



Minnesota
Pollution
Control
Agency

Statewide Air Monitoring: Coverage and Gaps



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February 2008

MPCA Air Monitoring

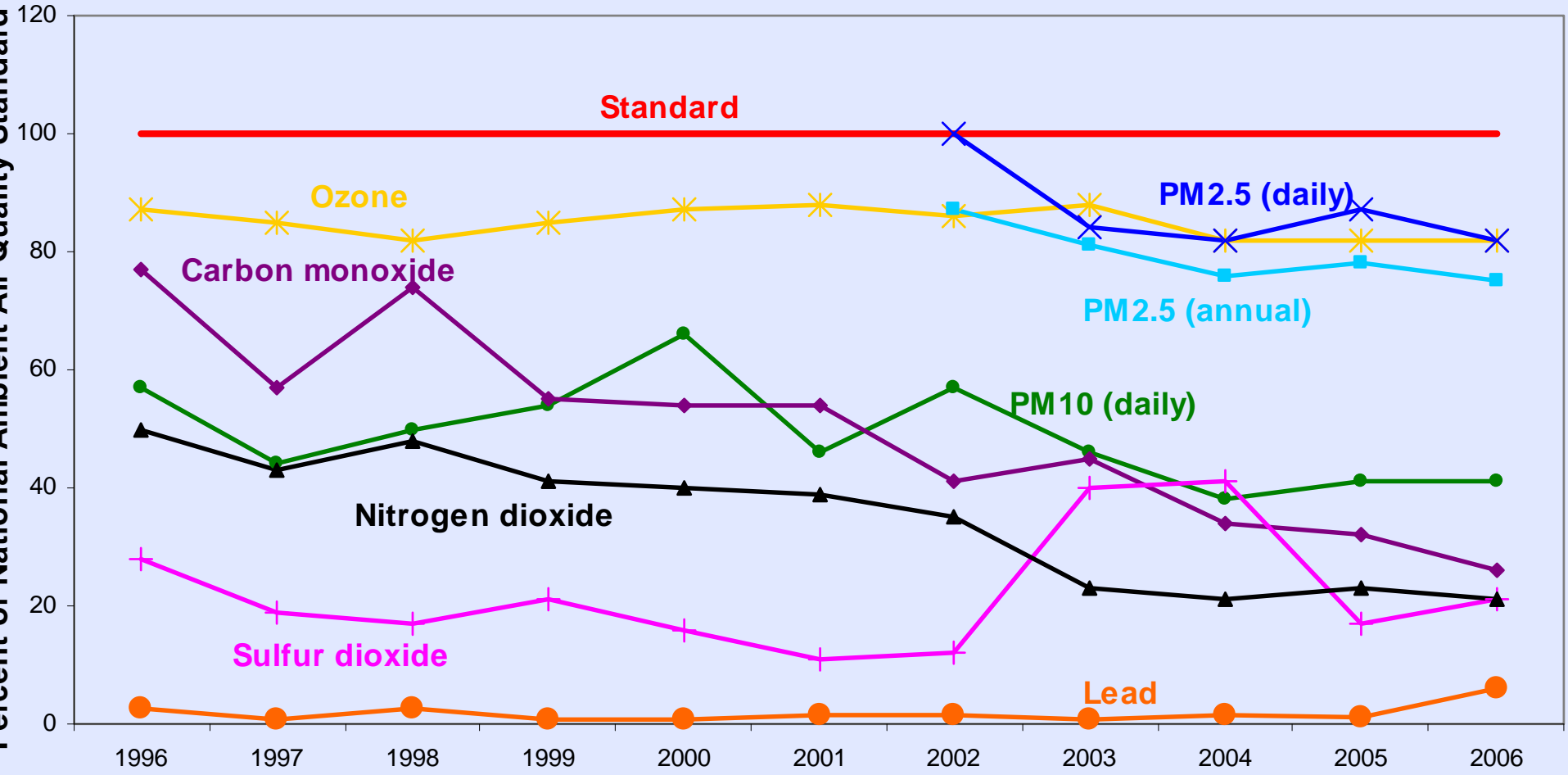


- Criteria pollutants (pollutants with standards)
- Air toxics
- Special studies

Criteria Pollutants

- Included in the Clean Air Act due to concerns regarding
 - Health
 - Environment
 - Property Damage
- Have National Ambient Air Quality Standards.
- Monitoring mandated by and often funded by the U.S. EPA.
- Used to calculate the Air Quality Index (AQI).

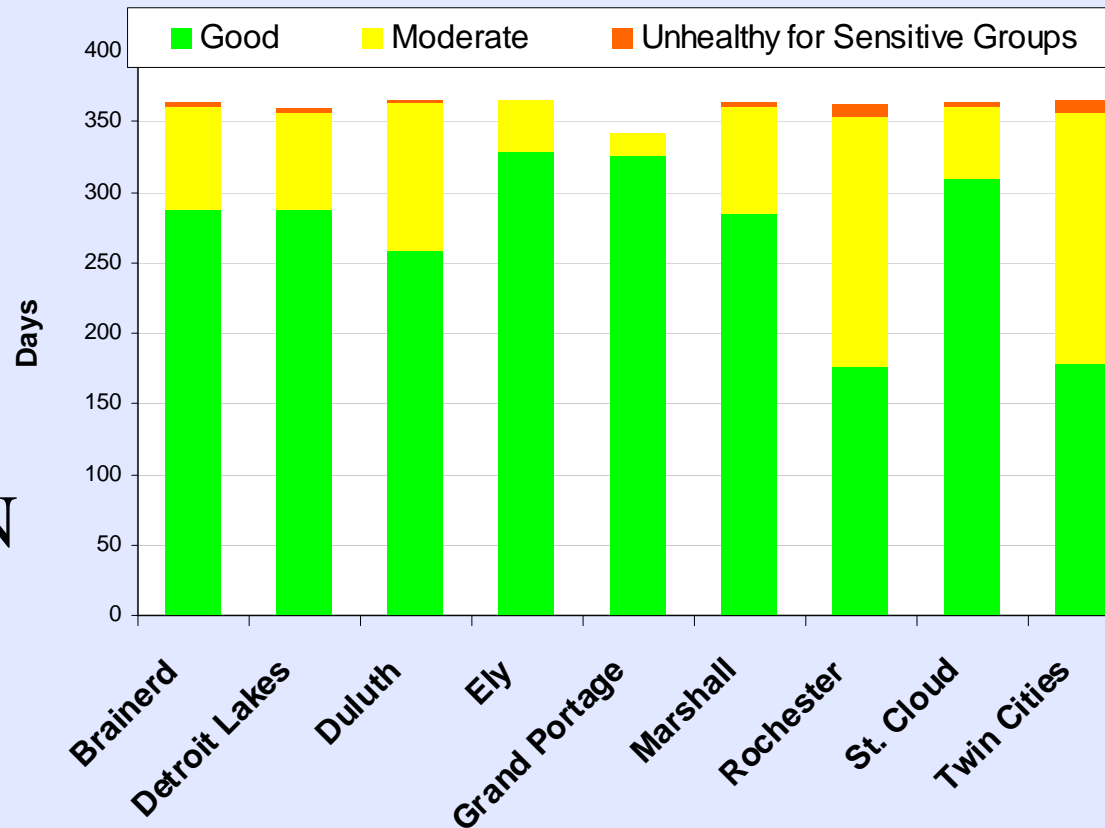
Trends in Key Air Pollutants in Twin Cities 1996-2006



Air Quality Index

- Reports daily air quality conditions
- Calculated from
 - ozone
 - sulfur dioxide
 - carbon monoxide
 - fine particles (PM_{2.5})
- Mainly driven in MN by ozone and PM_{2.5}

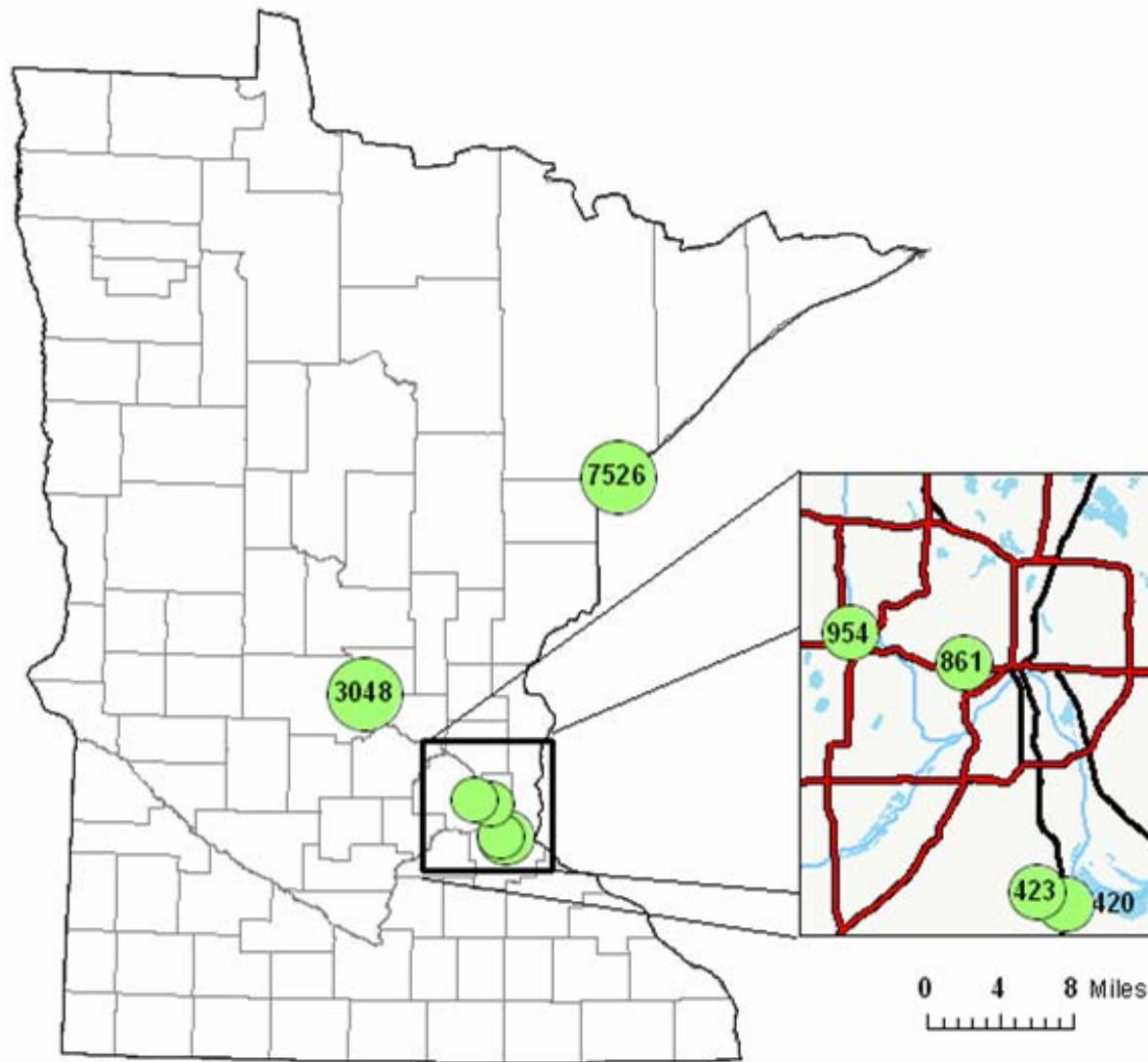
AQI Days for Cities in Minnesota, 2007



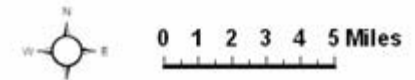
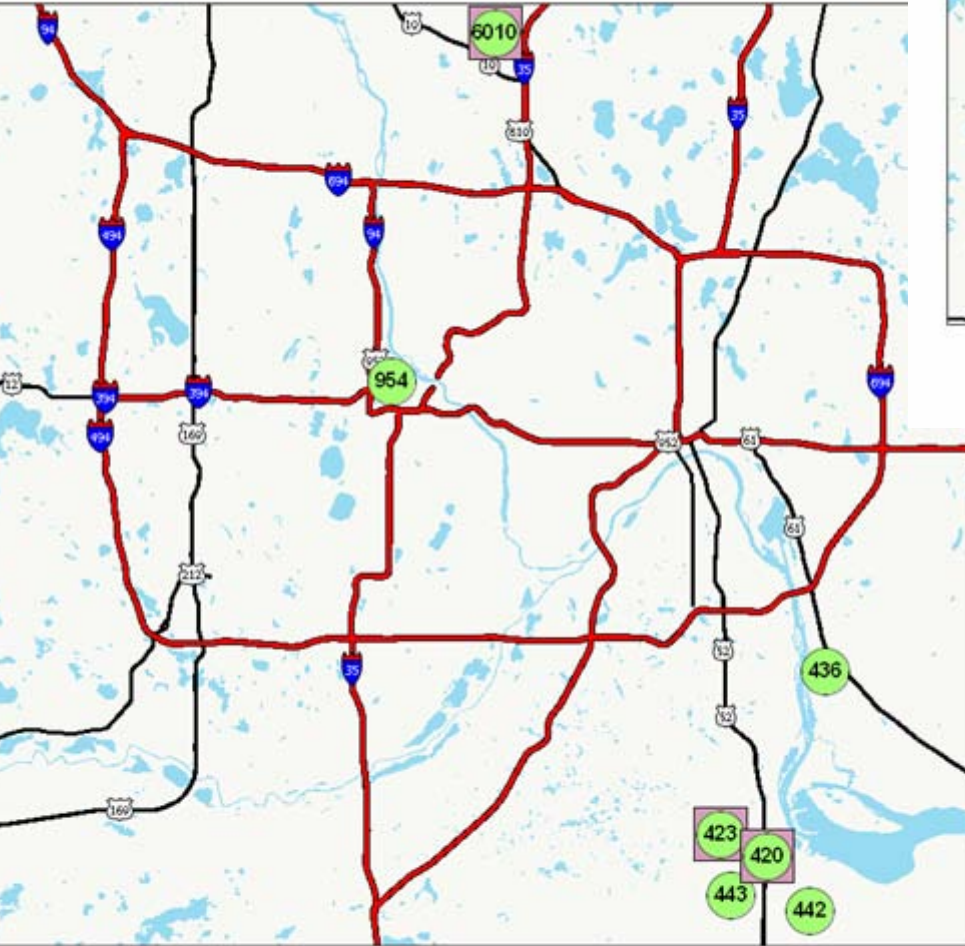
Criteria Pollutants well below standards

- CO, NO_x, SO₂, Lead & PM₁₀
- Fewer monitoring sites needed to show compliance with standards
- Less funding for monitoring sites

CO Sites in Minnesota



NOx and SO2 Sites in the Twin Cities Metro Area



**Criteria Pollutants
well below standards**

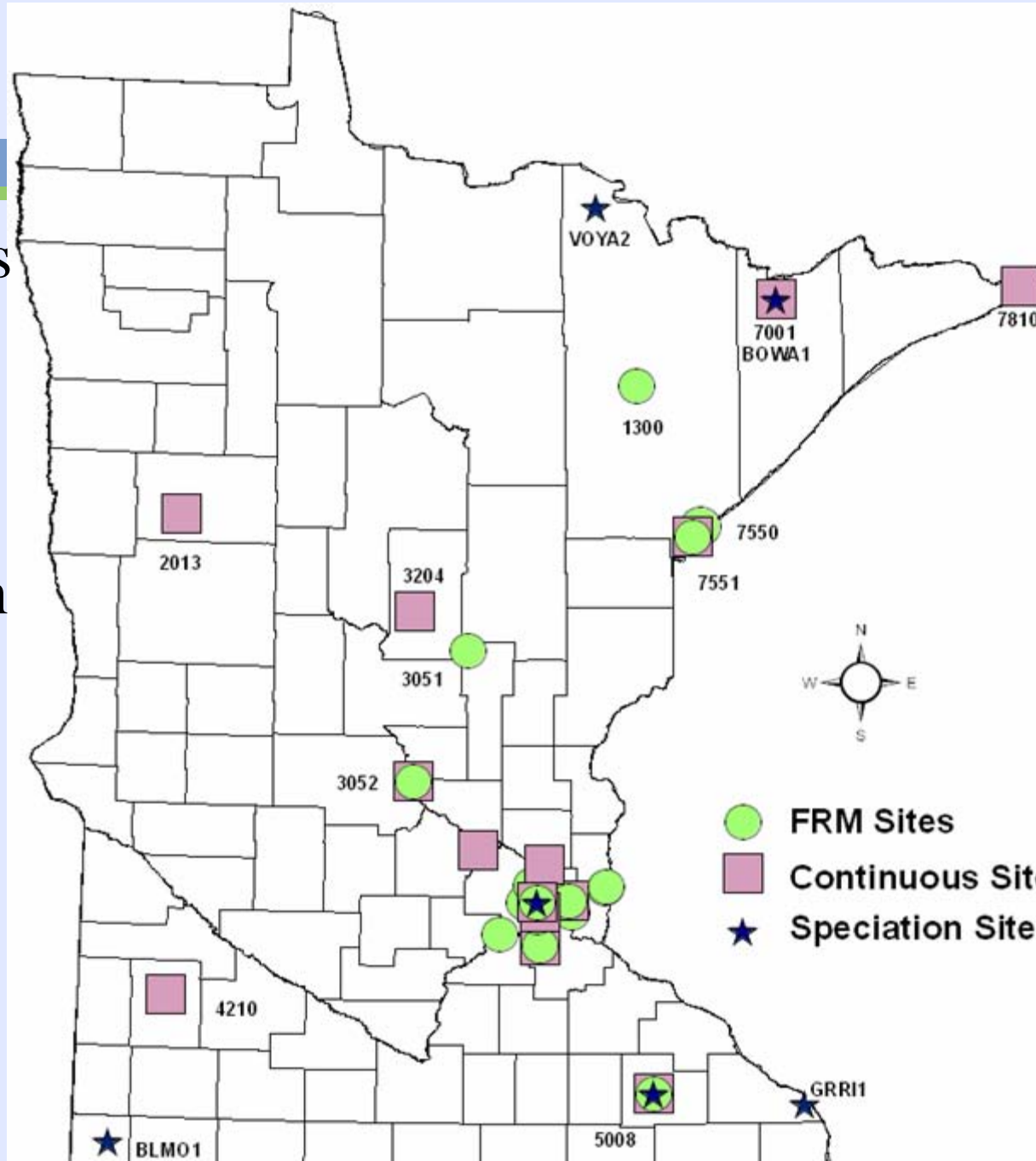
Fine Particles

Particles <2.5 microns in diameter

Contain a complex mixture of chemicals

Exposure can result in serious heart & lung effects including premature death

Filter, continuous & speciation monitoring

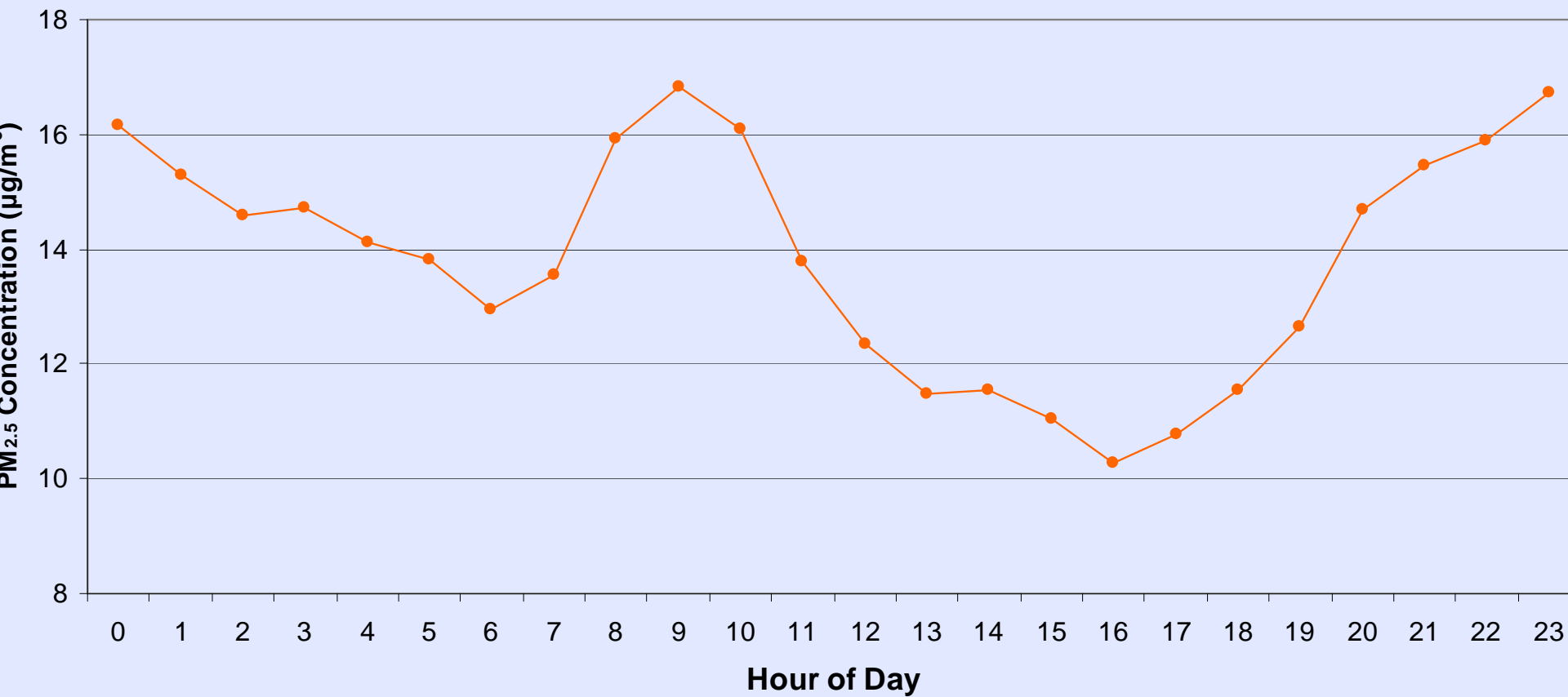


Minnesota PM_{2.5} FRM Concentrations Compared to Annual Standard 2004-2006



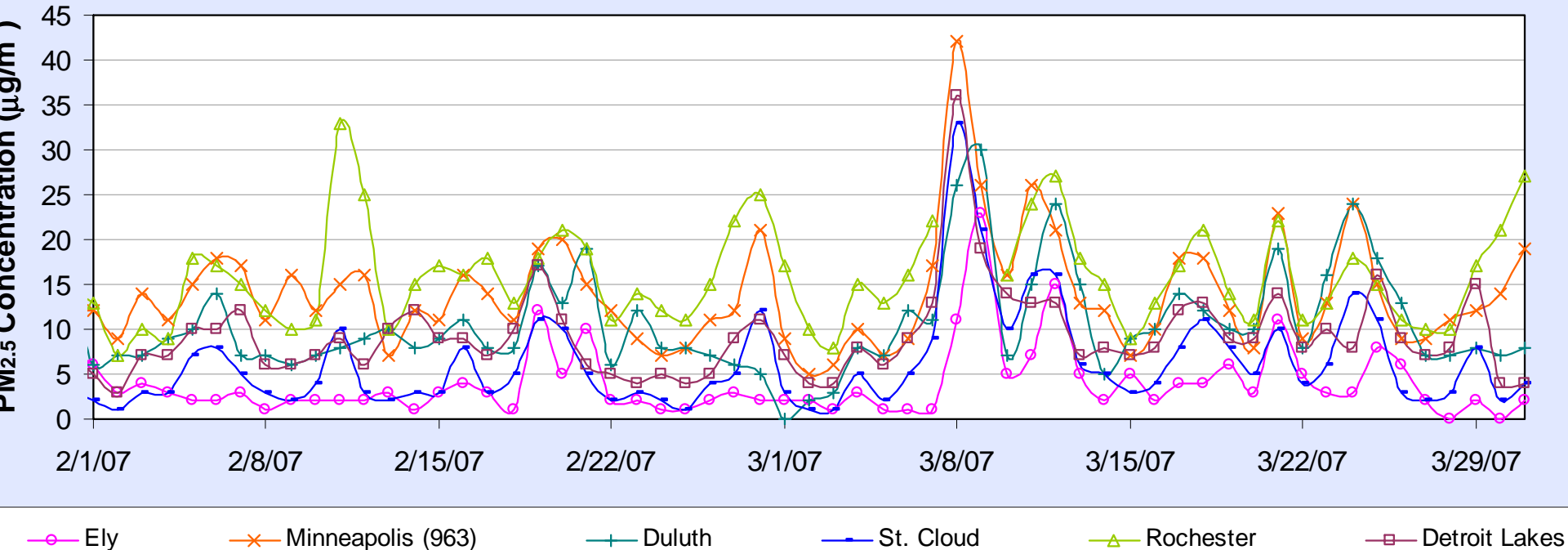
PM_{2.5} Continuous Data

PM_{2.5} Average Hourly Concentrations in Minneapolis from February to March 2007

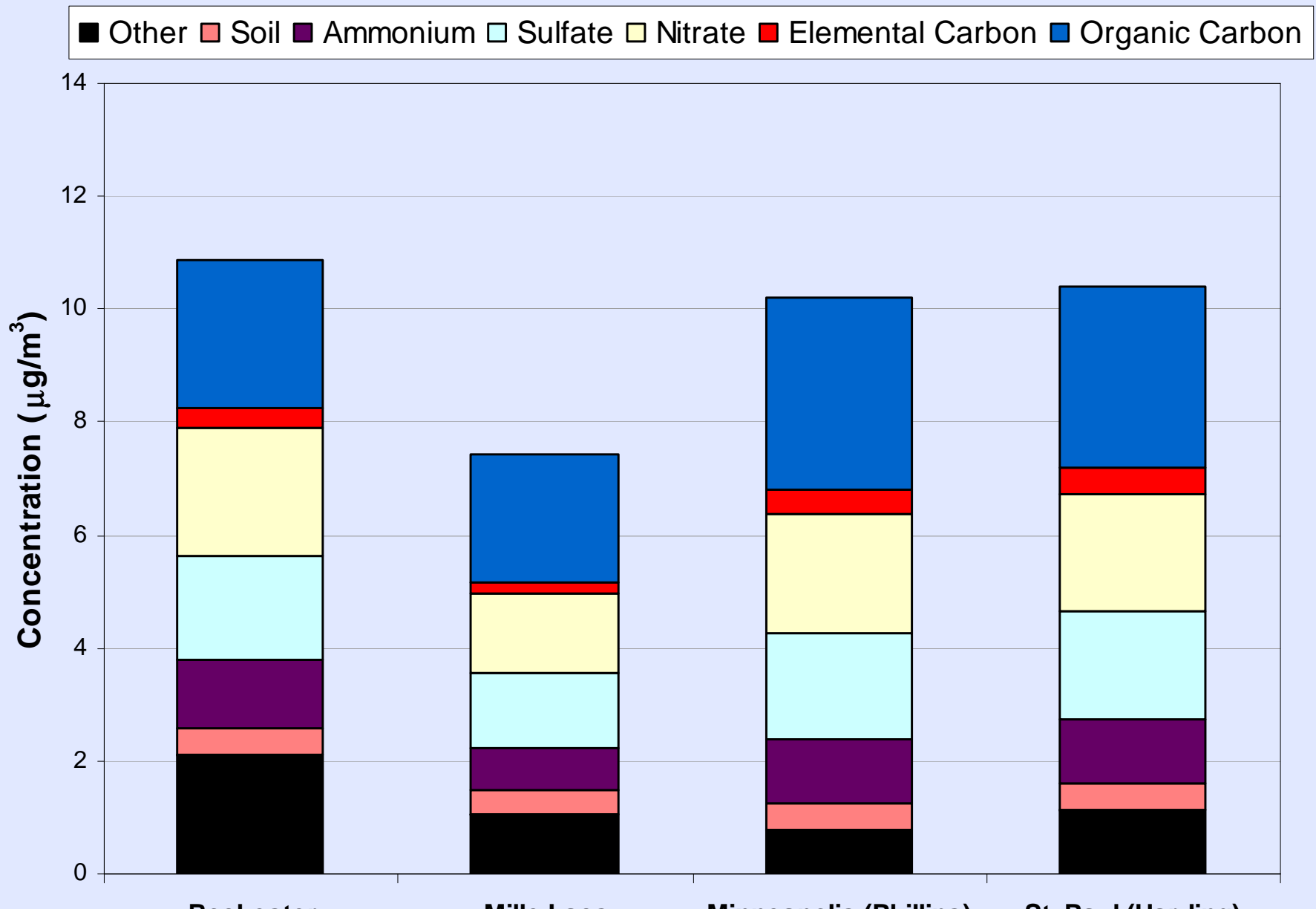


PM_{2.5} Continuous Data

**BAM Concentrations in Minnesota
February - March 2007**



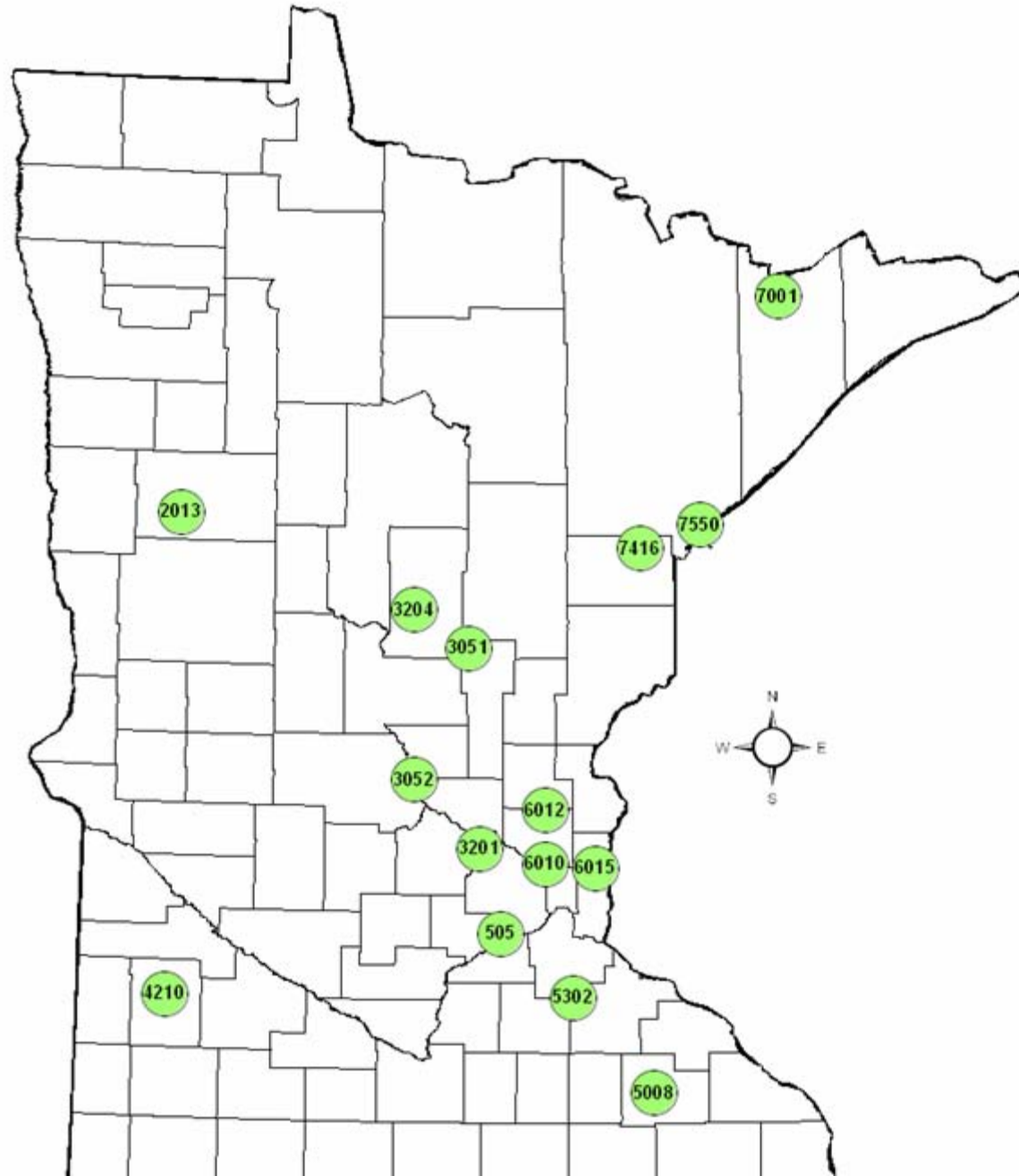
PM_{2.5} Speciation Data



Ozone

- Formed from a reaction between NO_x and VOCs.
- Exposure results in respiratory concerns
- Only a concern in the summer.
- Monitor from April-October
- New standard will be proposed in March

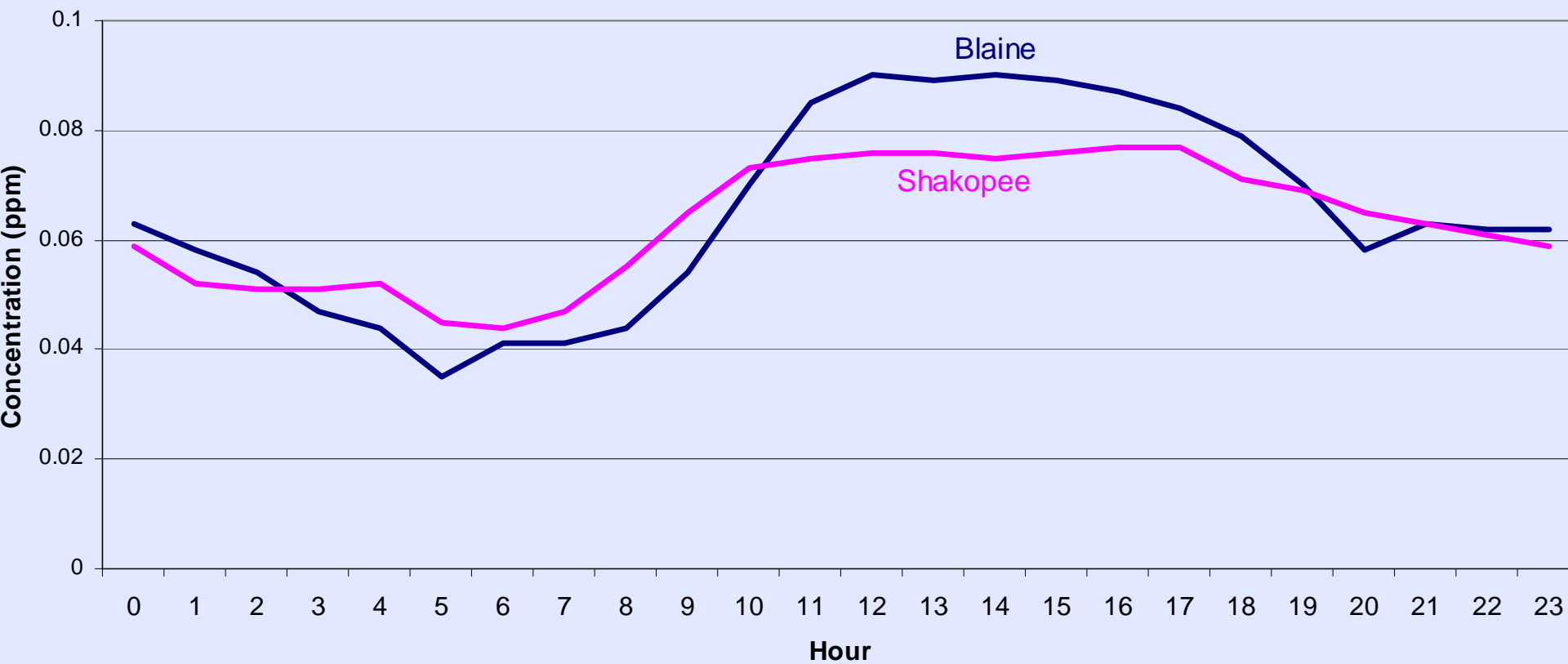
Ozone Sites in Minnesota



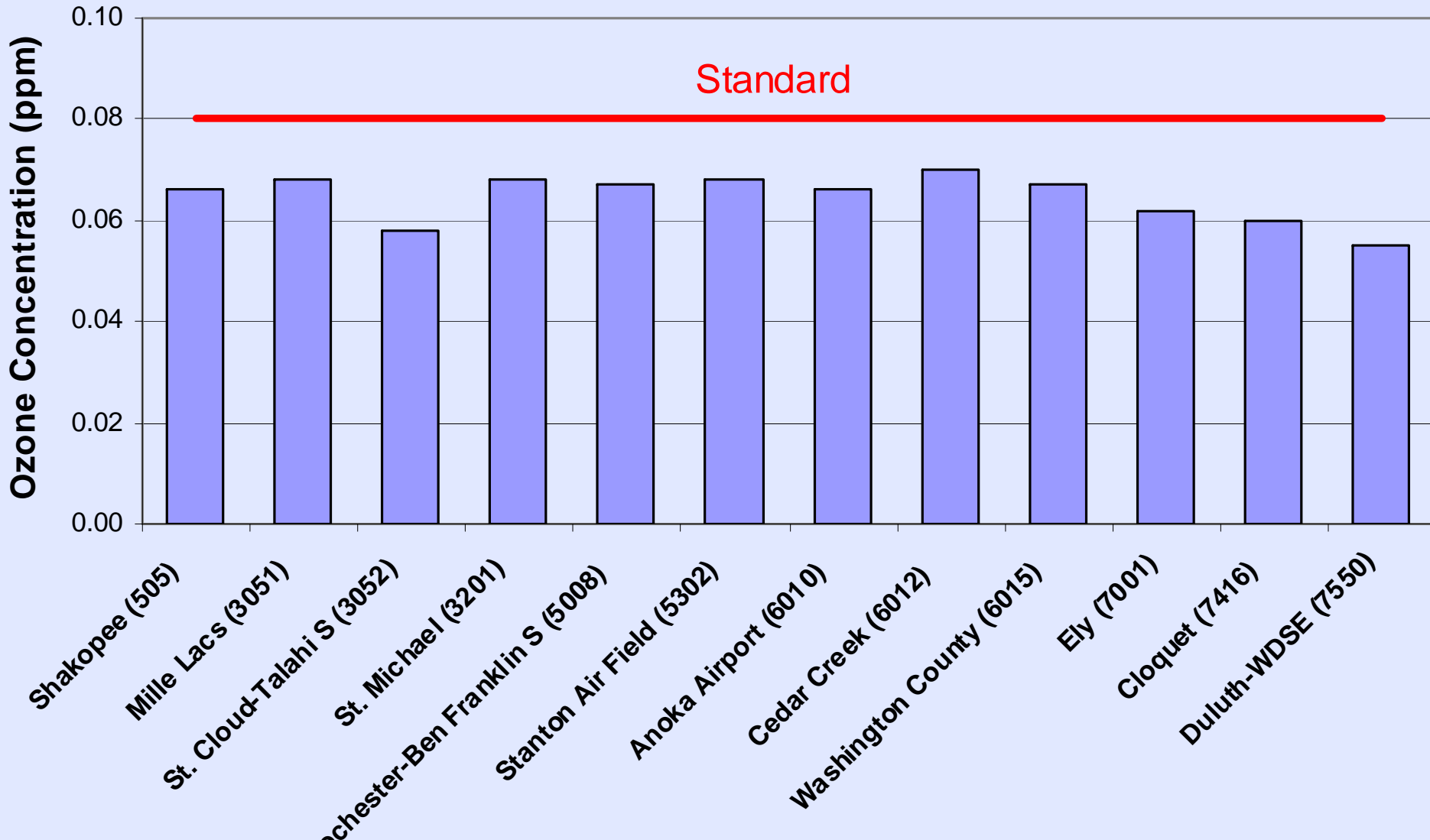
Ozone Data

Hourly Ozone

(June 13, 2007)



Minnesota Ozone Concentrations Compared to Standard 2004-2006

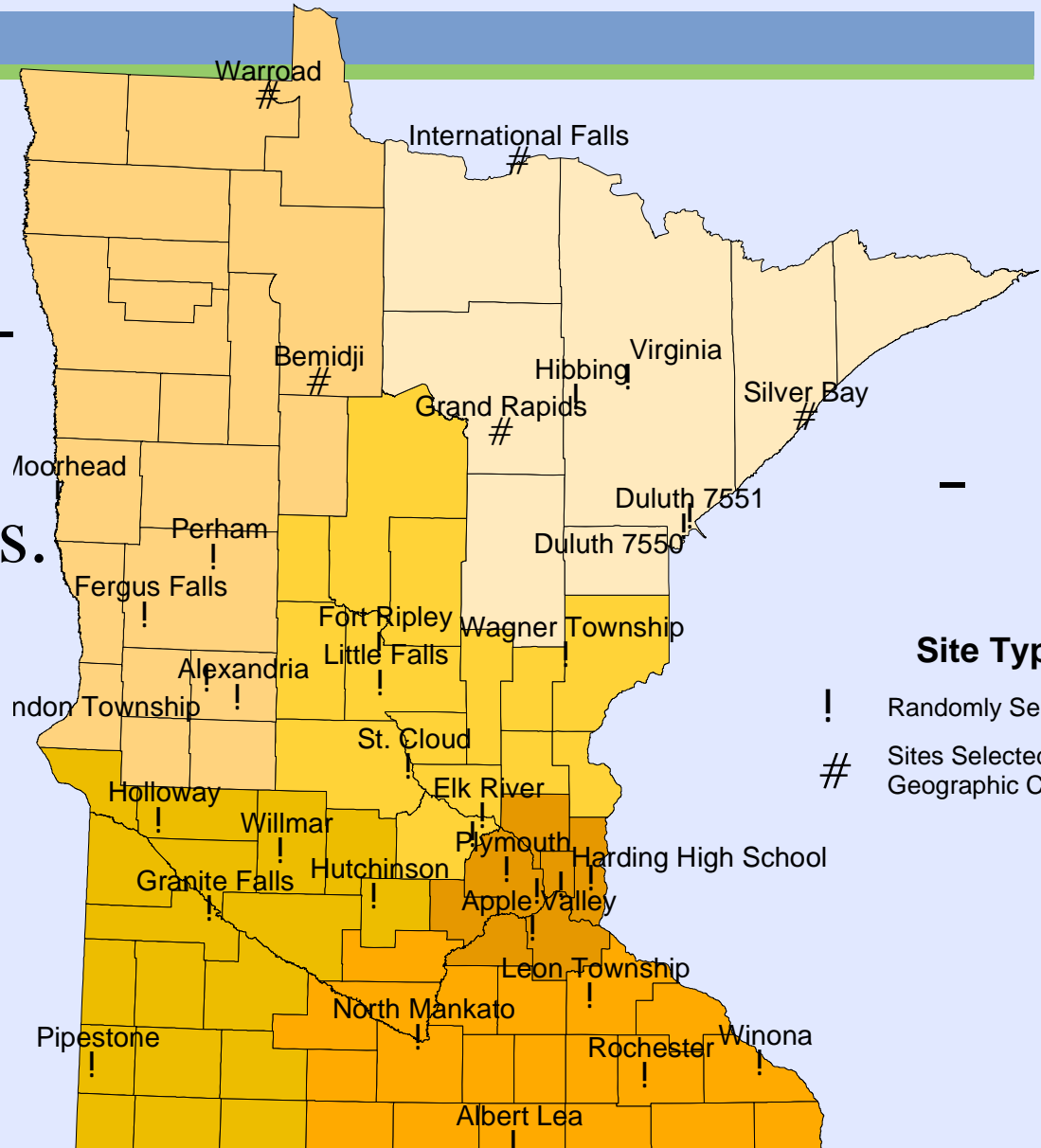


Air Toxics

- Pollutants that may cause serious health effects, but do not have standards.
- Include
 - Volatile organic compounds (VOCs)
 - Carbonyls
 - Metals
- Health benchmarks, not standards
- Limited federal funding for monitoring

Statewide Air Toxics Study

- 5 year study (1996-2001)
- 35 monitoring sites.
- 7 sites per year
- 37 VOCs
- 7 carbonyls
- 30 metals



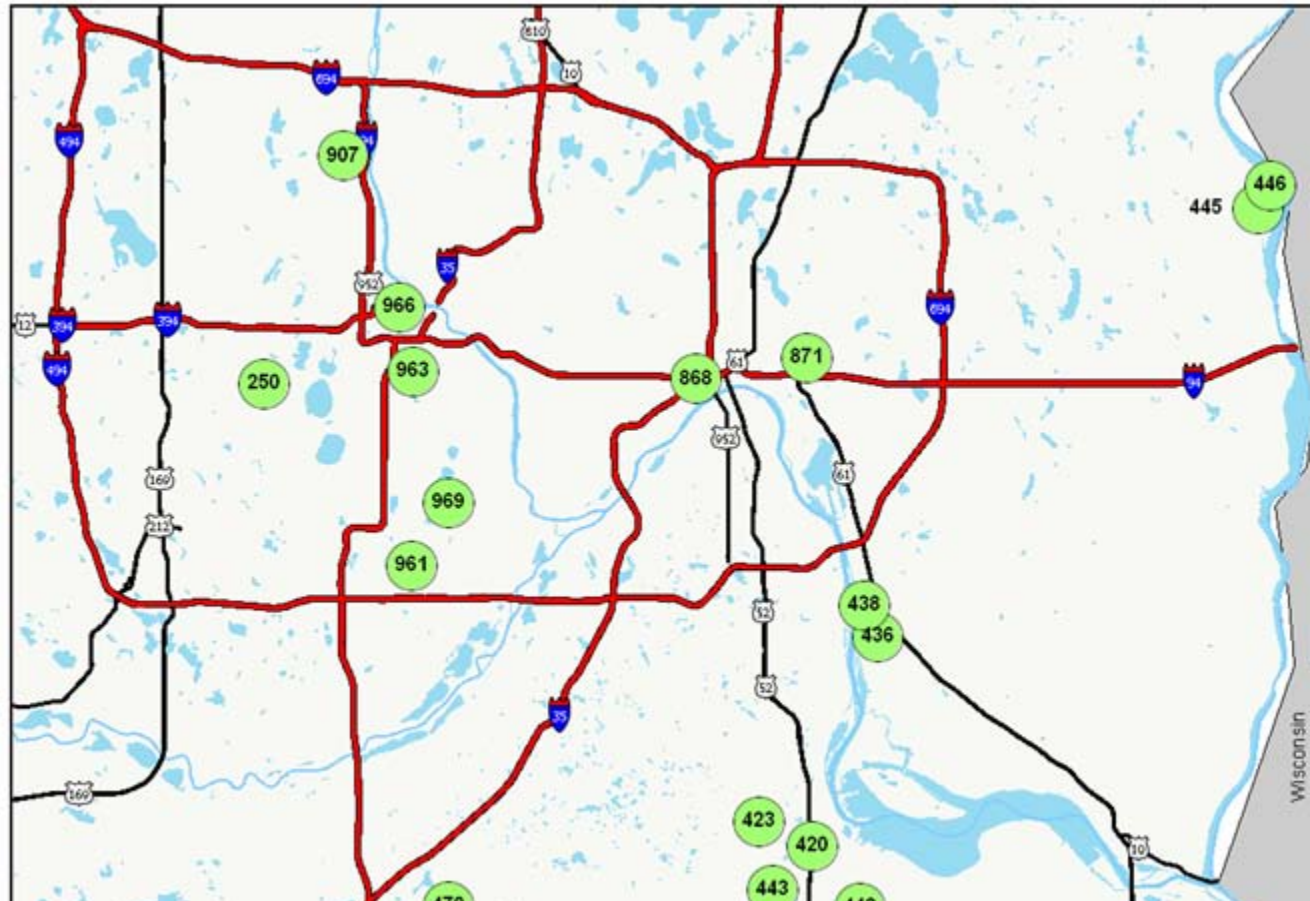
Current Air Toxics Monitoring

Monitoring in the
Twin Cities & Duluth

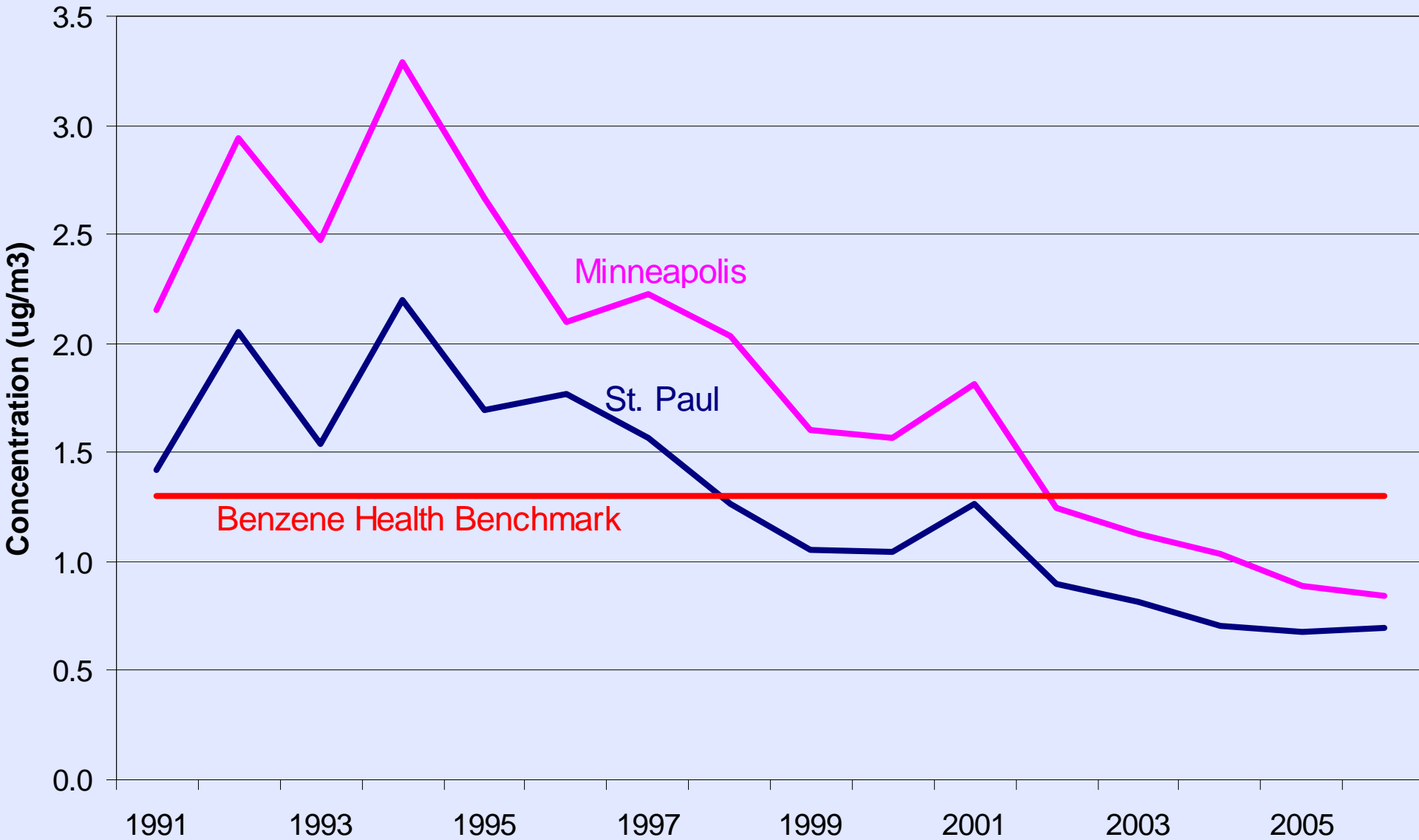
56 VOCs

7 Carbonyls

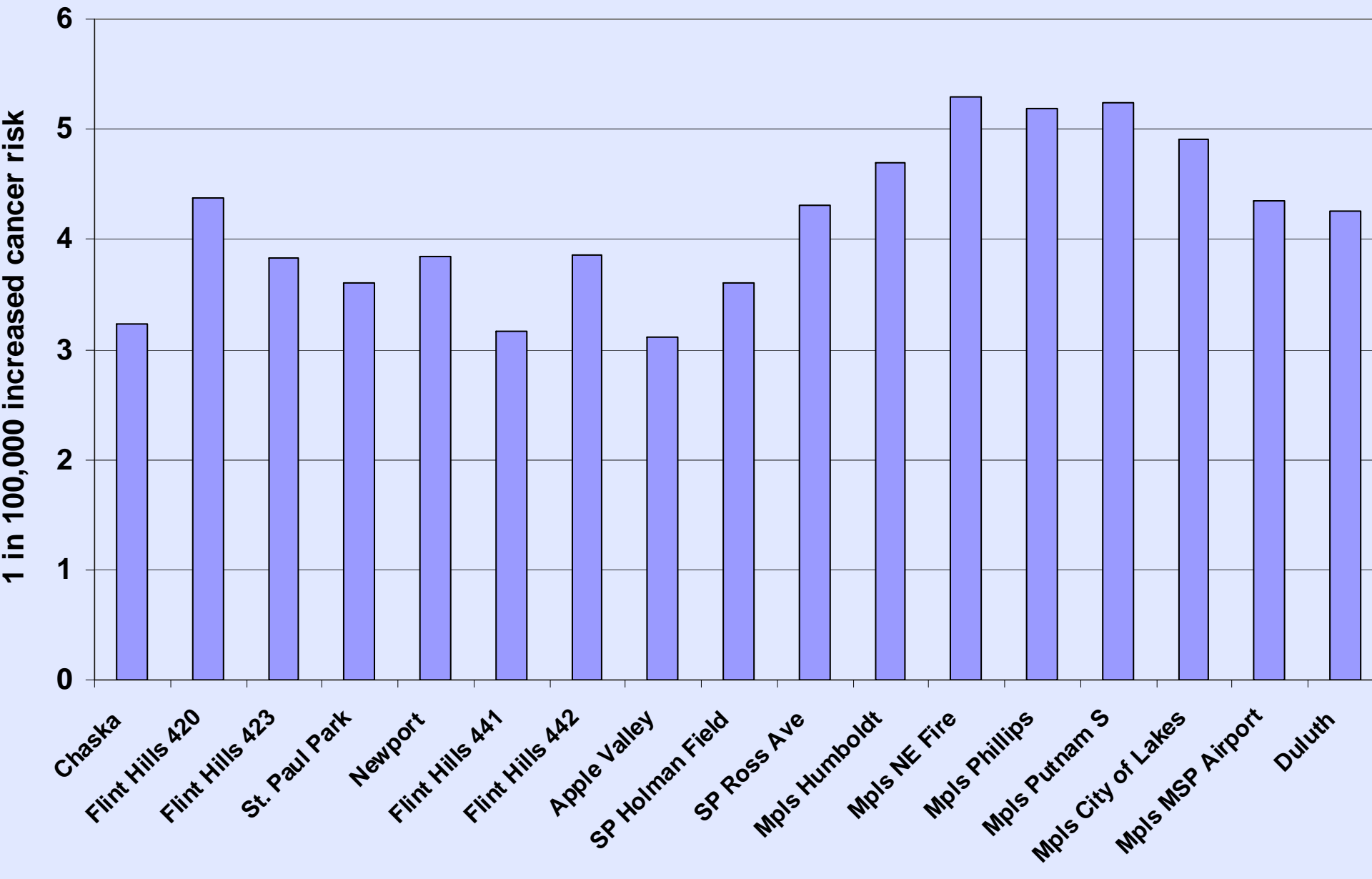
15 Metals



Benzene Trends

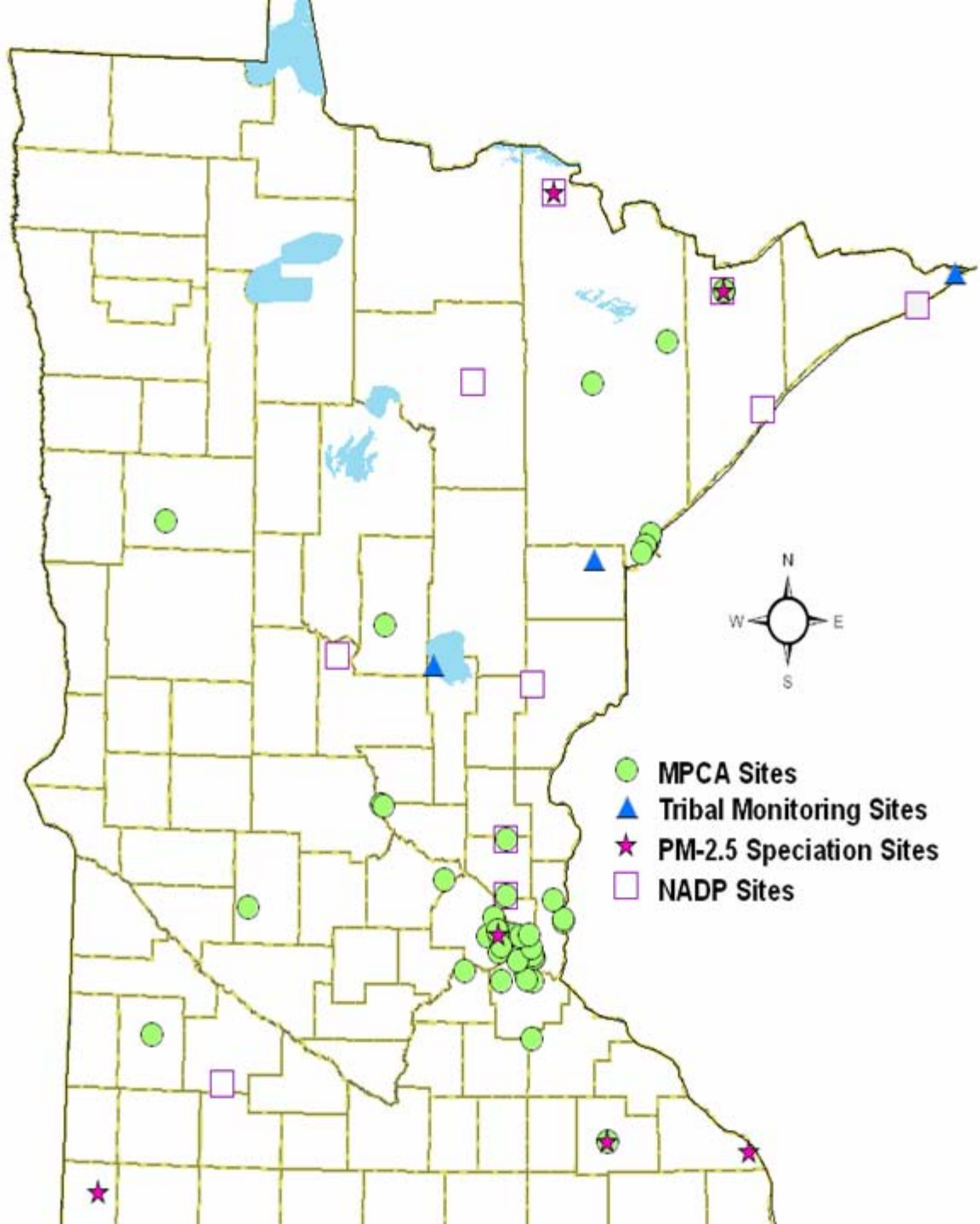


Inhalation Cancer Risk (2003-2006)



Special Studies

- Acid deposition
- Mercury deposition
- Ammonia
- Fibers
- Black carbon
- Hydrogen sulfide
- Total reduced sulfur
- Meteorological data
- Perflurochemicals
- Visibility



MPCA Air Quality Monitoring in Minnesota

MPCA Monitoring Coverage and Gaps

Coverage

- Demonstrates compliance with standards
- Reasonable coverage of metro area for
 - PM_{2.5}, ozone, air toxics
- Some coverage of greater MN
 - PM_{2.5} & Ozone
- Flexibility for special studies

Gaps

- List of air toxics
- Air toxics monitoring outside of metro
- Limited to 24 hour averages for air toxics
- Semivolatile pollutants
 - PAHs, Dioxins/Furans etc.
- Background data
- Hot spots

More Information

**Annual
Air Monitoring Network Plan
for the State of Minnesota**

2008



Minnesota Pollution Control Agency

- Annual Air Monitoring Network Plan
- Provides details on MPCA monitoring in Minnesota

<http://www.pca.state.mn.us/air/monitoringnetwork.html>

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