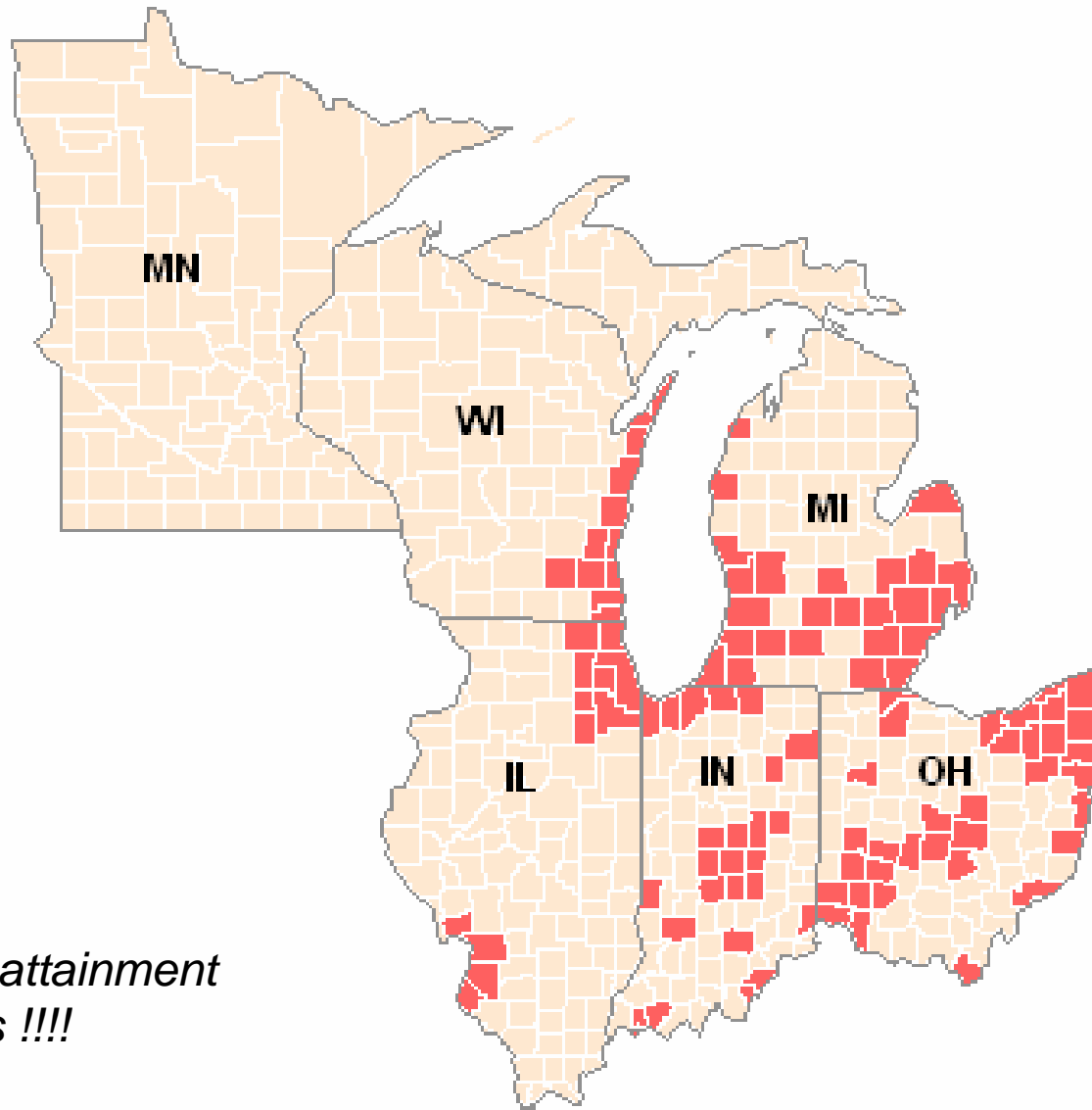
Overview

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

Current Air Quality

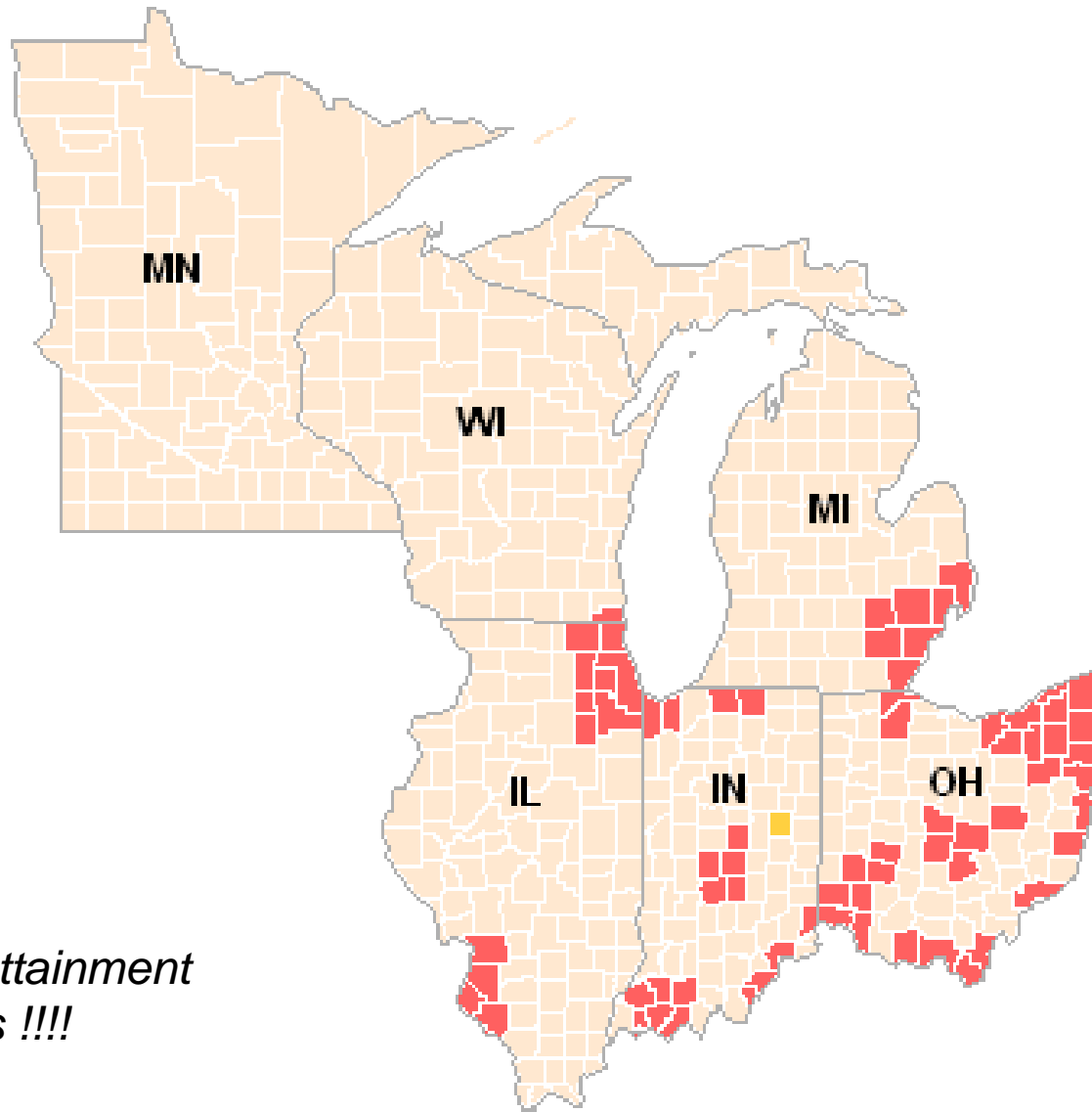
- O_3
- $PM_{2.5}$
- Regional Haze

8-Hour Ozone Nonattainment Areas (Region V)



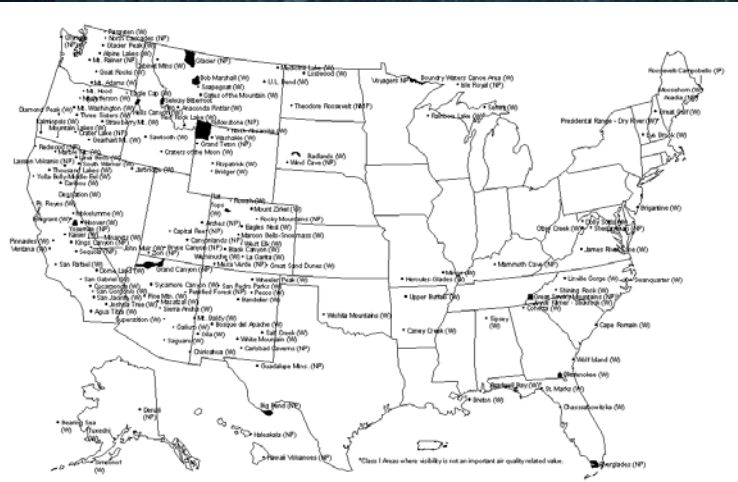
*104 Nonattainment
Counties !!!!*

PM_{2.5} Nonattainment Areas (Region V)



*70 Nonattainment
Counties !!!!*

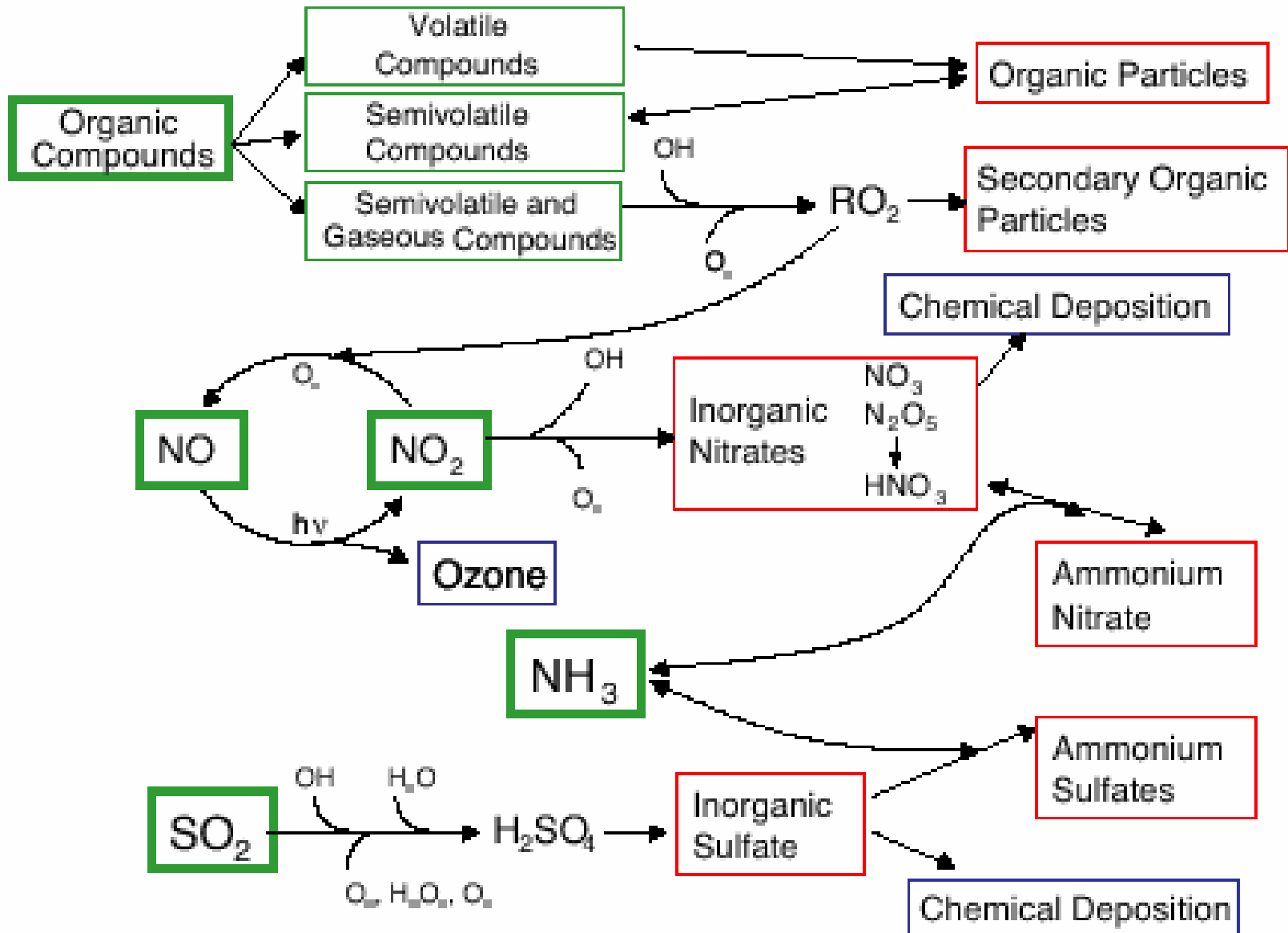
Isle Royale National Park, MI



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

Legend
NP = National Park
WA = Wilderness
IP = International Park

“One Atmosphere”



Regional Planning Efforts

- Schedule
- Preliminary control strategy work

Regulatory Schedule

	Ozone	PM_{2.5}	Haze
Nonattainment Designations	April 15, 2004 (June 15, 2004)	Dec 17, 2004 (April 5, 2005)	-----
SIPs due	June 2007	April 2008	Dec 2007
Attainment dates	2007/2009/2010	2010	2018 (2064)

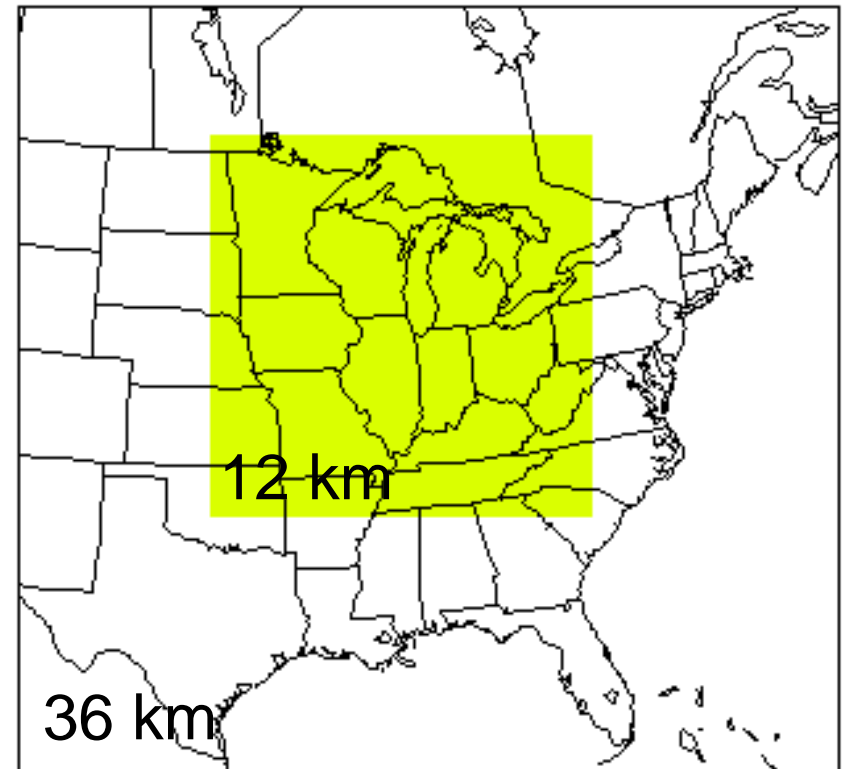
Technical Analyses: Modeling

Model: CAMx

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

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

2001, 2002, 2003
(summer) – O₃, 12 km

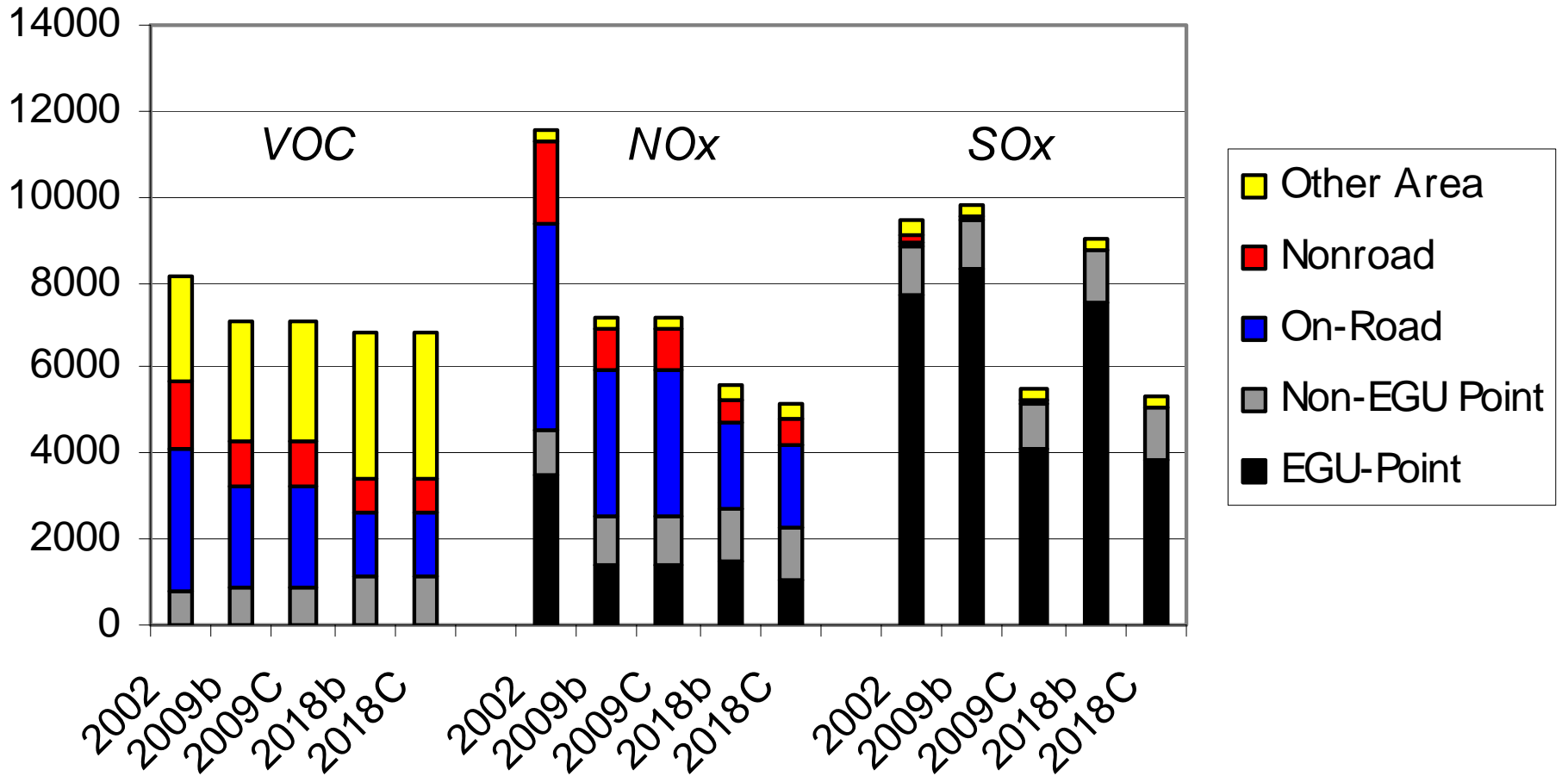


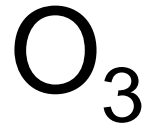
Control Strategies

- Scenario 1 – “*on the books*” controls
- Scenario 2 – “*on the way*” controls (CAIR)

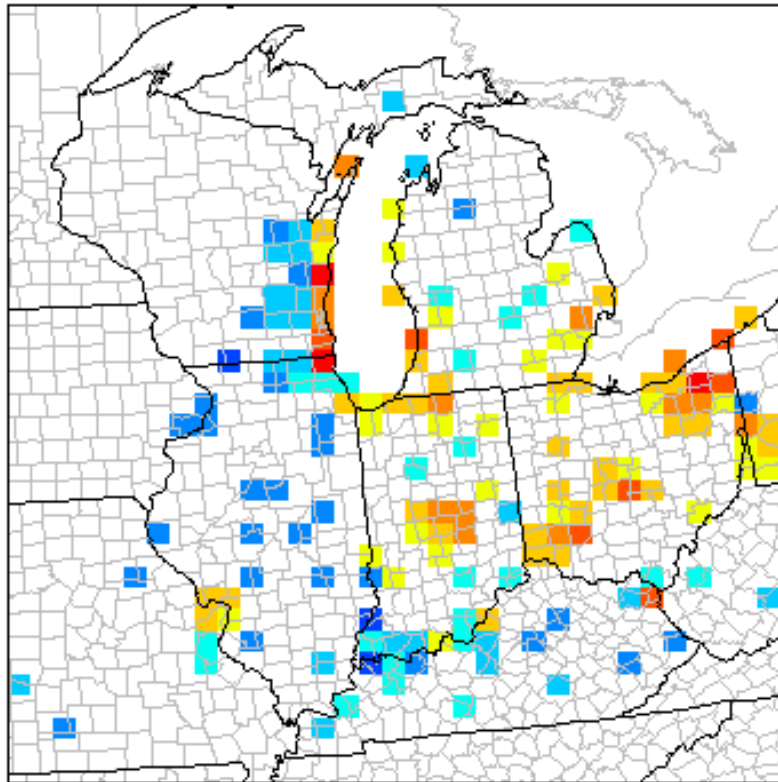
“On the books” Controls

- Current state/local rules to meet 1-hour ozone requirements (e.g., motor vehicle I/M, reformulated gasoline, and NO_x 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

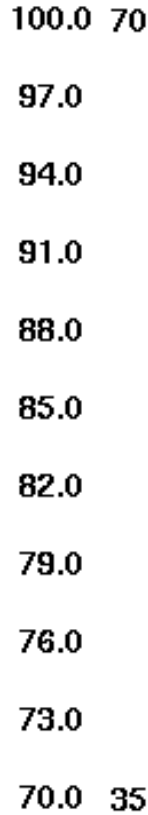
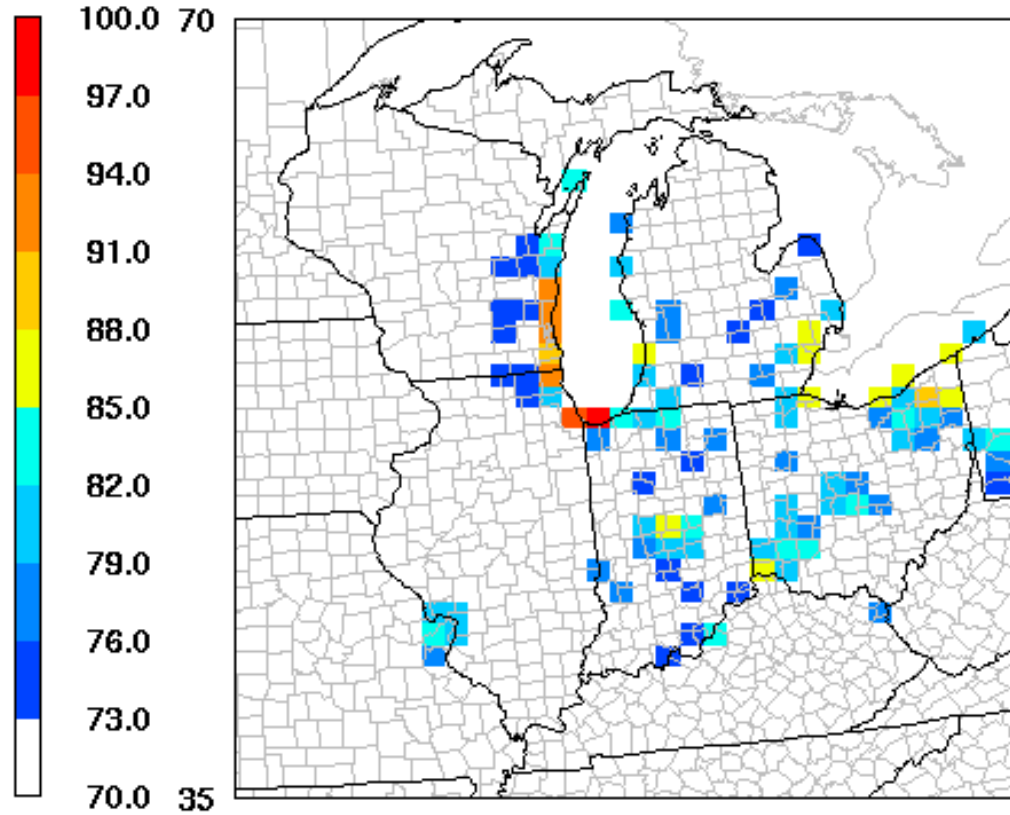


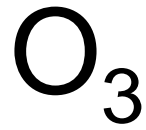


2002 Observed

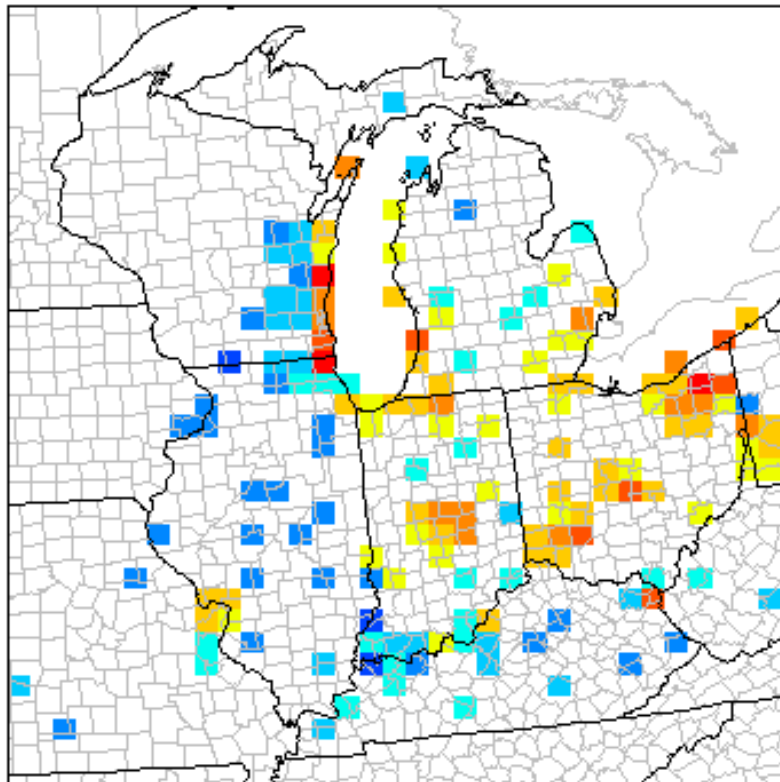


2009 "On the books"

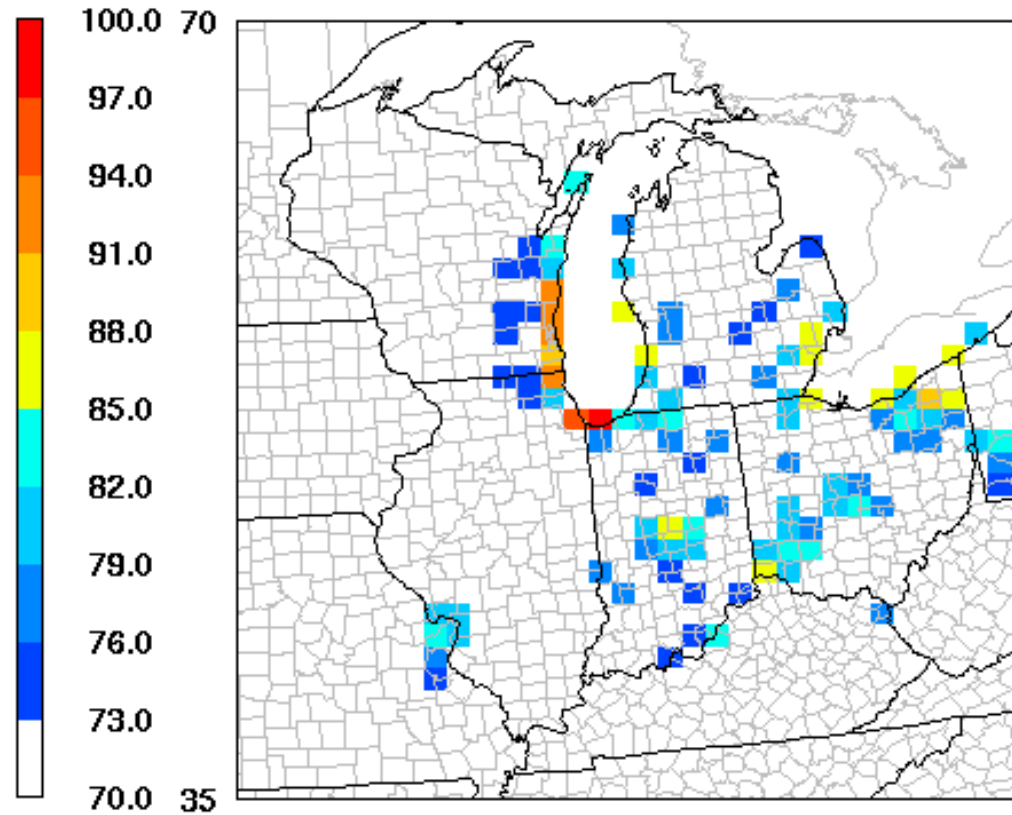




2002 Observed

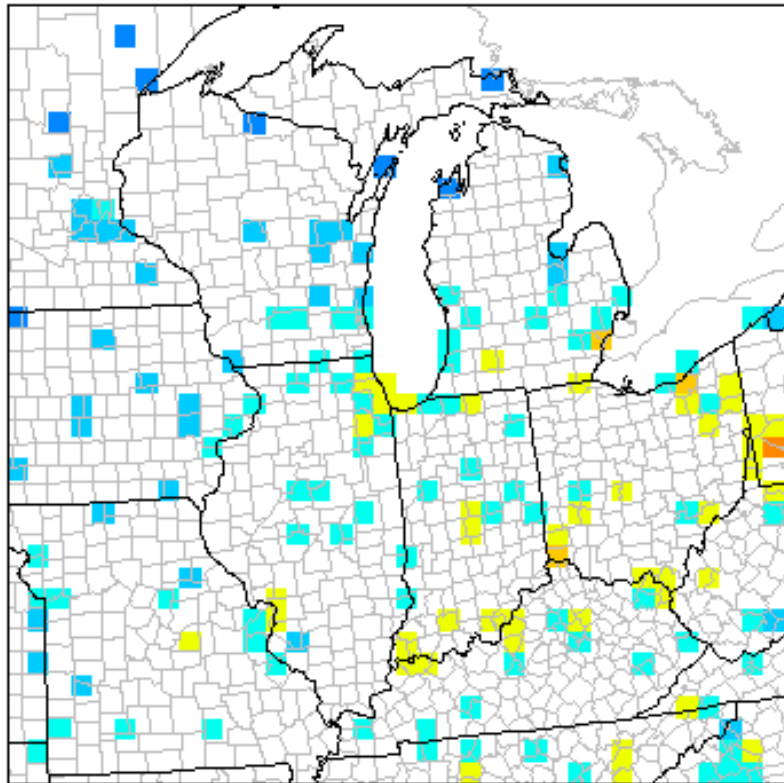


2009 "On the way"

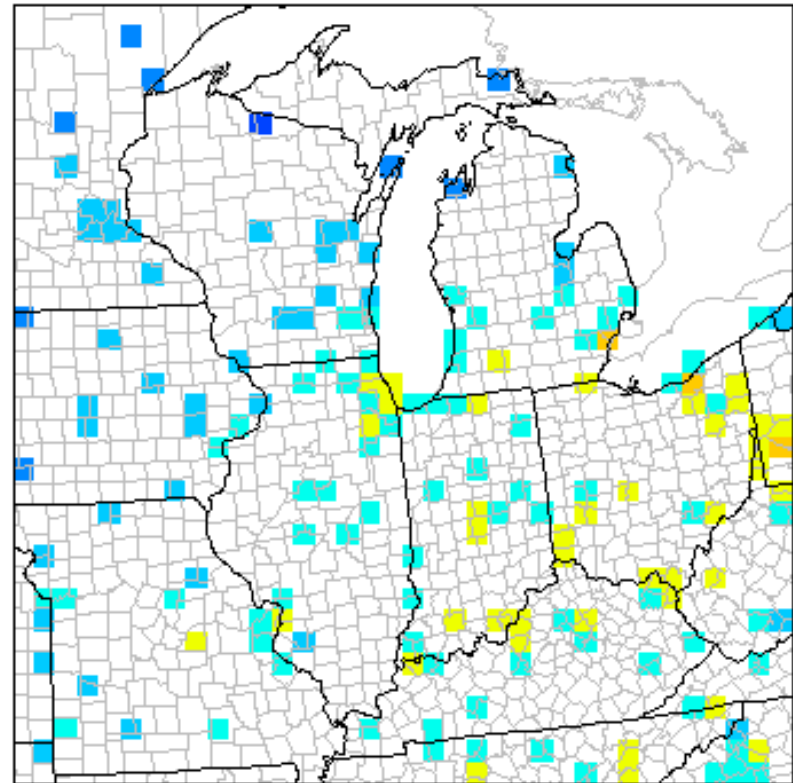
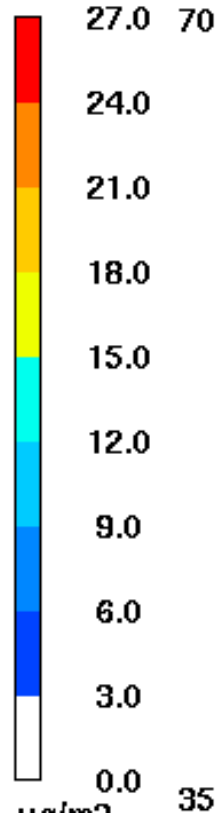


PM_{2.5}

2002 Observed

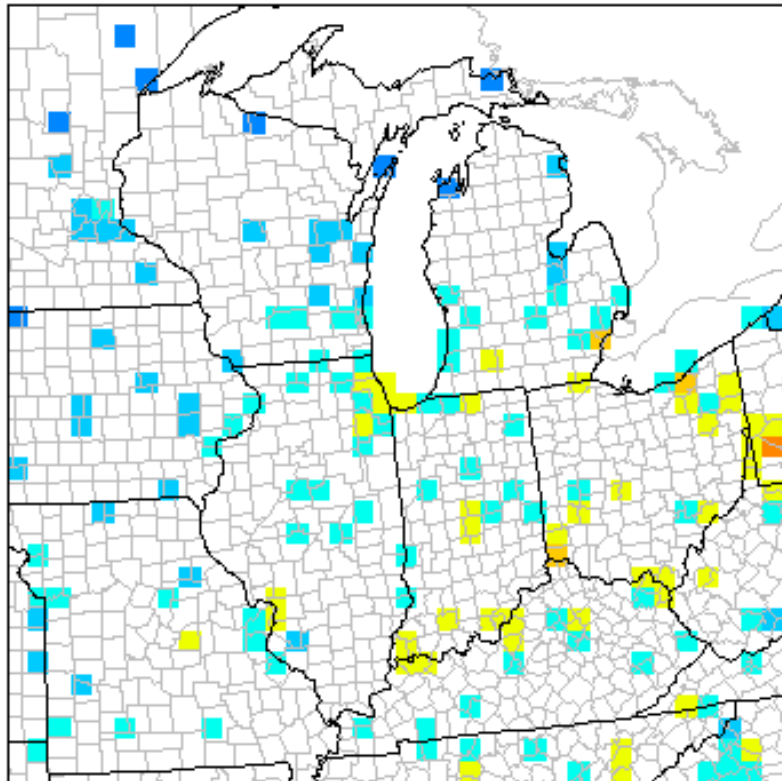


2009 "On the books"

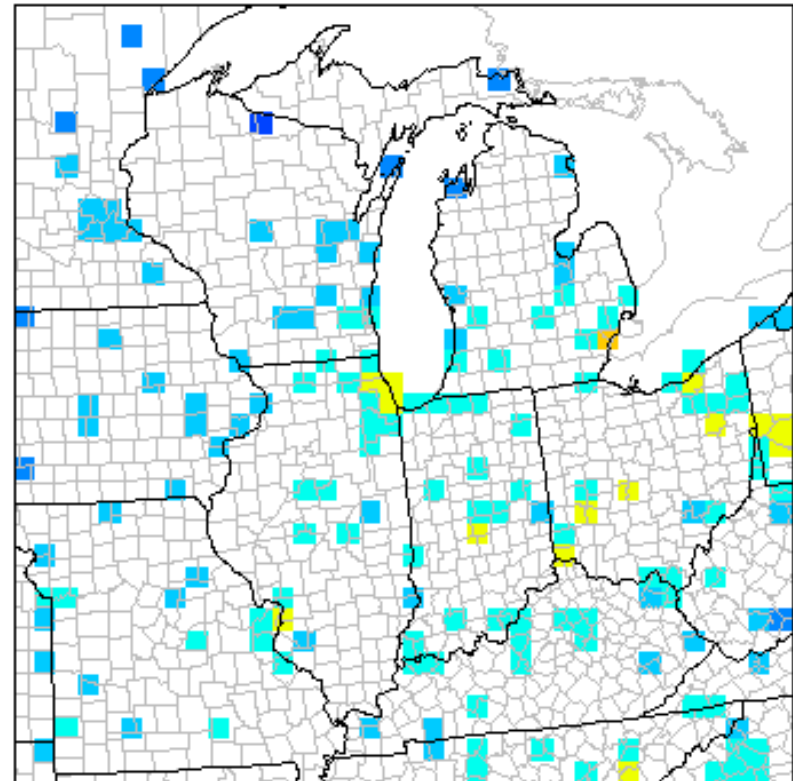
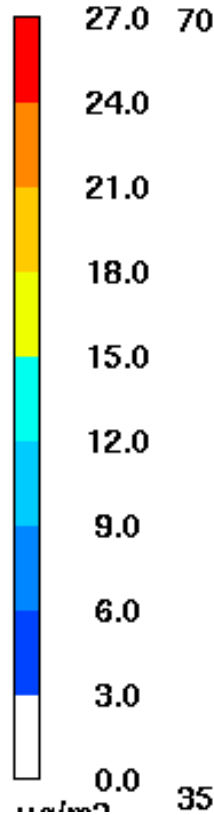


PM_{2.5}

2002 Observed



2009 "On the way"



Run 11. Scenario 2 plus

- 15% VOC and -15% OC all sectors in MRPO nonattainment counties

Run 12. Scenario 2 plus

- 15% VOC and -15% OC all sectors in MRPO nonattainment counties
- 35% SOX and -50% NOX elevated EGU point in 5-state MRPO region

Run 13. Scenario 2 plus

- 15% VOC and -15% OC all sectors in MRPO nonattainment counties
- 35% SOX and -50% NOX elevated EGU point in 5-state MRPO region
- 15% NOX onroad, offroad, other area, lowp in 5-state MRPO region

Run 14. Scenario 2 plus

- 15% VOC and -15% OC all sectors in MRPO nonattainment counties
- 35% SOX and -50% NOX elevated EGU point in 12-state region^[1]
- 15% NOx onroad, offroad, other area, lowp in 12-state region

Run 15. Scenario 2 plus

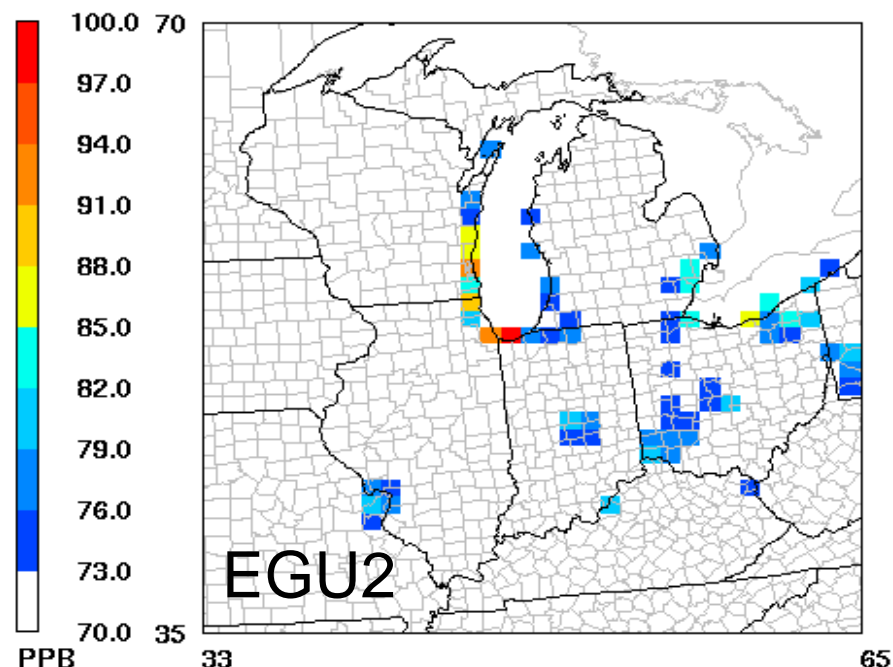
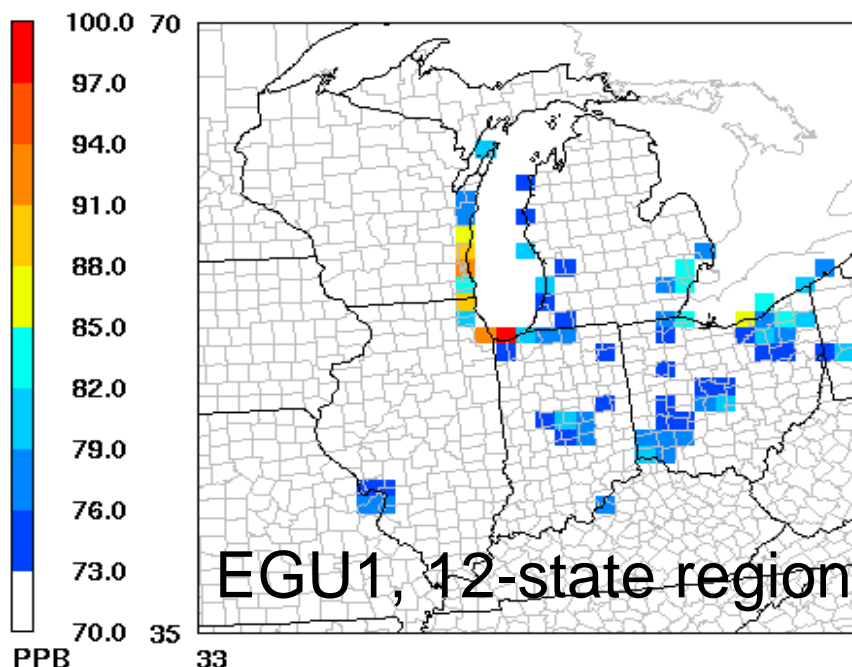
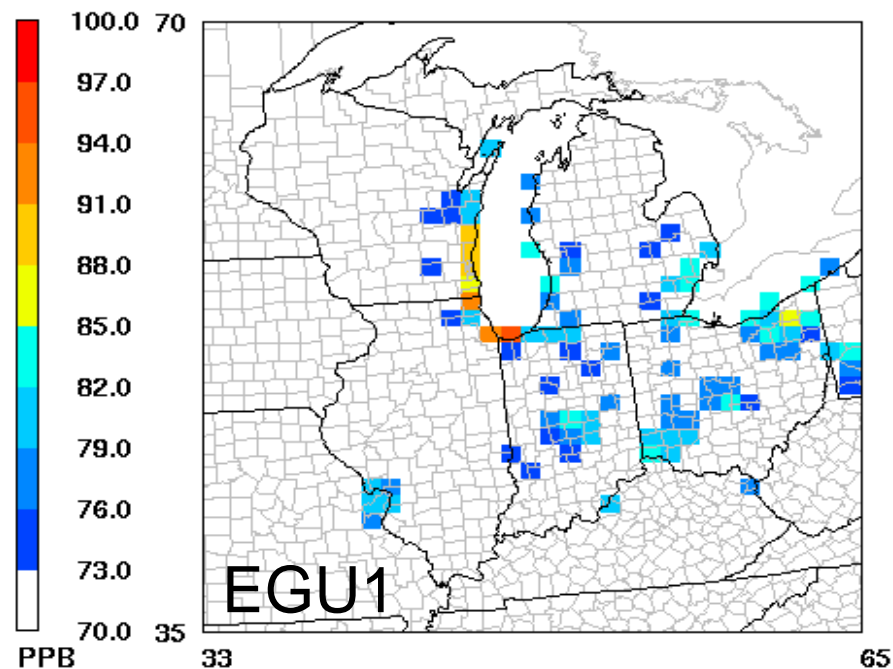
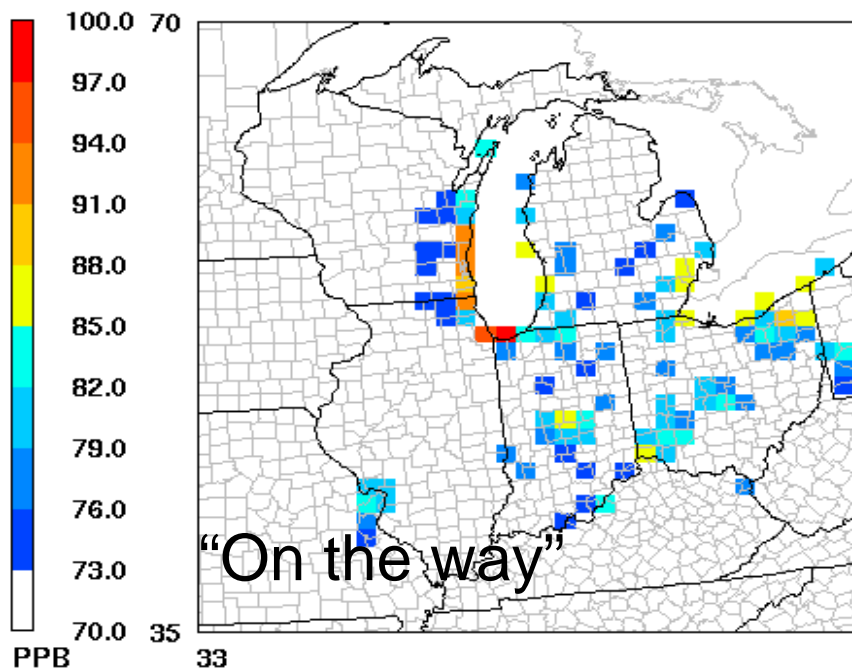
- 30% VOC and -30% OC all sectors in MRPO nonattainment counties
- 55% SOX and -60% NOX elevated EGU point in 5-State MRPO region
- 30% NOx onroad, offroad, other area, lowp in 5-state MRPO region

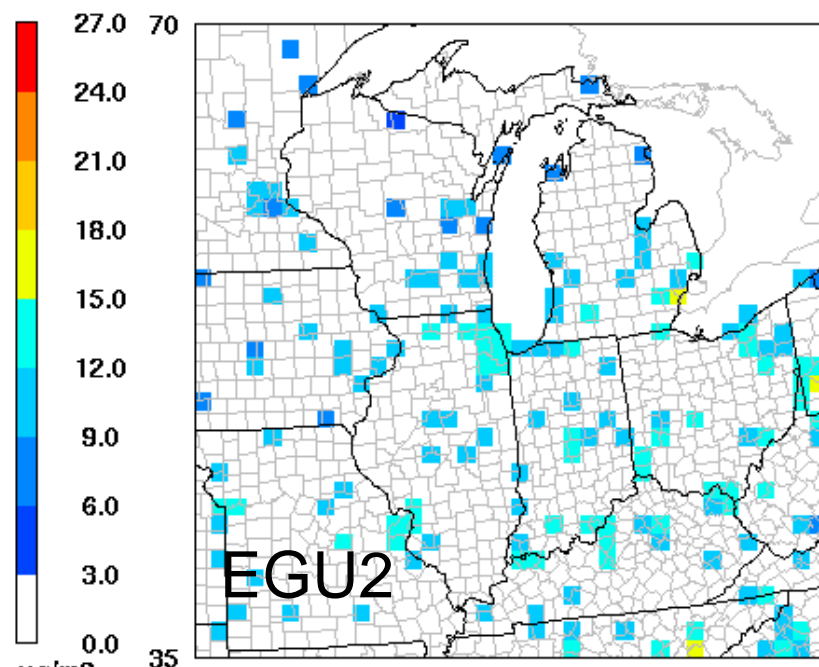
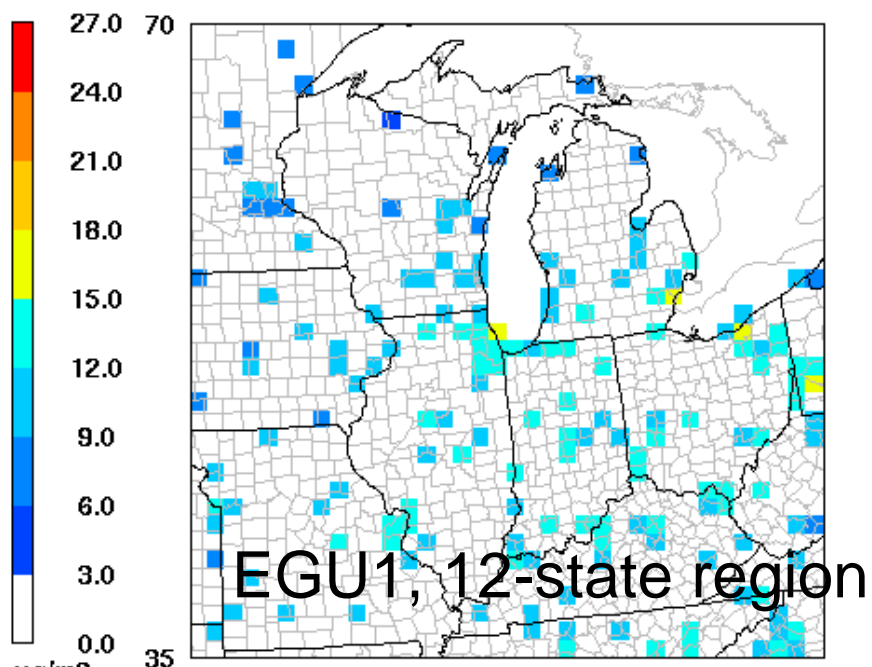
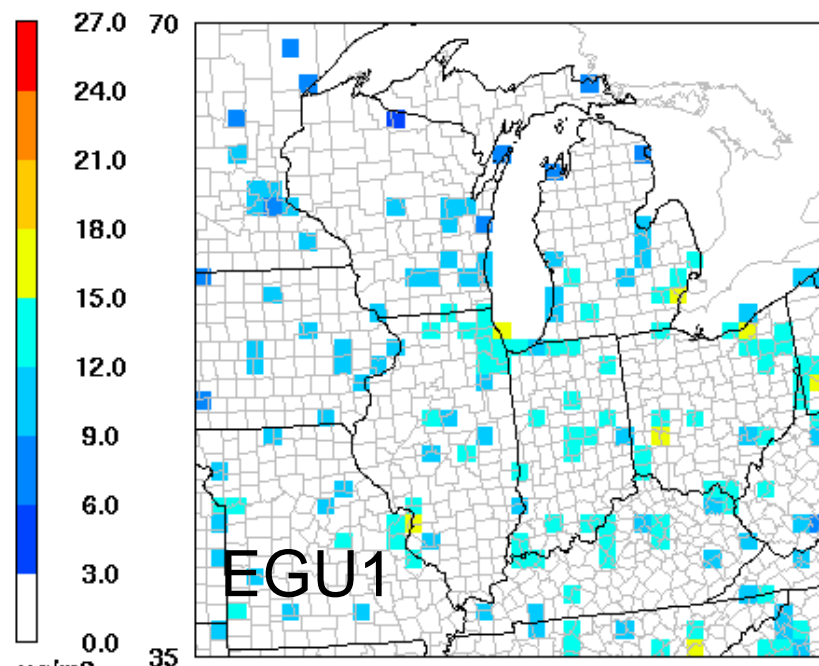
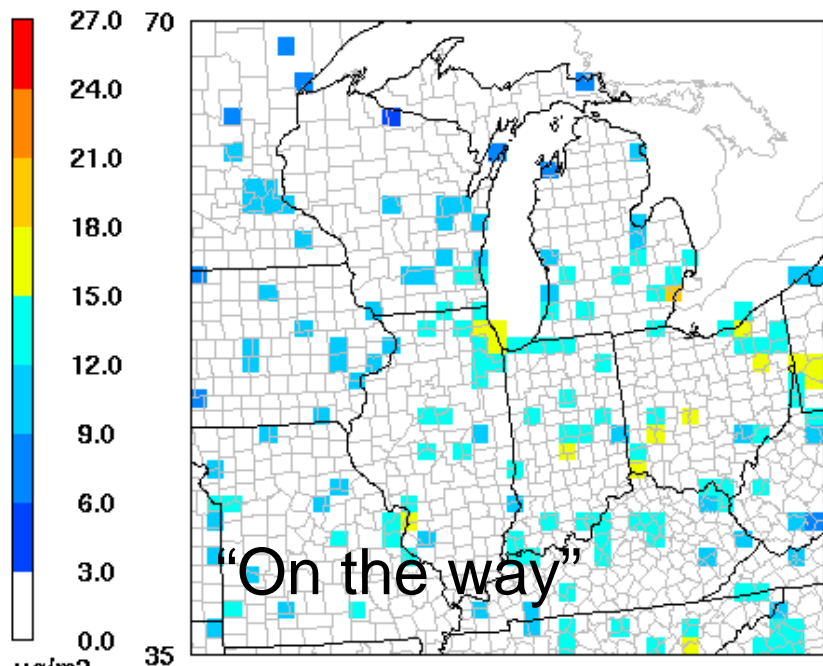
^[1] 12-state region = 5-state MRPO region plus MN, IA, MO, KY, TN, WV, and PA

EGU White Paper

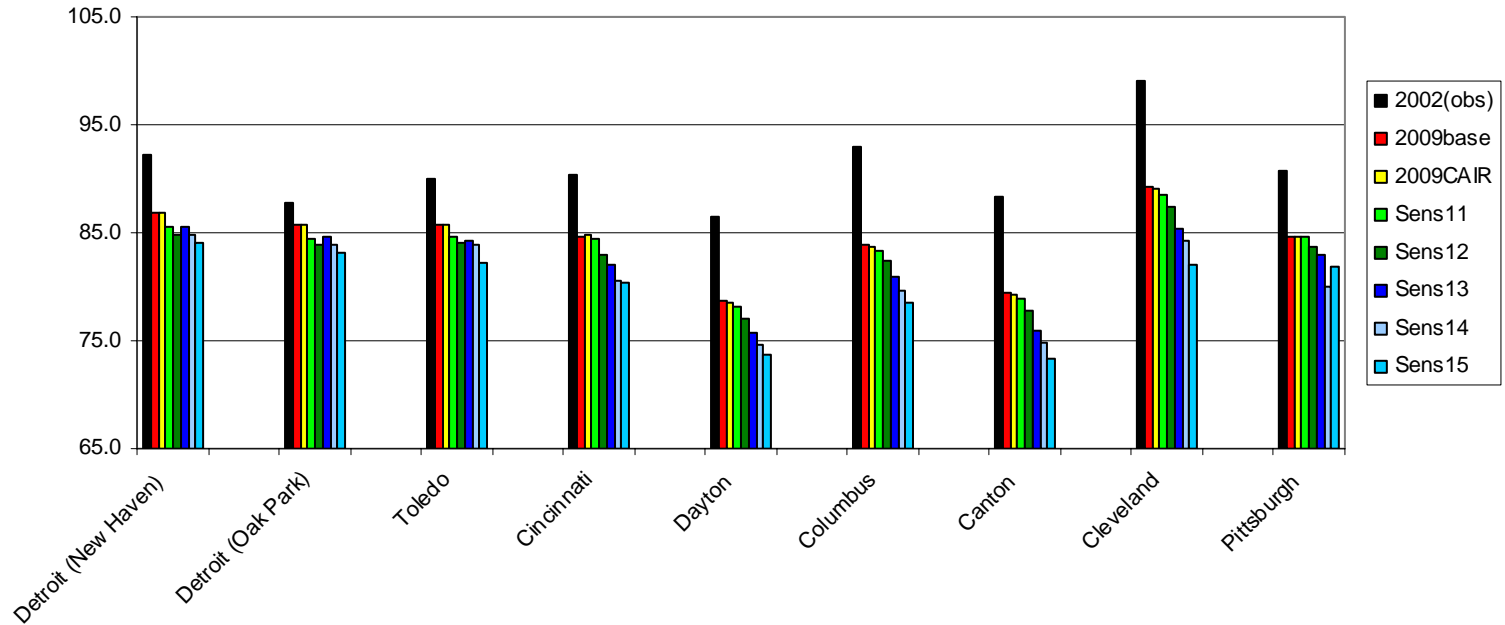
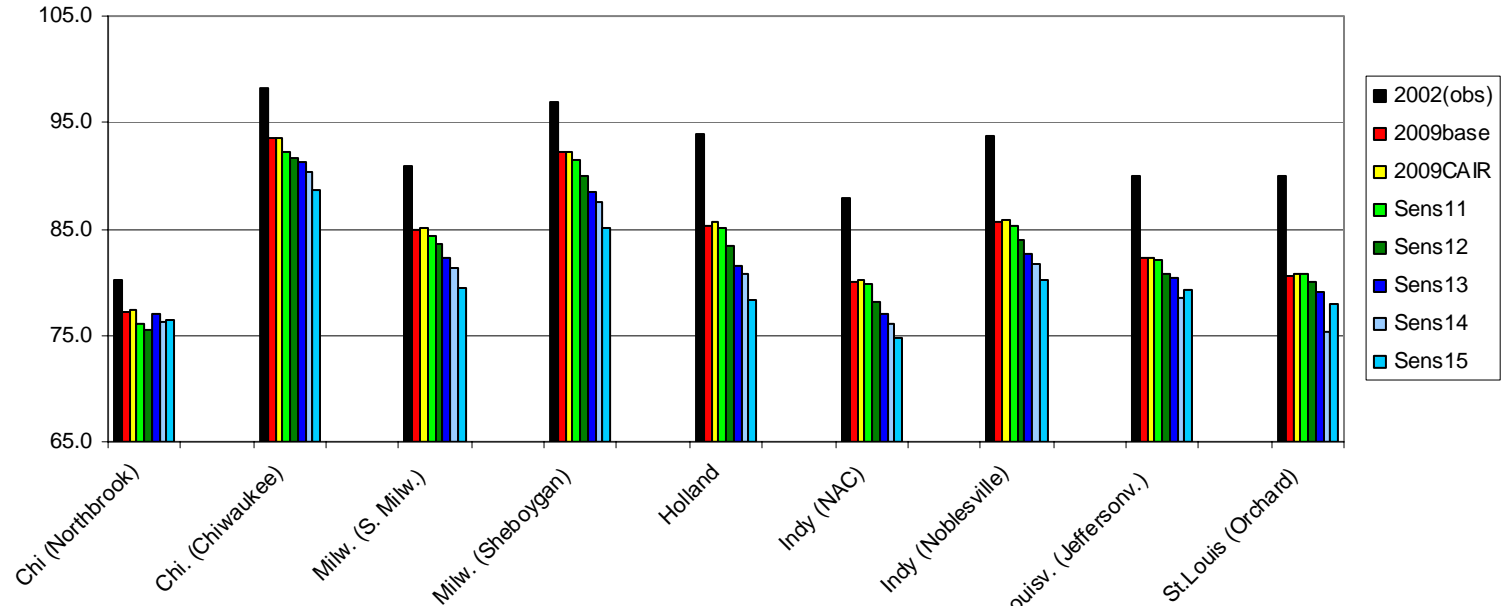
Regional Emission Levels (lb/MMBTU)

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

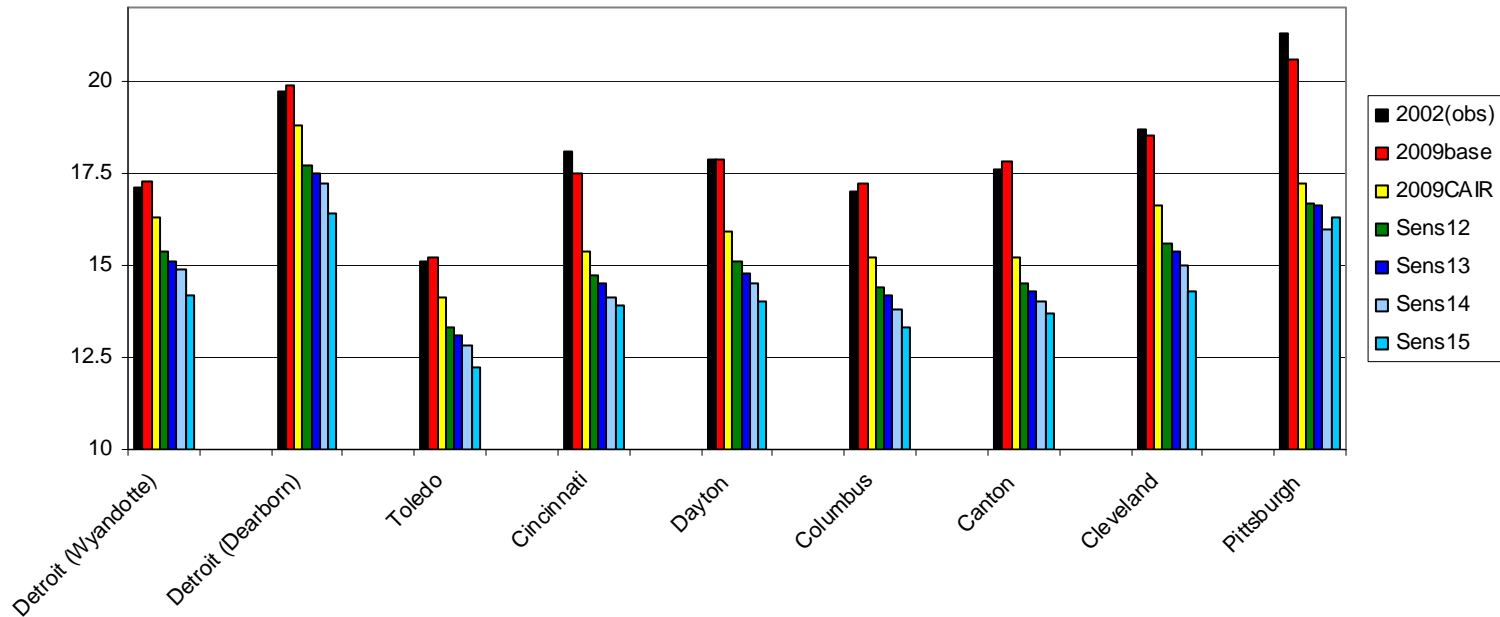
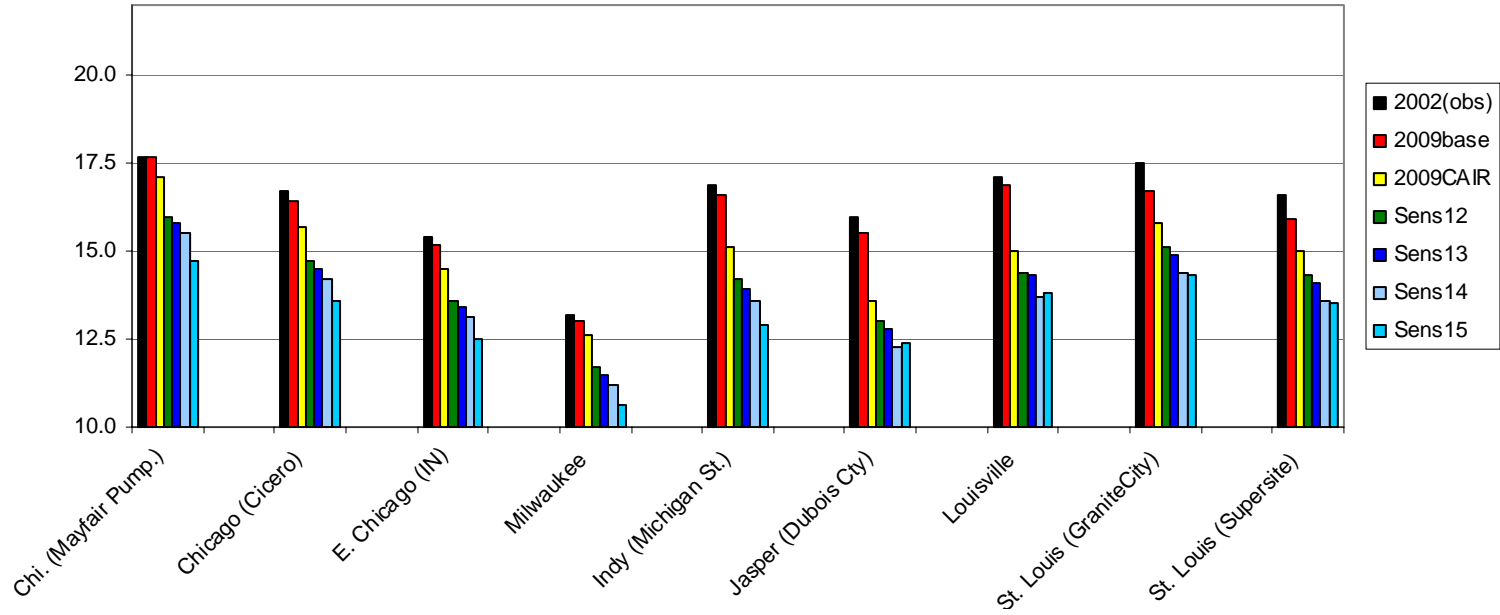




O₃



PM_{2.5}



Changes in Design Values

	Effect of CAIR	Effect of EGU1 * (5-state region)	Effect of EGU1 * (neighbor states)	Effect of EGU2+ * (5-state region)
Ozone	-----	1 ppb	2 - 3 ppb	2 - 3 ppb
PM _{2.5}	1.5 ug/m ³	1 ug/m ³	0.5 ug/m ³	2 ug/m ³

* = *beyond CAIR*

Summary

- Regional, multi-pollutant planning approach
- SIPs for ozone (8-hour) and PM_{2.5} 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 there will not be enough to provide for attainment everywhere
- Examination of additional, candidate control measures is on-going