

Overview of the Revised National Ambient Air Quality Standards for Particulate Matter

Joint Advisory Committee Meeting

October 24, 2024

Main Elements of the PM NAAQS Final Decision

- On February 7, 2024, EPA published a final rule **strengthening the level of the primary (health-based) annual standard for fine particles** (PM_{2.5}) to 9.0 micrograms per cubic meter (µg/m³) to reflect the latest available health science.
- **EPA did not revise any other PM standards:**
 - The primary (health-based) and secondary (welfare-based) 24-hour PM_{2.5} standards stay at the level of 35 µg/m³
 - The primary and secondary 24-hour PM₁₀ standards stay at the level of 150 µg/m³
 - The secondary annual PM_{2.5} standard stays at the level of 15.0 µg/m³
- EPA also:
 - Revised the Air Quality Index (AQI) to improve public communications about the risks from PM_{2.5} exposures
 - Made changes to the monitoring network to enhance protection of air quality in communities overburdened by air pollution

Revisions to the Primary Annual PM_{2.5} Standard

- EPA revised the level of the primary (health-based) **annual** PM_{2.5} standard to 9.0 µg/m³ to meet the Clean Air Act requirement that primary standards be “requisite to protect public health with an adequate margin of safety,” including the health of at-risk populations
- In the final rule, EPA concluded that the available scientific information supports strengthening the primary annual PM_{2.5} standard to ensure it adequately protects public health:
 - Recent studies suggest adverse health effects from exposure to PM_{2.5} are occurring at concentrations allowed by the previous standard of 12 µg/m³ (set in 2012), with additional studies demonstrating improvements in public health, including reductions in mortality, following reductions in PM_{2.5} in areas with air quality below 12 µg/m³
 - EPA’s quantitative risk assessment estimates that the previous standard of 12 µg/m³ could allow thousands of PM_{2.5}-associated deaths per year
- Decision reflects Clean Air Scientific Advisory Committee (CASAC) advice and public input
 - The CASAC reached consensus that the primary annual PM_{2.5} standard should be revised, with the majority recommending revision to a level between 8-10 µg/m³

Health Benefits of the Stronger PM Standard

- EPA estimates health benefits of strengthening the primary (health-based) annual standard for fine particles to 9.0 micrograms per cubic meter could be as high as \$46 billion in 2032 (2017\$, 3% discount rate).
- In 2032 alone, the health benefits include avoiding:
 - Up to 4,500 premature deaths
 - 2,000 emergency room visits
 - 5,700 cases of asthma onset
 - 800,000 cases of asthma symptoms
 - 290,000 lost workdays
 - 1,000 hospital admissions for Alzheimer's/Parkinson's diseases
 - 300 incidences of stroke/lung cancer
 - 38,000 hay fever symptoms

What is Particulate Matter (PM)?

- Mixture of solid and liquid droplets
 - Primary particles emitted directly from a source (e.g., smokestacks, fires, construction sites)
 - Secondary particles produced through complex atmospheric reactions of chemicals (e.g., NO_2 , SO_2) emitted by sources such as power plants, automobiles, etc.
- Particles defined by aerodynamic diameter
 - Coarse particles (PM_{10}), aerodynamic diameter $\leq 10 \mu\text{m}$
 - Fine particles ($\text{PM}_{2.5}$), aerodynamic diameter $\leq 2.5 \mu\text{m}$
 - Ultrafine particles (UFPs), aerodynamic diameter $\leq 0.1 \mu\text{m}$

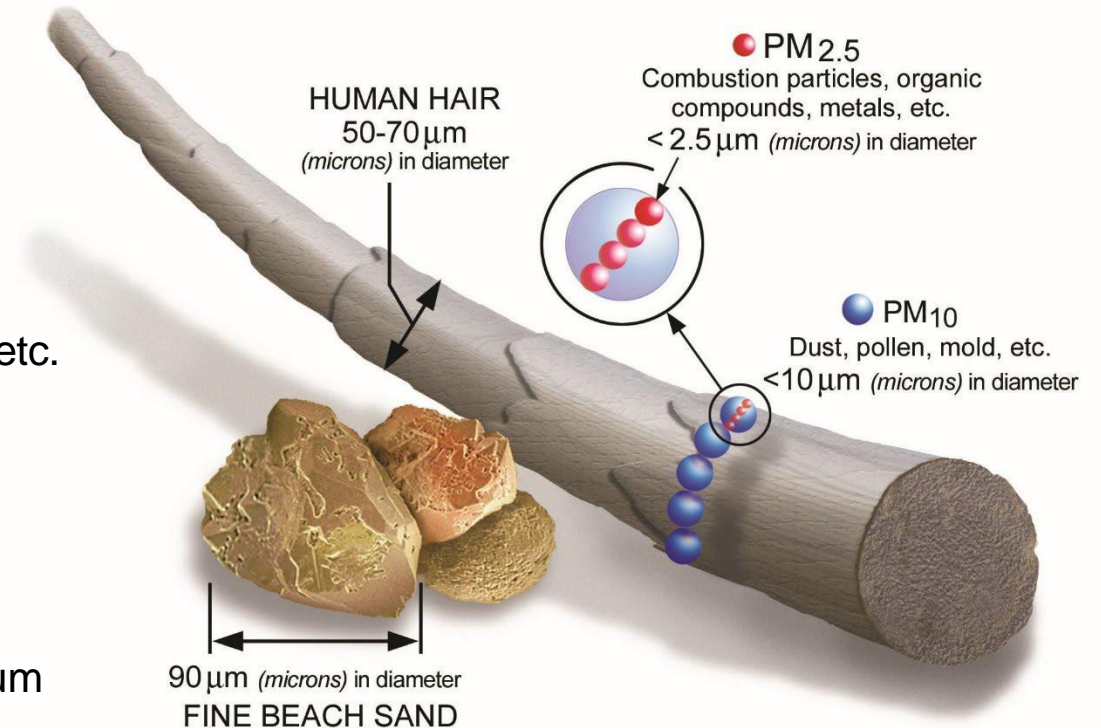


Image courtesy of the U.S. EPA

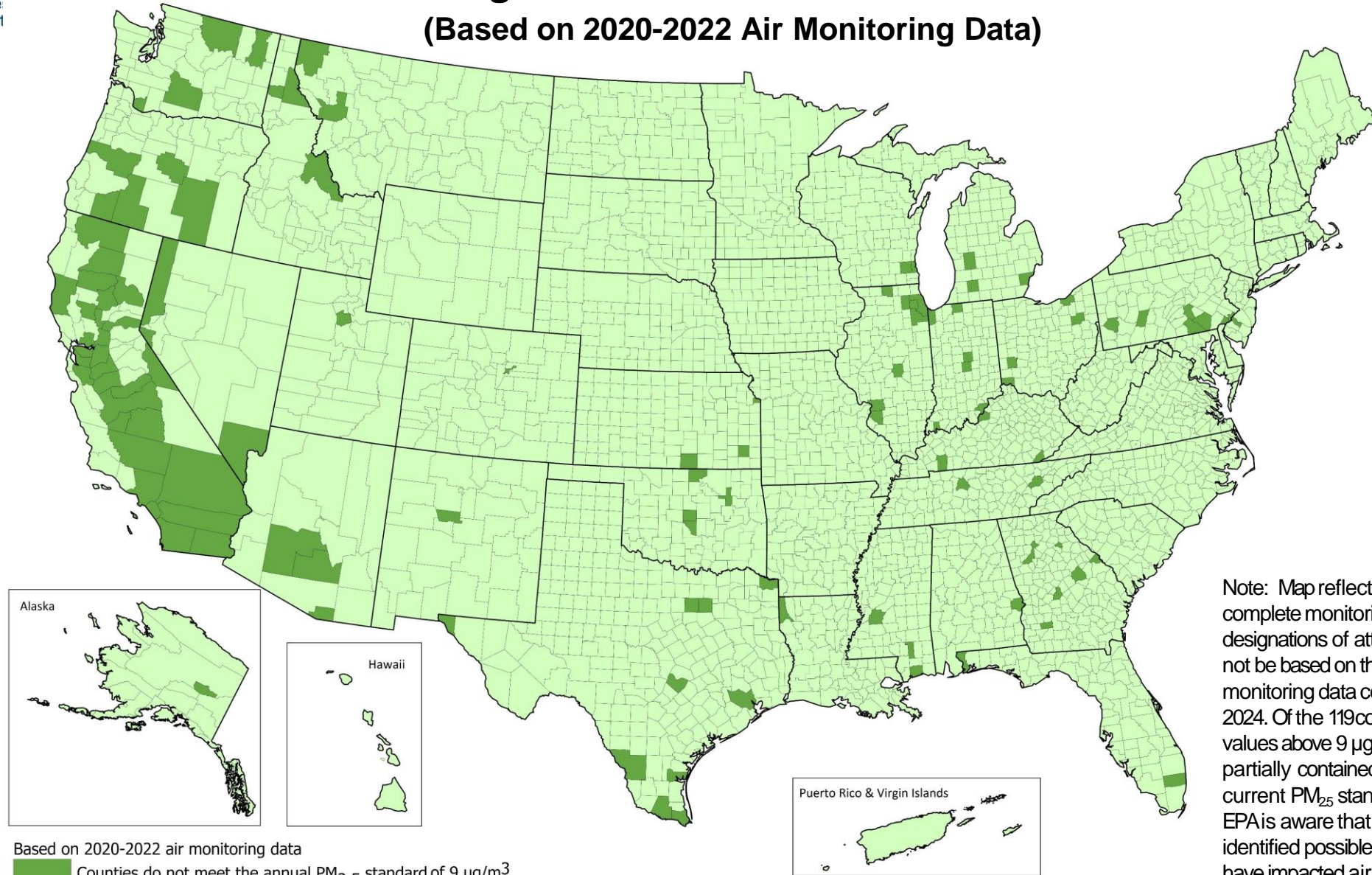
Source: <https://www.epa.gov/pm-pollution>

Designations/Implementation Timeline

The Clean Air Act directs EPA and states to take the following actions to deliver public health benefits following promulgation of a new/revised PM_{2.5} NAAQS:


- **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.
- **Within 2 years after a final NAAQS:** For areas with available information, EPA must "designate" areas as meeting (attainment areas) or not meeting (nonattainment areas) the final NAAQS considering the most recent air quality monitoring data and input from states and tribes. All PM_{2.5} nonattainment areas are initially designated as "Moderate."
- **Within 3 years after a final NAAQS:** Clean Air Act section 110 requires all states to submit state implementation plan revisions to show they have the basic air quality management program components in place to implement the final NAAQS.
- **Within 18 months after the effective date of designations:** Nonattainment area PM_{2.5} state implementation plans are due.
- **End of the 6th calendar year after the effective date of designations:** "Moderate" area attainment date.

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



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 $9 \mu\text{g}/\text{m}^3$, 59 counties are totally or partially contained in nonattainment areas for current $\text{PM}_{2.5}$ 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.

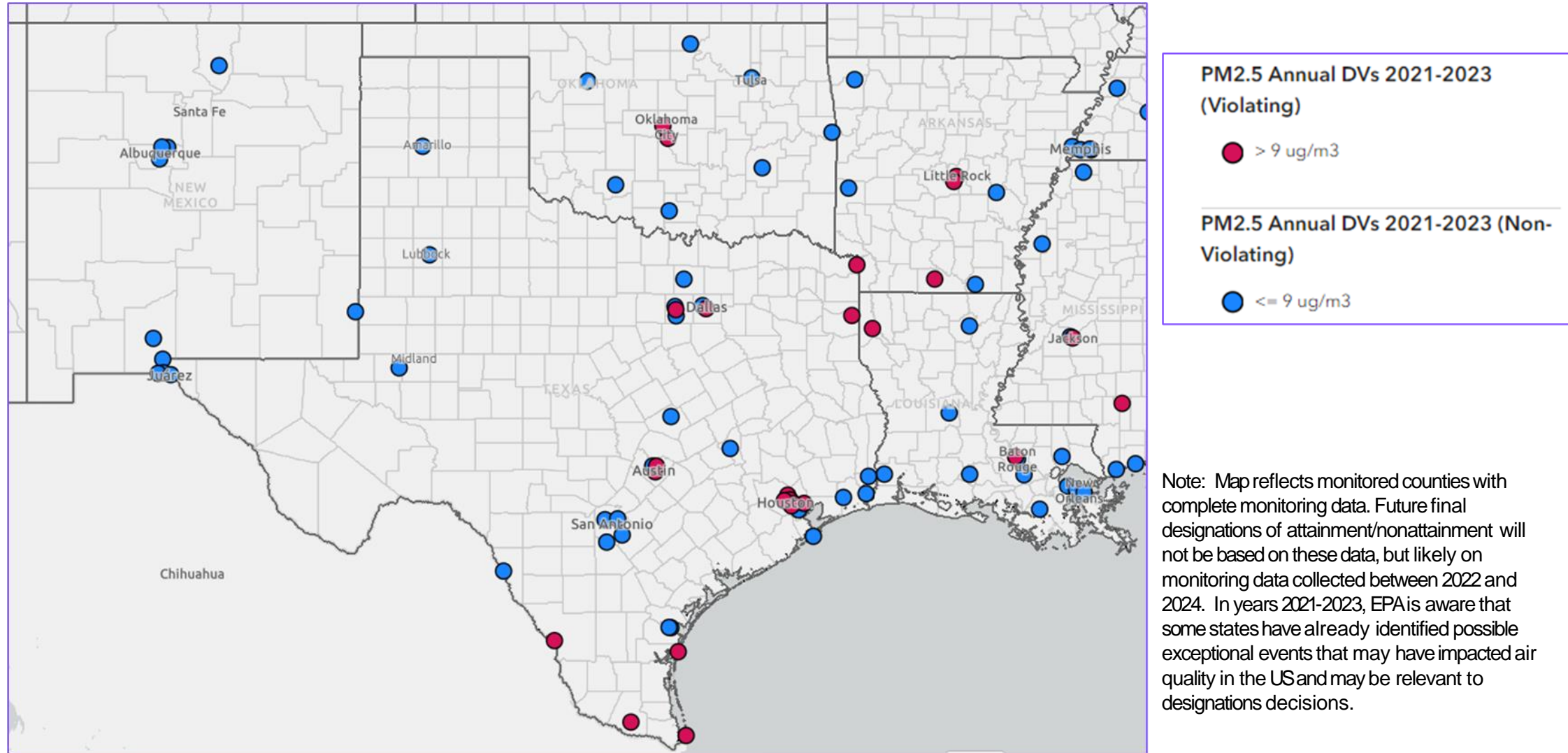
Based on 2020-2022 air monitoring data

 Counties do not meet the annual $\text{PM}_{2.5}$ standard of $9 \mu\text{g}/\text{m}^3$

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

EPA Region 6 Areas Violating the 2024 Annual PM2.5 NAAQS

(Based on 2021-2023 Air Monitoring Data)



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. In years 2021-2023, 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.

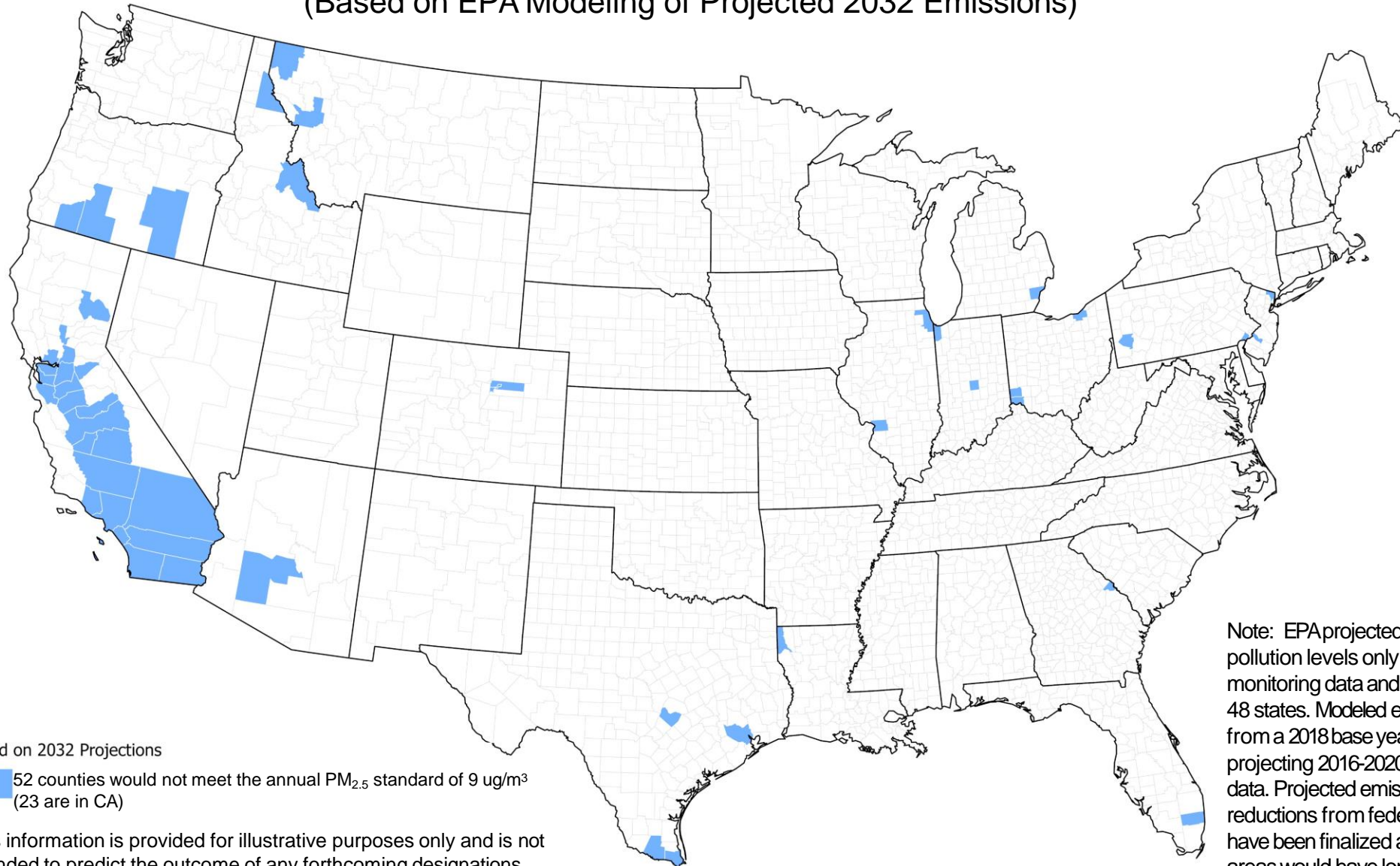
EPA Actions will Further Reduce Particle Pollution – Helping Meet Standards and Fostering Clean Growth

- National programs help communities across the country breathe cleaner air.
- Federal rules and programs, in partnership with state, Tribal, and local partners, will help to improve air quality around the country and reduce particle pollution.


2011	2014	2021	2022	2023	Coming Soon	Inflation Reduction Act
<ul style="list-style-type: none"> ▪ Power Plant Reductions (MATS) 	<ul style="list-style-type: none"> ▪ Motor Vehicle Emission and Fuel Standards 	<ul style="list-style-type: none"> ▪ Power Plant Reductions (CSAPR) 	<ul style="list-style-type: none"> ▪ Heavy-Duty Engine and Vehicle Standards 	<ul style="list-style-type: none"> ▪ Oil and Gas Regulations ▪ Power Plant and Industrial Reductions (Good Neighbor Plan) 	<ul style="list-style-type: none"> ▪ Light and Medium Duty Vehicle Rules ▪ Power Plant Reductions (MATS RTR, Section III) 	<ul style="list-style-type: none"> ▪ Investments in ▪ Clean ports ▪ Clean trucks ▪ Climate Pollution Reduction Grants ▪ Clean Energy Tax Credits

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 ug/m³
(23 are in CA)

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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.

Exceptional Events

The term "exceptional event" means an event that:

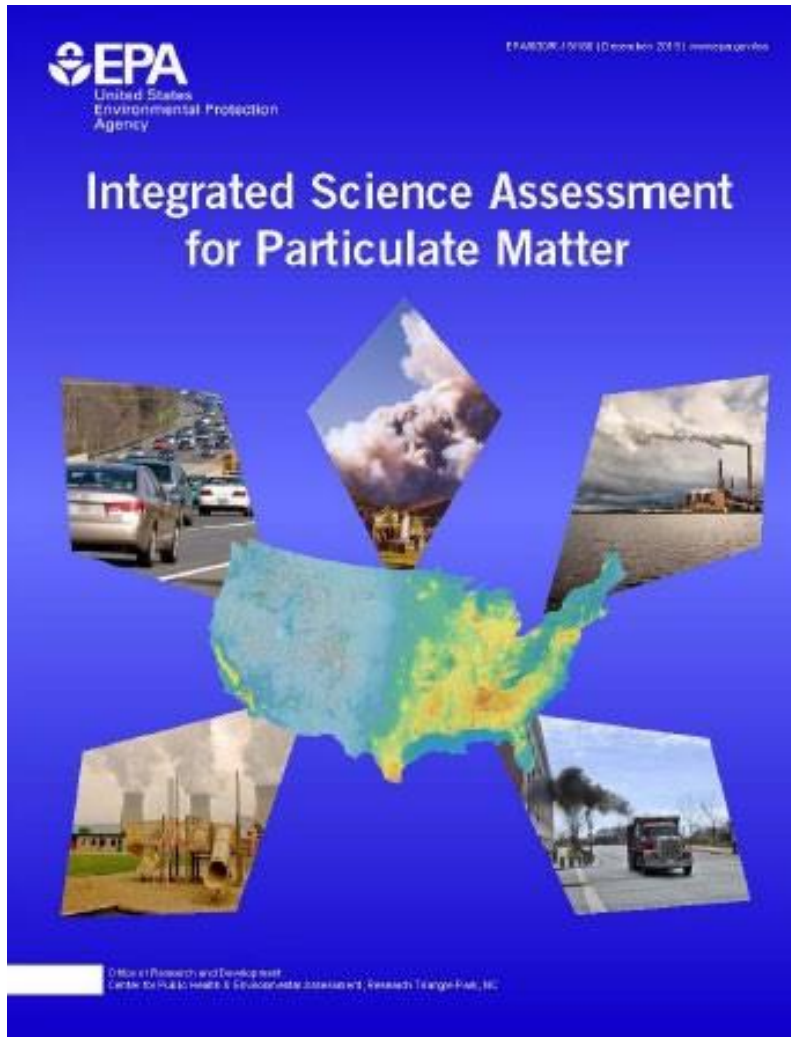
- (i) affects air quality;
- (ii) is not reasonably controllable or preventable;
- (iii) is an event caused by human activity that is unlikely to recur at a particular location or a natural event; and
- (iv) is determined by the Administrator through the process established in the regulations promulgated under paragraph (2) to be an exceptional event.

Additional Resources

- Information on particulate matter (PM) pollution: <https://www.epa.gov/pm-pollution>
- Information on the Final PM NAAQS, including fact sheets: <https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm>
- Information on the PM NAAQS review process and other related documents: <https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards>
- Information on the 2024 PM NAAQS designations process: <https://www.epa.gov/particle-pollution-designations/particle-pollution-designations-memorandum-and-data-2024-revised>
- Wildland Fire, Air Quality, and Public Health Considerations Fact Sheet (contains link to MOU): <https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-wildland-fire-air-quality-fact-sheet-final.pdf>
- Information on treatment of air quality monitoring data influenced by Exceptional Events: <https://www.epa.gov/air-quality-analysis/treatment-air-quality-monitoring-data-influenced-exceptional-events>

Appendix

Why is PM a Public Health Concern?



<https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter>

- Fine particles (PM_{2.5}) are of greatest health concern
 - PM_{2.5} can enter the respiratory tract and make its way into the lower parts of the lungs
 - Some particles can move out of the respiratory system and affect other organ systems
- EPA's 2019 Integrated Science Assessment (ISA) and ISA Supplement links exposure to PM_{2.5} to adverse health effects, including:
 - Premature death
 - Cardiovascular effects like irregular heartbeat and heart attacks
 - Respiratory effects like aggravated asthma, decreased lung function, coughing and difficulty breathing
 - Cancer
 - Nervous system effects
- At-risk populations include children, older adults, people with pre-existing respiratory or cardiovascular disease, minority populations, and low socioeconomic status (SES) populations

Summary of Previous Standards and 2024 Final Decision

Standards – Last Revised in the 2012 Review*					Decisions in 2020 Review	2024 Final Decision
Indicator	Averaging Time	Primary/ Secondary	Level	Form		
PM _{2.5}	Annual	Primary	12.0 µg/m ³	Annual arithmetic mean, averaged over 3 years	Retained	Revise level to 9.0 µg/m ³
		Secondary	15.0 µg/m ³		Retained	Retain
	24-hour	Primary and Secondary	35 µg/m ³	98th percentile, averaged over 3 years	Retained	Retain
PM ₁₀	24-hour	Primary and Secondary	150 µg/m ³	Not to be exceeded more than once per year on average over a 3-year period	Retained	Retain

* Prior to 2012, PM NAAQS were reviewed and revised several times – established in 1971 (total suspended particulate – TSP) and revised in 1987 (set PM₁₀), 1997 (set PM_{2.5}), 2006 (revised PM_{2.5}, PM₁₀)