Annual Network Plan

Covering Monitoring Operations in

25 California Air Districts

July 2023

CALIFORNIA
AIR RESOURCES BOARD

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Table of Contents

Appendices

Abbreviations used in this document

AB	Assembly Bill
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
CAMP	Community Air Monitoring Plans
CAN	Corrective Action Notification
CARB	California Air Resources Board
CASTNET	Clean Air Status and Trends Network
CBO	Community-based Organization
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CSC	Community Steering Committees
CSN	Chemical Speciation Network
DV	Design Value
EJ	Environmental Justice
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
QC	Quality Control

QMB	Quality Management Branch
QMS	Quality Management Section
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SLAMS	State and Local Air Monitoring Site
SNAPS	Study of Neighborhood Air near Petroleum Sources
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

Executive Summary

The Annual Network Plan is required by Title 40, Code of Federal Regulations (CFR), Part 58.10 and provides detailed information about criteria pollutant monitoring sites and instruments operating in California. It is due by July 1st of each year to the U.S. Environmental Protection Agency (U.S. EPA) after a 30-day public comment period. Accurately measuring air quality is the foundation of California's efforts to reduce air pollution and meet air quality standards. 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 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 air 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), Aerometric Data Analysis and Management (ADAM), Community Air Quality Viewer (AQview), 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 details of the extensive networks of low-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 (O_3), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb).

For each of these criteria pollutants, the 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, supporting the development of emissions reduction programs, and supporting air quality research studies. 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 GHGs. The GHG network currently uses state of the art, air monitoring instrumentation (cavity ringdown spectrometry) to measure carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). 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. Fenceline 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, community-level air monitoring network is continually expanding throughout California neighborhoods by community members, universities, private entities, and government agencies.

Continued usage of fenceline- 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 ongoing implementation of Assembly Bill 617 (AB 617), which was passed in 2017. Section 9 of this report includes some high-level discussion of community-scale air monitoring activities in California.

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 shows that they meet the Federal air monitoring and quality assurance requirements of 40 CFR 58.10 and Appendices A through E.

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) annually. 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 CARB Primary Quality Assurance Organization (PQAO) is comprised of 32 of the 35 local air districts in California. The air districts in the CARB PQAO may elect to prepare their own ANP or have their information included in the CARB ANP. The CARB ANP covers the monitoring networks of 25 air districts within the CARB PQAO. Seven air districts in the CARB PQAO will prepare their own ANPs and submit them directly to the U.S. EPA. Three other air 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 2023 ANP details the operations of the monitoring networks in 2022 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 air districts, CARB, and other agencies such as the National Park Service (NPS), within the jurisdictions of the air 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 Site (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 air districts preparing their own ANPs are identified in Table 1 and Figure 1. Monitoring sites operated by air 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 2023 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.

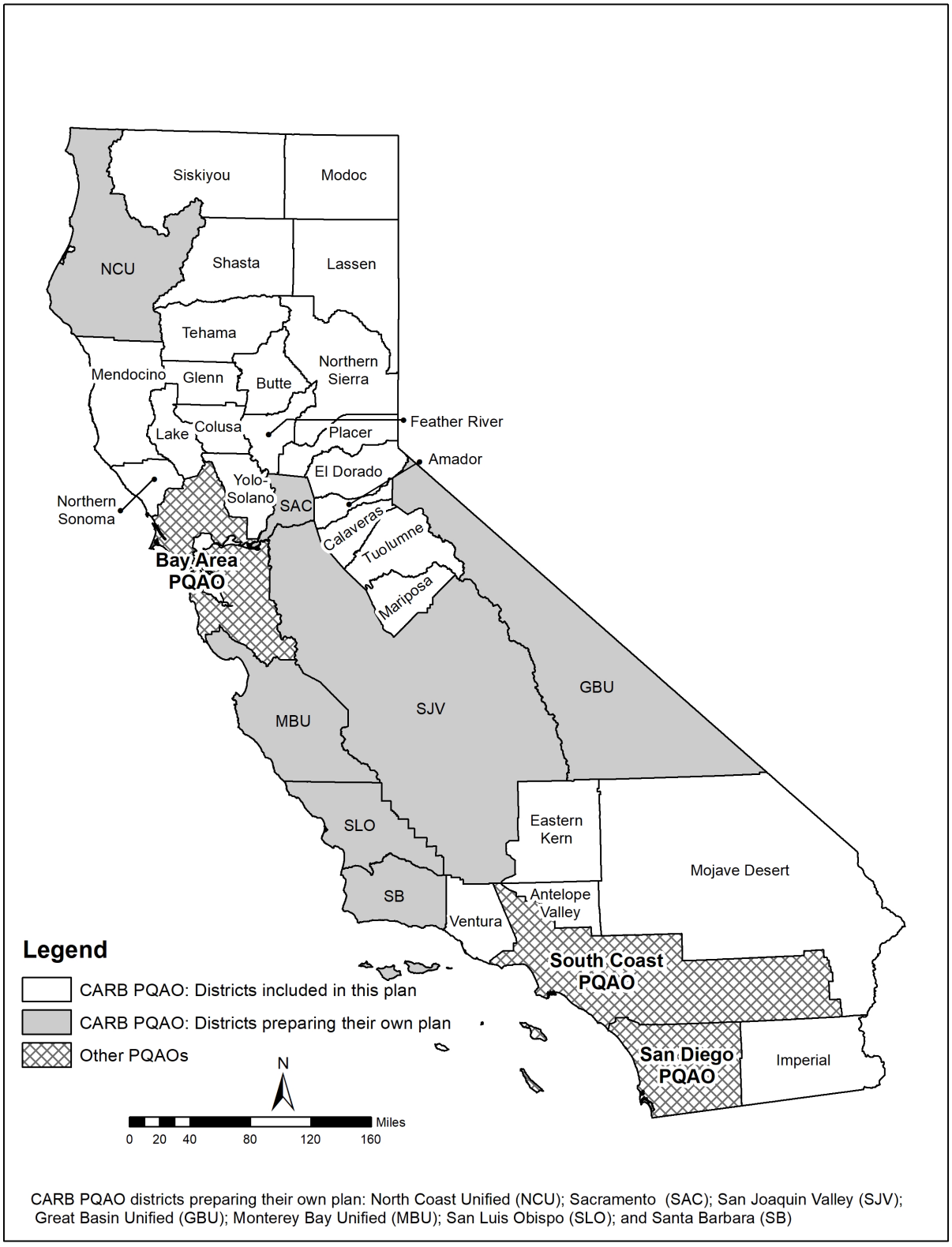
The final version of the CARB ANP is available for download from *https://www.arb.ca.gov/aqd/amnr/amnr.htm*.

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 Air Resources District
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



CARB PQAO districts preparing their own plan: North Coast Unified (NCU); Sacramento (SAC); San Joaquin Valley (SJV); Great Basin Unified (GBU); Monterey Bay Unified (MBU); San Luis Obispo (SLO); and Santa Barbara (SB)

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 standards, understanding spatial and temporal variation in air pollutants, and evaluating pollutant exposure. Monitors are operated by CARB, 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 (PM_{10}), CO, NO_2, SO_2, and 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 air 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 air 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 districts develop strategies, programs, and regulations to achieve needed emission reductions. Data from the ambient air 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-Fairgrounds (06-037-9035)		1	1		1	1	
Butte	Chico-East (06-007-0008)	1	1	1		1	1	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		1	1	Yes
Eastern Kern	Canebrake (06-029-0017)					1		
	Mojave (06-029-0019)			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-Canal St (06-017-2004)			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	
	Calexico-Ethel (06-025-0005)	1	1	1	1	1	2	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	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-Blosser (06-045-2003)						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				
	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		

District	Site (AQS ID)	CO	NO_2	Ozone	SO_2	PM_{10}	$PM_{2.5}$	CARB Operated
	Victorville-Park (06-071-0306)		1	1		1	2	
Northern Sierra	Chester (06-063-1007)						1	
	Grass Valley (06-057-0005)			1			1	
	Portola (06-063-1010)						3	
	Quincy-N Church (06-063-1006)						1	
	Truckee-Fire Station (06-057-1001)						2	
Northern Sonoma	Cloverdale (06-097-0001)					1		
	Guerneville-Church (06-097-3002)					1		
	Healdsburg-Matheson (06-097-0002)					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	1	Yes
	Tahoe City-Fairway (06-061-1004)			1			1	
Shasta	Anderson-North (06-089-0007)			1		1		
	Lassen Volcanic NP (06-089-3003)*			1				
	Redding-Health Dept (06-089-0004)			1		1	2	
	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-15th (06-113-2001)					1		
	Woodland-Gibson (06-113-1003)			1		1	2	

* These sites are operated by National Park Service (NPS).
Note: CARB operating sites are delineated with grey shading.

Section 3: Site and Monitoring Information

U.S. EPA requires that the ANPs include the federal site type, federal monitoring objective, and federal monitor type. 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. Since local development may change the spatial scale of representativeness of a monitor, CARB periodically evaluates the relevant information to make sure the site type and spatial scale are still appropriate.

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	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	Lakeport			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						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			
	Lucerne Valley					pop/n	
	Mojave NP*			gen/r		pop/n	pop/n
	Phelan			pop/n			
	Trona-Athol/Telescope		source/n	pop/n	source/n	high,source/n	

District	Site	CO	NO_2	Ozone	SO_2	PM_{10}	$PM_{2.5}$
	Victorville-Park	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
Northern Sonoma	Cloverdale					pop/n	
	Guerneville-Church					pop/n	
	Healdsburg					pop/n	
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
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-15th					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 national ambient air quality 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	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	
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	Lakeport	NAAQS Comparison	SLAMS	
Mariposa	Jerseydale	NAAQS Comparison	SLAMS	
	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	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
	Lucerne Valley	NAAQS Comparison	SLAMS	
	Mojave NP	Public Info.	non-EPA Federal	
	Phelan	NAAQS Comparison	SLAMS	
	Trona-Athol/Telescope	NAAQS Comparison	SLAMS	

District	Site	Monitoring Objective	Monitor Type*	Network Affiliation**
	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	
Northern Sonoma	Cloverdale	NAAQS Comparison	SLAMS	
	Guerneville-Church	NAAQS Comparison	SLAMS	
	Healdsburg	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	SLAMS	
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

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 FRMs, FEMs, or ARMs and meet certain siting criteria in order for the data to be used for national ambient air quality standards (NAAQS) comparison. While all continuous PM_{10} monitors discussed in this report are FEM monitors, there are some continuous $PM_{2.5}$ monitors that are non-FEMs and report under the pollutant codes of 88501 or 88502. 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	Gridley (06-007-4001)
	Paradise-Theater (06-007-2002)
Glenn	Willows-Colusa (06-021-0003)
Mariposa	Yosemite Village (06-043-1001)
Northern Sierra	Chester (06-063-1007)
	Grass Valley (06-057-0005)
	Portola (06-063-1010)
	Quincy-N Church Street (06-063-1006)[1]
	Truckee-Fire Station (06-057-1001)
Placer	Colfax-City Hall (06-061-0004)
	Lincoln-Moore Street (06-061-2003)
	Tahoe City-Fairway Drive (06-061-1004)
Yolo-Solano	Davis-UCD Campus (06-113-0004)

[1]Quincy-monitor closed on August 2022

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 air 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 air districts and CARB must communicate with each other when changes to the network are being considered. When proposed changes are communicated between air 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*.

Assessing the $PM_{2.5}$ monitoring network

The Roles and Responsibilities outlined in the documents described above direct CARB to coordinate all changes to the $PM_{2.5}$ monitoring network with air districts, the general public and affected CARB divisions. Any $PM_{2.5}$ network changes are thoroughly reviewed by CARB and air district working groups, both separately and in coordinated discussions, and impacts on all CFR requirements are assessed. CARB and the air districts then work together, and with U.S. EPA Region 9, to mitigate impacts of any changes to the monitoring network, particularly with regard to any changes that impact any monitors that have violated the NAAQS. Public comment is solicited

through the ANP process as required by 40 CFR 58.10(c) and any comments received are addressed in either this document or in the documents of the individual district Annual Network Plans.

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 ANPs 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-Folsom	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-Petaluma	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.

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 2020 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, 2021) 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 percent or less than 85 percent of the ozone standard). There are no minimum monitoring requirements outside of MSAs. 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 percent of any ozone NAAQS" apply.

Table 9: Minimum Ozone Monitoring Requirements for SLAMS

MSA population[1]	Monitors required for MSAs with most recent 3-year design value concentrations ≥85% of any Ozone NAAQS	Monitors required for MSAs with 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

[1]There are no minimum monitoring requirements for areas that are not belong to any MSAs.

Within each MSA, 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 MSAs covered by this ANP met the minimum ozone monitoring requirements for ozone in 2022. Sites from air 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 MSA. Note that percentages are

relative to the 0.070 ppm 8-hour 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

CBSA	2020 Census Population (2021 Population Estimate*)	2022 Design Value (% of NAAQS) *DV Site*	Required # of Sites	SLAMS Sites Operating in 2022 (District where site is located) ***Highest Concentration Sites Denoted by Bold Text***
Bakersfield	909,235 (917,673)	0.094 ppm (134%) *Edison*	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 (Eastern Kern)** Oildale-3311 Manor Street (San Joaquin Valley) Shafter-Walker Street (San Joaquin Valley)
Chico	211,632 (208,309)	0.071 ppm (101%) *Paradise*	1	Chico-East Avenue (Butte County) **Paradise-4405 Airport Road (Butte County)**
El Centro	179,702 (179,851)	0.077ppm (110%) *Calexico*	1	**Calexico-Ethel Street (Imperial)** **El Centro-9th Street (Imperial)** Niland-English Road (Imperial) Westmorland (Imperial)
Los Angeles-Long Beach-Anaheim	13,200,998 (12,997,353)	0.102 ppm (146%) *Glendora*	4	Anaheim-Pampas Lane (South Coast) Azusa (South Coast) Compton-700 North Bullis Road (South Coast) **Glendora-Laurel (South Coast)** La Habra (South Coast) Lancaster (Antelope Valley) Long Beach-Signal Hill (South Coast) Los Angeles-LAX (South Coast) Los Angeles-North Main Street (South Coast) Mission Viejo-26081 Via Pera (South Coast) North Hollywood (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	843,843 (839,784)	0.078 ppm (111%) *Simi Valley*	2	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	182,155 (182,139)	0.065 ppm (93%) *Anderson; Redding; Shasta*	1	Anderson-North Street (Shasta County) **Redding-Health Dept Roof (Shasta County)** Shasta Lake-13791 Lake Blvd (Shasta County)

CBSA	2020 Census Population (2021 Population Estimate*)	2022 Design Value (% of NAAQS) *DV Site*	Required # of Sites	SLAMS Sites Operating in 2022 (District where site is located) ***Highest Concentration Sites Denoted by Bold Text***
Riverside-San Bernardino-Ontario	4,599,839 (4,653,105)	0.113 ppm (161%) *Redlands*	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-Folsom	2,397,382 (2,411,428)	0.081 ppm (116%) *Auburn*	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-2885 Moore Rd (Placer County) North Highlands (Sacramento) **Placerville (El Dorado County)** **Roseville-N Sunrise Blvd (Placer County)** Sacramento-Del Paso Manor (Sacramento) Sacramento-T St (Sacramento) Sloughhouse (Sacramento) Tahoe City-221 Fairway Drive (Placer County) Woodland-Gibson Road (Yolo-Solano)
Santa Rosa-Petaluma	488,863 (485,887)	0.052 ppm (74%) *Sebastopol*	1	**Sebastopol (Bay Area)**
Vallejo-Fairfield	453,491 (451,716)	0.057ppm (81%) *Vallejo*	2	Fairfield-Chadbourne Road (Bay Area) Vallejo-304 Tuolumne Street (Bay Area) **Vacaville-Ulatis Drive (Yolo-Solano)**
Yuba City	181,208 (181,484)	0.076 ppm (109%) *Sutter Buttes*	1	**Sutter Buttes-S Butte (Feather River)** **Yuba City-Almond Street (Feather River)**

* Source: U.S. Census Bureau. Retrieved from *https://www.census.gov/programs-surveys/popest.html*

Seasonal Ozone Monitoring

The ozone monitoring season is year-round in California; however, monitoring at the five sites shown in Table 11 have operated on a seasonal basis since they were established. The ozone monitoring season for these sites is April through October, the period in which peak ozone is expected or when sites are physically accessible. A seasonal waiver for ozone monitoring in 2022 at these sites was granted by U.S. EPA. The waiver must be updated each year, and a copy of the waiver request for 2023 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
061010004	Sutter Buttes	Feather River	1993
061030004	Tuscan Butte	Tehama County	1995

Section 5B: Nitrogen Dioxide (NO_2)

Minimum Number of NO_2 Monitoring Sites

Federal regulations specify three types of NO_2 minimum monitoring requirements:

- Area-wide;
- Near-road NO_2 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 NO_2 monitoring are the Los Angeles-Long Beach-Anaheim, Riverside-San Bernardino-Ontario, Sacramento-Roseville-Folsom, 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 air districts covered by this ANP. As such, area-wide NO_2 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, NO_2 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 NO_2 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 NO_2 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-Folsom CBSAs are not within the jurisdiction of the air districts covered by this ANP. Near-road NO_2 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 NO_2 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 NO_2 Monitoring Requirements

CBSA	Population 2020 Census (2021 Population Estimate)	Area-wide Monitoring	Maximum AADT (2020)*	Required Near-road Sites	Near-road Sites; AQS ID (District where sites are located)
Bakersfield	909,235 (917,673)	No	140,000	1	Bakersfield–Westwind; 060292019 (San Joaquin Valley)
Fresno	1,008,654 (1,013,581)	Yes	143,000	1	Fresno-2482 Foundry Park; 060192016 (San Joaquin Valley)
Los Angeles-Long Beach-Anaheim	13,200,998 (12,997,353)	Yes	386,000	2	Anaheim-Route 5; 060590008 (South Coast) Long Beach-Route 710; 060374008 (South Coast)
Riverside-San Bernardino-Ontario	4,599,839 (4,653,105)	Yes	274,000	2	Ontario-Etiwanda; 060710026 (South Coast) Ontario-Route 60; 060710027 (South Coast)
Sacramento-Roseville-Folsom	2,397,382 (2,411,428)	Yes	249,000	2	Sacramento-Bercut Drive; 060670015 (Sacramento) - - **
San Diego-Chula Vista-Carlsbad	3,298,634 (3,286,069)	Yes	272,000	2	Rancho Carmel Drive; 060731017 (San Diego) San Ysidro; 060731025 (San Diego) **
San Francisco-Oakland-Berkeley	4,749,008 (4,623,264)	Yes	260,000	2	Laney College; 060010012 (Bay Area) Berkeley-Aquatic Park; 060010013 (Bay Area)
San Jose-Sunnyvale-Santa Clara	2,000,468 (1,952,185)	Yes	232,000	1	San Jose-Knox Ave; 060850006 (Bay Area) Pleasanton, 060010015, (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 2022.

As part of the final rule revising the NO_2 NAAQS in 2010 (75 FR 6474), U.S. EPA required the Regional Administrators to identify an additional 40 monitoring sites nationwide that would be located in areas representing susceptible and vulnerable populations. Seven of these sites are located in California, and the locations of them 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: Regional Administrator Required NO_2 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	Compton (060371302)
	Los Angeles-Main St. (060371103)
	San Bernardino (060719004)

* The San Joaquin Valley APCD's 2019 Air Monitoring Network Plan discussed Bakersfield Muni as the required NO_2 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 NO_2 monitor. If a CBSA has more than one near-road NO_2 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 2020 Census (2021 Population Estimate)	Required # of Near-road Sites	Near-road Sites (AQS ID; District where sites are located)
Fresno	1,008,654 (1,013,581)	1	Fresno-2482 Foundry Park; 060192016 (San Joaquin Valley)
Los Angeles-Long Beach-Anaheim	13,200,998 (12,997,353)	1	Anaheim-Route 5; 060590008 (South Coast)
Riverside-San Bernardino-Ontario	4,599,839 (4,653,105)	1	Ontario-Etiwanda; 060710026 (South Coast)
Sacramento-Roseville-Folsom	2,397,382 (2,411,428)	1	Sacramento-Bercut Drive; 060670015 (Sacramento)
San Diego-Chula Vista-Carlsbad	3,298,634 (3,286,069)	1	Rancho Carmel Dr.; 060731017 (San Diego)
San Francisco-Oakland-Berkeley	4,749,008 (4,623,264)	1	Laney College; 060010012 (Bay Area); Berkeley-Aquatic Park; 060010013 (Bay Area)
San Jose-Sunnyvale-Santa Clara	2,000,468 (1,952,185)	1	San Jose-Knox Ave; 060850006 (Bay Area)

As shown in Table 14, three CBSAs that include an air district covered by this ANP meet the population threshold and have minimum monitoring requirements for CO; however, the near-road areas with road segments that have the highest AADT for the Los Angeles-Long Beach-Anaheim, Riverside-San Bernardino-Ontario, and Sacramento-Roseville-Folsom 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 air districts covered by this ANP (Antelope Valley, Butte County, Imperial County, and Mojave Desert) operate five area-wide CO monitors as listed in Table 2. The data from these monitors are used for various purposes such as estimating the general population exposure and also determining the impact of emissions from

wildfires. 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 SO_2 Monitoring Sites

Monitoring regulations for SO_2 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 an air district covered by this plan meet the PWEI threshold and have minimum monitoring requirements for SO_2. Site types identified as population exposure, high concentration, source oriented, general background, or regional transport can satisfy minimum monitoring requirements. SO_2 monitors at NCore sites shall be counted toward minimum monitoring requirements.

The most recent emission data available to calculate PWEI was from the California Emissions Projection Analysis Model.

Table 15: CBSAs with Minimum Monitoring Requirements for SO_2

CBSA	District covered by this ANP	Other District ANPs covering this CBSA	County SO_2 (TPY) (2022 Data)*	Population 2020 Census (2022 Population Estimate)	PWEI	Required Sites	SLAMS Sites Operating in 2022
Los Angeles-Long Beach-Anaheim	Antelope Valley AQMD	South Coast AQMD	Los Angeles: 4,723 Orange: 418	13,200,998 (12,997,353)	67,876 (66,829)	1	Los Angeles-Main Street (South Coast) Los Angeles-Lax Hastings (South Coast)
Riverside-San Bernardino-Ontario	Mojave Desert AQMD	South Coast AQMD	Riverside: 290 San Bernardino: 1,048	4,599,839 (4,653,105)	6,155 (6,226)	1	Fontana (South Coast) Rubidoux (South Coast)

* Source: Criteria Pollutant Emission Inventory Data, California Air Resources Board *https://ww2.arb.ca.gov/criteria-pollutant-emission-inventory-data*

All air districts covered by this ANP met the minimum monitoring requirements for SO_2 in 2022. In December 2017, U.S. EPA designated all areas of California as unclassifiable/attainment for the federal SO_2 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. Based on the 2020 National Emissions Inventory, U.S. EPA identified the Twentynine Palms United States Marine Corps Air Ground Combat Center in the Mojave Desert as a source that may have exceeded the threshold for Pb monitoring. CARB is currently working with U.S. EPA and the Mojave Desert AQMD in assessing the issue to decide if Pb monitoring is needed near this source. None of the other 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: PM_{10}

Minimum Number of PM_{10} Monitoring Sites

Monitoring requirements for PM_{10} are based on population and air quality conditions in each MSA. The criteria for determining the minimum number of monitoring sites are 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 PM_{10} 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 PM_{10} 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 MSAs include at least a portion of the areas covered by this ANP. The Los Angeles-Long Beach-Anaheim MSA 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 PM_{10} 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 AQMD.

The monitors operated in air districts covered by this ANP are adequate to meet minimum monitoring requirements in the remaining ten MSAs; 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 Sacramento Metropolitan AQMD.

Table 17: CBSAs with Minimum Monitoring Requirements for PM_{10}

CBSA	2020 Census Population (2021 Population Estimate)	2022Max Concentration (% of NAAQS) *Max Concentration Site*	Required Sites	SLAMS Sites Operating in 2022 (District where site is located)
Bakersfield	909,235 (917,673)	416 µg/m^3 (277%) *Ridgecrest*	4-8	Canebrake (Eastern Kern); Mojave (Eastern Kern); Ridgecrest (Eastern Kern); Bakersfield-California (San Joaquin); Bakersfield-Golden (San Joaquin); Oildale (San Joaquin)
Chico	211,632 (208,309)	75 µg/m^3 (50%) *Chico*	0	Chico (Butte County)
El Centro	179,702 (179,851)	866 µg/m^3 (577%) *Westmorland*	1-2	Brawley (Imperial County); Calexico (Imperial County); El Centro (Imperial County); Niland (Imperial County); Westmorland (Imperial County)
Los Angeles-Long Beach-Anaheim	13,200,998 (12,997,353)	128 µg/m^3 (85%) *Long Beach (Hudson)/Webster*	4-8	Lancaster (Antelope Valley); Anaheim (South Coast); Azusa (South Coast); Glendora (South Coast); Los Angeles-N Main St (South Coast); Mission Viejo (South Coast); Santa Clarita (South Coast); South Long Beach (South Coast)
Oxnard-Thousand Oaks-Ventura	843,843 (839,784)	57 µg/m^3 (38%) *El Rio*	1-2	Simi Valley (Ventura County); El Rio (Ventura County)
Redding	182,155 (182,139)	53 µg/m^3 (35%) *Redding*	0	Redding (Shasta County)
Riverside-San Bernardino-Ontario	4,599,839 (4,653,105)	432µg/m^3 (288%) *Palm Springs*	6-10	Barstow (Mojave Desert); Lucerne Valley (Mojave Desert); Victorville (Mojave Desert); Hesperia (Mojave Desert); Banning (South Coast); Crestline (South Coast); Mecca (South Coast); Palm Springs (South Coast); Rubidoux (South Coast)
Sacramento-Roseville-Folsom	2,397,382 (2,411,428)	136 µg/m^3 (91%) *So. Lake Tahoe*	4-8	So. Lake Tahoe (El Dorado County); Roseville (Placer County); North Highlands (Sacramento); Del Paso (Sacramento); Sacramento-T St (Sacramento); Sacramento-Branch (Sacramento); Woodland (Yolo-Solano); West Sacramento (Yolo-Solano)
Santa Rosa-Petaluma	488,863 (485,887)	46 µg/m^3 (31%) *Healdsburg*	0-1	Cloverdale (Northern Sonoma); Healdsburg (Northern Sonoma); Guerneville (Northern Sonoma)
Vallejo-Fairfield	453,491 (451,716)	33 µg/m^3 (22%) *Vacaville*	0-1	Vacaville (Yolo-Solano)
Yuba City	181,208 (182,484)	72 µg/m^3 (48%) *Yuba City*	0	Yuba City (Feather River)

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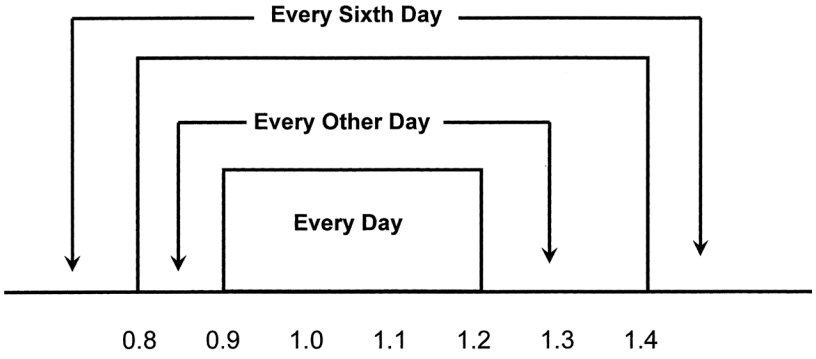
PM_{10} Sampling Frequency Requirements for Primary FRM Monitors

Federal regulations establish procedures for determining an appropriate sampling frequency for PM_{10} 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 PM_{10} Monitors



The calculated required sampling frequencies for all FRM PM_{10} monitors in the air 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 PM_{10} FRM Monitors

Site Name	District	AQS ID	2021 Max Concentration	Ratio of Max Concentration to Standard	Required Sampling Frequency	Current Sampling Frequency
Lakeport	Lake	060333002-1	35	0.23	1:6	1:6
Redding	Shasta	060890004-2	53	0.35	1:6	1:6
Red Bluff	Tehama	061030007-1	53	0.35	1:6	1:6
Vacaville	Yolo-Solano	060953001-2	33	0.22	1:6	1:6
West Sacramento	Yolo-Solano	061132001-1	54	0.36	1:6	1:6
Woodland	Yolo-Solano	061131003-1	64	0.43	1:6	1:6

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 MSA, as shown in Table 19. Each MSA 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 NO_2 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 MSA should be continuous monitors. In each MSA, 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	2020 Census Population (2021 Population Estimate)	2022 Design Value (% of NAAQS) Design Value Site		Required Sites	SLAMS Sites Operating in 2022 (District where site is located) Highest Concentration Site Types Denoted by Bold Text
		24-hour	Annual		
Bakersfield	909,235 (917,673)	62 µg/m^3 (177%) *Bakersfield-California*	18.8 µ/m^3 (157%) *Bakersfield-Planz*	2	Mojave (Eastern Kern) Ridgecrest (Eastern Kern) Bakersfield-California (San Joaquin) Bakersfield-Planz (San Joaquin)
Chico	211,632 (208,309)	57 µg/m^3 (163%) *Chico*	11.6 µg/m^3 (97%) *Chico*	1	Chico (Butte)
El Centro	179,702 (179,851)	32 µg/m^3 (91%) *Calexico*	11.1 µg/m^3 (93%) *Calexico*	1	Brawley (Imperial) Calexico (Imperial) El Centro (Imperial)
Los Angeles-Long Beach-Anaheim	13,200,998 (12,997,353)	41 µg/m^3 (117%) *Pico Rivera*	13.4 µg/m^3 (112%) *Compton*	3	Lancaster (Antelope Valley) Compton (South Coast) Long Beach-Rte 710 (South Coast) **Los Angeles-N Main (South Coast)** Pico Rivera (South Coast)
Oxnard-Thousand Oaks-Ventura	843,843 (839,784)	21 µg/m^3 (60%) *El Rio, Piru, Simi Valley, Thousand Oaks*	7.8 µg/m^3 (65%) *Simi Valley, Thousand Oaks*	1	El Rio (Ventura) Ojai (Ventura) **Piru (Ventura)** **Simi Valley (Ventura)** Thousand Oaks (Ventura)
Redding	182,155 (182,139)	65 µg/m^3 (186%) *Redding*	9.3 µg/m^3 (78%) *Redding*	1	Redding (Shasta)
Riverside-San Bernardino-Ontario	4,599,839 (4,653,105)	40 µg/m^3 (114%) *Ontario*	14.0 µg/m^3 (117%) *Ontario*	3	Victorville (Mojave Desert) **Mira Loma (South Coast)** Ontario (South Coast)
Sacramento-Roseville-Folsom*	2,397,382 (2,411,428)	65 µg/m^3 (191%) *Auburn*	11.7 µg/m^3 (98%) *Del Pasot*	3	Auburn (Placer) **Del Paso-Avalon Dr (Sacramento)** Roseville- (Placer) Sacramento-Bercut (Sacramento) Woodland (Yolo-Solano)
Santa Rosa-Petaluma	488,863 (485,887)	22 µg/m^3 (63%) *Sebastopol*	7.3 µg/m^3 (63%) *Sebastopol*	0	Sebastopol (Bay Area)
Vallejo-Fairfield	453,491 (451,716)	33 µg/m^3 (94%) *Vallejo*	9.3 µg/m^3 (78%) *Vallejo*	1	**Vallejo (Bay Area)**
Yuba City	181,208 (182,484)	55 µg/m^3 (157%) *Yuba City*	13.8 µg/m^3 (115%) *Yuba City*	1	Yuba City (Feather River)

* Incomplete data

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 2022[1] (District where site is located)
Bakersfield	2	1	Mojave (Eastern Kern); Ridgecrest (Eastern Kern)
Chico	1	1	Chico (Butte); Gridley (Butte)**; Paradise (Butte)**
El Centro	1	1	Brawley (Imperial); Calexico (Imperial)
Los Angeles-Long Beach-Anaheim	3	2	Lancaster (Antelope Valley); Anaheim (South Coast)
Oxnard-Thousand Oaks-Ventura	1	1	El Rio (Ventura); Ojai (Ventura); Piru (Ventura); Simi Valley (Ventura); Thousand Oaks (Ventura)
Redding	1	1	Redding (Shasta)
Riverside-San Bernardino-Ontario	3	2	Victorville (Mojave Desert); Rubidoux (South Coast
Sacramento-Roseville-Folsom	3	2	Auburn (Placer); Colfax (Placer)**; Lincoln (Placer)*; Roseville (Placer); Tahoe City (Placer)**; Davis (Yolo-Solano)**
Santa Rosa-Petaluma	0	0	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 monitors listed here are primarily those in the districts covered by this ANP. Sites outside of the scope of this ANP are only included if needed to meet minimum monitoring requirements.

$PM_{2.5}$ Sampling Frequency Requirements for Primary FRM Monitors

Sampling frequency for FRM $PM_{2.5}$ monitoring can vary by site. Determination of the required sampling frequency for primary $PM_{2.5}$ 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 air 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	2022 24-hr DV	2022 Annual DV	Required Sampling Frequency	Current Sampling Frequency
El Centro	060251003	Imperial	21	9.0	1:3	1:3
Lakeport[1]	060333002	Lake	43	6.6	1:3	1:6
Truckee[2]	060571001	Northern Sierra	53*	8.5*	1:3	1:3
Quincy[3]	060631006	Northern Sierra	73*	12.1*	1:3	1:1
Portola[4]	060631010	Northern Sierra	62	17.0	1:3	1:3
Woodland[5]	061131003	Yolo-Solano	61*	10.6*	1:3	1:6

*DV based on incomplete data.
[1] The Lake County AQMD is working with EPA to resolve district staffing and funding issues, as well as identifying equipment options for $PM_{2.5}$ to resolve the sampling frequency issue for Lakeport.
[2]The Truckee FRM monitor stopped monitoring on 7/9/22 and an FEM monitor began monitoring on 10/1/22.
[3]The Quincy FRM monitor was replaced as the primary monitor by an FEM monitor on 10/1/22.
[4]The Portola FRM monitor was replaced as the primary monitor by an FEM monitor on 10/1/22.
[5]The Yolo-Solano APCD is currently evaluating the replacement of the Woodland primary FRM monitor with an FEM and began a parallel monitoring program on 1/1/23.

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 $PM_{2.5}$ NAAQS. 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 annual $PM_{2.5}$ 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

[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.

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 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.

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 air 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	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	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 air districts covered by this ANP meet spacing requirements.

National Core Multipollutant Network (NCore) Monitoring

Sites in the NCore Monitoring 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 includes rural and metropolitan sites. As shown in Table 26, seven NCore sites are located in California; none of the sites are located in the air districts covered by this ANP, although the Freson-Garland site is operated by CARB. More information about specific sites can be found in the ANPs submitted by air 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 Fresno CBSA has triggered the PAMS 1 million population requirement according to the 2020 census results. CARB is working with San Joaquin Valley APCD and U.S. EPA to implement the PAMS monitoring at the Freson-Garland NCore site. 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.

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. CARB worked with Ventura County APCD and U.S. EPA Region 9 to develop an EMP in 2019, which was updated as part of the CARB 5-year Network Assessment in 2020. Ozone air quality continues to improve in the Ventura County due to the implementation of Ventura County APCD and State programs designed to reduce local and statewide ozone precursor emissions and ozone formation; therefore, no additional ozone or ozone precursor monitoring is planned or needed for the Ventura County nonattainment area at this time.

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 in 2019. Additionally, due to the land use development needs and age of the upper air profiler, the Simi Valley upper air profiler device located at the Simi Valley landfill will be retired and be replaced with a new measurement device, a ceilometer, in 2023. The ceilometer uses High-Performance Light Detection and Ranging (LiDAR) technology with depolarization measurement capable of unattended operation 24/7 in all conditions providing upper air measurements. The depolarization measurement enables differentiation between solid, liquid, or mixed-phase clouds and precipitation, providing ready-to-use information for atmospheric characterization. The depolarization measurement not only enables liquid/solid differentiation, but also makes it possible to detect dust and ash from wildfire smoke. The ceilometer will be located at the Ventura County ozone

design value site in Simi Valley. The Ventura County APCD continues to monitor NO2/NO/NOx at Simi Valley and El Rio sites; and surface meteorological parameters at its five monitoring sites.

Special Purpose Monitors (SPM)

In 2022, no regulatory SPM monitors were operating in the area covered by this ANP.

Section 7: Federal Quality Assurance Requirements

Section 7A: CARB PQAO Collocation Requirements

Appendix A of 40 CFR 58 includes requirements for collocation of samplers to ensure that measurements of $PM_{2.5}$, PM_{10}, and Pb are of comparable quality throughout monitoring networks located in each PQAO.

$PM_{2.5}$ 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.

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 $PM_{2.5}$ NAAQS. 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 PQAO that could potentially affect $PM_{2.5}$ measurements.

The current locations of collocated $PM_{2.5}$ samplers were collaboratively identified by CARB and air 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.

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)[1]	R&P Model 2000 with VSCC	2	1	*None at time of publication*
145 (FRM)[2]	R&P Model 2025 with VSCC	8	1	Bakersfield-California – 145/145 (San Joaquin Valley) El Centro – 145/209(Imperial) Sacramento-Del Paso – 145/145 (Sacramento)
170 (FEM)[3]	Met One BAM 1020 with VSCC	54	8	Calexico – 170/143 (Imperial) Folsom – 170/170 (Sacramento) Fresno-Garland – 170/145 (San Joaquin Valley) Sacramento-T St – 170/143 (Sacramento) Salinas – 170/143 (Monterey Bay) Simi Valley – 170/170 (Ventura) Victorville – 170/170 (Mojave Desert) Yuba City – 170/170 (Feather River)
181 (FEM)	Thermo TEOM 1400	1	1	Keeler – 181/145 (Great Basin)
209 (FEM)[4]	Met One BAM-1022 with VSCC or TE-PM2.5C	5	1	Redding – 209/143 (Shasta)
238 (FEM)	Teledyne TEOM T640X	2	1	Bishop/White Mountain – 238/145 (Great Basin)

[1]CARB is working with the air districts to replace the previous collocation site and anticipates resolution by the end of 2023.
[2]Two FRM (145) monitors (Portola and Truckee) closed in 2022 and are not included in this total.
[3]The Grass Valley FEM (170) monitor changed to FEM (209) on 6/1/22 and is not included in this total.
[4]Two FEM (209) monitors (Merced-M St and Fresno-Pacific) changed to FEM (170) on 3/04/22 and 3/11/22, respectively; Bakersfield-Golden closed the FEM (209) monitor on 1/20/22. These are not included in this total.
[5]Mammoth monitor is listed as SPM but included in this total since has been in operation over two years.

PM_{10} Collocation Status

Federal regulations require that 15 percent of PM_{10} sites using manual FRMs in a PQAO 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 PM_{10} FRM primary monitors, regardless of method code.

Table 28: Collocation Requirements for PM_{10}

Number of Primary FRM Monitors*	# of Required Collocated Monitors	Sites with Collocated Monitors - Method Types (District)
11	2	Keeler-Cerro – 127/127 (Great Basin) Sacramento-Del Paso – 063/063 (Sacramento)

*A number of FRM monitors were closed or changed to FEM in 2022. This count reflects monitors at the end of 2022.

Pb Collocation Status

There is one Pb monitor in the CARB PQAO 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.

Section 7B: CARB Quality Management Branch (QMB)

The information in this section, along with the information available on CARB's Quality Assurance website, *https://ww2.arb.ca.gov/our-work/programs/quality-assurance*, provides an overview of CARB's Quality Management Branch (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), Standards Laboratory Section (SLS), 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, SLS, 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.

SLS is responsible for ensuring air monitoring equipment and QAS standards are in compliance with federally establish acceptance criteria and traceable to national and international standards. 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. In addition, QAS performs technical system audits (TSA). QMS is responsible for ensuring CARB meets its federally mandated PQAO responsibilities and provides quality assurance oversight to monitoring organizations within CARB's PQAO.

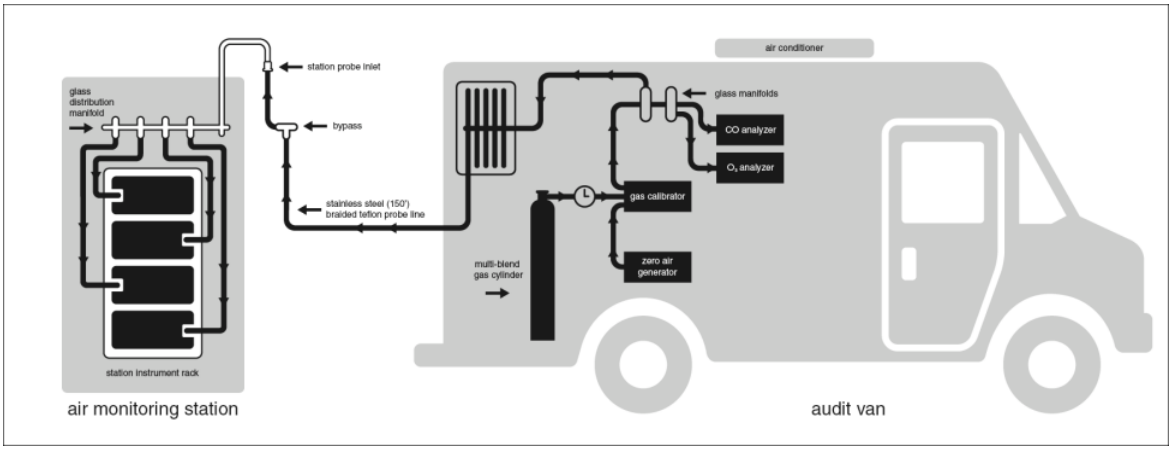
CARB Quality Assurance Activities

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 CO, NO_2, H_2S, SO_2, 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 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 monitoring organization 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

QMS assesses the quality of data collected by air monitoring stations operating in California through the analysis, in accordance with 40 CFR 58, Appendix A, 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 air district operated sites, and weekly or bi-weekly at other air district sites. Precision checks for non-continuous, collocated particulate matter samplers are to be performed at least every 12 days.

Flow rate verifications (one-point checks) are conducted by air monitoring staff at least once per month on filter-based and continuous samplers. 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

A comprehensive corrective action system is an essential component for the enhancement of data quality and the facilitation of continuous improvement to the data collection process. 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). The CAN process may be initiated by any person in CARB's PQAO who identifies an air monitoring issue that impacts or may impact the quality of air monitoring data. The responsible monitoring organization is expected to investigate the issue and implement appropriate corrective action to resolve the issue and prevent recurrence. A copy of the completed CAN form including the corresponding corrective action is submitted to QMB for review. Once QMB and the responsible organization have worked together to implement appropriate corrective action, a CAN closure notice is sent by QMB to the responsible organization.

Audit Report Summary

Information about each air monitoring station audited by QMB is available at *https://ww2.arb.ca.gov/applications/quality-assurance-air-monitoring-site-list-generator-1*. 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 2022 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. Notably for 2022, the audit program was fully functional while operating under travel restrictions and safety protocol imposed during the pandemic. Following the guidance on priorities from the March 26, 2020 U.S. EPA memo, the program was able to audit all required monitors, including semi-annual assessments of PM monitors. Nearly all PM assessments met the criteria of being five to seven months apart.

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 May 18, 2023.

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.

Table 29 lists the proposed and recently implemented monitoring site changes that CARB is currently aware of in the areas covered by this ANP.

Table 29: Proposed and Recently Implemented Changes to the Sites in the CARB ANP

District	Site (AQS ID)	Comment
Antelope Valley AQMD	Lancaster-Fairgrounds (060379035)	The Lancaster-Division street site (060379033) was shut down on 12/19/22 and a new site, Lancaster-Fairgrounds was started shortly after. This site move was approved by U.S. EPA. The Lancaster-Division street site was operated by Mojave Desert AQMD under contract to Antelope Valley AQMD. The new Lancaster-Fairgrounds site is being operated by Antelope Valley.
Butte County APCD	Paradise-Theater (060072002)	CARB is completing the consolidate of two Paradise monitoring stations to a single new location due to the potential demolition of the Theater building. The new site will be located at 5913 Clark Road. Completion of the new Paradise-Clark station is pending final site modifications.
	Paradise-Airport (060070007)	
Eastern Kern APCD	Mojave-CA-58 (060290019)	CARB's Mojave site was relocated to a new site at 3200 Pat Avenue in late February 2023 with AQS number: 060290020.
El Dorado APCD	Placerville-Canal Street (060172004)	CARB completed the site move from the Placerville-Gold Nugget site (060170010) to the Placerville-Canal Street site which is located on El Dorado High School property. The Placerville-Gold Nugget site was terminated June 2022 and the new Placerville-Canal Street site has been fully operational beginning July 2022.
Imperial County APCD	El Centro (060251003)	The R&P Unit was effectively shut down January 18, 2022 as the primary sampling monitor.
	Niland (060254004)	The Ozone unit conversion of the IZS occurred October 20, 2022. In addition, Imperial County plans to install an additional BAM unit for PM2.5 sampling. The actual model type is still pending.
	Westmorland (060254003)	
Lake County AQMD	Lakeport (060333002)	District is working with U.S. EPA to resolve District staffing and funding issues, as well as identifying equipment options for PM10 and PM2.5 to resolve any current and future sampling frequency concerns.
Mendocino County AQMD	Ukiah-Gobbi Street (060450008)	District replaced the API T265 Chemiluminescence Ozone Analyzer with the API T400 Photometric Ozone Analyzer on March 31,2023.
Northern Sierra AQMD	Grass Valley (060570005)	District has replaced the $PM_{2.5}$ Met One BAM 1020 with a Met One BAM 1022 on 6/1/2022; this change does not require U.S. EPA approval.
	Portola (060631010)	District shut down the primary and QA-Audit PM2.5 FRM monitors on 11/1/2022 and 8/9/2022, respectively and replaced the $PM_{2.5}$ Met One BAM 1020 with a Met One BAM 1022 on July 2022; these changes do not require U.S. EPA approval.
	Quincy (060631006)	District shut down the PM2.5 FRM on August 2022 and has replaced the $PM_{2.5}$ Met One BAM 1020 with a Met One BAM 1022 on 10/1/2022; this change does not require U.S. EPA approval.
	Truckee (060571001)	District shut down the PM2.5 FRM on June 2022; this change does not require U.S. EPA approval.
Shasta County APCD	Anderson-North Street (060890007)	District is looking at shutting down the site. This came up during EPA TSA audit in 2022. District is attainment for the federal ozone standard and will operate more than the minimum monitors required.

District	Site (AQS ID)	Comment
	Redding-Health Department (060890004)	District is planning to replace HiVol monitor with BAM.
Tehama County APCD	Red Bluff-Walnut Street (061030007)	District plans to purchase a Met One BAM 1022 to provide PM2.5 monitoring. The existing Met One BAM 1020 will then replace the Sierra Anderson 1200 Hi-Vol PM10 monitor such that District can have continuous PM10 data. District expects this change to occur during 2023.
Yolo-Solano AQMD	Woodland (061131003)	District has replaced the Teledyne API 400E ozone analyzer with a Teledyne API T400 ozone analyzer. The 400E analyzer was at the end of its useful life and the T400 is the newest model for replacement. District has installed a PM2.5 FEM Met One BAM 1020 at the Woodland site to replace the FRM R&P Partisol-Plus 2025, currently operating on a 1 in 6 day schedule. The new BAM will result in greater data capture and less staff time for maintenance.
	Vacaville (060953003)	District has replaced the Teledyne API 400E ozone analyzer with a Teledyne API T400 ozone analyzer. The 400E analyzer was at the end of its useful life and the T400 is the newest model for replacement.
CARB	Calexico (06025000); Chico (060070008); Modesto (060990005); Stockton (060771003)	CARB is working with U.S. EPA to close CO monitors at Calexico, Chico, Modesto, and Stockton. A formal discontinuation request letter was submitted to the U.S. EPA Region 9 on 9/9/2022, and is included in Appendix C of this ANP.

CARB operates multiple sites in districts that are not covered by this ANP. Table 30 lists proposed and recently implemented changes to the CARB operated sites in San Joaquin Valley APCD. For more detailed information of changes in these districts, please see the individual district plans.

Table 30: Proposed and Recently Implemented Changes to the CARB Operated Sites in the Other District ANPs

District	Site (AQS ID)	Comment
San Joaquin Valley APCD	Stockton-Hazelton (060771002)	CARB's Stockton-Hazelton monitoring site (060771002) was relocated to the Stockton-University Park site (060771003). Both CARB's request and EPA's approval are included in Appendix C.
	Visalia Church St. site (061072002)	CARB's Visalia Church St. site (061072002) was relocated to Visalia W. Ashland Ave. (061072003) and became operational on January 11, 2022. Both CARB's request and EPA's approval are included in Appendix C.

Section 9: Environmental Justice and Community-Scale Monitoring in California

Consideration of Environmental Justice in California's Regulatory Monitoring Network

U.S. EPA encourages monitoring agencies to address and advance environmental justice through the development and implementation of ANP. CARB is fully committed to developing a suitable template to incorporate its Racial Equity Lens tool and Community Engagement Model to address and advance environmental justice into our monitoring network design. By embracing inclusivity and consideration of historically disadvantaged communities into our system modification process, CARB will support U.S. EPA's strategic plan to address representative shortcomings in environmental justice communities. CARB will seek to optimize future relocation efforts, inclusive of disadvantaged communities, by using resources such as *CalEnviroScreen*[2] (developed by CalEPA) and *EJScreen*[3] (developed by U.S. EPA) mapping tools to evaluate locations that are a benefit to underrepresented communities while meeting the criteria for regional SLAMS monitoring objectives. More structured procedures are anticipated to be unveiled as we work towards the next Five-Year Network Assessment Report. For example, CARB has extensively engaged with community members in the process of relocating the monitoring sites in Stockton.

Presently, more than one third of the regulatory monitoring sites in California are located within the disadvantaged communities and tribal communities as designated by CalEPA using *CalEnviroScreen* for California's Senate Bill (SB) 535 (De León, Chapter 830, Statutes of 2012).

California's Community-Scale Air Monitoring Efforts

In addition to considering environmental justice in regulatory network design, California has put tremendous efforts into community-scale monitoring. Besides the use of traditional regulatory monitors, emerging air quality sensors have been widely used in California's community-scale monitoring efforts, because they are generally low in cost, highly portable, and can require less power, siting infrastructure, and expertise than traditional air monitoring methods. The performance of the sensors, as well as the evaluation and correction approaches, are being improved over time. Data

[2] CalEnviroScreen developed by CalEPA: *https://oehha.ca.gov/calenviroscreen*

[3] EJScreen developed by U.S. EPA: *https://www.epa.gov/ejscreen*

from air sensors have been used to help understand spatial variability of air quality in the communities, identify areas with relatively higher pollutant concentrations for further investigation, complement existing regulatory air monitoring networks, and evaluate personal exposure to air pollution.

California's community-scale monitoring has been largely supported under CARB's Community Air Protection Program[4], with a focus to reduce exposure in communities most impacted by air pollution, as required by California's Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017).

Under the Community Air Protection Program, sixteen communities have been selected to develop Community Air Monitoring Plans (CAMP) and conduct community-scale monitoring as guided by the CAMPs. CAMPs are developed by close collaboration among CARB, air districts, and community steering committees (CSC). The community-scale monitoring is designed to provide real-time air quality information to the community, obtain detailed air pollution levels through the community, determine areas in the community of highest risk, quantify sources of air pollution within the community, and inform and potentially track community emissions reduction strategies. For the AB 617 monitoring networks across California, ambient concentrations are collected for a variety of pollutants including $PM_{2.5}$, PM_{10}, BC, CO, NO, NO_2, O_3, SO_2, H_2S, and CH_4. Air toxics are also monitored at a number of sites in some communities. As California moves forward with AB 617 community-scale monitoring, there has been increased stationary monitoring with FEMs (criteria pollutants) and non-FEMs (e.g., BC and H_2S), expanded air sensor network monitoring, as well as mobile monitoring. The numbers of air toxics (e.g., pesticides, BTEX, and VOCs) monitoring equipment and sites have also increased. The air districts also lead monitoring in response to episodic emissions events (e.g., odor complaints and fugitive emissions).

Additionally, included in AB 617 is a provision for grants to community-based organizations (CBO) and California Native American Tribes for technical assistance and to support their efforts in this process. Started in 2018, CARB's Community Air Grants Program has supported more than 50 projects to set up or expand the monitoring networks in some AB 617 communities, as well as many other disadvantaged and low-income communities, primarily using air sensors.

Besides AB 617 monitoring networks and Community Air Grants monitoring projects, there have also been many special projects/studies for community-scale monitoring conducted in California, by CARB, air districts, communities, some major facilities,

[4] CARB's Community Air Protection Program: *https://ww2.arb.ca.gov/capp*

researchers, as well as private entities. These special projects/studies are generally conducted in response to specific concerns from the communities. Some examples are the San Ysidro Monitoring Pilot Project to understand air quality in the US-Mexico border area (CARB), Study of Neighborhood Air near Petroleum Sources (SNAPS) (CARB), community monitoring near refineries (air districts and refineries), mobile monitoring across California (CARB, air district, researchers, and private entities), and many community air monitoring projects funded by U.S. EPA's Enhanced Air Quality Monitoring for Communities - Competitive Grant through the American Rescue Plan of 2021 (ARP).

In order to support the data collected under community-scale monitoring efforts, CARB has developed a centralized data portal and management system, AQview, to support a wide range of monitoring technologies, pollutants, and data providers[5]. AQview provides visualization and easy access of air quality data to community members, as well as the transparent information on how data are collected and processed. Currently, AQview houses all AB 617 air monitoring data as well as data from several Community Air Grant projects. AQview provides assessments of data quality (especially from the sensor networks) through robust quality control (QC) checks to identify and flag any data records that appear questionable or invalid. AQview's QC checks include instrument-based upper limit and lower limit checks, spike check, and repeating values check. CARB will soon add all the data from the public PurpleAir network to AQview. In the future, CARB will be working to constantly add more data from community-scale monitoring efforts into AQview, such as those from more non-AB 617 communities, pesticides monitoring, and special projects/studies as described above.

Figure 5 shows a map for all the current regulatory monitoring sites[6] and community-scale monitoring sites (with data available in CARB's AQview system), along with the designated disadvantaged communities under SB 535 and all the AB 617 communities in California. Table 31 provides a summary of all community-scale monitoring data in CARB's AQview system[7].

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[5] CARB's AQview system: *https://aqview.arb.ca.gov/*

[6] Information retrieved from CARB's Quality Assurance Air Monitoring Site List: *https://ww2.arb.ca.gov/applications/quality-assurance-air-monitoring-site-list-generator-1*

[7] Detailed information about community-scale monitoring data can be found: *https://aqview.arb.ca.gov/resources/files/Pollutants_in_AQview.pdf*

Figure 5. Current Regulatory Monitoring Sites and Community-Scale Monitoring Sites (with Monitoring Data Available in CARB's AQview System) with the Designated Disadvantaged Communities

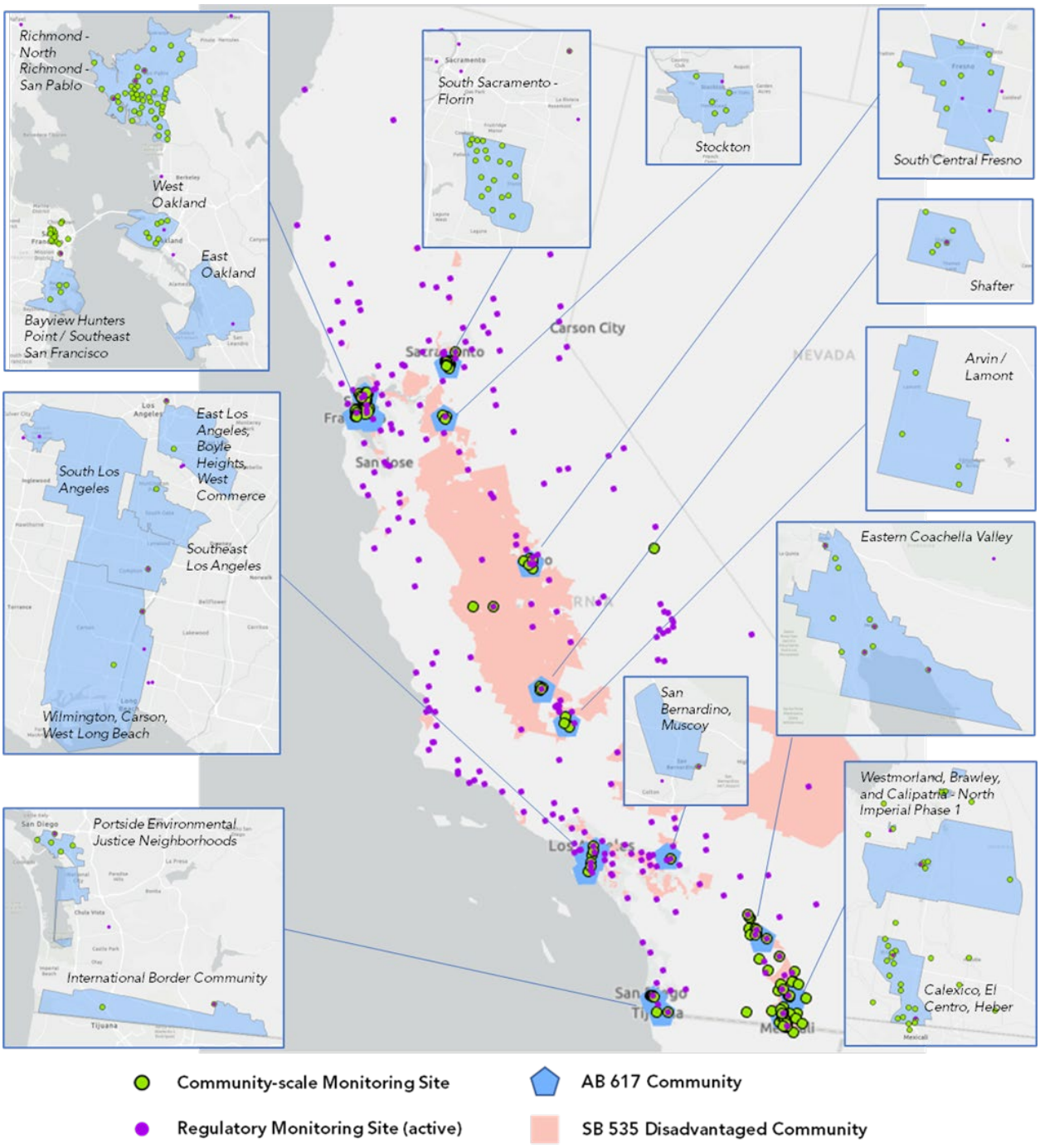

Table 31. List of All California AB 617 Monitoring Networks and Some Community Air Grant Projects with Monitoring Data Available in CARB's AQview System

District	AB 617 Community	Data Provider	Pollutants
AB 617 Monitoring Networks			
South Coast	East Los Angeles, Boyle Heights, West Commerce	South Coast AQMD	$PM_{2.5}$, PM_{10}, CO, Particle number, O_3, NO, NO_2, SO_2, CH_4, Total NMOC, BC, H_2S
	South Los Angeles	South Coast AQMD	$PM_{2.5}$, NO, NO_2, O_3, CO
	Southeast Los Angeles **	South Coast AQMD	$PM_{2.5}$, BC, Particle number, NO, NO_2, CH_4, H_2S
	San Bernardino, Muscoy	South Coast AQMD	$PM_{2.5}$, PM_{10}, BC, CO, Particle number, NO, NO_X, O_3
	Wilmington, West Long Beach, Carson	South Coast AQMD	$PM_{2.5}$, PM_{10}, BC, NO, NO_2, CO, Particle number, O_3, SO_2
	Eastern Coachella Valley	South Coast AQMD	$PM_{2.5}$, PM_{10}, BC, O_3, H_2S
San Diego	Portside EJ Neighborhoods	San Diego County APCD	BC
	International Border Community	San Diego County APCD	BC, $PM_{2.5}$*
San Joaquin Valley	Southwest Stockton	San Joaquin Valley APCD	$PM_{2.5}$, SO_2, NO, NO_2, Total VOCs*
	Arvin / Lamont	San Joaquin Valley APCD	$PM_{2.5}$, SO_2,, Total VOCs
	Shafter	San Joaquin Valley APCD	$PM_{2.5}$, PM_{10}, SO_2, H_2S, NO*, NO_2*, NO_X*, O_3, CO, Total VOCs*, BTEX*
	South Central Fresno	San Joaquin Valley APCD	$PM_{2.5}$, CO, SO_2, H_2S, NO, NO_X, O_3, Total VOCs*, BTEX*
Imperial County	Calexico, El Centro, Heber	Comité Civico del Valle, Inc	$PM_{2.5}$, PM_{10}
Bay Area	Richmond, North Richmond, San Pablo	Groundwork Richmond	$PM_{2.5}$, PM_{10}
	West Oakland **	Aclima	$PM_{2.5}$, O_3, NO_2
Sacramento Metro	South Sacramento, Florin	Sacramento Metropolitan AQMD	$PM_{2.5}$, PM_{10}, PM_{10} Metals*, BC*, VOCs*
Community Air Grant Projects (currently with data available in AQview)			
South Coast	N/A	Comité Civico del Valle, Inc	$PM_{2.5}$, PM_{10}

District	AB 617 Community	Data Provider	Pollutants
	N/A	Soboba Band of Luiseno Indians	$PM_{2.5}$, PM_{10}
San Joaquin Valley	N/A	Comité Civico del Valle, Inc on behalf of LEAP Institute	$PM_{2.5}$, PM_{10}
Imperial County	N/A	Comité Civico del Valle, Inc	$PM_{2.5}$, PM_{10}
Bay Area	N/A	Brightline Defense Project	$PM_{2.5}$, PM_{10}
	N/A	Comité Civico del Valle, Inc on behalf of Greenaction for Health and Environmental Justice	$PM_{2.5}$, PM_{10}
Great Basin	N/A	Big Pine Paiute Tribe of the Owens Valley	$PM_{2.5}$, PM_{10}

** Pollutants are measured at limited sites*
*** Data Available soon*

Section 10: Network Information Resources

While this ANP 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://ww2.arb.ca.gov/applications/quality-assurance-air-monitoring-site-search-1*. 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*.

Agency contacts for CARB

CARB's ANP:

Sunghoon Yoon, Air Pollution Specialist, Air Quality Analysis Section
sunghoon.yoon@arb.ca.gov
(916) 323-8543

Jin Xu, Manager, Air Quality Analysis Section
jin.xu@arb.ca.gov
(916) 327-1511

Collection of the ambient data:

Reggie Smith, Manager, Operations and Data Support Section
reginald.smith@arb.ca.gov
(916) 327-1238

Kathleen Gill, Chief, Air Quality Surveillance Branch
kgill@arb.ca.gov
(916) 324-7630

Regarding quality oversight of the monitoring program:

Manisha Singh, Chief, Quality Management Branch
Manisha.Singh@arb.ca.gov
(916) 327-1501

Questions on quality assurance:
Melissa Niederreiter, Manager, Quality Management Section
Melissa.Niederreiter@arb.ca.gov
(916) 277-0526

Agency contacts for the air districts covered by this ANP

Amador County Air Pollution Control District, Jackson, CA
Herminia Perry, Air Pollution Control Officer
hperry@amadorgov.org
(209) 257-0112

Antelope Valley Air Quality Management District, Lancaster, CA
Bret Banks, Air Pollution Control Officer
bbanks@avaqmd.ca.gov
(661) 723-8070

Butte County Air Quality Management District, Chico, CA
Stephen Ertle, Air Pollution Control Officer
sertle@bcaqmd.org
(530) 332-9400

Calaveras County Air Pollution Control District, San Andreas, CA
Lisa Medina, Air Pollution Control Officer
lmedina@co.calaveras.ca.us
(209) 754-6722

Colusa County Air Pollution Control District, Colusa, CA
Ana Allen, Air Pollution Control Officer
mallen@countyofcolusa.com
(530) 458-5000

Eastern Kern Air Pollution Control District, Bakersfield, CA
Glen Stephens, Air Pollution Control Officer
glens@co.kern.ca.us
(661) 862-8642

El Dorado County Air Quality Management District, Placerville, CA
Dave Johnston, Air Pollution Control Officer
dave.johnston@edcgov.us
(530) 621-7501

Feather River Air Quality Management District, Yuba City, CA
Christopher D. Brown, Air Pollution Control Officer
apco@fraqmd.org
(530) 634-7659, x210

Glenn County Air Pollution Control District, Willows, CA
Marcie Skelton, Air Pollution Control Officer
mskelton@countyofglenn.net
(530) 934-6500

Imperial County Air Pollution Control District, El Centro, CA
Belen Leon, Air Pollution Control Officer
belenleon@co.imperial.ca.us
(442) 265-1800

Lake County Air Quality Management District, Lakeport, CA
Douglas Gearhart, Air Pollution Control Officer
dougg@lcaqmd.net
(707) 263-7000

Lassen County Air Pollution Control District, Susanville, CA
Erik Edholm, Air Pollution Control Officer
eedholm@cityofsusanville.org
(530) 257-1057

Mariposa County Air Pollution Control District, Mariposa, CA
Eric Sergienko, Air Pollution Control Officer
esergienko@mariposacounty.org
(209) 966-2220

Mendocino County Air Quality Management District, Ukiah, CA
Douglas Gearhart, Air Pollution Control Officer
dougg@lcaqmd.net
(707) 463-4354

Modoc County Air Pollution Control District, Alturas, CA
Bonnie Bunyard, Air Pollution Control Officer
bonniebunyard@co.modoc.ca.us
(530) 233-6401

Mojave Desert Air Quality Management District, Victorville, CA
Brad Poiriez, Air Pollution Control Officer
bradp@mdaqmd.ca.gov
(760) 245-1661

Northern Sierra Air Quality Management District, Grass Valley, CA
Julie Hunter, Air Pollution Control Officer
Julieh@myairdistrict.com
(530) 274-9360

Northern Sonoma County Air Pollution Control District, Healdsburg, CA
Robert Bamford, Air Pollution Control Officer
robert.bamford@sonoma-county.org
(707) 433-5911

Placer County Air Pollution Control District, Auburn, CA
Erik White, Air Pollution Control Officer
ewhite@placer.ca.gov
(530) 745-2330

Shasta County Air Quality Management District, Redding, CA
Paul Hellman, Air Pollution Control Officer
phellman@co.shasta.ca.us
(530) 225-5674

Siskiyou County Air Pollution Control District, Yreka, CA
Jim Smith, Air Pollution Control Officer
jsmith@co.siskiyou.ca.us
(530) 841-4025

Tehama County Air Pollution Control District, Red Bluff, CA
Joe Tona, Air Pollution Control Officer
jtona@tehcoapcd.net
(530) 527-3717

Tuolumne County Air Pollution Control District, Sonora, CA
Kelle Schroeder, Air Pollution Control Officer
KSchroeder@co.tuolumne.ca.us
(209) 533-5693

Ventura County Air Pollution Control District, Ventura, CA
Ali Reza Ghasemi, Air Pollution Control Officer
aghasemi@vcapcd.org
(805) 303-4016

Yolo-Solano Air Quality Management District, Davis, CA
Gretchen Bennitt, Air Pollution Control Officer
gbennitt@ysaqmd.org
(530) 757-3673