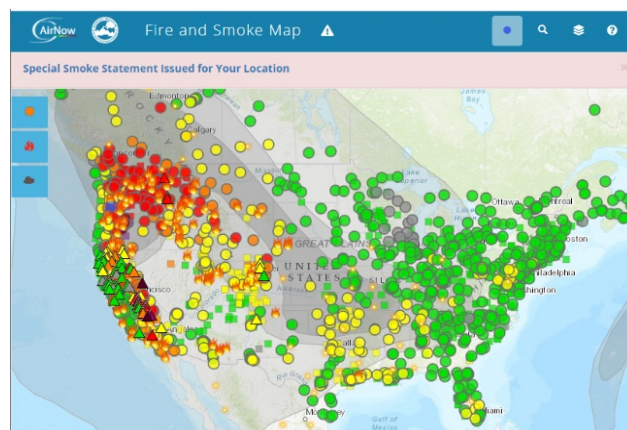


AIRNOW AND AIR QUALITY INFORMATION DURING WILDFIRES

With so many air quality websites available these days, it can be challenging to know which one to use for information – especially during a wildfire. Use this document to learn more about using key parts of the AirNow website: the Fire and Smoke Map, the Dial, and the Interactive Map.

[AirNow has a lot of maps and information. Which ones give me the best information on wildfires?](#)

During a wildfire, we recommend using the [AirNow Fire and Smoke Map](#). That’s because we’ve been able to add data from low-cost air sensors to the map as part of a pilot project between the U.S. Environmental Protection Agency (EPA) and the U.S. Forest Service (USFS). The goal of the pilot, launched in August 2020, is to provide additional information on air quality during wildfires, especially in areas where AirNow monitors or Forest Service temporary monitors may not exist. In addition to sensor data, the map features fine particle pollution (also known as fine particulate matter, or PM_{2.5}) data from the regulatory grade air pollution monitors that report to AirNow and from temporary monitors deployed by the U.S. Forest Service, along with information on large fire incidents, satellite-detected fires, smoke plumes and special smoke statements.



[Click on the image to see a live version of the map](#)

When there is no wildfire in your area, using the “[dial](#)” on the main page at AirNow.gov or the AirNow app also are good ways to get your current air quality information and forecasts. And if you want to look at a map, check out the AirNow interactive map on the website by clicking on the map section just below the dial, clicking the “Monitors Near Me” link below the city name to the right of the dial, or by selecting it from “Maps & Data” at the top of the page.

[Where does the sensor data on the fire map come from?](#)

At this time, the sensor data on the Fire and Smoke Map comes from PurpleAir¹. AirNow is using data from PurpleAir for the pilot, because EPA researchers have used a scientific approach to develop a correction equation and quality assurance steps for PurpleAir sensors. Researchers assessed these

¹ Note: EPA does not endorse any particular commercial product. Mention of trade names or commercial products does not constitute EPA or USFS endorsement or recommendation for use.

sensors, because their use has grown exponentially, resulting in an extensive network of publicly reporting sensors worldwide. EPA is in the process of collecting and analyzing data for other sensor models; however, the Agency does not have as much data for other sensor technologies since there are fewer deployed across the U.S.

Why do you need a correction equation for sensor data?

EPA scientists have found that PurpleAir sensors are biased -- they consistently overpredict fine particle concentrations in most locations and under higher humidity compared to the regulatory-grade monitors that are operated in the same location. While EPA does not use the sensor data for regulatory purposes, the correction equation our scientists have developed correct the PurpleAir bias, so you can easily compare readings from regulatory-grade monitors and PurpleAir sensors when you see them on the same map.

What is the difference between a monitor and a sensor?

EPA uses the term “air quality monitor” for regulatory air monitoring stations. These stations, considered the gold standard for measuring pollution in the outdoor air, are located according to EPA guidelines, remain in one place for many years, are maintained and operated by trained experts, and follow EPA quality assurance protocols.

Air sensors, also known as low-cost sensors, are a class of non-regulatory technology for measuring air pollution. This term often describes an integrated set of hardware and software that uses one or more “sensing elements” (also sometimes called sensors) to detect or measure concentrations of an air pollutant. Air sensors are lower in cost, more portable, and generally easier to operate than the regulatory monitors widely used in the United States. Because anyone can purchase and operate a low-cost sensor, EPA has little information about the location-related information that can influence their readings, such as how close sensors are to any sources of pollution. In addition, a lack of information about the maintenance, or operation of these sensors, adds additional uncertainty to the data they produce. Learn more at <https://www.epa.gov/air-sensor-toolbox>.

Why does the AirNow Fire and Smoke Map look different than the PurpleAir Map?

There are four key reasons why the maps may look different:

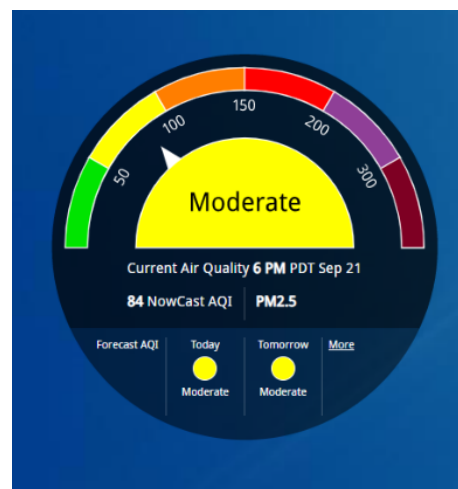
- 1) AirNow averages sensor data to an hour (so you can compare it to data from regulatory-grade monitors, which report on an hourly basis);
- 2) We apply an EPA [correction equation](#) to the sensor data before it is displayed to reduce bias in the readings;
- 3) We apply the AirNow’s [Nowcast](#), which is the algorithm used to relate hourly air quality data to the Air Quality Index (AQI). The AQI for particle pollution is a 24-hour index; and

- 4) As part of our quality assurance work, the AirNow Fire and Smoke Map does not include sensors that are labeled as “indoor” or that appear to be malfunctioning. AirNow identifies potentially malfunctioning sensors based on a comparison of readings from the two fine particle sensors each PurpleAir sensor contains, or from user reports.

How is the “dial” on the main AirNow page and the AirNow app produced?

Does sensor data contribute to that?

The “dial” is the at-a-glance feature on the AirNow home page and AirNow app that shows you your current NowCast AQI, the primary pollutant (that’s the pollutant with the highest AQI out of all the monitors in the area as of the last hour update), and your air quality forecast for the day. At this time, sensor data are used only in the Fire and Smoke Map pilot project and are not used elsewhere on AirNow, including for reporting the overall AQI for the day. The air quality data used to generate the dial readings comes exclusively from high-quality, regulatory grade monitors. AirNow generates a local dial based on the zip code or city name you enter when you first visit the page. That information is tied to a geographic “reporting area” and the particle pollution or ozone monitor(s) it contains. Reporting area boundaries are determined by the state, local and tribal air agencies that provide data to AirNow. When there are multiple monitors in a reporting area, the monitor reporting the highest amount of pollution is used to generate the dial shortly after the top of the hour. If the dial for your area doesn’t match what you are experiencing during a fire, it may be because no fine particle monitor is assigned to your reporting area; instead, your reporting area may be tied to a monitor for ozone or coarse particle pollution. If you have this experience, let us know. See the end of this document for instructions.



What is the NowCast? Why do you need it?

The NowCast is the algorithm AirNow uses to relate hourly air quality data to the Air Quality Index (AQI). The AQI for particle pollution is an official, 24-hour index that is designed to help people reduce their 24-hour exposure to particle pollution. It’s tied to both EPA’s annual and 24-hour standards for fine particulate matter and the health science behind those standards. But waiting for 24 hours of data isn’t practical when you’re trying to show people their current air quality, so we use the NowCast to estimate the AQI. The [NowCast](#) does this by using a calculation that involves multiple hours of past data. It uses longer averages during periods of stable air quality and shorter averages when air quality is changing rapidly.

What about the AirNow Interactive Map? Are sensors on that map?

At this time, AirNow shows sensor data only on the Fire and Smoke Map as part of a pilot project. When you visit the main AirNow [Interactive Map](#), you can see air quality “contours” which show the estimated AQI between regulatory-grade air quality monitors. You can also choose to show ozone and particle pollution monitors and click on individual monitors to see the NowCast AQI, the latest hourly concentration, and a 24-hour trend. This map is great for exploring your local monitored air quality in more detail. Like the dial, the interactive map updates shortly after the top of the hour.

[Which site should I use during a fire – the AirNow Fire and Smoke Map, my state’s air quality site, or a private air sensor site?](#)

You can use them all – but it’s important to understand what different sites show. AirNow’s Fire and Smoke Map allows you to compare current air quality from low-cost sensors, the regulatory grade monitors that report to AirNow, and temporary monitors that USFS, states, tribes and local agencies deploy on fires – and to see all of that information in one place. That’s possible because of the steps EPA and USFS take to correct sensor data, apply quality assurance measures, and apply the NowCast algorithm to show the data in the context of the AQI. The Fire and Smoke Map also shows smoke plumes, fire locations and special smoke statements.

Most state air quality websites show air quality in the U.S. AQI form and use the NowCast. But Washington state has its own index. That’s good to know if you are comparing a state’s page to AirNow. Sensor websites, which usually report more data in shorter timeframes than AirNow or state pages, can be helpful for showing you trends in your air quality, and when your air quality is starting to get better or worse.

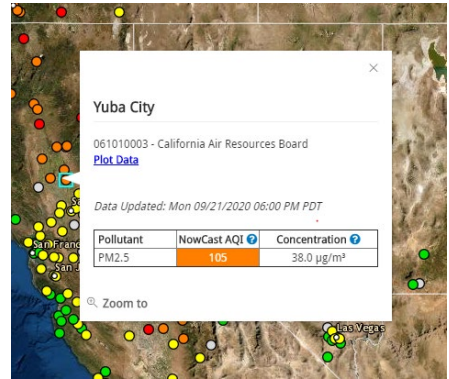
[The information AirNow is showing seems different than what I see outside. How can I let the AirNow program know about this?](#)

The AirNow team always strives to be as accurate as possible. If you think information on the site is incorrect, please let us know. We use feedback from site users as we review the AirNow site and the AirNow Sensor Data Pilot on the Fire and Smoke Map. Here’s the type of information that would be helpful. Be as specific as possible.

Tell us what page on AirNow you are commenting on – and provide details! The date and time you are viewing the site is especially important, and a screenshot is always helpful.

- If you are looking at the **Fire and Smoke Map**, tell us what AirNow monitor (shown in the circles), temporary monitor (triangles), or sensor (squares) you are commenting on. You can click on the icons to get the name of the monitor/sensor. Include the time you were viewing the map and the details of your comment/concern. Send feedback on the Fire and Smoke Map to sensordatapilot@epa.gov

- If you are using the **“dial” on the main page or AirNow app**, tell us what zip code you entered, and provide the time you were viewing the page along with your comment or concern about what the dial showed.
- If you are using the **AirNow Interactive Map**, let us know what boxes you’ve selected in the left-side menu. If you’re focusing on a particular monitor, it’s helpful if you click on that monitor to get the time and monitor ID. (The screenshot at right gives an example of what that detailed information looks like.) Send that along with your comment or concern about what the map showed.



Send the AirNow team information about the dial or interactive map through the Contact Us page on AirNow at <https://www.airnow.gov/contact-us/> If you’re sharing a screen shot, you can paste it into the form along with your comments. The information you share with us will help us continue to improve the AirNow page.