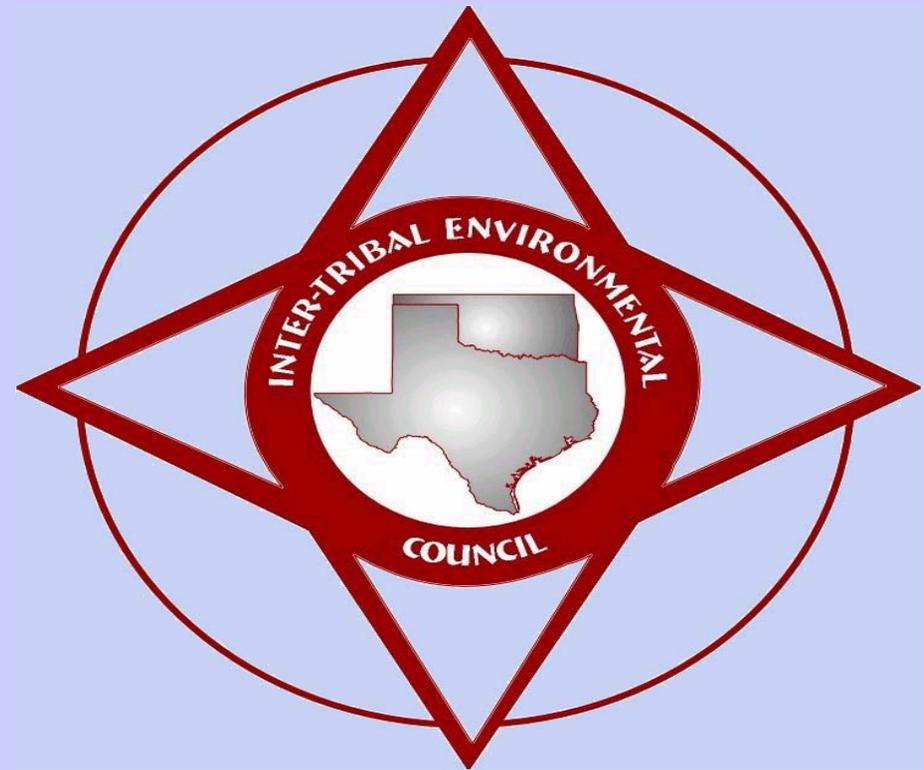


Inter-Tribal Environmental Council (ITEC)

Clean Air Projects
1997-2003



CAA 103 Funding

Clean Air GIS Pilot	FY 97-99	\$ 227,228
Clean Air GIS	FY 97-00	\$ 648,500
Source Inventories	FY 98-00	\$ 302,826
Criteria Air Monitoring	FY 98-01	\$1,274,943
PM2.5 Air Monitoring	FY 99-01	\$ 277,591
Criteria Air Monitoring	FY02-03	<u>\$1,102,149</u>
		\$3,833,237

Clean Air Personnel

Dwayne Beavers

Director

Ryan Callison

Environmental Specialist III

Glenn Gehring

Environmental Specialist II

Jack Butler

Environmental Specialist II

John Sparkman

Environmental Specialist II

David Justice

Environmental Specialist I

Accomplishments

- GIS mapping of tribal trust lands
- Inventory of stationary & air major/minor sources
- Criteria & meteorological monitoring for 3 tribes
- PM2.5 monitoring for 8 tribes
- Quarterly instrument audits
- National Monitoring Networks : IMPROVE & CASTNet sites
- Passive ozone monitoring for 3 tribes
- National Mercury Deposition Monitoring

Organization Participation

- Tribal Air Monitoring Service (TAMS) Center Steering Committee, EPA/ITEP
- National Tribal Air Association (NTAA) Bylaw Workgroup, NTEC, Region VI representative
- National Monitoring Strategy Workgroup, EPA OAQPS, CenRAP Monitoring Workgroup, Regional Planning Organization

Awards

- U.S.EPA Regional Administrator's Environmental Excellence Award (1997)
- U.S.EPA Regional Administrator's Environmental Excellence Award ,
"Exemplary Efforts in Air Monitoring: Implementing One of the Nation's
Leading Tribal Air Quality Monitoring Programs" (2000)

Training & Instruction

Developed & Offered by ITEC/OES to ITEC Member Tribes

- “GIS/GPS/ArcView” Instructor; Ryan Callison.
- “PM2.5 Program Management” Instructor; Dwayne Beavers
- “PM2.5 Data Validation” Instructor; Dwayne Beavers.
- “AIRS AQS” Instructors; Ryan Callison & John Sparkman.
- “Major/Minor Source Inventories” Instructor; Glen Gehring
- “Permitting” Instructor; Glen Gehring



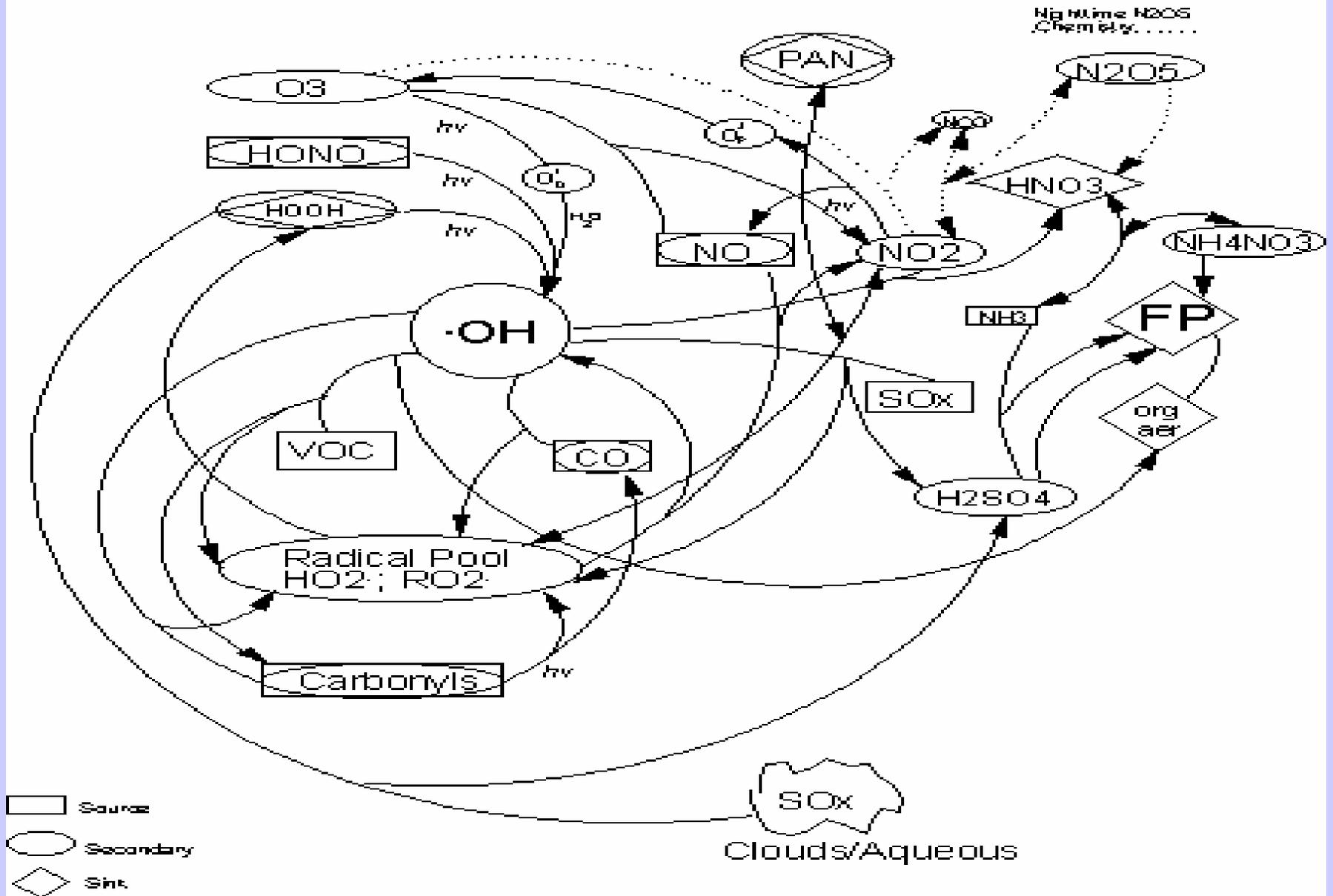
Based on the Clean Air Act the U.S. EPA has set National Ambient Air Quality Standards (NAAQS) to insure that our air quality is good or able to protect the most sensitive human population.....

There are NAAQS set for ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide and lead.

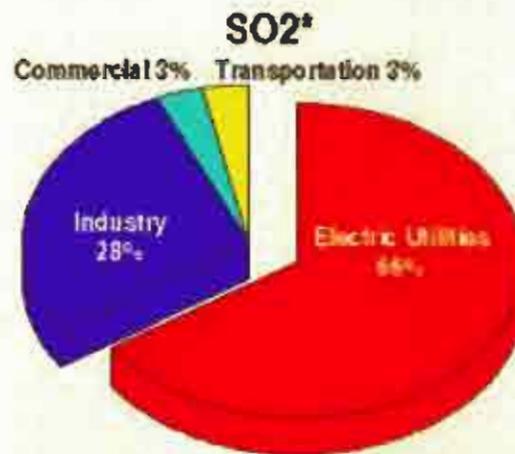
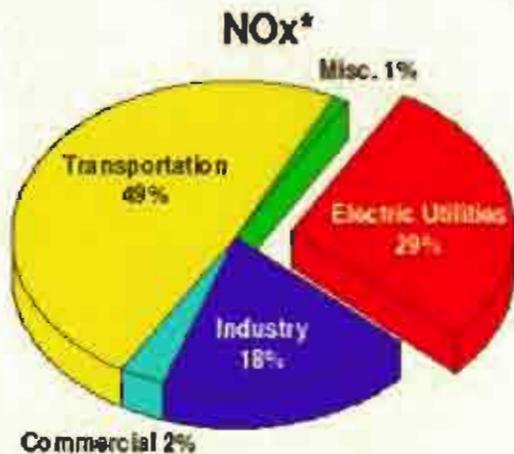
There are NAAQS being proposed for some hazardous air pollutants.

In order to determine if the NAAQS are being met, tribes, municipalities, states, and federal agencies conduct ambient (outside) air monitoring.

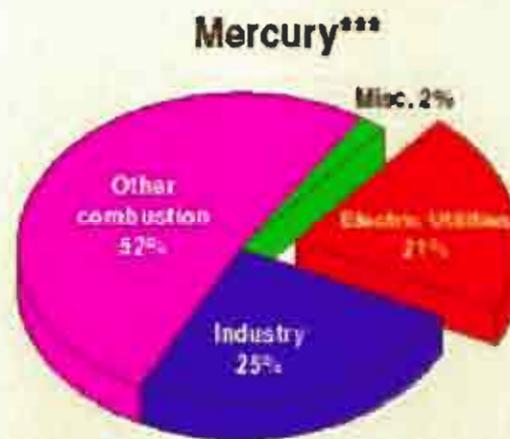
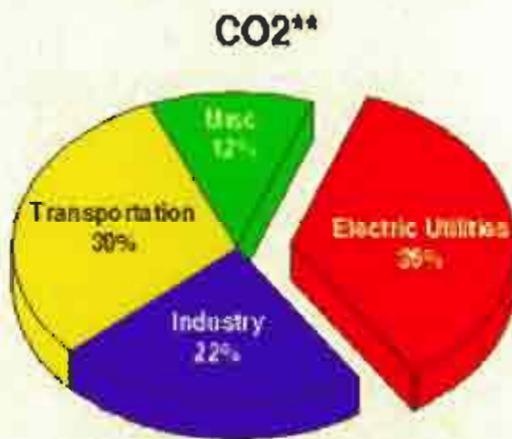
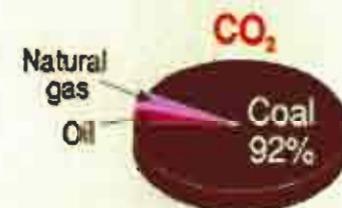
Gas & Aerosol Phase Chemistry of Air Pollutants



Power plants significantly contribute to air pollution in the United States.



Utility Emissions



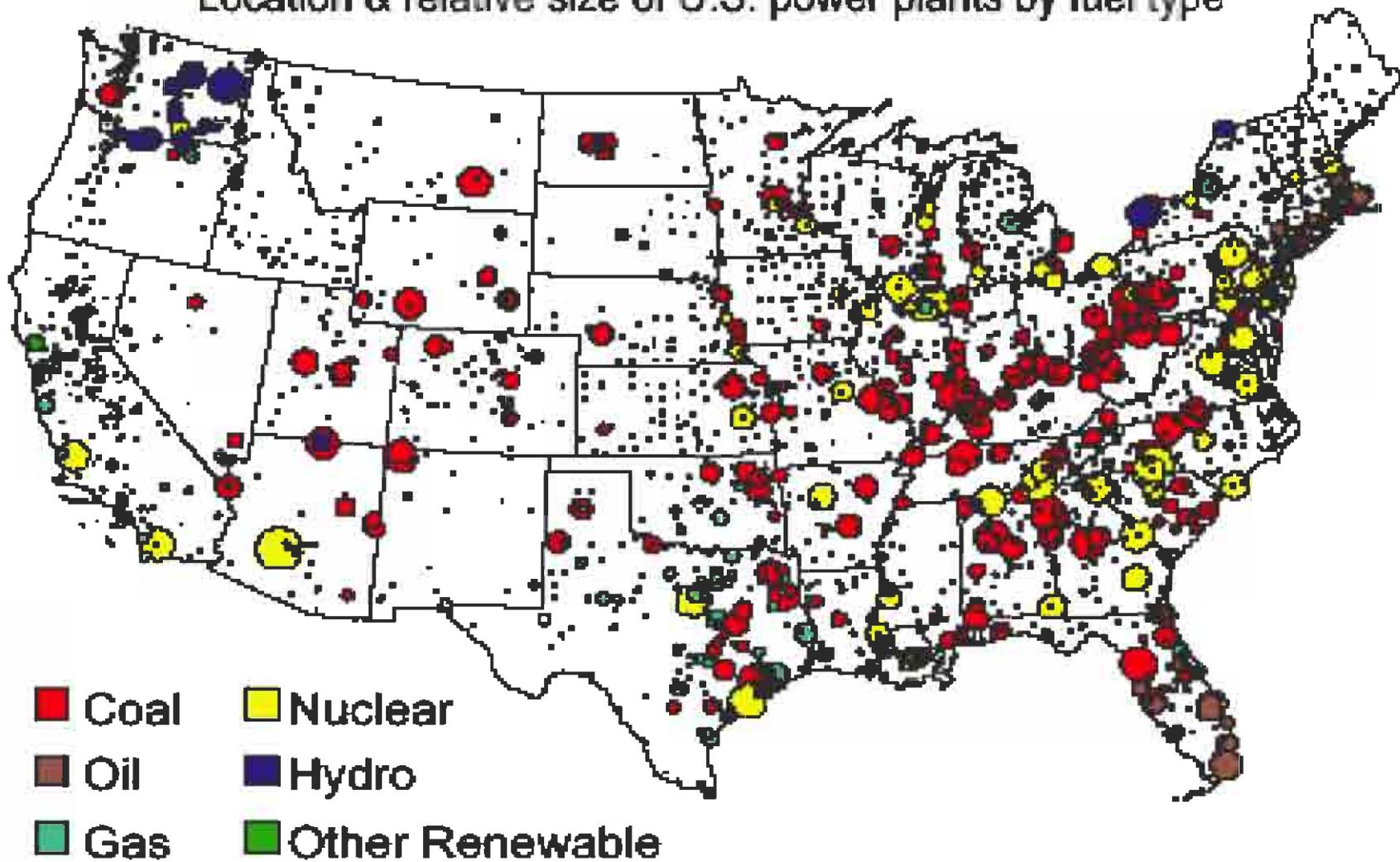
*1995 EPA National Air Pollutant Emissions Trends report.

**1994 EPA National Air Pollutant Emissions Trends report.

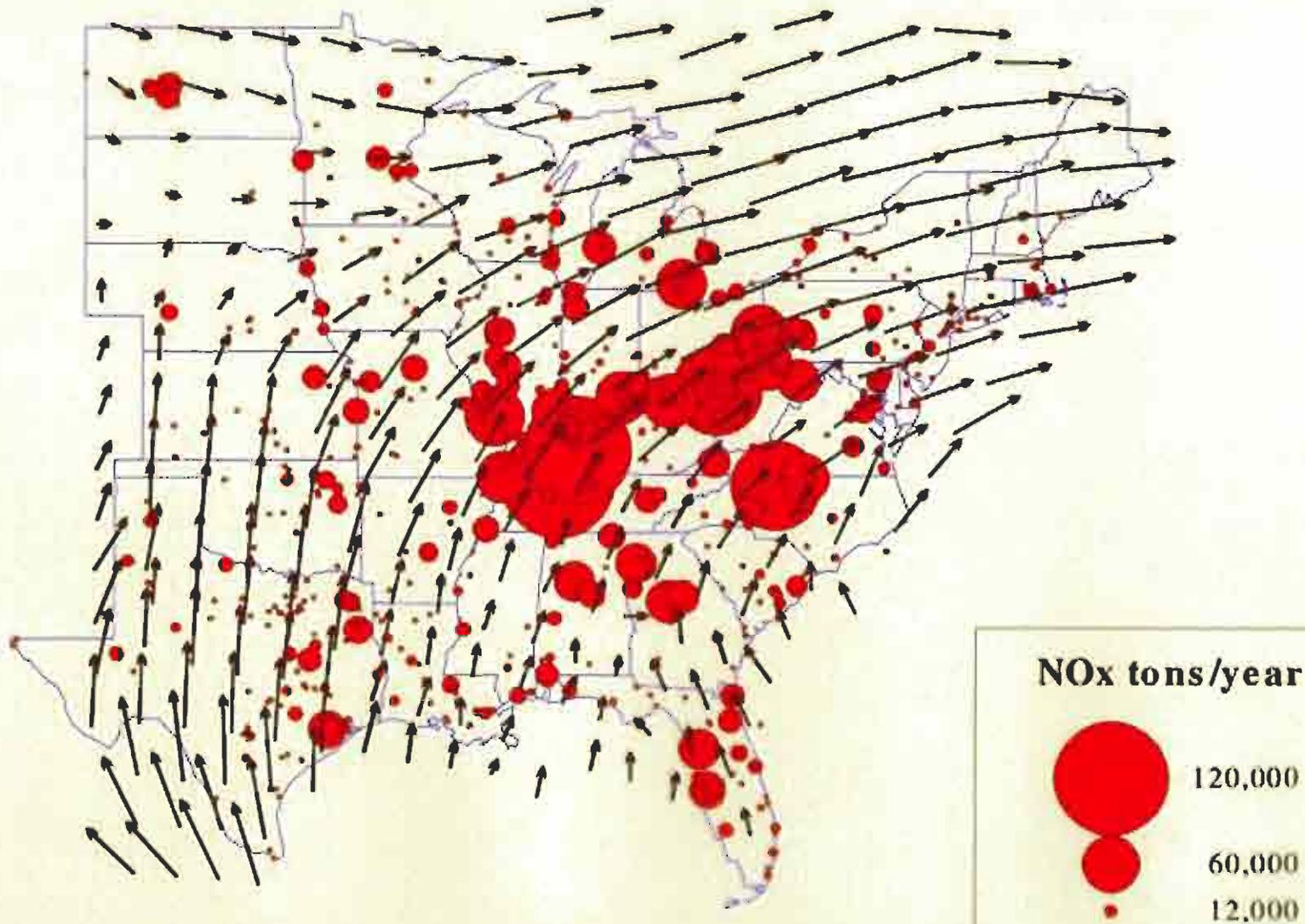
*** 1990 anthropogenic mercury emissions in the U.S., excluding noble sources, refineries, byproduct coke production, and manufacturers of mercury and mercury compounds. [Mercury Study Report to Congress, SAB Review Draft, EPA-432/R-95-001b, June 1996]

Figure 2.1. U.S. Electric generation by fuel type.

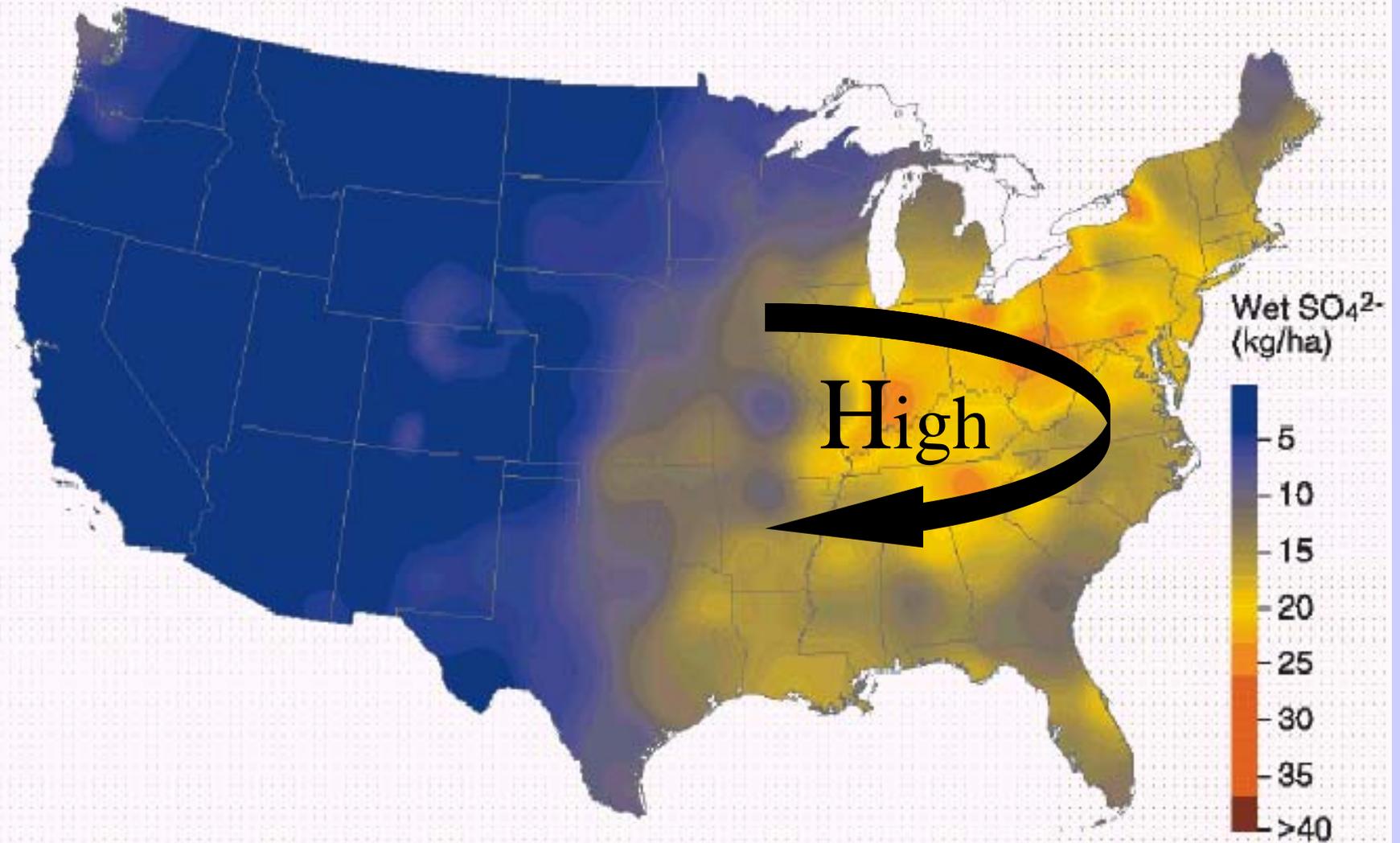
Location & relative size of U.S. power plants by fuel type



1998 power plant NOx emissions and wind patterns when high ozone episodes occur in Northeast



Annual mean sulfate deposition from precipitation, 1997 –1999

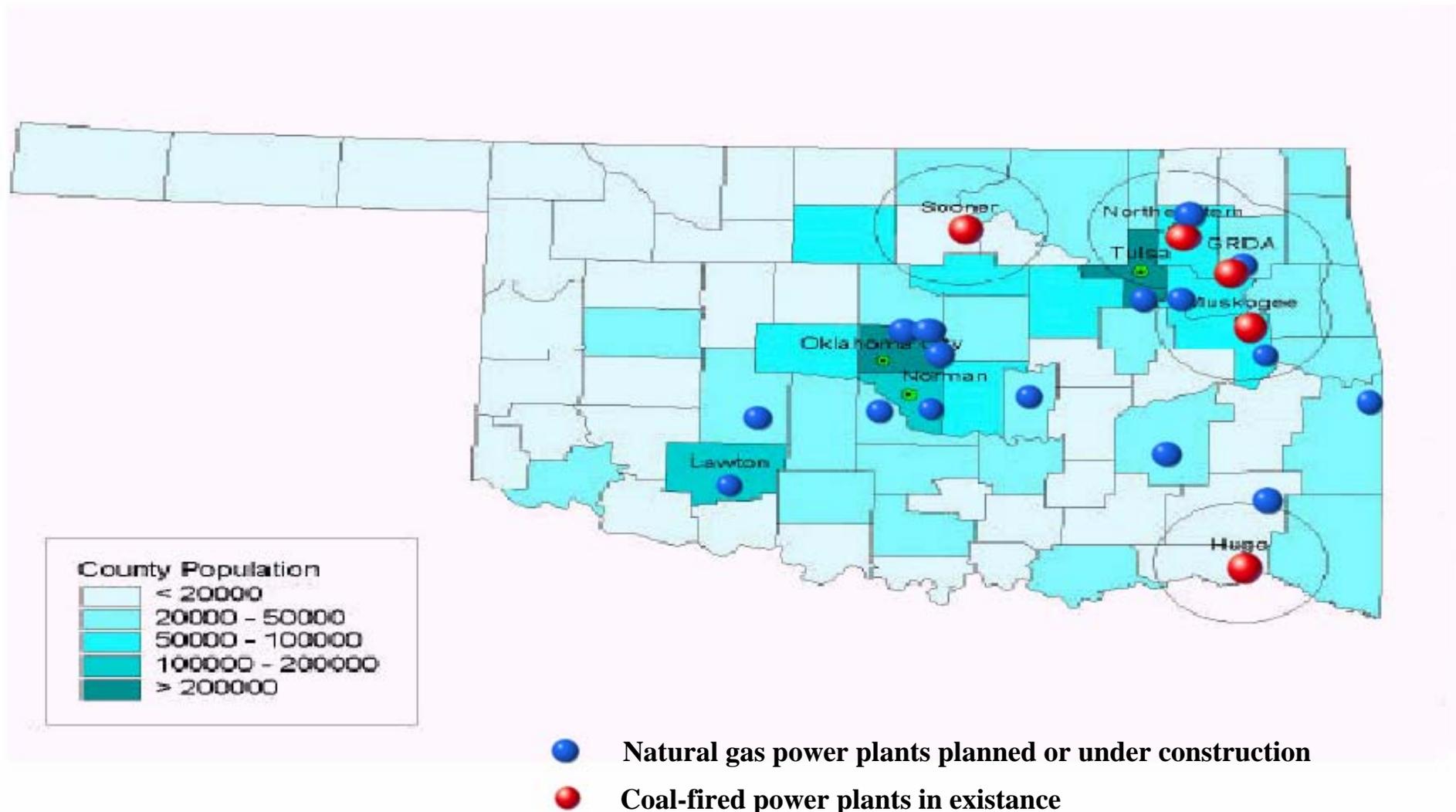


Source: CASTNET & NADP/NTN

USEPA/CAMD 03/28/01

At the surface, winds flow clockwise (anticyclonically) around high pressure.

Oklahoma State Profile of Exposure to Coal-Fired Power Plants



Map Legend

Circles Represent a Thirty Mile Radius around Power Plants

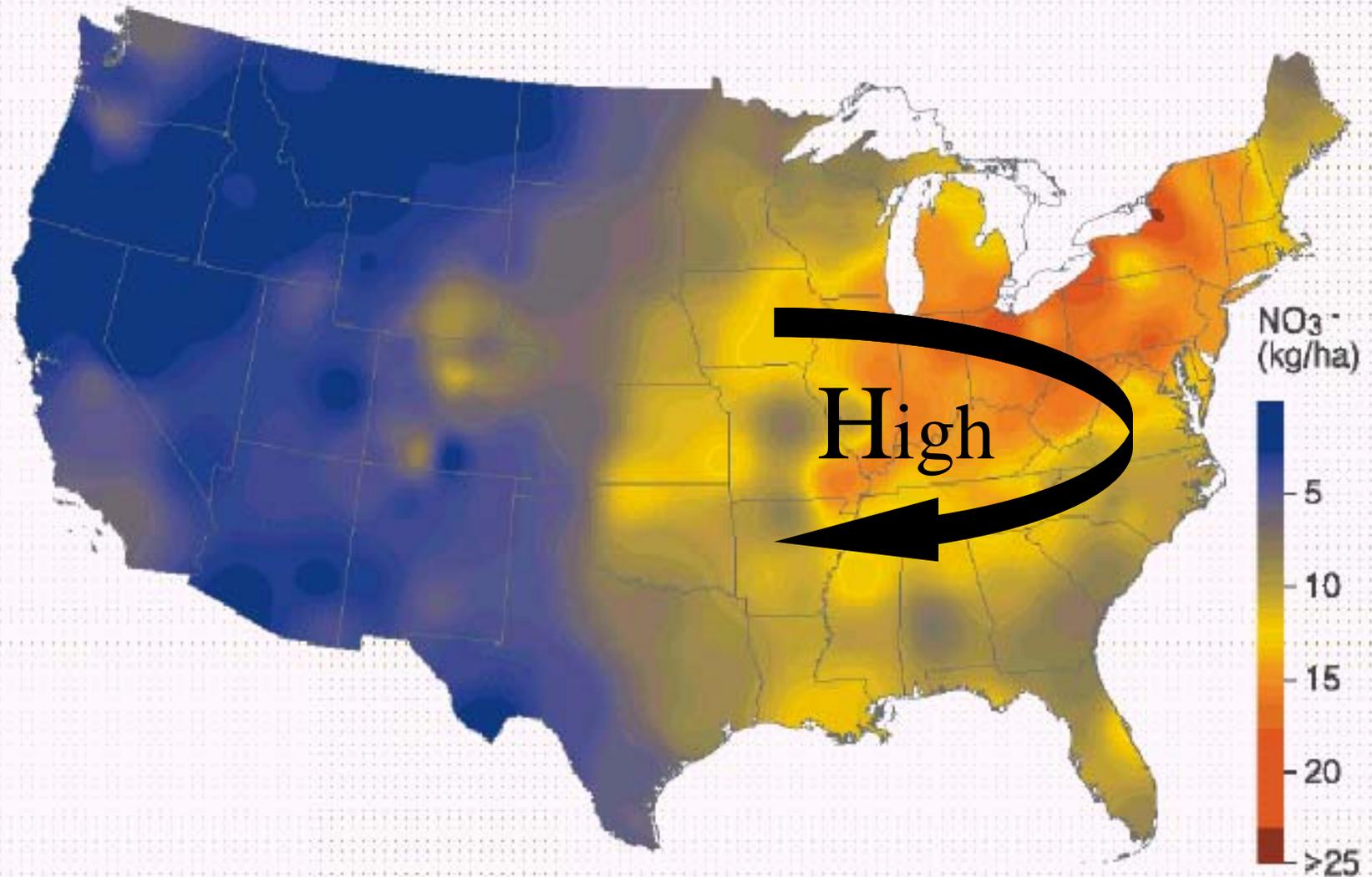
Major Cities are Shown

Automobile Emissions (NO_x, Particulate, CO & CO₂)



The 16 natural gas power plants planned and under construction in Oklahoma are equivalent to bringing all of the vehicles from Dallas, Texas and placing them in Oklahoma.

Annual mean nitrate deposition from precipitation, 1997 – 1999



Source: CASTNET & NADP/NTN

USEPA/CAMD 03/22/01

At the surface, winds flow clockwise (anticyclonically) around high pressure.

Percentage Change in Vehicle-Miles of Travel: 1989–1999

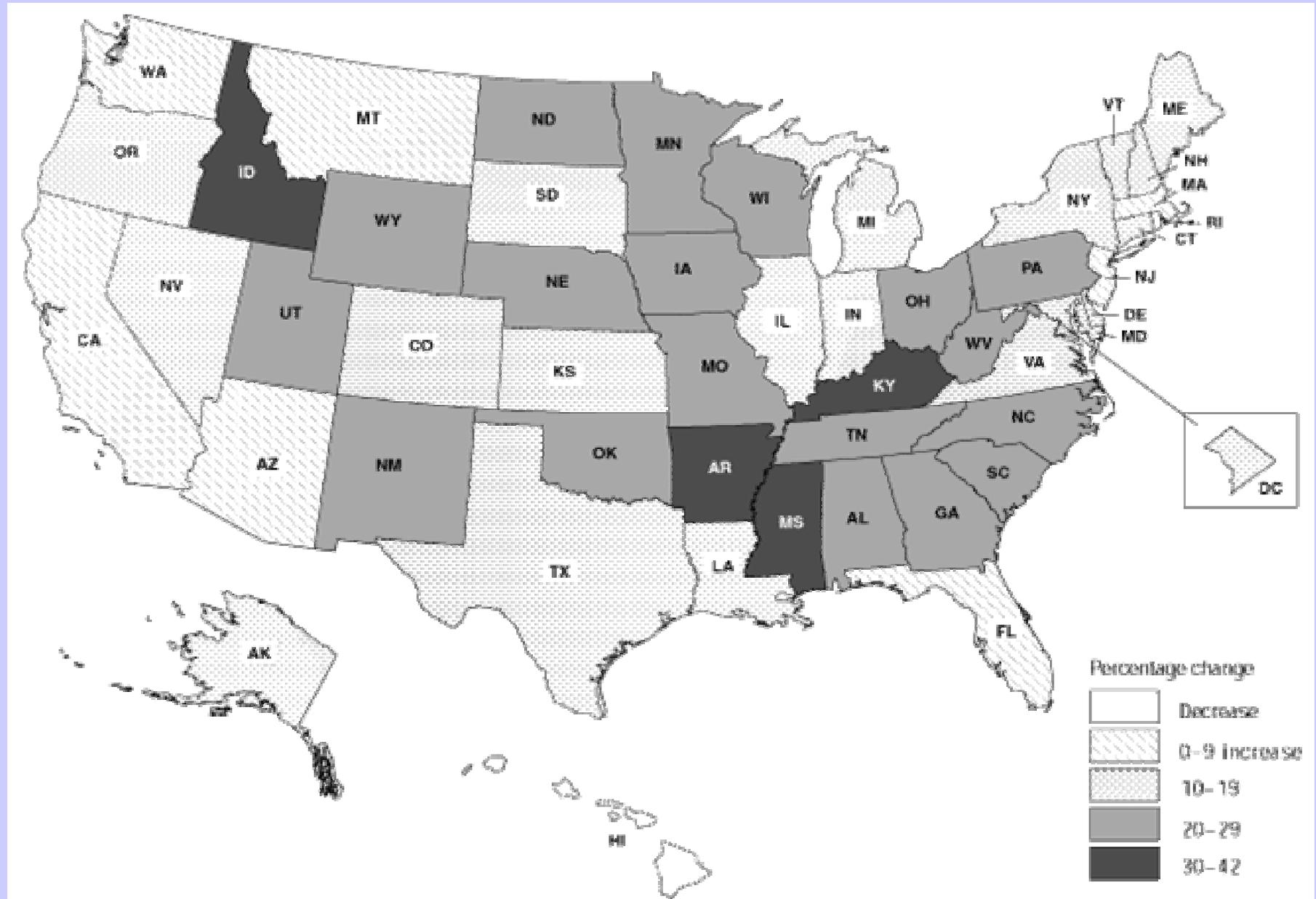
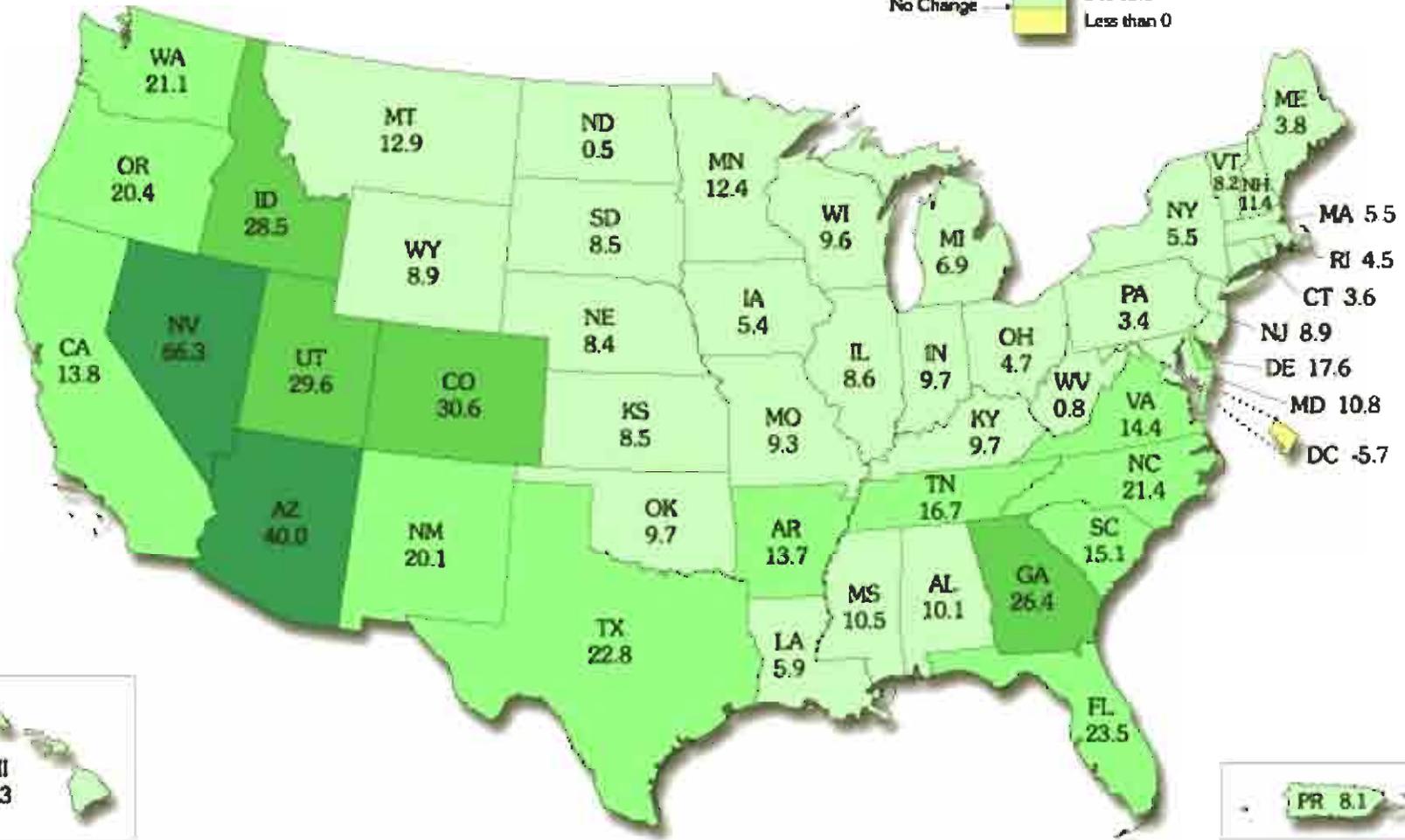
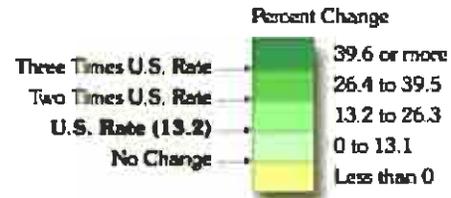
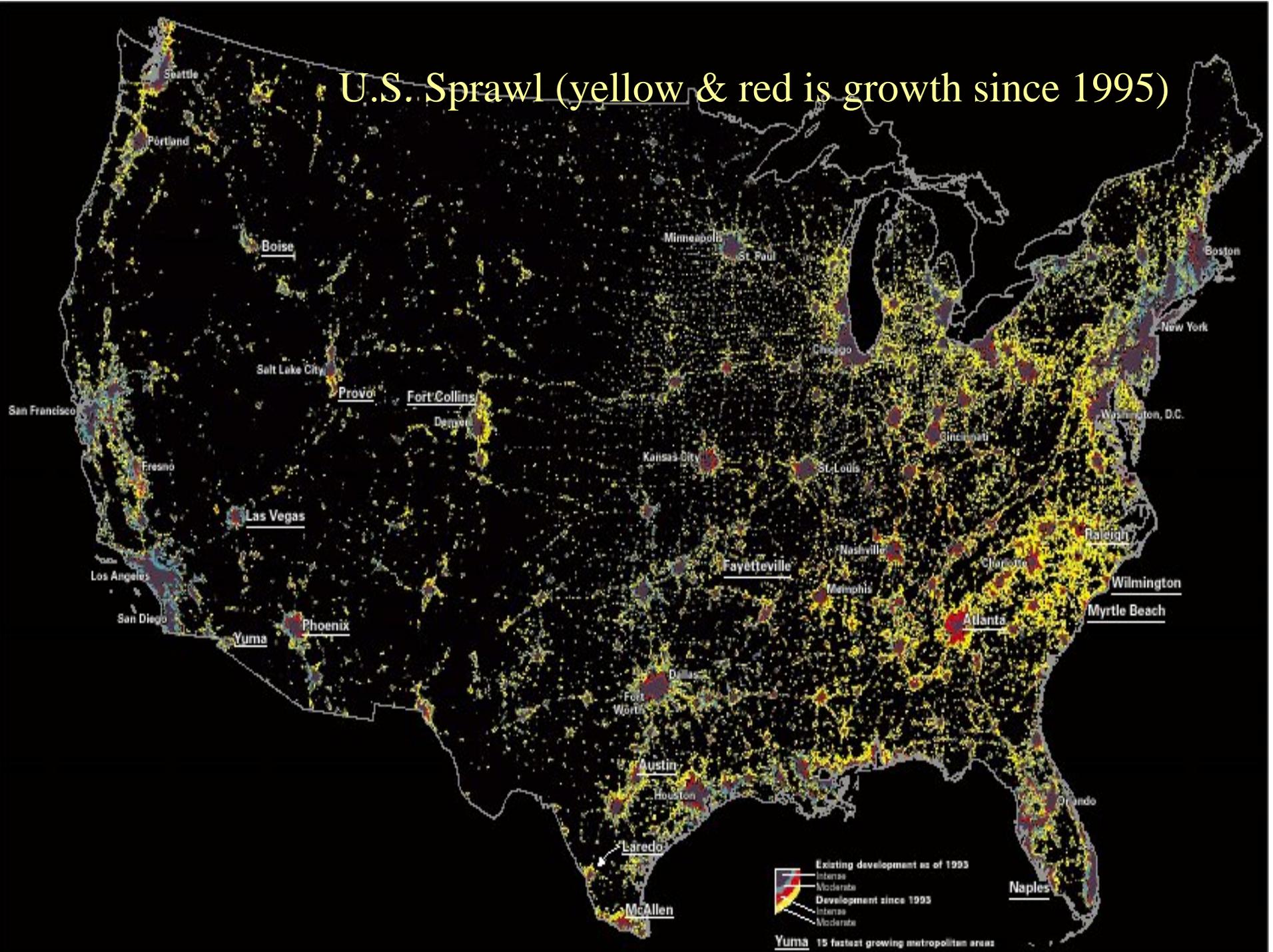


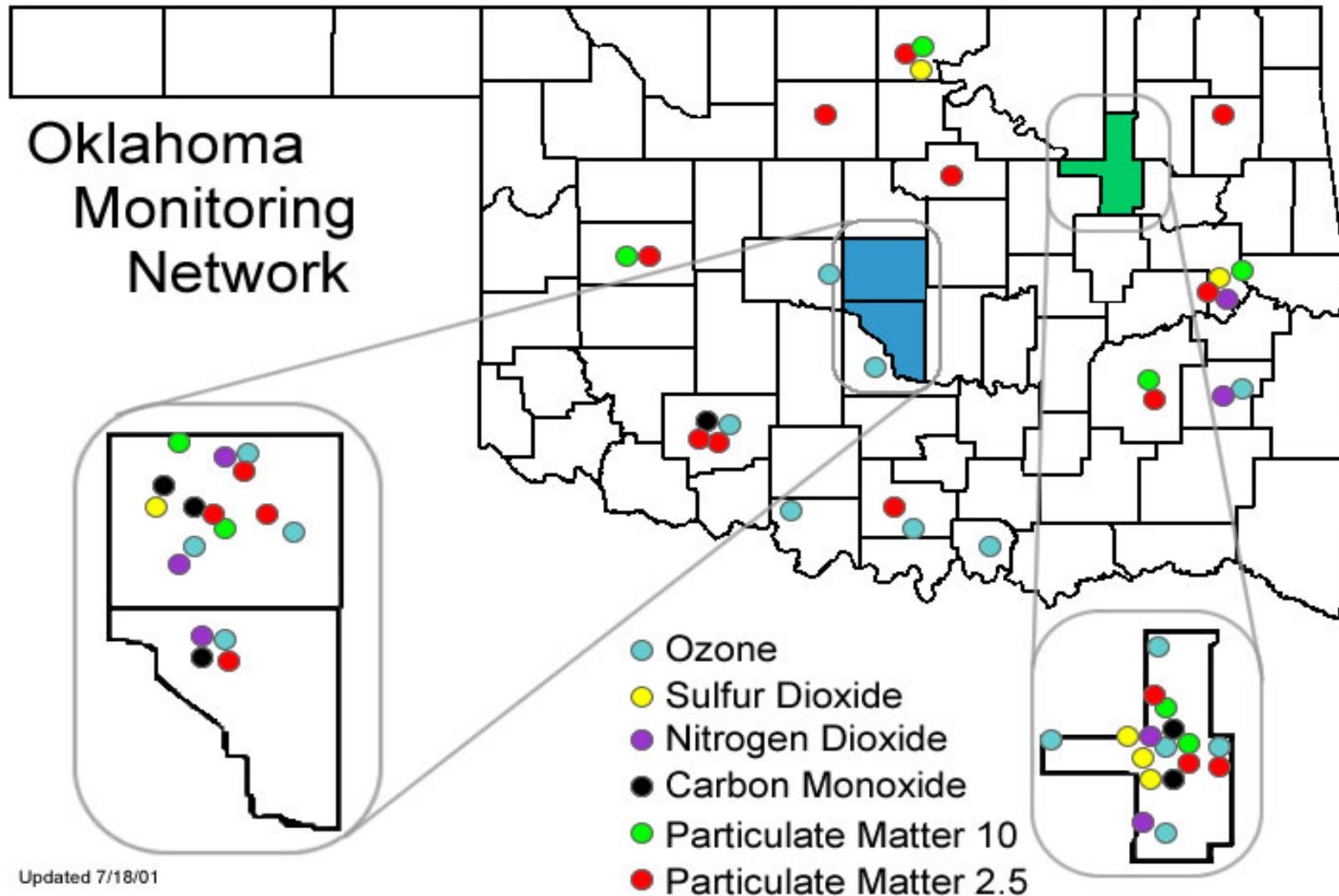
Figure 1. Percent Change in Resident Population for the 50 States, the District of Columbia, and Puerto Rico: 1990 to 2000



U.S. Sprawl (yellow & red is growth since 1995)



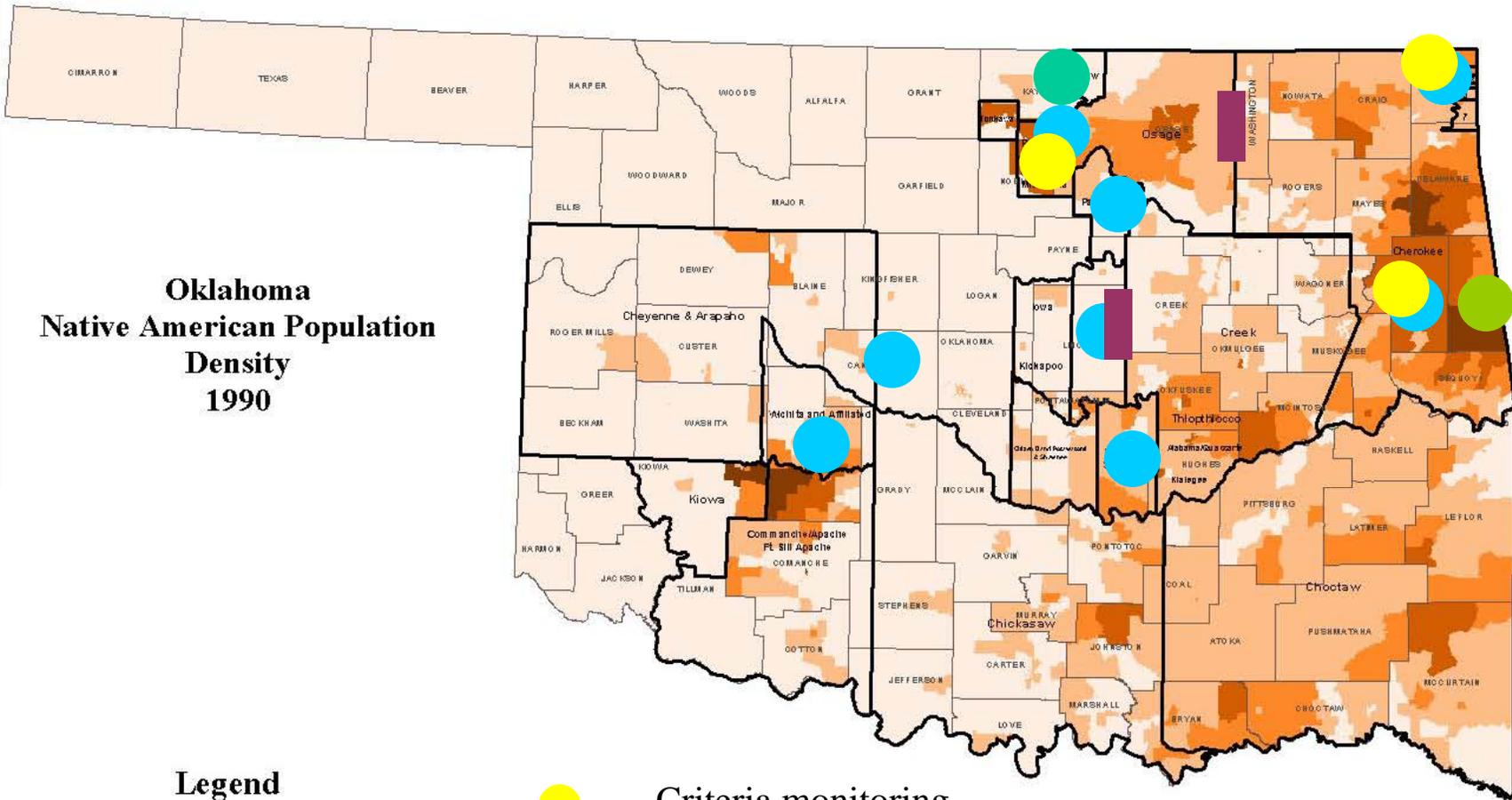
Oklahoma Monitoring Network



The Oklahoma air quality monitoring network consists of 62 monitors located at 37 sites throughout the state.

Percent Native American Population

Oklahoma Native American Population Density 1990



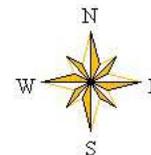
Legend

-  Tribal Jurisdictional Boundary
-  County Boundary

Percent Native American Population

-  <10%
-  10% - 20%
-  20% - 30%
-  30% - 50%
-  >50%

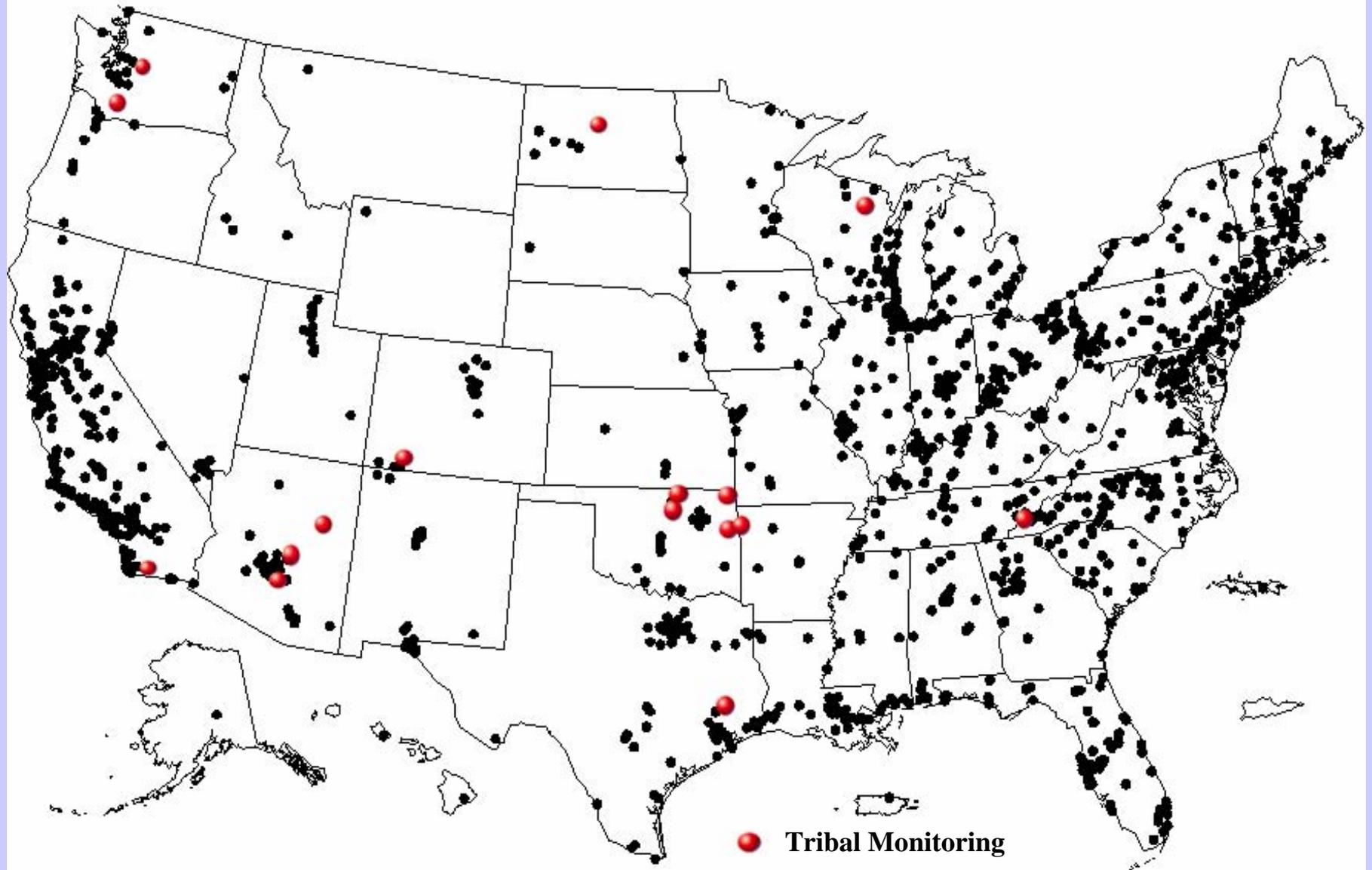
-  Criteria monitoring
-  PM2.5 monitoring
-  IMPROVE & CASTNet
-  Passive Ozone Monitoring



Produced by:
Cherokee Nation Office of Environmental
January 7, 1999

Data Source:
Cherokee Nation Geo Data Center
Oklahoma GIS Council
U.S. Census Bureau 1990
Oklahoma Department of Environmental
Tribal Boundaries digitized from Bureau of

Ozone Sites



Criteria & Meteorological Monitoring



Ozone, PM10, PM2.5, NO_x, CO, SO₂ & meteorological instruments

Ozone Exceedences (8 Hour Standard)

<u>Site</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>
Tahlequah	6	7	0	0
Ponca City	3	3	1	0
Miami	N/A	N/A	2	0
Stilwell	N/A	N/A	N/A	2
Newkirk	N/A	N/A	N/A	N/A

A site is considered to be in non-attainment when there are at least four 8-hour violations each year. And, the 4th highest violation for each year has been averaged over 3 years and is still greater than 0.085 ppm. Using rounding conventions, the 4th highest violation averaged over 3 years must be at least 0.085 ppm. Values 0.081 thru 0.849 would not round up to 0.085 ppm.

40CFR, Part 50, Appendix I, 2.3.

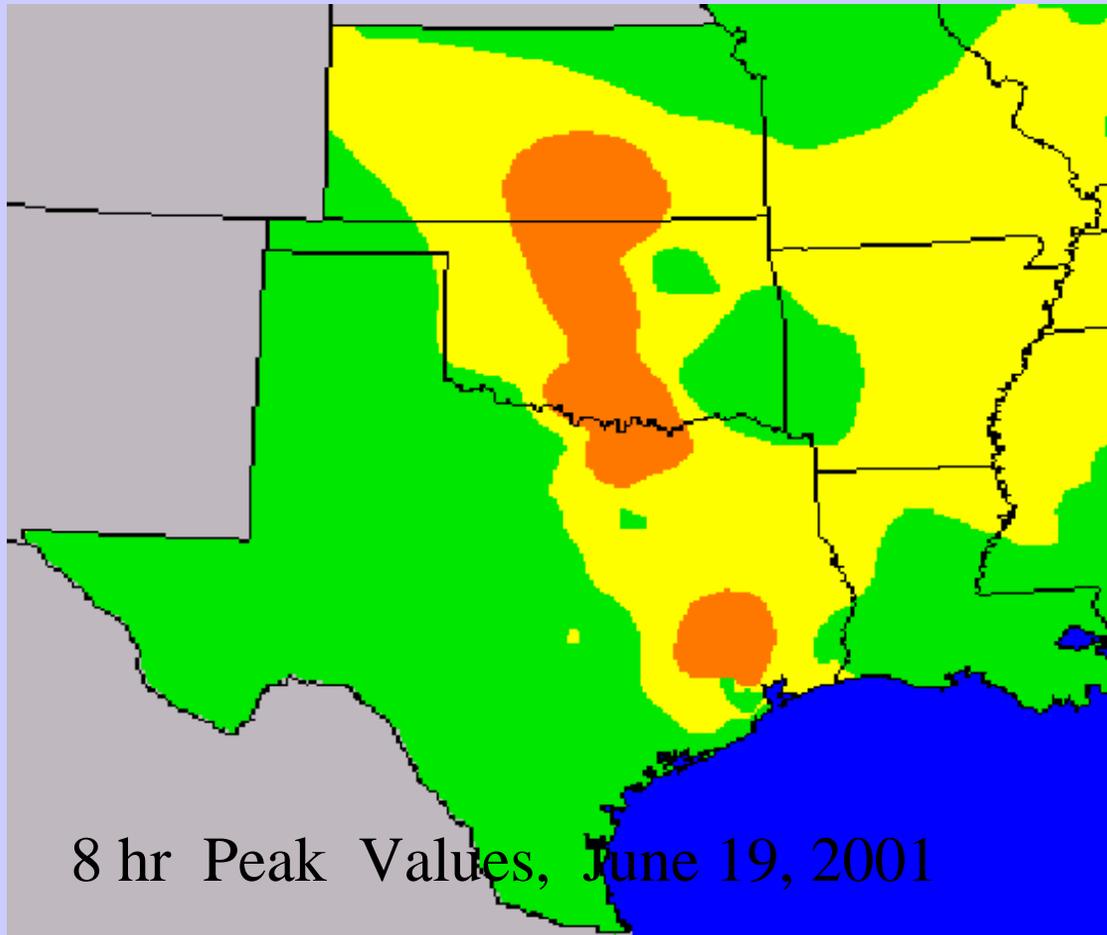
**Number of Ozone Occurrences (days)
at the
AQI Moderate Risk Level**

<u>Site</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>
Tahlequah	36	42	24	22
Ponca City	20	61	54	28
Miami	N/A	N/A	60	34
Stilwell	N/A	N/A	N/A	34
Newkirk	N/A	N/A	N/A	N/A

An ozone occurrence between 0.065-0.084 poses a risk to unusually sensitive individuals. They may experience respiratory effects from prolonged exposure to ozone during outdoor exertion. Possible respiratory symptoms may include a cough and breathing discomfort.

Real Time Ozone Reporting

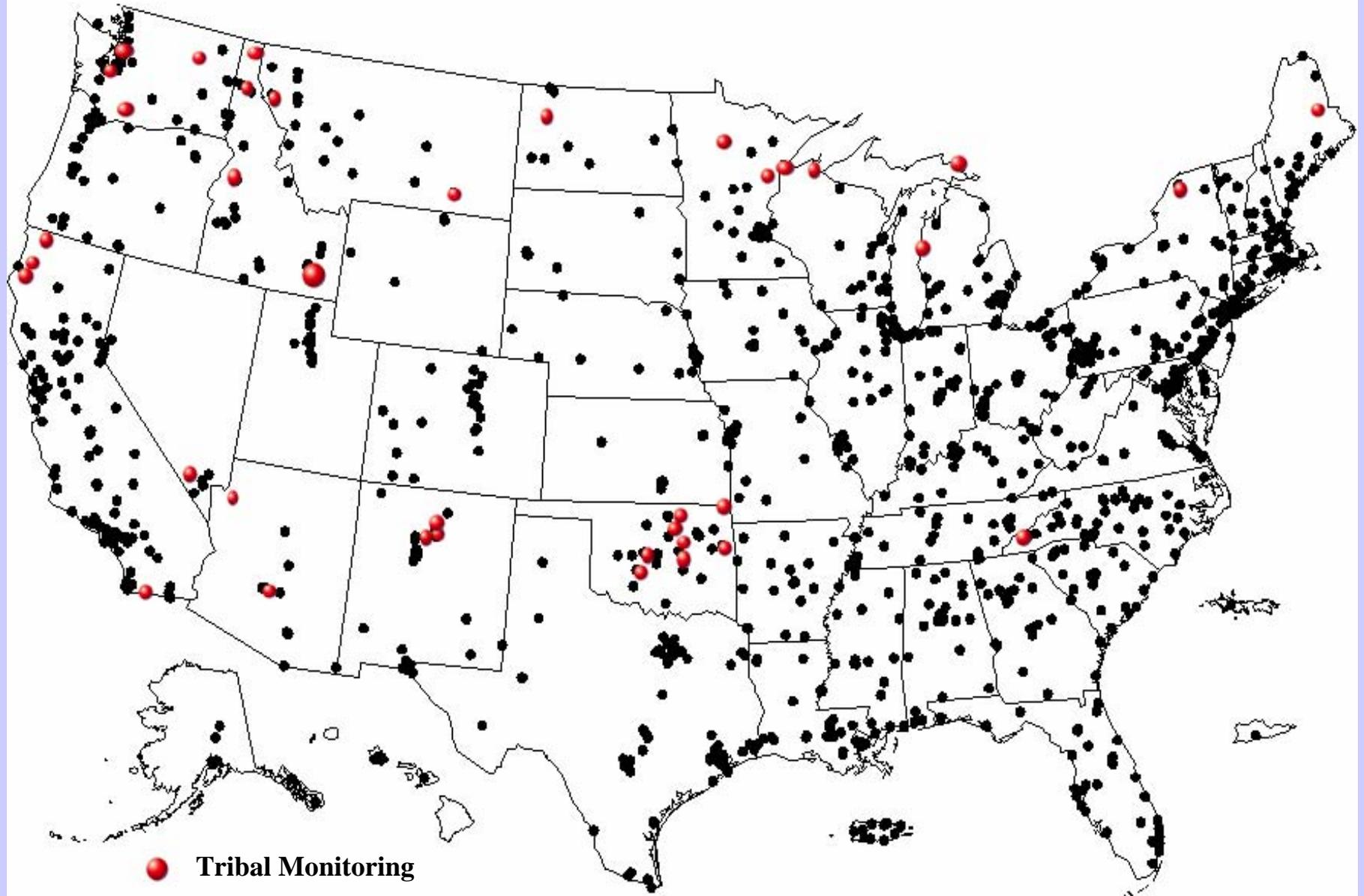
www.epa.gov/airnow/



AIRNOW

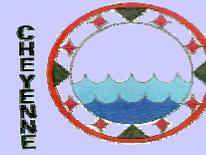
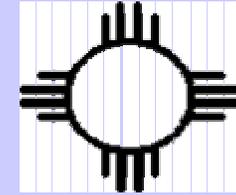


PM_{2.5} Sites





PM2.5 Monitoring Sites



ARAPAHO



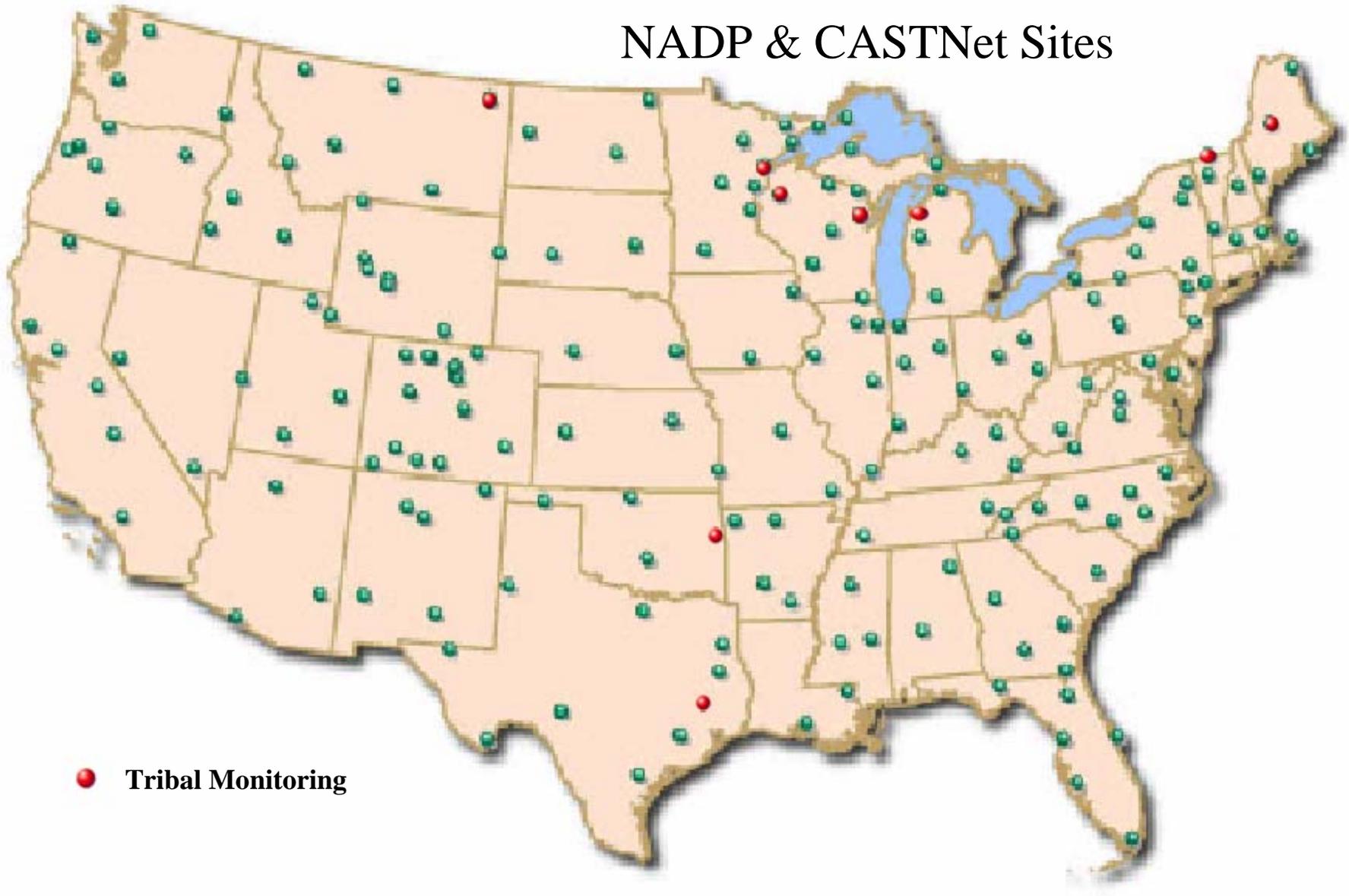
PM2.5 Monitoring Results

NAAQS Annual Mean (15.0 ug/m³)

Site	1999	2000	2001	2002
Tahlequah	12.5*	13.1	11.6	11.0
Miami	11.4*	12.9	11.2	---
Concho	10.5*	11.2	9.2	7.5
Stroud	---	10.7	---	---
Wewoka	---	11.6	9.8	7.6
Ponca City	---	12.2	9.0	---
Anadarko	---	9.4*	8.7	7.7
Pawnee	---	10.5*	---	---

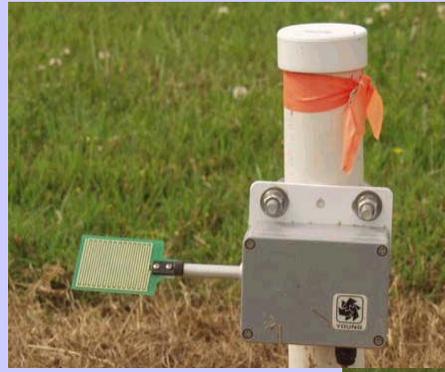
*Partial Year Sampling --- No Data or Tribe Assumed Sampling

NADP & CASTNet Sites



The Network measures sulfate, nitrate, hydrogen ion (measure of acidity), ammonium chloride, and base cations (calcium, magnesium, potassium).

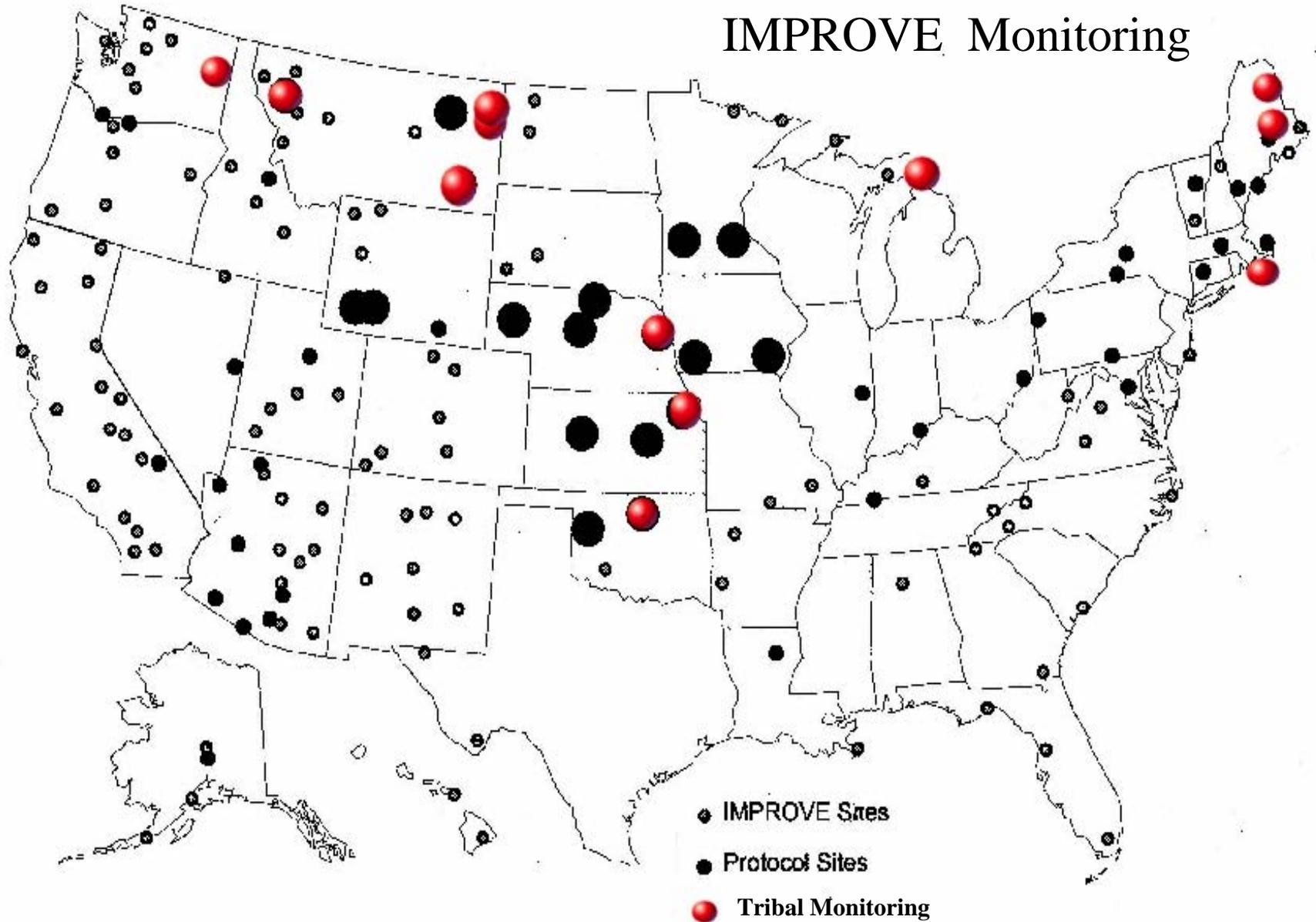
CASTNet (Stilwell, Oklahoma)



CASTNet Shelter; mass flow controller, datalogger, O3 & NOy analyzers



IMPROVE Monitoring



PM10 mass, PM2.5 mass, elements absorption, sulfate ions, nitrate ions, organic carbon and elemental carbon.



IMPROVE Site;

Ozone, PM_{2.5}, PM₁₀, NO_y & meteorological instruments

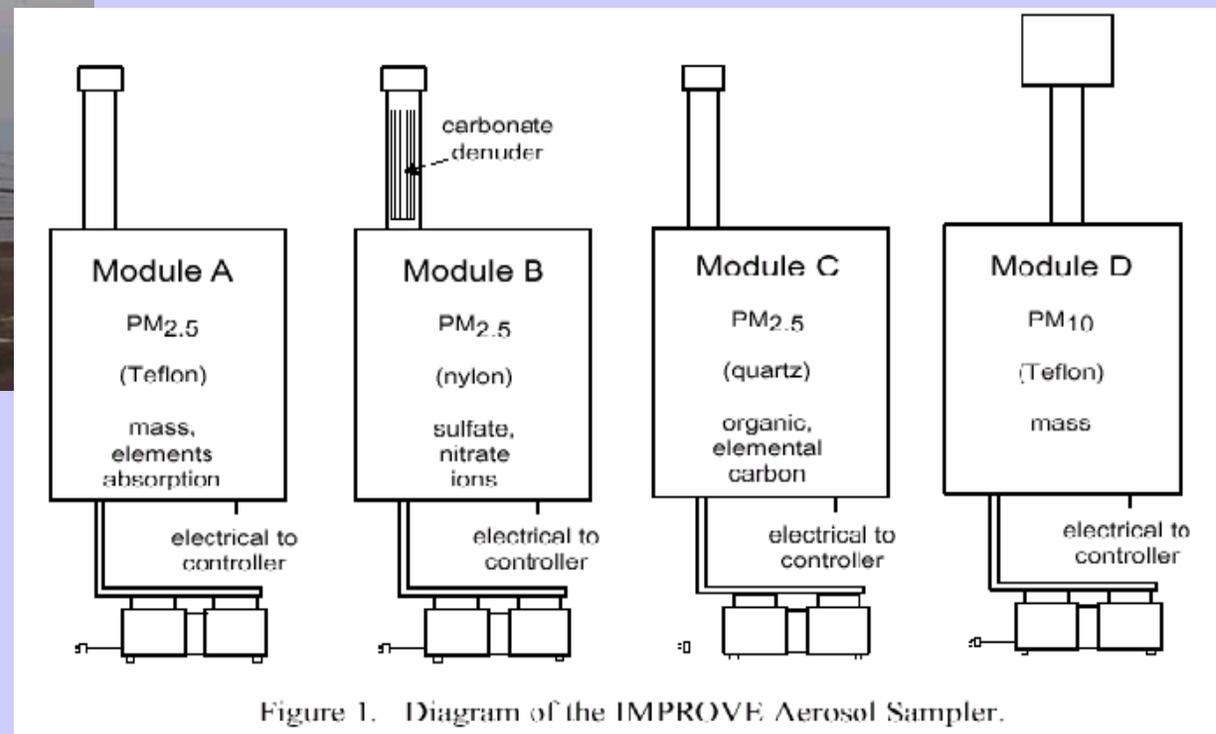


Figure 1. Diagram of the IMPROVE Aerosol Sampler.

Passive Ozone Monitoring



Sac & Fox Nation, Alabama/Coushatta, Delaware Tribe



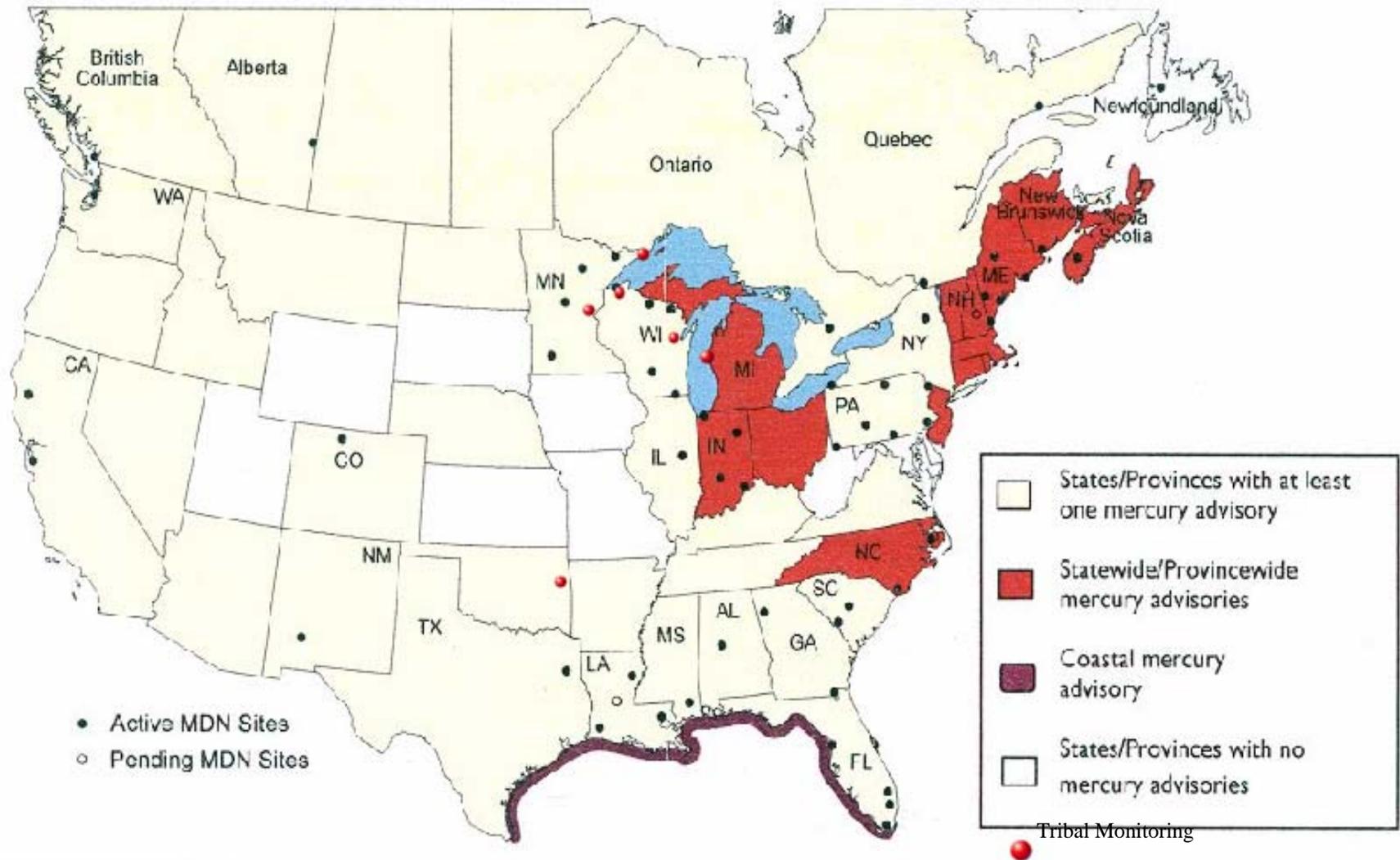


Hazardous Air Pollutant (HAP) Monitoring



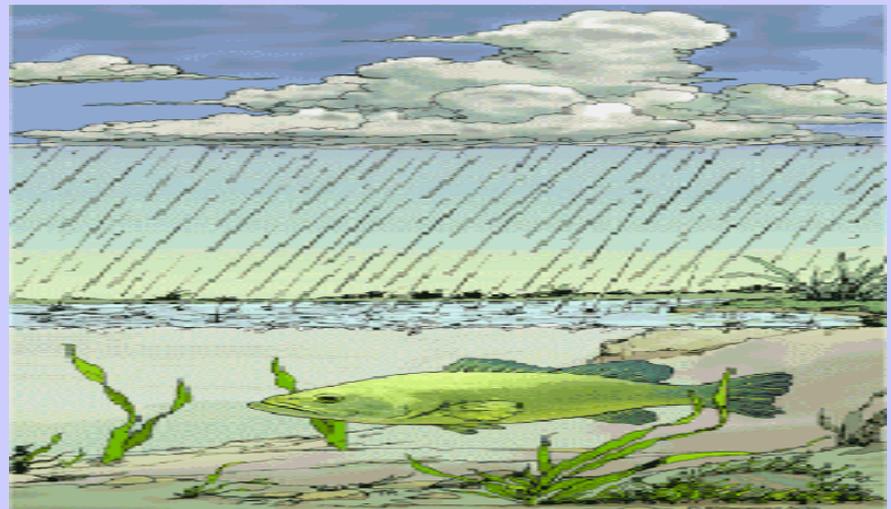
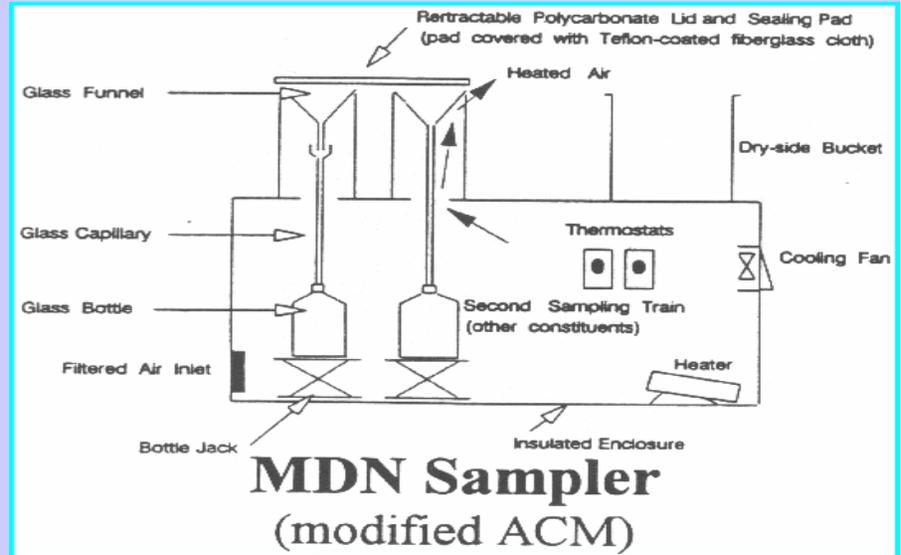
Carbon disulfide, carbonyl sulfide, hydrogen cyanide, hydrogen sulfide

MERCURY DEPOSITION NETWORK SITES AND MERCURY FISH ADVISORIES



The largest U.S. atmospheric sources of mercury are coal-fired power plants, incinerators and old chlor-alkali plants.

Mercury Deposition Monitoring (scheduled for December 2002)



Wet deposition monitoring & mercury/methyl mercury analysis (CASTNet site)