

**U.S. House Committee on Energy and Commerce**  
**Subcommittee on Environment, Manufacturing, and Critical Materials**  
**“Safeguarding American Prosperity and People’s Livelihoods: Legislation to**  
**Modernize Air Quality Standards.”**  
**[February 15, 2024]**

1. Letter from the Texas Commission on Environmental Quality to Chairs Rodgers and Carter, February 14, 2024, submitted by Rep. Pfluger.
2. Letter from Kentucky Governor Andy Beshear to President Biden, December 15, 2023, submitted by the Majority.
3. EPA report entitled “HEC Majority and Minority TA Request – Draft NAAQS Legislation” submitted by the Majority.
4. Letter from the American Chemistry Council to Dr. Lars Perlmutter (Health and Environmental Impacts Division, Office of Air Quality Planning and Standards, Environmental Protection Agency), March 28, 2023, submitted by the Majority.
5. U.S Chamber of Commerce Fact Sheet entitled “Here’s Why the EPA’s Proposed Air Quality Standards Will Cause Permitting Gridlock Across Our Economy” submitted by the Majority.
6. Letter from 34 Stakeholders to Administrator Regan, September 7, 2023, submitted by the Majority.
7. Letter to President Biden from the California delegation, June 13, 2023, submitted by the Majority.
8. Portland Cement Association Market Intelligence report entitled “Cement Industry Impacts of Lowering the Annual PM 2.5 Standard” submitted by the Majority.
9. Letter from the U.S. Chamber of Commerce to White House Chief of Staff Jeffrey Zients, January 12, 2024, submitted by the Majority.
10. Letter from The Aluminum Association to the Subcommittee on Environment, Manufacturing, and Critical Materials, February 14, 2024, submitted by the Majority.
11. U.S. Chamber of Commerce report entitled “EPA’s Proposed Air Quality Standards Will Cause Permitting Gridlock Across Our Economy” November 2023, submitted by the Majority.
12. Letter from the Environmental Council of the States, March 28, 2023, submitted by the Majority.
13. InsideEPA article entitled “EPA Eases Exceptional Event Waivers to Meet PM2.5 Limit Amid Fire Threat” February 9, 2024, submitted by the Majority.
14. Congressional Research Service Memorandum to House Energy and Commerce Committee, January 23, 2024, submitted by the Majority.
15. Letter from West Virginia Attorney General Patrick Morrisey to Chair Carter and Ranking Member Tonko, February 14, 2024, submitted by the Majority.
16. InsideEPA article entitled “EPA Sets Implementation Timeline for Newly Strengthened PM2.5 NAAQS” February 13, 2024, submitted by the Majority.

17. United States Government Accountability Office report entitled “Wildfire Smoke: Opportunities to Strengthen Federal Efforts to Manage Growing Risks” March 2023, submitted by the Majority.
18. Letter from the Georgia Forestry Commission to Administrator Regan, March 27, 2023, submitted by the Majority.
19. Letter from the Georgia Prescribed Fire Council, March 27, 2023, submitted by the Majority.
20. Letter from Kansas Governor Laura Kelly to President Biden, January 31, 2024, submitted by the Majority.
21. Letter from Portland Cement Association to Chair Rodgers and Ranking Member Pallone, February 13, 2024, submitted by the Majority.
22. Letter from Stanford University researchers to Administrator Regan, March 28, 2023, submitted by the Majority.
23. InsideEPA article entitled “States Grapple With Wildfire Smoke as EPA Faulted Over ‘Events’ Waiver” October 19, 2023, submitted by the Majority.
24. Letter from Wisconsin Governor Tony Evers to President Biden, February 6, 2023, submitted by the Majority.
25. InsideEPA article entitled “Wildfire Emissions Drive Bipartisan Concerns on EPA’s PM NAAQS Plan” September 19, 2023, submitted by the Majority.
26. Supplemental Document from Mr. John Eunice entitled “PM2.5 Grant Funding Levels” submitted by the Majority.
27. Supplemental Document from Mr. John Eunice entitled “Georgia PM2.5 Emissions (tons/year)” submitted by the Majority.
28. Supplemental Document from Mr. John Eunice entitled “2023 PM2.5 Annual DV AMP480” submitted by the Majority.
29. Letter from the American Foundry Society to Chair Carter, February 15, 2024, submitted by the Majority.
30. Letter from 32 Stakeholders, February 14, 2024, submitted by the Minority.
31. Report from Sierra Club entitled, “Leveraging Federal Funding to Meet and Exceed Soot Standards” December 2023, submitted by the Minority.
32. Letter from 19 Stakeholders submitted by the Minority.
33. EPA fact sheet entitled, “Wildland Fire, Air Quality, and Public Health Considerations Fact Sheet” submitted by the Minority.
34. Fact sheet from the Climate Action Campaign entitled, “The Sky Isn’t Falling, It’s Getting Less Polluted: Big Polluters and Their History of Misinformation About Soot Pollution Standards” December 2023, submitted by the Minority.

Jon Niermann, *Chairman*  
Bobby Janecka, *Commissioner*  
Catarina R. Gonzales, *Commissioner*  
Kelly Keel, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

February 14, 2024

The Honorable Cathy McMorris Rodgers  
Chair, House Committee on Energy and Commerce  
2215 Rayburn House Office Building  
Washington, D.C. 20515-6115

The Honorable Buddy Carter  
House Committee on Energy and Commerce Committee  
Chair, Subcommittee on Environment, Manufacturing, and Critical Materials  
2215 Rayburn House Office Building  
Washington, D.C. 20515-6115  
Dear Chairs Rodgers and Carter,

The Texas Commission on Environmental Quality (TCEQ) submits this letter in general support of the legislative reforms relating to the implementation of the National Ambient Air Quality Standards (NAAQS) to be discussed at the Environmental, Manufacturing and Critical Materials Subcommittee on Thursday, February 15, 2024.

TCEQ is committed to protecting air quality across Texas and achieving health-based standards grounded in sound science. The agency has made significant investments in its regulatory programs and air monitoring systems and has seen dramatic improvements in Texas's air quality even as Texas's economy and population have boomed.

Yet, while the implementation of the federal Clean Air Act and state law has been enormously successful in improving air quality, the NAAQS process has become one of diminishing returns. For example, as the NAAQS for ozone and particulate matter move ever closer to background concentrations, the burdens on state regulators have increased dramatically and the five-year NAAQS review schedule has become untenable.

States, which have the primary responsibility of implementing the Clean Air Act, face more cumbersome, restrictive, and ever-changing U.S. Environmental Protection Agency (EPA) interpretations and guidance, frustrating state efforts to develop state implementation plans that EPA will approve. As NAAQS are ratcheted down, EPA continues to enforce previous standards, multiplying redundant planning burdens on states with no added air quality benefits. And, as states have ratcheted down the requirements for emission sources within their legal authority, the extent of emissions outside states' authority have grown.

For example, mobile sources, a category states are federally preempted from regulating, is directly responsible for over 40% of ozone-forming nitrogen oxide emissions in Texas. Naturally occurring events, such as Saharan dust, high winds, and wildfires, none of which TCEQ can control, all contribute to air quality in Texas and impact NAAQS compliance. States with border cities also share a disproportionate air quality compliance burden due to the influence of emissions from Mexico. Wringing diminishing air quality improvements only from those sources within a state's legal authority has its practical limits and state implementation plans are approaching a moment of impossibility.

The Honorable Cathy McMorris Rodgers  
The Honorable Buddy Carter  
Page 2  
February 14, 2024

Finally, state air quality planners are constantly working toward a moving target. EPA's interpretations and guidance change within states' planning windows and, with the ever-growing burden on states increasing, these plans simply cannot rationally be compressed into the current planning process under Clean Air Act deadlines.

TCEQ has always and will continue to prioritize air quality for Texans. EPA's current NAAQS policies lack real world application and would benefit from reform. We appreciate the opportunity to provide these comments in support of needed reforms and are willing to engage in developing solutions that are scientifically supported and justified.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard C. Chism". The signature is written in a cursive, flowing style.

Richard C. Chism  
Director, Office of Air  
Texas Commission on Environmental Quality



COMMONWEALTH OF KENTUCKY  
OFFICE OF THE GOVERNOR

Andy Beshear  
GOVERNOR

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December 15, 2023

The Honorable Joseph R. Biden, Jr.  
President of the United States  
The White House  
1600 Pennsylvania Avenue, N.W.  
Washington, D.C. 20502-0001

**Re: Reconsideration of the National Ambient Air Quality Standards for Fine Particulate Matter**

Dear Mr. President:

As Governor of the Commonwealth of Kentucky, protecting the state's public health and air quality in the state is of crucial importance to me. I also recognize that it is often difficult to strike the correct balance between protecting public health and the environment and promoting long-term manufacturing that provides critical goods and services. However, public health, environmental conservation, and job creation and retention do not have to be mutually exclusive.

The United States Environmental Protection Agency (EPA) has solicited comments on its proposed Reconsideration of the National Ambient Air Quality Standards (NAAQS) for Fine Particulate Matter. The EPA's proposal is for a broad range of standards from 8.0  $\mu\text{g}/\text{m}^3$  to 11.0  $\mu\text{g}/\text{m}^3$ . The use of a range of proposed standards makes it extremely difficult to evaluate the Commonwealth's ability to implement a new standard and assess potential negative socioeconomic consequences resulting from any change. The proposed rulemaking should identify a single standard for the stakeholders to analyze and comment on. Further, although particulate matter in the air is a recognized public health concern, a sharp reduction in the standard without a sufficient glide path or compliance window for regulatory agencies and affected industries may result in significant implementation challenges and a negative impact on future job growth.

To the extent that it is supported by peer-reviewed clinical evidence, the most reasonable approach is a gradual step-down of the standard that balances the need to safeguard public health and the need to preserve manufacturing operations that provide jobs for our workforce. This is especially relevant given the uncertainties and restrictions stated by the EPA in its Proposed Rule, particularly in terms of technical implementation considerations. This balance is achieved through a progressive ratcheting down of the standard, which the EPA has historically used in prior NAAQS reconsiderations under the Clean Air Act.

I ask that the EPA consider these concerns, withdraw the current rulemaking, and propose a singular standard for consideration. The proposal of one standard, instead of a broad range of possible standards, will allow regulatory agencies, the public, and industry an opportunity to provide meaningful comment and begin to plan to comply with the proposal.

Sincerely,

A handwritten signature in blue ink that reads "Andy Beshear". The signature is fluid and cursive, with the first name "Andy" and the last name "Beshear" clearly legible.

Andy Beshear  
Governor

## HEC Majority and Minority TA Request Draft NAAQS Legislation

*This information is provided by EPA as technical assistance in response to a Congressional request. The technical assistance does not necessarily represent the policy positions of the Agency and the administration.*

- This draft bill language would change both the NAAQS setting and NAAQS implementation processes under the Clean Air Act. Many of the changes to the Clean Air Act proposed in this bill **could delay progress toward cleaner air and delay or deny health protections for millions of Americans, including children, older adults, and people with asthma.**
- **Lengthening the Clean Air Act-required NAAQS review cycle** to 10 years (from 5 years) could delay incorporation of the latest science into Agency decision making. Experience shows that a substantial amount of new relevant research can become available in 5 years. For example, the 2020 ozone standard review included more than 1,700 new studies that were published since EPA last reviewed the standards in 2015.
- **Adding consideration of attainability as a secondary consideration** under section 109(b)(1) could undermine the health-based decision-making that has been central to the success of the NAAQS. Attainability as used in section 2(b) of the draft bill language is ambiguous and as a result, the concepts included in that section are not likely to be implementable.
- **The new, mandatory requirements to issue implementing regulations and guidance when a NAAQS is revised** (p. 3, line 11) could result in uncertainty, delays, and economic burden for sources where such rule and/or guidance revisions are not needed. Currently, EPA is able to elect whether or not to implement the NAAQS via regulations or guidance or both. The promulgation of a new or revised NAAQS does not necessarily require revisions to implementation rules and guidance.
  - This provision could have the longer-term effect of hindering attainment of the revised NAAQS by the attainment date because it could allow construction to move forward based on a permit applicant demonstrating compliance with the previous NAAQS. A permit based on the previous NAAQS may lack emissions limitations necessary to avoid a violation of the new or revised NAAQS.
- Section 2(h) **Concerning PM milestones (p. 7, line 3)** proposes an unnecessary insertion of the words “which take into account technological and economic feasibility” before the current words “and which demonstrate” reasonable further progress. EPA’s existing PM2.5 implementation rule already includes flexibility for states to demonstrate that implementation of control measures on a set schedule that will result in “generally linear” or “stepwise” increments of emission reduction towards attainment.
- Section 2(i) **Exceptional Events (p. 7, line 9)** appears to be attempting to revise the CAA to expressly include prescribed fire under the Exceptional Events related provisions of Section 319(b). EPA has established a prescribed fire definition in the Exceptional Events Rule (40 CFR 50.1(m)). This definition was developed through notice and comment rulemaking and federal interagency collaboration. In the Exceptional Events Rule, prescribed fire is defined as: any fire intentionally

ignited by management actions in accordance with applicable laws, policies, and regulations to meet specific land or resource management objectives. In contrast, the phrase “actions to mitigate wildfire risk” is ambiguous and vague.

- In Section (2)(i)(2)(E) **Exclusions** (p. 8, line 16), the revisions in the draft bill appear to revise the exclusions so that more types of events may be considered exceptional under the revisions. This is potentially very broad. To date, exclusively meteorological events have not been considered exceptional events.
- The draft bill language (p. 9, line 10) appears to **require that EPA promulgate regulations within 6 months** after the enactment of the Air Quality Standards Implementation Act of 2024. The regulatory process typically takes between 18-24 months for a major rule that requires public notice and comment and review by the Office of Management and Budget. Six months from enactment is not feasible.
- The draft bill includes **database creation/maintenance and regional analysis provisions** that are novel, would require significant resources and may not provide relevant information. For example, due to case-specific circumstances, multi state notifications regarding exceptional events impacting air quality monitors does not mean that regional modeling and analysis would be useful to make exceptional events demonstrations. The demonstrations are typically specific to the impacted air quality monitor and local conditions, not regional conditions. Establishing a requirement for EPA to conduct such technical analyses would be very time and resource intensive and not as timely and effective as the current approach.
- **Transparency** part (C)(iv) (p. 11, line 1), raises significant concerns regarding the content and resource implications. The provision is vague and would substantially increase workload of air agencies and EPA to develop and submit demonstrations that may not be relevant for any regulatory action. The inclusion of “a determination as to whether a source is a new source as defined in Section 111, permitting, or other determinations by the Administrator for purposes of determining compliance with this Act,” is ambiguous, unenforceable, and inconsistent with multiple provisions of the CAA and EPA’s long-standing regulations.
- Section 2(k), **“Study on Ozone Formation”** (p. 12, line 24) It is premature to mandate incorporating the results of a study that is not yet completed into regulations and guidance implementing the 2015 ozone standards. Further, ozone formation is a very well understood aspect of air pollution so it is not clear what the purpose and meaningfulness of a peer-reviewed study on ozone formation would yield. In addition, the specific reference to winter-time ozone formation is extremely limited in its applicability—Uinta Basin—and that formation is also well researched and understood.
- Section 3 **Sanctions and Fees** (p. 14, line 18) would remove the imposition of sanctions or fees for certain deficiencies or failures with respect to Severe or Extreme ozone nonattainment areas if a state can make certain demonstrations. Both sanctions and the fees program are important tools to incentivize attainment of the ozone NAAQS in areas with persistent and serious air quality problems that undermine public health. Further, the exceptions provided for are worded vaguely so as to provide implementation difficulties both for states and EPA.



March 28, 2023

**Sent Electronically**

Dr. Lars Perlmutter  
Health and Environmental Impacts Division, Office of Air Quality Planning and Standards  
Environmental Protection Agency  
Mail Code C539-04  
Research Triangle Park, NC 27711

**RE: Comments of the American Chemistry Council on EPA's Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter [Docket No. EPA-HQ-OAR-2015-0072; 85 Fed. Reg. 82684].**

Dear Dr. Perlmutter:

The American Chemistry Council (ACC) appreciates the opportunity to submit comments on U.S. Environmental Protection Agency's (EPA or the Agency) proposed "Reconsideration of the National Ambient Air Quality Standards for Particulate Matter."<sup>1</sup> ACC member companies operate facilities throughout the country that are subject to emission limits subject to PM standards and as such, our members have a significant interest in any potential revision to existing NAAQS for PM. In addition to the comments provided below, ACC also supports the separate comments on this proposal from the NAAQS Regulatory Review and Rulemaking Coalition (NR3). ACC supports retaining the current PM<sub>2.5</sub> NAAQS and believes it remains protective of human health with an adequate margin of safety. ACC does not believe that the record and scientific evidence established in the 2019 Integrated Science Assessment (2019 ISA), the Supplement to the 2019 ISA (ISA Supplement), and the quantitative and policy analyses in the Policy Assessment (PA) have established concrete evidence of adverse health effects at a level below the current primary annual PM<sub>2.5</sub> standard of 12.0 mg/m<sup>3</sup>.

Given the unique nature of EPA proceeding with a reconsideration three years before its Clean Air Act (CAA) statutorily-mandated review, ACC believes the Agency has an obligation to expand its evaluation of the scope of impacts associated with the proposed requirements.

**I. EPA should retain the current annual primary PM<sub>2.5</sub> NAAQS of 12 µg/m<sup>3</sup>.**

In the proposal, EPA seeks comment on revising the level of the annual NAAQS from 12 µg/m<sup>3</sup> to within the range of 9.0 µg/m<sup>3</sup> to 10.0 µg/m<sup>3</sup> and solicits comment on levels of up to

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<sup>1</sup> ACC represents a diverse set of companies engaged in the business of chemistry, an innovative, \$517 billion enterprise. Our members work to solve some of the biggest challenges facing our nation and our world, driving innovation through investments in research and development that exceed \$11 billion annually.



11.0  $\mu\text{g}/\text{m}^3$  and as low as 8.0  $\mu\text{g}/\text{m}^3$ .<sup>2</sup> EPA also notes that a more stringent standard would be intended to address health risks associated with both long-term and typical daily  $\text{PM}_{2.5}$  exposures.<sup>3</sup> ACC believes that EPA’s scientific and administrative record does not support the Agency’s broader conclusion that the current suite of primary  $\text{PM}_{2.5}$  NAAQS fails to protect public health with an adequate margin of safety. As a result, any revision of the annual NAAQS is not appropriate, and EPA should either withdraw the current reconsideration or retain the current annual primary standard with plans to review it again during the next statutory review cycle.<sup>4</sup>

Previous recommendations from the Clean Air Scientific Advisory Committee (CASAC) support retaining the current standards. Although EPA’s proposal notes that the current CASAC “found that the information . . . supported revising the annual level to 10.0  $\mu\text{g}/\text{m}^3$ ,”<sup>5</sup> the Agency fails to account for the full record of CASAC recommendations on the existing standards. Specifically, EPA ignores the recommendations provided in the 2019 CASAC letter, wherein six of the seven CASAC members at that time concluded that the record did not call into question the adequacy of the 12  $\mu\text{g}/\text{m}^3$  primary  $\text{PM}_{2.5}$  NAAQS to provide the requisite public health protection. The letter explains:

Given the[] limitations in the underlying science basis for policy recommendations, and diverse opinions about what quantitative uncertainty analysis and further analysis of all relevant data using the best available scientific methods would show, some CASAC members conclude that the Draft PM PA does not establish that new scientific evidence and data reasonably call into question the public health protection afforded by the current 2012  $\text{PM}_{2.5}$  annual standard. Other members of CASAC conclude that the weight of the evidence, particularly reflecting recent epidemiology studies showing positive associations between  $\text{PM}_{2.5}$  and health effects at estimated annual average  $\text{PM}_{2.5}$  concentrations below the current standard, does reasonably call into question the adequacy of the 2012 annual  $\text{PM}_{2.5}$  National Ambient Air Quality Standards (NAAQS) to protect public health with an adequate margin of safety.<sup>6</sup>

Importantly, EPA previously relied on this advice from CASAC when the Agency proposed and finalized its decision to retain the current PM NAAQS without revision.<sup>7</sup> In that rulemaking, EPA noted that CASAC provided an “extensive critical review” of the scientific record and found that it was appropriate to retain the existing standards and, due to the significant uncertainties present, did not reach full consensus on the adequacy of the existing  $\text{PM}_{2.5}$  annual standard. In its subsequent action, EPA considered the views provided from both the CASAC

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<sup>2</sup> 88 Fed. Reg. at 5629.

<sup>3</sup> 88 Fed. Reg. at 5617.

<sup>4</sup> In the absence of a revision to the NAAQS, there is no reason to revise the Air Quality Index (“AQI”) as EPA has proposed. Should EPA proceed with revision of the AQI, however, the Agency must ensure that such a revision does not lead the public to believe, mistakenly, that air quality has declined, and that  $\text{PM}_{2.5}$  concentrations are increasing.

<sup>5</sup> 88 Fed. Reg. at 5626.

<sup>6</sup> 2019 CASAC Letter at 1.

<sup>7</sup> See 85 Fed. Reg. at 82690.

majority and minority and concluded that the current primary PM<sub>2.5</sub> standards “are requisite to protect the public health from fine particles with an adequate margin of safety, including the health of at-risk populations.”<sup>8</sup> ACC supports the comments from the NR3 on this matter and agrees that it is arbitrary and capricious for EPA in its current proposal to ignore the previous 2019 CASAC recommendations, which were a critical part of the record informing EPA’s previous decision to retain the current NAAQS in the action underlying this reconsideration.

**II. Based on the unique discretionary nature of the reconsideration, EPA should consider the full scope of costs associated with potential revisions to existing standards.**

A comprehensive and accurate accounting of the impacts of any proposed revision, especially the costs associated with future controls, must be a central part of any Agency rulemaking effort. This is particularly true when EPA’s rulemaking represents a potentially precedent-setting action – in this instance, a full administrative reconsideration of existing NAAQS standards. In the Proposal, EPA asserts that its authority under CAA Section 109(b) directs the Administrator to promulgate “primary” and “secondary” NAAQS for identified pollutants that are at a level “requisite to protect public health” for primary standards and “protect the public welfare from any known or anticipated adverse effects” for secondary standards.<sup>9</sup> Separately, CAA Section 109(d)(1) dictates when a NAAQS review should occur, providing that EPA must review and revise if necessary the existing standards every five years.

It is a well-established principle that EPA cannot consider costs during a regular NAAQS standard setting process. As EPA acknowledges, the U.S. Supreme Court has held that CAA Section 109(b) “unambiguously bars cost considerations from the NAAQS-setting process.”<sup>10</sup> However, ACC believes that EPA has erroneously applied the standard of prohibition on costs to its discretionary decision to reconsider the existing NAAQS. While the Supreme Court did bar EPA from considering costs in the context of a statutory review of a NAAQS under Section 109(b), the Court did not reach the same decision on EPA’s consideration of costs in its timing under CAA Section 109(d)(1), especially for a discretionary decision to revise existing standards.

In the Proposal, EPA takes the position that it “may not consider the costs of implementing the standards” in the process of setting a NAAQS.<sup>11</sup> Despite preparing a Regulatory Impact Analysis (RIA) to estimate the costs and benefits of attaining alternative annual PM<sub>2.5</sub> standard levels, the Agency expressly states that the RIA is “for informational purposes only” and none of the decisions in the proposed reconsideration are actually based on the information contained in the RIA. Even so, and as stated earlier, ACC believes that EPA has the authority to consider not only the costs identified in the RIA, but also the full scope of economic impacts and costs associated with a revision of the standard.

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<sup>8</sup> 88 Fed. Reg. at 82,718. See also 88 Fed. Reg. at 82,706-07, 82,716.

<sup>9</sup> 88 Fed. Reg. 5564.

<sup>10</sup> *Whitman v. Am. Trucking Associations*, 531 U.S. 457, 471 (2001).

<sup>11</sup> 88 Fed. Reg. 5563.

Specifically, a more stringent NAAQS would almost certainly lead to additional delay, uncertainty, and disapprovals of air permits across several regions, even in areas where the NAAQS are not violated. These impacts could present significant hindrances to economic growth and expansion in domestic manufacturing. If EPA chooses to revise the existing PM<sub>2.5</sub> standards, there is also a high likelihood that level of stringency will create modeling uncertainty with the presence of background concentrations, particularly for urban areas with many other sources of PM emissions contributions. This interference will likely jeopardize predictability and certainty that is necessary to the impacts modeling process for new or revised permit applications that address essential operational activities. These activities range from narrower, process-specific modifications that improve environmental performance, e.g. retrofits/improvements to combustion equipment like furnaces, boilers, turbines, and emergency engines to broader downstream manufacturing for new climate technology applications.

Since EPA’s current action is not a regular, statutorily-required review of an existing NAAQS, ACC strongly encourages EPA to consider the full scope of impacts, both those described above as well as costs beyond those limited to the RIA in its decision to reconsider the existing PM<sub>2.5</sub> NAAQS levels. This position on costs consideration was advanced by the Obama Administration’s Office of Information and Regulatory Affairs (OIRA), which sent EPA a September 2011 letter that directed it to withdraw a reconsideration of the ozone NAAQS in a similar procedural issue to the current PM NAAQS reconsideration. The OIRA letter stated that “finalizing a new standard now is not mandatory and could produce needless uncertainty” accounting for the need to “minimize regulatory *costs and burdens*, particularly in this economically challenging time.”<sup>12</sup> Notably, OIRA relied on this rationale despite explicitly “recogniz[ing] that the relevant provisions of the CAA forbid EPA to consider costs in deciding on the stringency of [NAAQS]”<sup>13</sup> – implying that CAA § 109(b)’s prohibition on considering cost and burden does not apply to the decision to move forward on a discretionary reconsideration under CAA §109(d)(1). President Obama was even more direct in an accompanying press statement, stating that he requested the withdrawal due to “the importance of reducing regulatory burdens and regulatory uncertainty, particularly as our economy continues to recover.”<sup>14</sup>

Beyond the procedural similarities, domestic economic challenges also parallel the ones that underpinned the Obama Administration OIRA’s determination in the letter. Specifically quarterly GDPs continue to remain near recession levels and are now compounded with the added burden of historic inflationary pressure. In total, the full scope of economic impacts and costs associated with a proposed revision combined with the current challenges across our economy result in significant, potentially significantly burdensome impacts to the regulated

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<sup>12</sup> Letter from Cass Sunstein, OIRA Administrator, to Lisa Jackson, EPA Administrator (Sep. 2, 2011) (“OIRA Letter”) (emphasis added).

<sup>13</sup> OIRA Letter at 1 (emphasis added). Notably, the D.C. Circuit declined to rule on this withdrawal, finding that it “lacks jurisdiction” over a “non-final decision” on a “voluntary revision” of NAAQS. Order # 1359125, *American Lung Assoc. v. EPA*, No 11-1396 (D.C. Cir. Feb. 17, 2012).

<sup>14</sup> Press Release, Statement by the President on the Ozone National Ambient Air Quality Standards (Sep. 2, 2011) (“Obama Ozone Reconsideration Statement”).

community at a time when American competitive manufacturing is critical to sustained national economic progress.

In addition to the permitting and costs considerations above, EPA should consider potential unintended consequences associated with a revision of the standard. For example, the installation and operation of Selective Catalytic Reduction (SCR) to control NO<sub>x</sub> emissions could result in increased ammonia emissions. Thus, a lowered PM standard in a nonattainment area may actually hinder the area's ability to achieve attainment as it works to address ozone but separately creates PM<sub>2.5</sub> emissions issues. Given the full scope of these impacts, ACC again notes that EPA's proposed reconsideration represents a discretionary choice by the Administrator to review and revise existing NAAQS for PM<sub>2.5</sub> closely ahead of a statutory review. As such, ACC strongly recommends that the Agency consider a broader suite of permitting and economic impacts, including costs, in its decision to reconsider the existing PM<sub>2.5</sub> NAAQS.

**III. If EPA revises the existing standards, the Agency should provide an effective date of two years following promulgation to avoid permitting disruptions in the prevention of significant deterioration (PSD) program and state implementation plan (SIP) development schedule.**

In the Proposal, EPA notes that it has “historically interpreted the requirement for an air quality impact analysis under CAA section 165(a)(3) and the implementing regulations” to “include a requirement to demonstrate that emissions from the proposed facility will not cause or contribute to a violation of any NAAQS” that is “in effect” as of the date a PSD permit is issued, “except to the extent that a pending permit application was subject to grandfathering provisions that the EPA had established through rulemaking.”<sup>15</sup> Specifically, the preamble points to the “2012 PM<sub>2.5</sub> NAAQS (78 FR 3086, January 15, 2013) and 2015 Ozone NAAQS (80 FR 65292, October 26, 2015)” as examples of prior NAAQS revisions where the Agency had “included limited grandfathering provisions that exempted certain pending PSD permit actions” – i.e., those that had “reached a particular stage in the permitting process at the time the revised NAAQS was promulgated or became effective” – from the requirement to “demonstrate that the proposed emissions increases would not cause or contribute to a violation of the revised NAAQS.”<sup>16</sup> Here, however, EPA proposed no such grandfathering provisions.<sup>17</sup>

EPA states that it changed its approach regarding grandfathering due to the decision of the U.S. Court of Appeals for the D.C. Circuit in *Murray Energy Corp. v. EPA*, 936 F.3d 597 (D.C. Cir. 2019). In that case, the preamble notes, the court “vacated the grandfathering provision in the PSD rules applicable to the 2015 Ozone NAAQS” because it found that the provision “contradicted ‘Congress’s ‘express policy choice’ not to allow construction which will ‘cause or contribute to’ nonattainment of ‘any’ effective NAAQS, regardless of when they are adopted or when a permit was completed.’”<sup>18</sup> Because EPA is “not proposing any

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<sup>15</sup> 88 Fed. Reg. at 5686-87.

<sup>16</sup> *Id.* at 5687.

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*, quoting 936 F.3d at 627.

grandfathering provision for this proposed PM<sub>2.5</sub> NAAQS revision, if finalized,” “PSD permits issued on or after the *effective date* of any final revised PM<sub>2.5</sub> NAAQS” would require a “demonstration that the proposed emissions increases would not cause or contribute to a violation of the revised PM<sub>2.5</sub> NAAQS.”<sup>19</sup>

While *Murray Energy* prohibits a grandfathering provision exempting PSD applicants from demonstrating compliance with “‘any’ effective NAAQS,” EPA can achieve the policy ends of grandfathering by establishing a later effective date for any revised standard. As explained below, EPA, like other agencies,<sup>20</sup> has clear authority to establish an effective date greater than 60 days after the date of publication. In the case of any revised PM NAAQS, a two-year effective date would avoid a suspension in PSD permitting without prejudicing any subsequent action a state may take to implement the revised standard. Failure to adopt this later effective date would be arbitrary and capricious and an abuse of discretion.

EPA’s past practice with respect to NAAQS rulemakings has been to set a new standard’s effective date at 60 days after *Federal Register* publication. This 60-day timeline is not itself required by law and, if imposed in this rulemaking, would require the reopening and amendment of pending applications and thereby significantly delay the processing of hundreds of permit applications under development and in review. This reopening of applications would have to be undertaken while EPA, state staff, and industry applicants would be required to develop new modeling and other information needed to conform applications with the tightened standard. At best, the construction of needed facilities would be delayed, and many projects would likely be abandoned.

A moratorium on PSD permitting would have severe adverse consequences for the public interest and the regulated community. Over the last two years, Congress has enacted several statutes, including the Infrastructure, Investment and Jobs Act (P.L. 117-58), the CHIPS and Science Act (P.L. 117-167), and the Inflation Reduction Act (P.L. 117-169), to improve existing infrastructure and to provide public and private-sector funding for new businesses needed to expedite the United States’ transition towards a less-polluting future. This funding promises much needed upgrades to the United States’ aging infrastructure as well as the development of new technologies in the field of batteries, renewable energy, and semiconductors that are key to energy transition and a more competitive economy. Delay in permitting would disrupt financing and postpone construction of these needed infrastructure projects.

In a time of rising constraints, these issues have national security and supply chain implications. The success of U.S. domestic manufacturing and proper preparation for an uncertain future requires swift movement to address supply chain challenges and build the production capacity needed. Forcing new modeling and the submission of new applications

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<sup>19</sup> *Id.* (emphasis added).

<sup>20</sup> See Debt Collection Practices, 85 Fed. Reg. 76734, 76863 (Nov. 30, 2020) (“The Bureau proposed that the final rule take effect one year after publication in the Federal Register . . . [we] received several comments on this aspect of the proposal . . . [and] determined that, as proposed, the final rule will become effective one year after publication in the Federal Register.”).

could delay construction by months and threaten expected investments. EPA, consistent with the CAA's dual goals "to promote the public health and welfare *and* the productive capacity" of the United States,<sup>21</sup> must take lawful action to avoid disruptions in PSD permitting following promulgation of revised standards.

As noted above, historically, EPA has recognized the public interest in limiting NAAQS permitting delays following publication of a revised NAAQS by administratively grandfathering PSD applications. Under such grandfathering rules, a source was required to demonstrate compliance with the standard that was in effect when the application was filed, not a new, tighter standard that became effective 60 days after publication. Because PSD permitting is time- and resource-intensive, often requiring extensive legal, engineering, and air quality analysis, grandfathering avoided the unfairness caused by disruption of a process that had already consumed months, or even years. Establishment of a two-year effective date would accomplish the fairness and clean air policy objectives that grandfathering sought to achieve, but do so consistent with *Murray Energy*.<sup>22</sup>

A final rule's effective date establishes when that rule becomes a binding, enforceable legal requirement that supersedes prior rules. In the APA, Congress required that the effective date of any substantive rule be "not less than 30 days" after publication in the *Federal Register*. 5 U.S.C. § 553(d). Subsequently, Executive Order 12866 extended this minimal period to "not less than 60 days" for "major" rules such as NAAQS. In the APA, the 30-day deferred effective date cannot be shortened except for "good cause," and Congress cautioned that "the specification of a 30-day deferred effective date is not to be taken as a maximum since there may be cases in which good administration or the convenience and necessity of the person subject to the rule reasonably requires a longer period."<sup>23</sup> As a result, EPA is authorized to adopt a later effective date for any revised PM NAAQS.<sup>24</sup>

Setting a two-year effective date for NAAQS revisions would prevent unnecessary disruptions and delays in the granting of PSD permits *without* impeding progress by states and EPA in implementing a new standard. The suggested two-year period would allow states and permit applicants preparing PSD air quality analyses to rely on the latest air quality information for modeling purposes. The two-year effective date for this rule will align the PSD permitting program with the first key deadline for developing new SIPs: EPA's promulgation of "the [attainment/nonattainment/unclassifiable] designation of areas" within each state.<sup>25</sup> Coordinating the effective date of a revised NAAQS with the two-year deadline for EPA's promulgation of designations creates a natural pivot and reset point for subjecting new PSD applications to a tightened standard. In the absence of a two-year effective date, state-level and EPA officials are operating with regulatory uncertainty in respect to their modeling and likely

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<sup>21</sup> 42 U.S.C. § 7401(b)(1) (emphasis added).

<sup>22</sup> *Murray Energy Corp.*, 936 F. 3d at 627; see also 42 U.S.C. § 7475.

<sup>23</sup> SENATE REP. NO. 752, at 201 (1945).

<sup>24</sup> See *supra* note 6.

<sup>25</sup> See 42 U.S.C. § 7407(d)(1)(B)(i) ("[T]he Administrator shall promulgate the designations . . . [within] 2 years from the date of [NAAQS] promulgation.").

NSR obligations for areas within a state.<sup>26</sup> That said, the proposed two-year effective date would not disrupt the development of future SIPs and the imposition of new air quality controls, which do not have to be submitted until three years after the NAAQS *promulgation date*, which, as noted, EPA equates to the publication date.

A two-year effective date for a revised NAAQS: (1) is consistent with the policies underlying Executive Orders, the APA, and the CAA provisions regarding rule effective dates; (2) conforms to recent case law in *Murray Energy*; (3) would not delay the CAA's schedule for § 107 designations and § 110 SIP preparation, submittal, and approval, which are tied to *promulgation date* rather than *effective date*; (4) promotes fairness to pending permit applicants; (5) avoids disruption to permitting of important projects necessary for modernizing the nation's infrastructure and diversifying our production and energy sources; (6) advances the public interest by assisting with the implementation of policies recently enacted by this Administration through Congress; and (7) allows EPA time to develop new modeling and permitting tools.

In carrying out a congressional authorization, EPA must implement the Act consistent with its purpose section, *cf. Sierra Club v. Ruckelhaus*, 343 F. Supp. 253 (D.D.C. 1972), and adopt authorized measures needed to avoid unreasonable and unfair results. A two-year effective date is just such a measure. As is explained above, there are no adverse environmental consequences associated with EPA's setting a two-year effective date, whereas EPA's refusal to do so would inflict considerable harm on the regulated community specifically and society generally. Nothing in *Murray Energy* can be read as precluding a two-year effective date. In these circumstances, the path forward is clear and compelled by the Act.

#### **IV. EPA Properly Recognizes There Is No Basis for Increasing the Stringency of the Primary PM<sub>10</sub> NAAQS.**

Since 1987, EPA has enforced a 24-hour primary standard for PM<sub>10</sub> at a level of 150 µg/m<sup>3</sup>, allowing an average of one exceedance of that level every three years.<sup>27</sup> That standard was retained by the 2020 rulemaking that the Agency is now reconsidering.<sup>28</sup> In the current reconsideration, the Administrator again proposes to retain the primary PM<sub>10</sub> standard.<sup>29</sup> This proposal is both appropriate and reasonable.

EPA now considers the PM<sub>10</sub> NAAQS a surrogate indicator for coarse PM – particles with a nominal mean aerodynamic diameter between 2.5 µg and 10 µg, denominated PM<sub>10-2.5</sub>.<sup>30</sup> As both the 2019 ISA and the Reconsideration Proposal recognize, the scientific evidence does not support a causal or likely causal determination for any adverse health outcomes for short- or

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<sup>26</sup> If more than two years are needed to develop modeling and other guidance, EPA has discretion to extend the effective date following notice and comment rulemaking.

<sup>27</sup> 52 Fed. Reg. 24,634 (July 1, 1987).

<sup>28</sup> 85 Fed. Reg. 82,687, 82,727 (Dec. 18, 2020).

<sup>29</sup> 88 Fed. Reg. at 5637.

<sup>30</sup> 2020 Policy Assessment at 4-18.

long-term exposure to PM<sub>10-2.5</sub>.<sup>31</sup> In particular, the 2019 ISA concludes that the causality determinations for all health outcome categories for short- and long-term PM<sub>10-2.5</sub> exposure are “either suggestive of, but not sufficient to infer, a causal relationship or inadequate to infer the presence or absence of a causal relationship.”<sup>32</sup> Although the 2022 Policy Assessment notes that the evidence for some PM<sub>10-2.5</sub>-related health effects has “been strengthened,” it recognizes that this evidence still suffers from significant uncertainties identified as long ago as the 2012 PM NAAQS review.<sup>33</sup> These uncertainties include questions about the PM<sub>10-2.5</sub> exposure estimates used in epidemiologic studies, about the potential for confounding by co-occurring pollutants, about the independence of PM<sub>10-2.5</sub> health effect associations, and about the biological plausibility of the PM<sub>10-2.5</sub>-related effects.<sup>34</sup> In 2022, CASAC concurred with this discussion of the uncertainties and noted “the difficulty in extracting the sole contribution of coarse PM to observed adverse health effects, in light of the causal evidence for PM<sub>2.5</sub> which can be a confounder in studies of PM<sub>10</sub> health effects.”<sup>35</sup> Indeed, in 2019, then-CASAC Chair Tony Cox pointed out that studies reporting positive associations between health effects and PM<sub>10-2.5</sub> should not be used to assess causality because “positive associations that are not free from confounding, coincident historical trends, and other non-causal explanations, do not provide valid evidence for making or strengthening causal determinations. Using them for this purpose amounts to drawing causal conclusions from non-causal evidence, and is not scientifically valid.”<sup>36</sup>

Recognizing the limitations in the scientific database, EPA staff conclude “the available evidence in this reconsideration of the 2020 final decision supports retaining the current standard.”<sup>37</sup> The 2019 CASAC determined that the available evidence did not call into question the adequacy of the public health protection afforded by the existing primary PM<sub>10</sub> standard and expressed support for retaining the current standard.<sup>38</sup> The 2022 CASAC supported the recommendation to retain the primary PM<sub>10</sub> NAAQS without revision.<sup>39</sup> For these reasons, the Administrator’s proposal to retain the primary PM<sub>10</sub> NAAQS is both appropriate and reasonable.<sup>40</sup>

## **V. EPA's Proposal to Retain the 24-Hour Primary PM<sub>2.5</sub> NAAQS Is Appropriate.**

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<sup>31</sup> 2019 ISA at 1-66 to 1-68, Tbl. 1-4; 88 Fed. Reg. at 5630. The ISA Supplement does not address PM<sub>10-2.5</sub> because it addresses only health effect relationships for which the 2019 ISA found a causal or likely causal relationship. 88 Fed. Reg. at 5630.

<sup>32</sup> 2019 ISA at ES-23 (emphasis omitted).

<sup>33</sup> 2022 PA at 4-9.

<sup>34</sup> 2022 Policy Assessment at 4-9 to 4-10.

<sup>35</sup> 2022 CASAC Letter, Consensus Responses at 19.

<sup>36</sup> Individual Comments of Dr. Tony Cox, 2019 CASAC Letter at B-26.

<sup>37</sup> 2022 Policy Assessment at 4-19.

<sup>38</sup> 2019 CASAC Letter, Consensus Responses at 13.

<sup>39</sup> 2022 CASAC Letter, Consensus Responses at 19.

<sup>40</sup> One member of the NR3 Coalition, the National Mining Association, is filing separate comments that address the substantial uncertainties that continue to plague research into health effects of coarse PM that prevent promulgation of any more stringent NAAQS for coarse PM and the importance of accounting for the effect of crustal PM on judging compliance with the PM<sub>2.5</sub> NAAQS.

EPA proposes to retain the 35  $\mu\text{g}/\text{m}^3$  24-hour primary  $\text{PM}_{2.5}$  NAAQS.<sup>41</sup> The Agency does so “recogniz[ing] that the current annual standard . . . and 24-hour standard . . . together, are intended to provide public health protection against the full distribution of short- and long-term  $\text{PM}_{2.5}$  exposures” and that “the 24-hour standard, with its 98<sup>th</sup> percentile form, is most effective at limiting peak daily or 24-hour concentrations.”<sup>42</sup> Focusing first on the controlled human exposure studies, EPA notes that results of these studies, largely involving 2-hour exposures, “are inconsistent particularly at . . .  $\text{PM}_{2.5}$  concentrations” lower than those found in ambient air.<sup>43</sup> EPA explains that, even at higher concentrations, the effects observed are “intermediate” ones that “typically, would not, by themselves, be judged as adverse” and “finds that the current suite of standards maintains sub-daily concentrations far below the current concentrations in controlled human exposure studies where consistent effects have been observed.”<sup>44</sup>

As to the epidemiologic evidence, EPA explains this evidence “does not help to inform questions on the adequacy of the current 24-hour standard given that the 24-hour standard focuses on reducing ‘peak’ exposures (with its 98<sup>th</sup> percentile form).”<sup>45</sup> Specifically, EPA notes difficulties in relating the air quality scenarios analyzed in the studies to the level and form of the current 24-hour standard.<sup>46</sup> With regard to the risk assessment, EPA recognizes it finds health benefits associated with a more stringent 24-hour standard only in a “more limited” population.<sup>47</sup> EPA also points out that neither the majority of CASAC members (who supported consideration of a more stringent 24-hour NAAQS) or the minority of CASAC members (who did not) indicated that the risk assessment justified a more stringent NAAQS.<sup>48</sup> As such, ACC supports EPA’s proposed decision to retain the current 24-hour NAAQS.

## **VI. EPA's Proposal Not To Revise the Secondary NAAQS Is Reasonable and Consistent with Scientific Evidence.**

The CAA directs EPA to set secondary NAAQS that specify a level of air quality that, “in the judgment of the Administrator,” is requisite to protect the public welfare from “known or anticipated” risks of “adverse” effects.<sup>49</sup> As with the primary NAAQS, the Act does not require the Administrator to set secondary NAAQS at a zero-risk level.<sup>50</sup> Rather, secondary NAAQS are to be set at a level that limits risk sufficiently to protect the public welfare, but not at a level more stringent than necessary to provide this protection.<sup>51</sup>

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<sup>41</sup> 88 Fed. Reg. at 5629.

<sup>42</sup> 88 Fed. Reg. at 5617.

<sup>43</sup> 88 Fed. Reg. at 5620.

<sup>44</sup> 88 Fed. Reg. at 5621.

<sup>45</sup> 88 Fed. Reg. at 5621.

<sup>46</sup> 88 Fed. Reg. at 5621.

<sup>47</sup> 88 Fed. Reg. at 5622, 5623.

<sup>48</sup> 88 Fed. Reg. at 5623.

<sup>49</sup> CAA § 109(b)(2).

<sup>50</sup> 88 Fed. Reg. at 5644.

<sup>51</sup> 88 Fed. Reg. at 5644.

The current secondary NAAQS for PM are equal to the primary NAAQS, with the exception that the secondary annual PM<sub>2.5</sub> standard is 15.0 µg/m<sup>3</sup> instead of 12.0 µg/m<sup>3</sup>.<sup>52</sup> These standards are based on protection of visibility, taking into account effects on other welfare values, including climate change and materials damage. Consistent with the decision the Agency reached in 2020 that “the current secondary standards are requisite to protect the public welfare from known or anticipated adverse effects,”<sup>53</sup> the Administrator’s proposal to determine “that no change to the current secondary PM standards is required at this time to provide requisite protection against the public welfare effects of PM within the scope of this reconsideration” is a reasonable exercise of his public welfare policy judgment authority under the Act.<sup>54</sup>

### **A. The Current Secondary NAAQS Provide the Requisite Protection of Visibility.**

In reaching his conclusion to propose retaining the current secondary NAAQS, the Administrator focuses first on the protection of visibility provided by the 24-hour PM<sub>2.5</sub> standard. He recognizes that the information on acceptable visibility “is largely the same as [it] was in the [2012 and 2020] reviews.”<sup>55</sup> The one new study of visibility preference in the United States is Malm, *et al.*, (2019), which the Administrator recognizes cannot readily be compared to the earlier studies.<sup>56</sup> Further, the Administrator notes that the Malm study examined visibility in Grand Canyon National Park. He concludes that Congress intended that visibility protection for a Class I Area such as the Grand Canyon would be provided by the CAA’s regional haze program rather than a secondary NAAQS.<sup>57</sup> As a result, he concludes that this study should not be the basis for his decision on whether the secondary NAAQS require revision.

Given the lack of new relevant scientific information, it is not surprising that the Administrator concludes that the current standards continue to protect public welfare with regard to visibility. The Administrator proposes to conclude that the indicator, form, and averaging time of that standard remain appropriate.<sup>58</sup> These conclusions are all rational, given that neither EPA career staff nor CASAC identified any alternatives for these aspects of the secondary NAAQS.<sup>59</sup> Turning to the level of the standard, EPA identifies a 30 deciview (dv) visibility as the level requisite to protect public welfare.<sup>60</sup> In doing so and responding to a request from the 2022 CASAC for better justification of the 30 dv level, the Administrator explains at some

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<sup>52</sup> 88 Fed. Reg. at 5644.

<sup>53</sup> 85 Fed. Reg. 82,684, 82,744 (Dec. 18, 2020).

<sup>54</sup> *See* 88 Fed. Reg. at 5643.

<sup>55</sup> 88 Fed. Reg. at 5659.

<sup>56</sup> 88 Fed. Reg. at 5649-50. *See also* 2022 Policy Assessment at 5-24 to 5-25.

<sup>57</sup> 88 Fed. Reg. at 5658, 5660.

<sup>58</sup> *See* 88 Fed. Reg. at 5658-59. *See also* 2022 Policy Assessment at 5-27 to 5-29 (recommending retention of the present indicator, form, and averaging time for the standard).

<sup>59</sup> *See* 2022 Policy Assessment at 5-27 to 5-28; 2019 CASAC Letter at 3. The 2022 CASAC suggests, “*For future reviews, . . . a more extensive technical evaluation of the alternative measures to provide the basis for a secondary standard protective of visibility.*” 2022 CASAC letter at 4 (emphasis added). By tying this recommendation to future reviews, CASAC tacitly acknowledges that the current record does not support consideration of such alternatives.

<sup>60</sup> 88 Fed. Reg. at 5660; 85 Fed. Reg. at 82,741; 78 Fed. Reg. at 3226-27.

length the “substantial uncertainties and limitations” in the visibility preference studies that provide the basis for the secondary NAAQS.<sup>61</sup> EPA reasons that, given the uncertain nature of the data and recognizing that the Regional Haze Program works with the secondary NAAQS to protect visibility, “it is appropriate to establish a target level of protection based on the upper end of the range of [studied] levels.”<sup>62</sup> The Agency notes that these judgments are “consistent with similar judgments in past reviews,”<sup>63</sup> when the same underlying data were available. Citing analyses by staff “demonstrat[ing] that the 3-year visibility metric is at or below 28 dv in all areas meeting the current 24-hour PM<sub>2.5</sub>,”<sup>64</sup> and noting that the 2022 CASAC did not recommend any alternative level for the NAAQS,<sup>65</sup> EPA “proposes to conclude that the current secondary standards provide requisite protection against PM-related visibility effects.”<sup>66</sup> This conclusion is well-grounded in the science and is appropriate.

### **B. Revision of the NAAQS To Protect Materials and Climate Is Not Appropriate.**

EPA also considers evidence that PM causes impacts on materials and climate AND concludes that uncertainties and limitations of significance remain concerning the relationships between PM and damage to materials and changes in climate such that “it is not appropriate to establish any distinct secondary PM standards to address” them.<sup>67</sup> This conclusion is consistent with the advice of both CASAC panels and of EPA staff.<sup>68</sup>

With regard to PM effects on materials, EPA staff explain:

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<sup>61</sup> 88 Fed. Reg. at 5660. *See also* 2022 Policy Assessment at 5-26, 5-29 (identifying remaining scientific uncertainties and limitations and expressing continued support for use of a 30 dv visibility index).

<sup>62</sup> 88 Fed. Reg. at 5660.

<sup>63</sup> 88 Fed. Reg. at 5660.

<sup>64</sup> 88 Fed. Reg. at 5660. *See* 2022 Policy Assessment at 5-30 to 5-33.

<sup>65</sup> 88 Fed. Reg. at 5660. The 2019 CASAC explicitly concluded that “the available evidence does not call into question the protection afforded by the current secondary PM standards.” 2019 CASAC Letter, Consensus Responses to Charge Questions at 14.

<sup>66</sup> 88 Fed. Reg. at 5661. Noting the request of the 2022 CASAC for better justification for the determination that a 30 dv visual range is protective of public welfare, the Administrator solicits comment on a 24-hour PM<sub>2.5</sub> standard as low as 25 µg/m<sup>3</sup>, noting the need for justification for any such comments. 88 Fed. Reg. at 5662. No such more stringent standard is justified in light of the uncertainties and limitations in the evidence concerning PM effects on visibility, as discussed in the proposal and in the 2022 PA.

<sup>67</sup> 88 Fed. Reg. at 5661.

<sup>68</sup> Letter from Dr. Elizabeth A. (Lianne) Sheppard, Chair, CASAC, to the Hon. Michael S. Regan, Administrator, EPA, Consensus Responses to Charge Questions at 22-23 (Mar, 18, 2022) (“large uncertainties” remain concerning the relationship between PM and climate change, and quantitative information on the relationship between PM and materials damage “is lacking”) (“2022 CASAC Letter”); Letter from Dr. Louis Anthony Cox, Jr., Chair, CASAC, to the Hon. Andrew R. Wheeler, Administrator, EPA, Consensus Responses to Charge Questions at 13-14 (Dec. 16, 2019) (recognizing “uncertainties” about concerning the PM/materials damage and PM-climate relationships) (“2019 CASAC Letter”); EPA, Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter 5-50 (May 2022) (recognizing “significant uncertainties” remain related to quantifying the relationship of PM to climate and materials) (“2022 PA”).

While there are a number of studies in the 2019 ISA that investigate the effect of PM on newly studied materials and further characterize the effects of PM on previously studied materials, there remains insufficient evidence to relate soiling or damage to specific PM levels or to establish a quantitative relationship between PM in ambient air and materials degradation. Uncertainties that were identified in the 2012 review still largely remain with respect to quantitative relationships between particle size, concentration, chemical concentrations, and frequency of repainting and repair. No new studies are assessed in the 2019 ISA that link perceptions of reduced aesthetic appeal of buildings and other objects to PM-related materials effects. Moreover, uncertainties about the deposition rates of airborne PM to surfaces and the interaction of co-pollutants still remain.<sup>69</sup>

Regarding PM and climate, they state:

[S]ignificant uncertainties remain that make it difficult to quantify the climate effects of PM. Such uncertainties include those related to our understanding of:

- The magnitude of PM radiative forcing and the portion of that associated with anthropogenic emissions;
- The contribution of regional differences in PM concentrations, and of individual components, to radiative forcing;
- The mechanisms of climate responses and feedbacks resulting from PM-related radiative forcing; and,
- The process by which PM interacts with clouds and how to represent such interactions in climate models.<sup>70</sup>

Declining to set a standard in the face of these uncertainties is appropriate. Revising a NAAQS in the face of uncertainties of this nature would be inappropriate. When EPA lacks an adequate scientific basis to make a reasonable judgment on an appropriate standard to protect public welfare, any standard would be arbitrary and capricious, *per se*.<sup>71</sup>

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Thank you for your consideration of these comments. Please feel free to contact me at 202- 249-6423 or [Brendan\\_Mascarenhas@americanchemistry.com](mailto:Brendan_Mascarenhas@americanchemistry.com) if you have questions or need more information on any of these issues.

Sincerely,

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<sup>69</sup> 2022 Policy Assessment at 5-46 to 5-47.

<sup>70</sup> 2022 Policy Assessment at 5-41.

<sup>71</sup> *Ctr. Biological Diversity v. EPA*, 749 F.3d 1079, 1087 (D.C. Cir. 2014).

A handwritten signature in black ink, appearing to read "Brendan Mascarenhas", enclosed within a thin black rectangular border.

Brendan Mascarenhas  
Director, Regulatory and Technical Affairs  
American Chemistry Council



# Here’s Why the EPA’s Proposed Air Quality Standards Will Cause Permitting Gridlock Across our Economy

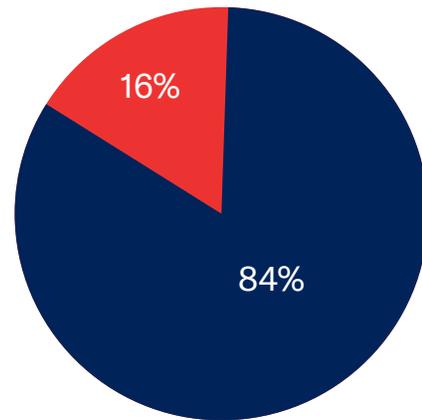
Everyone believes clean air is important. Thanks to technological advances and years of cooperation among businesses, states and the federal government, America’s air is cleaner than ever—1.6 times cleaner than Europe. And thanks in part to investments in the clean energy transition, air quality continues to improve.

One measure of air quality uses a standard for particulate matter (PM<sub>2.5</sub>) – fine particulates that are more than 20 times smaller than a human hair. PM<sub>2.5</sub> is made up of a complex mixture of tiny particles of everything from forest fire smoke to liquid droplets. The good news is that ambient levels of PM<sub>2.5</sub> have decreased by 42 percent over the last 20 years and continue to drop.

Despite these ongoing and significant air quality improvements, EPA has proposed a discretionary rule that would lower PM<sub>2.5</sub> standards to a level that threatens investment in manufacturing, critical infrastructure projects and more. If EPA tightens the standards to the lowest levels being considered, it would put almost 30 percent of U.S. counties in permitting gridlock. The problem with this proposal is that because of all the progress we’ve made, most PM<sub>2.5</sub> is now generated by what are called “non-point” sources that are difficult, costly, and sometimes infeasible to control. The chart to the right illustrates the issue at hand.

Fires are now the largest source of PM<sub>2.5</sub>. Due to their small size, these particles can drift long distances. The impact of fires can be felt around the country. For instance, counties in Arizona may violate EPA’s standards because of fires in California.

### PM<sub>2.5</sub> Predominantly From Non-Point Sources



● Point ● Non-Point

#### Point Sources

Power	11%
Industrial	5%
<b>Total</b>	<b>16%</b>

#### Non-Point Sources

Fires	43%
Road Dust	16%
Ag Dust	14%
Other	6%
Cars/Trucks	5%
<b>Total</b>	<b>84%</b>

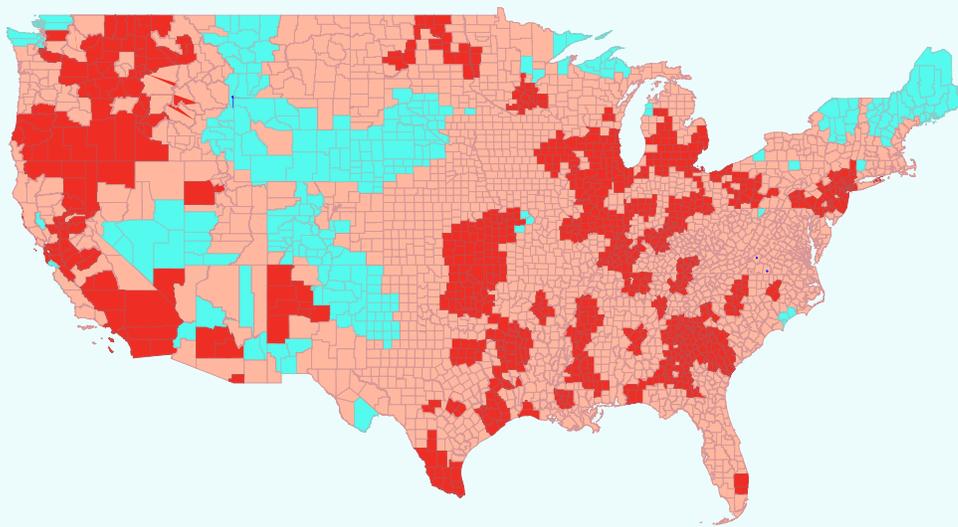
Source: U.S. EPA’s Policy Assessment for PM NAAQS



A new analysis by the U.S. Chamber finds that the impact of non-point sources is only getting worse. For example, the 2023 fire season is proving to be one of the worst yet. As a result, if the standard is lowered to the level EPA proposes and PM<sub>2.5</sub> data from this year – including forest fires - is factored in, **47 percent more counties would be in violation of the standard and face permitting gridlock, thereby restricting economic growth.**

That means **850 counties in the United States would be in violation (dark red) of the standards.** Counties with PM<sub>2.5</sub> levels just below the standards, the areas shown in lighter red, would also face restrictions on development, as they would have little headroom to build new infrastructure, expand manufacturing, and stimulate economic growth. Few areas of the country would be left unaffected (teal).

### Projected Nonattainment Impacts of PM<sub>2.5</sub> at 9.0 ug/m3



2021-2023 Est. Annual PM<sub>2.5</sub> Design Values

- Nonattainment
- 1-3 ug/m3 headroom
- >3 ug/m3 headroom

## Potential negative impacts of the EPA Rule:



Block permitting of new manufacturing facilities and associated good-paying jobs, pushing investment overseas



Increase costs and worsen inflationary impacts of doing business in the U.S. threatening close to \$200 billion in economic activity and putting at risk 1 million jobs according to Oxford Economics



Prevent building roads, bridges, and other infrastructure that was funded by the bipartisan infrastructure bill that would have eased congestion



Place burden on private sector despite fires being the main PM<sub>2.5</sub> source



Require mitigation from homeowners, restaurants, and small businesses putting burdens on all Americans

September 7, 2023

Michael Regan  
Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue NW  
Washington, DC 20460

Dear Administrator Regan,

The undersigned associations are writing to urge EPA to maintain the existing National Ambient Air Quality Standards (NAAQS) for fine particulate matter. Lowering standards further would harm America's ability to revitalize our supply chains and manufacturing, as well as to restore and revitalize our nation's infrastructure. In addition, the current reconsideration is discretionary and not required by the Clean Air Act as the existing standards were just reviewed in 2020.

America's air continues to improve. The business community has worked with EPA and its state partners to lower fine particulate matter (PM<sub>2.5</sub>) emissions by 42 percent since 2000<sup>1</sup> and is making significant progress even with the steady growth in the U.S. economy, population, and energy use. Thanks to innovation and investment, new emissions control technologies and solutions have been widely adopted to improve air quality.

The vast majority of PM<sub>2.5</sub> emissions, more than 84 percent, now come from non-point sources<sup>2</sup> such as fires and unpaved roads. The larger amounts of particles and gaseous PM<sub>2.5</sub> precursors resulting from the devastating wildfires in Canada and the West are stark reminders of the smothering blanket of emissions that cause serious impairment of air quality and why forestry management would appear to offer the greatest opportunity to reduce PM<sub>2.5</sub> emissions. In contrast to non-point sources, only 16 percent of PM<sub>2.5</sub> emissions come from industrial sources and power plants that are already well controlled and are making further reductions.

With twenty counties still out of attainment with, or in a maintenance area for the current 12 µg/m<sup>3</sup> annual air quality standards,<sup>3</sup> tightening the standards further would put large swaths of the country in non-attainment and permitting gridlock. In

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<sup>1</sup> U.S. EPA, Our Nation's Air: Trends Through 2022, [https://gispub.epa.gov/air/trendsreport/2023/#air\\_trends](https://gispub.epa.gov/air/trendsreport/2023/#air_trends).

<sup>2</sup> U.S. EPA, Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, May 2022, [https://www.epa.gov/system/files/documents/2022-05/Final%20Policy%20Assessment%20for%20the%20Reconsideration%20of%20the%20PM%20NAAQS\\_May2022\\_0.pdf](https://www.epa.gov/system/files/documents/2022-05/Final%20Policy%20Assessment%20for%20the%20Reconsideration%20of%20the%20PM%20NAAQS_May2022_0.pdf).

<sup>3</sup> U.S. EPA, Green Book, July 31, 2023, <https://www3.epa.gov/airquality/greenbook/kbtc.html>.

some areas, even eliminating *all* emissions from industrial sources, power plants and vehicles would likely not be sufficient to meet the existing PM<sub>2.5</sub> standards, let alone tighter standards.

As the PM<sub>2.5</sub> standards approach background levels, there are fewer tools available for compliance. This is not only an issue for nonattainment areas, but also for adjacent areas as well. The inability to comply with these near-background level standards could lead to consequences such as onerous permitting requirements that would freeze manufacturing and supply chain investments, as well as other unintended consequences. Recent supply chain disruptions exposed economic and national security vulnerabilities and the need for massive domestic investments in such activities as mining and processing of critical minerals for priorities like renewable energy, semiconductor manufacturing, and energy development for us and our allies.

Lowering the PM<sub>2.5</sub> air quality standards through discretionary rulemaking endangers these investments and the associated good paying jobs. One study found that lowering the standards would threaten close to one million jobs and \$200 billion in economic activity.<sup>4</sup> The economic impacts are estimated to be high because the headroom between PM<sub>2.5</sub> background levels and lower standards would shrink considerably, making each increment of additional reductions exceedingly more costly to achieve.

Given the progress being made to reduce emissions, and the potential harm that could be caused by lowering standards further, we ask that EPA maintain the existing standards while continuing to support innovation and current emissions reduction efforts. Thank you for your time and consideration.

Sincerely,

Agricultural Retailers Association  
The Aluminum Association  
American Chemistry Council  
American Coke and Coal Chemicals Institute  
American Council for Capital Formation  
American Exploration & Production Council  
American Farm Bureau Federation  
American Forest & Paper Association  
American Fuel and Petrochemical Manufacturers  
American Iron and Steel Institute

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<sup>4</sup> National Association of Manufacturers, U.S. Air Quality Standards and the Manufacturing Sector, April 2023, [https://documents.nam.org/COMM/NAM\\_Air\\_Quality\\_Standards\\_Analysis\\_Web\\_Version.pdf](https://documents.nam.org/COMM/NAM_Air_Quality_Standards_Analysis_Web_Version.pdf).

American Petroleum Institute  
American Public Gas Association  
American Public Power Association  
American Road & Transportation Builders Association  
American Wood Council  
Associated Builders and Contractors  
Associated General Contractors of America  
Consumer Energy Alliance  
Corn Refiners Association  
Council of Industrial Boiler Owners  
Energy Marketers of America  
The Fertilizer Institute  
Hardwood Federation  
Interstate Natural Gas Association of America  
National Association of Manufacturers  
National Lime Association  
National Mining Association  
National Oilseed Processors Association  
National Rural Electric Cooperative Association  
National Stone, Sand, & Gravel Association  
Portland Cement Association  
Steel Manufacturers Association  
Treated Wood Council  
U.S. Chamber of Commerce

**Congress of the United States**  
**Washington, DC 20515**

June 13, 2023

The Honorable Michael S. Regan  
Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington DC 20460

Dear Administrator Regan,

We write to urge your close collaboration with air districts, land managers, and fire practitioners regarding their ability to deploy prescribed fire without jeopardizing California's ability to comply with federal air quality standards or undermining the U.S. Environmental Protection Agency's (EPA) strengthening of these health-based air quality standards. We were encouraged to hear that the EPA has had productive conversations with federal land management agencies to discuss these issues, and we ask for your continued focus on developing a solution that both safeguards clean air and prevents the consistent cycle of devastating wildfires that also undermines our efforts to make progress on clean air.

California and the EPA have long worked hand-in-hand to achieve clean air gains, and no one supports the protection of clean air more than we do because we have seen how polluted air so negatively impacts public health and the quality of life for Californians. That's why we support the EPA's efforts to strengthen the national ambient air quality standard (NAAQS) for fine particle pollution (PM 2.5) to ensure stronger public health protections, particularly for communities who are disproportionately affected by air pollution stemming from goods movement and catastrophic wildfires. However, we are concerned that the proposed rule could inadvertently hinder the ability of land managers to deploy prescribed fires that help California avoid the larger catastrophic wildfires that more significantly pollute the air and threaten public safety. Therefore, throughout the rulemaking process and during implementation, we strongly encourage the EPA to continue working closely with federal land management agencies and state, Tribal, and local air quality districts of all sizes to ensure that implementation of the final rule will enable prescribed fire to be deployed through a simple, clear, and efficient process.

The principal pollutant of concern from wildfire smoke is PM 2.5, and numerous studies have shown that despite California's and the EPA's collaborative efforts to reduce air pollution, wildfire smoke has unfortunately eliminated much of our clean air progress. To address this, we must bring healthy, low intensity fire back to Western landscapes through prescribed fire and cultural burning. Scientific and public health experts agree that a significant increase in the use of these beneficial fire practices is essential to reducing overall PM 2.5 exposure and addressing the long-term impacts of rampant wildfire on our communities.

Beneficial fire is supported by the U.S. Forest Service's (USFS) Wildfire Crisis Strategy, which recommends a sizable increase in forest hazardous fuel treatments, including prescribed fire. In fact, the state of California has concluded a Memorandum of Understanding with the USFS to increase the use of

fuel treatments, including prescribed fire to 1 million acres per year by 2025. The Department of the Interior has also agreed that prescribed fire strategies need to be considered and increased. We agree with the scientific and public health community as well as our federal land management agencies that we must continue to deploy prescribed fire to reduce overall PM 2.5 emissions.

While we appreciate the possibility that our concerns could be addressed through the use of EPA's Exceptional Events Rule, the reality is that this process is unworkable for the scale of prescribed fire that will be necessary to protect our communities from increasingly catastrophic wildfires. The Exceptional Events Rule is specifically designed for "unusual or naturally occurring events that can affect air quality but are not reasonably controllable." This simply does not describe prescribed fires, which are methodically and diligently planned out by land managers who consider a multitude of factors including fuel level, weather, and moisture levels.

Given the sanctions risk of a potential finding of non-attainment, we remain concerned that California's Air Districts will, without clear and efficient ex-ante guidance from EPA, reduce prescribed fire usage rather than risk the consequences of a change in attainment status. This outcome would only exacerbate the risk of catastrophic wildfires that decimate communities and fundamentally undermine the air quality gains we are all working together to achieve.

We urge you to continue to collaborate with land managers, air districts, and fire practitioners to ensure that prescribed fire can be deployed in an efficient and timely way under the new standards. We ask that you keep our offices updated on your work to finalize the proposed rule, and please know that we stand ready to assist you in finding a workable solution.

Sincerely,



Alex Padilla  
United States Senator



Dianne Feinstein  
United States Senator



Jared Huffman  
Member of Congress



Scott H. Peters  
Member of Congress



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Kevin Mullin  
Member of Congress



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Zoe Lofgren  
Member of Congress



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Mark DeSaulnier  
Member of Congress



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Katie Porter  
Member of Congress



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Jimmy Panetta  
Member of Congress



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Jim Costa  
Member of Congress



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Salud Carbajal  
Member of Congress



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Josh Harder  
Member of Congress



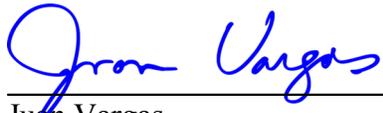
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Mike Thompson  
Member of Congress



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Doris Matsui  
Member of Congress



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Juan Vargas  
Member of Congress



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Mike Levin  
Member of Congress



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Sara Jacobs  
Member of Congress



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John Garamendi  
Member of Congress



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Grace F. Napolitano  
Member of Congress  
Water Resources and  
Environment



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J. Luis Correa  
Member of Congress



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Ted W. Lieu  
Member of Congress



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Pete Aguilar  
Member of Congress



---

Adam B. Schiff  
Member of Congress



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Brad Sherman  
Member of Congress



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Eric Swalwell  
Member of Congress

cc: The Honorable Thomas Vilsack, Secretary, U.S. Department of Agriculture  
The Honorable Deb Haaland, Secretary, U.S. Department of the Interior  
The Honorable Joe Goffman, Principal Deputy Administrator, Environmental Protection Agency

# Cement Industry Impacts of Lowering the Annual PM 2.5 Standard

## Overview

The Environmental Protection Agency (EPA) has lowered the annual mean concentration of particulate matter (PM) 2.5 from 12 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) to 9  $\mu\text{g}/\text{m}^3$ . The EPA began setting air quality standards for inhalable particles – particles equal to or smaller than 10 microns – in 1987, with standards for particles 2.5 microns or less first set in 1997 at 15  $\mu\text{g}/\text{m}^3$ . The National Ambient Air Quality Standards (NAAQS) for PM 2.5 had since been lowered once. In 2012, the EPA reduced the standard from 15  $\mu\text{g}/\text{m}^3$  to 12  $\mu\text{g}/\text{m}^3$ , where it has remained for more than a decade since.

Aside from the cement industry, the reach of a lower standard is large. Moreover, the scope of geographic footprint and economic output associated with reducing the PM 2.5 threshold from 12 to 9  $\mu\text{g}/\text{m}^3$  is not linear. Eighteen of 3,143 counties are currently in nonattainment for PM 2.5 under the 12  $\mu\text{g}/\text{m}^3$  standard. Approximately 9.2 million people are employed in those counties. Under the 9  $\mu\text{g}/\text{m}^3$  standard, 25.8% (41.5 million people) of the labor force reside in the 118 counties that fall into nonattainment. These figures are not inclusive of adjacent counties within a core-based statistical area (CBSA) of a nonattainment county. It is virtually certain some of these counties would be circumscribed in nonattainment areas under a stricter standard – further expanding the breadth of the regulation.

A lower standard will have a significant impact on the cement industry. PCA estimates that lowering the annual PM 2.5 standard to 9  $\mu\text{g}/\text{m}^3$  could require \$171.8 million in capital expenditures and \$54.6 million in additional annual operating expenses for U.S. cement producers. Even after such a large investment, there is still uncertainty as to whether these investments would even allow for achievement of the levels necessary to meet the new standard.

Such immense compliance costs would disincentivize expansion of domestic cement capacity. It is possible that a lower PM 2.5 standard will result in some plant closures if they deem the compliance investment required not justified on a financial basis. Moreover, increasing the footprint of nonattainment areas restricts more counties' ability to issue new permits due to emission offsetting requirements. The U.S. cement industry has experienced tight market supply conditions for the past several years and will soon need to supply tens of millions of tons of cement for public construction projects associated with the implementation of the Infrastructure Investment and Jobs Acts. There is a need for greater investment in U.S. cement production capabilities. The supply gap has been increasingly filled by imports. Costly new regulations do nothing to relieve these market realities.

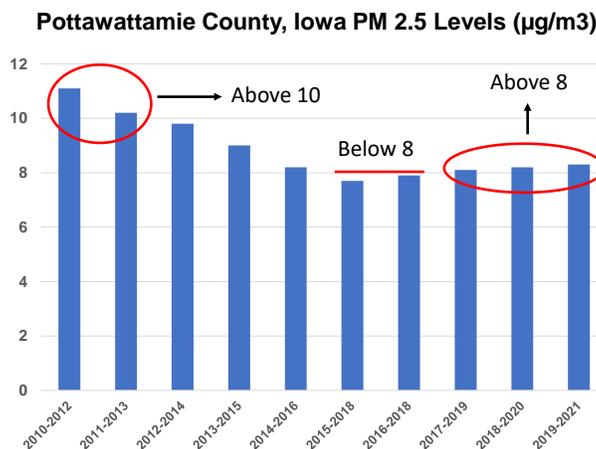
## Scope of a Lower Standard

The EPA measures PM 2.5 levels at ambient air monitoring sites. To determine attainment status, an annual arithmetic mean of PM 2.5 concentration is averaged over three years. This statistic, referred to as a design value, is what places a portion or whole county in nonattainment if it is currently over 12  $\mu\text{g}/\text{m}^3$ . The same process would be undertaken under a 9  $\mu\text{g}/\text{m}^3$  threshold.

Yet, this is not the sole determinant of an area's potential nonattainment status. The EPA recommends that states, as part of their state implementation plan (SIP), use CBSA's as a reasonable starting point

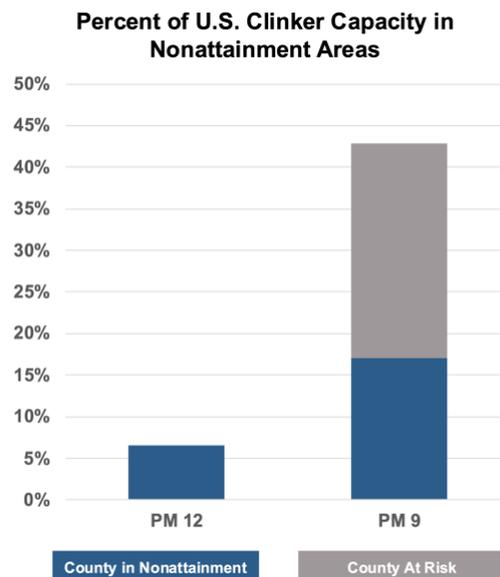
when establishing nonattainment area boundaries. The logic is that an adjacent county has the potential to contribute to a monitor violation within a CBSA. Using five consideration factors (air quality data; emissions and related data; meteorology; geography/topography; and jurisdictional boundaries), nonattainment boundaries are evaluated and determined on a case-by-case basis. It is possible that only portions of surrounding counties would be included in nonattainment areas. Given this methodology, a county could be more heavily regulated simply based on unfavorable wind patterns.

Using the latest EPA Green Book, PCA analyzed county design values. For the purposes of this report, counties with any monitor reporting a 2019-2021 average value at or above 9  $\mu\text{g}/\text{m}^3$  are considered in nonattainment. All counties within a CBSA of a violating county, as well as counties that have at any time been above the 9  $\mu\text{g}/\text{m}^3$  threshold in the past 10 years, are considered **at risk** for being in nonattainment areas. The majority of counties at risk are due to their CBSA association with a violating county.

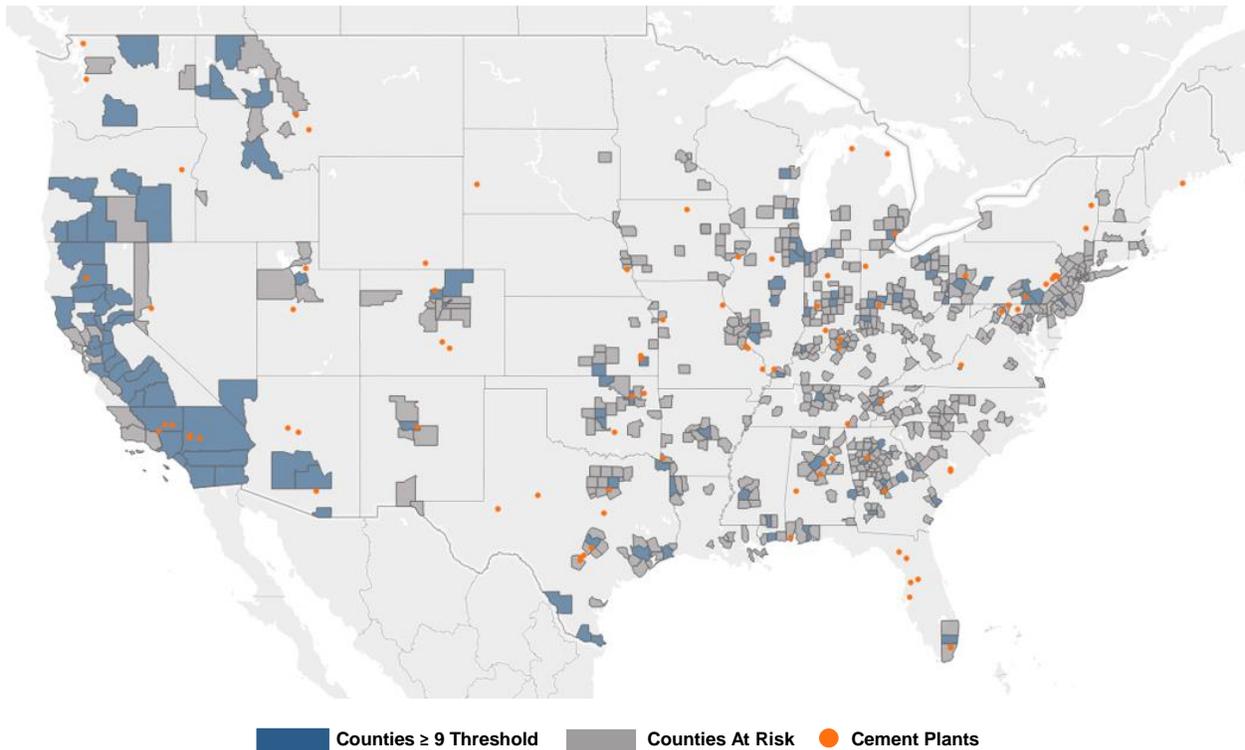


A complication with lowering the PM 2.5 standard to 9  $\mu\text{g}/\text{m}^3$  is that the footprint of regulation grows more uncertain. There are simply far more counties teetering just below 9  $\mu\text{g}/\text{m}^3$  than there are 12  $\mu\text{g}/\text{m}^3$ . Since adjacent counties within CBSA's have the potential to also fall into nonattainment areas, the unpredictability surrounding a county's future attainment status grows. This could deter investment dollars from counties that are viewed as at risk for falling into nonattainment and having to comply with comprehensive implementation plans, especially given the increased incidence of "background" PM like wildfires and farming.

Approximately 43% of the domestic cement industry, measured by clinker capacity, would either be in nonattainment or at risk of being in a nonattainment area with a standard of 9  $\mu\text{g}/\text{m}^3$ . Sixteen plants and two grinding facilities with a combined clinker and grinding capacity of 16.4 mmt and 21.8 mmt respectively dwell in counties that would fall into nonattainment areas. Another 21 plants totaling 24.9 mmt of clinker capacity and 28.6 mmt of grinding capacity would be at risk of inclusion in nonattainment areas.



## Annual PM 2.5 at 9 µg/m3



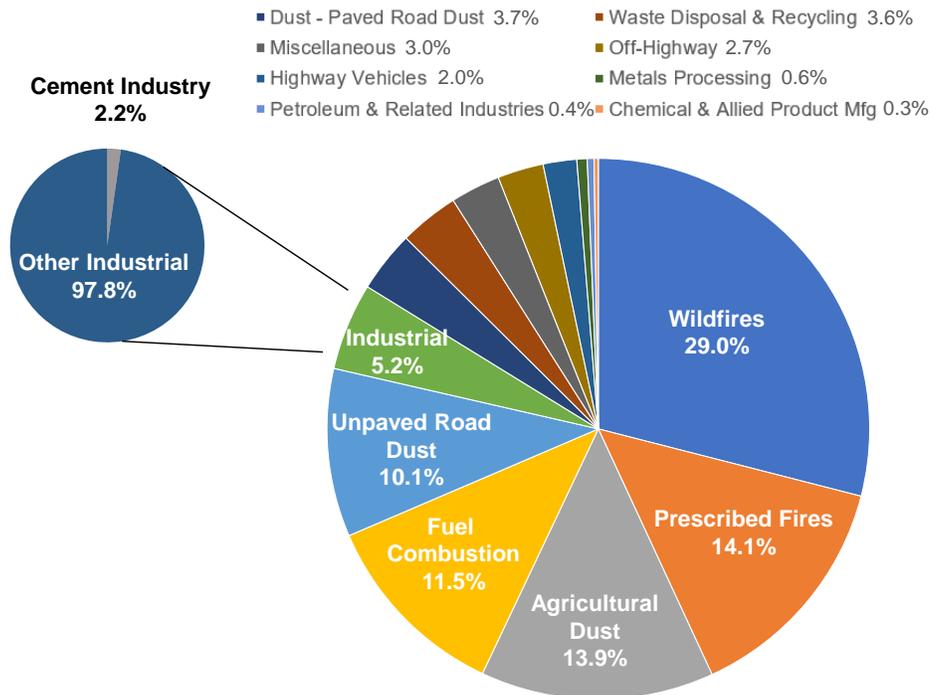
## Composition of PM 2.5 Emissions

The chemistry of fine particle formation is complex and depends on a multitude of factors such as atmospheric conditions and other pollutants. Direct PM 2.5 emissions include organic carbon, sulfates, nitrates, elemental carbon, and crustal material emitted from a variety of sources including fires, dust from agricultural practices, paved and unpaved roads, and fuel combustion. These emissions then couple with secondary particles known as precursor emissions. These include nitric oxide (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), volatile organic compounds (VOCs), and ammonia (NH<sub>3</sub>) and are emitted from things like cars and trucks, power generation, and agriculture.

Industry is not the primary source of PM 2.5 emissions. PCA assessed the latest EPA National Emissions Inventory (NEI) data. The data series contains both filterable and condensable PM 2.5 emissions at the national, state, and county level with estimates for sector sources of such emissions. Of all contributors to PM 2.5 emissions, industrial processes are a relatively minor one at 5.2% of total emissions.

On a national basis, the cement industry's contribution to PM 2.5 emissions is very small, accounting for a negligible 0.1% share of total PM 2.5 emissions. Since most areas of the country do not house cement plants and the true metric of concern is ambient air quality in specific areas of the country, this statistic is perhaps not the most representative. To this end, PCA went through the emissions inventory and isolated each county where there is a cement plant to see its share of total PM 2.5 emissions. In these counties, cement manufacturing on average represented 1.9% of PM 2.5 emissions.

## Sources of PM 2.5



## Control Technologies & Associated Costs

Particulate matter, and notably PM 2.5, is different in nature than most other emissions. With a majority comprised of “background” emissions, attributed to things like wildfires, dust from unpaved roads and agriculture, there is not necessarily a silver bullet approach to effectively regulate its main causes. Tasked with the goal of reducing PM emissions and unable to regulate its scattershot origins like mobile or natural sources, imposing new rules on industry may seem like the silver bullet even though it is a relatively small contributor to the problem. Regulations on industry alone would not resolve the problem.

The cement industry is already heavily regulated for particulate matter through the National Emissions Standards for Hazardous Air Pollutants (NESHAP). With PM currently well controlled at cement plants, plants may face diminishing returns from upgrades to control technologies like baghouses. Moreover, PM 2.5 comprises a small share of total filterable PM coming from a baghouse.

To get a sense of what control technologies might be considered, along with estimated capital and operating expenses associated with each control technology, PCA turned to its member company producers. The survey data PCA collected reflects current estimated investment costs to reduce PM 2.5 emissions. This information contains significant upside risk in the context of likely market conditions facing emission equipment suppliers. In the face of more stringent PM 2.5 standards, the cement industry would likely be mandated to install even more PM capture equipment on top of the vast number of baghouses already covering nearly every source at cement plants. This equipment would likely need to be in-place relatively quickly. However, there are a limited number of emission capture equipment suppliers. Demand for their services from the cement industry would likely increase dramatically. A premium will likely be placed on the urgent need to install the systems over a short period of time. The likely outcome would be an escalation in the costs of these systems. A 10% to 20% premium over existing costs is possible. PCA assumes a 15% increase over the survey information. With high running inflation, labor shortages, and raw material scarcity, this markup is probably conservative.

There is still a great deal of unknown as to what Reasonably Available Control Technology (RACT) requirements would look like under a lower standard. There will be regional variations according to each SIP. Some counties currently in nonattainment for PM could still add requirements to their SIP for a variety of reasons like being moved from a marginal to serious classification. The cost of these plants' upgrades would be significant but represent less of a capital burden than plants moving from attainment to nonattainment areas. This consideration is factored into PCA's cost estimates.

Attempting to further mitigate PM 2.5 at cement plants could involve complete baghouse swaps, hopper modifications and upgrades to filter bags. However, many of these controls are already in existence at cement plants. In general, filter bags are more expensive when trying to meet lower standards as is the cleaning cycle more frequent, meaning bags must be replaced at a faster rate. It remains uncertain, however, if bags that could achieve lower PM 2.5 levels even exist. Cement plants are already heavily regulated for PM 2.5 through NESHAP, with bags required to meet extremely low levels. Baghouse manufacturers may become uncomfortable guaranteeing such levels in a contract. Thus, it is dubious as to whether there would even be a supply of such baghouses to attempt to meet a lower standard.

Plants that move from attainment to nonattainment may also have to upgrade or install high-efficiency cyclones, wet scrubbers, and spray bars. Additionally, SIPs may require control measures for material storage piles including domes for raw materials like limestone, as well as for certain process and conveying equipment. These particular measures would have occupational health and safety (OHS) implications. Housing certain transfer points would expose workers who enter that structure to highly concentrated dust. This OHS concern may require further mitigation through personal protective equipment (PPE).

Installation of these technologies is expected to result in a serious financial burden to plants whose attainment status changes. In PCA's control technologies survey, the estimated cost associated with baghouse upgrades such as insulation, bag type or material used changes, or expansion of baghouse capacity ranged from around \$600,000 to \$2.9 million depending on the scope of the changes required. PCA estimates the average capital expense for plant baghouse upgrades is \$1.9 million, with an annual operating expense of \$550,000. Material control measures such as domes total from the hundreds of thousands of dollars to several million dollars depending on the size of the plant. Other control measures represent sophisticated technology that may not currently be at the plant. PCA estimates average per-plant other non-baghouse-related costs to be \$1.4 million with associated annual operating costs of \$400,000.

It is possible that certain SIPs may dictate that plants convert utility dust collection to membrane collection, requiring membrane bag installation throughout the plant. Cost estimates for this range from \$575,000 to \$1.6 million. PCA calculates the average cost for a plant to be \$1.1 million with an average annual operating expenditure of \$400,000. There is also the potential that on-site trucks could face regulation for PM. This could come in the form of membrane-based bags on truck exhaust systems. Retrofitting a fleet of a dozen trucks with this technology would total around \$100,000 and could be far higher if plants were to purchase new trucks with this system already installed.

The PM 2.5 standard applies to both filterable and condensable particulate matter. Control measures to reduce condensable PM may be the same as existing controls aimed at decreasing SO<sub>2</sub> or new controls entirely. While plants generally have SO<sub>2</sub> well controlled through existing regulatory and permitting requirements, if SIPs place a focus on condensable PM controls, it is possible plants would have to install things like hydrated lime systems, control measures for potential short-duration, infrequent SO<sub>2</sub> spikes. Further, ammonia hydroxide could be used to reduce the effects of a detached plume. In terms of costs, controls for condensable PM reflect the largest risk to estimate. If new control measures are required, it could easily total tens of millions of dollars at a single plant.

For the most part, the aforementioned controls are aimed at point emissions. Plants would also have to address fugitive dust emissions. Depending on RACT requirements, this could be particularly onerous and could encompass dust collector performance requirements on material storage silos, rumble grates and wheel washers, lower opacity limitations, unpaved roads and parking lot requirements and restrictions, additional controls during high wind events, materials moisture standards, and testing requirements for production and stockpiled materials. For cost context, a street sweeper, wheel washer,

paving a quarter mile worth of road, and moisture testing are estimated to collectively cost approximately \$1 million. The general survey consensus for ongoing annual costs was around \$70,000. It is worth noting that not all these controls can be implemented everywhere. Access to the quantity of water necessary for wheel washers or spraying piles does not exist everywhere or is rationed in areas during extreme drought conditions; a condition that we're experiencing more and more recently. Furthermore, not all these controls can be operated during certain times of the year, like a wheel washer using water in the winter. Increasing moisture contents of certain materials is detrimental to processing that material or increases the amount of drying that must occur in the process, which may result in unintended adverse consequences like increased fuel combustion and carbon dioxide (CO2) emissions.

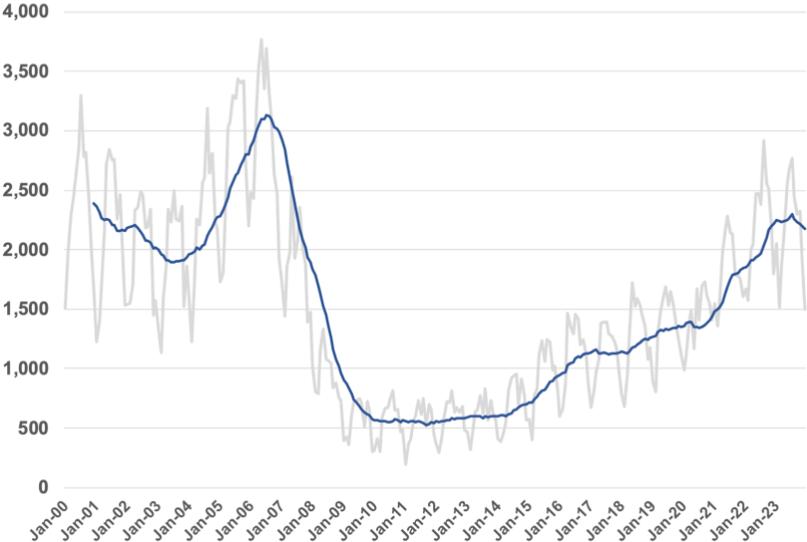
PCA recognizes that not every plant will have to install every single technology listed. Reasonable assumptions must be made. In total, it is estimated that increased control technologies will cost the average plant \$5.6 million in capital expenses and \$1.8 million in annual operating-related expenses.

**Effect on Domestic Cement Capacity & Industry Investment**

The United States cement industry is comprised of 23 companies operating 88 plants and four grinding facilities with a clinker capacity of 96.9 million metric tons (mmt) and a grinding capacity of 115 mmt. In 2022, the U.S. consumed 110.8 mmt of cement. While higher mortgage rates have resulted in declines in residential construction, the recently passed Infrastructure Investment and Jobs Act (IIJA) represents \$550 billion in new public construction spending. Construction projects associated with IIJA are expected to begin in earnest in 2024 and add tens of millions of tons of increased cement consumption over its five-year life and beyond.

Cement plants' theoretical maximum sustained utilization rate is assumed to be 90%, given the need for planned shutdowns for maintenance and repair. To meet the supply gap between domestic production capabilities and cement consumption, the U.S. cement market relies on imports. Cement imports finished 2023 with 26.9 mmt entering U.S. ports to meet demand in the year.

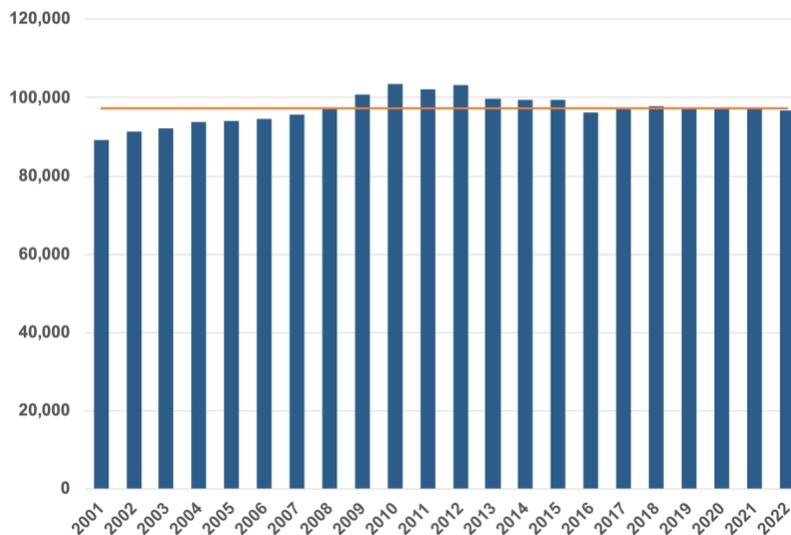
**Cement Imports into the United States**  
000 Metric Tons; Monthly



Recent years have been characterized by tight cement supply conditions. The cement industry is not immune to the supply chain disruptions that have plagued the general economy and are the result of strong cement demand, in some cases lingering disruptions associated with the coronavirus pandemic

and logistic hindrances. Aside from recent years, the U.S.'s clinker production capacity has remained largely unchanged over the past 20 years. The last two greenfield plants built in the U.S. occurred in 2009-2010. Over the last 20 years, 25 plants (including 4 grinding facilities) have closed. Most of the closures have occurred since stringent environmental regulations were imposed on the industry through the introduction of NESHAP regulations; 21 plants have closed since September 2008. While kiln size has grown over the past several decades and the plants that have been retired over the past 20 years tend to be smaller, domestic clinker production capacity has decreased from its high of 103.6 mmt in 2010 to 96.9 mmt today.

**United States' Annual Clinker Capacity**  
Thousands of Metric Tons



Large multinational companies own the overwhelming majority of U.S. cement manufacturers. Within a multinational company each geographic region, such as the U.S., competes for scarce corporate investment dollars (keep in mind, expanding cement production capacity is extremely expensive – a two million metric ton plant now costs close to a billion dollars, if not more). The rate of return on investment for new clinker production capacity in the U.S. is compared against returns in other countries. An uncertain regulatory environment could reduce expected returns on investments in the U.S. and contribute to corporate decisions to take a wait-and-see approach before making further investments. Moreover, investments of this magnitude are determined well in advance. It often takes great time and effort to dedicate funding for U.S. projects. If the U.S. regulatory structure becomes less certain, it is easy for these firms to redirect resources to other parts of the globe.

In order for the U.S. cement industry to meet the needs of projected future consumption levels, expansion of its current production capacity may be required. Continuing to fill the domestic supply gap with imports leaves the U.S. vulnerable to economic conditions outside its control.

The vast majority of cement is consumed in urban metro regions. Many of the areas that fall into nonattainment under a 9 µg/m<sup>3</sup> standard are among the fastest growing population centers in the country – implying less ability for local sourcing.

Increased production capacity brought online in areas that change from attainment to nonattainment would be stunted by a lack of new permitting. The EPA requires all new source review (NSR) permitting to include the lowest achievable emission rate (LAER), emission offsets, and the opportunity for public involvement. In many jurisdictions, there are little or no bankable emission offset credits available. With counties' ability to issue permits restricted, existing facilities may have to be shuttered in order for new ones to be built. PCA assumes no new production capacity will materialize in areas that fall into nonattainment.

None of this will help ease the supply tightness currently facing the U.S. cement market. Quite the opposite. Compliance costs averaging \$5.6 million per plant would disincentivize capacity expansions and greenfields, even if permitting allows for it. Even worse, lowering the PM 2.5 standard could result in plant closures. Some plants, many of which are designed to supply a tight market in close proximity to the plant, may deem the compliance investment required not justified on a financial basis if they must comply with more stringent SIPs. If some plants do indeed close, cement will need to be transported into the affected areas. This will result in more truck vehicle miles traveled, meaning more PM 2.5 emissions generated from vehicles and roadways. Furthermore, imports will be more heavily relied upon in the event of plant closures. An increase in ships sitting offshore and unloading of cement in ports would increase fine particle emissions in coastal communities, many of which would be in nonattainment areas under the new proposed standards.

Cement manufacturing jobs are highly technical and well-paying, with an average wage of \$97,790 per year. Approximately 6,212 people work at cement plants in counties that would be encompassed in nonattainment areas or at risk of it under a 9 µg/m<sup>3</sup> standard. Hiring a worker translates to hiring a taxpayer. Plant workers eat at restaurants and shop at stores in the surrounding area – further multiplying their economic impact and contributions to local taxes. Cement plants themselves contribute significantly to the local and state tax base.

Disincentivizing investment in domestic manufacturing through expensive compliance costs, permitting red tape, and creating greater uncertainty at a time of global supply chain unease would be counterproductive. Filling supply gaps through an increased reliance on imports runs counter to the spirit of Buy American and the Administration's goal of bolstering the U.S. manufacturing sector.

It is not just simply the compliance and ongoing operating expenses that represent costs. The potential for closed plants/lost jobs and ensuing lost tax revenue, the opportunity cost of forgoing expanded domestic production and its multiplier effect, and the potential increased cost to construction itself is real and represent cost. All these costs must be considered when performing a cost-benefit analysis of the new standard.

## **Costs vs. Benefits of a Lower Standard**

The benefits of lower concentrations of fine particulate matter include less incidence of heart attacks, respiratory conditions, and asthma exacerbations, as well as a lower premature mortality rate. The monetary benefits of lower hospital admissions, doctor and emergency room visits, savings on medication, and less frequent work absences associated with lower levels of PM 2.5 can be quantified. In 2021, the EPA quantified estimated per-ton benefits of reducing direct PM 2.5 emissions as well as precursor emissions by emitting sector. While the methodology to reach these estimates is questionable, for the moment they will be taken at face value. For cement kilns, the EPA calculates that every ton of PM 2.5 reduced results in a benefit of \$157,000.

For the purposes of this analysis, PCA assumes roughly 50% of the cement plant capacity in at-risk counties would end up in designated nonattainment areas. If all assumed impacted plants in nonattainment areas were able to reduce their PM 2.5 through the various control technologies by 25% – an ambitious number – that would translate to 405.1 tons of reduced PM 2.5 under a 9 µg/m<sup>3</sup> standard.

Using the EPA's benefit estimation for the cement industry, this would yield \$63.6 million in monetized benefits at a 9 µg/m<sup>3</sup> standard. It's important to note that this use of the EPA's monetary benefit for reducing PM 2.5 is specific to cement kilns. It's unclear if fugitive dust controls contain the same level of benefits as PM reduced at the kiln. Based on a literature review, it is likely not the case. Furthermore, the benefits EPA estimates of reducing precursor emissions like SO<sub>2</sub>, NO<sub>x</sub>, and NH<sub>3</sub> are an order of magnitude less than direct PM 2.5 emissions. If some reduction in these secondary emissions through certain control technologies as part of the emissions abatement mix is assumed, the monetized benefits would be overstated. Both these phenomena imply that the monetized benefits of using strictly direct PM 2.5 emissions from cement kilns are overstated for the cement industry as a whole. PCA estimates the monetized benefits to be closer to \$54 million.

On the cost side, lowering the annual PM 2.5 standard to 9 µg/m<sup>3</sup> is estimated to result in \$171.8 million in capital expenditures and \$54.6 million in additional annual operating expenses for U.S. cement producers. Ongoing operating expenses every year rival the estimated monetary benefits of the reduced PM 2.5 emissions. When accounting for and apportioning the initial capital compliance costs, the level of spending far exceeds the estimated monetized benefits.

It is important to note just how massive these costs for the cement industry would be when viewing them from a dollar spent per ton of PM 2.5 emission reduction basis. Even with apportioning compliance costs over a decade, the expected financial burden imposed on the cement industry would be approximately eight times greater than the \$2.5 billion spent annually on wildfire mitigation and prevention under a 9 µg/m<sup>3</sup> standard on a per-ton of PM 2.5 basis. Even this is not a fair representation because these costs for the cement industry reflect *additional* expenses under stricter standards. The industry has already spent and continues to spend extensively on PM control technologies. This implies much more PM 2.5 emission reduction potential through increased spending on wildfire mitigation both on a total ton basis and getting the most out of scarce financial resources.

None of this includes the opportunity costs of decreased industry investment, or the threat of plants closing. A mere 5% decline in capacity in nonattainment areas under a 9 µg/m<sup>3</sup> standard reflects \$21 million in annual lost wages.

Over the past 30 years, emissions of fine particulate matter have been reduced very significantly. Given the current composition of PM 2.5 emissions, with industrial processes only responsible for 5.2% of total PM 2.5 emissions, and natural causes comprising such a substantial share, it is unlikely the same rate of reduction will be mirrored in the future.

During the same reporting period, PM 2.5 emitted from Siskiyou County, CA fires alone generated nearly 18 times the amount of total PM 2.5 emissions generated from the entire U.S. cement industry. A single wildfire event could wipe out all the gains made by the cement industry. This does not mean the U.S. shouldn't take appropriate steps to mitigate PM emissions. The cement industry is already heavily regulated for PM by NESHAP. Incremental reductions in PM 2.5 emissions from an already low base will face diminished returns. The costs, however, are real and would result in a less robust domestic manufacturing base.



January 12, 2024

Mr. Jeffrey Zients  
Chief of Staff  
The White House  
1600 Pennsylvania Avenue, NW  
Washington, DC 20500

Dear Mr. Zients:

The U.S. Chamber of Commerce supports maintaining the existing standards for fine particulate matter under the National Ambient Air Quality Standards (NAAQS). EPA is considering discretionary action to lower standards which would lead to permitting gridlock that will hinder our ability to build new infrastructure, expand manufacturing, and grow our economy. In addition, EPA's proposal lacks transparency and lacks adequate factual analysis, as it has dramatically underestimated the impact of tighter standards by only partially estimating the geographic extent and costs of tightening the standards.

Our objections to EPA's proposed rule can be summarized by four major points of immense practical significance. A more detailed discussion of each follows:

- **EPA underestimated the number of counties that would not meet tighter standards ("nonattainment counties") by as much as 700 counties. EPA did so by counting only the counties that have PM<sub>2.5</sub> air monitors. That omission is nonsensical as many counties adjacent to counties with monitors would also violate tighter standards.**
- **43 percent of total particulate emissions are caused by fires—the largest single source of emissions. The NAAQS is the wrong tool to address this problem – and, worse, is a distraction from the right tools. The administration should focus on controlling fires, instead of imposing punitive permitting regulations that will smother infrastructure and manufacturing investments.**
- **EPA erroneously suggests that tighter PM standards would have no impacts in areas that meet those standards ("attainment areas"). But lower standards will use up available compliance "headroom" even for attainment areas – which will stifle economic growth.**
- **EPA failed to identify cost effective and technologically achievable pathways for complying with tighter standards as the agency only analyzed the costs of partial compliance. EPA arbitrarily capped its estimates of costs at \$167,000/ton of emissions reductions. But this cap doesn't reflect reality, it simply ignores the even *more* costly emissions control strategies that are needed to attain tighter standards.**

Each of these points is fundamental because it is essential that before taking action, EPA analyze and consider the full range of direct and indirect economic impacts that would result from more stringent NAAQS requirements. Overly stringent NAAQS will adversely affect jobs, business investment, and permitting in a broad range of important economic sectors and activities, *including* in areas of the country that are in attainment with the standards.

First, EPA underestimated the number of counties that would not meet tighter standards (“nonattainment counties”) by as much as 700 counties. EPA did so by counting only the counties that have PM<sub>2.5</sub> air monitors. That omission is nonsensical as many counties adjacent to counties with monitors would also violate tighter standards. EPA’s proposed rule estimate of counties that would be in violation of revised standards is more than 700, 500, 200, and 60 counties fewer at 8 µg/m<sup>3</sup>, 9 µg/m<sup>3</sup>, 10 µg/m<sup>3</sup>, and 11 µg/m<sup>3</sup> than what would actually violate the standards at each of those respective standard levels. Historically, EPA has designated many counties adjacent to those counties with air monitors as being in violation of the standards, based on the agency’s five-factor guidance that considers air quality, emission sources, vehicle miles traveled, topography, and local meteorology.

Large urban and adjacent areas would be in nonattainment, as opposed to just the counties with monitors disclosed in EPA’s proposed rule. Figure 1 and Figure 2 below compare EPA’s proposed rule nonattainment projections to those found in the U.S. Chamber of Commerce’s recent report.<sup>1</sup> As air emissions do not stop at monitored county borders, it is easy to see how expansive the number of counties in violation could be simply by considering air quality beyond the monitored counties. The projections for areas in nonattainment are represented in green for Figure 1 and dark red in Figure 2. For Figure 2, the light red areas are projected to meet the standards, but would also experience permitting restrictions as tighter standards would leave very little margin or “headroom” for economic growth as explained further below.

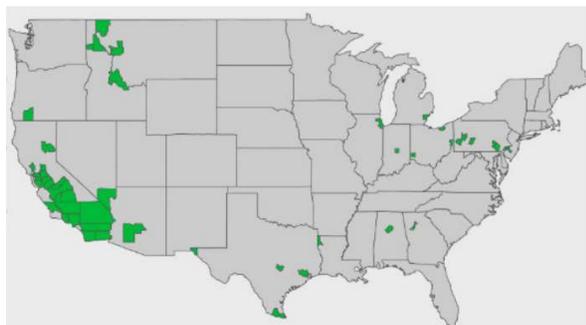


Figure 1. EPA nonattainment projection (9 µg/m<sup>3</sup> 51 nonattainment counties, green) <sup>2</sup>

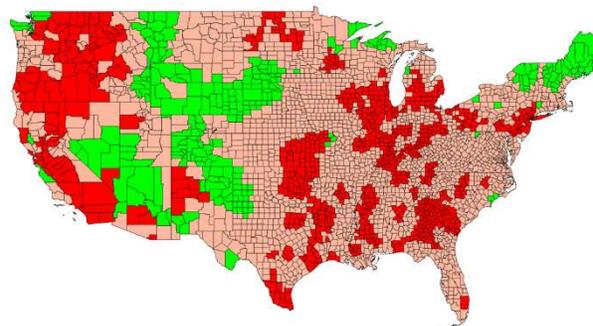


Figure 2. Chamber nonattainment projection (9 µg/m<sup>3</sup>, 569 nonattainment counties, red)

Going deeper, here are a few states where EPA failed to quantify the full impacts of permitting gridlock were the agency to tighten the standards down to 9 µg/m<sup>3</sup>.

- **Georgia:** 72 counties would be out of attainment, including all 29 counties in the core-based statistical area (CBSA) surrounding Atlanta.
- **Ohio:** 34 counties would be out of attainment, including all of the counties in the Cincinnati, Cleveland, Columbus, Dayton, Canton, Toledo, and Youngstown CBSAs.
- **Pennsylvania:** 25 counties would be out of attainment, including all 18 CBSA counties around Altoona, Allentown, Gettysburg, Harrisburg, Philadelphia, Pittsburgh, and York.

<sup>1</sup> Chamber of Commerce, November 9, 2023, <https://www.uschamber.com/energy/new-chamber-report-epas-proposed-air-quality-standards-will-cause-permitting-gridlock-across-our-economy>.

<sup>2</sup> U.S. Environmental Protection Agency, “Regulatory Impact Analysis for the Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter,” December 2022, [https://www.epa.gov/system/files/documents/2023-01/naaqs-pm\\_ria\\_proposed\\_2022-12.pdf](https://www.epa.gov/system/files/documents/2023-01/naaqs-pm_ria_proposed_2022-12.pdf).

- **Michigan:** 20 counties would be out of attainment, including all of the counties in the Detroit, Grand Rapids, Lansing, and Kalamazoo CBSAs.
- **North Carolina:** 15 counties would be out of attainment, including all of the counties in the Charlotte, Raleigh, and Winston-Salem CBSAs.
- **Wisconsin:** 14 counties would be out of attainment, including all of the counties in the Appleton, Platteville, Madison, and Milwaukee CBSAs.
- **New Mexico:** 4 counties would be out of attainment, including all of the counties in the Albuquerque CBSA.
- **Arizona:** 3 counties would be out of attainment, including all counties in the Phoenix, Nogales, Mesa, and Scottsdale CBSAs.

EPA's proposed rule consistently underestimates nonattainment areas for each of the standard levels (e.g. 8 ug/m<sup>3</sup>, 9 ug/m<sup>3</sup>, 10 ug/m<sup>3</sup>, 11 ug/m<sup>3</sup>), in addition to what is detailed above for standards at 9 µg/m<sup>3</sup>.

EPA made similar underestimations in the 2015 ozone NAAQS rulemaking, where the agency claimed only 14 counties<sup>3</sup> outside of California would be in nonattainment in 2025. But, with less than a year until we reach 2025, there are more than 143 counties<sup>4</sup> outside of California that are in nonattainment—an order of magnitude more than what EPA projected in their ozone rulemaking analysis.

**Second, 43 percent of total particulate emissions are caused by fires—the largest single source of emissions. The NAAQS is the wrong tool to address this problem – and, worse, is a distraction from the right tools. The administration should focus on controlling fires, instead of imposing punitive permitting regulations that will smother infrastructure and manufacturing investments.** The record 2023 wildfire season is estimated to incrementally increase the number of nonattainment areas by as much as 50 percent by simply updating the emissions data from years 2019-2020-2021 that EPA applied in their proposed rule to the more recent ambient emissions data from 2021-2022-2023.

EPA has established a process that allows states to request certain high emissions events like wildfires to be excluded when determining whether a state is violating the standards. But, the statute states that these exemptions can only be for emissions events that are “reasonably controllable or preventable.”<sup>5</sup> It is uncertain whether these exemptions could be applied to prescribed fires, an important tool to control more severe emissions from wildfires, as indicated by a California delegation of U.S. Senators and Representatives who explained that EPA’s exemption “process is unworkable for the scale of prescribed fire that will be necessary to protect our communities from increasingly catastrophic wildfires.”<sup>6</sup>

The costs that would be incurred by state governments who wish to use the exemption process is high and EPA’s ultimate approval uncertain. Because of the high costs and staff time involved in submissions, nearly 75 percent of fire emissions are not excluded, leading to

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<sup>3</sup> U.S. Environmental Protection Agency, 2015 Final Air Quality Standards for Ground-Level Ozone, “By the Numbers,” [https://www.epa.gov/sites/default/files/2015-10/documents/20151001\\_bynumbers.pdf](https://www.epa.gov/sites/default/files/2015-10/documents/20151001_bynumbers.pdf).

<sup>4</sup> U.S. Environmental Protection Agency, Green Book, 8-hour Ozone (2015) Nonattainment Area Summary, <https://www3.epa.gov/airquality/greenbook/jsum.html>.

<sup>5</sup> Clean Air Act Section 319(b)(1)(A)

<sup>6</sup> Letter from U.S. Senators and Representatives from California to EPA on Prescribed Fires, June 13, 2023, [https://insideepa.com/sites/insideepa.com/files/documents/2023/jun/epa2023\\_1088.pdf](https://insideepa.com/sites/insideepa.com/files/documents/2023/jun/epa2023_1088.pdf)

an increase in the number of nonattainment areas. In 2021, while there were close to 4,200 emissions events influenced by fires, only 26 percent were actually submitted to EPA for exemption.<sup>7</sup> One state air office indicated it cost between \$15,000-\$20,000 for each submission to EPA. This state spent \$750,000 and staff devoted 7,500 hours of effort, only to have EPA approve just 20 of 60 submitted exemption requests.<sup>8</sup>

**Third, EPA erroneously suggests that tighter PM standards would have no impacts in areas that meet those standards (“attainment areas”). But lower standards will use up available compliance “headroom” even for attainment areas – which will stifle economic growth.** Current tools to address NAAQS are being pushed to their limits, as ambient air standards are moved closer to background concentrations of criteria pollutants. With industrial and power sector emissions continuing to drop, emissions from fires, road dust, and other non-point sources are now the predominant source of fine particulate emissions. If EPA were to lower the particulate matter NAAQS, it would shrink the margin between background concentrations and the standards, leaving little space for economic growth as increasingly higher compliance costs would be coupled with incrementally smaller emissions headroom (that is, the gap between current PM levels in the air and the standard, which is the space within which new projects can receive permits for construction and operation that allow emissions that do not push a county’s PM levels into nonattainment).

As shown in Figure 2 above, large swaths of the country highlighted in light red would be on the margins of being in violation of the standards. While a permitting process for new industrial and power sector facilities in these light red areas of the map would be expected, a tighter NAAQS increases the challenges for these businesses to demonstrate that any new or expanded facilities would not bump those areas into nonattainment.

Recent Congressional testimony highlights how new facilities from steel, power, cement, brick, paper, and others need sufficient emissions headroom to accommodate EPA’s conservative modeling approach even with the best available emissions controls installed.<sup>9</sup> Not only would conventional manufacturers bump into the lower air quality ceiling, but other manufacturers spurred by renewable energy investments may face the same challenges. For example, the CS Wind facility that the President visited<sup>10</sup> in October 2023, which would create 800 jobs due in part to Inflation Reduction Act incentives, would contribute as much as a 1.9  $\mu\text{g}/\text{m}^3$  increase in fine particulate emissions based on EPA’s modeling.<sup>11</sup> The CS Wind and other manufacturing facilities would be able to build only in increasingly limited geographical areas if EPA tightens the standards. The lower the standards, the more costly and prohibitive

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<sup>7</sup> EO 12866 Interagency Review Comments, September 9, 2022, <https://www.regulations.gov/document/EPA-HQ-OAR-2015-0072-1618>.

<sup>8</sup> Particulate Matter NAAQS: Perspectives and Challenges – Arizona, September 27, 2023, [https://cleanairact.org/wp-content/uploads/2023/09/19\\_Brad-Busby-ADEQ-AAPCA-2023-Fall-Meeting-PM-Challenges\\_Final.pdf](https://cleanairact.org/wp-content/uploads/2023/09/19_Brad-Busby-ADEQ-AAPCA-2023-Fall-Meeting-PM-Challenges_Final.pdf).

<sup>9</sup> Testimony of Timothy Hunt, American Forest & Paper Association, September 19, 2023, [https://d1dth6e84htgma.cloudfront.net/09\\_19\\_23\\_ENV\\_Testimony\\_Hunt\\_4b415cf010.pdf](https://d1dth6e84htgma.cloudfront.net/09_19_23_ENV_Testimony_Hunt_4b415cf010.pdf), page 26.

<sup>10</sup> President Biden to Visit Largest Wind Tower Manufacturer in the World, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/16/president-biden-to-visit-largest-wind-tower-manufacturer-in-the-world-highlight-how-bidenomics-is-driving-record-investments-in-congresswoman-lauren-boeberts-district/>.

<sup>11</sup> CS Wind Air Permit Application to Colorado Department of Public Health & Environment, Table 5.6, <https://oitco.hylandcloud.com/CDPHERMPublicAccess/api/Document/ACOK2DliwoPEaWLhCMdrN9JBTetdS3t9IAzfLcNgbWDNaSg%C3%81vmCRBpu%C3%81aMB8cFhMx6Kfi04I9oM3IOVIBfA6Z8o%3D/>.

permitting would become. The potential for added costs for these permits or the opportunity costs of a manufacturing facility not being built were not considered in the EPA proposed rule.

**Fourth, EPA failed to identify cost effective and technologically achievable pathways for complying with tighter standards as the agency only analyzed the costs of partial compliance. EPA arbitrarily capped its estimates of costs at \$167,000/ton of emissions reductions. But this cap doesn't reflect reality, it simply ignores the even *more* costly emissions control strategies that are needed to attain tighter standards.** The agency stated that “[t]he estimated PM2.5 emissions reductions from these control applications do not fully account for all the emissions reductions needed to reach the proposed and more stringent alternative standard levels in some counties in the northeast, southeast, west, and California.”<sup>12</sup> Importantly, lack of identification of all control pathways means that the proposal underestimates regulatory costs and also raises the serious possibility that the only path to compliance in some areas will be closure of existing manufacturing and industrial facilities.

## Conclusion

In 2011, the White House Office of Management and Budget (OMB) returned a similarly damaging and unnecessary draft NAAQS rule to the EPA Administrator. Acknowledging the potential negative economic effects of tighter NAAQS standards, OMB returned EPA's draft 2011 ozone NAAQS final rule to the Administrator to consider, among other things, the policy directive of EO 13563 “to minimize regulatory costs and burdens.”<sup>13</sup> OMB should take the same step in this case.

Sincerely,



Neil L. Bradley  
Executive Vice President, Chief Policy Officer,  
and Head of Strategic Advocacy  
U.S. Chamber of Commerce

cc: Lael Brainard, Director of the National Economic Council  
John Podesta, Counselor to the President  
Michael Regan, Administrator, U.S. Environmental Protection Agency  
Steve Ricchetti, Counselor to the President  
Gene Sperling, Counselor to the President  
Ali Zaidi, National Climate Advisor

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<sup>12</sup> U.S. EPA, “Regulatory Impact Analysis”, ES-4.

<sup>13</sup> Office of Management and Budget, Letter to the Environmental Protection Agency on “Reconsideration of the 2008 Ozone Primary and Secondary National Ambient Air Quality Standards,” [https://www.reginfo.gov/public/return/EPA\\_Return\\_Letter\\_9-2-2011.pdf](https://www.reginfo.gov/public/return/EPA_Return_Letter_9-2-2011.pdf).



Submitted via [www.regulations.gov](http://www.regulations.gov)

February 14, 2024

House Committee on Energy and Commerce  
Environmental, Manufacturing, and Critical Materials Subcommittee  
2125 House Rayburn Office Building  
Washington, DC 20515

**RE: Environment, Manufacturing, and Critical Materials Subcommittee hearing titled “Safeguarding Jobs and the Economy: Legislation to End EPA’s Attack on American Manufacturing.”**

Dear Sir or Madam:

The Aluminum Association appreciates the opportunity to provide comment on the Environment, Manufacturing, and Critical Materials Subcommittee hearing titled “Safeguarding Jobs and the Economy: Legislation to End EPA’s Attack on American Manufacturing” to be held on February 15, 2024.

The Aluminum Association (the “Association”), based in Arlington, VA, is the voice of the aluminum industry in the United States, representing aluminum producing companies and their employees that span the entire aluminum value chain from primary production to fabricated aluminum products to recycling, as well as suppliers to the industry. The Association is charged with developing global standards, business intelligence, sustainability research, policy positions, and industry expertise for its member companies, policymakers, and the public. Altogether, Association member companies produce over 70 percent of the aluminum and aluminum products shipped in North America. The U.S. aluminum industry across the value chain directly employs more than 164,000 union and non-union workers and indirectly supports an additional 470,000 workers. Through its activity, the economic impact of the U.S. aluminum industry adds \$176 billion to the economy annually.

On February 7, 2024, EPA Administrator Michael Regan signed the final rule for “Reconsideration of the National Ambient Air Quality Standards for Particulate Matter”, lowering the PM2.5 NAAQS to an annual standard of 9 µg/m<sup>3</sup> from 12 µg/m<sup>3</sup>. The final rule reverses the 2020 decision by the Trump Administration EPA to retain the PM2.5 standard at its existing level. This reconsideration was completed two years before the statutorily required review of the PM2.5 NAAQS. The new 9.0 standard will go into effect 60 days following the Administrator’s signing and EPA is directing state agencies to submit their nonattainment designations by February 7, 2025.

EPA’s decision is problematic. The new standard will place an unprecedented amount of U.S. counties into nonattainment, requiring new projects and potentially existing sources to find ways to offset emissions through costly control technologies or reduced investments. The rule has severe economic consequences in areas that meet the standard as well. During the permitting of a new facility, the permitter must model the increased emissions concentration from the project to ensure that the area remains in attainment. Typically, modeling 1-3 µg/m<sup>3</sup> below the standard, referred to as “headroom”, is

required to show that a new project will not bring an area into nonattainment. This final rule limits areas with sufficient modeling headroom by bringing the country closer to background PM<sub>2.5</sub> concentrations, which include largely unregulated and uncontrollable particulate matter from prescribed burns or wildfires, agricultural and crop dust, and roadway dust. As a result, areas with a PM<sub>2.5</sub> concentration as low as 6 µg/m<sup>3</sup> could lack sufficient headroom to be able to permit new projects. According to EPA, the average background concentration in the U.S. is 8.5 µg/m<sup>3</sup>. The tightened standard and gap from background concentration would result in upwards of 40% of the U.S. population being placed in areas of nonattainment and 75% of U.S. counties not having enough headroom to permit new projects.

The economic consequences on the U.S. manufacturing sector because of this rule could be dire. The National Association of Manufacturers projects that the rule could cost \$200 billion in emission controls and lost investments, and result in a loss of over one million jobs. According to the Aluminum Association's projections, if the 9.0 µg/m<sup>3</sup> standard were to have been implemented during the 2020 PM<sub>2.5</sub> NAAQS review, over \$5.5 billion of investments and 2,430 jobs from aluminum industry growth projects would have been lost. Additionally, future projects announced in response to recent congressional and administration investments from the CHIPS and Science Act, Bipartisan Infrastructure Law, and Inflation Reduction Act could be cancelled or impossible to permit without adequate headroom or being in attainment. While EPA minimizes these economic impacts in stating that NAAQS can only consider human health impacts, this rule was a discretionary reconsideration two years in advance of the NAAQS statutory schedule. As such, it would be appropriate for Congress to include these economic costs and impacts in their decision making, since the human health-based NAAQS revision schedule did not instigate EPA action and could have been avoided entirely.

This rulemaking will result in the offshoring of jobs and investments to countries with less stringent PM standards. Even before the final rule, U.S. industry set the global standard for progressing to cleaner air in its communities. Since 2000, U.S. industry has reduced its PM<sub>2.5</sub> emissions by 42%. The remaining 9% of PM<sub>2.5</sub> from industry is dwarfed by the 84% of PM<sub>2.5</sub> from background sources. In comparison, the current EU PM<sub>2.5</sub> concentration standard is 25 µg/m<sup>3</sup> and is not projected to be lowered to 10 µg/m<sup>3</sup> until 2030, still 1 µg/m<sup>3</sup> above the recently established U.S. threshold.

To reduce the burden of the new standard and to continue the growth of U.S. manufacturing, the Aluminum Association encourages the Environment, Manufacturing, and Critical Materials Subcommittee to include the following in potential PM<sub>2.5</sub> NAAQS Legislation:

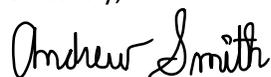
- Establish a two or three-year effective date for the 2024 PM<sub>2.5</sub> Revisions: A two to three-year effective date would address the significant implementation issues faced by state air agencies and allow EPA to complete its ongoing implementation-related improvement efforts. This includes correcting the Federal Equivalent Methods/Federal Reference Methods bias and other inaccuracies as mentioned below, possibly recovering up to 2 µg/m<sup>3</sup> of modeled PM<sub>2.5</sub> concentration.
- Establish an additional year for the deadline of state nonattainment designations for the 2024 PM<sub>2.5</sub> Revisions: Allowing states an additional year to designate what areas are in nonattainment would address implementation issues arising from the rule and allow states to integrate EPA implementation-related improvements.
- Establish a process to remove Exceptional Events (EE) from monitoring and modeling: EE events are unusual or natural occurrences with uncontrollable PM<sub>2.5</sub> emissions that result in higher-

than-normal background concentration levels. The process to categorize and exclude these occurrences and their emissions is cumbersome and inaccessible, resulting in artificially high background concentrations in air modeling and monitoring. The Association encourages PM2.5 NAAQS legislation to create a streamlined or self-implementing removal process of EE events from nonattainment monitoring and ambient air background calculations. Prescribed burns should be considered EE events as they are used to prevent the EE event of wildfires.

- Move facility ambient air modeling to a location of sustained human contact: In the current air permitting process for new and existing sources, ambient air quality is modeled at a site's fenceline. However, human exposure within a facility's fenceline is limited and brief. Instead, ambient air for a facility should be modeled at the closest location to sustained human contact, such as a school, workplace, or residential area, to accurately permit controls based on human health risk. Road and railways should not be considered as a location of sustained human exposure.
- Direct EPA to establish and update a list of all available permit modeling tools and one-off fixes: There are a variety of EPA approved permit modeling tools for states and regional EPA offices to utilize to provide accuracy and flexibility in determining ambient air concentrations. To encourage the use of these tools, the EPA should create an ongoing database containing all approved permit modeling tools for modelers to access.
- Direct EPA to adjust SIL level: The Significant Impact Level (SIL) for particulate matter in Prevention of Significant Deterioration (PSD) permits should be adjusted in response to the lower standard and to address the lack of headroom for new projects when those projects do not cause an area to go into nonattainment.
- Place EPA on a schedule for Appendix W revisions and similar permitting reforms: Appendix W, the Guidelines for Air Quality Models, is the primary forum for revising existing and approving new air quality models. The EPA's timeline of revising Appendix W has been inconsistent and insufficient for the demand of higher quality and more targeted air models. The Association recommends that the subcommittee create a statutory schedule for EPA to follow in approving Appendix W revisions. Additionally, the Association recommends language to direct EPA to increase its transparency on the status of alpha/beta options within the model development framework and allow for the approved use of more-developed alpha options as an alternative model on a case-by-case basis, so long as the option demonstrates improved model performance by peer-reviewed science and site-specific model evaluation.

The Association appreciates the opportunity to provide this letter to the Environment, Manufacturing, and Critical Materials Subcommittee as it considers reform to the PM2.5 NAAQS and EPA's final rule. If you have any questions or would like to discuss any of these recommendations in greater detail, please do not hesitate to contact me at 703.358.2985 or [asmith@aluminum.org](mailto:asmith@aluminum.org).

Sincerely,



Andrew Smith  
Regulatory Affairs Manager  
The Aluminum Association



U.S. Chamber of Commerce

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Washington, DC 20062-2000  
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# **EPA's Proposed Air Quality Standards Will Cause Permitting Gridlock Across Our Economy**

*November 2023*

## Topline Summary:

This U.S. Chamber of Commerce report highlights how the Environmental Protection Agency's (EPA) proposed fine particulate matter (PM<sub>2.5</sub>) air quality standards will cause permitting gridlock across our economy. Moreover, the Chamber analysis reveals that the EPA ignored the 2023 wildfires in its proposed rule, as this season's wildfires alone would increase the number of counties impacted by 50%, consequently imposing strict new penalties on American businesses—large and small—and their communities.

From requiring small businesses like restaurants to install costly equipment, homeowners to replace wood fireplaces with natural gas logs, and states to pave unpaved roads, this rule will impact many sectors of our economy. Our report indicates that EPA's discretionary rule would lower PM<sub>2.5</sub> standards to a level that threatens investment in manufacturing and critical infrastructure projects, even those made possible by the Infrastructure Investment and Jobs Act, the Chips and Science Act, and the Inflation Reduction Act.

The new report identifies potential impacts of placing as much as 30% of all counties in permitting gridlock, including:

- Block permitting of new manufacturing facilities and associated good-paying jobs, pushing investment overseas.
- Prevent building roads, bridges, and other infrastructure funded by the bipartisan infrastructure bill to ease congestion.
- Require mitigation from homeowners, restaurants, and small businesses putting burdens on all Americans.
- Place burden on the private sector despite fires being the main PM<sub>2.5</sub> emissions source.

## Background

Earlier this year, the EPA announced its "Reconsideration of the National Ambient Air Quality Standards for Particulate Matter" (Proposed Rule) that would revise the National Ambient Air Quality Standards (NAAQS) for PM<sub>2.5</sub>.<sup>1</sup> The current annual standard is 12.0 µg/m<sup>3</sup>; however, the EPA proposed lowering the standard down to the range of 9.0 to 10.0 µg/m<sup>3</sup> and is considering even stricter limits. Setting the standards is just the first step in the process – as any tightening of the standards requires the EPA to identify the areas, designated as nonattainment areas, whose PM<sub>2.5</sub> levels would be greater than the newly tightened standards.

As part of this first step, not only are the areas of the country identified that do not meet the tighter standards, but nearby areas contributing to those violations would also be identified. EPA would work with states to designate these nonattainment areas within one year of EPA finalizing any new standards and would likely use the air monitoring data through the end of 2023, a high wildfire year, to do so. The

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<sup>1</sup>Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, 88 Fed. Reg. 5558, January 27, 2023.

primary PM<sub>2.5</sub> standard is set based on air quality data from the three most recent years of monitoring data available at the time, which would include 2021, 2022, and 2023.

## **Calculation of Values EPA Would Use to Identify Nonattainment Areas**

To estimate for this report the number of counties in nonattainment with the different PM<sub>2.5</sub> standard levels that EPA proposed, data from air monitors was used to replicate the calculations that states and EPA would be expected to use. Part of this calculation process is to determine the 3-year design value for different areas of the country based on three years of air monitoring data.

To estimate the annual 2023 PM<sub>2.5</sub> design value (data from 2021, 2022, and 2023), observational data through the end of September 2023 was used and supplemented with 2022 calendar year data for dates that have not yet occurred or where missing data was identified. This allows the capture of most wildfire impacts seen in the second (April-June) and third (July-September) quarters of 2023. The monitor-level annual mean values for 2023 were then generated and combined with existing annual mean values from 2021 and 2022, resulting in an estimate for the 3-year design value for 2021-2023. All calculations made were consistent with EPA methods of PM<sub>2.5</sub> design value calculation.<sup>2</sup>

## **Comparing Results Across EPA Regions and Core-Based Statistical Areas (CBSA)**

Once monitor-level annual mean values were calculated for 2023, results were aggregated to the EPA regional level to show the PM<sub>2.5</sub> emissions trends reflective of the recent fire seasons across different parts of the country and internationally. This comparison shows how ambient PM<sub>2.5</sub> levels changed for each of the five years including the design value years (2019-2021) that EPA used in the Proposed Rule and the estimated (2021-2023) design values that would be used for nonattainment designations.

Figure 1 charts the average annual mean PM<sub>2.5</sub> across all monitors within each EPA region across each of the five years referenced above and demonstrates the impact of elevated levels of wildfire smoke on PM<sub>2.5</sub> concentrations in 2023. Across most of the eastern U.S. (EPA Regions 1-8), the relative trends show a significant increase in the annual mean values from 2019 to 2023. This annual increase also yields a higher 3-year design value for most of the country, except for the western U.S. (EPA Regions 9 and 10). In the western U.S., the values decrease compared to 2020, which was a record-breaking year for wildfires in those EPA regions. These higher PM<sub>2.5</sub> observations from the 2023 wildfire season will have profound implications for nonattainment designations if EPA were to finalize a tighter PM<sub>2.5</sub> NAAQS, making it incrementally more stringent. More counties would be designated as nonattainment than what was presented by EPA in the Proposed Rule.

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<sup>2</sup> 40 CFR 50.7

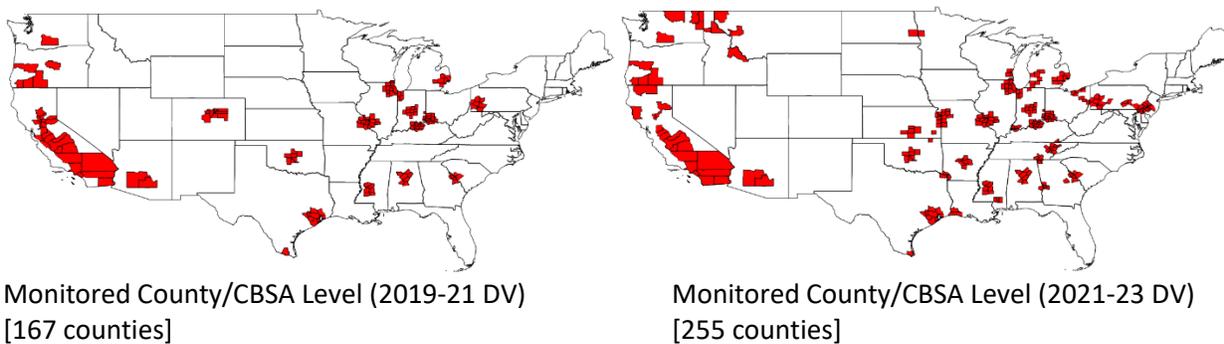
Annual Mean PM-2.5 Values (ug/m3)						
EPA Region	2019	2020	2021	2022	2023	5-Year Trend
1	5.9	6.2	6.7	5.9	6.9 - 7.0	
2	7.1	6.9	7.5	6.7	8.0 - 8.2	
3	7.8	7.1	8.4	7.5	9.0 - 9.2	
4	7.8	7.6	8.4	7.9	8.9 - 9.1	
5	8.2	7.8	8.9	7.9	10.2 - 10.3	
6	8.1	8.2	8.6	8.3	8.7 - 8.8	
7	7.5	7.4	8.5	7.2	8.8 - 9.1	
8	5.2	6.2	7.6	5.9	6.8 - 7.0	
9	6.9	10.7	9.1	7.8	7.1 - 7.3	
10	7.7	10.1	8.3	8.8	8.7 - 9.2	

Used for 2021 DV
Used for 2023 DV

Figure 1. Average annual mean PM<sub>2.5</sub> value trends (µg/m<sup>3</sup>) by EPA Region for 2019-2023.

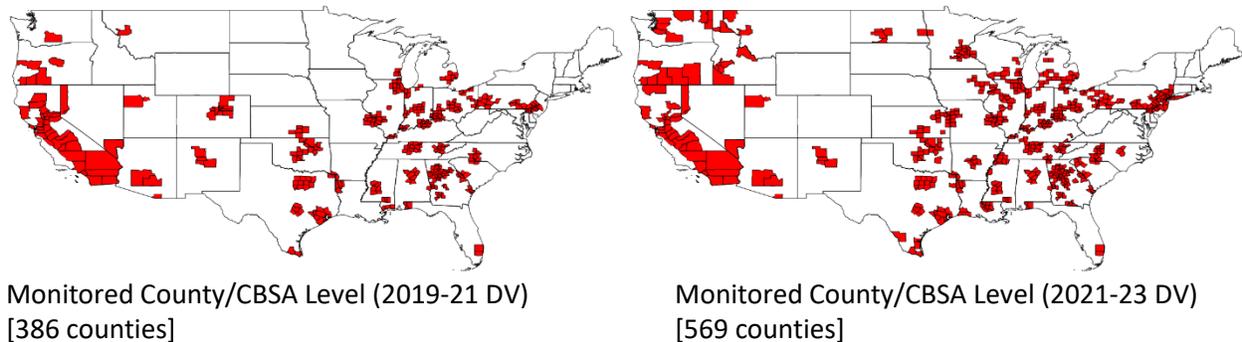
The 2023 wildfire emissions significantly raised the ambient concentrations of PM<sub>2.5</sub>, by as much as 2-3 µg/m<sup>3</sup> throughout most of the country. Looking at just the counties that have ambient monitors, the increase in the number of counties that would be designated as nonattainment can be seen in Figure 2 below.

### Annual PM<sub>2.5</sub> DV > 10.0 µg/m<sup>3</sup>



*Note: If EPA were to lower the annual PM<sub>2.5</sub> NAAQS to levels as low as 9.0 µg/m<sup>3</sup>, the resulting 2023 design values demonstrate that the number of nonattainment counties in the continental U.S. would increase by 183 counties from 386 to 569 counties, which is an increase of 47% compared to the count of nonattainment counties using 2021 design values. If EPA were to lower the annual PM<sub>2.5</sub> NAAQS to levels as low as 10.0 µg/m<sup>3</sup>, the resulting 2023 design values would increase the number of nonattainment areas by 88 counties from 167 to 255 counties, which is an increase of 53%.*

## Annual PM<sub>2.5</sub> DV > 9.0 µg/m<sup>3</sup>



*Figure 2. Nonattainment areas increase by approximately 50% due to the 2023 wildfires*

### Headroom, Permitting, and New Build Challenges

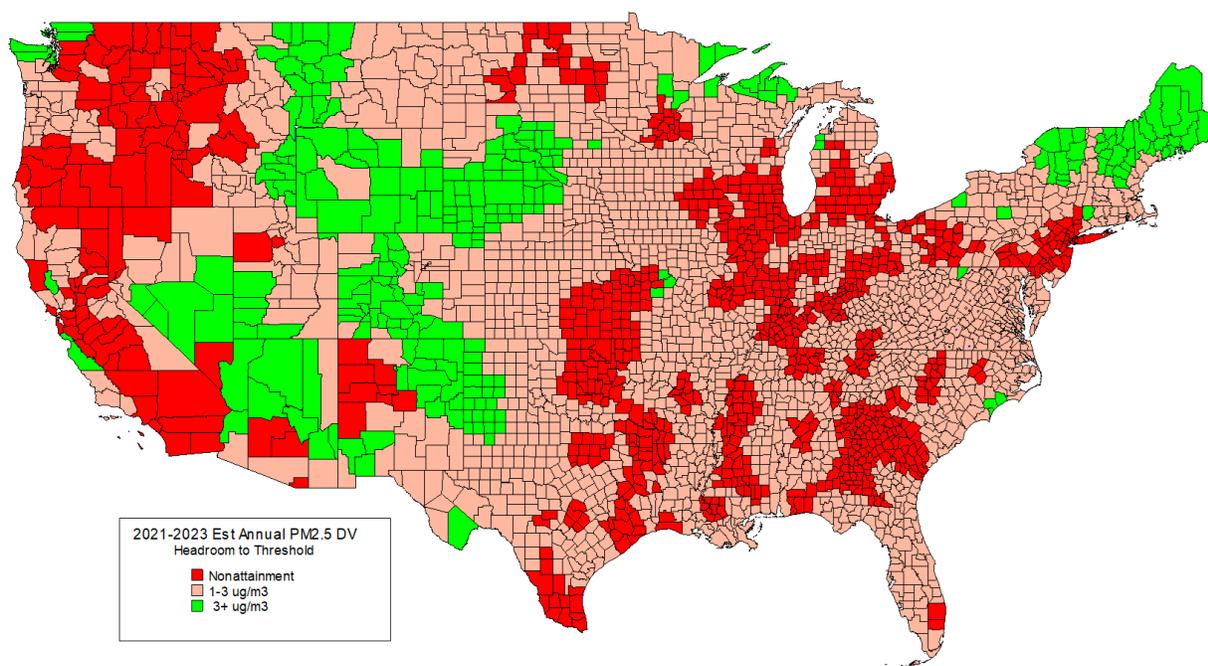
By applying EPA's methodology for designating areas adjacent to the monitored counties that would violate the standards, the universe of counties that would be in violation of tighter standards would be further expanded. All of these nonattainment counties, including monitored and adjacent counties, would be subject to stringent new permitting requirements across the economy from manufacturing, transportation infrastructure, to small businesses. Due to the recent wildfires, the economic impacts would be felt across a much larger geographic area than was estimated by EPA in the Proposed Rule.

Permitting gridlock would be exacerbated by the larger role that non-point PM<sub>2.5</sub> emissions from fires would play as the standards approach background levels. By tightening the standards, the margin or headroom between background PM<sub>2.5</sub> concentrations and the NAAQS standard levels would shrink, leaving little space for economic growth. It would couple increasingly higher compliance costs with incrementally smaller emissions reductions.

Current tools to address the PM<sub>2.5</sub> NAAQS would be pushed to their limits at the levels that EPA proposed. A review of the emissions control strategies that EPA evaluated in the Proposed Rule demonstrates the impact on homeowners, businesses, and governments. For instance, one option is to require homeowners to changeout existing wood-burning fireplaces with natural gas fireplaces. A second option would require small businesses such as restaurants to install costly emissions controls. A third option would require state and local governments to embark on massive road paving programs to reduce dust from unpaved roads and road shoulders. But, with the limited resources available to state and local governments, as well as the control scenarios' significant impact on homeowners and small businesses, it is a big gamble that these could be implemented. This means the agency would likely have to seriously consider costly control strategies on industrial facilities that are already well controlled.

Falling back on prescriptive national or regional regulatory programs to implement tighter PM<sub>2.5</sub> NAAQS standards would be costly and risks blunting investment and job growth. Major new manufacturing projects, including new or planned facilities and modifications to existing facilities, would be required to meet increasingly costly permitting requirements at the Lowest Achievable Emission Rate (LAER). Emissions offsets would also be required in an increasingly larger area, not only for directly emitted particulate matter, but also for pollutants that can create particulate matter in the atmosphere (e.g., nitrogen dioxide and sulfur dioxide). An immediate impact of a lower PM<sub>2.5</sub> NAAQS is that new or expanded manufacturing and other industrial projects may become too costly in areas defined as nonattainment and either not be pursued, or projects may be relocated to attainment areas. Based on these new projections, a larger swath of the country would be impacted. It would increase costs and worsen inflationary impacts of doing business in the U.S. threatening close to \$200 billion in economic activity and putting at risk 1 million jobs according to Oxford Economics.<sup>3</sup>

The areas in violation of the standards would not be the only areas that would experience permitting gridlock. If a tighter standard were finalized, there would be large regions of the country that would barely be meeting the standard but would still be impacted as they would have limited headroom for economic growth. Figure 3 presents the U.S. counties that would be in nonattainment or have limited headroom if the NAAQS were lowered to 9.0 µg/m<sup>3</sup> using the 2021-23 annual PM<sub>2.5</sub> design values.



*Figure 3. County-based headroom calculations for a NAAQS standard at 9.0 µg/m<sup>3</sup>.*

Red areas represent counties that would fail to meet a lower standard at 9.0 µg/m<sup>3</sup>. The counties in light red would fall 1-3 µg/m<sup>3</sup> just below 9.0 µg/m<sup>3</sup>, but also bump into the same permitting restrictions.

<sup>3</sup> See U.S. Air Quality Standards and the Manufacturing Sector (April 2023), available at [https://documents.nam.org/COMM/NAM\\_Air\\_Quality\\_Standards\\_Analysis\\_Web\\_Version.pdf](https://documents.nam.org/COMM/NAM_Air_Quality_Standards_Analysis_Web_Version.pdf).

They would also face restrictions on development as they would have little headroom to build new infrastructure, expand manufacturing, and stimulate economic growth. This is in part because states would be required to perform air dispersion modeling for significant new manufacturing and infrastructure projects in these light red areas to understand their potential impact on air quality. Dispersion models are designed to over-estimate actual concentrations and for many PM<sub>2.5</sub> sources tend to predict the highest project impacts at the fence line. The result is that these counties too would face tighter permitting requirements. Counties in green would be more than 3 µg/m<sup>3</sup> below the standard and would be less likely to be in jeopardy.

## **Conclusions**

Since the CAA's inception in 1970, the U.S. has reduced air pollution by almost 80%—with a 42% reduction since 2000—moving concentrations of PM<sub>2.5</sub> closer to background levels. A proposed NAAQS of 10.0 µg/m<sup>3</sup> or lower would have significant adverse economic impacts across most of the United States. Additional reductions of PM<sub>2.5</sub> are becoming incrementally more difficult to attain and 2023 wildfire emissions are expected to increase the number of counties in nonattainment by as much as 50 percent.

We strongly urge the Administration to suspend this discretionary rule and urgently consider the unintended consequences and unnecessary burdens this rule would place on all Americans sector despite fires being the main PM<sub>2.5</sub> source.



# Environmental Council of the States

1250 H Street NW, Suite 850 | Washington, DC 20005  
(202) 266-4920 | [www.ecos.org](http://www.ecos.org)

March 28, 2023

U.S. Environmental Protection Agency  
EPA Docket Center  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

Via [Regulations.gov](https://www.regulations.gov) Docket ID No: EPA-HQ-OAR-2015-0072

Re: Review of the National Ambient Air Quality Standards for Particulate Matter

Dear Administrator Regan:

The Environmental Council of the States (ECOS) appreciates the opportunity to provide input and recommendations to the U.S. Environmental Protection Agency (EPA) in response to its proposed rule to reconsider the 2020 National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM). ECOS is the national, non-partisan, non-profit association of state and territorial environmental agency leaders. Throughout our comments, the use of the word “states” is inclusive of states, territories, and the District of Columbia.

As co-regulators with EPA, states play a key role in implementing the NAAQS to reduce harmful pollutants and improve air quality in our communities across the nation. ECOS offers the following comments on the PM NAAQS reconsideration based on states’ decades of direct experience implementing environmental protection and air programs. These comments are intended to reflect areas of broad consensus among our member agencies, all of which face diverse challenges in reaching attainment goals under the NAAQS. The comments do not necessarily reflect the views of every state environmental protection agency. As such, ECOS asks EPA to carefully consider the comments of our individual member agencies, which are best positioned to speak to their own unique circumstances.

EPA’s last review of the PM NAAQS was completed in December 2020. In that review, EPA retained the primary (health-based) and secondary (welfare-based) NAAQS without revision. EPA is reconsidering the 2020 PM NAAQS final action because of its concerns that the current standards may not be adequate to protect public health and welfare, as required by the Clean Air Act (CAA).

ECOS appreciates EPA’s efforts to protect human health and the environment. In reconsidering these PM NAAQS, EPA should rely on current scientific information in conformance with the Clean Air Act.

States and EPA have worked together to significantly reduce ambient levels of PM and other pollutants, yet many areas remain in non-attainment. ECOS notes and EPA has acknowledged that lowering the PM NAAQS will increase the number of areas in non-attainment. This highlights the importance of focusing on the resources, guidance, and coordination that will be necessary to successfully implement a revised final standard.

To this end, ECOS underscores the critical need for resources and appropriate flexibility to meet the anticipated increase in demand for monitoring air quality, developing implementation plans, permitting, and compliance. ECOS asks EPA to seek increased Categorical Grants for state and local implementation programs through the annual President’s budget requests. In exercising state and local authority to determine the best way to achieve national standards in their respective states, ECOS members seek

**Myra Reece**

South Carolina Department of  
Health and Environmental Control  
ECOS President

**Chuck Carr Brown**

Louisiana Department of  
Environmental Quality  
ECOS Vice President

**Elizabeth Biser**

North Carolina Department of  
Environmental Quality  
ECOS Secretary-Treasurer

**Todd Parfitt**

Wyoming Department of  
Environmental Quality  
ECOS Past President

**Ben Grumbles**

ECOS Executive Director

collaboration and a strategic deployment of resources across all levels of government. Without appropriate flexibility and a coherent answer to the resource issue, state agencies will struggle to implement a revised PM NAAQS along with other EPA mandates.

ECOS also requests that EPA expeditiously develop and issue implementation guidance in conjunction with the final PM NAAQS, or as soon as possible thereafter. In particular, this implementation guidance should address how states can readily adjust their approach to managing areas with new non-attainment designations following final action on any revised PM standards. Each state has an obligation to design a State Implementation Plan (SIP) that puts the state on a path to timely attainment for PM and other criteria pollutants. An expedited release of PM NAAQS implementation guidance will provide states with critical time for planning attainment strategies and developing SIPs that are protective of human health and feasible to implement.

ECOS asks EPA to work cooperatively with states to address situations in which state compliance with the PM NAAQS may be impacted by sources outside the state's control. EPA should collaborate with states to assess the performance of the Exceptional Events Rule and consider improvements to the exceptional events demonstration process to make it less resource intensive. The Agency should better integrate the increased frequency of exceptional events into NAAQS implementation, attainment planning, and SIP development. Current rules and processes for exceptional events demonstrations should be streamlined and updated to better account for the increased frequency of wildfires, the need to reduce fuel load through prescribed burns, and other events that trigger short-term PM exceedances and non-attainment.

ECOS also calls on EPA to address transported air pollution. In particular, ECOS asks EPA to account for situations where state compliance with the PM NAAQS may be hindered by the international transport of emissions. States near international boundaries often struggle to develop and implement SIPs that can make up for international contributions to the ambient concentration of PM. ECOS urges EPA to address cross-border air pollution specifically, and international pollution in general, that is driving the background levels of air pollution thus putting attainment demonstrations out of reach in impacted areas. Section 115 of the CAA has been rarely used but provides specific authority for EPA to address international transport.

With respect to PM monitoring, ECOS asks EPA to consider insights from state agencies about the need to address meaningful differences observed in the data collected from collocated federal reference monitors (FRMs) and federal equivalent monitors (FEMs). As appropriate, EPA should be flexible in allowing the use of correction factors developed by states with collocated FRMs and FEMs and continue to work with equipment manufacturers to improve the data comparability between the FRMs and FEMs.

Finally, ECOS encourages EPA to address emissions from federally-regulated sources that contribute to ambient concentrations of PM. These include mobile sources such as locomotives, ocean-going vessels, aircraft, trucks, and light duty vehicles. ECOS also asks EPA to work cooperatively with other federal agencies to reduce PM contributions from federal fleet vehicles and other direct source contributors.

ECOS appreciates the opportunity to share input with EPA on this important rulemaking process. Thank you for your consideration of our comments.

Sincerely,



Ben Grumbles  
ECOS Executive Director



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## EPA Eases Exceptional Event Waivers To Meet PM2.5 Limit Amid Fire Threat

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February 9, 2024

Post

EPA is moving to ease states' use of "exceptional events" waivers to cope with the impact of wildfire smoke as they seek to attain its tougher federal limit for fine particulate matter (PM2.5), crafting tools to help exempt fire-driven air quality data from compliance and support an expansion of "prescribed fire" to prevent uncontrolled blazes.

The new annual [national ambient air quality standard](#) (NAAQS) for PM2.5 set at 9 micrograms per cubic meter (ug/m3) will create implementation challenges for states faced with increasingly severe wildfire smoke episodes, EPA acknowledges, and this will require increased use of the exceptional events policy.

"Wildfires have been growing in size and severity, with millions of people at risk from wildfire and wildfire smoke. The wildfire crisis is a public health crisis, including significant impacts on air quality," EPA says in [a fire policy fact sheet](#) issued alongside the new NAAQS rule.

As part of a broader Biden administration policy initiative, EPA is promoting the increased use of intentionally set prescribed fire to reduce the potential for larger, uncontrolled wildfires. "Increasing the application of prescribed fire in a strategic and coordinated manner is needed to mitigate the risk and adverse effects of high severity wildfire and future smoke exposure."

Characterizing both wildfire and prescribed fire as "wildland fire," EPA aims to enable waivers from NAAQS compliance for both.

"A wildland fire is any fire that occurs in an area where human activity and development, if any, is substantially non-existent, which can include forests, shrublands, grasslands, or wetlands," EPA says.

Underscoring the scope of the health and NAAQS compliance threat, EPA says wildland fires "including both wildfires and prescribed fires account for 44 percent of the nation's primary emissions of fine particulate matter (PM2.5). EPA recognizes the increasing challenges and human health impacts that wildland fire and smoke pose in communities all around the country."

EPA's efforts to boost prescribed fire and access to exceptional events waivers come amid pressure from lawmakers of both parties to limit the regulatory impacts of a tougher PM2.5 NAAQS in light of the wildfire problem.

For example, [California Democrats](#) in a June letter to EPA Administrator Michael Regan said they were "concerned that the proposed rule could inadvertently hinder the ability of land managers to deploy prescribed fires that help California avoid the larger catastrophic wildfires that more significantly pollute the air and threaten public safety."

EPA projections show that California will continue to struggle to attain NAAQS for PM2.5 and ozone, with much of the state likely to be in nonattainment with the new PM2.5 standard of 9 ug/m3 in 2032. Like other western states, California has seen a significant escalation of wildfire smoke impacts in recent years, reversing years of improvements in PM2.5 levels, although the issue is increasingly national in scope.

But air quality scientists are also questioning whether the exceptional events policy should even apply, given that wildfires are increasingly prevalent and this is linked to a warming climate, among other factors. Large wildfires are therefore not “exceptional,” some commentators have suggested, including members of EPA’s Clean Air Scientific Advisory Committee (CASAC) that advised EPA during its review of the PM standards.

Further, the waivers can help areas to avoid new or worsened NAAQS “nonattainment” status that brings with it potentially onerous regulatory requirements, but they cannot actually address air quality, which remains dangerously poor during wildfires, critics note.

### **Regulatory Pathway**

To assist regulators in using exceptional events waivers, EPA is making available a “suite of data visualization tools” to help agencies identify event-influenced data and regulatory significance, a “tiering” document focused on exceptional events demonstrations for events involving wildland fires and PM2.5, and a PM2.5 and “wildland prescribed fire demonstration.”

In [slides presented](#) at a Jan. 11 webinar, EPA staff outline these initiatives, emphasizing that both wildfire and prescribed fire can qualify as exceptional events.

“EPA is committed to providing a pathway under the Exceptional Events Rule that allows for increases in the use of strategic and coordinated prescribed fire as a tool to mitigate the adverse effects of high severity wildfire,” according to the presentation.

Prescribed fire can qualify as “human activity unlikely to recur.” It must also be “not reasonably controllable” and “not reasonably preventable.”

Under a 2016 EPA regulation, prescribed fire can meet the “not reasonably controllable” criterion by “being conducted under a certified Smoke Management Program or through the use of Basic Smoke Management Practices at the time of the burn,” and meet the “not reasonably preventable” test by “demonstrating the benefits that would be foregone had the prescribed fire not been conducted,” EPA staff say.

The prescribed fire demonstration will provide a template for others on how to exempt prescribed fires, EPA says. “EPA has not received an exceptional events demonstration for a prescribed fire on wildland (for any NAAQS) since

the Agency revised the Exceptional Events Rule in 2016,” and the demonstration, developed by California regulators, EPA and the U.S. Forest Service, will help to provide an example, the presentation says. The demonstration applies to a prescribed burn in the town of Grass Valley in Nevada County, CA.

The tiering system, meanwhile, will help state regulators determine how much evidence to submit to obtain an exceptional event waiver for a wildfire event, and is similar to an existing 2016 document for ozone and wildfire. The new tiering document would set a lower bar for more severe fires to win waivers as “Tier 1” events. For Tier 2 and Tier 3 events, more evidence tying a fire to high PM2.5 readings at a monitor would be required.

The system calls for the creation of a specific threshold of pollution. If air pollution is at least 1.5 times the threshold, the event qualifies as “Tier 1” and minimal evidence is needed to claim a waiver. EPA has published the tiering document and some “data visualization” tools for public comment through March 8.

Under a memorandum of understanding (MOU) and work plan unveiled Nov. 9, EPA agreed to work with the Departments of Interior and Agriculture, and the Centers for Disease Control and Prevention, to mitigate wildfire impacts, including smoke. **The MOU** calls for increased use of prescribed fire, among other measures, and also a pathway for states to efficiently use the exceptional events waivers.

The MOU says the agencies “commit to work together under existing laws to clarify and align regulations, policy, and practice to promote the mutual objectives of protecting public health from the impacts of smoke and enabling land management practices, including prescribed fire.”

Further, the MOU commits the agencies to work together “to ensure that EPA’s Exceptional Events Rule, and other relevant rules, and accompanying guidance provide an efficient pathway for exclusion of air monitoring data influenced by wildfire and prescribed fire emissions from certain regulatory decisions.” -- *Stuart Parker* ([sparker@iwpnews.com](mailto:sparker@iwpnews.com))

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### STAY CONNECTED



**MEMORANDUM**

January 23, 2024

**To:** House Energy and Commerce Committee  
Attention: Peter Spencer and Drew Lingle

**From:** Omar M. Hammad, Analyst in Environmental Policy, ohammad@crs.loc.gov, 7-1563

**Subject:** EPA’s National Ambient Air Quality Standards, Designation, and Implementation Rule Timelines

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This memorandum responds to your request for dates associated with the U.S. Environmental Protection Agency’s (EPA’s) final reviews of the Clean Air Act (CAA) national ambient (outdoor) air quality standards (NAAQS), designations, and subsequent implementation rules. Information regarding the NAAQS review, designations, and implementation rules may be of general interest to Congress. As such, this information may be provided by CRS to other congressional requesters, and may be used in other CRS products. Your confidentiality as a requester will be preserved in any case.

Under Sections 108 and 109 of the CAA,<sup>1</sup> EPA is to issue NAAQS for certain listed pollutants (1) whose emissions “may reasonably be anticipated to endanger public health or welfare” and (2) whose presence in ambient air “results from numerous or diverse mobile or stationary sources.”<sup>2</sup> EPA has identified and promulgated NAAQS for six principal pollutants, commonly referred to as *criteria pollutants*:

1. carbon monoxide (CO),
2. nitrogen dioxide (NO<sub>2</sub>),
3. sulfur dioxide (SO<sub>2</sub>),
4. lead (Pb),
5. particulate matter (PM), and
6. ozone (O<sub>3</sub>).

The CAA requires that EPA review the latest scientific studies and either reaffirm or modify previously established NAAQS every five years.<sup>3</sup> The CAA directs EPA to establish two types of NAAQS:

1. *primary standards*, “the attainment and maintenance of which in the judgment of the [EPA] Administrator ... are requisite to protect the public health” with “an adequate margin of safety”;<sup>4</sup> and

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<sup>1</sup> 42 U.S.C. §7408 and §7409.

<sup>2</sup> For more background, see CRS Report RL30853, *Clean Air Act: A Summary of the Act and Its Major Requirements*, by Richard K. Lattanzio.

<sup>3</sup> 42 U.S.C. §7409.

<sup>4</sup> 42 U.S.C. §7409(b)(1).

2. *secondary standards*,<sup>5</sup> which are necessary to protect the *public welfare*,<sup>6</sup> a broad term that includes visibility impairment; damage to crops and vegetation; and effects on soil and nutrient cycling, water, wildlife, property, and building materials.

As you indicated, you are interested in the general timeline of a NAAQS review, the subsequent nonattainment designations, state implementation plan (SIP) due dates, and the dates EPA promulgated an implementation rule or guidance following a NAAQS review decision.<sup>7</sup> The remainder of this memorandum discusses the NAAQS review timeline and when each criteria pollutant was listed, the subsequent dates for each final decision to revise the NAAQS, and when the corresponding implementation rule was issued for the revised NAAQS. The memorandum discusses post 1990 NAAQS reviews, designations, and subsequent implementation rules. While the SIP framework was first established in the 1970 CAA, it was modified in both the 1977 and 1990 CAA amendments.<sup>8</sup> The memorandum does not include changes proposed but not finalized or any current planning and review progress.<sup>9</sup> The sections below describe the dates associated with each criteria pollutant and the subsequent decisions associated with the respective NAAQS. Only initial nonattainment area designation dates and initial corresponding implementation rule or guidance dates are listed.<sup>10</sup>

## NAAQS Review Timeline and SIP Due Dates

Generally, nonattainment area SIP due dates are 18 months following the effective date of an area's designation. Unlike other NAAQS, ozone nonattainment areas have varying SIP due dates; these due dates rely on the nonattainment area classification.<sup>11</sup> **Figure 1** illustrates the varying timelines for a NAAQS nonattainment area after it has been designated nonattainment for a NAAQS.

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<sup>5</sup> 42 U.S.C. §7409(b)(2).

<sup>6</sup> 42 U.S.C. §7602(h). The use of *public welfare* in the CAA “includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.”

<sup>7</sup> State Implementation Plans (SIPs) are a collection of regulations and documents used by the state or local air district to implement, enforce, and fulfil the requirements of the CAA. EPA, *Basic Information about Air Quality SIPs*, <https://www.epa.gov/air-quality-implementation-plans/basic-information-about-air-quality-sips>. If the air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area (designated “attainment/unclassifiable”); areas that do not meet the national standard are called nonattainment areas. In some cases, EPA is not able to determine an area's status after evaluating the available information and those areas are designated “unclassifiable.” EPA, *Process to Determine Whether Areas Meet the NAAQS (Designations Process)*, <https://www.epa.gov/criteria-air-pollutants/process-determine-whether-areas-meet-naaqs-designations-process>.

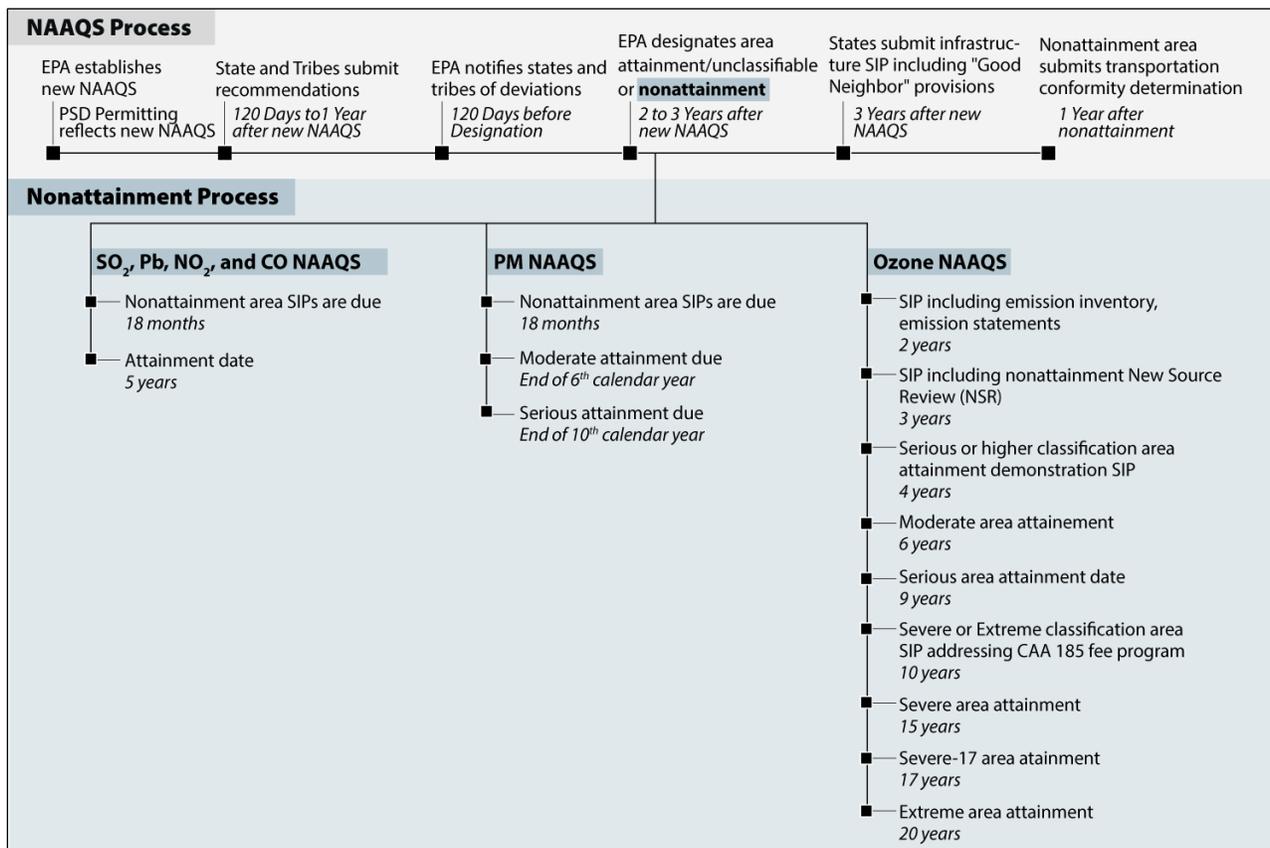
<sup>8</sup> For further information regarding the CAA and the act's major amendments, see CRS Report RL30853, *Clean Air Act: A Summary of the Act and Its Major Requirements*, by Richard K. Lattanzio.

<sup>9</sup> For more information regarding review documents and proposed national ambient air quality standards (NAAQS) *Federal Register* documents, see EPA, *Reviewing National Ambient Air Quality Standards (NAAQS): Scientific and Technical Information*, <https://www.epa.gov/naaqs>.

<sup>10</sup> Not all NAAQS nonattainment area designations occurred simultaneously. For example, the 2010 sulfur dioxide NAAQS designation process occurred in rounds. EPA, *Timeline for 2010 Primary SO<sub>2</sub> NAAQS Designation Process*, <https://www.epa.gov/sites/default/files/2016-01/documents/201503schedule.pdf>. Some implementation rules and guidance were supplemented, updated, or remanded after initial publication. See, for example, implementation of the 1997 and 2006 fine particulate matter (PM<sub>2.5</sub>) NAAQS. EPA, *Implementation of the 1997 and 2006 Particulate Matter (PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS)*, <https://www.epa.gov/pm-pollution/implementation-1997-and-2006-particulate-matter-pm25-national-ambient-air-quality>.

<sup>11</sup> Ozone nonattainment classifications are based on the area's design value at designation. EPA, *Green Book: Ozone Designations and Classification Information*, <https://www.epa.gov/green-book/ozone-designation-and-classification-information>.

**Figure I. Timeline of a National Ambient Air Quality Standard and Nonattainment Area**



**Source:** Congressional Research Service, based on data adapted from 42 U.S.C. CHAPTER 85, SUBCHAPTER I, Part D: Plan Requirements for Nonattainment Areas, 42 U.S.C. §§7501-7514a.

**Notes:** NAAQS = National Ambient Air Quality Standard, PSD = Prevention of Significant Deterioration, EPA = U.S. Environmental Protection Agency, SIP = State Implementation Plan, SO<sub>2</sub> = Sulfur dioxide, Pb = Lead, NO<sub>2</sub> = Nitrogen dioxide, CO = Carbon Monoxide, PM = Particulate Matter, RACT = Reasonably Available Control Technology, NSR = New Source Review.

42 U.S.C. §7410(a)(1) requires each state to submit a SIP which “provides for the implementation, maintenance, and enforcement” of the new NAAQS. These SIPs are known as “infrastructure SIPs.” 42 U.S.C. §7410(a)(2)(D)(i) contains elements infrastructure SIPs must address. The first two elements require each state to demonstrate adequate provisions for the ability to prohibit air emissions within the state that (1) contribute significantly to another state’s nonattainment of the NAAQS, or (2) interfere with another state’s maintenance of the NAAQS. These are often referred to as the “Good Neighbor” provisions.

Transportation conformity is required by 42 U.S.C. §7506(c) to ensure federal funding and approval are given to highway and transit projects that conform to the air quality goals established by a SIP.

## Carbon Monoxide (CO) NAAQS

In 1970, the Department of Health, Education, and Welfare listed carbon monoxide (CO) as a criteria pollutant.<sup>12</sup> There is only a primary NAAQS for CO. EPA established the primary CO NAAQS in 1971

<sup>12</sup> Department of Health, Education, and Welfare, “Issuance of Air Quality Criteria and Information on Recommended Control Techniques,” 35 *Federal Register* 4768, March 19, 1970.

and retained it in subsequent reviews.<sup>13</sup> EPA completed the latest review of the primary CO NAAQS in 2011.<sup>14</sup>

## Nitrogen Dioxide (NO<sub>2</sub>) NAAQS

EPA listed nitrogen dioxide (NO<sub>2</sub>) as a criteria pollutant in 1971.<sup>15</sup> There is a primary and a secondary NAAQS for NO<sub>2</sub>. EPA established the primary and secondary NO<sub>2</sub> NAAQS in 1971 and retained them in subsequent reviews.<sup>16</sup> EPA completed the latest review of the primary NO<sub>2</sub> NAAQS in 2018.<sup>17</sup> EPA completed the latest review of the secondary NO<sub>2</sub> NAAQS in 2012.<sup>18</sup>

## Sulfur Dioxide (SO<sub>2</sub>) NAAQS

The Department of Health, Education, and Welfare listed sulfur dioxide (SO<sub>2</sub>) as a criteria pollutant in 1969.<sup>19</sup> There is a primary and a secondary NAAQS for SO<sub>2</sub>. EPA established the primary and secondary SO<sub>2</sub> NAAQS in 1971 and while the primary SO<sub>2</sub> NAAQS was subsequently revised, the secondary SO<sub>2</sub> NAAQS was retained in subsequent reviews.<sup>20</sup> EPA completed the latest review of the secondary SO<sub>2</sub> NAAQS in 2012.<sup>21</sup> **Table 1** identifies the primary SO<sub>2</sub> NAAQS revisions and subsequent designations and implementation rules.

**Table 1. SO<sub>2</sub> Primary NAAQS Reviews, Designations, and Implementation Rules**

Year of Review	Federal Register Notice	Revised or Retained NAAQS	First Nonattainment Area Designated	Federal Register Notice	Implementation Rule	Federal Register Notice
1996	61 <i>Federal Register</i> 25566	Retained	-	-	-	-
2010	75 <i>Federal Register</i> 35520	Revised	August 5, 2013	78 <i>Federal Register</i> 47191	April 23, 2014	NA <sup>a</sup>
2019	84 <i>Federal Register</i> 9866	Retained	-	-	-	-

**Source:** CRS, based on data adapted from EPA, “Reviewing National Ambient Air Quality Standards (NAAQS): Sulfur Dioxide (SO<sub>2</sub>) Primary Air Quality Standards,” <https://www.epa.gov/naaqs/sulfur-dioxide-so2-primary-air-quality-standards>.

<sup>13</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards,” 36 *Federal Register* 8186, April 30, 1971.

<sup>14</sup> EPA, “Review of National Ambient Air Quality Standards for Carbon Monoxide,” 76 *Federal Register* 54294, August 31, 2011.

<sup>15</sup> EPA, “List of Air Pollutants; Issuance of Air Quality Criteria,” 36 *Federal Register* 1515, January 30, 1971.

<sup>16</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards,” 36 *Federal Register* 8186, April 30, 1971.

<sup>17</sup> EPA, “Review of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen,” 83 *Federal Register* 17226, April 18, 2018.

<sup>18</sup> EPA, “Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur; Final Rule,” 77 *Federal Register* 20218, April 3, 2012.

<sup>19</sup> Department of Health, Education, and Welfare, “Issuance of Air Quality Criteria and Information on Recommended Control Techniques,” 34 *Federal Register* 1988, February 11, 1969.

<sup>20</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards,” 36 *Federal Register* 8186, April 30, 1971.

<sup>21</sup> EPA, “Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur; Final Rule,” 77 *Federal Register* 20218, April 3, 2012.

**Notes:** SO<sub>2</sub> = Sulfur dioxide, NAAQS = National Ambient Air Quality Standard, NA = Not applicable.

- a. EPA issued non-binding guidance titled “Guidance for 1-Hour SO<sub>2</sub> Nonattainment Area SIP Submissions,” [https://www.epa.gov/sites/default/files/2016-06/documents/20140423guidance\\_nonattainment\\_sip.pdf](https://www.epa.gov/sites/default/files/2016-06/documents/20140423guidance_nonattainment_sip.pdf).

## Lead (Pb) NAAQS

EPA listed lead (Pb) as a criteria pollutant in 1976.<sup>22</sup> The Pb standard is the same for both the primary and secondary NAAQS. EPA established the Pb NAAQS in 1978.<sup>23</sup> **Table 2** identifies the Pb NAAQS revisions and subsequent designations and implementation rules.

**Table 2. Pb NAAQS Reviews, Designations, and Implementation Rules**

Year of Review	Federal Register Notice	Revised or Retained NAAQS	First Nonattainment Area Designated	Federal Register Notice	Implementation Rule	Federal Register Notice
2008	73 <i>Federal Register</i> 66964	Revised	November 22, 2010	75 <i>Federal Register</i> 71033	July 8, 2011	NA <sup>a</sup>
2016	81 <i>Federal Register</i> 71906	Retained	-	-	-	-

**Source:** CRS, based on data adapted from EPA, “Reviewing National Ambient Air Quality Standards (NAAQS): Lead (Pb) Air Quality Standards,” <https://www.epa.gov/naaqs/lead-pb-air-quality-standards>.

**Notes:** Pb = Lead, NAAQS = National Ambient Air Quality Standard, NA = Not applicable.

- a. EPA did not issue an implementation rule; it issued a memorandum “2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers,” [https://www.epa.gov/sites/default/files/2016-03/documents/memorandum\\_questions.pdf](https://www.epa.gov/sites/default/files/2016-03/documents/memorandum_questions.pdf). EPA later issued the March 2012 guide titled “Implementation of the 2008 Lead National Ambient Air Quality Standards Guide to Developing Reasonably Available Control Measures (RACM) for Controlling Lead Emissions,” <https://www.epa.gov/lead-air-pollution/lead-pb-national-ambient-air-quality-standards-naaqs-implementation-guidance>.

## Particulate Matter (PM) NAAQS

The Department of Health, Education, and Welfare listed particulate matter (PM) as a criteria pollutant in 1969.<sup>24</sup> The initial 1971 PM NAAQS was set for total suspended particles (TSP).<sup>25</sup> Particulate monitors for TSP were able to detect particles up to 45 micrometers (µm) in diameter. EPA subsequently, in 1987, established PM NAAQS for inhalable particles less than or equal to 10 µm (referred to as PM<sub>10</sub>).<sup>26</sup> In 1997, EPA set standards for PM<sub>2.5</sub> for particles smaller than 2.5 µm.<sup>27</sup> While there are primary and

<sup>22</sup> EPA, “Air Pollution Prevention and Control: Addition of Lead to List of Air Pollutants,” 41 *Federal Register* 14921, April 8, 1976.

<sup>23</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards for Lead,” 43 *Federal Register* 46246, October 5, 1978.

<sup>24</sup> Department of Health, Education, and Welfare, “Issuance of Air Quality Criteria and Information on Recommended Control Techniques,” 34 *Federal Register* 1988, February 11, 1969.

<sup>25</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards,” 36 *Federal Register* 8186, April 30, 1971.

<sup>26</sup> EPA, “Revisions to the National Ambient Air Quality Standards for Particulate Matter,” 52 *Federal Register* 24634, July 1, 1987.

<sup>27</sup> For more information regarding the particulate matter (PM) NAAQS, see CRS Report R47652, *Air Quality: EPA’s 2023 Proposed Changes to the Particulate Matter (PM) Standard*, by Omar M. Hammad.

secondary PM standards, they have been reviewed simultaneously. **Table 3** identifies the PM NAAQS revisions and subsequent designations and implementation rules.

**Table 3. PM NAAQS Reviews, Designations, and Implementation Rules**

Year of Review	Federal Register Notice	Revised or Retained NAAQS	First Nonattainment Area Designated	Federal Register Notice	Implementation Rule Date	Federal Register Notice
1997	62 <i>Federal Register</i> 38652	Revised <sup>a</sup>	January 5, 2005	70 <i>Federal Register</i> 944	April 25, 2007	72 <i>Federal Register</i> 20586
2006	71 <i>Federal Register</i> 61143	Revised <sup>b</sup>	November 13, 2009	74 <i>Federal Register</i> 58688	March 2, 2012	NA <sup>c</sup>
2012	78 <i>Federal Register</i> 3085	Revised <sup>d</sup>	January 15, 2015	80 <i>Federal Register</i> 2205	August 24, 2016	81 <i>Federal Register</i> 58010
2020	85 <i>Federal Register</i> 82684	Retained	-	-	-	-

**Source:** CRS, based on data adapted from EPA, “Reviewing National Ambient Air Quality Standards (NAAQS): Particulate Matter (PM) Air Quality Standards,” <https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards>.

**Notes:** PM = Particulate matter, NAAQS = National Ambient Air Quality Standard, NA = Not applicable.

- Partially revised; the PM<sub>10</sub> NAAQS was retained and a PM<sub>2.5</sub> (particles smaller than 2.5 micrometers) NAAQS was introduced.
- Partially revised; the PM<sub>2.5</sub> 24-hour NAAQS was revised and the annual PM<sub>10</sub> NAAQS was revoked. The annual PM<sub>2.5</sub> NAAQS and 24-hour PM<sub>10</sub> NAAQS were retained.
- EPA issued an implementation guidance memorandum for the 2006 PM NAAQS. EPA, *Implementation Guidance for the 2006 24-Hour Fine Particulate (PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS)*, [https://www3.epa.gov/ttn/naaqs/aqmguidel/collection/cp2/20120302\\_page\\_implement\\_guidance\\_2006-24-hr\\_pm2.5\\_naaqs.pdf](https://www3.epa.gov/ttn/naaqs/aqmguidel/collection/cp2/20120302_page_implement_guidance_2006-24-hr_pm2.5_naaqs.pdf).
- The primary annual PM<sub>2.5</sub> NAAQS was partially revised. The secondary annual PM<sub>2.5</sub> NAAQS, 24-hour PM<sub>2.5</sub>, and PM<sub>10</sub> NAAQS were retained.

## Ozone (O<sub>3</sub>) NAAQS

The Department of Health, Education, and Welfare listed ozone (O<sub>3</sub>) as a criteria pollutant in 1970.<sup>28</sup> The primary and a secondary NAAQS for O<sub>3</sub> are the same. EPA established the O<sub>3</sub> NAAQS in 1971.<sup>29</sup> **Table 4** identifies the O<sub>3</sub> NAAQS revisions and subsequent designations and implementation rules.

**Table 4. O<sub>3</sub> NAAQS Reviews, Designations, and Implementation Rules**

Year of Review	Federal Register Notice	Revised or Retained NAAQS	First Nonattainment Area Designated	Federal Register Notice	Implementation Rule Date	Federal Register Notice
1993	58 <i>Federal Register</i> 13008	Retained	-	-	-	-

<sup>28</sup> Department of Health, Education, and Welfare, “Issuance of Air Quality Criteria and Information on Recommended Control Techniques,” 35 *Federal Register* 4768, March 19, 1970.

<sup>29</sup> EPA, “National Primary and Secondary Ambient Air Quality Standards,” 36 *Federal Register* 8186, April 30, 1971.

<b>Year of Review</b>	<b>Federal Register Notice</b>	<b>Revised or Retained NAAQS</b>	<b>First Nonattainment Area Designated</b>	<b>Federal Register Notice</b>	<b>Implementation Rule Date</b>	<b>Federal Register Notice</b>
1997	62 <i>Federal Register</i> 38856	Revised	April 30, 2004	69 <i>Federal Register</i> 23858	April 30, 2004	69 <i>Federal Register</i> 23951
2008	73 <i>Federal Register</i> 16436	Revised	May 21, 2012	77 <i>Federal Register</i> 30088	March 6, 2015	80 <i>Federal Register</i> 12264
2015	80 <i>Federal Register</i> 65292	Revised	June 4, 2018	83 <i>Federal Register</i> 25776	December 6, 2018	83 <i>Federal Register</i> 62998
2020	85 <i>Federal Register</i> 87256	Retained	-	-	-	-

**Source:** CRS, based on data adapted from EPA, “Reviewing National Ambient Air Quality Standards (NAAQS): Ozone (O<sub>3</sub>) Air Quality Standards,” <https://www.epa.gov/naaqs/ozone-o3-air-quality-standards>.

**Notes:** O<sub>3</sub> = Ozone, NAAQS = National Ambient Air Quality Standard.



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February 14, 2024

The Honorable Buddy Carter  
Chair  
Subcommittee on Environment,  
Manufacturing, and Critical Materials  
U.S. House of Representatives  
2432 Rayburn House Office Building  
Washington, D.C. 20515

The Honorable Paul Tonko  
Ranking Member  
Subcommittee on Environment,  
Manufacturing, and Critical Materials  
U.S. House of Representatives  
2369 Rayburn House Office Building  
Washington, D.C. 20515

Dear Chair Carter and Ranking Member Tonko:

I am pleased to hear that you have scheduled a hearing for tomorrow titled “Safeguarding American Prosperity and People’s Livelihoods: Legislation to Modernize Air Quality Standards.” Although the Clean Air Act serves some important purposes, it requires reform to continue working effectively. And especially in the hands of an overly aggressive Environmental Protection Agency, the CAA’s National Ambient Air Quality Standards have become a tool—or more accurately, a weapon—to restrain States and impair economic development.

States are supposed to take the lead under the CAA. The Act “establishes a program of cooperative federalism that allows the States, within limits established by federal minimum standards, to enact and administer their own regulatory programs, structured to meet their own particular needs.”<sup>1</sup> “Congress intended ... to vest state and local governments with the ‘primary responsibility’ of controlling and preventing air pollution.”<sup>2</sup> In contrast, EPA “is relegated by the Act to a secondary role.”<sup>3</sup>

But recently, the CAA’s promise of federalism has been broken. EPA has at times set overly aggressive limits that threaten to impose billions of dollars of economic costs on the States, as it did just recently with new PM<sub>2.5</sub> standards. Other times, EPA has effectively rigged the system in the federal government’s favor, stripping the States of their statutorily protected discretion and imposing its own preferences, as it did with ozone good-neighbor standards. And although the air is getting cleaner, EPA has shown no sign of slowing the pace of its demands—which, as your committee’s majority staff has noted—means the paths to compliance are getting tougher and tougher.

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<sup>1</sup> *Virginia v. Browner*, 80 F.3d 869, 883 (4th Cir. 1996) (cleaned up).

<sup>2</sup> *Mayor & City Council of Balt. v. BP PLC*, 31 F.4th 178, 216 (4th Cir. 2022)

<sup>3</sup> *Train v. Nat. Res. Def. Council, Inc.*, 421 U.S. 60, 79 (1975).

The Air Quality Standards Implementation Act of 2024 under consideration by your committee is a good step towards fixing at least some of these problems. Among other things, I applaud the discussion draft's suggestions that (1) the NAAQS review cycle be extended from five years to ten; (2) the Administrator be empowered to consider attainability in setting a NAAQS; (3) state environmental personnel be placed on the Clean Air Science Advisory Committee; (4) economic feasibility be part of the analysis in some circumstances; and (5) EPA be required to promulgate implementing regulations for each new or revised NAAQS *before* it can be enforced.

As you evaluate ways to reform how NAAQS operates, I would urge you to consider a few additional changes that might reposition States at the top of the CAA structure and reinvigorate our economy while still improving our environment. Among other things, you might:

- Tighten the standards for “SIP calls” and “corrections.” EPA can call for revisions to state implementation plans “whenever” it decides that existing plans are “substantially inadequate.”<sup>4</sup> It can also unilaterally “revise” an earlier SIP approval if it decides at any point that the approval was “in error.”<sup>5</sup> These loose standards invite significant mischief, especially when administrations change. Out-of-nowhere revisions can undermine substantial reliance interests, while SIP calls can impose real burdens on the States. The subcommittee should consider whether new standards by way of amendments could mitigate those harms.
- Guarantee States a meaningful opportunity to correct purported deficiencies in SIPs. If EPA refuses to approve a SIP, then it must promulgate a federal implementation plan “at any time within 2 years.”<sup>6</sup> The two-year window should allow time for States to try to correct any problems that EPA identifies during its (sometimes extensive and delayed) plan-review process. But instead, EPA has recently promulgated FIPs almost *immediately* after a SIP disapproval, effectively shutting States out. The subcommittee should consider introducing a grace period or the like after disapproval that would allow States time to try again.
- Consider extending timelines for SIP submission and compliance. Creating and implementing a SIP is often a complex endeavor. EPA itself has sometimes taken years to grapple with them. More time would ensure that States can evaluate all available evidence (including complex modeling), permit full public participation, and consider all available options without immense burden or expense. And as you know, getting it right can be financially important, too, as non-compliance results in sanctions and the loss of important federal funding sources.
- Place more meaningful constraints on EPA’s ability to add criteria pollutants. Under existing law, EPA must set the maximum permissible concentrations of harmful air pollutants deemed to pose a risk to public health and safety.<sup>7</sup> To this point, EPA has shown some amount of restraint in identifying those pollutants; only six exist right now. But the agency is facing increasing pressure to name more pollutants, as when a group of Democratic Attorneys General recently urged EPA to set a NAAQS for carbon dioxide. If the agency succumbs to political pressure and begins naming more criteria pollutants, then the economic consequences would be disastrous and the

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<sup>4</sup> 42 U.S.C. § 7410(k)(5).

<sup>5</sup> *Id.* § 7410(k)(6).

<sup>6</sup> *Id.* § 7410(c)(1).

<sup>7</sup> *Id.* § 7408(a)(1)(A).

environmental benefits questionable. The subcommittee should weigh whether additional statutory language could prevent that kind of problematic regulatory capture.

In short, the subcommittee is making the right choice in taking a close look at how the CAA's NAAQS regime is currently functioning. "The Clean Air Act is an experiment in federalism, and the EPA may not run roughshod over the procedural prerogatives that the Act has reserved to the states, especially when ... the agency is overriding state policy."<sup>8</sup> But that's what seems to be happening much too often lately. The Air Quality Standards Implementation Act of 2024 could offer a welcome respite.

Thank you for your consideration and your work in protecting States, their economies, and their citizens.

Sincerely,



Patrick Morrissey  
Attorney General

cc: Mary Martin  
Peter Spencer  
Drew Lingle

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<sup>8</sup> *Bethlehem Steel Corp. v. Gorsuch*, 742 F.2d 1028, 1036–37 (7th Cir. 1984) (Posner, J).



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## EPA Sets Implementation Timeline For Newly Strengthened PM2.5 NAAQS

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February 13, 2024

Post

EPA is laying out its timetable for states and the agency to implement its tightened national ambient air quality standards (NAAQS) for fine particulate matter (PM<sub>2.5</sub>), with the first designations of areas of the country as meeting or violating the limit targeted for 2026 and compliance deadlines beginning six years later in 2032.

States will have until Feb. 7, 2025, to designate areas as attaining [the new annual limit](#) of 9 micrograms per cubic meter (ug/m<sup>3</sup>) or as being in nonattainment with it, and EPA will then have another year to approve or modify such determinations, according to [a Feb. 7 memo](#) by agency air chief Joseph Goffman.

This is consistent with the Clean Air Act's requirement for states and EPA to complete their initial designations process within two years of EPA issuing a new or revised NAAQS, unless the agency determines it has insufficient information, in which case it may add up to one year to the process. The memo confirms that EPA is deeming the NAAQS to be "promulgated" as of Feb. 7, although the rule will not become effective until 60 days after its forthcoming publication in the *Federal Register*.

All nonattainment areas will be initially listed as "moderate," giving them six years from the issuance of nonattainment designations in 2026 to attain the standards -- which puts the target compliance date at Feb. 7, 2032. Industry groups have already warned of excessive regulatory burdens that will result from large tracts of the country being designated as nonattainment areas.

By contrast, EPA's analysis released with the NAAQS purports to show limited impacts in 2032 -- outside of California, where serious nonattainment problems are expected to persist.

And while the agency is making changes to the air monitoring network, requiring that monitors be placed in "at-risk" communities disproportionately exposed to PM<sub>2.5</sub> emissions, that shift will not impact the initial area designations. Those decisions will be based on prior years' data, before the new mandates take effect.

Initial designations will rely on the three most recent years of certified data available to states when they submit designations next year.

"EPA expects that in providing designations recommendations, states and Tribes will review air quality data from 2021 to 2023. The EPA expects that in making final designations decisions, the EPA will rely on air quality data from 2022 to 2024," the agency says.

EPA's method for designating areas in attainment or nonattainment appears unchanged from prior NAAQS revisions, relying on five factors that states and the agency must consider: air quality data;

emissions and emissions-related data; meteorology; geography/topography; and jurisdictional boundaries.

The agency stresses that it will consider not only areas violating the NAAQS, but also nearby areas contributing to high PM levels when deciding the boundaries of nonattainment zones. The extent of such areas has been a major focus for litigation over previous NAAQS rules, with outlying areas often seeking to be excluded from nonattainment zones centered on urban cores.

### **Exceptional Events**

Further complicating the designation process, the initial findings will be based on periods when air quality in many parts of the country was marred by smoke from Canadian and U.S. wildfires.

This will likely spark a surge in requests from states for regulatory waivers to avoid basing their attainment decisions on “exceptional events.” EPA has acknowledged that scenario, and **has floated new guidance** to ease the exceptional events process.

Now, **a fact sheet** on implementation of the new standard says the agency is “committed to working closely with air agencies in managing the impacts of wildland fire and smoke events, such as the 2023 Canadian, Mexican, and domestic wildfires, on initial area designations for the revised PM2.5 NAAQS.”

Thus, “EPA anticipates that exceptional events may be implicated during initial area designations for the 2024 revised primary annual PM2.5 NAAQS,” the memo says.

Under EPA’s schedule, states must inform the agency by Jan. 1, 2025, if they intend to submit exceptional events requests for the years 2021, 2022 and 2023. Exceptional events demonstrations for those years must be submitted by Feb. 6, 2025, alongside area attainment or nonattainment designations. The deadline will be Sept. 30, 2025, for 2024 data.

After considering those applications, EPA will send out “120 day letters” advising states of its decisions on the pending designations by Oct. 9, 2025, and finalize them by Feb. 6, using data from 2022, 2023 and 2024.

However, prior NAAQS cycles have seen lengthy delays in EPA’s final actions on attainment designations and approving states’ air plans -- sometimes by several years, which has brought litigation from public health advocates and state governments.

### **State Plans**

States will have three years from promulgation of the new NAAQS to submit “infrastructure” state implementation plans (SIPs) to EPA outlining the general structure of their programs for managing PM2.5 pollution. After EPA makes its first attainment designations, states with nonattainment areas will have 18 months from the effective dates of those findings to also submit nonattainment SIPs detailing concrete control measures they will use to attain the limits.

In particular, facilities in nonattainment areas will face a higher bar to secure new source review (NSR) preconstruction permits -- which trade groups have warned could raise the costs of permitting or stymie industrial development altogether.

But EPA notes in its implementation fact sheet that new or modified industrial facilities will face tougher permit conditions even before the NSR requirements take effect, because prevention of significant deterioration (PSD) air permits will be required under the new NAAQS in all locations,

beginning with the effective date of the new standard. Industry groups say this requirement **is already causing permitting “gridlock.”**

PSD permits are required for “major” sources under NSR in areas designated in attainment for a NAAQS. Industry permit applicants will have to demonstrate that their projects will not result in violations of the tougher standard, or in violations of the NAAQS “increment” -- a measure of the available increase in air pollution allowed by EPA in any given location.

States and industry are pressing the agency to provide guidance as soon as possible on how PSD permitting will operate under the new standard, and EPA officials have indicated they generally intend to provide implementation measures to states quickly.

The fact sheet says, “PSD permitting will continue to apply in existing clean areas until EPA completes the process of designating areas as meeting or not meeting the strengthened PM2.5 standard (likely in 2026).”

It continues, “Permit applicants that received their final PSD permit before the effective date of the new standards will not need to make any adjustments. Facility owners with PSD permits still in process will need to determine if their modeling already demonstrates that their planned project will not cause or contribute to an exceedance of the new standard.”

If modeling demonstrates a possible exceedance, further in-depth analysis and possibly additional controls will be required, the fact sheet says.

But EPA also seeks to downplay potential problems those requirements could pose. “Permitting authorities and regulated industries are familiar with the NSR program requirements and the flexibility it provides to locate and design projects that can successfully obtain permits that ensure clean air and allow for growth. There are many project-specific variables that can be modified to align a new project with clean air requirements, including the use of cost-effective control technologies,” the fact sheet reads. -- *Stuart Parker* ([sparker@iwpnews.com](mailto:sparker@iwpnews.com))

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March 2023

# WILDFIRE SMOKE

## Opportunities to Strengthen Federal Efforts to Manage Growing Risks

# GAO Highlights

Highlights of [GAO-23-104723](#), a report to congressional requesters

## Why GAO Did This Study

The U.S. has recently experienced some of its worst wildfire seasons on record, creating unhealthy smoke that affected tens of millions of Americans. The 2018 *Fourth National Climate Assessment* projects that climate change will likely increase the frequency of large wildfires and worsen health effects from smoke.

EPA's mission is to protect human health and the environment. Managing risks to air quality and public health from wildfire smoke includes (1) ensuring communities can prepare for and respond to the risks, and (2) hazard mitigation to potentially reduce smoke risks from future fires.

GAO was asked to review issues related to the effects of wildfires on air quality and public health. This report examines, among other things, (1) EPA actions to manage risks to air quality and public health from wildfire smoke and to coordinate with other federal agencies, and (2) how EPA could better manage these risks.

GAO reviewed laws, regulations, and other documents; interviewed federal officials and 15 stakeholder entities, including tribal, state, and local agencies; and analyzed actions to reduce risks using criteria, including GAO's *Disaster Resilience Framework*.

## What GAO Recommends

GAO is making six recommendations, including that (1) EPA develop a coordinated approach for its actions to manage wildfire smoke risks; and (2) EPA, USDA, and Interior align air quality and land management goals for wildfire risk mitigation. EPA, USDA, and Interior generally agreed with the recommendations.

View [GAO-23-104723](#). For more information, contact J. Alfredo Gómez at (202) 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov).

March 2023

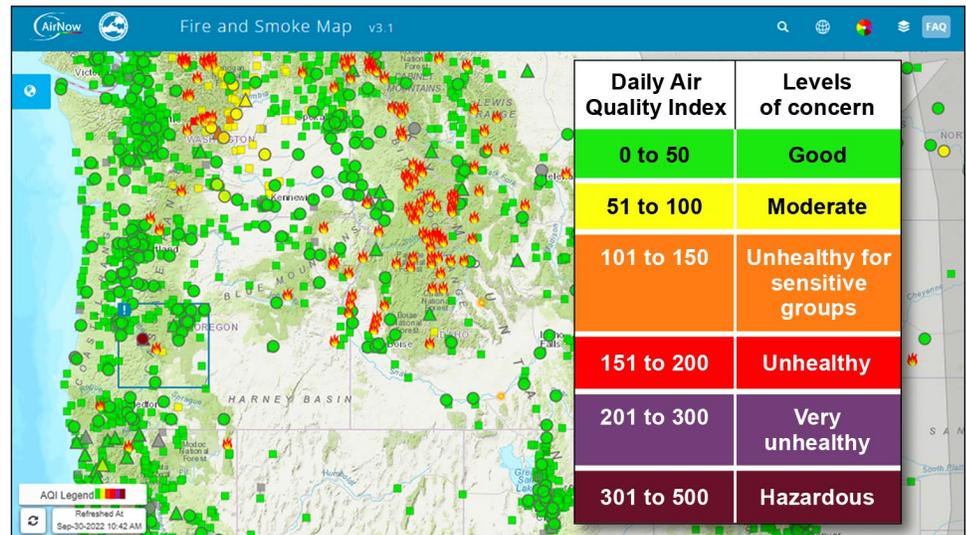
## WILDFIRE SMOKE

### Opportunities to Strengthen Federal Efforts to Manage Growing Risks

## What GAO Found

The Environmental Protection Agency (EPA) has partnered with other agencies to provide a range of information and tools to help communities prepare for and respond to wildfire smoke events. For example, EPA partnered with the U.S. Department of Agriculture's (USDA) Forest Service to develop an online map that shows near real-time air quality data, along with the locations of wildfires and where smoke is traveling.

Fire and Smoke Map, Showing Air Quality Information, Fire Locations, and Smoke Coverage



Source: [fire.airnow.gov](http://fire.airnow.gov). | GAO-23-104723

GAO identified opportunities for EPA to better manage the growing risks from wildfire smoke by building on its actions to help communities prepare for and respond to wildfire smoke events. In particular, EPA could take a more coordinated approach to its actions that aligns with leading practices for collaboration. EPA's actions are spread across program and regional offices and conducted in an ad hoc manner with no dedicated program or budget. By developing a coordinated approach to guide these actions, EPA could better ensure that the agency directs limited resources toward its highest priorities.

EPA also has opportunities to enhance its role in supporting hazard mitigation through methods to reduce the likelihood of catastrophic wildfires and resulting smoke events. For example, EPA could work with federal land management agencies—the Forest Service and agencies within the Department of the Interior—to strengthen federal coordination. EPA and the land management agencies have identified areas where their respective agency missions and goals for wildfire risk mitigation are not aligned. For example, land management agency officials said that EPA's air quality requirements can limit the use of certain land-management methods, such as prescribed burns, that have the potential to reduce smoke from future wildfires. By better aligning their goals for wildfire risk mitigation, the federal agencies can more effectively reduce risks to air quality and public health from wildfire smoke over the long term.

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# Contents

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Letter		1
	Background	6
	EPA Implements Federal Air Quality Requirements, and Federal Land Management Agencies Mitigate Wildfire Risks and Respond to Wildfire Smoke Events	14
	EPA Provides a Range of Information and Tools That Support Efforts to Help Communities Prepare for and Respond to Wildfire Smoke Events	24
	EPA Has Opportunities to Help Strengthen Efforts to Manage Wildfire Smoke Risks across Various Phases of Disaster Management	29
	Conclusions	44
	Recommendations for Executive Action	46
	Agency Comments and Our Evaluation	46
Appendix I	Objectives, Scope, and Methodology	52
Appendix II	Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis	58
Appendix III	Additional Information on Wildfire Smoke Pollutants and Health Effects	64
Appendix IV	Additional Information on EPA's Support of Efforts to Prepare for and Respond to Wildfire Smoke Events	66
Appendix V	Additional Information on Potential EPA Actions to Provide Incentives for and Support Wildfire Risk Mitigation	72
Appendix VI	Comments from the Environmental Protection Agency	75

---

Appendix VII	Comments from the U.S. Department of Agriculture	80
Appendix VIII	Comments from the Department of the Interior	82
Appendix IX	GAO Contact and Staff Acknowledgments	84

Tables

Table 1: Fuel Reduction Methods to Help Mitigate Wildfire Risk	20
Table 2: Environmental Protection Agency (EPA) Regions Selected for Interviews	53
Table 3: Affiliations of 15 Stakeholders We Interviewed	55
Table 4: Potential Research Actions That Could Help Decision Makers and the Public Better Understand the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views	59
Table 5: Potential Actions That Could Help the Environmental Protection Agency (EPA) Build on Existing Actions and Partnerships to Help Communities Prepare for the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views	60
Table 6: Potential Actions That Could Help the Environmental Protection Agency (EPA) Build on Existing Actions to Help Communities Respond to the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views	61
Table 7: Potential Actions That Could Help the Environmental Protection Agency (EPA) Provide Incentives for and Support Wildfire Risk Mitigation to Manage the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views	62
Table 8: Populations Potentially More at Risk of Health Effects from Wildfire Smoke Exposure	65

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## Figures

Figure 1: Area Burned by Wildfires Annually, 1983–2021	6
Figure 2: Examples of Wildfire Smoke Effects on Air Quality	10
Figure 3: Number of Wildfire Exceptional Event Demonstrations Submitted to EPA, and EPA Decisions, Fiscal Years 2013–2020, as of Sept. 1, 2022	17
Figure 4: Example of a Prescribed Burn That Removed Smaller Vegetation and Left Mature Trees Unharmmed	21
Figure 5: Fire and Smoke Map Showing Fire Locations, Smoke Plumes from Satellite Data, and the Air Quality Index from Air Quality Monitors and Sensors on August 30, 2022	28

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## Abbreviations

CDC	Centers for Disease Control and Prevention
EPA	Environmental Protection Agency
HVAC	heating, ventilation, and air conditioning
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
USDA	U.S. Department of Agriculture

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March 13, 2023

Congressional Requesters

Since 2015, the United States has experienced its three most catastrophic wildfire seasons on record in terms of area burned, according to data from the National Interagency Fire Center.<sup>1</sup> Smoke from these wildfires has created hazardous and unhealthy air quality conditions for tens of millions of Americans and, in some instances, for locations thousands of miles from the fires. For example, in July 2021, smoke from wildfires in the western United States and Canada prompted unhealthy air quality alerts for multiple days in East Coast cities, including New York City and Washington, D.C. Climate change is likely to increase the frequency of and area burned by wildfires and exacerbate health effects from wildfire smoke, according to the 2018 *Fourth National Climate Assessment*.<sup>2</sup>

Wildfire smoke and its related health threats also increase the fiscal exposure of the federal government through increased health care costs. The federal government is the nation’s largest purchaser of health care services through programs that often serve older adults and people with

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<sup>1</sup>The National Interagency Fire Center started collecting data on annual area burned in 1983. The National Interagency Fire Center is the nation’s federal support center for wildland firefighting. Its members are the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service within the Department of the Interior; and Forest Service within the U.S. Department of Agriculture. Other partners include the National Association of State Foresters, U.S. Fire Administration, and National Weather Service. According to the National Park Service, a wildfire is an unplanned fire caused by lightning or other natural causes, accidental human ignitions, arson, or an escaped prescribed burn. A prescribed burn is an intentionally ignited fire set for land management objectives. Wildland fire is an overarching term that encompasses both wildfires and prescribed burns. In this report, we use the term “prescribed burn” to mean “prescribed fire,” except in cases where we are referring to reports or legal documents that use “prescribed fire.”

<sup>2</sup>U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*, vol. 2 (Washington, D.C.: 2018).

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fewer resources who face higher risks from wildfire smoke.<sup>3</sup> A 2022 report from the Office of Management and Budget estimated that wildfire smoke exposure could increase federal health care expenditures by between \$128 million and \$226 million per year by the end of the century.<sup>4</sup>

Through its mission to protect human health and the environment, the Environmental Protection Agency (EPA) has a primary role in managing risks to air quality and public health from air pollution sources. EPA works through its headquarters and regional offices to preserve and improve air quality and protect public health by administering the Clean Air Act and providing support and guidance to the tribal, state, and local agencies that are responsible for managing air quality in their jurisdictions.<sup>5</sup>

Other federal agencies have key roles in managing risks from wildfire smoke. For example, the U.S. Department of Agriculture's (USDA) Forest Service and the Department of the Interior's Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service manage wildfire risks on federal lands and, in the case of the Bureau of Indian Affairs, tribal lands.<sup>6</sup> These agencies coordinate with partners such as Tribes, state and local agencies, and communities on

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<sup>3</sup>According to EPA, older adults are more likely to have certain preexisting conditions that wildfire smoke exposure may exacerbate. People with fewer resources may have less access to measures that can reduce some exposure, such as indoor air filtration, according to EPA. The Congressional Budget Office reported that federal spending on Medicare, Medicaid, and other health care programs has totaled about 35 percent of national health care expenditures in recent years. Congressional Budget Office, *Wildfires* (June 2022).

<sup>4</sup>Estimates are reported in 2020 dollars. Office of Management and Budget, *Climate Risk Exposure: An Assessment of the Federal Government's Financial Risks to Climate Change (White Paper)* (Apr. 2022).

<sup>5</sup>EPA's Office of Air and Radiation is the headquarters office responsible for developing national programs, policies, and regulations for controlling air pollution and administering the Clean Air Act, among other things. EPA has 10 regional offices, which are responsible for partnering with Tribes, states, and territories in their respective regions to execute EPA programs. The 10 regional offices are Region 1 (Boston), Region 2 (New York City), Region 3 (Philadelphia), Region 4 (Atlanta), Region 5 (Chicago), Region 6 (Dallas), Region 7 (Kansas City), Region 8 (Denver), Region 9 (San Francisco), and Region 10 (Seattle).

<sup>6</sup>Tribal lands include those held in trust by the federal government for the benefit of the Tribe or individual Indians, as well as restricted fee lands, which are those owned by a Tribe or individual Indians subject to certain restrictions. For purposes of this report, we use the term tribal lands to refer collectively to tribal and individual Indian trust and restricted fee lands.

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efforts to manage fire risks on lands across the country. The Forest Service also leads efforts to assess and communicate to tribal, state, and local agencies and the public risks posed by smoke during wildfires.<sup>7</sup>

In addition, the Department of Health and Human Service's Centers for Disease Control and Prevention (CDC) provides science-based guidance to help protect the nation from environmental hazards—such as wildfire smoke—that affect public health, and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) predicts air quality impacts from wildfire smoke through modeling. While each of these agencies has its own role and mission, each partners with other federal agencies on efforts to manage risks from wildfire smoke.

Since 2013, in recognition of the federal government's significant stake in managing the impacts of climate-related disasters, we have included Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks on our High-Risk List.<sup>8</sup> In our prior work, we have found that enhancing resilience to disasters can help limit the federal government's fiscal exposure because investing in resilience is a risk management strategy that can reduce the need for more costly steps in the future. Enhancing resilience to disasters means taking actions to reduce potential future losses by planning and preparing for hazards such as smoke from wildfires. We published *the Disaster Resilience Framework* in 2019 to serve as a guide for analysis of federal actions to

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<sup>7</sup>Specifically, the Forest Service led the effort to develop and implement the Interagency Wildland Fire Air Quality Response Program called for by the John D. Dingell, Jr. Conservation, Management, and Recreation Act. Pub. L. No. 116-9, § 1114(f), 133 Stat. 580, 617 (2019). The program was created to directly assess, communicate, and address risks posed by wildland fire smoke to the public as well as fire personnel.

<sup>8</sup>The High-Risk List identifies federal program areas that are at high risk of vulnerabilities to fraud, waste, abuse, and mismanagement or in need of transformation. See GAO, *High-Risk Series: An Update*, [GAO-13-283](#) (Washington, D.C.: Feb. 13, 2013); and *High-Risk Series: Dedicated Leadership Needed to Address Limited Progress in Most High-Risk Areas*, [GAO-21-119SP](#) (Washington, D.C.: Mar. 2, 2021).

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promote resilience to disasters and address the actual and anticipated effects of climate change.<sup>9</sup>

You asked us to review issues related to the effects of increasingly frequent catastrophic wildfires on air quality and public health. This report (1) describes key federal roles related to managing risks to air quality and public health from wildfire smoke, (2) identifies the actions EPA has taken to help manage these risks and how EPA coordinates with other federal agencies on these actions, and (3) examines how EPA could better help manage these risks.

To (1) describe key federal roles related to managing risks to air quality and public health from wildfire smoke and (2) identify the actions EPA has taken to help manage these risks and how EPA coordinates with other federal agencies on these actions, we analyzed documents and conducted interviews with federal officials. Specifically, we analyzed relevant laws and regulations, as well as documents from EPA and other federal agencies, such as memoranda of understanding that describe coordination between EPA and other federal agencies. We also analyzed our relevant prior work and other federal reports related to managing risks to air quality and public health from wildfire smoke. In addition, we conducted and analyzed interviews with officials (1) from EPA headquarters program offices that have responsibilities related to managing the risks to air quality and public health from wildfire smoke, and (2) from a nongeneralizable sample of five EPA regional offices selected to correspond to areas with recent experience managing risks to air quality and public health from wildfire smoke. We also interviewed officials from the CDC, Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, Forest Service, National Park Service, and NOAA.

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<sup>9</sup>GAO, *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters*, [GAO-20-100SP](#) (Washington, D.C.: Oct. 23, 2019). We have also previously reported on risks that wildfires can pose to life, property, and health. See, for example, GAO, *Household Hazardous Waste Removal: EPA Should Develop a Formal Lessons Learned Process for Its Disaster Response*, [GAO-22-104276](#) (Washington, D.C.: Mar. 17, 2022); *Wildfire: Information on Forest Service Response, Key Concerns, and Effects of the Chetco Bar Fire*, [GAO-20-424](#) (Washington, D.C.: Apr. 29, 2020); and *Wildfire Disasters: FEMA Could Take Additional Actions to Address Unique Response and Recovery Challenges*, [GAO-20-5](#) (Washington, D.C.: Oct. 9, 2019).

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To examine how EPA could better help manage risks to air quality and public health from wildfire smoke, we reviewed relevant literature and interviewed knowledgeable stakeholders to identify potential actions that EPA could take to better manage such risks. Specifically, we conducted a literature search and identified, reviewed, and analyzed 28 academic studies; law review articles; and other reports. We also conducted and analyzed interviews with a nongeneralizable sample of 15 stakeholders.<sup>10</sup> These stakeholders were (1) officials from nine tribal, state, and local air agencies selected based on having had recent experience managing risks to air quality and public health from wildfire smoke and to provide geographic diversity, and (2) six stakeholders with relevant expertise—from academic, nonprofit, and other organizations—selected to represent a variety of organization types, geographic areas, and areas of expertise. Our findings from these interviews cannot be generalized to stakeholders we did not interview.

We performed a content analysis of the literature and interviews to compile a list of potential actions that EPA could take to better manage the risks to air quality and public health from wildfire smoke. We then grouped similar actions into broad categories. We also compared EPA's current and potential actions to manage risks with our *Disaster Resilience Framework* principles for enhancing disaster resilience, selected leading practices for collaboration, and essential elements of enterprise risk management.<sup>11</sup> See appendix I for a more detailed discussion of our scope and methodology. Appendix II provides tables summarizing the results of our content analysis.

We conducted this performance audit from January 2021 to March 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

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<sup>10</sup>We considered each entity we interviewed as one stakeholder even though multiple officials or representatives participated in many of the interviews.

<sup>11</sup>For our *Disaster Resilience Framework*, see [GAO-20-100SP](#). For leading practices for collaboration, see GAO, *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, [GAO-12-1022](#) (Washington, D.C.: Sept. 27, 2012). For essential elements of enterprise risk management, see GAO, *Enterprise Risk Management: Selected Agencies' Experiences Illustrate Good Practices in Managing Risk*, [GAO-17-63](#) (Washington, D.C.: Dec. 1, 2016).

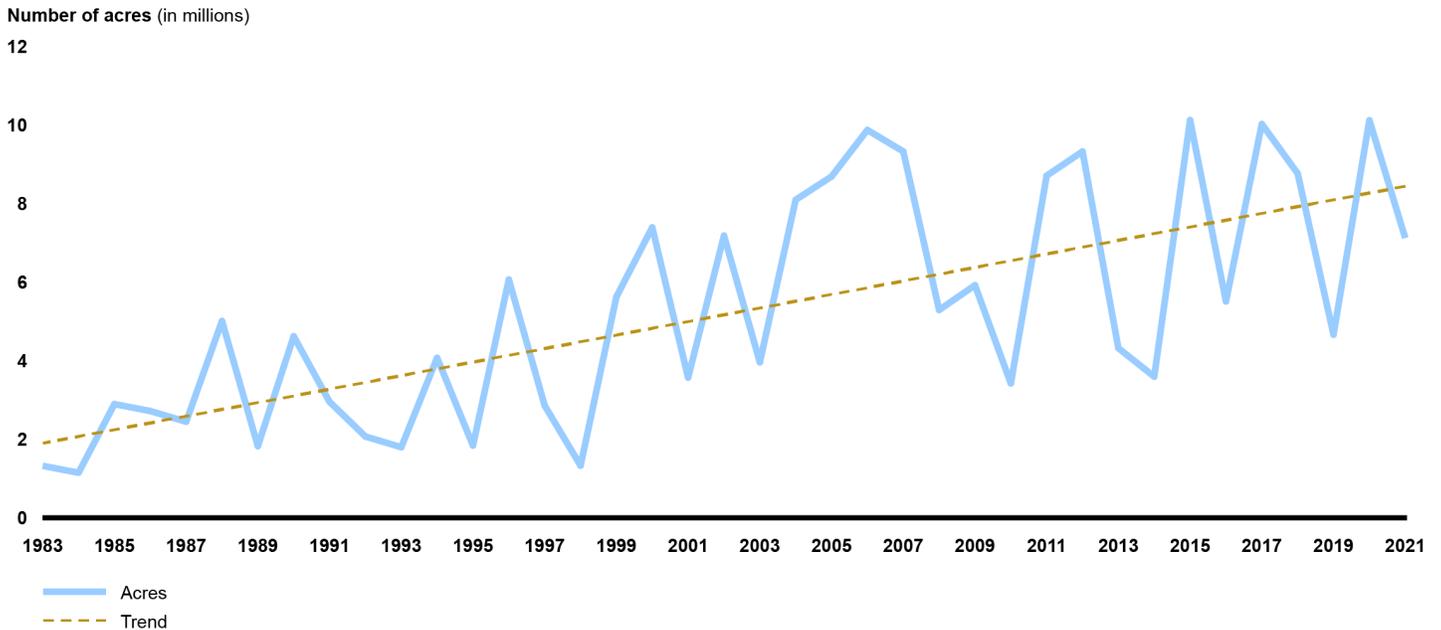
the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## Background

### Wildfire Trends

Over the past three decades in the United States, the average number of acres burned by wildfires has increased even though the number of wildfires each year has declined, indicating a growing number of larger, more catastrophic wildfires since official data collection began in the 1980s. Data from the National Interagency Fire Center indicates that the area burned by wildfires each year in the United States has significantly increased since 1983 (see fig. 1). In each of the years 2015, 2017, and 2020, more than 10 million acres—an area larger than Maryland—burned nationwide, according to the Forest Service.<sup>12</sup>

**Figure 1: Area Burned by Wildfires Annually, 1983–2021**



Source: GAO analysis of National Interagency Fire Center data. | GAO-23-104723

<sup>12</sup>U.S. Department of Agriculture, Forest Service, *Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America's Forests* (Washington, D.C.: Jan. 2022).

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Changes in the climate—such as warmer and drier conditions—have lengthened the wildfire season and increased the frequency of large fires, according to the 2018 *Fourth National Climate Assessment*.<sup>13</sup> The *Fourth National Climate Assessment* also states that human expansion into wildland areas in the past few decades and fire management policies that suppressed fires in the past century have contributed to the increasing frequency of large fires. The assessment also projects that wildfire frequency and area burned in the United States will continue to increase over this century, leading to an increase in wildfire smoke.<sup>14</sup>

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## Effects of Wildfire Smoke on Air Quality and Public Health

Wildfire smoke poses a growing threat to air quality and public health, according to a 2022 report from the National Academies of Science, Engineering, and Medicine.<sup>15</sup> Of the pollutants found in wildfire smoke, fine particulate matter is the main pollutant of concern with regard to

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<sup>13</sup>The 2018 *Fourth National Climate Assessment* and other studies have found that increases in the frequency of wildfires in the western United States are due in part to climate change, which has contributed to increasing temperatures and droughts in the West, as well as a later onset of rains that end fire seasons. The assessment expresses high confidence that rising temperatures and earlier spring snowmelt will very likely result in lengthening the wildfire season in portions of the United States, leading to an increased frequency of wildfires and associated smoke. According to the assessment, there is very high confidence that increasing exposure to wildfire smoke will increase adverse health impacts. However, the assessment notes that the frequency and severity of wildfire occurrence in the future will be largely determined by forest management practices and climate adaptation measures, which are very uncertain. Additionally, the assessment reports that it is unclear if the apparent climate-related increase in area burned by wildfire is outside the range of what has been observed over centuries of fire occurrence. U.S. Global Change Research Program, *Fourth National Climate Assessment*. See also Holden, Z. A. et al., “Decreasing fire season precipitation increased recent western US forest wildfire activity,” *Proceedings of the National Academy of Sciences*, vol. 115, no. 36 (2018): E8349-E8357.

<sup>14</sup>The 2018 *Fourth National Climate Assessment* states that there is a broad and consistent evidence base leading to a high-confidence conclusion that the increasing impacts of wildfire are very likely, including increased smoke and adverse effects on air quality. U.S. Global Change Research Program, *Fourth National Climate Assessment*.

<sup>15</sup>National Academies of Science, Engineering, and Medicine, *Wildland Fires: Toward Improved Understanding and Forecasting of Air Quality Impacts: Proceedings of a Workshop* (Washington, D.C.: 2022).

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human health.<sup>16</sup> EPA estimated that wildfire smoke contributed approximately 30 percent of the nation’s directly emitted fine particulate matter pollution in 2017.<sup>17</sup>

Fine particulate matter can cause health problems because it is small enough to be inhaled deep into the lungs and enter the bloodstream, according to EPA. Exposure to fine particulate matter may lead to a range of health effects, from minor effects, such as eye and respiratory tract irritation, to more serious effects, such as bronchitis, heart failure, and death. Certain groups of people may potentially be more at risk from various health effects from wildfire smoke exposure. For example, according to EPA, people with fewer resources may have both increased exposure and higher likelihood of insufficiently treated conditions that can exacerbate effects. Some of these individuals may already be disproportionately affected by pollution, according to EPA. Appendix III provides additional information on other populations potentially at greater risk from wildfire smoke exposure.

Smoke from wildfires, which can travel thousands of miles, affects tens of millions of people in the United States, creating local, regional, and national air quality and public health concerns (see text box and fig. 2).<sup>18</sup> EPA uses the term “smoke event” to describe an episode in which wildfire smoke makes the air unhealthy to breathe. Smoke events can last days, weeks, or even months.

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<sup>16</sup>According to EPA, particulate matter is a mixture of solid particles and liquid droplets found in the air. EPA distinguishes between two categories of particulate matter: (1) particles with diameters generally larger than 2.5 micrometers and smaller than or equal to 10 micrometers (such as dust, pollen, or mold), known as PM<sub>10</sub>; and (2) fine particles with diameters generally 2.5 micrometers or smaller, known as fine particulate matter or PM<sub>2.5</sub>, which is about 25 times smaller than the diameter of a human hair. Approximately 90 percent of particulate matter in smoke is fine particulate matter.

<sup>17</sup>Environmental Protection Agency, *2017 National Emissions Inventory (NEI) Data* (Jan. 2021), accessed Nov. 17, 2022, <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>.

<sup>18</sup>In addition to direct health effects, wildfire smoke can affect the economy through, for example, effects on agricultural production, outdoor worker productivity, tourism, and recreation. Wildfire smoke can also affect transportation due to decreased visibility on roads. In addition to affecting air quality, wildfires can also have significant effects on water quality. These effects are not addressed in this report.

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### **Examples of Wildfire Effects on Air Quality and Public Health in Specific Areas**

Officials we interviewed from tribal, state, and local agencies said that wildfire smoke has been progressively worsening in recent years and is affecting air quality and public health in their communities:

**Hoopa Valley Tribe.** An official from the Hoopa Valley Tribe located in California said that the Hoopa Valley region has seen wildfires become more intense and wildfire seasons last longer. Every year, the resulting poor air quality severely affects the health of communities in Hoopa Valley and the surrounding areas, according to the official.

**Yurok Tribe.** An official from the Yurok Tribe located in California said that wildfire smoke events have become more frequent and intense in recent years, creating hazardous air quality. The Yurok Tribe has observed health effects from wildfire smoke on the population, including on babies and elders, according to the official.

**California.** Officials from the California Air Resources Board said that wildfire smoke has been increasing and contributing to worsening air quality in recent years. These officials said that in 2020, the state experienced the highest annual acreage burned in recorded history, which resulted in 70 days affected by poor air quality. That year, over 95 percent of the state's population experienced one or more days of poor air quality due to wildfire smoke, according to the officials. The officials also said that wildfires are expected to become more widespread and severe, which may lead to the entire population of almost 40 million people in California experiencing the effects of wildfire smoke.

**Colorado.** Officials from the Colorado Department of Public Health and Environment said that, in 2020, much of the state experienced the effects of wildfire smoke and that the state issued 167 health advisories that year. According to the officials, in August 2021, the city of Denver was reported to have the worst air quality of any city in the world for several hours during a day when smoke from western wildfires polluted the area.

**Oregon.** Officials from the Oregon Department of Environmental Quality told us that wildfire smoke has been progressively worsening in recent years. They said that, in 2021, the community of Klamath Falls experienced wildfire smoke nearly every day from August 1 through October 1.

**Clark County, Nevada.** Officials from the Clark County Division of Air Quality stated that air quality impacts from wildfire smoke have progressively worsened over the past decade. These officials said that wildfire smoke generally affects Clark County, which includes the city of Las Vegas, from May through September each year and that wildfire smoke events are becoming more prolonged, lasting days or weeks.

**Missoula City-County, Montana.** Officials from the Missoula City-County Health Department said that Missoula County has experienced high levels of wildfire smoke with notable impacts on air quality for 5 of the 10 years from 2012 through 2021. These officials said that, in 2017, the area experienced 1.5 months of continuous wildfire smoke.

Source: GAO analysis of information from stakeholders. | GAO-23-104723

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**Figure 2: Examples of Wildfire Smoke Effects on Air Quality**



Smoky skies in San Francisco from several California wildfires, late morning, Sept. 9, 2020.

Smoky sunset in Yellowstone National Park from wildfires in Montana, Aug. 22, 2020.

Source: GAO. | GAO-23-104723

In addition to fine particulate matter, wildfire smoke contains a complex mixture of other pollutants that degrade air quality. The pollutants found in wildfire smoke can vary depending on factors such as the temperature of the fire, the type of vegetation burned, and whether the fire burns structures and other human-made materials. Pollutants in wildfire smoke can include air toxics, carbon monoxide, and pollutants that lead to ozone formation. All of these pollutants can lead to a range of negative health effects. Appendix III provides more information on wildfire smoke pollutants and health effects.

In addition to affecting outdoor air quality, wildfire smoke can enter buildings and affect indoor air quality in places such as homes and schools. Wildfire smoke can enter buildings through open windows and doors; heating, ventilation, and air-conditioning (HVAC) systems; bathroom or kitchen fans that vent outdoors; and small openings around closed windows and doors.

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## Managing Disaster Risks and Enhancing Disaster Resilience

### Disaster Risk Management

According to a 2012 report by the National Academies, the risks posed by disasters, such as wildfires, depend on factors, including (1) the severity

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and likelihood of a hazard causing a risk; (2) vulnerability to—or the potential for harm and disruption from—the risk; and (3) the number of people and assets exposed to the risk.<sup>19</sup> The report identified the following phases of managing disaster risk to address the hazard, vulnerability, and exposure:

- **Hazard mitigation:** Investing in hazard mitigation is one way to reduce future risk to people and property from disasters. Hazard mitigation is any sustainable action taken in advance of disasters that reduces or eliminates long-term risk to people and property from future disasters, according to the Federal Emergency Management Agency. In the case of wildfires and their effects on air quality and public health, hazard mitigation could include wildfire risk mitigation—that is, taking actions before a fire occurs to reduce the risk of future wildfires that produce large amounts of smoke. As we have previously reported, such actions may include implementing strategies for reducing the buildup of materials that can fuel a fire.<sup>20</sup>
- **Preparedness:** Actions to prepare in advance of disasters can help address risks that remain after hazard mitigation. As noted in the 2014 National Cohesive Wildland Fire Management Strategy, fire is a natural process necessary for the maintenance and health of many ecosystems.<sup>21</sup> Therefore, there will always be wildfires and wildfire smoke. According to EPA, actions to help communities prepare for smoke events could include (1) identifying populations vulnerable to smoke and effective ways to provide information to help them plan for how to protect themselves during smoke events; (2) setting up communication methods so that community members know where to find critical information; (3) creating and effectively using public “cleaner air” centers where community members can go for healthy indoor air; and (4) purchasing, storing, and establishing plans for distributing protective equipment such as N95 respirators, portable air cleaners, or high efficiency HVAC filters.
- **Response:** Response actions occur during or immediately after a disaster to save lives, protect property and the environment, and meet

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<sup>19</sup>National Research Council of the National Academies of Science, Engineering, and Medicine, *Disaster Resilience: A National Imperative* (Washington, D.C.: 2012).

<sup>20</sup>GAO, *Wildland Fire: Federal Agencies' Efforts to Reduce Wildland Fuels and Lower Risk to Communities and Ecosystems*, [GAO-20-52](#) (Washington, D.C.: Dec. 19, 2019).

<sup>21</sup>U.S. Department of Agriculture and Department of the Interior, *National Strategy, The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy* (Apr. 2014).

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basic human needs. The effectiveness of these actions depends on the level of preparedness in place to reduce vulnerabilities. Wildfire smoke response actions are aimed at helping reduce smoke exposure for firefighters and the public. For wildfire smoke events—which, unlike other disasters, can sometimes last for weeks or months—response actions could include (1) monitoring and communicating information about air quality, how it may change, and what measures people should take to protect themselves; (2) distributing protective equipment and providing instructions on its proper use; and (3) modifying wildfire management strategies and tactics to reduce smoke impacts on firefighters and the public.<sup>22</sup>

- **Recovery:** Recovery actions involve helping communities restore essential services and repair damages caused by an event. Wildfire smoke events do not typically require the recovery actions needed after many types of disasters, such as rebuilding infrastructure systems and restoring health, social, and community services. However, in some instances when a wildfire burns close to populated areas, buildings and homes may sustain smoke damage and require remediation.

## Disaster Resilience Framework

In October 2019, we issued the *Disaster Resilience Framework* to help federal agencies and policymakers consider what kinds of actions they could take to reduce disaster risk and thereby enhance disaster resilience.<sup>23</sup> Disaster resilience refers to the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. The *Framework* is organized around three high-level and overlapping principles—integration, information, and incentives—that can help identify opportunities to enhance federal efforts to reduce disaster risk and enhance disaster resilience. Users of the *Framework* can consider its principles to analyze any type of existing federal effort across all phases of disaster management: hazard mitigation, preparedness, response, and recovery. Such an analysis can help federal agencies and policymakers consider what kinds of actions to take if they seek to promote and facilitate disaster risk reduction.

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<sup>22</sup>These are examples of potential response actions identified by the CDC, Forest Service, or Interior.

<sup>23</sup>[GAO-20-100SP](#). We reported that funding disaster resilience primarily in reaction to disasters that have already occurred has not worked efficiently across federal programs. We also noted that, due to the complexity and seriousness of natural disasters, solutions will be multifaceted and often require cooperation across agencies, governments, and sectors.

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According to the Framework, the federal government can help enhance resilience to disasters by, for example:

- **Integrating** planning to bring together agencies with different missions and across sectors to take coordinated resilience actions. In this regard, federal efforts can (1) help to establish overarching strategies that guide national resilience efforts, and (2) convene stakeholders with different perspectives and interests to create whole systems solutions.
- Providing reliable and authoritative **information** about current and future risk to help decision makers understand the risks they face and assess alternative strategies to reduce the risks. In addition, information on risks can help contribute to an understanding of approaches for estimating the returns on investments to reduce disaster risk.
- Providing **incentives** and reducing disincentives—including in the form of federal regulatory requirements or as conditions of federal financial assistance—to enhancing disaster resilience, which can make risk reduction measures more viable and improve program design to motivate risk-reduction actions.

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## EPA Implements Federal Air Quality Requirements, and Federal Land Management Agencies Mitigate Wildfire Risks and Respond to Wildfire Smoke Events

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### EPA Implements Federal Air Quality Requirements to Protect Public Health, Including by Assessing Data about Air Affected by Wildfire Smoke

EPA is the federal agency responsible for implementing federal air quality requirements through administration of the Clean Air Act.<sup>24</sup> The act requires EPA to establish standards for certain pollutants in the ambient—or outdoor—air to protect the public health or welfare. EPA has set these National Ambient Air Quality Standards (NAAQS) for six “criteria” pollutants, including particulate matter, ozone, and carbon monoxide—all pollutants in wildfire smoke.<sup>25</sup>

Under the Clean Air Act, states—and in some instances, local governments—are responsible for managing air quality in their jurisdictions, including by monitoring air quality and by establishing State Implementation Plans that describe how each state will attain and

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<sup>24</sup>42 U.S.C. § 7401 et seq. The purposes of the Clean Air Act include, among other things, to protect and enhance the quality of the nation’s air resources so as to promote the public health and welfare and the productive capacity of its population. 42 U.S.C. § 7401(b)(1).

<sup>25</sup>The remaining three criteria air pollutants are lead, sulfur dioxide, and nitrogen dioxide. For particulate matter, EPA has established standards for both PM<sub>2.5</sub> and PM<sub>10</sub>. Criteria pollutants are pollutants that come from numerous or diverse mobile or stationary sources and that the emissions of which, in EPA’s judgment, cause or contribute to pollution that may reasonably be anticipated to endanger public health or welfare. The Clean Air Act establishes two types of NAAQS: primary, which are health based, and secondary, which are welfare based.

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maintain compliance with the NAAQS.<sup>26</sup> Further, under EPA's Tribal Authority Rule, Tribes have the ability to develop air quality management programs.<sup>27</sup> To determine compliance with NAAQS, tribal, state, and local governments operate air quality monitors that are part of a national monitoring system to measure air pollution levels around fixed locations using standardized methods.<sup>28</sup>

EPA has established procedures for assessing data about the quality of air affected by wildfire smoke and, in certain cases, excluding such data in determining compliance with NAAQS. Specifically, the Clean Air Act, as amended in 2005, called for EPA to promulgate regulations governing the review and handling of air quality monitoring data influenced by an "exceptional event."<sup>29</sup> The Clean Air Act also provides that such regulations are to, among other things, include a process for EPA to exclude air quality monitoring data influenced by these events from use in

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<sup>26</sup>A State Implementation Plan is a collection of regulations and documents used by a state or local air district to implement, maintain, and enforce the NAAQS and to fulfill other requirements of the Clean Air Act. These plans are required to include, among other things, enforceable emissions limitations and other control measures and a program to provide for the enforcement of such measures. Contents submitted with these plans include, for example, documentation of permitting programs, vehicle inspection and maintenance plans, monitoring networks, and emissions inventories.

<sup>27</sup>The Tribal Authority Rule, finalized in February 1998, implements the provisions of section 301(d) of the Clean Air Act authorizing eligible Tribes to implement their own tribal programs. See 63 Fed. Reg. 7254 (Feb. 12, 1998) (implementing 42 U.S.C. § 7601(d)).

<sup>28</sup>For additional information, see our prior report on the national air quality monitoring system, GAO, *Air Pollution: Opportunities to Better Sustain and Modernize the National Air Quality Monitoring System*, [GAO-21-38](#) (Washington, D.C.: Nov. 12, 2020).

<sup>29</sup>Pub. L. No. 109-59, § 6013(a), 119 Stat. 1144, 1882 (amending 42 U.S.C. § 7619 to address exceptional events). Under the Clean Air Act, an "exceptional event" is an event that affects air quality, is not reasonably controllable or preventable, is caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by EPA through a process established by regulation to be an exceptional event. 42 U.S.C. § 7619(b)(1); 40 C.F.R. § 50.1(j). Regulations implementing the Clean Air Act provide that meteorological events involving high temperatures or lack of precipitation do not directly cause pollutant emissions and are not considered exceptional events. The regulations further note, however, that conditions involving high temperatures or lack of precipitation may promote occurrences of particular types of exceptional events, such as wildfires or high-wind events, which do directly cause emissions. 40 C.F.R. § 50.1(j).

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EPA's determination of whether an area complies with the NAAQS.<sup>30</sup> EPA has issued regulations determining several types of events, including wildfires, as added in 2016 when EPA substantially revised its regulations, to be exceptional events.<sup>31</sup> The Exceptional Events Rule establishes criteria and procedures for determining whether an event is an exceptional event, including that there must be a clear causal relationship between the specific event and the monitored exceedance of NAAQS.<sup>32</sup> If a tribal, state, or local air agency demonstrates, to EPA's satisfaction, that emissions from wildfires caused an exceedance of one or more NAAQS—through an analysis called an exceptional event demonstration—EPA is to exclude the air quality monitoring data from use in determinations of whether the area was in compliance with NAAQS.<sup>33</sup>

Since EPA started tracking exceptional event demonstrations, the number of wildfire exceptional event demonstrations submitted by air agencies has generally increased (see fig. 3).<sup>34</sup> As of September 2022, EPA had concurred with 26 exceptional events demonstrations for wildfires

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<sup>30</sup>Specifically, under the Clean Air Act, EPA's regulations are to, among other things, provide that there are criteria and procedures for a state to petition EPA to exclude air quality monitoring data that is directly due to exceptional events from use in determinations by EPA with respect to exceedances or violations of the NAAQS. 42 U.S.C. § 7619(b)(3)(B)(iv).

<sup>31</sup>40 C.F.R. § 50.14(b)(4). In addition to wildfires, other types of events that EPA has determined to be exceptional events include high-wind dust events, prescribed fires, and stratospheric intrusions.

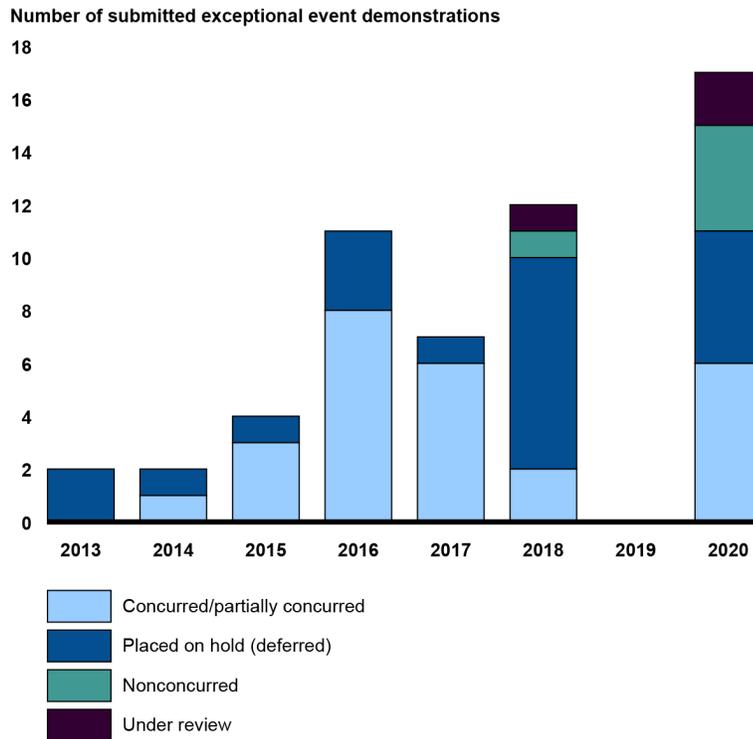
<sup>32</sup>See 40 C.F.R. § 50.14.

<sup>33</sup>Specifically, EPA is to exclude data from use in determinations of exceedances and violations of NAAQS for certain regulatory determinations where a tribal, state, or local air agency demonstrates to EPA's satisfaction that emissions from wildfires caused a specific air pollution concentration in excess of one or more NAAQS at a particular air quality monitoring location and otherwise satisfies the requirements of the Exceptional Event Rule. 40 C.F.R. § 50.14(b)(4).

<sup>34</sup>EPA began formally tracking exceptional event demonstration submissions after promulgation of the final Exceptional Events Rule in 2016. See 81 Fed. Reg. 68,216 (Oct. 3, 2016). Demonstrations submitted in 2016 cover exceptional events that occurred as far back as 2013.

occurring from 2013 through 2020 in states across the country, including California, Colorado, Rhode Island, and Texas.<sup>35</sup>

**Figure 3: Number of Wildfire Exceptional Event Demonstrations Submitted to EPA, and EPA Decisions, Fiscal Years 2013–2020, as of Sept. 1, 2022**



Source: GAO analysis of Environmental Protection Agency (EPA) data. | GAO-23-104723

Note: EPA did not receive any exceptional event demonstrations for wildfires occurring in 2019. According to the National Interagency Fire Center, 2019 was a below-average year in the United States for both fire frequency and size.

When an area has recurring exceptional events—at least three events in a 3-year period—the Exceptional Events Rule requires that the Tribe,

<sup>35</sup>Data were current as of September 2022. These 26 demonstrations include those for which EPA partially concurred. According to EPA officials, the agency may partially concur with a demonstration when, for example, only some of the days covered in the demonstration had pollutant concentrations that would affect compliance with NAAQS.

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state, or locality develop a mitigation plan.<sup>36</sup> EPA regulations require each mitigation plan to include provisions for (1) public notification to and education programs for affected or potentially affected communities; (2) steps to identify, study, and implement mitigating measures; and (3) periodic review and evaluation of the mitigation plan and its implementation and effectiveness by the air agency and all interested stakeholders.<sup>37</sup> As of April 2022, EPA had identified 15 areas in California, Colorado, Montana, and Nevada that were required to develop mitigation plans for wildfires.<sup>38</sup>

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**Federal Land Management Agencies Lead Efforts to Mitigate Wildfire Risk and Respond to Wildfire Smoke Events**

Federal land management agencies—the Forest Service and Interior’s Bureau of Land Management, Fish and Wildlife Service, and National Park Service—lead efforts to mitigate wildfire risk on federal lands, which can help reduce the amount of potential smoke from future wildfires. The Forest Service also coordinates an interagency program for responding to wildfire smoke events that provides technical specialists to assess and communicate smoke risks during wildfires.

**Federal Efforts to Mitigate Wildfire Risk**

Federal land management agencies have primary responsibility for managing the risk of wildfires on federal and tribal lands. The Forest Service, Bureau of Land Management, Fish and Wildlife Service, and National Park Service manage more than 670 million acres of federal land across the country. In addition, the Bureau of Indian Affairs is responsible for administering approximately 55 million acres of lands held in trust by the United States for Indian Tribes, individuals, and Alaska Natives. The federal land management agencies have estimated that over 100 million

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<sup>36</sup>40 C.F.R. § 51.930(b)(1). Specifically, the Exceptional Events Rule requires all states having areas with historically documented or known seasonal events, which include events of the same type and pollutant that recur in a 3-year period, to develop a mitigation plan.

<sup>37</sup>40 C.F.R. § 51.930(b)(2).

<sup>38</sup>EPA recommends that Tribes and states determine the boundaries for such areas based on five factors: (1) air quality data, (2) emissions data, (3) meteorology, (4) geography or topography, and (5) jurisdictional boundaries. The 15 areas required to develop mitigation plans for wildfires are Butte County, CA; Nevada County, CA; Sacramento, CA; Santa Barbara County, CA; San Joaquin Valley, CA; South Coast, CA; Tehama County, CA; Ventura County, CA; Denver-Boulder-Greeley-Ft. Collins-Loveland, CO; Missoula County, MT; Ravalli County, MT; Carson City, NV; Clark County, NV; Douglas County, NV; and Washoe County, NV.

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acres of federal lands are at high risk from wildfire.<sup>39</sup> State forestry agencies and other nonfederal entities—including tribal, county, city, and rural fire departments—have primary responsibility for managing the risk of wildfires on nonfederal lands.<sup>40</sup> A report by the National Association of State Foresters estimated that over 63,000 communities nationwide are considered to be at risk from wildfire in fiscal year 2021.<sup>41</sup>

Land management agencies mitigate wildfire risk using methods that reduce fuels on the landscape.<sup>42</sup> Reducing fuels in areas where a large amount has accumulated can help reduce a wildfire’s intensity, which in turn can help mitigate the risk that the wildfire poses to communities, structures, and firefighter safety, as well as to air quality and public health, according to the 2014 National Cohesive Wildland Fire Management Strategy developed by USDA and Interior.<sup>43</sup> As we reported in 2019, according to Forest Service and Interior documents and officials, methods used to reduce fuels to mitigate the risk of wildfires include

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<sup>39</sup>In 2018, the Forest Service estimated that there were approximately 63 million acres of national forest lands at high to very high risk from wildfire. In July 2019, Interior officials estimated that 54 million acres of the lands Interior’s agencies manage or administer were at high or very high risk from wildfire.

<sup>40</sup>We previously reported on federal-nonfederal collaboration to reduce wildfire risks. See GAO, *Wildland Fire Risk Reduction: Multiple Factors Affect Federal-Nonfederal Collaboration, but Action Could Be Taken to Better Measure Progress*, [GAO-17-357](#) (Washington, D.C.: May 10, 2017).

<sup>41</sup>National Association of State Foresters, *Communities at Risk, Fiscal Year 2021 Report* (Washington, D.C.: 2022). The National Association of State Foresters is a non-profit organization composed of the directors of forestry agencies in the 50 states, the District of Columbia, five U.S. territories, and three nations in compacts of free association with the United States.

<sup>42</sup>As we previously reported, fires have an important ecological role on the nation’s landscapes. However, various management practices over the past century—including fire suppression, timber harvesting, and grazing—have altered the normal frequency of fires in many forest and grassland ecosystems and have increased these ecosystems’ vulnerability to catastrophic fire. This history of fire suppression and forest management has resulted in a buildup of surface fuels and the overstocking of some forests with trees and other fuels. See [GAO-20-52](#).

<sup>43</sup>The Federal Land Assistance, Management, and Enhancement Act of 2009 required the Secretary of the Interior and the Secretary of Agriculture to submit to Congress a report that contains a cohesive wildfire management strategy. Pub. L. No. 111-88, tit. V, § 503, 123 Stat. 2968, 2971. The subsequent National Cohesive Wildland Fire Management strategy provides a national framework designed to more fully integrate fire management efforts across jurisdictions, manage risks, and protect firefighters, property, communities, and landscapes. See U.S. Department of Agriculture and Department of the Interior, *The National Cohesive Wildland Fire Management Strategy*.

mechanical treatments, prescribed burns, and herbicides and targeted grazing (see table 1 and fig. 4).<sup>44</sup>

**Table 1: Fuel Reduction Methods to Help Mitigate Wildfire Risk**

Fuel reduction method	Description and benefits	Potential limitations and considerations
Mechanical treatments	This method entails using equipment such as chainsaws, masticators, bulldozers, or mowers to cut and remove vegetation. Mechanical treatments reduce tree density where there are abnormally dense groups of trees or layers of vegetation close to the ground to help reduce the risk of a wildfire becoming catastrophic.	Mechanical treatments may also increase the amount of smaller fuels on the ground, including treetops, limbs, and other debris from thinning, which can in some cases increase a fire's intensity or rate of spread. In addition, mechanical treatments are often planned in conjunction with prescribed burns to remove or reduce fuels that remain after the treatment.
Prescribed burns	This method entails using deliberate, planned fires set by land managers to reduce fuels and restore or maintain desired ecosystem conditions. Prescribed burns are planned and implemented under specified fuel and weather conditions and are designed to meet land management and safety objectives. Prescribed burns can be effective in removing smaller vegetation that can fuel a fire—such as grasses, leaves, pine needles, and twigs—which can reduce a future fire's intensity and rate of spread.	Smoke produced from prescribed burns and the risk of a prescribed burn spreading into other areas can limit the use of prescribed burns near communities. To reduce the potential effects of smoke from prescribed burns, land managers use established practices for managing smoke, such as (1) evaluating where smoke may travel based on meteorological conditions; (2) monitoring how smoke affects air quality; and (3) using techniques—like allowing the material to dry before burning—to minimize the effects of smoke on the public and avoid exceedances of National Ambient Air Quality Standards. <sup>a</sup> Tribal, state, and local air agencies often require permits for prescribed burns.
Herbicides and targeted grazing	Herbicides can be used to reduce fuels such as by killing fast growing vegetation to maintain an existing fuel reduction project. Targeted grazing—the intentional use of cows, sheep, or goats to eat vegetation in a specified area—can also be used to reduce grasses and other small fuels.	Although herbicide kills vegetation, it does not remove it, potentially increasing an area's susceptibility to wildfire if further action—such as prescribed burning—is not taken to remove the dead fuel.

Source: GAO analysis of information from the U.S. Forest Service and Department of the Interior. | GAO-23-104723

<sup>a</sup>These practices are called Basic Smoke Management Practices. The Environmental Protection Agency's Exceptional Events Rule under the Clean Air Act provides that in order for a prescribed fire to qualify as an exceptional event, a state must either certify that it has adopted and is implementing a smoke management program, or demonstrate that the burn manager employed appropriate Basic Smoke Management Practices identified in the regulations. 40 C.F.R. §50.14(b)(3)(ii)(A). The Forest Service and Interior have policies noting that prescribed fires should generally be conducted using Basic Smoke Management Practices.

<sup>44</sup>GAO-20-52.

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**Figure 4: Example of a Prescribed Burn That Removed Smaller Vegetation and Left Mature Trees Unharm**



Source: Wildland Fire Leadership Council (U.S. Department of Agriculture Forest Service photos). | GAO-23-104723

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The federal land management agencies lead key national-level wildfire mitigation groups. The groups include the Wildland Fire Leadership Council, White House Wildfire Resilience Interagency Working Group, and Wildland Fire Mitigation and Management Commission.<sup>45</sup> These three groups are federal interagency and intergovernmental entities that develop strategies for addressing wildfire risks across the country.

The Wildland Fire Leadership Council oversees implementation of the 2014 National Cohesive Wildland Fire Management Strategy, which sets broad, strategic, and national-level direction for implementing actions and activities across the nation to manage fires and associated risks, among other things.<sup>46</sup> The Cohesive Strategy describes ways the nation can make strategic investments intended to reduce the effects of wildland fire on high-risk areas. To complement the Cohesive Strategy, the Forest Service and Interior land management agencies have implementation strategies that document their plans and priorities for reducing wildfire risk to people, communities, and natural resources through wildfire mitigation.<sup>47</sup> For example, the Forest Service's strategy calls for, over 10 years, carrying out fuel reduction activities on 20 million acres in the National Forest system and up to an additional 30 million acres on other federal, tribal, state, and private lands in the West. Funding authorized in

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<sup>45</sup>The Wildland Fire Leadership Council was established in 2002 by the Secretaries of Agriculture and the Interior to provide an intergovernmental committee to support the implementation and coordination of federal fire management policy. Its members include federal, tribal, state, county, and municipal government members. The White House Wildfire Resilience Interagency Working Group is chaired by USDA and Interior and was tasked by the President to develop broad, national strategies to address the growing risks from wildfires, according to Forest Service officials. The Wildland Fire Mitigation and Management Commission was established in December 2021 by USDA and Interior, and the Federal Emergency Management Agency in response to the Infrastructure Investment and Jobs Act of 2021. The act called for the establishment of the commission to study and make recommendations to improve federal policies relating to (1) the prevention, mitigation, suppression, and management of wildland fires in the United States; and (2) the rehabilitation of land in the United States devastated by wildland fires. Pub. L. No. 117-58, § 70203(a), 135 Stat. 429, 1252. The commission is co-chaired by USDA and Interior and the Federal Emergency Management Agency. It includes 11 federal members and 36 nonfederal members (18 primary members and 18 alternate members representing diverse backgrounds related to wildfire issues).

<sup>46</sup>U.S. Department of Agriculture and Department of the Interior, *The National Cohesive Wildland Fire Management Strategy*.

<sup>47</sup>See U.S. Department of Agriculture, Forest Service, *Confronting the Wildfire Crisis: A 10-Year Implementation Plan*, FS-1187b (Washington, D.C.: Jan. 2022) and Department of the Interior, *Infrastructure Investment and Jobs Act Wildfire Risk Five-Year Monitoring, Maintenance, and Treatment Plan* (Washington, D.C.: Apr. 2022).

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Federal Efforts to Respond to  
Wildfire Smoke Events

the 2021 Infrastructure Investment and Jobs Act (also known as the Bipartisan Infrastructure Law), including \$1 billion for prescribed fire and mechanical treatments, provides a significant investment in achieving the fuel reduction goals, according to Forest Service officials.<sup>48</sup>

In 2007, the Forest Service initiated the Interagency Wildland Fire Air Quality Response Program to directly assess, communicate, and address risks posed by wildfire smoke to the public and fire personnel.<sup>49</sup> The program deploys technical specialists with training and expertise in air quality science to certain wildfires. These specialists—known as air resource advisors—predict wildfire smoke dispersion; deploy monitors to measure the effects of wildfire smoke on air quality; provide smoke forecasts that include information about how people can stay safe; and coordinate with tribal, state, and local air quality agencies, public health officials, and community leaders to help them understand and consistently communicate smoke risks.<sup>50</sup> According to its annual report, in 2021 the Interagency Response Program deployed 101 air resource advisors to incident management teams that respond to wildfires.<sup>51</sup>

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<sup>48</sup>The Infrastructure Investment and Jobs Act of 2021 authorized almost \$3.4 billion to be appropriated to the Secretary of the Interior and the Secretary of Agriculture to conduct various activities related to wildfire risk reduction, including planning and conducting prescribed fires, as well as conducting certain mechanical treatments. Pub. L. No. 117-58, § 40803(c), 135 Stat. 429, 1097. The act provides that, of federal land and certain tribal land that has been identified as having a very high wildfire hazard potential, Interior and Forest Service are to conduct restoration treatments, by the end of fiscal year 2027, of 10 million acres located in the wildland-urban interface or a public drinking water source area. *Id.* § 40803(b). Additionally, subsequently enacted legislation commonly referred to as the Inflation Reduction Act of 2022 appropriated \$1.8 billion to USDA for hazardous fuels reduction projects on National Forest System land within the wildland-urban interface. Pub. L. No. 117-169, § 23001(a)(1), 136 Stat. 1818, 2023. The act defines “hazardous fuels reduction project” as an activity, including the use of prescribed fire, to protect structures and communities from wildfire that is carried out on National Forest System land. *Id.* § 23001(e)(3).

<sup>49</sup>The Forest Service initiated the Response Program in 2007 to help manage the smoke impacts from active fires. The program was codified in 2019 by the John D. Dingell, Jr. Conservation, Management, and Recreation Act, which called for the Secretaries of Agriculture and the Interior to establish the Interagency Wildland Fire Air Quality Response Program. Pub. L. No. 116-9, § 1114(f), 133 Stat. 580, 617.

<sup>50</sup>Air resources advisors have come from federal, tribal, state, and local air, forestry, and health agencies, as well as the private sector.

<sup>51</sup>Interagency Wildland Fire Air Quality Response Program, *2021 Annual Report: A Nation in Wildfire Smoke*.

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In addition, the Interagency Response Program maintains a cache of over 100 portable air quality monitors and sensors, according to Forest Service officials. These monitors and sensors can be set up during a fire to provide information in areas without the permanent monitors that Tribes, states, and local governments operate as a part of the national ambient air quality monitoring system. The information collected by the Interagency Response Program’s monitors and sensors is provided to communities affected by smoke.

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## EPA Provides a Range of Information and Tools That Support Efforts to Help Communities Prepare for and Respond to Wildfire Smoke Events

EPA has provided a range of information and tools to support federal and nonfederal efforts aimed at helping communities prepare for and respond to smoke events, which are two of the four phases of disaster risk management. Stakeholders we interviewed from tribal, state, and local agencies said that EPA’s actions have supported their efforts to manage the risks of wildfire smoke in important ways. The information and tools that EPA has provided, in partnership with other federal agencies in some instances, include the following: (1) research to help decision makers and the public understand the risks to air quality and public health from wildfire smoke, (2) planning information and tools to help communities prepare for wildfire smoke events, and (3) air quality information and tools to help support wildfire smoke response efforts.<sup>52</sup>

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## Research to Help Decision Makers and the Public Understand Risks to Air Quality and Public Health from Wildfire Smoke

EPA conducts, supports, and partners on research to help decision makers and the public better understand risks to air quality and public health from wildfire smoke and make informed decisions to help reduce those risks. To identify needed research, among other things, EPA’s Office of Research and Development holds listening sessions with stakeholders, including national and regional air quality associations and tribal, state, and local air agencies, according to EPA officials. The Office of Research and Development incorporates the stakeholder feedback into its *Air, Climate, and Energy Strategic Research Action Plan*, which outlines research priorities to address EPA’s strategic objectives to improve air quality and protect public health and the environment.<sup>53</sup>

EPA has also partnered with other federal entities on various research efforts. For example, EPA has coordinated with the Joint Fire Science

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<sup>52</sup>EPA maintains a “Smoke-Ready Toolbox” on its website that includes links to many of these information sources and tools (see <https://www.epa.gov/smoke-ready-toolbox-wildfires>).

<sup>53</sup>Environmental Protection Agency, *Air and Energy Strategic Research Action Plan 2019-2022*, EPA601K20003 (Washington, D.C.: Mar. 2020).

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Program and NOAA on research to identify the different amounts and types of pollutants in wildfire smoke and how these different pollutants can affect health.<sup>54</sup> EPA has also coordinated with the federal land management agencies and National Institute of Standards and Technology on research to examine the air quality and public health effects of prescribed burns compared to wildfire.<sup>55</sup> Finally, in 2017, EPA—in partnership with the Forest Service, National Park Service, NOAA, National Aeronautics and Space Administration, and the CDC—initiated a Wildland Fire Air Sensors Challenge, a competition aimed at stimulating innovation in the development of air pollutant sensors that can operate in wildfire conditions. See appendix IV for additional information on EPA research to help decision makers and the public understand air quality and public health risks from wildfire smoke.

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## Planning Information and Tools to Help Communities Prepare for Wildfire Smoke Events

EPA helps communities prepare for wildfire smoke events by providing and partnering on information and tools to help them plan for how to stay safe and reduce smoke exposure. Stakeholders we interviewed from state and local agencies said that this information has been useful in helping communities establish plans before a smoke event occurs to, for example, ensure that appropriate interventions are available. Such interventions may include establishing community cleaner air centers or a cache of home air filters that can be loaned to vulnerable and underserved residents. The information has also helped state and local entities educate the public about the risks of wildfire smoke and how people can protect themselves and their families.

EPA has coordinated with other federal agencies to provide information and tools, such as educational materials and outreach, to help communities prepare for wildfire smoke events. For example, EPA worked with the CDC, Forest Service, California Air Resources Board, and California Office of Environmental Health Hazard Assessment to

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<sup>54</sup>The Joint Fire Science Program is funded by the Department of the Interior and Forest Service. It provides funding for scientific studies associated with managing wildland fire, fuels, and fire-impacted ecosystems to respond to emerging needs of managers, practitioners, and policymakers from local to national levels. The Joint Fire Science Program has provided funding for some EPA studies related to wildfire smoke and its effect on public health.

<sup>55</sup>Environmental Protection Agency, Center for Public Health and Environmental Assessment, Office of Research and Development, *Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire (CAIF): A Case Study in the Western U.S.*, EPA/600/R-21/197 (Research Triangle Park, N.C.: 2021). This work was coordinated through the Wildland Fire Leadership Council.

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produce the 2019 Wildfire Smoke Guide for Public Health Officials.<sup>56</sup> In addition, EPA Region 10 coordinates an annual smoke management meeting focused on raising awareness of smoke issues and sharing new tools and resources.<sup>57</sup> The meeting brings together people from federal, tribal, state, and local air quality, public health, and land management agencies, as well as researchers, according to EPA officials. Also, an EPA regional office co-leads a workgroup that brings together federal, state, and local officials to discuss ongoing smoke communications work. See appendix IV for additional information on EPA planning information and tools to help communities prepare for wildfire smoke events.

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## Air Quality Information and Tools to Support Wildfire Smoke Response Efforts

EPA supports the Forest Service-led Interagency Response Program, as well as community efforts to respond to wildfire smoke events. EPA supports these efforts in large part by providing information and tools to help decision makers and the public understand the extent to which smoke has affected or is likely to affect air quality during wildfire smoke events.<sup>58</sup> Stakeholders from tribal, state, and local agencies we interviewed said that such information and tools have been valuable in supporting their communications with the public about when people should take actions to protect themselves from smoke exposure, such as by limiting outdoor activity if possible or wearing an N95 respirator.

EPA's actions to provide, at times in partnership with other agencies, air quality information and tools during wildfire smoke events include forming a partnership with the Forest Service to develop the Fire and Smoke Map. This map is available on EPA's AirNow website.<sup>59</sup> The Fire and Smoke Map shows near real-time air quality data from air quality monitors (typically operated by air quality agencies) and low-cost sensors

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<sup>56</sup>This guide provides tribal, state, and local public health officials with information to help them establish plans for communicating health risks and taking measures to protect the public when wildfire smoke is present. Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impacts Division, *Wildfire Smoke: A Guide for Public Health Officials, Revised 2019*, EPA-452/R-19-901 (Research Triangle Park, N.C.: Aug. 2019). The California Air Resources Board and California Office of Environmental Health Hazard Assessment were nonfederal partners in this effort.

<sup>57</sup>EPA Region 10 serves Alaska, Idaho, Oregon, Washington, and 271 Tribes.

<sup>58</sup>In [GAO-21-38](#), we reported that more widespread air quality monitoring could help air quality managers better understand the effects of wildfire smoke on air quality and public health as it moves through communities.

<sup>59</sup>See Environmental Protection Agency and Forest Service, "Fire and Smoke Map," *AirNow*, accessed Nov. 11, 2022, <https://fire.airnow.gov>.

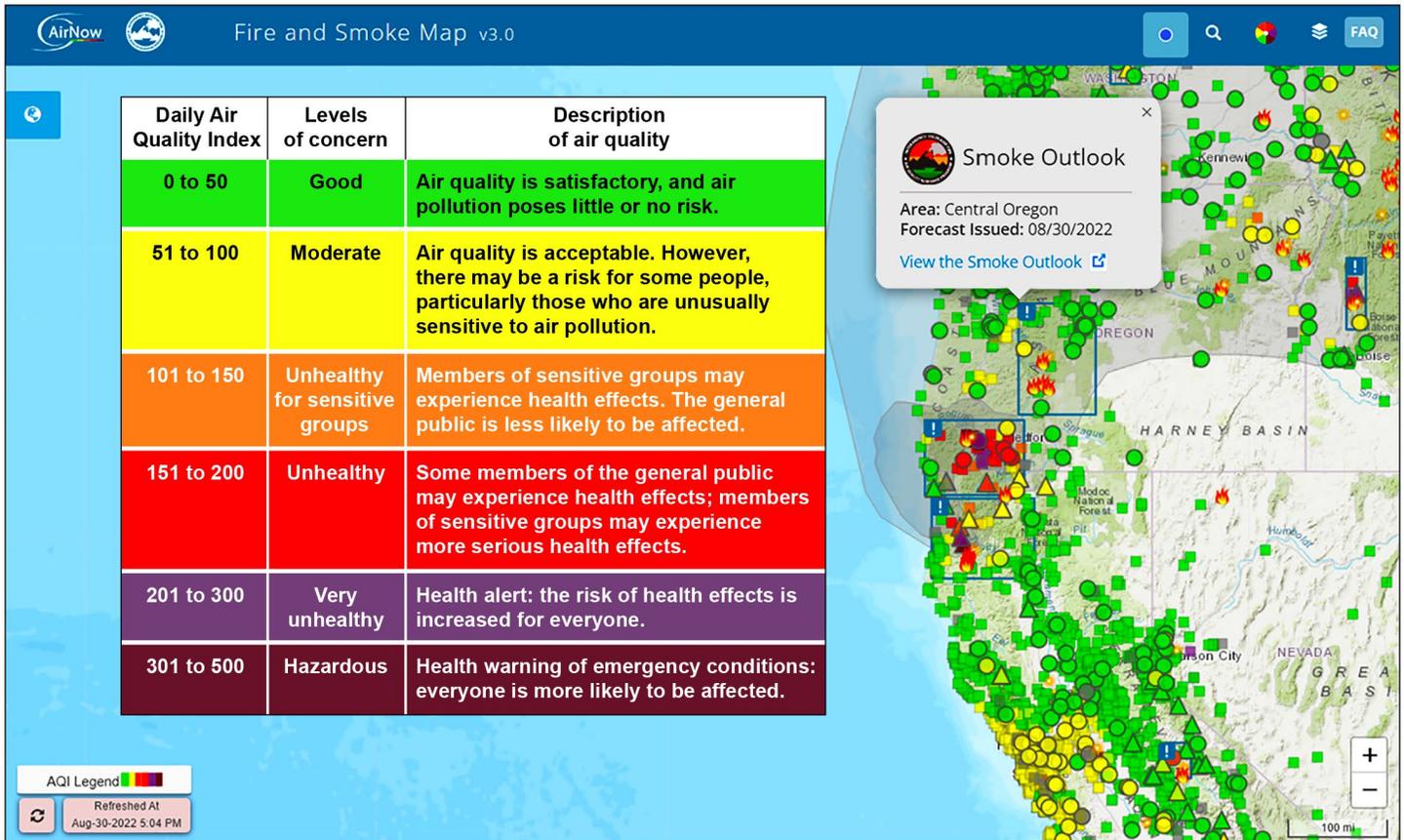
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(operated by groups such as government agencies, community organizations, and the public), along with the locations of wildfires and satellite information on where smoke is traveling (see fig. 5).<sup>60</sup> In addition, to provide additional air quality monitoring during wildfires, EPA launched the Wildfire Smoke Air Monitoring Response Technology pilot program in 2021 to enhance the availability of air quality monitoring equipment in areas affected by wildfire smoke that have limited or no established air quality monitoring equipment. The program loans air quality sensors and mobile monitoring systems that can be attached to vehicles to provide air quality information at different locations during smoke events. See appendix IV for additional information on EPA air quality information and tools to help support wildfire smoke response efforts.

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<sup>60</sup>The Fire and Smoke Map also uses satellite information from NOAA to fill in gaps between ground-based monitors and sensors. A Spanish version of the Fire and Smoke Map was released in September 2022.

**Figure 5: Fire and Smoke Map Showing Fire Locations, Smoke Plumes from Satellite Data, and the Air Quality Index from Air Quality Monitors and Sensors on August 30, 2022**



Source: fire.airnow.gov. | GAO-23-104723

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## EPA Has Opportunities to Help Strengthen Efforts to Manage Wildfire Smoke Risks across Various Phases of Disaster Management

We identified opportunities for EPA to help strengthen the management of wildfire smoke risks across various phases of disaster management.<sup>61</sup> In particular, EPA has opportunities to take a more coordinated approach to its existing preparedness and response actions. In addition, EPA has opportunities to enhance its role in supporting wildfire hazard mitigation through working with land management agencies to strengthen federal coordination, developing additional information about smoke risks, and providing incentives for and supporting mitigation activities.

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### EPA Has Opportunities to Take a More Coordinated Approach to Its Preparedness and Response Actions

EPA does not have a coordinated agency-wide program or dedicated staff and resources for the agency's work related to helping communities prepare for and respond to wildfire smoke, according to EPA officials. Specifically, the officials told us that staff in various EPA program and regional offices plan and implement these actions in an ad hoc manner. Officials from EPA and the Forest Service said that the various offices within EPA working on wildfire smoke issues do not have coordinated strategies and goals. In addition, EPA officials said that EPA has few dedicated resources for managing wildfire smoke issues, and that they are not able to implement all the actions they have identified that could help manage the effects of wildfire smoke. They said that, due to the agency's limited resources, most wildfire smoke activities are done in addition to employees' regular job duties. Other than scientists working specifically on wildfire smoke issues and one staff member in Region 10, as of September 2022, no other positions within EPA formally included wildfire smoke responsibilities, according to EPA officials.

EPA and others have said that efforts to build on the agency's existing work are important for managing the growing risks posed by wildfire smoke. EPA has identified additional actions it plans to take in its strategic plan for 2022 through 2026 and its October 2021 Climate

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<sup>61</sup>The chronologic order of the disaster management phases is hazard mitigation, preparedness, response, and then recovery. In this section, we discuss preparedness and response actions first because these phases are where EPA has focused most of its actions. Our analysis of literature and stakeholder views did not identify specific opportunities for EPA to better manage risks to air quality and public health from wildfire smoke that were related to the recovery phase of disaster management. We previously reported on improving the federal government's approach to disaster recovery. See GAO, *Disaster Recovery: Actions Needed to Improve the Federal Approach*, [GAO-23-104956](#) (Washington, D.C.: Nov. 15, 2022).

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Adaptation Action Plan.<sup>62</sup> For example, the strategic plan states that EPA will work with federal partners to improve smoke forecasting abilities, identify and communicate when and where smoke events are happening, build local capacity to help communities prepare for the risks of wildfire smoke before wildfires occur, and provide tools and resources for communities for health protection during smoke events.

Furthermore, our analysis of literature and stakeholder views identified examples of potential actions that EPA could take to build on its current preparedness and response actions (see app. II). These actions fell into categories such as providing additional assistance for communities to prepare for wildfire smoke events, helping build more capacity for air quality monitoring during smoke events, and enhancing research on the effectiveness of interventions to reduce exposure during smoke events. For example, a stakeholder said that EPA could invest in further studies to understand the impacts on indoor air quality during wildfire smoke events and help identify effective approaches for protecting indoor air.

We have identified leading practices for collaboration that could provide opportunities for EPA to take a more coordinated approach within the agency as it builds on its current actions for helping communities prepare for and respond to wildfire smoke.<sup>63</sup> Specifically, according to selected leading practices, EPA has opportunities take a more coordinated approach by

- **Identifying outcomes and reinforcing accountability.** We have previously reported that leading practices to enhance and sustain collaboration include clearly defining short-term and long-term outcomes and goals and monitoring progress toward meeting those goals.<sup>64</sup> However, according to EPA officials, EPA has not established

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<sup>62</sup>Environmental Protection Agency, *Fiscal Year 2022-2026 EPA Strategic Plan* (Washington, D.C.: Mar. 28, 2022); and *Climate Adaptation Action Plan* (Washington, D.C.: Oct. 2021).

<sup>63</sup>GAO-12-1022 identified seven leading practices that can enhance collaboration. We selected three of these practices: (1) identifying outcomes and reinforcing accountability, (2) identifying and leveraging resources, and (3) clarifying roles and responsibilities. We selected these practices because they most closely relate to the nature of EPA's current and potential actions to manage risks to air quality and public health from wildfire smoke. The other practices are bridging organizational cultures, identifying leadership, including relevant participants, and documenting collaboration through written guidance and agreements.

<sup>64</sup>GAO-12-1022.

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common goals across the agency for its actions to help communities prepare for and respond to wildfire smoke events. EPA officials said that various groups within EPA working on wildfire smoke issues have different strategies and goals when it comes to this work. Establishing common goals and monitoring progress toward those goals could help EPA assess its priorities for helping communities prepare for and respond to risks from wildfire smoke and better identify ways to build upon the work.

- **Identifying and leveraging resources.** Leading practices for collaboration include identifying and leveraging resources, including funding and staffing, that are needed to sustain a collaborative effort.<sup>65</sup> According to EPA officials, limited resources constrain the agency's actions to support federal, tribal, state, and local efforts to help communities prepare for and respond to wildfire smoke events. Identifying the resources needed to achieve EPA's priorities for this work would help EPA, its partners, and Congress understand the level of investment required.
- **Clarifying roles and responsibilities.** We also reported that leading practices to enhance and sustain collaboration include clarifying roles and responsibilities.<sup>66</sup> EPA's actions related to supporting community efforts to prepare for and respond to wildfire smoke events require a high level of coordination with and are integrated into the programs of federal, tribal, state, and local partners, all with different missions, goals, and resources. Working with its partners to develop specific roles and responsibilities could help EPA refine its approach for building on this work on a nationwide level. For example, according to Forest Service officials, EPA could enhance collaboration with the Interagency Response Program by clarifying commitments to provide air resource advisors that communicate smoke risks to affected communities. Additionally, officials from the CDC said that creating a framework for coordinating research related to community preparedness for wildfire smoke could help federal agencies more intentionally plan such research and create a community of practice on the topic.

Using these leading practices for collaboration would provide EPA with opportunities to develop a more coordinated approach for helping communities prepare for and respond to wildfire smoke events. A more coordinated approach that establishes EPA's goals, identifies and

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<sup>65</sup>[GAO-12-1022](#).

<sup>66</sup>[GAO-12-1022](#).

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leverages resources, and involves clarifying roles and responsibilities with stakeholders could help EPA more effectively work with its partners and take additional actions needed to build on this work. Developing and documenting such an approach to guide EPA's actions would help EPA better target the agency's limited resources toward the highest priorities for managing the risks, particularly as catastrophic wildfires become more frequent and intensify these effects.

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### EPA Has Opportunities to Enhance Its Role in Supporting Hazard Mitigation

EPA has opportunities to reduce the risks posed by wildfire smoke by enhancing its role in hazard mitigation to reduce the likelihood of future smoke events.<sup>67</sup> Specifically, EPA has opportunities to (1) work with land management agencies to strengthen federal coordination to reduce smoke risks through wildfire risk mitigation; (2) develop additional information on reducing wildfire smoke risks through wildfire risk mitigation; and (3) provide incentives for and support mitigation activities at the tribal, state, and local levels.

### Work with Land Management Agencies to Strengthen Federal Coordination to Reduce Smoke Risks through Wildfire Risk Mitigation

EPA and the federal land management agencies have identified areas where their respective agency missions and goals for wildfire risk mitigation are not aligned. EPA's mission is to protect public health and the environment, including by ensuring that Americans have clean air, and the agency has a strategic plan goal of "ensuring clean and healthy air for all communities."<sup>68</sup> To help achieve the mission and goal, EPA officials told us that they want to work with land management agencies to increase the attention paid to air quality and public health risks. The officials said that these risks are often overshadowed in national-level discussions about wildfire risk mitigation. They also said that more of an emphasis should be placed on smoke risks because wildfire smoke affects a far greater number of people than the direct effects from the fires.

EPA officials said that EPA has traditionally had informal or limited involvement in wildfire mitigation discussions. EPA's role has mostly focused on advising on issues related to managing smoke from

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<sup>67</sup>As noted by EPA officials, EPA does not implement wildfire risk mitigation efforts. Rather, land managers and owners implement such efforts, such as reducing fuels on the landscape, implementing land use and development regulations and ordinances in areas at high risk from wildfire, and educating the public to help prevent fires from starting. For additional information on wildfire risk mitigation efforts, see [GAO-17-357](#) and [GAO-20-52](#).

<sup>68</sup>Environmental Protection Agency, *Fiscal Year 2022-2026 EPA Strategic Plan*.

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prescribed burns, according to EPA officials.<sup>69</sup> More recently, EPA has become an official member of the Wildland Fire Leadership Council, the White House Wildfire Resilience Interagency Working Group, and the Wildland Fire Mitigation and Management Commission. According to EPA officials, the agency has opportunities to use its new position in these groups to help better protect air quality and public health in the future, as the country makes new investments in wildfire risk mitigation through recent legislation such as the Infrastructure Investment and Jobs Act. However, EPA officials said that the agency cannot simply elevate its role in wildfire risk mitigation work at the federal level and increase attention to air quality and public health issues without the support and acceptance of its federal partners.

The federal land management agencies' goals related to wildfire risk mitigation focus on restoring and maintaining landscapes so that they are resilient to fire. In national-level strategies, the agencies also identify air quality as a value at risk affected by wildfires. According to land management agency officials, the agencies view reduced effects on air quality and public health as co-benefits of wildfire risk mitigation because, in general, efforts to reduce the risk of future catastrophic wildfires will likely also reduce the amount of smoke.<sup>70</sup> Officials from land management agencies told us that, as the agencies begin to implement strategies for increasing wildfire risk mitigation across the landscape, air quality standards could limit their ability to make progress toward the goals for the number of acres they aim to treat with prescribed burns. Specifically, opportunities to obtain permits from state agencies for prescribed burns can be limited in areas out of compliance, or nearly out of compliance, with the NAAQS, according to Forest Service officials. If the NAAQS for fine particulate matter were lowered, a change currently under

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<sup>69</sup>According to Forest Service officials, federal land management agencies have taken the lead in identifying strategies to manage smoke from prescribed burns, including the initial development of Basic Smoke Management Practices and development of technical tools to determine prescribed burn smoke dispersion.

<sup>70</sup>For specific wildfire risk mitigation programs or for individual fires, federal land management agency officials told us that agencies thoroughly integrate air quality considerations into their planning and execution. For example, federal land management agency officials told us that when using prescribed burns for wildfire risk mitigation, the agencies conduct extensive analysis and planning to consider and reduce the resulting air quality effects, such as through training, National Environmental Policy Act analyses that identify smoke impacts of different alternatives, smoke management permits, and smoke management compliance. Also, these officials told us that air resource advisors play a role during fires to bring consideration of air quality effects into incident management decision making.

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consideration by EPA, many areas nationally would likely be out of compliance with those lower NAAQS, according to land management agency officials.<sup>71</sup> The officials said that this would likely lead to further challenges obtaining permits for prescribed burns.

EPA and the federal land management agencies have taken steps to improve their coordination on air quality issues related to wildfire risk mitigation. In 2017 and again in 2021, the agencies signed a memorandum of understanding to develop a collaborative framework to address issues related to wildland fire and air quality and to promote forest management, including through the use of prescribed burns, to mitigate wildfire risks.<sup>72</sup> In addition, in 2020, EPA, the federal land management agencies, and the Department of Health and Human Services issued a joint vision document on the relative benefits of prescribed burns to wildfire, including the message that “enhancing and creating healthy forests and rangelands is a paramount natural interest, as is maintaining clean air.”<sup>73</sup> Finally, in June 2022, EPA and the Forest Service formed a subgroup of the White House Wildfire Resilience Interagency Working Group to focus on the air quality and public health effects of smoke from wildfires and prescribed burns.

However, EPA and federal land management agency officials identified opportunities to better coordinate and align their goals. For example, EPA officials said that national-level groups working on wildfire risk mitigation strategies should increase attention to air quality and public health effects to help ensure that these strategies better consider such effects. They

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<sup>71</sup>In June 2021, EPA announced its decision to reconsider a 2020 decision to retain the existing particulate matter NAAQS, noting that the available scientific evidence and technical information indicated that the current standards may not be adequate to protect public health and welfare, as required by the Clean Air Act. In January 2023, EPA issued a proposed rule to revise the primary annual fine particulate matter standard from 12.0 micrograms per cubic meter to a level within the range of 9.0 to 10.0 micrograms per cubic meter. 88 Fed. Reg. 5558 (Jan. 27, 2023).

<sup>72</sup>Department of Agriculture, Department of the Interior, and Environmental Protection Agency, *Partnership Agreement Between the United States Department of Agriculture, the United States Department of the Interior, and the United States Environmental Protection Agency, Regarding Wildland Fire and Air Quality* (Jan. 12, 2017) and *Memorandum of Understanding Between the United States Department of Agriculture Forest Service and the United States Department of the Interior and the United States Environmental Protection Agency, Wildland Fire and Air Quality Coordination* (Jan. 7, 2021).

<sup>73</sup>The agencies issued the joint vision document through the Wildland Fire Leadership Council. See Wildland Fire Leadership Council, *Joint Vision and Key Messages on Relative Benefits of Prescribed Fire to Wildfire* (Sept. 2020).

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noted that the smoke impacts subgroup of the White House Wildfire Resilience Interagency Working Group could help strengthen communication and coordination across the federal government on issues related to wildfire smoke effects. In addition, Interior officials stated that, since fire has been suppressed on the landscape over the last century, the land management agencies need to have the flexibility to conduct prescribed burns at appropriate scales to restore forest health and resilience. Forest Service and Interior officials said that EPA's implementation of NAAQS and the Exceptional Events Rule can, at times, inhibit that flexibility.<sup>74</sup>

In prior work, we have described the benefits of coordinating efforts across the federal government. For example, our *Disaster Resilience Framework* states that the federal government can help reduce disaster risks by promoting coordination across agency missions, integrating strategic goals, and pursuing whole systems solutions to risk reduction.<sup>75</sup> EPA and the federal land management agencies have also identified the need for an aligned, whole-of-government approach to wildfire risk mitigation.<sup>76</sup> In addition, we have identified key features that can help enhance and sustain collaboration among federal agencies, including defining and articulating a common outcome and bridging organizational cultures by establishing mutually reinforcing or joint strategies to help align the partner agencies' activities, core processes, and resources to accomplish the outcome.<sup>77</sup>

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<sup>74</sup>Wildfires and prescribed fires are addressed separately and have different requirements for qualifying as an exceptional event, under EPA regulations. See 40 C.F.R. § 50.14(b)(3), (4).

<sup>75</sup>[GAO-20-100SP](#).

<sup>76</sup>EPA's Climate Adaptation Action Plan states that the agency will closely work with other federal agencies to address effects from climate change that cut across agency jurisdictions to improve the efficiency and effectiveness of the combined federal effort as part of a whole-of-government approach. See Environmental Protection Agency, *Climate Adaptation Action Plan*. Also, federal land management agencies, in their wildfire risk mitigation strategies, have committed to implementing those strategies in coordination with other federal partners. The Forest Service's strategy notes that such coordination would bring a whole-of-government approach to addressing wildfires and help achieve mutually desired goals. See U.S. Department of Agriculture, *Wildfire Crisis Implementation Plan*; and U.S. Department of the Interior, *Infrastructure Investment and Jobs Act Wildfire Risk Five-Year Monitoring, Maintenance, and Treatment Plan*.

<sup>77</sup>[GAO-12-1022](#). See also GAO, *Results-Oriented Government: Practices that Can Help Enhance and Sustain Collaboration among Federal Agencies*, [GAO-06-15](#) (Washington, D.C.: Oct. 21, 2005).

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By working together to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals, EPA and the federal land management agencies can create a whole systems approach that may more effectively reduce wildfire disaster risks to air quality and public health over the long term. EPA and federal land management agency officials said that such alignment was particularly important as land management agencies plan to increase the scope and scale of wildfire risk mitigation in the coming years.

Identify and Develop Additional Information on Reducing Smoke Risks through Wildfire Risk Mitigation

Officials from EPA and land management agencies said additional information could help land managers reduce wildfire smoke risks through wildfire risk mitigation. Federal land management agencies generally prioritize areas for wildfire risk mitigation efforts based on the likelihood that an ignition could expose homes, communities, and infrastructure to wildfire, among other things. However, as noted in the national-level strategies for wildfire risk mitigation, risks to air quality from smoke are also components of overall wildfire risk.

According to our analysis of literature and stakeholder views, EPA has opportunities to identify and further develop risk information to help federal agencies better manage risks to air quality and public health from wildfire smoke.<sup>78</sup> For example, EPA could provide the following information:

- **Relative effects of prescribed burns and potential wildfires to help most effectively use prescribed burns to reduce risks.** Prescribed burns have localized, short-term effects on air quality, but they may decrease long-term smoke effects by reducing the size, severity, and intensity of future wildfires.<sup>79</sup> However, according to EPA officials, there remain significant limitations and uncertainty in the scientific understanding of these tradeoffs, particularly under different timescales and locations. For example, according to the officials, information needs to be developed to better understand the differences between smoke from prescribed burns and wildfires and to account for the fact that the proportion of prescribed burns to wildfire

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<sup>78</sup>See app. II for the results of our analysis of literature and stakeholder views.

<sup>79</sup>Interior officials noted that, while air quality is one consideration when considering prescribed burns, an additional benefit of the burns is to restore the health of ecosystems that naturally rely on fire. Forest Service officials added that many of the wildland ecosystems of the United States evolved and are dependent on fire as a natural and critical disturbance that maintains ecological resilience.

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varies across the country. Moreover, some areas are almost exclusively exposed to prescribed burn smoke and rarely to wildfire smoke.<sup>80</sup> This type of information could help decision makers understand how prescribed burns can be used to reduce the public health impacts of wildfires, according to EPA's 2019 Wildland Fire Research Framework.<sup>81</sup> The information could also be important for gaining greater public acceptance of prescribed burns, according to one stakeholder we interviewed.

- **Extent and costs of wildfire smoke exposure to increase national attention to the risks.** According to our analysis of literature and stakeholder views, additional information is needed on factors such as the number of people affected and costs associated with illness, death, and mental health effects from wildfire smoke, to help federal agencies understand the full costs of wildfires. More information about the risks of wildfire smoke exposure could help increase attention to the risks and underscore the need for large-scale wildfire mitigation to help reduce these risks in the long term, according to one stakeholder. In addition, Forest Service officials told us that EPA could provide additional information on how climate change will likely affect future wildfire smoke emissions and public health.
- **Pollutants in wildfire smoke under different conditions to help manage the greatest risks.** EPA and others have conducted studies on air quality and public health effects from wildfire smoke under different conditions. However, our analysis of literature and stakeholder views indicates that additional information on these effects could help agencies better understand the relative risks of different types of fires, such as fires burning only vegetation versus fires that also burn human-made structures. Better understanding these risks can help identify the best ways to manage them. For example, a 2022 report by the National Academies found that information about the pollutants in smoke from fires that occur in the

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<sup>80</sup>The September 2021 study on the comparative effects of prescribed burns versus wildfires cited the following additional limitations: (1) the sparse availability of ground-level air quality monitoring data for wildfire smoke; (2) limited understanding of the health implications of exposures to different durations of wildfire smoke; (3) limited accounting of prescribed burn activity over space and time; (4) variability in exposure indicators used to represent wildfire smoke exposure across epidemiologic studies; and (5) relative lack of epidemiologic studies specifically examining the health effects of prescribed burn smoke exposure. Environmental Protection Agency, *Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire*.

<sup>81</sup>Environmental Protection Agency, *Wildland Fire Research Framework 2019 – 2022*, EPA 600/R-19-001 (Apr. 2019).

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wildland-urban interface and that burn homes, cars, and other human-made structures can help decision makers mitigate the potential health impacts of these types of fires.<sup>82</sup>

- **Locations of vulnerable communities to help prioritize wildfire mitigation efforts.** Certain communities may be at particularly high risk for negative air quality and public health effects. One stakeholder we interviewed also noted that some communities may be more prone to poor air quality from wildfire smoke due to their geographic location in rural areas, prevailing winds, and topography. EPA and the CDC have developed information on different communities' vulnerabilities to wildfire smoke.<sup>83</sup> However, EPA officials stated that EPA could better convey information on these types of vulnerabilities to land management agencies for consideration when prioritizing wildfire mitigation efforts.<sup>84</sup>

EPA and land management agency officials said that there are federal efforts to produce these types of information, but they acknowledged that the agencies could better work together to identify additional information needs. For example, federal land management agency officials said that EPA should include federal, tribal, state, and local land managers in its listening sessions with other stakeholders to help identify research needs related to how wildfire risk mitigation can help minimize risks to air quality and public health. According to Forest Service officials, including land managers in these conversations could help make a long-term difference in how EPA and the Forest Service move forward in addressing wildfire smoke research needs.

Based on principles in the *Disaster Resilience Framework*, EPA has opportunities to help reduce disaster risks from wildfire smoke over the long term by identifying and developing additional information on the risks to better target risk management activities. According to the *Disaster Resilience Framework*, federal agencies can reduce disaster risks by

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<sup>82</sup>National Academies of Science, Engineering, and Medicine, *The Chemistry of Fires at the Wildland-Urban Interface (2022)* (Washington, D.C.: The National Academies Press, 2022).

<sup>83</sup>See, for example, Rappold, A. G. et al., "Community Vulnerability to Health Impacts from Wildland Fire Smoke Exposure," *Environmental Science and Technology*, vol. 51, no. 12 (2017): 6674-6682; and Vaidyanathan, A., F. Yip, and P. Garbe, "Developing an Online Tool for Identifying At-risk Populations to Wildfire Smoke Hazards," *Science of the Total Environment*, vol. 619-620 (2018): 376-383.

<sup>84</sup>According to NOAA officials, there is a growing body of research, including among federal agencies, on the effects of wildfire smoke on vulnerable communities.

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providing information on current and future risks and the impact of risk reduction strategies, which can help decision makers better understand overall disaster risk.

The framework also states that information to help analyze the costs and benefits of various disaster risk-reduction alternatives can help decision makers identify and select among such alternatives. Identifying and developing additional information on reducing air quality and public health risks from wildfires through wildfire risk mitigation would align with EPA's strategy of "delivering rigorous scientific research and analyses to inform evidence-based decision-making," which the agency identified in its strategic plan for 2022 through 2026.<sup>85</sup> By identifying and developing such information, in consultation with federal land management agencies, EPA can help ensure that decisions about investments in wildfire risk mitigation better consider the potential for protecting air quality and public health.

#### Provide Incentives for and Support Wildfire Risk Mitigation Activities at the Tribal, State, and Local Levels

EPA has opportunities to provide incentives for and support wildfire risk mitigation at the tribal, state, and local levels. Such incentives and support could begin to address concerns over public health and increasing resource burdens as catastrophic wildfires become more frequent. Eight stakeholders we interviewed expressed concerns that, as wildfire conditions have changed, EPA's current approach of excluding wildfire smoke data from NAAQS compliance determinations through the Exceptional Events Rule and requiring mitigation plans in areas with recurring events does not adequately protect public health. In particular, these stakeholders said that people are still breathing polluted air from wildfire smoke irrespective of NAAQS compliance status. Similarly, EPA officials said that this approach identifies air pollution events beyond the control of the states for purposes of regulation, but does not remove the unhealthy air pollution.

Furthermore, as catastrophic wildfires become more frequent, EPA's current approach could increase certain resource burdens on tribal, state, and local air agencies, as well as EPA. These resource burdens come from the extensive analyses agencies conduct to demonstrate that emissions from wildfires caused an exceedance of one or more NAAQS in order to exclude the air quality monitoring data from use in certain

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<sup>85</sup>Environmental Protection Agency, *Fiscal Year 2022-2026 EPA Strategic Plan*.

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regulatory determinations.<sup>86</sup> Stakeholders we interviewed representing six state and local air agencies said that these analyses are extremely time consuming and resource intensive to prepare. Officials from two of the agencies said that they had to contract assistance to prepare the analyses.<sup>87</sup> In addition, according to EPA officials, providing guidance for and reviewing the analyses demand a significant resource investment from the EPA regional offices. However, EPA officials told us that this process is necessarily stringent because approving an exceptional event allows the affected area to have poor air quality without regulatory ramifications.

Our analysis identified actions EPA could consider to address concerns about public health and increasing resource burdens. These actions involve providing incentives and support for tribal, state, and local air agencies to collaborate with land managers, land owners, and communities to reduce the likelihood of future smoke events from catastrophic wildfires through wildfire risk mitigation.<sup>88</sup> The actions fell into several categories of options, including<sup>89</sup>

- assessing the performance and implementation of the Exceptional Events Rule and considering improvements or alternatives to address any limitations and challenges identified;
- enhancing the effectiveness of mitigation plans required when an area has recurring exceptional events;
- using State Implementation Plans or the exceptional events process to better encourage wildfire risk mitigation; and

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<sup>86</sup>See 40 C.F.R. § 50.14(b)(4). As previously discussed in this report, these analyses are referred to as exceptional event demonstrations.

<sup>87</sup>According to officials from NOAA, states often reach out to NOAA's subject matter experts, as well as subject matter experts from the National Aeronautics and Space Administration for assistance with using satellite data for exceptional event demonstrations.

<sup>88</sup>As noted by EPA officials, prescribed burning itself produces smoke, so these actions should include taking steps to minimize the smoke impacts associated with prescribed burning. EPA officials also said that all agencies need to ensure that actions are taken to prepare communities and individuals for smoke events so their exposures can be reduced.

<sup>89</sup>See app. V for additional examples of actions within these categories. See app. II for the results of our analysis of literature and stakeholder views.

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- removing barriers to wildfire risk mitigation methods such as prescribed burns and cultural burns.<sup>90</sup>

EPA officials also identified some actions that could help provide incentives for and support wildfire risk mitigation. For example, EPA officials said that the agency could enhance communication with its tribal, state, and other partners with land and fire management responsibilities about wildfire risk mitigation that could, over the long term, help reduce the risks of smoke from future catastrophic wildfires. They also said that EPA could consider developing an approach for identifying areas anticipated to have wildfire smoke issues and focusing available resources on those areas to proactively address the issues.<sup>91</sup> Also, to remove barriers to certain wildfire risk mitigation strategies, EPA officials said that the agency could, for example, finalize its proposed rule related to permit requirements for air curtain incinerators. Air curtain incinerators are devices for burning debris collected through methods such as mechanical thinning.<sup>92</sup> According to EPA officials, these devices offer an alternative to prescribed burns and have much fewer emissions than burning debris piles or prescribed burns.

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<sup>90</sup>Tribal communities have historically used fire on their lands as an essential part of their cultures to help maintain ecosystem health. Cultural burns are low-intensity controlled fires, similar to prescribed burns, but unlike prescribed burns, they are administered to achieve specific cultural objectives, often involve an elder or other tribal leader, and utilize traditional ecological knowledge. Cultural burns not only reduce fuels and mitigate the risk of wildfires on tribal lands, but also increase ecosystem resilience; manage crops; protect species of cultural importance for uses such as traditional foods, medicines, and weaving; and preserve culture and language.

<sup>91</sup>EPA regional offices are starting to take such an approach to anticipating when areas are at risk for not attaining NAAQS and are investing resources to help avoid that situation, according to EPA officials. In addition, in the Exceptional Events Rule, EPA noted that it believes that elements of the Basic Smoke Management Practices, which are designed for prescribed burns, could also be practical and beneficial to apply to wildfires for areas likely to experience recurring wildfires. See 40 C.F.R. § 50.14 (Table 1, table note (a)).

<sup>92</sup>An air curtain incinerator is an incineration unit that operates by forcefully projecting a curtain of air across an open, integrated combustion chamber (fire box) or open pit or trench (trench burner) in which combustion occurs. The “air curtain” traps and re-burns the fine particulate matter in smoke, so that it is not released into the air. In 2020, EPA issued a proposed rule that would amend its regulations to eliminate a permitting requirement for certain air curtain incinerators that burn only wood waste, clean lumber, and yard waste. See 85 Fed. Reg. 54,178, 54,194 (Aug. 31, 2020). According to Forest Service officials, the use of air curtain incinerators helps reduce woody fuel on a site but does not necessarily reduce the need for prescribed burns to reduce fine surface fuels.

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However, according to EPA officials, the agency faces constraints in what it can do to provide incentives for and support wildfire risk mitigation. For example, EPA officials told us that the agency's authority to regulate exceptional events under the Clean Air Act is the only authority it has to regulate fire or smoke. They said that the states have to determine the pollution control measures necessary to manage air pollution and comply with the NAAQS.<sup>93</sup> In addition, the Exceptional Events Rule, including its identification of wildfires as "exceptional events," aligns with criteria in the Clean Air Act, according to EPA officials.<sup>94</sup> The officials also said that the rule strikes a balance between protecting public health and ensuring that tribal, state, and local air agencies are not held accountable for pollution sources outside of their control.<sup>95</sup> Such pollution sources may include

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<sup>93</sup>While EPA is responsible for reviewing State Implementation Plans and approving them if they meet applicable requirements, states are responsible for the development of the plans themselves, which are to include, among other things, the control measures, means, or techniques necessary or appropriate to comply with the NAAQS. See 42 U.S.C. §§ 7407(a), 7410(a)(2)(A), (k). EPA officials noted that neither the Clean Air Act nor its implementing regulations require that air agencies include wildfire risk mitigation provisions in their State Implementation Plans. The officials also indicated that they were not aware of any regulations that allow for EPA to make approval of an exceptional event demonstration contingent on air agencies working with land managers and owners on wildfire risk mitigation measures. EPA regulations provide that EPA is not to approve an exceptional event demonstration for prescribed fires, in certain contexts, unless air agencies periodically collaborate with burn managers on a process by which air agencies and land managers will work together to protect public health and manage air quality impacts during the conduct of prescribed fires on wildland. However, according to EPA officials, current regulations do not include similar collaboration requirements related to wildfire exceptional event demonstrations. See 40 C.F.R. § 50.14(b)(3)(ii)(B), (4).

<sup>94</sup>Additionally, the conference report accompanying the 2005 amendments to the Clean Air Act, which, among other things, required EPA to issue regulations governing the review and handling of air quality monitoring data influenced by exceptional events, noted that events such as forest fires should not influence whether a region is meeting its federal air quality goals. H.R. Rep. No. 109-203, at 1066 (2005) (Conf. Rep.).

<sup>95</sup>Under the Clean Air Act, EPA's exceptional events regulations are to follow several principles, including, among other things, the principle that protection of public health is the highest priority, and the principle that air quality data should be carefully screened to ensure that events not likely to recur are represented accurately in all monitoring data and analyses. 42 U.S.C. § 7619(b)(3)(A)(i), (v).

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smoke originating from a distant wildfire outside of the regulated area's jurisdiction.<sup>96</sup>

Nonetheless, EPA officials also told us that the agency recognizes the magnitude of wildfire smoke issues and the growing risks to air quality and public health as the climate changes. In its strategic plan for 2022 through 2026 and its October 2021 Climate Adaptation Action Plan, EPA identified wildfire smoke pollution as a climate change vulnerability that could affect its ability to meet air quality goals.<sup>97</sup> Specifically, the strategic plan identified wildfire smoke as an external factor and emerging issue to be considered in developing strategies to carry out the plan. It stated that the increasing intensity, duration, and scale of wildfires in the western United States as the climate changes worsens air quality across the country. The Climate Adaptation Action Plan described wildfires as climate change vulnerability that could affect EPA's mission, facilities, and operations. It noted that more frequent and severe wildfires due to climate change may increase particulate matter concentrations and diminish air quality.

The Biden administration has directed federal agencies to address such climate-related disaster risks, and our prior work has identified principles and strategies for doing so. Specifically, Executive Order 14008 directed federal agencies to prioritize action on climate change in their policy-making and budget processes and develop plans that identify steps they can take to increase resilience to the impacts of climate change based on their climate vulnerabilities.<sup>98</sup> Our *Disaster Resilience Framework* states

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<sup>96</sup>In addition to smoke from U.S. wildfires crossing state boundaries, smoke from international wildfires can affect air quality in the United States. For example, in 2021, wildfires in Canada created hazardous air quality conditions in Michigan, Minnesota, and Wisconsin, according to Forest Service officials. As a result, the Interagency Response Program deployed air resource advisors to help address the smoke impacts in these states.

<sup>97</sup>Environmental Protection Agency, *Climate Adaptation Action Plan*. EPA released its first Climate Change Adaptation Plan in June 2014, followed by 17 Climate Change Adaptation Implementation Plans prepared by its National Environmental Program Offices, National Support Offices, and 10 regional offices. The 2021 EPA Climate Adaptation Action Plan will be followed by updates to the 17 Implementation Plans to report on its progress since 2014 and identify future actions to address agency-wide priorities.

<sup>98</sup>Executive Order 14008 provides that it is the policy of the administration to deploy the full capacity of federal agencies to combat climate change to implement a government-wide approach that, among other things, increases resilience to the impacts of climate change. 86 Fed. Reg. 7619, 7622 (Feb. 1, 2021).

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that the federal government can enhance disaster resilience by providing incentives—including through regulatory requirements—to promote forward-looking risk reduction efforts.<sup>99</sup> According to the framework, such incentives may include those to make risk reduction measures more viable and attractive and to improve program design to motivate risk reduction actions. Our prior work on risk management indicates that EPA has opportunities to better manage wildfire smoke risks into the future by considering and selecting appropriate risk response options for providing these types of incentives.<sup>100</sup>

As EPA officials stated, implementing many of these options for providing incentives for and supporting wildfire risk mitigation would require close coordination with tribal, state, and local partners. Further, EPA officials said that some options may fall within EPA's existing authority, while others might require congressional action. By working with its tribal, state, and local partners to evaluate options and establish a plan for implementing appropriate options, including by seeking additional authority from Congress if necessary, EPA could more proactively help reduce disaster risks from wildfire smoke over the long term. This could also help EPA fulfill its mission of protecting human health and the environment as the climate changes.

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## Conclusions

Smoke from increasingly frequent catastrophic wildfires affects tens of millions of Americans annually through polluted air that can cause a wide range of health effects. As a part of its mission to protect human health and the environment, EPA has partnered with other federal agencies to manage the growing risks to air quality and public health by developing information and tools to help communities prepare for and respond to wildfire smoke events.

However, EPA's actions have been ad hoc and spread out across different program and regional offices. EPA has opportunities to take a more coordinated approach that establishes the agency's goals, identifies ways to leverage resources, and clarifies stakeholder roles. By developing and documenting a coordinated approach for EPA's actions to help communities prepare for and respond to wildfire smoke events that aligns with leading practices for collaboration, the agency could more effectively target limited resources to the highest priorities.

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<sup>99</sup>[GAO-20-100SP](#).

<sup>100</sup>[GAO-17-63](#).

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In addition to opportunities related to preparedness and response, EPA has opportunities to better manage risks to air quality and public health by enhancing its role in supporting hazard mitigation to reduce the likelihood of future smoke events. These opportunities include

- **Strengthening federal coordination.** EPA and the federal land management agencies have not aligned some of their goals for wildfire risk mitigation. By working together to better align their goals and establish joint strategies for achieving those goals, EPA, the Forest Service, and Interior can create a whole systems approach to more effectively reduce wildfire disaster risks to air quality and public health over the long term. Such alignment of goals is particularly important, as land management agencies plan to increase the scope and scale of wildfire risk mitigation in the coming years through funding provided in the Infrastructure Investment and Jobs Act and Inflation Reduction Act of 2022.
- **Identifying and developing additional risk information.** Although there are several federal efforts to produce information related to the effects of wildfire on air quality and public health, some limitations exist. Additional information could help EPA and its federal partners better inform efforts to manage air quality and public health risks through wildfire risk mitigation. Identifying and developing additional information on reducing these risks through wildfire risk mitigation—in consultation with its federal land management agency partners—could help EPA ensure that decisions about investments in wildfire risk mitigation better consider the potential for protecting air quality and public health.
- **Providing incentives for and supporting tribal, state, and local action.** EPA faces constraints in its ability to provide incentives for and support wildfire risk mitigation at the tribal, state, and local levels to help reduce future wildfire smoke risks. However, our analysis and EPA officials identified a range of actions the agency could take, under its current authority or with additional authority, to provide incentives for and support wildfire risk mitigation. By working with its tribal, state, and local partners to evaluate such options and establish a plan for implementing appropriate options, including by seeking additional authority from Congress if necessary, EPA could more proactively help reduce disaster risks from wildfire smoke over the long term. This could also help EPA fulfill its mission of protecting human health and the environment as the climate changes.

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## Recommendations for Executive Action

We are making a total of six recommendations, including four to EPA and one each to USDA and Interior:

The Administrator of EPA should develop and document a coordinated approach for EPA's actions to help communities prepare for and respond to the air quality and public health risks of wildfire smoke. The approach should align with leading practices for collaboration, including establishing goals, identifying and leveraging resources, and clarifying key stakeholder roles and responsibilities. (Recommendation 1)

The Administrator of EPA should work with the Secretaries of Agriculture and the Interior to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals. (Recommendation 2)

The Secretary of Agriculture should work with the Administrator of EPA and Secretary of the Interior to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals. (Recommendation 3)

The Secretary of the Interior should work with the Administrator of EPA and Secretary of Agriculture to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals. (Recommendation 4)

The Administrator of EPA should, in consultation with federal land management agencies, identify and develop additional information on reducing risks from wildfire smoke to air quality and public health through wildfire risk mitigation. (Recommendation 5)

The Director of EPA's Office of Air and Radiation should work with EPA's tribal, state, and local partners to evaluate options for providing incentives for and supporting wildfire risk mitigation and establish a plan for implementing appropriate options, seeking additional authority from Congress if needed. (Recommendation 6)

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## Agency Comments and Our Evaluation

We provided a draft of this report to EPA, USDA, Interior, NOAA, and the Department of Health and Human Services for review and comment. In its comments reproduced in appendix VI and summarized below, EPA generally agreed with our recommendations to the agency and asked for additional clarification on one of the recommendations. In its comments reproduced in appendix VII and summarized below, USDA generally agreed with our draft report and recommendations. In its comments

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reproduced in appendix VIII and summarized below, Interior concurred with our recommendation to the department. EPA, USDA, and Interior also provided technical comments, which we incorporated as appropriate. NOAA provided technical comments only, which we incorporated as appropriate. The Department of Health and Human Services informed us that it had no comments on the draft report.

In its written comments, EPA stated that in recognition of the magnitude of the air quality problem created by recent wildfire trends, EPA staff and management have informally advanced numerous programs, projects, and collaborations to reduce exposure to smoke and have identified several goals for which the agency intends to take action. Our report discusses much of this work, including the two efforts that EPA highlighted in its letter. EPA also stated that the agency has identified several challenges in its work to address risks from wildfire smoke, and it said its primary challenge is a lack of dedicated funding and organizational structure to house this work.

With regard to our recommendation that EPA develop a coordinated approach for the agency's actions to help communities prepare for and respond to the risks of wildfire smoke, EPA stated that it continues to make progress on its work in this area, and EPA said that this work is underfunded. As we state in the report, implementing our recommendation would help EPA better target its limited resources toward the highest priorities for managing wildfire smoke risks. EPA listed numerous examples of its work, including efforts involving multiple EPA offices. For example, EPA identified an entity established within the agency, referred to as the wildfire sub-lead, which helps coordinate the agency's work related to wildfires. EPA stated that through this sub-lead, the agency is exploring ways to create a more formal structure and strategy to manage wildland smoke work across EPA. The wildfire sub-lead was in its early stages when we were conducting our work, but if it and related efforts align with leading practices for collaboration, they would address our recommendation.

With regard to our recommendation that EPA work with USDA and Interior to better align air quality and land management goals for wildfire risk mitigation, EPA described recent actions it has taken to elevate the public health challenges that arise from both wildfire and prescribed burn smoke. EPA also stated that the agency plans to seek further opportunities to improve interagency collaboration and better mitigate risks from smoke. Ensuring that such actions better align air quality and land management goals and establishing joint strategies with USDA and

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Interior to do so, if implemented effectively, would address our recommendation.

With regard to our recommendation that EPA identify and develop additional information on wildfire smoke risks through wildfire risk mitigation, EPA stated that many of the wildfire risk mitigation methods identified in our report are outside the scope of EPA's work and statutory authority. Our report states that EPA does not implement wildfire risk mitigation methods and, rather, land managers and owners do so. We included further clarifying language that land managers would implement wildfire risk mitigation methods, not EPA. EPA also stated that it is currently advancing additional efforts to reduce risks from wildland fire smoke and will continue to consider ways to communicate wildfire smoke impacts to the public in a timely and effective manner. The efforts EPA described in its letter are important for preparing for smoke events and providing information about smoke risks after fires start. However, as discussed in our report, EPA also has opportunities to provide information to help federal agencies better reduce risks from wildfire smoke through wildfire risk mitigation before fires occur. Efforts to identify and develop such information in consultation with federal land management agencies, if implemented effectively, would address our recommendation.

With regard to our recommendation that EPA's Office of Air and Radiation work with tribal, state, and local partners to evaluate options for providing incentives for and supporting wildfire risk mitigation, EPA asked for clarification about what we mean by "evaluate options for providing incentives." EPA has stated that it does not have the authority to regulate how states choose to structure prescribed burn programs, and we recognize the limited role and authority that EPA has in implementing wildfire risk mitigation. However, as discussed in our report, EPA has opportunities to provide incentives for and support wildfire risk mitigation to help the agency more proactively manage wildfire smoke risks into the future and help fulfill its mission. As discussed in our report, incentives can come in the form of regulatory requirements or other mechanisms that may make certain risk reduction actions more viable or motivate risk-reduction actions. The report identifies a range of potential options that EPA could consider to incentivize and support wildfire risk mitigation. For example, the report identifies the option of assessing the performance and implementation of the Exceptional Events Rule for wildfires and considering alternatives or improvements to address limitations with the current approach.

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In addition to the potential options identified in our report, the actions EPA described in its written comments could also incentivize wildfire risk mitigation, in large part by removing disincentives. These actions are understanding air quality-related barriers to prescribed burns and exploring ways to make the exceptional events process less resource intensive. Finally, EPA recently described another option to incentivize and support wildfire risk mitigation in a February 2023 fact sheet about its proposed rulemaking to revise the annual fine particulate matter NAAQS. In the fact sheet, EPA stated that the agency is committed to partnering with federal land managers and working with other entities to provide necessary tools and resources to engage in responsible wildfire risk reduction activities while ensuring attainment and maintenance of air quality standards to protect public health and welfare under the Clean Air Act. Evaluating these or other potential options to provide incentives for and support wildfire risk mitigation at the tribal, state, and local level, and establishing a plan for implementing appropriate options, would address our recommendation.

In its written comments, USDA stated that the role of the Forest Service in responding to wildfire smoke and protecting public health, as well as the importance of mitigation efforts to address smoke impacts associated with the wildfire crisis, was captured well in our report, and that this role and mitigation are critical to long-term efforts for wildfire risk reduction. USDA also stated that, as the environmental impacts of catastrophic wildfire extend far beyond air quality, effectively implementing our recommendations requires focused collaboration beyond smoke and its impacts to public health. USDA said that only focusing on the effect of wildfire smoke on public health minimizes the breadth of the current crisis impacting the natural and human environment and neutralizes the most effective mitigation tool that also mimics natural processes—prescribed fire, which, according to USDA, can be managed to minimize impacts on public health.

In addition, USDA said that, as air quality standards become more stringent, expanded interagency discussions are needed to ensure the increased use of prescribed burning as the primary mitigation to catastrophic wildfire. USDA said that bolstering current authorities and approaches mentioned in our draft report should balance impacts on firefighter and public safety, water quality, and protection of municipal water supplies, among other environmental effects. As discussed in our report, EPA has raised other concerns related to the increased use of prescribed burning. We believe USDA would have important opportunities to raise these and related issues as it works with EPA and Interior to

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implement our recommendation to better align air quality and land management goals.

In its written comments, Interior stated that to achieve our recommendation to work with EPA and USDA to better align air quality and land management goals, it plans to increase staffing to plan for and manage smoke emissions at the departmental and bureau levels and to work across agencies at the national and regional levels, as well as with tribal, state, and local governments and other external partners. Interior also stated that its management of air quality and wildfire risk mitigation goals will include an increasingly wide array of communications, data management, planning, budget development, wildfire operations, environmental justice efforts, and fuels management implementation, which will be supported by its additional staffing. Interior said these efforts will be initiated this year and will enable coordination of its existing efforts with EPA and USDA and the joint development of further efforts. Interior stated that this will support efforts to increase the pace and scale of fuels management treatments and address the overall wildfire risk reduction objectives included in the Infrastructure Investment and Jobs Act. The actions Interior described, if implemented effectively, would address our recommendation.

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We are sending copies of this report to the appropriate congressional committees; Administrator of EPA; Secretaries of Agriculture, the Interior, Commerce, and Health and Human Services; and other interested parties. In addition, the report is available at no charge on the GAO website at <https://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IX.

A handwritten signature in black ink that reads "Alfredo Gómez". The signature is written in a cursive style with a large, stylized initial "A".

J. Alfredo Gómez  
Director, Natural Resources and Environment

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*List of Addressees*

The Honorable Zoe Lofgren  
Ranking Member  
Committee on Science, Space, and Technology  
House of Representatives

The Honorable Ami Bera  
House of Representatives

The Honorable Suzanne Bonamici  
House of Representatives

The Honorable Brad Sherman  
House of Representatives

The Honorable Mikie Sherrill  
House of Representatives

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# Appendix I: Objectives, Scope, and Methodology

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Our objectives were to (1) describe key federal roles related to managing risks to air quality and public health from wildfire smoke, (2) identify the actions the Environmental Protection Agency (EPA) has taken to help manage these risks and how EPA coordinates with other federal agencies on these actions, and (3) examine how EPA could better help manage these risks.

To (1) describe key federal roles related to managing risks to air quality and public health from wildfire smoke and (2) identify actions EPA has taken to help manage these risks and how EPA coordinates with other federal agencies on these actions, we analyzed relevant laws and regulations. For example, we reviewed the Clean Air Act and Exceptional Events Rule.<sup>1</sup> We also analyzed federal agency documents related to EPA and other federal agency actions to manage risks from wildfire smoke, such as resources in EPA's Smoke-Ready Toolbox, EPA's *Air and Energy Strategic Research Action Plan*, and memoranda of understanding that describe coordination between EPA and other federal agencies.<sup>2</sup> Finally, we analyzed our prior work and other federal reports related to managing risks to air quality and public health from wildfire smoke.

Additionally, we interviewed EPA officials and officials from other federal agencies who are knowledgeable about EPA's actions to manage risks to air quality and public health from wildfire smoke. Specifically, we conducted and analyzed interviews with EPA officials from headquarters program offices that have responsibilities related to managing the risks to air quality and public health from wildfire smoke. These offices included the Office of Air and Radiation, Office of Air Quality Planning and Standards, Office of Research and Development, and Office of Policy. We also interviewed EPA officials from a nongeneralizable sample of five regional offices selected to correspond to areas with recent experience

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<sup>1</sup>42 U.S.C. § 7401 et seq.; 40 C.F.R. §§ 50.14, 51.930.

<sup>2</sup>For EPA's Smoke-Ready Toolbox, see <https://www.epa.gov/smoke-ready-toolbox-wildfires>. For EPA's Strategic Action Research Plan, see Environmental Protection Agency, Office of Research and Development, *Air and Energy Strategic Action Research Plan 2019-2022*, EPA 601K20003 (Mar. 2020).

managing risks to air quality and public health from wildfire smoke.<sup>3</sup> The regions we selected are listed in table 2. In addition, we conducted and analyzed interviews with officials from the Centers for Disease Control and Prevention; Department of the Interior agencies, including the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service; the Forest Service; and the National Oceanic and Atmospheric Administration.

**Table 2: Environmental Protection Agency (EPA) Regions Selected for Interviews**

EPA region	Area served
Region 5 (Great Lakes)	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin, and 35 Tribes
Region 6 (South Central)	Arkansas, Louisiana, New Mexico, Oklahoma, Texas, and 66 Tribes
Region 8 (Mountains and Plains)	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming, and 28 Tribes
Region 9 (Pacific Southwest)	Arizona, California, Hawaii, Nevada, the Pacific Islands, and 148 Tribes
Region 10 (Pacific Northwest)	Alaska, Idaho, Oregon, Washington, and 271 Tribes

Source: GAO. | GAO-23-104723

To examine how EPA could better help manage the risks to air quality and public health from wildfire smoke, we reviewed academic studies, law review articles, and other reports published between January 2016 and September 2021. We identified literature through searching Scopus and ProQuest literature databases using relevant key search terms, such as “wildfire,” “air,” and “pollution.”<sup>4</sup> Finally, we identified additional relevant literature that were cited in literature that we reviewed. The literature database search identified 157 potentially relevant pieces of literature. Two analysts reviewed the abstracts of those 157 pieces of literature, and they agreed upon and selected 21 pieces of literature that discussed potential actions that EPA could take to better manage the risks of wildfire smoke. We also identified two additional reports from our interviews.

<sup>3</sup>EPA has 10 regional offices, which are responsible for partnering with Tribes, states, and territories in their respective regions to execute EPA programs. The 10 regional offices are Region 1 (Boston), Region 2 (New York City), Region 3 (Philadelphia), Region 4 (Atlanta), Region 5 (Chicago), Region 6 (Dallas), Region 7 (Kansas City), Region 8 (Denver), Region 9 (San Francisco), and Region 10 (Seattle). The findings from our interviews with officials from selected regional offices are not generalizable to the regional offices not included in our review.

<sup>4</sup>The ProQuest literature databases are Research Library, SciTech Premium Collection, Sociology Collection, Health & Medical Collection, and Policy File Index.

Finally, we identified five reports through citations in selected articles. In total, we reviewed and analyzed 28 pieces of literature.

We also conducted semi-structured interviews with 15 stakeholders who were either (1) officials from nine tribal, state, and local air agencies with recent experience in managing risks to air quality and public health from wildfire smoke, or (2) six stakeholders with expertise in addressing the risks of wildfire smoke to air quality and public health who can provide a regional or national perspective (see table 3 for affiliations of the stakeholders we interviewed).<sup>5</sup> During these interviews, we obtained information on the effects of wildfires on air quality and public health, current actions to manage risks to air quality and public health from wildfire smoke, and potential actions that EPA could take to manage the risks from wildfire smoke. Our findings from these interviews cannot be generalized to stakeholders we did not interview.

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<sup>5</sup>We considered each entity we interviewed as one stakeholder, even though multiple officials or representatives participated in many of the interviews.

**Table 3: Affiliations of 15 Stakeholders We Interviewed**

<b>Tribes</b>
Hoop Valley Tribe
Yurok Tribe
<b>States</b>
California
Colorado
Ohio
Oregon
Texas
<b>Local areas</b>
Clark County, NV
Missoula City-County, MT
<b>Organizations</b>
American Lung Association
National Tribal Air Association
Stanford Woods Institute for the Environment
Western States Air Resources Council
Wildland Fire Leadership Council
University of California, San Francisco

Source: GAO. | GAO-23-104723

We selected Tribes, states, local areas, and organizations using the following methodology:

- **Tribes.** To select tribal air agencies, we considered the list of federally recognized Tribes we identified through our methodology. We considered recommendations from stakeholders who were knowledgeable about which tribal agencies may have recent experience with managing risks to air quality and public health from wildfire smoke. From the list of tribal agencies identified through these methods, we selected two tribal agencies.
- **States.** To select state air agencies with recent experience in managing risks from wildfire smoke, we analyzed yearly data from the National Interagency Fire Center to create lists of the 10 states that have had the most wildfires per year and the 10 states that had the largest average number of acres burned per year, during the years 2016 through 2020. We also analyzed data from EPA on areas that have submitted exceptional event demonstrations for wildfire smoke since 2016 and identified the corresponding states. We identified the

states that were on all three lists, and we took into consideration recommendations from stakeholders who were knowledgeable about which states may have recent experience with managing risks to air quality and public health from wildfire smoke to select five state agencies.

- **Local areas.** To select local agencies, we used data from EPA to (1) identify areas subject to the mitigation plan requirements in the Exceptional Events Rule,<sup>6</sup> and (2) identify areas that have submitted exceptional event demonstrations for wildfire smoke since 2016. We considered recommendations from stakeholders who were knowledgeable about which local agencies may have recent experience with managing risks to air quality and public health from wildfire smoke. From the list of local entities identified through these methods, we selected two local agencies.
- **Stakeholders with expertise.** To select stakeholders with expertise, we created a preliminary list of individuals or organizations (1) referred from federal, state, local, and tribal officials and other stakeholders; (2) who authored a relevant article or report; or (3) who presented or participated in a panel for a relevant conference, hearing, or webinar. We screened these lists to identify those stakeholders whose work primarily focuses on managing risks to air quality and public health from wildfire smoke and who could provide a regional or national perspective. Then, we selected six stakeholders from the list to represent a variety of organization types (e.g., academic institutions, nongovernmental organizations, and regional organizations) and areas of expertise (e.g., public health, land/fire management, air quality, etc.).

To identify categories of potential actions that EPA could take to better manage the risks of wildfires to air quality and public health, we analyzed the content of the articles we reviewed and records of our interviews. First, an analyst reviewed the literature and interviews and recorded information on potential actions EPA could take in a spreadsheet. A second analyst reviewed the literature, interviews, and spreadsheet content to confirm agreement with the work of the first analyst. Any disagreement between the two analysts was documented and resolved. An analyst then categorized potential actions into broad groups of similar actions, and a second analyst performed an independent review of the

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<sup>6</sup>Specifically, the Exceptional Events Rule, as amended in 2016, requires all states having areas with historically documented or known seasonal events, as defined by regulation, to develop a mitigation plan. 40 C.F.R. § 51.930(b).

categorization. Any disagreement of the assignment of categories between the two analysts was documented and resolved.

Finally, to identify opportunities for EPA to better help manage risks to air quality and public health from wildfire smoke, we analyzed the information we obtained on EPA's current and potential actions using our *Disaster Resilience Framework*, principles for enhancing disaster resilience, selected leading practices for collaboration, and essential elements of enterprise risk management (references to this work are included in the report where the work is discussed).<sup>7</sup>

We conducted this performance audit from January 2021 to March 2023, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>7</sup>For our *Disaster Resilience Framework*, see GAO, *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters*, [GAO-20-100SP](#) (Washington, D.C.: Oct. 23, 2019). For leading practices for collaboration, see GAO, *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, [GAO-12-1022](#) (Washington, D.C.: Sept. 27, 2012). For essential elements of enterprise risk management, see GAO, *Enterprise Risk Management: Selected Agencies' Experiences Illustrate Good Practices in Managing Risk*, [GAO-17-63](#) (Washington, D.C.: Dec. 1, 2016).

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# Appendix II: Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis

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## Potential Actions Related to Preparedness and Response

Our content analysis of literature and stakeholder views identified potential actions the Environmental Protection Agency (EPA) could take to help tribal, state, and local entities better (1) help decision makers and the public understand the risks to air quality and public health from wildfire smoke (see table 4); (2) help prepare their communities for wildfire smoke events (see table 5); and (3) respond to the risks of wildfire smoke during a smoke event (see table 6).

According to EPA officials and our analysis of EPA information and tools that support efforts to help communities prepare for and respond to wildfire smoke, EPA has already started taking some of these potential actions identified by literature and stakeholders. For example, EPA officials said that EPA has developed fact sheets about wildfire smoke and has started translating them into other languages. Several of these potential actions build on existing partnerships that EPA has with other federal agencies. EPA officials told us that the agency faces challenges in taking some of these actions, particularly because the agency has limited resources available for reducing the risks of wildfire smoke.

**Appendix II: Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis**

**Table 4: Potential Research Actions That Could Help Decision Makers and the Public Better Understand the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views**

Category of potential Environmental Protection Agency (EPA) research topics or efforts	Illustrative examples identified by literature and stakeholders	Number of times the category was mentioned by stakeholders or in the literature <sup>a</sup>
Extent and costs of smoke exposure	<ul style="list-style-type: none"> <li>• Mental health impacts when smoke forces people to stay indoors or avoid recreational activities for days or weeks at a time.</li> <li>• Economic costs of illness and deaths from wildfire smoke, particularly in more densely populated areas.</li> <li>• Health effects from smoke exposure in the short term, such as multiple days of exposure to high levels of wildfire smoke, and long term, such as exposure over many seasons.</li> </ul>	Stakeholders: 11 times Literature: 7 times
Pollutants in wildfire smoke under different conditions	<ul style="list-style-type: none"> <li>• Relative toxicity of smoke from fires that burn structures versus fires that only burn vegetation.</li> <li>• How the toxicology of particulate matter in smoke compares to other sources of particulate matter.</li> <li>• Factors that affect differences in the quantity, composition, toxicity, and duration of wildfire smoke.</li> </ul>	Stakeholders: 3 times Literature: 5 times
Interagency and cross-disciplinary research	<ul style="list-style-type: none"> <li>• EPA could serve as a centralized coordinator for interagency research on wildfire smoke and its effects and public health.</li> <li>• EPA could help bridge the gap between Tribes and researchers to help understand Tribes' needs, including research needs.</li> </ul>	Stakeholders: 3 times Literature: 4 times
Comparative effects of prescribed burns and wildfires	<ul style="list-style-type: none"> <li>• Relative health and air quality effects from controlled, prescribed burns versus uncontrolled, catastrophic wildfires.</li> <li>• Trade-offs between air quality and other benefits of using prescribed burns or letting wildfires burn to achieve land management goals.</li> </ul>	Stakeholders: 2 times Literature: 3 times
Information on vulnerable communities	<ul style="list-style-type: none"> <li>• Differences in health effects among vulnerable populations of people, such as the elderly or those with preexisting conditions.</li> <li>• Disproportionate impacts of wildfire smoke on different communities.</li> </ul>	Stakeholders: 2 times Literature: 3 times
Relative health effects of wildfire mitigation strategy alternatives	<ul style="list-style-type: none"> <li>• How different land management strategies can potentially affect future wildfire smoke and resulting health effects.</li> <li>• Cost-effectiveness of alternative land management strategies, compared to prescribed burns when health effects are considered.</li> </ul>	Stakeholders: 3 times

Source: GAO analysis of literature and stakeholder views. | GAO-23-104723

<sup>a</sup>We interviewed a total of 15 stakeholders—six stakeholders with experience related to managing wildfire smoke at a national or regional scale from various organization types (academia, nonprofit, regional groups, etc.) and different areas of expertise (air quality, public health, forest management); and officials from nine tribal, state, and local entities in areas that had recent experience in managing wildfire smoke. We performed a literature search and identified 28 pieces of literature and reports from stakeholders to examine how EPA could better help manage the risks to air quality and public health from wildfire smoke.

**Appendix II: Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis**

**Table 5: Potential Actions That Could Help the Environmental Protection Agency (EPA) Build on Existing Actions and Partnerships to Help Communities Prepare for the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views**

Category of potential EPA preparedness actions	Illustrative examples identified by literature and stakeholders	Number of times the category was mentioned by stakeholders or in the literature <sup>a</sup>
Provide additional information for communities on preparing for wildfire smoke events	<ul style="list-style-type: none"> <li>• Translate science into more straightforward and actionable information to improve the public’s knowledge of the health risks of wildfire smoke and how to prepare for those risks.</li> <li>• Make information more accessible to more people, including vulnerable communities, such as by creating fact sheets and other communication materials in additional languages.</li> <li>• Customize information and support for individuals living with different types of health risks, such as those with certain medical conditions, and for spaces with different types of infrastructure, such as different air filtration systems.</li> </ul>	Stakeholders: 9 times Literature: 4 times
Provide additional assistance for communities to prepare for wildfire smoke events	<ul style="list-style-type: none"> <li>• Provide additional resources, such as grant funding, for states and communities to develop smoke-ready communities—communities that are educated and prepared for the risks of wildfire smoke before the wildfire occurs.</li> <li>• Provide additional assistance for communities to address wildfire smoke effects, such as by helping communities procure air filters or set up cleaner air shelters—public spaces where people can seek relief from wildfire smoke.</li> </ul>	Stakeholders: 9 times Literature: 4 times
Integrate actions across disciplines and missions (e.g., air quality, public health, emergency management, etc.) to help communities prepare for wildfire smoke events	<ul style="list-style-type: none"> <li>• Enhance coordination with other federal agencies on smoke preparedness, so that wildfire smoke receives the same level of response as other natural disasters such as hurricanes.</li> <li>• Continue working with organizations such as ASHRAE (formerly known as the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) to improve standards for indoor air quality for public spaces like schools.</li> </ul>	Stakeholders: 1 time Literature: 4 times

Source: GAO analysis of literature and stakeholder views. | GAO-23-104723

<sup>a</sup>We interviewed a total of 15 stakeholders—six stakeholders with experience related to managing wildfire smoke at a national or regional scale from various organization types (academia, nonprofit, regional groups, etc.) and different areas of expertise (air quality, public health, forest management); and officials from nine tribal, state, and local entities from areas that had recent experience in managing wildfire smoke. We performed a literature search and identified 28 pieces of literature and reports from stakeholders to examine how EPA could better help manage the risks to air quality and public health from wildfire smoke.

**Appendix II: Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis**

**Table 6: Potential Actions That Could Help the Environmental Protection Agency (EPA) Build on Existing Actions to Help Communities Respond to the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views**

Category of potential EPA response actions	Illustrative examples identified by literature and stakeholders	Number of times the category was mentioned by stakeholders or in the literature <sup>a</sup>
Build more capacity for air quality monitoring during wildfire smoke events	<ul style="list-style-type: none"> <li>• Provide resources, through means such as grants and training, to help communities purchase, use, and maintain smoke monitors.</li> <li>• Expand air quality monitoring by providing additional sensors in rural and tribal areas, where monitors are typically sparse.</li> </ul>	Stakeholders: 6 times Literature: 4 times
More effectively communicate information on smoke risks during wildfire smoke events	<ul style="list-style-type: none"> <li>• Improve consistency of smoke messaging across levels of government to create unified messages to the public.</li> <li>• Provide more guidance to help the public understand how to interpret and make decisions based on public air quality data, including the Air Quality Index.<sup>b</sup></li> <li>• Provide guidance to strategically communicate information to populations that are not receiving existing messages and populations that have specific health risks from wildfire smoke, such as children, and how to reduce those risks.</li> </ul>	Stakeholders: 5 times Literature: 4 times
Improve smoke modeling and forecasting capabilities for tribal, state, and local entities to better understand where the smoke may travel	<ul style="list-style-type: none"> <li>• With other federal agencies, such as the Forest Service and National Oceanic and Atmospheric Administration, improve or refine air pollution models, such as by making them more user-friendly.</li> <li>• Use additional data, such as satellite data, in models used to forecast wildfire smoke.</li> </ul>	Stakeholders: 4 times Literature: 4 times
Improve and expand technology for air quality monitoring during wildfire smoke events	<ul style="list-style-type: none"> <li>• Help nonfederal entities, such as states, access and use technologies to gather more information on the composition of fine particulate matter.</li> <li>• Improve technology to collect more robust data from air quality sensors and more easily create visualizations from these data.</li> </ul>	Stakeholders: 5 times Literature: 2 times
Support research on interventions to inform how best to respond to wildfire smoke	<ul style="list-style-type: none"> <li>• Support research on risk communication to inform communication strategies, including on how to effectively convey air quality alerts.</li> <li>• Support research on what interventions for wildfire smoke may be the most effective, sufficient, and feasible for different communities and individuals.</li> </ul>	Stakeholders: 2 times Literature: 2 times

Source: GAO analysis of literature and stakeholder views. | GAO-23-104723

<sup>a</sup>We interviewed a total of 15 stakeholders—six stakeholders with experience related to managing wildfire smoke at a national or regional scale from various organization types (academia, nonprofit, regional groups, etc.) and different areas of expertise (air quality, public health, forest management); and officials from nine tribal, state, and local entities from areas that had recent experience in managing wildfire smoke. We performed a literature search and identified 28 pieces of literature and reports from stakeholders to examine how EPA could better help manage the risks to air quality and public health from wildfire smoke.

<sup>b</sup>EPA uses a tool called the Air Quality Index to communicate daily air quality. The tool uses color-coded categories and provides statements that describe the air quality in the area and information on how the air quality may impact the health of different groups.

**Appendix II: Potential Actions for EPA to Better Manage Wildfire Smoke Risks, Identified by Our Analysis**

**Potential Actions Related to Hazard Mitigation**

Our content analysis identified potential actions EPA could consider to provide incentives for and support tribal, state, and local air agency efforts to collaborate with land managers, land owners and communities to reduce the likelihood of future smoke events from catastrophic wildfires through wildfire risk mitigation. According to EPA officials, the agency does not currently have the authority to take some of these actions (for additional information, see app. V).

**Table 7: Potential Actions That Could Help the Environmental Protection Agency (EPA) Provide Incentives for and Support Wildfire Risk Mitigation to Manage the Risks to Air Quality and Public Health from Wildfire Smoke, Identified by Content Analysis of Literature and Stakeholder Views**

Category of potential EPA actions to provide incentives for and support wildfire risk mitigation	Illustrative examples identified by literature and stakeholders <sup>a</sup>	Number of times the category was mentioned by stakeholders or in the literature <sup>b</sup>
Remove barriers to wildfire risk mitigation <sup>c</sup>	<ul style="list-style-type: none"> <li>• Generate incentives for innovative use of woody debris—waste wood produced by activities such as logging and land clearing.</li> <li>• Encourage air quality agencies to facilitate prescribed burn permitting, such as through eliminating fees for prescribed burn permits, issuing permits for a broader area, or standardizing permitting processes that currently differ across jurisdictions, such as states.</li> <li>• Provide support for cultural burning—which is part of Tribes’ traditional ecological knowledge and used for multiple purposes, including reducing fuels.</li> </ul>	Stakeholders: 7 times Literature: 7 times
Assess the performance and implementation of the Exceptional Events Rule, and consider improvements or alternatives	<ul style="list-style-type: none"> <li>• Review the consideration of wildfire as an “exceptional event,” which, if a demonstration of a specific wildfire is approved as such an event, excludes air quality data influenced by the wildfire from determination of compliance with National Ambient Air Quality Standards<sup>d</sup></li> <li>• Develop a regulatory approach that considers the transboundary nature of wildfire smoke, which can cross state and international boundaries.</li> <li>• Identify new actions that can be taken to reduce risks from wildfire smoke events, which are no longer “exceptional.”</li> </ul>	Stakeholders: 6 times Literature: 4 times
Use air quality management tools to better incentivize wildfire mitigation	<ul style="list-style-type: none"> <li>• As a prerequisite for approving an exceptional events demonstration, require states to take wildfire mitigation actions through land management.</li> <li>• Require air agencies to include wildfire mitigation provisions in their State Implementation Plans, such as provisions to work with utilities to fix problematic power lines that could start a fire<sup>e</sup></li> <li>• Enhance the effectiveness of exceptional event mitigation plans, such as by requiring them to include provisions for states, potentially through air agencies to work with land managers and owners to reduce wildfire risk<sup>f</sup></li> </ul>	Stakeholders: 4 times Literature: 4 times

Source: GAO analysis of literature and stakeholder views. | GAO-23-104723

<sup>a</sup>According to EPA officials, the agency would face constraints in implementing many of these actions with its current authority.

<sup>b</sup>We interviewed a total of 15 stakeholders—six stakeholders with experience related to managing wildfire smoke at a national or regional scale from various organization types (academia, nonprofit, regional groups, etc.) and different areas of expertise (air quality, public health, forest management);

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**Appendix II: Potential Actions for EPA to  
Better Manage Wildfire Smoke Risks, Identified  
by Our Analysis**

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and officials from nine from tribal, state, and local entities in areas that had recent experience in managing wildfire smoke. We performed a literature search and identified 28 pieces of literature and reports from stakeholders to examine how EPA could better help manage the risks to air quality and public health from wildfire smoke.

<sup>c</sup>According to EPA officials, protecting public health needs goes hand in hand with removing barriers to prescribed burning.

<sup>d</sup>Under the Clean Air Act, an “exceptional event” is an event that affects air quality, is not reasonably controllable or preventable, is an event caused by human activity that is unlikely to recur at a particular location or a natural event, and is determined by EPA through a process established by regulation to be an exceptional event. 42 U.S.C. § 7619(b)(1). EPA has issued regulations determining several types of events, including wildfires, to generally be exceptional events. See 40 C.F.R. § 50.14(b)(4).

<sup>e</sup>State Implementation Plans describe how each state will attain and maintain compliance with National Ambient Air Quality Standards.

<sup>f</sup>Under the Exceptional Events Rule, all states having areas with historically documented or known seasonal events, which include events of the same type and pollutant that recur in a 3-year period, are required to develop a mitigation plan. 40 C.F.R. § 51.930(b)(1).

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# Appendix III: Additional Information on Wildfire Smoke Pollutants and Health Effects

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Fine particulate matter is the main pollutant of concern from wildfire smoke with regard to human health, according to the Environmental Protection Agency (EPA). However, wildfire smoke contains a complex mixture of other pollutants that degrade air quality and cause health effects. Additional pollutants from wildfire smoke include

- **Ozone.** Wildfires can produce volatile organic compounds and nitrogen oxides, which react in sunlight to create ground-level ozone. Ozone can cause health effects such as inflammation of the airways and shortness of breath.
- **Air toxics.** Wildfire smoke can include air toxics, which are pollutants known or suspected to cause cancer or other serious health effects.<sup>1</sup> The amount and types of air toxics in smoke depend on factors such as the type of vegetation burned and whether structures or other human-made materials are burned. Different air toxics can have different health effects.
- **Carbon monoxide.** Carbon monoxide—a colorless and odorless gas—causes effects ranging from chest pain to disorientation, visual impairment, and death. Carbon monoxide may particularly affect populations very close to the fire, such as firefighters.

According to EPA, certain groups of people may potentially be more at risk from various health effects from wildfire smoke exposure (see table 8). Additionally, the Centers for Disease Control and Prevention notes on its website that people with COVID-19 may be at increased risk of health effects from exposure to wildfire smoke due to compromised heart and lung function related to COVID-19. Wildfire smoke events can cause mental health effects when, for example, people experience a reduction in physical activity and isolation from remaining indoors.

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<sup>1</sup>EPA uses the term “hazardous air pollutants” for air toxics that are specifically listed as relevant to programs in the Clean Air Act. Some air toxics are not included on the list of hazardous air pollutants.

**Appendix III: Additional Information on Wildfire  
Smoke Pollutants and Health Effects**

**Table 8: Populations Potentially More at Risk of Health Effects from Wildfire Smoke Exposure**

<b>Population</b>	<b>Why this population is potentially more at risk</b>	<b>Potential health effects from wildfire smoke exposure</b>
Children	Children’s lungs are still developing, and children may spend more time outdoors, engage in more vigorous activity, and inhale more air per pound of body weight compared to adults.	<ul style="list-style-type: none"> <li>• Breathing difficulties</li> <li>• Chest tightness</li> <li>• Decreased lung function</li> </ul>
Older adults	Older adults are more likely to have preexisting lung and heart diseases and less robust defense mechanisms.	<ul style="list-style-type: none"> <li>• Exacerbation of heart and lung diseases</li> </ul>
Outdoor workers	Outdoor workers may spend extended periods of time exposed to high concentrations of wildfire smoke.	<ul style="list-style-type: none"> <li>• Breathing difficulties</li> <li>• Exacerbation of heart and lung diseases</li> </ul>
People with asthma and other respiratory diseases	Wildfire smoke can trigger severe respiratory responses in those with compromised health status because of underlying respiratory diseases.	<ul style="list-style-type: none"> <li>• Breathing difficulties</li> <li>• Exacerbation of chronic lung diseases, such as asthma</li> </ul>
People with cardiovascular disease	Wildfire smoke can trigger severe cardiovascular events in those with compromised health status because of underlying cardiovascular diseases.	<ul style="list-style-type: none"> <li>• Conditions such as heart attack and stroke</li> <li>• Worsening heart failure</li> <li>• Abnormal heart rhythms</li> </ul>
People with fewer resources	Less access to health care could lead to higher likelihood of untreated or insufficient treatment of underlying health conditions such as asthma and diabetes. Less access to measures to reduce smoke exposure—such as indoor air filtration—could lead to higher smoke exposure.	<ul style="list-style-type: none"> <li>• Breathing difficulties</li> <li>• Exacerbation of heart and lung diseases</li> </ul>
Pregnant people	Pregnancy-related changes, such as increased breathing rates, may increase vulnerability to wildfire smoke. In addition, during critical development periods, the fetus may experience vulnerability to wildfire smoke exposure.	<ul style="list-style-type: none"> <li>• Low birth weight</li> <li>• Preterm birth</li> </ul>
Firefighters	Firefighters may spend extended periods of time in close proximity to wildfires and be exposed to high concentrations of wildfire smoke.	<ul style="list-style-type: none"> <li>• Health effects such as increased risk of heart disease or cancer</li> </ul>
Individuals in tribal communities	Tribal nations and Indigenous people are often located in areas with higher-than-average wildfire risk and may have fewer resources available to adapt.	<ul style="list-style-type: none"> <li>• Various health effects depending on the individual</li> </ul>

Source: GAO summary of information from the Environmental Protection Agency, California Air Resources Board, California Office of Environmental Health Hazard Assessment, Centers for Disease Control and Prevention, and Forest Service. | GAO-23-104723

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# Appendix IV: Additional Information on EPA's Support of Efforts to Prepare for and Respond to Wildfire Smoke Events

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The Environmental Protection Agency (EPA) has contributed to a range of information and tools to support federal and nonfederal efforts aimed at helping communities understand the air quality and health risks from wildfire smoke and prepare for and respond to smoke events. The tools that EPA has provided include (1) research to help decision makers and the public understand air quality and public health risks from wildfire smoke, (2) planning information and tools to help communities prepare for wildfire smoke events, and (3) air quality information and tools to help support wildfire smoke response efforts.

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## Research to Help Decision Makers and the Public Understand Air Quality and Public Health Risks from Wildfire Smoke

EPA has conducted, supported, and partnered on research on topics, including

- **Wildfire smoke emissions and air quality impacts.** EPA has coordinated with other agencies and institutions, such as the Joint Fire Science Program, the National Oceanic and Atmospheric Administration (NOAA), and academic institutions, on research to identify the different amounts and types of pollutants in wildfire smoke. For example, with support from the Joint Fire Science Program, EPA conducted research to compare particulate matter in smoke from various vegetation types and from flaming fires versus smoldering fires to show differences in effects on air quality.
- **Health effects of wildfire smoke.** EPA has conducted research aimed at understanding health effects of wildfire smoke in general and on different populations, which can help target strategies to protect public health. For example, EPA has produced studies on the toxicity of wildfire smoke and how wildfire smoke exposure is associated with various health outcomes, such as cardiovascular health in individuals age 65 and older. EPA has also conducted research to project changes in air quality and health effects from wildfire smoke under different future climate scenarios. In addition, in 2017, EPA researchers published a Community Health Vulnerability Index to identify the locations of communities most vulnerable to smoke exposure and smoke-related health effects.<sup>1</sup> This type of information can be used to target strategies to help those vulnerable communities, according to the study.
- **Role and relative health effects of prescribed burns.** EPA has examined the air quality and public health effects of prescribed burns

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<sup>1</sup>Rappold, A. G. et al., "Community Vulnerability to Health Impacts from Wildland Fire Smoke Exposure," *Environmental Science and Technology*, vol. 51, no. 12 (2017): 6674-6682.

compared to wildfire. For example, in September 2021, EPA published the *Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire (CAIF): A Case Study in the Western U.S.* in collaboration with the Forest Service, Department of the Interior, and National Institute of Standards and Technology.<sup>2</sup> The report characterized and compared the air quality and public health effects of wildfires that burned in two areas that had been treated with prescribed burns with hypothetical scenarios of how wildfires may have burned with different amounts of prescribed burns in the areas. Among other findings, the report concluded that well-designed prescribed burns may be able to reduce the effects of subsequent wildfires on air quality and public health. The study aimed to inform future land management and fire management strategies and also identified limitations in the current understanding of smoke from prescribed burns and wildfires.

- **Air quality sensor technology.** EPA has several actions to test and develop air quality sensor technologies to understand and enhance their ability to measure fine particulate matter and other smoke pollutants.<sup>3</sup> For example, as part of its Mobile Ambient Smoke Investigation Capability study launched in May 2019, EPA collects air measurements from regulatory monitors and low-cost sensors to determine how they perform during wildfires. In addition, in 2017, EPA—in partnership with the Forest Service, National Park Service, NOAA, National Aeronautics and Space Administration, and the Centers for Disease Control and Prevention—initiated a Wildland Fire Air Sensors Challenge, a competition aimed at stimulating innovation in the development of multipollutant sensors that can operate in wildfire conditions. In June 2020, EPA awarded grants for continued development and commercialization of the winning sensors.

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<sup>2</sup>Environmental Protection Agency, Center for Public Health and Environmental Assessment, Office of Research and Development, *Comparative Assessment of the Impacts of Prescribed Fire Versus Wildfire (CAIF): A Case Study in the Western U.S.*, EPA/600/R-21/197 (Research Triangle Park, N.C.: 2021). This work was coordinated through the Wildland Fire Leadership Council.

<sup>3</sup>In November 2020, we found that low-cost sensors were increasingly available as a tool to measure air quality and provide information in areas not currently monitored. However, we also found that there were concerns about the quality of data they produce, and that users need additional information on accepted applications and proper use of sensors. See GAO, *Air Pollution: Opportunities to Better Sustain and Modernize the National Air Quality Monitoring System*, GAO-21-38 (Washington, D.C.: Nov. 12, 2020). In addition, we reported on air quality sensor technology challenges and opportunities in GAO, *Science & Tech Spotlight: Air Quality Sensors*, GAO-21-189SP (Washington, D.C.: Dec. 7, 2020).

- **Strategies to protect public health.** EPA researchers are working with various partners, including federal, tribal, state, and local agencies, to conduct studies that evaluate the effectiveness of different strategies to communicate information about air quality and health risks and implement measures to reduce exposure to wildfire smoke. For example, EPA is conducting the Wildfire Advancing Science Partnerships for Indoor Reductions of Smoke Exposures study in partnership with the Missoula City-County Health Department in Montana, University of Montana, and Hoopa Valley Tribe located in California. According to the study's authors, the study can inform air quality managers, public health professionals, and others about strategies—such as how to design and operate air filtration and heating, ventilation, and air-conditioning (HVAC) systems—to reduce indoor fine particulate matter concentrations and protect indoor air quality and public health during wildfire smoke events. In addition, EPA co-sponsored with other federal, tribal, state, and local agencies the “Cleaner Indoor Air during Wildfires Challenge” to encourage development of effective, low-cost approaches to removing fine particulate matter from indoor air. Also, EPA awarded more than \$9 million in grant funding, through its Science to Achieve Results program, for researchers to study interventions and communication strategies to reduce exposures and health risks of wildfire smoke.<sup>4</sup>

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Planning Information and  
Tools to Help Communities  
Prepare for Wildfire  
Smoke Events

EPA provides information and tools to help communities prepare for wildfire smoke events, such as

- **Educational materials.** EPA provides educational materials—developed in partnership with other federal agencies, state agencies, and local organizations—to help communities and the public prepare for wildfire smoke events and reduce their exposure to smoke. For example, EPA worked with CDC, Forest Service, California Air Resources Board, and California Office of Environmental Health Hazard Assessment to produce the 2019 Wildfire Smoke Guide for Public Health Officials.<sup>5</sup> This guide provides tribal, state, and local public health officials with information to help them establish plans for communicating health risks and taking measures to protect the public when wildfire smoke is present. EPA also provides educational

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<sup>4</sup>EPA awarded 12 grants for this body of research, which is to be conducted between 2021 and 2025, according to agency documents.

<sup>5</sup>Environmental Protection Agency, Office of Air Quality Planning and Standards, Health and Environmental Impacts Division, *Wildfire Smoke: A Guide for Public Health Officials, Revised 2019*, EPA-452/R-19-901 (Research Triangle Park, N.C.: Aug. 2019).

materials for the public on its website. Such materials include health fact sheets—developed with partners such as the CDC, Forest Service, and California Air Resources Board—on reducing an individual's smoke exposure, protecting children from wildfire smoke, and indoor air filtration. EPA has also developed educational materials on indoor air quality issues, including webpages, a video demonstrating how to create a clean room at home, and instructions on how to assemble an air cleaner from a box fan and high-efficiency air filter. Many of these materials have been translated into nine languages to reach more U.S. communities, according to EPA officials.

- **Communication, outreach, and grant support.** EPA conducts outreach to tribal, state, and local partners and the public to help raise awareness of wildfire smoke issues and enhance communities' abilities to plan for smoke events. For example, EPA's Office of Radiation and Indoor Air, Office of Research and Development, and three regional offices we interviewed have conducted outreach through means such as webinars, including one presented entirely in Spanish, on using N95 respirators and indoor air filtration during wildfire smoke events. The offices have also developed targeted messaging on health risks from wildfire smoke for specific audiences, such as tribal communities or schools, and they have posted information on social media about protecting one's health during wildfire season.

In addition, EPA Region 10 coordinates an annual smoke management meeting focused on raising awareness of smoke issues and sharing new tools and resources.<sup>6</sup> The meeting brings together people from air quality, public health, and land management agencies at the federal, tribal, state, and local levels, as well as researchers, according to EPA officials. Also, an EPA regional office co-leads a workgroup that brings together federal, state, and local officials to discuss ongoing smoke communications work. According to EPA officials, the group discusses topics such as coordinated messages related to smoke and needs and gaps around smoke communication. Finally, EPA has awarded grants to help fund efforts to enhance community preparedness. For instance, in October 2022, EPA

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<sup>6</sup>EPA Region 10 serves Alaska, Idaho, Oregon, Washington, and 271 Tribes.

announced a \$4 million grant program to help communities better prepare buildings to protect occupants from wildfire smoke.<sup>7</sup>

- **Guidelines for protecting building occupants from smoke.** EPA staff are serving on an ASHRAE committee to create a guideline for protecting building occupants from wildfire and prescribed burn smoke.<sup>8</sup> The guideline will apply to commercial, institutional, and similar types of buildings. The committee developed interim guidance that describes actions that should be taken before and during a smoke event, a checklist to determine if a building's HVAC system is ready for a smoke event, and elements that building managers should include in plans to ensure that a building is ready for a smoke event.

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## Air Quality Information and Tools to Help Support Wildfire Smoke Response Efforts

EPA's actions to provide and partner on providing air quality information and tools to help communities respond during wildfire smoke events include

- **Fire and Smoke Map.** EPA and the Forest Service partnered to develop an online platform and interactive map that shows near real-time air quality data from air quality monitors and low-cost sensors, along with the locations of wildfires and satellite information on where smoke is traveling. According to EPA officials, this map is used extensively by the public during smoke events. The map reports the information through an Air Quality Index that uses color-coded categories to convey the levels of health concern posed by the amount of air pollution. The map also includes links to smoke outlooks that are produced by air resource advisors deployed to a wildfire by the Interagency Response Program. Two stakeholders we interviewed said that EPA's actions to incorporate data from low-cost sensors into the map have been extremely valuable in providing air quality information in areas not covered by monitors operated by air quality agencies.
- **Access to low-cost sensors and other monitoring technology.** EPA has taken various actions to increase air quality monitoring in communities that otherwise do not have sufficient air quality data. For

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<sup>7</sup>EPA has also provided grants to Tribes and states for smoke preparedness through the Clean Air Act and Indian Environmental General Assistance Program, according to EPA officials.

<sup>8</sup>ASHRAE is an organization focused on building systems, energy efficiency, indoor air quality, and sustainability for the built environment. The organization conducts research and writes standards, among other things. ASHRAE was formerly known as the American Society of Heating, Refrigerating, and Air-Conditioning Engineers.

example, in 2021, EPA launched the Wildfire Smoke Air Monitoring Response Technology pilot program to enhance the availability of air quality monitoring equipment in areas affected by wildfire smoke that have limited or no established air quality monitoring equipment. The program loans air quality sensors and mobile monitoring systems that can be attached to vehicles.<sup>9</sup> The equipment is also used by air resource advisors deployed through the Interagency Response Program.<sup>10</sup> In addition, Region 10 has programs for loaning portable sensors to air quality officials and the public in tribal and rural communities. The sensors can be used to provide air quality information during wildfire smoke events.<sup>11</sup>

- **Smoke forecasting and air quality modeling.** EPA partners with other federal agencies to help develop information about where smoke could travel and how it could affect air quality. For example, EPA has provided air resource advisors for the Interagency Response Program, which is the primary source of smoke forecasting for individual fires using models developed by the Forest Service.<sup>12</sup> In addition, EPA and NOAA collaborate to forecast future air quality conditions across the United States, including how wildfires could affect air quality in the coming 72 hours.<sup>13</sup>

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<sup>9</sup>EPA's Vehicle Add-on Mobile Monitoring System was custom built by EPA to combine a fine particulate matter monitor, global positioning system unit, and other equipment. It can be attached to any vehicle to obtain mobile measurements of air quality, which firefighting personnel and air quality advisors can use to compare against smoke models.

<sup>10</sup>In addition, since the early 2000s, the Interagency Response Program has maintained a cache of emergency monitors for fine particulate matter and carbon monoxide for use during wildfire smoke events.

<sup>11</sup>EPA regional offices have developed air sensor loan programs independently and through collaborations with libraries, Tribes, museums, and others to help the public learn about air quality in their communities. The goals, structure, eligibility, and available equipment vary among the programs.

<sup>12</sup>Other federal agencies, including the CDC and NOAA, have also provided air resource advisors.

<sup>13</sup>NOAA officials said that this partnership helps provide short-term air quality predictions and alerts that can inform people of the need to take protective action ahead of dangerous smoke events. NOAA has multiple wildfire smoke models that can provide information to help manage risks from wildfire smoke, according to NOAA officials. For example, NOAA's Rapid Refresh-Smoke model simulates the emissions and transport of smoke from wildfires and predicts the impact of smoke on the weather.

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# Appendix V: Additional Information on Potential EPA Actions to Provide Incentives for and Support Wildfire Risk Mitigation

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Our analysis of literature and stakeholder views identified actions the Environmental Protection Agency (EPA) could consider to provide incentives for and support tribal, state, and local air agencies' efforts to collaborate with land managers, land owners, and communities to reduce the likelihood of future smoke events from catastrophic wildfires through wildfire risk mitigation. The actions identified through our analysis of literature and stakeholder views included the following options (for an overview of the results of our analysis, see app. II):

- **Assessing the performance and implementation of the Exceptional Events Rule and considering improvements or alternatives.** According to our analysis of literature and stakeholder views, EPA could consider a new approach for managing risks to air quality and public health from wildfire smoke or develop a regulatory approach that considers the transboundary nature of wildfire smoke. As one stakeholder noted, identifying a specific solution for an alternative approach is very challenging, but EPA could consider alternatives. For example, according to stakeholders, EPA could consider a more holistic approach that encourages wildfire prevention and mitigation, or an innovative approach that addresses wildfire smoke outside of the Exceptional Events Rule.
- **Using certain air quality management tools to better encourage wildfire mitigation.** Our analysis of literature and stakeholder views identified actions EPA could take to better use existing air quality management tools. For example, according to our analysis, EPA could consider requiring air agencies to include wildfire risk mitigation provisions in their State Implementation Plans.<sup>1</sup> One of these stakeholders suggested that these plans could include programs for state air agencies to work with land managers and utilities to fix problematic power lines or make the electrical grid more resilient to prevent fires from starting. Additionally, according to our analysis, EPA could ask air agencies to show, as a prerequisite for approving a wildfire exceptional event demonstration, that air agencies had taken

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<sup>1</sup>According to EPA officials, neither the Clean Air Act nor implementing regulations currently require that air agencies include wildfire mitigation provisions in their State Implementation Plans. They said that, while EPA is responsible for reviewing State Implementation Plans or Tribal Implementation Plans that may include wildfire mitigation provisions or smoke management programs, the tribal, state, or local agency determines whether or not to allow individual burns. The officials also said that EPA agrees that regular communication between fire-related federal, state, and other partners is imperative to successful implementation of air quality and fire goals.

steps to coordinate with land managers on implementing wildfire mitigation actions.

- **Enhancing the effectiveness of exceptional event mitigation plans.** According to EPA officials, EPA verifies that mitigation plans contain certain required content but does not evaluate the implementation or the effectiveness of the plans.<sup>2</sup> Officials we interviewed from three state or local air agencies required by EPA to have mitigation plans said that the plans typically document wildfire smoke response strategies that were already in place, such as how to communicate with the public during smoke events.<sup>3</sup> An official we interviewed from one agency said that the agency had almost forgotten that it had the plan since the plan did not require the agency to take any new actions. According to our analysis, to enhance the effectiveness of the plans, EPA could require that the plans contain provisions for state air agencies to work with land managers and land owners to reduce wildfire risks. EPA, in the preamble to the 2016 final rule amending the Exceptional Events Rule, notes that forest management plans—which land managers can use to identify goals and objectives for wildfire mitigation, among other things—might satisfy the mitigation elements for wildfires.<sup>4</sup> Another stakeholder said that EPA could consider requiring more mitigation plans for wildfire smoke and making them more effective and enforceable.<sup>5</sup>
- **Removing barriers to wildfire risk mitigation.** According to our analysis of literature and stakeholder views, EPA could remove some

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<sup>2</sup>The Exceptional Events Rule requires all states having areas with historically documented or known seasonal events, which include events of the same type and pollutant that recur in a 3-year period, to develop a mitigation plan. 40 C.F.R. § 51.930(b)(1).

<sup>3</sup>When required to develop mitigation plans, air agencies must include in such plans certain specified provisions, including provisions for public notification to and education programs for affected or potentially affected communities. Agencies must also include steps to identify, study, and implement mitigating measures such as approaches to address, among other things, measures to abate or minimize contributing controllable sources of identified pollutants. 40 C.F.R. § 51.930(b)(2).

<sup>4</sup>81 Fed. Reg. 68,216, 68,274 (Oct. 3, 2016).

<sup>5</sup>According to EPA officials, the agency continues to evaluate the effectiveness of the mitigation requirements within the Exceptional Events Rule. They also noted that the mitigation plan requirements would only apply to areas that have recurring events as determined by submitted demonstrations, and air agencies have the discretion to submit exceptional events demonstrations. Even if an area is affected by multiple wildfires, if the air agency does not submit a demonstration, then the wildfires would not trigger the requirements to develop a mitigation plan, according to EPA officials.

barriers to wildfire risk mitigation methods such as prescribed burns and cultural burns. For example, EPA officials told us that the allowance for certain prescribed burns to be considered exceptional events can incentivize wildfire mitigation. However, two stakeholders we interviewed said that state and local agencies are unlikely to use this provision for prescribed burns because the agencies would not likely approve prescribed burns that could cause National Ambient Air Quality Standards exceedances in the first place. In addition, land management agency officials and one stakeholder said that state and local agencies may not use the provision because exceptional event demonstrations are technically complicated and resource intensive.<sup>6</sup> To better incentivize wildfire mitigation, one stakeholder noted that EPA could modify its approach to prescribed burn exceptional event demonstrations to make them less burdensome or more expansive to cover an entire prescribed burn program.<sup>7</sup> This stakeholder also suggested that EPA could encourage state air agencies to standardize processes for prescribed burn permitting or eliminate the cost of prescribed burn permits, since they provide a public benefit.

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<sup>6</sup>According to EPA officials, EPA received and concurred with an exceptional events demonstration for prescribed burns causing ozone exceedances in the Flint Hills of Kansas in December 2012. Since that time, as of August 2022, no tribal, state, or local agency had submitted an exceptional event demonstration for a prescribed burn, according to EPA officials.

<sup>7</sup>According to EPA officials, in implementing the Clean Air Act and promulgating the Exceptional Events Rule, EPA considered a wide array of stakeholder feedback and developed an approach for fire-related exceptional events demonstrations that was intended to reduce the administrative burden. They added that EPA continues to work with tribal and state air agencies to address opportunities to improve or clarify program implementation in a manner consistent with the Clean Air Act.

# Appendix VI: Comments from the Environmental Protection Agency



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

February 15, 2023

OFFICE OF  
AIR AND RADIATION

Mr. Alfredo Gómez  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
Washington, D.C. 20548

Dear Mr. Gómez:

Thank you for the opportunity to review and comment on the U.S. Government Accountability Office's draft report, "Wildfire Smoke: Opportunities to Strengthen Federal Efforts to Manage Growing Risks," (GAO-23-104723) ("Draft Report"). The purpose of this letter is to provide the U.S. Environmental Protection Agency's (EPA) response to the Draft Report's findings, conclusions, and recommendations. This response provides a detailed discussion of our current progress, goals, and existing challenges in reducing the health risks of wildfire smoke.

Recognizing the magnitude of the air quality problem created by recent wildfire trends, EPA staff and management have informally advanced numerous programs, projects, and collaborations to help reduce exposure to smoke. This report captures some, but not all, of the important work that EPA has undertaken, despite not having dedicated funding or a formal program. For example, EPA has made significant improvements to systems that inform the public of air quality conditions and timely information reporting through the AirNow Fire and Smoke Map. The Agency also uses existing interagency processes and stakeholder collaborations to provide communities with resources that will aide in their preparation and response to wildfire smoke events.

In our continued efforts to advance EPA's work on wildfire smoke, we have identified several goals for which we intend to take action and have requested Agency resources to do so. These actions include: assessing the impact of wildland fire smoke on air quality; improving communication of smoke-related health risks, increasing collaboration among EPA Headquarters and Regional Offices; continuing collaboration with internal and external partners; and providing funding to assist communities with wildfire smoke preparedness. EPA also plans to improve its interagency collaboration by continuing its participation in existing efforts to discuss and plan strategies to address public health issues.

EPA has identified several challenges, first and foremost being the lack of dedicated funding and the lack of an organizational structure to house this work. Further, wildfire risk mitigation methods can have adverse impacts on air quality that require careful consideration and management, and many are outside of the scope of EPA's statutory authority and work. However, EPA is advancing efforts to reduce risks through (1) collaboration between EPA's National Emissions Inventory Team and the United States Forest Service (USFS) to provide smoke emissions estimates using ground and satellite data; (2) assessing smoke impacts using modeling and monitoring tools; (3) continuing to increase public awareness through the fact sheets and information dissemination; and (4) considering fire-related air quality issues in the context of implementation of air quality management programs such as for the national ambient air quality standards, and others.

GAO Recommendations

**Recommendation 1. The Administrator of EPA should develop and document a coordinated approach for EPA's actions to help communities prepare for and respond to the air quality and public health risks of wildfire smoke. The approach should align with leading practices for collaboration, including establishing goals, identifying and leveraging resources, and clarifying key stakeholder roles and responsibilities.**

EPA Response:

EPA generally agrees with the recommendation and continues to make progress regarding EPA actions to help communities. EPA's work in this area is underfunded; however, EPA has been able to improve communication tools and provide the public with critical information during wildfire smoke events. As the report acknowledges, EPA is limited in its ability to fully respond to this growing threat until sufficient resources are allocated to this important work. EPA has developed several tools to help communities prepare for and respond to the air quality and public health risks of wildfire smoke. Examples include:

- Continued modifications to the Air Quality Index and notifications systems, such as AirNow, which inform the public of poor air quality conditions.
- Collaborating with the other government agencies on Smoke Ready tools and resources. The Smoke Ready Toolbox provides information, such as air quality reports and fact sheets, to help communities prepare for and respond to wildfire and smoke events.
- EPA's Office of Air and Radiation (OAR) implements other programs that include aspects of community engagement, including tools regarding indoor air quality.

One of our most important tools, which EPA continues to enhance, is the AirNow Fire and Smoke Map. The AirNow Fire and Smoke map, which has now been translated into Spanish, has been an on-going collaborative effort between EPA's Office of Air Quality Planning and Standards (OAQPS), Office of Research and Development (ORD), and EPA Regional Offices, USFS, and state, local, tribal air quality officials. The AirNow Fire and Smoke map has many fire and smoke-related features, in addition to air quality data to help inform the public in smoke situations. The Fire and Smoke map is accessible through the AirNow mobile app and EPA's AirNow website, which includes a dedicated wildland smoke section with health-related and other guidance

documents. This tool provides important and timely information regarding air quality across the United States. Staff in OAQPS, ORD and EPA Regional Offices continue to engage and coordinate on improvements to the technical air quality information presented in the map and associated public outreach and communication on appropriate data interpretation.

Staff in OAR, ORD and EPA Regional Offices have established regular coordination and information sharing meetings. Specific examples include the following:

- OAR and ORD have regular staff level coordination meetings specifically devoted to addressing wildland fire issues of joint interest.
- OAQPS has identified the following four strategic goals to facilitate a more coordinated and strategic approach to addressing wildland fire issues:
  - Assess and describe impacts of wildland fire smoke on air quality;
  - Communicate health risks of smoke;
  - Implement the Clean Air Act in light of smoke impacts; and
  - Collaborate with internal and external partners.
- Beginning in 2021, EPA's Regional air programs established a regional office sub-lead, currently Region 9, for wildfire issues under the air program's lead region system wherein individual regions take on responsibility for coordinating across regions on particular topics. The wildfire sub-lead convenes a monthly meeting across OAR, ORD, and the Regional Office to coordinate and enhance communications and activities related to wildfires. Through the sub-lead, we are exploring ways to create a more formal structure and strategy to manage wildland fire smoke work across EPA, though many of these options will require time and resource commitments.

EPA has received \$4 million in its FY2022 appropriation and another \$7M in its FY2023 appropriations to award grants for wildfire smoke preparedness in community buildings and related activities which will be distributed to states, tribes, public preschools, local educational agencies, and non-profit organizations. The Notice of Funding Opportunity (NOFO) for these grants is expected to be published in 2023. EPA's Office of Radiation and Indoor Air (ORIA), which is leading the development of the NOFO, is coordinating with EPA Regions to determine how best to administer the program with limited staff dedicated to this issue.

**Recommendation 2. The Administrator of EPA should work with the Secretaries of Agriculture and the Interior to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals. (PDF P. 43)**

EPA Response

EPA generally agrees with the recommendation, while recognizing the challenge presented by the adverse impacts that certain mitigation measures may yield for air quality and public health.

EPA continues to improve interagency collaboration by participating in efforts such as the Wildland Fire Leadership Council (WFLC), the Wildfire Resilience Interagency Working Group (IWG), and the Wildfire Mitigation and Management Commission (Commission). In each of these venues, EPA has been proactive in elevating the public health challenges that arise from both wildfire and prescribed fire smoke. Recent actions include:

- Formation of a smoke subgroup to the IWG that unites representatives across the Federal family with equities in addressing the impacts of smoke.
- Initiated planning for a series of joint workshops between EPA, USDA, and DOI to share understanding of the public health impacts of wildland fire smoke, including what is known and not known about differences between prescribed fire and wildfire smoke, the efficacy of prescribed fires in mitigation wildland fires, and how to improve communication during wildland fire smoke events.

EPA plans to continue the relevant collaboration meetings and seek further opportunities to improve interagency collaboration and better mitigate risk from wildland fire smoke.

**Recommendation 5. The Administrator of EPA should, in consultation with federal land management agencies, identify and develop additional information on reducing risks from wildfire smoke to air quality and public health through wildfire risk mitigation. (PDF P. 44)**

EPA Response:

EPA generally agrees with the recommendation; we also note that many of the wildfire risk mitigation methods identified in the GAO report are outside the scope of EPA's work and statutory authority. EPA is currently advancing efforts to reduce risk from wildland fire smoke. In addition to the previously identified tools and efforts, EPA is also engaging in the following:

- EPA's National Emissions Inventory Team works closely with the USFS to estimate smoke emissions, using both ground and satellite information, which has resulted in more fire activity information being provided by states, local governments, and tribal governments. Improved information facilitates improved preparedness and communications.
- EPA supports, develops, and evaluates tools (models and monitors) to quantify the smoke impacts of specific fires and wildfires.
- EPA, in collaboration with numerous other Federal and state agencies, continues to develop and enhance the [information and fact sheets](#) associated with the Wildfire Smoke: A Guide for Public Health Officials.

EPA will continue to consider methods of communicating wildfire smoke impacts to the public in a timely and effective manner.

**Recommendation 6. The Director of EPA's Office of Air and Radiation should work with EPA's tribal, state, and local partners to evaluate options for providing incentives for and supporting wildfire risk mitigation and establish a plan for implementing appropriate options, seeking additional authority from Congress if needed. (PDF P.44)**

EPA Response:

EPA seeks clarification regarding what GAO means in its recommendation that EPA and partners evaluate options for providing incentives. EPA has taken a leadership role in the Wildfire Mitigation and Management Commission, the result of which will include recommendations to Congress as needed to improve wildfire risk mitigation, among other goals.

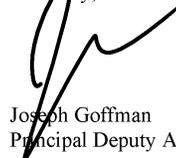
If GAO considers incentives for wildfire risk mitigation to include mechanisms for incentivizing prescribed burns, EPA notes that it does not have the authority to regulate how states choose to structure permitting or prescribed burn programs, or which entities within states are given authority over such programs or priority to conduct such burns. EPA has revised key regulations and guidance regarding implementation of the particulate matter and ozone air quality standards to address smoke from both wildland fires and prescribed fires, and has addressed similar issues in other air quality implementation programs. EPA intends to work with federal, state, local, and tribal partners to understand where air quality concerns may create a barrier to prescribed burns. Further, EPA continues to explore possible approaches to make the exceptional events process less resource-intensive for air agencies, specifically with regards to wildfire and prescribed fire events. As noted above, EPA has established several channels of regular communication with other agencies, including WFLC, the Wildfire Resilience Interagency Working Group, with its smoke subgroup, as well as ongoing collaborations such as dialogues on the impacts of prescribed fire on air quality and the work on the Fire and Smoke Map.

Conclusion:

In summary, EPA generally agrees with GAO's recommendations and appreciates its assessment of issues and possible solutions for managing the risks and impact of wildfire smoke on public health. As funding allows, EPA will continue to consider methods of communicating wildfire smoke impacts to the public in a timely and effective manner. EPA respectfully requests clarification on GAO's recommendation to evaluate options for providing incentives to its tribal, state, and local partners in support of wildfire risk mitigation, given that states have their own, independent authorities to establish approaches on choosing to structure permitting or prescribed burn programs.

I appreciate the opportunity to be of service and trust the information provided is helpful.

Sincerely,



Joseph Goffman  
Principal Deputy Assistant Administrator

# Appendix VII: Comments from the U.S. Department of Agriculture



United States  
Department of  
Agriculture

Forest  
Service

Washington Office

1400 Independence Avenue, SW  
Washington, D.C. 20250

**File Code:** 1420  
**Date:** January 24, 2023

Mr. Alfredo Gomez  
Director, Federal Lands and Water  
Natural Resources and Environment  
U.S. Government Accountability Office  
441 G. Street, NW  
Washington, DC 20548

Dear Mr. Gomez:

The U.S. Department of Agriculture (USDA) Forest Service appreciates the opportunity to respond to the U.S. Government Accountability Office's (GAO) draft report titled, *Wildfire Smoke: Opportunities to Strengthen Federal Efforts to Manage Growing Risks* (GAO-23-104723). USDA generally agrees with the GAO draft report and recommendations. Given the significance of the wildfire crisis facing the Nation and our current efforts to increase wildfire mitigation efforts across the country, we look forward to continuing the work to bring needed urgency to this issue.

I appreciate the hard work your team did on such a challenging and complex issue. The role of the Forest Service in responding to wildfire smoke and protecting public health, as well as the importance of mitigation efforts to address smoke impacts associated with the wildfire crisis, was captured well in the report, which is critical to our long-term efforts for wildfire risk reduction. Especially as the environmental impacts of catastrophic wildfire extend far beyond just air quality, the discussions requested by GAO require focused collaboration broadening beyond smoke and its impacts to public health in order to effectively implement the recommendations.

Only focusing on the effect of wildfire smoke on public health minimizes the breadth of the current crisis impacting the natural and human environment and neutralizes the most effective mitigation tool that also mimics natural processes – prescribed fire, which can be managed to minimize impacts on public health. Almost all forest and range types in the United States have evolved with (and are dependent on) fire, making recognition of fire's role in the ecosystem critically important. As air quality standards become more stringent, expanded interagency discussions are needed to ensure the use of prescribed fire, as the primary mitigation to catastrophic wildfire, can increase significantly.

Prescribed fires minimize impacts to public health through smoke management, especially when compared to the uncontrolled duration and severity of wildfires. It is our agency policy to conduct prescribed fires utilizing *Basic Smoke Management Practices* (Fed. Reg. Vol. 81, No. 191, pg. 68278). With our continued work with partners within the National Wildfire Coordinating Group to improve smoke management of prescribed fires, along with our continued agency research leadership, we expect to further develop better management strategies, smoke dispersion models, and enhance emission reduction techniques. Bolstering current authorities and



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Mr. Alfredo Gomez

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approaches mentioned in the draft report should balance impacts on firefighter and public safety, water quality, and protection of municipal water supplies among other environmental effects.

There will not be a smokeless future, whether through high severity wildfire or use of prescribed fire. I urge consideration of these key areas to strengthen the report and acknowledge the challenges in addressing the Nation's wildfire crisis. If you have any questions, please contact Robert Velasco, Chief Financial Officer, at [robert.velasco@usda.gov](mailto:robert.velasco@usda.gov).

Sincerely,



RANDY MOORE  
Chief

# Appendix VIII: Comments from the Department of the Interior



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, DC 20240

J. Alfredo Gomez  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Gomez:

Thank you for providing the Department of the Interior (Department) the opportunity to review and comment on the draft Government Accountability Office (GAO) report entitled, *Wildfire Smoke: Opportunities to Strengthen Federal Efforts to Manage Growing Risks*, GAO report (GAO-23-104723). We appreciate GAO's review of the increasing risk from wildfire smoke emissions and the likelihood that these risks will continue to increase for the foreseeable future.

The GAO issued several recommendations to multiple agencies, including one to the Department to address its finding. Below is a summary of actions planned to implement the recommendation.

**Recommendation 4:** *The Secretary of the Interior should work with the Administrator of EPA and Secretary of Agriculture to better align air quality and land management goals for wildfire risk mitigation and establish joint strategies for achieving those goals.*

**Response:** Concur. To achieve this recommendation, the planned course of action for the Department is to increase staffing to plan for and manage smoke emissions at the Departmental and the bureau levels and to work across agencies at the national and regional levels, as well as with Tribal, state and local government, as well as other external partners. The Department's management of air quality and wildfire risk mitigation goals will include an increasingly wide array of communications, data management, planning, budget development, wildfire operations, environmental justice and fuels management implementation, which will be supported by this additional staffing. These robust efforts will be initiated this calendar year and will enable coordination of numerous existing DOI efforts with EPA and USDA, and the joint development of further efforts. They will also support efforts to increase the pace and scale of fuels management treatments and address the overall wildfire risk reduction objectives included in the Bipartisan Infrastructure Law.

Review of this draft report was coordinated with the Bureau of Indian Affairs, Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service. Each of the bureaus concurred with GAO's recommendation. The attached enclosure contains some technical comments from our review for your consideration while finalizing the report.

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**Appendix VIII: Comments from the Department  
of the Interior**

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If you have any questions, please contact Jeff Rupert, Director, Office of Wildland Fire, at [Jeff\\_Rupert@ios.doi.gov](mailto:Jeff_Rupert@ios.doi.gov) or 202-208-2719.

Sincerely,

**JOAN  
MOONEY**

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Joan M. Mooney  
Principal Deputy Assistant Secretary for  
Policy, Management and Budget exercising  
the authorities of Assistant Secretary

Enclosure

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# Appendix IX: GAO Contact and Staff Acknowledgments

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## GAO Contact

J. Alfredo Gómez at (202) 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Chad M. Gorman (Assistant Director), Anne Hobson (Analyst in Charge), Karen Chen, Jonathan Dent, Ellen Fried, Cindy Gilbert, Kathryn Godfrey, Patricia Moye, Jim Rice, Patricia Roy, Dan Royer, Joseph Dean Thompson, Breanna Trexler, Lisa Van Arsdale, Sarah Veale, and Jack Wang made key contributions to this report.

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## Public Affairs

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U.S. Government Accountability Office, 441 G Street NW, Room 7149  
Washington, DC 20548

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Washington, DC 20548





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March 27, 2023

The Honorable Michael S. Regan, Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Re: National Ambient Air Quality Standards for Particulate Matter, Docket ID No. EPA-HQ-OAR-2015-0072

Dear Administrator Regan,

The Georgia Forestry Commission, (GFC), a state agency of the State of Georgia, provides the following comments for consideration by the US Environmental Protection Agency (EPA) concerning the proposed lowering of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter 2.5. (PM2.5)

- The GFC opposes EPA's proposal to revise and lower the level for primary annual PM2.5 standards from 12.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) to a level within the range of 8.0 to 10.0  $\mu\text{g}/\text{m}^3$ .
- The GFC opposes revising and lowering of the level for primary 24-hour PM2.5 standards to 25  $\mu\text{g}/\text{m}^3$ .
- The GFC does support the EPA's proposal to retain and continue the primary 24-hour PM2.5 standards at the level of 35  $\mu\text{g}/\text{m}^3$ .

The GFC respectfully asks EPA to reconsider making changes and lowering the primary annual and 24-hour PM2.5 standards. The lowering of these standards will have multiple consequences and would lead to further restrictions on prescribed burning. The lowering of these NAAQS will likely result in the establishment of air quality rules in Georgia, and potentially nationwide, which will require restrictions to be placed on the use of prescribed fire.

Through years of experience, application, and observation of fire on landscapes, prescribed fire managers, practitioners, and fire scientists have long recognized the importance of weather to smoke management and fire behavior. Weather parameters are key factors for consideration when planning for prescribed burning operations and as a management instrument in predicting how smoke produced from prescribed burning will disperse. Prescribed fire practitioners use weather forecasts and the many factors of local and regional weather that affect how smoke behaves in their planning and application of prescribed fire to avoid unfavorable effects it may have on long-term air quality.

It is not a desire or intent of prescribed fire practitioners to unfavorably influence air quality. For forest land managers to effectively and efficiently manage the resources they are entrusted with, prescribed burning must be utilized. Without the sustainability, and even increasing the frequency, of prescribed fire on the landscape the very existence of healthy ecosystems they help manage would cease to exist as well as increase the likelihood of major and destructive wildfires continuing to occur.

As recognized by national and state wildland management agencies as well as EPA, the need for prescribed fire to reduce hazardous wildland fuels is a major prevention effort to protect communities from harm where people live and work by reducing the frequency and intensity of major wildfires throughout the nation. Congress, through the Bipartisan Infrastructure Bill, recognizes the need for more prescribed fire near vulnerable populations and communities to reduce the risk associated with wildfires and has provided funding to assist in carrying out wildfire mitigation practices to include the use of prescribed fire.

Large wildfires produce much more extreme volumes of smoke, in most cases, for extended periods of time that may last for weeks and months, and which negatively impact air quality over large regions of the U.S. Low-intensity prescribed fires burn fewer acres, and produce far fewer emissions over a very short period of time, usually less than 24 hours, and within a localized area but accomplish the objectives of land and ecosystem management on the lands they are burning on.

Prescribe fire is also the most efficient means of controlling invasive vegetative species which are threatening our native ecosystems. It also is the most effective means of promoting and enhancing wildlife habitat by increasing native and desired species of grasses and vegetation on which herbivores are dependent for forage and providing suitable habitat for animals and for those rearing their young. Many of the fire-dependent species of plants and animals are listed as threatened and/or endangered species due to habitat loss where fire has been excluded from forestlands, farmlands, and rangeland.

The GFC also makes the following observations and further requests that EPA not make changes to the current NAAQS due to all air monitoring equipment are not of the same type and kind. The data used to make potential rule changes is not consistent and standardized throughout the U.S. It is our understanding that some states as well as Georgia have deployed and are operating air monitors which collect PM2.5 data which are providing conflicting PM2.5 data and which are inconsistent. These differences have caused air quality agencies to perform calculations of collected PM2.5 data to correlate the records to determine actual PM of 2.5 levels. Georgia EPD has calculated the adjustment factor between the FRM and FEM monitors here in Georgia. These calculations would bring the data from these different kinds of monitors within tolerance of each other. We ask EPA to approve and accept these calculations as submitted. In some locations where air monitors exist near state boundaries, and where populated areas transcend across state lines, there may be conflicting and debatable PM2.5 data being used because of different types and configurations of air monitors being operated near each other by the state's air resource agency or the calculated adjustments not being the same. The GFC asks EPA to work with individual state air resource agencies to provide needed resources and funding to establish and replace air monitors, where needed, which are of the same kind and type and have the same technology and accuracies so that data obtained to make rule-changing decisions are consistent.

The GFC thanks the EPA in advance for their consideration of our comments and asks EPA decision-makers to carefully consider these comments and not make changes to the current PM2.5 NAAQS and consider excluding prescribed fire events from PM2.5 analyses.

Respectfully Submitted,

Georgia Forestry Commission



March 27, 2023

The Honorable Michael S. Regan  
Administrator  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Re: National Ambient Air Quality Standards for Particulate Matter, Docket ID No. EPA-HQ-OAR-2015-0072

Dear Mr. Regan,

The Georgia Prescribed Fire Council is submitting these comments in response to the proposed rulemaking to lower the current limit for fine particulate matter (PM<sub>2.5</sub>) from an annual average of 12 micrograms per cubic meter (µg/m<sup>3</sup>) to a level between 9 and 10 µg/m<sup>3</sup> while maintaining the existing daily exposure limit of 35 µg/m<sup>3</sup>.

The Georgia Prescribed Fire Council (GPFC) is a non-profit organization made up of land managers, scientists, and other professionals who are dedicated to promoting the safe and effective use of prescribed fire in Georgia. The GPFC was established in 2006 to address a growing need for collaboration and communication among the diverse stakeholders involved in prescribed fire management in the state. The council serves as a forum for sharing information and best practices, promoting research and education on the benefits and risks of prescribed fire, and advocating for policies and practices that support the use of prescribed fire as a management tool.

Prescribed fire, also known as controlled burning, is a tool used by land managers to intentionally set fires under carefully controlled conditions. Prescribed fire has a number of benefits, including reducing the risk of wildfires, promoting ecosystem health, and improving wildlife health. The use of prescribed fire greatly improves habitat for threatened and endangered plants and animals. It was identified as a top conservation strategy in Georgia's State Wildlife Action Plan.

In this action, EPA has proposed to lower the annual fine particulate matter (PM<sub>2.5</sub>) NAAQS from the current level of 12.0 µg/m<sup>3</sup> to a level in the range of 9.0 to 10.0 µg/m<sup>3</sup>. If EPA finalizes an annual PM<sub>2.5</sub> NAAQS level in the range of 9.0 to 10.0 µg/m<sup>3</sup>, then the annual PM<sub>2.5</sub> NAAQS level should be set no lower than 10.0 µg/m<sup>3</sup> as this is the only value in this range that was supported by all seven members of



the chartered Clean Air Scientific Advisory Committee (CASAC). Further, the minority of the CASAC concluded that the primary annual PM<sub>2.5</sub> standard should be revised to a level of 10.0 to 11.0 µg/m<sup>3</sup>.

Consideration should be given to the higher range minority CASAC conclusion of 11.0 µg/m<sup>3</sup> to prevent unintended negative consequences for the use of prescribed fire as a management tool. Otherwise, prescribed fire managers would face stricter regulations and higher hurdles in using prescribed fire as a management tool. This could limit their ability to effectively manage ecosystems, reduce the risk of uncontrolled wildfires, and maintain healthy forests and grasslands.

The EPA has recognized that prescribed fires are essential for reducing the risk of catastrophic wildfires and maintaining healthy ecosystems. However, prescribed fires can also generate smoke and particulate matter that can have short-term impact on air quality in nearby communities. Therefore, the EPA created the Exceptional Events Rule to allow states to exclude certain events from air quality calculations, including prescribed fires that meet the criteria outlined in the rule. Since the implementation of the Exceptional Events Rule, several prescribed fires have been designated as exceptional events and excluded from air quality calculations.

Prescribed fire is the best available tool to reduce the amount of fuel available for wildfires, which can release significantly larger amounts of smoke and PM into the air than prescribed fires. Lowering the PM<sub>2.5</sub> standards could limit the use of prescribed fire, resulting in an increased risk of larger, more destructive wildfires that could have even greater negative impacts on air quality and public health. Expanding the EPA Exceptional Events Rule for prescribed fire could help address this issue by allowing states to exclude air quality data affected by prescribed fire smoke from regulatory decisions. This could provide more flexibility for prescribed fire managers while ensuring that air quality standards are met over the long term and should be part of any EPA air quality actions.

Overall, lowering the PM<sub>2.5</sub> standards in a way that could limit the ability of land managers to use prescribed fire as a management tool and potentially increase the risk of more damaging wildfires is opposed by the Georgia Prescribed Fire Council as it would have negative consequences for both public health and the environment.

Respectfully,

Georgia Prescribed Fire Council Steering Committee

# STATE OF KANSAS



CAPITOL BUILDING, ROOM 241 SOUTH  
TOPEKA, KS 66612

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GOVERNOR LAURA KELLY

January 31, 2024

The Honorable Joseph R. Biden, Jr.  
President of the United States  
The White House  
1600 Pennsylvania Avenue, N.W.  
Washington, D.C. 20502-0001

**Re: Reconsideration of the National Ambient Air Quality Standards for Fine Particulate Matter**

Dear Mr. President:

As Governor of Kansas, I believe protecting public health and air quality to be of utmost importance. I also recognize that it can be challenging to maintain a balance between protecting public health and the environment while promoting industry that provides critical goods and services. However, public health, environmental conservation, and job creation and retention do not have to be mutually exclusive.

The United States Environmental Protection Agency (EPA) had solicited comments on its proposed Reconsideration of the National Ambient Air Quality Standard (NAAQS) for Fine Particulate Matter. At this time, I would ask you to consider retaining the current Fine Particulate Matter (PM) NAAQS. In 2016, there was a proposal to lower the ozone NAAQS standard. The Clean Air Scientific Advisory Committee (CASAC) proposed the lower standard, just like the impending PM standard. The decision of the EPA at that time was to retain the existing ozone standard. Kansas agrees the existing standard is protective of human health and the environment.

The EPA's current proposal covers a range of standards from 9.0  $\mu\text{g}/\text{m}^3$  to 10.0  $\mu\text{g}/\text{m}^3$ . Using a range of proposed standards made it extremely difficult for Kansas to evaluate its ability to implement a new standard and assess any change's potential negative socioeconomic consequences. Kansas believes that the current proposed rulemaking should have identified a single standard for the stakeholders to analyze and comment on. In addition, although particulate matter in the air is a recognized health concern for our citizens, a sharp reduction in the standard without a sufficient glide path or compliance window for regulatory agencies and affected industries may result in significant implementation challenges and a negative impact on industry and future job growth in our state.

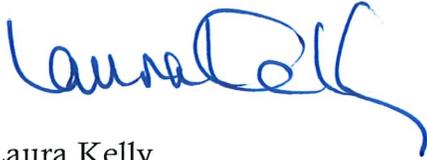
The most reasonable approach is a gradual step-down of the standard to balance safeguarding public health and preserving manufacturing operations that provide jobs for Kansas' workforce. This balance could be achieved through a progressive lowering of the standard, which EPA has historically used in prior NAAQS reconsiderations under the Clean Air Act.

Letter to The Honorable Joseph R. Biden, Jr.  
President of the United States  
Re: Reconsideration of the National Ambient Air Quality Standards  
for Fine Particulate Matter  
January 31, 2024  
Page 2 of 2.

On behalf of Kansas's citizens, I ask that the White House, in concert with the EPA, withdraw the current rulemaking and allow the current standard for Fine Particulate Matter to remain in place. If the EPA wants to propose a singular standard for consideration in the future, this will allow regulatory agencies, the public, and industry an opportunity to provide meaningful comments and begin to plan to comply with the proposal.

Your consideration of this matter and its impact on all citizens of Kansas and the United States is greatly appreciated.

Respectfully,



Laura Kelly  
Governor of Kansas

cc: Michael S. Regan, US EPA Administrator  
Janet Stanek, KDHE Secretary

February 13, 2024

The Honorable Cathy McMorris Rodgers  
Chair  
U.S. House of Representatives  
Energy & Commerce Committee  
Washington, DC 20150

The Honorable Frank Pallone  
Ranking Member  
U.S. House of Representatives  
Energy & Commerce Committee  
Washington, DC 20150

Dear Chairwoman McMorris Rodgers and Ranking Member Pallone:

I am writing on behalf of the Portland Cement Association (PCA)<sup>1</sup> in support of your hearing, *Safeguarding American Prosperity and People's Livelihoods: Legislation to Modernize Air Quality Standards*. The Energy & Commerce Committee's goal for the hearing is to review how to address the Environmental Protection Agency's (EPA) recently released [Final Reconsideration of the Particulate Matter National Ambient Air Quality Standards \(NAAQS\)](#) (EPA-HQ-OAR-2015-0072), is critical to PCA's membership. PCA and its members take protecting health and the environment seriously and have invested hundreds of millions of dollars to meet regulatory obligations at the state and federal levels. PCA and its members support pragmatic and technically feasible air emissions controls to meet those obligations and to protect human health and the environment.

The Committee examined the effects of short-sighted air regulations in September 2023, during which time we provided you with our concerns and analysis of how the EPA then considered the range for the Particulate Matter 2.5 (PM2.5) standard of 9 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) to  $10 \mu\text{g}/\text{m}^3$  could harm the cement industry. We also shared our concerns and analysis with the EPA and the Office of Management and Budget during the comment period for the proposed rule. Since then, PCA's Market Intelligence group has, in the attached updated report, estimated that lowering the annual PM2.5 standard to the finalized  $9 \mu\text{g}/\text{m}^3$  will require \$171.8 million in capital expenditures and \$54.6 million in additional yearly operating expenses for U.S. cement producers. While these costs are significant, we first wish to stress that this rule will impact Congress and the Administration's priorities.

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<sup>1</sup> PCA conducts market development, engineering, research, education, technical assistance, and public affairs programs on behalf of its member companies. Our mission focuses on improving and expanding the quality and uses of cement and concrete, raising the quality of construction, and contributing to a better environment.

Foremost, the ability of cement manufacturers to provide the necessary construction materials for public and private infrastructure projects, including those investments made in the Infrastructure Investment & Jobs Act will be harmed by the revised standard. Cement manufacturers will have to curtail their production of cement to comply with this regulation. A reduction in cement production will lead to supply disruptions and impair the ability to construct wind & solar generation facilities, water treatment plants, sidewalks, bridges, highways, schools, hospitals, and roads.

We urge your consideration of legislation that delays the effective date of the rule and modernizes the implementation of the National Ambient Air Quality Standards (NAAQS) Program that sets the PM<sub>2.5</sub> standard. The NAAQS program, while well-intentioned, has failed in certain aspects, such as the five-year review cycle, which is an insufficient amount of time to conduct a NAAQS review. A ten-year review period would allow the EPA to consider if reductions are technologically feasible, analyze the latest available science, and collect data to inform a NAAQS review properly. A longer review period would also permit EPA to provide timely implementation regulations and guidance as well as ensure that states are not required to develop regulations to meet standards that they do not have the authority to make changes to meet. Further, the EPA should be required to release implementation guidance for any NAAQS when issued so manufacturers may adequately prepare for it to take effect. For projects underway in the permitting process, when a new NAAQS is finalized, statutory language should be clear that the new standard should not be applicable to those projects. Inconsistencies and ever-shifting regulatory hurdles are unfair to manufacturers seeking to expand their facilities and reduce their energy use and greenhouse gas emissions.

While manufacturers play a role in PM<sub>2.5</sub> levels, natural events play a far more significant role. Most PM emissions are comprised of “background” emissions attributed to nonpoint sources, including wildfires and dust from unpaved roads. These sources are not directly regulated by states, like industrial facilities. Wildland fires account for more than 30% of primary PM<sub>2.5</sub> emissions. Nationally, the cement industry’s contribution to PM<sub>2.5</sub> emissions only makes up a 0.1% share of total PM<sub>2.5</sub> emissions. A single wildfire event could wipe out all the gains made by the cement industry. The cement industry is already well-regulated for PM and has invested in baghouses and other state-of-the-art technologies to control PM and dust emissions. PCA emphasizes the need for the EPA to focus on more significant sources of PM<sub>2.5</sub> emissions, including wildfires. Without such a focus, attempts to meet a lowered standard will disproportionately harm domestic American manufacturing. We urge legislation to help state air agencies with the resources and flexibility they need to properly designate and account for natural events that harm attainment status.

For these reasons, we support the efforts of the Energy and Commerce Committee to evaluate the NAAQS program. We encourage bipartisan collaboration to tackle the complexities of air permitting policy and find solutions that balance the need to reduce greenhouse gas and PM emissions, foster economic growth, and protect human health. We offer assistance on any technical or other drafting questions required for that effort. Achievable air emissions regulations are necessary as the cement industry focuses on decarbonization in the coming decade. We appreciate your consideration of our views. If you have any questions, please contact me at [soneill@cement.org](mailto:soneill@cement.org) or (202)719-1974.

Sincerely,

A handwritten signature in black ink, appearing to read "Sean O'Neill". The signature is written in a cursive style with a large, stylized "S" and "O".

Sean O'Neill  
Senior Vice President, Government Affairs  
Portland Cement Association

March 28, 2023

Submitted via *Regulations.gov*

U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

Re: Docket ID No. EPA-HQ-OAR-2015-0072; Review of the National Ambient Air Quality Standards for Particulate Matter

Dear Mr. Joseph Goffman,

Please see the comment below regarding the U.S. Environmental Protection Agency's proposed modification of the National Ambient Air Quality Standards for fine particle pollution (PM<sub>2.5</sub>). We are interested researchers and students at Stanford University who focus on wildfire smoke and its impacts on the western U.S. The primary authors of this note are Akruti Gupta, Stanford Master's Student in Civil and Environmental Engineering, and Emily Alpert, Stanford Law Student.

#### Abstract

Protecting public health and welfare in the era of climate change requires creativity and new approaches to the implementation of the Clean Air Act (CAA). We support the lowering of the annual PM<sub>2.5</sub> National Ambient Air Quality Standards as proposed by the Environmental Protection Agency (EPA) but suggest that unless the agency modifies its implementation approach to protect the use of beneficial fire, the proposed rule will have significant unintended consequences for air pollution, public safety, and ecosystems. Beneficial fire is one of the most effective tools to reduce the severity and intensity of wildfire. However, recent data suggests that administering a lowered PM<sub>2.5</sub> standard as the EPA has done in the past will discourage the use of beneficial fire even at its current rate. The process to obtain an exceptional event determination for beneficial fire is so arduous that states do not attempt to conduct beneficial fire at a scale that would cause exceedances of the annual PM<sub>2.5</sub> standard. A lowered standard will therefore discourage land managers both from following through on beneficial fire programs as well as expanding such programs to address the warmer and drier conditions of climate change that contribute to wildfire risk. We have two sets of recommendations, one for the EPA and the second for Congress, to better account for the public health effects of PM<sub>2.5</sub> while also protecting Americans from the public health effects of wildfire smoke. First, we suggest granting conditional approval in advance of beneficial fires through the State Implementation Plan process for programs that meet specified parameters and include public health mitigation measures. **Second, we suggest modest statutory revisions to the CAA aimed at reducing ambiguity about whether beneficial fire can be considered an exceptional event.**

## I. Executive Summary

Smoke is an unavoidable part of the fire-dependent landscape of the Western U.S., where the ecosystem depends on frequent low-intensity fires. Climate change and fuels buildup from a century of fire suppression efforts have resulted in increasingly catastrophic wildfires, generating smoke and fine particulate matter (PM<sub>2.5</sub>) levels not experienced in living memory. California, other Western states, the United States Forest Service (USFS), and the Bureau of Land Management now recognize and are undertaking significant steps to increase the use of prescribed burns, a type of beneficial fire, as a tool to reduce fuels buildup. Reducing the buildup of fuels will in turn reduce the severity and frequency of catastrophic wildfires.

While the Environmental Protection Agency's (EPA) proposed reduction in the annual PM<sub>2.5</sub> standard to 9–10 µg/m<sup>3</sup> is essential to address the pollutant's adverse health effects, the EPA must carefully implement the standard in a way that does not hinder land managers' ability to effectively use beneficial fire as a land management tool to mitigate the harmful impacts of wildfires. If states like California and agencies like the USFS successfully implement their plans to increase the use of beneficial fire over the next decade, multiple air districts will likely exceed their annual PM<sub>2.5</sub> standard, forcing states to choose between compliance with National Ambient Air Quality Standards (NAAQS) and the Clean Air Act (CAA) on the one hand and wildfire mitigation on the other.

The Regulatory Impact Assessment (RIA) relies on outdated data centered on 2016. Reliance on data that does not capture the rapid intensification of wildfire or resulting smoke in the regions most vulnerable to these phenomena hinders a complete understanding of the implications of the proposed rule. New models and analytical techniques indicate that decades of policy-driven improvements in air quality have been lost due to smoke contributions to PM<sub>2.5</sub> concentrations. In fact, ambient PM<sub>2.5</sub> concentrations have increased significantly due to wildfire smoke since 2016. An assessment that evaluates NAAQS based on 2016 is therefore misleading relative to both the current state of the growing western wildfire crisis and to planned, science-based responses to better manage it.

The proposed change to the PM<sub>2.5</sub> standard provides an opportunity to redesign the implementation of the EPA's regulatory guidance for our new climate era. The current exceptional event determination process heavily discourages proactive beneficial fire at scale, and the proposed standard would only exacerbate this dynamic. The EPA should use its authority to interpret the CAA to allow states to increase the use of beneficial fire to meet the needs of a changing climate without risking noncompliance with NAAQS.

Our first set of recommendations focuses on the State Implementation Plan (SIP) process. We recommend that the EPA grant conditional exceptional event determinations for beneficial fires in advance through SIPs, provided that states reasonably comply with certain requirements. The EPA should also require selected states to include a beneficial fire plan and public health mitigation measures to reduce the impact of beneficial fire smoke in their SIPs for PM<sub>2.5</sub>. **Beyond the EPA's implementation strategy, we recommend that Congress modify CAA Section 319 (42 U.S.C. Section 7619[b]) to make it clear to land managers that beneficial fire is eligible for exceptional event determinations.**

## II. Introduction

We support the proposed lowering of the annual fine particulate matter (PM<sub>2.5</sub>) standard, provided that the Environmental Protection Agency (EPA) revises the rule's implementation. As proposed, the lowered PM<sub>2.5</sub> standard will discourage beneficial fire as a land management tool when it is needed most to curb the disastrous effects of wildfire in the era of climate change. We suggest granting conditional approval through the State Implementation Plan (SIP) process in advance for beneficial fire programs that meet specified parameters. We also suggest a minor statutory revision of the Clean Air Act (CAA) to remove any ambiguity about whether beneficial fires can be exceptional events. Both recommendations would encourage beneficial fire and remove disincentives by excluding the associated PM<sub>2.5</sub> from National Ambient Air Quality Standards (NAAQS) exceedances. This comment will focus primarily on fire in the American West, where catastrophic wildfire has become an air pollution, public safety, and ecosystem crisis.

## III. Background

### A. History of smoke and fire in the West

Smoke inevitably comes from fire, which has been part of the West's landscape for thousands of years. Many Western ecosystems benefit from frequent low-intensity fires, with fifty-four percent of California's ecosystems being fire-dependent.<sup>1</sup> Throughout history, inhabitants of this land have taken multiple fire management approaches, with varying success. Some Indigenous practitioners acted as fire stewards and used cultural fire, a type of beneficial fire, as a tool to manage forest health.<sup>2</sup> These regular burns prevented the build-up of fuels now associated with catastrophic wildfires.<sup>3</sup> In contrast, Americans of European descent began completely suppressing wildfire in the early twentieth century to preserve the use of land for timber and grazing and in response to the lethal wildfire season of 1910. This pivotal decision exchanged some smoke in the present for more smoke in the future.<sup>4</sup>

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<sup>1</sup> Kirsten H. Engel, *The Case of Wildfire Smoke Regulation*, 40 *Ecology L.Q.* 623, 626 (2013); Jeffery Stackhouse & Lenya Quinn-Davidson, *Options for Prescribed Fire on Private Lands in California*, *Spring Grasslands* 12 (2019), <https://ucanr.edu/sites/forestry/files/312926.pdf> (citing S.J Pyne, *California: A Fire Survey* [2016]).

<sup>2</sup> *Wildland Fire Program*, Karuk Tribe, <https://www.karuk.us/index.php/departments/natural-resources/eco-cultural-revitalization/wildland-fire-program> (last visited Mar. 20, 2023) ("Prescribed burning is an ancestral cultural practice that has taken place for thousands of years to manage the landscape, to stimulate the production of resources for humans and for animals, to prevent catastrophic wildfires, and to provide for species abundance and diversity"); Kevin C. Ryan et al., *Prescribed fire in North American forests and woodlands: history, current practice, and challenges*, 11 *Frontiers in Ecology and the Env't* e15, e17 (Aug. 1, 2013), <https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1890/120329> (describing tribes' long tradition of administering fire).

<sup>3</sup> Engel, *supra* note 1, at 626.

<sup>4</sup> Ben Richmond, *Beyond the Exceptional Events Rule: How the Local Implementation of Air Quality Regulations Affects Wildfire Air Policy*, 46 *Ecology L.Q.* 343, 350–51 (2020) (explaining the motivations for complete fire suppression); Lee Ann L. Hill et al. for PSE Healthy Energy, *Can Prescribed Fires Mitigate Health Harm? A Review of Air Quality and Public Health Implications of Wildfire and Prescribed Fire* 5, 16, 36 (2022), [https://www.lung.org/getmedia/fd7ff728-56d9-4b33-82eb-abd06f01bc3b/pse\\_wildfire-and-prescribed-fire-brief\\_final\\_2022](https://www.lung.org/getmedia/fd7ff728-56d9-4b33-82eb-abd06f01bc3b/pse_wildfire-and-prescribed-fire-brief_final_2022) (describing the choice between smoke now versus smoke later).

Starting in the 1970s, government agencies began to identify prescribed fire, another type of beneficial fire, as helpful for many forest ecosystems.<sup>5</sup> Although land managers moved away from complete fire suppression, the prevalence of beneficial fire remained at low levels and did not adequately reduce wildfire fuels in the West.<sup>6</sup> Today, as climate change contributes to more extreme conditions that intersect with record levels of fuels buildup and regulatory barriers to beneficial fire, the West has witnessed a quickening march of catastrophic fires that threaten the health of millions of Americans, the existence of rural communities, and the future of cultural treasures like the Giant Sequoias.<sup>7</sup> The State of California now recognizes prescribed burns as “one of the most versatile and cost-effective tools available to reduce fuels buildup in forests and the risk of catastrophic wildfires while increasing climate resilience.”<sup>8</sup> The USFS recognizes that fire needs to return to fire-adapted ecosystems as a significant presence as well.<sup>9</sup> Many other state and federal government agencies, including the EPA, also recognize beneficial fire as an effective land management tool that has the potential to maintain long-term air quality by reducing the likelihood of destructive wildfires.<sup>10</sup>

## B. Public health impacts of smoke

Studies of wildfire smoke reveal its harmful impact on human health, including adverse respiratory and cardiovascular effects and an association with adverse birth outcomes and premature mortality.<sup>11</sup> Not only does smoke from burned natural materials contain human carcinogens, smoke that includes burned structural materials also contains asphyxiants,

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<sup>5</sup> *EPA Releases Report Comparing Air Quality and Public Health Impacts from Prescribed Fire and Wildfire Smoke*, Env’t Prot. Agency (Sept. 30, 2021), <https://www.epa.gov/newsreleases/epa-releases-report-comparing-air-quality-and-public-health-impacts-prescribed-fire> (defining prescribed fire as “a land management tool that can reduce the likelihood of catastrophic wildfires by strengthening an area’s ecosystems and reducing the buildup of unwanted fuels” and “a planned event and therefore with coordination and advance notification communities and individuals can take health protective actions to reduce exposure”); Emily Williams, *Reimagining Exceptional Exceptional Events: Regulating Wildfire Events: Regulating Wildfires Through the Clean Air Act*, 96 Wash. L. Rev. 765, 767, 772–73 (2021) (stating when government agencies started to change their perspective on prescribed burns).

<sup>6</sup> Crystal A. Kolden, *We’re Not Doing Enough Prescribed Fire in the Western United States to Mitigate Wildfire Risk*, 30 Fire 2, 8 (2019); Engel, *supra* note 1, at 637–38 (positing that the southeast conducts more prescribed burns than the West because it uses them to maximize timber harvest); Hill et al., *supra* note 4, at 20 (stating that the southeast conducts seventy percent of prescribed burns in the U.S.).

<sup>7</sup> *Top 20 Most Destructive California Wildfires*, Cal. Dep’t of Forestry and Fire Prot. (Oct. 24, 2020), [https://www.fire.ca.gov/media/t1rdhizr/top20\\_destruction.pdf](https://www.fire.ca.gov/media/t1rdhizr/top20_destruction.pdf) (showing that fifteen of the twenty most destructive wildfires in California history occurred in 2015 or later); *Wildfires Kill Unprecedented Numbers of Large Sequoia Trees*, Nat’l Park Serv. (Feb. 25, 2022), <https://www.nps.gov/articles/000/wildfires-kill-unprecedented-numbers-of-large-sequoia-trees.htm>.

<sup>8</sup> *California’s Wildfire and Forest Resilience Action Plan*, State of Cal. 19 (Jan. 2021).

<sup>9</sup> *Confronting the Wildfire Crisis*, U.S. Forest Serv. 28–29 (Jan. 2022), [https://www.fs.usda.gov/sites/default/files/fs\\_media/fs\\_document/Confronting-the-Wildfire-Crisis.pdf](https://www.fs.usda.gov/sites/default/files/fs_media/fs_document/Confronting-the-Wildfire-Crisis.pdf) (“We need to thin western forests and return low-intensity fire to western landscapes in the form of both prescribed and natural fire. . . . science suggests that fire-adapted conditions should be restored on 35 to 45 percent of a fireshed”).

<sup>10</sup> *AP-42, Fifth Edition Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources*, Env’t Prot. Agency (1995), [https://www.epa.gov/sites/default/files/2020-10/documents/13.1\\_wildfires\\_and\\_prescribed\\_burning.pdf](https://www.epa.gov/sites/default/files/2020-10/documents/13.1_wildfires_and_prescribed_burning.pdf).

<sup>11</sup> Hill et al., *supra* note 4, at 13.

respiratory irritants, and reproductive and developmental toxicants.<sup>12</sup> While literature comparing the health impacts of beneficial fire and wildfire is limited, a recent comparative assessment suggests that wildfires result in greater impacts to morbidity and mortality than beneficial fire.<sup>13</sup> Communities are affected in different ways by beneficial fire and wildfire smoke. Communities of color are more likely to experience elevated levels of PM<sub>2.5</sub> during beneficial fires and wildfires.<sup>14</sup>

Compared to beneficial fire, wildfires that burn in forests with unmanaged fuels are more likely to become megafires and cause major destruction,<sup>15</sup> create more PM<sub>2.5</sub> per burned acre,<sup>16</sup> and lift more smoke aloft to reach more people.<sup>17</sup> In contrast, smoke plumes from beneficial fire tend to stay within the forest canopy and impact public health at a more localized scale than the longer-term exposure of wildfire smoke to broader populations.<sup>18</sup> Moreover, proper beneficial fire management can further reduce the impacts from beneficial fire on human health.<sup>19</sup> For example, more air quality monitoring during beneficial fire activities, expanded reporting and public engagement, and the deployment of portable air cleaners mitigate adverse health impacts.<sup>20</sup> While more must be understood about the specific health impacts of beneficial fire smoke on human health, conducting beneficial fire as a land management tool at a greater scale and in a careful way has the potential to prevent catastrophic wildfires and ultimately reduce human exposure to dangerous levels of smoke.

### C. Proposed changes to the PM<sub>2.5</sub> standard

The EPA is required to set NAAQS for criteria pollutants, which include primary and secondary standards.<sup>21</sup> Primary standards provide public health protections, especially for sensitive populations such as asthmatics, children, and the elderly.<sup>22</sup> Secondary standards provide welfare-based protection against effects like decreased visibility and damage to animals or crops.<sup>23</sup> For PM<sub>2.5</sub>, 24-hour and annual standards work together to provide protection against public health and public welfare effects associated with short-term and long-term exposures.<sup>24</sup>

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<sup>12</sup> *Id.* at 9.

<sup>13</sup> *Id.* at 29.

<sup>14</sup> Hill et al., *supra* note 4, at 30–31; Ian P. Davies et al., *The unequal vulnerability of communities of color to wildfire*, 13 PLOS ONE, 1, 6–7, (2018).

<sup>15</sup> *California's Wildfire and Forest Resilience Action Plan*, *supra* note 8, at 19.

<sup>16</sup> G. J. Williamson et al., *A transdisciplinary approach to understanding the health effects of wildfire and prescribed fire smoke regimes*, 11 Environ. Res. Lett. 1, 15 (2016), <http://dx.doi.org/10.1088/1748-9326/11/12/125009>, at 4; Hill et al., *supra* note 4, at 26.

<sup>17</sup> Richmond, *supra* note 4, at 349; Hill et al., *supra* note 4, at 4–5, 22; Williamson, *supra* note 16, at 2.

<sup>18</sup> Williamson, *supra* note 16; Kathleen M. Navarro et al., *A Review of Community Smoke Exposure from Wildfire Compared to Prescribed Fire in the United States* 8 (2018), <https://doi.org/10.3390/atmos9050185>.

<sup>19</sup> Hill et al., *supra* note 4, at 25–30, 36.

<sup>20</sup> *Id.* at 6.

<sup>21</sup> *NAAQS Table*, Env't Prot. Agency (Mar. 15, 2023), <https://www.epa.gov/criteria-air-pollutants/naaqs-table>.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

<sup>24</sup> *America's Children and the Environment, Third Edition*, Env't Prot. Agency 32 (Jan. 25, 2013), <https://www.epa.gov/sites/default/files/2015-05/documents/environments-contaminants-criteria-air-pollutants.pdf>.

The current annual health PM<sub>2.5</sub> standard is 12 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), and the 24-hour PM<sub>2.5</sub> standard is 35  $\mu\text{g}/\text{m}^3$ .<sup>25</sup> The EPA proposes lowering the annual NAAQS for PM<sub>2.5</sub> to within the range of 9–10  $\mu\text{g}/\text{m}^3$ . The EPA does not propose revising the secondary annual PM<sub>2.5</sub> standard, primary and secondary 24-hour PM<sub>2.5</sub> standards, or primary and secondary PM<sub>10</sub> standards.<sup>26</sup>

#### IV. The Impact of Smoke on PM<sub>2.5</sub> NAAQS Compliance

##### A. Data and methods must be improved

NAAQS established by the EPA are generally effective at improving air quality and reducing the levels of certain criteria pollutants, including PM<sub>2.5</sub>, from anthropogenic sources. The proposed reduction of the annual PM<sub>2.5</sub> standard to 9–10  $\mu\text{g}/\text{m}^3$  continues to address the need for reducing anthropogenic PM<sub>2.5</sub> emission sources and brings the regulation more in line with increasing epidemiological understanding of the negative health impacts from PM<sub>2.5</sub> exposure as described in Section III. However, the proposed standard fails to acknowledge the modern impacts of more frequent and intense wildfires on communities and puts the use of beneficial fire as a land management tool in the West at risk. The most recent NAAQS assessment for PM<sub>2.5</sub> used a Community Multiscale Air Quality (CMAQ) model based on triennial year monitoring data centered on 2016 to project PM<sub>2.5</sub> levels to 2032.<sup>27</sup> The assessment excluded EPA-concurred exceptional events, including wildfires. While some amount of wildfire contributions persist in the data because the cutoff value of 61  $\mu\text{g}/\text{m}^3$  is much higher than the current 24-hour standard,<sup>28</sup> the data centered on 2016 is unlikely to capture the expected increase in frequency and intensity of wildfire in the West through the next decade or the PM<sub>2.5</sub> contributions from beneficial fire as described in the rest of this section.<sup>29</sup>

It is important to note that the EPA's Regulatory Impact Analysis (RIA) relies on data, which includes the 2017 National Emissions Inventory (NEI), that does not adequately capture the nuances of conditions on the ground. Analysis of annual wildfire data in California from 1987 to 2021 shows the increasing extent of wildfire over the last three decades, as shown in Figure 1. Additionally, linear regression of the annual data shows that the trend in annual wildfire extent is likely to be steeper than what is captured by 2017 NEI data, on which the proposed NAAQS was assessed, as shown by Figure 2.

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<sup>25</sup> *Particulate Matter (PM) Air Quality Standards*, Env't Prot. Agency (Jan. 6, 2022), <https://www.epa.gov/naaqs/particulate-matter-pm-air-quality-standards>.

<sup>26</sup> *National Ambient Air Quality Standards (NAAQS) for PM*, Env't Prot. Agency (Jan. 31, 2023), <https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm>.

<sup>27</sup> *Regulatory Impact Analysis for the Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter*, Env't Prot. Agency (Jan. 6, 2023), [https://www.epa.gov/system/files/documents/2023-01/naaqs-pm\\_ria\\_proposed\\_2022-12.pdf](https://www.epa.gov/system/files/documents/2023-01/naaqs-pm_ria_proposed_2022-12.pdf).

<sup>28</sup> *Id.*

<sup>29</sup> *California Prepares for Increased Wildfire Risk to Air Quality From Climate Change*, Env't Prot. Agency, <https://www.epa.gov/arc-x/california-prepares-increased-wildfire-risk-air-quality-climate-change> (last visited Mar 1., 2023).

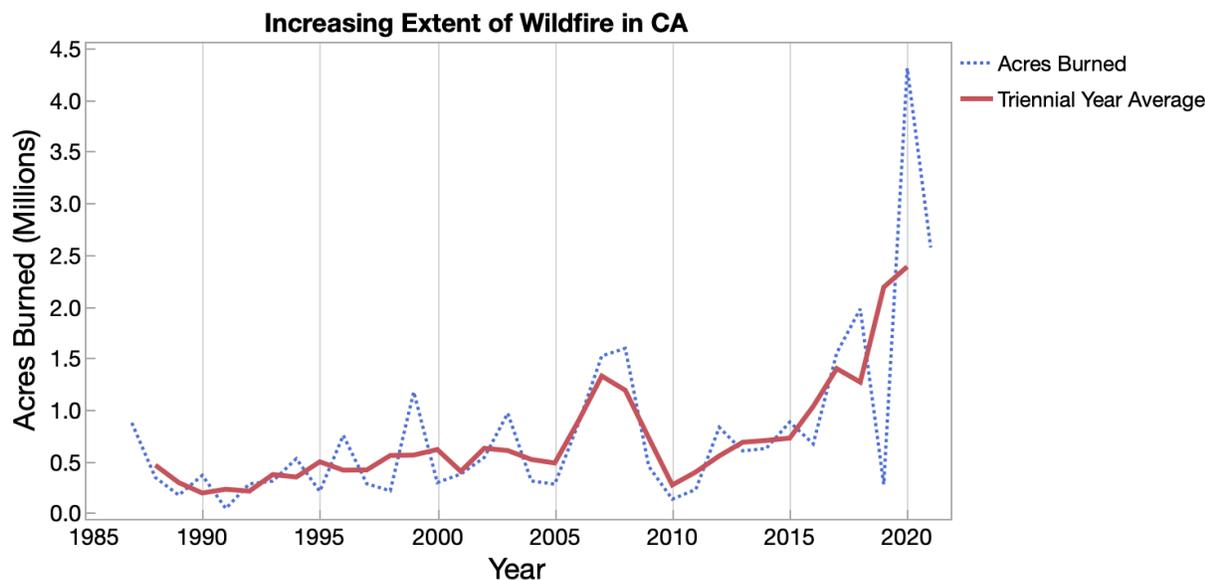


Figure 1: This graph plots the extent of wildfires in California. The dotted blue line indicates the observed acreage burned in that year, retrieved from CAL FIRE Incident Statistics,<sup>30</sup> and the red line indicates the triennial average centered on the year plotted.

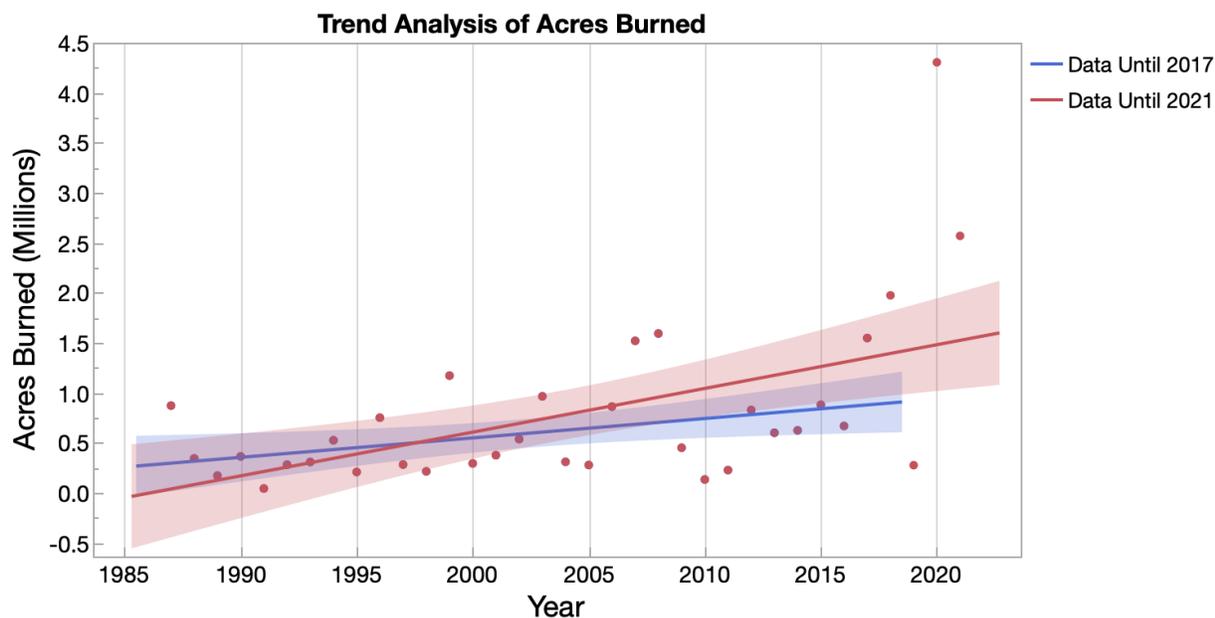


Figure 2: The annual data was fitted with two linear regressions. The regression in blue was fit to all data until 2017, reflecting the data used in the EPA’s Regulatory Impact Analysis for the proposed NAAQS, while the regression in red was fit to all data until 2021.

Some may contend that the wildfire season of 2020 is an outlier and should not be included in this analysis. We maintain that there is good reason to include 2020 data as part of the distribution we are studying, as the factors underlying this real data point and the general

<sup>30</sup> Statistics, Cal. Dep’t of Forestry and Fire Prot., <https://www.fire.ca.gov/our-impact/statistics> (last visited Mar. 4, 2023).

increase in wildfire scale and severity include lengthy periods of drought, an untenable buildup of fuels, and drier weather attributable to climate change. However, in the interest of illustrating the relative signal between the two distributions, Figure 3 shows the regression excluding observed burns in 2020 that may be considered an outlier. Even this conservative analysis shows that data centered on 2016 does not appropriately capture the change in the extent of wildfire that California experienced in the past three years and the change it may expect in the coming decades if this trend continues its trajectory.

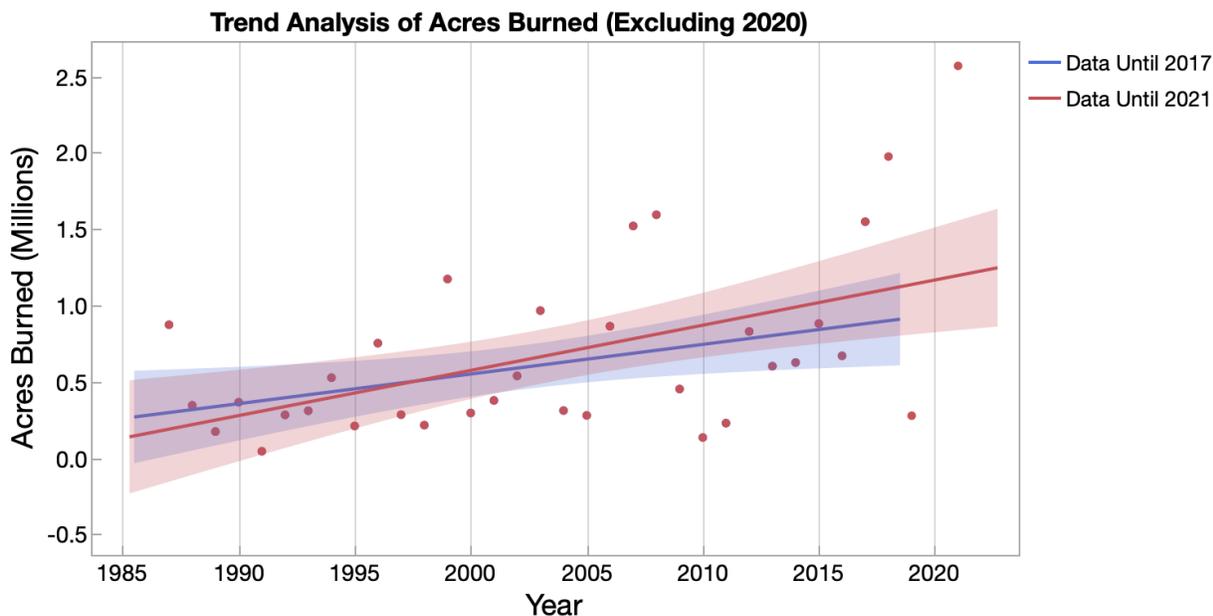


Figure 3: The same regressions were conducted while excluding the 2020 data, which may be considered an outlier from the full data set. This conservative analysis also shows that 2017 NEI data does not sufficiently account for the increase in the extent of wildfire California is likely to experience in the next decade.

Additionally, new models and analytical techniques indicate that smoke contributions to  $PM_{2.5}$  concentrations have reversed decades of policy-driven improvements observed in overall air quality in the Western United States.<sup>31</sup> Wildfire smoke itself has driven substantial increases in ambient  $PM_{2.5}$  concentrations since 2016 as seen in the figures below. Lines in Figures 4 and 5 show three-year trailing annual averages by air district and county, respectively, for observed total  $PM_{2.5}$  (black) and counterfactual estimated  $PM_{2.5}$  without smoke (blue). Counterfactual estimates are calculated using methods in Burke et al. (2023), and annual averages are calculated from stations with more than fifty observations per year for at least twelve years of data.<sup>32</sup> The horizontal dashed lines show the range of levels under consideration for the new standard (9-10  $\mu\text{g}/\text{m}^3$ ).

<sup>31</sup> Marshall Burke et al., *Wildfire influence on recent US pollution trends - Working paper*, Nat'l Bureau of Econ. Rsch. (Jan. 2023), [https://www.nber.org/system/files/working\\_papers/w30882/w30882.pdf](https://www.nber.org/system/files/working_papers/w30882/w30882.pdf).

<sup>32</sup> *Id.*

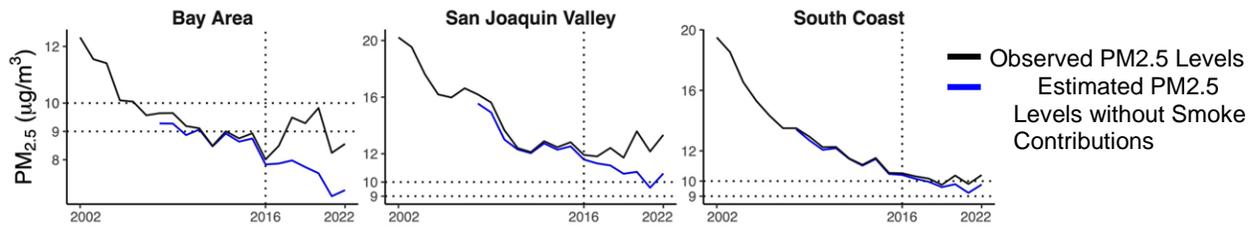


Figure 4: Observed total PM<sub>2.5</sub> levels (black) and counterfactual estimated PM<sub>2.5</sub> levels without smoke contributions (blue) in select Californian air districts over time.

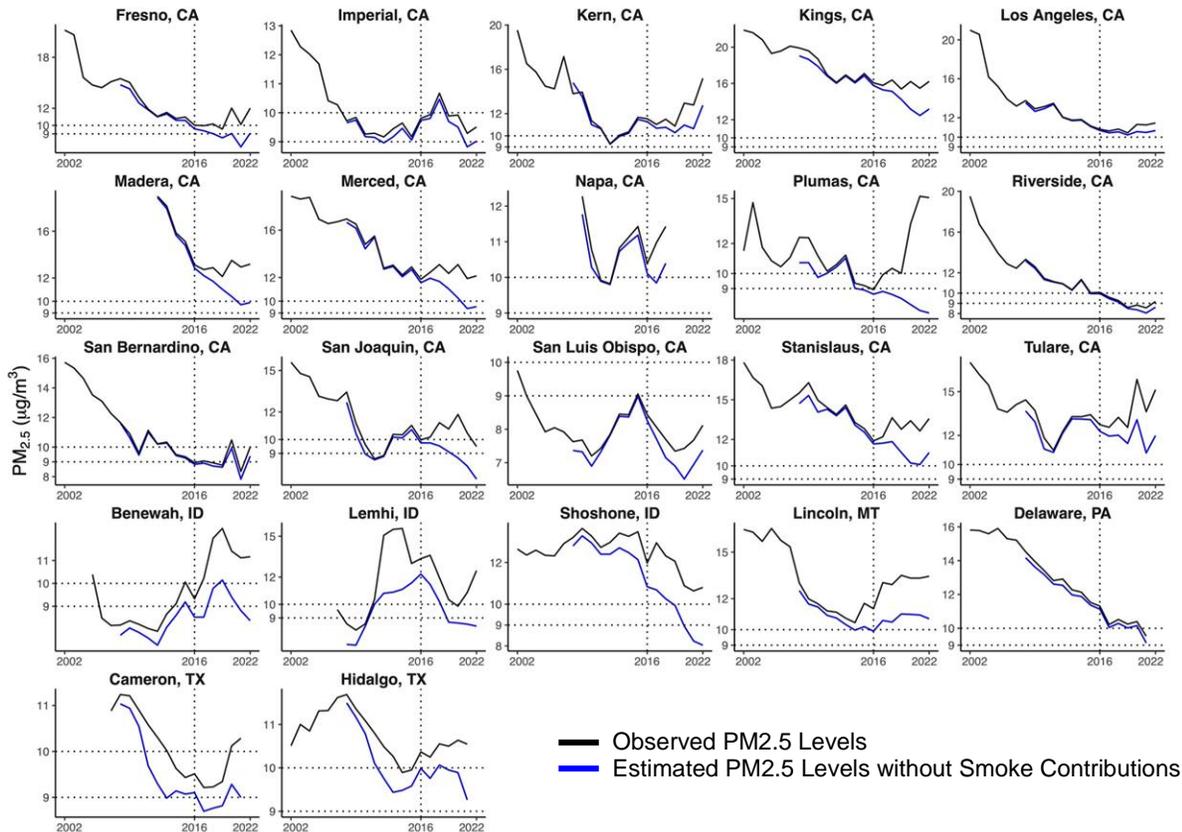


Figure 5: Observed total PM<sub>2.5</sub> levels (black) and counterfactual estimated PM<sub>2.5</sub> levels without smoke contributions (blue) in select counties across the United States over time.

These graphs show a downward trend in PM<sub>2.5</sub> levels overall in the last two decades, which can likely be attributed to NAAQS and other policy measures that reduced pollution from power plants and car exhaust.<sup>33</sup> However, the observed and counterfactual data diverge around the year 2016, shown by the vertical dashed lines. Smoke, originating primarily from wildfires, as evidenced by Figure 1, has contributed significantly to the observed increase in PM<sub>2.5</sub> levels over the last six years. As shown in Figure 4, the San Joaquin Valley in particular has observed PM<sub>2.5</sub> levels about 2 to 4 µg/m<sup>3</sup> above the proposed standard of 9 µg/m<sup>3</sup>. As the West anticipates that more frequent and more intense wildfires will continue to increase over the coming years,

<sup>33</sup> Nadja Popovich, *America's Skies Have Gotten Clearer, but Millions Still Breathe Unhealthy Air*, N.Y. Times (June 19, 2019), <https://www.nytimes.com/interactive/2019/06/19/climate/us-air-pollution-trump.html>.

the communities in California’s Central Valley will continue to see PM<sub>2.5</sub> levels that exceed the proposed annual NAAQS.<sup>34</sup>

The EPA’s most recent RIA acknowledges that having “more refined data would be ideal for agricultural dust and burning, prescribed burning, and nonpoint (area) sources due to their large contribution to primary PM<sub>2.5</sub> emissions and the limited availability of emissions controls,” but that detailed local analyses are “beyond the scope of th[e] RIA.”<sup>35</sup> We assert that the EPA must use better modeling and data accounting techniques to properly capture the impact of wildfire PM<sub>2.5</sub> on communities, especially the most vulnerable communities bearing the brunt of both anthropogenic and wildfire emissions. For static or slowly changing emission sources, NEI data with some latency can serve as a useful guide. However, in the special case of the rapidly worsening western wildfire situation, reliance on older NEI data is misleading. The NEI is not adequate to conduct meaningful impact analysis, especially if wildfire contributions of PM<sub>2.5</sub> emissions are excluded. The projected increase in wildfire emissions beyond 2016 must be included to properly assess the impact of wildfire on vulnerable populations and put emissions from beneficial fire in appropriate context.

#### B. Beneficial fire puts states in the West at risk of NAAQS noncompliance

Beneficial fires conducted to reduce catastrophic wildfires are likely to cause counties like those in the San Joaquin Valley to exceed the proposed annual PM<sub>2.5</sub> standard. For this section, we use EPA’s CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool to gain a cursory understanding of the impact of projected beneficial fire targets in the West.<sup>36</sup> The illustrative scenarios modeled in COBRA are based off of the current rate of treating approximately 125,000 acres per year with beneficial fire,<sup>37</sup> as well as projected targets of increasing annual beneficial fire treatments to 400,000 acres set by the California Wildfire and Forest Resilience Task Force<sup>38</sup> and 1,000,000 acres set by the Agreement for Shared Stewardship of California’s Forests and Rangelands between the United States Department of Agriculture and the State of California.<sup>39</sup> The total emissions estimated from the beneficial fire targets, derived from the 2020 NEI Fire Data, were divided equally among seven counties as point sources to simplify the modeling on the COBRA platform. See Appendix A for details about the assumptions, total emissions calculations, and model inputs.

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<sup>34</sup> Andrew Moore, *Climate Change is Making Wildfires Worse — Here’s How*, NC State College of Natural Resources News (Aug 29, 2022), <https://cnr.ncsu.edu/news/2022/08/climate-change-wildfires-explained/>.

<sup>35</sup> *Regulatory Impact Analysis for the Proposed Reconsideration of the National Ambient Air Quality Standards for Particulate Matter*, *supra* note 27, at ES-3.

<sup>36</sup> *Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)*, Env’t Prot. Agency (Jan. 25, 2023), <https://www.epa.gov/cobra>.

<sup>37</sup> *Prescribed Burning: About*, Cal. Air Res. Bd., <https://ww2.arb.ca.gov/our-work/programs/prescribed-burning/about> (last visited Feb. 24, 2023).

<sup>38</sup> *California’s Strategic Plan for Expanding the Use of Beneficial Fire*, Cal. Wildfire & Forest Resilience Task Force, 3 (Mar. 2022), <https://wildfiretaskforce.org/wp-content/uploads/2022/05/californias-strategic-plan-for-expanding-the-use-of-beneficial-fire.pdf>.

<sup>39</sup> *Agreement for Shared Stewardship of California’s Forest and Rangelands*, State of Cal. & USDA, Forest Service Pacific Southwest Region 3 (Aug. 12, 2020), <https://www.gov.ca.gov/wp-content/uploads/2020/08/8.12.20-CA-Shared-Stewardship-MOU.pdf>.

Table 1: Scenarios modeled in COBRA.

Scenario	Beneficial Fire Added (acres/year)	Total State PM <sub>2.5</sub> Emissions (tons)	Emissions per Point Source Modeled (tons)
a. Baseline	0	0	0
b. Current Treatments	125,000	6300	900
c. Projection 1	400,000	20,160	2,880
d. Projection 2	1,000,000	50,400	7,200

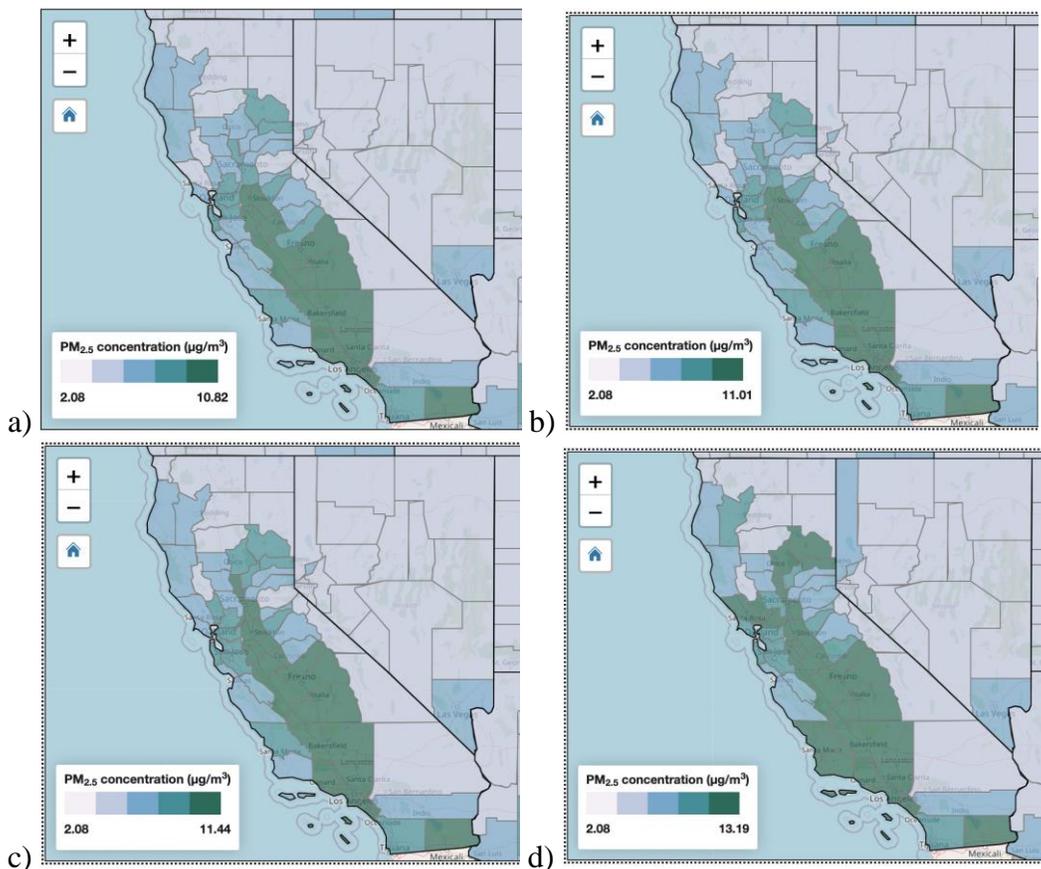


Figure 7: COBRA models projecting PM<sub>2.5</sub> concentrations from prescribed fire added to the landscape in the following amounts a) 0 acres, b) 125,000 acres, c) 400,000 acres, d) 1,000,000 acres. Note the changing legends; increased beneficial fire activity causes an increase in the highest estimated concentrations and the spread of the pollutant.

This simplified modeling shows how current and projected beneficial fire targets will likely put much of California at risk of noncompliance or nonattainment with the proposed rule. For example, adding 400,000 acres of beneficial fire to the landscape in the COBRA model shows PM<sub>2.5</sub> levels of around 10 µg/m<sup>3</sup> in the San Joaquin Valley Air District, while 1,000,000 acres of beneficial fire brings levels in that area to around 11 µg/m<sup>3</sup>. Moreover, even in the

scenario modeling current treatments, certain counties in the San Joaquin Valley Air District far surpass the proposed NAAQS limits. Figure 7 shows the progressive increase in the range of output PM<sub>2.5</sub> concentrations for each scenario. Table 2 lists the output by county within the San Joaquin Valley Air Pollution Control District of each COBRA model scenario.

Table 2: San Joaquin Valley PM<sub>2.5</sub> Concentration by County, Per Scenario: 1) 125,000 acres, 2) 400,000 acres, and 3) 1,000,000 acres.

County in San Joaquin Valley Air District, CA	Scenario 1 PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )	Scenario 2 PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )	Scenario 3 PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
San Joaquin County	10.20	10.38	10.78
Stanislaus County	10.06	11.04	13.19
Merced County	9.17	9.59	10.51
Madera County	7.48	7.67	8.10
Fresno County	11.01	11.44	12.37
Kings County	10.72	10.96	11.49
Tulare County	9.22	9.47	10.00
Kern County	9.93	10.11	10.50
<b>San Joaquin Valley Average</b>	<b>9.72</b>	<b>10.08</b>	<b>10.87</b>

Wildfire, which has broader and more severe impacts on public health than beneficial fire, currently constitutes a majority of fire-related emissions as shown in Figure 4. The increasing extent of wildfire is likely to expose communities like those in the San Joaquin Valley to even greater levels of PM<sub>2.5</sub> than observed currently, given the trends shown in Figures 2 and 3. In a similar vein, the projected increase in beneficial fire as modeled in COBRA also shows a likely increase in PM<sub>2.5</sub> levels in the short term. However, the major difference here is that beneficial fire over time will curtail the extent of catastrophic wildfire by creating a more fragmented fuels landscape, hopefully decreasing exposures in the long term.

A recent report from the U.S. Government Accountability Office (GAO) highlights the need for the EPA to “develop a coordinated approach for its actions to manage wildfire smoke risks” given its mission to protect human health and the environment.<sup>40</sup> In accordance with the data presented in this paper and the recommendations from the GAO, the EPA should better assess the impacts of fire-related emissions on PM<sub>2.5</sub> levels. To do so, the agency should model the impact of the impending increase in wildfire in conjunction with the potential impacts of

<sup>40</sup> *Wildfire Smoke: Opportunities to Strengthen Federal Efforts to Manage Growing Risks*, U.S. Gov’t Accountability Off. (Mar. 13, 2023), <https://www.gao.gov/products/gao-23-104723>.

beneficial fire on the estimated levels of PM<sub>2.5</sub>. Such modeling needs to take into account not just the short term but also the long term implications to properly understand the impact of the proposed PM<sub>2.5</sub> NAAQS reduction on public health, especially in vulnerable communities. In doing so, the EPA should account for the recent development of better modeling and inventory frameworks, such as the Wildfire Burn Severity and Emissions Inventory, that can be utilized to simulate and project wildfire into the future.<sup>41</sup> The rest of this comment will describe the current regulatory scheme, explain how the proposed rule will reduce beneficial fire, and provide regulatory and legislative recommendations that the agency and Congress might consider in the near term in order to better protect vulnerable populations from wildfire emissions sources.

## V. Beneficial fire stakeholders

Beneficial fire practitioners must operate within a complex web of stakeholders and regulations. The CAA requires the EPA to set NAAQS that states must attain, or comply with.<sup>42</sup> Because fire smoke releases PM<sub>2.5</sub>, NAAQS govern both wildfire and beneficial fire.<sup>43</sup> States draft Smoke Management Plans (SMPs) and State Implementation Plans (SIPs) that detail how states will attain NAAQS and other requirements of the CAA.<sup>44</sup> States or their air districts then implement and enforce these frameworks, depending on how a state has elected to structure CAA compliance.<sup>45</sup> States certify to the EPA when they have adopted SMPs, whereas the EPA reviews SIPs in a multi-year approval process.<sup>46</sup> States with air quality violations, or non-attainment status, face the withholding of federal highway funds and significantly more stringent regulatory requirements.<sup>47</sup> However, if a state applies for and the EPA approves an exceptional event determination (described below), the PM<sub>2.5</sub> associated with the event does not count against a state's compliance with NAAQS.<sup>48</sup>

Public land managers, including the USFS and state governments, engage in most fire suppression and conduct most beneficial fires.<sup>49</sup> However, land managers face many challenges in doing so. First and most relevant to this comment, beneficial fire releases PM<sub>2.5</sub> that can hinder states' ability to comply with the annual and 24-hour PM<sub>2.5</sub> standards (discussed in greater depth

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<sup>41</sup> Qingqing Xu et al., *Wildfire burn severity and emissions inventory: an example implementation over California*, 17 *Env't Res. Letters* 11 (2022), <https://doi.org/10.1088/1748-9326/ac80d0>.

<sup>42</sup> *Reviewing National Ambient Air Quality Standards (NAAQS): Scientific and Technical Information*, Env't Prot. Agency (Jul. 28, 2022), <https://www.epa.gov/naaqs>; *EPA Proposes to Strengthen Air Quality Standards to Protect the Public from Harmful Effects of Soot*, Env't Prot. Agency (Jan. 6, 2022), <https://www.epa.gov/newsreleases/epa-proposes-strengthen-air-quality-standards-protect-public-harmful-effects-soot>.

<sup>43</sup> *Particulate Matter (PM) Air Quality Standards*, *supra* note 25.

<sup>44</sup> *Basic Information about Air Quality SIPs*, Env't Prot. Agency (Jul. 22, 2022), <https://www.epa.gov/air-quality-implementation-plans/basic-information-about-air-quality-sips>.

<sup>45</sup> *Prescribed Burning: About*, *supra* note 37.

<sup>46</sup> Williams, *supra* note 5, at 779, 803.

<sup>47</sup> Jonathan Adler & Nathaniel Stewart, *Is the Clean Air Act Unconstitutional?*, 43 *Ecology L.Q.* 671, 673 (2016).

<sup>48</sup> Williams, *supra* note 5, at 781, 783–84.

<sup>49</sup> Engel, *supra* note 1, at 665 (“The high number of severe wildfires today is, in part, an effect of the long-standing, deliberate policy on behalf of federal and state land managers to suppress wildfires on public”); *see Statement of Forest Service Chief Randy Moore Announcing Pause of Prescribed Fire Operations on National Forest System Lands*, U.S. Forest Serv. (May 20, 2022), <https://www.fs.usda.gov/news/releases/statement-forest-service-chief-randy-moore-announcing-pause-prescribed-fire> (“The Forest Service oversees the nation’s largest prescribed fire program and safely conducts an average of 4,500 prescribed fire projects annually, treating more than 1,400,000 acres of National Forest System lands”).

in Section VI).<sup>50</sup> Second, communities located close to beneficial fire feel the greatest effects of beneficial fire smoke and bear the unlikely but potentially disastrous risk that a beneficial fire could escape the planned boundaries.<sup>51</sup> Communities also bear the similarly unlikely but potentially disastrous risk of being destroyed by a megafire of the climate change era and joining the ranks of other California communities such as Paradise, Greenville, and Grizzly Flats.<sup>52</sup>

Though communities located near beneficial fire activities shoulder some risk given the local nature of the practice, the resulting reduced risk of catastrophic wildfire benefits not only neighboring communities, but even communities across state lines. While beneficial fire smoke is concentrated in the communities closest to the burn,<sup>53</sup> wildfire smoke travels aloft and can reach millions of Americans across the country.<sup>54</sup> Because beneficial fire is likely to make subsequent wildfires less intense, proximate communities may experience a tradeoff: exposure to some smoke now in exchange for much less smoke in the future.<sup>55</sup> Given these challenges, a modification to the annual PM<sub>2.5</sub> NAAQS and revisions to its Implementation Rule present an opportunity to remove structural constraints to beneficial fire while mitigating local public health impacts of smoke and reducing smoke exposure for Americans across the country.<sup>56</sup>

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<sup>50</sup> Engel, *supra* note 1, at 653.

<sup>51</sup> *From the Chief's Desk: Reviewing our prescribed fire program*, U.S. Forest Serv. (May 20, 2022), <https://www.fs.usda.gov/inside-fs/leadership/chiefs-desk-reviewing-our-prescribed-fire-program> (“99.84% [of prescribed fires] go according to plan . . . slightly more than one escape[s] per every 1,000 prescribed fires,” which equals “about six escapes per year”); Rob Jordan, *Empowering private landowners to prevent wildfires*, Stanford Woods Institute for the Environment (Sept. 22, 2022), <https://woods.stanford.edu/stanford-wildfire-research/news/empowering-private-landowners-prevent-wildfires> (noting only two of 400 prescribed burns in California within a three-year time span escaped the planned boundaries); Williamson, *supra* note 16, at 1 (stating that less than 1% of prescribed burns escape from intended boundaries).

<sup>52</sup> Erika D. Smith & Anita Chabria, *Column: California spends billions rebuilding burned towns. The case for calling it quits*, L.A. Times (Sept. 27, 2022, 5:00 AM), <https://www.latimes.com/california/story/2022-09-27/california-climate-change-stop-rebuilding-rural-towns-wildfire-greenville>.

<sup>53</sup> Williamson, *supra* note 16, at 5.

<sup>54</sup> Matt Vasilogambros, *Proliferating Wildfires Poison Public Health Across the Country*, The Pew Charitable Tr. (Oct. 17, 2022), <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2022/10/17/proliferating-wildfires-poison-public-health-across-the-country>; Williamson, *supra* note 16, at 4; Hill et al., *supra* note 4, at 10.

<sup>55</sup> Williams, *supra* note 5, at 774; Engel, *supra* note 1, at 638; Hill et al., *supra* note 4, at 36.

<sup>56</sup> Other obstacles to beneficial fire are important but are not under the EPA’s discretion. They include: the advance permitting process (Richmond, *supra* note 4, at 364-65); insufficient budgets (*The Burning Solution: Prescribed Burns Unevenly Applied Across U.S.*, Climate Central [May 29, 2019] [https://assets.climatecentral.org/pdfs/May2019\\_Report\\_TheBurningSolution.pdf?pdf=TheBurningSolution-Report](https://assets.climatecentral.org/pdfs/May2019_Report_TheBurningSolution.pdf?pdf=TheBurningSolution-Report) [explaining that fire suppression grows every year, and showing that in 2018 federal agencies spent seven times more on fire suppression than prescribed burns]); a tradition of suppression in land management (Hill et al., *supra* note 4, at 32); the Endangered Species Act’s focus on short-term risks instead of habitat health (Ryan et al., *supra* note 2, at e20); and bankruptcy fears by private landowners who conduct beneficial fires (Ross W. Gorte & Kelsi Bracmort, Cong. Rsch. Serv., RL30755, *Forest Fire/Wildfire Protection*, 1 n. 3 [Mar. 7, 2012] [70% of forests and rangelands in the lower forty-eight states are privately owned as of 2007]); Karen Bradshaw, *A Modern Overview of Wildfire Law*, 21 Fordham L. Rev. 445, 465 (2010) (institutional timberland landowners, who are “non-governmental actors [that] own at least 5,000 acres of forested wildland,” hold the majority of property affected by wildfire).

## VI. Fire regulation

### A. Regulation of Exceptional Events

Under subsection 319(b)(1)(A) of the CAA, exceptional events are “events for which the normal planning and regulatory process established by the CAA is not appropriate.”<sup>57</sup> PM<sub>2.5</sub> released in exceptional events does not count as an exceedance of NAAQS. Subsections 319(b)(1)(A)(i) and (ii) define an exceptional event as an event that is “not reasonably controllable or preventable. . . .” or “caused by human activity that is unlikely to recur at a particular location or a natural event . . . .”<sup>58</sup> In accordance with subsection 319(b)(3)(B)(ii), “a clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location.”<sup>59</sup>

The CAA’s current implementation discourages increasing the scale of beneficial fire in multiple ways. The process for states to seek exceptional event treatment is laborious and risky, and includes an opaque and unpredictable EPA evaluation. Importantly, the exceptional event classification process does not begin until after the exceedance has occurred.<sup>60</sup> When a beneficial fire on wildland exceeds NAAQS, the local air agency or federal land manager must provide an initial notification to its EPA Regional Office.<sup>61</sup> The EPA and the air agency or federal land manager then work together to “determine appropriate scope of demonstration based on regulatory significance and approvability considerations,” and after there is an agreement on the scope and “regulatory significance of demonstration package,” the air agency flags data requested for exclusion in the Air Quality System.<sup>62</sup> The air agency must then submit a “demonstration” in accordance with 40 C.F.R. 50.14(c)(3), which requires a narrative conceptual model, “analyses comparing the climbed event-influenced concentration(s) to concentrations at the same monitoring site at other times,” and documentation that the submitting air agency followed the public comment process.<sup>63</sup> The EPA may take up to twelve months to render a decision.<sup>64</sup> Moreover, the EPA designates exceptional events on a case-by-case basis using a “weight of the evidence” test, fostering uncertainty about the outcome of an exceptional event determination attempt.<sup>65</sup> In comparison, the EPA considers wildfires unambiguously to be

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<sup>57</sup> Treatment of Data Influenced by Exceptional Events, 72 Fed. Reg. 13560 (Mar. 22, 2007) (codified at 40 C.F.R. § 50).

<sup>58</sup> 42 U.S.C. § 7619 (2013).

<sup>59</sup> *Id.*

<sup>60</sup> *Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations*, Env’t. Prot. Agency, 5 (Aug. 8, 2019), [https://www.epa.gov/sites/default/files/2019-08/documents/ee\\_prescribed\\_fire\\_final\\_guidance\\_-\\_august\\_2019.pdf](https://www.epa.gov/sites/default/files/2019-08/documents/ee_prescribed_fire_final_guidance_-_august_2019.pdf).

<sup>61</sup> *Id.*

<sup>62</sup> *Id.*

<sup>63</sup> *Id.* at 2, 5.

<sup>64</sup> *Id.* at 5.

<sup>65</sup> *Id.* at 2 (“EPA believes it is appropriate to consider all relevant evidence and qualitatively “weigh” this evidence based on its relevance to the Exceptional Events Rule criterion being addressed, the degree of certainty, its persuasiveness, and other considerations appropriate to the individual pollutant and the nature and type of event”); Williams, *supra* note 5, at 786.

exceptional events and does not subject the tremendous amount of associated PM<sub>2.5</sub> emissions to the same administrative burden.<sup>66</sup>

States and air districts thus need significant resources and must be willing to risk a CAA violation to conduct beneficial fire at the necessary level.<sup>67</sup> Recognizing the risk and effort that large beneficial fire programs entail, land managers only conduct beneficial fire when and at a scale that makes exceedances unlikely.<sup>68</sup> In fact, no exceptional event determinations have ever been made for beneficial fire.<sup>69</sup> Exceptional event status for beneficial fire thus remains essentially a hypothetical option that is so impractical that states and air districts simply do not attempt it. The proposed change threatens to further discourage proactive beneficial fires at a time when they need to occur at a broader scale to reduce the increasing risk of catastrophic wildfires.<sup>70</sup>

#### B. Potential effects of these changes on both current and proposed uses of beneficial fire, with specific analysis of effects in California

Although we support the lowering of the annual health PM<sub>2.5</sub> standard to better reflect the harmful effects of PM<sub>2.5</sub> on human health, the current proposal is likely to have the unintended consequence of increasing PM<sub>2.5</sub> levels beyond even the 2016 levels modeled in this comment. First, a lower annual PM<sub>2.5</sub> standard will make more beneficial fires subject to the onerous and risky exceptional events determination process, because beneficial fires that do not currently need an exceedance under 12 µg/m<sup>3</sup> will be more likely to need one under 9 µg/m<sup>3</sup> or 10 µg/m<sup>3</sup>.<sup>71</sup> If exceptional event determination applications for beneficial fires remain at the current rate of zero, states and air districts will not conduct as many beneficial fires as they do today for fear of violating the CAA. Second, the proposed change does not take into consideration that land managers in the West need to increase the use of beneficial fire as a land management tool.<sup>72</sup> Without more beneficial fire to reduce fuels buildup, there will likely be an increase in wildfires beyond even the rate the West has seen in the past ten years.<sup>73</sup>

It is worth acknowledging that the smoke community does not unanimously advocate for more beneficial fire. Some argue that beneficial fires are worse because they do not effectively reduce uncontrolled fire smoke and because the increased local effects disproportionately impact

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<sup>66</sup> Richmond, *supra* note 4, at 359.

<sup>67</sup> This is reflected in the rate at which planned prescribed burns are executed. Hill et al., *supra* note 4, at 18 (“In California, between 2013 and 2018 an estimated 38% to 51% of acres planned to burn were actually burned”) (citing Miller et al., *Barriers and enablers for prescribed burns for wildfire management in California*, 3 *Nature Sustainability*, 1–9 [2020]).

<sup>68</sup> Williams, *supra* note 5, at 788.

<sup>69</sup> Personal communication from Erica Sasser of Env’t Prot. Agency Off. of Air and Radiation to Michael Wara (Also stating that two beneficial fires were submitted as exceptional events in 2011 but then withdrawn before the EPA could make a determination).

<sup>70</sup> *California’s Wildfire and Forest Resilience Action Plan*, *supra* note 8, at 19.

<sup>71</sup> *Cf.* Richmond, *supra* note 4, at 349 (“[B]ecause most small fires do not violate air quality standards, increasing prescribed burns will have few impacts on air quality”).

<sup>72</sup> *Confronting the Wildfire Crisis*, *supra* note 9 at 3–4 (Jan. 2022) (announcing a plan to treat 50 million acres over ten years with thinning, prescribed burning, and pruning).

<sup>73</sup> Williams, *supra* note 5, at 774; Hill et al., *supra* note 4, at 16; Williamson, *supra* note 16, at 1.

vulnerable communities.<sup>74</sup> Others caution that because there remains some uncertainty within the scientific data about the definitive impacts of wildfire and beneficial fire smoke on the public health of local and broad populations, land managers should not scale up beneficial fire programs.<sup>75</sup>

These concerns do not justify implementing the proposed change as written. The reduction in forest fuels that results from beneficial fire has been documented to curb megafires and thereby save communities.<sup>76</sup> In fact, this proposal is an opportunity to revisit beneficial fire guidance and make sure that planners mitigate local health effects, give proper notice to local communities, and mitigate inequities in communities exposed to fire-generated PM<sub>2.5</sub>.<sup>77</sup> Revising the way the CAA governs beneficial fire can encourage an essential tool in fire management while improving the current process. Inaction will only exacerbate the growing national public health crisis of wildfire and smoke in the West.

## VII. Implementation recommendations

We propose two implementation recommendations that would allow states to scale their beneficial fire programs while protecting local communities. First, we suggest requiring states wherein a significant contribution to overall PM<sub>2.5</sub> is derived from wildfire smoke to include a beneficial fire plan and public health mitigation measures in their SIPs for PM<sub>2.5</sub>. Second, we recommend the EPA make conditional exceptional event determinations through the SIP process. Although these recommendations do not remove all barriers to beneficial fires, they address significant obstacles within the EPA's discretion.

### A. SIP Burn Plan and Public Health Mitigation Requirement

Incorporating beneficial fire plans and public health mitigation measures as mandatory elements of certain states' SIPs for PM<sub>2.5</sub> provides the best opportunity to foster forest resiliency, improve interagency collaboration, and promote public health and climate resiliency in the current rule.<sup>78</sup> As demonstrated by the data above, states like California need to conduct beneficial fires on hundreds of thousands of acres in the coming years – approximately an eight-fold increase from current annual treatments – to address the wildfire crisis.<sup>79</sup> Because catastrophic fires have become a public health and public safety emergency, the EPA needs to empower states to more proactively reduce forest fuels through beneficial fire.

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<sup>74</sup> Benjamin A. Jones et al., *More smoke today for less smoke tomorrow? We need to better understand the public health benefits and costs of prescribed fire*, 31 *International Journal of Wildland Fire* 918, 919–20 (2022); Williamson, *supra* note 16, at 6.

<sup>75</sup> Jones, *supra* note 74, at 918.

<sup>76</sup> Yoohyun Jung & Paula Friedrich, *Maps: How Prescribed Burns And Other Treatments Helped Curb Caldor's Growth*, S.F. Chron. (Sept. 20, 2021 5:01 P.M.), <https://www.sfchronicle.com/projects/2021/caldor-fire-prescribed-burn/> (“Data shows fuel treatments, especially prescribed burn projects, made a difference in various parts of the Caldor Fire's path, including the town of Meyers”).

<sup>77</sup> Hill et al., *supra* note 4, at 37.

<sup>78</sup> *Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations*, *supra* note 60, at 1. (stating that prescribed fire may also impact ozone, which requires a different SIP).

<sup>79</sup> Section IV(B), Table 1.

The SIP beneficial fire requirement would include two components. First, states would need to include a target for acres burned by beneficial fire for each air district. Because air districts have unique forest and health considerations, we do not suggest mandating a specific acreage. Rather, states would have to at least incorporate a plan for how many acres they would treat with beneficial fire within the three-year SIP period. This frequency aligns with CAA section 110 (42 U.S.C. section 7410), which requires states to submit SIPs every three years.<sup>80</sup> Beneficial fire pre-burn plans could also incorporate a pre-burn protocol to reduce the risk of escaped prescribed fire.<sup>81</sup>

Second, EPA could also require that states include a public health mitigation plan in their SIPs. As beneficial fires increase in scope, it is essential that forest resiliency not come at the cost of local communities' health. The EPA could require that SIPs demonstrate how each air district is a "smoke-ready community" as defined by the EPA. Smoke-ready communities have public buildings equipped with filtration for fire smoke, residents understand the health risks associated with smoke exposure and can readily access tools to protect their health, and resources are available to help those most vulnerable to smoke exposures.<sup>82</sup> To ensure the effective deployment of public health mitigation tools, the EPA could also require states to simulate effects on local communities from beneficial fires. The EPA should also consider leveraging its Environmental Justice Government-to-Government (EJG2G) program to properly integrate environmental justice considerations into public health mitigation plans.<sup>83</sup>

#### B. How to apply the SIP requirement to states with different ecosystem and public health needs

We recognize that the mandatory nature of SIPs would pose an undue burden on states whose forests do not demand frequent fire. We therefore propose that the EPA establish a wildfire threshold above which states must include a beneficial fire plan in their SIP. We suggest a percentage of total acres in a state burned by wildfires, averaged over ten years. A percentage threshold would address the disparate size of states, and a ten-year average would address the volatility of wildfires year over year. The threshold would be based on wildfire acreage because the purpose of beneficial fire is to decrease the intensity and severity of wildfires, so the new beneficial fire plan requirement would only apply to states with significant wildfire and public health challenges. Because smoke from beneficial fire is localized, it is less likely to migrate to another state. As a result, one state's prescribed fire program is unlikely to significantly interfere with another state's attainment of NAAQS.

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<sup>80</sup> *Basic Information about Air Quality SIPs*, *supra* note 44.

<sup>81</sup> *See, e.g. National Prescribed Fire Program Review*, U.S. Forest Serv. 5 (Sept. 2022), <https://www.wildfirelessons.net/orphans/viewincident?DocumentKey=5ca69127-bffa-4cfd-be64-dbf0dcfe23b> (creating guidelines in response to a New Mexico fire that started with prescribed burns); Simon Romero, *The Government Set a Colossal Wildfire. What Are Victims Owed?*, N.Y. Times (Jun. 21 2022), <https://www.nytimes.com/2022/06/21/us/new-mexico-wildfire-forest-service.html>.

<sup>82</sup> Hill et al., *supra* note 4, at 35 (citing Mike McGown, Env't Prot. Agency, *Smoke Ready EPA Tools and Resources – Creating a Smoke Ready Community Webinar* 24, <https://static1.squarespace.com/static/5760488227d4bd87de902e88/t/5f317f4f635be16341245f9c/1597079510643/Smoke+Ready%2C+EPA+Tools+and+Resources> [last visited Mar. 3, 2023]).

<sup>83</sup> *The Environmental Justice Government-to-Government Program*, Env't Prot. Agency (Feb. 28, 2023), <https://www.epa.gov/environmentaljustice/environmental-justice-government-government-program>.

The graph in Appendix B demonstrates how a threshold approach could function in practice. Because we do not have access to a ten-year average of the percentage of acres burned by wildfire across all states, we set a threshold of one percent based on 2020 wildfire data alone. The sample data reveals a SIP requirement that would only apply to eight states, seven of which are in the West. Not only does the geographical distribution reflect how concentrated the wildfire crisis is, the relatively small number of states above the threshold underscores what a significant difference our recommendation would make for forest resiliency and public health while subjecting only a few states to an additional administrative burden. For the threshold to accurately reflect states' relative need for beneficial fire, we recommend that the EPA conduct rigorous analysis to determine the threshold above which wildfire has more severe ecological and public health effects.

### C. Conditional exceptional event determination

#### 1. Proposed process

We recommend that the EPA build on existing SIP infrastructure to make conditional exceptional event determinations through the SIP approval process. The EPA could require states to include a pre-burn review for beneficial fire programs that states expect to exceed the annual PM<sub>2.5</sub> standard. Although it may be difficult to precisely predict what a post-burn review will look like in advance, the EPA would grant a final exceptional event determination to a post-burn review reasonably consistent with the pre-burn review of a conditionally approved SIP. This would allow beneficial fire to meet demand and reduce the NAAQS nonattainment risk that rests with states and air districts under the current regulation and guidance.

We advocate for this approach for several reasons. First, the EPA already conditionally approves SIP revisions based on a state's commitment to adopt specific enforceable measures by a specific date.<sup>84</sup> The EPA then treats a conditional approval as a disapproval if a state fails to follow through with their commitment.<sup>85</sup> Second, beneficial fire regulatory guidance already requires a post-burn review when there is an exceptional events demonstration, so this would not create additional post-burn work for burn managers.<sup>86</sup> A conditional exceptional event determination through SIPs would thus adopt these processes to lower the barriers to beneficial fire. Our recommendation would signal to states that their beneficial fire program would likely not contribute to exceedances if executed as planned. Pre-burn exceptional event determination via the SIP conditioned on a post-event report would therefore promote the public health goals of the CAA while adapting to today's changing climate.

#### 2. How the proposed process would interact with the exceptional events rule

Although Congress drafted the CAA with smokestacks and tailpipes in mind rather than beneficial fire, we think there is a way to grant conditional exceptional event status for beneficial

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<sup>84</sup> 42 U.S.C. § 7410(k)(4).

<sup>85</sup> *Id.*

<sup>86</sup> 40 C.F.R. § 50.14(b)(3)(ii)(A); *Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations*, *supra* note 60, at 21 (recommending that program evaluations in SMPs consider post-burn reports, which “may describe implemented contingency plans due to smoke impacts or use of [basic smoke management practices] and recommendations for future improvements”).

fires before they occur.<sup>87</sup> The tension between exceptional events and beneficial fire stems from the EPA’s explicit inclusion of beneficial fire as an exceptional event compared with statutory requirements that the event be “not reasonably controllable or preventable,” “caused by human activity that is unlikely to recur at a particular location or a natural event,” and have “a clear causal relationship . . . between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location.”<sup>88</sup> We address these requirements in turn.

First, the EPA already categorizes prescribed fire as “not reasonably controllable or preventable” in the context of exceptional events, provided that a state either certifies a smoke management program or “demonstrate[s] that the burn manager employed appropriate basic smoke management practices.”<sup>89</sup> The agency support for our recommendation is therefore strong. In addition, from an ecological perspective, the past ten years have shown that fire and smoke will occur in the West regardless of whether the source is beneficial fire or wildfire.<sup>90</sup> Unlike wildfire, beneficial fire is associated with smoke that usually stays within a forest canopy and impacts public health at a more localized scale with less severe public health consequences.<sup>91</sup> As a result, beneficial fire is the safer choice of a process we can no longer control or prevent.

Second, beneficial fire meets the requirement of an event “caused by human activity that is unlikely to recur at a particular location or a natural event” despite first appearances.<sup>92</sup> Although beneficial fire is likely to recur, the EPA already categorizes beneficial fire as eligible for this requirement. According to federal regulations, states may:

rely upon and reference an assessment of the natural fire return interval or the prescribed fire frequency needed to establish, restore and/or maintain a sustainable and resilient wildland ecosystem contained in a multi-year land or resource management plan with a stated objective to establish, restore and/or maintain a sustainable and resilient wildland ecosystem and/or to preserve endangered or threatened species through a program of prescribed fire.<sup>93</sup>

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<sup>87</sup> *Clean Air Act Requirements and History*, Env’t. Prot. Agency (Aug. 10, 2022), <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>.

<sup>88</sup> *Id.*

<sup>89</sup> 40 C.F.R. § 50.14(b)(3)(ii)(A) (“the State . . . may rely upon . . . the prescribed fire frequency needed to establish, restore and/or maintain a sustainable and resilient wildland ecosystem contained in a multi-year land or resource management plan . . . .”); *Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations*, supra note 60, at 1.

<sup>90</sup> Ezra David Romero, *Fire Suppression — And Climate Change — Is To Blame For California’s Megafires*, *Experts Unpack The Term*, CapRadio (Sept. 12, 2020), (“[F]ire suppression hasn’t worked and we need to be more proactive and better stewards of the landscape”); Alejandra Borunda, *Wildfires in the West are inevitable, but this strategy can help control them*, Nat’l Geographic (Sept. 3, 2021), <https://www.nationalgeographic.com/environment/article/wildfires-in-the-west-are-inevitable-but-this-strategy-can-help-control-them> (“While we can’t change the weather patterns or climate pressures, York says, at least not in the short term, we can control the fuels”).

<sup>91</sup> Navarro et al., supra note 18, at 8.

<sup>92</sup> 40 C.F.R. § 50.14(b)(3)(iii).

<sup>93</sup> *Id.*

Because our recommendation would require states to include burn plans in their SIPs, they would therefore meet the multi-year land resource management plan requirement.

Third, an exceptional event determination must show a clear causal relationship between the exceedance and the event. This may seem at first glance to be the thorniest challenge for a conditional exceptional event determination before the event. First, the causal requirement requires data that appears to only be possible to collect after the fact. Second, PM<sub>2.5</sub> from beneficial fire is hard to identify regardless of when the data is collected. Most air quality monitors do not distinguish between beneficial fire smoke and other sources of PM<sub>2.5</sub>, including wood-burning stoves and vehicular traffic.<sup>94</sup> Finally, low-intensity beneficial fire does not generate spikes in PM<sub>2.5</sub> that easily identify a causal relationship between the event and an exceedance, unlike high-intensity wildfires.<sup>95</sup>

This causal relationship challenge is one that better monitoring technology and modeling can surmount. The EPA could require that SIPs include modeling that shows how much additional PM<sub>2.5</sub> their beneficial fire plan will release beyond a standard deviation from average annual PM<sub>2.5</sub> distribution levels in the air district in question. After the event, the state would need to demonstrate how a beneficial fire conformed to the model submitted in their SIP for a conditional exceptional event determination to be confirmed as a non-exceedance. We recognize that models cannot provide complete certainty, but the standard deviation requirement allows for some disparity between pre- and post-burn reviews without granting an exceptional event determination to any beneficial fire that was conditionally approved in a SIP.

Moreover, although monitors and modeling come at a cost, we are encouraged by the decreasing cost of monitors for wildland firefighters and satellite smoke monitors, as well as decreasing costs of computational modeling.<sup>96</sup> We are also encouraged by the increasing adoption of filter-based speciation monitors that are able to provide information about the composition and sources of PM<sub>2.5</sub> pollution.<sup>97</sup> The EPA could assist interested states in deploying speciation monitors at scale to resolve the difficulty of connecting beneficial fire to exceedances of the PM<sub>2.5</sub> standard. We recognize that these are additional costs, but they are trivial in comparison to either ongoing wildfire suppression costs or the costs of catastrophic wildfires to public health, public safety, infrastructure, and ecosystems.

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<sup>94</sup> See Prakash Thangavel et. al, *Recent Insights into Particulate Matter (PM<sub>2.5</sub>)-Mediated Toxicity in Humans: An Overview*, 19 International Journal of Environmental Research and Public Health 3 (2022), <https://doi.org/10.3390/ijerph19127511> (listing PM<sub>2.5</sub> sources including wood smoke and vehicular traffic); *Annual Report on the California Air Resources Board's Fine Particulate Matter Monitoring Program*, Cal. Air Res. Board (Feb. 2019), <https://ww2.arb.ca.gov/sites/default/files/2019-02/pm25-monitoring-2019.pdf> (describing how California's PM<sub>2.5</sub> pollution monitoring program identifies sources of PM<sub>2.5</sub> pollution).

<sup>95</sup> See Richmond, *supra* note 4, at 348.

<sup>96</sup> See *BlueSky Framework*, U.S. Forest Serv., <https://www.fs.usda.gov/pnw/tools/bluesky-framework> (last visited Mar. 23, 2023); Marshall Burke et al, *The changing risk and burden of wildfire in the United States*, 118 Proceedings of the Nat'l Acad. of Sci. 1 (2021), <https://doi.org/10.1073/pnas.2011048118>; Peter Dizikes, *Low-cost device can measure air pollution anywhere*, MIT News (Mar. 16, 2023), <https://news.mit.edu/2023/low-cost-device-can-measure-air-pollution-anywhere-0316#:~:text=Caption%3A-.MIT%20researchers%20have%20made%20an%20open%2Dsource%20version%20of%20the,a%20prototype%20to%20a%20car.>

<sup>97</sup> *Annual Report on the California Air Resources Board's Fine Particulate Matter Monitoring Program*, *supra* note 95.

## D. Why SIPs

Our implementation recommendations focus on the SIP process for several reasons. First, the CAA already requires states to submit SIPs to the EPA for review and approval.<sup>98</sup> Our recommendations thus build on an existing process instead of creating a new one. Second, there is precedent for the EPA granting approval for beneficial fires in advance. From 1998 to 2005, the EPA instructed that states with SMPs could obtain an exemption under the exceptional event rule.<sup>99</sup> In addition, our recommendations center on SIPs instead of SMPs because SIPs are mandatory whereas SMPs are not.<sup>100</sup> Any increase in beneficial fires must address the equity challenges created by localized smoke. The voluntary nature of SMPs leaves too much uncertainty about whether burn managers will prioritize the health of local communities and vulnerable populations, especially those of color.<sup>101</sup>

The SIP approach does not come without disadvantages. Approval of SIPs can take years, during which time forest and climate conditions can change, potentially rendering burn plans obsolete.<sup>102</sup> In addition, the EPA would need to devote additional administrative resources to reviewing SIPs if they also include beneficial fire plans. Nevertheless, absent a revision of the statutory language of the CAA, we believe that mandating beneficial fire plans and public health mitigation measures while granting conditional exceptional event determinations through SIPs is the best opportunity to allow beneficial fires to increase at the necessary pace while mitigating negative health impacts of the combination of wildfire and beneficial fire smoke on local communities.

## E. EPA's legal authority to revise the implementation of the CAA

The EPA has the authority to interpret 319(b) of the CAA as covering beneficial fire under both *Chevron* deference and the major questions doctrine review standards. Courts generally grant broad deference to federal agencies.<sup>103</sup> If a regulation or other agency action is challenged, courts apply the relevant standard of review to determine if the agency has exceeded its authority.<sup>104</sup> Although the major questions doctrine's precise relationship to the *Chevron* doctrine has yet to be definitively articulated by the courts, *Chevron* deference usually applies unless the "major questions" doctrine requires a more searching review.<sup>105</sup>

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<sup>98</sup> Williams, *supra* note 5, at 779; Richmond, *supra* note 4, at 359, 364, 369.

<sup>99</sup> Williams, *supra* note 5, at 782; *Interim Air Quality Policy on Wildland and Prescribed Fires*, Env't Prot. Agency 2 (1998), <https://nepis.epa.gov/Exec/ZyPDF.cgi/9100JSKT.PDF?Dockey=9100jskt.pdf> ("In exchange for States and tribes proactively implementing SMP's, EPA intends to exercise its discretion not to redesignate an area as nonattainment if the evidence that fires managed for resource benefits caused or significantly contributed to violations of the daily or annual PM<sub>2.5</sub> or PM<sub>10</sub> standard"); Williams, *supra* note 5, at 782 (explaining that when Congress codified the exceptional events rule in 2005 through 42 U.S.C. Section 7619, the EPA switched from using its own guidance to the statutory definition).

<sup>100</sup> Engel, *supra* note 1, at 656.

<sup>101</sup> Hill et al., *supra* note 4, at 32.

<sup>102</sup> *EPA-Approved Statewide Statutes and State Regulations in the California SIP*, Env't Prot. Agency (Feb. 2, 2023), <https://www.epa.gov/sips-ca/epa-approved-statewide-statutes-and-state-regulations-california-si> (showing that approval can take up to five years).

<sup>103</sup> Williams, *supra* note 5, at 797; Richmond, *supra* note 4, at 362.

<sup>104</sup> The Major Questions Doctrine, Cong. Rsch. Serv., IF12077 1, <https://crsreports.congress.gov/product/pdf/IF/IF12077>.

<sup>105</sup> *Id.* at 2.

*Chevron* instructs courts to defer to an agency when reviewing its construction of a statute that it administers.<sup>106</sup> According to *Chevron*, a court will defer to the agency’s interpretation when a Congressional statute is ambiguous and an agency’s interpretation is reasonable.<sup>107</sup> As a first step, a court asks “whether Congress has directly spoken to the precise question at issue” to determine whether a Congressional statute is ambiguous.<sup>108</sup> If the statute is silent or ambiguous, the second step for the court is to determine “whether the agency’s answer is based on a permissible construction of the statute.”<sup>109</sup>

Congress is not silent regarding the EPA’s authority to conditionally approve SIPs. Under *Chevron*, “[i]f the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.”<sup>110</sup> Because Congress enacted CAA section 110(k)(4), “[c]onditional approval,” a court would likely end a *Chevron* inquiry into the conditional approval of SIPs and defer to the EPA. CAA section 110(k)(4) grants the EPA the authority to “approve a [SIP] revision based on a commitment of the State to adopt specific enforceable measures by a date certain.”<sup>111</sup> Beneficial fire exceptional event determinations through SIPs, conditioned on post-burn reviews that are reasonably consistent with the pre-burn review, can be one such enforceable measure. A court would likely grant *Chevron* deference to a revision of the EPA’s interpretation of CAA section 319(b) and accordingly uphold the regulation. Even though the CAA is silent as to whether beneficial fire can be an exceptional event, a court is likely to find that the suggested implementation revisions are a permissible construction of the CAA given the EPA’s explicit authority to conditionally approve SIPs.<sup>112</sup> Therefore, a court applying *Chevron* deference would likely find that the EPA’s incorporation of beneficial fire in its exceptional events guidance is a permissible construction of the CAA.

Should a court apply the major questions doctrine instead of *Chevron* deference, as in *West Virginia v. Environmental Protection Agency*, the EPA would have to “point to ‘clear congressional authorization’ for the authority it claims.”<sup>113</sup> However, the major questions doctrine is highly unlikely to apply to beneficial fire and the exceptional events rule. The major questions doctrine only applies to decisions of “vast economic and political significance.”<sup>114</sup> The EPA granting conditional exceptional event determinations to beneficial fire plans in SIPs would not be akin to the “generation shifting” at issue in *West Virginia* that warranted a major questions analysis.<sup>115</sup> Our recommendation would simply be a modification to an existing process; as a process-oriented change, it is unlikely to be considered to have the significant economic and political implications that would trigger the major questions doctrine.

A court would also be unlikely to extend the Tenth Circuit’s finding in *Ukeiley v. United States Env’t Prot. Agency* that the “EPA can only qualify a human-caused event as an exceptional

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<sup>106</sup> The *Chevron* Opinion and Its Two-Step, 33 Fed. Prac. & Proc. Judicial Review § 8425 (2d ed.).

<sup>107</sup> *Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 842–43 (1984).

<sup>108</sup> *Id.* at 842.

<sup>109</sup> *Id.* at 843.

<sup>110</sup> *Chevron*, 467 U.S. at 843.

<sup>111</sup> 42 U.S.C. § 7410(k)(4).

<sup>112</sup> *Id.*

<sup>113</sup> 142 S. Ct. 2587, 2595 (2022).

<sup>114</sup> *Id.* at 2605 (quoting *UARG v. EPA*, 573 U.S. 302, 324 [2014]).

<sup>115</sup> *Id.* at 2605.

event if it is unlikely to recur”<sup>116</sup> to the prescribed fire context. There, the court reviewed a challenge to the EPA’s granting of exceedances for high wind events in a place where high wind was allegedly common.<sup>117</sup> However, the court’s analysis is not applicable to beneficial fire. The *Ukeiley* court only looked at references to human activity in CAA section 319 (42 U.S.C. Section 7619(b)[1]) and 40 C.F.R Section 50.1(j).<sup>118</sup> Because the case was about wind events, the court had no reason to consider 40 C.F.R. Section 50.14(b)(3), which applies specifically to prescribed fire. There, the EPA outlined in detail how prescribed fire and wildfire, among other events, can be considered exceptional events, even though human activity causes prescribed fire.<sup>119</sup> Thus, although CAA section 319 (42 U.S.C. Section 7619) does not specifically mention prescribed fire, the EPA’s interpretation is correct to include beneficial fire as an exceptional event because it is part of the unavoidable and uncontrollable natural fire process in the West.

In addition, the *Ukeiley* court’s concerns about the potential application of the exceptional events doctrine to emissions caused by agricultural practices<sup>120</sup> are not as applicable given subsequent EPA guidance that “the EPA d[id] not intend for [its] guidance to be used for preparing exceptional events demonstrations related to burns conducted for agricultural purposes.”<sup>121</sup> As a result, a total bar on human-caused activities from exceptional event demonstrations is not necessary to prevent the one human-caused activity the *Ukeiley* court highlighted as being outside of Congress’s intended scope for exceptional event demonstrations. In addition, the EPA already recognizes that “air quality impacts from prescribed fire on wildlands should be excluded from some regulatory uses.”<sup>122</sup> The implementation recommendations are thus consistent with the position the EPA has articulated.

*Murray Energy Corp v. Environmental Protection Agency* lends further support to the EPA’s authority to revise the implementation of the exceptional events rule. In *Murray Energy*, the court noted that pursuant to section 109 (42 U.S.C. section 7409(b)[1]), “[t]he primary NAAQS are to be set at levels ‘the attainment and maintenance of which in the judgment of the Administrator, ... allowing an adequate margin of safety, are requisite to protect the public health.’”<sup>123</sup> Because data shows that even small amounts of PM<sub>2.5</sub> harm human health, the proposed lowering of the annual PM<sub>2.5</sub> standard thus aligns with the NAAQS’ broad purpose of protecting public health.<sup>124</sup> However, if the EPA lowers the annual PM<sub>2.5</sub> standard and continues to implement the exceptional event process in a way that burdens states and air districts with the

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<sup>116</sup> *Ukeiley v. U.S. Env’t Prot. Agency*, 896 F.3d 1158, 1165 (10th Cir. 2018).

<sup>117</sup> *Id.* at 1163.

<sup>118</sup> *Id.* at 1161–66 (citing 42 U.S.C. § 7619 which requires for exceptional event status that the event be “caused by human activity that is unlikely to recur at a particular location or a natural event”); 40 C.F.R § 50.1(j) (defining an exceptional event as “an event(s) caused by human activity that is unlikely to recur at a particular location or a natural event(s)”).

<sup>119</sup> 40 C.F.R. § 50.14(b).

<sup>120</sup> *Ukeiley*, 896 F.3d at 1165 (“For instance, human-induced recurring agricultural practices would not be eligible for exclusion as exceptional events”).

<sup>121</sup> *Exceptional Events Guidance: Prescribed Fire on Wildland that May Influence Ozone and Particulate Matter Concentrations*, *supra* note 60, at 3.

<sup>122</sup> *EPA Releases Additional Resource on Prescribed Fires to Support Air Agencies*, Env’t Prot. Agency (Aug. 14, 2019), <https://www.epa.gov/newsreleases/epa-releases-additional-resource-prescribed-fires-support-air-agencies> (quoting EPA Administrator Andrew Wheeler).

<sup>123</sup> *Murray Energy Corp. v. Env’t Prot. Agency*, 936 F.3d 597, 604 (D.C. Cir. 2019) (quoting 42 U.S.C. Section 7409(b)(1)).

<sup>124</sup> *Health Effects of Particulate Matter*, World Health Organization (2013), [https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf](https://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf).

risk of nonattainment, land managers will continue to conduct beneficial fire at a scale small enough that exceptional event status is unnecessary. At the same time, states will seek exceptional event determinations more and more frequently for wildfires that harm human health. Data shows that more catastrophic fires will likely result from inadequate beneficial fire, and more PM<sub>2.5</sub> will follow as an inevitable consequence.<sup>125</sup> To fulfill the CAA's broad purpose of protecting public health, the EPA should change the way it administers the exceptional event process for beneficial fires.

### VIII. Statutory recommendations

We also recommend that Congress consider revising the definition of exceptional events in Section 319(b) of the CAA. As the climate changes and scientists increasingly recognize the urgent need for beneficial fire, Congress should provide EPA with even clearer authority to promote public health by facilitating beneficial fire. To reduce uncertainty for regulated parties, the CAA itself should make explicit that beneficial fire can be a type of exceptional event, in keeping with the EPA's interpretation in its regulatory guidance of 40 C.F.R. Section 50.14(b)(3). At the same time, any changes should not be overinclusive or potentially increase the total volume of PM<sub>2.5</sub> emitted. We believe that the recommendations below strike that balance and would minimize the harm posed by wildfire smoke to millions of Americans.

First, Congress should revise CAA section 319(b)(1)(A)(ii).<sup>126</sup> The requirement of “not reasonably controllable or preventable” should be amended to read “not reasonably controllable or preventable, unless the purpose is to prevent more severe emissions of the same pollutant.” This change would provide more certainty to states that the PM<sub>2.5</sub> from beneficial fire programs created to reduce the intensity of catastrophic fires would be exceptional events. In addition, the new language would not cover events intended to prevent emissions with a longer time horizon, which may have a less convincing causal relationship. We do not think this statutory revision would have the unintended consequence of allowing states to abuse the exception and generate more pollution without a beneficial effect. To qualify as an exceptional event, human activity would need to generate the same pollutant and have the purpose of preventing more severe emissions later. In addition, “purpose” requires a connection between the pollution event and future more severe emissions.

Second, Congress should revise CAA section 319(b)(1)(A)(iii). The requirement that an exceptional event be “caused by human activity that is unlikely to recur at a particular location or a natural event” should be amended to read “caused by human activity that is unlikely to recur at a particular location or a natural event, unless the recurrence mirrors the natural recurrence.”<sup>127</sup> This modification would more clearly communicate to states that human-caused events can be exceptional events if they recreate a natural rhythm, as stated in 40 C.F.R. Section 50.14(b)(3)(ii)(A).<sup>128</sup> The modification would thus only cover exceptional event determinations for PM<sub>2.5</sub> that would occur in the landscape anyway. Because beneficial fire likely reduces the volume of PM<sub>2.5</sub> in a landscape over time, beneficial fire would more than meet the reworded

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<sup>125</sup> *California's Wildfire and Forest Resilience Action Plan*, supra note 8, at 19.

<sup>126</sup> 42 U.S.C. § 7619 (2013).

<sup>127</sup> *Id.*

<sup>128</sup> 40 C.F.R. § 50.14(b)(3)(ii)(A) (“the State . . . may rely upon . . . the prescribed fire frequency needed to establish, restore and/or maintain a sustainable and resilient wildland ecosystem contained in a multi-year land or resource management plan . . .”).

requirement. In comparison, the agricultural burns that the *Ukeiley* court was concerned about would not meet the reworded requirement.<sup>129</sup>

Third, Congress should revise CAA section 319(b)(3)(B)(ii). The requirement that “a clear causal relationship must exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location” should be amended to read “a clear causal relationship must exist or be reasonably expected to exist between the measured exceedances of a national ambient air quality standard and the exceptional event to demonstrate that the exceptional event caused a specific air pollution concentration at a particular air quality monitoring location.” The modification would capture the reasonable expectation of land managers that a robust beneficial fire plan may cause a state or air district to exceed a 9  $\mu\text{g}/\text{m}^3$  or 10  $\mu\text{g}/\text{m}^3$  annual standard at specific air quality monitoring locations. Although states would need to use modeling to identify which air quality monitors would experience exceedances of the annual standard, our public health mitigation recommendation would already require states to model which local communities would experience  $\text{PM}_{2.5}$  effects from beneficial fires. If states took into consideration the location of air quality monitors at the same time, they would both satisfy new SIP requirements and meet one of the requirements for exceptional event determinations.

## IX. Conclusion

Wildfire smoke, which carries serious respiratory and cardiovascular risks, has become a public health crisis in the U.S. due to climate change and decades of wildfire suppression. However, the proposed changes to the annual  $\text{PM}_{2.5}$  standard will likely put the use of beneficial fire at risk. We commend the EPA’s proposal to lower the annual  $\text{PM}_{2.5}$  standard to reduce exposure and improve public health, especially for vulnerable populations. We recommend that the EPA also use its authority to modify the implementation of the CAA by granting conditional exceptional event determinations for beneficial fires through SIPs. Specifically, we propose that the EPA require states to submit burn plans that outline the beneficial fire acreage targets they expect to meet and public health mitigation measures they intend to take, and to institute a new pre-burn review. This change would bring the agency’s exceptional event determination process in line with the widely accepted role of beneficial fire as a necessary land management tool to reduce the severity and devastation of increasingly frequent catastrophic wildfires. To clarify the EPA’s statutory authority and reduce uncertainty, we also recommend a statutory revision to better align CAA section 319(b) with the overall goals of the CAA.

Respectfully,

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<sup>129</sup> *Ukeiley*, 896 F.3d at 1165 (“For instance, human-induced recurring agricultural practices would not be eligible for exclusion as exceptional events”).

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## Appendix

### A. COBRA Modeling

The data in Figure A1 was derived from the 2020 National Emissions Inventory - Wildland Fire Data. Each data point represents the annual tons of PM<sub>2.5</sub> emissions released for every acre burned in a specific county. The counties of San Mateo and Santa Cruz were excluded from this analysis, as they were significant outliers. This data was used to determine the relationship between the amount of PM<sub>2.5</sub> emitted and an acre of fire burned, which was then averaged across all counties in California. While in reality we expect to see varied emission factors in different regions in California based on vegetation burned and intensity of fire, we use the averages for the purpose of cursory modeling in COBRA. Prescribed fire was assumed to release 0.0504 metric tons of PM<sub>2.5</sub> per acre burned.

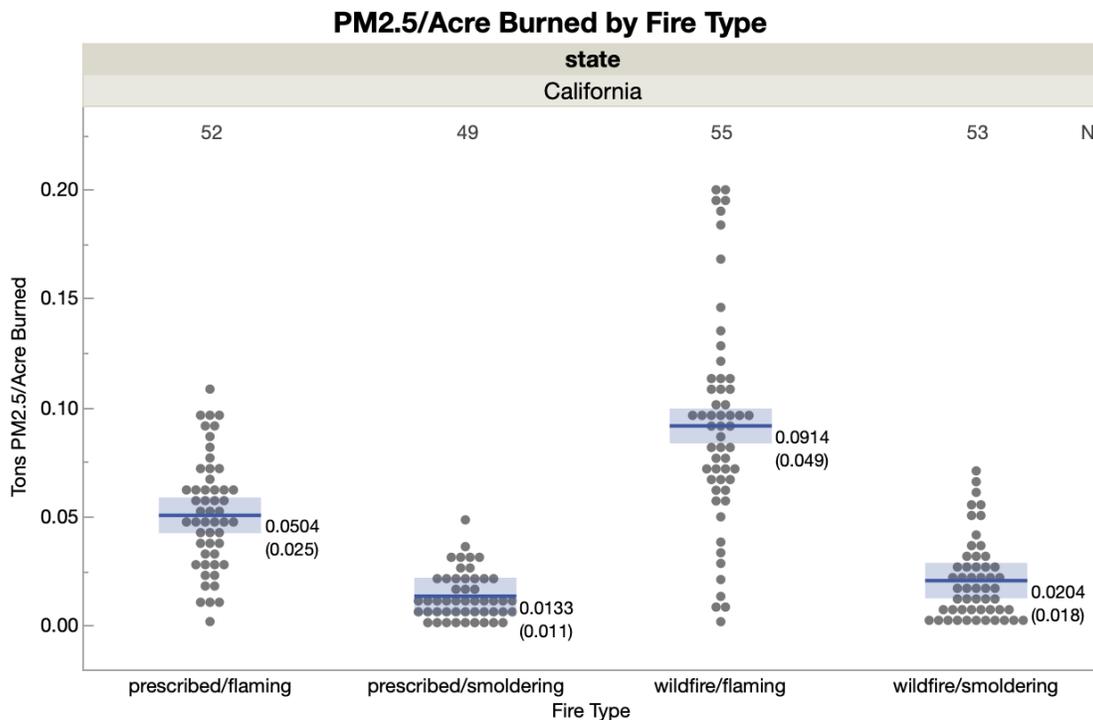


Figure A1: This data shows the mean and standard deviation as well as the distribution of tons of PM<sub>2.5</sub> burned per acre for each of the four types of fire recorded in the 2020 NEI Fire Data.

Seven counties were chosen for the COBRA models: Butte County, Fresno County, Siskiyou County, Sonoma County, Monterey County, Stanislaus County, and Santa Barbara County. These counties were chosen to model point sources across the state where there has already been significant prescribed fire activity<sup>130</sup> and where Community-Based Burning Efforts are active.<sup>131</sup> The COBRA models assume that each of the selected counties implements the same amount of prescribed fire, as shown by model inputs in Figure A2.

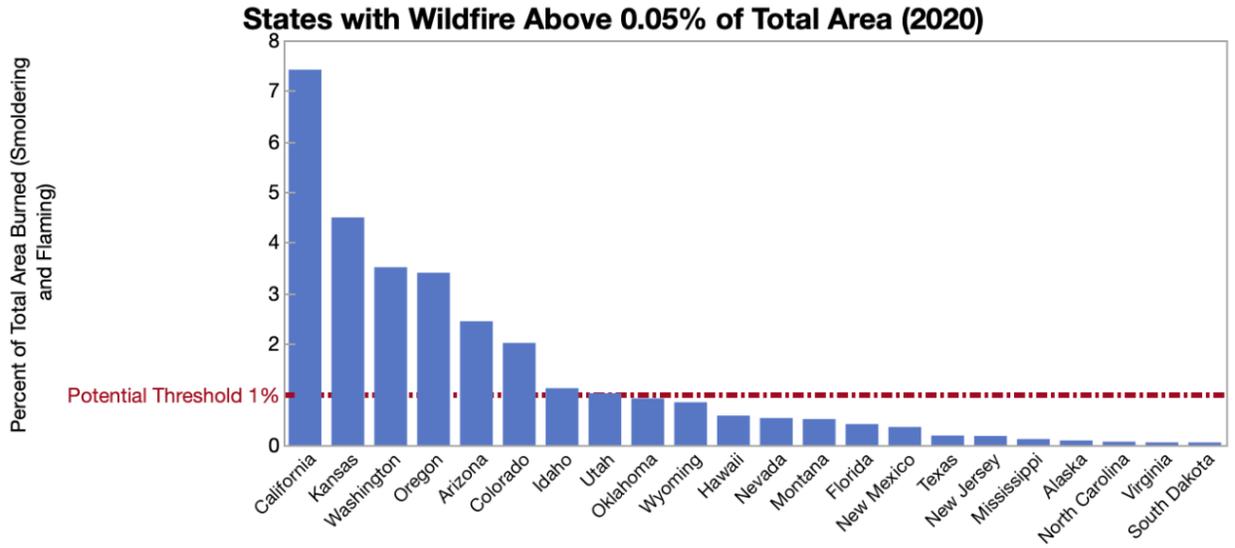
<sup>130</sup> Annual County SCC CAP and Pb Emissions for Wildland Fires (short tons) (xlsx), Env't Prot. Agency (Jan. 17, 2023), <https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries>.

<sup>131</sup> California Wildfire & Forest Resilience Task Force, *supra* note 29.

<b>Location(s)</b>	<b>Sector</b>	<b>Emissions Modification(s)</b>
Stanislaus, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Sonoma, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Siskiyou, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Santa Barbara, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Monterey, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Fresno, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons
Butte, California	Miscellaneous Other Combustion Prescribed Burning	PM <sub>2.5</sub> increase by 7,200 tons

*Figure A2: An example of the COBRA Model inputs for one of the three scenarios modeled. Each point source was added to the model separately.*

B. Acres Burned in 2020 as a Percentage of Total Acres by State





*Weekly Focus*

## States Grapple With Wildfire Smoke As EPA Faulted Over 'Events' Waiver

October 19, 2023

Post

State air regulators are wrestling with how to use EPA's "exceptional events" waiver policy to excuse high pollution readings driven by increasingly prevalent wildfires, amid renewed criticism of the waiver rule from environmentalists and others who are concerned the policy provides a "loophole" for unhealthy air.

One state source says that the increasingly pressing issue is being addressed by state groups, such as the National Association of Clean Air Agencies, representing state and local regulators across the country, which is now polling its membership on best practices in this area.

Air regulators are exchanging information on "doing what's doable," given the very limited powers of air regulators to actually curb wildfire, the source says.

And a Western air quality expert says that states and EPA haven't communicated the role of the exceptional events rule to the public "in any substantial way, but those who work with the rule know that we need to in the near future," given the increasing incidence of fires and the rising pressure on states to ask for the waivers.

The states' efforts come amid growing prevalence and intensity of wildfires. Earlier this year, severe wildfire smoke pushed levels of fine particulate matter (PM2.5) to dangerous levels in the eastern half of the country, producing unprecedented adverse conditions in major East Coast cities and in the Midwest.

Smoke levels **were far in excess** of the national ambient air quality standards (NAAQS) for PM2.5, echoing similar problems that have already become regular occurrences in Western states. **Some research** already shows wildfire smoke reversing years of progress in reducing pollution levels.

EPA's exceptional events rule is therefore increasingly important to state and local air regulators as they seek to avoid falling into nonattainment with the NAAQS, or into worsened nonattainment status. The rule allows them to exclude spikes in PM2.5 driven by wildfires from their emissions data used for determining compliance with the standards, as nonattainment status drives tougher regulatory burdens for states and industry and can hinder economic development.

Furthermore, air regulators have few tools available to curb wildfires, which are caused by factors including a hotter and drier climate, forestry practices and human encroachment into wildlands.

State regulators are now contemplating how best to cope with increased wildfire, and how to use the exceptional events rule in a world where large fires are no longer unusual, yet are not controllable by air agencies, the state source says, noting that "we don't write a permit for a wildfire, or even for a

prescribed burn,” although regulators do provide input to other government bodies on when such burns are advisable.

Prescribed burns are controlled fires deliberately set to burn away vegetation to reduce the potential for massive, uncontrolled wildfires. Use of such burns is receiving **increased attention** from lawmakers of both parties, including California Democrats, who are pushing EPA to ensure that prescribed burns qualify for the exceptional events waiver, because EPA's rule does not unambiguously apply to such burns as written.

Industry groups and GOP lawmakers **have also argued** that the increasing role of wildfire smoke is a reason for EPA not to tighten the PM2.5 standards, as attaining tighter limits would be difficult or impossible. EPA may issue a final rule tightening the NAAQS for PM2.5 as soon as next month.

### **‘Unhealthy Situation’**

But environmentalists and others say use of the exceptional events waiver is incompatible with the role of the NAAQS in informing the public of their exposure to unhealthy air quality.

For example, in two articles published Oct. 16 and 17, the *Guardian* newspaper in collaboration with the *California Newsroom* and government accountability news site *MuckRock* discusses the results of a joint investigation into use of the exceptional events waiver, which the *Guardian* calls a “loophole.”

“In addition to obscuring the true health risks of pollution and swerving away from tighter control on local polluters, the rule threatens the potency of the Clean Air Act, experts argue, at a time when the climate crisis is posing an unprecedented challenge to the health of millions of Americans,” the *Guardian* **wrote Oct. 16**.

The article cites environmental groups including Natural Resources Defense Council (NRDC) and Environmental Integrity Project (EIP) that are critical of the current policy.

Vijay Limaye, a climate and health epidemiologist with NRDC, told the *Guardian* that EPA's existing policy is painting an unrealistically positive picture of air quality by excluding air monitoring data from the days most affected by fires. “The true conditions on the ground in terms of the air that people are breathing in, day after day, week after week, year after year, is increasingly an unhealthy situation,” Limaye said.

The *Guardian* further says that since the last revision of the exceptional events rule in 2016, “In more than half of the states where exceptional events were forgiven, industry lobbyists and business interests pressed to make that happen, sometimes as the only public voice in the regulatory process. Also, to protect the status quo, some regulators spent millions of taxpayer dollars doing research for and making exceptional events requests, sometimes working hand in hand with industry stakeholders.”

Since 2016, EPA agreed to grant waivers for 139 of nearly 700 exceptional events “noted” by states, the newspaper claims.

The *Guardian* then followed up with **an Oct. 17 article** focused on Michigan, where smoke from Canadian wildfires has been used by local air regulators and EPA to avoid NAAQS nonattainment designations for ozone.

Environmentalists strongly opposed use of the exceptional events waiver in this way in Wayne County, MI, part of the Detroit metropolitan area.

On July 17, the Great Lakes Environmental Law Center and Sierra Club [sued EPA](#) over the issue, seeking to overturn EPA's approval of a Michigan Department of Environment, Great Lakes and Energy (EGLE) exceptional events request that allowed Detroit to exclude several high-ozone days in 2022 from consideration for its NAAQS attainment as being caused by smoke from Canadian wildfires.

Meanwhile, members of EPA's Clean Air Scientific Advisory Committee (CASAC), which advises EPA on setting NAAQS, have pushed for EPA to set tighter short-term limits for PM2.5, in part spurred by concern over short spikes in air pollution caused by fires. EPA has proposed to tighten a key annual NAAQS for PM2.5, but not the 24-hour limit designed to limit surges in pollution.

During deliberations on the NAAQS rulemaking, some members of CASAC's special panel on PM standards -- notably those from the West Coast -- raised concerns about the increasing role of wildfire in elevating levels of PM2.5 and the larger PM10.

The NAAQS are intended to protect public health with an "adequate margin of safety," but if severe smoke pollution is omitted from calculations of NAAQS compliance, then areas will appear to have healthier air than they actually do, some panelists warned.

### **'Bend Over Backwards'**

However, state regulators say environmentalists' criticism is unfair, and that critics of the exceptional events policy misunderstand or mischaracterize how it works.

Environmentalists charge that excluding exceptional events data from NAAQS compliance lets regulators "off the hook" for further clamping down on local sources of air pollution they can control.

Regulators, however, dispute this, noting that severe smoke readings can be orders of magnitude greater than the contribution of local sources -- in effect rendering the NAAQS impossible to meet.

This will be doubly difficult if EPA as proposed tightens the PM2.5 NAAQS. A tougher standard, combined with a warming climate and more wildfire, would raise further obstacles to attainment for Western air regulators in particular, and especially in California, which already sees serious nonattainment problems for both PM2.5 and ozone.

Accusations that use of the exceptional events rule is hiding the true state of air pollution from the public are "unfair," says the state source.

States and EPA in fact "bend over backwards" to inform the public of smoke health risks and encourage the public to protect themselves, the source says.

The source further notes that NAAQS attainment is not the same as always having pollution below the level of the NAAQS. Attainment is determined over time, using formulas that allow for occasional "exceedances" of the NAAQS levels. So in that sense, attainment is a regulatory construct, not an immediate indicator of air quality.

The Western air quality expert says, "I do believe that, in the West at least, communications about public health and smoke has become quite effective."

"Priority is to communicating public health risk immediately," the expert says. "Communicating public health impacts is almost an entirely different task from exceptional event analysis although how/when public health impacts are communicated can be part of an exceptional event demonstration."

The *Guardian's* Oct. 16 article “confuses flagging data with exceptional event demonstrations and EPA concurrence, for example. An air agency might flag some data, but that doesn't mean the air agency will necessarily submit an [exceptional events] demo for those days because an analysis at a later date (maybe years later) must show that those days are regulatorily significant; which means they make or break an area's attainment status.”

“Communicating with the public about the exceptional events rule itself is something that EPA and the states haven't worked on in any substantial way, but those who work with the rule know that we need to in the near future. This article is a good example of why that work needs to be done,” the expert says. -- *Stuart Parker* ([sparker@iwpnews.com](mailto:sparker@iwpnews.com))

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# Tony Evers

Office of the Governor | State of Wisconsin

February 6, 2024

The Honorable Joseph R. Biden, Jr.  
President of the United States  
The White House  
1600 Pennsylvania Avenue, N.W.  
Washington, D.C. 20502-0001

## **Re: Reconsideration of the National Ambient Air Quality Standards for Fine Particulate Matter**

Dear Mr. President:

Protecting the health of Wisconsinites and improving our state's air quality is a top priority for both Senator Baldwin and my administration. We also share your commitment to retain and expand manufacturing jobs in America. These two priorities are complementary, and we write to urge you to take appropriate action to ensure both priorities can advance.

The U.S. Environmental Protection Agency (EPA) is finalizing its final rule on Reconsideration of the National Ambient Air Quality Standards (NAAQS) for fine particulate matter, known as PM2.5. EPA has proposed setting a standard of between 9 and 10 ug/m<sup>3</sup>, with the final standard yet to be determined. A more stringent revision of the PM2.5 standard will have significant health and air quality benefits, as well as create new challenges for certain industries in their expansion and innovation efforts, particularly in the form of permitting requirements. If the PM2.5 standard were to be revised and go into effect without appropriate time to implement the revision, the Wisconsin Department of Natural Resources is aware of at least one permit application that has already been submitted to the Department that would be impacted. Requiring industry to meet the new standard nearly immediately after the publication of the new rule without allowing appropriate time to enable those same industries to account for the new standard threatens U.S. competitiveness and risks the loss of U.S. jobs and expansions, including here in Wisconsin.

It is essential that a robust and workable implementation plan first be developed before the rule takes effect. This includes permitting and modeling tools that accurately reflect real-world conditions and allow beneficial plant modernization projects to proceed. States also need effective tools to appropriately consider any PM2.5 contributions from wildfire emissions and international transport. To ensure this is accomplished, we request that the EPA provide a sufficient implementation timeframe for the revised PM2.5 standard to allow for the development of an effective implementation plan before the new standards become effective.

Thank you for your consideration of this request, and we look forward to continuing to work with you to protect our environment and support Wisconsin industries.

Sincerely,

Tony Evers  
Governor

Tammy Baldwin  
U.S. Senator



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## Wildfire Emissions Drive Bipartisan Concerns On EPA's PM NAAQS Plan

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September 19, 2023

Post

Increasing wildfire smoke emissions are looming large over EPA's pending plan to toughen national ambient air quality standards (NAAQS) for particulate matter, as House lawmakers of both parties raise concerns over states' ability to meet tougher limits because of the emissions though only GOP lawmakers are publicly opposing tighter limits.

At a House Energy and Commerce environment panel hearing Sept. 19, House Republicans lined up to oppose [EPA's proposal](#) to tighten the "primary," or health-based standard for fine PM (PM<sub>2.5</sub>), which is slated for finalization next month, but has not yet commenced interagency review that typically takes at least 90 days.

GOP members cited their fears over billions of dollars in compliance costs for industry and lost economic opportunity that could result from tightening the annual PM<sub>2.5</sub> NAAQS to levels near background, which includes wildfire smoke, and pollution from other countries.

EPA's rule "can have drastic negative effects that would stifle manufacturing in our country and run counter to an administration that claims to have an industrial policy. Even worse, the EPA is considering dropping the standard to as low as 8 micrograms per cubic meter, a level that is approaching natural background levels in many areas of the nation," said panel Chair Bill Johnson (R-OH).

EPA has proposed to tighten the annual limit from the current level of 12 micrograms per cubic meter (ug/m<sup>3</sup>) down to a tougher level in the range of 9 ug/m<sup>3</sup> to 10 ug/m<sup>3</sup>, in line with advice from agency staff and science advisers, although it is considering a limit as low as 8 ug/m<sup>3</sup>.

But a standard set at 8 ug/m<sup>3</sup> would throw much of the country into "nonattainment" with the new limits, triggering obligations for states to craft plans setting tougher controls for industry, and imposing new permitting burdens.

While such concerns are not new during a NAAQS review process, the wildfire issue is increasingly overshadowing the discussion. GOP lawmakers were quick to identify wildfire as a major impediment to implementation of tougher standards, along with emissions from overseas.

Witness [Bryce Bird](#), air director at the Utah Department of Environmental Quality, outlined the impact of wildfire in the western states, which compounds problems states face in finding sources to regulate in order to attain NAAQS. States have very limited powers to regulate mobile sources under the Clean Air Act, for example, placing the onus on stationary sources to provide pollution cuts.

The "drying west and forest fuel loading has resulted in lengthy wildfire impacts and increased impacts from prescribed fires that are necessary to reduce the fuel load. Past forest management

decisions have increased the rate and scope of wildfires on the federally managed forest,” Bird said in written testimony.

“Smoke from wildfires causes the highest monitored values of fine particulate matter . . . that impact public health. Monitored levels of air pollution during wildfire smoke events are tens to hundreds of times higher than are typically attributable to local regulated sources of air pollution in Utah.”

State air regulators are able to exclude wildfire smoke from demonstrations of their compliance with NAAQS under EPA’s “exceptional events” rule. However, making exceptional events demonstrations requires considerable work of state regulators, with that workload expected to increase as more such events occur, western state sources have previously told *Inside EPA*.

“The current treatment of natural and exceptional events increases the costs [borne] by states to implement the Clean Air Act programs,” Bird said.

### **‘Prescribed Fire’**

Further, in order to reduce the risk of catastrophic wildfires, state and federal land managers can use “prescribed fire” to intentionally burn certain areas. But EPA’s exceptional events rule does not unambiguously cover prescribed fires, which are deliberate and repeated events, GOP lawmakers noted.

California Democrats [have written to EPA](#) asking the agency to explicitly allow regulatory exemptions for prescribed fires, which would be vital to attain any tougher PM2.5 NAAQS in a state that already faces the most intractable compliance problems in the country.

Bird quoted EPA data showing that wildfires and prescribed fires combined make up 44 percent of the country’s primary emissions of PM2.5.

Responding to concerns expressed over wildfire by Rep. Earl Carter (R-GA), witness [Tim Hunt](#), senior director for air quality programs at the American Forest & Paper Association, noted that “wildfires are a huge source of emissions.”

Hunt in his written testimony said that “wildfires, road dust and other non-point fugitive sources make up over 70% of emissions yet receive little focus in emission reduction discussions.”

Therefore, “EPA should explore how to develop emission reduction strategies for other sources including non-traditional sources, such as wildfires and road dust. For example, better forest management practices including thinning and prescribed burns can reduce the chances of catastrophic fires and their accompanying emissions,” Hunt said.

Hunt claimed that EPA’s failure to develop implementation guidance and rules before tightening the NAAQS would cause “regulatory gridlock,” as permit writers would be forced to take the new standards into account immediately. “EPA needs to wait to revise the NAAQS until it has developed comprehensive permitting guidance with stakeholder input,” Hunt said. Many industrial projects might fail if there is not enough “headroom” under a new standard to increase emissions, he said.

Witnesses and lawmakers noted that wildfire is not restricted to the western United States, and that smoke from Canada has seriously impacted air quality across the country this year.

Rep. Scott Peters (D-CA), meanwhile, reflected the concerns of many Californian lawmakers, supporting EPA’s proposal, but also noting the wildfire is the largest source of PM2.5 in the state, due to “poor land management and climate change.”

EPA has few powers to mitigate wildfires, with land management decisions left to other federal government departments and agencies, and to state governments.

“If we don’t act on wildfires,” PM emissions “will increase exponentially,” said Peters, urging Congress to fully fund federal firefighting efforts.

Rep. Jay Obernolte (R-CA) also supported action to address wildfire, although likely not under the Clean Air Act but under a “whole of government approach” that would include better land management. -- *Stuart Parker* ([sparker@iwpnews.com](mailto:sparker@iwpnews.com))

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February 15, 2024

Chairman Buddy Carter  
House Energy and Commerce Subcommittee on Environment,  
Manufacturing, and Critical Minerals  
2432 Rayburn House Office Building  
Washington, D.C. 20515

Dear Chairman Carter:

Thank you for holding the House Energy and Committee Subcommittee hearing on the “Harmful EPA NAAQS Standards” on Thursday, February 15. The American Foundry Society (AFS) and its members are very concerned about the Environmental Protection Agency’s (EPA’s) newly revised PM<sub>2.5</sub> National Ambient Air Quality Standard (NAAQS), that would impose stricter air standards for fine particulate matter on U.S. businesses. Specifically, as part of its discretionary reconsideration of a final 2020 decision, EPA has lowered the current standard from 12.0 ug/m<sup>3</sup> to 9.0 ug/m<sup>3</sup>. In the preamble to the final rule, EPA erroneously claimed that it cannot take into account costs and economic impact in setting the new PM<sub>2.5</sub> standard.

The U.S. metalcasting industry accounts for \$110.5 billion in economic activity and pays more than \$32.1 billion in wages and benefits annually. U.S. foundries, made up mostly of small businesses, design and produce the highly engineered castings needed to support our quality of life, manufacturing economy, and national defense. All Americans benefit when we produce metal castings domestically.

For the following reasons, the new PM<sub>2.5</sub> standard is unnecessary, misguided, and will impose significant economic hardships on our nation’s 1,700 metalcasters, the 490,000 Americans whose jobs depend on metalcasting, and the competitiveness of U.S. manufacturing. Accordingly, we urge you to take appropriate actions to negate or modify the revised PM<sub>2.5</sub> standard to minimize the impacts of the rule on U.S. manufacturing and the nation’s economy.

#### ***Metalcasters Have Decreased PM<sub>2.5</sub> Emissions Significantly***

The new revisions to the PM<sub>2.5</sub> standard are not necessary and would impose a significant burden on U.S. manufacturing and the nation’s economy. Metalcasters continue to make critical investments to effectively reduce air emissions. Today, our manufacturing processes are cleaner and greener than at any other time in history. EPA recently reported that PM<sub>2.5</sub> levels have decreased by 42 percent since 2000, driven by the existing regulatory controls for particulate matter emissions from stationary sources like metalcasting operations.

#### ***Nonpoint Sources Are Responsible for Most PM<sub>2.5</sub> Emissions***

Over 80 percent of PM<sub>2.5</sub> emissions in the U.S. are from uncontrolled nonpoint sources such as wildfires, unpaved roads and bare agricultural soils. Controlling these nonpoint sources is difficult and can be very expensive. Accordingly, regulators will continue to focus on point sources and impose significant burdens on facilities located in nonattainment areas. Even with the removal of all

PM<sub>2.5</sub> emissions from stationary sources like metalcasting operations, the new PM<sub>2.5</sub> standards could not be attained in many areas due to PM<sub>2.5</sub> emissions from natural-occurring nonpoint sources. Unfortunately, these burdensome and economically devastating restrictions imposed on stationary sources would do little, or nothing, to achieve attainment due to the uncontrolled nonpoint sources of PM<sub>2.5</sub>.

### ***Impact of EPA's New PM<sub>2.5</sub> Standard***

The new PM<sub>2.5</sub> rule could be economically devastating for all industry sectors, including metalcasters. With the standard set at 9 µg/m<sup>3</sup>, approximately 50 percent of counties nationwide could be designated as nonattainment areas for PM<sub>2.5</sub> and subject to stringent regulatory requirements. This is critical because facilities located in nonattainment areas could face further restrictions on production, bans on new facilities or expansions of existing facilities, stringent new emission limits for PM<sub>2.5</sub>, and increased regulatory oversight on facility operations and air permits.

The lower PM<sub>2.5</sub> standard will also:

- **Make permitting more challenging as manufacturers will be required to demonstrate further reductions of PM<sub>2.5</sub> emissions for air permit renewals, modifications for plant expansions and permits for new manufacturing facilities.** As mentioned above, these requirements will impose significant burdens on metalcasting operations and do little, if anything, to reduce PM<sub>2.5</sub> emissions to meet a lower PM<sub>2.5</sub> NAAQS.
- **These new stringent standards are at, or below, background levels of PM<sub>2.5</sub> in many areas, leaving facilities with little or no room for compliance with the new standards.** This would prevent metalcasters from expanding existing facilities and building new facilities, even with the most effective PM<sub>2.5</sub> emissions control technologies already in place.
- **The proposal undercuts U.S. competitiveness and will not further the goal of global emissions reduction because it hinders onshoring efforts and encourages manufacturing abroad,** which is typically less clean than manufacturing in the U.S.

### ***Metalcasting Serves Supply Chains Critical to U.S. Economy and National Defense***

Metal castings are integral to virtually all U.S. manufacturing activities. In the U.S., castings are used to produce 90 percent of all manufactured durable goods and nearly all manufacturing machinery. In addition to the automotive, construction, and defense industries, other major sectors supplied by the metalcasting industry include agriculture, aerospace, energy exploration and conversion, oil and gas, mining, railroad, municipal/water infrastructure, transportation, and health care.

Furthermore, metalcasting is vital for our national defense. For example, cast parts are critical to the development, procurement, and sustainment of all major defense systems by the Defense Industrial Base. They are used in almost all platforms (e.g., ships, submarines, aircraft, ground combat vehicles, spacecraft, etc.), kinetic weapons and weapon systems (e.g., guns, missiles and rockets, bombs, ammunition, artillery pieces, etc.), and many supporting systems (e.g., vehicles, powered support equipment, etc.).<sup>1</sup>

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<sup>1</sup> *Securing Defense-Critical Supply Chains*, U.S. Department of Defense, Feb. 2022.  
<https://media.defense.gov/2022/Feb/24/2002944158/-1/-1/1/DOD-EO-14017-REPORT-SECURING-DEFENSE-CRITICAL-SUPPLY-CHAINS.PDF>

A recent study commissioned by the National Association of Manufacturers (NAM) found that EPA's new PM<sub>2.5</sub> standard would reduce the Gross Domestic Product (GDP) by nearly \$200 billion and cost as many as one million jobs through 2031. Any economic impacts on metalcasting operations as a result of EPA's new PM<sub>2.5</sub> standard could have a significant impact on the U.S. economy and threaten national security.

***EPA's Should Consider the Economic Burdens of this Rule***

Pursuant to the Clean Air Act, EPA is required to review the PM<sub>2.5</sub> NAAQS every five years. The final rule is actually a reconsideration of a 2020 EPA decision to make no changes to the PM<sub>2.5</sub> NAAQS. Because the reconsideration is not part of the mandated five-year review, EPA is not required to make any changes to the PM<sub>2.5</sub> NAAQS at this time. In addition, actions undertaken by EPA outside the statutorily mandated five-year reviews (such as this rule) can take economic impacts into consideration. In the preamble to the final rule, EPA erroneously claimed that it could not take costs and economic impacts into account in revising the PM<sub>2.5</sub> standard. In fact, the Obama Administration relied upon economic impacts when reconsidering the ozone NAAQS several years ago.

Accordingly, we urge you to take appropriate actions to negate or modify the PM<sub>2.5</sub> standard to minimize the impact of the rule on U.S. manufacturing and the nation's economy. If EPA believes that revisions to the PM<sub>2.5</sub> NAAQS are warranted, then it can, and should, wait until 2025 as part of the statutorily mandated five-year review.

Thank you for your support of U.S. metalcasting industry and manufacturers across the nation. If you have any questions or would like additional information, please do not hesitate to contact me.

Sincerely,

*Greg Kramer*

Greg Kramer  
Technical Director  
American Foundry Society  
[gkramer@afsinc.org](mailto:gkramer@afsinc.org)

cc: Chair Cathy McMorris Rodgers, House Energy and Commerce Committee  
Rep. Bob Latta (OH-5)  
Rep. Troy Balderson (OH-12)  
Rep. Brett Guthrie (KY-2)  
Rep. John Joyce (PA-13)  
Rep. Tim Walberg (MI-5)  
Rep. Gary Palmer (AL-6)  
Rep. Mariannette Miller-Meeks (IA-1)  
Rep. Larry Bucshon (IN-8)  
Rep. Greg Pence (IN-6)

February 14, 2024

Dear Representative,

On behalf of our millions of members and supporters, the undersigned 32 organizations urge you to oppose the “Air Quality Standards Implementation Act of 2024” (H.R. \_\_\_\_). The innocuous-sounding name is misleading: this legislation would weaken the Clean Air Act radically without a single improvement, rob Americans of their 54-year right to healthy air based on medical science, and delay life-saving health standards already years overdue.

This bill’s vision of “Air Quality Standards *Implementation*” instead attacks how clean air health standards are *set* to protect Americans. The legislation eliminates the right to truly safe air and health benefits that Americans enjoy under today’s law. First, the legislation would abolish the Clean Air Act’s exclusive consideration of health and medical science to determine how much air pollution is unsafe for people to breathe. For the first time, Congress would authorize EPA to expose American communities to unhealthy levels of smog and soot and sulfur dioxide and even toxic lead pollution, by prioritizing corporate compliance costs, profits, technological feasibility or other non-safety factors. The medically-based health standards that the Clean Air Act has been founded on for 54 years instead could become a political football weakened by polluters’ predicted compliance costs—costs that often are overestimated.

Second, the bill would double the law’s five-year review periods for recognizing the latest medical science and updating health standards, which already are late by five years or longer; this means in practice that unhealthy air would persist for longer than ten years and more Americans would be harmed. Third, the bill shrinks the number of medical experts and health scientists who serve as Clean Air Science Advisory Committee members advising EPA on how to set medically-based air pollution health standards. Instead, the bill grants nearly half of the member slots to state officials whose expertise is implementation of standards. This is consistent with the legislation’s greater concern for implementation affecting industry than with health hazards and medical science impacting the American people, but it is an unjustified change to the Clean Air Act.

Fourth, the legislation would delay the updating and strengthening of health standards for harmful air pollution, by delaying and conditioning Americans’ right to safer air quality on EPA’s issuance of implementation rules. The guaranteed result would be delayed safeguards, longer exposure to unsafe air pollution across the U.S., and the continuation of health hazards that today’s law would disallow. The bill even penalizes Americans with dirty air for longer if EPA fails to meet the legislation’s deadlines. Fifth, the bill unaccountably weakens special Clean Air Act safeguards that apply in parts of the U.S. struggling the most with unsafe smog and soot levels, making it even harder for Americans living there to breathe safe air.

Finally, the legislation amends the Clean Air Act needlessly and carelessly, by redundantly allowing “prescribed burns” to be “exceptional events” under the Act’s NAAQS program, when EPA regulations already define prescribed burns to be exceptional events. The bill’s problematic drafting weakens existing law and regulations, however, by expanding other exemptions for “exceptional events” that are not counted towards compliance with health standards for air quality, even when air pollution levels are unsafe. This will mean more unsafe air more often, with no responsibility to clean it up. These changes should not become law. The remainder of the bill confuses Clean Air Act provisions that are clearer and better, today.

The “Air Quality Standards Implementation Act of 2024” unjustifiably weakens Clean Air Act requirements meant to ensure progress toward reducing smog and soot and lead pollution. It shifts the law from its focus on public health and safe air to economic and technological feasibility for polluting industries. Despite its bland name, this bill represents an extreme attack on the most fundamental safeguards and rights in the Clean Air Act.

Since 1970, the Federal Clean Air Act has been organized around one governing principle: that the EPA must set health standards based on medical science for dangerous air pollution— including smog, soot and lead —that is needed to protect all Americans, with “an adequate margin of safety” for vulnerable populations like children, the elderly and asthmatics. This legislation eviscerates that principle and protection. We urge you to oppose this legislation, to protect our families and Americans’ rights to clean air.

Sincerely,

Appalachian Mountain Club  
Asthma and Allergy Foundation of America  
Center for Biological Diversity  
Center for Community Action and  
Environmental Justice  
Change the Chamber  
Clean Air Task Force  
Climate Action Campaign  
Downwinders at Risk  
Earthjustice  
Elders Climate Action  
Endangered Species Coalition  
Environment America  
Environmental Defense Action Fund  
Environmental Law & Policy Center  
Familias Unidas del Chamizal/La Mujer Obrera  
HEAL Utah  
Interfaith Power & Light  
LCV  
Michigan Sustainable Business Forum  
National Environmental Health Association  
Natural Resources Defense Council  
Northeast Ohio Black Health Coalition  
Partnership for Policy Integrity  
Physicians for Social Responsibility  
Physicians for Social Responsibility Pennsylvania  
Poder Latinx  
Respiratory Health Association  
Sierra Club  
U.S. PIRG  
UNC Gillings School of Global Public Health

Union of Concerned Scientists  
Utah Physicians for a Healthy Environment



# Leveraging Federal Funding to Meet and Exceed Soot Standards

December 2023

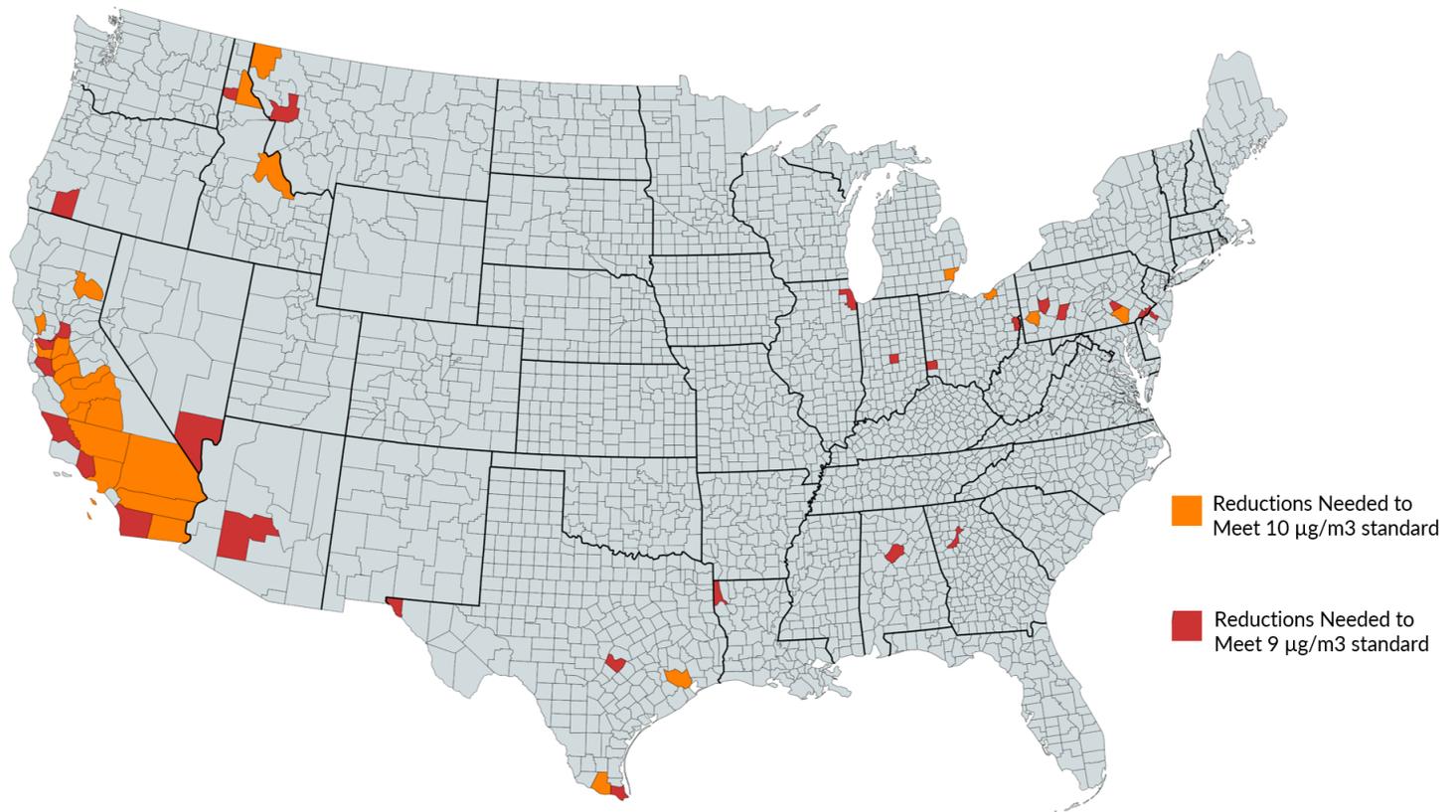
*Provisions in the Inflation Reduction Act and the Bipartisan Infrastructure Law present opportunities for state and local governments to create safer, healthier communities and cost-effectively meet national air quality standards for particulate matter, also referred to as PM2.5 or soot.*



## Introduction

Exposure to air pollution has been linked to a number of adverse health impacts, including increased asthma rates, bronchitis, heart attacks, higher risk of severe illness from COVID-19, and premature death. The majority of this pollution is due to the combustion of fossil fuels, which creates tiny particles in the air. The smallest of these particles (those with diameters 2.5 micrometers and smaller; referred to as PM<sub>2.5</sub> or 'particulate matter') cause the greatest risk to public health. A recent study from researchers at Harvard University, George Mason University, and the University of Texas, Austin shows that a staggering 460,000 deaths between 1999 - 2020 are attributable to coal PM<sub>2.5</sub> pollution<sup>1</sup>. In January 2023, the Environmental Protection Agency (EPA) released a long-awaited proposal to strengthen the PM<sub>2.5</sub> National Ambient Air Quality Standard (NAAQS) from the current annual primary standard of 12 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) to a range of 9–10  $\mu\text{g}/\text{m}^3$ <sup>2</sup>.

### Counties Required to Reduce Particulate Matter Pollution to Meet Alternative Standards<sup>3</sup>



<sup>1</sup> [Mortality risk from United States coal electricity generation](#)

<sup>2</sup> [Proposed Decision for the Reconsideration of the NAAQS for Particulate Matter](#)

<sup>3</sup> Shaded counties represent reductions needed beyond the 2032 'Annual 12/35 Design Value' in Table 2A-8 of EPA's RIA for the proposed NAAQS

In its analysis of the proposal, EPA found that only 24 of 3,100+ counties<sup>4</sup> in the U.S. would need to reduce ambient particulate matter levels to meet an alternative standard of 10 µg/m<sup>3</sup> in comparison with the current standard<sup>5</sup>. An additional 27 counties would need to reduce ambient particulate matter levels to meet a stronger alternative standard of 9 µg/m<sup>3</sup>. Even under the stronger alternative standard, these 51 counties (shown in the map above) would only need to reduce ambient particulate matter levels by an average of 10%<sup>6</sup>. Although the number of counties impacted by the proposed alternative standards is small, and the average reductions required are modest, the benefits to public health are more than worthwhile. EPA's modeling estimates that achieving a stronger alternative standard of 9 µg/m<sup>3</sup> would prevent up to 4,200 premature deaths each year<sup>7</sup>.

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## Federal Funding Paves the Way for Particulate Matter Reductions

Still, there would be a cost to reducing pollution to achieve a new standard. Under a stronger alternative standard, there would be 16 states responsible for reducing ambient particulate matter levels for the 51 counties projected to be in nonattainment. In its regulatory impact analysis, the EPA models control measures that these states could take to reduce local emissions and the approximate cost of those measures. These local control measures (e.g. installing particulate filters on industrial commercial and institutional boilers; filtering commercial cooking emissions; converting residential wood burning to gas logs; paving road shoulders and unpaved roads to control dust) could account for 45% of the reductions needed to achieve a standard of 9 µg/m<sup>3</sup> at an estimated annual cost of \$393 million<sup>8</sup>. However, it's important to note that the control measures EPA modeled in its regulatory impact analysis are not prescriptive and that we're already on a path to achieve much of the particulate matter reductions needed under a stronger NAAQS. This path is achievable due to the billions of dollars of funding available in the Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IIJA).

## Opportunities to Cut Soot Pollution in the Electric Sector

In the **electric sector**, IRA and IIJA provide funding in the form of credits to manufacture and build clean energy, expand and modernize transmission, refinance or retire coal plants, and repurpose retired fossil fuel infrastructure. As a result of this funding, it's estimated that 99% of remaining U.S. coal plants are now more expensive to run than replacement by new local solar, wind, or energy storage<sup>9</sup>. For some counties, pollution from coal plants (both nearby and in other states) significantly contributes to ambient particulate matter levels<sup>10</sup>.

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<sup>4</sup> [EPA Regulatory Impact Analysis accompanying the Notice of Proposed Rulemaking](#)

<sup>5</sup> In the RIA, EPA determined the pollution reductions required at a county level in comparison to baseline "design values". These design values project expected reductions in current particulate matter levels in 2032 from other finalized CAA rules (including compliance with the existing 12 µg/m<sup>3</sup> PM<sub>2.5</sub> standard). The design values also screen for the influence of "exceptional events", such as wildfires. EPA excludes counties impacted by these exceptional events from [nonattainment designation](#).

<sup>6</sup> Reductions needed calculated as percentage difference between the 2032 'Annual 12/35 Design Value' in Table 2A-8 of the RIA and a value of 9 µg/m<sup>3</sup>

<sup>7</sup> [EPA press release on the Proposed Rulemaking](#)

<sup>8</sup> Note - 81% of the additional reductions needed would be in California. Total cost from Table ES-5, and total emissions reductions from Tables ES-3 and ES-4 of the [RIA](#).

<sup>9</sup> [Coal Crossover 3.0](#), Energy Innovation

<sup>10</sup> [Out of Control: The Deadly Impact of Coal Plant Pollution](#), Sierra Club

For counties where the majority of remaining coal plants are located, Sierra Club estimates that replacing remaining coal plants with clean energy alone would account for 41% of the total particulate matter reductions needed to achieve a 9 µg/m<sup>3</sup> standard<sup>11</sup>.

However, we won't need to retire every coal plant in the country to achieve meaningful particulate matter reductions. In Pennsylvania, for example, three of the four deadliest coal plants have recently retired (Homer City Station) or will retire by 2028 (Keystone and Conemaugh)<sup>12</sup>. These three plant retirements could account for an average of 58% of the total particulate matter reductions needed to achieve a 9 µg/m<sup>3</sup> standard<sup>13</sup> in Pennsylvania.

## Opportunities to Cut Soot Pollution in the Transportation Sector

In the transportation sector, IRA and IIJA funding primarily takes the form of personal tax credits to purchase electric vehicles (EVs), commercial EV tax credits, clean heavy-duty vehicle credits, domestic supply-chain incentives, and charging infrastructure credits. The IRA and IIJA also include grant and rebate programs that will provide funding for electric school buses, electric transit buses, electric trucks and equipment at ports, and charging infrastructure. These incentives are projected to significantly accelerate sales of electric cars, trucks, and buses. Recent analysis shows that the 2030 national sales share of both light/medium and heavy-duty electric trucks could more than double thanks to incentives in the IRA and IIJA<sup>14</sup>. The transportation incentives in the infrastructure bills, along with enacted state-level policies like Advanced Clean Cars II<sup>15</sup> and Advanced Clean Trucks are projected to decrease national gasoline and diesel consumption by as much as 15-20% in the next decade<sup>16</sup>.

Both light-duty and heavy-duty vehicles are also significant sources of particulate matter emissions. In fact, air pollution from diesel emissions contributes an average of 0.3 µg/m<sup>3</sup> across the counties projected by EPA to be in nonattainment under a 9 µg/m<sup>3</sup> PM<sub>2.5</sub> standard<sup>17</sup>. The projected reduction in diesel consumption associated with the IRA and IIJA alone could give these counties an average of 15% of the reductions needed to meet the 9

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<sup>11</sup> Estimate of ambient particulate matter levels attributable to remaining coal plants (at a county level) detailed [here](#). U.S. counties included in this calculation (based on having 2032 Annual 12/35 Design Values exceeding 9 µg/m<sup>3</sup>): Jefferson, AL; Fulton, GA; Cook, IL; Marion, IN; Caddo, LA; Wayne, MI; Camden, NJ; Butler, OH; Cuyahoga, OH; Jefferson, OH; Allegheny, PA; Armstrong, PA; Cambria, PA; Delaware, PA; Lancaster, PA; Lebanon, PA; Philadelphia, PA; Cameron, TX; El Paso, TX; Harris, TX; Hidalgo, TX; Travis, TX. Percentage represents the average across these counties.

<sup>12</sup> Based on stated plans to retire in compliance with EPA's Effluent Limitation Guidelines.

<sup>13</sup> Estimate of ambient particulate matter levels attributable to remaining coal plants (at a county level) detailed [here](#). Eastern U.S. counties included in this calculation (based on having 2032 Annual 12/35 Design Values exceeding 9 µg/m<sup>3</sup>): Jefferson, AL; Fulton, GA; Cook, IL; Marion, IN; Caddo, LA; Wayne, MI; Camden, NJ; Butler, OH; Cuyahoga, OH; Jefferson, OH; Allegheny, PA; Armstrong, PA; Cambria, PA; Delaware, PA; Lancaster, PA; Lebanon, PA; Philadelphia, PA; Cameron, TX; El Paso, TX; Harris, TX; Hidalgo, TX; Travis, TX. Percentage represents the average across these counties.

<sup>14</sup> [Modeling the infrastructure bills Using the Energy Policy Simulator](#), Energy Innovation

<sup>15</sup> [Sierra Club Clean Vehicle Program state tracker](#)

<sup>16</sup> [Taking Stock 2023](#), Rhodium Group

<sup>17</sup> Estimate of county-level ambient PM<sub>2.5</sub> pollution from diesel from [Clean Air Task Force](#). This amount was compared to the counties with 2032 Annual 12/35 Design Values exceeding 9 µg/m<sup>3</sup> in EPA's PM NAAQS RIA.

µg/m<sup>3</sup> PM<sub>2.5</sub> standard. In fact, a 20% reduction in diesel particulate emissions would account for over 50% of the reductions San Diego county, California; El Paso and Travis county TX would need to be in compliance with a stronger NAAQS.

## Additional Opportunities to Cut Soot Pollution

There are numerous incentives in the IRA and IJA to cut industrial and residential fossil fuel pollution as well. For example, instead of homes reducing particulate emissions by switching from burning wood to gas logs, homeowners can get a \$2,000 tax credit to install a heat pump from the IRA<sup>18</sup>. If states, electric utilities, and homeowners take advantage of the billions of dollars available in these bills to accelerate clean energy and stop burning fossil fuels, cleaner air and healthier lungs will follow. EPA's own modeling showed a stronger PM<sub>2.5</sub> standard of 9 µg/m<sup>3</sup> could result in as much as \$43 billion in net health benefits in 2032. And that standard is well within reach; if this funding is utilized as intended, these programs could generate enormous public health and jobs benefits, preventing up to 4,500 premature deaths from air pollution in 2030 and creating up to 1.3 million jobs<sup>19</sup>.

Contact: Jessica King, [jessica.king@sierraclub.org](mailto:jessica.king@sierraclub.org)

Cover photo: Analicia Hazelby, AMH Creative LLC

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<sup>18</sup> [A Holiday Shopping Guide for Healthy and Affordable Home Upgrades](#), Sierra Club

<sup>19</sup> [Updated IRA Modeling Using the Energy Policy Simulator](#), Energy Innovation



### Smoggy Skies Act Will Codify Unhealthy Air

The undersigned health, medical and nursing organizations strongly oppose the **Air Quality Standards Implementation Act of 2024 – better named the Smoggy Skies Act**. Many versions of this bill have tried and failed to become law in the past because at the end of the day, this bill would undermine sound science and public health.

Clean air is fundamental for good health and the Clean Air Act promises all Americans air that is safe to breathe. The Clean Air Act works – decades of implementation have shown that the law’s provisions have cleaned up pollution at the same time as the economy has grown, with the benefits far outweighing the costs. Since the passage of the 1970 Clean Air Act amendments, the United States Gross Domestic Product has grown by 304% while emissions of criteria air pollutants have been reduced by 78%, evidence that cleaner air supports economic growth. **This bill would permanently weaken the Clean Air Act by gutting one of its most important programs: the National Ambient Air Quality Standards.**

Despite decades of progress, air pollution still kills. In 2019, deaths in the United States attributable to particle pollution was estimated to be nearly 48,000. Air pollution also contributes to morbidities such as asthma attacks, cardiovascular harm, emergency room visits, onset of lung cancer and more every year. The National Ambient Air Quality Standards are a critical path to continued pollution reductions and more lives saved. But despite the clear evidence of the need for greater protection from air pollution matched with the Clean Air Act’s balanced process for continued cleanup, **the Smoggy Skies Act would impose additional delays and sweeping changes that threaten health, particularly the health of children, seniors and people with chronic disease.**

The National Ambient Air Quality Standards have driven much of the Clean Air Act progress. Under the law, EPA must regularly review the scientific evidence of health harms from six common and dangerous outdoor air pollutants, including particulate matter. If the science shows that the current limit on a given pollutant does not accurately reflect the science, EPA must update it. **Under the Smoggy Skies Act, EPA would have to wait as much as a decade to consider new evidence when setting standards. Ten years is far too long to wait to protect public health from levels of pollution that science shows are dangerous.**

A key success of the National Ambient Air Quality Standards is the requirement that standards be set based on what the latest science says is necessary to protect health. Cost and feasibility are fully considered in the implementation phase of the standard, where states work with EPA to develop a flexible plan to clean up air pollution if their levels are unhealthy. This health-based approach has been upheld by the Supreme Court in an opinion issued by Justice Antonin Scalia. **The Smoggy Skies Act would permanently weaken the core health-based premise of the Clean Air Act by incorporating considerations of technological feasibility into the standard-setting – basically, siding with the polluters.**

While the text might have modifications from previous versions, make no mistake: This bill is a wolf in sheep's clothing. It is the same failed attempt to weaken the Clean Air Act and codify unhealthy air that the public health community has strongly opposed in the past and will continue to oppose.

**Please prioritize the health of your constituents and vote NO on the Air Quality Standards Implementation Act – the Smoggy Skies Act.**

Sincerely,

Allergy & Asthma Network  
Alliance of Nurses for Healthy Environments  
American Heart Association  
American Lung Association  
American Public Health Association  
American Thoracic Society  
Asthma and Allergy Foundation of America  
Children's Environmental Health Network  
Climate Psychiatry Alliance  
Health Care Without Harm  
Medical Students for a Sustainable Future  
National Association of Pediatric Nurse Practitioners  
National Environmental Health Association  
National Hispanic Health Foundation  
National Hispanic Medical Association  
National League for Nursing  
Oncology Advocates United for Climate and Health - International  
Physicians for Social Responsibility  
Public Health Institute



## Wildland Fire, Air Quality, and Public Health Considerations Fact Sheet

### Summary

- On February 7, 2024, the U.S. Environmental Protection Agency (EPA) announced a final rule to strengthen the nation's National Ambient Air Quality Standards (NAAQS) for fine particle pollution, also known as fine particulate matter (PM<sub>2.5</sub>) or soot.
- EPA is setting the level of the primary (health-based) annual PM<sub>2.5</sub> standard at 9.0 micrograms per cubic meter (µg/m<sup>3</sup>) to provide increased public health protection, consistent with the available health science. EPA is also finalizing revisions to other key aspects related to the PM NAAQS, including revisions to the monitoring requirements for the PM NAAQS with a focus on communities with environmental justice concerns and revisions to the Air Quality Index. EPA is changing the breakpoints of the PM<sub>2.5</sub> Air Quality Index (AQI) to reflect the revised level of the primary annual PM<sub>2.5</sub> standard and reflect recent health science on PM<sub>2.5</sub>.
- Wildfires have been growing in size and severity, with millions of people at risk from wildfire and wildfire smoke. The wildfire crisis is a public health crisis, including significant impacts on air quality. As wildfires increase in size and severity, the related public health impacts, including from smoke exposure, will continue to grow. At the same time, increasing the application of prescribed fire in a strategic and coordinated manner is needed to mitigate the risk and adverse effects of high severity wildfire and future smoke exposure.
- A wildland fire is any fire that occurs in an area where human activity and development, if any, is substantially non-existent, which can include forests, shrublands, grasslands, or wetlands. Wildland fires – including both wildfires and prescribed fires – account for 44 percent of the nation's primary emissions of fine particulate matter (PM<sub>2.5</sub>). EPA recognizes the increasing challenges and human health impacts that wildland fire and smoke pose in communities all around the country.
- EPA works with other federal agencies, state and local health departments, and air and forestry agencies, Tribal Nations, state forestry agencies, and other partners to provide information, tools, and resources to support communities in preparing for, responding to, and manage health effects from wildland fire and smoke.
- EPA works with the U.S. Forest Service to provide the public with near real-time data on wildfire smoke and air quality through the [AirNow Fire and Smoke Map](#); jointly maintain

a [Smoke-Ready Toolbox](#) to provide communities, public health agencies, and other partners with information on how to reduce the health impacts of smoke from wildland fires; and provides [technical assistance to help communities](#) plan and prepare for smoke impacts. EPA will continue its longstanding participation in the U.S. Forest Service-led [Interagency Wildland Fire Air Quality Response Program](#) which provides operational smoke outlooks to help communities respond to smoke from large wildfires.

- EPA also provides the [Air Quality Index](#) - a color-coded tool for communicating air quality to the public. EPA is changing the AQI breakpoints to reflect the latest science on particle pollution and health, and the updates EPA has made to the annual standard for fine particle pollution. The new breakpoints will become effective 60 days following publication of the final rule in the Federal Register. Many areas can expect to see more days in the Moderate (Code Yellow) category because of the changes in the breakpoints. The Moderate category now begins when fine particle pollution concentrations reach 9 micrograms per cubic meter of air. Previously, the Moderate category began at 12 micrograms per cubic meter. The Unhealthy for Sensitive Groups (Code Orange) category does not change and remains at 35 micrograms per cubic meter. The Agency does not expect significant increases in days in the other AQI categories as a result of the updates to the category breakpoints. However, when events like wildfires affect air quality, the revised breakpoints in the upper AQI categories may shift some days from Unhealthy to Very Unhealthy, or from Very Unhealthy to Hazardous.
- EPA has recently signed a [Memorandum of Understanding \(MOU\)](#) on Wildland Fire and Air Quality with the U.S. Department of Agriculture, the Department of the Interior, and the Centers for Disease Control and Prevention. This MOU is designed to enhance coordination and communication while aligning air quality and land management goals for wildfire risk mitigation, including strategic increase in prescribed fires, and establish joint strategies for achieving those goals.
  - USDA, USDO, USEPA, and USCDC are working together and investing in the mutually important objectives of protecting public health from the impacts of smoke and enabling land management practices that reduce the future risk of large, high severity fire events.
  - USDA, USDO, USEPA, and USCDC are committed to working with our federal, state, local, and Tribal partners to strengthen our coordination, implementation, and communication of policies and programs that relate to the increased use of prescribed fire to improve ecosystem function and resilience of forests and other wildlands, while protecting communities from wildfire and smoke impacts. EPA is committed to ensuring there exists a clear path forward to allow for the

exclusion of air quality data influenced by exceptional events to be excluded from regulatory actions such as initial area designations.

- EPA will also continue to support states in managing the impacts of wildland fire and smoke on attainment of the National Ambient Air Quality Standards (NAAQS) for PM. Both the Exceptional Events Rule and the [PM<sub>2.5</sub> State Implementation Plan Requirements Rule](#) address fire-related emissions, including emissions from wildfires and prescribed fires on wildland.

#### Exceptional Events Demonstrations

- EPA’s mission includes preserving and improving the quality of our nation’s ambient air to protect human health and the environment; however, the Clean Air Act also recognizes that it may not be appropriate to use the monitoring data influenced by “exceptional” events that are collected by the ambient air quality monitoring network when making certain regulatory decisions.
- The Exceptional Events Rule provides a framework for states and air agencies to request exclusion of air quality data influenced by exceptional events, including wildfires and prescribed fires, from certain regulatory decisions such as initial area designations. EPA has issued detailed [guidance](#) on how states can seek to exclude data influenced by such events under the Exceptional Events Rule.
- EPA is committed to ensuring that the process for requesting the exclusion of event-influenced data is clear. Where needed, EPA intends to offer clarifications or information to help support state, local, and Tribal air agencies (and their delegates) to seek exclusion of air quality monitoring data influenced by wildland fire smoke events.
- EPA appreciates that stakeholders across the nation are evaluating the impacts of wildfire smoke from the Summer of 2023 to initial area designations for the revised PM<sub>2.5</sub> standard. Information on the timeline for submission of exceptional events demonstrations associated with initial area designations is addressed in EPA’s Exceptional Events Rule and will also be discussed in the forthcoming designations memorandum.
- Exceptional events demonstrations deadlines are due based on the data years that will be used for the initial area designations. The deadline for submitting demonstrations to the EPA for the first and second data years is 1 year following promulgation of the NAAQS. The deadline for the third data year used is the last day of the month that is 1 year and 7 months after promulgation.

- In addition to previously issued information, guidance, and tools, EPA is developing three new products to improve and support an efficient process for demonstrating that air quality data was influenced by exceptional events, when appropriate.
- These tools specifically address wildland fire events and events that influence PM2.5 concentrations. Each of these resources will go through some level of public review before they are finalized.
  - **Data visualization and comparison tools.** EPA is developing a suite of tools to help air agencies identify and evaluate event-influenced PM2.5 data for potential exclusion. These tools will assist air agencies in identifying which impacted days affect design values and whether the events have regulatory significance.
  - **PM2.5 Wildfire Exceptional Events Tiering Document.** To supplement EPA’s guidance on developing exceptional events demonstrations for both prescribed fires on wildland and wildfires, the Agency is developing a resource that would include information on tiering wildfire/PM events, similar to the tiering approach used for EPA’s guidance on preparing exceptional events demonstrations for wildfire events influencing ozone concentrations. This tool would help to right-size demonstrations by identifying the minimum required information needed to support the criteria for an exceptional events demonstration.
  - **Prescribed Fire Demonstration Example.** EPA is committed to ensuring that air agencies have a clear pathway for needed exceptional events demonstrations for prescribed fires ignited to mitigate the effects of high-severity wildfires. EPA recognizes the importance of significantly increasing the application of prescribed fires to wildlands. To that end, EPA is working closely with the State of California, the United States Forest Service, and other collaborators to develop an exceptional events demonstration for a prescribed fire in Northern California. A public review opportunity on this document was offered in December 2023. This actual prescribed fire demonstration will go through the entire exceptional events process as an example of a successfully developed demonstration and will identify opportunities for land management and air agencies to efficiently collaborate on prescribed fire exceptional events demonstrations.

#### For More Information

- More information on exceptional events demonstration submission deadlines can be found in [Table 2 to 40 CFR section 50.14\(c\)\(2\)\(vi\)](#) – “Schedule for Initial Notification and Demonstration Submission for Data Influenced by Exceptional Events for Use in Initial Area Designations.”

- More information on the requirements and associated timelines for implementing the revised PM standards can be found in the [Implementation Fact Sheet](#).
- More information on the changes to the Air Quality Index can be found in the Changes to the [AQI Fact Sheet](#).



**SOLUTIONS  
FOR POLLUTION**  
For Clean Air and  
a Healthy Climate

## **The Sky Isn't Falling, It's Getting Less Polluted**

### ***Big Polluters and Their History of Misinformation***

### ***About Soot Pollution Standards***

*December 2023*

This month, the Environmental Protection Agency is preparing to issue a new, more protective standard for soot pollution – aka the NAAQS Particulate Matter 2.5 rule. With some industry lobbying [against](#) this public health standard, it is worthwhile to revisit industry claims from 2012, the last time EPA strengthened the soot standard.

Oil companies, manufacturers and industry claimed in [2012](#) that regulation of soot pollution would result in economic hardship and stifle new development. **In the decade since the implementation of the standard, the opposite has occurred: GDP has grown, unemployment has dropped, and oil companies have posted record profits.**

The dire industry predictions from 2012, never came true. Today, big polluters are repeating the same failed lies.

### **Key Findings:**

**Industry Claimed 2012 NAAQS Would Increase Unemployment; Rates Fell More Than 4 Points From 2012–2022.** In 2012, industry claimed that stricter soot standards would lead to [more](#) unemployment. In reality, nation-wide unemployment dropped from [7.9%](#) in 2012 to [3.5%](#) in December 2022, ten years after the implementation of the standard.

**Industry Claimed the Standard Would Discourage New Business In Non-Attainment Areas.** In 2012, Industry members such as [API](#) and the [Edison Electric Institute](#) argued that increased standards would result in economic costs to nonattainment areas. In 2023, there were 5 areas of non-compliance for the 2012 PM 2.5 standard. *Counties within each area show growth in GDP, drops in unemployment rates, or increases in median household incomes.* Non-attainment status did not cause unnecessary and severe economic harm. An analysis from [Earthjustice](#) of air quality from 14 wide-ranging metro areas found “on average

across these 14 metropolitan areas, from 2012 to 2021, unemployment rates decreased 2%, real GDP increased 21%, and PM2.5 and ozone air quality indices each decreased – that is, improved – by 12%.”

**2012 NAAQS Did Not Drag Down the Economy.** In 2012, the National Association of Manufacturers claimed the proposed NAAQS would “[will be an enormous drag on American manufacturing, economic growth, and job creation.](#)” In fact, ten years later the United States economy added [4.5 million jobs in 2022](#), compared to [1.8 million in 2012](#). GDP grew from [\\$17.4 trillion](#) in 2012 to [\\$21.9 trillion](#) in 2022.

**Industry Claimed 2012 NAAQS Would Stymie Growth, Industry Instead Increased Jobs.** In testimony and statements, in response to the PM 2.5 NAAQS published by the Clean Air Report in 2012, industry officials such as the American Petroleum Institute, predicted the rule would “stymie job and business growth.” According to API, the number of jobs created by the industry has [grown](#) since 2012 and is expected to continue to rise. Additionally, according to the Bureau of Labor Statistics, manufacturing employment [increased](#) nationwide from 11,926,900 in 2012 to 12,825,700 in 2022.

**Industry Claimed 2012 NAAQS Would Stifle Growth.** In 2012 industry, particularly the oil industry according to the Clean Air Report, claimed that tightening the soot standard would hinder development of new facilities. Despite that dire prediction, oil production rose from [6 billion barrels](#) per day in 2012 to [11.6 billion barrels](#) per day in 2022.

**API Claimed 2012 NAAQS Would Drive Up Costs For Industry.** According to a Clean Air Report article from 2012, the American Petroleum Institute claimed, “the revised standard ‘is unnecessary and could drive up costs for new and expanding businesses trying to hire employees.” 2022 instead was a record year for oil companies, posting nearly [\\$200 billion](#) in profit.