Ambient Monitoring Update

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Office of Air Quality Planning and Standards

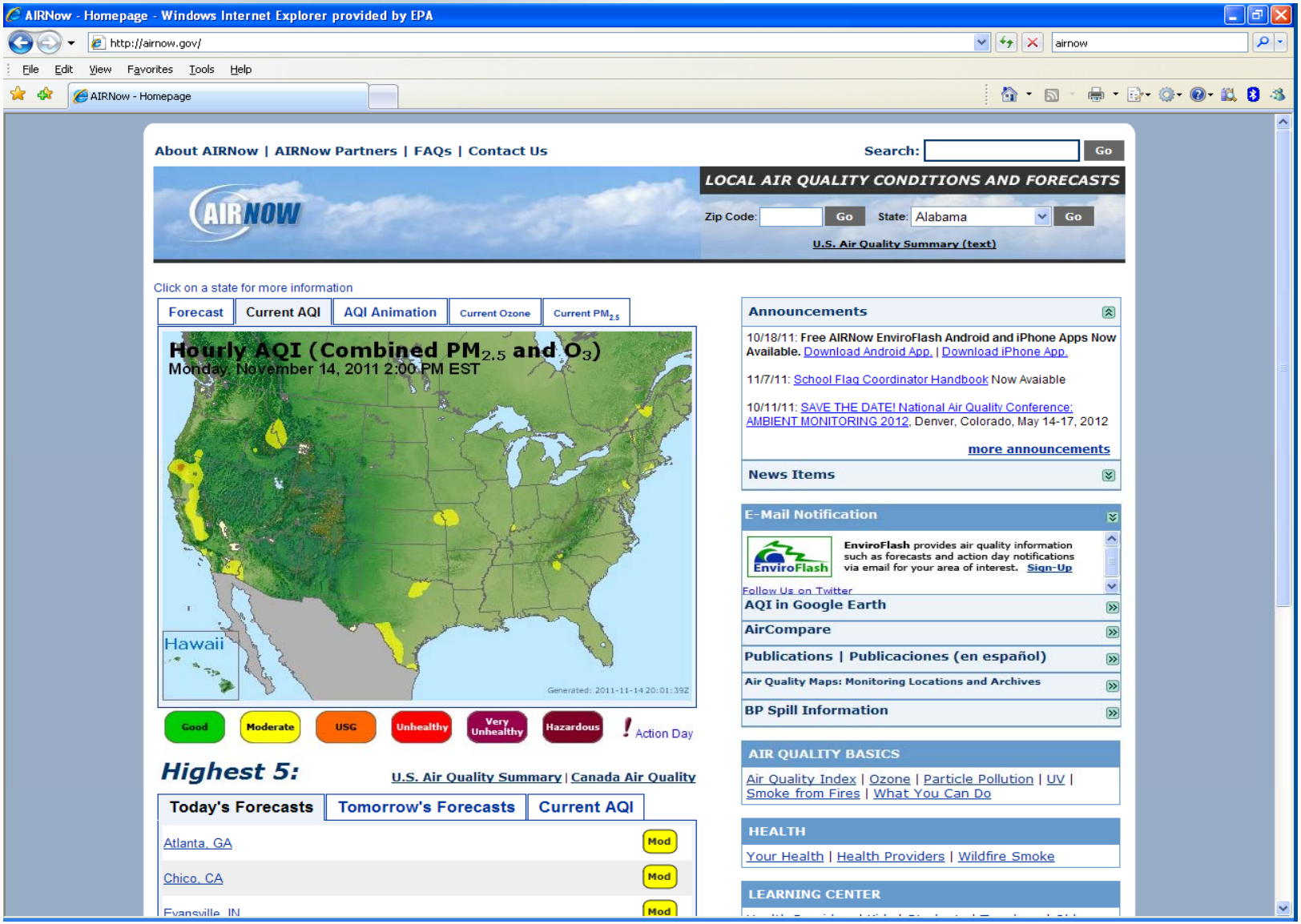
Outline

- Objectives of the ambient monitoring program
- Key challenges
- Updates on key monitoring activities
  - Criteria pollutants (Ozone, PM, Lead)
  - Air toxic compounds
  - Tribal programs
- Sampling of emerging issues
- Final thoughts and questions

Objectives of the Ambient Monitoring Program

- Providing air quality data to the public in a timely manner
  - Air Quality Index
  - AIRNOW program
- Determining compliance with air quality standards and assessing effectiveness of emission control strategies
  - Model validation
- Supporting air pollution research studies (health, methods development, atmospheric chemistry)

AIRNOW.GOV


AIRNow - Homepage - Windows Internet Explorer provided by EPA
http://airnow.gov/
File Edit View Favorites Tools Help
AIRNow - Homepage
About AIRNow | AIRNow Partners | FAQs | Contact Us
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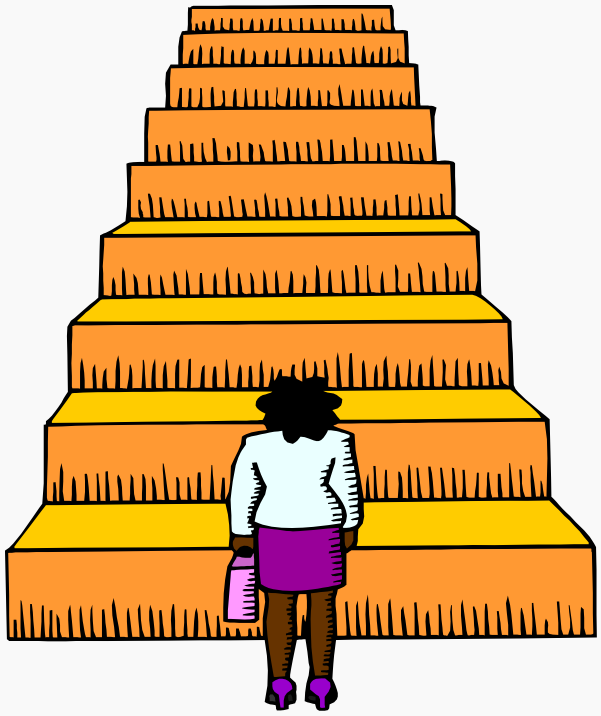
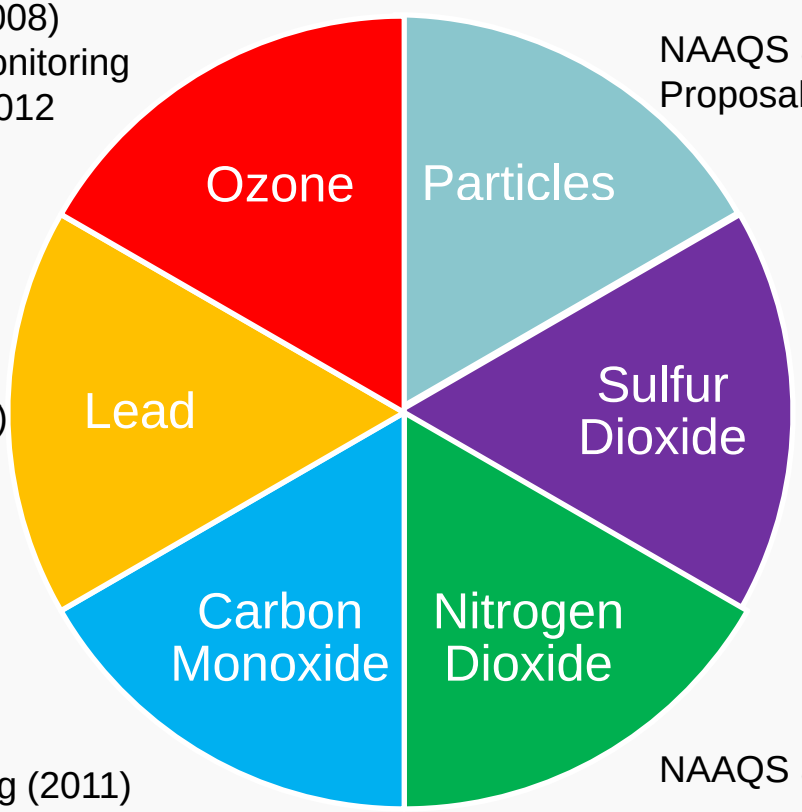
AIRNOW
LOCAL AIR QUALITY CONDITIONS AND FORECASTS
Zip Code: Go State: Alabama Go
U.S. Air Quality Summary (text)
Click on a state for more information
Forecast Current AQI AQI Animation Current Ozone Current PM2.5
Hourly AQI (Combined PM2.5 and O3)
Monday, November 14, 2011 2:00 PM EST
Hawaii
Generated: 2011-11-14 20:01:39Z
Good Moderate USG Unhealthy Very Unhealthy Hazardous Action Day
Highest 5:
U.S. Air Quality Summary | Canada Air Quality
Today's Forecasts Tomorrow's Forecasts Current AQI
Atlanta, GA Mod
Chico, CA Mod
Evansville, IN Mod
Announcements
10/18/11: Free AIRNow EnviroFlash Android and iPhone Apps Now Available. Download Android App. | Download iPhone App.
11/7/11: School Flag Coordinator Handbook Now Avaiable
10/11/11: SAVE THE DATE! National Air Quality Conference: AMBIENT MONITORING 2012, Denver, Colorado, May 14-17, 2012
more announcements
News Items
E-Mail Notification
EnviroFlash provides air quality information such as forecasts and action day notifications via email for your area of interest. Sign-Up
Follow Us on Twitter
AQI in Google Earth
AirCompare
Publications | Publicaciones (en español)
Air Quality Maps: Monitoring Locations and Archives
BP Spill Information
AIR QUALITY BASICS
Air Quality Index | Ozone | Particle Pollution | UV | Smoke from Fires | What You Can Do
HEALTH
Your Health | Health Providers | Wildfire Smoke
LEARNING CENTER

The Challenges We Face

- Rapid pace of revisions to standards (NAAQS) for fine particles, ozone, lead, sulfur dioxide, and nitrogen dioxide since 2006
- Changing emission patterns leading to revised monitoring network design
  - Source focus (lead, SO2, NO2, CO)
  - Area focus (ozone, fine particles)
  - Near-road characterization
- NAAQS and ambient levels have generally decreased – challenging some sampling and analytical methods
- Federal and state resources to update ambient networks are more limited



Criteria Pollutants – Recent Changes



NAAQS (2008)
Revised monitoring expected 2012

NAAQS and monitoring
Proposal expected fall 2011

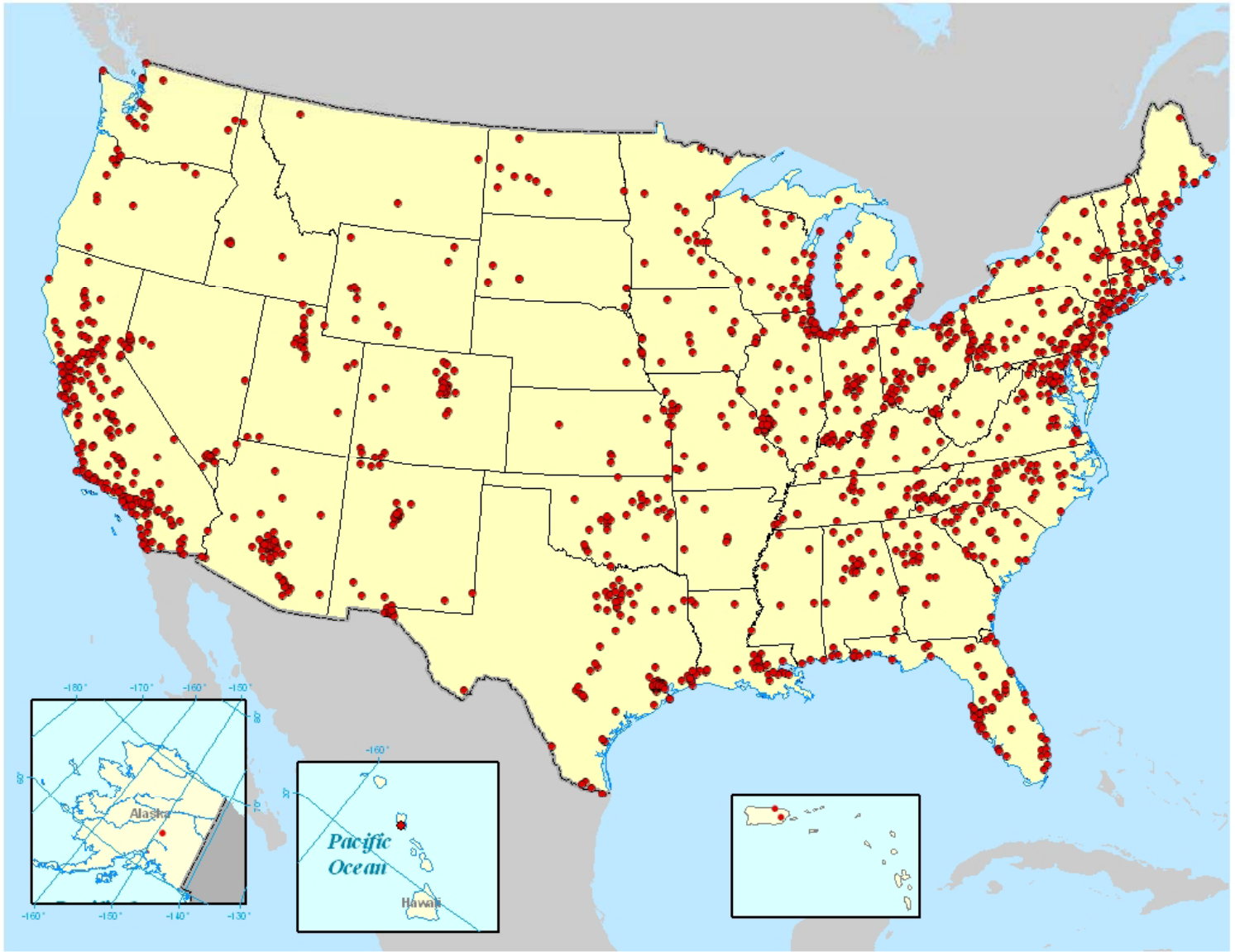
NAAQS and monitoring (2008)
Revised monitoring (2010)

NAAQS and monitoring (2010)

Monitoring (2011)

NAAQS and monitoring (2010)

Ozone Network



KEY FACTS

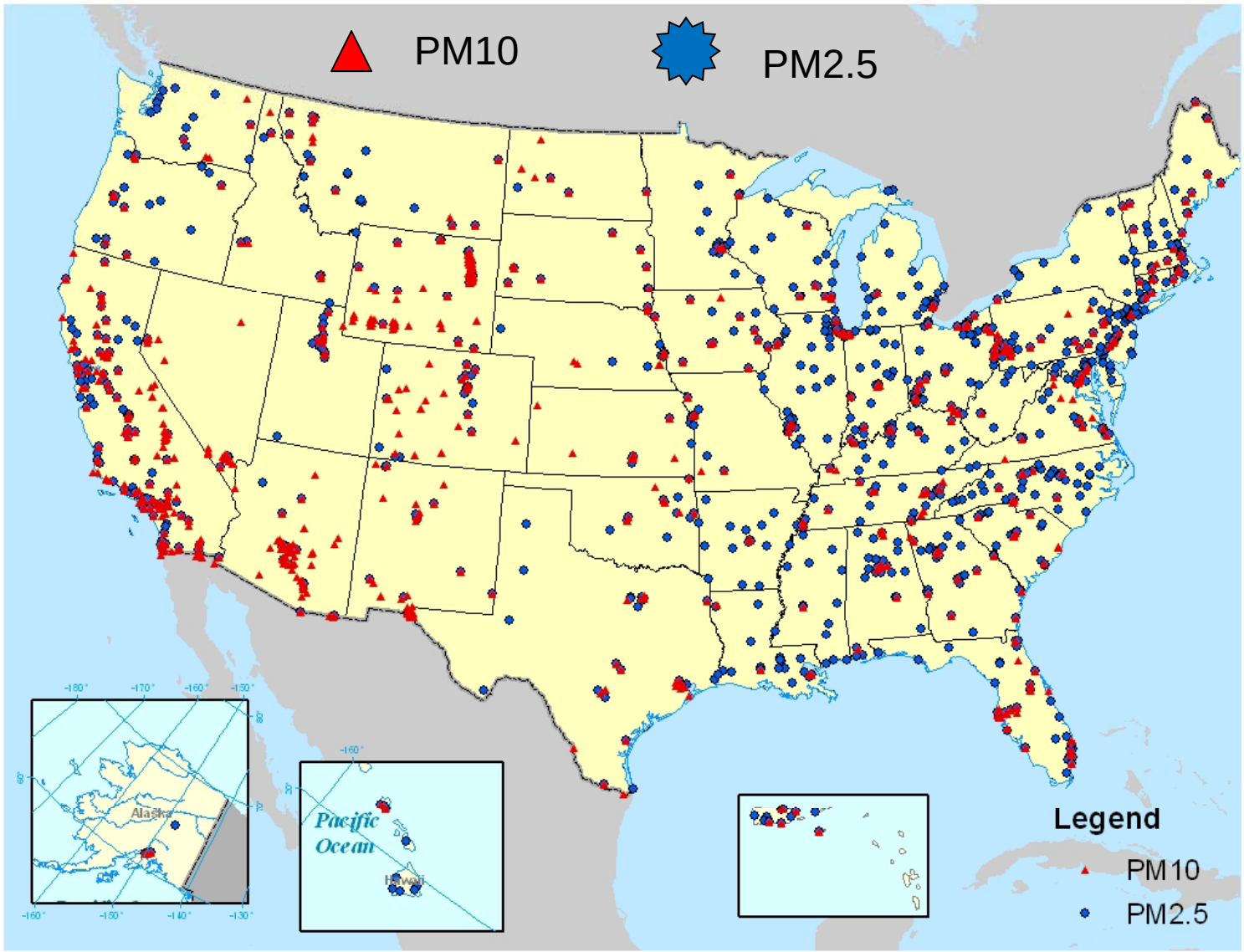
Approximately 1250 monitors

Density is robust in eastern US and CA

Some gaps in western areas

Monitors operated on a seasonal schedule that is being revised in a pending final rule

PM Network – Mass Measurements



KEY FACTS

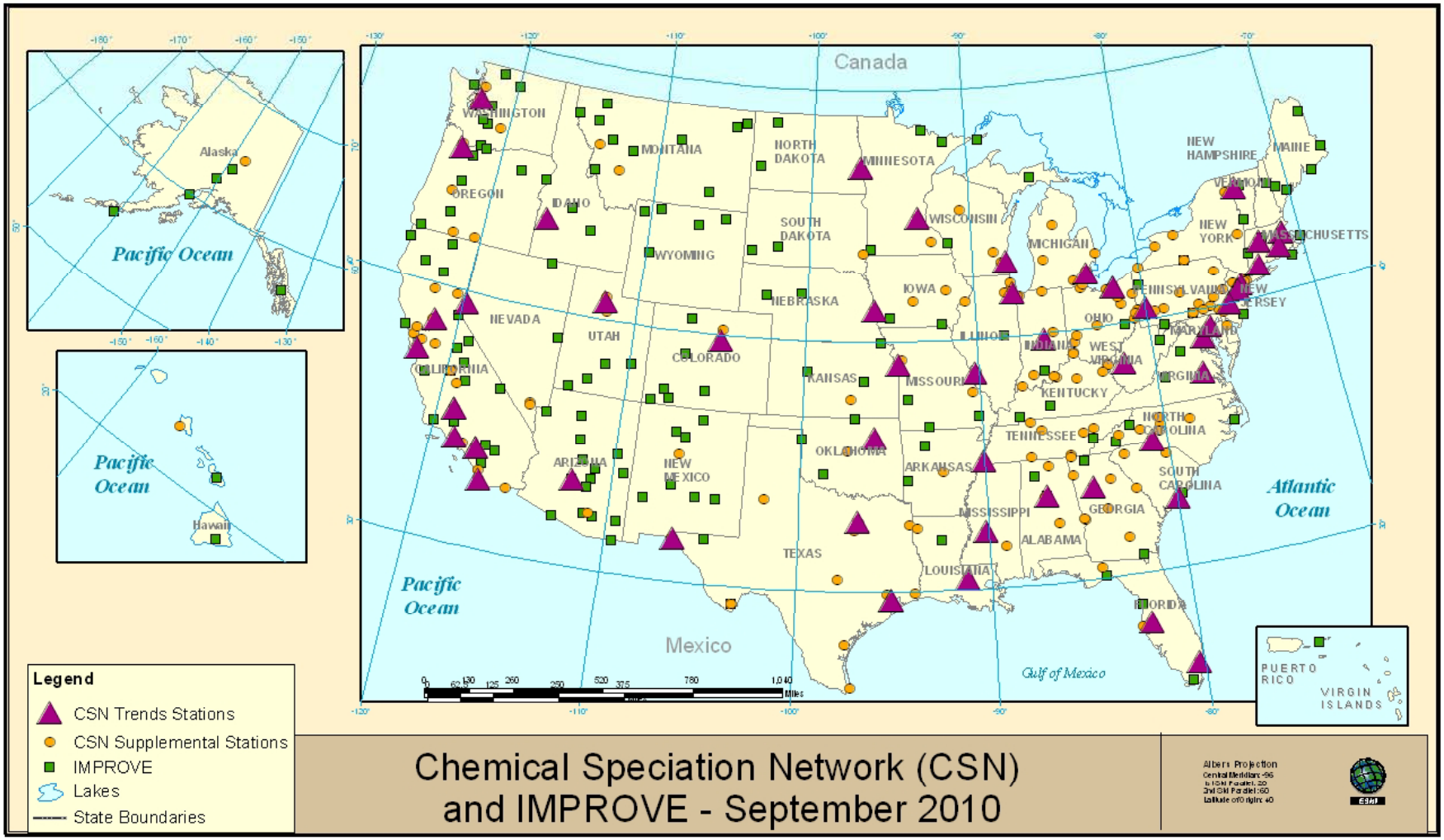
Approximately 1100 PM2.5 and 1000 PM10 monitors

PM2.5 more area-wide focused while PM10 is more source focused

PM2.5 network is stable with some transition to real-time methods

PM10 network is declining slowly

PM Network – Speciation Measurements*



* Components include total mass, elements, ions, elemental and organic carbon

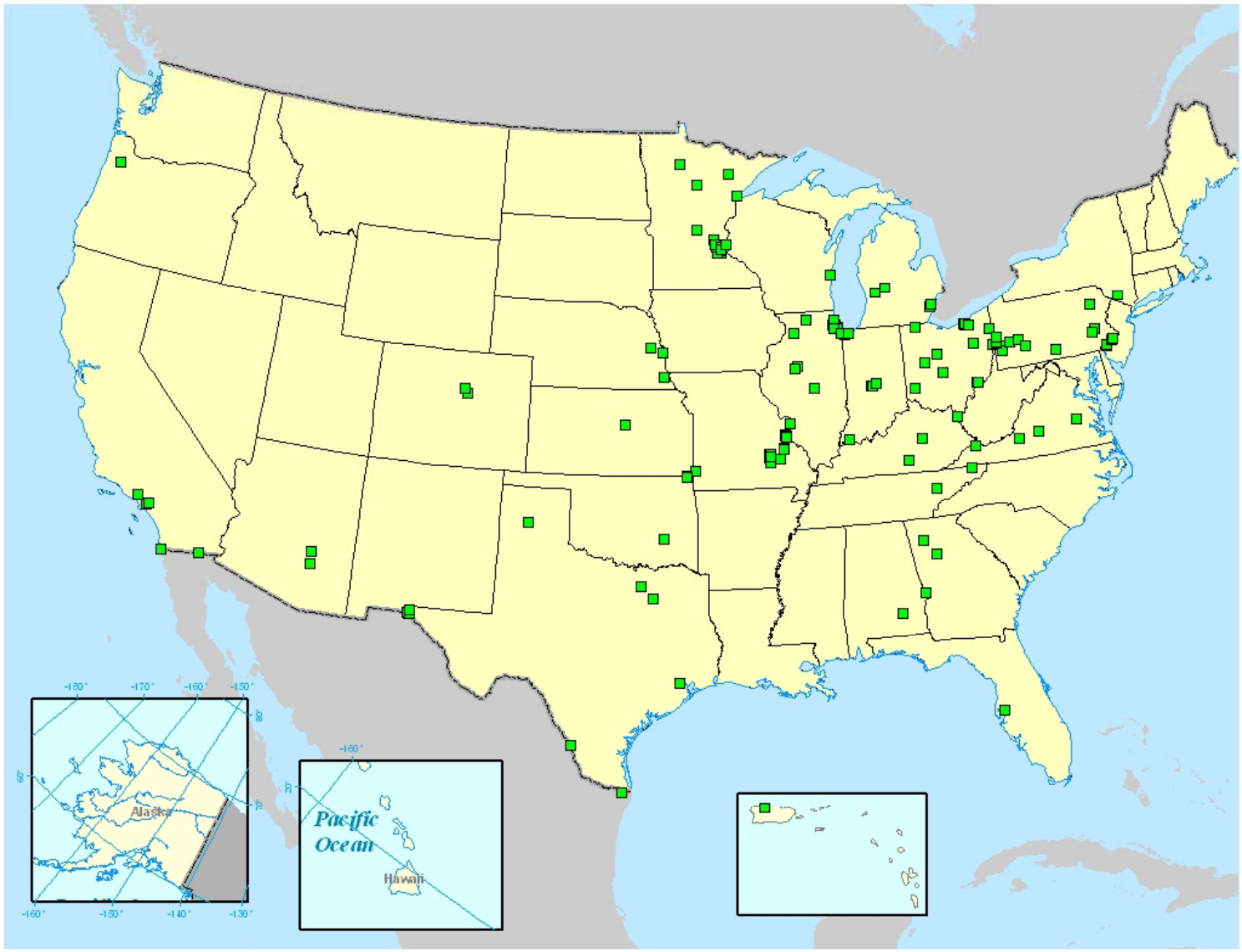
Ozone/PM Monitoring Issues

Ozone Challenges	**PM2.5 Challenges**
•Monitoring seasons need revision to reflect 2008 NAAQS •Western U.S. has network gaps and winter ozone problems •Rural areas will need attention if distinct secondary NAAQS is finalized •Some redundancies in eastern U.S. **PM10 Challenges** •Very slow transition to PM10-2.5 monitoring (NCore sites only) limits ability to shift coarse particle indicator	•Near-road environment is uncharacterized •Transition from filter-based to continuous methods has been problematic in some areas due to method performance issues •Monitoring agencies need further training on newer methods •Stakeholders requesting additional speciation measurements (sites and frequency)

Recent Developments in Lead Monitoring following 2008 NAAQS revision

- Expanded source oriented network to include facilities emitting ½ ton or greater (will be completed by Dec 27, 2011)
- Non-source trends network deployed at existing multi-pollutant sites
- Implementing short-term study of 15 general aviation airports
- Revised analytical methods to account for new technology and use of more generic methods
- Improved QA program to include independent field audits

Lead Network



KEY FACTS

1 ton source monitors deployed Jan 1, 2010

½ ton source monitors and non-source monitors will be operational by Dec 27, 2011

15 airports will be monitored during special study

Airport Lead Monitoring Locations

Airport	County	State
Merrill Field	Anchorage	AK
Pryor Field Regional	Limestone	AL
Palo Alto Airport of Santa Clara County	Santa Clara	CA
McClellan-Pallomar	San Diego	CA
Reid-Hillview	Santa Clara	CA
Gillespie Field	San Diego	CA
San Carlos	San Mateo	CA
Nantucket Memorial	Nantucket	MA
Oakland County International	Oakland	MI
Republic	Suffolk	NY
Brookhaven	Suffolk	NY
Stinson Municipal	Bexar	TX
Northwest Regional	Denton	TX
Harvey Field	Snohomish	WA
Auburn Municipal	King	WA

Airports* will be monitored for 1-year period beginning December 27, 2011. Monitors reading greater than 50% of the NAAQS (3-month average >= 0.075 µg/m3) will become permanent state monitors.

* Study airports selected by EPA/OTAQ

Emerging Issue – Near road monitoring

- Over 35 million people living near major roads
- Research has established that people who live, work, or attend school near major roads have an increased incidence and severity of particular health problems that may be related to air pollution from heavy traffic.
  - cardio-respiratory effects (asthma, bronchitis), adverse birth outcomes, premature mortality, cardiovascular effects and cancer.
- EPA's monitoring regulations have not historically addressed near-road exposure (except for CO) and relatively few sites are located to characterize exposure


The Hidden Toll of Traffic Jams

Los Angeles

California Cities

New York City

China

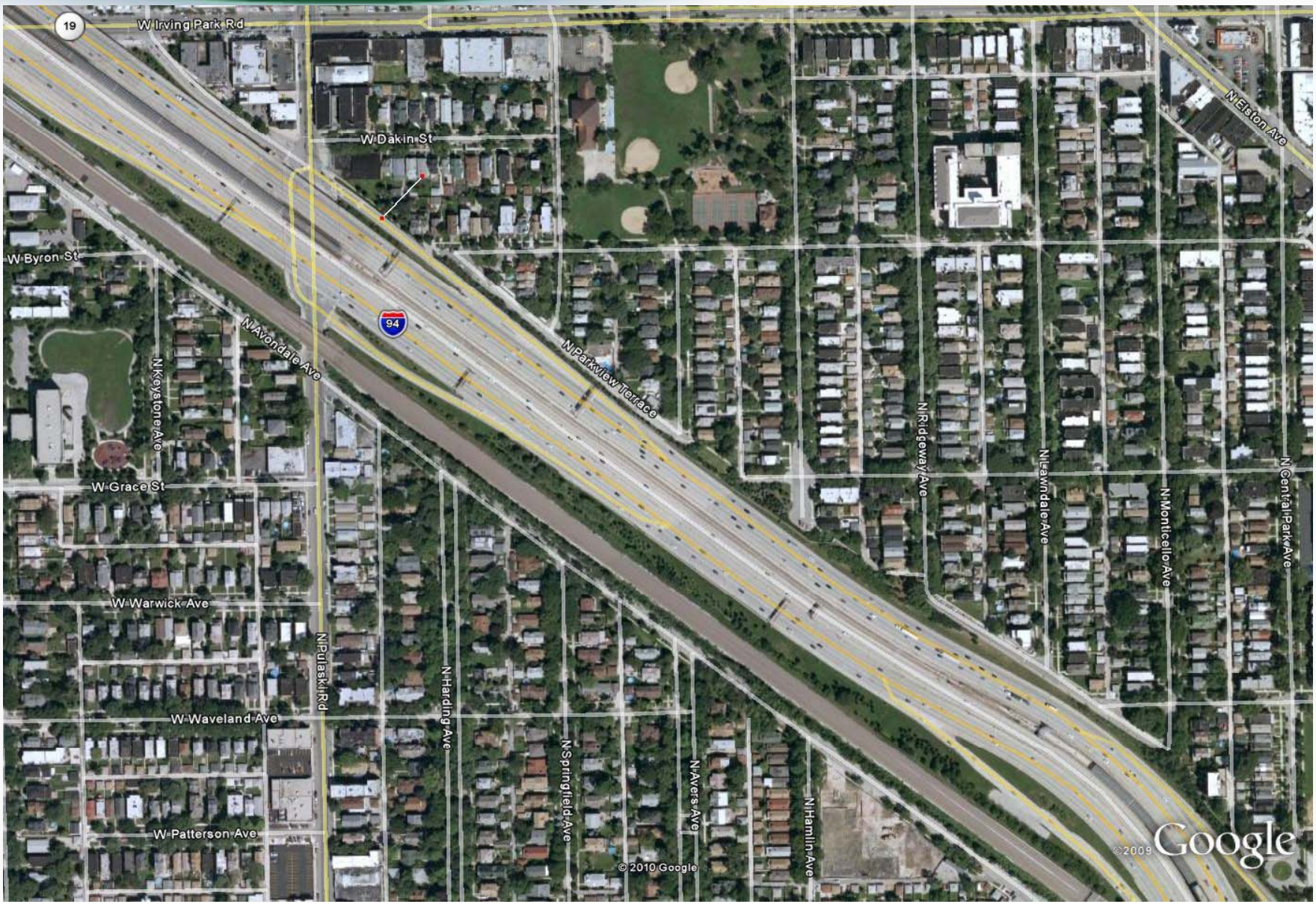
Mexico City

New Jersey

Scientists Increasingly Link Vehicle Exhaust With Brain-Cell Damage, Higher Rates of Autism

Wall Street Journal, 11/8/11

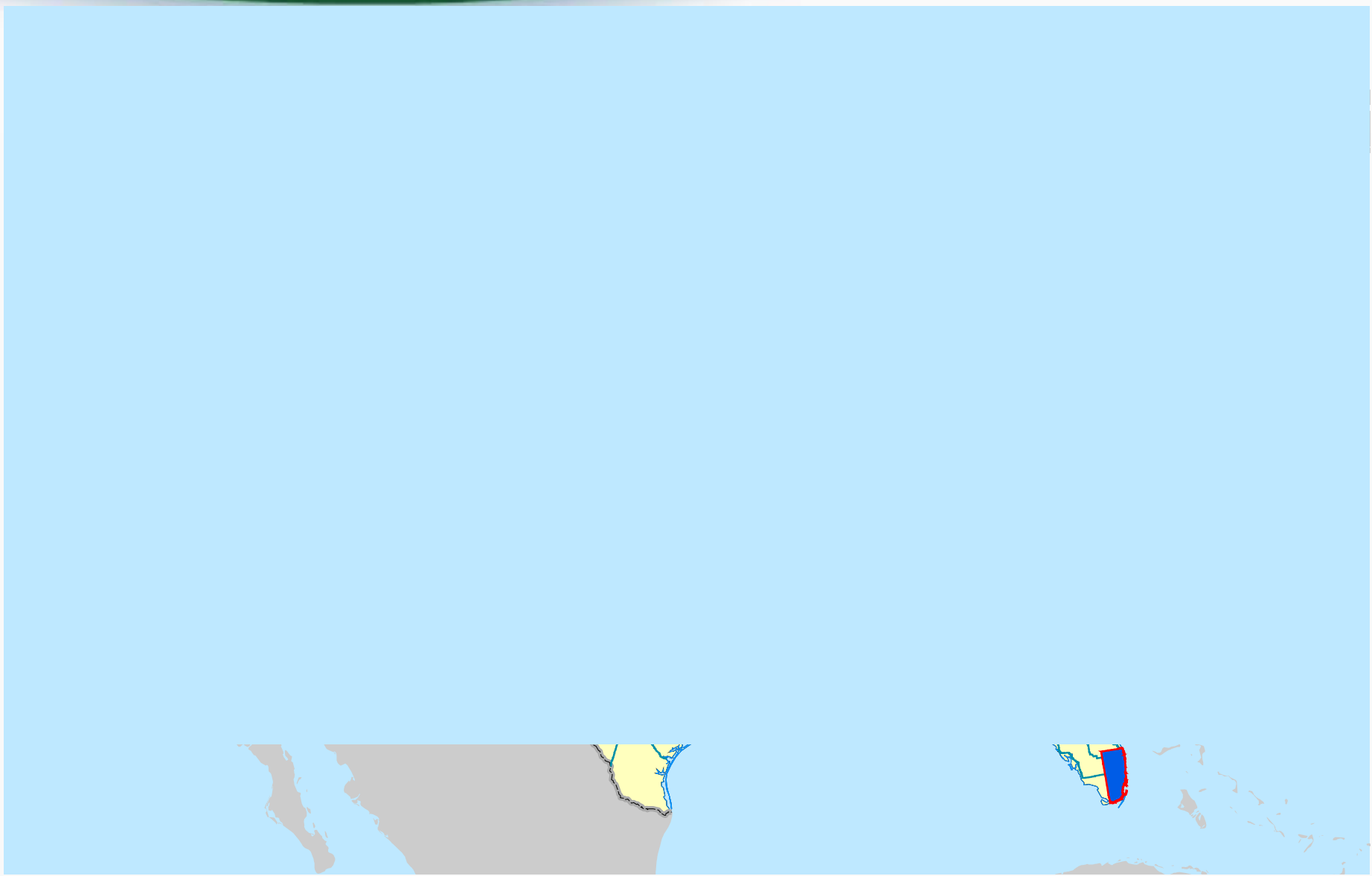
I-94 – Edens Expressway - Chicago



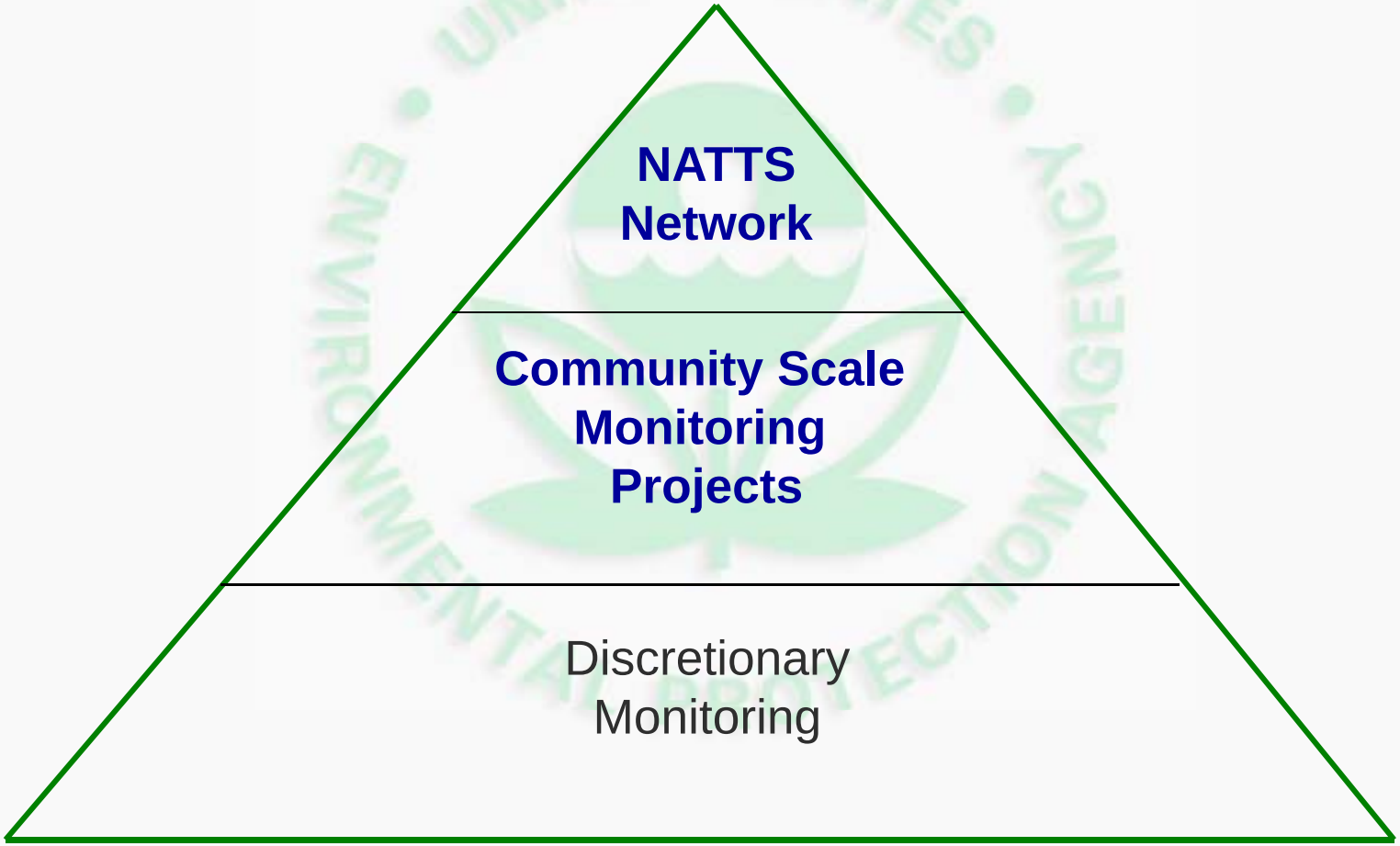
Recent actions – Near road monitoring

- EPA finalized a requirement for near-road NO2 monitoring in the 2010 NAAQS rule
  - Initial monitors in areas of 1M population or greater will be installed in 2013 and 2014
- CO monitors will be required at these sites by 2017
- The role of PM2.5 monitoring at near-road sites is being considered as part of PM NAAQS review
- A partnership with states, NACAA, FHWA, and CASAC has been formed to develop and review technical assistance materials to guide the development of the near-road infrastructure
  - http://www.epa.gov/ttnamti1/nearroad.html
- EPA expects the near-road network to be enhanced with additional measurements such as black carbon, ultrafine particles, and air toxics as monitoring objectives are clarified based on health studies and other research efforts

Initial Near-road Monitoring Areas



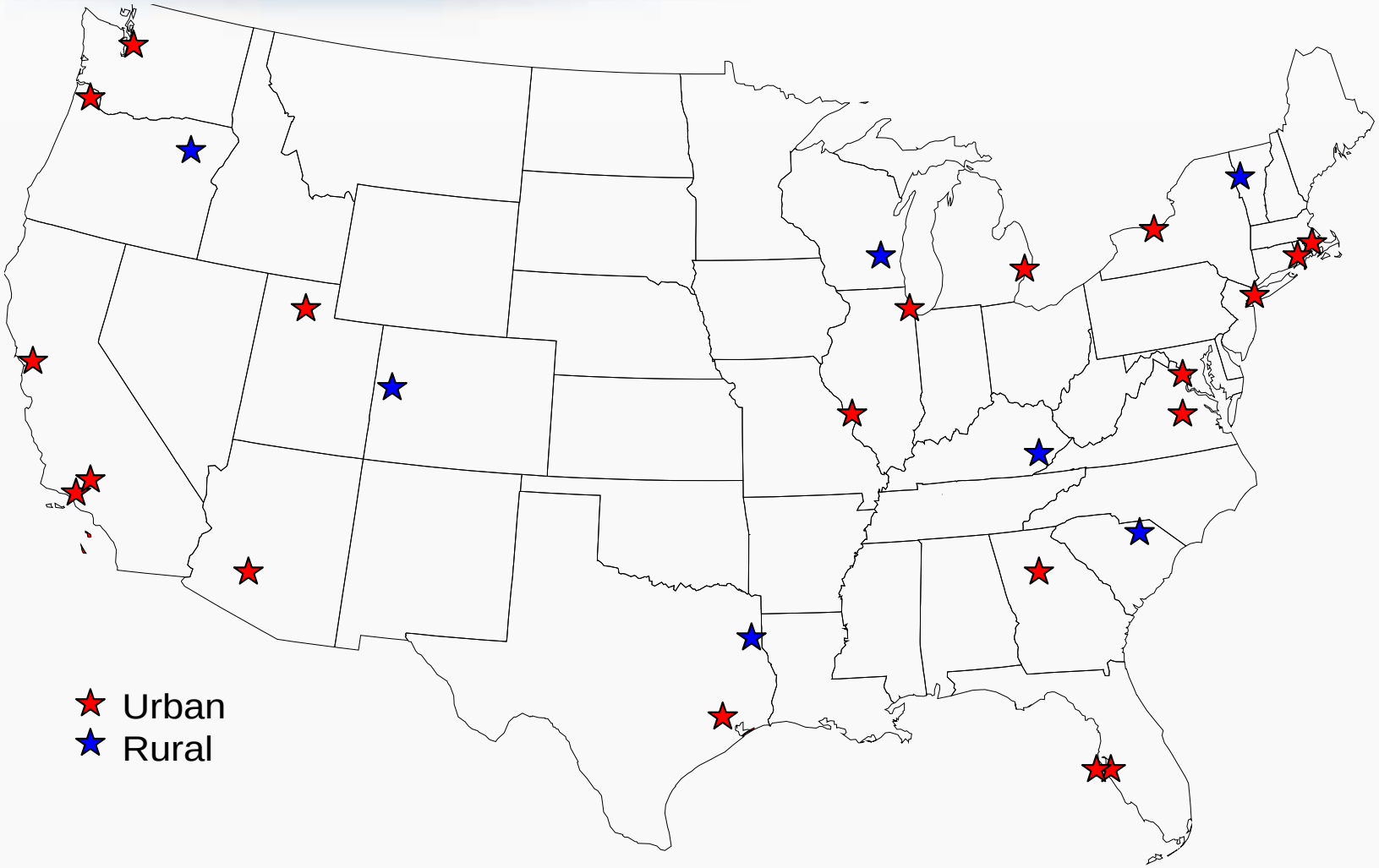
Air Toxics Ambient Monitoring



NATTS Facts

- The National Air Toxics Trends Station (NATTS) Network was developed to fulfill the need for long-term hazardous air pollutant (HAP) monitoring data of consistent quality.
- The current network configuration includes 27 sites (20 urban, 7 rural) across the United States; thirteen sites were established in 2003, ten sites in 2004, and two sites each in 2007 and 2008.
- There are typically over 100 pollutants monitored at each NATTS (though only 19 of those are required); included are VOCs, carbonyls, PM10 metals, hexavalent chromium, and PAHs.
- Objectives include:
  - Provide quality assured, standardized ambient data
  - Identify and assess trends / program progress
  - Ground truth air quality and human exposure models
  - Direct input into source-receptor models
  - Assess exposure and risk

NATTS Network



Minimum Required NATTS Analytes

VOCs
Acrolein
Benzene
Chloroform
1,3-butadiene
Vinyl Chloride
Perchloroethylene
Carbon Tetrachloride
Trichloroethylene
1,2-dichloropropane
Dichloromethane

Carbonyls
Formaldehyde
Acetaldehyde

PAHs
Benzo(a)pyrene
Naphthalene

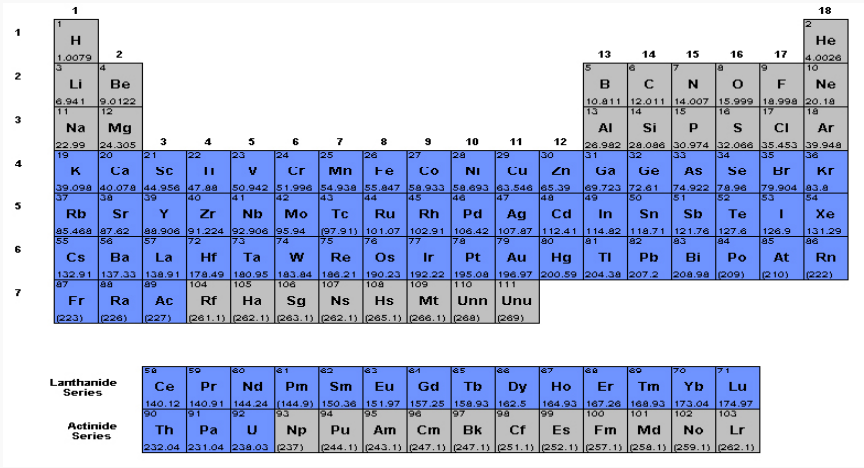
PM10 Metals
Nickel compounds
Arsenic compounds
Cadmium compounds
Manganese compounds
Beryllium compounds
Lead compounds

TSP Hexavalent Chromium

http://www.epa.gov/ttnamti1/natts.html

Emerging Issue – Modernizing AT Methods

- Limitations of typical air toxic monitoring methods
  - Integrated measurements over multiple hours to days
  - Costly laboratory analysis
  - Time delayed data reporting
- Technologies exist for real-time reporting of certain pollutants
- EPA is evaluating a real-time metals monitor to support follow-up measurements after the School Air Toxics program
  - Initial studies being conducted in various locations in OR and OH to characterize levels of metals including cadmium, manganese, and lead
  - Results can be analyzed to support source apportionment studies
  - High levels of interest from compliance staff



Community-Scale Air Toxics Ambient Monitoring (CSATAM) Grants

- ✓ Competitively awarded, short term (2-3 years) grant / cooperative agreement projects
- ✓ Grant competition centrally managed by Program Office
- ✓ Awards and post-award oversight by Regional Offices
- ✓ Funded with STAG Section 103
- ✓ Eligibility limited to state, local, and tribal Air Pollution Control Agencies
- ✓ Objectives include:
  - o Characterizing the degree and extent of local-scale air toxics problems
  - o Identifying and profiling air toxics sources
  - o Tracking progress of air toxics reduction activities
  - o Developing and assessing emerging measurement methods

2011 Proposals Recommended for Award (1 of 2)

- ✓ MN Pollution Control Agency
  - o Delineate spatial and temporal inner city (Minneapolis) PAH concentrations
  - o Assess risk, attribute to sources, compare ambient data with model output
- ✓ VA Dept of Environmental Quality
  - o Delineate spatial and temporal methyl bromide concentrations / variability associated with two large fumigation facilities (Suffolk); assess health risks
- ✓ Shelby County TN
  - o Delineate spatial and temporal VOC concentrations in heavily industrialized and populated President's Island community (Memphis)
  - o Assess risk, attribute to sources, compare ambient data with model output
- ✓ City of Philadelphia PA
  - o Continuous real-time measure of VOC, carbonyl, PAH ambient concentrations in vicinity of major oil refinery and other proximal industry
  - o Assess risk; real time warning for HF (highly toxic; assoc. with gas refining)

2011 Proposals Recommended for Award (2 of 2)

- ✓ Linn County IA
  - o Follow up to 07/08 CSATAM grant
    - o Assess aldehyde concentrations associated with fermentation industry
    - o Result – ambient concentrations characterized, sources verified and emission reductions negotiated
  - o 2011 grant - assess impact from negotiated emission reductions
- ✓ Municipality of Anchorage AK
  - o Follow up to 07/08 CSATAM grant
    - o Characterize ambient concentrations for key Mobile Source Air Toxic pollutants prior to implementing second round of MSAT regulations
    - o Result – ambient concentrations successfully characterized
  - o 2011 grant - assess impact of regulatory benzene reduction in gasoline
- ✓ Broward County FL
  - o Evaluate alternative carbonyl (TO-11A) and PAH (TO-13A) methods
  - o Reduce / simplify media and sample prep (and thus effort and cost)

Tribal Monitoring - Overview

- 565 Federal Recognized Tribes
- Tribes are “Sovereign Dependent Nations” thus administer their own programs or EPA administers for them
- Purposes for Tribal Monitoring include:
  - Regulatory monitoring to support NAAQS determinations
  - Air Quality assessments
  - Screening analysis
  - Supporting cultural and other relevant values or priority
- Tribal Air Monitoring Support Center (TAMS)
  - Provides technical training
  - Professional Assistance
  - Filter weighing
  - Other support to tribes
- Key tribal concerns include resources constraints and challenges to meeting quality assurance requirements so that data can be used for regulatory purposes

Tribal Monitoring

- Tribes reporting data to the Air Quality System
  - The number of tribe monitoring since 2005 has ranged from 48 to 66 with 53 tribes monitoring in 2011
  - Currently there are 68 Tribal monitoring sites in AQS down from 92 in 2010
- Tribes operating monitors in other national monitoring programs including IMPROVE, National Atmospheric Deposition Program, and Mercury Deposition Network,
- Tribal School Air Toxics Program
  - 2 tribes participate in the national effort (Nez Perce, Southern Ute)
  - Excess equipment was provided to the TAMS Center to support additional tribal screening studies
  - Additional monitoring has been conducted at:
    - Navajo
    - Leach Lake Band of Ojibwe
    - Red Lake Band of Ojibwe
    - Nez Perce

Final Thoughts

What we are discussing with Agencies

- Assisting with ambient network investment and divestment decisions
  - Priorities and objectives must be reassessed in an environment of shrinking resources
- Supporting the investment in new measurement technologies that might (ultimately) be less expensive, more specific, and provide better time resolution while meeting QA goals
- Providing better data management and display tools to support more efficient and effective data analysis efforts

Questions