

# 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<sub>2.5</sub> and air toxics

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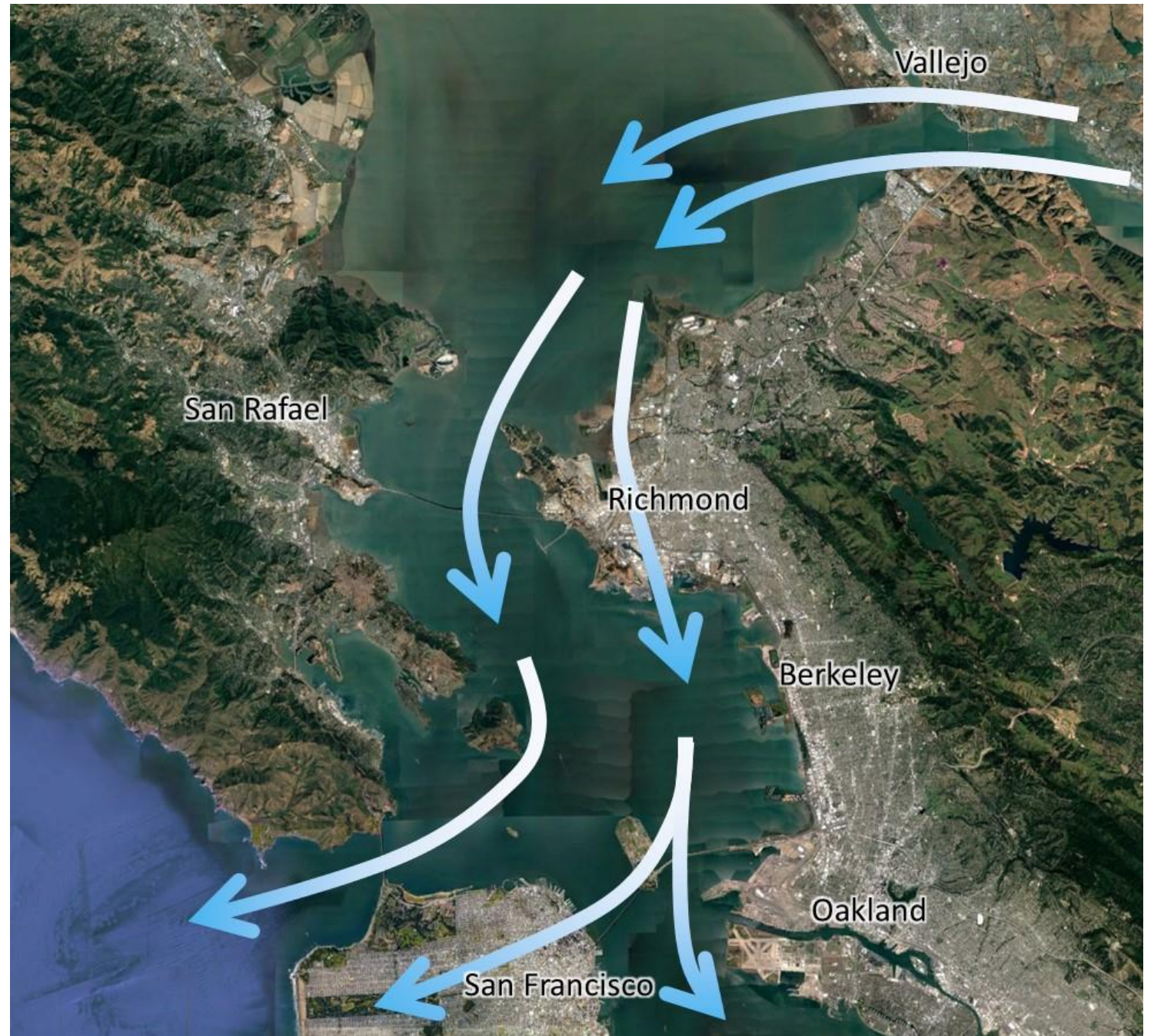
## Typical spring to summer wind flow at the surface

- 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



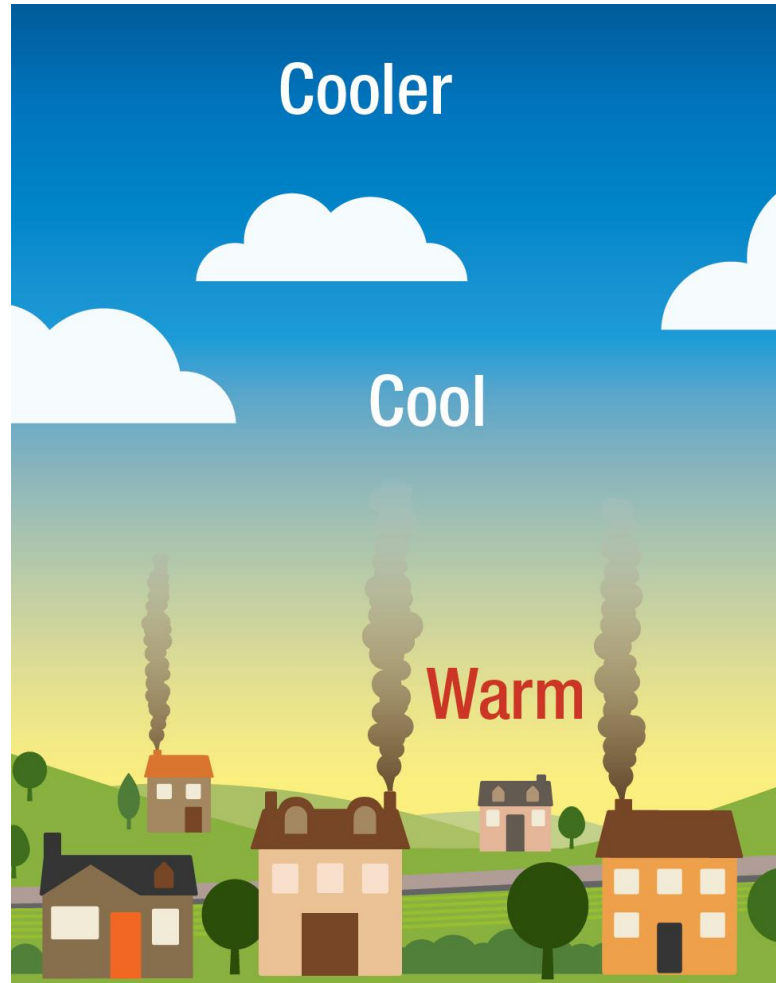
## Typical autumn to winter wind flow at the surface

- 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)

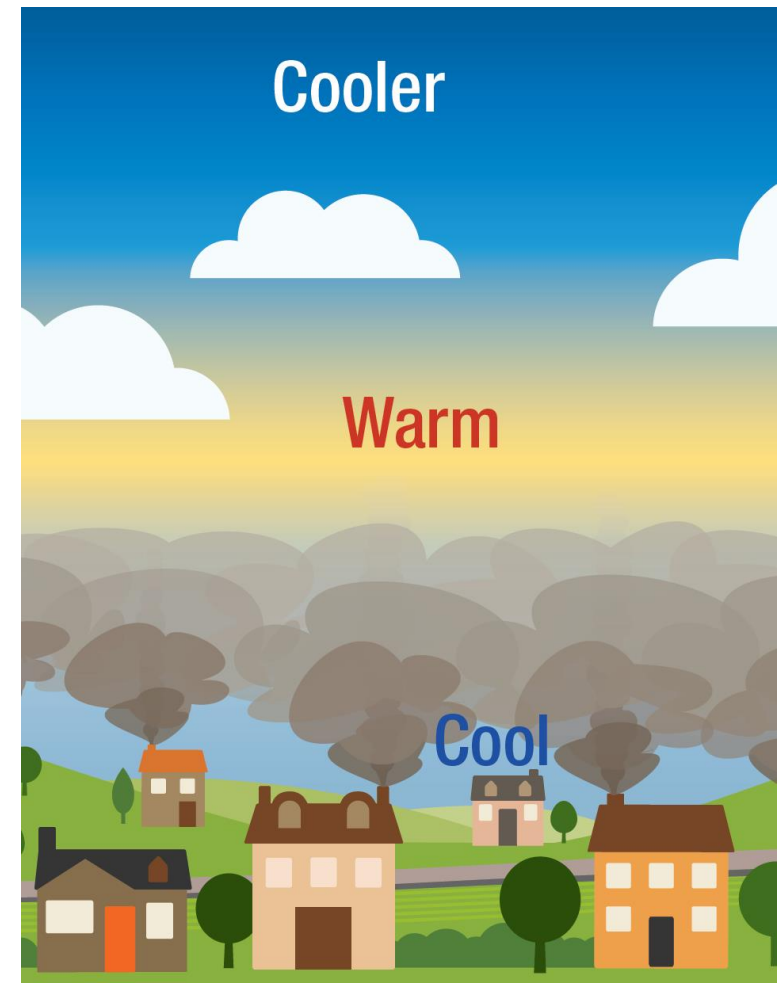


## Vertical mixing and inversions

- 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



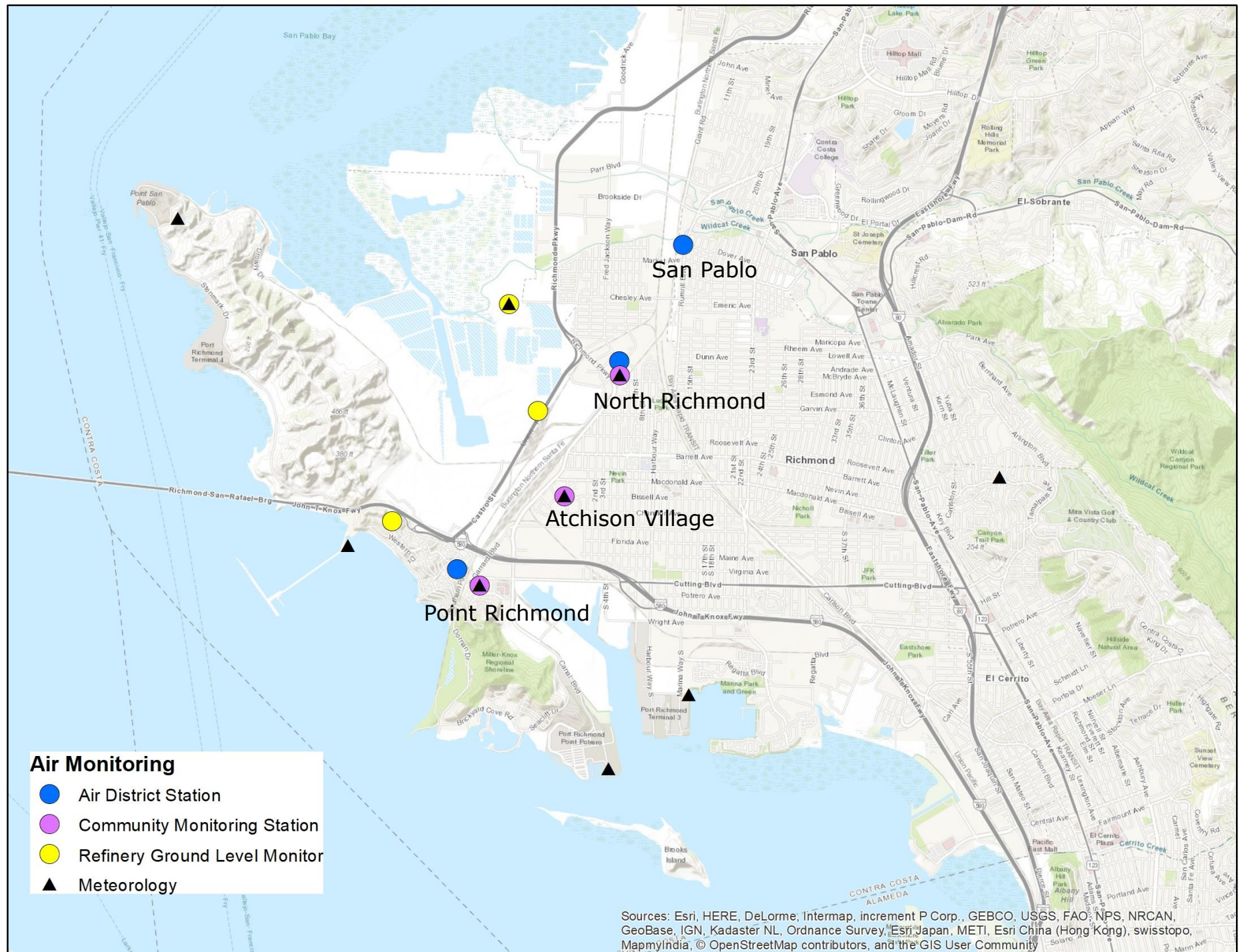
Good vertical mixing:  
Temperatures decrease  
with elevation



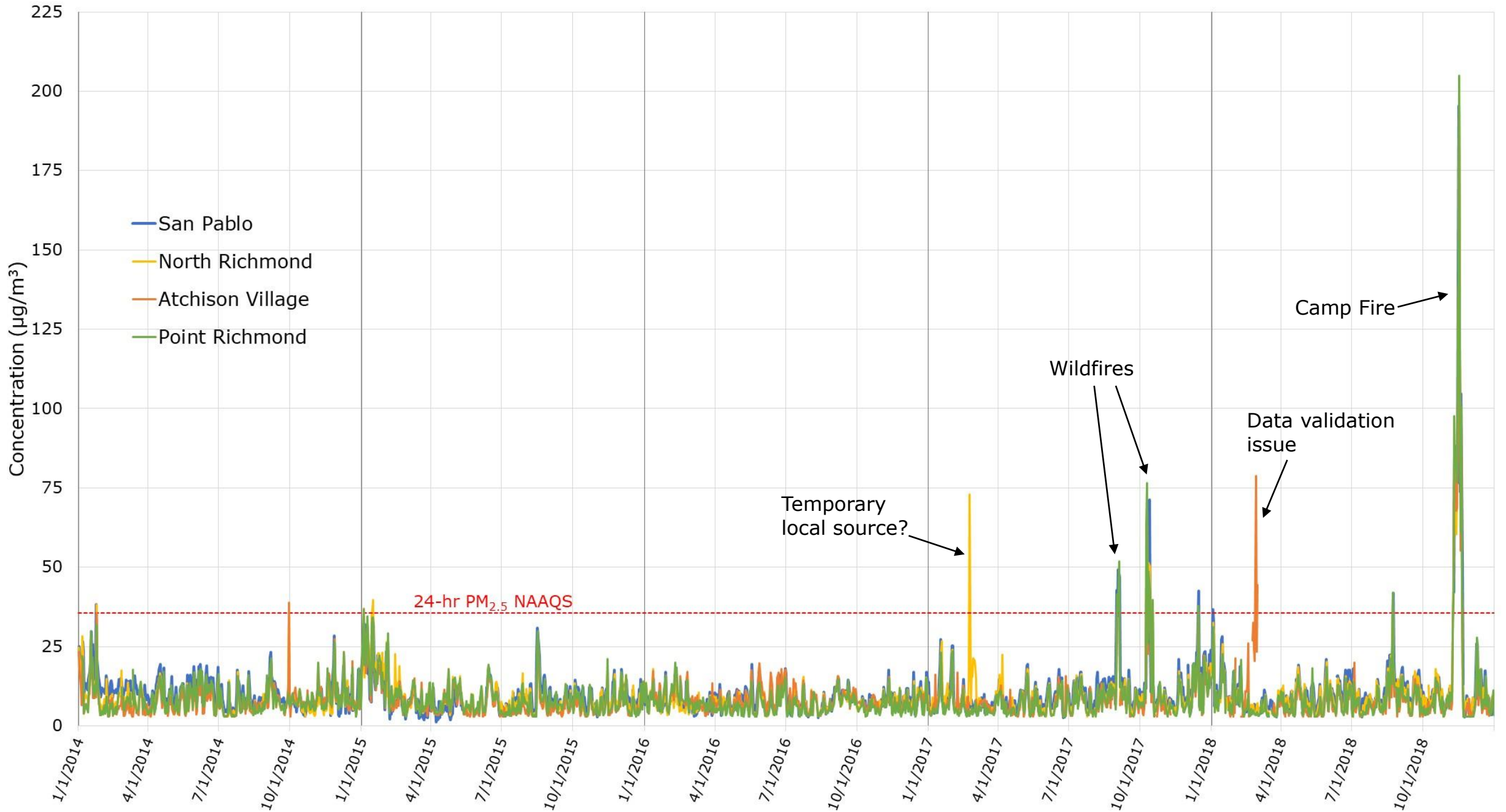
Poor vertical mixing:  
Layer of temperature  
increase with elevation

# Air Monitoring Sites

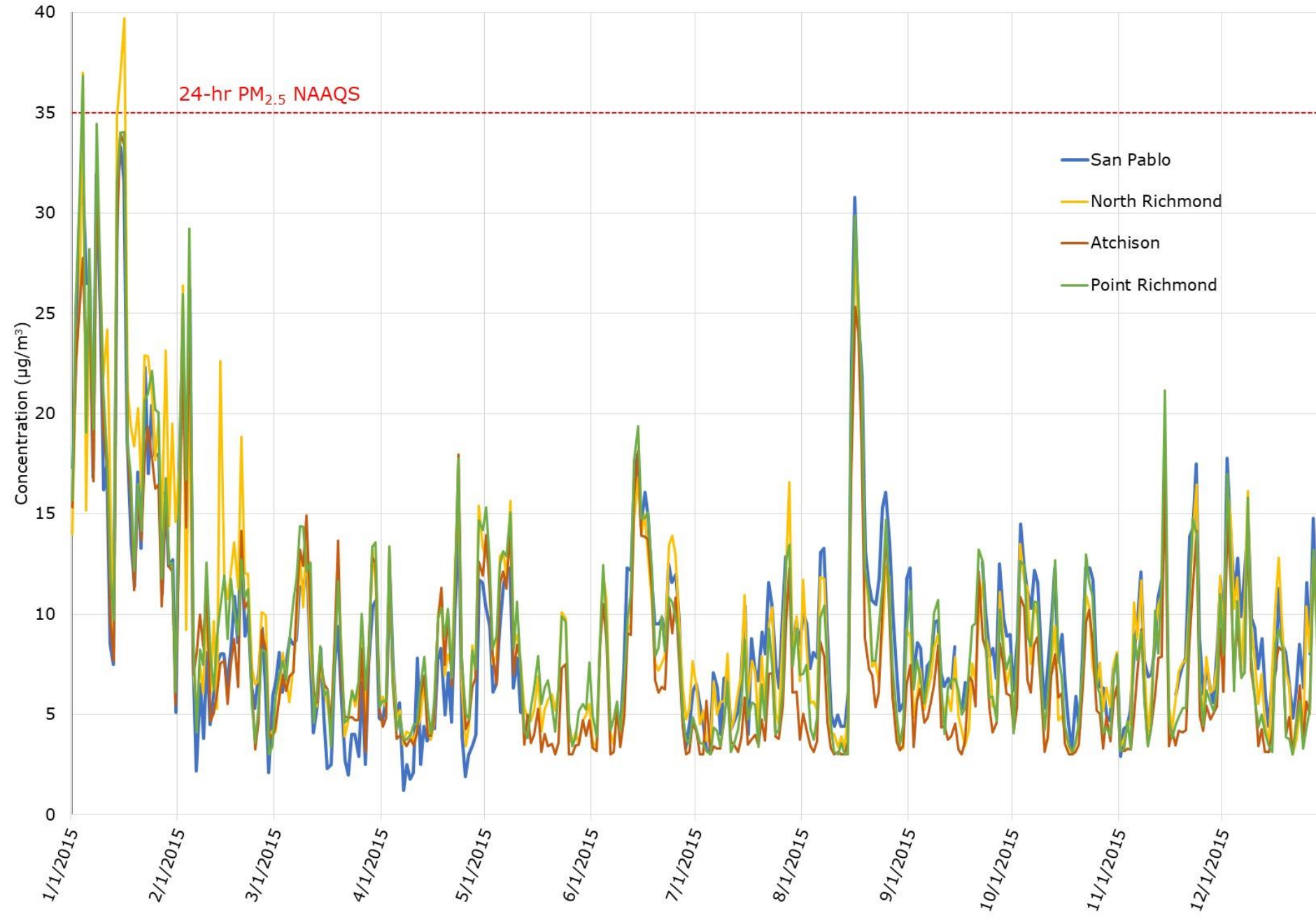
- Full regulatory site at San Pablo
- Air monitoring has historically been focused around Chevron
- Air District is summarizing existing data sets, including from the Community Monitoring Stations



# 24-hour Average PM<sub>2.5</sub> Concentrations

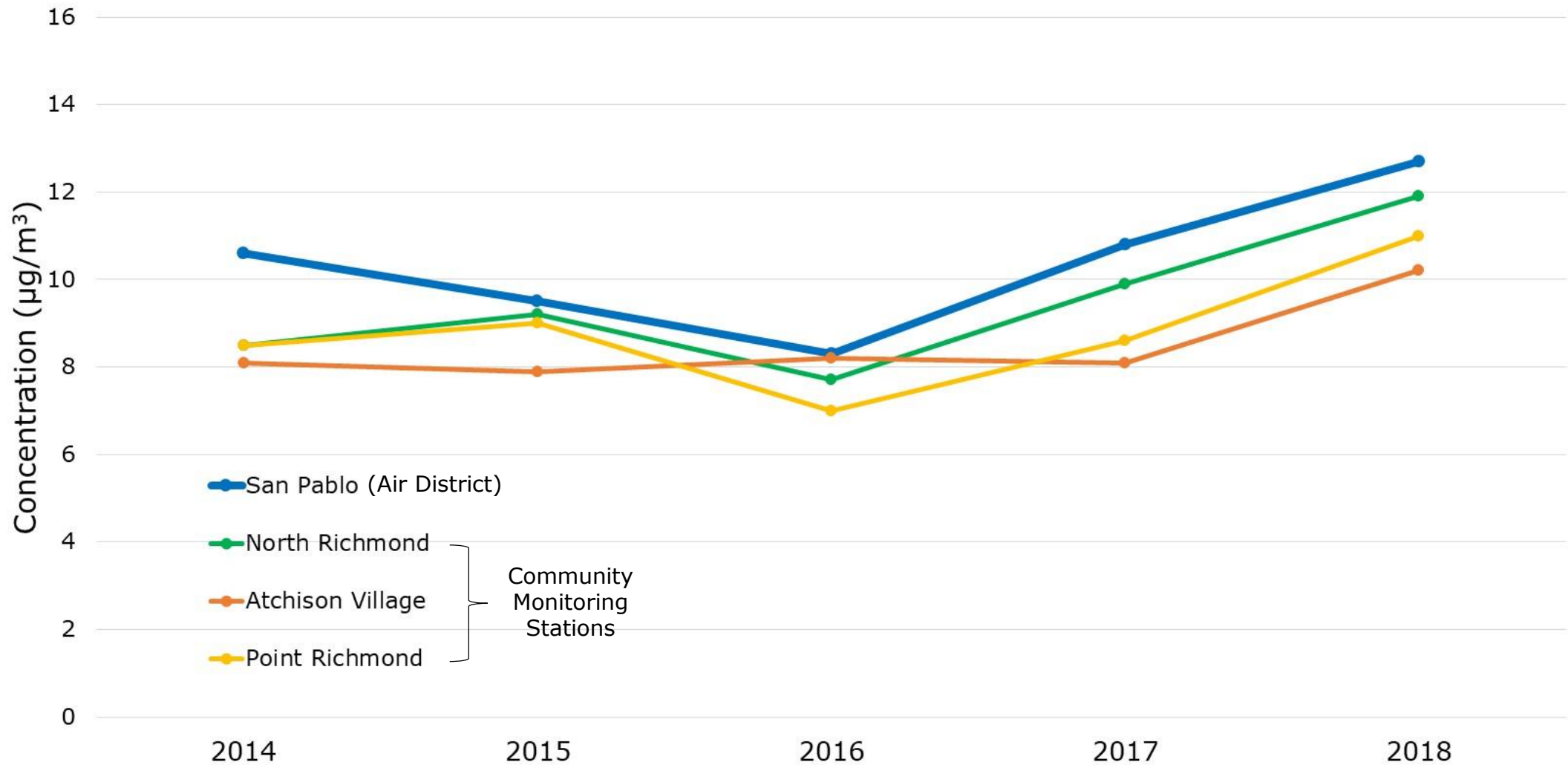


# 24-hour Average PM<sub>2.5</sub> Concentrations, 2015



- PM<sub>2.5</sub> 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<sub>2.5</sub> than others stations

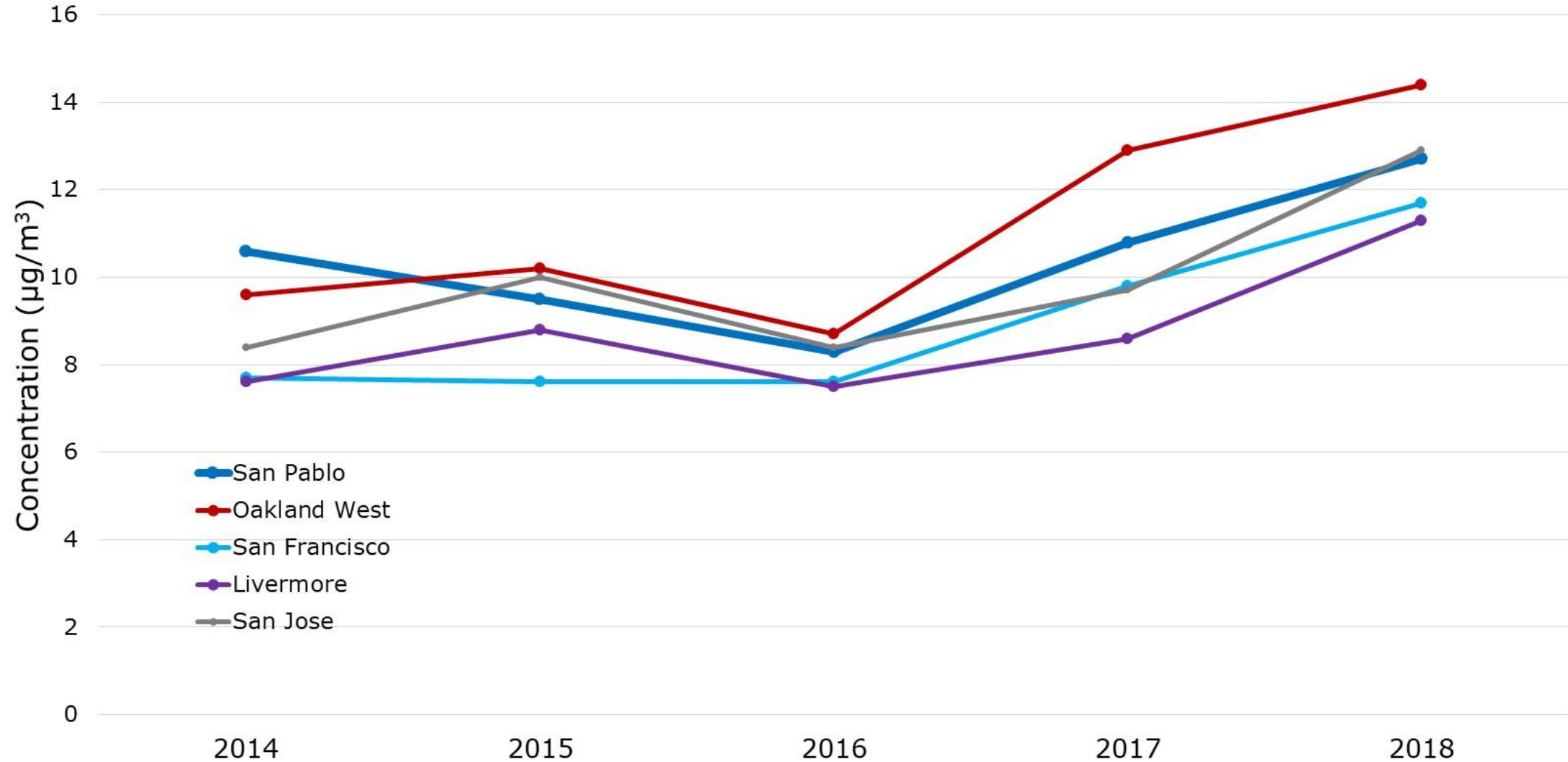
# Annual Average PM<sub>2.5</sub> Concentrations



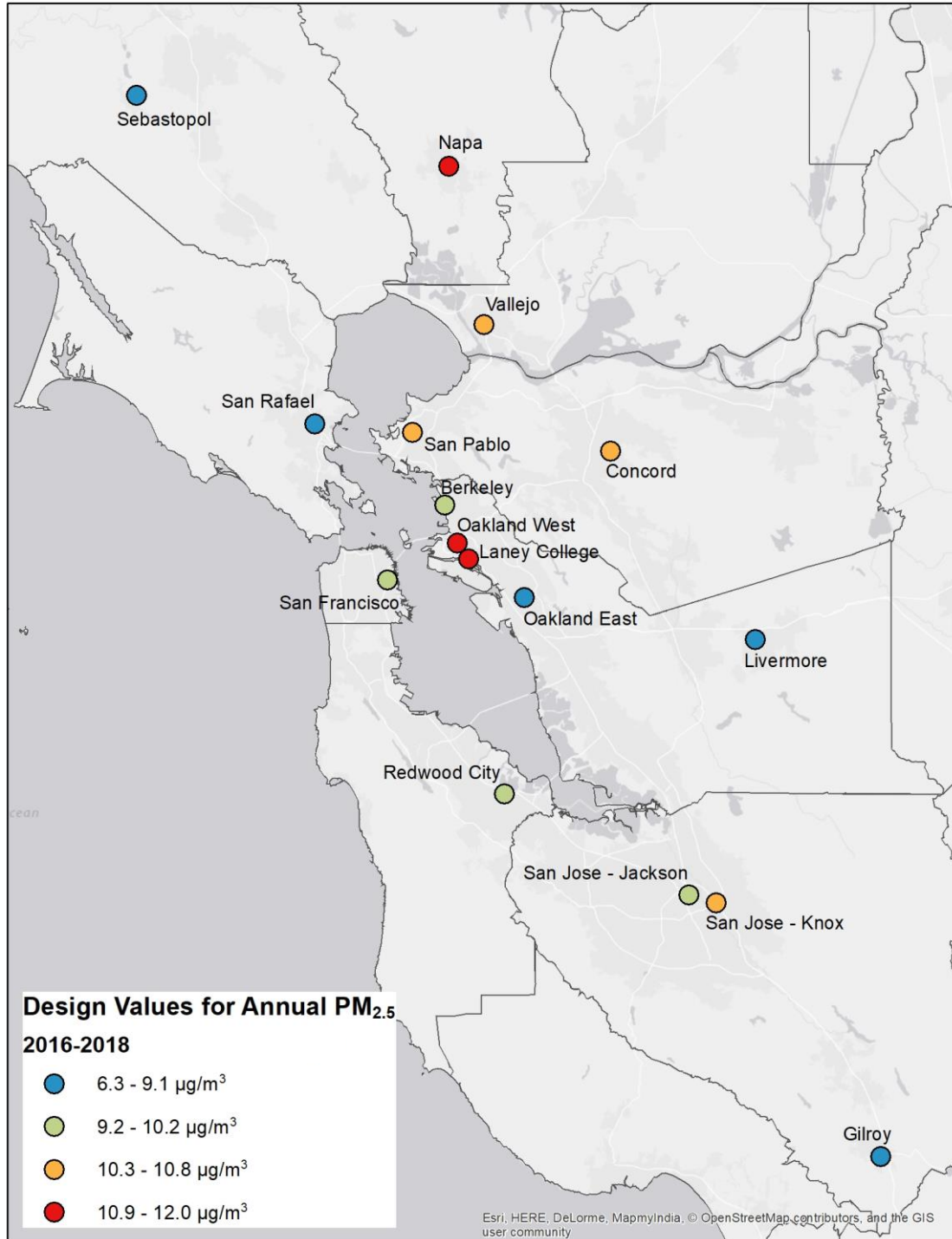
- Annual averages are similar across stations (within 2-3  $\mu\text{g}/\text{m}^3$ ), with San Pablo slightly higher than the other stations but within typical error range of the instrumentation
- Increases in 2017 & 2018 are largely attributable to wildfire smoke



# Annual Average PM<sub>2.5</sub> Concentrations

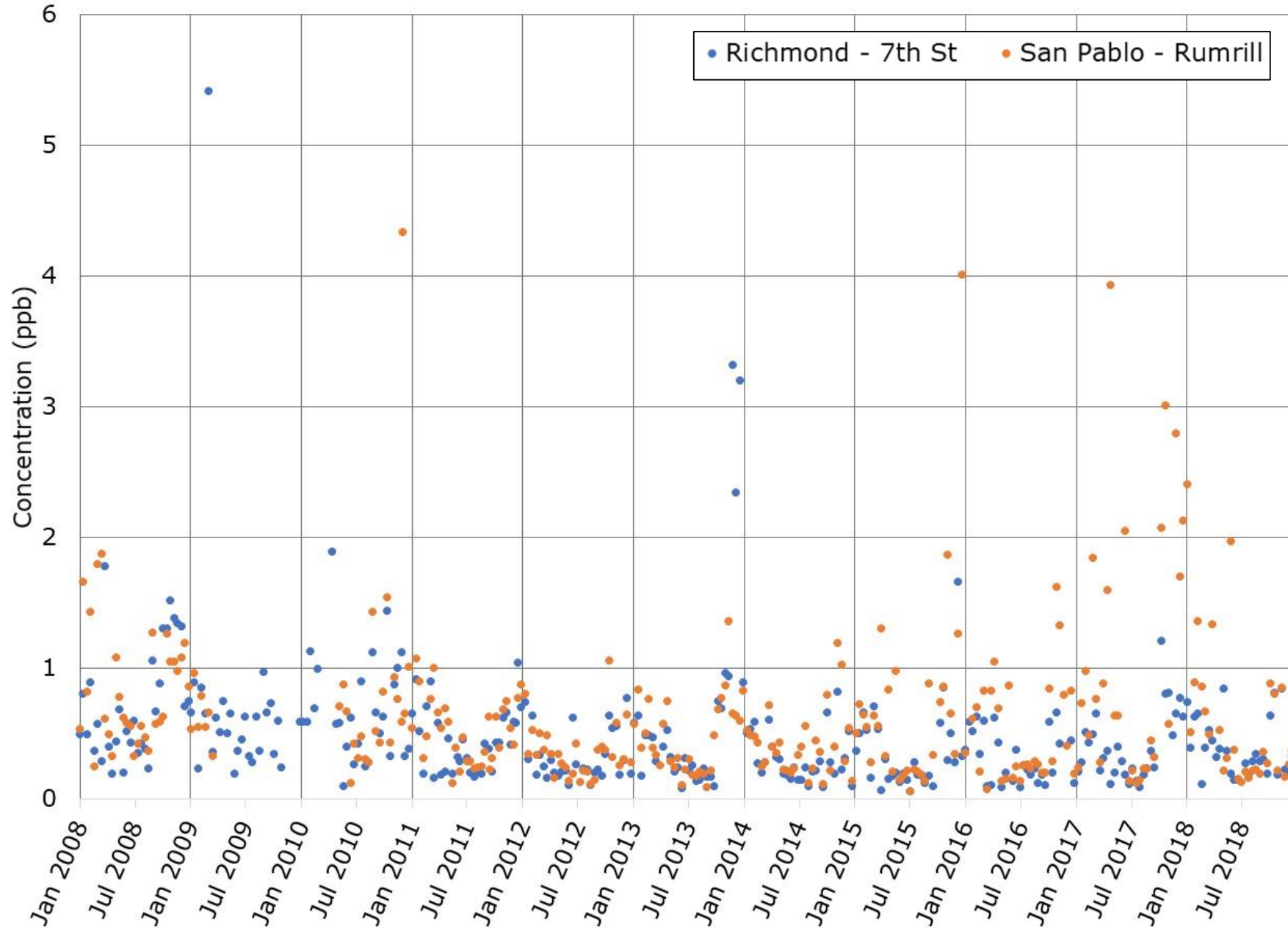


- Annual averages across stations within 2-4 µg/m<sup>3</sup>, with Oakland West higher than the other stations
- 2016 was a notably stormy year, resulting in lower PM<sub>2.5</sub> concentrations regionally
- Increases in 2017 & 2018 are largely attributable to wildfire smoke



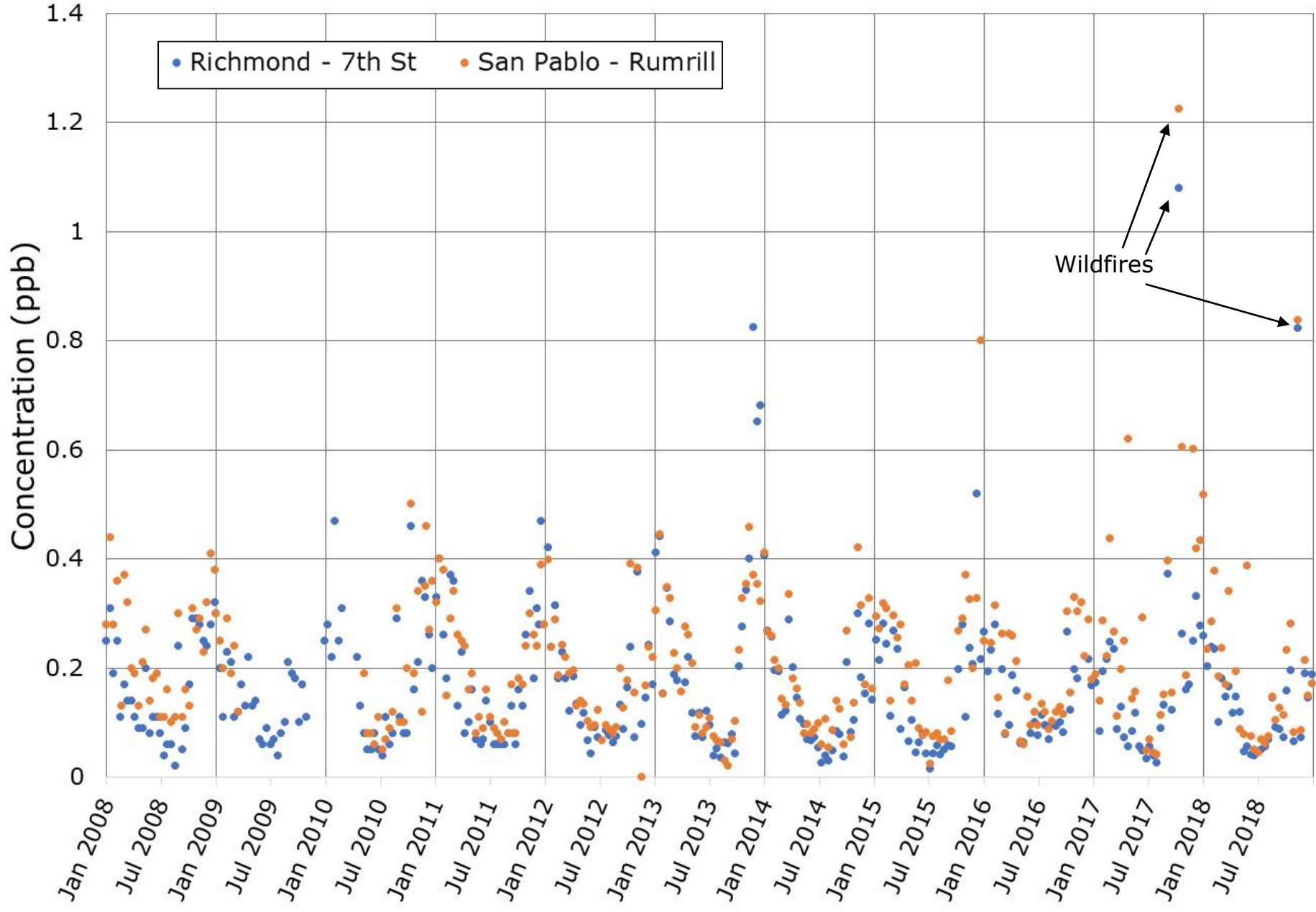
Another way to track air quality trends over time or geography is with Design Values, a measure used by EPA to determine whether areas are in attainment of air quality standards

# Toluene at Richmond and San Pablo, 2008-2018



- 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

# Benzene at Richmond and San Pablo, 2008-2018



- 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<sub>2.5</sub> 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](https://aqs.epa.gov/aqsweb/airdata/download_files.html)
  - Scroll down to “Daily Summary Data” section
    - Then scroll down to “Particulates” for PM<sub>2.5</sub> data
    - Then scroll down to “Toxics, Precursors, and Lead” for air toxics data
- Or, PM<sub>2.5</sub> (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:

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# Additional Resources

## Air quality data and tools:

- National current air quality data (EPA/AirNow) - [www.airnow.gov](http://www.airnow.gov)
- Local current air quality data (Air District) - [www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data](http://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:

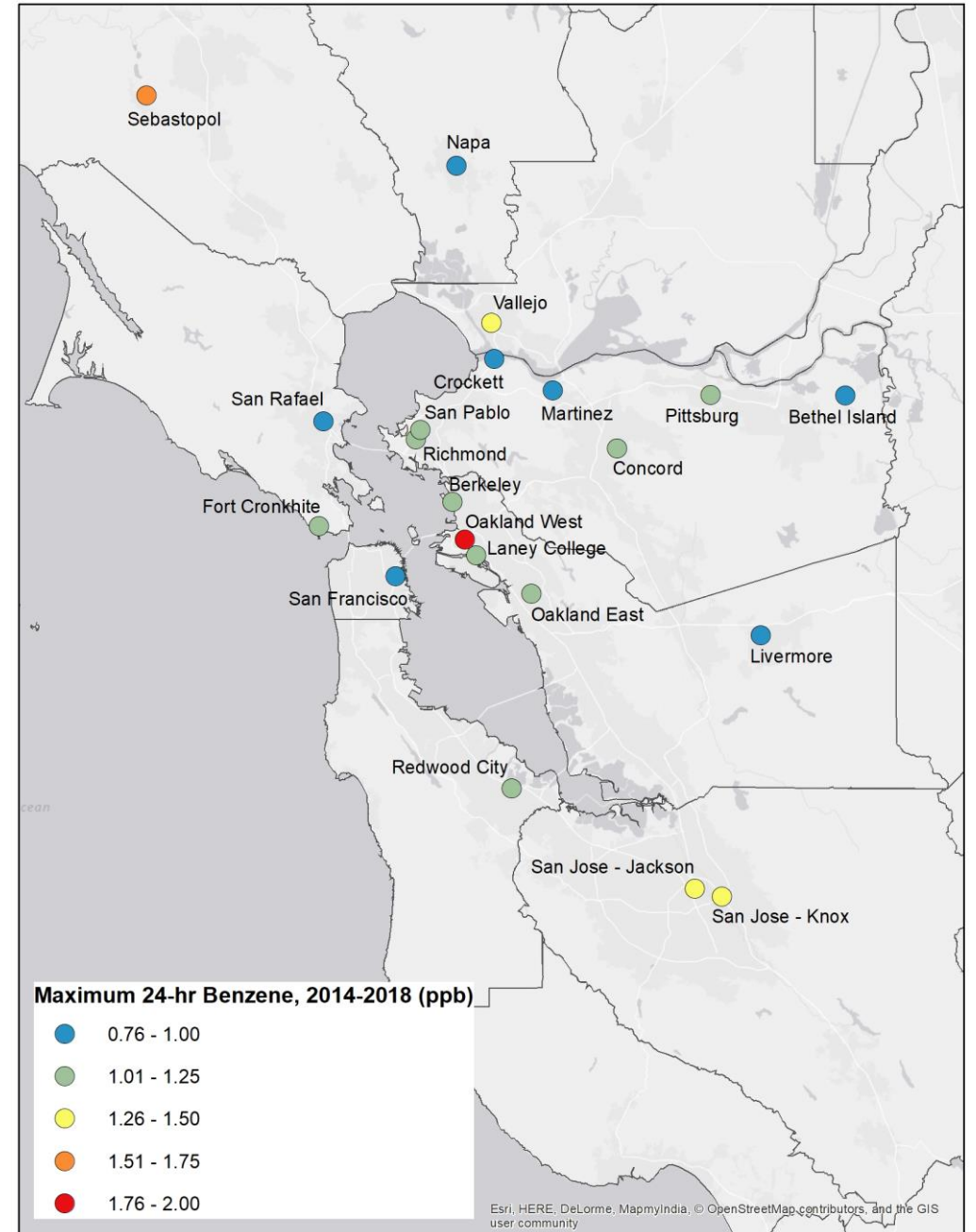
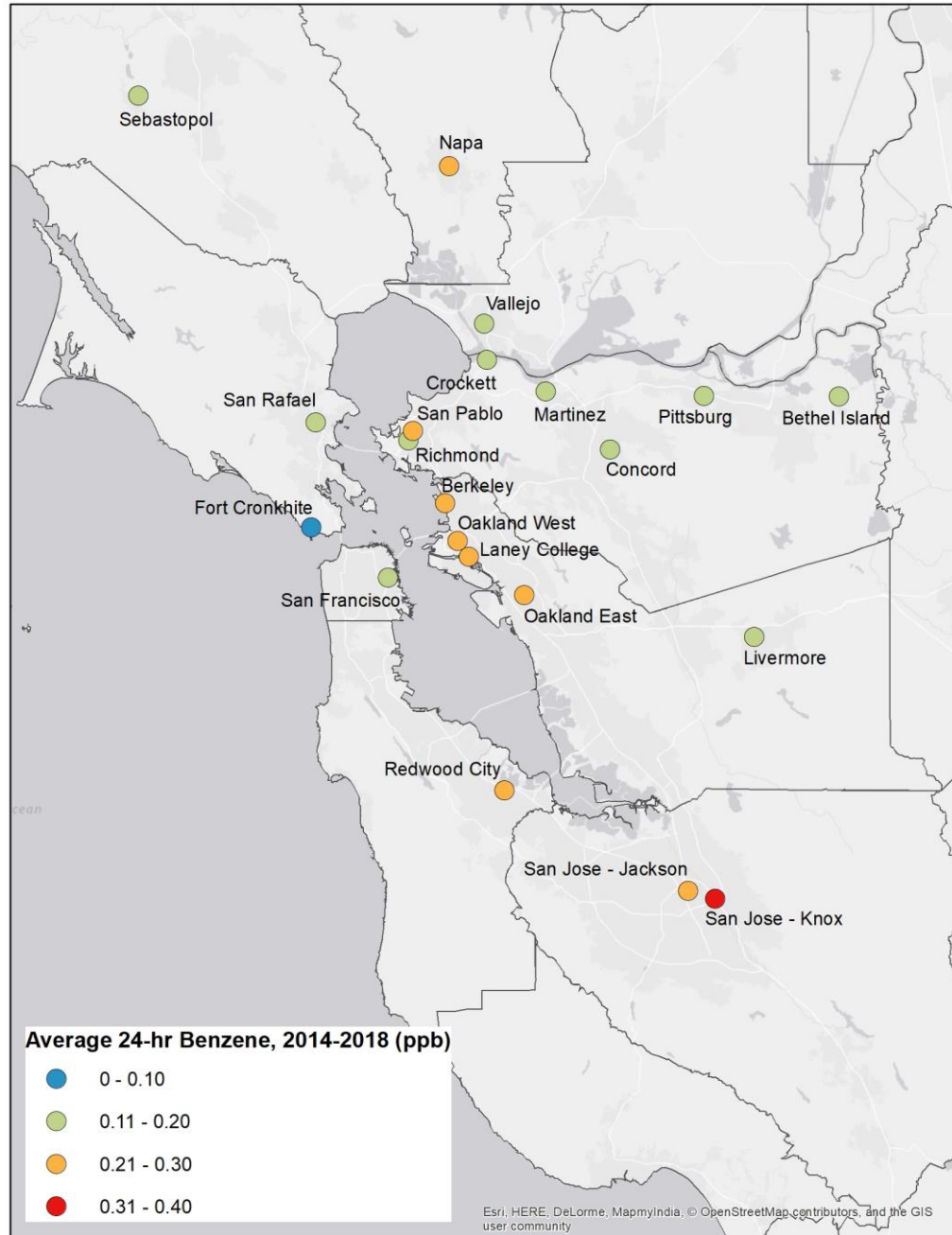
- Particulate matter and health effects (EPA) - <https://www.epa.gov/pm-pollution>
- Hazardous air pollutants and health effects (EPA) - <https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants>

## Screening tools:

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

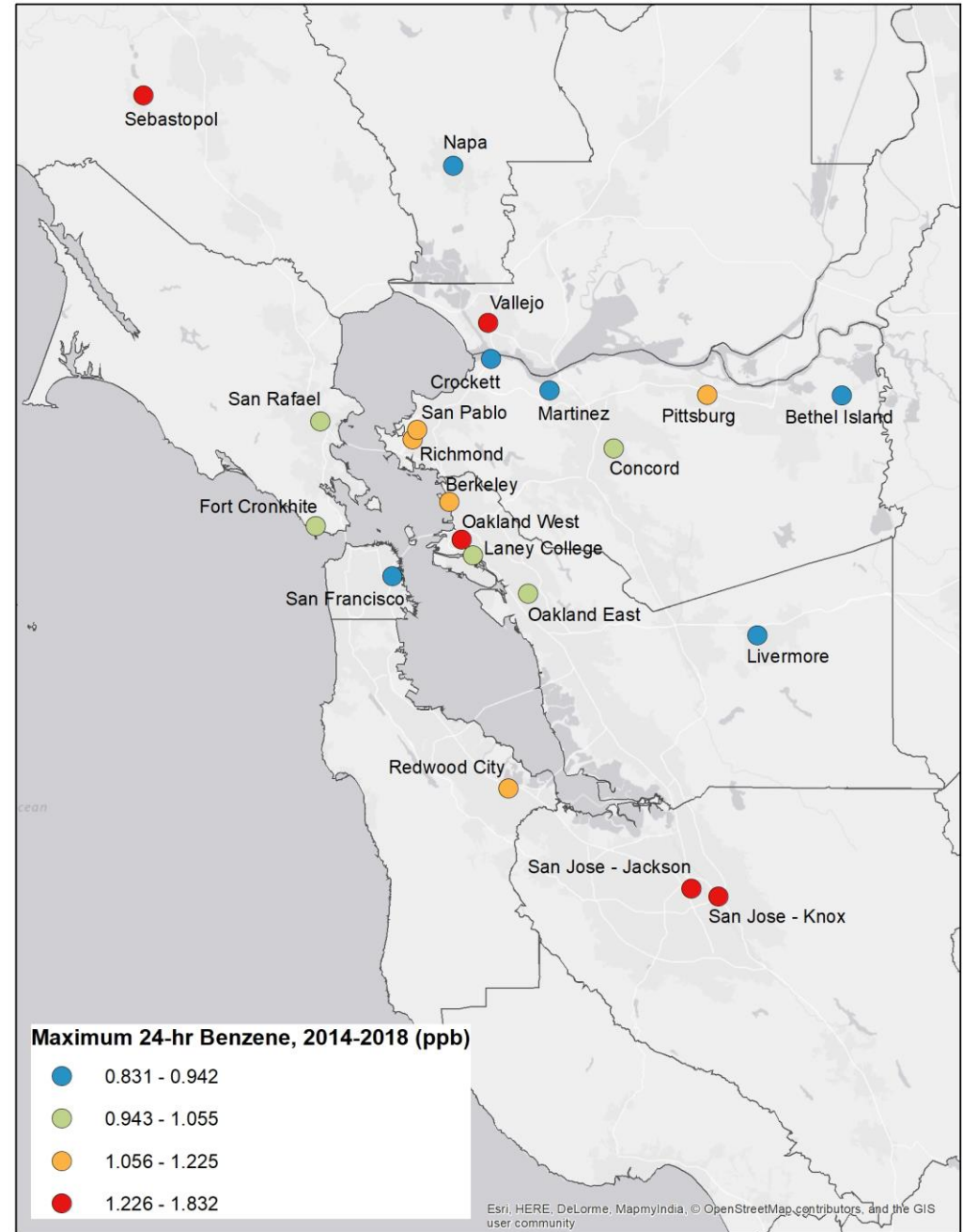
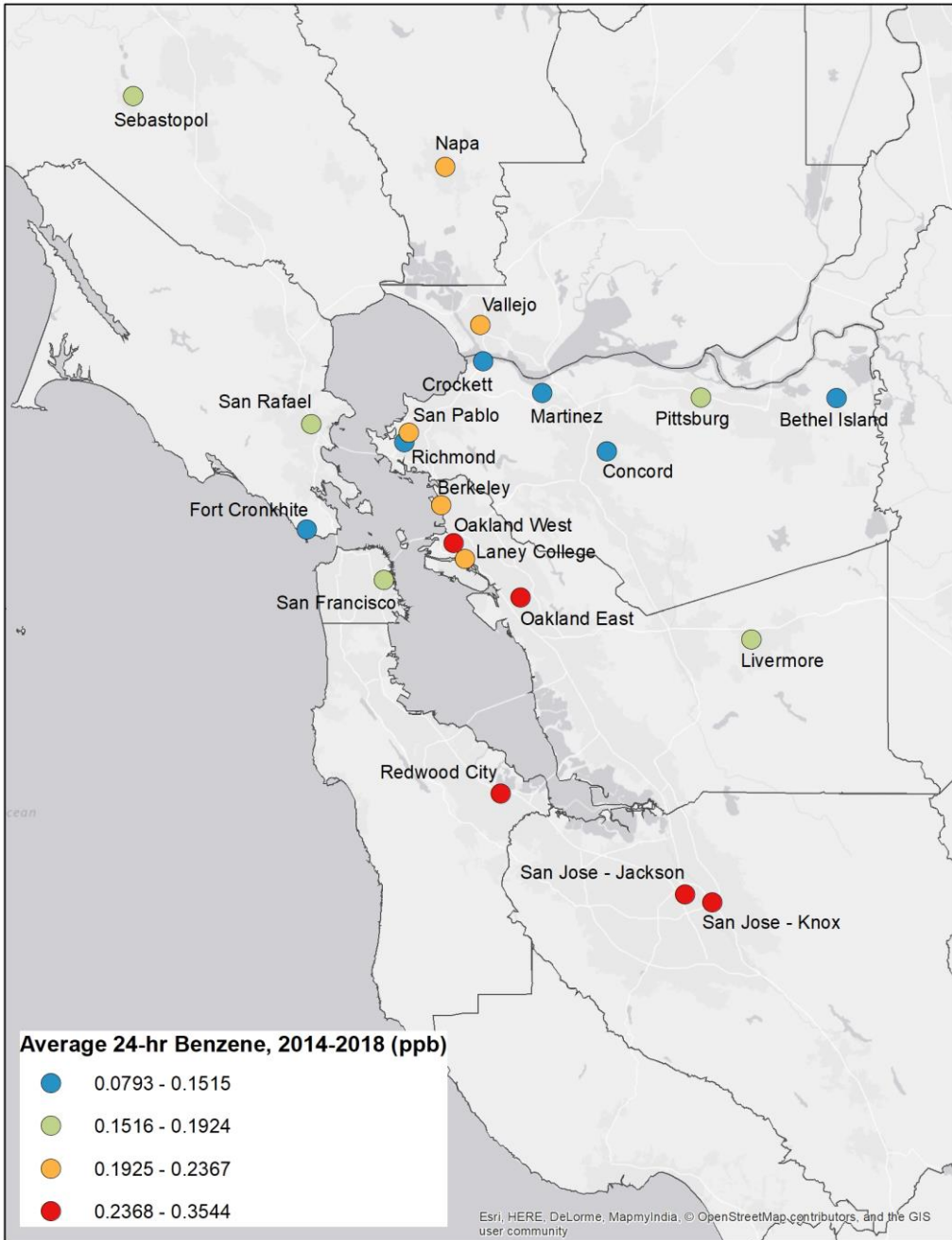
## Links to AB-617 pages:

- 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)





(Data binned as quartiles)