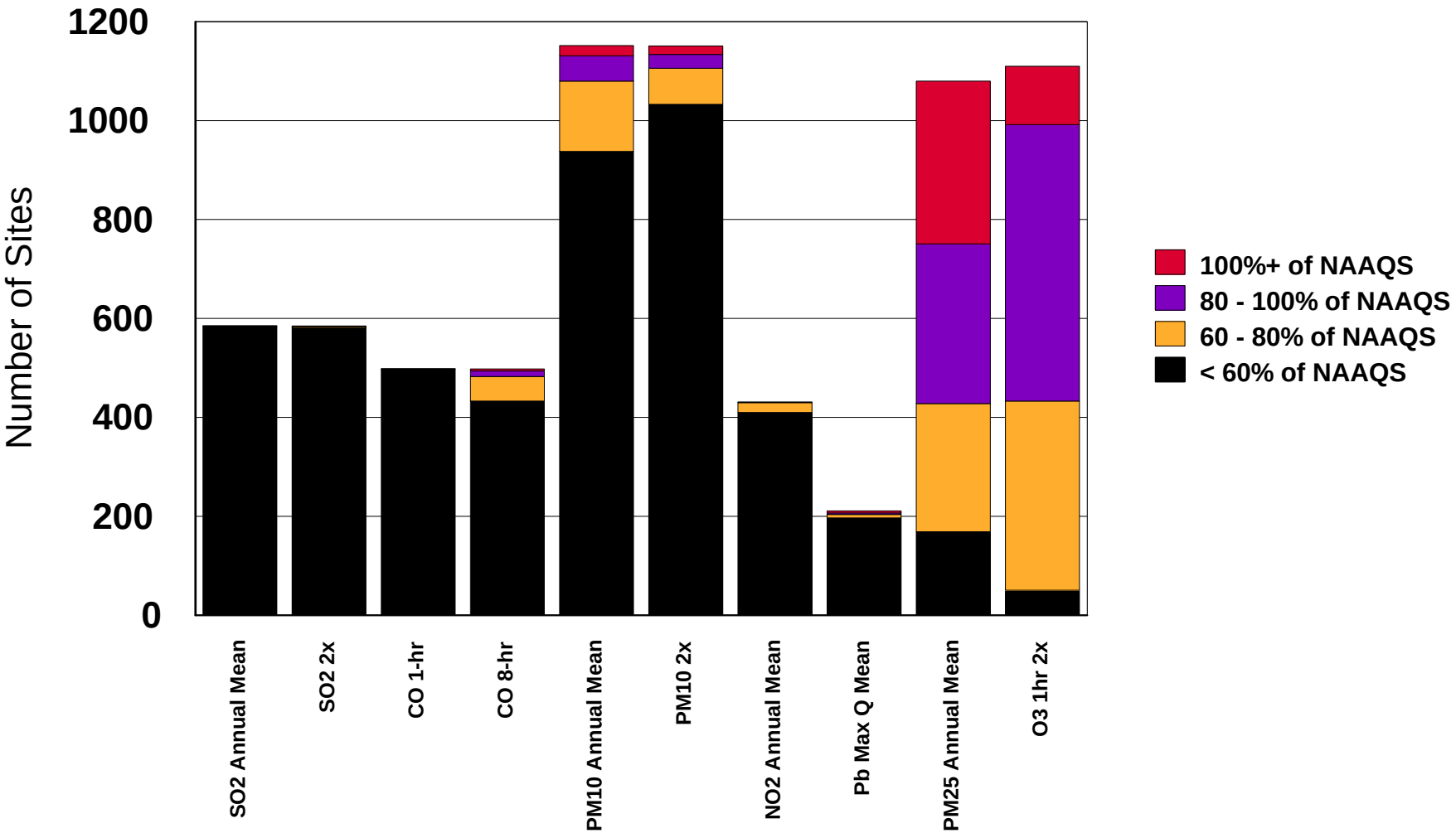
OAR Presentation: National Monitoring Strategy and Implications for Health Studies

Tim Hanley
EPA Office of Air Quality Planning and Standards
December 1, 2005

Why a National Monitoring Strategy?

- Air quality has improved substantially for primary pollutants, but remains an issue for secondary formed ones
- New priorities keep coming up, but resources are flat or diminishing
- Air program management needs for ambient monitoring data have evolved into areas beyond just NAAQS compliance:
  - Public reporting and forecasting
  - Support for modeling and accountability of emission control programs
  - Science and ecosystem support
- Methods have improved, but are not readily accepted in networks

Why a National Monitoring Strategy?



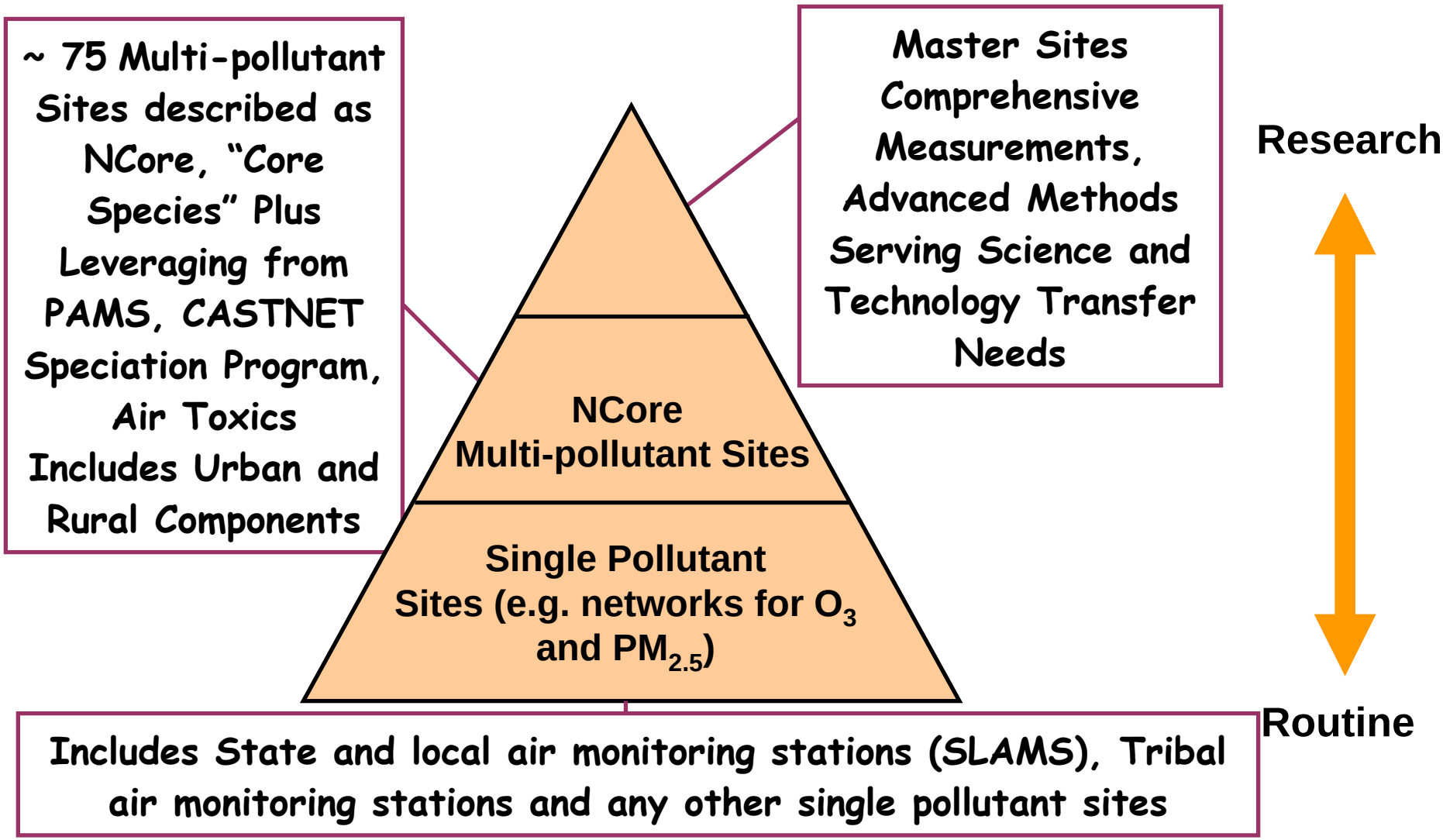
National Monitoring Strategy Background

- A reinvention of the ambient air monitoring program operated by State, local, Tribal, and Federal partners
- Provides direction for investments and divestments in ambient air monitoring programs according to a new framework
- Stakeholder driven process developed over the last 5 years by EPA and State/local/Tribal Air Monitoring Agencies
- Review and input from CASAC Ambient Air Monitoring and Methods Subcommittee and former CASAC Subcommittee
- Consistent with NAS-AQM report calling for broader multi-pollutant integration and additional attention to air toxics and ecosystem/multimedia
- Strong support from CAAAC S&T subgroup
  - Endorses EPA proposed national monitoring strategy and encourages regional monitoring strategies. The existing monitoring networks are top-heavy on compliance and light on addressing other monitoring objectives, especially control strategy development and accountability.

National Monitoring Strategy – Major Themes

- Move from layered compliance networks to an integrated multiple pollutant measurement infrastructure
- Network Assessments
- Reinvention of Quality Assurance
- Performance based acceptance of PM continuous technologies
- Enhance data availability

National Ambient Air Monitoring System



Role of EPA, EPA Regional Offices, State, local, and Tribal Monitoring Agencies in Changes to Network

- Multi-pollutant NCore Sites
  - Operated by State, local, Tribal, and CASTNet Contractor/Partners (for some rural sites)
  - Part of Annual Network Review submitted by State
  - Approved by EPA Headquarters
- Single-Pollutant Sites
  - Operated by State, local, and Tribal Monitoring Agencies
  - Part of Annual Network Review submitted by State
  - Approved by EPA Regional Offices

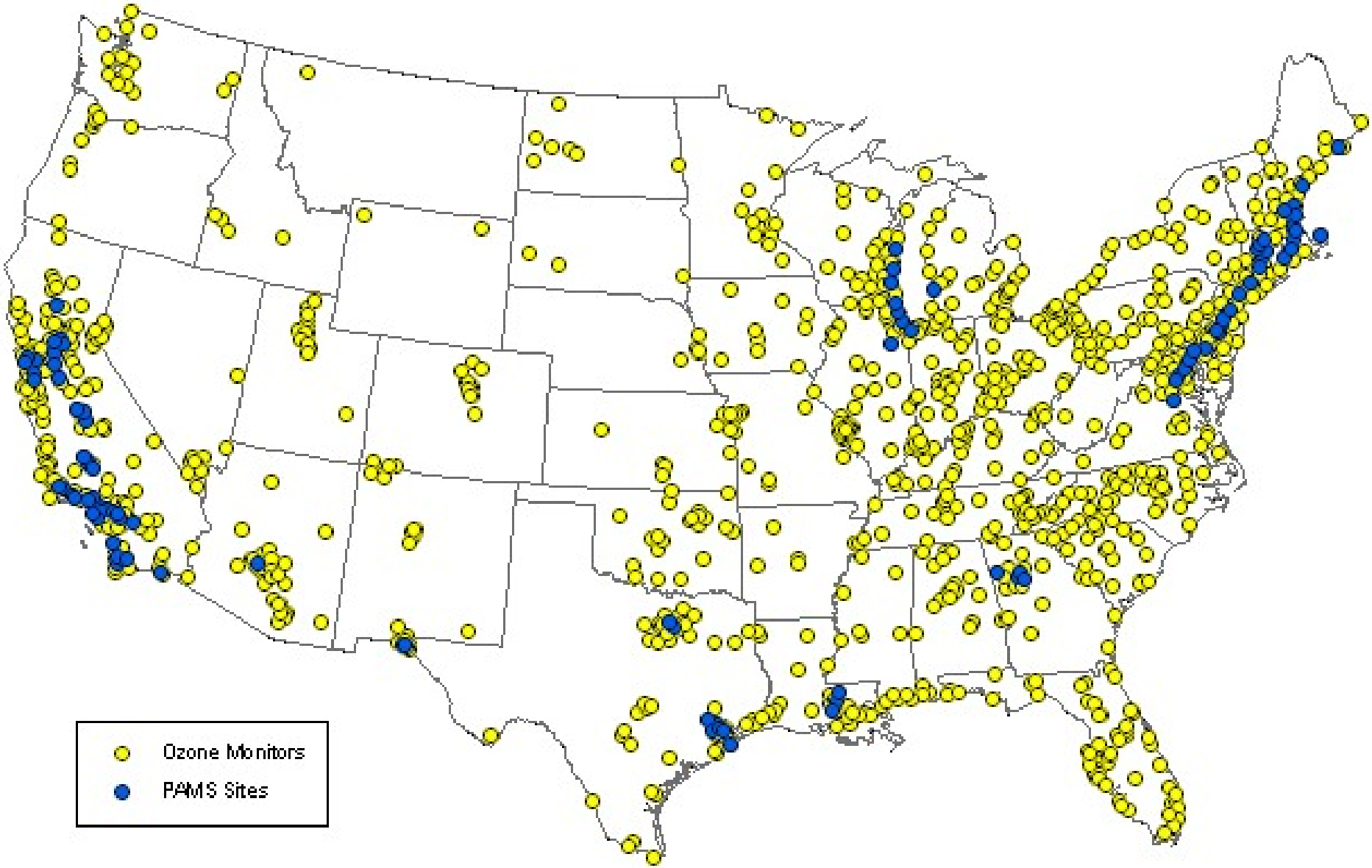
Transforming the Ambient Monitoring Networks

- Expect to:
  - Reduce monitoring networks for:

Pollutant	Operating Number of Monitors (Approx)
PM_{10}	1,072
Carbon Monoxide	445
Sulfur Dioxide	465
Nitrogen Dioxide	413
Lead	184

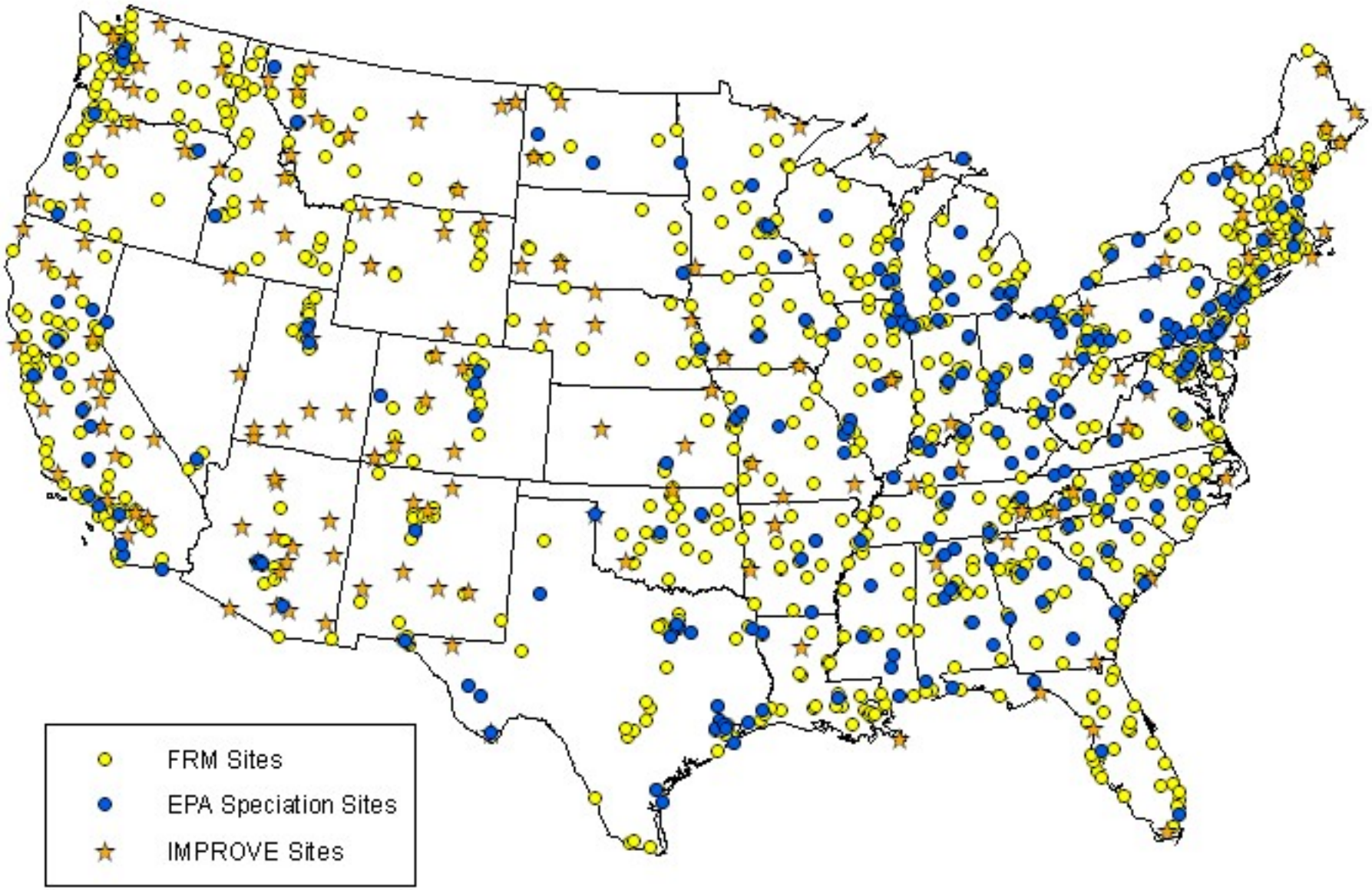
  - Retain large spatial networks for:

Ozone Monitoring



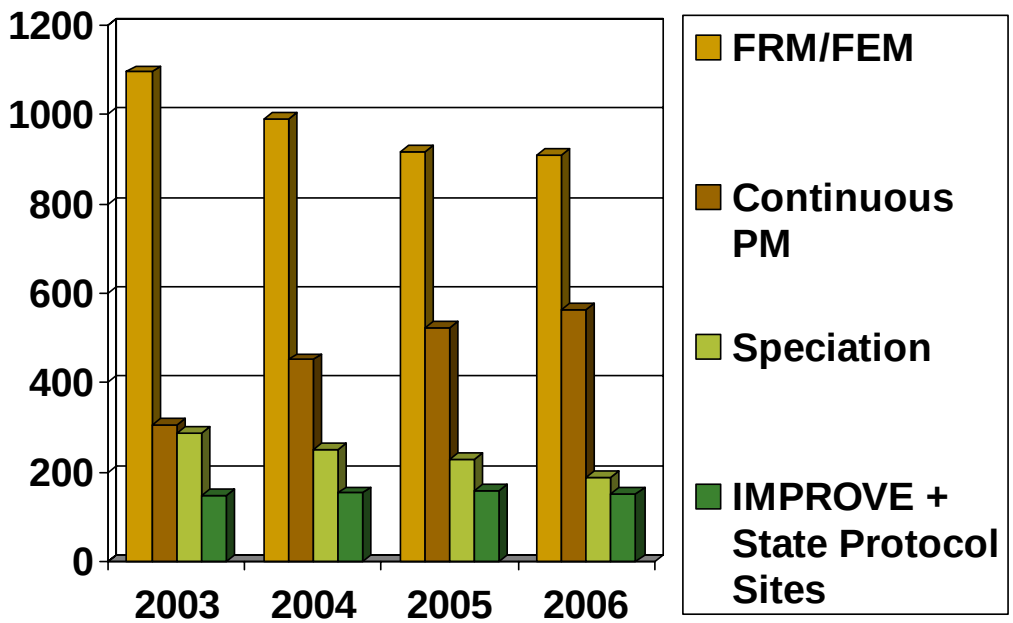
$PM_{2.5}$ Monitoring

(peak network operation)



$PM_{2.5}$ Monitoring Network Implementation

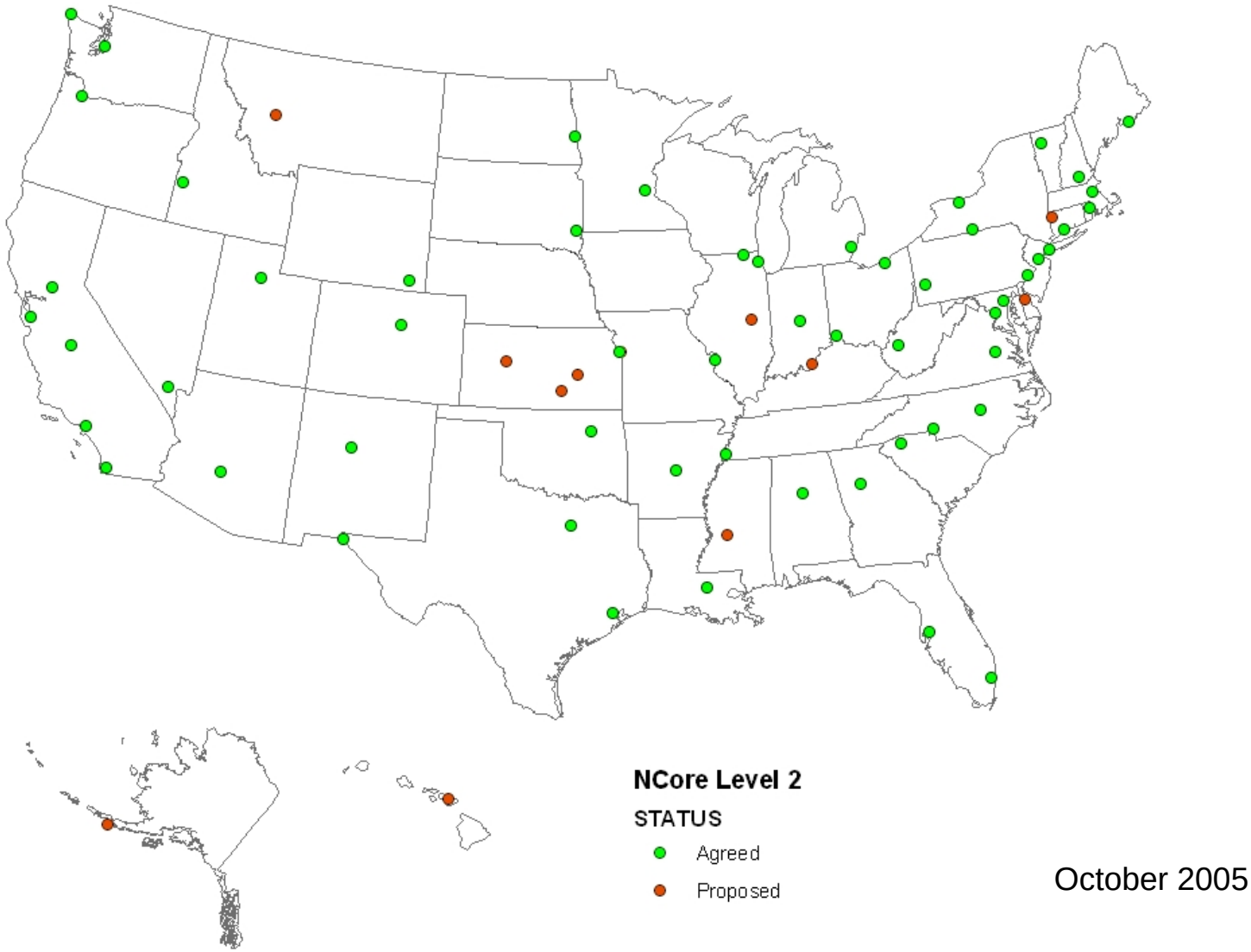
- **$PM_{2.5}$ FRMs and Filter FEMs**
  - Attainment Designations completed in 2005
  - Possible revisions to NAAQS in 2006
  - Number of FRMs expected to decrease
- **$PM_{2.5}$ Continuous Monitoring**
  - Supports AQI
  - Potential to support possible short term secondary standard for urban visibility
  - Number of monitors expected to rise as FRMs decrease
- **Speciation and IMPROVE Programs**
  - IMPROVE program stable
  - Trends Network stable
  - Number of supplemental speciation sites expected to decrease
    - Mostly 1/6 sites



Transforming the Ambient Monitoring Networks - *continued*

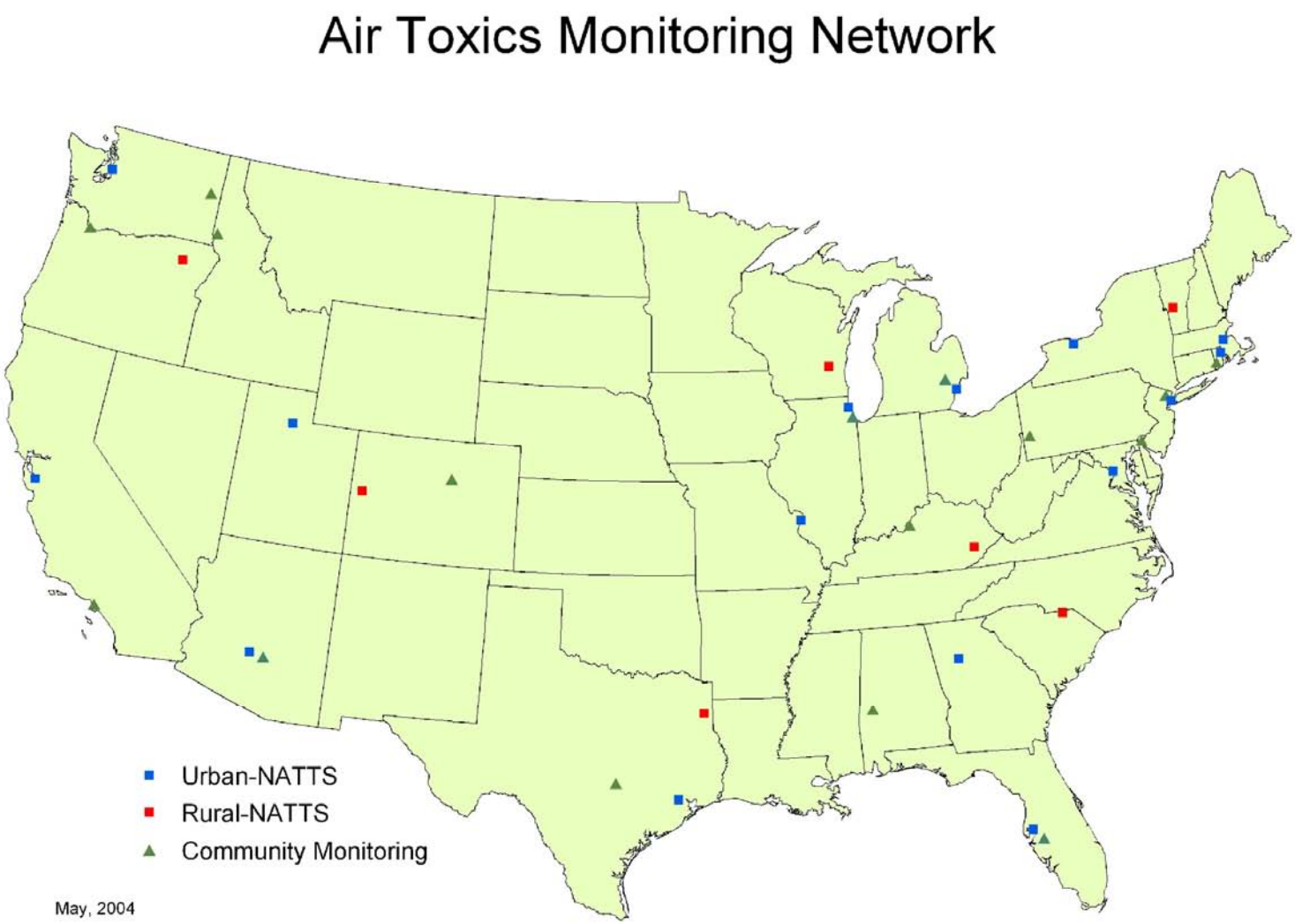
- Expect to add ~75 multi-pollutant sites as the National Core (NCore) network, monitoring for:
  - Particles
    - $PM_{2.5}$ FRM
    - $PM_{2.5}$ Chemical Speciation
    - $PM_{2.5}$ and $PM_{10-2.5}$ Continuous
  - Ozone (O_3)
  - High sensitivity gas monitors for:
    - carbon monoxide (CO);
    - sulfur dioxide (SO_2); and
    - total reactive nitrogen (NO_y)
  - Ammonia (NH_3) and Nitric Acid (HNO_3)
  - Meteorology – T, RH, WS, WD
- Typically will be at neighborhood scale or larger

Draft Recommended National Core (NCore) multi-pollutant sites



October 2005

Leverage National Air Toxic Trends Sites with NCore Multi-pollutant Sites



Does Not Include other local Air Toxics sites

What Further Changes Are Likely?

- Proposal for a $PM_{10-2.5}$ network
- Possible revocation of PM_{10} NAAQS
- PAMS redesign with some limited reductions
- Meaningful network re-assessments at 5 year intervals

National Monitoring Strategy Update and Timetable

- National Monitoring Strategy with Implementation plan released April 2004.
- CASAC AAMM Scientific review of Implementation plan – December 2004.
- 2005 – Pilot NCore multi-pollutant sites at ~24 State/local agencies
  - Mostly PM speciation trends sites with high sensitivity analyzers for CO, SO2, and NOy
  - OAP-OAQPS CASTNET collaboration
- Updated Monitoring Strategy Document and Planned Proposal for new Monitoring Regulations - December 2005
- Final Monitoring Rule incorporating National Core Network (NCore) and possible $PM_{10-2.5}$ – September 2006
- 2007-2010 Implement NCore sites

National Monitoring Strategy – Notes on Methods

- **Chemical Speciation Program**
  - Developing plan for consistency between IMPROVE and Speciation Trends (including supplemental sites) carbon sampling and analysis. Likely to adopt IMPROVE protocol for carbon.
- **Multi-pollutant measurements**
  - Methods for high-sensitivity measurement of CO, SO_2, and NO_y have been developed
  - Investigating options for NH_3 and direct NO_2 measurements
  - HNO_3 will come later
  - CASTNET pilot of MARGA technology (ion chromatography)
- **$PM_{10-2.5}$**
  - Expect to rely on filter-based methods for FRM; however, will only use in approval process of continuous equivalent methods and for quality assurance purposes
  - Equivalency criteria based on data quality objective process has been developed
- **$PM_{2.5}$**
  - Equivalency criteria based on data quality objective process has been developed

Data Availability

- AIRNowTech - Processing and availability of near real-time continuous data
  - Mostly PM and ozone; however, other continuous data and collocated meteorology can now be processed
  - http://www.airnowtech.org/index.cfm?page=login

- AQS
  - Large effort on improved availability of data to science and other partners underway includes:
    - Availability of standard queries with on-line tools that are updated frequently. For example: http://www.epa.gov/airexplorer
    - Access via an off-the-shelf query tool called "Business Objects“
    - Access via web services
  - Target for first stages of release – early 2006

Communicating Change

- Plan is to have State and local agencies make their annual network reviews available for comment (via web)
- National Monitoring Conference for State, local, and Tribal Monitoring Agencies being Planned for Fall 2006

- Ideas on how we can keep communication lines open between the ambient monitoring program and your Research?