



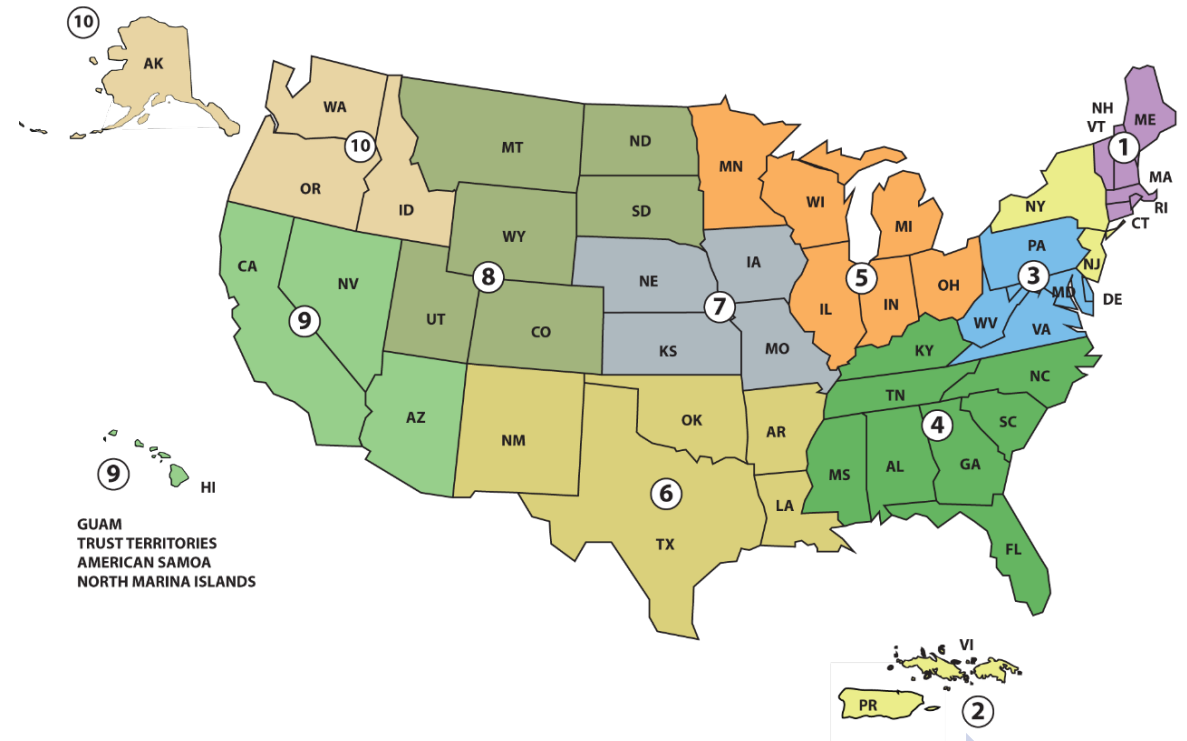
# Ambient Air Monitoring and NAAQS Overview

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National Ambient Air Monitoring Conference  
Pittsburgh, PA

# What is encompassed in the U.S. Ambient Air Monitoring Networks?

*(as reported to AQS)*



185  
Reporting  
Agencies

4,857  
Sites

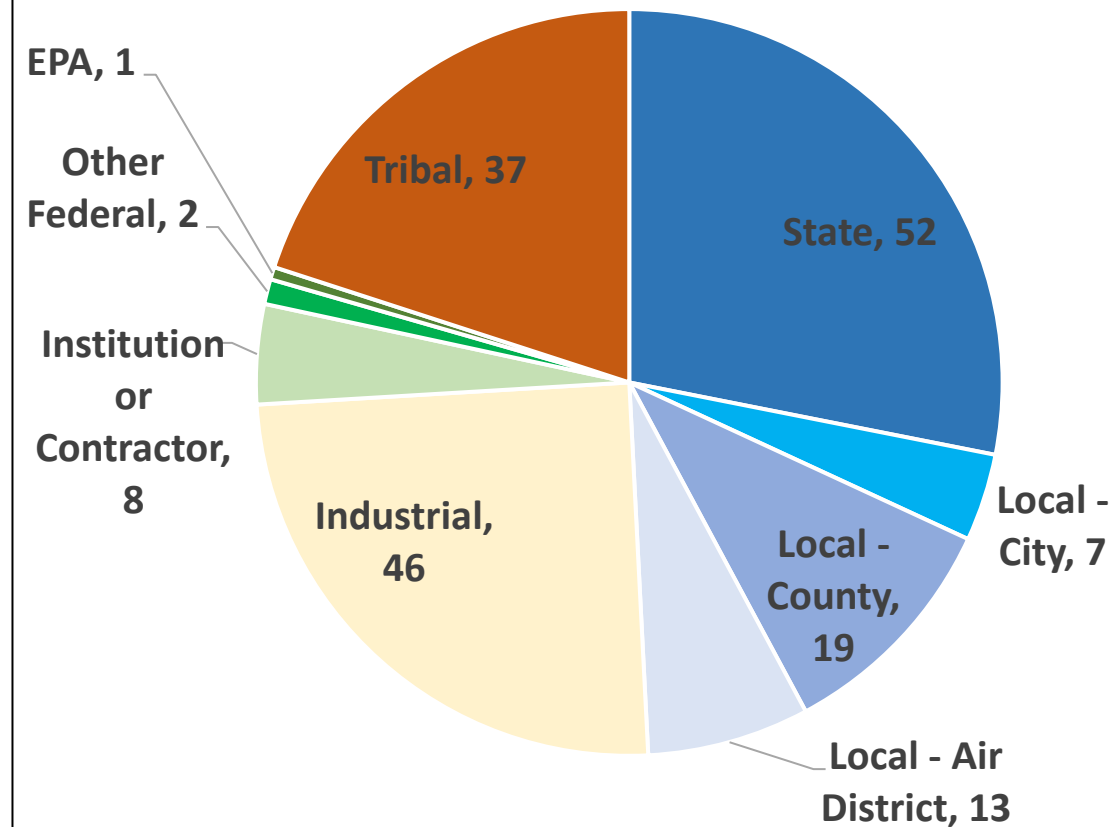
49,336 Monitors<sup>1</sup>

~121 M  
measurements a  
year

<sup>1</sup> - Each measurement is reported as its own monitor.

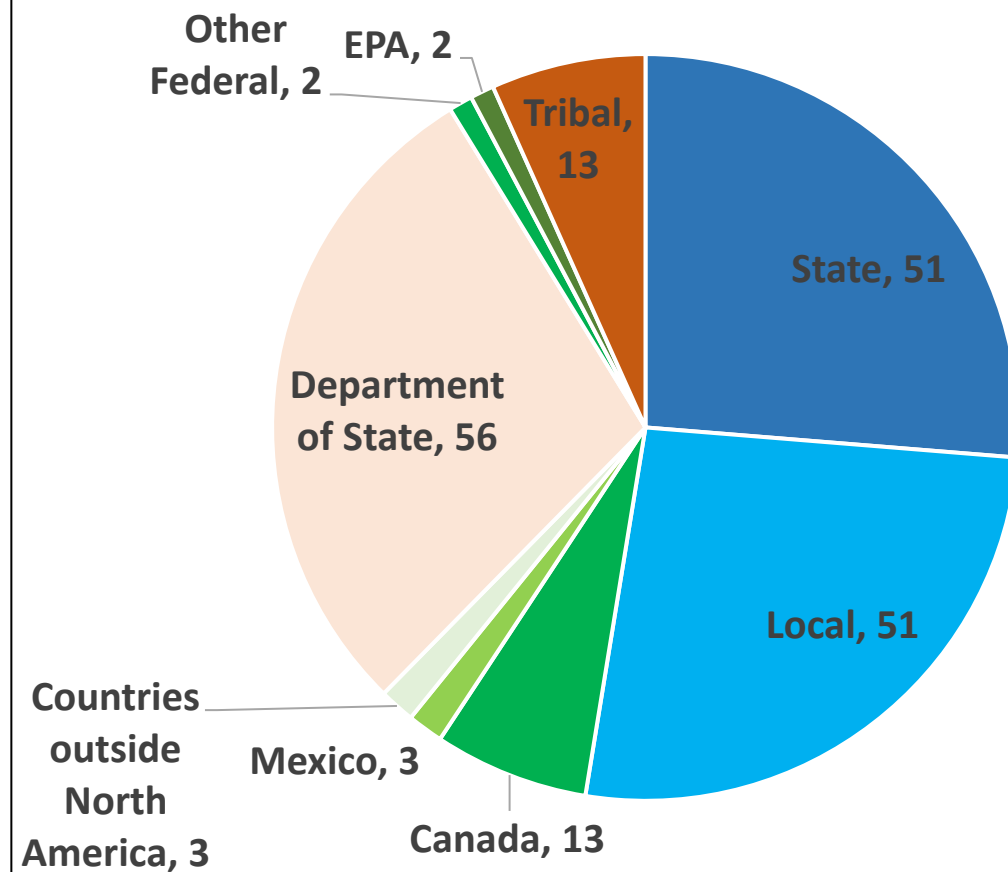
# What types of Reporting Agencies are represented in our ambient air monitoring network databases? – AQS and AIRNow reporting

## Reporting to AQS



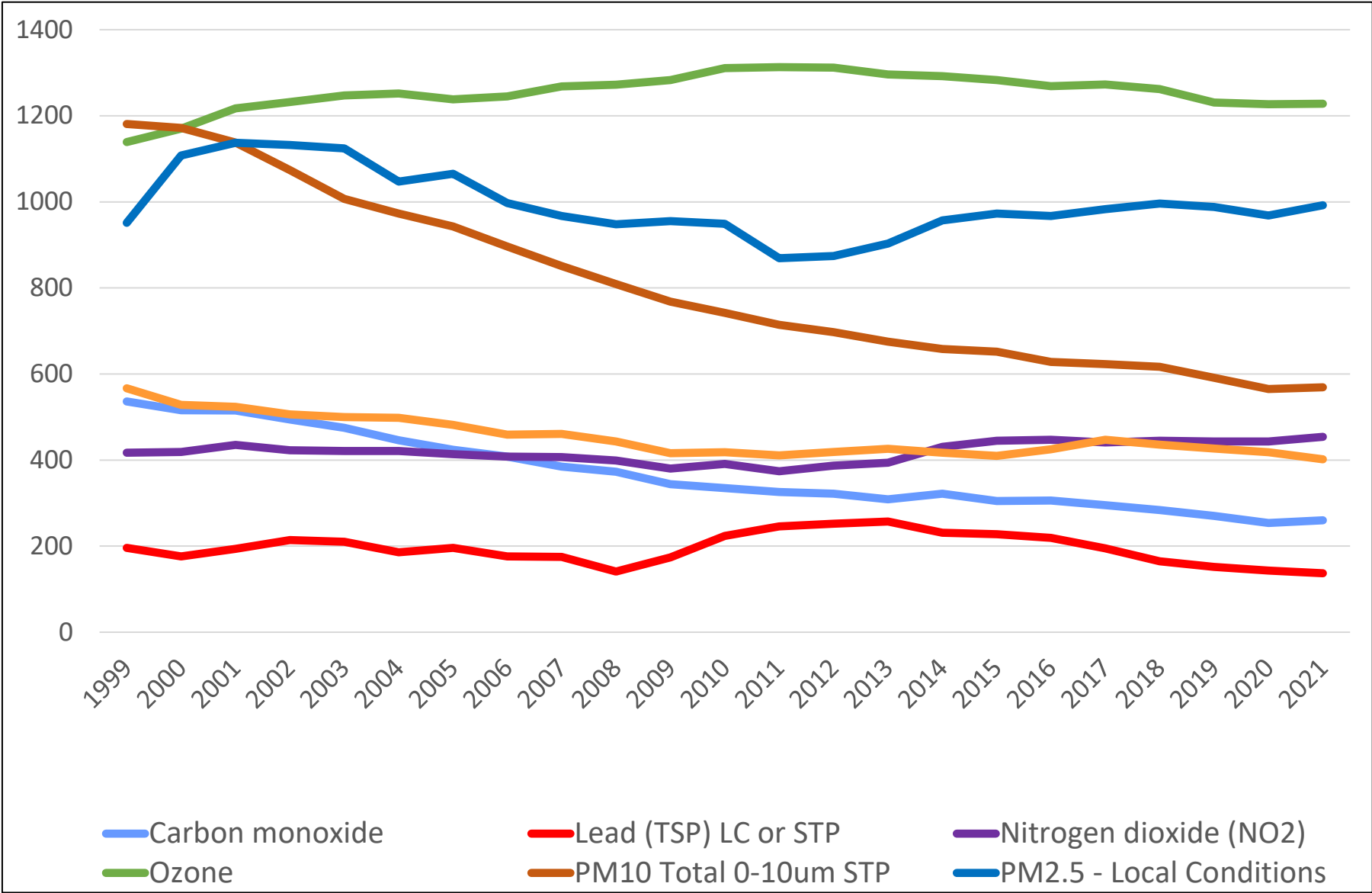
AQS is EPA's long-term repository of data

## Reporting PM<sub>2.5</sub> to AIRNow



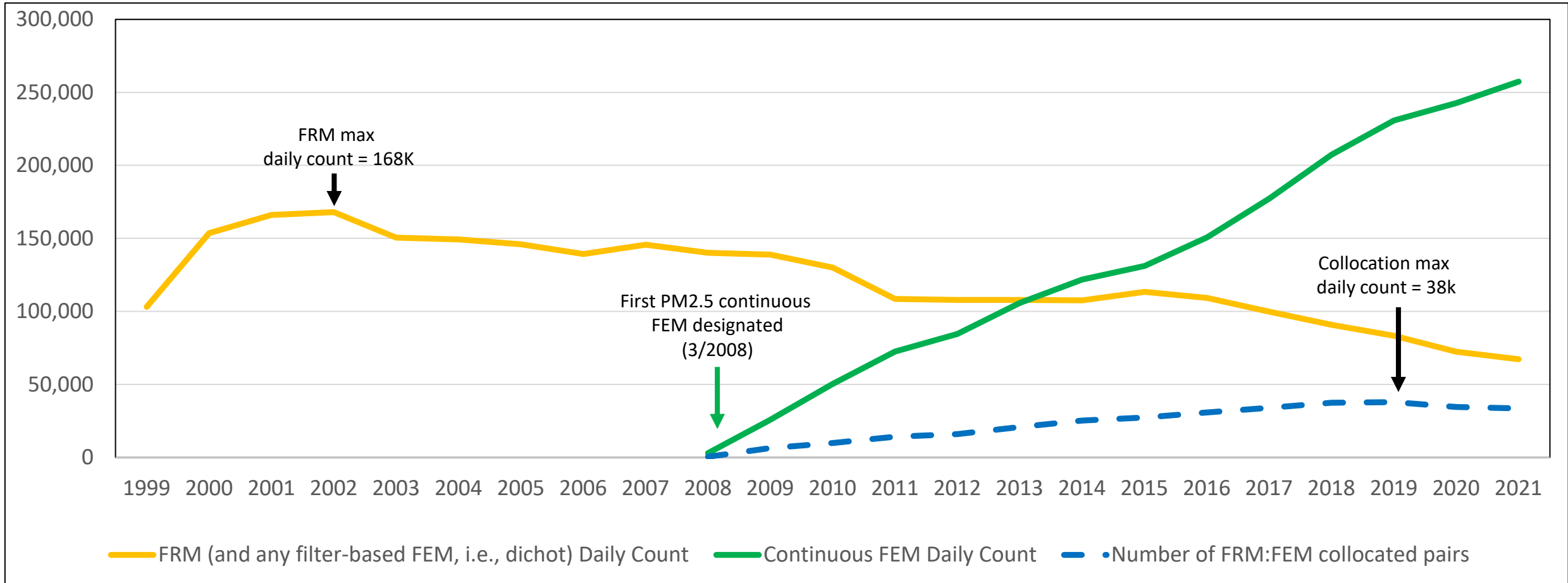
AIRNow is EPA's real-time database for reporting and forecasting<sup>3</sup> of the AQI

# Number of NAAQS Sites Reporting by Pollutant since 1999



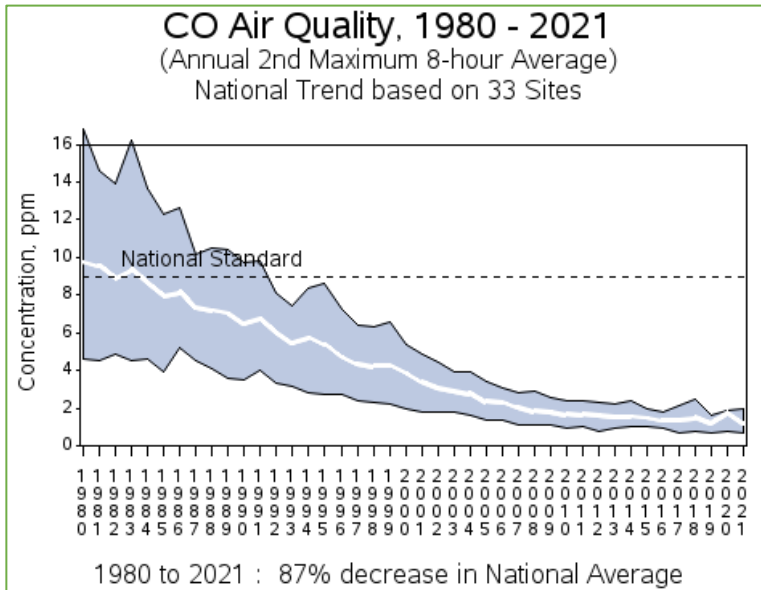
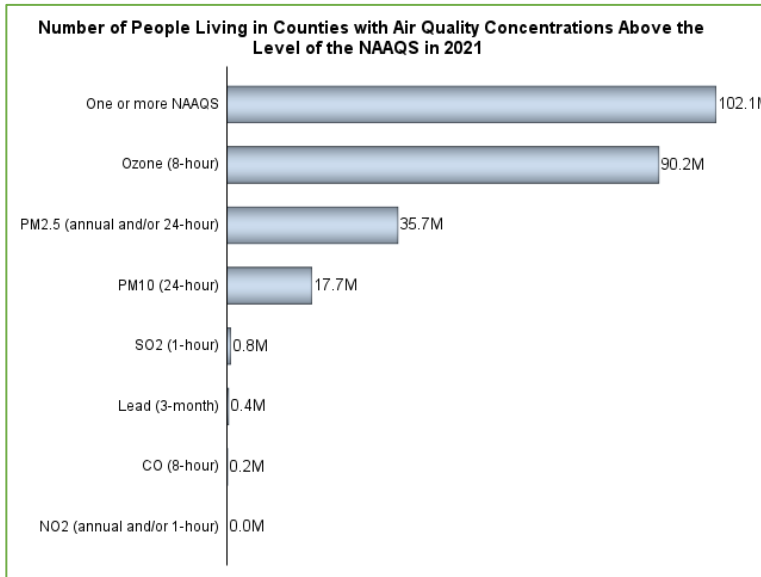
- Large robust networks for:
  - Ozone
  - PM<sub>2.5</sub>
  
- Stable networks for:
  - Nitrogen dioxide
  - Sulfur dioxide
  
- Networks with a decreasing number of sites in recent years:
  - PM<sub>10</sub>
  - Carbon monoxide
  - Lead

# Reporting of PM<sub>2.5</sub> Federal Reference Methods (FRMs) and continuous Federal Equivalent Methods (FEMs) to AQS by daily days loaded

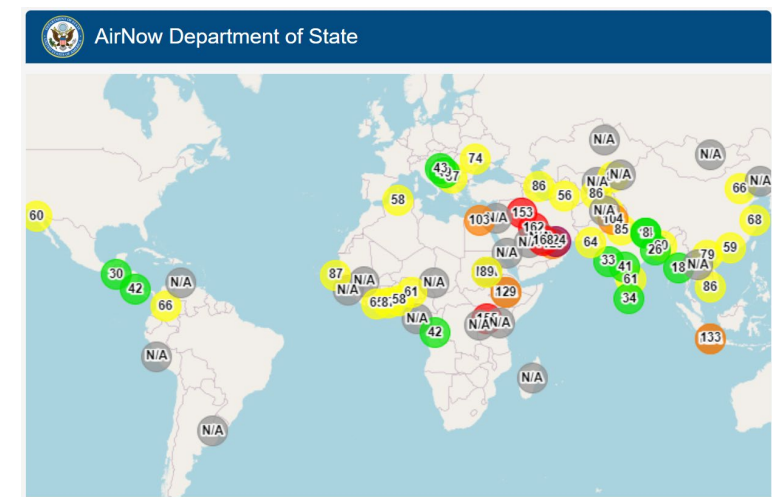
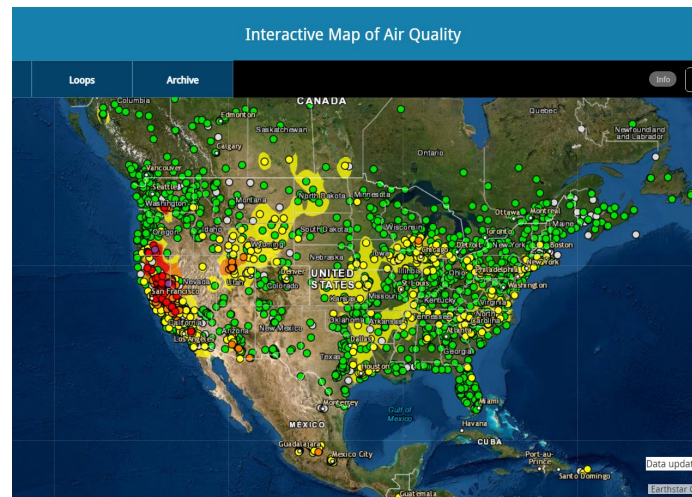
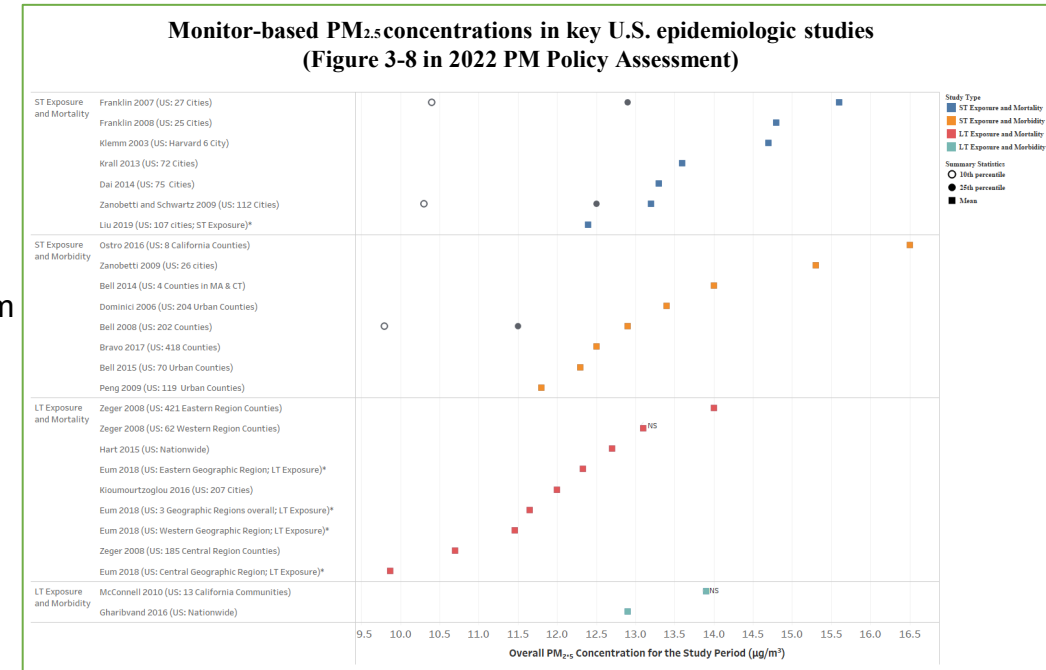


Required sample frequency	-	Typically - 1:3	Daily	Collocated paired days
Total sample days reported	2021	72,055	257,414	33,654

# Monitoring Objectives for NAAQS data



- Comparison with air quality standards (i.e., NAAQS) and supporting technical uses of the data.
  - Development and assessment of emission control strategies (Accountability) including long term trends.
- Public awareness (Air Quality Index).
- Support for air pollution research studies.
  - Atmospheric processes
  - Health effects/exposure



# NAAQS Background and Statutory Requirements

- EPA sets National Ambient Air Quality Standards (NAAQS) for six criteria pollutants; the Clean Air Act requires EPA to **review the standards every 5 years**
  - Carbon monoxide
  - Ground-level ozone
  - Particulate matter
  - Oxides of Nitrogen
  - Oxides of Sulfur
  - Lead
- **Primary (health-based) standards:** in the “judgment of the Administrator” must be “requisite” to protect public health with an “adequate margin of safety”
  - The term requisite means “sufficient, but not more than necessary” [a zero-risk standard is neither possible nor required]
  - By requiring an “adequate margin of safety”, Congress was directing EPA to build a buffer to protect against uncertain and unknown dangers to human health
- **Secondary (welfare-based) standards:** “...specify a level of air quality the attainment and maintenance of which” in the “judgment of the Administrator” are “requisite to protect the public welfare from any known or anticipated adverse effects”
  - Welfare effects include “effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate . . .”
- In setting NAAQS, EPA is **barred from considering the cost of implementing the standards** or adjusting a protective standard solely on the basis of attainability in light of background concentrations of the pollutant

**Ambient Air  
Monitoring data  
are used  
throughout the  
National Ambient  
Air Quality  
Standards  
(NAAQS) process**





# Summary of Current U.S. Standards

Pollutant		Type	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary & secondary	Rolling 3-month average	0.15 µg/m <sup>3</sup>	Not to be exceeded
Nitrogen Dioxide (NO <sub>2</sub> )		primary	1 hour	100 ppb	98 <sup>th</sup> percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary & secondary	1 year	53 ppb	Annual mean
Ozone (O <sub>3</sub> )		primary & secondary	8 hours	0.070 ppm	Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM <sub>2.5</sub>	primary	1 year	12.0 µg/m <sup>3</sup>	annual mean averaged over 3 years
		secondary	1 year	15.0 µg/m <sup>3</sup>	
		primary & secondary	24 hours	35 µg/m <sup>3</sup>	98 <sup>th</sup> percentile, averaged over 3 years
	PM <sub>10</sub>	primary & secondary	24 hours	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO <sub>2</sub> )		primary	1 hour	75 ppb	99 <sup>th</sup> percentile of 1-hour daily maximum concentration, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

# Connecting the Criteria Pollutant PM to the measurements (FRMs and FEMs) for PM

**Criteria pollutant** in Clean Air Act  
- PM (Particulate Matter)

**Indicators** in final agency rulemakings  
- Coarse particles as PM<sub>10</sub> mass  
- Fine particles as PM<sub>2.5</sub> mass

**Federal Reference Methods (FRMs)** in Final Agency rulemakings:

- Appendix J to Part 50. Reference Method for the Determination of Particulate Matter as PM<sub>10</sub> in the Atmosphere
- Appendix L to Part 50. Reference Method for the Determination of Fine Particulate Matter as PM<sub>2.5</sub> in the Atmosphere

Includes design (e.g., inlet and separator) and performance specifications (e.g., flow rate, temperature control)

**Federal Equivalent Methods (FEMs)**

Designated in accordance with 40 CFR Part 53

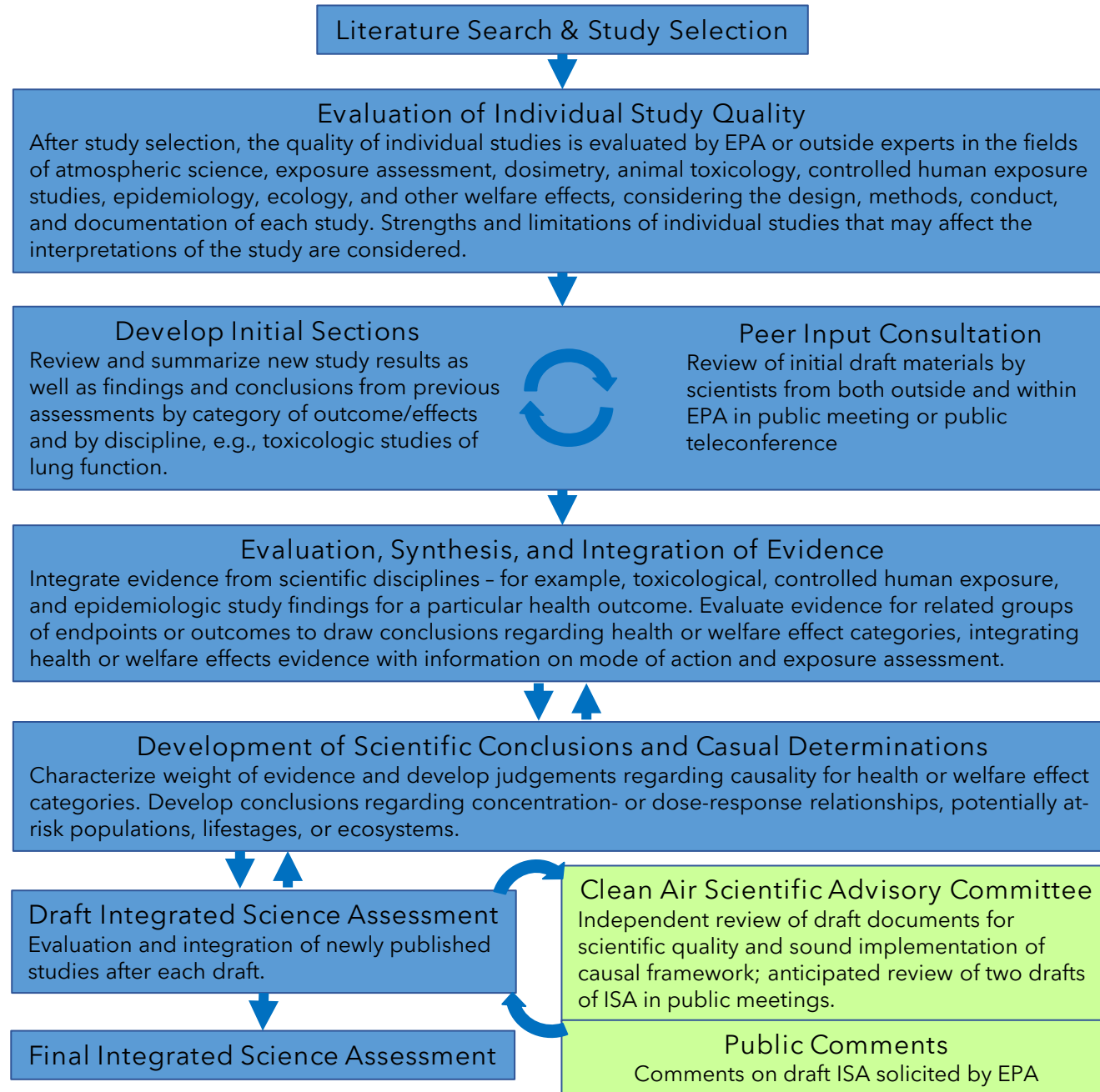
Continuous methods are performance based

# Integrated Science Assessment

- Comprehensive evaluation and synthesis of the policy-relevant scientific information that is the foundation for the review

- Characterization of the strengths and uncertainties of the evidence
- Conclusions on causality for health and welfare effects
- Characterization of evidence for at-risk populations
- Assessment of evidence for dose/concentration-response relationships

<http://www.epa.gov/isa>

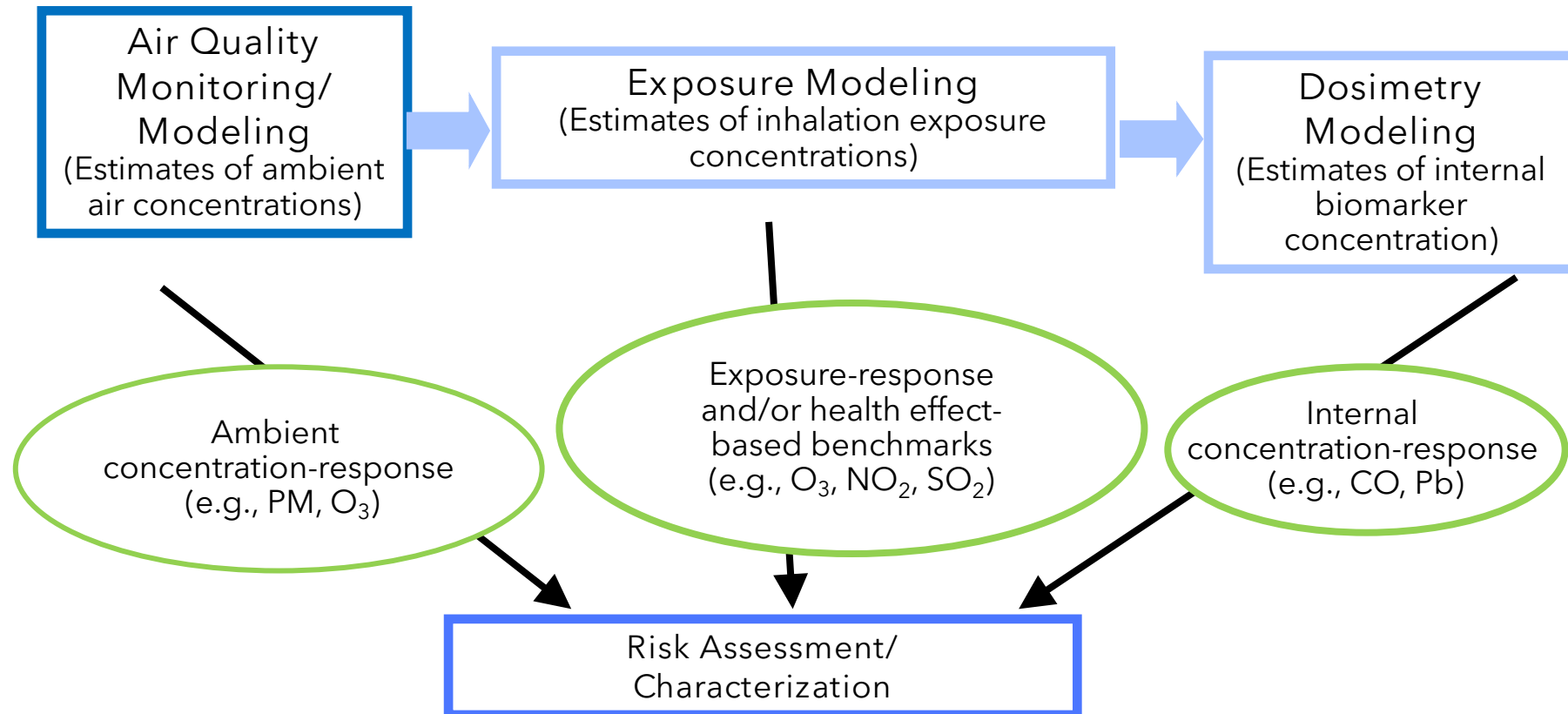


PM ISA includes detailed chapter on: Sources, Atmospheric Chemistry, and Ambient Concentrations. This includes subsection on Measurement and Monitoring.

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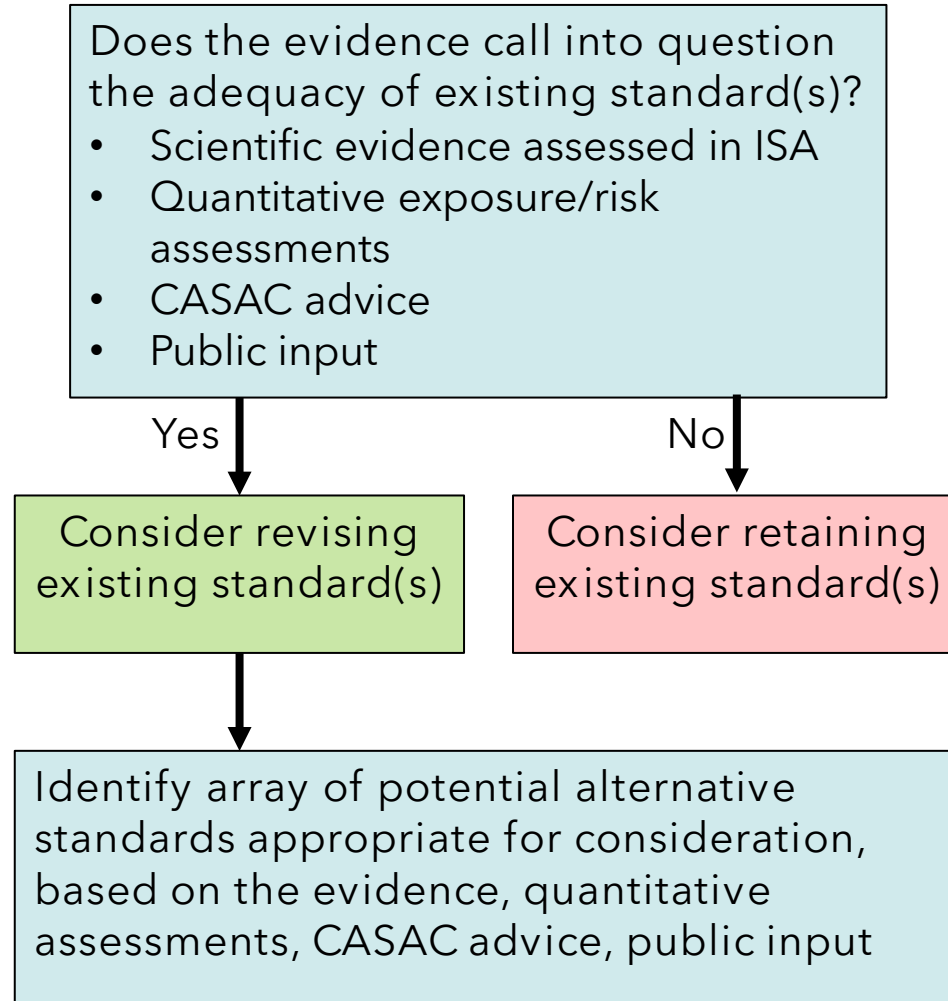
# Risk and Exposure Analyses

The nature and strength of evidence influences selection of appropriate quantitative risk characterization model.



# Policy Assessment for the Reconsideration of the NAAQS for PM

- Presents conclusions regarding the policy options supported by the current scientific evidence and quantitative assessments
- Considers all elements of the standard: indicator, averaging time, form, level

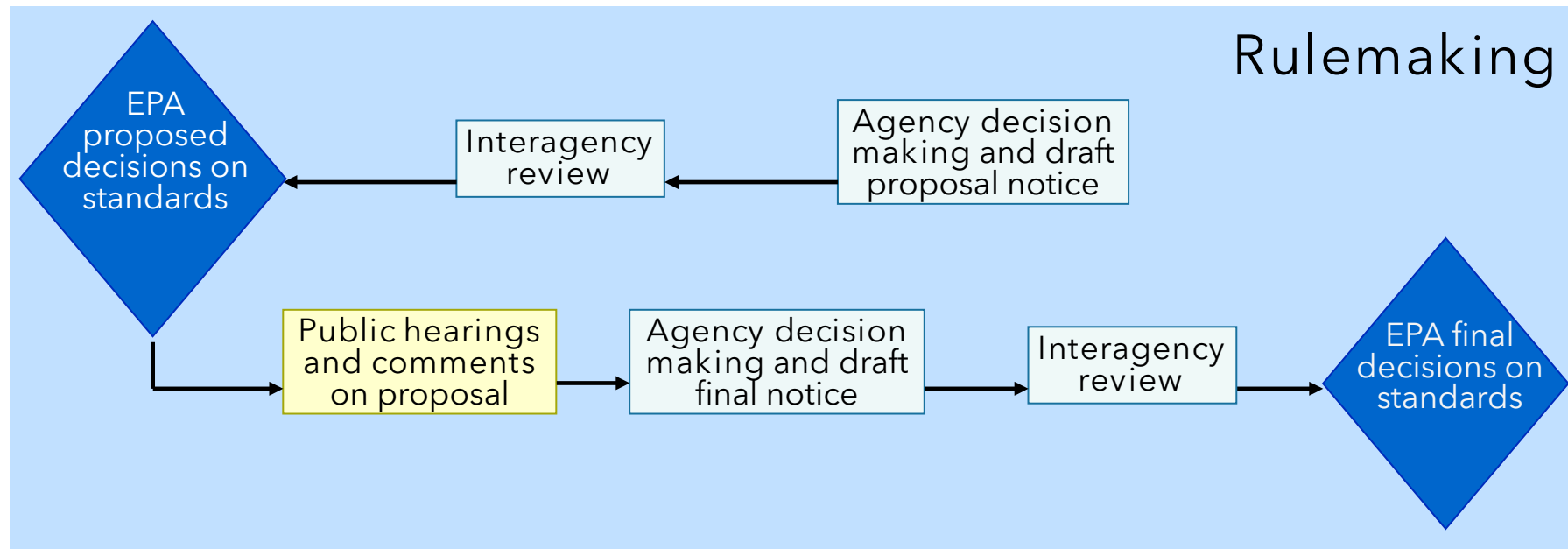


PM PA includes sections detailing PM emissions, monitoring, and air quality

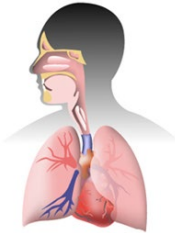
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# NAAQS Process: Regulatory Steps

- The Agency decision-making process for the proposed and final rulemaking decisions includes internal EPA deliberation of key issues and decisions, development of proposed and final decision notices and review of draft notices by other federal agencies
  - Interagency review is coordinated through the Office of Management and Budget
- Final decisions are informed by scientific evidence, any quantitative analyses conducted, staff conclusions in the PA, CASAC advice, and public comments on the proposal

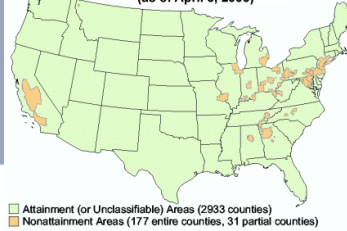


# NAAQS Designations & Implementation



EPA revises National Ambient Air Quality Standards, Monitoring Requirements

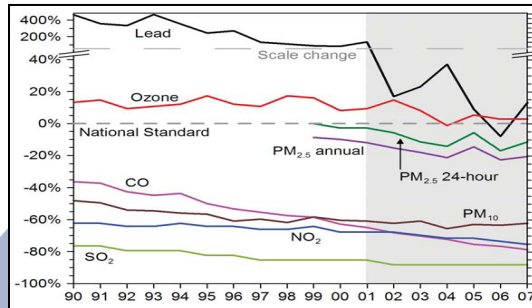
Attainment and Nonattainment Areas in the U.S. PM<sub>2.5</sub> Standards (as of April 5, 2005)



EPA Designates Nonattainment Areas



Air Agency Assesses Expected Improvement From Federal Measures, and Develops Additional Control Strategies to Attain Standards



Ongoing Evaluation by EPA and Air Agency: Air Quality Monitoring, Tracking Emissions and Implementation of Control Programs

Scientific Research



Air Agency Submits Plan to EPA and Implements Control Strategies Through Regulatory and Non-regulatory Approaches



**Thank You!**