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IN FOCUS

Federal Air Quality and Wildland Fire Smoke Forecasting

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Numerous communities across the United States have expressed concern about health risks from wildland fire smoke after experiencing regional- and national-scale smoke events. Some Members of Congress have expressed interest in improving smoke forecasting to aid in preparation for and response to smoke events. This In Focus provides background on wildland fire smoke; federal air quality standards; federal wildland fire smoke observations, forecasting, and communications; and considerations for Congress.

Background

Wildland fire smoke (from both wild and prescribed fires) is a mixture of gases and fine particles that temporarily degrades air quality over long distances—potentially thousands of miles—and may harm human health. The U.S. Environmental Protection Agency (EPA) identifies wildland fires as a major contributor of fine particle air pollution (particles less than 2.5 microns or "PM2.5") and other air pollution, though quantifying the precise contribution of wildland fires to air pollution remains an active area of research. Other fine particle air pollution sources include emissions from power plants, automobiles, and industrial sources. Fine particles may contribute to a range of health effects, across multiple systems in the body (e.g., respiratory, cardiovascular).

Nationwide, air pollution from fine particles declined by 45% from 2000 to 2025. However, transboundary pollution from Canadian wildfires drove surges in U.S. fine particle air pollution in 2023 and 2026.

Federal Air Quality Requirements

Congress has directed federal agencies to take on various roles related to air quality and wildland fire smoke. The Clean Air Act (CAA) requires EPA to establish minimum national standards for ambient air quality. Under this authority, EPA has set and periodically revised national ambient air quality standards (NAAQS) for six "criteria" air pollutants, such as fine particles found in wildland fire smoke. Under the CAA, states have primary responsibility for assuring compliance with NAAQS and for establishing implementation plans intended to meet these standards. Some states establish prescribed fire smoke management plans to minimize smoke entering populated areas, prevent public safety hazards, and maintain CAA compliance.

EPA uses data from a network of air quality monitoring stations (described under "Observations"), in combination with modeling analyses, to inform determinations about NAAQS compliance. CAA allows EPA to exclude air quality data from regulatory decisions if air quality is demonstratively influenced by "exceptional events," such as certain wildland fires.

Federal Wildland Fire Smoke Forecasting

Congress has provided various federal agencies with responsibilities related to wildland fire smoke monitoring, forecasting, communication, and research.

Observations

The need for real-time air quality information is critical during wildland fires. EPA's network of air quality monitoring stations collects measurements of ambient air concentrations of pollutants at thousands of monitoring sites, mostly owned and operated by state, local, and tribal agencies. Nearly 1,500 of those sites collect information on fine particles, among other pollutants associated with smoke. The U.S. Forest Service (FS) and EPA also lend smoke and fine particle monitoring kits upon request. The National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) collect fire and smoke activity information across North America, Hawaii, and the Caribbean from multiple satellite systems.

Forecasting

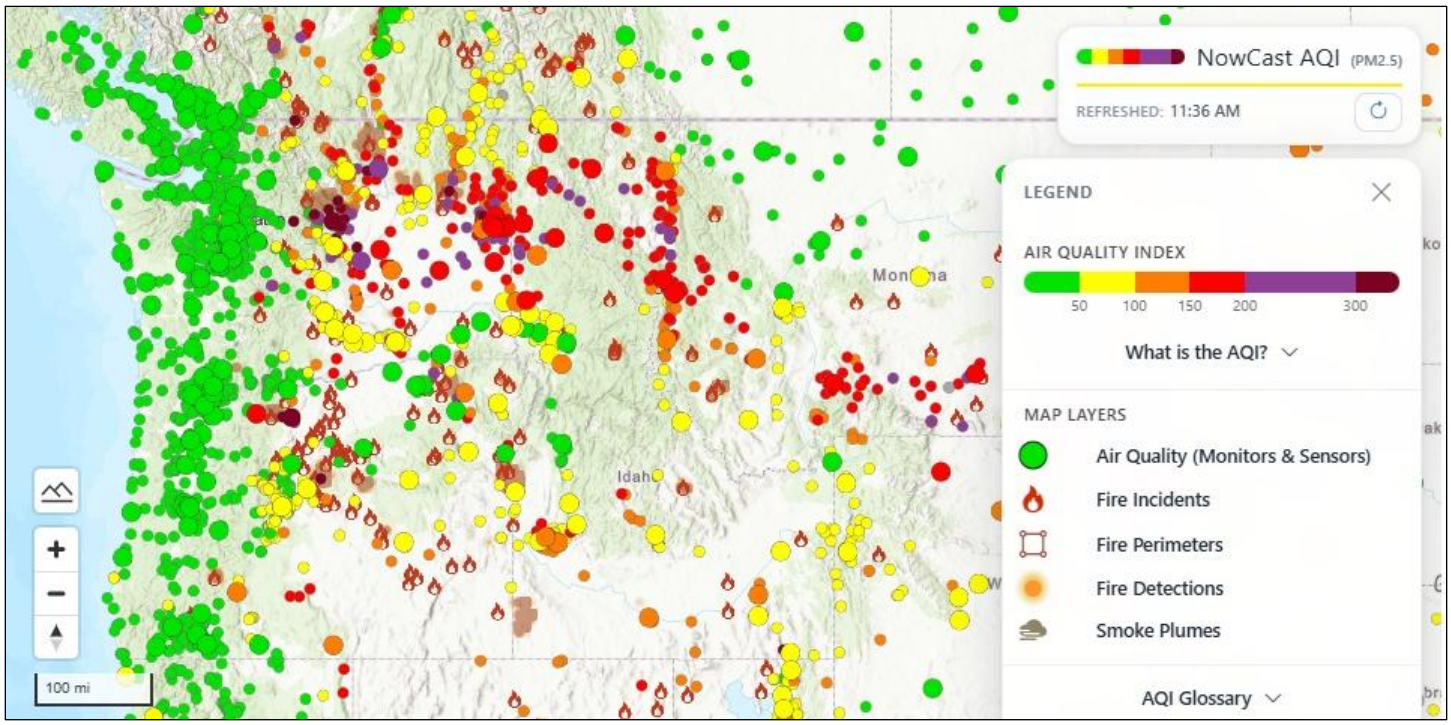
EPA and NOAA work on air quality forecasting together under a Memorandum of Agreement and the National Air Quality Forecast Capability program. Under this interagency agreement and program, EPA delivers real-time ambient air quality observations to NOAA. NOAA then utilizes modeling and prediction techniques to generate daily, nationwide air quality forecast guidance (baseline forecast maps), including for fine particles and smoke. States use NOAA's forecast guidance to create their own local air quality forecasts and warnings. Nationwide and local forecasts generally are available for one to three days into the future.

Communication

State and local environmental agencies distribute their air quality forecasts widely through federal and nonfederal means. For example, EPA manages AirNow, a federal multiagency effort that reports current and forecasted air quality based on available federal and nonfederal observations. EPA's AirNow reports air quality information using an "Air Quality Index" (AQI) index, ranging from 0-500. EPA calculates the AQI for a criteria air pollutant based on the ambient concentration of that pollutant. The higher the AQI, the greater the level of air pollution. The FS-led Interagency Wildland Fire Air Quality Response Program (IWFAQRP) collaborates to maintain the public AirNow Fire and Smoke Map (**Figure 1**). The map shows current air quality data and fire and smoke plume information.

Both NOAA and EPA issue alerts to notify the public about hazardous air quality, including smoke. For example, local NOAA National Weather Service weather forecast offices (NWS WFOs) convey official information from state and local air quality agencies when the AQI reaches or exceeds 151 (the threshold at which air is considered unhealthy) through Air Quality Alerts. EPA also shares air quality alerts and forecasts through its EnviroFlash email alert service. State and local agencies also distribute the forecast information they generate to local radio and television stations and online.

Figure 1. Screenshot of AirNow Fire and Smoke Map, Focused on the Pacific Northwest, as of August 3, 2026.



Source: CRS screenshot of the northwest United States, from AirNow, "Fire and Smoke Map," as of August 3, 2026, at 11:37am.

Wildland Fire-Specific Efforts

Specific to wildland fires, IWFAQRP deploys technical specialists—Air Resource Advisors (ARAs)—during large smoke events. ARAs may provide, install, and operate monitors, develop smoke forecasts and outlooks, and share information with fire personnel, air quality regulators, and the public.

Research

Smoke observations and forecasting continue to be areas of active research due to the complex nature of wildland fires, atmospheric conditions and processes, and the smoke itself. EPA, for example, supports air monitoring technology testing to evaluate the performance of monitors under high smoke concentration conditions. NOAA's laboratories focus on improving smoke and air quality modeling. Additional smoke and air quality observations and forecasting research are supported by other federal agencies, such as NASA and the National Science Foundation.

Congressional Considerations

Congress may consider the federal role in wildland fire smoke observations, forecasting, communications, and research. Some stakeholders and groups have identified additional activities for which there could be a federal role. For instance, in a 2026 NOAA workshop, state and local air quality forecasters identified several outstanding needs: (1) reliable communication methods for air quality alerts between state and local forecasters and NWS WFOs; (2) development of fire and non-fire fine particle tracking systems; and (3) a "one stop shop" for all air quality models, among other requests. A 2023 report from a congressionally created nonfederal committee recommended the establishment of a nationally consistent smoke monitoring and alert system, with investment into monitors, equipment, personnel, technology, and data sharing at FS, EPA, and NOAA. A 2023 GAO report found that collaboration between EPA, FS, and NOAA to improve or refine smoke modeling and forecasting capabilities could help state, local, and tribal entities respond to wildland fire events.

Congress could decide to support such activities through existing programs or establish new programs or interagency efforts. A part of that consideration may include whether federal agencies have the capacity to implement such efforts after agency staff reductions that began in 2025. Congress could also determine existing support levels are sufficient.

Congress directed several agencies to implement wildland fire smoke-related forecasting activities in language accompanying the FY2026 appropriations bill. For example, Congress directed EPA to continue improving smoke monitoring and prediction and to expand wildland fire smoke monitoring in underserved or under-monitored communities. Congress also supported funding for wildland fire science at multiple agencies, which may include smoke observations, forecasting, communications, and research in some cases.

Topics addressed in previously proposed legislation (e.g., H.R. 471, H.R. 753, H.R. 1923, H.R. 2770, H.R. 4075, S. 306, S. 453, S. 1462, S. 3923, and S. 5145 in the 119th Congress) included wildland fire smoke observations, forecasting, communication, and research. Congress may conduct oversight of agency implementation of past directives, may consider additional legislation, or may take no action.

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