

# Air Toxics Ambient Monitoring

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on Air Pollution Exposure and Health

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EPA Office of Air Quality Planning and Standards

<http://www.epa.gov/ttn/amtic/airtoxpg.html>

# Agenda

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## Focus: Air Toxics Ambient Monitoring Data

- Overview of Air Toxics Ambient Monitoring
- Pollutant, Geographical, and Temporal Coverage
- Accessibility
- Reliability / Validity

# National Air Toxics Ambient Monitoring

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**NATTS:** National Air Toxics Trends Stations

- 23 sites across CONUS
- Long-term (i.e., trends)

**CSM:** Community-Scale Monitoring

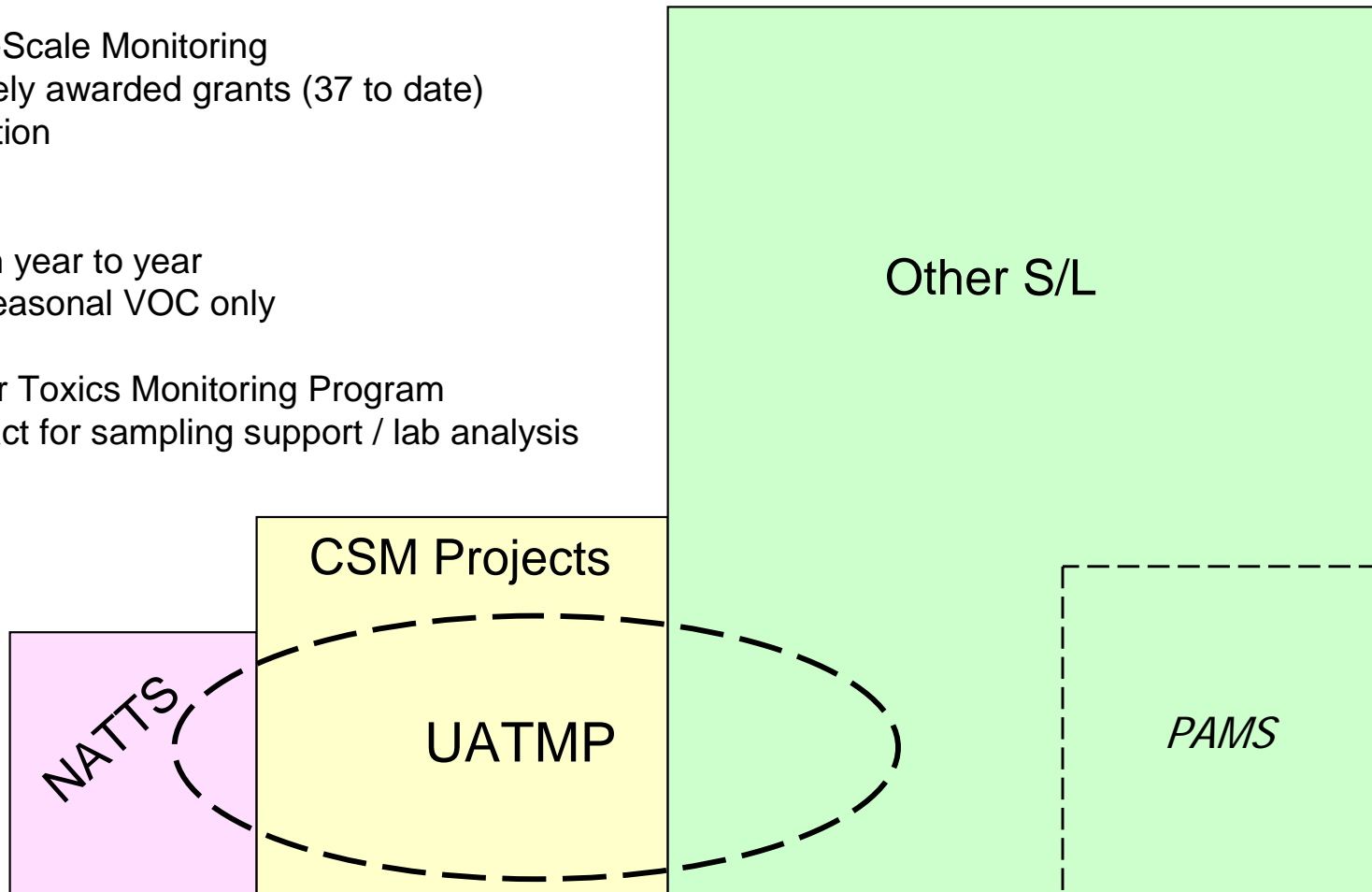
- Competitively awarded grants (37 to date)
- ~ 2 yr duration

**Other S/L:**

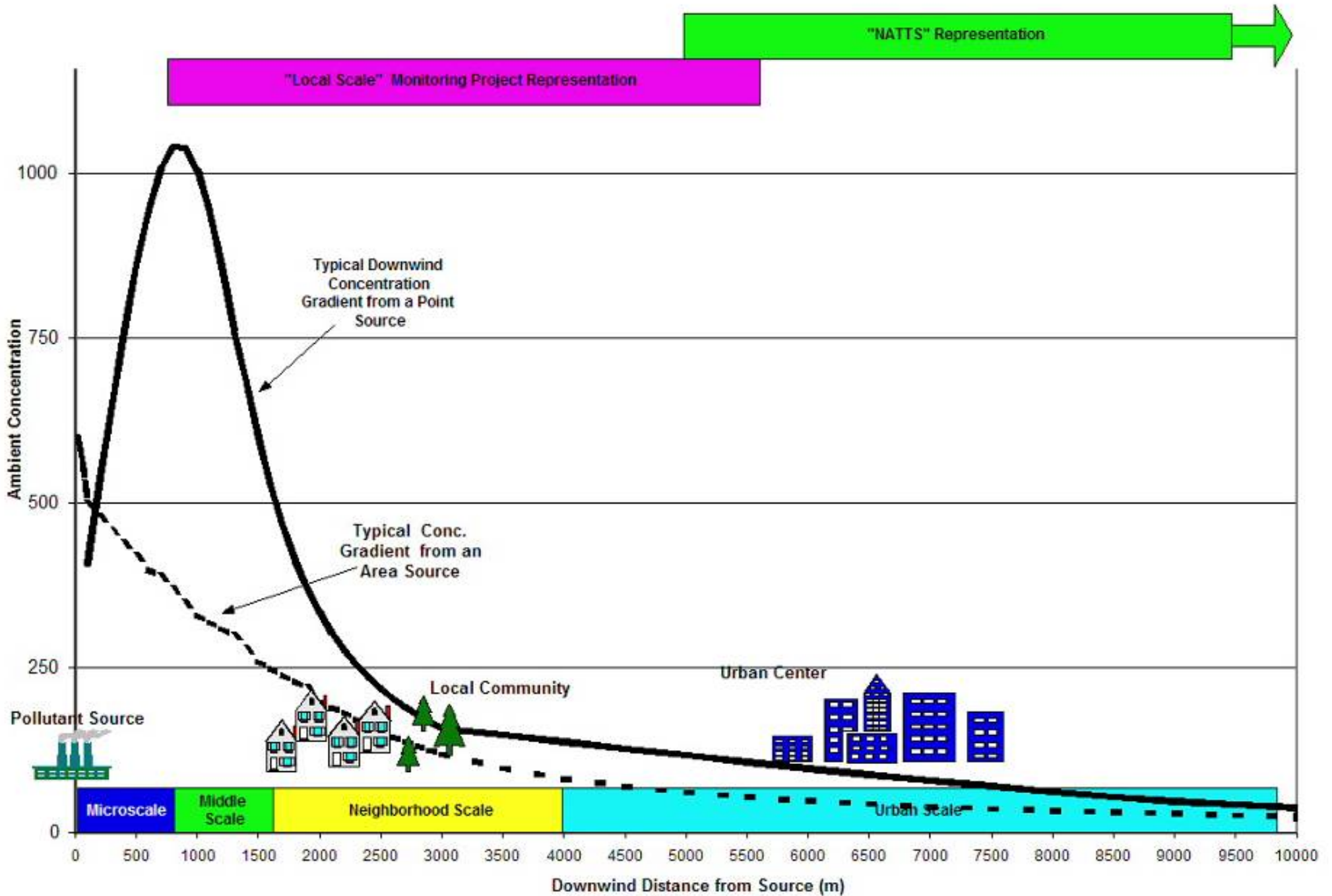
- Varies from year to year
- Many are seasonal VOC only

**UATMP:** Urban Air Toxics Monitoring Program

- Nat'l contract for sampling support / lab analysis



# National Monitoring Projects Scales of Representation



# National Air Toxics Trend Stations (NATTS)

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- Initial sites established 2003; balance established 2004
  - ✓ Limited data for 2003/04; first complete year 2005
- 23 national air toxics trends sites; 17 urban / 6 rural
  - ✓ Principle Objective: trends and accountability
  - ✓ Scale: urban (5 km) and greater
  - ✓ Network may be expanded by ~5-10 sites in 2008
- Collocated with PM<sub>2.5</sub> speciation samplers, some also with PAMS
- Sampling and analysis: VOCs, carbonyls, PM<sub>10</sub> HAP metals, TSP hexavalent chromium
  - ✓ Other HAPs (e.g., SVOCs) may be added in 2008
- All sites expected to follow QA program for sampling and analysis

# NATTS Sites and Pollutants

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## Sites

Roxbury MA	Houston TX
Providence RI	Bronx NY
Washington DC	Hazard KY
Dearborn MI	St. Louis MO
San Jose CA	Bountiful UT
Seattle WA	
Underhill VT	
Rochester NY	
Chesterfield SC	
Chicago (Northbrook) IL	
Mayville WI	
Harrison County TX	
Grand Junction CO	
Phoenix AZ	
La Grande OR	
Tampa FL (1) – Hillsborough Co.	
Tampa FL (2) – Pinellas Co.	
Atlanta (Decatur) GA	

## Pollutants (*Minimum* Requirements)

VOCs by TO-15 (analysis by GC/MS SIM)

Acrolein

Perchloroethylene

Benzene

carbon tetrachloride

Chloroform

Trichloroethylene

1,3-butadiene

Carbonyls by TO-11A

Formaldehyde

acetaldehyde

PM10 Metals by IO 3.5

nickel compounds

arsenic compounds

cadmium compounds

manganese compounds

antimony

Hexavalent Chromium (TSP) by modified

CARB Method 039

# Local-Scale Monitoring Projects

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- Middle and Neighborhood scale (.5km to 4 km) air quality issues, where not addressed by NATTS network
- 15 to 20 projects are expected to be funded each year in different locations
- FY2004 – \$6.2 Million
  - ✓ 17 projects awarded from 49 proposals
  - ✓ Project completion dates from latter 2006 through 2007
- FY2005 – \$6.5 Million
  - ✓ 20 projects awarded from 56 proposals
  - ✓ Project completions anticipated 2008
- FY2006 /2007 (combined) ~ \$10.4 Million
  - ✓ Awards anticipated mid 2007
  - ✓ Project completions by end of 2009

# Other Local Programs

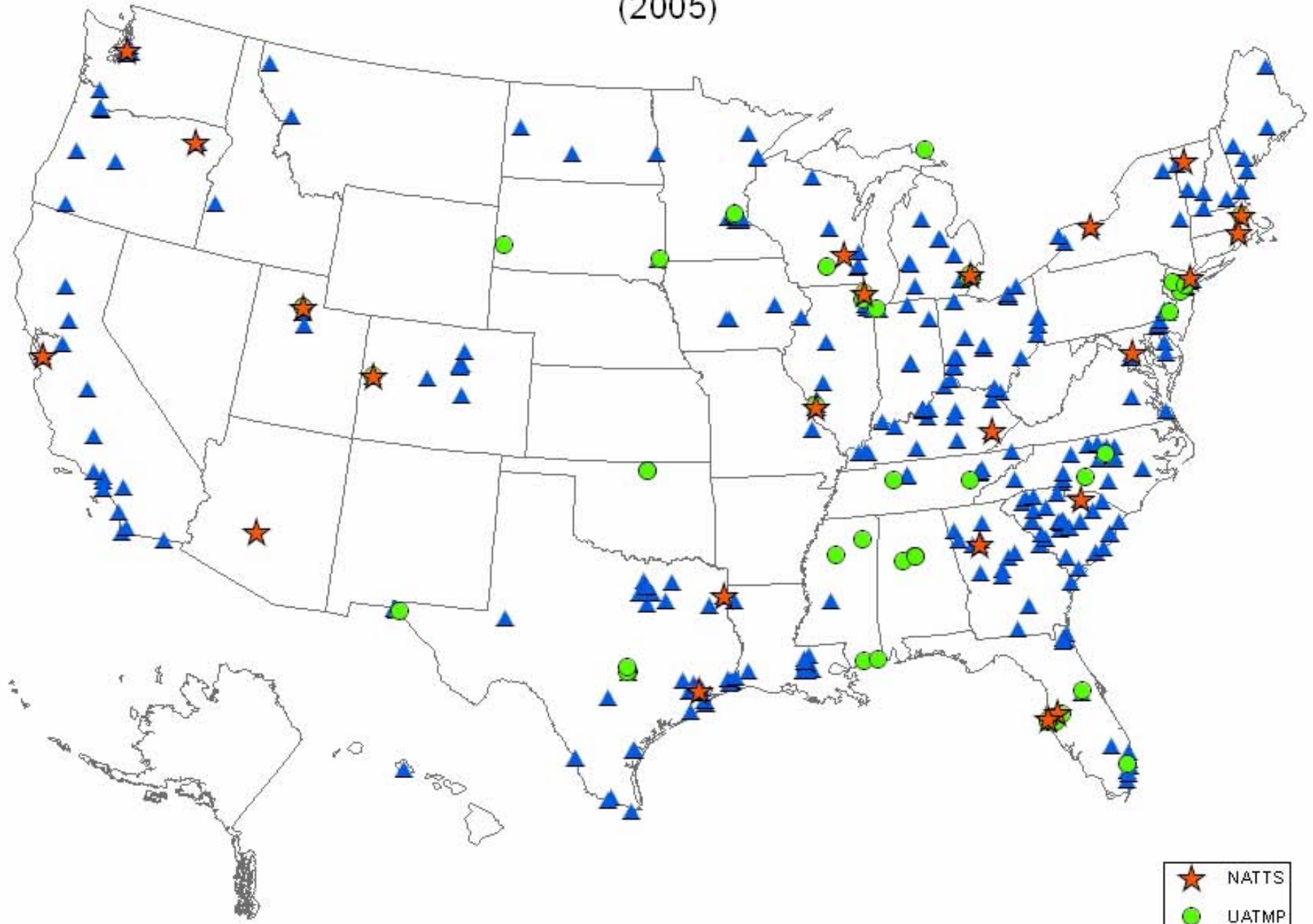
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- State / local agencies conduct monitoring to address specific concerns
  - ✓ Hot spots
  - ✓ EJ
  - ✓ Public complaints
- Some agencies use EPA sampling support and lab analysis contract; many choose to use State / local labs instead
- Not all agencies enter data into EPA Database (Air Quality System or AQS)



# Air Toxics Monitoring Sites (2005)



# Spatial and Temporal Coverage

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## ➤ Spatial

- ✓ Monitoring has and continues to be most prevalent east of Mississippi, Gulf coast and coastal west states
- ✓ Clear tendency to monitor in densely populated areas

## ➤ Temporal

- ✓ Typically 24 hour samples on 1 in 6 day schedule
- ✓ Limited toxics data extends as far back as late 60's
- ✓ Increased activity since late 80s; significant increase over past five years
- ✓ Relatively few sites have consistent, long term records
  - Over last 10 years, few S / L / T agencies have sustained commitment to air toxics monitoring
  - Often 1 to 3 years only (i.e., specific purpose)
  - Not uncommon to monitor, cease for year or two, resume
  - Further, not all monitoring is calendar year – some summer to summer record, seasonal only, etc.

# Data Quality

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- NATTS - well developed Quality Assurance (QA) Program
  - ✓ Proficiency Testing (PT)
    - Blind samples of known analyte concentrations sent to participant labs
    - Samples analyzed, results to program office, compared with actual
    - Results documented in Quarterly and Annual NATTS QA Reports (<http://www.epa.gov/ttn/amtic/airtoxqa.html>)
  - ✓ Technical Systems Audits (TSA's): on-site evaluation of analytical laboratories and site operations
    - Periodic (1-3 yr frequency, dependent upon demonstrated proficiency)
  - ✓ DQOs: CV15%, data completeness 85%
- Non-NATTS
  - ✓ Must comply with EPA QA requirements
    - <http://www.epa.gov/quality/>
  - ✓ Quality indicators via database flagging
  - ✓ Not required to participate in NATTS QA program
    - Starting this year, 7 non-NATTS labs have elected to participate in NATTS PT program

# Data Quality Issues

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## ➤ Methods

- ✓ Prior to this year, no viable routine method for acrolein and hexavalent chromium (problems with sample stability and recovery)
- ✓ Revised methods developed by ERG and OAQPS/AAMG
  - Acrolein: TO-15 (GC/MS operated in SIM mode)
  - Cr+6: modified CARB Method 039
  - Greatly improved sample stability and recovery
  - Aim is to fully implement CY07
- ✓ Detection Limits
  - MDLs for many air toxics are too high to characterize the low end of urban concentration ranges
  - Challenge will be to improve methods such that detection limits are at or lower than health benchmarks

# Data Accessibility

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- Air Quality System (<http://www.epa.gov/ttn/airs/airsaqs/>)
  - ✓ Contains detailed measurements for criteria and toxic air pollutants from 1993 through current
  - ✓ Pre-1993 data archived off-line; available by request
  - ✓ Principle Contact:
    - Jake Summers ([summers.jake@epa.gov](mailto:summers.jake@epa.gov), 919-541-5695)
- AQS Data Warehouse (<http://www.epa.gov/ttn/airs/aqsdatamart/>)
  - ✓ Contains both detailed and summary criteria and toxics air quality data since 1980
  - ✓ Database established Spring '06; data retrieval will become active late 2006
  - ✓ Principle Contact:
    - Nick Mangus ([mangus.nick@epa.gov](mailto:mangus.nick@epa.gov), 919-541-5549)
- Air Toxics Data Archive (<http://vista.cira.colostate.edu/atda/>)
  - ✓ Toxics data from 1960s through 2001

# Conclusion

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- Increasing number of air toxics ambient monitoring sites, data reported to AQS, and quality of data, esp. in past several years
- Local- / community-scale monitoring program beginning to yield results
  - ✓ First round of projects nearing completion; results to be presented over next year
- Challenges
  - ✓ Work to improve methods with MDLs near or above health benchmarks
  - ✓ Continue emphasis on data quality
  - ✓ Continue to emphasize coordination between air toxics ambient monitoring and health studies / exposure assessments, especially in local-scale project grants