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# **LADCO STATES 5-YEAR NETWORK ASSESSMENT**

# About LADCO

- The Lake Michigan Air Directors Consortium (LADCO) was established in 1990 by the states of **Illinois, Indiana, Michigan, and Wisconsin**. In March 2004, **Ohio** became a member, and **Minnesota** joined in Feb 2012
- The main purpose of LADCO is to
  - provide technical assessments for and assistance to its member states on problems of air quality;
  - provide a forum for its member states to discuss air quality issues.
- LADCO's major pollutants of concern are ozone, fine particles, regional haze and their precursors
- Problems related to other pollutants (such as air toxics) may be assessed at the direction of the member states.
- Geographic focus is our member states and any areas which affect air quality in our member states.

# 5-Year Assessment Objectives

- Does the network meet monitoring objectives from 40 CFR 58 App.D?:
  - provide timely data to public
  - support NAAQS compliance
  - support control strategy development
  - support air pollution research
- Are new sites needed?
- Are any existing sites not needed?
- Can any new technologies be incorporated into networks?

# 2010 Assessment

- EPA R5 agreed to accept **regional** assessment rather than individual state efforts
- LADCO-led workgroup (members from each state, R5, LADCO) performed various analyses for region as a whole, without regard to state boundaries
- Semiquantitative approach:
  - sites ranked on multiple factors
  - ranks combined into an overall score
  - Final assessment based on ranks plus common sense and unquantified aspects
- Included a cost analysis
- Recommended some shutdowns, some additions, and posed questions about priorities
- Final document available at [http://www.ladco.org/reports/general/Regional\\_Network\\_Assessment/Regional\\_Network\\_Assessment\\_Report\\_Version\\_5.0\\_May\\_27\\_2010.pdf](http://www.ladco.org/reports/general/Regional_Network_Assessment/Regional_Network_Assessment_Report_Version_5.0_May_27_2010.pdf)

# Key 2010 Findings

- Current funding and staffing **insufficient** to meet all existing monitoring requirements; some resource shifts were recommended
- New monitoring requirements will require **additional funding** beyond current levels
- Ozone and PM<sub>2.5</sub> should be highest priority networks
- **Recommended disinvestments**: some ozone and PM<sub>2.5</sub> sites were identified as highly correlated or lower value and potential candidates for shutdowns
- **Recommended investments**: need for additional ozone precursor monitoring, rural monitoring, PM<sub>2.5</sub> speciation in Green Bay WI, PM<sub>2.5</sub> mass in NW OH, more passive NH<sub>3</sub>, ultrafine PM at NCore

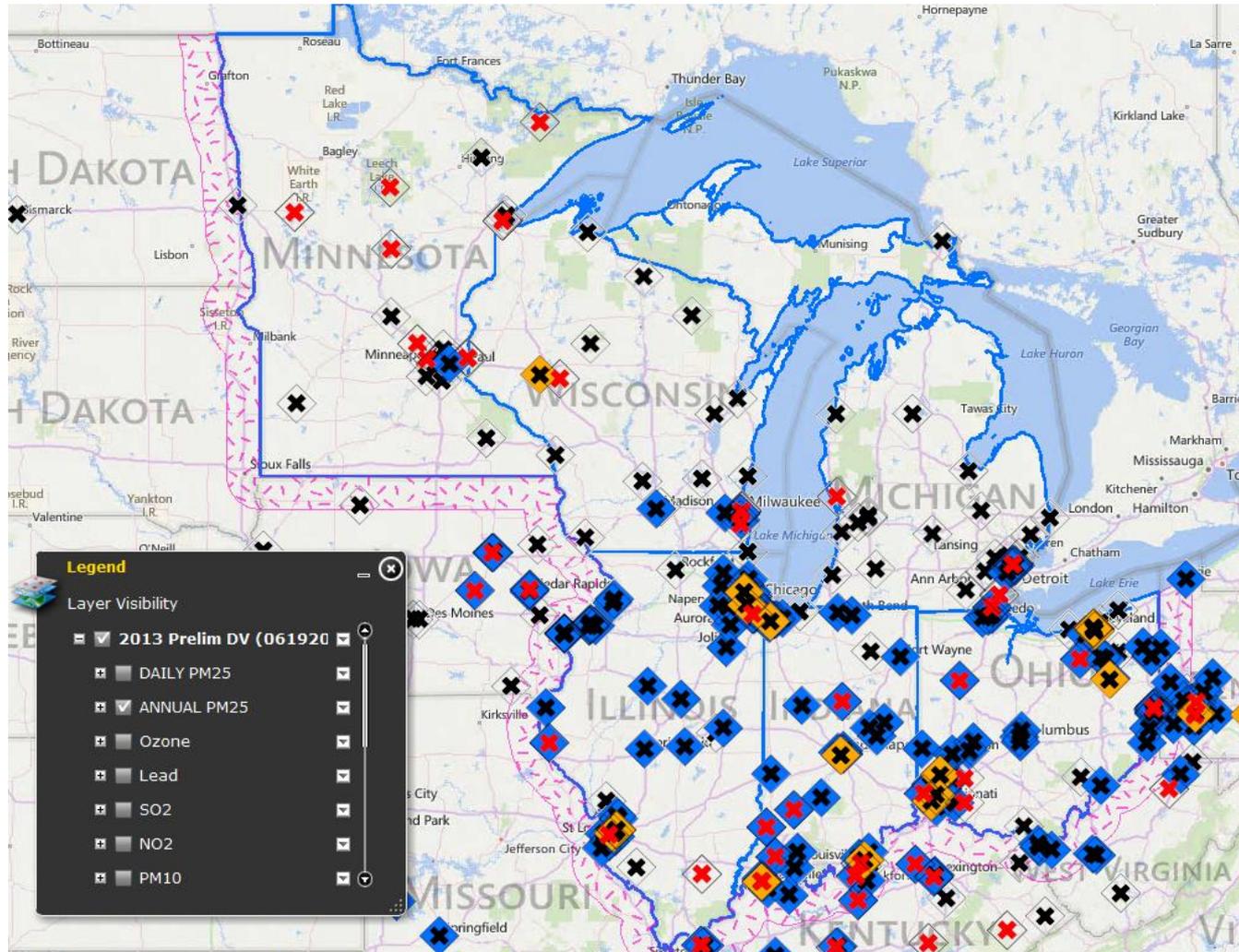
# Current 5-Year Assessment

- Due to EPA July 2015
- No new guidance from EPA; will discussions at August 2014 Air Monitoring Conference lead to guidelines?
- Regional approach, O<sub>3</sub> and PM<sub>2.5</sub> focus
- Workgroup established, meeting every 2 weeks, evaluating 2011-2013 data with 2014 ozone update possible. Anxiously awaiting final design values from EPA!

# Current tasks

- Evaluate missing data, incomplete site records and invalid data
- Revise EPA's R tools:
  - Removal bias
  - New site analysis
  - Correlation matrix
  - Area and population served
- Correlations and clusters among monitors
- Concentration ranks
- Deviation from NAAQS
- Urban/rural pairs
- Length of record
- Trends
- Inventory/site comparison
- Multiple measurements per site

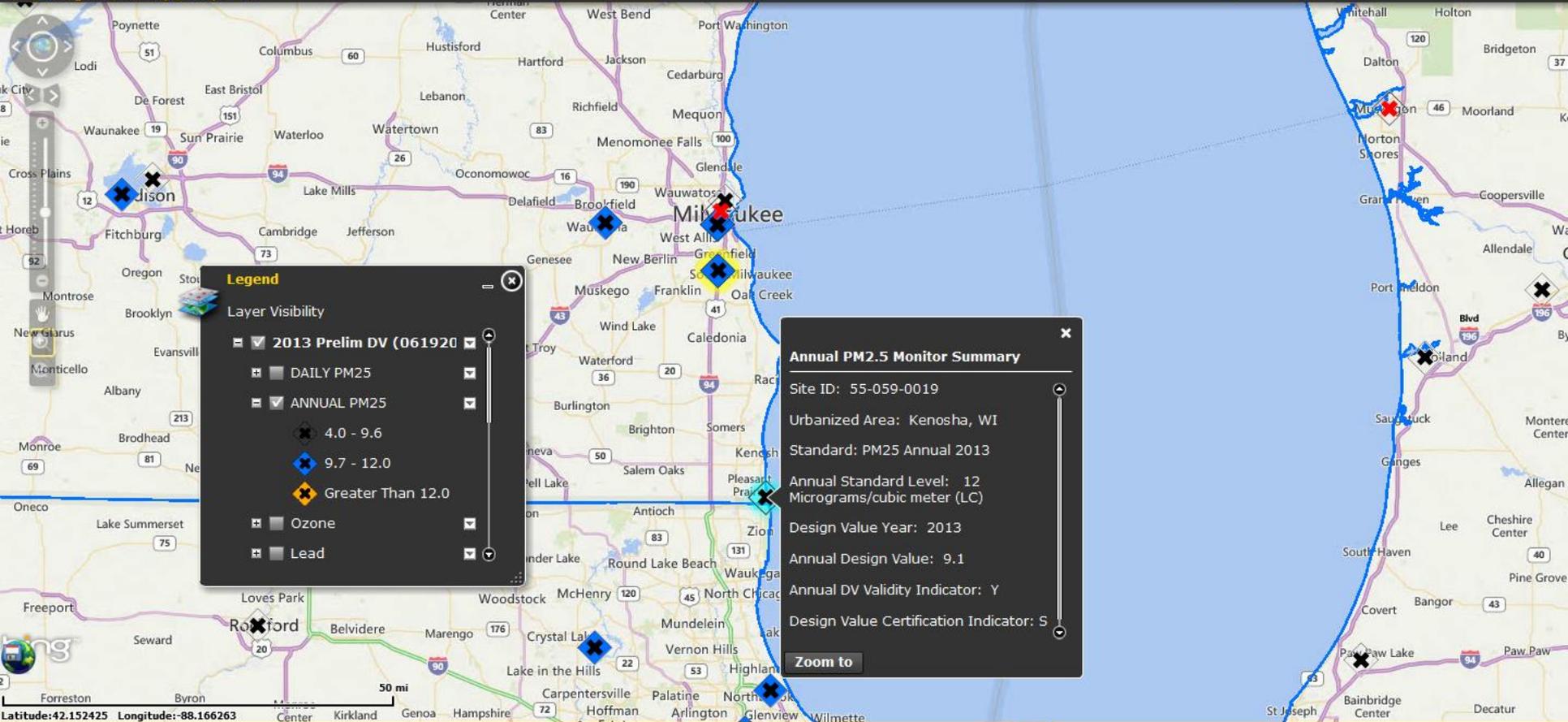
# EPA R5 Flex Viewer developed by Ed Delisio



[http://r5imt2.net/gis/R5\\_Air/Eds\\_Draft\\_Air/](http://r5imt2.net/gis/R5_Air/Eds_Draft_Air/)

# Official Use Only - Preliminary 5 Year Network Review

USEPA Region 5 States/Locals/Tribes



**Attribute Table**

ANNUAL PM25														
...	Si...	Dv_...	Street_Address	City_N...	Urbanized...	Cbsa_Name	Latitude	Longitude	Pollutant_Name	Daily_Standard...	Da...	Da...	Annual_Standa...	An...
55	079	0058	1550 W College Ave	Milwaukee	Milwaukee, WI	Milwaukee-Waukesha-West Allis, WI	42.93056	-87.932104	PM2.5 - Local Conditions	PM25 24-hour 2013	35.00	24.00	PM25 Annual 2013	12.00
55	079	0099	711 W WELLS ST	Milwaukee	Milwaukee, WI	Milwaukee-Waukesha-West Allis, WI	43.04100	-87.925	PM2.5 - Local Conditions	PM25 24-hour 2013	35.00	25.00	PM25 Annual 2013	12.00
26	121	0040	199 E APPLE AVE	Muskegon	Muskegon, MI	Muskegon-Norton Shores, MI	43.23306	-86.238580	PM2.5 - Local Conditions	PM25 24-hour 2013	35.00	21.00	PM25 Annual 2013	12.00
55	079	0010	HEALTH CENTER, 1337 SO 16TH ST	Milwaukee	Milwaukee, WI	Milwaukee-Waukesha-West Allis, WI	43.01666	-87.933332	PM2.5 - Local Conditions	PM25 24-hour 2013	35.00	27.00	PM25 Annual 2013	12.00
55	079	0010	HEALTH CENTER, 1337 SO 16TH ST	Milwaukee	Milwaukee, WI	Milwaukee-Waukesha-West Allis, WI	43.01666	-87.933332	PM2.5 - Local Conditions	PM25 24-hour 2013	35.00	27.00	PM25 Annual 2013	12.00

# Flexviewer

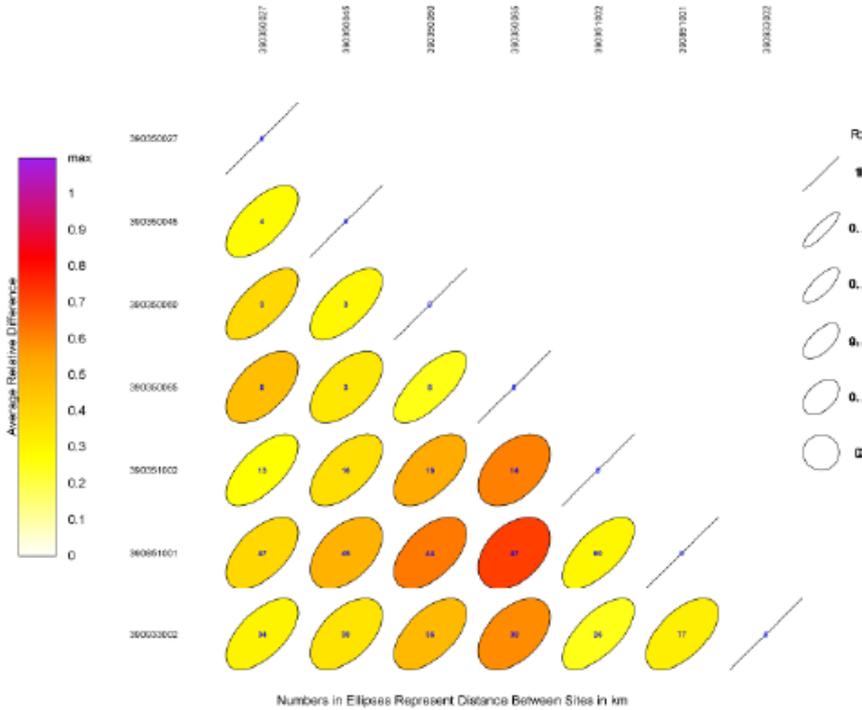
- Base map can be satellite imagery, terrain, roads, etc.
- Zoom and search by name, monitor id, features, buildings, roads, etc.
- Additional layers will include: emissions, nonattainment areas, environmental justice areas, population and other census data, modeled future-year concentrations, land use
- Includes a 30-mile buffer outside R5 states
- Anyone can use; no guarantees about long-term availability or access
- [http://r5imt2.net/gis/R5 Air/Eds Draft Air/](http://r5imt2.net/gis/R5_Air/Eds_Draft_Air/)

# Updating EPA Assessment Tools

- R-based tools developed by Mike Rizzo for the 2010 assessments
- Need to be updated to work with current version of R, along with recent data files
- Subset of current workgroup has R coding expertise, working on updates
- Hope to make these functional and available to all states
- Side benefit: building R expertise and comradery among states in LADCO/R5

# Correlation Matrix

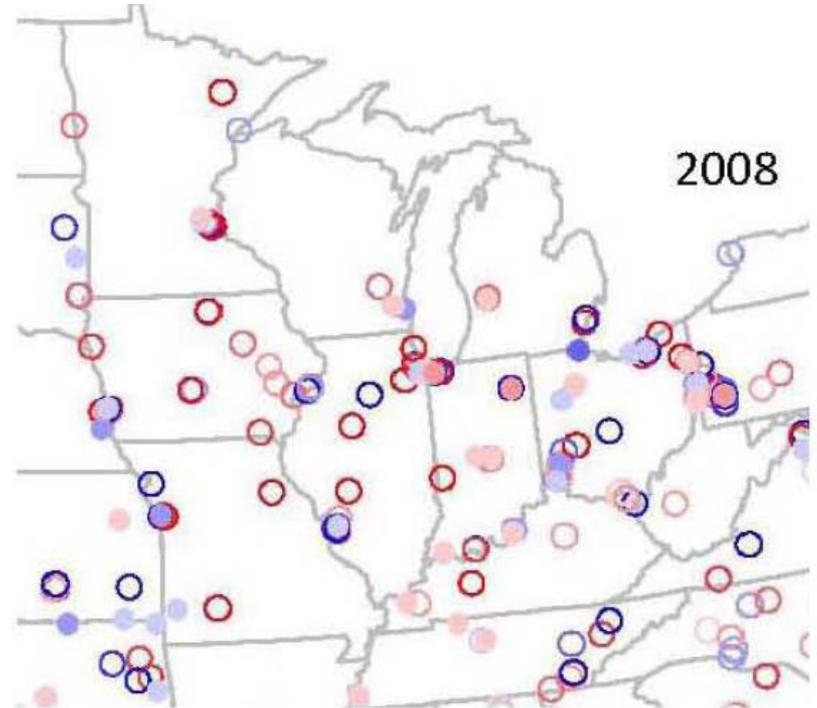
## Cleveland



Flatter ellipses=highly correlated sites

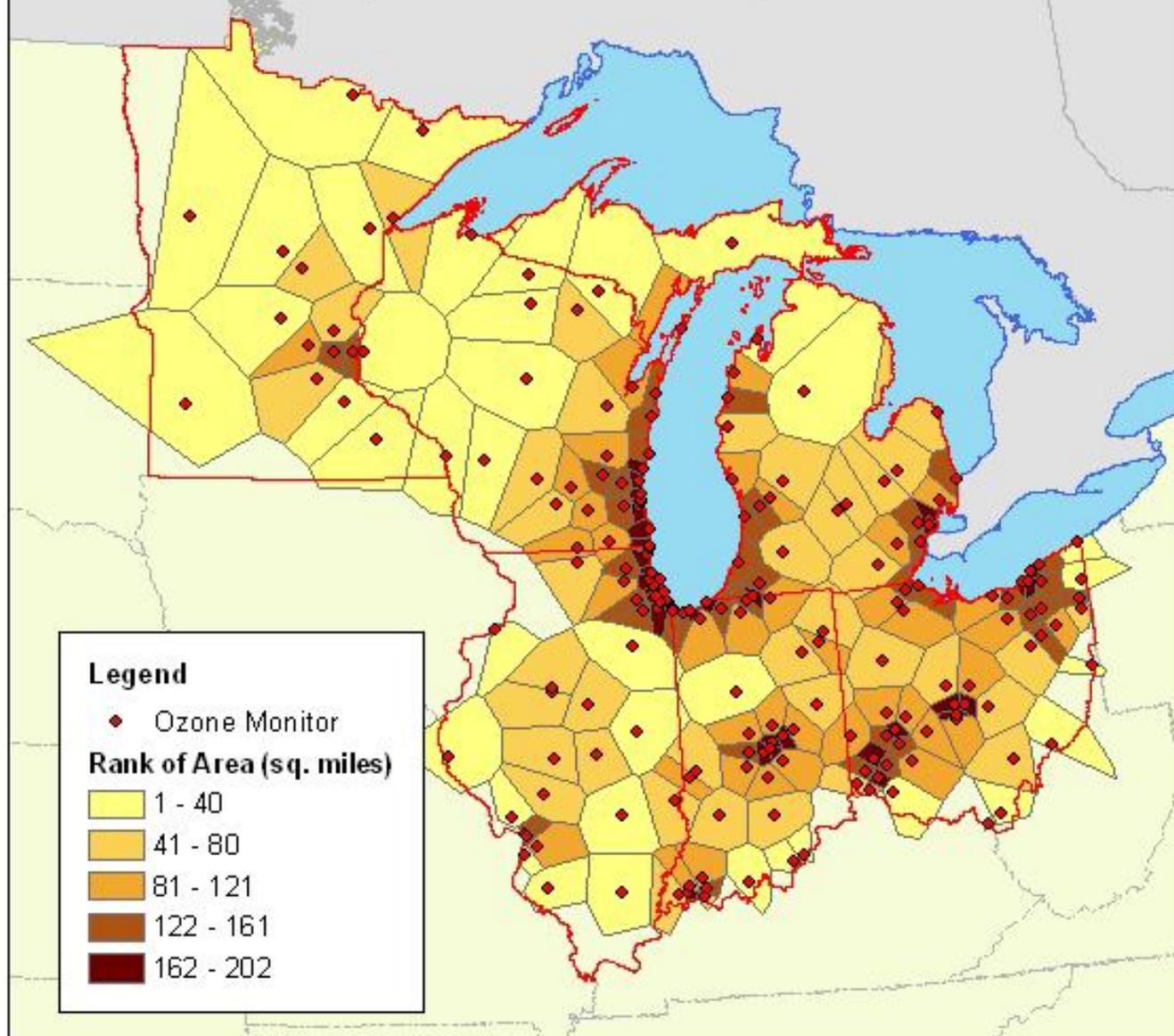
Paler yellow colors = sites with low average relative difference (concns. are similar in magnitude)

# Removal Bias

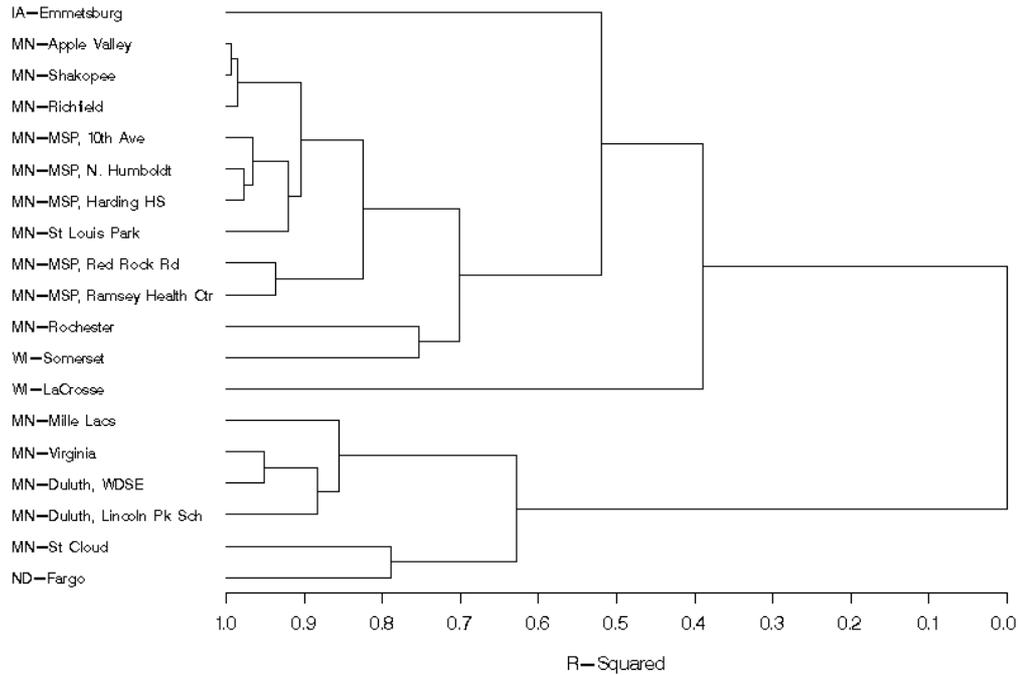


Blue sites have little impact on concentration estimates when removed; red sites are influential. Useful for assessing impact of removing sites identified as low value by other analyses.

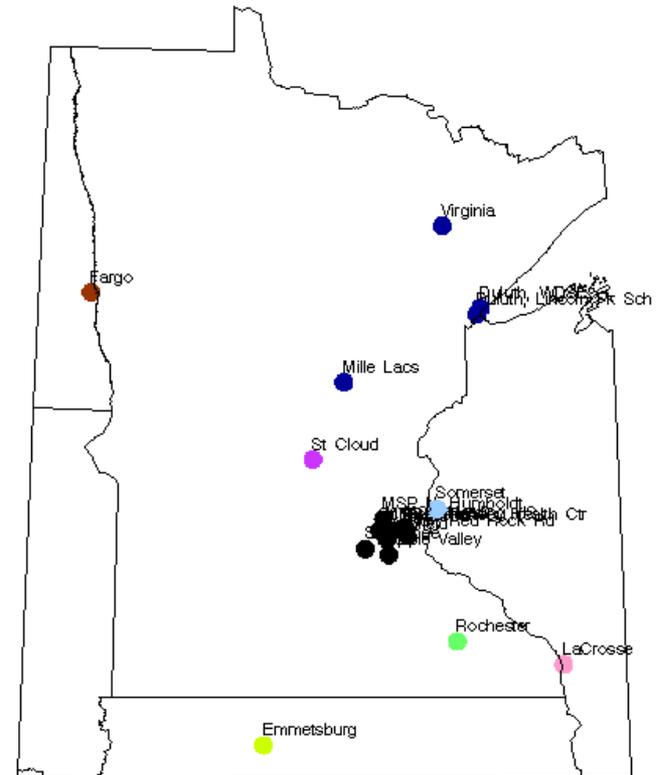
### Rank of Area Served (sq. miles) by Ozone Monitors in Region 5



## Minnesota Monitor Clusters



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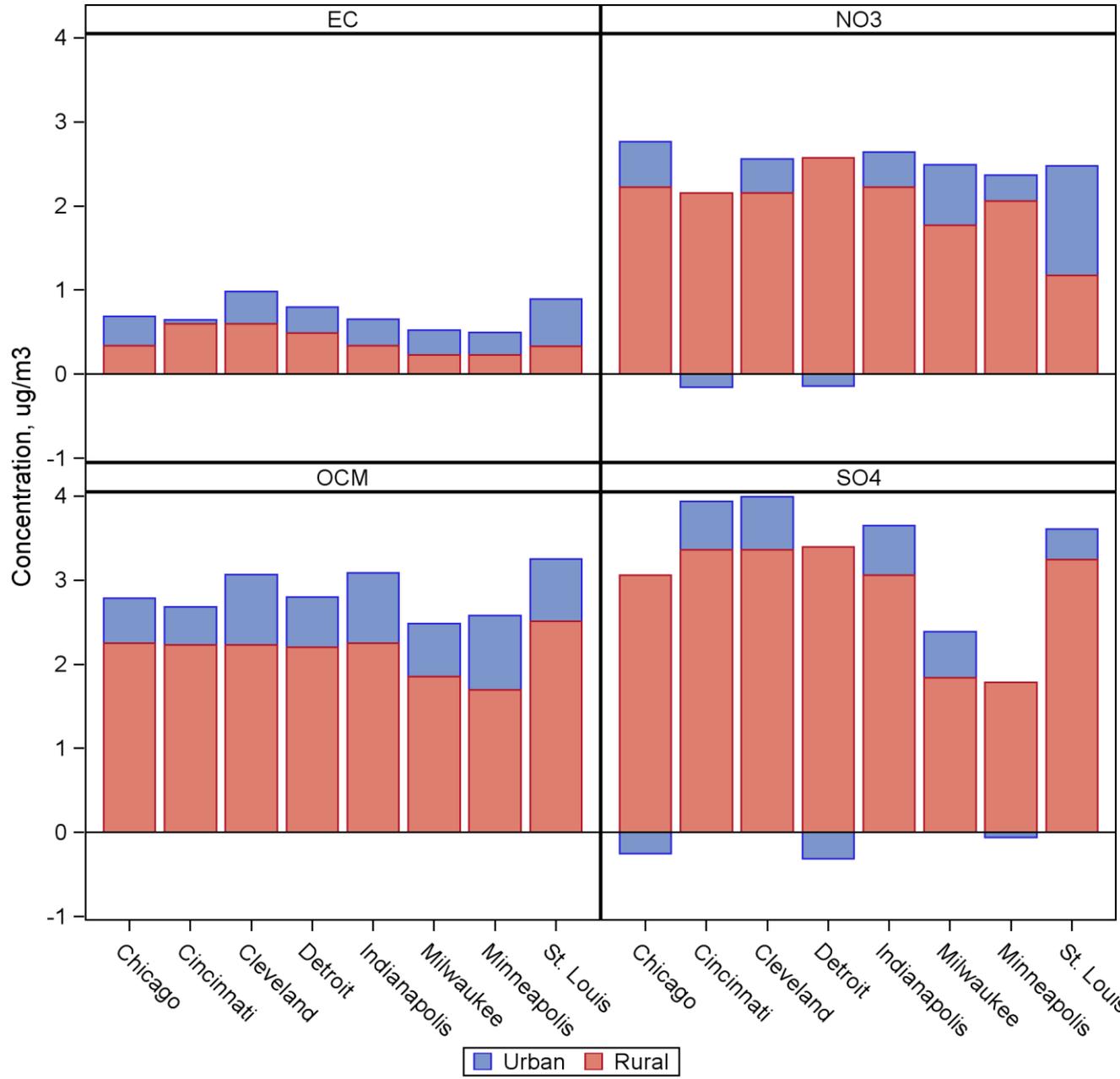


Each color indicates a cluster. Eight are shown.

# Urban/Rural Pairs Analysis

	<b>Ozone</b>				
	Upwind Site	Low Corr, High Ave Diff?	Distance - Outside CBSA?	Direction - Prevailing Upwind Dir?	Good Site?
Chicago	Braidwood	Y	Y (almost)	Y	Y
St. Louis	Bonne Terre, MO	---	Y	Y	Y
Indianapolis	Plummer	---	Y	Y	Y
Louisville	Elizabethtown, KY	Y	Y	Y	Y
Grand Rapids	Jenison	N	Y	Y	Y
Detroit	Tecumseh	Y	Y	Y	Y
Minneapolis- St.Paul	Mille Lacs	---	Y	N	<b>N</b>
Cincinnati	East Bend, KY	Y	Y (almost)	Y	Y
Columbus	Madison Co.	Y	Y (almost)	Y	Y

### Speciated Urban Excess in LADCO Cities





# Unmonitored Area Analysis

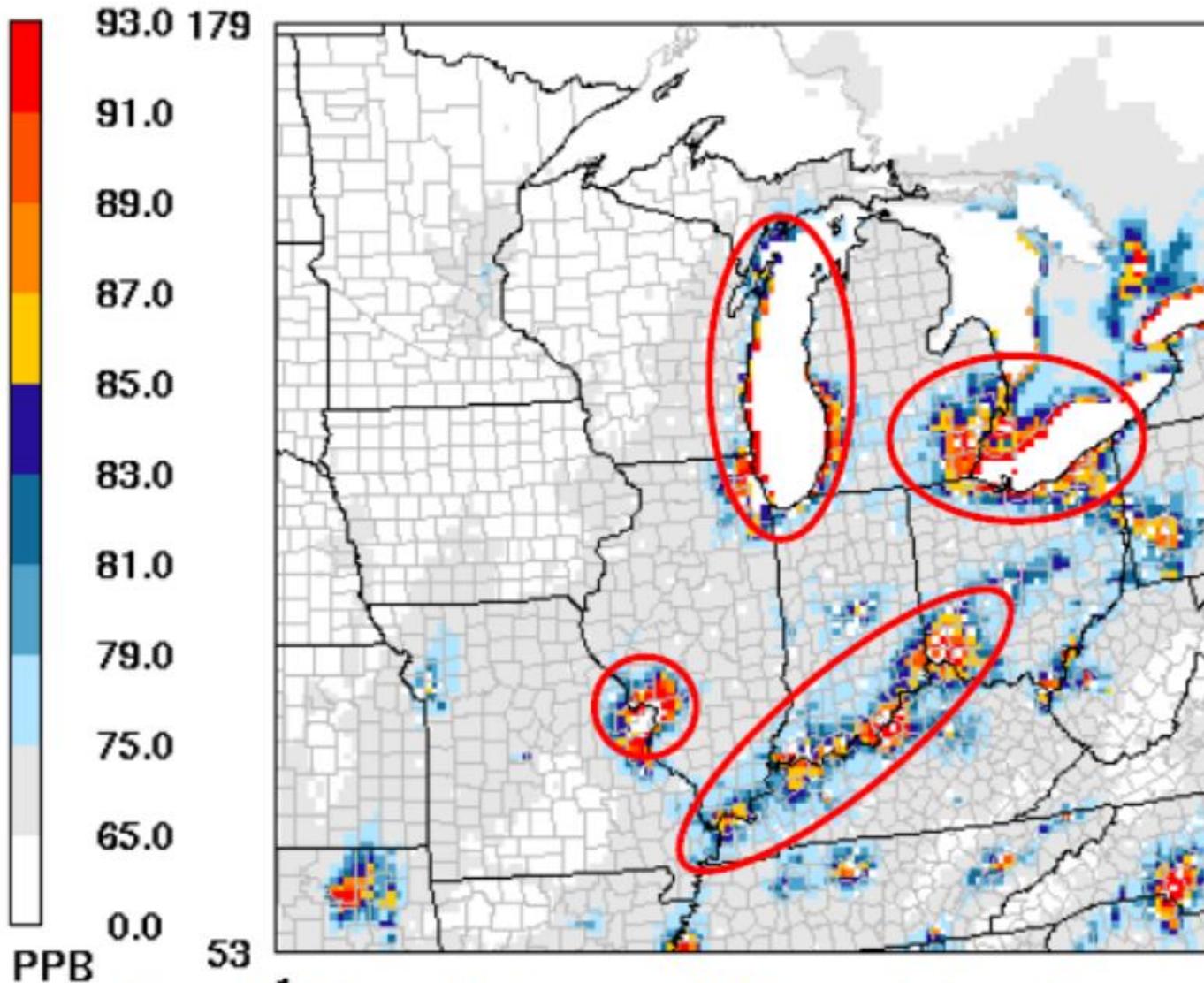
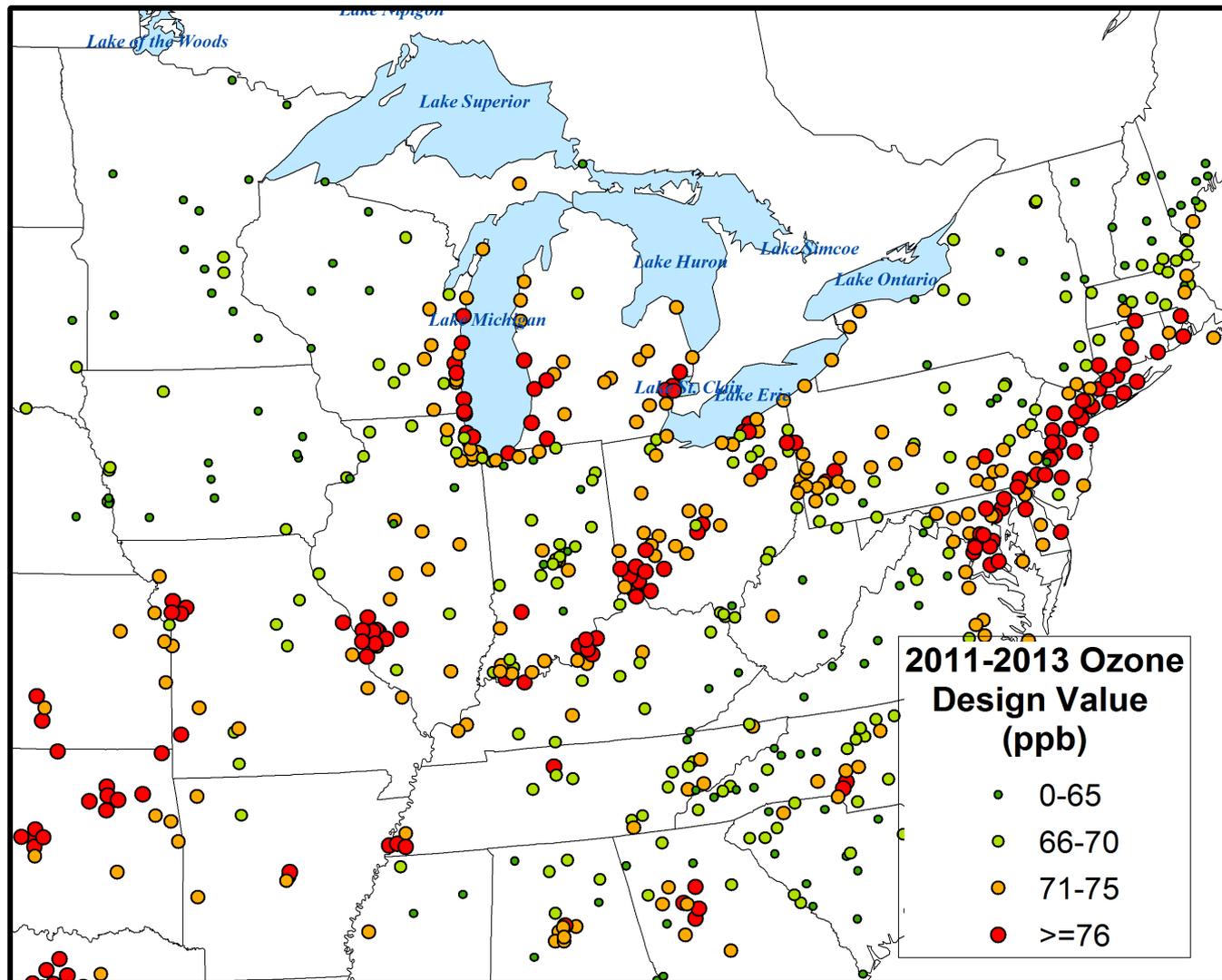


Figure 16. Estimated future year (2012) ozone design values

# Concentration-based Analyses: Design values, Trends, Deviation from NAAQS



# Additional issues to address

- Potential impacts of revisions to NAAQS
- Are we in compliance with all new regulations (NCORE, SO<sub>2</sub>, NO<sub>2</sub> roadside)
- Need for PAMS in additional urban areas, especially if/when O<sub>3</sub> NAAQS is revised downward
- Tribal monitors, in or out?
- Cost: compare current costs (capital and operating) to estimated future costs and grant allocations; can states meet all requirements with expected funding?
- Pressures on states from special monitoring projects: fracking, sand mining, school toxics, etc.

# More issues/lessons learned

- Conflicts between regulatory requirements, technical assessment, and financial realities: how can we disinvest when assessment conflicts with regulations?
- States need to establish a dialogue with EPA (beyond the monitoring community) to find consensus on how to address conflicts.
- CFR does not define any feedback loop for assessments; no approval/disapproval mechanism

**QUESTIONS?**