EARTHJUSTICE

ASSESSING 2024 PM2.5 STANDARD IMPLEMENTATION SO FAR: WHO'S ON TRACK TO GET CLEAN AIR AND WHO'S LEFT BEHIND

Executive Summary

The Clean Air Act has provided safeguards to reduce the country's exposure to unhealthy air pollution for over fifty years. Congress enacted and designed the law to ensure that federal, state, and local governments had mechanisms by which they could, and indeed must, reduce the population's exposure to unhealthy air pollution. One category of air pollution – fine particulate matter – especially harms human health and has been found to cause cardiovascular, respiratory, and nervous system effects, as well as cancer. To protect people, the U.S. Environmental Protection Agency (EPA) in 2024 adopted a rule that would initiate a series of actions to reduce exposure to harmful levels of fine particulate matter. The next steps are supposed to proceed like clockwork from here, moving according to a schedule set in the Clean Air Act until all communities across the country enjoy healthy air. Unfortunately, the Trump Administration has shown no interest in taking the next steps, and in fact, recently asked a federal court to roll back the rule. But rolling back the rule would be wrong. Instead, to save lives, EPA must implement the rule. This paper assesses where we stand in the process of implementing the 2024 fine particulate matter rule and shines a light on why it is so important to faithfully implement it, as Congress mandated EPA to do.

Over 75 million people – about 22% of the U.S. population – live in a county whose air currently exceeds the level of the 2024 standard. Six of the twenty-two states containing at least one county with illegally unhealthy air submitted recommendations to EPA that some or all of those areas be designated in violation of the standard, or "nonattainment," and thus put on the path to clean air – Alaska, California, Michigan, Montana, Ohio, and Pennsylvania, covering 45 million people. However, across the other sixteen states, 38 million people reside in counties whose states did not put them up for nonattainment. Nine of these (Alabama, Georgia, Idaho, Louisiana, Mississippi, North Carolina, Oregon, Tennessee, and Washington) put forth exceptional events, such as wildfire smoke or fireworks, as their reason for failing to meet the standard. Five states (Arizona, Arkansas, Illinois, Indiana, and Missouri) submitted no recommendations at all; and Kansas blamed monitor bias. Lastly, the governor of Texas – a state containing nearly 17 million people residing in 16 counties with monitors registering dirty air – went against the advice of the state environmental agency and refused to recommend any areas of nonattainment. In doing so, Governor Abbott failed to reference the monitor data or provide any valid justification.

People of color are disproportionately affected, making up a larger share of the population in counties with illegally unhealthy air. The U.S. overall consists of 42.4% people of color, yet within the subset of counties with illegally unhealthy air, people of color make up a much larger share of the population: 61.4%. Those affected also disproportionately tend to be Hispanic: 19.8% of the U.S. identifies as Hispanic, but counties with monitor violations are 34.3% Hispanic. Additionally, counties where

[1] *EPA, Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, 89 FR 16202, 16203/2 (Mar. 6, 2024), available at https://www.govinfo.gov/app/details/FR-2024-03-06/2024-02637.*
[2] *89 FR 16203/3; see also 2019 ISA.*

states failed to recommend a nonattainment designation had a higher Black population (18.3%) than counties where states did recommend nonattainment (10.3%).

Air pollution remains a broad, serious problem and a threat to people's health. Implementing the fine particulate matter standard as directed by the Clean Air Act as Congress intended can go a long way to solving it. EPA has a large role to play and must step up in order for this to be achieved.

Introduction

Fine particulate matter, also referred to as soot or PM2.5, consists of particles with diameters less than or equal to 2.5 micrometers (μm). In 2024, after evaluating extensive evidence linking exposure to PM2.5 to cardiovascular, respiratory, and nervous system effects, as well as cancer, the U.S. Environmental Protection Agency (EPA) issued a rule under its National Ambient Air Quality Standards (NAAQS) program intended to reduce the levels of PM2.5 to which communities are exposed. Now that a more health-protective PM2.5 standard has been finalized, communities need EPA to act to secure the cleaner air promised by the law and the 2024 rule.

EPA has long recognized the threat particulate matter poses to public health. For decades, EPA has found that even low levels of particulate matter cause death and other serious health harms. The latest of EPA's science assessments in support of the 2024 NAAQS concluded that "recent studies further support, and in some instances extend, the evidence … that characterizes relationships between [particulate matter] exposure and … cardiovascular effects and mortality…".[3] Research also shows that not all groups are equally affected, as Black populations and populations of lower socioeconomic status have been shown to face both higher levels of PM2.5 exposure and higher health risk from those exposures.[4] While health risks associated with PM2.5 concentrations below the level of the 2024 standard still exist,[5] implementation of the 2024 NAAQS will go a long way toward ensuring that no one is exposed via their air to a higher risk of cancer, stroke, or other health problems based simply on who they are or where they live.

For the first of this paper's three objectives, we take stock of where things stand in the PM2.5 NAAQS implementation process. Before action can be taken to remedy dirty air and bring it into compliance with the NAAQS, EPA must rule on which areas need remediation. EPA does so by issuing initial designations, or decisions on whether the ambient air in an area meets or violates the 2024 NAAQS – an area in violation receives a "nonattainment" designation. Though EPA has the final say, states and Tribes can weigh in on how they believe areas within their borders should be designated. Second, we present these state recommendations, obtained via a Freedom of Information Act (FOIA) request and make many of them made public for the first time. Lastly, we outline the public policy importance of faithful and equitable implementation of the NAAQS: so that communities across the country receive the clean air and improved public health promised by the law.

With the above objectives in mind, this paper explores the following lines of analysis:

- Highlight population-level demographic disparities between populations recommended by their states for receiving nonattainment status and those not;

[3] *EPA, Supplement to 2019 Integrated Science Assessment for Particulate Matter EPA/600/R-22/028 ES-ii (May 2022), available at https://assessments.epa.gov/risk/document/&deid=354490.*
[4] *EPA, Supplement to 2019 Integrated Science Assessment for Particulate Matter EPA/600/R-22/028 ES-iii (May 2022), available at https://assessments.epa.gov/risk/document/&deid=354490.*
[5] *See EPA, Policy Assessment for the Review of the National Ambient Air Quality Standards for Particulate Matter EPA-452/R-20-002 at pp.3-103 to 3-104 (Jan. 2020), available at https://www.epa.gov/system/files/documents/2021-10/final-policy-assessment-for-the-review-of-the-pm-naaqs-01-2020.pdf; see also Letter from Dr. Elizabeth A. (Lianne) Sheppard, Chair, CASAC, to Michael S. Regan, Administrator, U.S. Environmental Protection Agency, re: "CASAC Review of EPA's Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (External Review Draft – October 2021)" at PDF pp. 3, 22 (Mar. 18, 2022), available at https://casac.epa.gov/ords/sab/r/sab_apex/casac/0?report_id=1094&request=APPLICATION_PROCESS%3DREPORT_DOC&session=7769508604190.*

- Explore states' justifications for excluding data from regulatory decisions, as provided in their designation recommendations, obtained via FOIA; and

- Compare the another group's earlier predictions of future nonattainment designations to the actual recommendations.

Background

This section introduces the reader to the purpose and significance of the NAAQS, recounts recent history of the PM2.5 NAAQS, and explores next steps stemming from adoption of the 2024 standard, including implementation.

Overview of PM2.5 NAAQS

Purpose of NAAQS

The National Ambient Air Quality Standards, or NAAQS, were established under the Clean Air Act to reduce the levels of criteria pollutants – such as ozone, sulfur oxides, nitrogen oxides, and particulate matter – that the population is exposed to via the air. The Clean Air Act establishes two types of standard: primary standards, for protecting public health; and secondary standards, for protecting public welfare.[6]

NAAQS are one of the principal tools the Clean Air Act includes for ensuring all Americans breathe clean, healthy air. In 1970, Congress rewrote the Clean Air Act to initiate "a massive attack on air pollution," with NAAQS serving as "the engine that drives nearly all of Title I of the" Act.[7] Congress directed EPA to set and regularly update primary NAAQS to ensure they "protect the public health," "with an adequate margin of safety."[8] NAAQS are designed to protect not just healthy young adults, but also more vulnerable populations, such as children, older adults, and people with preexisting heart and lung conditions.[9]

Once EPA sets a NAAQS, the Clean Air Act requires states to take steps to ensure that all areas of the country come into compliance with the NAAQS as quickly as possible and stay in compliance. As discussed in the next section, Congress created a comprehensive system for implementing standards, via a state-federal partnership that requires both states and EPA to take specific steps to clean up the air and keep it clean. Due to the connection between setting health-protective standards and implementing measures to improve air quality and come into compliance with those standards, the NAAQS remain one of the most important tools for ensuring healthy air for communities across the country.

The NAAQS program has proven extremely effective: anyone who has recently viewed the San Gabriel mountain range from downtown Los Angeles has witnessed the success of the NAAQS program in cleaning up the country's air. Emissions of the air pollutants covered by the program have dropped by 78% since 1970.[10] Though not all areas of the country yet have air quality that meets these health-protective standards, air quality has improved, with ambient levels of the NAAQS pollutants down by 18%-92% since 1990.[11] Contrary to frequent assertions by polluters, this progress has strengthened the economy rather than hurt it: since the 1970s, U.S. gross domestic product has more than tripled as the air has gotten cleaner.[12] Yet further work remains. The American Lung Association found that nearly half the population – 156.1 million

[6]Bachmann, J. Will the Circle Be Unbroken: A History of the U.S. National Ambient Air Quality Standards. J. Air Waste Manag. Assoc. 2007, 57 (6), 652–697 at p.666. https://doi.org/10.3155/1047-3289.57.6.652. Public health refers to the health of the population, including sensitive groups such as asthmatics, children, and the elderly; while public welfare refers to protecting visibility, as well as preventing damage to animals, crops, vegetation, and buildings. EPA, NAAQS Table (last updated Nov. 4, 2025), https://www.epa.gov/criteria-air-pollutants/naaqs-table.

[7]S. Rep. No. 91-1196, at 1 (1970); Whitman v. Am. Trucking Ass'ns, 531 U.S. 457, 468 (2001)

[8]42 U.S.C. § 7409(b)(1), (d)(1).

[9]See Coal. of Battery Recyclers Ass'n v. EPA, 604 F.3d 613, 618 (D.C. Cir. 2010) ("this court has held that NAAQS must protect not only average healthy individuals, but also sensitive citizens such as children, and if a pollutant adversely affects the health of these sensitive individuals, EPA must strengthen the entire national standard." (cleaned up)).

[10]EPA, Our Nation's Air: Trends Though 2023, Economic Strength with Cleaner Air, https://gispub.epa.gov/air/trendsreport/2024/#growth.

[11]EPA, Our Nation's Air: Trends Through 2023, Air Quality Trends Show Clean Air Progress, https://gispub.epa.gov/air/trendsreport/2024/#air_trends. Levels of sulfur dioxide and lead have dropped the most, while ozone and particulate matter levels have been more stubborn about declining. Id.; see also EPA, Our Nation's Air: Trends Through 2023, Criteria Pollutant Trends Show Clean Air Progress, https://gispub.epa.gov/air/trendsreport/2024/#naaqs_trends (use dropdown to select specific pollutants and averaging periods).

[12]EPA, Our Nation's Air: Trends Though 2023, Economic Strength with Cleaner Air, https://gispub.epa.gov/air/trendsreport/2024/#growth.

people – live in areas with unhealthy levels of ozone or particulate matter pollution and that communities of color face greater exposure and vulnerability to air pollution.[13] But the progress that remains to be made does not diminish the progress already made.

History of NAAQS for Particulate Matter

The first NAAQS for particulate matter, established in 1971, set the primary standard, requisite for protecting public health, at 75 μg/m^3 annually and 260 μg/m^3 for 24-hour periods, not to be exceeded more than once per year.[14] Since then, the primary annual standard has been updated five times – 1987, 1997, 2006, 2012, and 2024.[15]

In 2012, EPA strengthened the primary annual standard from the level that the 2006 review had retained – 15.0 μg/m^3 – down to 12.0 μg/m^3 in order to "provide increased protection of public health."[16] The next final action came in a 2020 decision by the first Trump administration's EPA not to revise the primary annual standard of 12.0 μg/m^3.[17]

In 2024, in recognition of science showing harm occurring at and below the level of the current primary annual standard level of 12.0 μg/m^3, the Biden EPA strengthened the NAAQS to a more health-protective 9.0 μg/m^3.[18] Industry opposed the update, raising oft-repeated and demonstrably false claims of economic slowdown[19] and wrongly predicting the stalling-out of industrial facility permitting.[20] The 2024 standard took effect May 6, 2024.[21]

However, under the second Trump administration, EPA's priorities shifted. In March 2025, EPA Administrator Lee Zeldin announced that the agency would reconsider the strengthened PM2.5 NAAQS,[22] leaving the future of the 2024 standard in doubt. And, in late November 2025, the Trump Administration asked the U.S. Court of Appeals for the District of Columbia Circuit to strike down – "vacate" – the 2024 standard.[23] As of the date of this white paper, the 2024 standard remains in effect, however.

Timeline for Implementation

Overview of NAAQS Implementation Process

After EPA issues a NAAQS, the Clean Air Act's thorough requirements for implementing it kick in. Immediately, a preconstruction permitting requirement takes effect under the Clean Air Act's prevention of significant deterioration ("PSD") program. Under the PSD program, before a company can build or modify a major stationary source of NAAQS pollutants, it must demonstrate that its emissions will not cause or contribute to any violation of any NAAQS, including the recently updated NAAQS.[24] A typical major stationary source is an industrial facility, like a fossil-fuel-fired power plant, a refinery, or a chemical plant.

A NAAQS's issuance also triggers the process for reducing dangerous pollution levels so that all people in all areas of the country breathe clean, healthy air. This process begins with initial air quality designations. First, within a year of the NAAQS's issuance, states must review air quality monitoring data and other information and submit to EPA designations of all areas in

[13] *America Lung Association, State of the Air: 2025 Report 12 (2025), https://www.lung.org/getmedia/5d8035e5-4e86-4205-b408-865550860783/State-o*
[14] *Bachmann, J. Will the Circle Be Unbroken: A History of the U.S. National Ambient Air Quality Standards. J. Air Waste Manag. Assoc. 2007, 57 (6), 652–697 at p.671 & tbl.5. https://doi.org/10.3155/1047-3289.57.6.652.*
[15] *US EPA, O. Timeline of Particulate Matter (PM) National Ambient Air Quality Standards (NAAQS). https://www.epa.gov/pm-pollution/timeline-particulate-matter-pm-national-ambient-air-quality-standards-naaqs (accessed 2025-09-25). Though EPA has regulated particulate matter since 1971, EPA has changed the "indicator" for its NAAQS consistently over time to target regulation of smaller particles. In 1971, EPA regulated the amount of "total suspended particulate matter," or "TSP," in the air people breathe, which covered particulate matter smaller than 25-45 micrometers in diameter. 52 FR 24634, 24635/3 (July 1, 1987). In 1987, EPA's updated standard regulated the amount of "PM10," which is, roughly, particulate matter smaller than 10 micrometers in diameter, because scientific developments demonstrated that the health effects of particulate matter are worse when people inhale them more deeply, and people can inhale finer particle deeper into their respiratory tracts. 52 FR 24639/1-3. As science continued to develop and it became clearer that the finer fraction of PM10 was more harmful than the coarser fraction, in 1997, EPA for the first time specifically targeted PM2.5. 62 FR 38652, 38666/3-68/1 (July 18, 1997).*
[16] *89 FR 16208/2-3.*
[17] *89 FR 16209/1-3, 16210/1.*
[18] *89 FR 16202.*
[19] *Chamber of Commerce's Dubious Analysis of Clean Air Rules Is Wrong. Earthjustice. https://earthjustice.org/experts/seth-johnson/chamber-of-commerces-dubious-analysis-of-clean-air-rules-is-wrong (accessed 2025-09-25); see also Putting Industry Claims to Rest: Data Reveals Economic Success Amidst Clean Air Rules. Earthjustice. https://earthjustice.org/experts/robyn-winz/putting-industry-claims-to-rest-data-reveals-economic-success-amidst-clean-air-rules (accessed 2025-09-25).*
[20] *The Gridlock Scare Was Just Hot Air. Earthjustice. https://earthjustice.org/experts/robyn-winz/the-gridlock-scare-was-just-hot-air (accessed 2025-09-25).*
[21] *89 FR 16202.*
[22] *EPA Press Office, Trump EPA Announces Path Forward on National Air Quality Standards for Particulate Matter (PM2.5) to Aid Manufacturing, Small Businesses (Mar. 12, 2025), https://www.epa.gov/newsreleases/trump-epa-announces-path-forward-national-air-quality-standards-particulate-matter.*
[23] *Earthjustice, Trump's EPA Abandons Defense of National Soot Standard That Saves Lives (Nov. 25, 2025), https://earthjustice.org/press/2025/trumps-epa-abandons-defense-of-national-soot-standard-that-saves-lives.*
[24] *42 U.S.C. § 7475(a)(3); see Murray Energy Corp. v. EPA, 936 F.3d 597, 624-27 (D.C. Cir. 2019).*

the state as "nonattainment," "attainment," or "unclassifiable."[25] Nonattainment areas are areas that do not meet the NAAQS or that contribute to the air quality in a nearby area that does not meet the NAAQS; attainment areas are areas that meet the NAAQS; and unclassifiable areas are areas for which there is not enough information to determine whether they are attainment or nonattainment, and are treated as attainment areas.[26] Second, within two years of the NAAQS's issuance, EPA must issue final designations.[27] EPA is not bound by the states' submissions, but if it intends to depart from a state's submission – if, for example, newer air quality monitoring data shows an area no longer meets the NAAQS, or if data shows a nonattainment area should be bigger or smaller than a state recommended – it must notify the state at least 120 days before EPA finalizes its designation, to give the state an opportunity to disagree with EPA.[28]

When EPA determines the air of an area violates a NAAQS or contributes to a nearby violation, it designates that area as nonattainment. An area in nonattainment must then take certain steps mandated by the Clean Air Act to clean up its air within a timeframe established by the Clean Air Act and based upon the severity of the violation.[29] Areas that EPA designates as attainment or unclassifiable must continue to implement the PSD preconstruction permitting program.[30] Thus, the initial air quality designations process is the vital step necessary for ensuring that all people in the United States actually breathe clean air.

Overview of Next Steps in Implementation Process Following Issuance of the 2024 PM2.5 NAAQS

The updated PM2.5 NAAQS became effective May 6, 2024.[31] PSD permitting requirements took effect then. States and Tribes were required to submit their lists of designation recommendations by February 7, 2025.[32] EPA must promulgate final 2024 PM2.5 area designations by February 6, 2026.[33] No later than 120 days prior – by October 9, 2025 – EPA can make modifications to designation recommendations and boundaries of areas. Letters notifying states and Tribes of EPA's planned changes are known as "120-day letters."[34] The agency typically provides a 30-day comment period following EPA's public notice of availability of recommendations and modifications to comment.[35]

The Clean Air Act lays out next steps for getting from an updated NAAQS to cleaner air. States have three years from the effective date of the 2024 standard to submit infrastructure State Implementation Plan, or "SIPs": until February 7, 2027, in this case.[36] Within eighteen months of the effective date of nonattainment designations, states are required to submit nonattainment plan SIPs, which include measures by which the state plans to provide for attainment and maintenance of the 2024 standard:[37] until August 6, 2027. These SIPs will lay out states' plans for ensuring communities have the healthy air to which the Clean Air Act entitles them. Depending on the degree to which they violate the NAAQS, nonattainment areas will have a certain number of years from their designation date to come into attainment.

Status Under the Trump Administration

The Trump administration seems to have taken very few if any steps toward fully implementing the standard. It declined to publicize the

[25] *42 U.S.C. § 7407(d)(1)(A).*
[26] *See id.; id. § 7471.*
[27] *Id. § 7407(d)(1)(B).*
[28] *Id. § 7407(d)(1)(B)(ii); see Catawba County v. EPA, 571 F.3d 20, 40 (D.C. Cir. 2009) ("[EPA] has no obligation to give any quantum of deference to a designation that it 'deems necessary' to change.").*
[29] *42 U.S.C. §§ 7502-7503, 7506, 7513-7513a; see Natural Res. Def. Council v. EPA, 706 F.3d 428, 434-37 (D.C. Cir. 2013). Among the steps the Clean Air Act requires are (1) implementing a permitting program for new and modified major stationary sources that requires highly effective pollution controls and emission reductions that fully offset the new emissions from the source; (2) enhanced transportation planning requirements so that major highway expansions remain consistent with coming into attainment on time; (3) creating a plan that shows how the nonattainment area will come into attainment as expeditiously as practicable, and no later than the statutory attainment deadline; and (4) mandating the use of reasonably available control measures on PM emissions in the nonattainment area. 42 U.S.C. § 7502-7503, 7506(c)(1), 7513a(a)(1).*
[30] *All states, regardless of any designation, also must develop a plan to eliminate any emissions from their state that significant contribute to downwind nonattainment or interfere with maintenance of the NAAQS in any other state. 42 U.S.C. § 7410(a)(2)(D)(i)(I). This requirement is commonly called the Good Neighbor Provision. See EPA v. EME Homer City Gen., 572 U.S. 489, 495 (2014). This white paper does not address Good Neighbor obligations.*
[31] *89 FR 16202.*
[32] *Memorandum from Joseph Goffman, Assistant Administrator, Office of Air and Radiation, EPA, to Regional Administrators, re: "Initial Area Designations for the 2024 Revised Primary Annual Fine Particle National Ambient Air Quality Standard" at att.2 (Feb. 7, 2024) ("Goffman Memo").*
[33] *Goffman Memo at att.2.*
[34] *Goffman Memo at att.1.*
[35] *Goffman Memo at att.1.*
[36] *42 U.S.C. § 7410(a)(1); 89 FR 16367/2.*
[37] *42 U.S.C. § 7513a(a)(2)(B); 89 FR 16367/3; 40 CFR 51.1003(a).*
[38] *Goffman Memo at att.1.*

state designation recommendations that were due to EPA on February 7, 2025.[38] Further, if EPA disagrees with recommendations or area boundaries submitted by a state or Tribe, the agency may make modifications and then notify the state or Tribe with a "120-day letter". As final designations for the 2024 PM2.5 NAAQS are due February 6, 2026, 120-day letters would have been due October 9, 2025. EPA has not publicly released any 120-day letters, and it also has not opened the customary public comment for interested parties to weigh in on the planned area designations. Instead, the administration has asked a federal court to eliminate the 2024 standard in advance of the designations deadline.[39]

Data Sources

Air Quality Measurements

Regulatory bodies, for the purposes of the NAAQS, evaluate air quality via a metric called the design value. To determine a design value for a given county, EPA starts by gathering data that has been collected at air quality monitors operated by EPA, states, and Tribes. These monitors take air samples periodically to assess the level of PM2.5 in the ambient air, sometimes analyzed in a lab and sometimes evaluated in situ depending on the type of monitor. With that data, EPA calculates a three-year average of annual mean PM2.5 levels.[40] If there are multiple

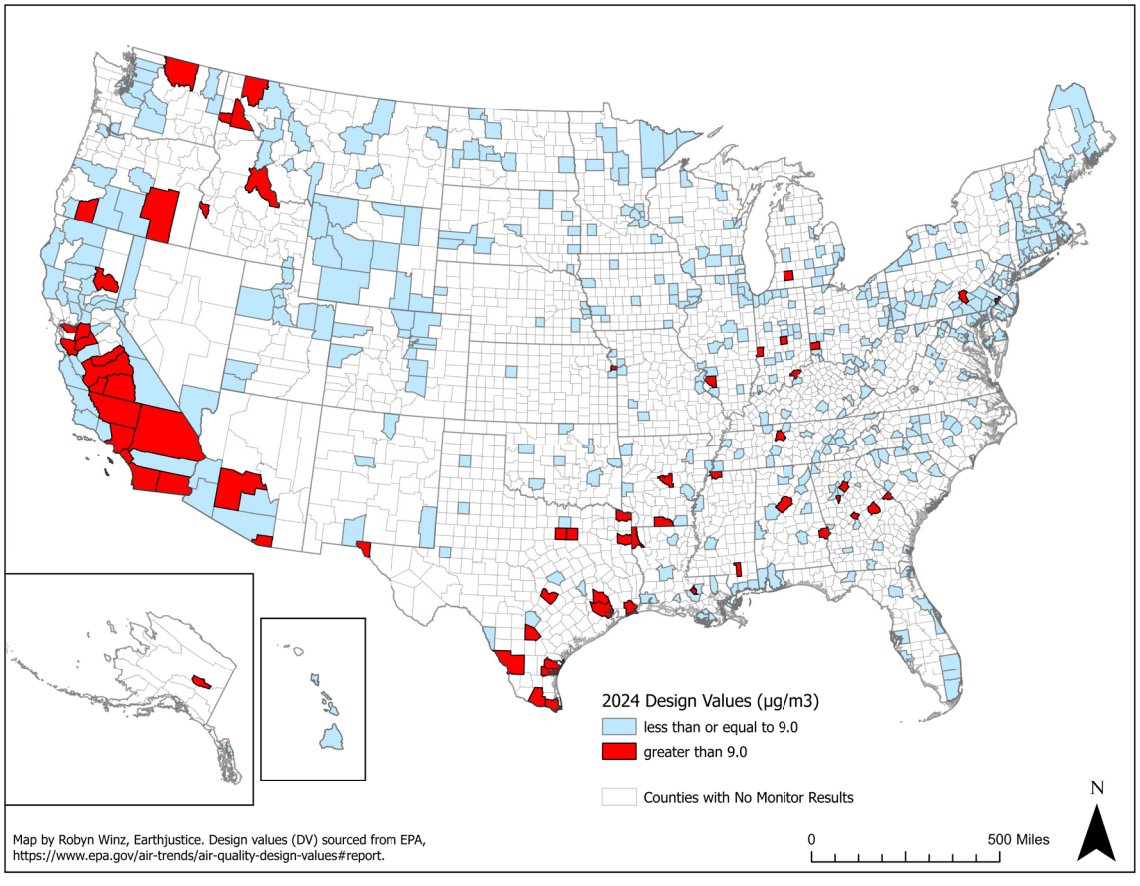

Figure 1 – 2024 Design Values of U.S. Counties

[39]Respondents' Motion for Vacatur 1, Kentucky v. EPA, No. 24-1050 (D.C. Cir. Nov. 24, 2025), available at https://earthjustice.org/document/epas-motion-to-vacate-pm-naaqs.
[40]The annual PM2.5 design values consist of the annual arithmetic mean concentration, averaged over three consecutive years. Detailed instructions for calculating the design value, including data completeness requirements, can be found at Appendix N to 40 C.F.R. Part 50.
[41]AL, AK, AZ, AR, CA, GA, ID, IL, IN, KS, LA, MI, MS, MO, MT, NC, OH, OR, PA, TN, TX, WA. See 2024 Design Value Reports – PM2.5 Design Values, 2024 (xlsx), available at https://www.epa.gov/air-trends/air-quality-design-values#report.

monitors in a county yielding valid three-year design values, the highest one becomes the design value for the county.

Though only six states identified areas for EPA to designate nonattainment, a far larger number – twenty-two states – have at least one county whose three-year 2024 PM2.5 design value shows exceedance of the 9.0 μg/m^3 threshold.[41]

Figure 1 maps the locations of counties where one or more monitors showed PM2.5 concentrations exceeding the 2024 standard of 9.0 μg/m^3.

As shown in Figure 1, wide swaths of the country contain no air monitors at all or contain monitor(s) that did not produce a valid 2024 design value. Such areas are routinely considered unclassifiable and treated like attainment areas for purposes of the NAAQS; however, that may not be the case, were we able to collect the data. Without sufficient monitors and data collection, we do not have the full picture of air quality in all counties nationwide.

Yet, a 2024 design value in excess of 9.0 μg/m^3 is not the final word on whether EPA designates a county or area nonattainment. If a state or Tribe believes that a monitor has been influenced by, for example, wildfires, it can submit an "Exceptional Event" demonstration to EPA. For days where EPA agrees with the state's showing that an exceptional event influenced the monitor's reading, data will be struck from the record and not used for regulatory decision-making.[42] According to EPA's Exceptional Events Guidance, EPA must have conducted its initial review of 2021-2023 exceptional events demonstrations by June 7, 2025 (within 180 days of EPA's receipt of such demonstrations).[43] States and Tribes had until September 30, 2025, to submit exceptional events demonstrations for 2024 data.[44]

State Designation Recommendations – FOIA to EPA

States and Tribes had until February 7, 2025, to make their designation recommendations to EPA.[45] As most were not initially made publicly

State	Area(s) recommended NA
Alaska	North Pole
California	Imperial County (partial), Mendocino County (partial), Plumas County (partial), Sacramento County, San Diego County, San Francisco Bay Area Air Basin, San Joaquin Valley Air Basin, South Coast Air Basin, and Yuba City-Marysville
Michigan	Kalamazoo and Wayne Counties
Montana	Libby Township in Lincoln County
Ohio	Butler, Cuyahoga, Hamilton, and Jefferson Counties
Pennsylvania	Allegheny, Cumberland, Dauphin, Delaware, Lancaster, Montgomery, Philadelphia, and York Counties

Table 1 – Areas Recommended for Nonattainment by Their States

[42] *EPA, Treatment of Data Influenced by Exceptional Events: Final Rule, 81 FR 68216 (Oct. 3, 2016), available at https://www.federalregister.gov/documents/2016/10/03/2016-22983/treatment-of-data-influenced-by-exceptional-events ("Exceptional Events Guidance"); see also 40 C.F.R. 50.1, 50.14, and 51.930.*
[43] *Exceptional Events Guidance at 68,217-8.*
[44] *Goffman Memo at att.2.*
[45] *Goffman Memo p.2; 42 U.S.C. § 7407(d)(1); 89 FR 16365/3-66/1.*

available, Sierra Club submitted a FOIA request. In response, EPA returned documents from 45 states, D.C., Puerto Rico, Virgin Islands, and 3 Tribes. Five states – Arizona, Arkansas, Illinois, Indiana, and Missouri – did not submit designation recommendations at all.

Of those that submitted, only six states recommended any areas for nonattainment – Alaska, California, Michigan, Montana, Ohio, and Pennsylvania.

Demographic data

This project used demographic data from the most recently available U.S. Census five-year American Community Survey, for years 2019-2023.[46] County-level data for variables of race and Hispanic origin were queried and spatially matched with 2024 PM2.5 design values by county[47] for analysis.

Some areas recommended for nonattainment by states contain partial counties, either a portion of a single county or a grouping of whole and partial county or counties together. These include North Pole, Alaska; Imperial County, Mendocino County, Plumas Couty, San Francisco Bay Area Air Basin, San Joaquin Valley Air Basin, South Coast Air Basin, and Yuba City-Marysville, California; and Libby Township, Montana. For the analysis of demographic factors within areas recommended by states for nonattainment, any county that was represented at least partially in a recommendation was accounted for as a whole county in demographic data.[48]

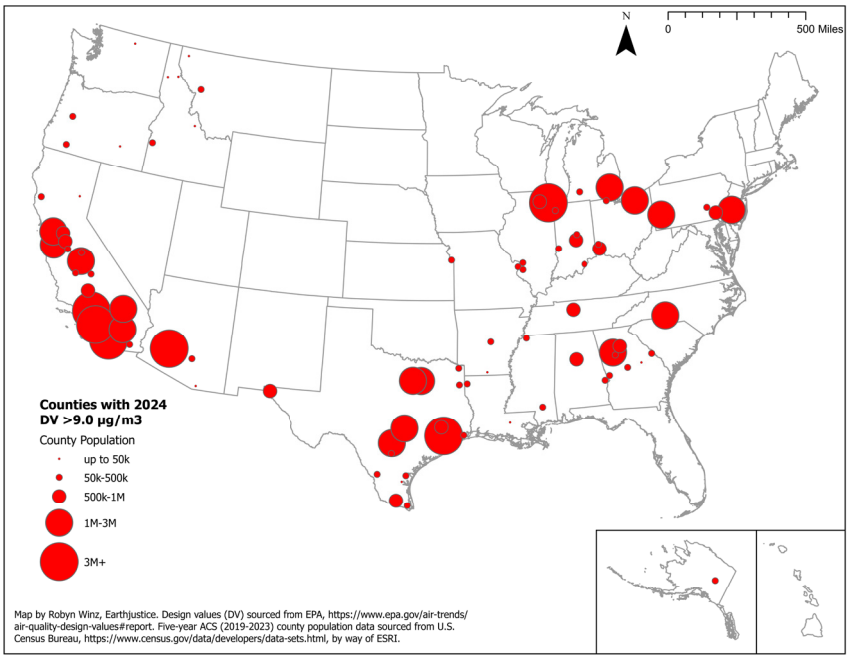

Figure 2 – Population of Counties with 2024 DVs Showing Air Violating Standard (Red)

Results

Out of about 335 million people in the U.S., over 75 million live in counties with 2024 design values above the level of the updated PM2.5 annual NAAQS. While 45 million people live in counties recommended for a nonattainment designation by states, over 38 million people live in "left-behind counties": counties with 2024 design values above 9.0 µg/m^3 and where their states did not recommend nonattainment.[49]

Figure 2 illustrates the population distribution across counties with design values above 9.0 µg/m^3. Major metropolitan areas like Dallas-Fort Worth, Austin, San Antonio, El Paso, Laredo, Corpus Christi, and Houston, Texas; Chicago, Illinois; St. Louis, Missouri-Illinois; Indianapolis, Indiana; Atlanta and Augusta, Georgia; Baton Rouge, Louisiana; Birmingham, Alabama; Charlotte, North Carolina;

[46] *Demographic data obtained via ESRI's ACS Race and Hispanic Origin Variables map layer, 5-year ACS data for 2019-2023 (updated April 9, 2025), https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/ACS_Population_by_Race_and_Hispanic_Origin_Boundaries/FeatureServer, which sources data from the U.S. Census Bureau's API for American Community Survey, https://www.census.gov/data/developers/data-sets.html.*

[47] *EPA, 2024 Design Value Report for PM2.5 (.xlsx) (June 3, 2025), available at https://www.epa.gov/air-trends/air-quality-design-values#report.*

[48] *This was done to simplify the analysis, as boundaries of partial counties that were recommended for nonattainment designation do not match up perfectly to the boundaries for demographic data, which are presented at the county or census block level.*

[49] *Alameda, Marin, Napa, San Francisco, San Mateo, Solano, and Yuba counties are among those recommended for nonattainment designations by California. These counties either had valid 2023 DVs less than 9.0 µg/m3 or did not report a valid 2023 DV, but California recommended them for inclusion in nonattainment areas because it found they contribute to bad air quality in nearby areas.*

County	State	Population	2024 DV	State Recommended Nonattainment?
Los Angeles	CA	9,484,406	11.9	Yes
Cook	IL	5,185,812	11.0	No
Harris	TX	4,758,579	12.7	No
Maricopa	AZ	4,491,987	10.7	No
San Diego	CA	3,282,782	13.2	Yes
Orange	CA	3,164,063	9.8	Yes
Miami-Dade	FL	2,685,296	7.6	No
Kings	NY	2,646,306	7.8	No
Dallas	TX	2,603,816	10.1	No
Riverside	CA	2,449,909	12.4	Yes
Queens	NY	2,330,124	8.1	No
Clark	NV	2,293,764	8.7	No
King	WA	2,262,713	8.3	No
San Bernardino	CA	2,187,816	12.9	Yes
Tarrant	TX	2,135,743	9.4	No
Bexar	TX	2,037,344	9.2	No

Table 2 – Populations and 2024 Design Values for Counties with Over Two Million People

Phoenix, Arizona; and Nashville, Tennessee, collectively contain millions of people living with unhealthy air in states that have given no indication that they plan to do anything about it under the 2024 NAAQS.

As Table 2 shows, there are six left-behind counties (in red) whose populations exceed two million, with three having populations exceeding that of the largest county with air meeting the standard (in blue). The six large, left-behind counties – Cook County, Illinois; Maricopa County, Arizona; and Harris, Dallas, Tarrant, and Bexar Counties, Texas – together account for over 21 million people.

Texas recommended the entire state be designated attainment or unclassifiable, and Illinois and Arizona failed to make any recommendations to EPA at all. Appropriately designating nonattainment counties across these three states alone would eventually reduce the number of people exposed to illegally unhealthy air by 55%, assuming faithful implementation of the NAAQS and no exceptional events.

Highlight Population-Level Demographic Disparities Between Populations Recommended for Receiving Nonattainment Status and Those Not

A major objective of this paper is to determine whether demographic disparities exist between left-behind counties and recommended counties; or between counties with air above the standard and the U.S. population as a whole. Our analysis shows that the decision by some states to

decline to take steps to address unhealthy air by designating relevant areas nonattainment is likely to exacerbate existing PM2.5 exposure and health risk inequalities. We find about a 20 point discrepancy in the percentage of people of color[50] in the entire U.S. when compared with the percentage in counties with air violating the standard. The U.S. as a whole is 42.4% people of color, yet within the subset of counties with 2024 PM2.5 design values above 9.0 μg/m^3, people of color make up a much larger share of the population: 61.4%. Similarly, left-behind counties consist of 59.5% people of color.[51]

Furthermore, the U.S. is 19.8% Hispanic overall, but counties with 2024 design values greater than 9.0 μg/m^3, or above the new standard, are 34.3% Hispanic. Left-behind counties have higher Black populations (18.3%) than counties with 2024 design values greater than 9.0 μg/m^3 where states did recommend nonattainment (10.3%). Some of this last discrepancy may result from how sweepingly states in the south, like Georgia and Texas, declined to recommend any nonattainment designations

	United States	Counties with DVs>9.0 μg/m^3	Counties Recommended NA by States[53]	Left-Behind Counties
Total Population	335,642,425	75,353,199	45,463,549	38,446,427
White alone, non-Hispanic	57.6% (193,363,045)	38.6% (29,113,894)	38.8% (17,640,800)	40.5% (15,572,481)
Total Population less non-Hispanic white alone	42.4% (142,279,380)	61.4% (46,239,305)	61.2% (27,822,749)	59.5% (22,873,946)
Hispanic/Latino	19.8% (66,347,413)	34.3% (25,857,688)	33.0% (15,017,821)	32.5% (12,491,372)
Black alone, non-Hispanic+ Hispanic	12.3% (41,308,652)	14.4% (10,849,883)	10.3% (4,691,147)	18.3% (7,045,395)

Table 3 - Race and Hispanic Origin Across Whole U.S., Counties with DVs Not Meeting the Standard, and Counties Recommended or Not Recommended for Nonattainment by States

[50]People of color totals found by subtracting numbers of non-Hispanic white people from the total population of a given area.
[51]Demographic data obtained via ESRI's ACS Race and Hispanic Origin Variables map layer, 5-year ACS data for 2019-2023 (updated April 9, 2025), https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/ACS_Population_by_Race_and_Hispanic_Origin_Boundaries/FeatureServer, which sources data from the U.S. Census Bureau's API for American Community Survey, https://www.census.gov/data/developers/data-sets.html.

in any of the numerous areas that had air quality violating the 2024 PM2.5 NAAQS.

The science has established that people of color, and especially Black people, face greater risks of PM2.5-related health effects.[52] Some states have shown a willingness to address elevated PM2.5 levels through their proposed nonattainment designations, while others haven't. The Clean Air Act promises healthy air for all: no individual should face elevated risk of poor health or mortality from air pollution simply due to where they live. EPA must properly designate areas as nonattainment based on actual monitoring data, regardless of whether states have indicated they agree.

Explore States' Justifications for Excluding Data from Regulatory Decisions

Only six states out of twenty-two containing at least one county with air pollution violating the standard proposed any areas for nonattainment designation. Nine of the remaining sixteen stated they planned to submit demonstrations for monitor results they believe to be influenced by wildfire smoke and other "exceptional" events – Alabama, Georgia, Idaho, Louisiana, Mississippi, North Carolina, Oregon, Tennessee, and Washington. In total, twenty-two states[54] have either submitted exceptional events demonstrations for the 2021-2023 and/or 2022-2024 periods or indicated that they would as of their designation recommendations due to EPA on February 7, 2025. Nearly every state submitting exceptional events demonstration(s) gave wildfire smoke as the cause, with a few also citing prescribed fires, Saharan dust, and/or local holiday fireworks displays.

Three states wholly or partially blamed Teledyne monitors for their higher PM2.5 monitor readings (Kansas, North Dakota, and Oklahoma; though only Kansas contains a county with a monitor showing PM2.5 concentrations above the standard). Teledyne Advanced Pollution Instrumentation (TAPI) T640 and 640X PM mass monitors are Federal Equivalent Method (FEM) devices, meaning that their use is approved for regulatory purposes. However, in April 2023, EPA determined that the Teledyne monitors reported high biased values in comparison to the category of monitors known as Federal Reference Monitors (FRM). FRMs are considered the standard by which all other types of monitors, including Teledyne and other FEMs, are judged. To correct this observed bias, EPA applied a uniform, retroactive, downward adjustment for all PM2.5 concentration measurements reported by Teledyne devices from 2017 onward.[55] This impacts the NAAQS designations process by lowering PM2.5 concentrations reported by Teledyne devices across the board, flipping the design value of some counties from above 9.0 μg/m^3 to below 9.0 μg/m^3 and into attainment status without any actual reduction in PM2.5 levels. Even after this EPA-sanctioned data adjustment, Kansas, North Dakota, and Oklahoma claim that their Teledyne monitors still over-report PM2.5 concentrations relative to the Federal Reference Monitors, and EPA should rely on this possibility to decline to designate areas within their states nonattainment, notwithstanding their monitoring results.[56] Kansas points to a comparison of air quality measurements from a Teledyne monitor and from a filtration-based FRM monitor at a single location to claim that Teledyne's downward adjustment didn't correct the alleged bias to a sufficient degree. Kansas also contends that smoke from wildfires and prescribed burns leads to an increase of bias at the Teledyne monitor relative to the FRM.[57]

[52]EPA, Supplement to 2019 Integrated Science Assessment for Particulate Matter EPA/600/R-22/028 p.3-147 to 3-148 (May 2022), available at https://assessments.epa.gov/risk/document/&deid=354490.

[53]This category includes some whole and partial counties in California that do not have valid 2023 DVs greater than 9.0 μg/m3 – Alameda, Marin, Napa, San Francisco, San Mateo, Solano, and Yuba counties – but that were recommended for nonattainment designations by California. These listed counties either had valid DVs less than 9.0 μg/m3 or did not report a valid 2023 DV, but California recommended them for inclusion in nonattainment areas because it found they contribute to bad air quality in nearby areas.

[54]Alabama, Alaska, California, Connecticut, Georgia, Idaho, Louisiana, Michigan, Mississippi, Montana, Nevada, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, Washington, West Virginia, Wisconsin, and Wyoming.

[55]Supplemental Information on the EPA's Update of PM2.5 Data from T640/T640X PM Mass Monitors (May 13, 2024), available at www.epa.gov/system/files/documents/2024-05/2_supplemental-info_t640-data-update_final-05-13-2024.pdf.

[56]See Kansas Dep't Health and Env't, 2024 Primary Annual Fine Particulate Matter (PM2.5) National Ambient Air Quality Standard Designation Recommendations for Kansas p.25 (Feb. 7, 2025); Letter from Kelly Armstrong, Governor of North Dakota, to Regional Administrator, USEPA Region 8, Re: North Dakota Initial Designation Recommendation for the 2024 Revised Primary Annual PM2.5 National Ambient Air Quality Standard p.5 (Feb. 7, 2025); Letter from J. Kevin Stitt, Governor of Oklahoma, to Mr. Scott Mason, Regional Administrator, USEPA Region 6, Re: Designation Recommendation for 2024 Final Particulate Matter NAAQS p.1 (Jan. 27, 2025).

[57]See Kansas Dep't Health and Env't, 2024 Primary Annual Fine Particulate Matter (PM2.5) National Ambient Air Quality Standard Designation Recommendations for Kansas p.25 (Feb. 7, 2025).

Texas stands on its own in a third, outlying category for justification of monitoring data exclusion. Staff at the Texas Commission on Environmental Quality (TCEQ), Texas's state environmental agency, recommended submitting Bowie, Dallas, Harris, and Tarrant counties for nonattainment designation.[58] However, the Texas governor altered the recommendations prior to submitting to EPA and refused to recommend nonattainment for any area despite elevated PM2.5 levels across sixteen counties. The governor's submission did not base the departure from TCEQ's recommendation on disputing any of the underlying monitoring data for any reason. Instead, the governor reiterated his opposition to the 2024 NAAQS itself, citing the purported economic costs of complying and gesturing vaguely to "potential national security implications" as reason to ignore monitoring data showing violations and designate the entire state as attainment or unclassifiable.[59] With nearly 17 million people in Texas in areas with 2024 design values higher than 9.0 $\mu g/m^3$, the governor's refusal to meaningfully participate in the designations process accounts for 44% of the 38 million people nationally in left-behind counties. Had the Texas governor followed TCEQ staff's recommendations, 9.5 million more people would be on track to receive health protections – 25% of the 38 million left-behind nationwide.

Lastly, five states – Arizona, Arkansas, Illinois, Indiana, and Missouri – simply did not submit recommendations at all, according to the response to this FOIA request. However, ignoring the opportunity to recommend designations does not make the requirement to designate go away: EPA still bears final responsibility to designate nonattainment areas. And a nonattainment designation, even when a state ignores its requirements under the Clean Air Act, still means that a state must make a plan and take actions to clean up the air in so-designated areas.

Compare the Chamber of Commerce's Predictions to the Actual Recommendations

Objective (c) of this paper concerns comparing actual, 2024 annual county design values for PM2.5 with the Chamber of Commerce's map, copied below as Figure 3, of their November 2023 document[60] claiming that large swaths of the U.S. would face permitting restrictions if the annual PM2.5 NAAQS were made more health-protective. Figure 4, below, is based in reality and stands in stark rebuke to the Chamber's claims. Whereas the Chamber posited that much of the country would need to be designated nonattainment, our analysis demonstrates otherwise.

Figure 4 shows areas that have been recommended nonattainment by states in purple. Areas in red represent left-behind counties whose states did not propose designating nonattainment, whether due to a justification outlined above in V.b, or because the state failed to submit any recommendations at all. All other counties either contain monitors showing that the ambient air meets the 2024 standard, contain monitors without valid 2024 readings, or contain no monitors at all.

PM2.5 pollution is no small problem – 75 million people, or 22.5% of the U.S. population, reside in a county with air in violation of the 2024 standard. And EPA must include in a nonattainment area any non-violating areas that contribute to poor air quality in a nearby area.

[58] *Texas Comm'n on Envtl. Quality, Agenda Item Request for Approval of the 2024 Annual PM2.5 NAAQS State Designations (Nov. 26, 2024), available at https://www.tceq.texas.gov/downloads/air-quality/sip/pm/designations/20240250th_2024pm_statedesig_backup.pdf/view.*
[59] *Letter from Greg Abbott, Governor of Texas, to Lee Zeldin, Administrator, USEPA, Re: State Designations for the 2024 Revised Primary Annual Fine Particulate Matter National Ambient Air Quality Standard (NAAQS or Standard) (Feb. 6, 2025).*
[60] *https://www.uschamber.com/assets/documents/AChamber-PM2.5-Report-_-11.8.23-Final-Draft.pdf.*

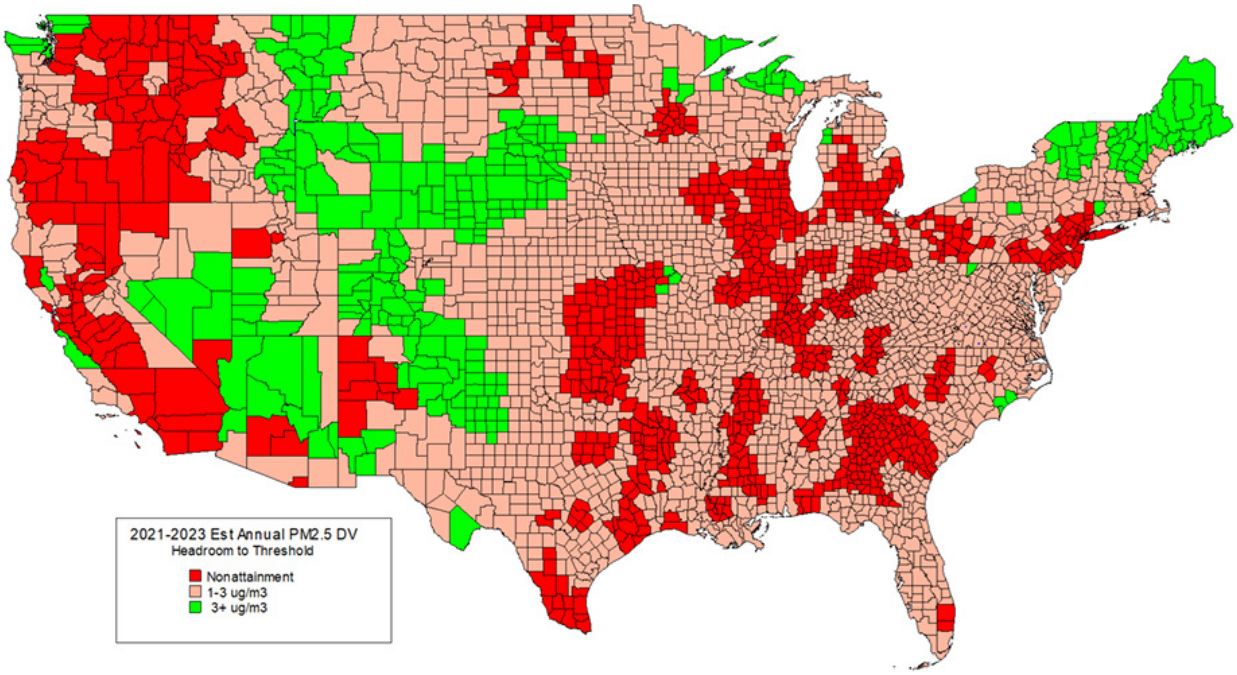

Figure 3 – U.S. Chamber of Commerce's map predicting nonattainment designations under 2024 NAAQS (predicted nonattainment designations in dark red)

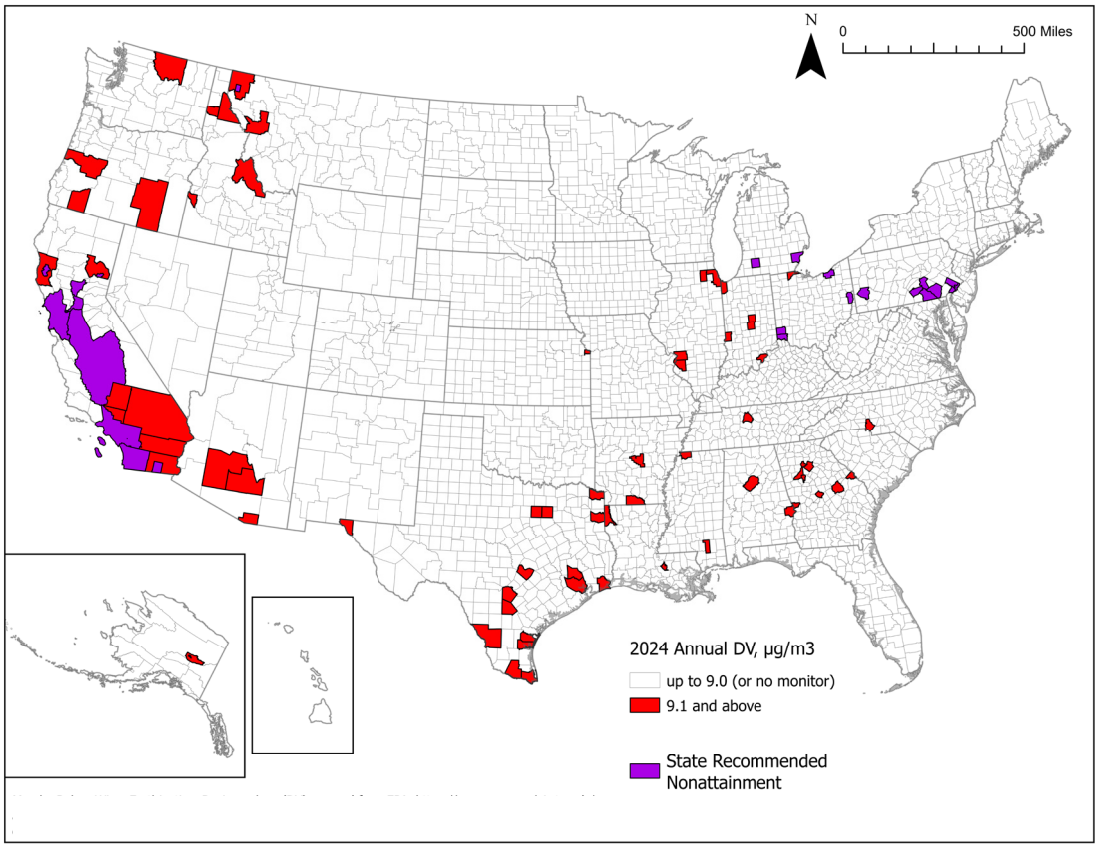

Figure 4 – 2024 PM2.5 Design Values with States' Designation Recommendations Overlay*
***size of Mendocino County, CA (partial) recommended nonattainment area enlarged for visibility**

Yet even considering this, the Chamber's version of NAAQS implementation grossly exaggerates how many counties are likely to be designated as nonattainment. The Chamber's map bears little resemblance to reality, further confirming that its overheated warnings about the effects of NAAQS implementation on permitting activity are not credible.[61]

Discussion and Conclusion

EPA finalized the 2024 updated PM2.5 NAAQS after thorough review of the science, which establishes clearly that exposure to fine particulate matter damages human health and can even kill. Now that the standard has been finalized, EPA must proceed with implementing the rest of the NAAQS program, including designating areas of the country with unhealthy air as nonattainment and approving or disproving plans that states must submit detailing how each intends to improve air quality.

Best available science shows that people of color, particularly Black people, face disproportionate exposures to PM2.5 and resulting health risks. Our analysis of the demographics of counties with air violating the 2024 NAAQS makes clear that areas with unhealthy air are indeed substantially and disproportionately people of color (61.4%) when compared to the entire U.S. (42.4%). Furthermore, counties with unhealthy air where the states recommend nonattainment are 10% Black, whereas left-behind counties are 18% Black. The Clean Air Act guarantees healthy air for everyone in the U.S.; no community or group of people should face a higher risk of mortality from air pollution.

Seventy-five million people reside in counties with at least one monitor showing violation of the 2024 PM2.5 NAAQS. Yet, based on the designation submissions (or lack of submissions), not all states appear willing to meaningfully address PM2.5 pollution. Only six states out of twenty-two containing at least one county with air violating the standard proposed any areas for nonattainment designation. Thirty-eight million people live in counties whose states did not recommend nonattainment designation despite violating monitors. Texas alone accounts for nearly half – 16.8 million – of that total, but the state provided no reasonable rationale for refusing to recommend nonattainment for its violating counties. Nine of the remaining sixteen rely on "exceptional" events, a few others blame monitor bias, and five states simply did not submit recommendations at all, according to the response to this FOIA request.

Ignoring the opportunity to recommend designations does not make the requirement to designate go away: EPA still bears final responsibility to designate. A nonattainment designation means a state must make a plan and act to clean up the air in so-designated areas. EPA and many states must do the jobs demanded of them by science and the Clean Air Act so that communities aren't unnecessarily burdened by the air they breathe.

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Acknowledgements
David Baron, Marvin C. Brown IV, Casey Chin, Tylar Greene, Sage Lincoln, and Elizabeth Ruben of Earthjustice provided valuable feedback on material and graphics. Sierra Club allowed use of documents resulting from their FOIA request.

[61] *See The Gridlock Scare Was Just Hot Air. Earthjustice. https://earthjustice.org/experts/robyn-winz/the-gridlock-scare-was-just-hot-air (accessed 2025-09-25).*