Richmond – San Pablo Community Air Monitoring Plan
Steering Committee Meeting#3

May 15, 2019

Today’s Agenda

I. Welcome, Introductions and Roll Call

II. Agenda Review

III. Review of Steering Committee Deliberation Process

IV. What We Know: Health Outcomes in the Richmond-San Pablo Area

V. What We Know: Air Quality in the Richmond-San Pablo Area

VI. Group Mapping Activity

VII. Next Steps

VIII. Public Comments

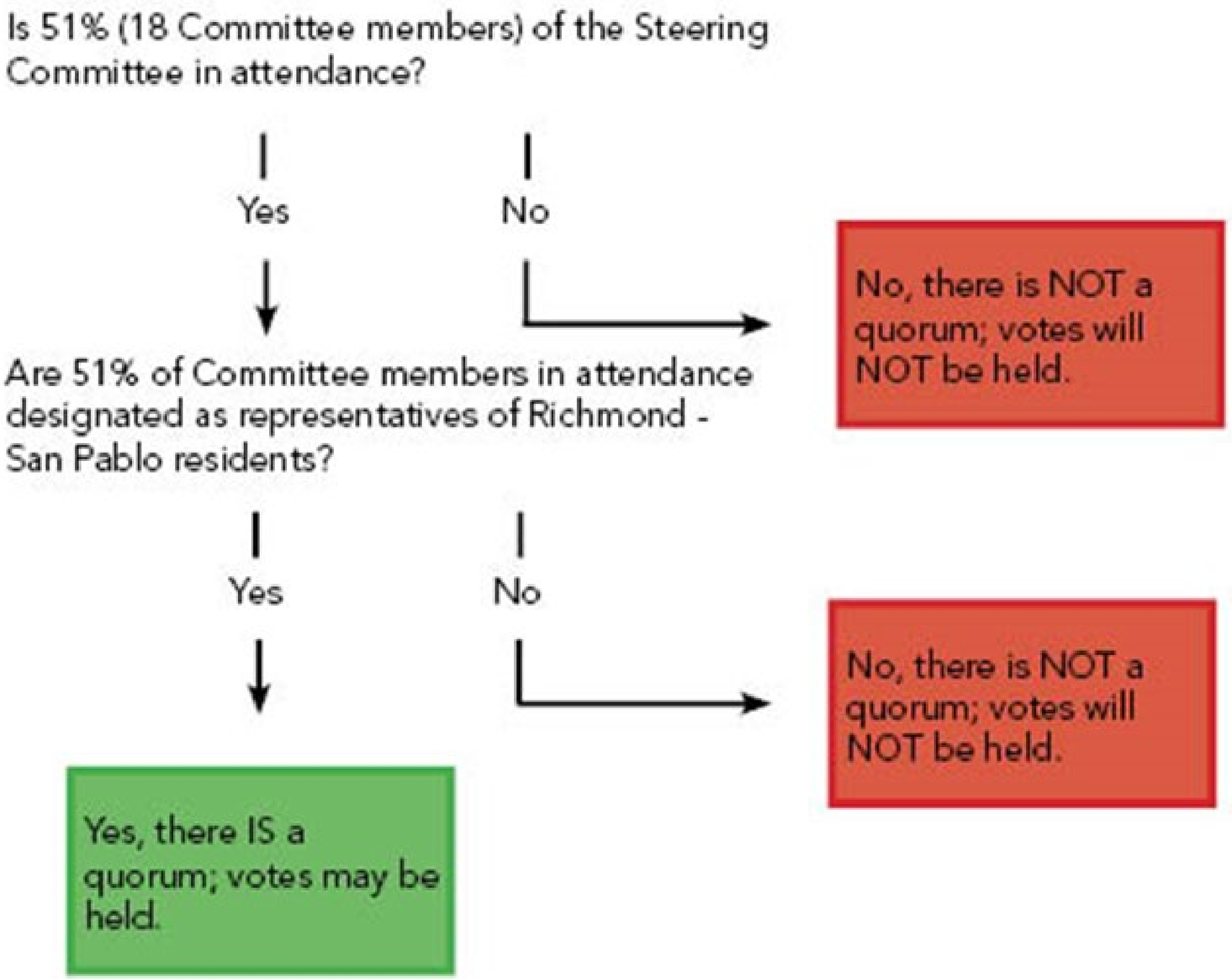
Review of Steering Committee Deliberation Process

Deliberation Process

- 35 Steering Committee Members

- Quorum:
  - Majority (51% or 18 members) of **active voting members** are present; **and**
  - A majority (51%) of those present **represent people who live** in the Richmond-San Pablo area.

Deliberation Process



General Votes: Simple Majority

- For all votes except charter amendments, the **majority** vote determines the outcome (51% or more)
- Members who **abstain** from voting will NOT be counted as part of the total number of votes.
- In a tie, the **final decision** will be made by the Co-Lead Team.
  - Co-Lead Team members will discuss and take a separate vote to determine the outcome, and report back to the Steering Committee.

Charter Amendment Votes

- A **two-thirds majority** (66%) is required to amend the Charter.

- Members who abstain from voting will NOT be counted as part of the total number of votes.

Charter Amendment

4. Roles and Responsibilities

Community Steering Committee Members

Steering committee members will be responsible for assisting Air District and community co-leads in developing the Richmond-San Pablo Community Air Monitoring Plan, in accordance with the California Air Resources Board's Community Air Protection Blueprint[1]. Committee members may be asked to assist in identifying air pollution issues and sources of air pollution in the area, and in reviewing air quality data and local health impact studies to assist in developing the Plan.

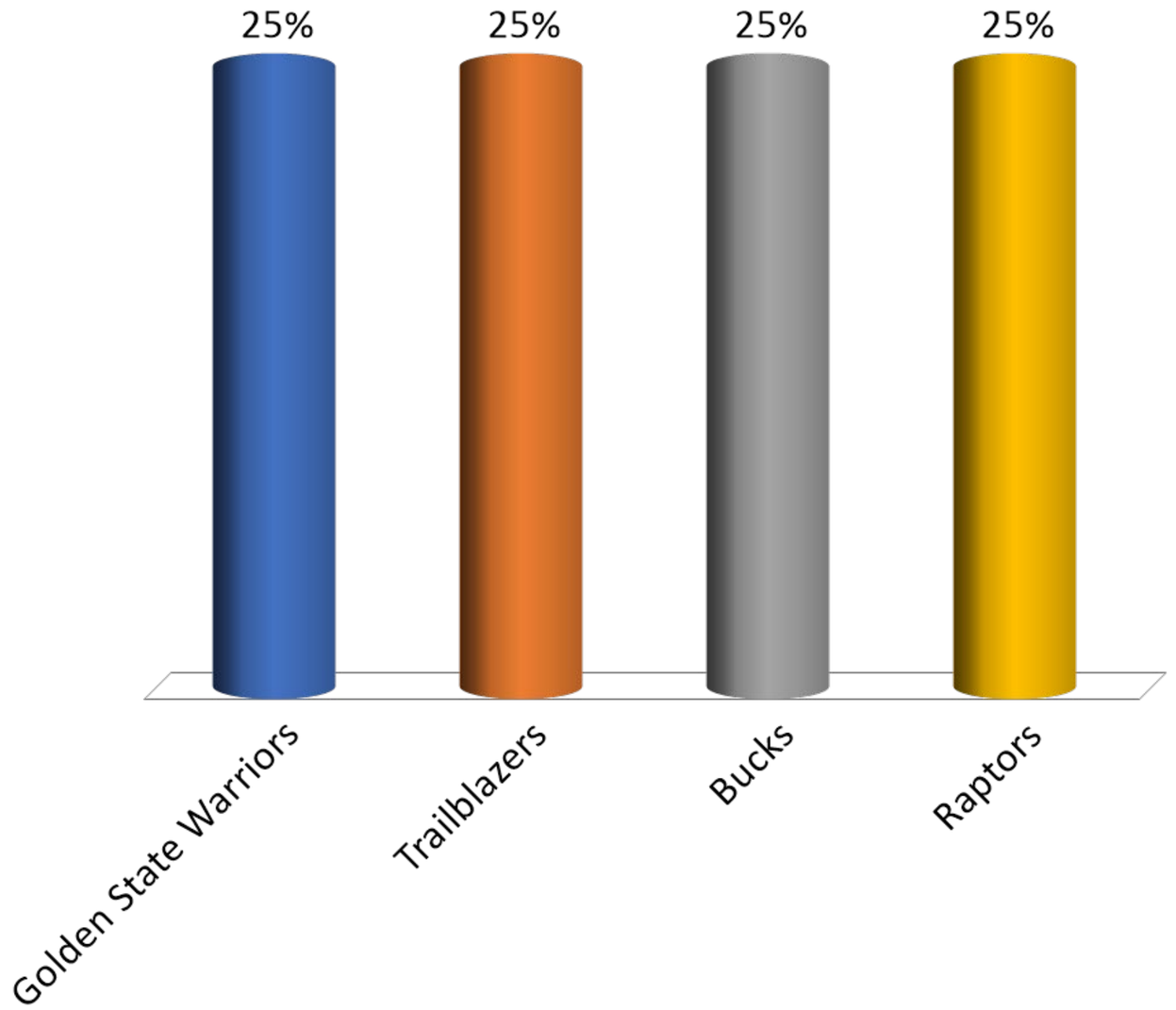
Co-Leads

The Steering Committee will be supported by a team of co-leads comprised of **one to three** **[changed to]** **five** community leaders and the Air District. The co-lead team will provide infrastructure support to the Steering Committee and the air monitoring plan development. The community leads will be local to the Richmond-San Pablo Area and can be one trusted organization or a small collective or coalition of individuals.

The co-lead team will be responsible for providing necessary background materials for steering committee members, developing meeting agendas, coordination with the meeting facilitator, and for leading Steering Committee activities. The co-lead team will also be responsible for providing technical support and other relevant technical assessment information to the Steering Committee.

Who will win the 2019 NBA championship?

A. Golden State Warriors
B. Trailblazers
C. Bucks
D. Raptors

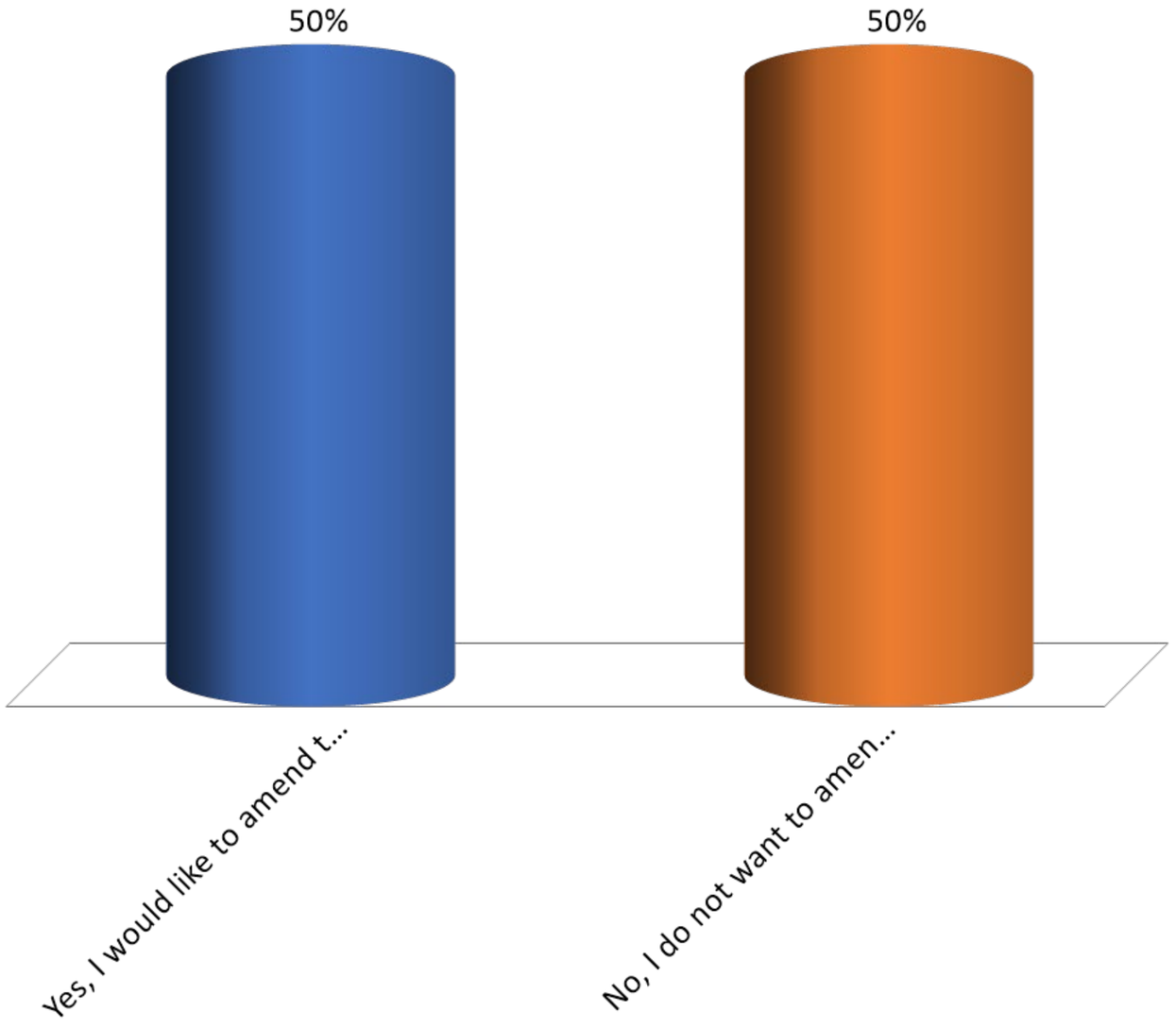


Would you like to vote to amend the Charter to expand the number of community member Co-Leads from 3 to 5?

A. Yes, I would like to amend the Charter.

B. No, I do not want to amend the Charter.

C. I abstain.



What We Know: Health Outcomes in the Richmond-San Pablo Area

CONTRA COSTA
HEALTH SERVICES

Air Quality and Health Outcomes: What we Know, What to Do

Rohan Radhakrishna MD, MPH, MS
Chair – Family and Adult Medicine
Deputy Health Officer, Contra Costa Cou

Overview

- How are West Contra Costa County communities affected by air quality? Who's most affected?
- What are the environmental contributors?
- What more can we do?

HEALTH IMPACTS OF AIR POLLUTION

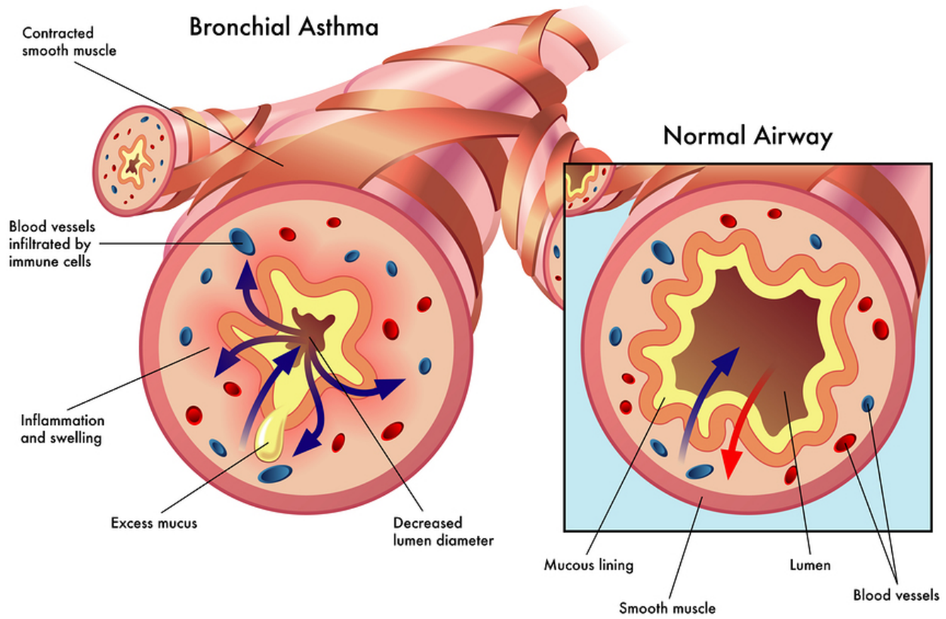
- Impaired lung growth in children
- Increased asthma, coughs and bronchitis
- Impairment of brain development in babies and small children
- Low birth weight and adverse birth outcomes
- Heart attack and stroke
- Upper respiratory track irritation and infection
- Worsening of existing health problems in people with chronic disease

PEOPLE MOST SUSCEPTIBLE

Outdoor Air Pollution & Health

Particulate air pollution, including smoking, wild fires and point source or motor vehicle exhaust, lead to impairment of lung function, an effect that occurs in a few minutes.

1. Stressed Lung triggers the brain and heart raising blood pressure
2. Inflammation triggers vessel damage and clotting
3. Air Sac (alveoli) damage decreases lung function and increases risk of heart/lung disease and infections



Sources: CDPH 2019

Air Pollution & Adverse Birth Outcomes

1. Low Birth Weight

2. Pre-term Birth

3. Small for Gestational Age

Meta-analysis showed very mild effect size
(CO, NO2, NOx, O3, PM2.5, PM10, or SO2)

Still controversial

Sources: Shah and Balkhair, 2011; Nieu- wenhuijsen et al., 2013; Pedersen et al., 2013. Guo et al 2019)

Outdoor Air Pollution and Asthma

- Proximity to roads with heavy traffic may contribute to:
  - New onset (in children and adults)
  - Exacerbation (in children and adults)
  - Increased risk of ED visits and hospitalizations due to asthma (in children)
  - Black carbon (particulates), organic compounds and heavy metals from traffic pollution all contribute to asthma risk and severity

Sources: Salam, 2008. Lin, 2002. McConnell, 2010. Guamieri, 2014. Jerrett, 2008. Nishimura, 2013. Wilhelm, 2008. Rusconi, 2010. Shamasunder, 2018, Patel, 2009.

Outdoor Air Pollution and Asthma

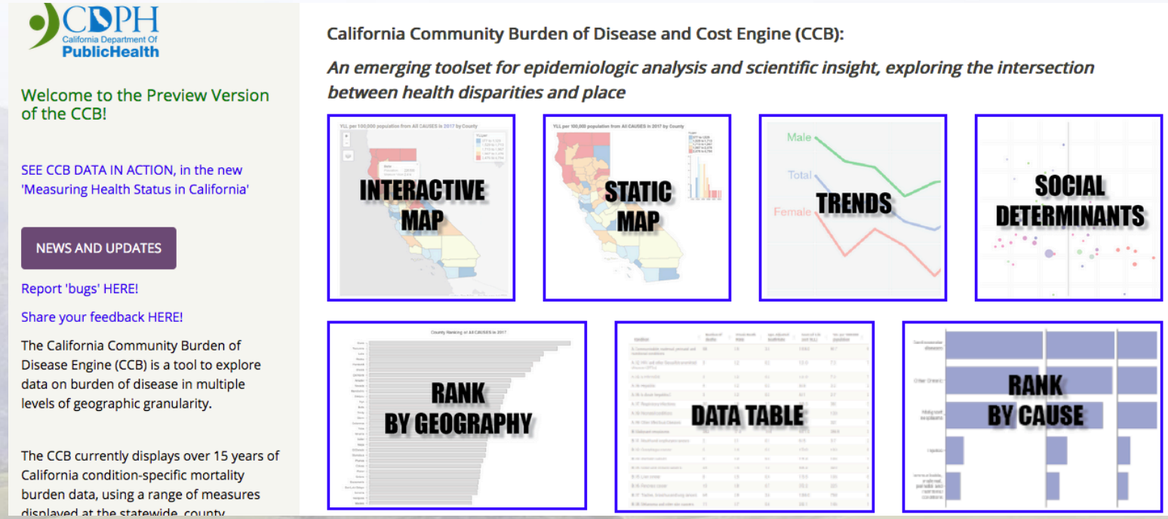
- Proximity to point sources of pollution may contribute to asthma severity:
  - Risk of asthma attack is associated with residing near a grain mill (odds ratio (OR) = 1.35), petroleum refinery (OR = 1.44), asphalt plant (OR = 1.23), or power plant (OR = 1.28) (all p's < 0.05).
  - Residence near major air emissions sources (>100 tons/year) increased asthma attack risk by 108% (p < 0.05).

Sources: Am J Epidemiol. 2007 Apr 15;165(8):927-35. Epub 2007 Feb 17.

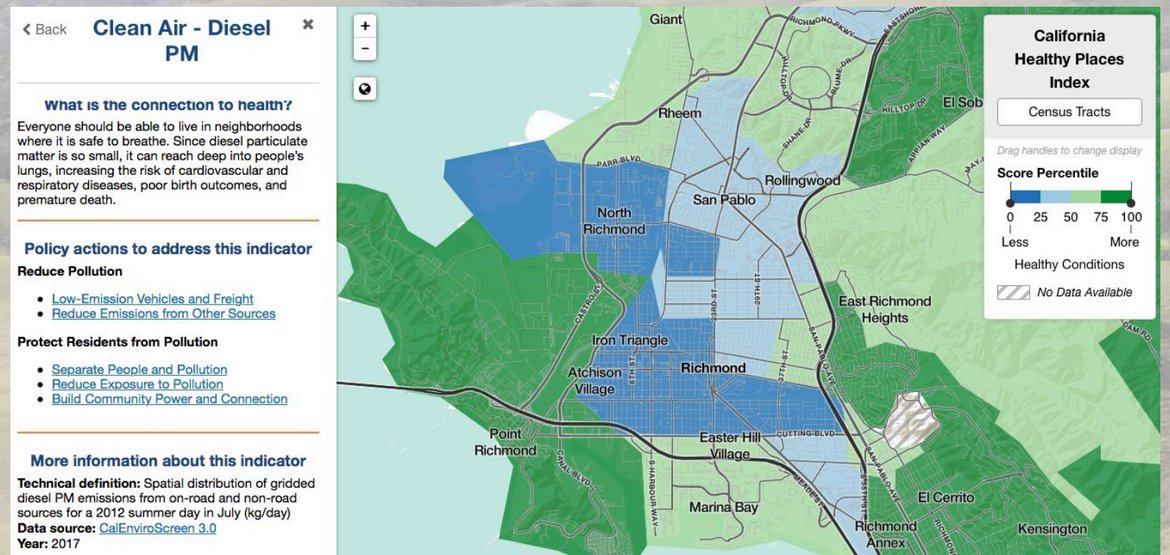
Resources

Cal Enviro-Screen

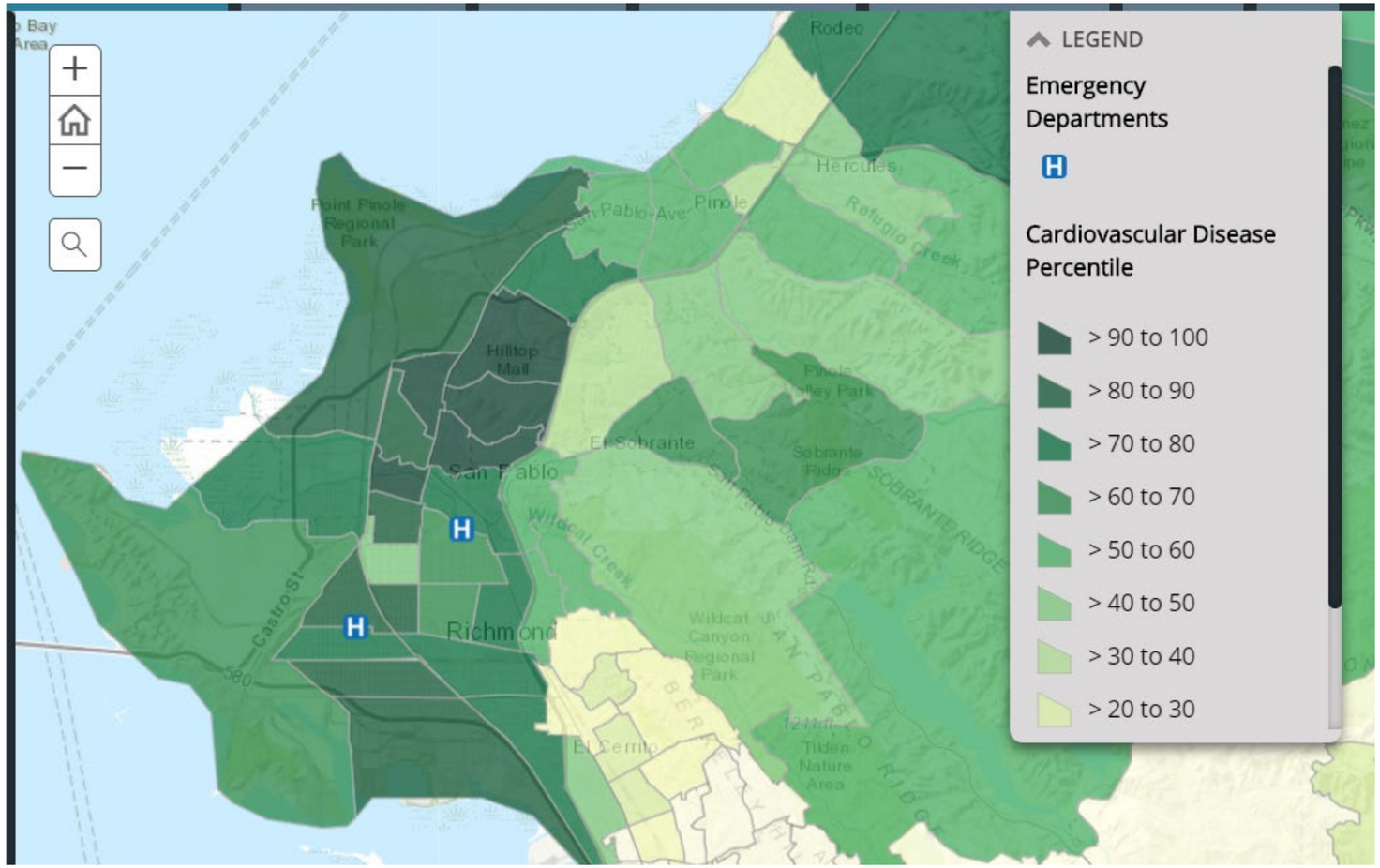
CDPH CCB:
CA Community Burden



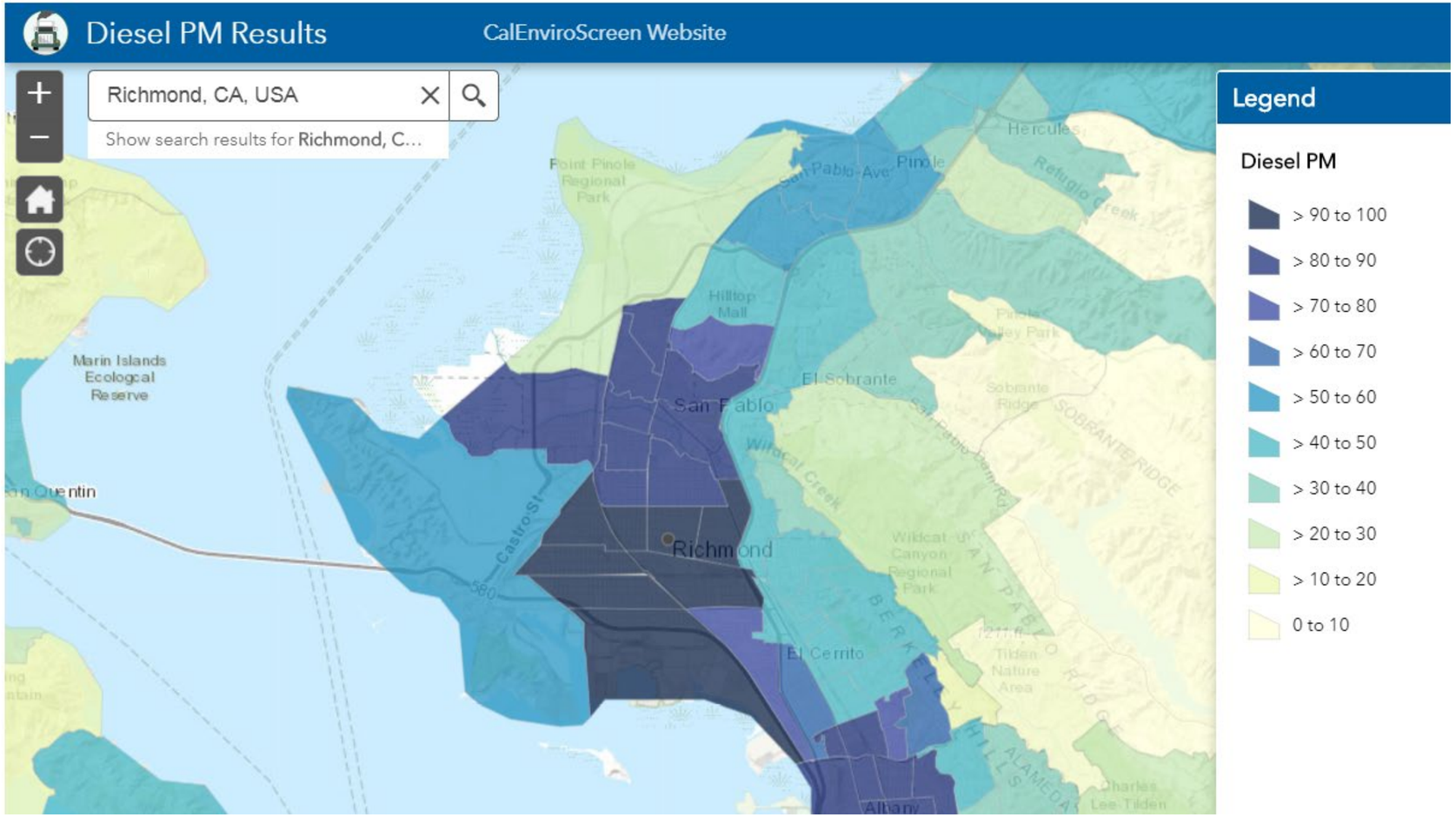
Healthy Places Index



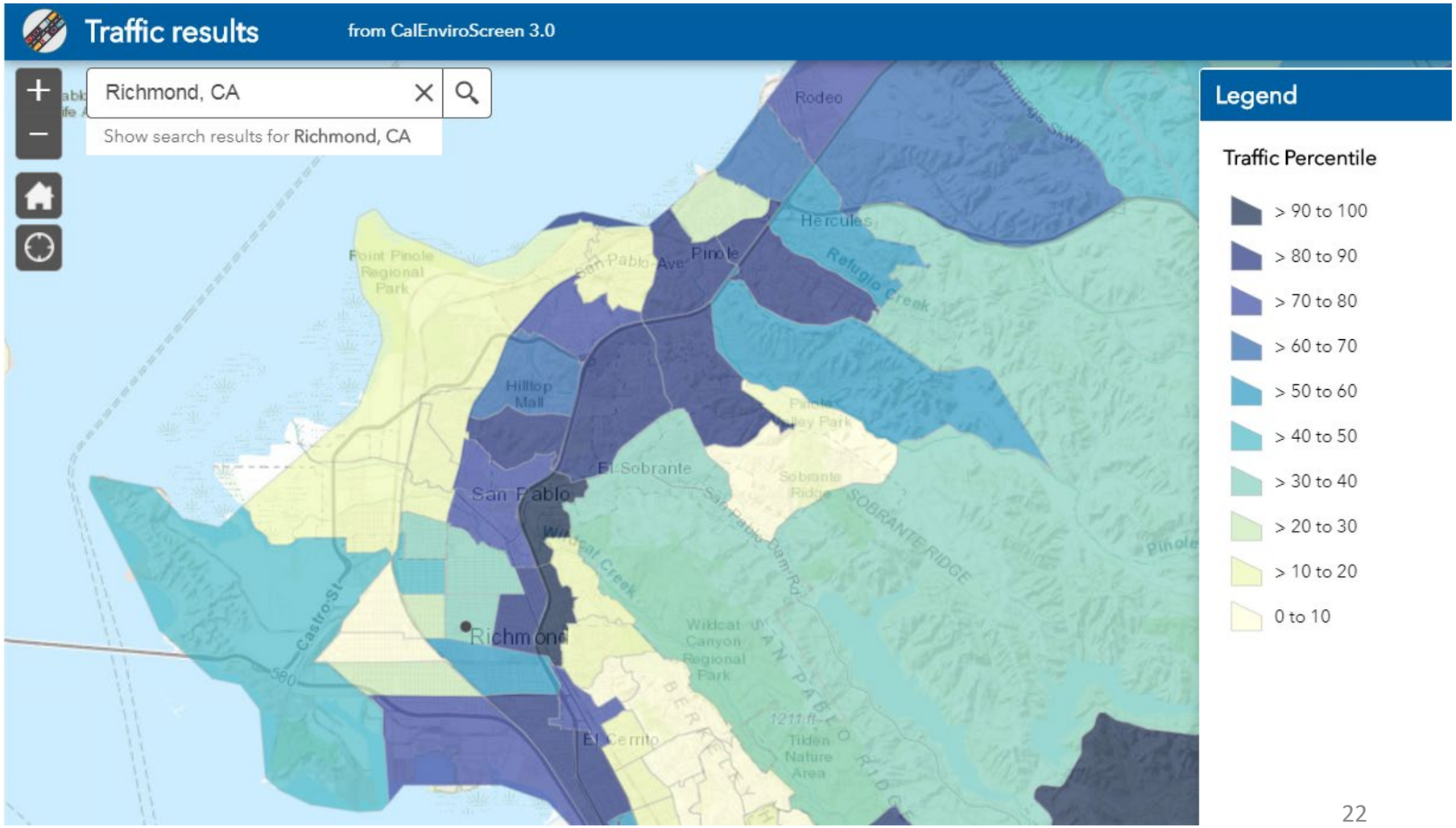
Emergency Department Visit Rate Myocardial Infarction (2011-2013)



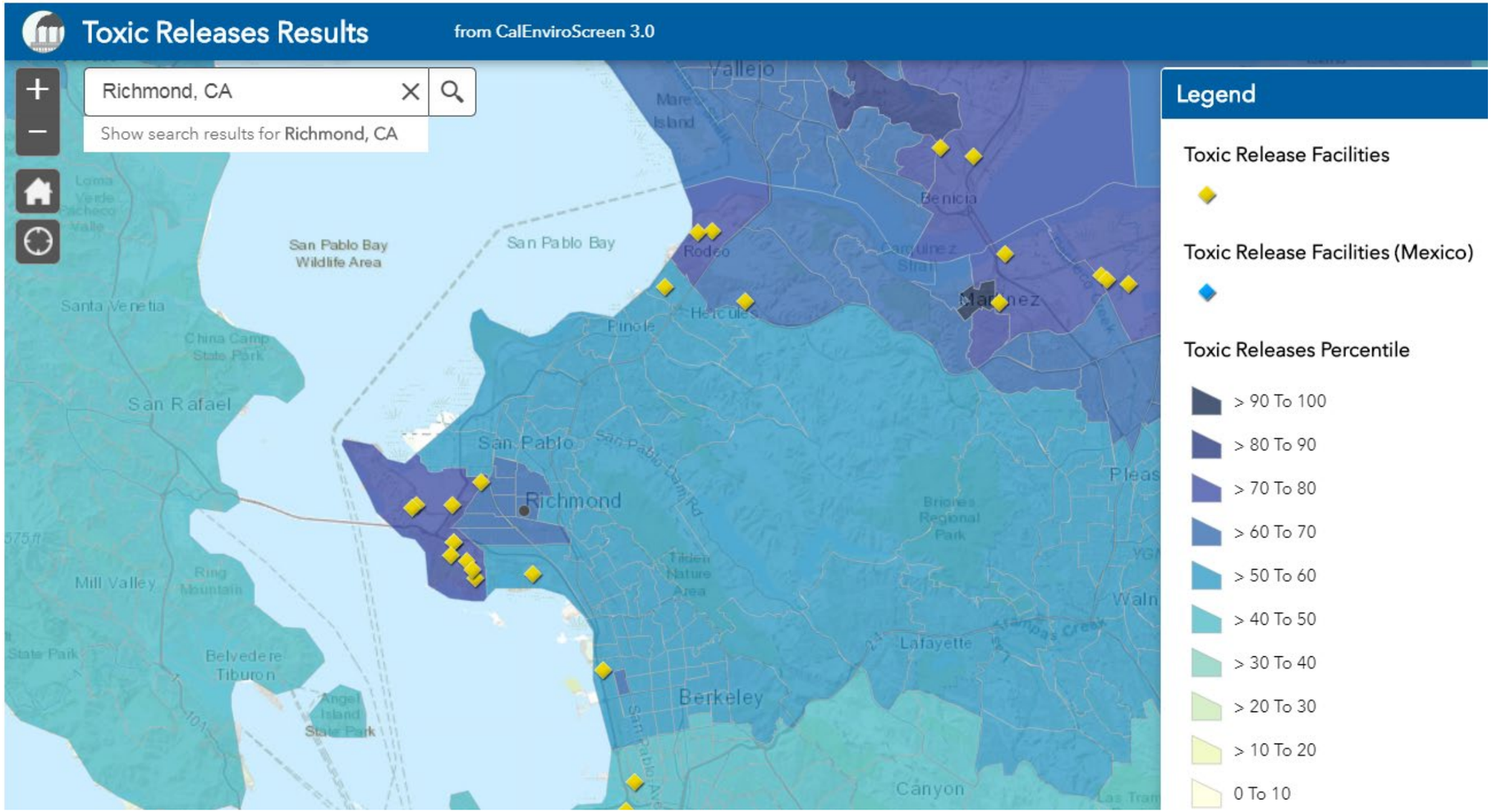
Diesel Particulate Matter Richmond Region Percentile



Traffic Results
Richmond Region Percentile



Toxic Releases Results
Richmond Region Percentile

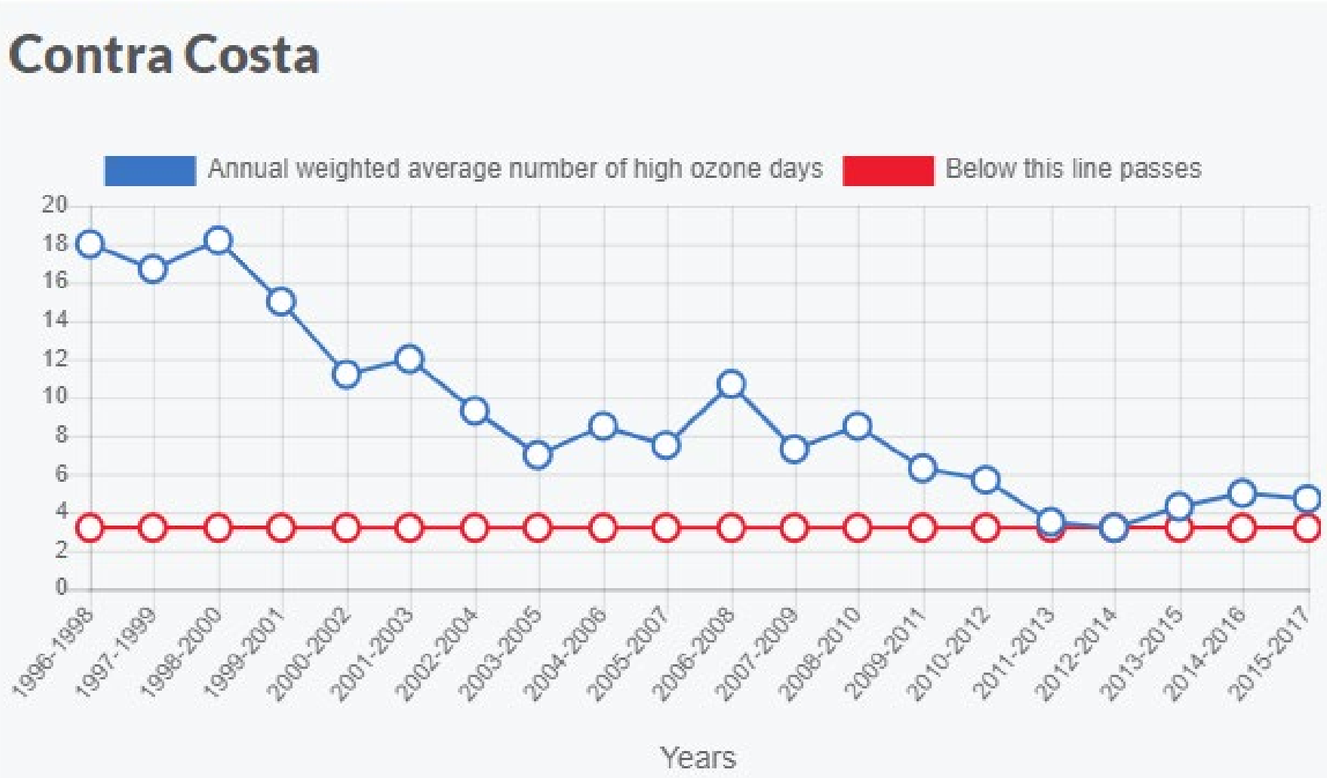


Ozone Pollution has worsened in recent years

High Ozone Days

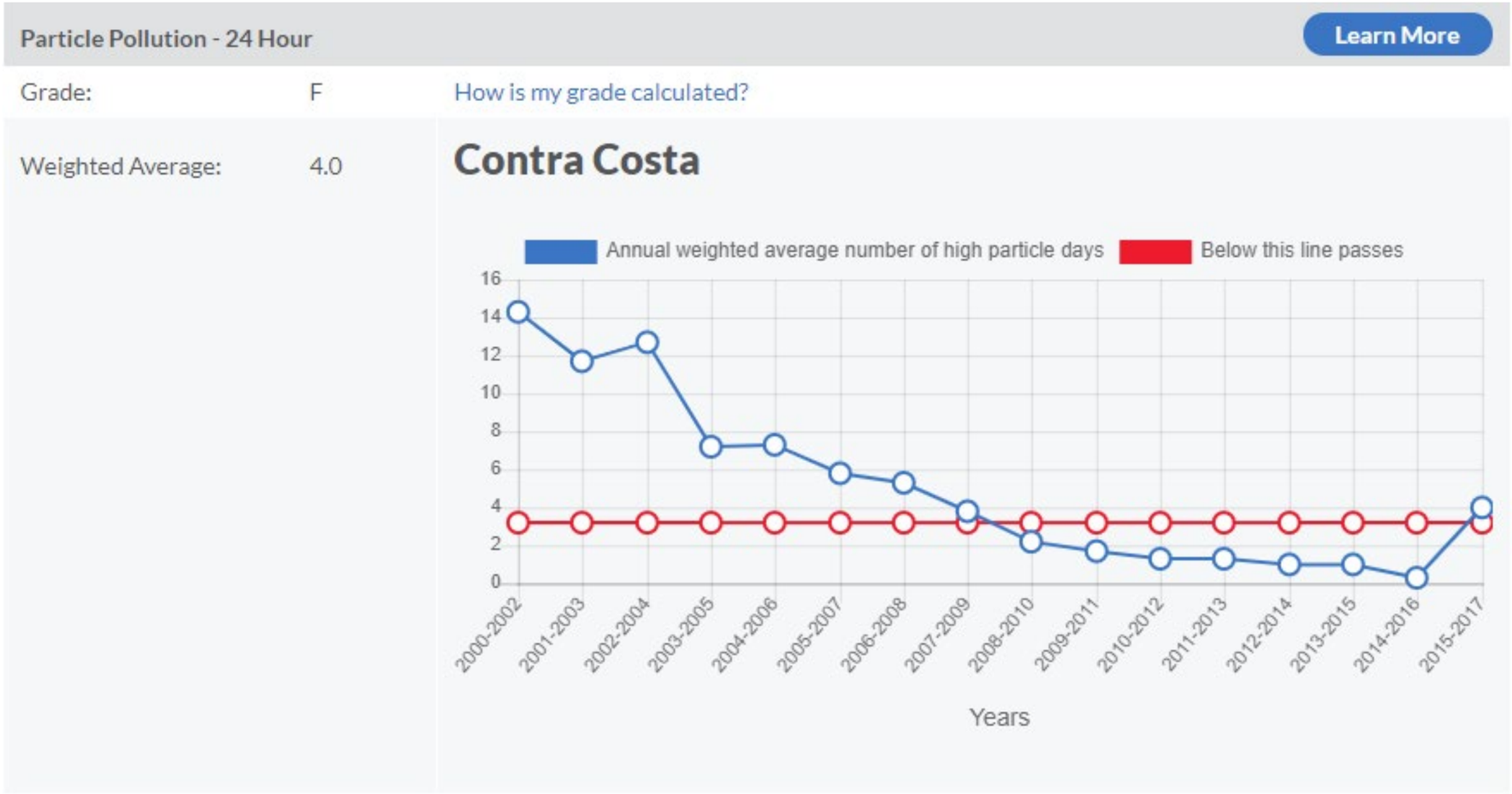
Learn More

Ozone Grade:	F	How is my grade calculated?
Weighted Average	4.7	



Source: https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/california/contra-costa.html

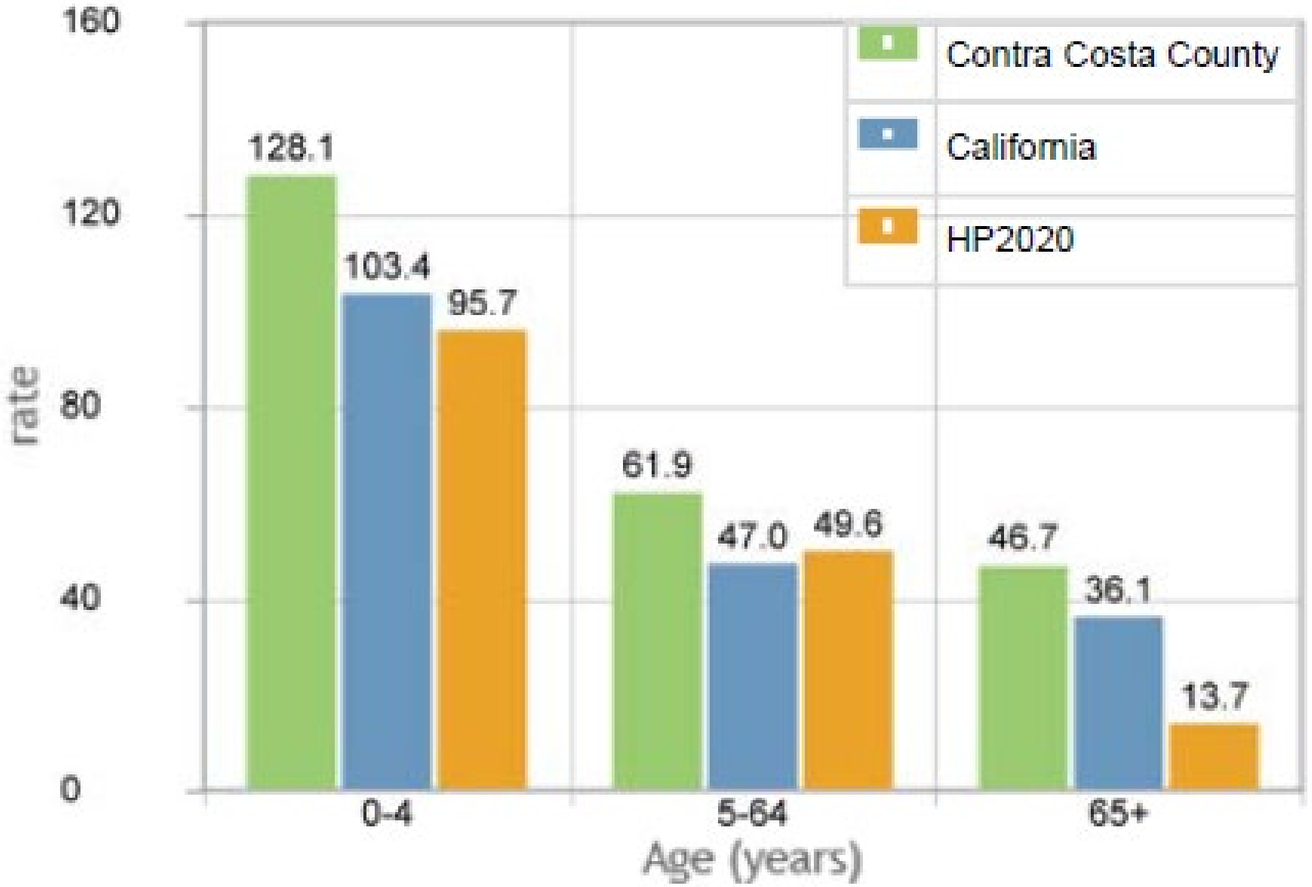
Particulate Pollution has worsened in recent years



Source: https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/california/contra-costa.html

Asthma Severity is above the Healthy Person 2020 target levels

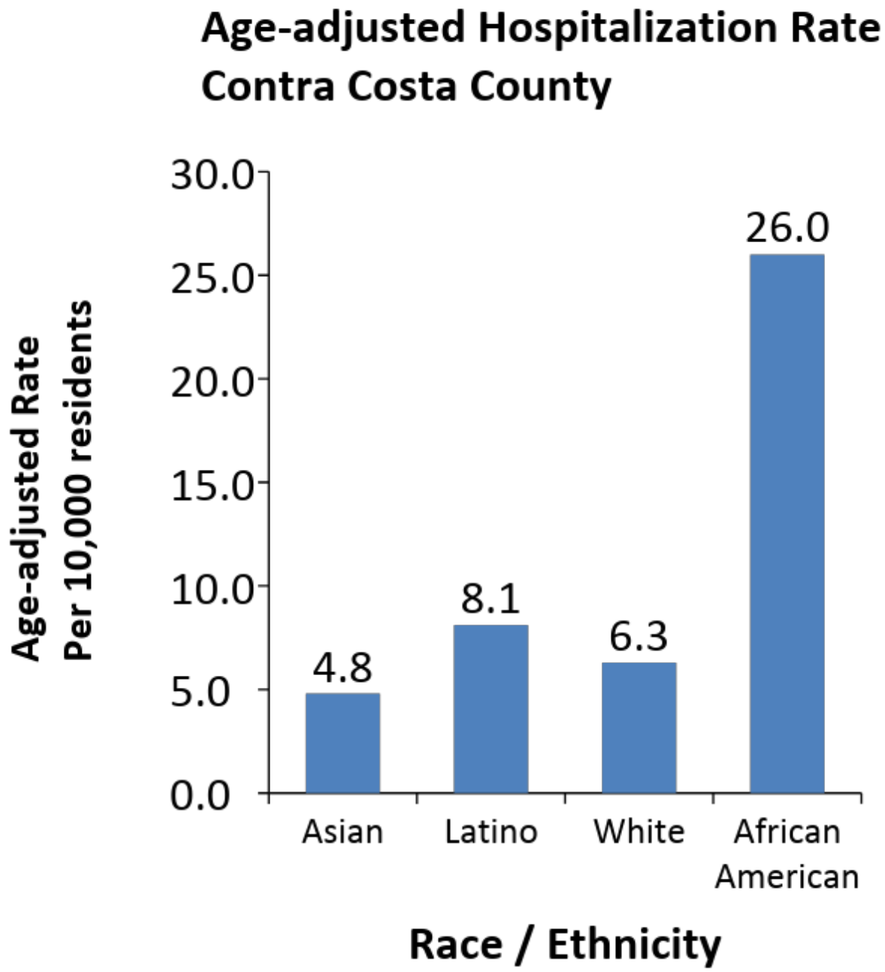
Asthma ED Visits per 10,000 Residents by Age Compared to California and HP2020 Targets, 2014



Source: California Healthy Breathing; Office of Statewide Health Planning and Development

Asthma hospitalizations are more frequent among African-Americans

Asthma Hospitalizations by Race/Ethnicity, 2014

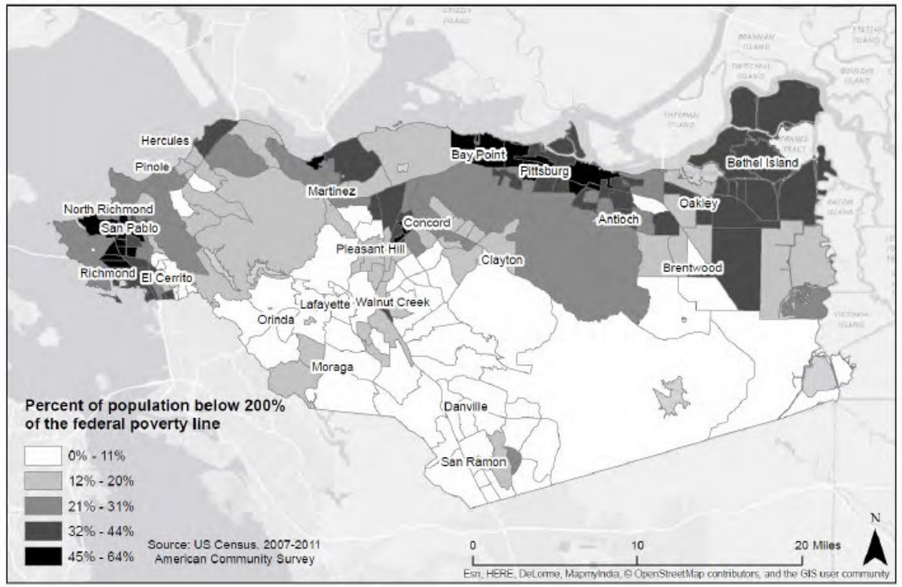


Source: California Breathing, Contra Costa County Asthma Profile, September 2016

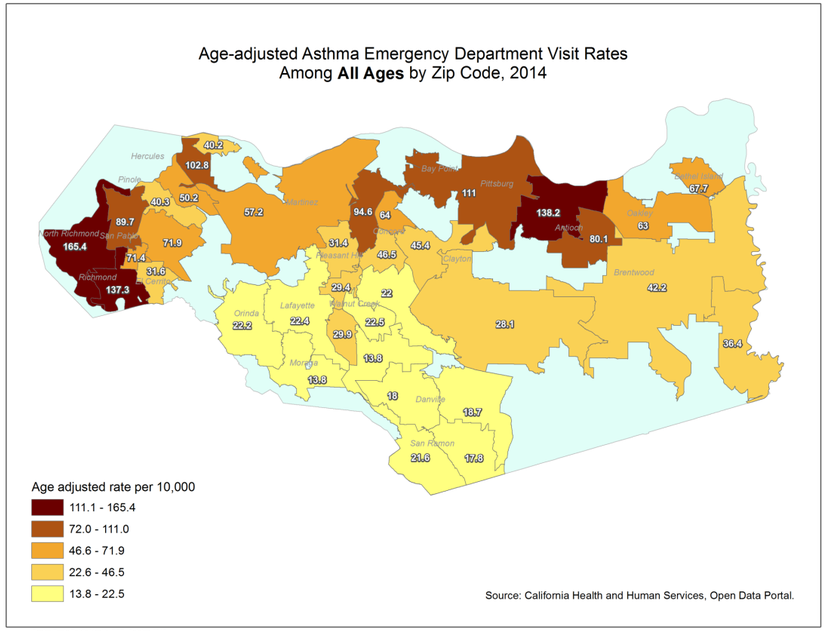
Asthma Disproportionately Affects the Poor

Percentage of Population Below 200% of the Federal Poverty Level, 2007-2011

Figure 10: Percentage Of Population Below 200% Of The Federal Poverty Level, 2007–2011



Age-adjusted Asthma Emergency Department Visit Rates Among **Children** by Zip Code, 2014



Contra Costa Public Health, EPE, October 2018.

Air Quality Affects Health
Air Quality is Worsening
Health Outcomes are Worse in CCC
and even worse in West CCC

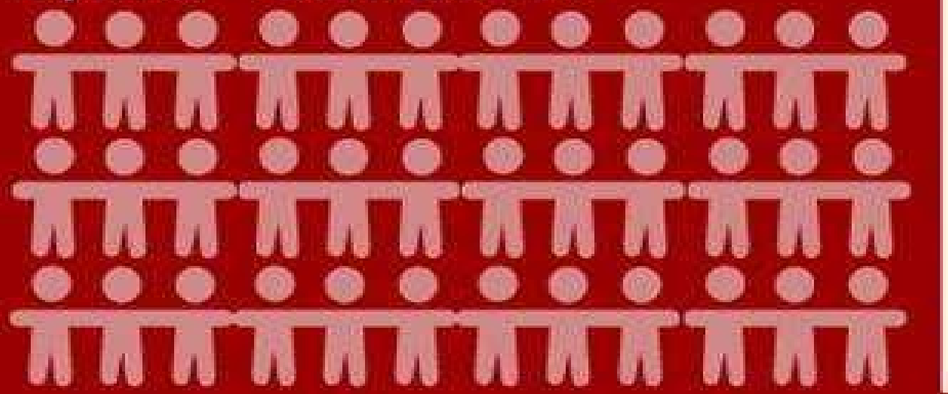
Is there hope?

Cleaner Air = Healthier Lungs

USC Researchers find less pollution in LA area is associated with better lung function in children

USC CHILDREN'S HEALTH STUDY

2,120 Children



5 SoCal Communities

WHAT WAS MEASURED ?

Lung function

3 groups of kids were tested from 11-15 years of age.
Group 1 was tested: 1994-1998
Group 2 was tested: 1997-2001
Group 3 was tested: 2007-2011

Pollution

Pollution levels across So Cal have been measured for a period spanning 20 years starting in 1994.

Particles: Coarse (PM10), Fine (PM 2.5)
Gases: Nitrogen Dioxide (NO_2), Ozone (O_3)

The major findings of the study were:

- Lung function deficits associated with nitrogen dioxide, atmospheric acidity, PM 2.5 and PM10.
- Children living in high ozone communities, who are especially active, are up to three times more likely to develop asthma.
- Children living near roadways with high traffic have an increased risk for asthma diagnosis.
- Short-Term exposures to elevated ozone levels associated with increase (up to 1.3 million per year) in school absences from respiratory illnesses and asthma attacks.
- Children who move to cleaner communities have improvements in lung function growth rates. This means that even small reductions in air pollution can have immediate benefits to the long-term respiratory health of children living in polluted communities.

Ref: Guaderman et. al.:The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age. N Engl J Med 2004; 351:1057-1067

POLLUTION DOWN, LUNG HEALTH UP

Air quality in the Los Angeles basin, as measured in five cities by USC researchers, improved over two decades. That provided a more healthful environment for children's growing lungs.

AIR POLLUTION

Nitrogen dioxide

33%

Fine particles

47%

CHILDREN'S LUNGS

In 1998, nearly eight of 100 15-year-olds had significant lung deficits.

By 2011, only about 3 1/2 of 100 15-year-olds had significant lung deficits.

Source: USC Children's Health Study

USC Graphic by Molly Zisk

Indoor Air Quality and Asthma

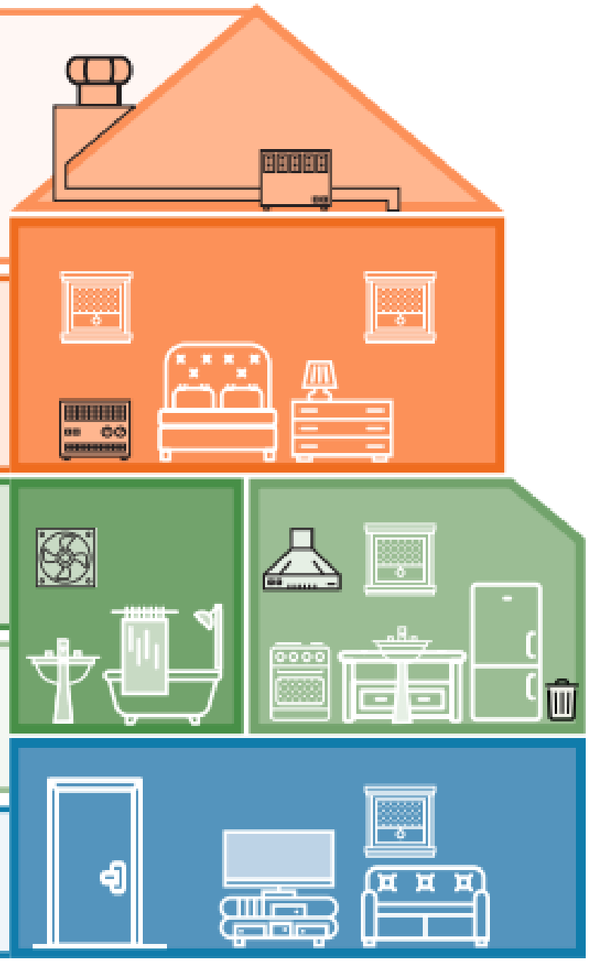
Inadequate ventilation, which increases exposure to indoor and outdoor air pollution and increases moisture and mold, is associated with an increased risk of respiratory symptoms, cardiovascular disease, and cancer;[7]

Improper heating and cooling combine with temperature extremes from climate change that can exacerbate illnesses or cause death;[9]

Indoor moisture and mold contribute to respiratory diseases, such as asthma;[6]

Pests, such as cockroaches and rodents, are connected to a range of communicable and respiratory diseases;[8]

Stress from unhealthy housing conditions can have mental health impacts, including depression.[10]



Community messaging during unhealthy air days (wildfire smoke, ozone, etc.)

Developing a robust wildfire smoke emergency response plan

Identify, support and promote “Cleaner Air Centers” as daytime respite locations for homeless and those with poor indoor air quality

Develop robust messaging aligned with messaging from state and regional agencies

Develop automated text messaging to send to asthma patients during smoke events

Additional Actions:

- CCHP Home Visiting Nurse Pilot
- Green and Healthy Homes Initiative - weatherization
- Board of Supervisors Ad Hoc Committee on Childhood Asthma
  - Bring stakeholders together to develop overall strategy
- Children's Leadership Council
  - Kickoff meeting March 27, 2019
- Support a state wellness fund for chronic disease prevention
  - Possibly funded by a sugar sweetened beverage tax
- Build healthy living into the county general plan revision
  - Bike lanes, parks, public transportation
  - Reduce point sources of pollution (i.e. industry)
  - Reduce mobile sources of pollution (diesel, gasoline vehicles)
- Address the affordable housing crisis
  - Help homeless become housed
  - Help those in substandard housing move to better, healthier housing

Causation can be hard to pinpoint

Correlation is strong enough to mitigate air pollution for better human health

What We Know: Air Quality in the Richmond-San Pablo Area

What we know about Air Quality in the Richmond/San Pablo Area

- Patterns of how air moves around the Richmond/San Pablo area, and how that influences air quality

- Air quality information from measurements
  - Monitoring locations
  - Patterns and trends of $PM_{2.5}$ and air toxics

Dan Alrick

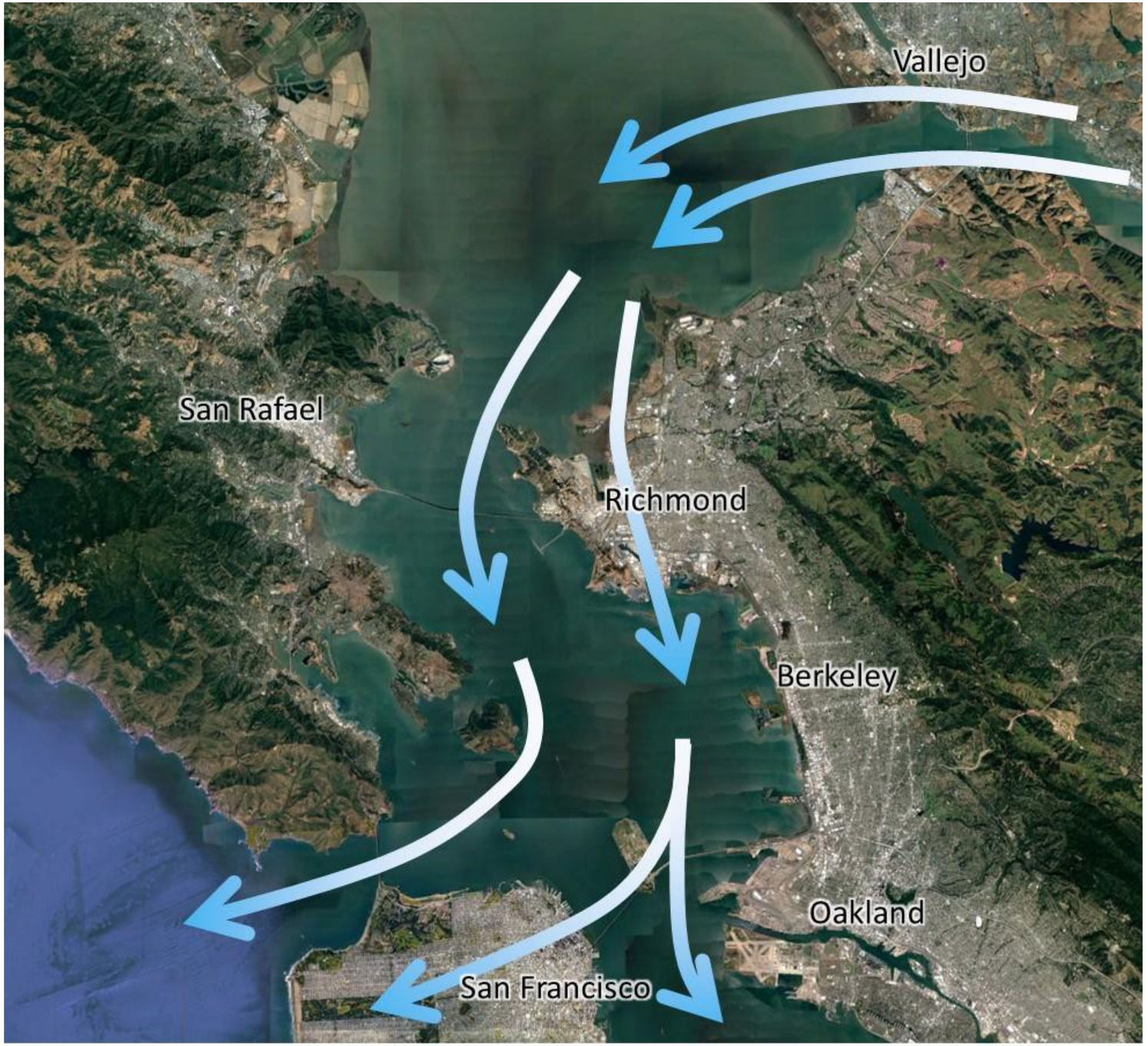
Bay Area AQMD

Typical spring to summer wind flow at the surface

- Winds from the south across Richmond, stronger in the afternoon & early evening (commonly referred to as onshore winds)
- Winds typically much lighter in the late night & morning

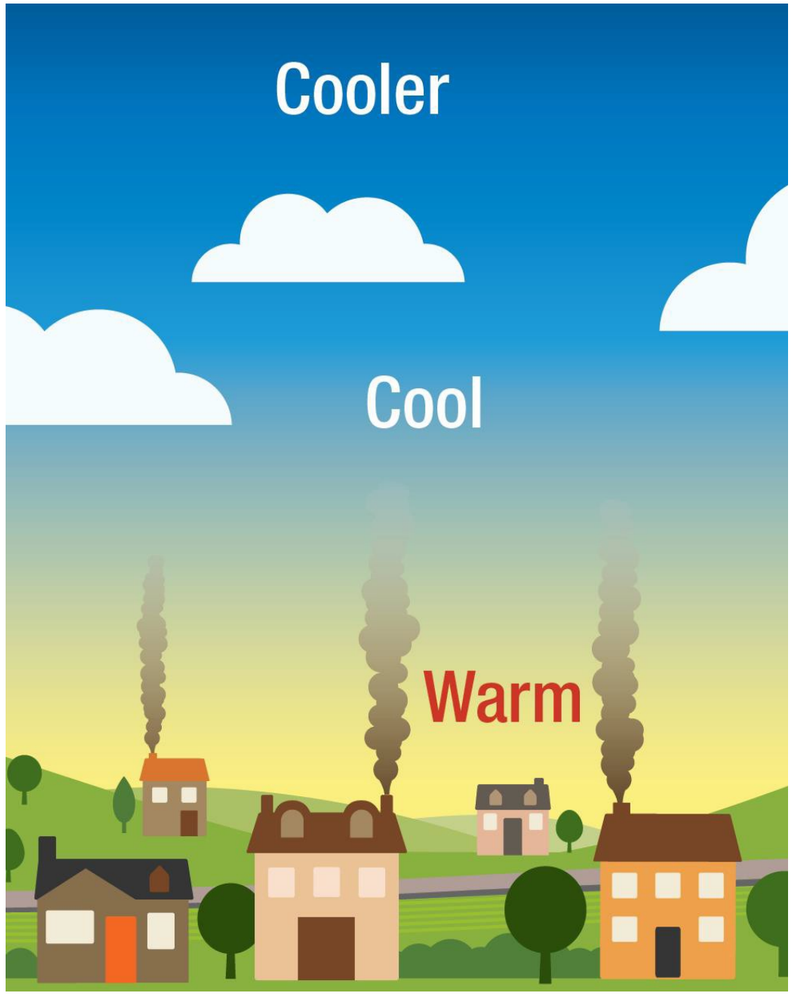
Typical autumn to winter wind flow at the surface

- Winds are generally from the north across Richmond (commonly referred to as offshore winds)
- Note: During stormy periods, winds are generally stronger & from the south or southwest (opposite of direction shown on map)

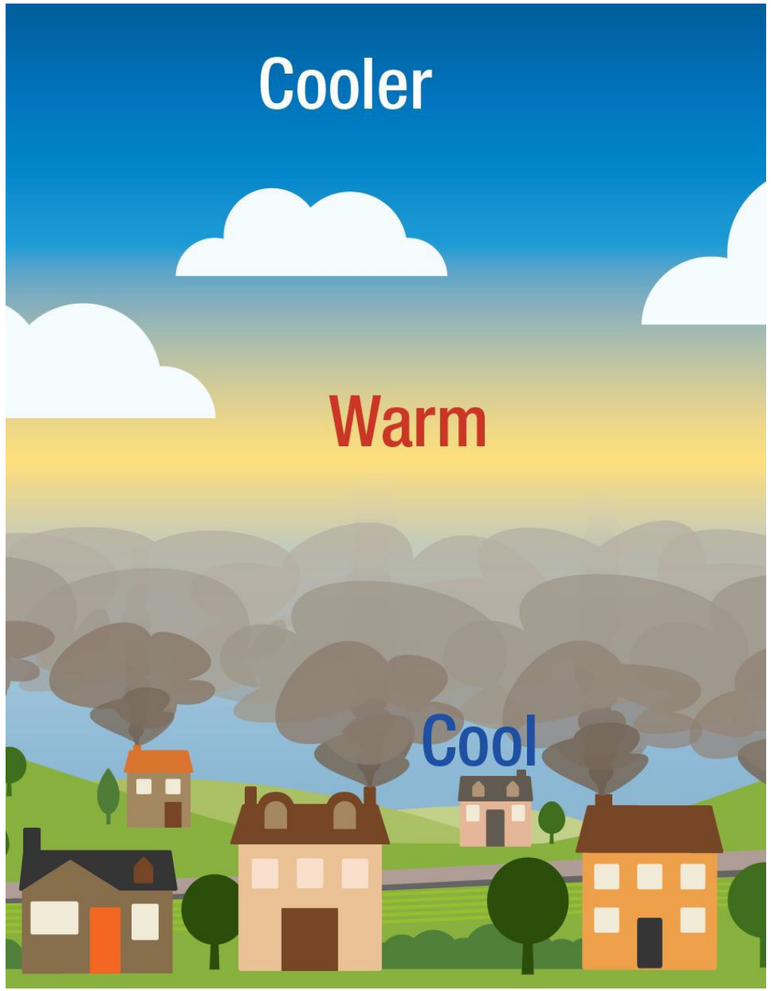


Vertical mixing and inversions

- Air quality is typically better during windy periods with good vertical mixing (storms moving through)
- Air quality is typically worse during stagnant periods when vertical mixing is reduced by temperature inversions



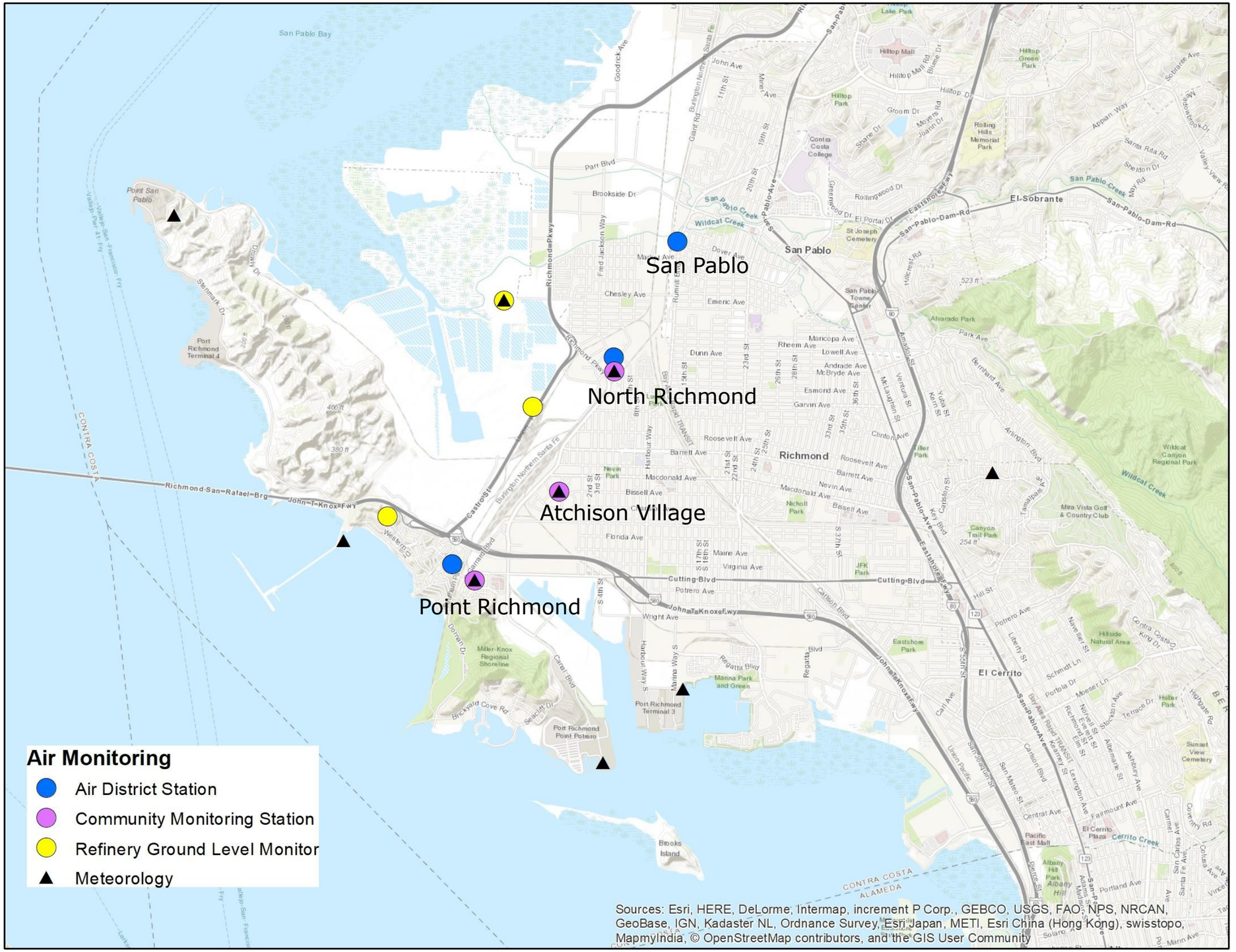
Good vertical mixing: Temperatures decrease with elevation



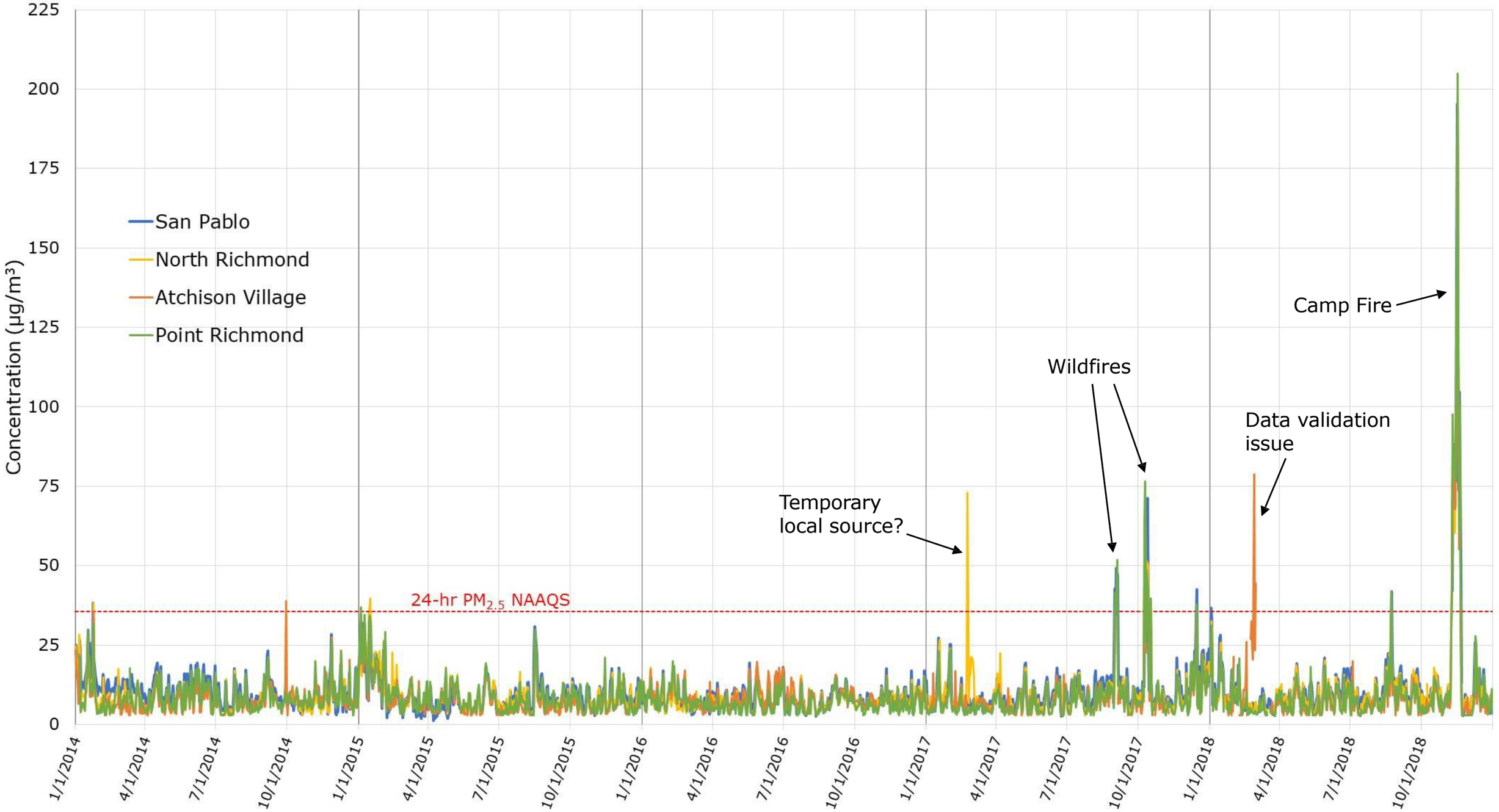
Poor vertical mixing: Layer of temperature increase with elevation

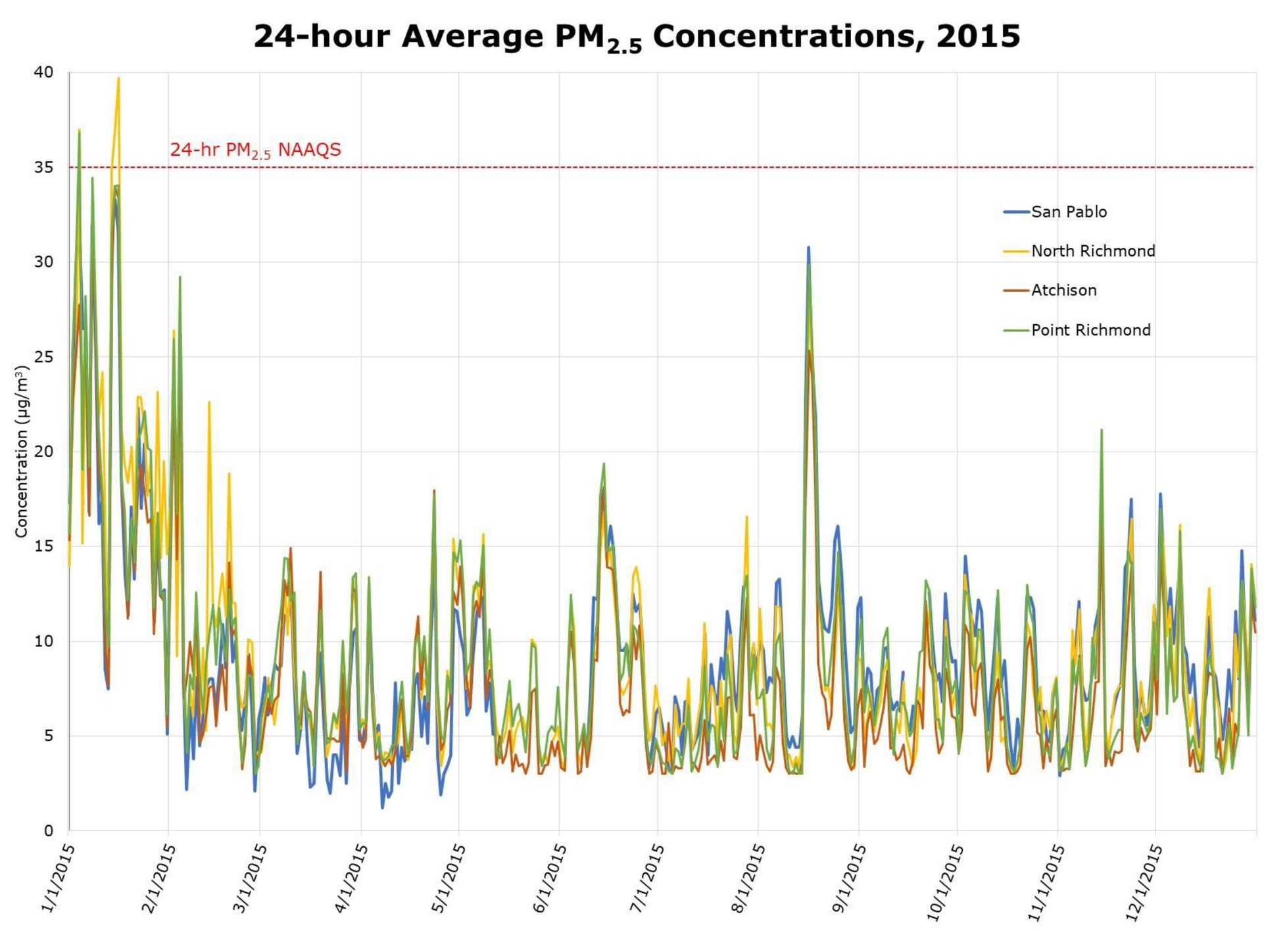
Air Monitoring Sites

- Full regulatory site at San Pablo
- Air monitoring has historically been focused around Chevron
- Air District is summarizing existing data sets, including from the Community Monitoring Stations



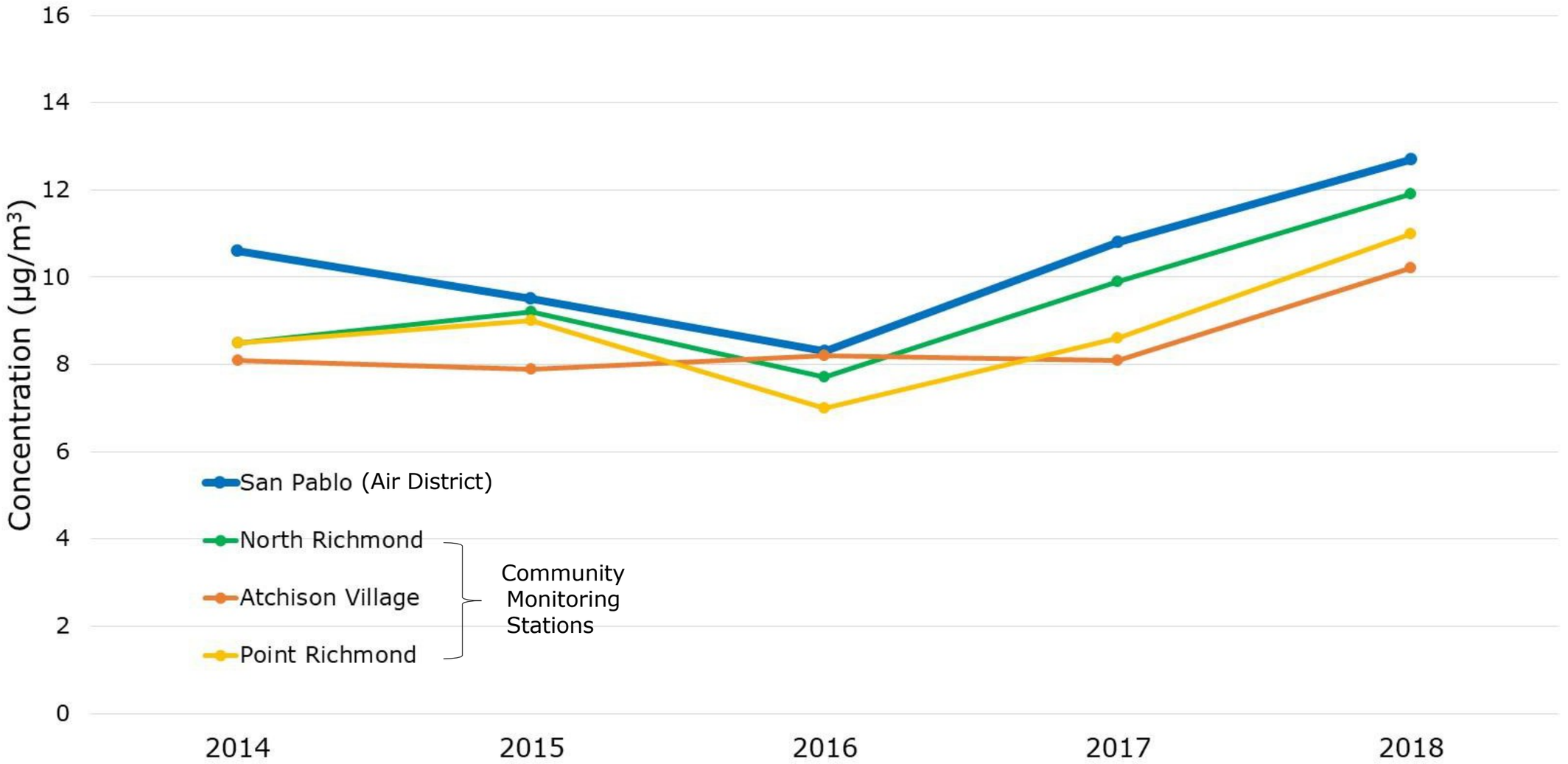
24-hour Average $PM_{2.5}$ Concentrations





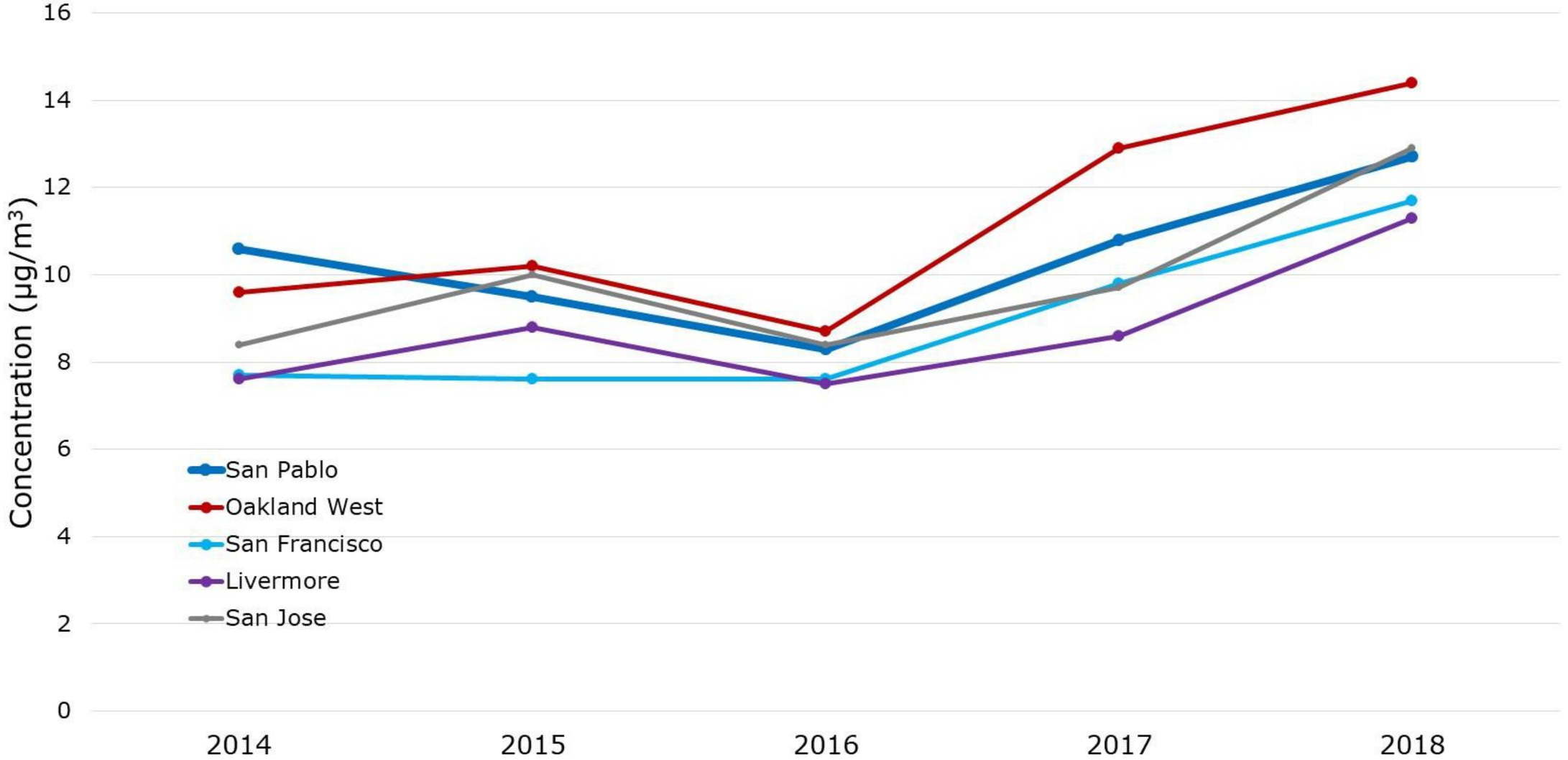
- $PM_{2.5}$ data follow similar day-to-day patterns, driven by regional air quality and meteorology
- Local sources may cause one station to temporarily show higher $PM_{2.5}$ than others stations

Annual Average $PM_{2.5}$ Concentrations

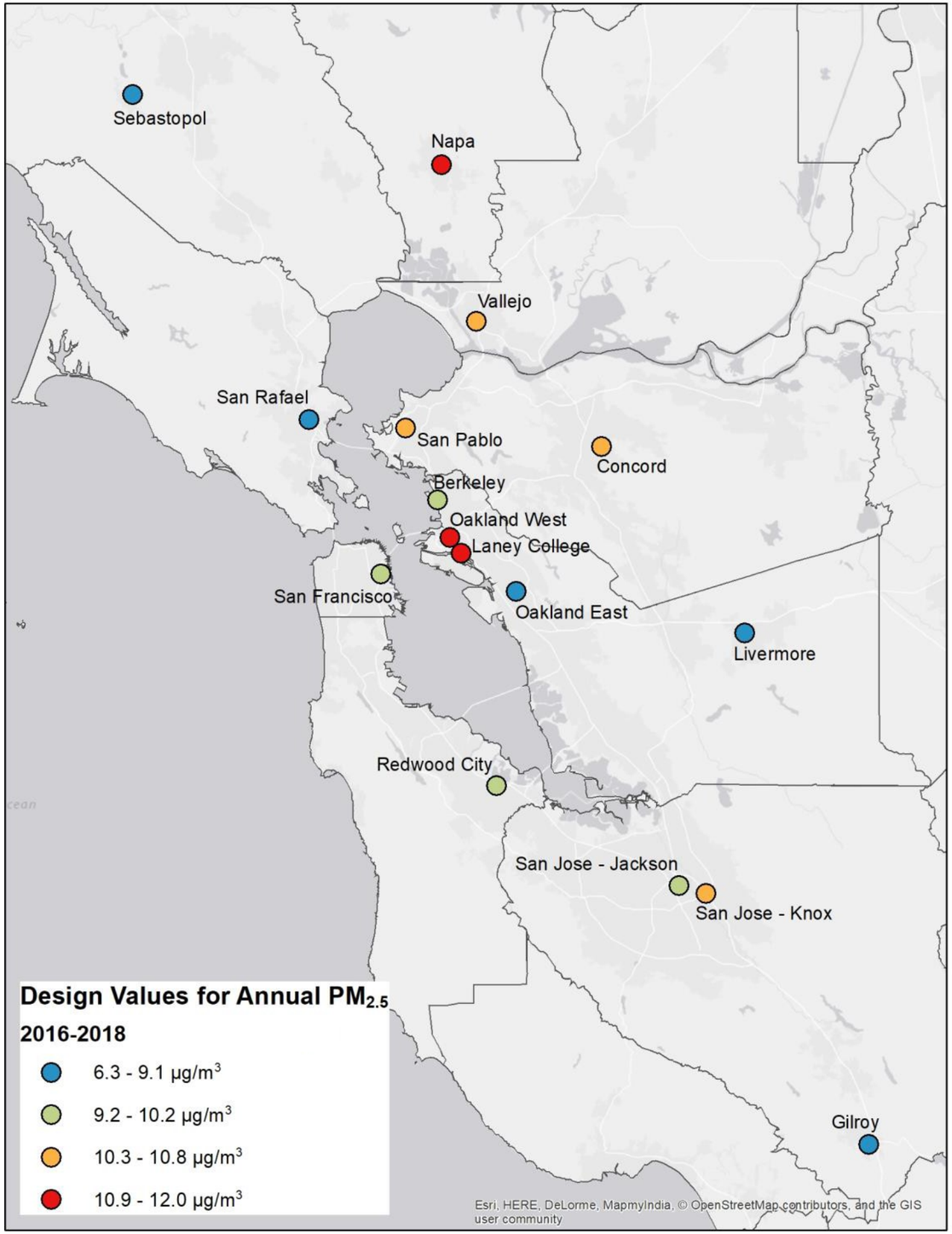


- Annual averages are similar across stations (within 2-3 µg/m³), with San Pablo slightly higher than the other stations but within typical error range of the instrumentation
- Increases in 2017 & 2018 are largely attributable to wildfire smoke

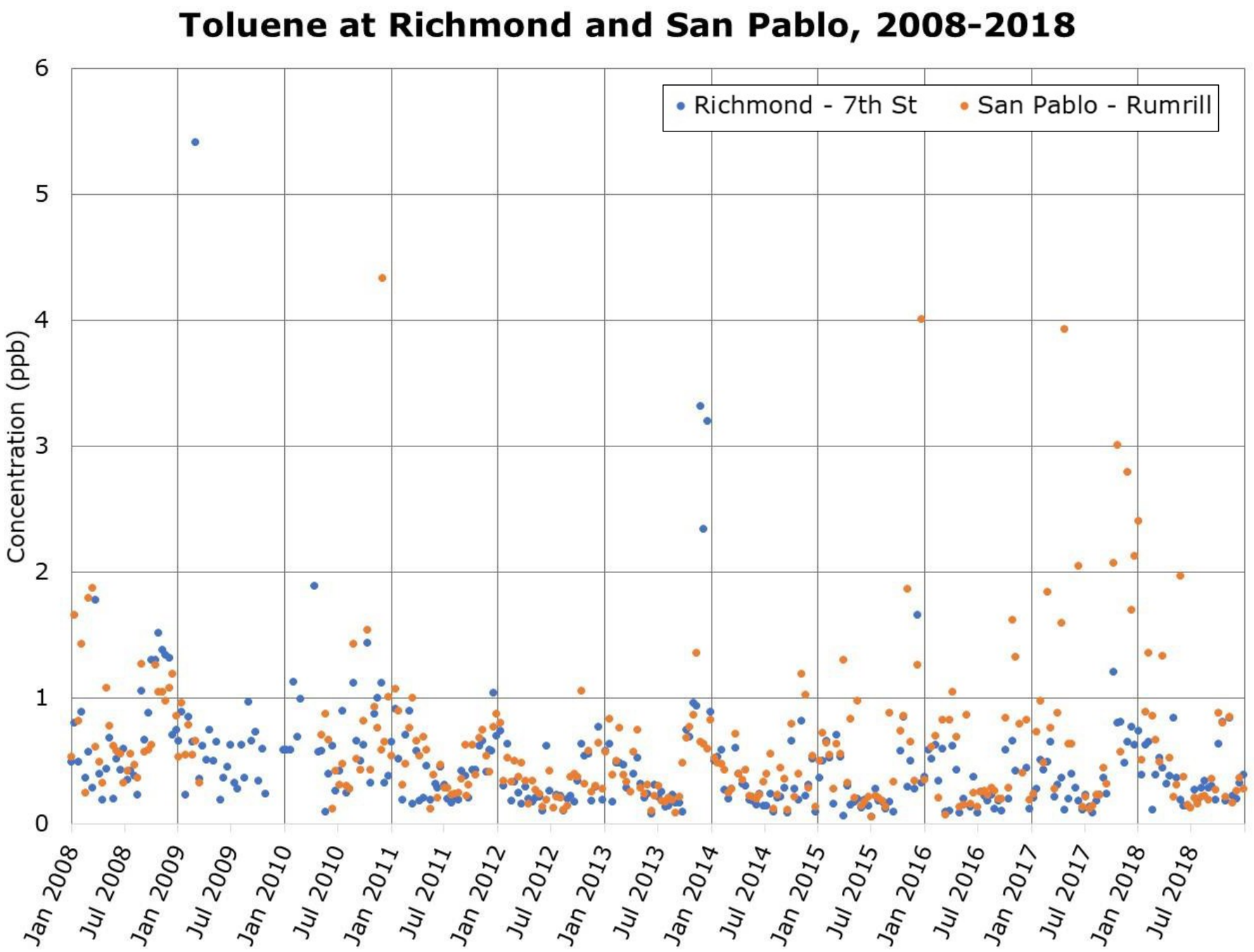
Annual Average $PM_{2.5}$ Concentrations



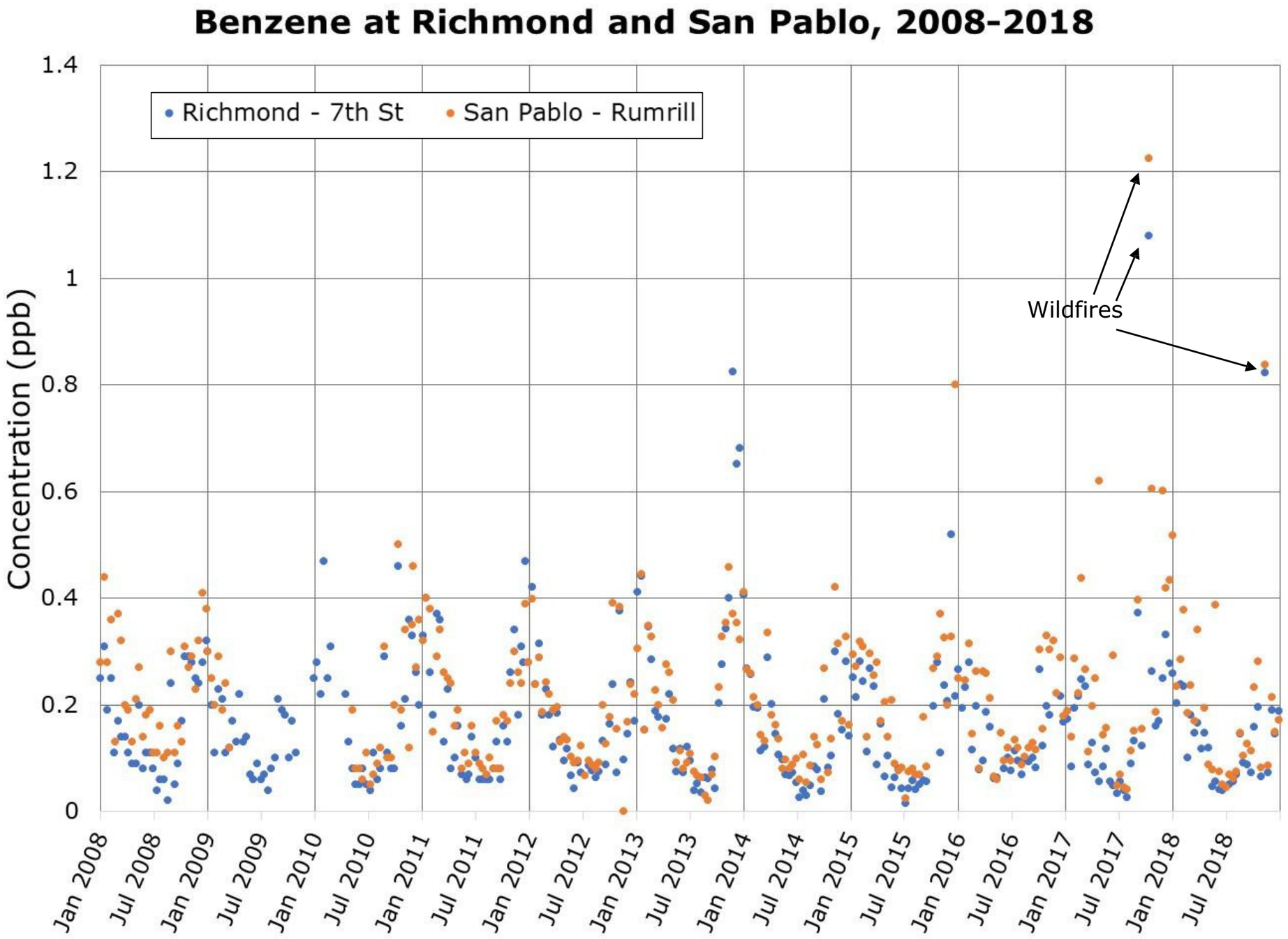
- Annual averages across stations within 2-4 µg/m^3, with Oakland West higher than the other stations
- 2016 was a notably stormy year, resulting in lower $PM_{2.5}$ concentrations regionally
- Increases in 2017 & 2018 are largely attributable to wildfire smoke



Another way to track air quality trends over time or geography is with Design Values, a measure used by EPA to determine whether areas are in attainment of air quality standards



- Air District measures air toxics data (such as benzene and toluene) on a 1-in-12 day schedule)
- Measured data are generally low with occasionally higher readings
- These measurements are designed for longer-term toxics trends analysis, and not necessarily detection of very localized or temporary sources



- Air District measures air toxics data (such as benzene and toluene) on a 1-in-12 day schedule
- Measured data are generally low with occasionally higher readings, sometimes driven events such as wildfires
- Benzene measurements at Richmond and San Pablo have been comparable and follow a seasonal cycle (higher in winter)

Where to Download Data

- $PM_{2.5}$ and Air Toxics data for regulatory air quality monitors across the United States can be downloaded here: https://aqs.epa.gov/aqsweb/airdata/download_files.html
  - Scroll down to “Daily Summary Data” section
    - Then scroll down to “Particulates” for $PM_{2.5}$ data
    - Then scroll down to “Toxics, Precursors, and Lead” for air toxics data

- Or, $PM_{2.5}$ (and other criteria pollutants) can be downloaded for selected regulatory monitors here: https://www.epa.gov/outdoor-air-quality-data/download-daily-data

Questions?

Contact:

Dan Alrick
Principal Air and Meteorological Monitoring Specialist
dalrick@baaqmd.gov

Additional Resources

Air quality data and tools:

- National current air quality data (EPA/AirNow) - www.airnow.gov
- Local current air quality data (Air District) - www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data
- Historical air quality data (EPA) - https://www.epa.gov/outdoor-air-quality-data
- Air quality trends (EPA) - https://www.epa.gov/air-trends
- National emissions inventory (EPA) - https://gispub.epa.gov/neireport/2014/
- National air toxics assessment (EPA) - https://www.epa.gov/national-air-toxics-assessment
- Real time geospatial data viewer (EPA) - https://www.epa.gov/hesc/real-time-geospatial-data-viewer-retigo

Air quality and health:

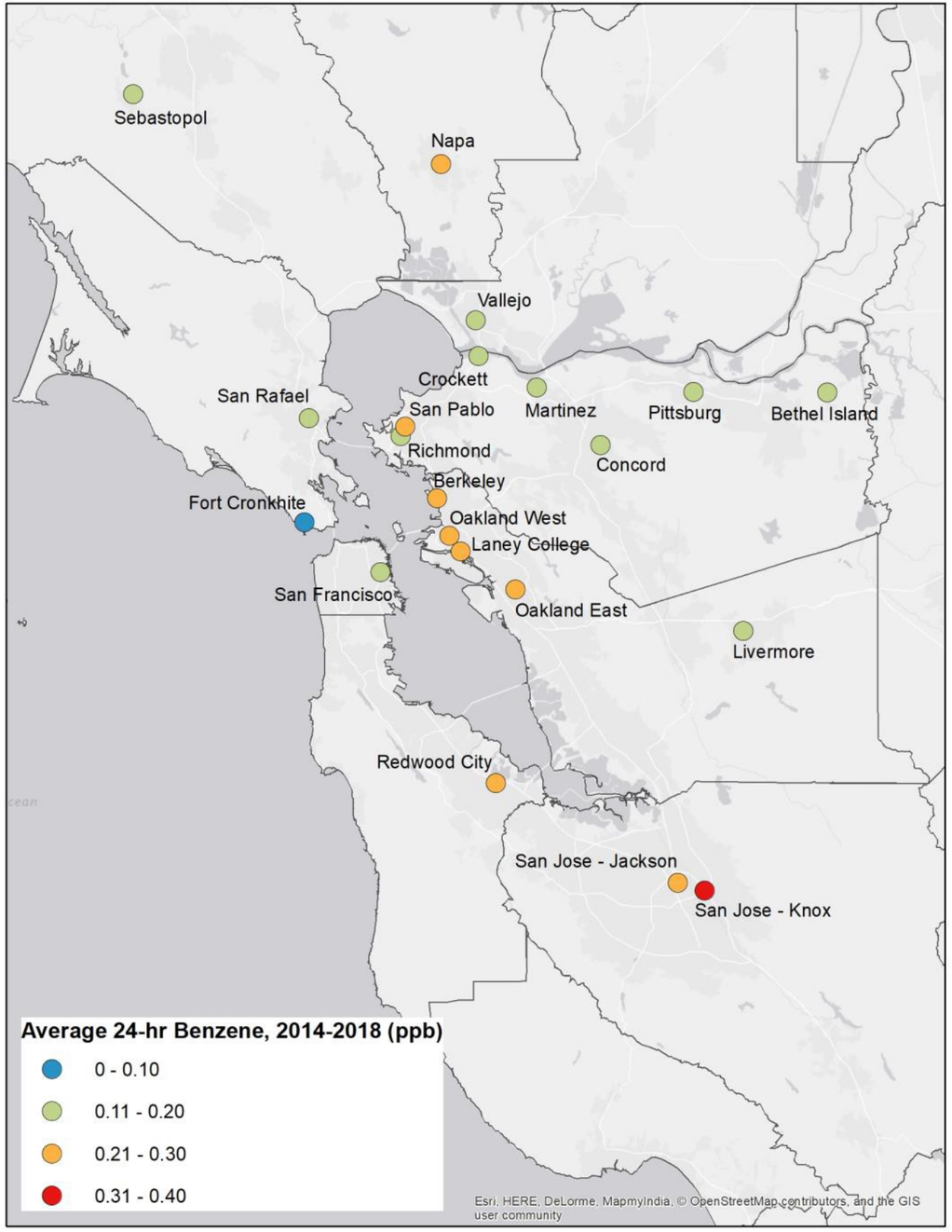
- Particulate matter and health effects (EPA) - https://www.epa.gov/pm-pollution
- Hazardous air pollutants and health effects (EPA) - https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants

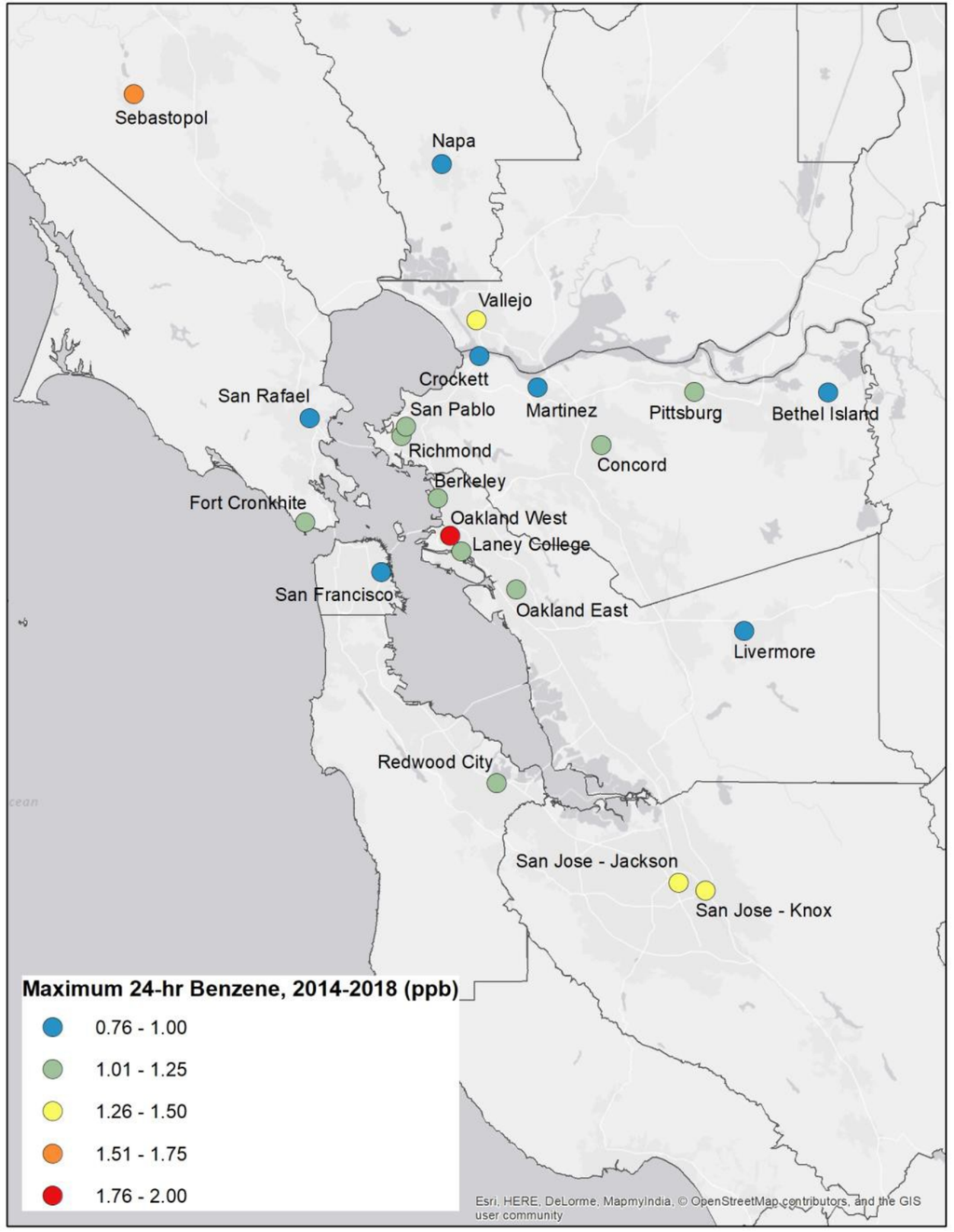
Screening tools:

- CalEnviroScreen - https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30
- Healthy Places Index - https://healthyplacesindex.org/
- Tracking California - https://trackingcalifornia.org/

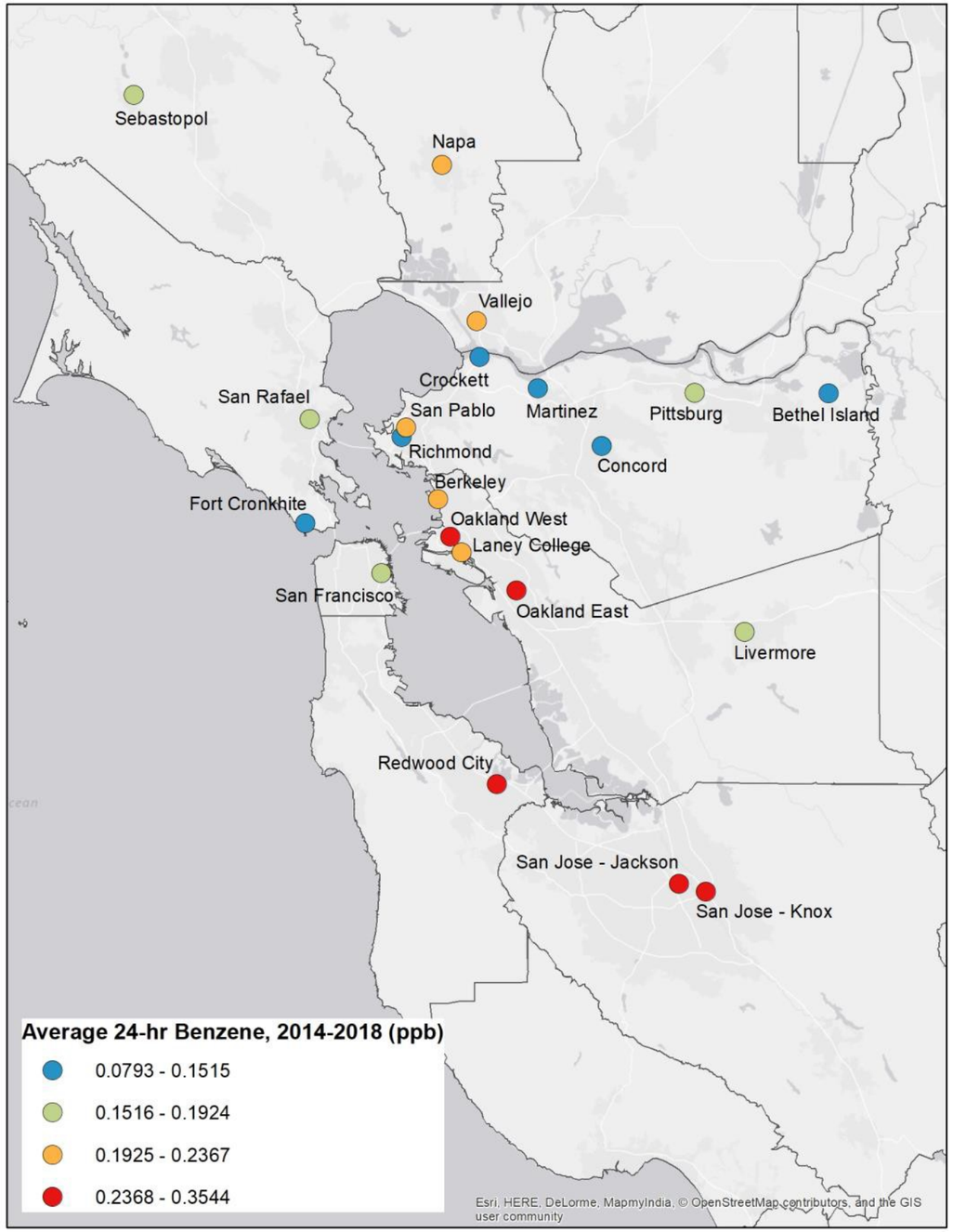
Links to AB-617 pages:

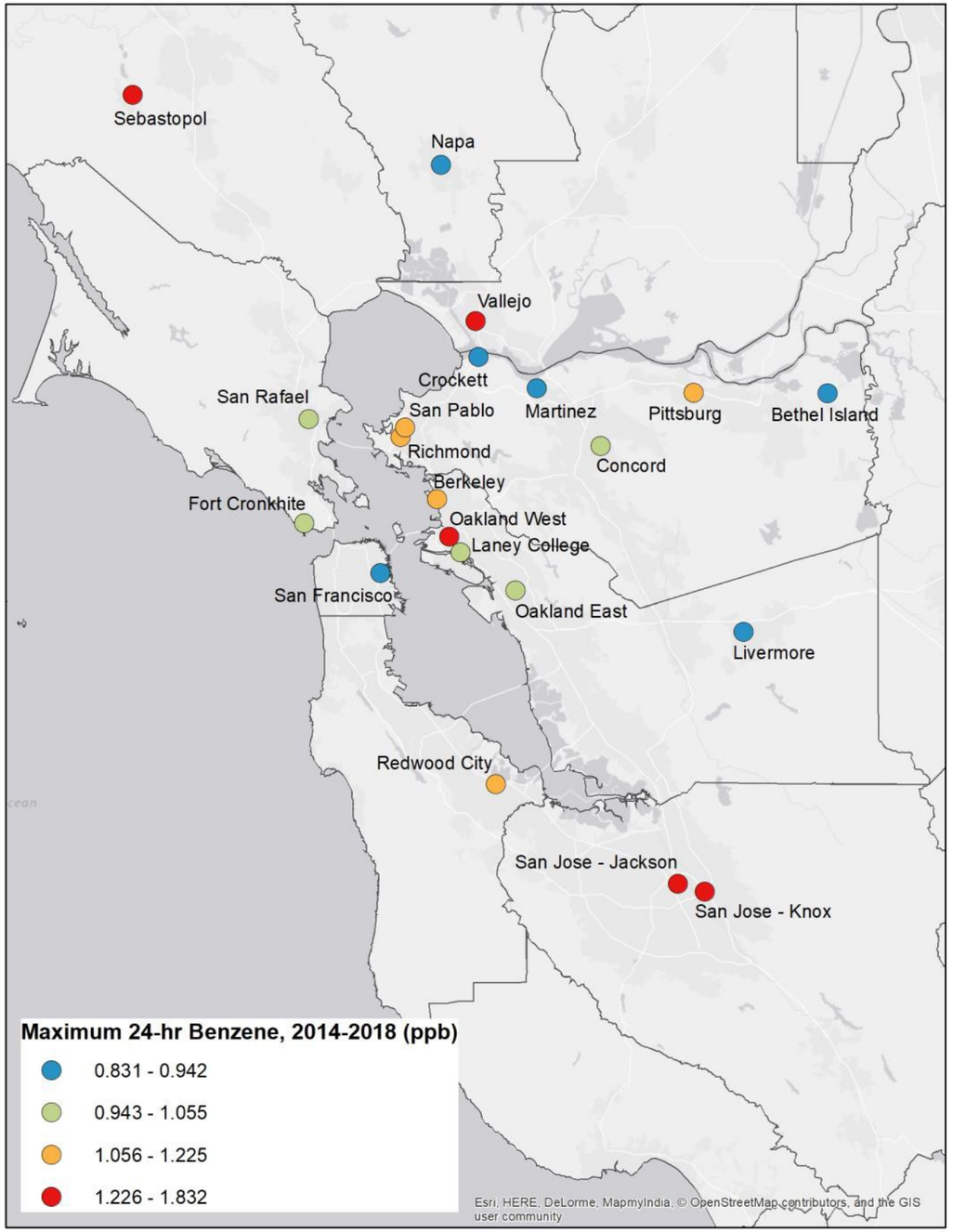
- Community Air Protection Program homepage (CARB) - https://ww2.arb.ca.gov/our-work/programs/community-air-protection-program
- Richmond/San Pablo community health protection program (Air District) - http://www.baaqmd.gov/community-health/community-health-protection-program/richmond-area-community-health-protection-program





(Data binned at equal intervals)





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Group Activity

Activity Objectives

- Identify the areas or pollutants that the community is concerned about

- Discuss high-priority areas for monitoring

- Discuss monitoring approaches

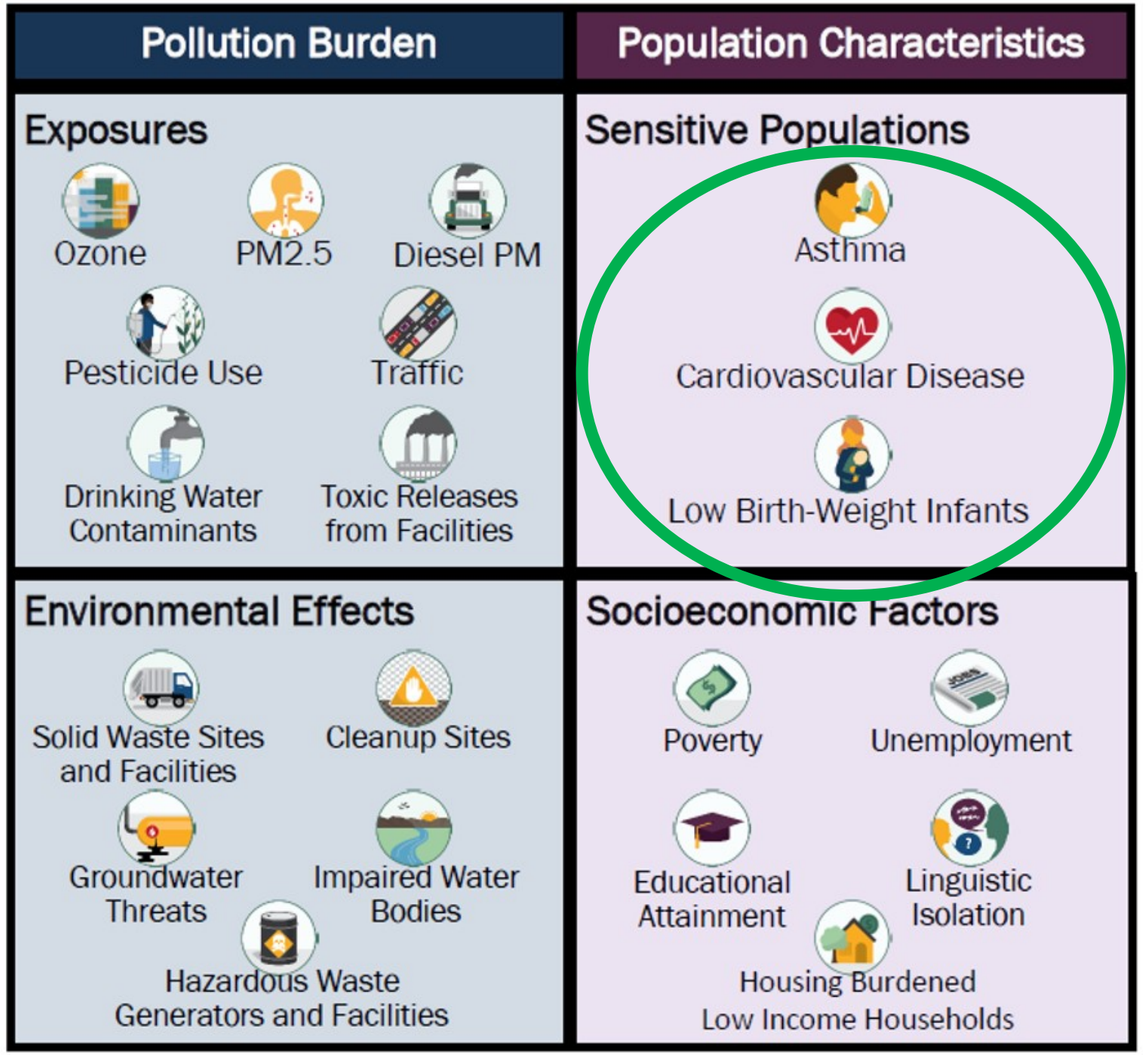
Interactive map in Google Maps with shareable URL:
https://bit.ly/2HcNav5

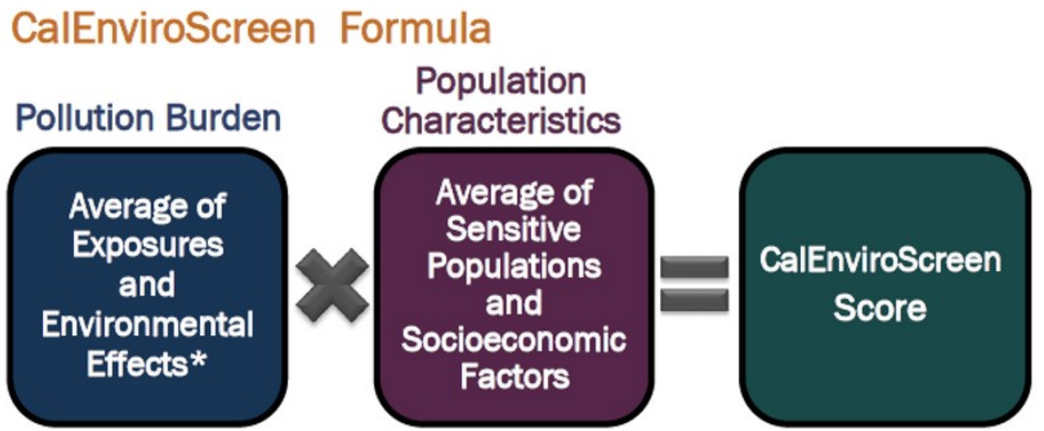
Data layers on the map include:

- Air District permitted facilities locations
- Air monitoring locations
- Health burden census-tract data
  - Asthma percentiles*, cardiovascular disease percentiles*, and low birth weight percentiles* (CalEnviroScreen 3.0)
  - Life expectancy percentiles* (Healthy Places Index)
- Sensitive receptors data for Contra Costa County
  - Schools
  - Child care
  - Senior care
  - Hospitals/clinics
- Air District regional modeling for $PM_{2.5}$, diesel PM, and cancer risk

*Percentiles across census tracts in California. A census tract at the 75th percentile for asthma has worse asthma rates than 75% of census tracts in California.

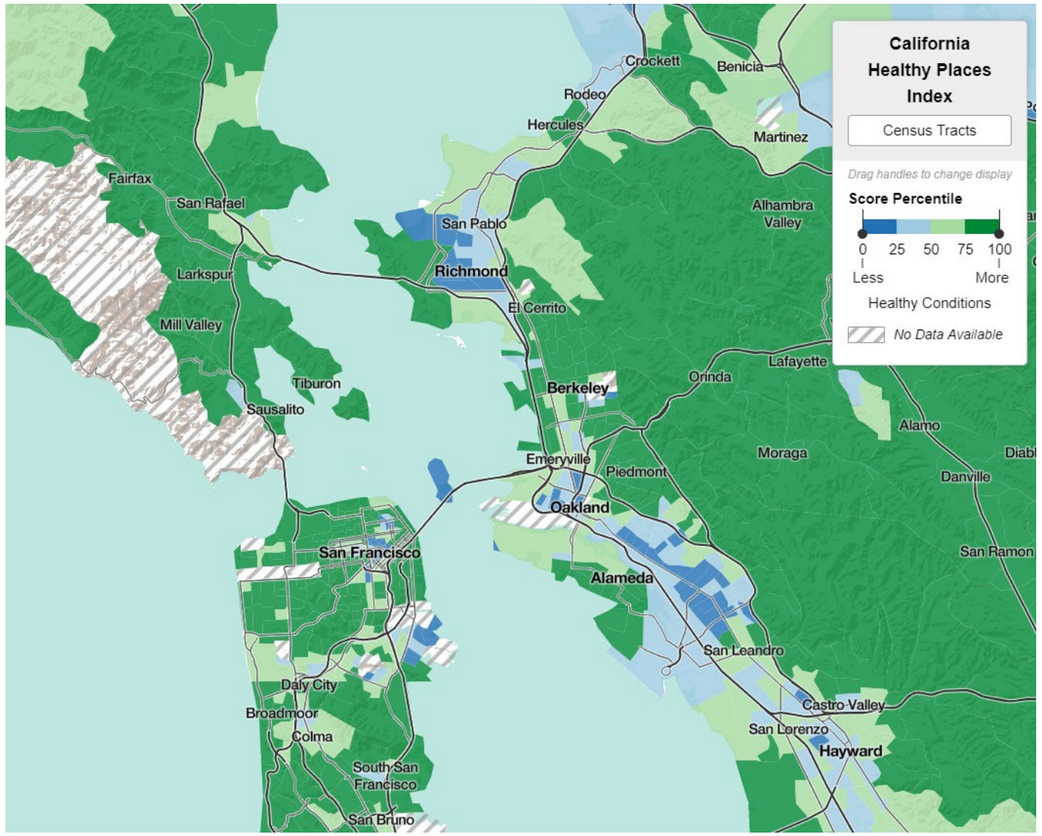
CalEnviroScreen 3.0 Indicators





California Healthy Places Index

- Screening tool developed by the Public Health Alliance of Southern California: https://healthyplacesindex.org/
- County, city, and census tract level data

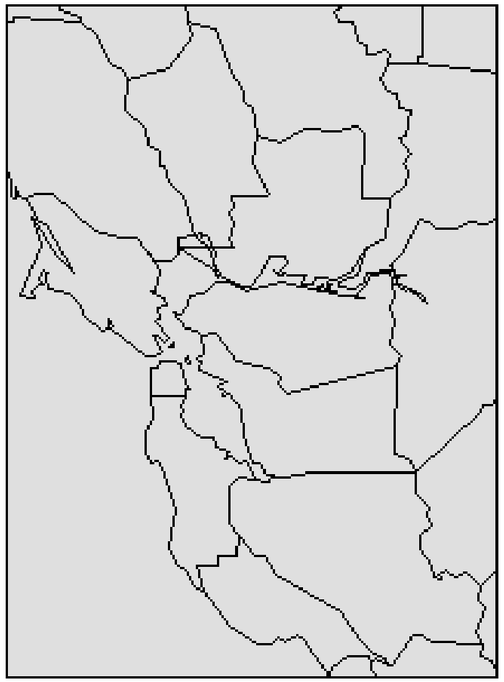


Category	Indicator(s)
Healthcare access	• Insured adults
Clean environment	• Ozone • $PM_{2.5}$ • Diesel PM • Drinking water contaminants
Neighborhoods	• Park access • Tree canopy • Supermarket access • Off-sales alcohol outlets • Retail density
Housing	• Uncrowded housing • Low-income renters • Low-income homeowners • Housing habitability • Homeownership
Transportation	• Automobile access • Active commuting
Education	• In preschool • In high school • Bachelor's education or higher

Regional $PM_{2.5}$ and air toxics modeling

- The EPA's Community Multiscale Air Quality (CMAQ) model was applied at 1-km grid resolution over the Bay Area
- CMAQ uses gridded, hourly meteorological observations and emissions data to estimate annual average pollutant concentrations
- CMAQ reports hourly pollutant concentrations for each grid cell in the modeling domain
- $PM_{2.5}$ and air toxics were modeled for the entire year of 2016

CMAQ 1-km modeling domain



Discussion Questions

1. Identify areas that you are concerned about - no area is too big or too small. In other words, what are our needs for air quality monitoring and why?

- For example, where are there important, sensitive receptors; health vulnerabilities; and/or key sources?

2. Which of the areas of concern and monitoring needs identified in Question 1 should we prioritize and why?

3. What is your objective for collecting additional air quality information in the focus areas?

- Example objectives include screening for hot spots, providing real time information to the public for personal decision making or conducting specialized monitoring to determine sources of elevated pollution.

Public Comments

Next Steps

Next Steps

- Next Steering Committee meeting:
  - **June 19, 2019, 6-8 pm**
  - San Pablo Library, Community Room

- **RSVP** for the June 19th meeting by **June 12th**
  - https://forms.gle/rHuJPgM5MJ2CCaRY8

Steering Committee Meeting Schedule

- June 19, 6:00 – 8:00 pm

- July 10, 6:00 – 8:00 pm
- August 14, 6:00 – 8:00 pm
- September 11, 6:00 – 8:00 pm

- October 9, 6:00 – 8:00 pm
- November 13, 6:00 – 8:00 pm
- December 11, 6:00 – 8:00 pm

To view Steering Committee agendas, minutes and PowerPoint presentations online, visit:

http://bit.ly/Richmond-SanPablo-CommunityHealth

Richmond – San Pablo Community Air Monitoring Plan
Steering Committee Meeting#3

May 15, 2019