

PM2.5 ANNUAL NAAQS UPDATE



September 2024

Mary Hauer-Davis | MECC Conference

Agenda

- 1** Clean Air Act
- 2** National Ambient Air Quality Standards
- 3** PM_{2.5}
- 4** What's Next?
- 5** Case Studies
- 6** Wrap-up

Clean Air Act Requirements



- ▶ Section 108 and 109 of CAA
- ▶ Set National Ambient Air Quality Standards
 - Primary standards - to protect human health
 - ▶ Specifically, the sensitive populations
- ▶ Secondary standards – to protect public welfare
 - Protection against:
 - ▶ Decreased visibility
 - ▶ Damage to animals, crops, vegetation and buildings
- ▶ Requires “a review of the criteria published” and recommend any new NAAQS or revisions of existing criteria at 5-year intervals
- ▶ Rigorous assessments
 - Integrated Science Assessment (ISA) – Policy review/basis
 - Risk/Exposure Assessment (REA) – Quantitative risks to human health and environment
 - Policy Assessment (PA) – Assessment to inform CASAC’s advice to EPA on standards and potential revisions
 - ▶ Indicator, averaging time, form and level
 - Rulemaking



NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)



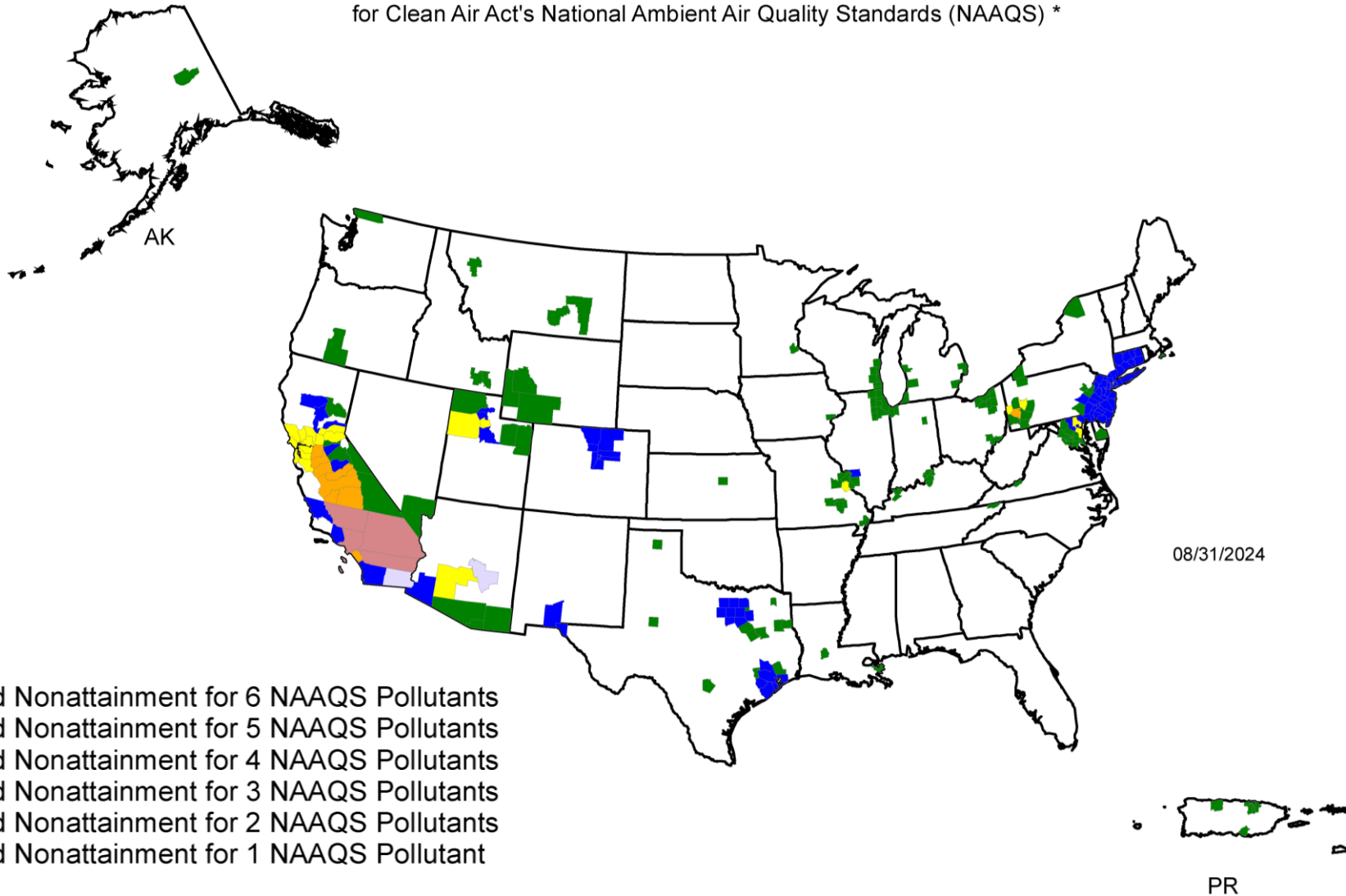
Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3- month Ave.	0.15 µg/m ³ ⁽¹⁾	Not to be exceeded
Nitrogen Dioxide (NO ₂)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb ⁽²⁾	Annual Mean
Ozone (O ₃)		primary and secondary	8 hours	0.070 ppm ⁽³⁾	Annual fourth-highest daily max 8-hour conc, averaged over 3 years
Particle Pollution (PM)	PM _{2.5}	primary	1 year	9.0 µg/m ³	Annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m ³	Annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on ave over 3 years
Sulfur Dioxide (SO ₂)		primary	1 hour	75 ppb ⁽⁴⁾	99th percentile of 1-hour daily max. conc. averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Nonattainment Areas



Counties Designated "Nonattainment"

for Clean Air Act's National Ambient Air Quality Standards (NAAQS) *



Legend **

- County Designated Nonattainment for 6 NAAQS Pollutants
- County Designated Nonattainment for 5 NAAQS Pollutants
- County Designated Nonattainment for 4 NAAQS Pollutants
- County Designated Nonattainment for 3 NAAQS Pollutants
- County Designated Nonattainment for 2 NAAQS Pollutants
- County Designated Nonattainment for 1 NAAQS Pollutant



► Ozone:

- 0.070 ppm 8-hour standard

► PM2.5:

- 9 $\mu\text{g}/\text{m}^3$ annual standard
- 35 $\mu\text{g}/\text{m}^3$ 24-hour standard

Ozone (O_3)		primary and secondary	8 hours	0.070 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM _{2.5}	primary	1 year	9.0 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years



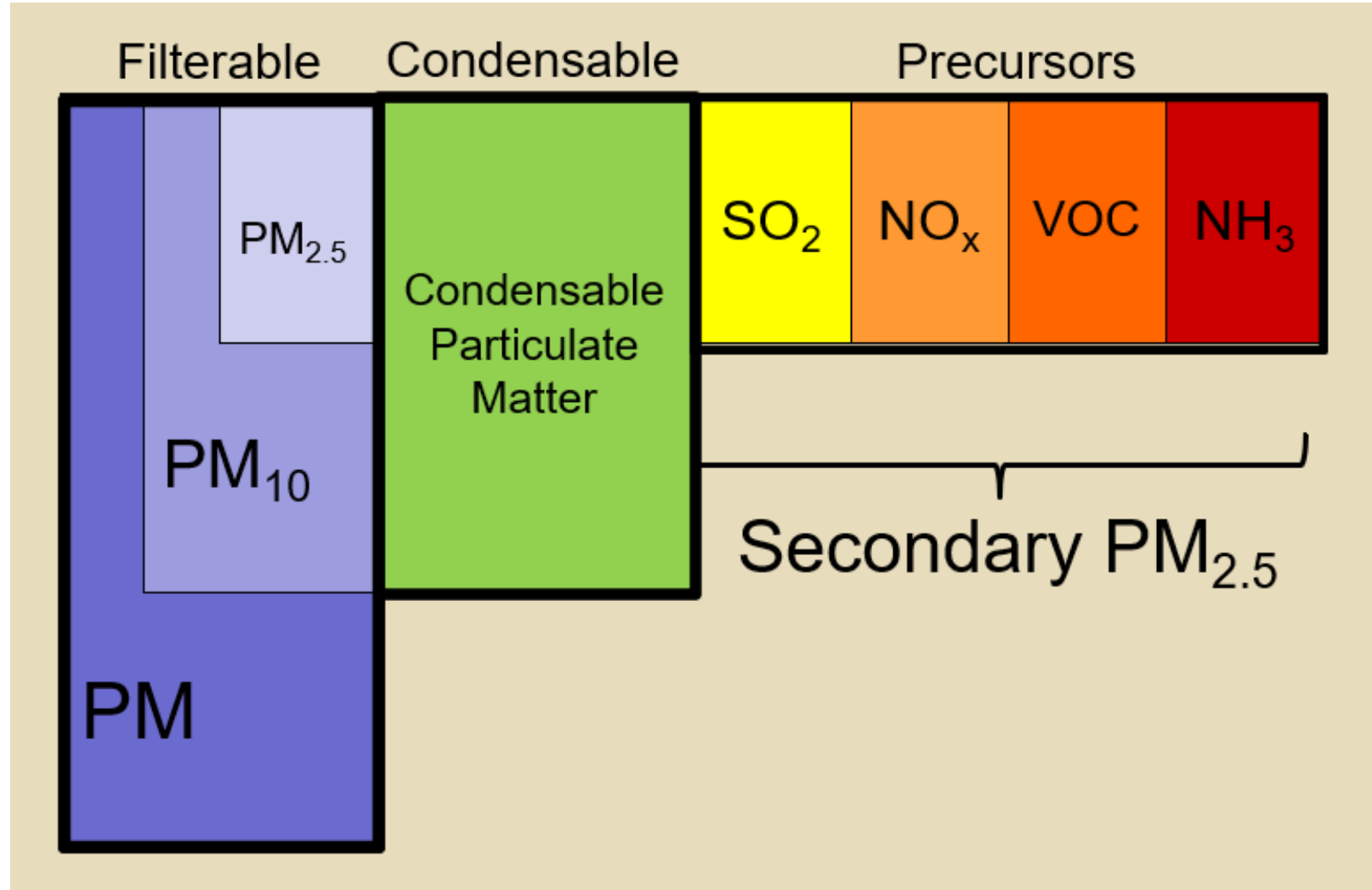
- ▶ Other regulations and requirements address PM2.5 and ozone
 - Clean Air Interstate Rule (CAIR)
 - Cross State Air Pollution Rule (CSAPR)
 - Ozone Transport Region (OTR)
 - Regional Haze (BART)
 - RACT/LAER/BACT



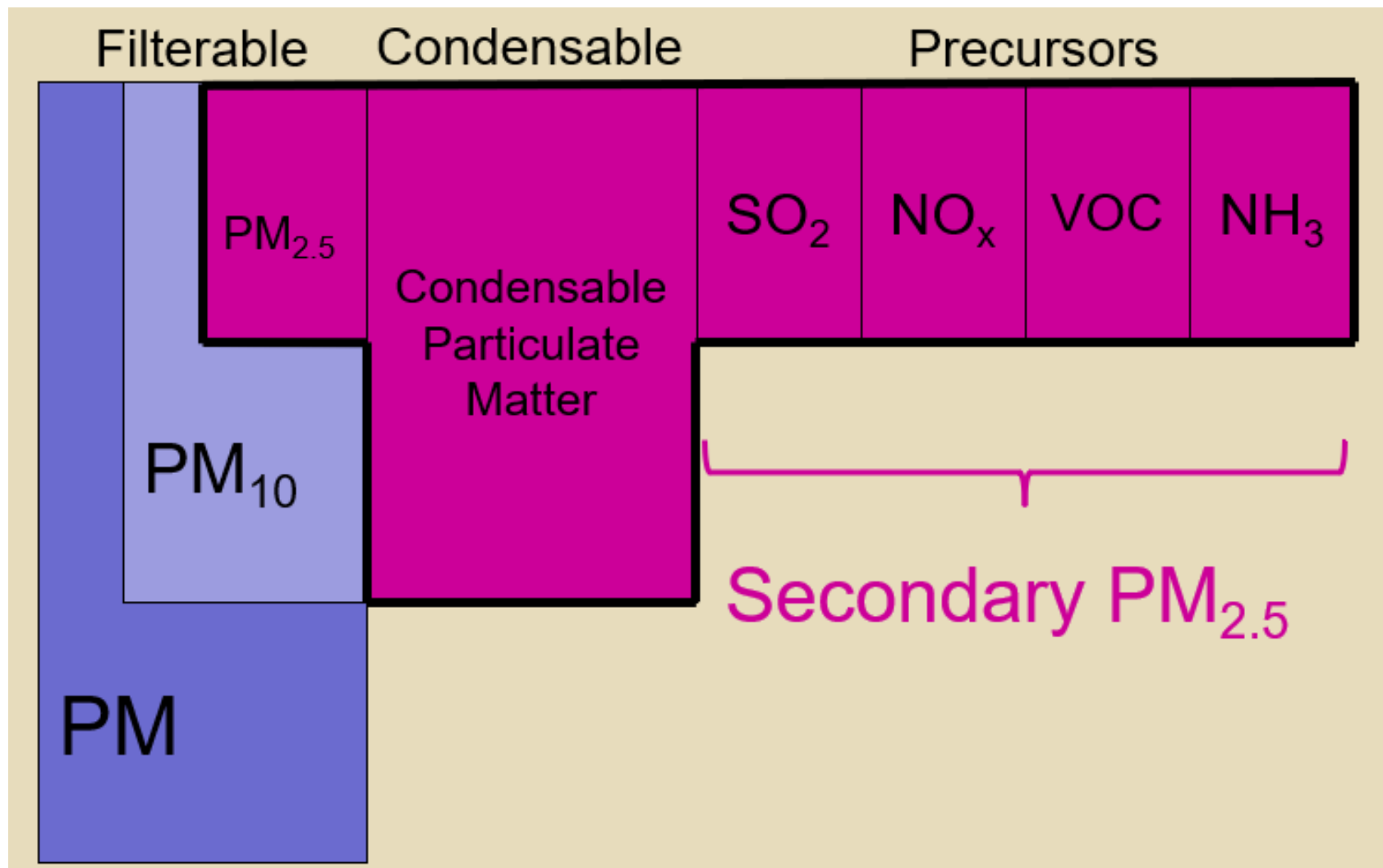
PARTICULATE MATTER (PM_{2.5})



Particulate Matter



PM_{2.5}



PM_{2.5} Emissions



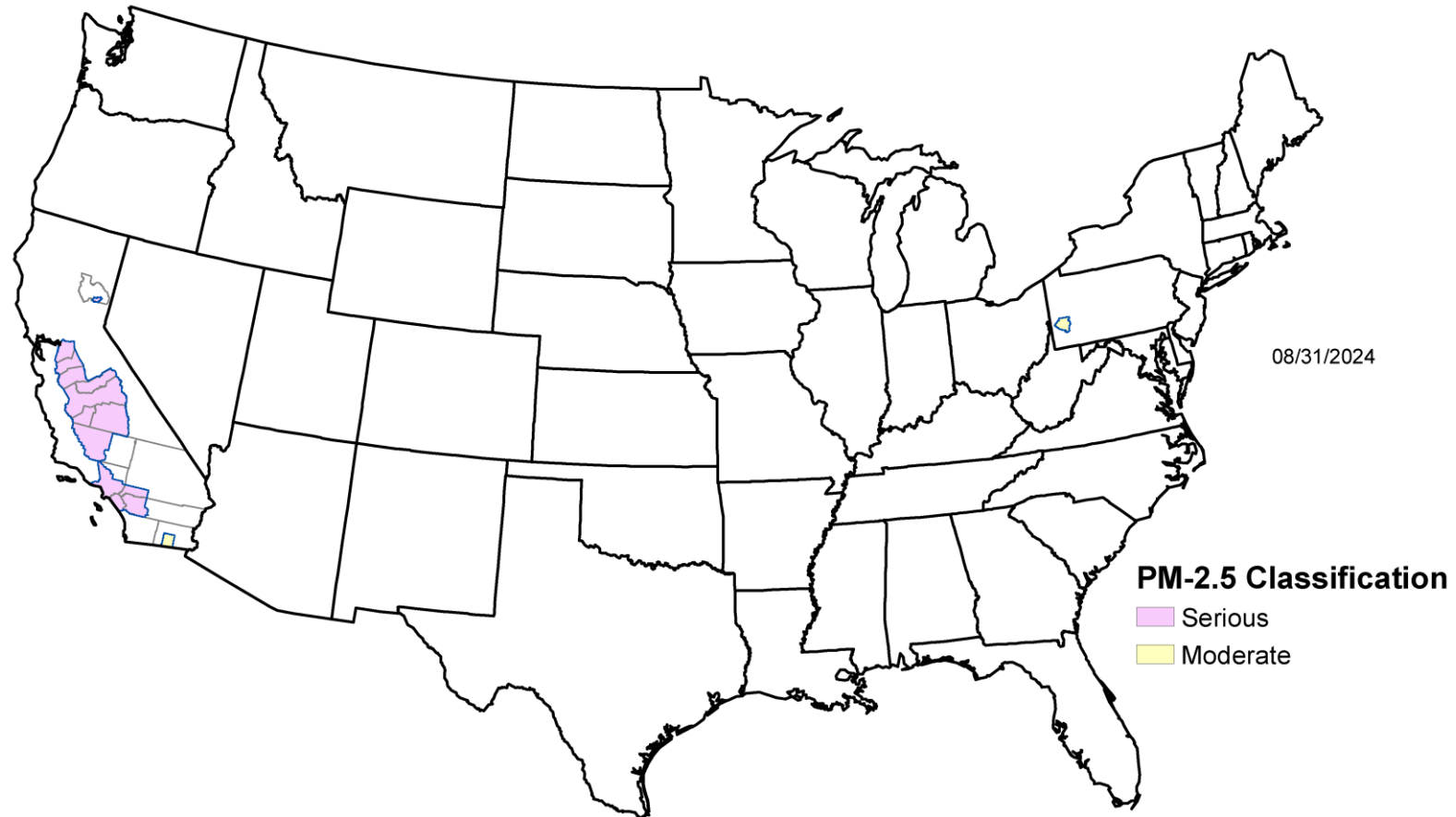
- ▶ Identified as the most harmful to humans
- ▶ PM_{2.5} methods for quantification continue to evolve
- ▶ New methodology for secondary PM_{2.5} (MERPS)
- ▶ As methodology for quantifying emission emerges, available NAAQS seem to be less
- ▶ High background concentrations
 - US average ~ 4-9 ug/m³

Year	Averaging Period	Level	Form
1997	24 hour	65 ug/m³	98 th percentile, averaged over 3 years
1997	Annual	15.0 ug/m³	Mean, averaged over 3 years
2006	24 hour	35 ug/m³	98 th percentile, averaged over 3 years
2006	Annual	15.0 ug/m³	Mean, averaged over 3 years
2012	24 hour	35 ug/m³	98 th percentile, averaged over 3 years
2012	Annual	12.0 ug/m³	Mean, averaged over 3 years
2020	No change		
2024	Annual	9.0 ug/m³	Mean, averaged over 3 years

PM_{2.5} NAAQS



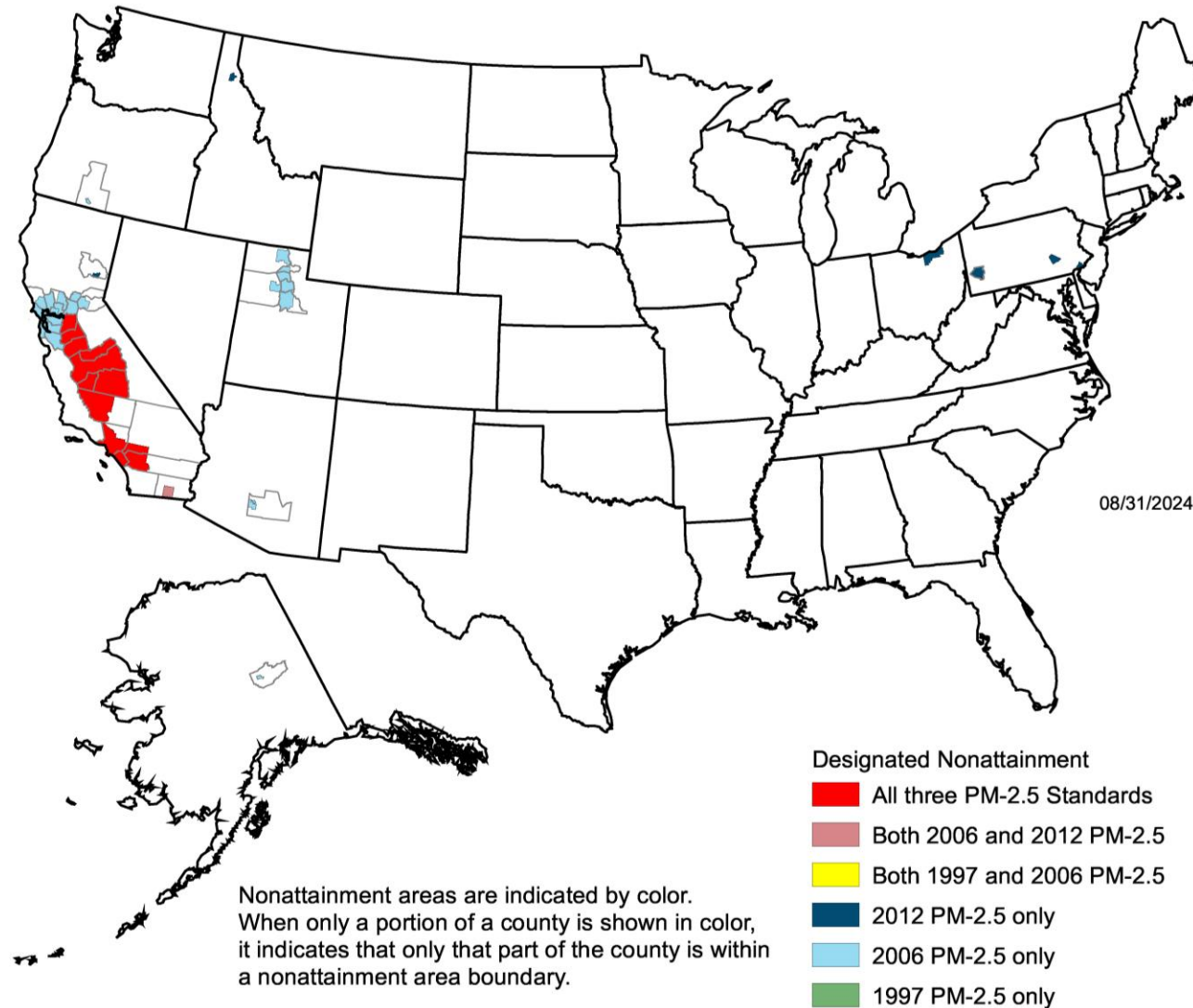
PM-2.5 Nonattainment Areas (2012 Standard)



PM_{2.5} NAAQS



Counties Designated Nonattainment for PM-2.5 (1997, 2006, and/or 2012 Standards)



PM_{2.5} Status



- ▶ Dec 2020 – EPA issues a final rule to not revise the PM NAAQS
- ▶ Jan 2021 – Lawsuits
- ▶ Jan 2021 - Biden Executive Order
- ▶ June 2021 – EPA announces reconsideration of PM NAAQS
- ▶ Feb 2022 – EPA’s CASAC recommends tightening PM standard
- ▶ May 2022 – CASAC issues PA
 - Annual lowered to 8-12 ug/m³ but retain 24-hour at 35 ug/m³
- ▶ Aug 2022 – Proposed rule to OMB for inter-agency review
- ▶ February 2024 - EPA is strengthens the annual health-based standard for fine particles to 9.0 micrograms per cubic meter, after advice from CASAC and 700,000 public comments
- ▶ March 6, 2024 – Final rule published lowering annual standard to 9.0 ug/m³
- ▶ May 6, 2024 – Effective date of final rule
- ▶ April 30, 2024 – EPA revises the Significant Impact Level for annual PM_{2.5} to 0.13 ug/m³



Area Designations and Plans

- ▶ Within 2 years after a final NAAQS: EPA must "designate" areas as meeting (attainment areas) or not meeting (nonattainment areas) the final NAAQS considering the most recent air quality monitoring data
- ▶ All PM2.5 nonattainment areas are initially designated as "Moderate."
- ▶ Within 3 years after a final NAAQS: All states must submit state implementation plan revisions to show they have the air quality management program components in place to implement the final NAAQS.
- ▶ Within 18 months after the *effective date of designations*: Nonattainment area PM2.5 state implementation plans are due.
- ▶ End of the 6th calendar year after the *effective date of designations*: "Moderate" area attainment date.

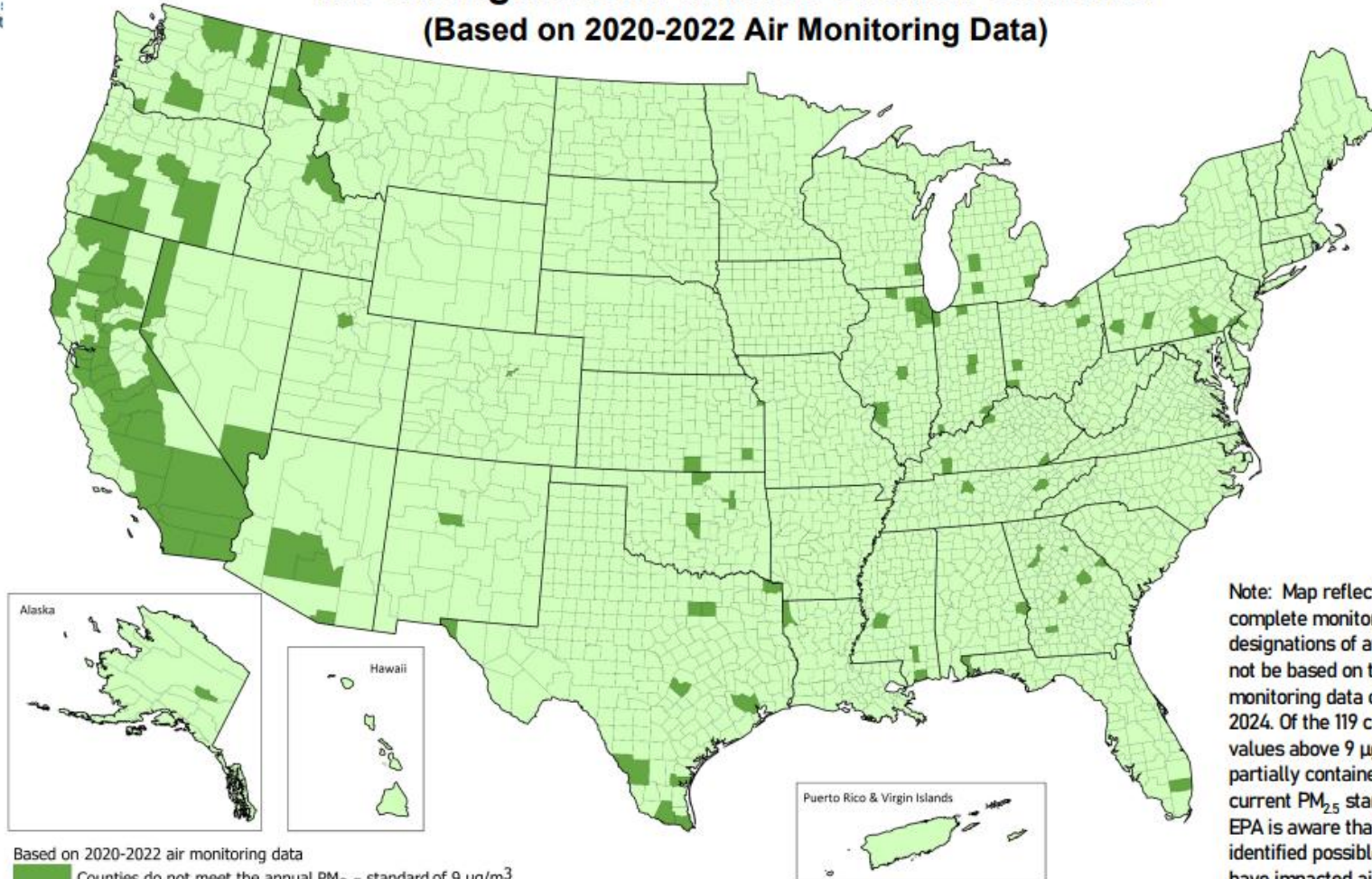
Stationary Source Permitting

- ▶ Prevention of Significant Deterioration (attainment area permitting) applies with respect to a new standard in all areas of the U.S. designated attainment for the pollutant upon the effective date of the new standard.
- ▶ Nonattainment New Source Review applies in areas designated nonattainment for the pollutant, which includes any areas newly designated nonattainment **at/after the effective date of nonattainment designations.**

2020-2022 Data



Most Counties with Monitors Already Meet the Strengthened Particle Pollution Standard (Based on 2020-2022 Air Monitoring Data)



Based on 2020-2022 air monitoring data
■ Counties do not meet the annual $PM_{2.5}$ standard of $9 \mu g/m^3$

This information is provided for illustrative purposes only and is not intended to predict the outcome of any forthcoming designations process.

Note: Map reflects monitored counties with complete monitoring data. Future final designations of attainment/nonattainment will not be based on these data, but likely on monitoring data collected between 2022 and 2024. Of the 119 counties with 2020-2022 design values above $9 \mu g/m^3$, 59 counties are totally or partially contained in nonattainment areas for current $PM_{2.5}$ standards. In years 2021 and 2022, EPA is aware that some states have already identified possible exceptional events that may have impacted air quality in the US and may be relevant to designations decisions.

2021-2023 Data



PM2.5 Designations Mapping Tool, US EPA, OAR, OAQPS

Open in Map Viewer Classic

Legend

Air Quality Data

PM2.5 Annual DVs 2021-2023 (Violating)

● > 9 ug/m3

PM2.5 Annual DVs 2021-2023 (Non-Violating)

● <= 9 ug/m3

Jurisdictional Boundaries

PM2.5 Nonattainment Areas and Designations

PM2.5 24hr (2006 standard)

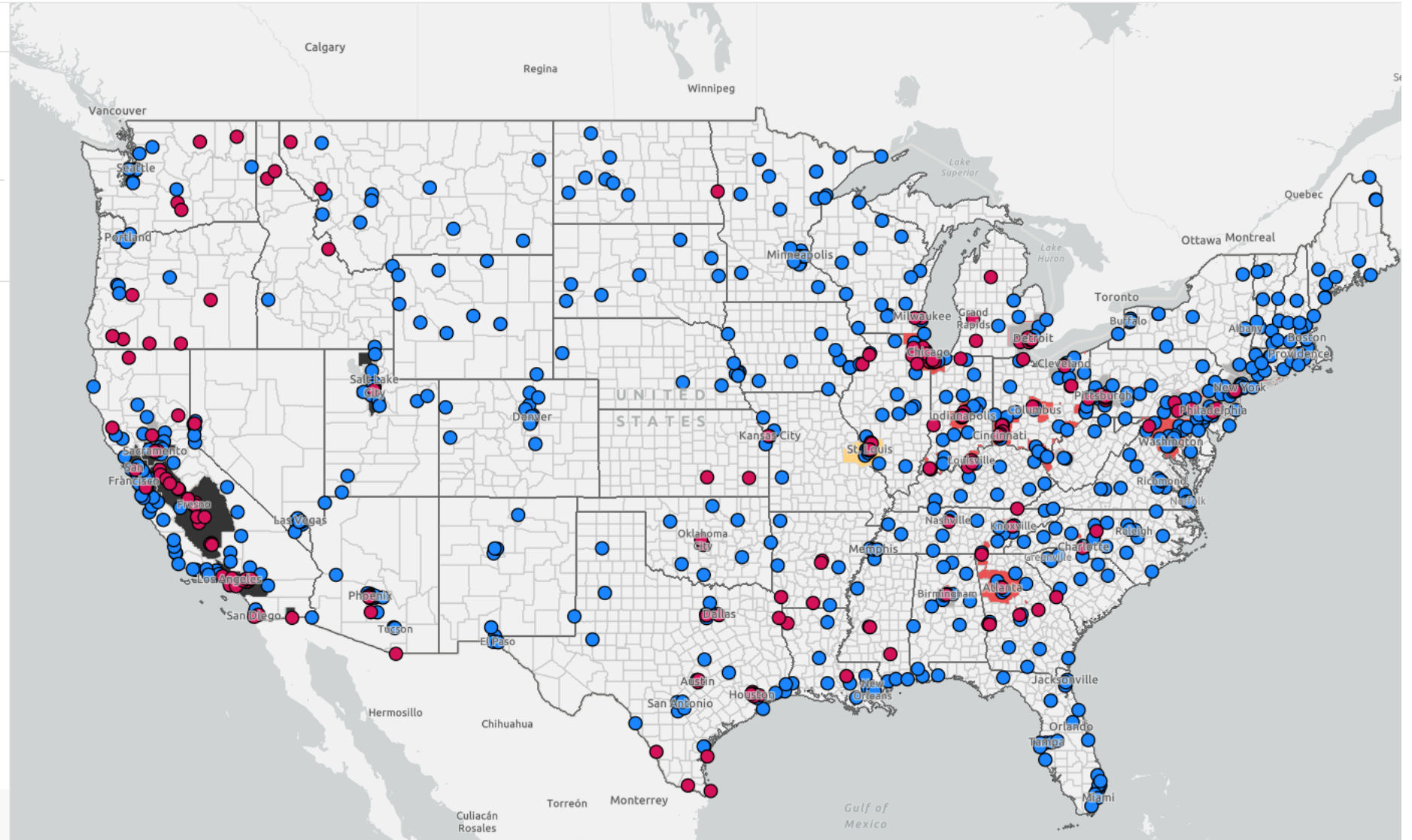
■ Maintenance
■ Nonattainment

PM2.5 Annual (1997 standard)

■ Maintenance
■ Nonattainment
■ Maintenance (NAAQS revoked)

PM2.5 Annual (2012 standard)

■ Maintenance
■ Nonattainment



Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS | Sources: Esri; U.S. Department of Commerce, Census Bureau; U.S. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (... Powere

PM_{2.5} Annual NAAQS Designations



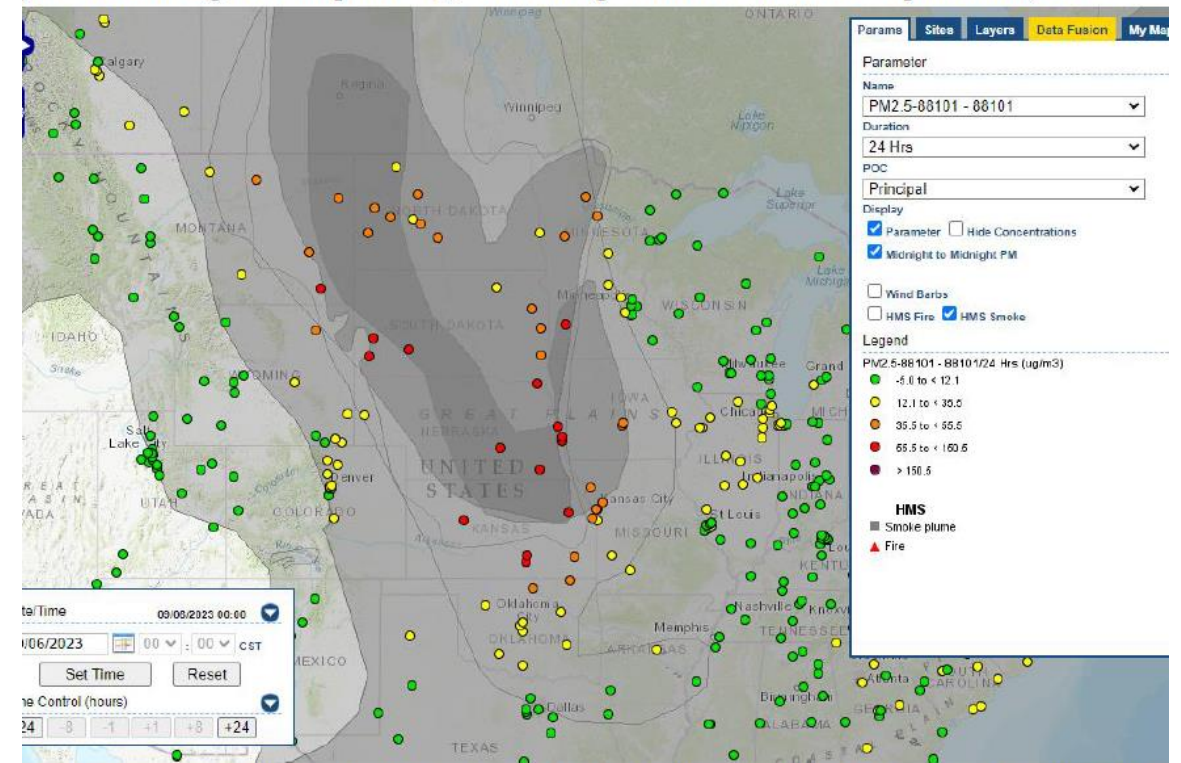
▶ Continuous PM Monitors Bias

- February 2, 2024- March 6, 2024 - EPA takes comment on “Proposed Update of PM_{2.5} Data From T640/T640X PM Mass Monitors”
- May 13, 2024 - EPA retroactively applied equations to all the hourly T640 and T640X PM_{2.5} concentrations in the EPA’s AQS data beginning in 2017

▶ Exceptional Events

- 2016 rule which allows for “Exceptional Events” to be removed from data for NAAQS attainment determinations
- Sets standards for evaluating the data
- April 2024 – EPA developed three products to assist with demonstration of Exceptional Events
 - ▶ Includes data visualization tools for prescribed fires and wildfires
 - ▶ Includes Tiering methodology depending on thresholds.

Figure VII-10. Regional Map of PM_{2.5} Monitoring Sites and Smoke for September 6, 2023*

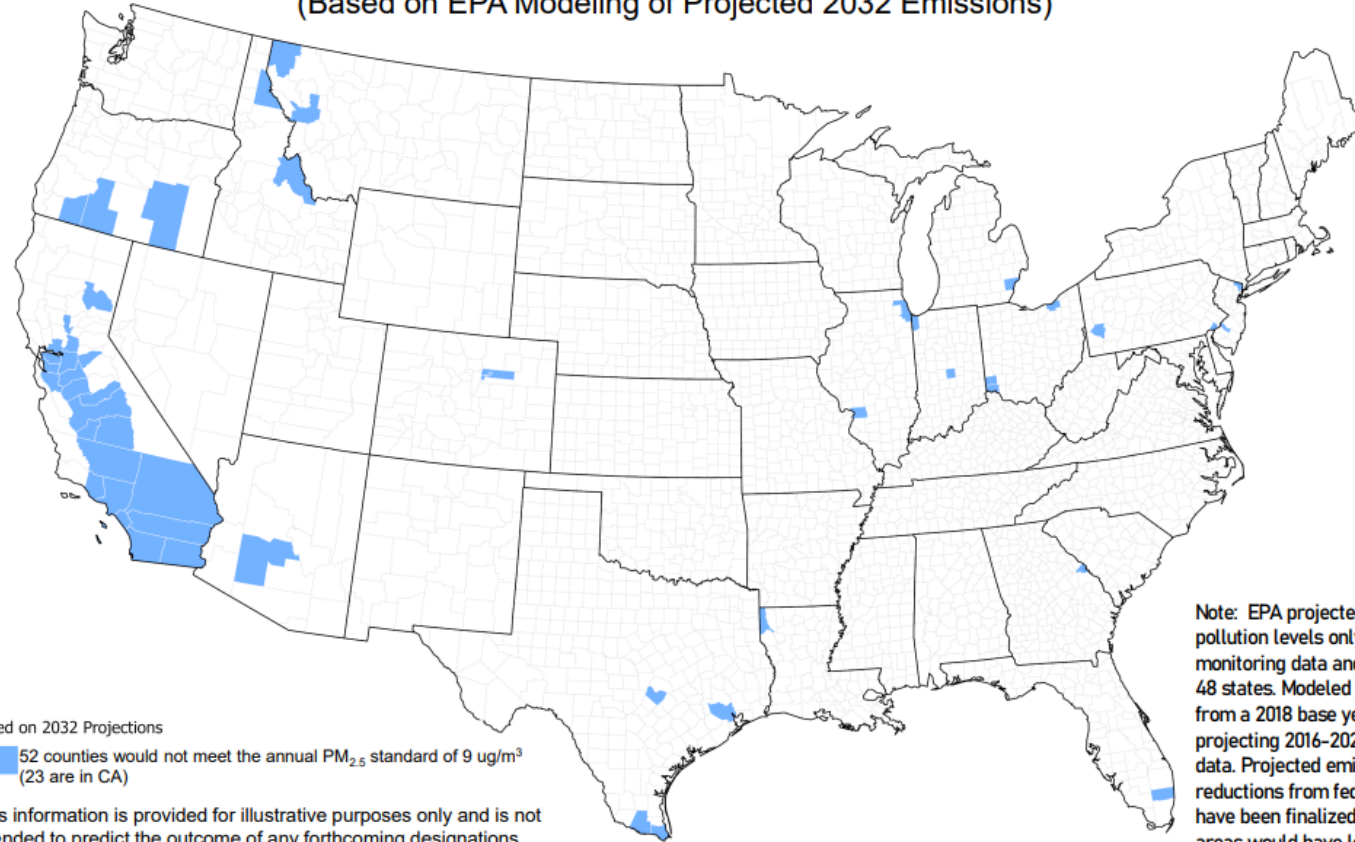


Smoke plumes (gray) and monitoring locations with PM_{2.5} values colored by AQI category, from EPA Air N Tech website (<http://www.airnowtech.org>).

2032 Expected Nonattainment Areas



EPA Projects More than 99% of Counties would Meet the Revised Fine Particle Pollution Standard Projection of Counties with Monitors that would not Meet in 2032 (Based on EPA Modeling of Projected 2032 Emissions)



Based on 2032 Projections

52 counties would not meet the annual $PM_{2.5}$ standard of $9 \mu g/m^3$
(23 are in CA)

This information is provided for illustrative purposes only and is not intended to predict the outcome of any forthcoming designations process.

Note: EPA projected future fine particle pollution levels only for counties with monitoring data and within the contiguous 48 states. Modeled emissions are developed from a 2018 base year and used in projecting 2016–2020 monitoring data. Projected emissions reflect expected reductions from federal regulations that have been finalized as of March 2023. Some areas would have longer than 2032 to attain the revised $PM_{2.5}$ standard.



WHAT'S NEXT?



What Happens Next?



- ▶ States make recommendations of nonattainment with new standard to EPA within 1 year of effective date
- ▶ EPA reviews each state's recommendation and approves or disapproves
 - Final designations are made by May 6, 2026
 - States submit plan to achieve attainment

*TYPICALLY TAKES YEARS FOR
IMPLEMENTATION*



Permitting Scenarios



- ▶ A facility has a final permit in hand before the effective date of new standard
 - Project moves ahead, no new air permitting requirements. Permit issued
- ▶ A facility has a permit in process when new standard takes effect – likely to be issued by a state or local air agency
 - Update modeling results to the new standard level, evaluate if additional air pollution emissions reductions are needed. Meet new standard. Permit issued.
- ▶ Plans for building new facility or expanding an existing one
 - Work with permitting agency to achieve results within the new standard, demonstrate compliance with Clean Air Act requirements. Permit issued.
- ▶ Plans for building new facility or expanding one in an area not meeting the new standard (**permit needed after EPA designations process is completed – likely in or after 2026**)
 - If major project under the SIP, install Lowest Achievable Emission Rate controls, Demonstrate compliance with Clean Air Act requirements. Obtain offsets. Permit issued.

Implications of Lower Standards



Evaluation of Exceeding Monitors

- Who is responsible?
- Culpability assessments
- Modeling may be performed
- Reductions assessed if necessary
- Plan for attainment

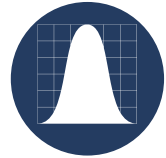
Much more difficult to build new facilities

- Air modeling requirement for NAAQS compliance
- High background values
- Secondary PM2.5 and ozone

Case Study 1: Existing Facility – PM_{2.5}



Existing Facility



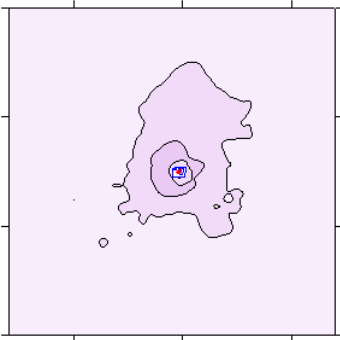
May have projects subject to modeling in future



Background value is 8.5 ug/m³ based on nearest monitor



Emission sources do not change



Case Study 1 – PM_{2.5} NAAQS



2010 Results

PM _{2.5} Annual Facility Modeled Impacts	Annual PM _{2.5} Background Concentration	Total PM _{2.5} Annual Modeled Impacts	2010 Year PM _{2.5} Annual NAAQS
1.90 µg/m ³	8.5 µg/m ³	10.4 µg/m ³	15 µg/m ³

2012 Results

PM _{2.5} Annual Facility Modeled Impacts	Annual PM _{2.5} Background Concentration	Total PM _{2.5} Annual Modeled Impacts	2012 Year PM _{2.5} Annual NAAQS
1.90 µg/m ³	8.5 µg/m ³	10.4 µg/m ³	12 µg/m ³

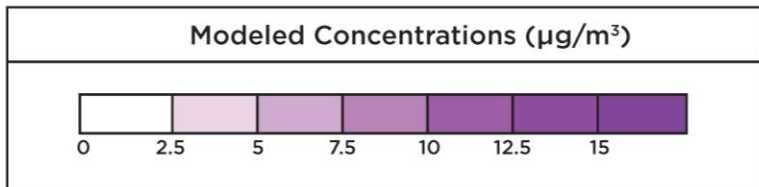
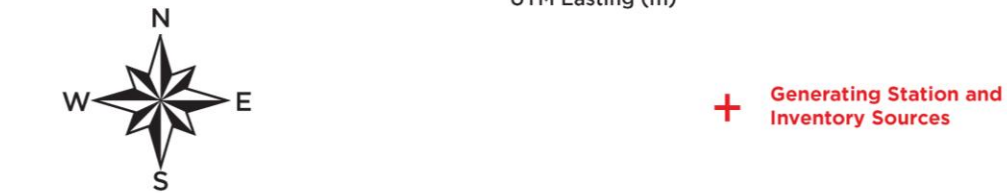
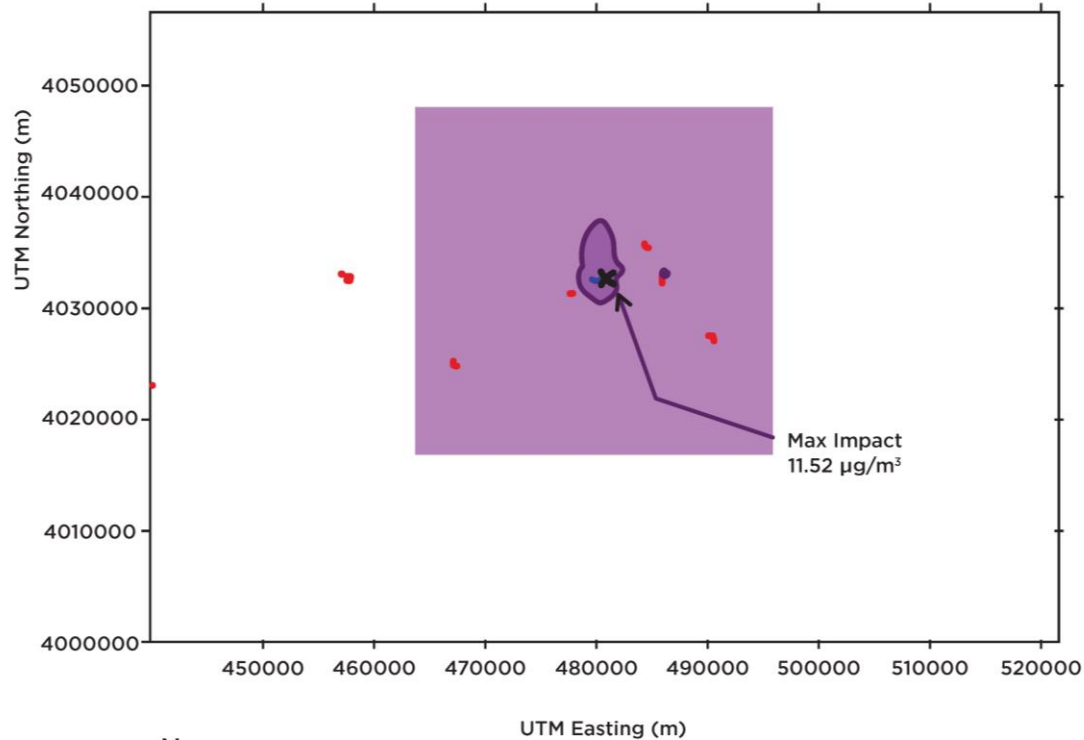
2024 and Beyond Results

PM _{2.5} Annual Facility Modeled Impacts	Annual PM _{2.5} Background Concentration	Total PM _{2.5} Annual Modeled Impacts	2024 Year PM _{2.5} Annual NAAQS
1.90 µg/m ³	8.5 µg/m ³	10.4 µg/m ³	9 µg/m ³

Case Study 2 | New Project



Figure 1: NAAQS PM2.5 Annual With Background (5 years)



- ▶ Case 2: PSD application at state agency
- ▶ Natural gas-fired facility
- ▶ Includes secondary PM2.5
- ▶ NAAQS effective date before permit issued
- ▶ Includes haul roads
- ▶ Need to make changes to facility and resubmit



Case 3: Background Information

- ▶ PSD application at state agency in a county that is deemed nonattainment with new standard
- ▶ Natural gas-fired facility
- ▶ Includes secondary PM2.5
- ▶ Permit cannot be issued before the area is officially deemed nonattainment in a rulemaking (2026 timeframe)

Case 3: Options

- ▶ Reduce emissions to below Nonattainment New Source review threshold
- ▶ Obtain a Nonattainment New Source Review permit
 - ▶ Install Lowest Achievable Emission Rate (LAER)
 - ▶ Locate and obtain offsets at a ratio of more than 1:1

WRAP-UP



If you are an industrial facility, know the PM2.5 levels in your area

Lower PM2.5 standard will likely create several nonattainment areas



Be aware of any potential projects at your facility and the timeframes for these new projects



Understand your facility's contribution to the PM2.5 levels



Keep an eye on the state's designations for your facilities or proposed projects



Watch for updates to ozone NAAQS in 2025

QUESTIONS?

MARY HAUNER-DAVIS
MHAUNER@BURNSMCD.COM

