

HOW TO INTERPRET ONLINE MONITORING INFORMATION

Introduction

Particulate pollution or particulate matter (PM) is an air pollutant found in the air we breathe. It is categorized by particle size and measured in micrograms (of PM) per cubic meter of air ($\mu\text{g}/\text{m}^3$). The U.S. Environmental Protection Agency (U.S.EPA) and the California Air Resources Board (CARB) have set ambient air quality standards for pollutants including PM, or in other words, how much can be concentrated in the air, without becoming a health hazard for people to breathe.

Particulate matter 2.5 (PM_{2.5}) microns in diameter is currently monitored and includes dust, ash, and smoke. For perspective, a human hair has a diameter of about 70 micrometers.

Both the U.S.EPA and CARB have the same health-based annual average standard of $12 \mu\text{g}/\text{m}^3$. The U.S.EPA also adopted an additional 24-hour average standard from midnight to midnight of $35 \mu\text{g}/\text{m}^3$.

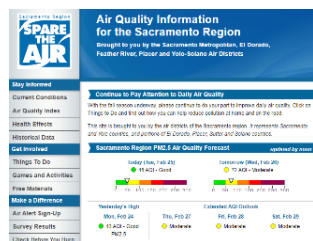
To help interpret Air Quality information, the U.S. EPA created the user-friendly Air Quality Index (AQI), that translates data into simple understandable metrics using colors with corresponding numbers, and a descriptors with public health advisory information. The AQI for PM_{2.5} is based on the 24-hour rolling average.

Understanding and Using Air Monitoring and Sensor Data

To understand air quality monitoring and sensor data, the following describes monitors and one type of sensor commonly used by the public. When used in the following order, if available, the information can be complementary in understanding. These all use electricity to operate and transmit the data for online viewing.

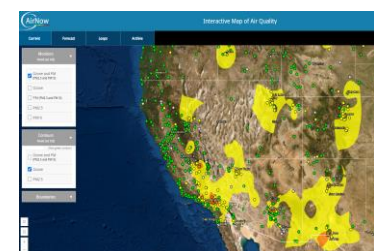
Stationary Monitors

Stationary monitors provide reliable, accurate data. They operate continuously, are expensive, complicated to operate, require maintenance and are located in an external temperature-controlled structure. Data is collected hourly and is used for regulatory and planning purposes since it is quality controlled. The following websites can be used to view this information.



Sacramento Regional Spare The Air

Provides daily forecasted AQI, real-time air quality data, and Spare the Air alerts when necessary. The daily forecasted AQI is created from weather forecasts and observations and monitoring data from Sacramento, El Dorado, Sutter, Placer, Yolo, and Solano counties. When smoke conditions change abruptly, air quality readings and updates may lag.

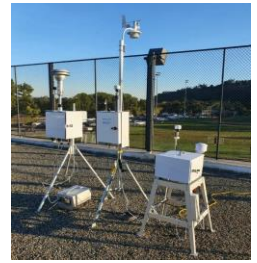


U.S. EPA AirNow

The AirNow home page provides the current air quality with an interactive map of current and forecasted air quality conditions. The data is from stationary monitors if available. Air Quality is extrapolated across broad areas to estimate AQI where no air monitors are in use. This process provides some confidence in predicting values outside of the monitor range, although the AQI values might be less reliable in locations farther away from the stationary monitoring locations.

Portable Monitors

Portable monitors are mobile, operate by electricity or batteries, and can be set up quickly. The data collected is on an hourly basis. These monitors are maintained, calibrated and used in temporary situations such as monitoring smoke from wildfires or prescribed burns to fill in where there are no nearby stationary monitors.



Air Quality Sensors

Air quality sensors (also called low cost sensors), are easy to install and operate making them very popular. These sensors count particles in a sample of air that moves past a laser beam calculating the measurement quickly, with the viewable data on an online map. These sensors can provide real-time air quality information that is useful when there are no nearby stationary monitors.

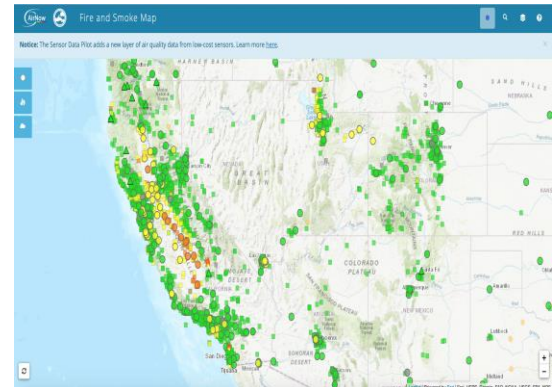
Sensors have a few limitations including not being able to be calibrated or provide maintenance. Siting the sensor where it is unknowingly next to a source of particulates like a backyard BBQ or fire pits or mis-label the sensor for indoors or outdoors happens occasionally. Lastly, some sensors use different AQI colors in their data visualization.



Regardless, air quality sensors can provide enough information on PM movement and are especially useful when smoke quickly either impacts or disperses in an area.

[AirNow Fire and Smoke Map](#)

In August 2020, the U.S. EPA, and the United States Forest Service (USFS) collaborated to on a pilot project to updated the [AirNow Fire and Smoke Map](#). This map, shows PM data every 15 minutes from stationary and portable monitors and from PurpleAir (PA) sensors. The PA sensors have been quality controlled to mitigate bias in the data (overestimating or underestimating) before being displayed on the map. Large active fire incident information is displayed as well as satellite fire detections and smoke plumes. The sensor technology provides supplemental air quality data providing more information that can be used to help protect one's health.



In order to assist the public in understanding the information from the AirNow Fire and Smoke Map, the Placer County Air Pollution Control District worked with the Placer County Communications Office, in collaboration with U.S. EPA AirNow staff and U.S. Forest Service staff, to create and publish a video on using the Fire and Smoke Map. The video can be found at this website: <https://vimeo.com/592345480> or on the California Smoke Blog (www.californiasmokeinfo.blogspot.com) under the Air Quality tab.