

Draft 2022 CARB Annual Network Plan

Public Workshop
June 20, 2022

Overview

- Types of monitoring networks in California
- Regulatory Monitoring Network
- Annual Network Plan and requirements

The CARB Annual Network Plan (ANP) covers the criteria pollutant monitoring networks of 25 districts within the CARB Primary Quality Assurance Organization (PQAO)

Logistics

- Draft 2022 ANP and presentation available on-line
[Annual Monitoring Network Report | California Air Resources Board](#)
- *Please submit your official comments by 6/27/2022 at 5:00 PM*
Sunghoon Yoon at Sunghoon.Yoon@arb.ca.gov
Jin Xu at Jin.Xu@arb.ca.gov
- Problems during presentation
Email Matthew Densberger at matthew.densberger@arb.ca.gov

Types of Monitoring Networks in California

- **Regulatory (criteria pollutants)**

- Ground-level ozone (O_3)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particulate matter ($PM_{2.5}$ and PM_{10})
- Sulfur dioxide (SO_2)
- Lead (Pb)

- Toxic air contaminants

- Greenhouse gas emissions (e.g., CO_2 , CH_4 , and N_2O)

- Community-scale

Regulatory Monitoring Network

- Criteria pollutant monitoring
- Over 250 sites in California
- Operated by CARB, Districts, Tribes, and Federal Agencies
- Monitors audited by MLD on annual or semi-annual basis
- Network Plans submitted on an annual basis to EPA
- Network Assessments submitted on a 5-year basis to EPA

Regulatory Monitoring Objectives

40 CFR 58, Appendix D

- Support compliance with state and federal standards
- Provide air quality data to the general public
- Support air quality research

Federal Site Types

- 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

Spatial Scale of Different Site Types

Spatial Scale of Representativeness	Definition
Microscale	Several meters up to about 100 meters
Middle scale	About 100 meters to 0.5 kilometer
Neighborhood scale	0.5 to 4.0 kilometers range
Urban scale	On the order of 4 to 50 kilometers
Regional scale	From tens to hundreds of kilometers
National and global scales	Characterizing the nation and the globe as a whole

Regulatory Monitoring Stations

- Types of monitoring stations
 - ✓ State and Local Air Monitoring Station (SLAMS)
 - ✓ National Core Network (NCore)
 - ✓ Photochemical Assessment Monitoring Station (PAMS)
 - ✓ PM Chemical Speciation Network(CSN)
 - ✓ Special Purpose Monitor (SPM)
 - ✓ Interagency Monitoring of Protected Visual Environments (IMPROVE)
 - ✓ Clean Air Status and Trends Network (CASTNET)
- Types of regulatory monitors
 - ✓ Federal Reference Method (FRM)
 - ✓ Federal Equivalent Method (FEM)

Appendix C to Part 58—Ambient Air Quality Monitoring Methodology
National Air Quality Monitoring Program Fact Sheets:

www3.epa.gov/ttnamti1/files/ambient/pm25/qa/vol2appa.doc

Annual Monitoring Network Plan

Annual Monitoring Network Plan (ANP)

- Annual network plan
- Content of CARB annual network plan
- Federal minimum monitoring requirements
- Detailed site information
- Ozone waiver requests

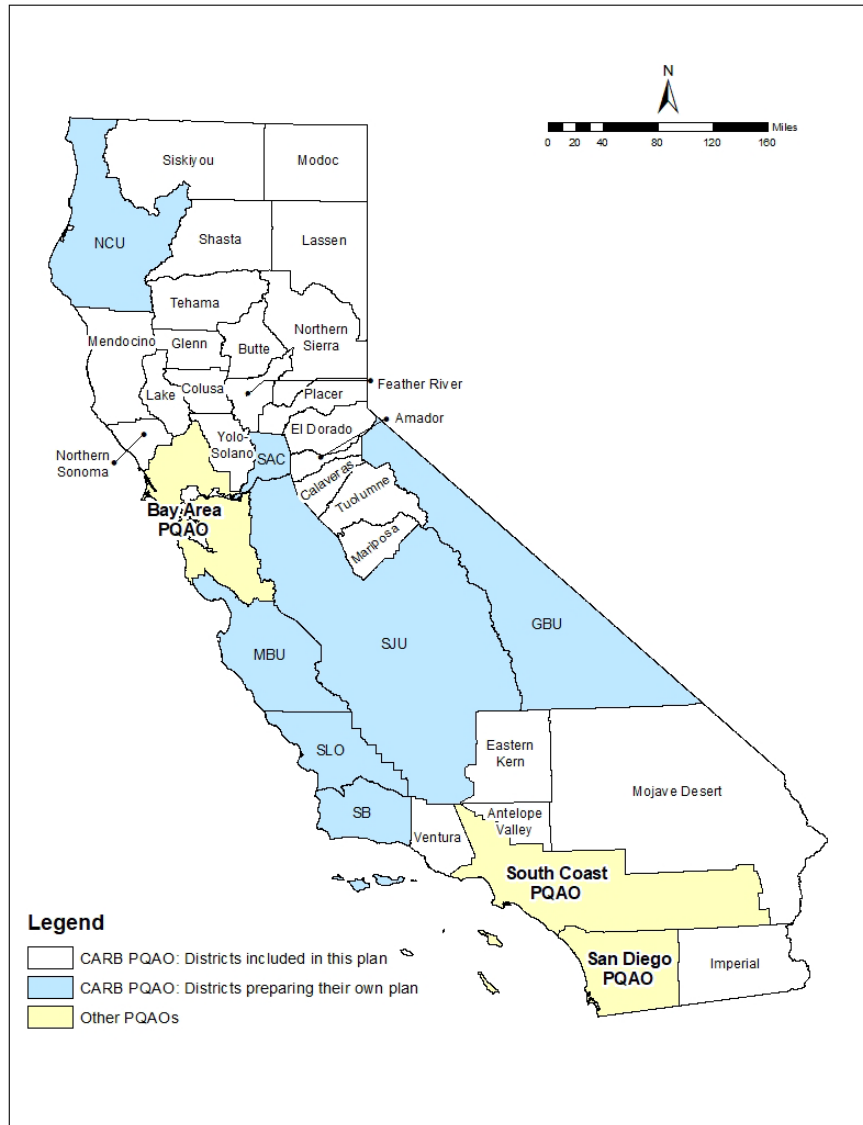
Annual Network Plan Requirements

- Required under federal regulations – submitted to the U.S. EPA by July 1st of each year
- 40 CFR 58.10: Annual Monitoring Network Plan and periodic network assessment

“The plan shall include a statement of whether the operation of each monitor meets the requirements of appendices A, D, and E of this part, where applicable.”

- 40 CFR 58, Appendix A: audits; collocation
- 40 CFR 58, Appendix D: Network Design Criteria
- 40 CFR 58, Appendix E: Probe and Monitor Path Siting Criteria
- It is more of a documentation tool than a planning tool.

Areas Covered in the CARB ANP



▶ CARB PQA

✓ 25 Districts Included in the CARB ANP

Amador County, Antelope Valley, Butte County, Calaveras County, Colusa County, Eastern Kern, El Dorado County, Feather River, Glenn County, Imperial County, Lake County, Lassen County, Mariposa County, Mendocino County, Modoc County, Mojave Desert, Northern Sierra, Northern Sonoma County, Placer County, Shasta County, Siskiyou County, Tehama County, Tuolumne County, Ventura County, Yolo-Solano

✓ 7 Districts Drafting Their Own ANP

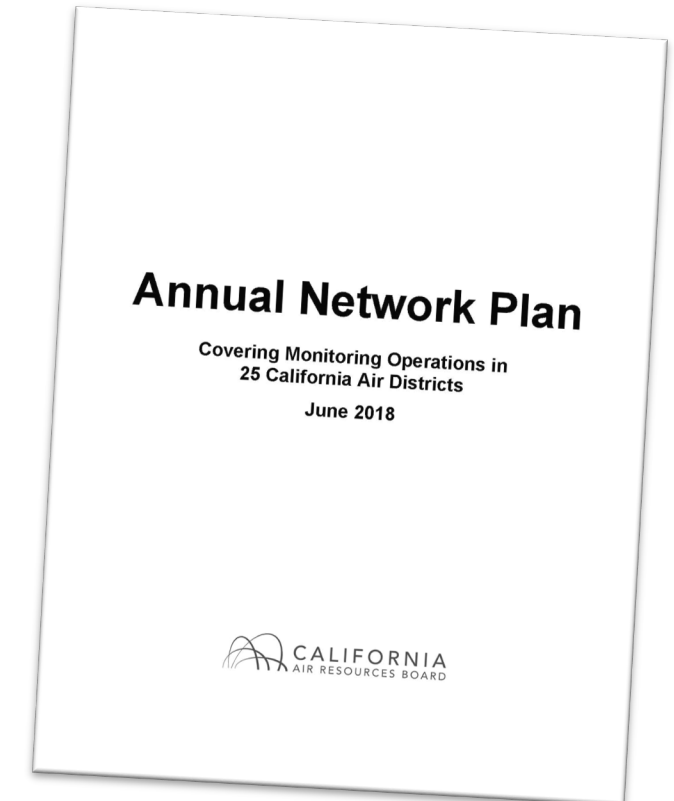
Great Basin, Monterey Bay, North Coast, Sacramento, San Joaquin Valley, San Luis Obispo County, Santa Barbara

▶ 3 Other PQAOs

Bay Area, South Coast, San Diego

What is in the CARB ANP?

- Federal requirements
 - Minimum monitoring requirements
 - Quality assurance requirements
 - Particulate Matter collocation requirements
- Site information
 - Detailed information on each monitor
 - Recently implemented and proposed changes
 - Supporting documents
- Ozone and PM_{2.5} waiver requests
- Public Comments and CARB Responses



Federal Minimum Monitoring Requirements

- Each pollutant requires a minimum number of monitors based upon certain criteria

Pollutant	Minimum Monitor Criteria
Ozone, PM ₁₀ and PM _{2.5}	MSA Population, Design Value Concentration
NO ₂	MSA Population
Near Road NO ₂	MSA Population, Annual Average Daily Traffic
SO ₂	MSA Population, SO ₂ Emissions (tons/year)
Pb	Pb Emissions (NEI) <ul style="list-style-type: none">– airports >1.0 tons/year– non-airport sources >0.50 tons/year

Federal Minimum Monitoring Requirements: Example: Ozone Minimum Monitoring Requirements

Metropolitan Statistical Area population	3-year design value concentrations $\geq 85\%$ of any Ozone NAAQS	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

- MSA: Sacramento–Roseville–Arden Arcade
- Population: 2,397,382
- Design Value: 0.082 ppm
- Design Value = 117 percent of 0.070 ppm NAAQS

HOW MANY MONITORS ARE REQUIRED?

2

Federal Minimum Monitoring Requirements: Example: PM_{2.5} Minimum Monitoring Requirements

Population	DV exceeds \geq 85% of any NAAQS	DV exceeds $<$ 85% of any NAAQS
> 1 million	3 sites	2 sites
500,000 – 1 million	2 sites	1 sites
50,000 – <500,000	1 sites	0 sites

- MSA: Bakersfield
- Population: 909,235
- Design Value: 61 $\mu\text{g}/\text{m}^3$ (24-hour) and 17.8 $\mu\text{g}/\text{m}^3$ (Annual)
- Design Value = 174% (24-hour) and 148% (Annual)

HOW MANY MONITORS ARE REQUIRED?

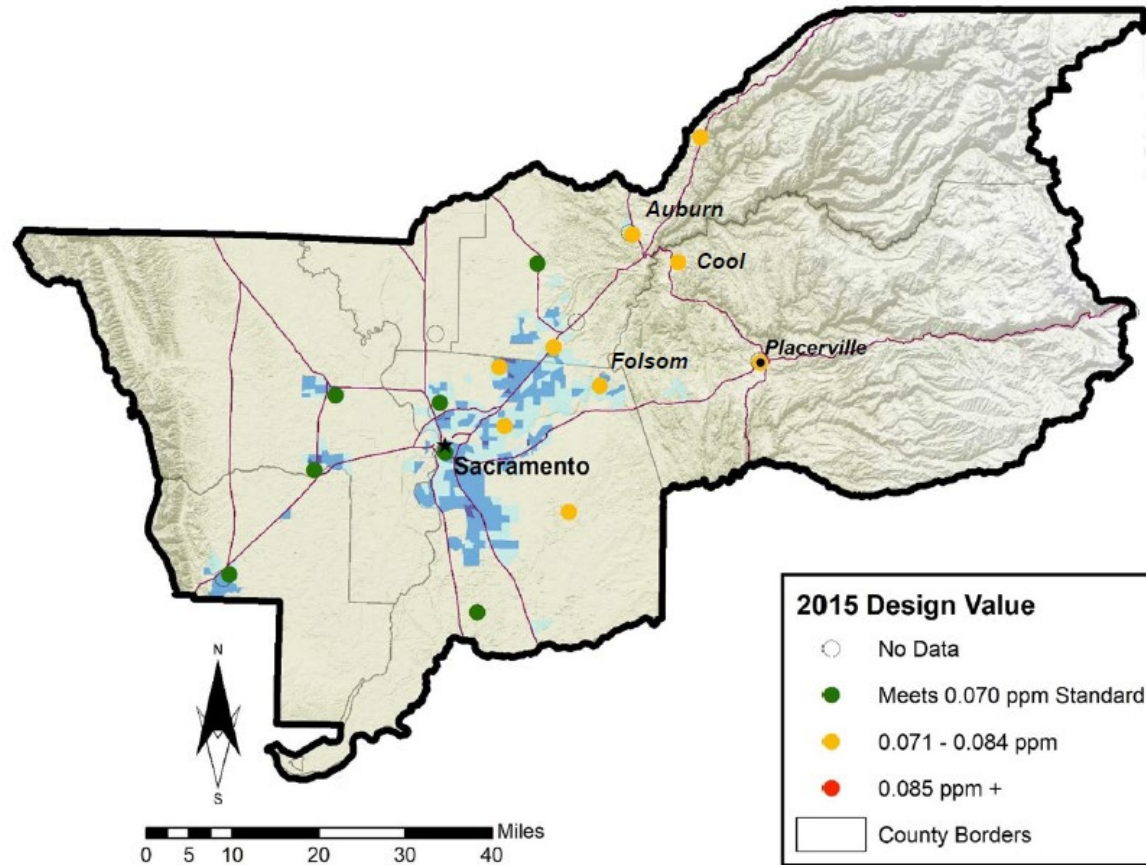
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Minimum Monitoring Requirements

- Need more than minimum monitoring requirements?
 - ✓ State and Federal planning
 - ✓ Community needs
 - ✓ Emergency monitoring
 - ✓ Other Federal requirements
 - Highest concentration site
 - Background site
 - Transport site

Variations in High Concentration Site

Sacramento Metropolitan Nonattainment Area



Minimum sites required: 2

- 2000: Cool
- 2005: Cool & Folsom
- 2010: Folsom
- 2015: Placerville
- 2020: Auburn

Exceptional Events and PM₁₀ Minimum monitoring Requirement

- ✓ MSA: Oxnard–Thousand Oaks–Ventura
- ✓ County: Ventura
- ✓ Population: 843,843

Year	Max Concentration (% of NAAQS)	Required Sites	Active Sites
2021	377 ug/m ³ (251%)	4–8	2

- Monitoring data generally cannot be excluded for monitoring requirements
- Footnotes indicating data might be impacted by Exceptional Event (wildfire activity)
- Air agencies may consult with their EPA Regional office regarding unique situation

Detailed Site Information

Local Site Name	Anderson-North Street	
AQS ID	06-089-0007	
GPS Coordinates	40.45318, -122.29883	
Street Address	2220 North St, Anderson, 96007	
County	Shasta	
Distance to roadways (meters)	717 to CA-273; 818 to I-5	
Traffic Count (AADT,year)	8,600 (CA-273); 51,000 (I-5) (2015)	
Ground Cover	Asphalt	
Representative statistical area name (i.e. MSA, CBSA, other)	Redding Metropolitan Statistical Area	
Pollutant, POC	Ozone, 1	PM10, 1
Primary, QA-Audit, Supplementary, or N/A	N/A	Primary
Parameter Code	44201	81102
Basic monitoring objective(s)	NAAQS	NAAQS
Site type(s)	Population Exposure	Highest Concentration
Monitor type(s)	SLAMS	SLAMS
Network affiliation(s)	N/A	
Instrument manufacturer and model	Teledyne API 400	Sierra Andersen 1200
Method code	87	83
FRM/FEM/ARM/Other	FEM	FRM
Collecting Agency	Shasta County	Shasta County
Analytical Lab (i.e. weigh lab, toxics lab, other)	N/A	
Reporting Agency	Shasta County	ARB
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	05/01/1993	05/01/1993
Current sampling frequency	Continuous	18
Required sampling frequency including exceptional events	N/A	18
Sampling season	1-Jan - 31-Dec	1-Jan - 31-Dec
Probe height (meters)	7	5.5
Distance from supporting structure (meters)	3	>2
Distance from obstructions on roof (meters)	No obstructions	No obstructions
Height above probe for obstructions on roof (meters)	N/A	N/A
Distance from obstructions not on roof (meters)	No obstructions	No obstructions
Height above probe for obstructions not on roof (meters)	N/A	N/A
Distance to nearest tree drip line (meters)	>10	>10
Distance to furnace or incinerator flue (meters)	N/A	N/A
Distance between monitors fulfilling a QA collocation requirement (meters)	N/A	N/A
Unrestricted airflow (degrees around probe/inlet or % of monitoring path)	360	360
Probe material for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (e.g. Pyrex, stainless steel, Teflon)	Teflon	N/A
Residence time for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (seconds)	4.8	N/A
Will there be changes within the next 18 months?	No	No
Is it suitable for comparison against the annual PM2.5 NAAQS?	N/A	N/A
Frequency of flow rate verification for manual PM samplers, including Pb samplers	N/A	<90 days
Frequency of flow rate verification for automated PM analyzers	N/A	N/A
Frequency of one-point QC check for gaseous instruments	weekly	N/A
Date of Annual performance evaluation conducted in the past calendar year for gaseous parameters	3/12/2019	N/A
Date of two semi-annual flow rate audits conducted in the past calendar year for PM monitors	N/A	03/12/2019 09/05/2019

Shasta County AQMD	
Local Site Name	Anderson-North Street
AQS ID	06-089-0007
GPS Coordinates	40.45318, -122.29883
Street Address	2220 North St, Anderson, 96007
County	Shasta
Distance to roadways (meters)	717 to CA-273; 818 to I-5
Traffic Count (AADT,year)	8,600 (CA-273); 51,000 (I-5) (2015)
Ground Cover	Asphalt
Representative statistical area name (i.e., MSA, CBSA, other)	Redding Metropolitan Statistical Area

Detailed Site Information (Cont'd)

Pollutant, POC	Ozone, 1	PM10, 1
Primary, QA-Audit, Supplementary, or N/A	N/A	Primary
Parameter Code	44201	81102
Basic monitoring objective(s)	NAAQS	NAAQS
Site type(s)	Population Exposure	Highest Concentration
Monitor type(s)	SLAMS	SLAMS
Network affiliation(s)	N/A	N/A
Instrument manufacturer and model	Teledyne API 400	Sierra Andersen 1200
Method code	87	63
FRM/FEM/ARM/Other	FEM	FRM
Collecting Agency	Shasta County	Shasta County
Analytical Lab (i.e. weigh lab, toxics lab, other)	N/A	CARB
Reporting Agency	Shasta County	CARB
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	05/01/1993	05/01/1993
Current sampling frequency	Continuous	1:6
Required sampling frequency including exceptional events	N/A	1:6
Sampling season	1-Jan - 31-Dec	1-Jan - 31-Dec



Detailed Site Information (Cont'd)



Pollutant, POC	Ozone, 1	PM10, 1
Probe height (meters)	7	5.5
Distance from supporting structure (meters)	3	>2
Distance from obstructions on roof (meters)	No obstructions	No obstructions
Height above probe for obstructions on roof (meters)	N/A	N/A
Distance from obstructions not on roof (meters)	No obstructions	No obstructions
Height above probe for obstructions not on roof (meters)	N/A	N/A
Distance to nearest tree drip line (meters)	>10	>10
Distance to furnace or incinerator flue (meters)	N/A	N/A
Distance between monitors fulfilling a QA collocation requirement (meters)	N/A	N/A
Unrestricted airflow (degrees around probe/inlet or % of monitoring path)	360	360
Probe material for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (e.g. Pyrex, stainless steel, Teflon)	Teflon	N/A
Residence time for reactive gases NO/NO2/NOy, SO2, O3; PAMS: VOCs, Carbonyls (seconds)	5.0	N/A
Will there be changes within the next 18 months?	No	No
Is it suitable for comparison against the annual PM2.5 NAAQS?	N/A	N/A
Frequency of flow rate verification for manual PM samplers, including Pb samplers	N/A	<90 days
Frequency of flow rate verification for automated PM analyzers	N/A	N/A
Frequency of one-point QC check for gaseous instruments	weekly	N/A
Date of Annual performance evaluation conducted in the past calendar year for gaseous parameters	3/13/2018	N/A
Date of two semi-annual flow rate audits conducted in the past calendar year for PM monitors	N/A	4/12/2018 9/25/2018

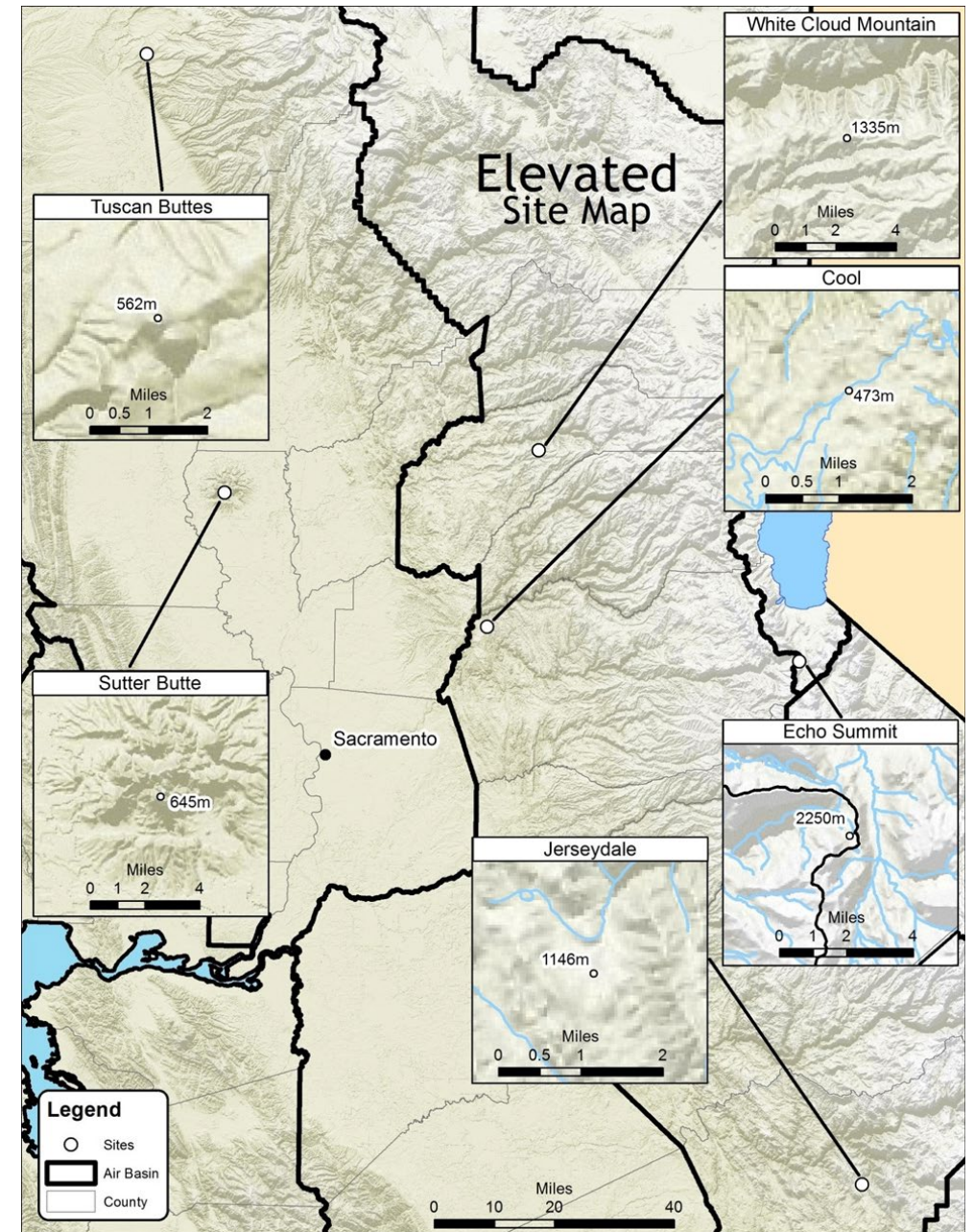
Monitoring Site Changes (examples)

- Site relocation
 - Shelter and power issues, area development, end of lease term, etc.
- Discontinuation
 - attainment during the previous 5 years
 - consistently measured lower concentration than other monitor in the same county during the previous 5 years
 - not required by an attainment or maintenance plan
- 40 CFR 58.14 – System modification

District	Site (AQS ID)	Comment
Northern Sierra AQMD	White Cloud Mountain (060570007)	Monitoring site is no longer available due to shelter and power issues. CARB is currently in the process of requesting U.S. EPA 's approval to close the site and establish a new site in the area.
San Joaquin Valley APCD	Stockton–Hazelton (060771002) Stockton–University Park (060771003)	Due to site demolition, the Stockton–Hazelton site was permanently closed on Nov 2021. The new Stockton–University Park site was installed and online Nov 2021.
Northern Sonoma County APCD	Healdsburg–Airport(060971003)	The ozone monitor was shut down in June 2020 and the shut-down was approved by U.S. EPA.
Yolo–Solano AQMD	Woodland (061131003)	District has switched the PM _{2.5} FRM to PM _{2.5} FEM on January 1, 2021; this change does not require EPA approval.

Ozone Seasonal Monitoring Waiver Request

- Six seasonal monitoring sites: Echo Summit, Cool, Jerseydale, White Cloud Mountain, Sutter Buttes, Tuscan Butte
- April – October
- Justification:
 - ✓ O₃ concentrations are significantly lower in the early spring and late fall months
 - ✓ Located in remote, mountainous area
 - ✓ Winter weather conditions



Contact Information

*Please submit any written comments by
6/27/2022 at 5:00 PM*

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THANK YOU!

