

Annual Network Plan

**Covering Monitoring Operations in
25 California Air Districts**

July 2020



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Abbreviations used in this document

ANP	Annual Network Plan
APCD	Air Pollution Control District
AQMD	Air Quality Management District
AQS	Air Quality System
ARD	Air Resources District
ARM	Approved Regional Method
AQDA	Air Quality Data Action
CAN	Corrective Action Notification
CARB	California Air Resources Board
CASTNET	Clean Air Status and Trends Network
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CSN	Chemical Speciation Network
DV	Design Value
EMP	Enhanced Monitoring Plan
FEM	Federal Equivalent Method
FRM	Federal Reference Method
IMPROVE	Interagency Monitoring of Protected Visual Environments
MATES	Multiple Air Toxics Exposure
MLD	Monitoring and Laboratory Division
NAAQS	National Ambient Air Quality Standard
NCore	National Core multipollutant network monitoring Station
NIST	National Institute of Standards and Technology
NO ₂	Nitrogen Dioxide
NPS	National Park Service
OMB	Office of Management and Budget
OTR	Ozone Transport Region
PAMS	Photochemical Assessment Monitoring Site
PM ₁₀	Particulate Matter with an aerodynamic diameter ≤10 micrometers
PM _{2.5}	Particulate Matter with an aerodynamic diameter ≤2.5 micrometers
PQAO	Primary Quality Assurance Organization
PWEI	Population Weighted Emissions Index
QAS	Quality Assurance Section
QMB	Quality Management Branch
QMS	Quality Management Section
SLAMS	State and Local Air Monitoring Site
SO ₂	Sulfur Dioxide
SPM	Special Purpose Monitor

STN	Speciated Trends Network
TPY	Tons per Year
TSA	Technical System Audit
U.S. EPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound

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Executive Summary

The Annual Network Plan provides detailed information about criteria pollutant monitoring sites and instruments operating in California. Accurately measuring air quality is the foundation of California's efforts to reduce air pollution. For more than 50 years, California has maintained one of the most extensive air monitoring networks in the world, collecting data on a wide range of pollutants. The information gathered from these networks makes it possible to track progress in cleaning the air and identify the most effective actions needed to meet health-based air quality standards.

The California Air Resources Board (CARB) and California's thirty-five local air districts, 25 of which are covered in this plan, have been measuring ambient air quality using a variety of stationary monitoring networks supplemented by mobile platforms including cars, aircraft, and ships. From the very beginning, California's air monitoring program has been a partnership between government agencies at the federal, state, and local level, along with universities and more recently with engaged community members and industry representatives.

California's different air monitoring networks are designed to meet a range of regulatory requirements, such as compliance with the federal Clean Air Act, as well as to help address research and public health priorities. Over time, the types of pollutants being monitored and the extent of the air monitoring networks have varied as a function of new legislative mandates, community concerns, as well as our success in improving air quality in many parts of California. Air monitoring data outreach such as the Air Quality and Meteorological Information System (AQMIS), Air Quality Index, and AirNow program allow people and companies to take precautions by avoiding the outdoors or minimizing activities that contribute to air pollution when levels are unhealthy.

This executive summary briefly describes the main types of monitoring that are conducted in California. The focus of this report is on criteria pollutant monitoring being conducted by governmental agencies using regulatory grade monitoring instruments. This report does not discuss the extensive networks of lower cost sensors installed by agencies, community groups, academics, and others.

Criteria Pollutant Monitoring

The majority of California's governmental air monitoring resources, reflected in the current statewide network of approximately 250 regulatory monitoring stations, have been dedicated to measuring ambient concentrations of criteria pollutants, which are ground-level ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead (Pb).

As detailed in the Annual Network Plan, for each of these criteria pollutants, the Code of Federal Regulation (CFR) specifies a list of acceptable instruments and methods, the frequency at which samples are to be collected, and how many instruments must be duplicated at the same location for each region. The CFR also details standards to be

used for locating air monitoring sites (such as population, local traffic counts, local emission sources, etc.), number of sites located in each region, and the appropriate scale (e.g., neighborhood, urban, and regional) for the spatial objective of the particular pollutant.

Data from these monitoring networks are used for determining the attainment status for national and State ambient air quality standards, supporting public information services, forecasting expected high pollution events, and supporting the development of emissions reduction programs. Monitoring data must undergo review and validation process by the agency collecting the data before the data is deemed final for regulatory purposes. Because this type of monitoring often requires significant infrastructure and resources, these methods have limitations for widespread deployment as part of community air monitoring efforts.

Additional Types of Air Monitoring Not Covered in the Annual Network Plan

Toxic Air Contaminants Monitoring: Beginning in the 1980s, with the recognition of the health risks posed by a wide range of chemicals, California and the local air districts deployed a network of approximately 35 air toxics monitoring stations. Each of these stations take samples of toxic compounds which are then analyzed using specialized equipment. A few examples are volatile organic compounds, carbonyl compounds, toxic metals, and hexavalent chromium.

Most air toxics monitoring methods involve collecting air samples in the field and returning them to the laboratory for subsequent analysis. One significant limitation is that data from these methods may take weeks, or in some cases months, after sampling to become available as these sophisticated methods often require labor-intensive analytical procedures. Air toxic monitoring data are used to identify sources contributing to air toxic pollution and trends in the concentration of air toxics over time. Data can be used to support regulatory and enforcement actions when collected in a scientifically defensible manner.

Greenhouse Gas Emission Monitoring: With the passage of the California Global Warming Solutions Act of 2006 (AB 32), CARB collaborated with federal agencies and universities to deploy a network of 15 tall towers and other stations across California to measure greenhouse gases (GHG), study regional GHG emissions trends throughout the state, and evaluate regional and statewide emissions inventories.

Evaluating regional and statewide GHG emissions requires highly accurate and precise measurements of ambient greenhouse gases. The GHG network currently uses state-of-the-art, air monitoring instrumentation (cavity ring-down spectrometry) to measure carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). In conjunction with the ground-based network, airborne and spaceborne remote sensing measurements are conducted to screen large spatial regions for methane “hot spots”.

Remote Sensing: Remote sensing instrumentation measures reflected or emitted radiation to collect information about air pollutant concentrations and meteorological conditions. Remote sensing instruments can be deployed on ground-based (mobile and stationary), airborne (i.e., aircraft), and spaceborne (i.e., satellites) platforms. Fence-line remote sensing applications can monitor emissions from facilities such as refineries. When deployed on aircraft or satellites, remote sensing systems can survey large spatial areas and identify the general location of concentrated air pollution.

Community-Scale Air Monitoring: Recognizing the need to understand air quality at the neighborhood level, CARB and the local air districts have periodically undertaken community-focused air monitoring studies. With the advent of low-cost air sensors in the last decade, many community groups and individuals are now also measuring air quality and deploying their own grassroots monitoring networks. As a result, there are now about a thousand community-focused air monitors deployed in a wide range of California neighborhoods by community members, universities, private entities, and government agencies.

Continued usage of fence-line monitoring, advancements in air sensors, and additional mobile monitoring studies are important pieces to local air monitoring programs. Community-level air monitoring programs are expected to continue expanding in California with the adoption of Assembly Bill 617 (AB 617) in 2017. Monitoring methods commonly used for community air monitoring include:

- **Fence-line Monitoring:** Fence-line monitoring is a monitoring strategy in which air quality is measured at the perimeter of a known or potential emission source. Air districts may require fence-line monitoring at facilities that emit or potentially emit air pollutants and greenhouse gases. Depending on the air pollutant that is expected to be emitted, fence-line monitoring can utilize a wide variety of measurement tools such as air sensors, passive samplers, remote sensing systems, and real-time instrumentation. This type of monitoring may be used to help determine where and when leaks are occurring, the rate emissions are leaving the source, and what chemicals are present. AB 1647 and AB 617 include new requirements for enhanced fence-line and community monitoring in the vicinity of major stationary sources such as refineries.
- **Air Sensors:** Air quality sensors measure air pollutants on a real-time or near real-time basis and are generally low in cost, highly portable, and can require less power, siting infrastructure, and expertise than other air monitoring methods. Currently, no low-cost (i.e., \$2,000 or less) sensors meet federal reference or federal equivalent method requirements and many have not been robustly evaluated to determine the accuracy of their measurements. However, sensor technology is rapidly developing and performance is expected to improve over time. Sensors have the potential to provide hyper-local air quality data as part of coordinated, well-designed, community-led air monitoring efforts. The resulting data may be of sufficient quality to help understand spatial variability, identify areas with relatively higher pollutant concentrations for further investigation,

complement existing air monitoring networks, and evaluate personal exposure to air pollution.

- *Mobile Monitoring:* Mobile monitoring platforms collect environmental data while in motion, for example in a car or van. Instrumentation is utilized that can quickly measure air pollutant concentrations and provide instantaneous snapshots of air pollutant concentrations at a specific location and time. Mobile platforms can deploy a variety of instrumentation ranging from sensors, research-grade instrumentation, and remote sensing devices. Mobile platforms have the ability to measure real-time air pollutant concentrations at fine spatial gradients which can be used to identify persistent elevated pollutant concentrations and indicate potential contributing sources. These mobile monitoring platforms provide a valuable means of identifying areas that may need additional measurements and/or inspections or inquiries.

Conclusion

Monitoring networks and studies provide critical information for identifying and mitigating California's most significant air quality challenges. This Annual Network Plan documents California's network of regulatory ambient air quality monitors and describes how they meet Federal air monitoring and quality assurance requirements.

Section 1: Introduction

Federal regulations require state and local agencies that conduct ambient air monitoring for regulatory purposes to submit an Annual Network Plan (ANP) to the U.S. Environmental Protection Agency (U.S. EPA). ANPs are required to include detailed information about sites and instruments operating in the ambient air monitoring network. This ANP meets the federal regulatory requirements set forth in 40 CFR 58.10 and Appendices A through E.

The California Air Resources Board (CARB) Primary Quality Assurance Organization (PQAO) is comprised of 32 of the 35 air districts in California. The districts in the CARB PQAO may elect to prepare their own ANP or have their information included in the CARB ANP. The 2020 CARB ANP covers the monitoring networks of 25 districts within the CARB PQAO. Seven districts in the CARB PQAO will prepare their own ANPs and submit them directly to the U.S. EPA. Three other districts in California, the Bay Area Air Quality Management District (AQMD), San Diego County Air Pollution Control District (APCD), and South Coast AQMD represent their own PQAOs and are responsible for preparing their own ANPs and submitting them directly to U.S. EPA.

The 2020 ANP details the operations of the monitoring networks in 2019 and describes the changes that are planned to occur within the next 18 months. Consistent with direction from U.S. EPA, this ANP describes monitors operated by local districts, CARB, and other agencies such as the National Park Service (NPS), within the jurisdictions of the districts covered by this report. As required by federal regulations, this ANP includes detailed information about monitors using Federal Reference Methods (FRM), Federal Equivalent Methods (FEM), or Approved Regional Methods (ARM) that are included in the State and Local Air Monitoring (SLAMS) network, National Core (NCore) multipollutant monitoring station, Chemical Speciation Network (CSN), Special Purpose Monitor (SPM) stations, and Photochemical Assessment Monitoring Stations (PAMS).

Areas Covered in this Network Plan

The geographic boundaries of the 25 air districts covered in this ANP as well as the districts preparing their own ANPs are identified in Table 1 and Figure 1. Monitoring sites operated by districts that are not covered by this ANP are included when necessary to demonstrate fulfillment of federal monitoring requirements.

Public Inspection and Comment Period

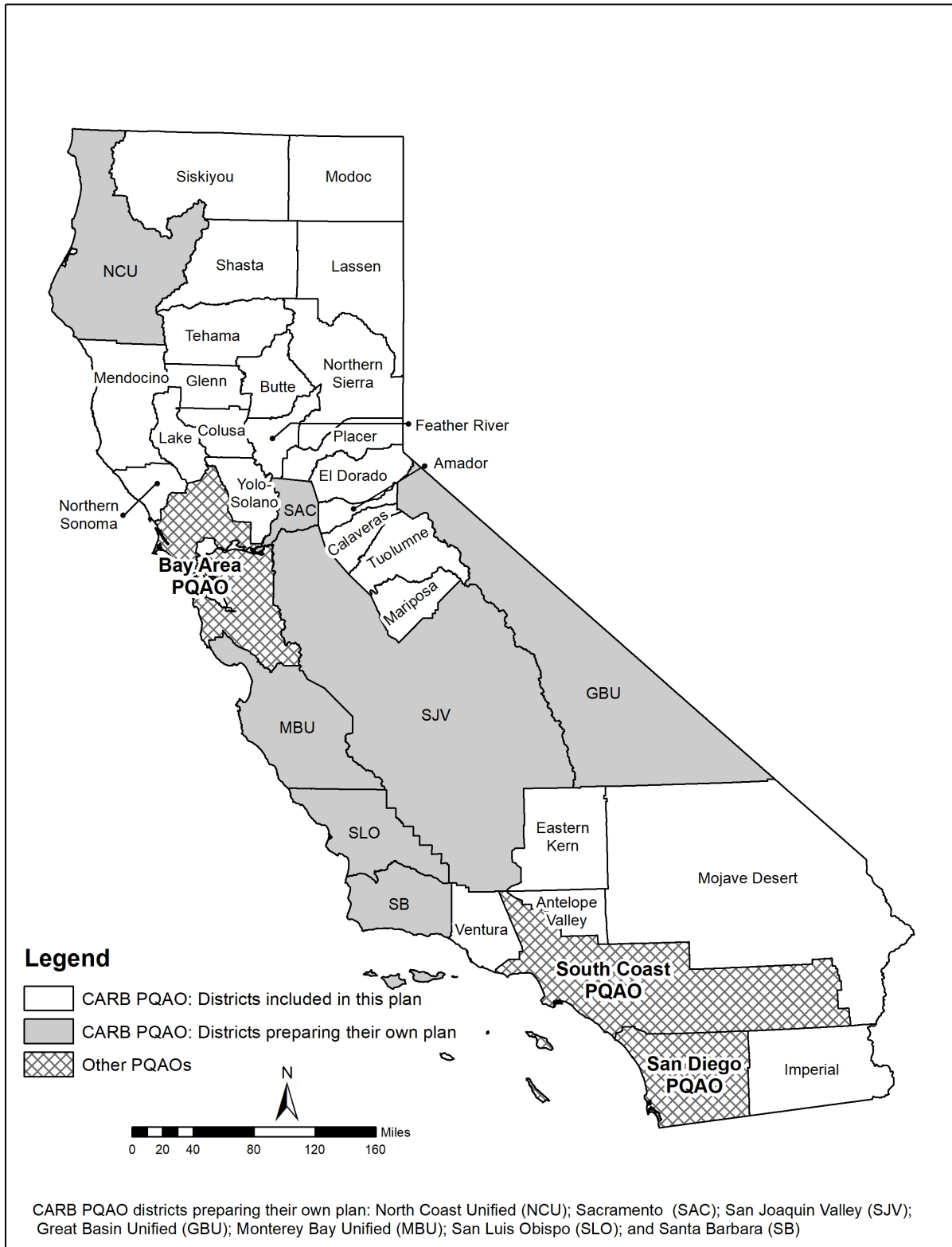
The CARB ANP will be available for a 30 day public inspection and comment period prior to its submittal to the U.S. EPA. If public comments are received, CARB will provide a response to the comments when the plan is submitted to the U.S. EPA. The final version of the CARB ANP is available for download from <http://www.arb.ca.gov/aqd/amnr/amnr.htm>.

Table 1: Districts in the CARB Primary Quality Assurance Organization

Districts Included in the CARB ANP	
Amador County APCD	Antelope Valley AQMD
Butte County AQMD	Calaveras County APCD
Colusa County APCD	Eastern Kern APCD
El Dorado County AQMD	Feather River AQMD
Glenn County APCD	Imperial County APCD
Lake County AQMD	Lassen County APCD*
Mariposa County APCD	Mendocino County AQMD
Modoc County APCD*	Mojave Desert AQMD
Northern Sierra AQMD	Northern Sonoma County APCD
Placer County APCD	Shasta County AQMD
Siskiyou County APCD	Tehama County APCD
Tuolumne County APCD	Ventura County APCD
Yolo-Solano AQMD	
Districts Drafting Their Own ANP	
Great Basin Unified APCD	Monterey Bay ARD
North Coast Unified AQMD	Sacramento Metropolitan AQMD
San Joaquin Valley APCD	San Luis Obispo County APCD
Santa Barbara County APCD	

* Lassen County APCD and Modoc County APCD are covered by this ANP; however, no ambient air quality monitors are currently sited in these districts.

Figure 1: California Primary Quality Assurance Organizations



Section 2: Monitoring Network Overview

California's ambient air monitoring network includes over 250 sites and more than 700 monitors, making it one of the most extensive in the world. Many regions in California are characterized by complex terrain, variable meteorological conditions, and diverse emission sources. A large monitoring network is critical for assessing the State's progress in meeting clean air objectives, understanding spatial and temporal variation in air pollutants, and evaluating pollutant exposure. Monitors are operated by CARB, local air districts, and other entities including the NPS, private contractors, and tribal authorities. Tribal monitors are not included in this report.

Ambient concentration data are collected for a wide variety of pollutants including ozone, particulate matter with a diameter of 2.5 microns or less (PM_{2.5}), particulate matter with a diameter of 10 microns or less (PM₁₀), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead (Pb), which are the federal criteria pollutants. Meteorological parameters, volatile organic compounds (VOCs), and a host of toxic air contaminants are also monitored at a number of sites. While toxics, VOCs, and meteorological monitoring play an integral role in California's air quality programs, the focus of this ANP, as specified by federal requirements, is on sites that conduct monitoring of the federal criteria pollutants, as well as PAMS data, within the jurisdiction of districts covered by this ANP.

Although most sites monitor for multiple pollutants, not all pollutants are monitored at every site because the data needs vary by locale. One fundamental purpose of monitoring is to distinguish between areas where pollutant levels violate the ambient air quality standards and areas that meet ambient air quality standards. Areas in violation of a standard usually have increasingly stringent mandates to reduce the sources of pollution that result in the exceedances. Based in part on monitoring data, air quality agencies develop strategies, programs, and regulations to achieve needed emission reductions. Data from the ambient monitoring network are then used to assess the efficacy of those strategies, programs, and regulations.

The pollutants and the number of monitors at each monitoring site in the area covered by this ANP are shown in Table 2; additional site and monitor-level details are provided in Appendix A.

Table 2: Pollutants Monitored in the Districts Covered by this ANP

District	Site (AQS ID)	CO	NO ₂	Ozone	SO ₂	PM ₁₀	PM _{2.5}	CARB Operated
Amador	Jackson-Clinton (06-005-0002)			1				Yes
Antelope Valley	Lancaster-Division (06-037-9033)	1	1	1		1	1	
Butte	Chico-East (06-007-0008)	1	1	1		1	2	Yes
	Gridley (06-007-4001)						1	Yes
	Paradise-Airport (06-007-0007)			1				Yes
	Paradise-Theater (06-007-2002)						1	Yes
Calaveras	San Andreas (06-009-0001)			1		1	1	Yes
Colusa	Colusa-Sunrise Blvd (06-011-1002)			1		2	2	Yes
Eastern Kern	Canebrake (06-029-0017)					1		
	Mojave (06-029-0011)			1		1	1	Yes
	Ridgecrest-Ward (06-029-0018)					1	1	
El Dorado	Cool (06-017-0020)			1				Yes
	Echo Summit (06-017-0012)			1				Yes
	Placerville (06-017-0010)			1				Yes
	South Lake Tahoe (06-017-0011)					1		Yes
Feather River	Sutter Buttes (06-101-0004)			1				Yes
	Yuba City (06-101-0003)		1	1		1	2	Yes
Glenn	Willows-Colusa (06-021-0003)			1		1	1	Yes
Imperial	Brawley-Main (06-025-0007)					1	1	
	Calxico-Ethel (06-025-0005)	1	1	1	1	2	3	Yes
	El Centro-9th (06-025-1003)		1	1		1	1	
	Niland-English (06-025-4004)			1		1		
	Westmorland (06-025-4003)			1		1		
Lake	Anderson Spring (06-033-3010)					1		
	Glenbrook (06-033-3011)					1		
	Lakeport-S.Main (06-033-3002)			1		1	1	
Mariposa	Jerseydale (06-043-0006)			1				Yes
	Yosemite Village (06-043-1001)					1	1	Yes
	Yosemite NP-Turtleback (06-043-0003)*			1				
Mendocino	Fort Bragg-300 Dana (06-045-0010)					1		
	Ukiah-Gobbi (06-045-0008)			1				
	Ukiah-Library (06-045-0006)						1	
	Willits-Justice Center (06-045-2002)						1	
Mojave Desert	Barstow (06-071-0001)	1	1	1		1		
	Blythe-Murphy (06-065-9003)			1				Yes
	Hesperia-Olive (06-071-4001)			1		1		
	Joshua Tree-Black Rock (06-071-9002)*			1				
	Joshua Tree-Pinto Wells (06-065-1004)*			1				
	Lucerne Valley (06-071-0013)					1		
	Mojave NP (06-071-1001)*			1				
	Phelan (06-071-0012)			1				
	Trona-Athol/Telescope (06-071-1234)		1	1	1	1		
Victorville-Park (06-071-0306)	1	1	1	1	2	2		
Northern Sierra	Chester (06-063-1007)						1	
	Grass Valley (06-057-0005)			1			2	
	Portola (06-063-1010)						3	
	Quincy-N Church (06-063-1006)						2	
	Truckee-Fire Station (06-057-1001)						2	
	White Cloud Mountain (06-057-0007) **			1				Yes
Northern Sonoma	Cloverdale (06-097-0001)					1		
	Guerneville-Church (06-097-3002)					1		
	Healdsburg-Matheson (06-097-0002)					1		
	Healdsburg-Airport (06-097-1003)			1				
Placer	Auburn-Atwood (06-061-0003)			1			1	
	Colfax-City Hall (06-061-0004)			1			1	
	Lincoln-Moore (06-061-2003)			1			1	
	Roseville-N Sunrise (06-061-0006)		1	1		1	3	Yes
	Tahoe City-Fairway (06-061-1004)			1			1	

Table 2 continued

District	Site (AQS ID)	CO	NO ₂	Ozone	SO ₂	PM ₁₀	PM _{2.5}	CARB Operated
Shasta	Anderson-North (06-089-0007)			1		1		
	Lassen Volcanic NP (06-089-3003)*			1				
	Redding-Health Dept (06-089-0004)			1		1	1	
	Shasta Lake-Lake (06-089-0009)			1				
	Shasta Lake-La Mesa (06-089-0008)					1		
Siskiyou	Yreka (06-093-2001)			1			1	
Tehama	Red Bluff-Walnut (06-103-0007)			1		1	1	
	Tuscan Butte (06-103-0004)			1				Yes
Tuolumne	Sonora-Barretta (06-109-0005)			1				Yes
Ventura	El Rio-Rio Mesa School (06-111-3001)		1	1		1	1	
	Ojai-East Ojai (06-111-1004)			1			1	
	Piru-Pacific (06-111-0009)			1			1	
	Simi Valley-Cochran (06-111-2002)		1	1		1	2	
	Thousand Oaks (06-111-0007)			1			1	
Yolo-Solano	Davis-UCD Campus (06-113-0004)		1	1			1	Yes
	Vacaville-Merchant (06-095-3001)					1		
	Vacaville-Ulatis (06-095-3003)			1				
	West Sacramento-15 th (06-113-2001)					1		
	Woodland-Gibson (06-113-1003)			1		1	1	

* These sites are operated by National Park Service (NPS).

** White Cloud Mountain did not operate in 2019.

Note: CARB operating sites are delineated with grey shading.

Section 3: Site and Monitoring Information

U.S. EPA requires the federal site type, federal monitoring objective, and federal monitor type to be included in ANPs. These elements are described in the following sections and identified at the monitor-level in the detailed site reports in Appendix A.

Federal Site Type

Monitoring sites must be capable of informing air quality program managers about peak air pollution levels, typical levels in populated areas, air pollution transported into and out of a city or region, and air pollution levels near specific sources. For these reasons, U.S. EPA requires that each monitor at a site be designated, at a minimum, with one of the following site types established in the Air Quality System (AQS) database:

- Extreme Downwind
- Highest Concentration
- Maximum Ozone Concentration
- Maximum Precursor Emissions Impact
- Population Exposure
- Source Oriented
- Upwind Background
- General/Background
- Regional Transport
- Welfare Related Impacts
- Quality Assurance
- Other

U.S. EPA requires that a monitor be designated with an appropriate site type so that the data collected can be used to support a specific federal monitoring objective. The site type designations are at the monitor level rather than the site level because U.S. EPA has determined that a single site type may not be adequate to describe all of the monitors at a particular site.

Federal regulations note that the spatial scale of representativeness of a monitor should be consistent with the stated site type. The spatial scale of representativeness is a measure of the physical dimensions of the air mass through which pollutant concentrations are expected to be relatively homogeneous. The scales of representativeness that are most relevant to ambient air monitoring are defined as follows:

- *Microscale*: Measured concentrations are expected to be similar for an area ranging from several meters up to about 100 meters.
- *Middle scale*: Measured concentrations are expected to be similar for areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.

- *Neighborhood scale*: Measured concentrations are expected to be similar within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range.
- *Urban scale*: Measured concentrations are expected to be similar within an area of city-like dimensions, on the order of 4 to 50 kilometers.
- *Regional scale*: Measured concentrations are expected to be similar within a rural area of reasonably homogeneous geography without large sources, and extend from tens to hundreds of kilometers.
- *National and global scales*: These measurement scales represent concentrations characterizing the nation and the globe as a whole

The spatial scale of representativeness that is generally most appropriate for each of the most common federal site types are shown in Table 3, which is based on Table D-1 in Appendix D of 40 CFR 58.

Table 3: Site Type and Recommended Spatial Scale

Appropriate Site Type	Appropriate Spatial Scales
Highest concentration	Micro, middle, neighborhood (sometimes urban or regional for secondarily formed pollutants)
Population exposure	Neighborhood, urban
Source oriented	Micro, middle, neighborhood
General background	Urban, regional
Regional transport	Urban, regional
Welfare-related impacts	Urban, regional

The types of monitoring sites and the spatial scales designated in the area covered by this ANP are listed in Table 4 and included in the detailed site reports in Appendix A. The site type is listed first following the spatial scale. Note that a monitor may have more than one site type.

Table 4: Site Type and Spatial Scale in the Districts Covered by this ANP

District	Site	CO	NO ₂	Ozone	SO ₂	PM ₁₀	PM _{2.5}
Amador	Jackson-Clinton			pop/ n			
Antelope Valley	Lancaster-Division	pop/ m	pop/ m	pop/ m		pop/ n	pop/ n
Butte	Chico-East	pop/ n	pop/ n	pop/ n		pop/ n	pop/ n
	Gridley						pop/ n
	Paradise-Airport			high/ r			
	Paradise-Theater						gen/ n
Calaveras	San Andreas			high/ n		gen/ n	gen/ n
Colusa	Colusa-Sunrise Blvd			gen/ r		high, pop/ n	pop/ n
Eastern Kern	Canebrake					gen,pop/ u	
	Mojave			high/ r		pop/ n	high/ n
	Ridgecrest-Ward					high/ n	pop/ n
El Dorado	Cool			high/ r			
	Echo Summit			trans/ r			
	Placerville			high/ r			
	South Lake Tahoe					pop/ m	
Feather River	Sutter Buttes			high,trans/ r			
	Yuba City		pop/ n	high/ n		pop/ n	pop/ n
Glenn	Willows-Colusa			pop/ n		pop/ n	pop/ n
Imperial	Brawley-Main					pop/ n	pop/ n
	Calexico-Ethel	pop/ n	pop/ n	gen/ n	pop/ n	pop/ n	pop/ n
	El Centro-9th		pop/ n	high/ n		pop/ n	pop/ n
	Niland-English			pop/ n		pop/ n	
	Westmorland			pop/ r		pop/ m	
Lake	Anderson Spring					pop/ u	
	Glenbrook					pop/ u	
	Lakeport-S.Main			pop/ u		gen/ n	pop/ n
Mariposa	Jerseydale			high/ r			
	Yosemite Village					pop/ m	pop/ m
	Yosemite NP-Turtleback*			gen/ r			
Mendocino	Fort Bragg-300 Dana					gen/ n	
	Ukiah-Gobbi			pop/ n			
	Ukiah-Library						pop/ n
	Willits-Justice Center						pop/ n
Mojave Desert	Barstow	pop/ m	pop/ m	pop/ m		pop/ n	
	Blythe-Murphy			gen/ n			
	Hesperia-Olive			pop/ n		gen,pop/ n	
	Joshua Tree-Black Rock*			high/ r			
	Joshua Tree-Pinto Wells*			gen/ r			
	Lucerne Valley					pop/ n	
	Mojave NP*			gen/ r			
	Phelan			pop/ n			
Trona-Athol/Telescope		source/ n	pop/ n	pop/ n	source/ n	high,source/ n	
Victorville-Park	pop/ n	pop/ n	pop/ n	pop/ n	pop/ n	pop/ n	trans,pop/ n
Northern Sierra	Chester						pop/ n
	Grass Valley			pop/ n			pop/ n
	Portola						pop/ n
	Quincy-N Church						pop/ n
	Truckee-Fire Station						pop/ n
	White Cloud Mountain			gen/ r			
Northern Sonoma	Cloverdale					pop/ n	
	Guerneville-Church					pop/ n	
	Healdsburg-Matheson					pop/ n	
	Healdsburg-Airport			gen/ u			
Placer	Auburn-Atwood			pop/ n			pop/ n
	Colfax-City Hall			pop/ n			pop/ n
	Lincoln-Moore			pop/ n			pop/ n
	Roseville-N Sunrise		pop/ n	high/ n		high/ n	pop/ n
	Tahoe City-Fairway			gen/ u			gen/ u

Table 4 continued

District	Site	CO	NO ₂	Ozone	SO ₂	PM ₁₀	PM _{2.5}
Shasta	Anderson-North			pop/ n		high/ n	
	Lassen Volcanic NP*			gen/ r			
	Redding-Health Dept			pop,high/ n		high/ n	pop/ n
	Shasta Lake-Lake			pop/ n			
	Shasta Lake-La Mesa					pop/ n	
Siskiyou	Yreka			high,trans,pop/ n			pop/ n
Tehama	Red Bluff-Walnut			pop/ n		high/ n	gen/ n
	Tuscan Butte			high/ r			
Tuolumne	Sonora-Barretta			high/ n			
Ventura	El Rio-Rio Mesa School		pop/ u	pop/ u		pop/ n	pop/ n
	Ojai-East Ojai			pop/ u			pop/ n
	Piru-Pacific			pop/ n			high/ n
	Simi Valley-Cochran		high/ u	high/ u		pop/ n	high/ n
	Thousand Oaks			pop/ u			pop/ n
Yolo-Solano	Davis-UCD Campus		pop/ n	pop/ n			pop/ n
	Vacaville-Merchant					pop/ n	
	Vacaville-Ulatis			high, pop/ n			
	West Sacramento-15 th					pop/ n	
	Woodland-Gibson			pop/ n		pop/ n	pop/ n

* These sites are operated by National Park Service (NPS).

Site Types:

- gen - general background
- high - highest concentration
- pop - population exposure
- trans - regional transport
- source - source oriented

Spatial Scales:

- m - middle scale
- n - neighborhood scale
- u - urban scale
- r - regional scale

Federal Monitoring Objective

The federal monitoring objectives are defined in Appendix D of 40 CFR 58. Federal monitoring regulations require that each monitor measuring a criteria pollutant is sited to meet at least one monitoring objective. The three federal monitoring objectives are:

- To provide air quality data to the public in a timely manner;
- To support compliance with national ambient air quality standards; and
- To support air quality research studies.

Many air quality agencies operate monitors with multiple objectives in mind. For example, monitoring is conducted to provide both air quality data to the public as well as to support compliance with national ambient air quality standards. There are a number of monitoring purposes besides the federal monitoring objectives that are directly related to the needs of state and local agencies. Some of the most common state and local monitoring purposes include determination of agricultural and residential burn periods, geyser air monitoring, and state designations. These are outside of the scope of the ANP.

Federal Monitor Type

The federal monitor type refers to the agency operating the monitor or the specific purpose for which the monitor is operated. There are seven federal monitor types:

- SLAMs
- SPM
- Industrial
- Non-EPA federal
- Tribal
- EPA
- Other *

* U.S. EPA states that "Other" is intended for a monitor for a parameter not addressed by 40 CFR Part 58. (i.e., it will not be allowed for criteria pollutants or monitoring network such as NCore, PAMs or NATTS).

Most monitors established and operated by state and local air agencies are identified as SLAMs. SLAMs monitors meet specific siting and quality assurance criteria defined in federal regulations. Some monitors are identified as SPMs, and are operated by state and local monitoring agencies to fulfill very specific or short-term monitoring goals. SPMs are required to meet 40 CFR Part 58 Appendix A requirements, and 40 CFR Part 58 Appendix E requirements are optional. Many SPMs operated in California by state and local agencies do fulfill these requirements. SPMs that operate for more than two years can be used by U.S. EPA to determine compliance with federal standards.

In this ANP, all the monitors identified as non-EPA federal monitors are operated by the NPS. Industrial monitors and EPA monitors are not operated in the area covered by this ANP. Tribal monitors are operated on tribal lands by tribal entities and are outside of the scope of this ANP. Table 5 shows the types of monitors, their monitoring objectives and the network affiliations. Some monitors are operated under specific types of monitoring network programs. Examples of the network affiliations are PAMS, NCore, Near-road and CSN. The full list can be found at <https://aqs.epa.gov/aqsweb/documents/codetables/networks.html>.

Table 5: Monitoring Objective, Monitor Type and Network Affiliation

District	Site	Monitoring Objective	Monitor Type*	Network Affiliation**
Amador	Jackson-Clinton	NAAQS Comparison	SLAMS	
Antelope Valley	Lancaster-Division	NAAQS Comparison, Public Info.	SLAMS	
Butte	Chico-East	NAAQS Comparison, Public Info.	SLAMS	CSN Supplemental
	Gridley	Public Info.	SLAMS	
	Paradise-Airport	NAAQS Comparison	SLAMS	
	Paradise-Theater	Public Info.	SLAMS	
Calaveras	San Andreas	NAAQS Comparison, Public Info.	SLAMS	
Colusa	Colusa-Sunrise Blvd	NAAQS Comparison	SLAMS	
Eastern Kern	Canebrake	NAAQS Comparison	SLAMS	
	Mojave	NAAQS Comparison	SLAMS	
	Ridgecrest-Ward	NAAQS Comparison	SLAMS	
El Dorado	Cool	NAAQS Comparison	SLAMS	
	Echo Summit	NAAQS Comparison	SLAMS	
	Placerville	NAAQS Comparison	SLAMS	
	South Lake Tahoe	NAAQS Comparison	SLAMS	
Feather River	Sutter Buttes	NAAQS Comparison	SLAMS	
	Yuba City	NAAQS Comparison, Public Info.	SLAMS	

Table 5 continued

District	Site	Monitoring Objective	Monitor Type*	Network Affiliation**
Glenn	Willows-Colusa	NAAQS Comparison, Public Info.	SLAMS	
Imperial	Brawley-Main	NAAQS Comparison	SLAMS	
	Calexico-Ethel	NAAQS Comparison, Public Info.	SLAMS	CSN Supplemental
	El Centro-9th	NAAQS Comparison	SLAMS	
	Niland-English	NAAQS Comparison	SLAMS	
	Westmorland	NAAQS Comparison	SLAMS	
Lake	Anderson Spring	Public Info.	SLAMS	
	Glenbrook	Public Info.	SLAMS	
	Lakeport-S.Main	NAAQS Comparison	SLAMS	
Mariposa	Jerseydale	NAAQS Comparison	SPM	
	Yosemite Village	NAAQS Comparison, Public Info.	SLAMS	
	Yosemite NP-Turtleback	NAAQS Comparison	non-EPA Federal	CASTNET
Mendocino	Fort Bragg-300 Dana	NAAQS Comparison	SLAMS	
	Ukiah-Gobbi	NAAQS Comparison	SLAMS	
	Ukiah-Library	NAAQS Comparison	SLAMS	
	Willits-Justice Center	NAAQS Comparison	SLAMS	
Mojave Desert	Barstow	NAAQS Comparison	SLAMS	
	Blythe-Murphy	NAAQS Comparison, Public Info.	SLAMS	
	Hesperia-Olive	NAAQS Comparison	SLAMS	
	Joshua Tree-Black Rock	NAAQS Comparison	non-EPA Federal	CASTNET
	Joshua Tree-Pinto Wells	Public Info.	non-EPA Federal	
	Lucerne Valley	NAAQS Comparison	SLAMS	
	Mojave NP	Public Info.	non-EPA Federal	
	Phelan	NAAQS Comparison	SLAMS	
	Trona-Athol/Telescope	NAAQS Comparison	SLAMS	
	Victorville-Park	NAAQS Comparison	SLAMS	
Northern Sierra	Chester	NAAQS Comparison	SLAMS	
	Grass Valley	NAAQS Comparison	SLAMS	
	Portola	NAAQS Comparison	SLAMS	CSN Supplemental
	Quincy-N Church	NAAQS Comparison	SLAMS	
	Truckee-Fire Station	NAAQS Comparison	SLAMS	
	White Cloud Mountain	NAAQS Comparison	SLAMS	
Northern Sonoma	Cloverdale	NAAQS Comparison	SLAMS	
	Guerneville-Church	NAAQS Comparison	SLAMS	
	Healdsburg-Matheson	NAAQS Comparison	SLAMS	
	Healdsburg-Airport	NAAQS Comparison	SLAMS	
Placer	Auburn-Atwood	NAAQS Comparison	SLAMS	
	Colfax-City Hall	NAAQS Comparison, Public Info.	SLAMS	
	Lincoln-Moore	NAAQS Comparison, Public Info.	SLAMS	
	Roseville-N Sunrise	NAAQS Comparison, Public Info.	SLAMS	
	Tahoe City-Fairway	NAAQS Comparison, Public Info.	SLAMS	
Shasta	Anderson-North	NAAQS Comparison	SLAMS	
	Lassen Volcanic NP	NAAQS Comparison, Research	non-EPA Federal	CASTNET
	Redding-Health Dept	NAAQS Comparison	SLAMS	
	Shasta Lake-Lake	NAAQS Comparison	SLAMS	
	Shasta Lake-La Mesa	NAAQS Comparison	SLAMS	
Siskiyou	Yreka	NAAQS Comparison	SLAMS	
Tehama	Red Bluff-Walnut	NAAQS Comparison	SLAMS	
	Tuscan Butte	NAAQS Comparison	SPM	
Tuolumne	Sonora-Barretta	NAAQS Comparison	SLAMS	
Ventura	El Rio-Rio Mesa School	NAAQS Comparison	SLAMS	PAMS
	Ojai-East Ojai	NAAQS Comparison	SLAMS	
	Piru-Pacific	NAAQS Comparison	SLAMS	
	Simi Valley-Cochran	NAAQS Comparison, Public Info.	SLAMS	PAMS
	Thousand Oaks	NAAQS Comparison	SLAMS	
Yolo-Solano	Davis-UCD Campus	NAAQS Comparison, Public Info.	SLAMS	
	Vacaville-Merchant	NAAQS Comparison	SLAMS	
	Vacaville-Ulatis	NAAQS Comparison	SLAMS	
	West Sacramento-15th	NAAQS Comparison	SLAMS	
	Woodland-Gibson	NAAQS Comparison	SLAMS	

* There are no other network types such as CSN, STN, IMPROVE, NATTS, NCore, or Near-road in the area covered by this ANP.

Section 4: Additional Information about the Monitors

Required Monitor Information

U.S. EPA regulations (40 CFR Part 58.10) require that the annual monitoring network plan lists specific additional information that characterizes the nature and location of the monitors. U.S. EPA Region 9 identified all of the information that is required on each site/monitor basis. The full list of required information is included in Table 6. This detailed information for each site can be found in the detailed site tables in Appendix A of this ANP.

Table 6: Required Detailed Monitoring Site Information

Site Name
Local site name
AQS ID
GPS coordinates (decimal degrees)
Street Address
County
Distance to roadways (meters)
Traffic count (AADT, year)
Groundcover (e.g. paved, vegetative, dirt, sand, gravel)
Representative statistical area name (i.e. MSA, CBSA, other)
Pollutant, POC
Primary / QA Collocated / Other
Parameter code
Basic monitoring objective(s)
Site type(s)
Monitor type
Network affiliation(s), if applicable
Instrument manufacturer and model
Method code
FRM/FEM/ARM/other
Collecting Agency
Analytical Lab (i.e. weigh lab, toxics lab, other)
Reporting Agency
Spatial scale (e.g. micro, neighborhood)
Monitoring start date
Current sampling frequency
Required sampling frequency
Sampling season
Probe height (meters)
Distance from supporting structure (meters)
Distance from obstructions on roof. Include horizontal distance + vertical height above probe for obstructions nearby (meters).
Distance from obstructions not on roof. Include horizontal distance + vertical height above probe for obstructions nearby (meters).
Distance from tree drip-lines (meters)
Distance to furnace or incinerator flue (meters)
Distance between monitors fulfilling a QA collocation requirement (meters).
Unrestricted airflow (degrees around probe/inlet or percentage of monitoring path)
Probe material for reactive gases NO/NO ₂ /NO _y , SO ₂ , O ₃ ; PAMS: VOCs, Carbonyls

Table 6 continued

Residence time for reactive gases NO/NO ₂ /NO _y , SO ₂ , O ₃ ; PAMS: VOCs, Carbonyls (seconds)
Will there be changes within the next 18 months? (Y/N)
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)
Frequency of flow rate verification for manual PM samplers, including Pb samplers
Frequency of flow rate verification for automated PM analyzers
Frequency of one-point QC check for gaseous instruments
Date of Annual Performance Evaluation conducted in the past calendar year for gaseous parameters
Date of two semi-annual flow rate audits conducted in the past calendar year for PM monitors

Information on the continuous PM_{2.5} non-FEM monitors

The federal regulations require that monitors are Federal Reference Method (FRM), Federal Equivalent Method (FEM), or Approved Regional Method (ARM) and meet certain siting criteria in order for the data to be used for NAAQS comparison. While all continuous PM₁₀ monitors discussed in this report are FEM monitors, there are some continuous PM_{2.5} monitors that are non-FEMs. Table 7 lists the continuous PM_{2.5} non-FEM monitoring sites covered in this ANP. The continuous PM_{2.5} data reported from these non-FEM monitors are excluded from NAAQS comparison. However, many of these non-FEM monitors are California Approved Samplers (CAS) and the data are used for State designation purposes and/or in AirNow for Air Quality Index reporting.

Table 7: Monitoring Sites Operating Continuous PM_{2.5} Non-FEM monitors

District	Site
Butte	Chico-East Avenue (06-007-0008)
	Gridley (06-007-4001)
	Paradise-Theater (06-007-2002)*
Colusa	Colusa-Sunrise Blvd (06-011-1002)
Feather River	Yuba City (06-101-0003)
Glenn	Willows-Colusa (06-021-0003)
Imperial	Calexico (06-025-0005)
Mariposa	Yosemite Village (06-043-1001)
Northern Sierra	Chester (06-063-1007)
	Portola (06-063-1010)
	Quincy-N Church Street (06-063-1006)
	Truckee-Fire Station (06-057-1001)
Placer	Colfax-City Hall (06-061-0004)
	Lincoln-Moore Street (06-061-2003)
	Roseville-N Sunrise Ave (06-061-0006)
	Tahoe City-Fairway Drive (06-061-1004)
Yolo-Solano	Davis-UCD Campus (06-113-0004)

* This site was non-operational from 11/8/18 to 1/22/19.

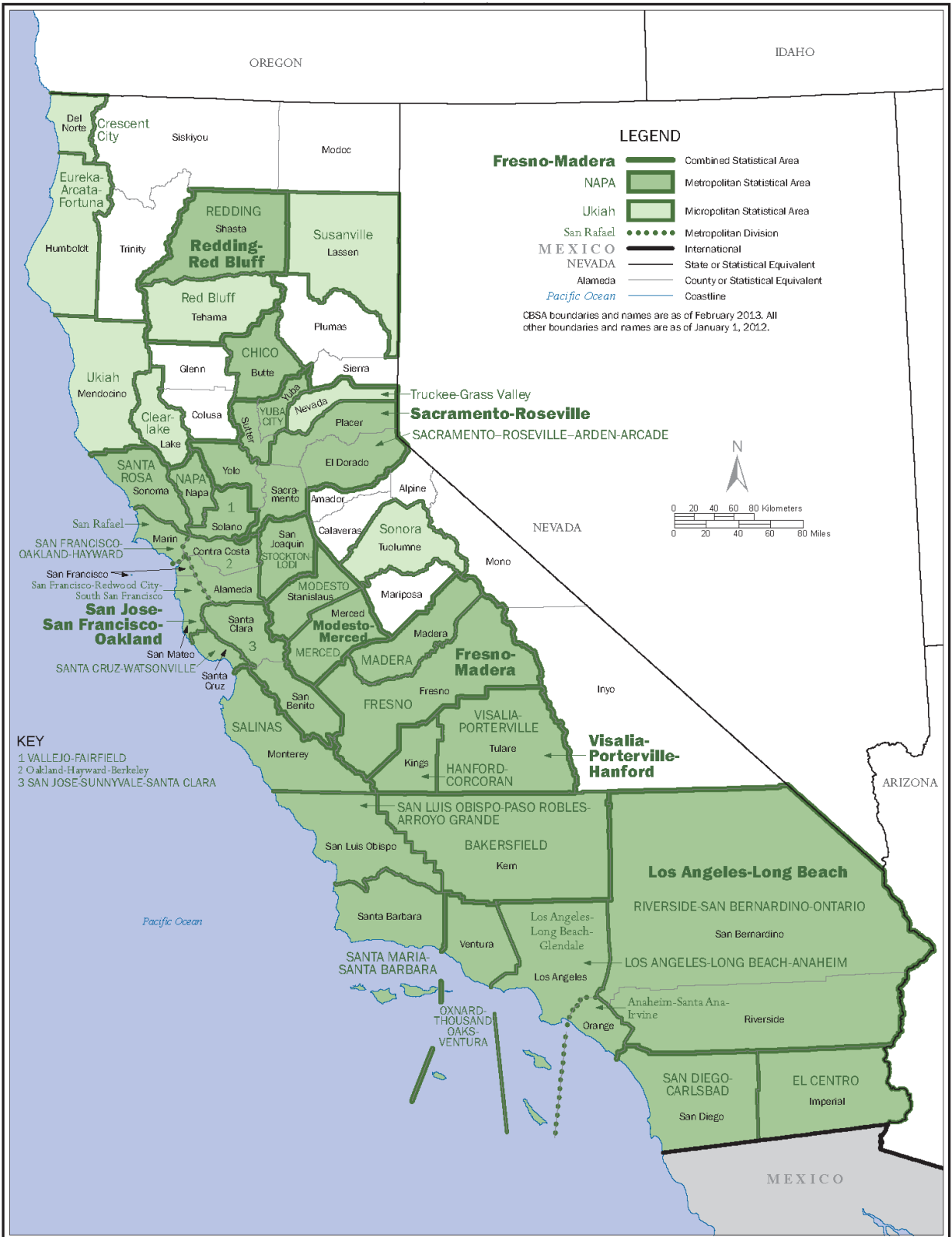
Core-Based Statistical Areas

Appendix A of this ANP also lists the location of each monitor, including the Core-Based Statistical Area (CBSA) in which each monitor is located. CBSAs are defined by the United States Office of Management and Budget (OMB) and provide a consistent set of geographical areas for federal agencies to use in collecting, tabulating, and publishing statistical data. Two types of areas are included as CBSAs: Metropolitan Statistical Areas and Micropolitan Statistical Areas, which differ by population threshold. A Metropolitan Statistical Area has an urban core with a population of 50,000 or more, whereas a Micropolitan Statistical Area has an urban core with a population of at least 10,000, but less than 50,000. Several counties in California are sparsely populated and do not meet the classification requirements for incorporation into a CBSA (Figure 2).

U.S. EPA specifies the number of monitors required for each pollutant based on the CBSA. Table 8 contains a comprehensive list of CBSAs and associated air districts for California. Several of the 25 air districts covered by this ANP are located in CBSAs that also include air districts that are preparing their own ANPs. Information regarding monitors operated by districts outside of those covered by this ANP will be included in this plan when necessary to demonstrate fulfillment of federal monitoring requirements.

For CBSAs that include multiple districts, fulfillment of minimum monitoring requirements is dependent upon coordination between air monitoring staff, particularly when changes to the monitoring network are considered. The Roles and Responsibilities documents developed by CARB specify that districts and CARB must communicate with each other when changes to the network are being considered. When proposed changes are communicated between districts and CARB, staff from both agencies will work closely to evaluate impacts on minimum monitoring requirements and develop pathways that ensure federal requirements are met. The Roles and Responsibilities documents are available on the CARB website at <https://ww2.arb.ca.gov/our-work/programs/quality-assurance/qm-document-repository/roles-responsibility-agreements>.

Figure 2: Core-Based Statistical Areas in California



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

Table 8: List of Core-Based Statistical Areas included in CARB ANP and Other ANP in California

CBSA Name*	County	Included in the CARB ANP?	Included in other ANP?
Bakersfield	Kern	Yes; Eastern Kern	San Joaquin Valley
Chico	Butte	Yes	--
Clearlake	Lake	Yes	--
Crescent City	Del Norte	No	North Coast Unified
El Centro	Imperial	Yes	--
Eureka-Arcata-Fortuna	Humboldt	No	North Coast Unified
Fresno	Fresno	No	San Joaquin Valley
Hanford-Corcoran	Kings	No	San Joaquin Valley
Los Angeles-Long Beach-Anaheim	Los Angeles; Orange	Yes; Antelope Valley	South Coast
Madera	Madera	No	San Joaquin Valley
Merced	Merced	No	San Joaquin Valley
Modesto	Stanislaus	No	San Joaquin Valley
Napa	Napa	No	Bay Area
Oxnard-Thousand Oaks-Ventura	Ventura	Yes	--
Red Bluff	Tehama	Yes	--
Redding	Shasta	Yes	--
Riverside-San Bernardino-Ontario	Riverside; San Bernardino	Yes, Mojave Desert	South Coast
Sacramento-Roseville-Arden Arcade	El Dorado; Placer; Sacramento; Yolo	Yes; Placer, Yolo-Solano, and El Dorado	Sacramento Metropolitan
Salinas	Monterey	No	Monterey Bay
San Diego-Carlsbad	San Diego	No	San Diego County
San Francisco-Oakland-Hayward	Alameda; Contra Costa; Marin; San Francisco; San Mateo	No	Bay Area
San Jose-Sunnyvale-Santa Clara	San Benito; Santa Clara	No	Bay Area
San Luis Obispo-Paso Robles-Arroyo Grande	San Luis Obispo	No	San Luis Obispo County
Santa Cruz-Watsonville	Santa Cruz	No	Monterey Bay
Santa Maria-Santa Barbara	Santa Barbara	No	Santa Barbara County
Santa Rosa	Sonoma	Yes; Northern Sonoma	Bay Area
Sonora	Tuolumne	Yes	--
Stockton-Lodi	San Joaquin	No	San Joaquin Valley
Susanville	Lassen	Yes	--
Truckee-Grass Valley	Nevada	Yes	--
Ukiah	Mendocino	Yes	--
Vallejo-Fairfield	Solano	Yes; Yolo-Solano	Bay Area
Visalia-Porterville	Tulare	No	San Joaquin Valley
Yuba City	Sutter; Yuba	Yes	--

* Micropolitan Statistical Areas are delineated with grey shading.

Assessing the monitoring network

The Roles and Responsibilities outlined in the documents described above direct CARB to coordinate all site changes, as appropriate, with affected CARB divisions as well as local air districts. Any network changes are thoroughly reviewed by CARB and district working groups, both separately and in coordinated discussions, and impacts on all CFR requirements are assessed. CARB and the local air districts then work together closely to mitigate impacts of any changes to the monitoring network, particularly with regard to any changes that impact any violating monitors. Public comment is solicited through the annual network plan process and any comments received are addressed in either this document or in the documents of the individual district Annual Network Plans.

Section 5: Federal Minimum Monitoring Requirements

For criteria pollutants, U.S. EPA has established minimum monitoring requirements that are specified in federal regulations (Appendix D of Title 40, Part 58 of the CFR). Generally, requirements are based on the population from the most recent census data, the severity of the air quality problem, as specified by the design value, or emissions.

This ANP uses 2010 Census populations to determine official minimum monitoring requirements. Upon direction from U.S. EPA, this ANP also includes the most recent available population census estimates (July 1, 2018) to estimate any changes to these requirements.

Section 5A: Ozone

Minimum Number of Ozone Monitoring Sites

The criteria for minimum monitoring requirements for ozone are shown in Table 9. The requirements are based on the population of the MSA and the magnitude of the design value (i.e. if the design value is greater or equal to 85% or less than 85% of the ozone standard). There are no minimum monitoring requirements outside of metropolitan statistical areas. NCore and SLAMS monitors can be used to meet minimum monitoring requirements for ozone. In the absence of a valid design value, requirements for “less than 85% of any ozone NAAQS” apply.

Table 9: Minimum Ozone Monitoring Requirements for SLAMS

Metropolitan Statistical Area population	Most recent 3-year design value concentrations ≥85% of any Ozone NAAQS	Most recent 3-year design value concentrations <85% of any Ozone NAAQS
>10 million	4	2
4 - 10 million	3	1
350,000 - <4 million	2	1
50,000 - <350,000	1	0

Within each Metropolitan Statistical Area, at least one site should be sited to capture maximum ozone concentrations and the site type should be identified as “Highest Concentration”. As shown in Table 10, the 11 metropolitan statistical areas covered by this ANP met the minimum ozone monitoring requirements for ozone in 2018. Sites from districts not covered by this ANP are also listed to provide a complete picture of all the sites contributing towards the minimum monitoring requirements in each Metropolitan Statistical Area. Note that percentages are relative to the 0.070 ppm ozone standard and high concentration sites are denoted with bold text.

SPMs and non-EPA Federal ozone monitors are operated in some areas covered by this ANP, but cannot be counted towards the minimum monitoring requirements. Information about these monitors is provided in Appendix A of this ANP.

Table 10: CBSAs with Minimum Ozone Monitoring Requirements

Metropolitan Statistical Area	2010 Census Population (2018 Population Estimate*)	2017-2019 Design Value (% of NAAQS) <i>DV Site</i>	Required # of Sites	SLAMS Sites Operating in 2019 (District where site is located) <i>Highest Concentration Sites Denoted by Bold Text</i>
Bakersfield	839,361 (896,764)	0.088 ppm (126%) <i>Edison</i>	2	Arvin-Di Giorgio (San Joaquin Valley) Bakersfield-5558 California Avenue (San Joaquin Valley) Bakersfield-Municipal Airport (San Joaquin Valley) Edison (San Joaquin Valley) Maricopa-Stanislaus Street (San Joaquin Valley) Mojave-923 Poole Street (Eastern Kern) Oildale-3311 Manor Street (San Joaquin Valley) Shafter-Walker Street (San Joaquin Valley)
Chico	220,000 (231,256)	0.074 ppm (106%) <i>Paradise</i>	1	Chico-East Avenue (Butte County) Paradise-4405 Airport Road (Butte County)
El Centro	174,528 (181,827)	0.079 ppm (113%) <i>Calexico</i>	1	Calexico-Ethel Street (Imperial) El Centro-9th Street (Imperial) Niland-English Road (Imperial) Westmorland (Imperial)
Los Angeles-Long Beach-Anaheim	12,828,837 (13,291,486)	0.103 ppm (147%) <i>Glendora</i>	4	Anaheim-Pampas Lane (South Coast) Azusa (South Coast) Compton-700 North Bullis Road (South Coast) Costa Mesa-Mesa Verde Drive (South Coast) Glendora-Laurel (South Coast) La Habra (South Coast) Lancaster-43301 Division Street (Antelope Valley) Long Beach-2425 Webster Street (South Coast) Los Angeles-LAX (South Coast) Los Angeles-North Main Street (South Coast) Mission Viejo-26081 Via Pera (South Coast) Pasadena-S Wilson Avenue (South Coast) Pico Rivera-4144 San Gabriel (South Coast) Pomona (South Coast) Reseda (South Coast) Santa Clarita (South Coast) West Los Angeles-VA Hospital (South Coast)
Oxnard-Thousand Oaks-Ventura	823,318 (850,967)	0.076 ppm (109%) <i>Simi Valley</i>	3	El Rio-Rio Mesa School #2 (Ventura) Ojai-Ojai Avenue (Ventura) Piru-3301 Pacific Avenue (Ventura) Simi Valley-Cochran Street (Ventura) Thousand Oaks-Moorpark Road (Ventura)
Redding	177,223 (180,040)	0.071 ppm (101%) <i>Shasta</i>	1	Anderson-North Street (Shasta County) Redding-Health Dept Roof (Shasta County) Shasta Lake-13791 Lake Blvd (Shasta County)

Table 10 Continued

Metropolitan Statistical Area	2010 Census Population (2018 Population Estimate*)	2017-2019 Design Value (% of NAAQS) DV Site	Required # of Sites	SLAMS Sites Operating in 2019 (District where site is located) Highest Concentration Sites Denoted by Bold Text
Riverside-San Bernardino-Ontario	4,224,851 (4,622,361)	0.108 ppm (154%) <i>Crestline/ Redlands/ San Bernardino</i>	3	Banning Airport (South Coast) Barstow (Mojave Desert) Blythe-445 West Murphy Street (Mojave Desert) Crestline (South Coast) Fontana-Arrow Highway (South Coast) Hesperia-Olive Street (Mojave Desert) Indio-Jackson Street (South Coast) Lake Elsinore-W Flint Street (South Coast) Mira Loma-Van Buren (South Coast) Palm Springs-Fire Station (South Coast) Perris (South Coast) Phelan (Mojave Desert) Redlands-Dearborn (South Coast) Riverside-Rubidoux (South Coast) San Bernardino-4th Street (South Coast) Trona-Athol and Telegraph (Mojave Desert) Upland (South Coast) Victorville-14306 Park Avenue (Mojave Desert) Winchester-33700 Borel Road (South Coast)
Sacramento-Roseville-Arden Arcade	2,149,127 (2,345,210)	0.086 ppm (123%) <i>Auburn</i>	2	Auburn-11645 Atwood Road (Placer County) Colfax-City Hall (Placer County) Cool-Highway 193 (El Dorado County) Davis-UCD Campus (Yolo-Solano) Echo Summit (El Dorado County) Elk Grove (Sacramento) Folsom (Sacramento) Lincoln-1445 1st Street (Placer County) North Highlands (Sacramento) Placerville-Gold Nugget Way (El Dorado County) Roseville-N Sunrise Blvd (Placer County) Sacramento-Del Paso Manor (Sacramento) Sacramento-Goldenland (Sacramento) Sacramento-T St (Sacramento) Sloughhouse (Sacramento) Tahoe City-221 Fairway Drive (Placer County) Woodland-Gibson Road (Yolo-Solano)
Santa Rosa	483,878 (499,942)	0.057 ppm (81%) <i>Healdsburg</i>	1	Healdsburg-Municipal Airport (Northern Sonoma) Sebastopol (Bay Area)
Vallejo-Fairfield	413,344 (446,610)	0.064 ppm (91%) <i>Vacaville</i>	2	Fairfield-Chadbourne Road (Bay Area) Vallejo-304 Tuolumne Street (Bay Area) Vacaville-Ulatis Drive (Yolo-Solano)
Yuba City	166,892 (174,848)	0.068 ppm (97%) <i>Sutter Buttes</i>	1	Sutter Buttes-S Butte (Feather River) Yuba City-Almond Street (Feather River)

* Source: U.S. Census Bureau. Retrieved from <https://data.census.gov/>

Seasonal Ozone Monitoring

The ozone monitoring season is year-round in California; however, monitoring at the six sites shown in Table 11 have operated on a seasonal basis since they were established. The ozone monitoring season for these sites was April through October, the period in which peak ozone is expected or when sites are physically accessible. A seasonal waiver for ozone monitoring in 2019 at these sites was granted by U.S. EPA. The waiver must be updated each year, and a copy of the waiver request for 2020 is provided in Appendix B.

Table 11: Seasonal Ozone Monitoring Sites

AQS ID	Site Name	District	Start Year
060170012	Echo Summit	El Dorado County	2000
060170020	Cool	El Dorado County	1996
060430006	Jerseydale	Mariposa County	1995
060570007	White Cloud Mountain*	Northern Sierra	1995
061010004	Sutter Buttes	Feather River	1993
061030004	Tuscan Butte	Tehama County	1995

*The White Cloud Mountain site has not operated since 2016 due to shelter and power issues. A date for the relocation and startup of a new site is unknown at this time.

Section 5B: Nitrogen Dioxide (NO₂)

Minimum Number of NO₂ Monitoring Sites

Federal regulations specify three types of NO₂ minimum monitoring requirements:

- Area-wide;
- Near-road NO₂ monitoring, and;
- Monitoring in communities with susceptible populations

Area-wide monitoring must be conducted in CBSAs with populations of one million or more. For these areas, a minimum of one monitor is required and should be sited to capture the highest concentrations at a neighborhood or larger spatial scale. PAMS sites can be used to meet area-wide minimum monitoring requirements if they meet siting criteria.

The CBSAs in California that meet the population thresholds for required area-wide NO₂ monitoring are the Los Angeles-Long Beach-Anaheim, Riverside-San Bernardino-Ontario, Sacramento-Roseville-Arden Arcade, San Diego-Carlsbad, San Francisco-Oakland-Hayward and San Jose-Sunnyvale-Santa Clara. The areas of expected highest concentration in these CBSAs are not within the jurisdictions of the districts covered by this ANP. As such, area-wide NO₂ monitoring for these CBSAs is addressed in the ANPs prepared by the South Coast AQMD, Sacramento Metropolitan AQMD, San Diego County APCD, and Bay Area AQMD. Although not required, NO₂ monitors are operated in several districts covered by this ANP. Information about these monitors can be found in Appendix A of this ANP.

Near-road NO₂ monitoring requirements are based on population of the CBSA and Annual Average Daily Traffic (AADT) counts on road segments within the CBSA. One monitor is required in CBSAs with a population of one million or more. A second monitor is required in CBSAs with a population greater than or equal to 2.5 million; or CBSA's with populations greater than or equal to 1 million and roadway AADT greater than or equal to 250,000 on one or more road segments. Near-road monitors should be sited to capture maximum one hour concentrations at a micro spatial scale. The near-road requirements are being implemented in phases, over the course of several years. For informational purposes, all of the CBSAs in California that are required by current federal regulations to conduct near-road NO₂ monitoring are shown in Table 12.

The near-road areas with road segments with the highest AADT for the Bakersfield, Los Angeles-Long Beach-Anaheim, Riverside-San Bernardino-Ontario, and Sacramento-Roseville-Arden Arcade CBSAs are not within the jurisdiction of the districts covered by this ANP. Near-road NO₂ monitoring for these CBSAs in the CARB PQAO is addressed in the ANPs prepared by the San Joaquin Valley APCD and the Sacramento Metropolitan AQMD. Information about near-road NO₂ monitoring for the other PQAOs in California can also be found in the ANPs prepared by the San Diego County APCD, South Coast AQMD and the Bay Area AQMD.

Table 12: CBSAs with Near-Road NO₂ Monitoring Requirements

CBSA	Population 2010 Census (2018 Population Estimate)	Area-wide Monitoring	Maximum AADT (2017)*	Required Near-road Sites	Near-road Sites; AQS ID (District where sites are located)
Bakersfield	839,361 (896,764)	No	154,000	1	Bakersfield–Westwind; 060292019 (San Joaquin Valley)
Fresno	930,450 (994,400)	No	149,000	1	Fresno-2482 Foundry Park; 060192016 (San Joaquin Valley)
Los Angeles-Long Beach-Anaheim	12,828,837 (13,291,486)	Yes	461,000	2	Anaheim-Route 5; 060590008 (South Coast) Long Beach-Route 710; 060374008 (South Coast)
Riverside-San Bernardino-Ontario	4,224,851 (4,622,361)	Yes	278,000	2	Ontario-Etiwanda; 060710026 (South Coast) Ontario-Route 60; 060710027 (South Coast)
Sacramento-Roseville-Arden Arcade	2,149,127 (2,345,210)	Yes	260,000	2	Sacramento-Bercut Drive; 060670015 (Sacramento) - - **
San Diego-Carlsbad	3,095,313 (3,343,364)	Yes	307,000	2	Rancho Carmel Drive; 060731017 (San Diego) San Ysidro; 060731025 (San Diego) **
San Francisco-Oakland-Hayward	4,335,391 (4,729,484)	Yes	293,000	2	Laney College; 060010012 (Bay Area) Berkeley-Aquatic Park; 060010013 (Bay Area)
San Jose-Sunnyvale-Santa Clara	1,836,911 (1,999,107)	Yes	283,500	2	San Jose-Knox Ave; 060850006 (Bay Area) - - **

* Source: Traffic Census Program, California Department of Transportation <http://www.dot.ca.gov/trafficops/census/>.

** Near-road sites were in the planning/construction stages and not yet operating in 2019.

Federal regulations also require area-wide NO₂ monitoring in select areas with susceptible and vulnerable populations. The locations of these areas in California were determined by the U.S. EPA Regional Administrator and are shown in Table 13 along with the responsible monitoring agency. More information on this monitoring can be found in the ANPs prepared by the Bay Area AQMD, the San Diego County APCD, the San Joaquin Valley APCD and the South Coast AQMD.

Table 13: NO₂ Regional Administrator Required Monitoring Site

District	Site (AQS ID)
San Diego	Sherman Elementary School (060731026)*
Bay Area	Oakland West (060010011)
San Joaquin Valley	Parlier (060194001)
	Bakersfield-Muni (060292012)**
South Coast	Long Beach North (060374002)
	Los Angeles-Main St. (060371103)
	San Bernardino (060719004)

* Sampling will start in 2020.

** The San Joaquin Valley APCD's 2019 Air Monitoring Network Plan discussed Bakersfield Muni as the required NO₂ monitoring site for susceptible and vulnerable populations.

Section 5C: Carbon Monoxide (CO)

Minimum Number of CO Monitoring Sites

The only federal requirement for CO monitoring is for near-road CO monitoring. In CBSAs with a population of one million or more, one CO monitor is required to operate collocated with one near-road NO₂ monitor. If a CBSA has more than one near-road NO₂ monitoring site, a CO monitor is only required at one near-road site in the CBSA. The CO monitor was required to be operational by January 1, 2015 in CBSAs with a population more than 2.5 million, and by January 1, 2017 for all other CBSAs.

Table 14: CBSAs with CO Minimum Monitoring Requirements

CBSA	Population 2010 Census (2018 Population Estimate)	Required # of Near-road Sites	Near-road Sites (AQS ID; District where sites are located)
Los Angeles-Long Beach-Anaheim	12,828,837 (13,291,486)	1	Anaheim-Route 5; 060590008 (South Coast)
Riverside-San Bernardino-Ontario	4,224,851 (4,622,361)	1	Ontario-Etiwanda; 060710026 (South Coast)
Sacramento-Roseville-Arden Arcade	2,149,127 (2,345,210)	1	Sacramento-Bercut Drive; 060670015 (Sacramento)
San Diego-Carlsbad	3,095,313 (3,343,364)	1	Rancho Carmel Dr. ; 060731017 (San Diego)
San Francisco-Oakland-Hayward	4,335,391 (4,729,484)	1	Laney College; (060010012 (Bay Area) Berkeley-Aquatic Park; 060010013 (Bay Area)
San Jose-Sunnyvale-Santa Clara	1,836,911 (1,999,107)	1	San Jose-Knox Ave; 060850006 (Bay Area)

As shown in Table 14, three CBSAs that include a district covered by this ANP meet the population threshold and have minimum monitoring requirements for CO; however, the near-road areas with road segments with the highest AADT for the Los Angeles-Long Beach-Anaheim, Riverside-San Bernardino-Ontario, and Sacramento-Roseville-Arden Arcade, CBSAs are not within the areas covered by this ANP. Subsequently, near-road monitoring for these CBSAs is addressed in the ANPs prepared by the South Coast AQMD, Bay Area AQMD, and the Sacramento Metropolitan AQMD. Several districts covered by this ANP conduct area-wide CO monitoring. CO concentrations at area-wide monitors are well below the standard, and California has long attained federal and State CO standards. Information about these monitors is provided in Appendix A.

Regional Administrators may require additional CO monitoring in other areas where data or other indicators suggest that concentrations may approach or exceed the NAAQS.

Section 5D: Sulfur Dioxide (SO₂)

Minimum Number of SO₂ Monitoring Sites

Monitoring regulations for SO₂ are based on the population weighted emissions index (PWEI) in a CBSA. The PWEI considers population and aggregated county-level emissions data and is calculated using the equation:

$$CBSA\ PWEI = \frac{CBSA\ Population \times \sum_{County} Emission}{1,000,000}$$

One monitor is required in CBSAs with PWEIs equal to or greater than 5,000 but less than 100,000; two monitors are required in CBSAs with PWEIs equal to or greater than 100,000 but less than one million; and three monitors are required in CBSAs with PWEI values of one million or more. As shown in Table 15, two CBSAs that contain a district covered by this plan meet the PWEI threshold and have minimum monitoring requirements for SO₂. Site types identified as population exposure, high concentration, source oriented, general background, or regional transport can satisfy minimum monitoring requirements. SO₂ monitors at NCore sites shall be counted toward minimum monitoring requirements.

The most recent data available to calculate PWEI were the 2010 U.S. census data and emissions data from the 2020 CARB Emission Inventory.

Table 15: CBSAs with Minimum Monitoring Requirements for SO₂

CBSA	District covered by this ANP	Other District ANPs covering this CBSA	County SO ₂ (TPY) (2020 Data)	Population 2010 Census (2018 Population Estimate)	PWEI	Required Sites	SLAMS Sites Operating in 2017
Los Angeles-Long Beach-Anaheim	Antelope Valley AQMD	South Coast AQMD	Los Angeles: 4,818	12,828,837 (13,291,486)	67,897 (70,345)	1	Costa Mesa (South Coast) Fontana (South Coast) Long Beach (South Coast) Los Angeles-Main Street (South Coast) Los Angeles-Hastings (South Coast)
			Orange: 475				
Riverside-San Bernardino-Ontario	Mojave Desert AQMD	South Coast AQMD	Riverside: 329	4,224,851 (4,622,361)	8,790 (9,617)	1	Rubidoux (South Coast) Trona (Mojave Desert) Victorville (Mojave Desert)
			San Bernardino: 1,752				

All districts covered by this ANP met the minimum monitoring requirements for SO₂ in 2017. In December 2017, U.S. EPA designated all areas of California as unclassifiable/attainment for the federal SO₂ standard.

Section 5E: Lead (Pb)

Minimum Number of Pb Monitoring Sites

Monitoring is required near Pb sources which are expected or have been shown to contribute to a maximum Pb concentration in excess of the federal standard. Specifically, monitoring is required at airports which emit more than 1.0 tons per year or non-airport sources which emit 0.50 tons per year or more of Pb. None of the areas covered by this ANP exceed the threshold for source monitoring.

Pb monitoring at NCore site is no longer required. However, agencies that operate NCore sites are required to obtain approval to terminate an existing Pb monitor.

Section 5F: PM₁₀

Minimum Number of PM₁₀ Monitoring Sites

Monitoring requirements for PM₁₀ are based on population and air quality conditions in each metropolitan statistical area. The criteria for determining the minimum number of monitoring sites is listed in Table 16. The number of sites is given as a range rather than an absolute number because the goal of establishing a network of monitoring sites is to characterize national and regional air quality trends and geographic patterns, which can vary in complexity from place to place.

Table 16: Minimum Monitoring Requirements for PM₁₀ Monitoring Sites

Population	High Concentration (Exceeds NAAQS by ≥20%)	Medium Concentration (≥80% of NAAQS)	Low Concentration (<80% of NAAQS)
> 1 million	6 – 10 sites	4 – 8 sites	2 – 4 sites
500,000 - 1 million	4 – 8 sites	2 – 4 sites	1 – 2 sites
250,000 - 500,000	3 – 4 sites	1 – 2 sites	0 – 1 sites
100,000 - 250,000	1 – 2 sites	0 – 1 sites	0 sites

The number of required monitoring sites in CBSAs with populations that are greater than or equal to 100,000 are shown in Table 17. Only sites designated as SLAMS may be counted to meet PM₁₀ minimum monitoring requirements. In contrast to the information presented on the gaseous monitoring network, sites outside of the scope of this ANP are only included in Table 17 if needed to meet minimum monitoring requirements because of the complex nature of PM monitoring.

Eleven Metropolitan Statistical Areas include at least a portion of the areas covered by this ANP. The Los Angeles-Long Beach-Anaheim Metropolitan Statistical Area includes the Antelope Valley AQMD; however, most of the area is under the jurisdiction of the South Coast AQMD. Monitoring sites operated by South Coast AQMD are necessary to meet minimum monitoring requirements for PM₁₀ and include sites located in areas where high concentrations are expected. The sole monitoring site run by Antelope Valley AQMD is not needed to meet minimum monitoring requirements for this area but serves to complement the network of monitors operated by South Coast.

The monitors operated in districts covered by this ANP are adequate to meet minimum monitoring requirements in the remaining ten Metropolitan Statistical Areas; however, there are additional monitors operated in these areas that are in jurisdictions outside of the scope of this ANP. Information about these monitors can be found in the ANPs prepared by the South Coast AQMD, San Joaquin Valley APCD, and the Sacramento Metropolitan AQMD.

Table 17: CBSAs with Minimum Monitoring Requirements for PM₁₀

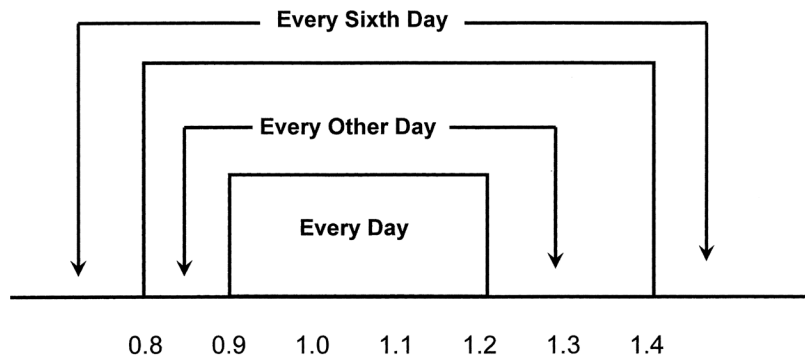
Metropolitan Statistical Area	2010 Census Population (2018 Population Estimate)	2019 Max Concentration (% of NAAQS) Max Concentration Site (District where site is located)	Required ¹ Sites	SLAMS Sites Operating in 2019 (District where site is located)
Bakersfield	839,361 (896,764)	652 ug/m ³ (435%) <i>Bakersfield-Golden (San Joaquin)</i>	4-8	Canebrake (Eastern Kern) Mojave (Eastern Kern) Ridgecrest (Eastern Kern) Bakersfield-California (San Joaquin) Bakersfield-Golden (San Joaquin) Oildale (San Joaquin)
Chico	220,000 (231,256)	54 ug/m ³ (36%) <i>Chico-East Ave (Butte County)</i>	0	Chico-East Ave (Butte County)
El Centro	174,528 (181,827)	324 ug/m ³ (216%) <i>Brawley (Imperial County)</i>	1-2	Brawley (Imperial County) Calexico-Ethel St (Imperial County) El Centro (Imperial County) Niland (Imperial County) Westmorland (Imperial County)
Los Angeles-Long Beach-Anaheim	12,828,837 (13,291,486)	165 ug/m ³ (110%) <i>Lancaster (Antelope Valley)</i>	4-8	Lancaster (Antelope Valley) Anaheim-Pampas Ln (South Coast) Azusa (South Coast) Glendora-Laurel (South Coast) Long Beach-PCH (South Coast) Long Beach-Webster (South Coast) Los Angeles-N Main St (South Coast) Los Angeles-LAX (South Coast) Mission Viejo (South Coast) Santa Clarita (South Coast)
Oxnard-Thousand Oaks-Ventura	823,318 (850,967)	188 ug/m ³ (125%) <i>El Rio (Ventura County)</i>	4-8 ¹	Simi Valley (Ventura County) El Rio (Ventura County)
Redding	177,223 (180,040)	41 ug/m ³ (27%) <i>Shasta Lake (Shasta County)</i>	0	Redding (Shasta County) Anderson (Shasta County) Shasta Lake (Shasta County)
Riverside-San Bernardino-Ontario	4,224,851 (4,622,361)	283 ug/m ³ (187%) <i>Mira Loma (South Coast)</i>	6-10	Barstow (Mojave Desert) Lucerne Valley (Mojave Desert) Victorville (Mojave Desert) Trona (Mojave Desert) Hesperia (Mojave Desert) Banning (South Coast) Crestline (South Coast) Indio-Jackson St (South Coast) Mecca (South Coast) Palm Springs (South Coast)
Sacramento-Roseville-Arden Arcade	2,149,127 (2,345,210)	174 ug/m ³ (116%) <i>Sacramento-T St (Sacramento)</i>	4-8	So. Lake Tahoe (El Dorado County) Roseville-N Sunrise (Placer County) North Highlands (Sacramento) Del Paso (Sacramento) Sacramento-T St (Sacramento) Sacramento-Branch (Sacramento) Woodland-Gibson Rd (Yolo-Solano) West Sacramento (Yolo-Solano)
Santa Rosa	483,878 (499,942)	37 ug/m ³ (25%) <i>Healdsburg (Northern Sonoma)</i>	0-1	Cloverdale (Northern Sonoma) Healdsburg (Northern Sonoma) Guerneville (Northern Sonoma)
Vallejo-Fairfield	413,344 (446,610)	70 ug/m ³ (47%) <i>Vacaville-Merchant St (Yolo-Solano)</i>	0-1	Vacaville-Merchant St (Yolo-Solano)
Yuba City	166,892 (174,848)	80 ug/m ³ (53%) <i>Yuba City-Almond St (Feather River)</i>	0	Yuba City-Almond St (Feather River)

¹ The minimum monitoring requirements were impacted by exceptional events in 2019 in some areas. Some of these impacts will be addressed under the Exceptional Event Rule (81 FR 68216) while others did not lead to exceedances of the standard. Existing monitoring meets the needs of the local air districts and the communities; CARB is committed to working with U.S. EPA and the local air districts to ensure that monitoring levels continue to protect public health and safety.

PM₁₀ Sampling Frequency Requirements for Primary FRM Monitors

Federal regulations establish procedures for determining an appropriate sampling frequency for PM₁₀ monitors. All 24-hour samples must be taken from midnight to midnight, local standard time, to ensure consistency among measurements nationwide. Figure 3, reproduced from Figure 1 in 40 CFR 58.12e, shows the required sampling frequency based upon the ratio of the design value to the standard.

Figure 3: Required Sampling Frequency for manual PM₁₀ monitors



The calculated required sampling frequencies for all FRM PM₁₀ monitors in the districts covered by this ANP are shown in Table 18. Note that exceptional events are included in the concentrations shown.

Table 18: Required Sampling Frequency for PM₁₀ FRM Monitors

Site Name	District	AQS ID	2019 Max Concentration	Ratio of Max Concentration to Standard	Required Sampling Frequency	Current Sampling Frequency
Canebrake ¹	Eastern Kern	060290017-1	35	0.23	1:6	1:6
Anderson Springs	Lake	060333010-1	20	0.13	1:6	1:6
Glenbrook	Lake	060333011-1	16	0.11	1:6	1:6
Lakeport	Lake	060333002-1	21	0.14	1:6	1:6
Anderson	Shasta	060890007-1	32	0.21	1:6	1:6
Redding	Shasta	060890004-2	26	0.17	1:6	1:6
Shasta Lake	Shasta	060890008-1	41	0.27	1:6	1:6
Red Bluff	Tehama	061030007-1	43	0.29	1:6	1:6
Vacaville	Yolo-Solano	060953001-2	70	0.47	1:6	1:6
West Sacramento	Yolo-Solano	061132001-1	48	0.32	1:6	1:6
Woodland	Yolo-Solano	061131003-1	80	0.53	1:6	1:6

¹Canebrake (060290017-1) was replaced by an FEM (060290017-3) on 7/17/19.

Section 5G: PM_{2.5}

Minimum Number of PM_{2.5} Monitoring Sites

The minimum number of monitoring sites that are required for the PM_{2.5} network is based on population and air quality within each metropolitan statistical area, as shown in Table 19. Each Metropolitan Statistical Area is required to have at least one monitoring site situated to measure maximum concentrations at a neighborhood or larger scale.

Table 19: Minimum Monitoring Requirements for PM_{2.5}

Population	DV ≥ 85% of any PM _{2.5} NAAQS	DV < 85% of any PM _{2.5} NAAQS
> 1 million	3 sites	2 sites
500,000 - 1 million	2 sites	1 site
50,000 - <500,000	1 site	0 sites

Only SLAMS sites situated to measure concentrations that are representative of area-wide PM_{2.5} concentrations should be used to meet minimum monitoring requirements. NCore and PAMS sites can count towards meeting minimum monitoring requirements if the site(s) are representative of area-wide PM_{2.5} concentrations. In contrast to the information presented on the gaseous monitoring network, sites outside of the scope of this ANP were only included in Table 20 if needed to meet minimum monitoring requirements because of the complex nature of PM monitoring.

PM_{2.5} Near-Road Monitoring

Federal regulations require that at least one PM_{2.5} monitor is collocated at a near-road NO₂ monitoring site in CBSAs with a million or more people. No near-road sites are located in the areas covered by this ANP. Information about near-road sites can be found in the ANPs prepared by the Bay Area AQMD, Sacramento Metropolitan AQMD, San Joaquin Valley APCD, and South Coast AQMD.

PM_{2.5} Continuous Monitoring

Federal regulations require that at least half of the minimum number of required monitors operated in each Metropolitan Statistical Area should be continuous monitors. In each Metropolitan Statistical Area, at least one continuous monitor should be collocated with a required FRM/FEM/ARM monitor unless one of the required monitors is a continuous monitor. Sites outside of the scope of this ANP were only included in Table 21 if needed to meet minimum monitoring requirements.

Table 20: CBSAs with Minimum Monitoring Requirements for PM_{2.5}

Metropolitan Statistical Area	2010 Census Population (2018 Population Estimate)	2019 Design Value (% of NAAQS) ¹ Design Value Site (District where site is located)		Required Sites	SLAMS Sites Operating in 2019 (District where site is located) Highest Concentration Site Types Denoted by Bold Text
		24-hour	Annual		
Bakersfield	839,361 (896,764)	61 ug/m ³ (174%) <i>Bakersfield-California</i> (San Joaquin)	16.9 ug/m ³ (141%) <i>Bakersfield-Planz</i> (San Joaquin)	2	Bakersfield-California (San Joaquin) Bakersfield-Planz (San Joaquin) Mojave (Eastern Kern) Ridgecrest (Eastern Kern)
Chico*	220,000 (231,256)	39 ug/m ³ (111%) <i>Chico-East Ave</i> (Butte County)	9.7 ug/m ³ (81%) <i>Chico-East Ave</i> (Butte County)	1	Chico-East Ave (Butte)
El Centro	174,528 (181,827)	33 ug/m ³ (94%) <i>Calexico-Ethel St</i> (Imperial County)	12.0 ug/m ³ (100%) <i>Calexico-Ethel St</i> (Imperial County)	1	Brawley (Imperial) Calexico-Ethel St (Imperial) El Centro (Imperial)
Los Angeles-Long Beach-Anaheim	12,828,837 (13,291,486)	38 ug/m ³ (109%) <i>Compton-N Bullis</i> (South Coast)	12.5 ug/m ³ (104%) <i>Compton-N Bullis</i> (South Coast)	3	Lancaster (Antelope Valley) Compton-N Bullis (South Coast) Long Beach-Rte 710 (South Coast)
Oxnard-Thousand Oaks-Ventura	823,318 (850,967)	43 ug/m ³ (123%) <i>Ojai</i> (Ventura County)	9.5 ug/m ³ (92%) <i>Ojai</i> (Ventura County)	2	El Rio (Ventura) Ojai (Ventura) Piru (Ventura) Simi Valley (Ventura) Thousand Oaks (Ventura)
Redding	177,223 (180,040)	53 ug/m ³ (151%) <i>Redding</i> (Shasta County)	10.1 ug/m ³ (84%) <i>Redding</i> (Shasta County)	1	Redding-Health Dept (Shasta)
Riverside-San Bernardino-Ontario*	4,224,851 (4,622,361)	37 ug/m ³ (106%) <i>Mira Loma</i> (South Coast)	14.0 ug/m ³ (117%) <i>Ontario</i> (South Coast)	3	Victorville (Mojave Desert) Mira Loma (South Coast) Ontario (South Coast)
Sacramento-Roseville-Arden Arcade	2,149,127 (2,345,210)	54 ug/m ³ (154%) <i>Woodland</i> (Yolo-Solano)	10.2 ug/m ³ (85%) <i>Del Paso</i> (Sacramento)	3	Auburn-Atwood St (Placer County) Del Paso-Avalon Dr (Sacramento) Roseville-N Sunrise Blvd (Placer) Sacramento-Bercut (Sacramento) Woodland (Yolo-Solano)
Santa Rosa	483,878 (499,942)	35 ug/m ³ (100%) <i>Sebastopol-Morris</i> (Bay Area)	7.4 ug/m ³ (62%) <i>Sebastopol-Morris</i> (Bay Area)	1	Sebastopol-Morris St (Bay Area)
Vallejo-Fairfield	413,344 (446,610)	48 ug/m ³ (137%) <i>Vallejo</i> (Bay Area)	11.2 ug/m ³ (93%) <i>Vallejo</i> (Bay Area)	1	Vallejo-Tuolumne St (Bay Area)
Yuba City	166,892 (174,848)	32 ug/m ³ (91%) <i>Yuba City</i> (Feather River)	9.3 ug/m ³ (78%) <i>Yuba City</i> (Feather River)	1	Yuba City-Almond St (Feather River)

¹ Many monitoring sites were impacted by exceptional events in 2018 and 2019. Some of these impacts will be addressed under the Exceptional Event Rule (81 FR 68216) while others did not lead to exceedances of the standard but impacted the minimum monitoring requirements. CARB is working with local air districts to evaluate minimum monitoring requirements for all impacted areas.

Table 21: CBSAs with Minimum Monitoring Requirements for Continuous PM_{2.5}

Metropolitan Statistical Area	Minimum # of Required Sites	Required Continuous Monitors	Sites with Continuous Monitors Operating in 2019 (District where site is located)
Bakersfield	2	1	Mojave (Eastern Kern) Ridgecrest (Eastern Kern)
Chico	1	1	Chico-East Ave (Butte) Gridley (Butte)* Paradise (Butte)*
El Centro	1	1	Calexico (Imperial)*
Los Angeles-Long Beach-Anaheim	3	2	Lancaster (Antelope Valley) Anaheim (South Coast)+ Glendora-Laurel (South Coast)* Long Beach-Rte 710 (South Coast) Long Beach-South (South Coast)* Los Angeles-N Main St (South Coast)+ Reseda (South Coast)* Santa Clarita (South Coast)*
Oxnard-Thousand Oaks-Ventura	2	1	El Rio (Ventura) Ojai (Ventura) Piru (Ventura) Simi Valley (Ventura) Thousand Oaks (Ventura)
Redding	1	1	Redding (Shasta) ¹
Riverside-San Bernardino-Ontario	3	2	Victorville (Mojave Desert) Banning (South Coast)* Crestline (South Coast)* Lake Elsinore (South Coast)* Mira Loma (South Coast)+ Ontario (South Coast) Rubidoux (South Coast)+ Temecula/Winchester (South Coast)* Upland (South Coast)*
Sacramento-Roseville-Arden Arcade	3	2	Auburn (Placer) Colfax (Placer)+ Lincoln (Placer)* Roseville (Placer)* Tahoe City (Placer)+ Del Paso (Sacramento)* Elk Grove (Sacramento)+ Folsom (Sacramento) ² Sacramento-T St (Sacramento)* Sloughhouse (Sacramento) ³ Davis (Yolo-Solano)+
Santa Rosa	1	1	Sebastopol (Bay Area)
Vallejo-Fairfield	1	1	Vallejo (Bay Area)
Yuba City	1	1	Yuba City (Feather River)+

* These sites operate continuous SLAMS monitors reporting only under non-regulatory parameter codes 88501 or 88502.

+ These sites operate continuous monitors reporting under non-regulatory parameter codes 88501 or 88502 but not as SLAMS monitors (e.g., SPM or Other).

¹ The Redding PM_{2.5} FRM monitor will be replaced with an FEM monitor after parallel monitoring is complete and will operate as a Special Purpose Monitor (SPM) until that time.

² The Folsom PM_{2.5} FEM was discontinued on 7/31/19.

³ The Sloughhouse PM_{2.5} FEM changed from SPM to SLAMS on 5/10/19

PM_{2.5} Sampling Frequency Requirements for Primary FRM Monitors

Sampling frequency for manual FRM PM_{2.5} monitoring can vary by site. Determination of the required sampling frequency for PM_{2.5} monitors is based upon the site level design value and a number of different factors identified in federal regulations and summarized in Table 22. Sites located in areas with more severe air quality conditions generally are required to collect measurements more frequently than other sites.

The current and required sampling frequency for PM_{2.5} FRM monitors located in districts covered by this ANP are shown in Table 23 and also in Appendix A. Exceptional events are included in the determination of the design values shown here.

Table 22: Criteria for Minimum Sampling Frequency for FRM PM_{2.5} Monitoring

1:6 may be approved by Regional Administrator	1:3	1:1
Collocated with continuous FEM/ARM monitor	Not collocated with continuous FRM/FEM/ARM monitor	Not collocated with continuous FRM/FEM/ARM monitor
AND	OR	AND
Annual DV is <90% of NAAQS and not the highest in the area	Annual DV is ± 10% of NAAQS and highest in the area	24 hour DV is ± 5% of NAAQS and the highest in the area
AND	OR	AND
24 hour DV is <90% of NAAQS and not the highest in the area	24 hour DV is ± 10% of NAAQS and highest in the area	Annual DV is below annual NAAQS
AND	OR	
24 hour NAAQS has not been exceeded one or more times in each of the past three years	24 hour NAAQS has been exceeded one or more times in each of the past three years	
	OR	
	NCore Site	
	OR	
	Required regional background site	
	OR	
	Required regional transport site	

Table 23: Required PM_{2.5} Sampling Frequency for FRM monitors

Site Name	AQS ID	District	2019 24-hr DV	2019 Annual DV	Required Sampling Frequency	Current Sampling Frequency
Chico-East ¹	060070008	Butte	39	9.7	1:3	1:1
Colusa ²	060111002	Colusa	40	8.8	1:6	1:6
Calexico	060250005	Imperial	33	12.0	1:1	1:1
Brawley	060250007	Imperial	26	9.4	1:3	1:3
El Centro	060251003	Imperial	19	8.3	1:3	1:3
Lakeport ²	060333002	Lake	40	6.2	1:6	1:6
Truckee	060571001	Northern Sierra	26	6.5	1:3	1:3
Roseville ²	060610006	Placer	31	8.6	1:6	1:6
Quincy	060631006	Northern Sierra	39	10.1	1:3	1:1
Portola	060631010	Northern Sierra	45	14.2	1:3	1:3
Redding ²	060890004	Shasta	53	10.1	1:6	1:6
Yuba City ¹	061010003	Feather River	32	9.3	1:3	1:1
Woodland ²	061131003	Yolo-Solano	54	9.8	1:6	1:6

¹Chico-East FRM was replaced with an FEM on 7/1/2019; Yuba City FRM was replaced with an FEM on 4/10/2020.

²Colusa, Lakeport, Redding, Roseville, and Woodland were granted waivers to allow 1:6 sampling (Letter from G.Yoshimura, EPA to R.Ramalingam on November 26, 2019). An updated waiver request for these sites is included in Appendix C of this ANP. The Colusa FRM monitor will be replaced with an FEM by June 2020.

Suitability for comparison to the annual PM_{2.5} standard

The CFR states that for PM_{2.5} FRM or FEM monitors used in area-wide monitoring and that meet siting criteria, the reported data are comparable to the annual PM_{2.5} standard. For a PM_{2.5} monitor to be considered area-wide, the concentration values measured by the monitor should be representative of concentrations expected over an area with dimensions of a few kilometers. The PM_{2.5} FRM and FEM monitors included in this report are sited per the definition of area-wide monitoring in the CFR and meet applicable requirements; therefore, the FRM and FEM data are suitable for comparison to the PM_{2.5} NAAQS.

Requirements for PM_{2.5} Background and Transport Sites

Within each state, federal regulations require at least one site measuring concentrations representative of regional background and at least one site representative of regional transport. The regulatory language referenced in 40 CFR 58 Appendix C 2.9 indicates that IMPROVE samplers used for regional background/regional transport requirements

can be considered SLAMS.¹ Federal regulations require that monitors required to characterize regional background and transport have a minimum sampling frequency of one in every three days (1:3). The monitors sited to meet these requirements are listed below.

Table 24: Regional Background and Transport Sites for PM_{2.5}

Regional Background Sites (Monitor Type/AQS ID)	Regional Transport Sites (Monitor Type/AQS ID)
Northern: Point Reyes National Seashore (EPA/060410002) Southern: San Rafael Wilderness (EPA/060839000)	Vallejo (SLAMS/060950004)

All districts covered by this ANP meet the requirements for PM_{2.5} minimum monitoring, near-road monitoring, and continuous monitoring. CARB is working with local air districts to reassess the current sampling schedules and assist in applying for additional funding to comply with sampling frequency requirements and associated continuous collocation requirements.

¹ January 13, 2017 email communication from A.Meburst, EPA, to R.Fine/G.Sweigert/T.Najita/W.Tasat citing 40 CFR 58 Appendix C 2.9.

Section 6: Other Federal Monitoring Requirements

Chemical Speciation Network (CSN)

Federal regulations also require that states continue to conduct speciated particulate measurements at CSN sites. These measurements are intended to support development of SIPs and research activities. Some districts in California conduct additional speciated particulate measurements to fulfill specific local objectives. Table 25 lists the California sites in the National Speciation Trends Network (STN) and State speciation network.

Table 25: PM_{2.5} CSN Sites in California

Site Name	AQS ID	District	National STN Site	State Speciation Site
Anaheim-Pampas*	060590007	South Coast		x
Bakersfield-California Ave	060290014	San Joaquin Valley	x	
Calexico-Ethel St	060250005	Imperial County		x
Chico-East Ave	060070008	Butte County		x
El Cajon-Lexington	060731022	San Diego	x	
Fontana-Arrow*	060712002	South Coast		x
Fresno-Garland	060190011	San Joaquin Valley	x	
Livermore-Rincon*	060010007	Bay Area		x
Los Angeles-North Main St	060371103	South Coast	x	
Modesto-14th	060990005	San Joaquin Valley		x
Oakland-West*	060010011	Bay Area		x
Portola-Gulling	060631010	Northern Sierra		x
Riverside-Rubidoux	060658001	South Coast	x	
Sacramento-Del Paso Manor	060670006	Sacramento	x	
Sacramento-T Street	060670010	Sacramento		x
San Jose-Jackson	060850005	Bay Area	x	
Vallejo-Tuolumne *	060950004	Bay Area		x
Visalia-Church St	061072002	San Joaquin Valley		x

* District supplemental speciation monitor

PM Monitor Spacing

Federal regulations require that high volume monitors, defined as monitors that have a sample flow rate > 200 liters per minute, are more than 2 meters away from all other PM samplers. Further, low volume monitors, those with a sample flow rate < 200 liters per minute, are required to be more than 1 meter away from all other PM monitors.

The PM monitors in the districts covered by this ANP meet spacing requirements.

National Core multipollutant Network (NCore) Monitoring

Sites in the NCore Monitoring Network measure multiple pollutants to support a wide range of air quality management objectives. NCore sites are intended to be long-term sites that will generate datasets useful for trend analyses and model evaluation. The NCore Monitoring Network includes rural and metropolitan sites. As shown in Table 26, seven NCore sites are located in California; however, none of the sites are located in the districts covered by this ANP. More information about specific sites can be found in the ANPs submitted by districts in which the sites are located.

Table 26: NCore Sites in California

Site	AQS ID	District	Site Type
El Cajon-Lexington Elementary	060731022	San Diego	Urban
Fresno-Garland	060190011	San Joaquin Valley	Urban
Los Angeles-N Main St.	060371103	South Coast	Urban
Riverside-Rubidoux	060658001	South Coast	Urban
Sacramento-Del Paso Manor	060670006	Sacramento	Urban
San Jose-Jackson	060850005	Bay Area	Urban
White Mountain Research Station	060270002	Great Basin	Rural

Photochemical Assessment Monitoring Station (PAMS)

Ozone nonattainment areas classified as serious, severe, or extreme were required to establish PAMS site(s) which provide enhanced monitoring of ozone, NOx, VOCs, and meteorological parameters. The enhanced monitoring is intended to provide comprehensive data to evaluate the nature of ozone pollution and craft effective planning strategies to improve air quality in effected areas.

On October 1, 2015 U.S. EPA substantially revised the PAMS requirements in 40 CFR part 58 Appendix D. As part of the revision, U.S. EPA required state and local monitoring agencies to make PAMS measurements (including hourly averaged mixing height) at NCore sites in CBSAs with a population of 1,000,000 or more. The revisions

also required state monitoring agencies with Moderate and above 8-hour ozone nonattainment areas and states in the Ozone Transport Region (OTR) to develop and implement an Enhanced Monitoring Plan (EMP) detailing enhanced ozone and ozone precursor monitoring activities to be performed to better understand area specific ozone issues.

In California, the Bay Area AQMD, Sacramento Metropolitan AQMD, San Diego County APCD, San Joaquin Valley APCD, South Coast AQMD, and Ventura County APCD have established PAMS sites. Ventura County is the only district covered by this ANP that conducts monitoring as part of the PAMS program. Due to the significant resources required to operate and maintain VOC measurements at the PAMS, the age of equipment, and changes to the monitoring regulations, the Ventura County APCD terminated VOC sampling at the Simi Valley and El Rio sites with U.S. EPA's approval on January 26, 2019. The District continues to monitor NO₂/NO_x at Simi Valley and El Rio sites; upper air meteorological parameters at the Simi Valley upper air site; and surface meteorological parameters at its six monitoring sites.

Ventura County does not have any NCore sites and its CBSA (Oxnard-Thousand Oaks-Ventura) is under 1,000,000. However, Ventura County is Nonattainment - Serious for ozone and is required to develop and implement an EMP. Ventura County APCD worked with CARB and U.S. EPA Region 9 to develop an EMP in 2019. The EMP will be updated as part of the CARB 5-year Network Assessment in 2020.

Special Purpose Monitors (SPM)

In 2019, no SPM monitors were operating in the area covered by this ANP.

Section 7: Federal Quality Assurance Requirements

CARB PQA Collocation Requirements

Appendix A of 40 CFR 58 includes requirements for collocation of samplers to ensure that measurements of PM_{2.5}, PM₁₀, and Pb are of comparable quality throughout monitoring networks located in each PQA.

PM_{2.5} Collocation Status

Federal regulations require that 15 percent of the FEM and FRM monitors in the network of primary PM_{2.5} monitors must have a collocated monitor. Collocated FRM monitors must have the same method of measurement. For each site with collocated PM_{2.5} FEM monitors, half of the collocated monitors must have the same method of measurement and half must be FRM monitors. If there are an odd number of required collocated monitors then the additional monitor must be an FRM monitor.

Table 27: Collocation Requirements for PM_{2.5} Monitoring Methods

Method Type	Method Description	# of Primary Monitors	# of Required Collocated Monitors	Sites with Collocated Monitors - Method Type (District)
143 (FRM)	R&P Model 2000 with VSCC	5	1	Roseville-N Sunrise – 143/143 (Placer)
145 (FRM) ¹	R&P Model 2025 with VSCC	21	3	Bakersfield-California – 145/145 (San Joaquin Valley) Calexico-Ethel – 145/145 (Imperial) Fresno-Garland – 145/145 (San Joaquin Valley) Portola – 145/145 (Northern Sierra) Sacramento-Del Paso – 145/145 (Sacramento)
170 (FEM) ^{1,2,3}	Met One BAM 1020 with VSCC	37	6	Folsom – 170/170 (Sacramento) Modesto – 170/143 (San Joaquin Valley) Salinas – 170/143 (Monterey Bay) Simi Valley – 170/170 (Ventura) Madera – 170/143 (San Joaquin Valley) Stockton – 170/170 (San Joaquin Valley) Victorville – 170/170 (Mojave Desert)
181 (FEM)	Thermo TEOM 1400	1	1	Keeler – 181/145 (Great Basin)
204 (FEM) ³	Teledyne BAM 602	3	1	Clovis – 204/145 (San Joaquin Valley)
238 (FEM)	Teledyne TEOM T640X	3	1	Bishop – 238/145 (Great Basin)

¹Chico (Butte County) replaced the 145 monitor with a 170 monitor on 7/1/19.

²Folsom (Sacramento) 170 monitors were discontinued on 7/31/19.

³The 204 monitor at Manteca was replaced by a 170 monitor on 9/11/19.

Federal regulations require that 80 percent of collocated PM_{2.5} monitors are located at sites where the design values are within 20 percent of the federal PM_{2.5} standards. However, California is a large state in which environmental conditions can cause significant variation in ambient PM_{2.5} concentrations across spatial and temporal scales.

Thus, CARB determined that limiting the focus of collocation efforts on meeting the 80 percent metric would result in collocated monitors being tightly clustered in a limited geographic range, which would not adequately represent the range of environmental conditions in the PQAQ that could potentially affect PM_{2.5} measurements.

The current locations of collocated PM_{2.5} samplers were collaboratively identified by CARB and local districts as representative of areas of expected high concentrations as well as areas with environmental conditions that could potentially affect measurements, which effectively addresses the quality control function of the collocated monitoring requirement.

PM₁₀ Collocation Status

Federal regulations require that 15 percent of PM₁₀ sites using manual FRMs in a PQAQ have collocated monitors. Collocated monitors must use the same method of measurement as the primary FRM monitor.

Per U.S. EPA’s guidance, the required number of collocation sites was determined by counting all of the PM₁₀ FRM primary monitors, regardless of method code.

Table 28: Collocation Requirements for PM₁₀

Number of Primary FRM Monitors*	# of Required Collocated Monitors	Sites with Collocated Monitors - Method Types (District)
26*	4	Bakersfield-California – 063/063 (San Joaquin Valley) Sacramento-Del Paso – 063/063 (Sacramento) Keeler-Cerro – 127/127 (Great Basin) Fresno-Drummond – 162/162 (San Joaquin Valley)

* This number reflects the number of monitors operating in the CARB PQAQ in 2019. The Olancho-Well monitor replaced the Olancho-Walker Creek monitor in 7/2019, but since these are separate sites in AQS, these are counted separately here.

Pb Collocation Status

There is one Pb monitor in the CARB PQAQ, located at the Sacramento-Del Paso Manor sites. However, Pb collocation for NCore sites is addressed by U.S. EPA at the national level. Thus, CARB is not required to collocate for lead at the NCore sites.

CARB Quality Management Branch (QMB)

The information in this section, along with the information available on CARB's Quality Assurance website, <http://www.arb.ca.gov/aqgm/qa/qa.htm>, provides an overview of CARB's QMB compliance status with the requirements of 40 CFR Part 58, Appendices A, C, and E. The compliance status overview is part of the annual network plan requirement.

QMB Background

The Quality Assurance Section (QAS) and Quality Management Section (QMS) fulfill the QMB mission to ensure ambient air quality data meet or exceed the quality and program objectives of the end users. QAS and QMS perform various quality assurance activities to verify that the data collected comply with procedures and regulations set forth by U.S. EPA and can be considered good quality data and data-for-record.

The quality assurance activities are achieved through various audits which are independent from the ambient air monitoring program responsibilities. California's large network and unique ambient air monitoring challenges require a comprehensive state-of-the-art audit program. CARB's audit program meets the federal requirements for conducting annual performance evaluations. Audits are conducted by using independent National Institute of Standards and Technology (NIST) traceable standards and must adhere to federally established acceptance criteria.

QAS is responsible for conducting performance audits of criteria and non-criteria gaseous analyzers, particulate matter samplers, meteorological equipment, and laboratory analyses utilized for generating ambient pollutant level measurements. QAS also performs site reviews as well as reports quality assessment and quality control results. QMS is responsible for ensuring that CARB meets its federally mandated PQAO responsibilities. QAS performs technical system audits (TSA) and provides quality assurance oversight of the PQAO districts.

CARB Quality Assurance Activities

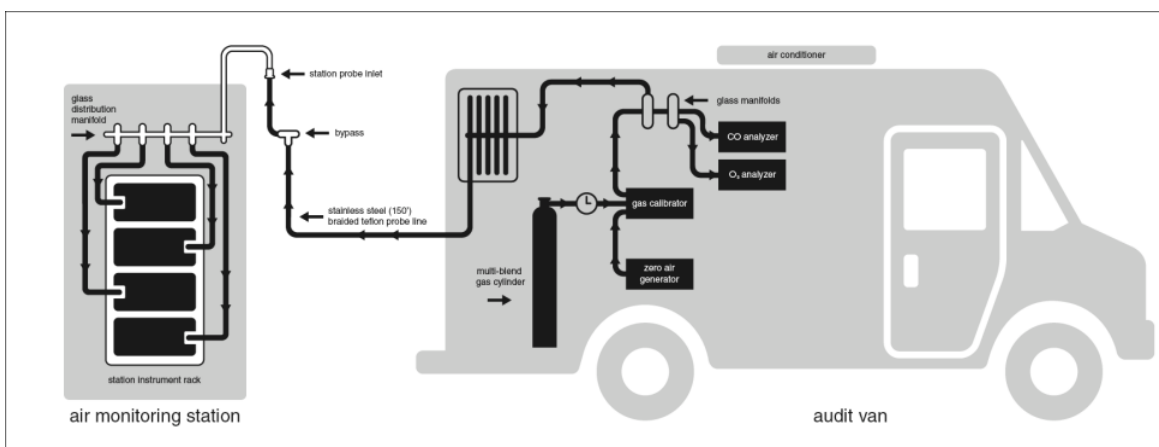
Monitoring Station Audits

Annually, QAS conducts through-the-probe (TTP) audits for all continuous gaseous analyzers in the network. TTP audits of the gaseous analyzers, which monitor for carbon monoxide, nitrogen dioxide, hydrogen sulfide, sulfur dioxide, and ozone, are conducted in accordance with U.S. EPA requirements (Title 40, CFR, Part 58, Appendix A). These audits verify the accuracy of the gaseous analyzers and ensure the integrity of the entire sampling system. For most TTP audits, an audit van is transported by QAS to the ambient air monitoring station. Audit vans house the necessary instrumentation and equipment to allow the audit to be conducted at the same condition as the station instruments. TTP audits, depicted in Figure 4, are conducted by introducing NIST traceable gases from the van into the station sampling probe inlet at various

concentrations. QAS compares the results obtained from the station analyzer to the known values generated in the van.

TTP audit methodology can identify deficiencies caused by poor analyzer response, pollutant scavenging contaminants, and sampling system leaks. Deficiencies like these can cause the gaseous analyzers to fail an audit and possibly affect the quality of the ambient air data.

Figure 4: Through-the-Probe Audit



Biannually, QAS determines the accuracy of each particulate matter sampler in the network by comparison of the instrument's flow rate to either a certified orifice or a mass flow meter. These devices are certified against a NIST traceable flow device or calibrator. The audit device is connected in-line with the sampler's flow path and the flow rate is measured while the sampler is operating under normal sampling conditions. The true flow is calculated from the audit device's calibration curve. The sampler's flow is then compared to the true flow and a percent difference is determined for verifying compliance.

QAS also conducts annual audits of meteorological sensors using NIST traceable equipment. Accurate meteorological data are important for characterizing meteorological processes such as transport and diffusion, and to make air quality forecasts and burn-day decisions.

An integral part of a performance audit is conducting a siting evaluation. Stations that meet siting criteria at the time of initial setup may no longer conform due to updated regulations or changes in surrounding conditions and land use. Physical measurements and observations are noted on the site survey or accompanying documentation to determine compliance with 40 CFR Part 58, Appendix E requirements. Many of the siting issues result from the growth of vegetation such as trees infringing on the minimum distance required from probe inlets.

Laboratory Performance and System Audits

Laboratory mass analysis performance audits are conducted annually by QAS. These audits utilize NIST certified weights, hygrometers, and temperature sensors to verify the accuracy of the laboratory balance, relative humidity, and temperature sensors.

Technical System Audit

A Technical System Audit (TSA) is an on-site inspection and review of a monitoring organization's entire ambient air monitoring program. CARB conducts TSAs of monitoring organizations within its PQAO in accordance with U.S. EPA Quality Assurance Guidance Document: Conducting Technical Systems Audits of Ambient Air Monitoring Programs, EPA-454/B-17-004, November 2017. Each local agency within a PQAO must be audited on a six year schedule. The entire measurement system is reviewed which includes sample collection, sample analysis, and data processing. TSAs include a review of staff records, procedures, instrumentation, facilities, and documentation to assure compliance with all applicable requirements. Following evaluation of available information, a report is issued which includes a summary of the audit process, and a summary of findings and recommendations to correct any issues identified.

Quality Assessment and Quality Control

QAS ensures the quality of the data collected by the air monitoring stations operating in California through the analysis of precision data submitted to U.S. EPA's AQS database. Precision checks for gaseous-continuous samplers are required once every two weeks. These precision checks are conducted nightly at CARB and some district operated sites, and weekly or bi-weekly at other district sites. Precision checks for non-continuous, collocated particulate matter samplers are to be performed at least every 12 days. QAS staff analyzes the precision data in accordance with 40 CFR 58, Appendix A.

Air monitoring staff perform a one-point flow rate verification at least once every month on the filter-based and automated PM analyzers. Air monitoring staffs review these data and take corrective action when the results exceed U.S. EPA's requirements. These flow rate verifications are used to assess bias of the automated instruments in accordance with 40 CFR Part 58, Appendix A, 3.2.3. These bias estimates are further verified by the semi-annual flow rate audits that are conducted five to seven months apart in each calendar year. In the course of auditing the PM_{2.5} FRM and continuous samplers, the date of the last six months of flow rate and leak checks performed by the air monitoring staff are recorded.

Identifying and Correcting Deficiencies

During a performance audit, if a parameter fails to meet critical criteria (QA Handbook Volume II, Appendix D) or CARB control limits, an Air Quality Data Action (AQDA) request is issued to the facility operator. All AQDAs must be investigated by the

operator and resolved to bring the parameter in question into compliance. The station operator completes the AQDA by documenting the resolution, specifying the time period during which data were potentially affected, and recommending whether the data are to be released, corrected, or invalidated. QMB reviews the completed AQDA and discusses any concerns with the operator. A finalized copy of the AQDA is forwarded to the operator and CARB's Air Quality Analysis Section. Other issues identified as systematic or operational criteria that may impact or potentially impact data quality are documented through the issuance of a Corrective Action Notification (CAN).

Audit Report Summary

Information about each air monitoring station audited by QMB is available at http://www.arb.ca.gov/qaweb/sitelist_create.php. This web page provides the map location, latitude and longitude coordinates, site photos, the pollutants monitored, along with a detailed site survey of the instrumentation and physical parameters for each site.

The 2019 calendar year audit dates for both the gaseous analyzers and PM monitors and residence time for each gas analyzer operating at the monitoring sites covered in this report are provided in the detailed site tables in Appendix A. Audit results are directly submitted to AQS quarterly per Appendix A of 40 CFR Part 58.

In addition, as required by 40 CFR Part 58.15, CARB submits a data certification letter along with the required AQS reports (AMP450NC and AMP600) to U.S.EPA annually. The most recent certification letter was sent to the U.S. EPA on August 12, 2019.

Section 8: Proposed and Recently Implemented Monitoring Site Changes

CARB utilizes the annual network plan process to document and provide the public opportunities to comment on any proposed changes to the monitoring network. Any received comments are formally addressed via letters and are documented in the network plan. The network plan is submitted to the U.S. EPA annually for formal approval of all network modifications.

This section lists the proposed and recently implemented monitoring site changes that CARB is currently aware of in the areas covered by this ANP.

District	Site (AQS ID)	Comment
Butte County APCD	Chico (060070008)	CARB has switched the PM _{2.5} FRM to PM _{2.5} FEM on 7/1/2019; this change does not require formal U.S.EPA approval.
	Paradise-Theater (060072002)	CARB is currently seeking an alternate monitoring site for the Paradise-Theater site due to the potential demolition of the theater building. CARB plans to move ozone monitoring from the Airport to the new Paradise location and combine Theater and Airport parameters at one location.
	Paradise-Airport (060070007)	
Colusa County APCD	Colusa-Sunrise (060111002)	CARB is planning to switch the PM _{2.5} FRM to PM _{2.5} FEM by July 1 st pending modifications to the building; this change does not require formal U.S.EPA approval.
Eastern Kern APCD	Canebrake (060290017)	District replaced the PM ₁₀ FRM with an E-BAM Plus monitor on July 16, 2019; this change did not require formal U.S. EPA approval.
	Mojave (060290011)	CARB was informed by District that an approved runway expansion at the Mojave Air and Space Port will require relocation of the Mojave site. This expansion is scheduled to occur in June of 2020. CARB has worked with the District to identify the proposed new site. However, the execution of the lease and the physical relocation of the existing shelter are delayed in part due to conditions brought about by the 2020 pandemic.
El Dorado APCD	Placerville (060170010)	CARB is currently working to move the CARB operated Placerville-Gold Nugget station to El Dorado High School property. Lease negotiations are in process. The station move timeline is pending lease approval and construction/power work - no timeline for the move has been established at this time.
Feather River AQMD	Yuba City (061010003)	CARB has switched the PM _{2.5} FRM to PM _{2.5} FEM on 4/10/2020; this change does not require formal U.S.EPA approval.
Imperial County APCD	Calexico-Ethel (06250005)	The Calexico site was relocated in early 2020, with complete switch over of operations to occur in late Spring. An approval request letter was submitted to U.S. EPA on February 14, 2020.
Lake County AQMD	Lakeport-S. Main Street	Districts is planning on replacing the Teledyne API 400 to a Teledyne T400.

District	Site (AQS ID)	Comment
Mojave Desert AQMD	Lucerne Valley (060710013)	PM10 monitor is being relocated into a shelter, approximately 50 ft. from existing location, no change in GPS coordinates.
	Victorville-Park (060710306)	NO ₂ monitor upgrade from a 200E to a T200U should happen in 2020, date to be determined.
Northern Sierra AQMD	White Cloud Mountain (060570007)	Monitoring site is no longer available due to planned helitack expansion by site owner. CARB is unable to secure an alternative monitoring location in the area due to siting issues and lack of power.
Shasta County AQMD	Redding-Health Dept. (060890004)	The District is not replacing the R&P 2000 PM2.5 with the Met One Bam 1022 due to co-locating requirements; The District will be operating the BAM 1022 as a special study monitor for two years, and keep the R&P 2000 PM2.5 as the official monitor. The Bam 1022 started operating on February 23, 2019.
	Anderson-North (060890007)	The District is planning on shutting down the Hi-Vol PM10 monitors at the Anderson and Shasta Lake monitoring stations.
	Shasta Lake-La Mesa (060890008)	
Northern Sonoma County APCD	Healdsburg-Airport (060971003)	The District is planning to discontinue monitoring and data submittal of the Healdsburg Airport Ozone site due to limited resources. The District has lost a significant amount of data through the winter months because of rain and connectivity issues due to local infrastructure beyond the District's control. The District has been in discussion with EPA on this matter.
Siskiyou County APCD	Yreka (060932001)	The Met One BAM 1022 is currently operating temporarily at Yreka site to verify proper operations including new data acquisition software.
	Mt Shasta City (not yet available)	The District continues to move ahead with the SPM BAM1022 deployment for Mt Shasta City.

CARB operates multiple sites in districts that are not covered by this ANP. Below are proposed and recently implemented changes to the CARB operated sites in Sacramento Metro AQMD and San Joaquin Valley APCD. For more detailed information of changes in these districts, please see the individual district plans.

District	Site (AQS ID)	Comment
Sacramento Metro AQMD	Folsom-Natoma (060670012)	The PM _{2.5} monitors at this site were discontinued on July 31, 2019.
San Joaquin Valley APCD	Hazelton St. (060771002)	The CARB operated Stockton – Hazelton monitoring site is planned to close during the summer of 2020 due the demolition of the building located at the site and the construction of a larger facility. CARB and DGS are currently seeking an alternate monitoring site in the area.
	Fresno - Garland (060190011)	The CARB operated Fresno – Garland monitoring station currently operates collocated PM2.5 FRM samplers (method 145), collocated PM2.5 FEM BAM-1020s (method 170) and collocated PM10 FEM BAM-1020s. By 9/1/2020, CARB plans to discontinue operation of the collocated PM2.5 and PM10 BAM-2020 units and the collocated PM2.5 sampler. The PM2.5 FRM will continue to operate as the primary PM2.5 sampler.

Section 9: Network Information Resources

While this report includes a great deal of information about the ambient air quality monitoring network, much more information, including summaries of the pollutant data from the monitors around the State is readily available on the web. This section lists a number of additional sources of such information. Also listed is contact information for the agencies responsible for the monitoring covered in this report.

CARB's Monitoring and Laboratory Division (MLD) maintains web pages with information about all the existing monitoring sites that routinely monitor and submit air quality data in California. The pages also include detailed local maps showing the location of the sites. This information can be found at https://ww3.arb.ca.gov/qaweb/siteinfo_basin.php. A more general MLD web page that provides links to other aspects of ambient monitoring is located at <https://ww2.arb.ca.gov/our-work/programs/ambient-air-monitoring-regulatory>

Summaries of the official air quality data from sites around the State can be found at <http://www.arb.ca.gov/adam/welcome.html>. Summaries of the most recent preliminary data can be viewed at: <http://www.arb.ca.gov/aqmis2/aqmis2.php>. These last two sources of information are maintained by CARB staff of the Air Quality Planning and Science Division, as is the following more general web page that lists links to other aspects of the ambient air quality data program: <http://www.arb.ca.gov/html/ds.htm>.

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