Annual Report
on the
Air Resources Board's
Fine Particulate Matter Monitoring Program

January 2015

California Environmental Protection Agency
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This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

California's PM2.5 monitoring network includes:

- Federally-approved monitors that measure PM2.5 mass over a 24-hour period at 63 sites;

Federal reference method monitor

Health and Safety Code, Section 39619.5(g) requires the Air Resources Board (ARB or Board) to provide an update each year on the status and results of the fine particulate matter (PM2.5) monitoring program. This report provides a summary of PM2.5 monitoring activities in 2014 and how the data are being used to support ARB programs.

California's PM2.5 air quality monitoring program provides information used for determining which areas violate standards, characterizing the sources that contribute to PM2.5 pollution, determining background concentrations, assessing pollution transport, and supporting health studies and other research. Monitoring data also provide information to develop and evaluate programs for improving air quality.

California's PM2.5 monitoring network began collecting data in 1998. A number of different types of PM2.5 monitors are operated to provide information on PM2.5 mass and chemical composition which are summarized below. Figure 1 displays the locations of PM2.5 monitors throughout the State. Additional information on PM2.5 monitoring can be found at:

http://www.arb.ca.gov/aaqm/partic.htm

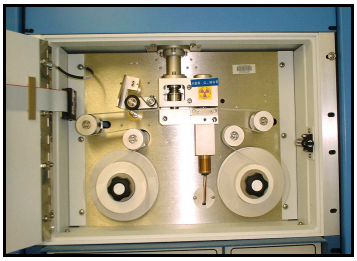
Federal Reference Method Monitors

The installation of federally-approved PM2.5 mass monitors throughout California began in 1998. In 2014, Federal Reference Method (FRM) monitors were operated at 63 sites. These monitors collect particulate samples on filters, which are later weighed and analyzed in a laboratory. Because of this two-step process, PM2.5 air quality data collected with these monitors are not immediately available. To provide "real-time" PM2.5 air quality information, we added continuous PM2.5 mass monitors to our network.

Continuous Mass Monitors

Continuous PM2.5 mass monitors provide valuable information for public reporting, temporal representation, health studies, transport studies, and background monitoring. PM2.5 mass can be measured continuously with several different commercially available technologies.

- Samplers that quantify PM2.5 mass continuously at 97 sites;



Beta attenuation monitor

and

- Monitors that collect PM2.5 samples for analysis of chemical components at 20 sites.

Speciation monitor

We chose the Beta Attenuation Monitor (BAM) for use in California and have installed monitors at 97 sites. The U.S. Environmental Protection Agency (U.S. EPA) designated certain models of the continuous monitors as Federal Equivalent Method (FEM) monitors. They are considered equivalent to the FRM monitors and can therefore be used to determine compliance with federal standards. California has deployed 61 of these FEM monitors.

Speciation Monitors

Another major stage of network implementation is the deployment of PM2.5 speciation monitors. Speciation monitoring provides valuable information about the composition (and ultimately sources) of PM2.5 pollution. However, monitoring of the individual species that make up PM is still an emerging field, with continuous speciation measurements the greatest challenge. We continue to evaluate newly emerging methods not currently used in routine monitoring for potential incorporation in California's PM2.5 monitoring network.

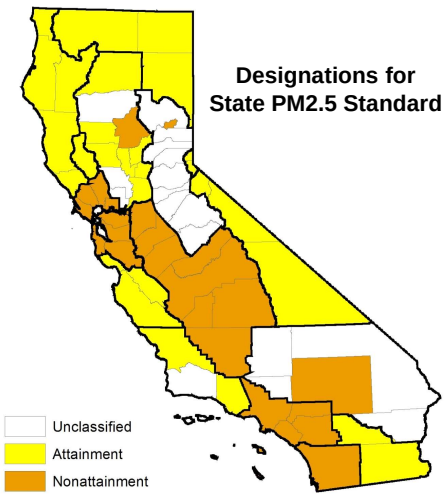
In 2014, along with states, U.S. EPA conducted a nationwide assessment of the PM2.5 speciation network to determine whether the sites were meeting the objectives and still needed. The review determined that all of the sites in California were needed and should continue to operate.

Federally-Required Speciation Monitors

There are two components to the PM2.5 speciation network in California. The first component, mandated by the U.S. EPA, required filter-based PM2.5 speciation monitoring at eight California sites that are now part of a national trends network for PM2.5 speciation. These monitors are the National Air Monitoring Stations (NAMS) monitors for the speciation network. The eight PM2.5 speciation monitors are located in Bakersfield, El Cajon, Fresno, Sacramento, San Jose, Los Angeles, Riverside, and Simi Valley.

State and National PM2.5 Ambient Air Quality Standards
(micrograms per cubic meter)

	California	National
Annual	12	12
24-hour	---	35



Additional Speciation Monitors

The second component of California's PM2.5 speciation network is the selection and deployment of samplers at selected State and Local Air Monitoring Stations (SLAMS). Data from these sites provide additional information needed for developing effective air quality attainment plans. The focus of the SLAMS PM2.5 speciation network is to enhance the spatial coverage of the NAMS sites in areas with a diversity of PM problems.

ARB and the air districts have deployed filter-based speciation monitors at twelve sites - Anaheim, Calexico, Chico, Fontana, Escondido, Modesto, Portola, Visalia, Sacramento, Vallejo, Livermore, and Oakland.

In 2007, ARB began monitoring for specific wood smoke tracers to determine the contribution of wood burning sources to PM2.5 ambient levels. Wood smoke tracers are being monitored at seven of the speciation SLAMS sites - Calexico, Chico, Escondido, Modesto, Portola, Sacramento, and Visalia during the winter season.

Accessing PM2.5 Data

Data collected as part of California's PM2.5 monitoring program can be obtained through a number of means. Daily PM2.5 values as well as summary statistics can be accessed through the interactive query program on ARB's web page at:

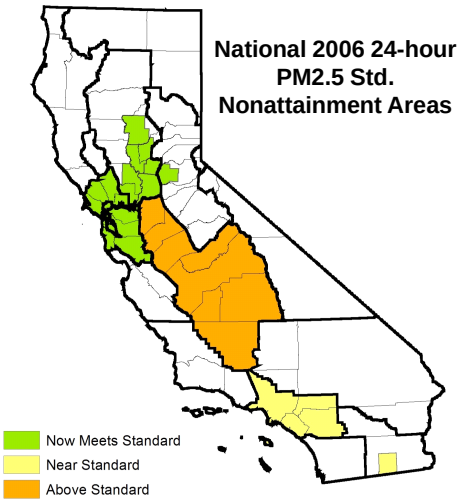
http://www.arb.ca.gov/adam/welcome.html

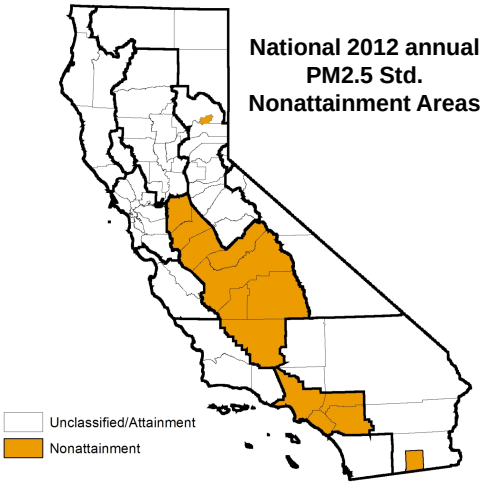
Real-time hourly PM2.5 data from California's continuous monitors can also be found at:

http://www.arb.ca.gov/aqmis2/aqdselect.php

PM2.5 Designations

The Clean Air Act requires the U.S. EPA to set national 24-hour and annual PM2.5 ambient air quality standards, and to designate nonattainment area for the national standards. ARB established a more health protective





State PM2.5 ambient air quality standard as required by California State Law. California State Law also requires ARB to designate each area as attainment, nonattainment, or unclassified for the State standard.

Based on data collected as part of California's PM2.5 monitoring network, the ARB designates the attainment status of areas with respect to the State annual average PM2.5 ambient air quality standard of 12 µg/m^3. Based on 2010-2013 air quality data, there were no changes to any area's PM2.5 attainment status. Most urban areas of California exceed the State PM2.5 standard, as well as several more isolated sub-areas. However, as air quality has improved more areas now meet the State PM2.5 ambient air quality standard.

In 2006, U.S. EPA strengthened the national 24-hour PM2.5 standard from 65 µg/m^3 to 35 µg/m^3. The U.S. EPA issued final designations for this standard which became effective in December 2009. Seven areas in California were designated as not meeting the strengthened federal 24-hour PM2.5 standard – the South Coast Air Basin, San Joaquin Valley Air Basin, Bay Area Air Basin, Sacramento Metropolitan area, a portion of the Feather River Air Pollution Control District, a portion of Butte County, and a portion of Imperial County. In 2013, based on recent data, U.S. EPA determined that the Bay Area Air Basin, the Feather River Air Pollution Control District, Sacramento Metropolitan area, and Butte County attained the standard. Information on the final determinations can be found at:

http://www.epa.gov/region9/air/actions/ca.html

In 2012, U.S. EPA lowered the annual PM2.5 standard from 15 µg/m^3 to 12 µg/m^3. The U.S. EPA issued final designations for this standard in December 2014 based on 2011-2013 air quality data. Four areas in California were designated as not meeting the lowered annual PM2.5 standard – South Coast Air Basin, San Joaquin Valley Air Basin, and portions of Imperial and Plumas Counties. Information on the State and federal designations can be found at:

http://www.arb.ca.gov/desig/pm25desig/pm25desig.htm

PM2.5 Attainment Plans

To meet the requirements of the revised 24-hour PM2.5 standard, the South Coast Air Quality Management District and the San Joaquin Valley Air Pollution Control District prepared State Implementation Plans in 2012. ARB adopted the plans and submitted them to U.S. EPA in 2013. Imperial County Air Pollution Control District also prepared a State Implementation Plan for the Imperial County nonattainment area. This plan was adopted by ARB in December 2014 and submitted to U.S. EPA. Information on the South Coast Plan, the San Joaquin Valley Plan, and the Imperial County Plan are available, respectively, at:

http://www.arb.ca.gov/planning/sip/planarea/scabsip.htm

http://www.arb.ca.gov/planning/sip/planarea/sanjqnvllysip.htm

http://www.arb.ca.gov/planning/sip/planarea/imperial/imperialsip.htm

New PM2.5 attainment plans for the revised annual PM2.5 standard of 12 $\mu g/m^3$ will be due to U.S. EPA in 2016.

Figure 1: PM2.5 Monitoring Stations in California