

# PM2.5 NAAQS Reconsideration – History and Potential Impact

**A&WMA -Louisiana Section Environmental  
Conference**

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# Agenda

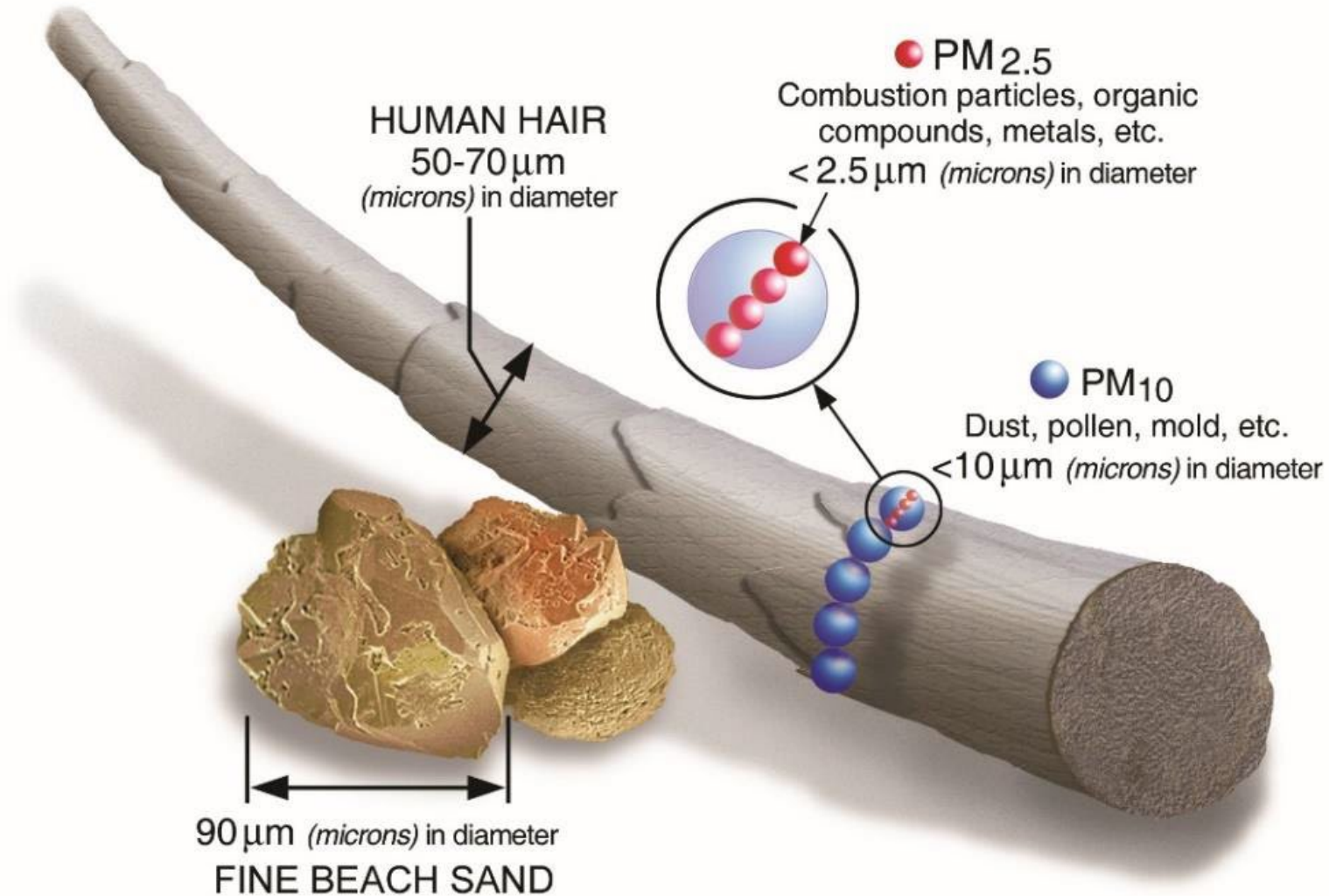
- ✓ What is Particulate Matter (PM)
- ✓ History of PM National Ambient Air Quality Standards (NAAQS)
- ✓ PM<sub>2.5</sub> Reconsideration Progress
- ✓ Potential PM<sub>2.5</sub> Nonattainment Areas
- ✓ Impact of lowered NAAQS on Previously Permitted Projects



# What is Particulate Matter(PM)?

- United States Environmental Protection Agency (U.S. EPA) refers to particulate matter as a complex mixture of extremely small particles and liquid droplets.
- The following subcategories of particulate matter are regulated:
  - Coarse particles – particles between 2.5 micrometers and 10 micrometers in diameter, referred to as particulate matter less than 10 microns ( $PM_{10}$ ).
  - Fine particles – particles less than 2.5 micrometers in diameter ( $PM_{2.5}$ )
    - Primary  $PM_{2.5}$  – directly emitted into air as solid or liquid particles
    - Secondary  $PM_{2.5}$  – formed by chemical reactions of gases in the atmosphere

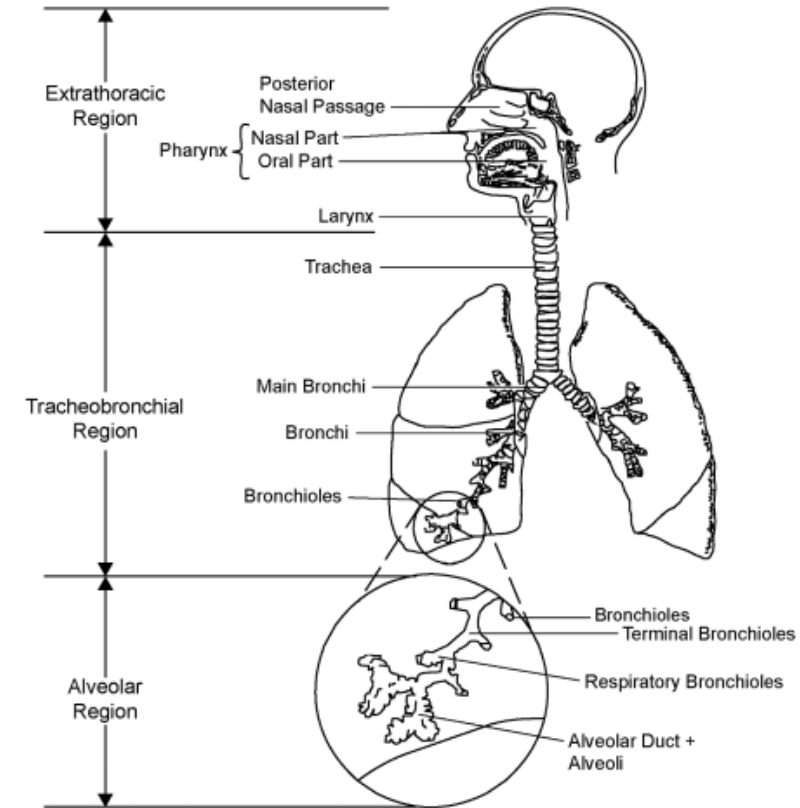
# Particulate Matter



Source: <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>

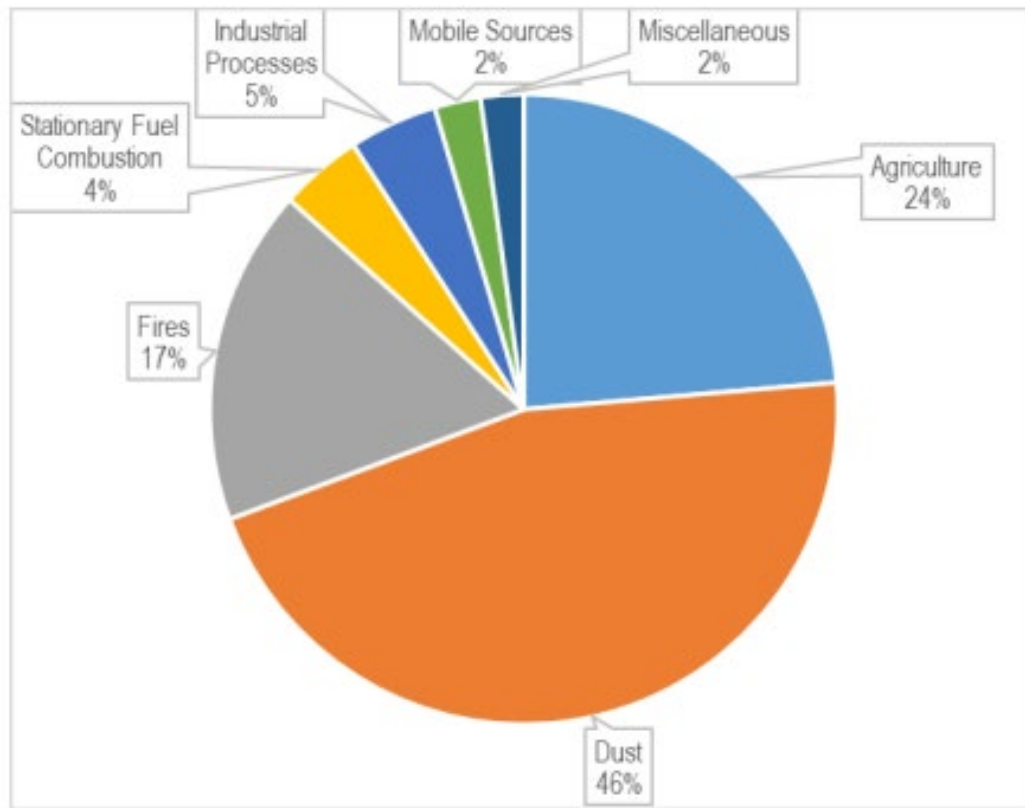
# Why is PM a Health Concern?

- Fine particles ( $PM_{2.5}$ ) are of greatest health concern
- $PM_{2.5}$  can enter the respiratory tract and make their way into the lower parts of the lungs
- Some particles can move out of the respiratory system and affect other organ systems
- Exposure to  $PM_{2.5}$  can both exacerbate pre-existing health conditions and lead to the development of some diseases (e.g., respiratory and cardiovascular)

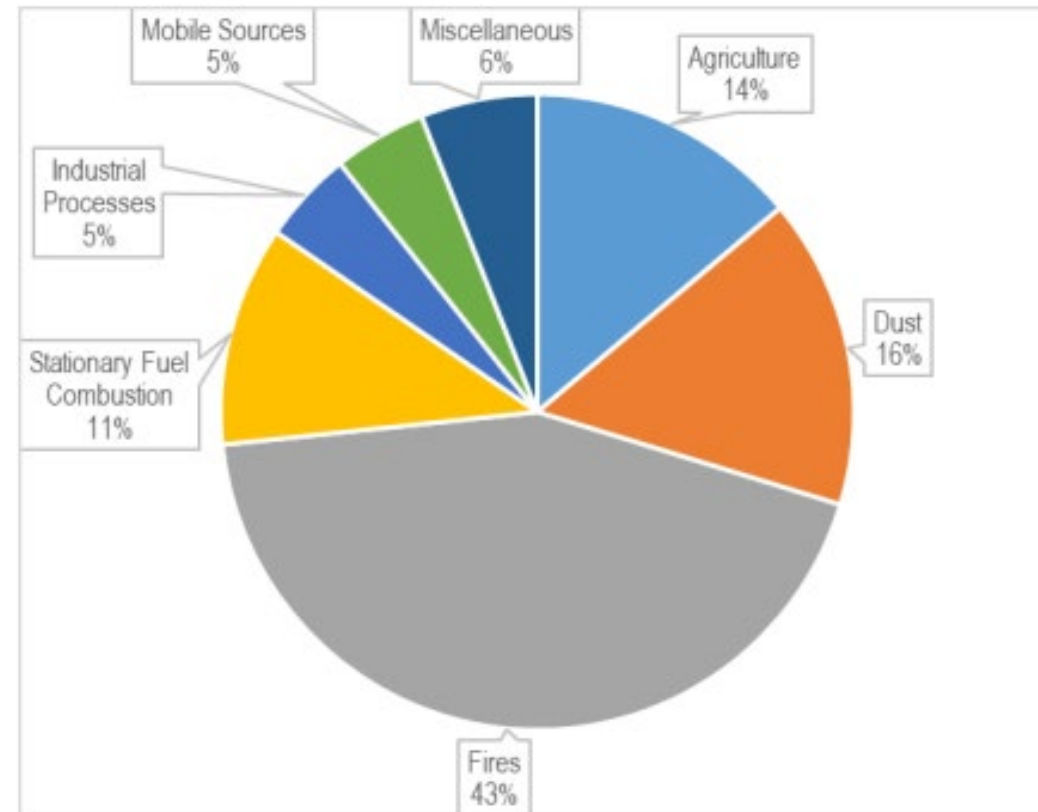


# Where does PM come from?

Percent contribution of PM<sub>10</sub> national emissions by source sectors, 2017 NEI Data

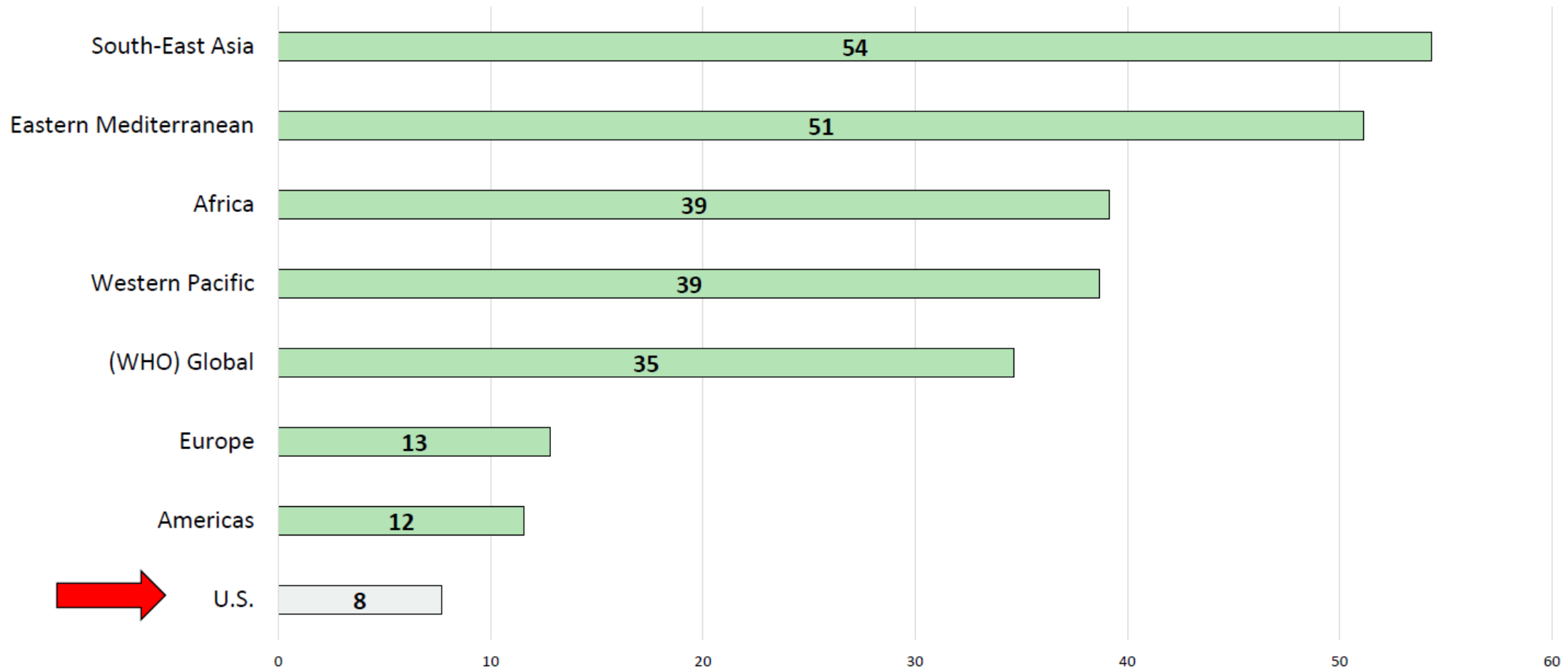


Percent contribution of Primary PM<sub>2.5</sub> national emissions by source sectors, 2017 NEI Data



Source: Figures 2-2 and 2-3 from Policy Assessment for Reconsideration of National Ambient air Quality Standards for Particulate Matter

# World Health Organization Global Ambient Concentrations of PM<sub>2.5</sub> (μg/m<sup>3</sup>)



Source: World Health Organization (WHO), Global Health Observatory (GHO), Sustainable Development Goals (SDG) Indicator 11.6.2:

# History of PM NAAQS

- 1971 – 24-hour and annual (Total suspended particulate (TSP) standards (260 and 75  $\mu\text{g}/\text{m}^3$ )
- 1987 – replaced TSP with 24-hour and annual  $\text{PM}_{10}$  (150 and 50  $\mu\text{g}/\text{m}^3$ )
- 1997 – added 24-hour and annual  $\text{PM}_{2.5}$  standards (65 and 15  $\mu\text{g}/\text{m}^3$ )
- 2006 – lowered 24-hour  $\text{PM}_{2.5}$  NAAQS to 35 $\mu\text{g}/\text{m}^3$ , revoked annual  $\text{PM}_{10}$  NAAQS
- 2010 –  $\text{PM}_{10}$  as surrogate for  $\text{PM}_{2.5}$  repealed
- 2012 – lowered the annual  $\text{PM}_{2.5}$  NAAQS to 12 $\mu\text{g}/\text{m}^3$





# History of PM NAAQS

- December 2020 – the existing primary 24-hour PM<sub>10</sub>, 24-hour and annual PM<sub>2.5</sub> NAAQS were retained without revision. The secondary PM<sub>10</sub> and PM<sub>2.5</sub> standards were also retained without revision.
- June 2021 – U.S. EPA announces it will reconsider the December 2020 decision to retain all the existing primary and secondary PM<sub>10</sub> and PM<sub>2.5</sub> standards.

Pollutant	Primary/Secondary	Averaging Period	Level	Form of the Standard
PM <sub>10</sub>	Primary and secondary	24 hours	150 µg/m <sup>3</sup>	Not to be exc >1/yr avg over 3 yr
PM <sub>2.5</sub>	Primary Secondary Primary and secondary	Annual Annual 24 hours	12.0 µg/m <sup>3</sup> 15.0 µg/m <sup>3</sup> 35 µg/m <sup>3</sup>	Ann mean avgd over 3 years Ann mean avgd over 3 years 98 <sup>th</sup> percentile avgd over 3 years



# Reconsideration Process

- Clean Air Act (CAA) requires the following steps to be conducted by EPA when reviewing the NAAQS (5-year cycle):
  - **Planning**
  - **Integrated Science Assessment (ISA)**
  - **Risk/Exposure Assessment (REA)**
  - **Policy Assessment (PA)**
  - The **Clean Air Scientific Advisory Committee (CASAC)** provides consultation and peer review.
  - **Rulemaking:** Taking into consideration the information in the ISA, REA(s), and PA and the advice of CASAC, EPA proposes a rule, takes comment, and promulgates a final rule.





# Reconsideration Progress

- ❑ Draft Supplement to the ISA – September 2021
- ❑ Final Supplement to the ISA – May 2022
- ❑ Draft Policy Assessment for Reconsideration of PM NAAQS – October 2021
- ❑ Final Policy Assessment for Reconsideration of PM NAAQS – May 2022
  - Updated policy assessment continues to support no change to PM<sub>10</sub> standards
  - Consensus among CASAC members that annual PM<sub>2.5</sub> standard should be lowered, somewhere between 8-12 ug/m<sup>3</sup>.
  - Difference in opinion among CASAC members on whether 24-hour PM<sub>2.5</sub> standard should be lowered, with some members arguing for as low as 25 ug/m<sup>3</sup>.





# Reconsideration Progress

- ❑ Final step is to take CASAC and public comments into consideration and draft a rulemaking for a proposed revised PM<sub>2.5</sub> NAAQS.
- ❑ Proposal was originally planned for Summer 2022. Has been at Office of Management and Budget (OMB) for review since September 22, 2023. The final rulemaking is imminent.
- ❑ Final rule originally planned for Spring 2023, now end of 2023:

**Presumed Proposed Final Annual PM<sub>2.5</sub> NAAQS: 9.0 µg/m<sup>3</sup>**

**No change to 24-hour PM<sub>2.5</sub> NAAQS**

**National 2020-2022 average ambient background is 8.08 µg/m<sup>3</sup>**

(average of ambient monitor design values in EPA Trends Report

[https://www.epa.gov/system/files/documents/2023-05/PM25\\_DesignValues\\_2020\\_2022\\_FINAL\\_05\\_23\\_23.xlsx](https://www.epa.gov/system/files/documents/2023-05/PM25_DesignValues_2020_2022_FINAL_05_23_23.xlsx) )

# Current and Potential Nonattainment Areas

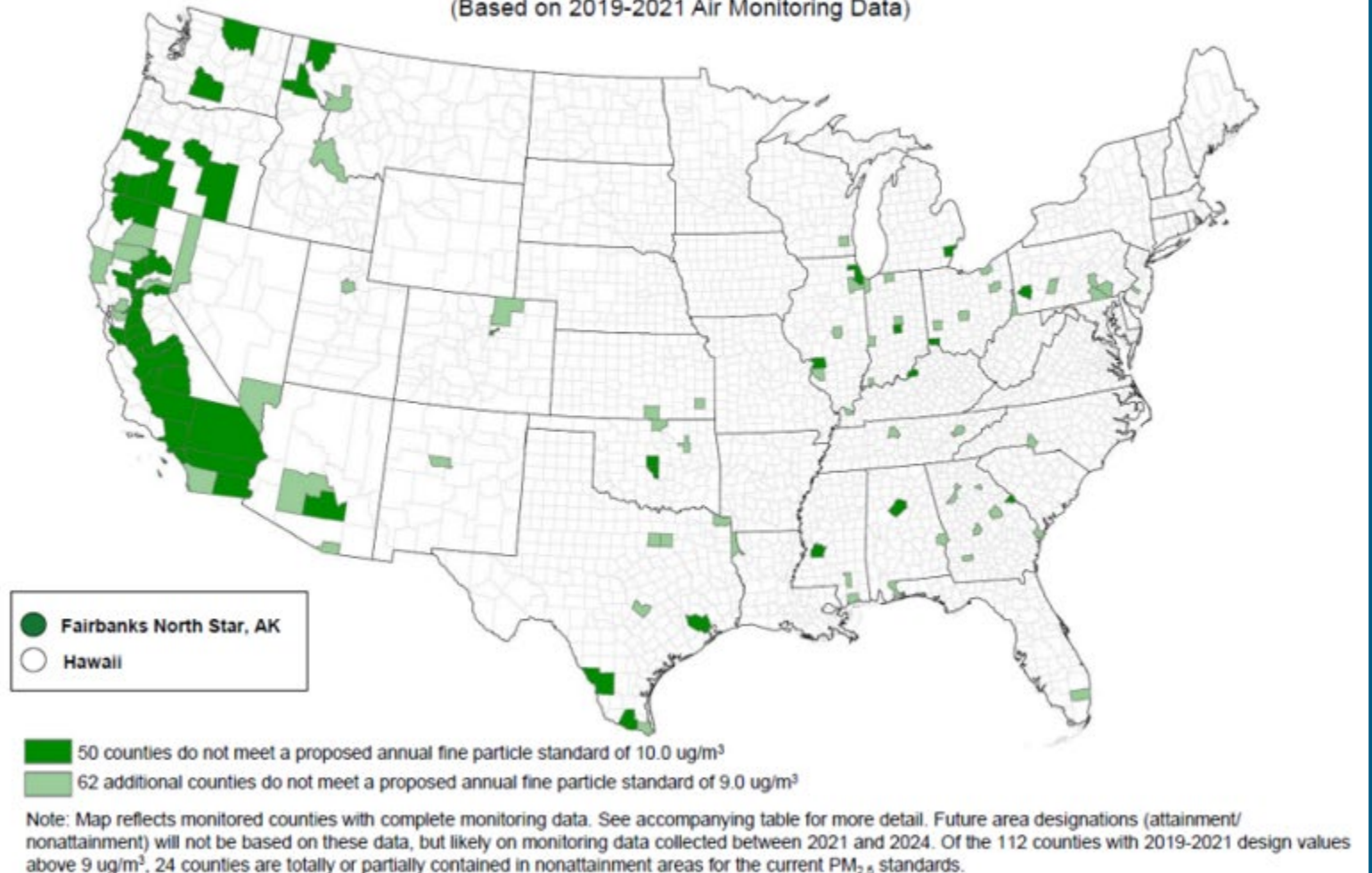


## Annual PM<sub>2.5</sub>:

- ❑ Current # of counties in nonattainment: 15
- ❑ # of Counties in nonattainment at NAAQS of 10  $\mu\text{g}/\text{m}^3$ : 50
- ❑ # of counties in nonattainment at proposed NAAQS of 9  $\mu\text{g}/\text{m}^3$ : 112

## Current Air Monitoring Data Show Some Counties Would Not Meet Proposed Primary Fine Particle Standards

(Based on 2019-2021 Air Monitoring Data)



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



# Nonattainment Area Requirements

- For nonattainment areas, states will develop SIPs that will contain specific rules and provisions aimed at bringing the areas back into compliance with the standard.
- Nonattainment new source review (NNSR) permits include additional requirements, including offsets, lowest achievable emissions rate, and the alternative sites analysis.

# Recent PSD Permit Applications for PM<sub>2.5</sub>

Facility	State	Annual Average PM <sub>2.5</sub> (micrograms per cubic meter)		
		Modeled(1)	Background(2)	Total(3)
Steel	Arkansas	2.5	9.4	11.9
Steel	Arkansas	4.3	7.6	11.9
Steel	Arkansas	4.4	7.3	11.7
Pulp & Paper Mill	Florida	5.7	5.9	11.6
Recycled Paper Mill	Oklahoma	3.4	8.3	11.7
Brick	Iowa	3.5	8.0	11.5
Steel	Illinois	3.7	7.8	11.5
Paper	Texas	2.8	8.5	11.3
Greenfield Paper Mill	Arkansas	3.1	8.2	11.3
Cement	Pennsylvania	2.2	9.0	11.2
Power	Wisconsin	3.9	7.3	11.2
Paper	Louisiana	3.7	7.4	11.1
Power	Pennsylvania	3.0	8.1	11.1
EV Batteries	Georgia	1.8	8.9	10.7
Cement	Georgia	2.3	8.3	10.6
Wood Products Panels	South Carolina	3.1	7.1	10.2
Steel	North Carolina	1.2	8.9	10.1
Lumber	Washington	6.0	4.1	10.1

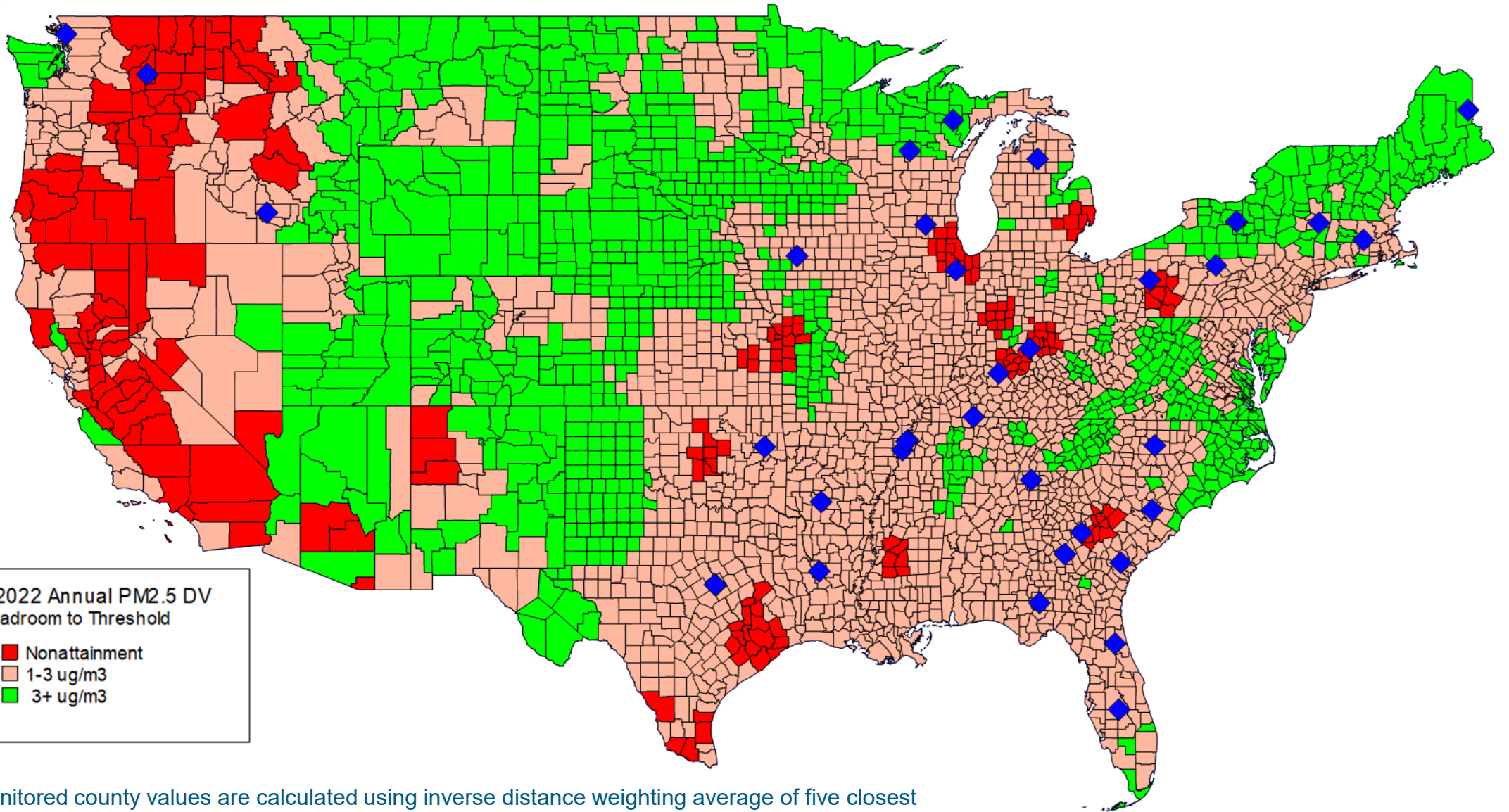
Facility	State	Annual Average PM <sub>2.5</sub> (micrograms per cubic meter)		
		Modeled(1)	Background(2)	Total(3)
Automotive EV & Battery	Georgia	2.5	7.3	9.8
Manufacturing	Washington	3.3	6.5	9.8
Aluminum	Kentucky	1.5	8.1	9.6
Steel	Kentucky	1.7	7.8	9.5
Paper	Texas	0.9	8.5	9.4
Gas-fired EGU	Georgia	0.9	8.4	9.3
Paper	Michigan	4.6	4.7	9.3
Steel	Kentucky	1.9	7.4	9.3
Feed & Grain	Idaho	4.3	4.9	9.2
Pharmaceutical	New York	0.4	8.7	9.1
Power	Wisconsin	1.3	7.6	8.9
Gas-fired EGU	Georgia	0.9	7.9	8.8
Gas-fired EGU	New York	1.8	6.5	8.3
Steel	Kentucky	0.1	7.7	7.8
Paper	Maine	3.5	4.0	7.5
Steel	Florida	0.9	6.5	7.4
Wood Products Panels	Michigan	1.4	5.6	7.0
LNG Storage	Massachusetts	1.6	5.1	6.7
<b>Count</b>		<b>36</b>	<b>36</b>	<b>36</b>
<b>90th Percentile</b>		<b>4.4</b>	<b>8.8</b>	<b>11.6</b>
<b>75th Percentile</b>		<b>3.6</b>	<b>8.3</b>	<b>11.2</b>
<b>Average</b>		<b>2.6</b>	<b>7.3</b>	<b>9.9</b>
<b>Median</b>		<b>2.5</b>	<b>7.7</b>	<b>10.0</b>
<b>25th Percentile</b>		<b>1.5</b>	<b>6.5</b>	<b>9.2</b>
<b>10th Percentile</b>		<b>0.9</b>	<b>5.0</b>	<b>7.7</b>

- "MDC" denotes the **modeled design concentration** computed by AERMOD (i.e., the maximum 5-year average annual mean concentration) simulating cumulative impacts from applicant facility and nearby sources. Includes secondary PM<sub>2.5</sub> screening concentration from precursor emissions of NO<sub>x</sub> and SO<sub>2</sub> estimated using EPA's MERPs and related guidance.
- "Background" denotes the background concentration accounting for all sources not explicitly simulated in AERMOD, typically quantified as the design value (3-year average) from a representative (usually nearest) Federal Reference Method or Federal Equivalent Method ambient monitor. Color coding denotes relatively higher (hotter) and lower (cooler) background concentrations among sampled analyses.
- "Total" denotes the sum of the MDC and background, which is compared to the level of the NAAQS to demonstrate that the total ambient PM<sub>2.5</sub> concentration simulated in the cumulative impact analysis would not exceed the standard. Color coding distinguishes total modeled annual average PM<sub>2.5</sub> concentrations from 11-12 (red), 10-11 (orange), 9-10 (yellow), 8-9 (blue), and less than 8 (green).

Projects shaded in blue listed on the Biden administration Investing in America website, \$12.1 billion and 10,000+ jobs

The "typical project" will be challenged relative to a lower NAAQS

# NAAQS Headroom to $10 \mu\text{g}/\text{m}^3$



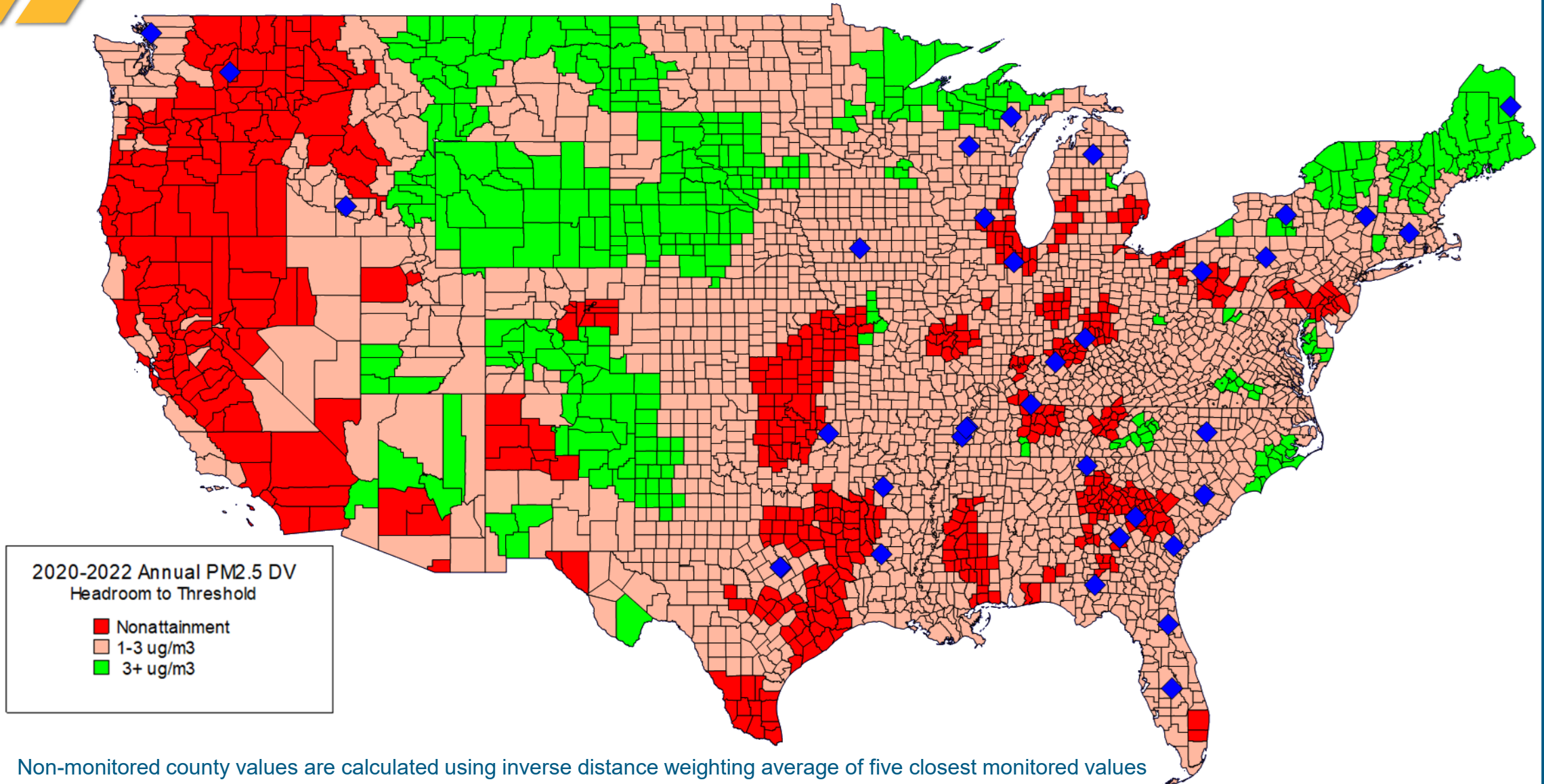
2020-2022 Annual PM<sub>2.5</sub> DV  
Headroom to Threshold

- Nonattainment
- 1-3 ug/m<sup>3</sup>
- 3+ ug/m<sup>3</sup>

Non-monitored county values are calculated using inverse distance weighting average of five closest monitored values Blue diamonds represent PSD projects  
Slide By Greg Stella – Alpine Geophysics



# NAAQS Headroom to $9 \mu\text{g}/\text{m}^3$





# Summary

- The final reconsidered version of the PM<sub>2.5</sub> Annual NAAQS is imminent. The expectation is that the Annual NAAQS will be set to 9 µg/m<sup>3</sup>, while the 24-hour PM<sub>2.5</sub> NAAQS will remain at 35 µg/m<sup>3</sup>.
- The change will leave limited headroom under the NAAQS when ambient background is considered, creating significant permitting challenges.
- If the PM<sub>2.5</sub> Annual NAAQS is set to 9 µg/m<sup>3</sup>, the number of counties in nonattainment will increase from 15 to 112.
- Many previously permitted projects would not have passed modeling at a revised NAAQS of 9 µg/m<sup>3</sup> (or 10 µg/m<sup>3</sup>). With modeling largely background driven, refinements to get under the NAAQS will be difficult.



# Questions or Comments?

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