



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Navigating Air Quality Data: Strategies for Using and Improving Access to Air Monitoring Data for Bay Area Communities

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Kate Hoag, Ph.D.

khoag@baaqmd.gov

Air monitoring has rapidly expanded



Many new publicly available sources of air monitoring data

Case-by-case use of data by District programs is growing

Communities are interested in using the data and websites for a variety of purposes



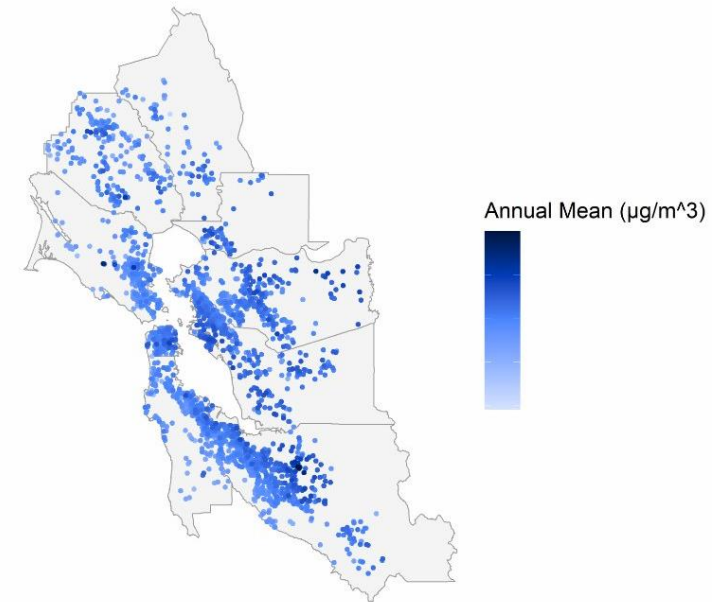
Using Air Monitoring Data



Examples of using different types of existing air monitoring data to help with specific tasks

- Analysis of community-operated sensor network data to identify locations with higher PM_{2.5}
- Use mobile monitoring to identify unexpected emissions impacts
- Use publicly available real-time sub-hourly data to assess air quality impacts during an unplanned facility incident

Public Purple Air Sensors (PM_{2.5})

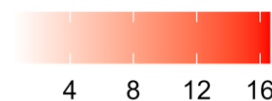
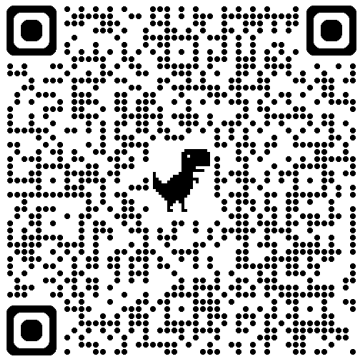


Example: Community PM_{2.5} Sensor Network

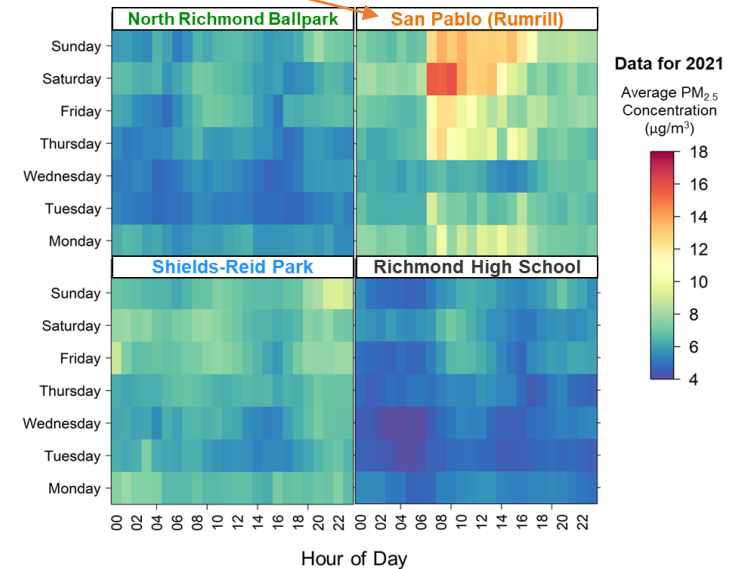
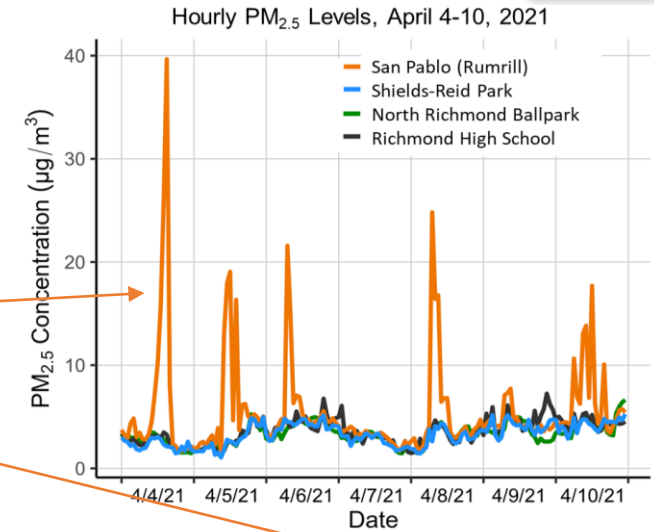


Identify areas with higher hourly PM_{2.5} levels

Continue to provide community-scale assessments of air quality like this



Percent of Hours at least 5 µg/m³ Above Sensor Network Average, 2020-2021

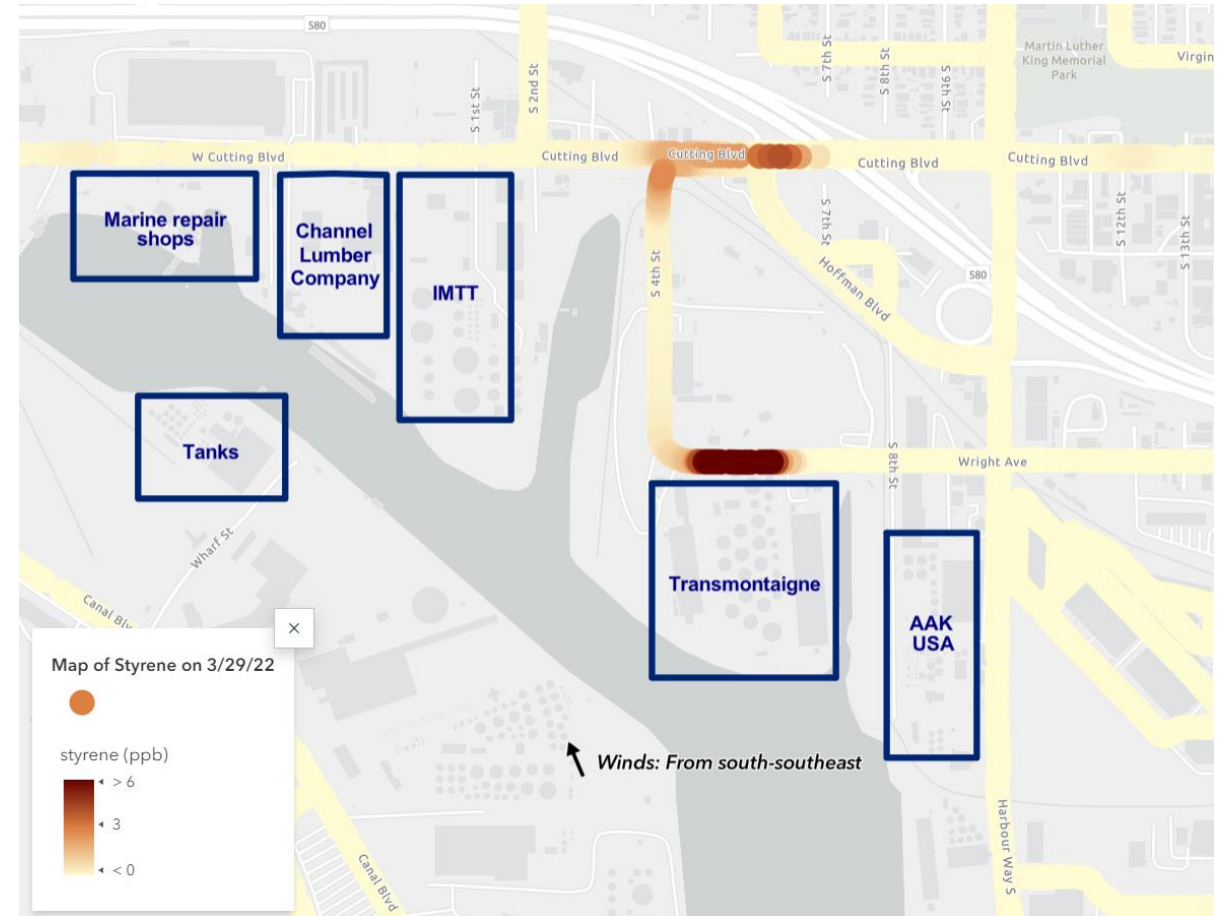
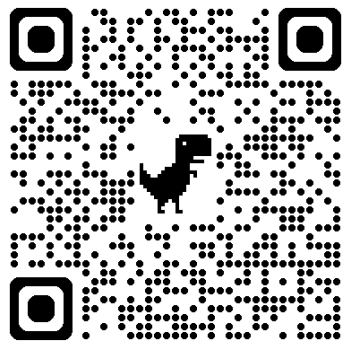


Example: StoryMap for PTCA CAMP



Air toxics monitoring project

- Air District air monitoring van surveyed target areas for certain air toxics
- Higher levels of different air toxics were detected near specific facilities and operations in the study area
- Key findings were summarized and displayed in an interactive GIS-based StoryMap

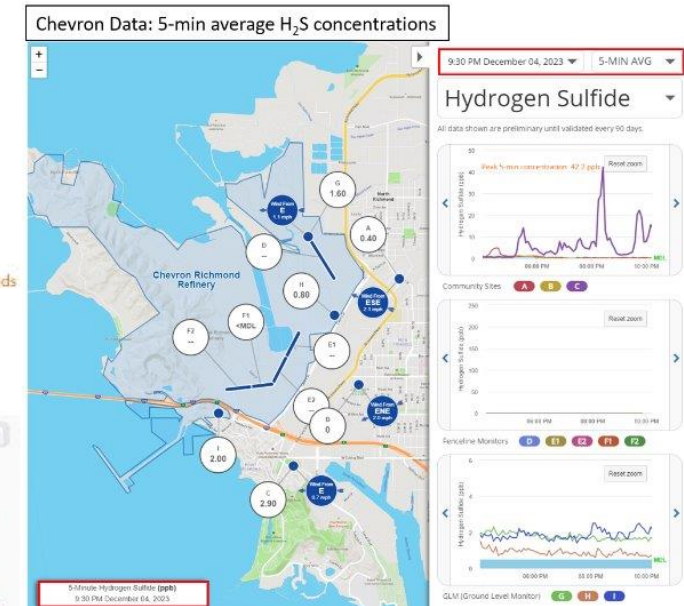
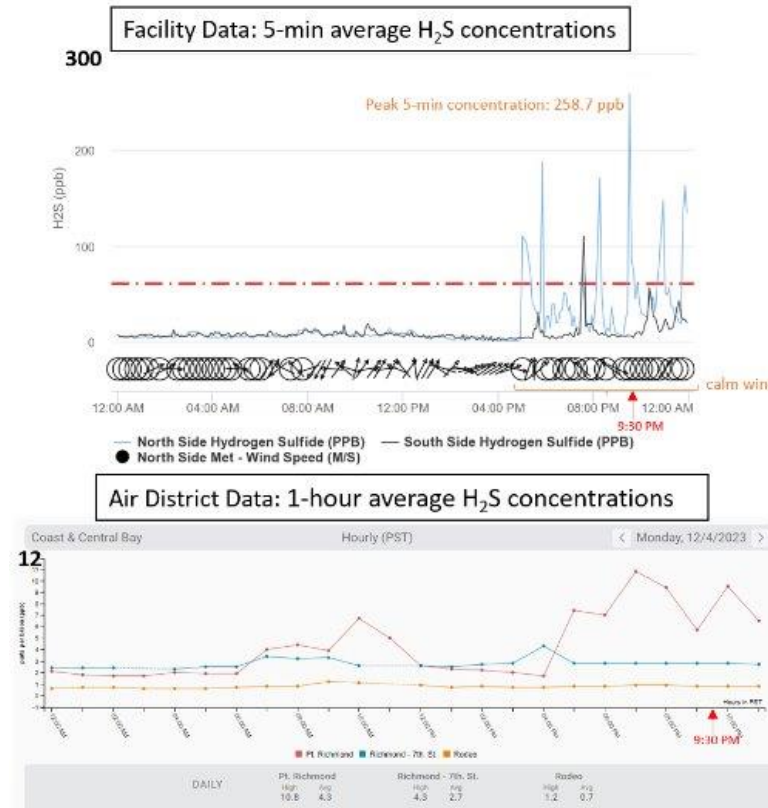


Example: Real-time Data During Incidents



Incident at City of Richmond Wastewater Treatment Plant (Veolia) – December 4-6, 2023

- High readings of H₂S at Veolia's two fenceline monitors
- Some peak concentrations at Veolia coincided with elevated readings at other nearby monitors

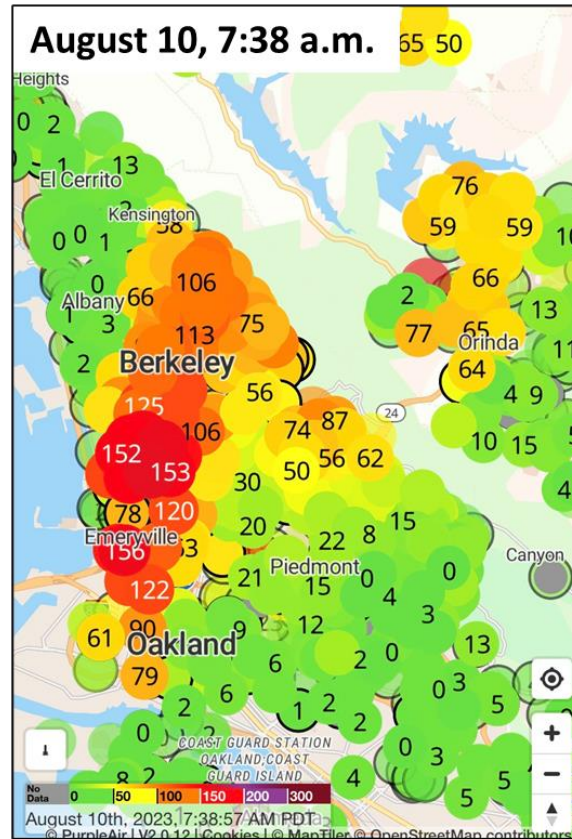
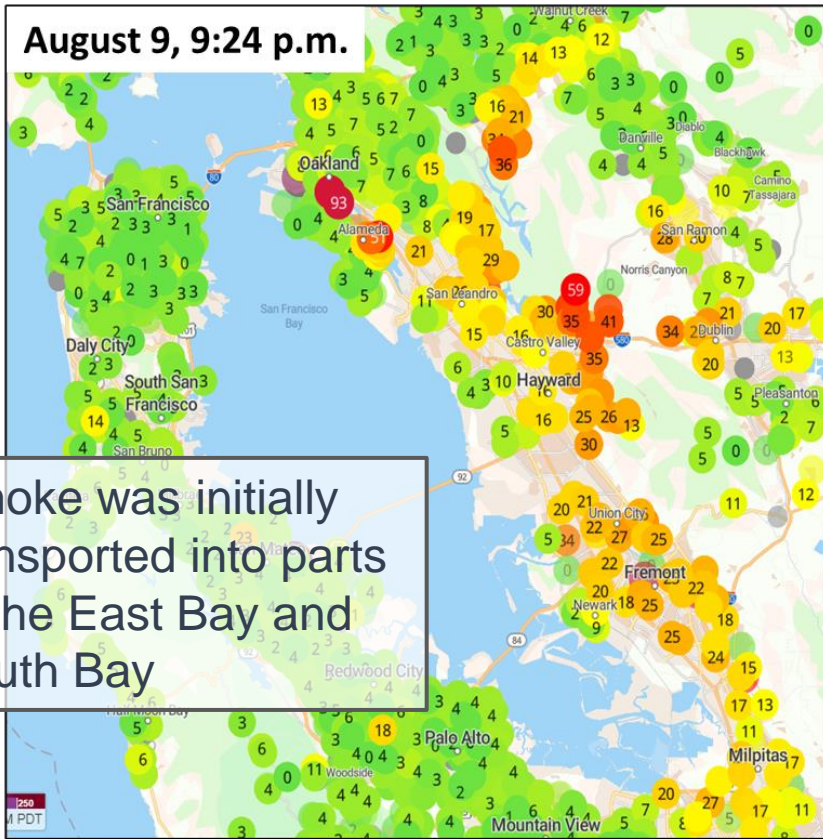


Example: Real Time Data During Incidents



Fire at Schnitzer Steel in West Oakland

PM_{2.5} data from lower-cost sensors helped illustrate the spatial extent of the smoke plume



Some of the peak impacts were experienced in overburdened communities, including East and West Oakland and along I-880

Winds shifted overnight and transported smoke northward

Included information about the location of ground-level smoke in air quality advisories and presentations to other agencies and community organizations

Screenshots from the PurpleAir website (map.purpleair.com) of PM_{2.5} 10-min averages

Improving Data Accessibility



Work with community partners to develop a plan to improve data accessibility, including:

- Identify and consolidate existing air monitoring data, where possible
- Develop resources to help communities access and use air monitoring data for their objectives
- Identify gaps where new data collection, analysis, or consolidation is needed

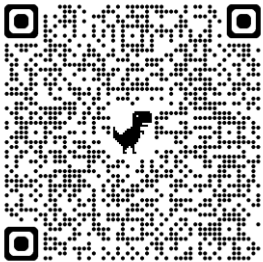


Inventory of Existing Data



Develop inventories of existing air monitoring data so that community members can find and use existing data to support their work.

The Path to Clean Air Community Air Monitoring Plan included such a list of air and emissions monitoring efforts including information on who is conducting the monitoring, what pollutants are being measured and where, and a brief description of where the data can be viewed, downloaded, or requested.



English



Español

Ambient Air Monitoring Reference Guide for the Richmond-North Richmond-San Pablo Area

This table provides information about different ambient air monitoring programs and projects. Air monitoring efforts are performed by different organizations, and datasets include different pollutants and have different purposes and uses. Ambient data refers to data collected in-community where people live and work, representing the outdoor air we normally breathe.

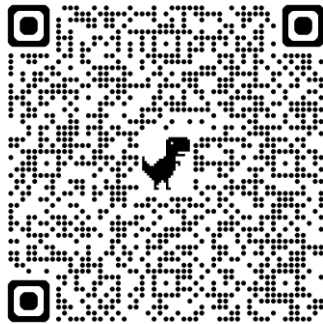
Air Monitoring Program or Project	Data Description	Monitoring Locations	Pollutants or parameters measured	Links to data and information	
Air District	Regulatory ambient data; required for Air District, CARB, and U.S. EPA programs; some data available in real-time	San Pablo (Rumrill Blvd.)	O ₃ , CO, NO, NO ₂ , SO ₂ , PM ₁₀ , PM _{2.5} , gas air toxics	Real-time data (except PM₁₀ and air toxics) Historical data on EPA's AirData page Air District Monitoring Network Information	
		Richmond (7 th Street)	SO ₂ , H ₂ S, gas air toxics		
		Point Richmond	H ₂ S		
Air District-operated mobile monitoring	Short-term monitoring project focused on gas air toxics; project selected by the AB 617 Monitoring Plan Steering Committee	Targeted areas in Richmond-North-Richmond-San Pablo	Selected gas air toxics such as BTEX and 1,3-butadiene	StoryMap with project information and findings	
Chevron	Chevron-operated Community Monitoring Stations	Non-regulatory ambient data, required by the City of Richmond and not subject to Air District regulations; data available in real-time	Atchison Village North Richmond Point Richmond	Black Carbon, PM _{2.5} , H ₂ S, BTEX and other gas air toxics, meteorology	Chevron real-time monitoring data page
Sensor Networks	PSE Healthy Energy & APEN	CARB AB 617 grantee; network of Aeroqual sensors; additional short-term monitoring for black carbon and volatile organic compounds	50 sensors installed across the area	PM _{2.5} , NO ₂ , O ₃ , temperature, relative humidity, and dew point	Project information page
	Groundwork Richmond & Ramboll	CARB AB 617 grantee; network of Clarity sensors with real-time data; additional short-term monitoring for black carbon and PM metals	52 sensors installed across the area	PM _{2.5} , NO ₂	Air Rangers Project Information Clarity Open Map (real-time data)
	BEACO ₂ N	School-based sensor network with real-time data, operated by UC Berkeley	15+ schools across the area	CO ₂ , CO, NO, NO ₂ , O ₃ , PM	Data, map, and information page
	PurpleAir	Public-operated sensors with real-time data	20+ locations across the area	PM _{2.5} , PM ₁₀	Real-time data page
Additional Projects and Datasets	Aclima	Mobile monitoring conducted August-October 2019 – quarterly average concentrations	Throughout the Richmond-North Richmond-San Pablo area	PM _{2.5} , NO ₂ , O ₃ , CO, CO ₂	Aclima Insights Website
		Annual baseline monitoring (data for Contra Costa County collected November 2019-October 2020)	Throughout the Bay Area	PM _{2.5} , NO ₂ , O ₃ , CO, CO ₂	Aclima Air Health Website
	Assessment of Coal Air Pollution Project	Short-term project focused on particulate matter from coal and petroleum coke operations; CARB AB 617 grantee	Around Levin Terminal and adjacent railways	Particulate matter	Project background and status provided in Update on Air Monitoring Projects, Fall 2021
	AirNow Fire and Smoke Map	Real-time, interactive map for displaying data from government agency monitors and Purple Air sensors, designed for use during wildfire events	Data available from across the U.S.	PM _{2.5}	AirNow Fire and Smoke Map Website

Guide Explaining Data Websites

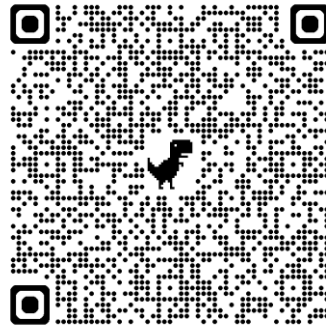


Publicly available air monitoring data are displayed on many websites

Developed a guide describing how air monitoring data is displayed, what it is useful for, and provide links.



English



Español

RESOURCE GUIDE FOR AIR QUALITY MONITORING DATA WEBSITES

There are many sources for air quality data, providing data from a range of monitoring instrumentation and operated by different organizations. This resource guide provides an overview of websites with air quality data, including information about the data sources, suggested data use, and links to additional information.

Data from the Bay Area Air Quality Management District (Air District) fixed-site monitoring network are validated according to rigorous quality control and quality assurance requirements from the EPA to ensure that the air quality data are consistent and accurate, and to determine if the Bay Area is meeting air quality standards. Criteria pollutant data from Air District sites serve as the official data source for EPA's reporting of the Air Quality Index (AQI) Nowcast and are comparable to EPA's health-based air quality standards.

A dense network of low-cost sensors can provide helpful information as well even though data from sensors might not be as accurate as from Air District monitoring sites. In areas where there is not a nearby Air District monitoring site, sensor networks provide information about relative air quality on a neighborhood by neighborhood sensors often report data on time scales shorter than an hour, and therefore can provide information changes in air quality, which can be useful in certain cases, like during wildfire smoke episodes.

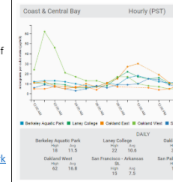
Each data source and monitoring network can tell you something different about air quality in your recommends using the official AQI Nowcast calculated from Air District monitoring data when assess quality in your area is safe **AND** also using low-cost sensor data to inform you whether air quality is be different than the nearest regulatory monitoring site. Using these data sources together can provide understanding of when and where poor air quality conditions may be occurring.

Air District Network (Current Air Quality Website)

Data Source: Air District Monitoring Sites
Pollutants: Fine Particulate Matter (PM_{2.5}), Ozone (O₃), Black Carbon, Carbon Monoxide (CO), Hydrogen Sulfide (H₂S), Nitric Oxide (NO), Nitrogen Dioxide (NO₂), Oxides of Nitrogen (NO_x), and Sulfur Dioxide (SO₂) available for visualization
Data Type: AQI Nowcast and concentration data
Averaging Time: 1-hour (begin hour)
Uses:

- Real-time reporting of AQI and concentration data

Additional Information: [Air District's Monitoring Network Page](#)



AirNow (AirNow Homepage)

Data Source: Air District Monitoring Sites
Pollutants: PM_{2.5}, Coarse Particulate Matter (PM₁₀), O₃
Data Type: AQI Nowcast and concentration data
Averaging Time: 1-hour (end hour)
Uses:

- Official real-time reporting of the AQI

Additional Information: [AQI Basics](#)

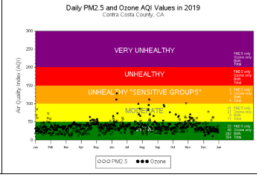


EPA Air Data (Air Data Website)

Data Source: Air District Monitoring Sites
Pollutants: PM_{2.5}, PM₁₀, O₃, CO, NO₂, and SO₂ for visualizations; additional pollutants (such as air toxics) available for download
Data Type: AQI and concentration data
Averaging Time: Pollutant dependent
Uses:

- Official reporting of the Air Quality Index (AQI)
- Compliance with health-based standards
- Create graphical displays using visualization tools
- Download air quality data to a file
- Output air quality data into summary reports

Additional Information: [Air Data FAQ Webpage](#)



Aclima (Aclima Insights Website for Richmond-San Pablo)

Data Sources: Aclima mobile monitoring and PSE/APEN Aeroqual sensor network
Pollutants:

- Aclima: PM_{2.5}, O₃, CO, CO₂, NO, NO₂
- PSE: PM_{2.5}, O₃, and NO₂

Data Type: Map of pollutant concentration data
Averaging Time:

- Aclima: Three-month average (Aug-Oct 2019)
- PSE/APEN: current conditions or average for previous 24 hours, week, month, or 90 days

Uses:

- Visualize relative differences in air quality across Richmond-San Pablo
- Enter an address to create a customized air quality report for that location



Chevron Monitoring (Chevron Richmond Air Measurements Website)

Data Sources: Chevron refinery fence-line and community monitoring stations
Pollutants:

- Fence-line: SO₂, H₂S, and 11 selected gas air toxics
- Community Stations: PM_{2.5}, Black Carbon, H₂S, 14 selected gas air toxics, and meteorology

Data Type: Real-time
Averaging Time: 5-min, 1-hour
Uses:

- Visualize data on map and graphically
- View measurements for pollutants that pass through the fence-line monitoring system

Notes:

- Fence-line monitoring system is designed for compliance with Air District Rule 12-15
- Some pollutants may often be displayed as "<MDL", meaning concentrations are below the minimum detection level of the monitor



Bay Air Center Resource Library



Home Services Resources About CONTACT US

Working Together for Clean Air

Bay Air Center supports communities with technical guidance, training, and relevant resources.

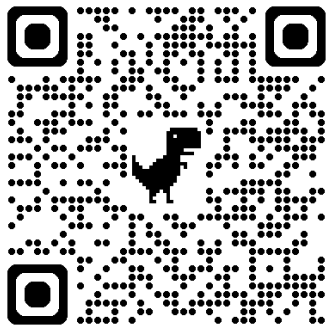
Discover More

A New Community Resource

<https://bayaircenter.org/>

Provides a place to collect information in one place including links to websites and documents on many topics

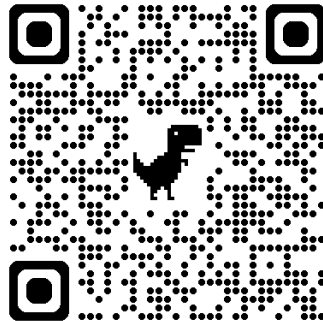
- Air Pollution Foundations
- Designing a Community Scale Air Monitoring Project
- [Understanding Air Quality Data](#)
- Educational and Training Materials



Historical Air Sensor Dataset



- Compiled a dataset of publicly available PurpleAir data from 2018-2022
- Used EPA data quality methods consistent with Fire & Smoke Map
- Can be used by the District, other agencies, and community groups



BAY AIR CENTER

Home Services Resources About

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Understanding Air Quality Data

Data Sources Data Analysis Wildfire Indoor Air Quality

Data Sources

> [Air Sensor Dataset Resource](#)
An extensive Bay Air Center resource for local air sensor data, spanning the nine counties covered by the Bay Area Air Quality Management District. The [...]

Resources

Resource Library
Air Pollution Foundations

Upcoming data accessibility work



- Start with a focus on refinery emissions and air monitoring data
 - Work with Community Advisory Council, upcoming Refinery Corridor Community Workgroup, and PTCA CERP Implementation CSC
 - Consolidate all refinery-related data, making data easier to find or download and providing additional information and context so data is more meaningful
 - Revisions to rules in response to new state legislation that would strengthen requirements for facility-conducted air monitoring to increase availability of real-time data
- Continue working with community partners to develop air monitoring data resources and community-scale air quality assessments specific to overburdened communities
- Provide training to community members or other partners on using air quality data websites

Questions



Contact information:

Ambient Air Quality Analysis Section: analysis@baaqmd.gov

Dan Alrick: dalrick@baaqmd.gov

Michael Flagg: mflagg@baaqmd.gov

Josephine Fong: jfong@baaqmd.gov

Kate Hoag: khoag@baaqmd.gov

Joe Lapka: jlapka@baaqmd.gov