BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Community-Focused Air Monitoring and Data Assessments:
Aclima, long-term monitoring, mobile monitoring, and sensor networks

Community Advisory Council Meeting
November 17, 2022

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Presentation Outcomes

1. Build a shared language of how these different sources of data tell us different things about an area's air quality, and how different sources of data can be used together to provide a more complete picture

2. Explain how to access the Aclima Air.Health air quality data tool and other sources of air quality information

3. Request guidance from CAC on initial ideas for the Air District's community-scale air quality data assessments

Presentation Outline

- Recap of air pollution

- Introduction to monitoring approaches, strengths, and limitations

- Initial examples of air quality analyses

- Questions for CAC member guidance
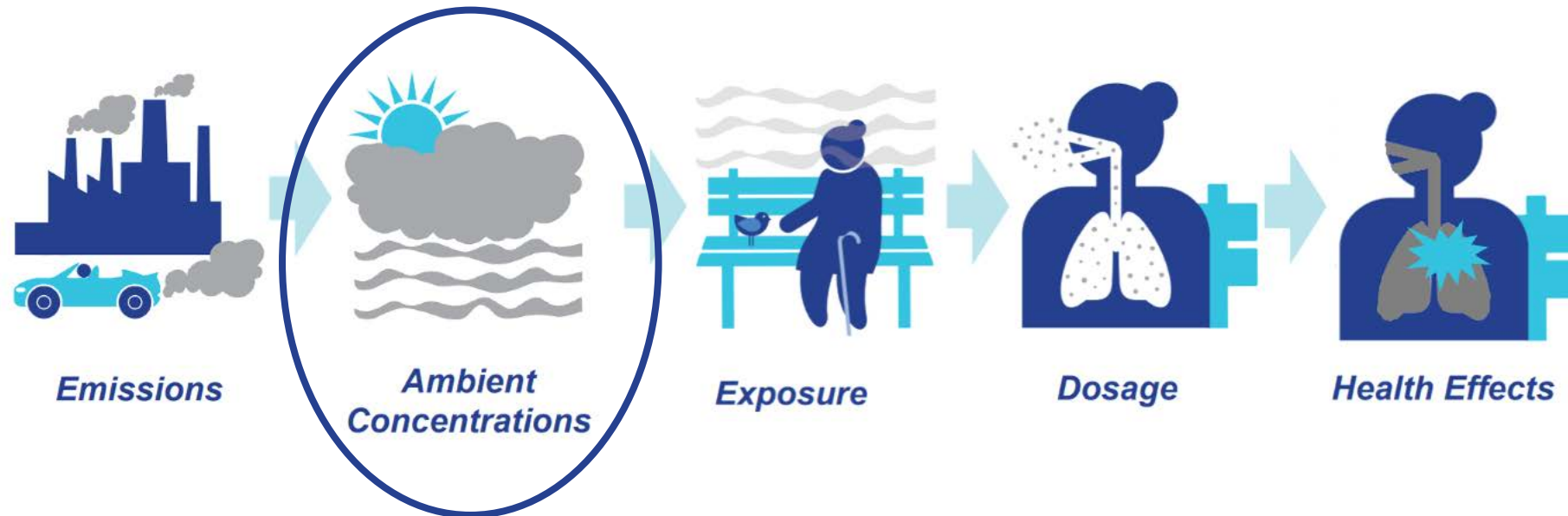
Presentation for Information Only

- No action requested.

Emissions to Health Effects

Emissions → Ambient Concentrations → Exposure → Dosage → Health Effects

Recap: Air Pollution (cont.)

| Pollutant	Sources
Fine particulate matter ($PM_{2.5}$)	Burning fuel in cars and trucks, industrial facilities, diesel generators, and fireplaces/woodstoves; brake and tire wear, activities that generate or kick up dust, wildfires, chemical reaction of gases in the air
Ozone (O_3)	Gases emitted by cars, trucks, and other sources (like nitrogen dioxide and organic compounds) react in the air to form ozone
Nitrogen oxides (NO_2)	Burning fuel in cars and trucks, industrial facilities, diesel generators, and fireplaces/woodstoves; wildfires

Recap: Air Pollution (cont.)

Pollutant	Sources
Volatile Organic Compounds (VOCs) A group of air pollutants - some are toxic Examples include benzene and toluene	Burning fuel; decomposing organic waste; industrial facilities, cooking, evaporation from paints, solvents, and consumer products, wildfires
Carbon Monoxide (CO) Carbon Dioxide (CO_2)	Burning fuel in cars and trucks, industrial facilities, diesel generators, and fireplaces/woodstoves; wildfires

Why Do Ambient Air Monitoring?

- Build awareness and interest

- Regulatory decisions (National Ambient Air Quality Standards, enforcement etc.)

- Provide real time information

- Better understand local-scale disparities in levels of air pollution to take action

- Evaluate air quality after emissions reduction actions or other changes in conditions
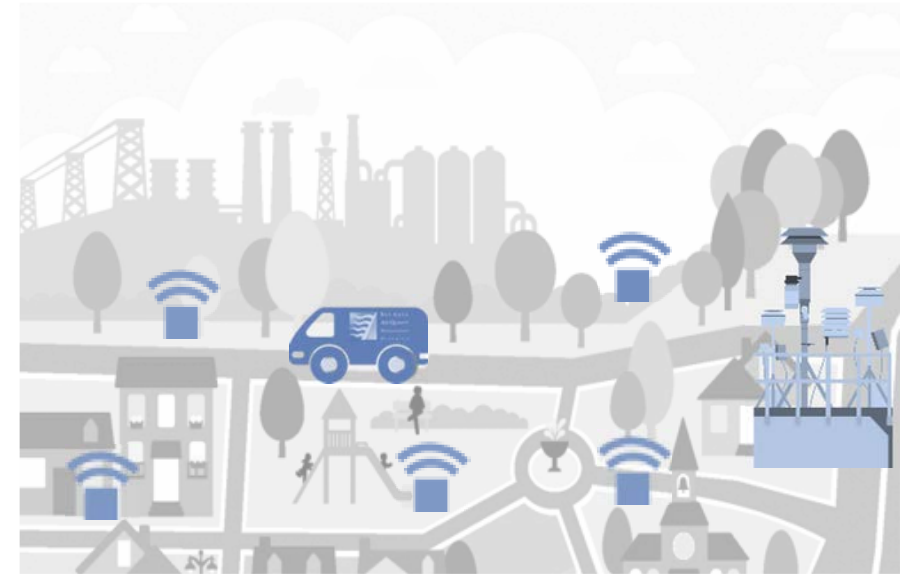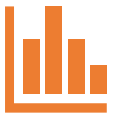
Examples of Air Monitoring Methods

Tailoring a Monitoring Plan for Community Conditions

What air quality information is already available?

Community information

Violations and complaints
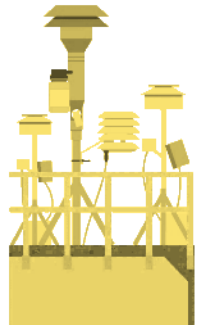
Modeling

Emissions data

Existing monitoring data

Which air pollutants are related to the concern?

Criteria pollutants

Toxic air contaminants

GHGs

gases or particles

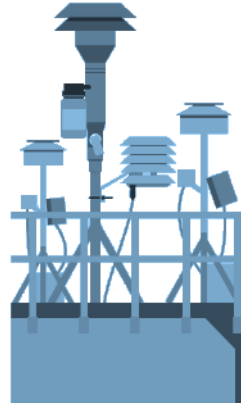**What type of instruments or how many?**

Sensors

Laboratory-grade

EPA-approved

Tailoring a Monitoring Plan for Community Conditions (cont.)

Where are the monitors and are they moving or stationary?

Mobile can cover a larger area with snapshots in time

Stationary shows how levels change over time, but only in some locations

How long are we monitoring for?

Mobile: Limited to the number of drives at a given location

Stationary: Duration can vary from hours to months or even many years

Monitoring Example #1: Aclima Mobile Monitoring

Air District Monitoring Station Data

Community-scale studies showing block-to-block differences

Pollutants: NO_2, $PM_{2.5}$, O_3, CO, CO_2

Aclima sensor module – for mobile at scale
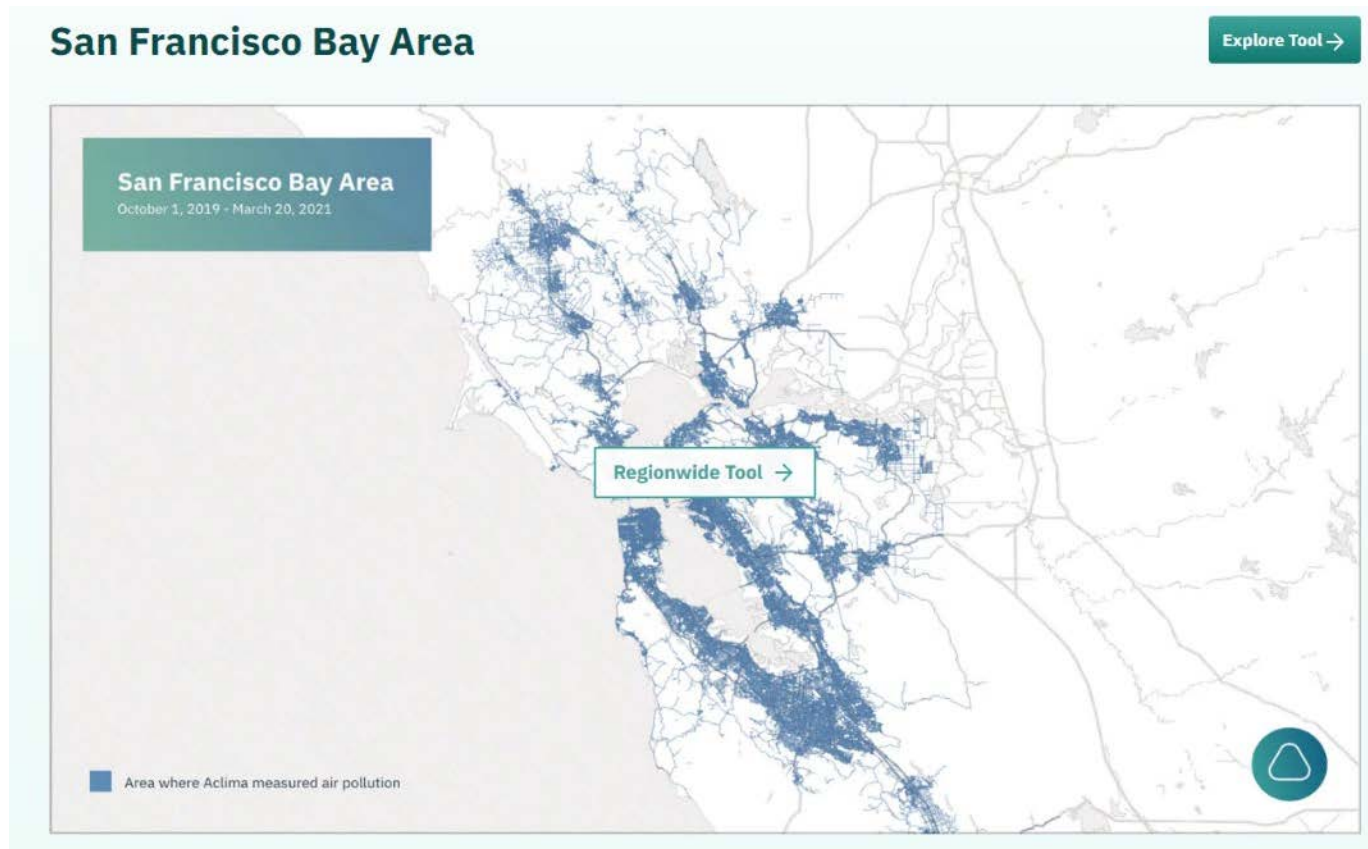
Mobile

Over 20 passes for one year

Combine the data from all drives with District station measurements to estimate an annual average level on each block
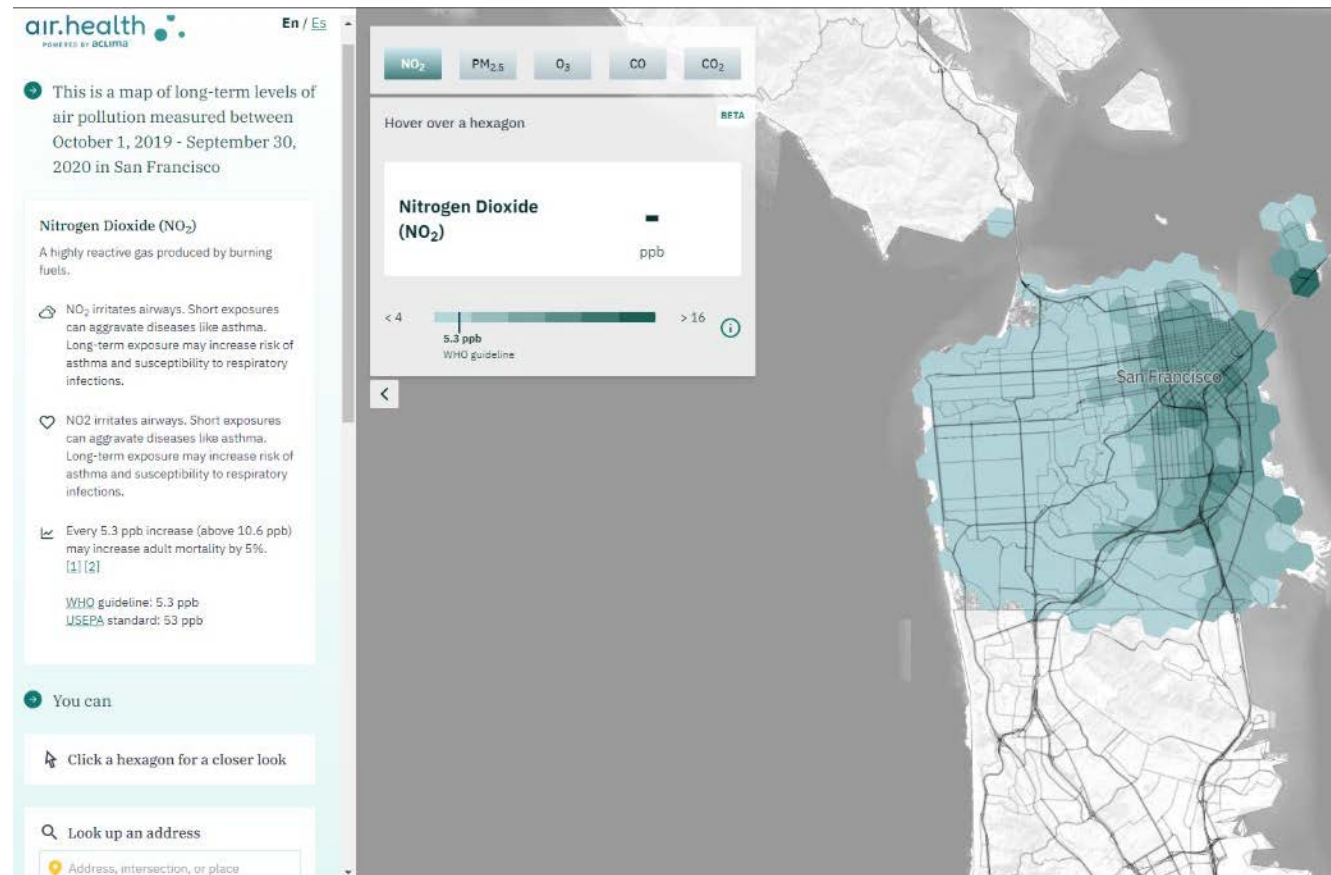
Aclima Annual Air Pollution Maps

At Air.Health, you can look at the data, search for an address, and learn more about the method

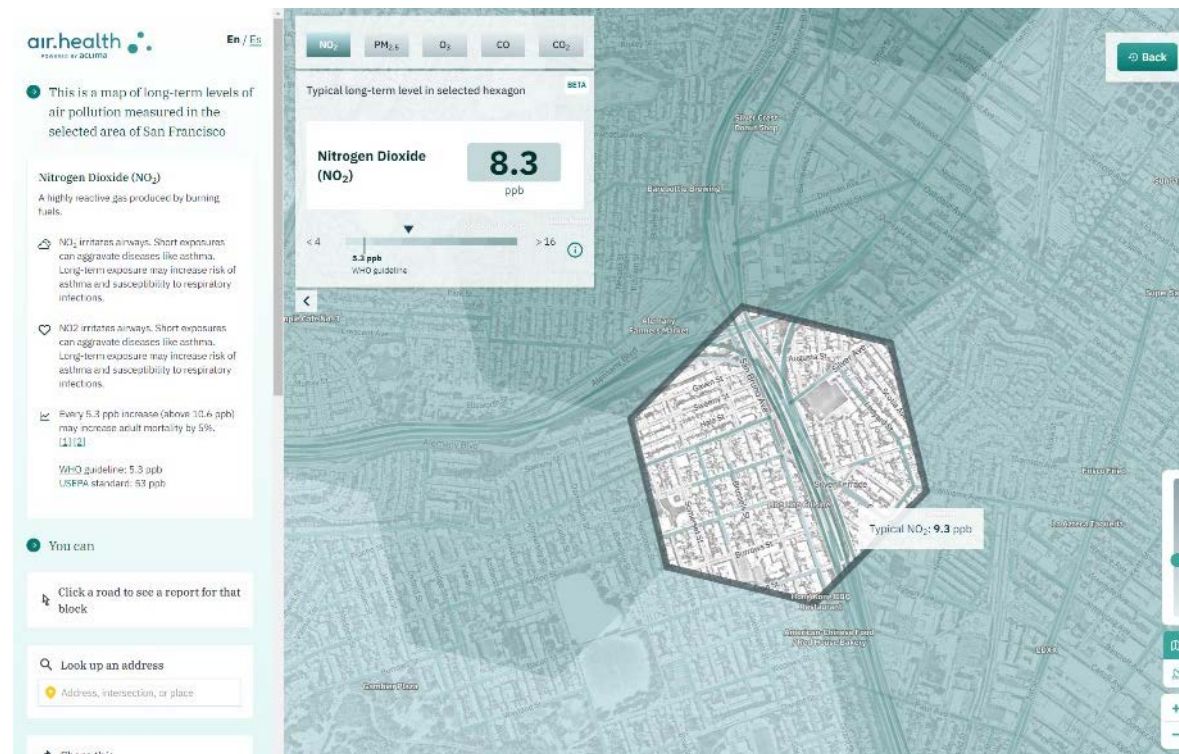# Aclima Annual Air Pollution Maps (cont.)

County specific pages with hexagon averages show pollutant patterns across the area

Aclima Annual Air Pollution Maps (cont.)

Clicking on a specific hexagon gives you more granular information about the road segments

Aclima Annual Air Pollution Maps (cont.)

Clicking on a road segment displays even more information about that block

Aclima Annual Air Pollution Maps (cont.)

- Air District has requested information from Aclima and will continue to review and evaluate the methods and data

- At least 20 drive passes for each road segment, spread throughout the year.

- Some limitations to the data on Air.Health include:
  - Some air pollutants (e.g. air toxics) cannot be measured with this method.
  - Infrequent or short-duration pollution episodes will not be captured thoroughly, unless they happen to coincide with one of the drive passes

Monitoring Example #2: Community Air Quality Sensor Networks

Boundary of Study Area defined by AB 617 Community Steering Committee

Community concern about PM exposure from traffic and freeways in greenspaces

Pollutants: $PM_{2.5}$ and NO_2

Clarity Node, solar powered sensors

Stationary

Late 2019 to present
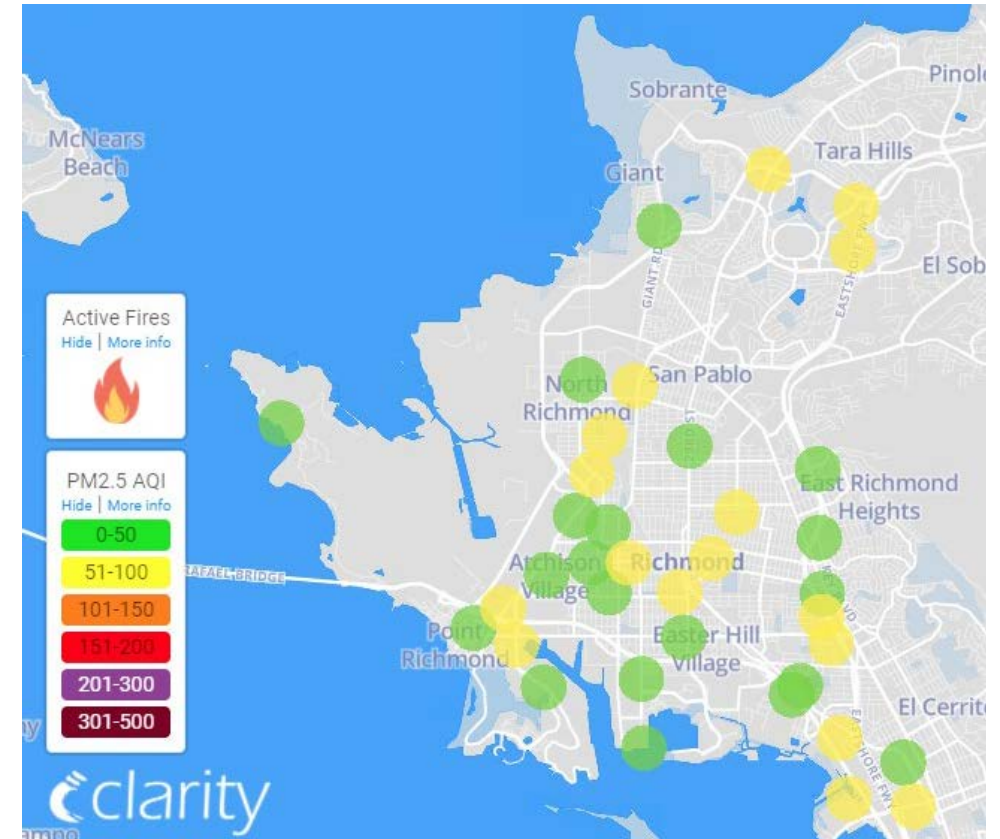
Community Air Quality Sensor Networks

Locations of air quality sensors measuring
fine particulate matter (PM$_{2.5}$)
(Groundwork Richmond & Ramboll)
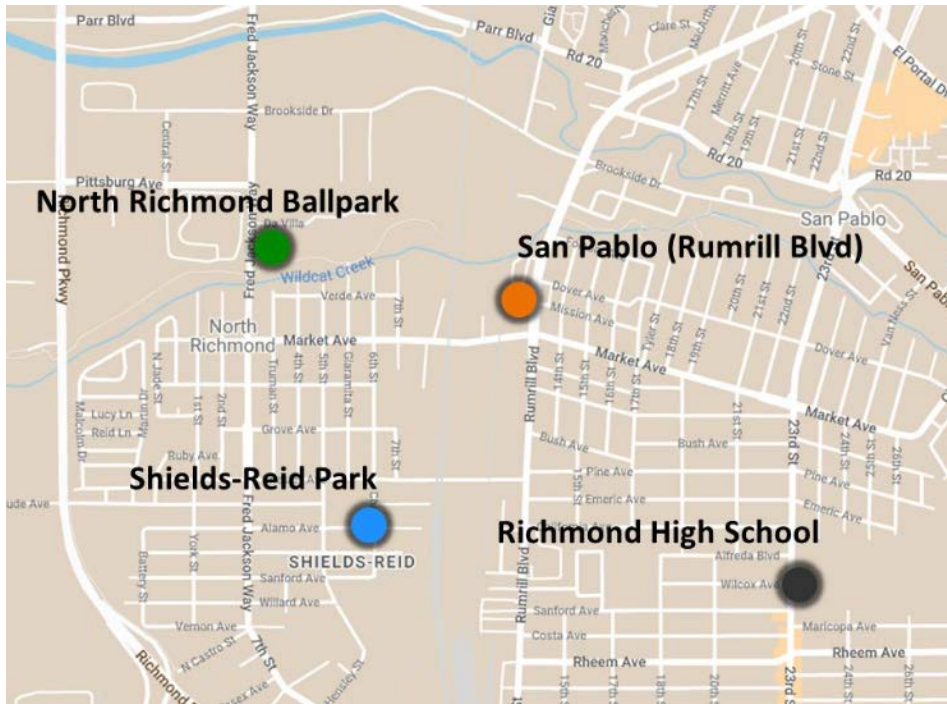
Hourly PM$_{2.5}$ Levels : April 4 – 10 2021
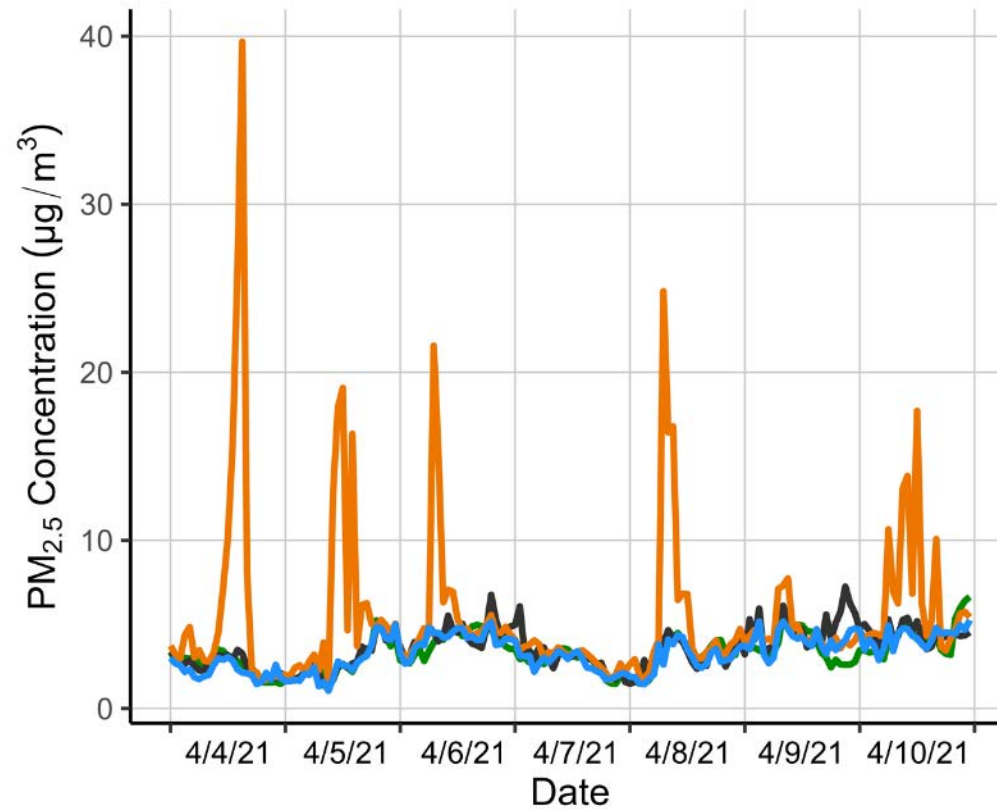
Community Air Quality Sensor Networks (cont.)

Map of area around Rumrill Blvd. and Market Ave.

PM$_{2.5}$ episodes may be due to food operations

- Time periods when the higher levels occur (during the day and on weekends)
- Air quality complaint in this area related to food operations
- Proximity of the air monitor to those operations

Monitoring Example #3: Source Oriented Mobile Monitoring

AB 617 Community Steering Committee identified specific facilities of concern that emit toxic volatile organic compounds (VOCs) and nearby communities with high health burdens

Pollutants: Speciated VOCs PM, NO$_x$, CO

Mass Spectrometer + research-grade instruments

Mobile

Jan-April 2022

4 different days for each target area

Parr Blvd. Vicinity
Landfill and recycling centers, scrapyards, water treatment, warehouses, vacant lots

Refinery and Rail
Chevron and adjacent related petroleum operations, railyards

23rd Street Corridor
Auto body shops, restaurants, gas stations

Richmond Harbor
Storage/transfer terminals, water treatment, paint and casting shops, gas stations, laboratories, scrapyards, rail and railyards, freeway

Source Oriented Mobile Monitoring

- Higher levels of several volatile organic compounds (VOCs) at intersection of Rumrill Blvd. and Pine Ave. in San Pablo

- Van operators noted odor and gas station receiving delivery at this time

- Information triggered rapid Source Test investigation resulting in several violation or mitigation referrals to Compliance & Enforcement

VOC Levels near Rumrill Blvd. and Pine St., 2/08/2022
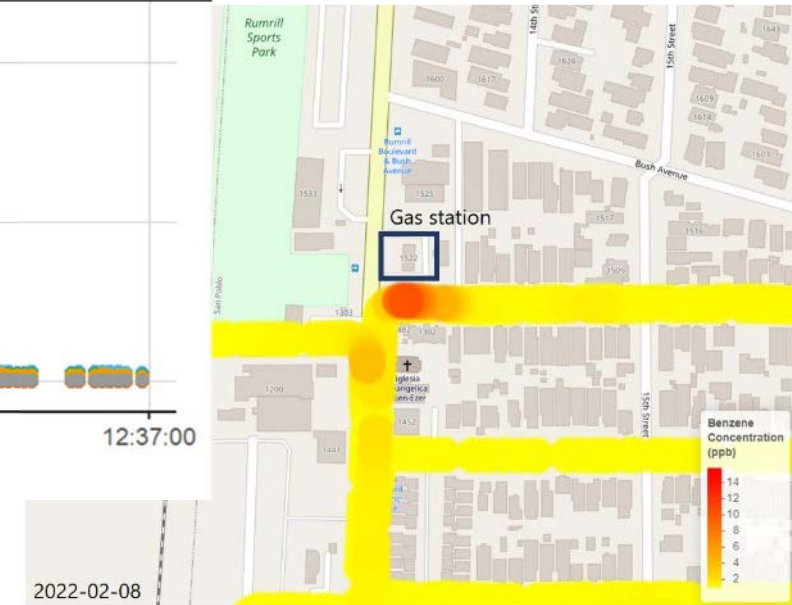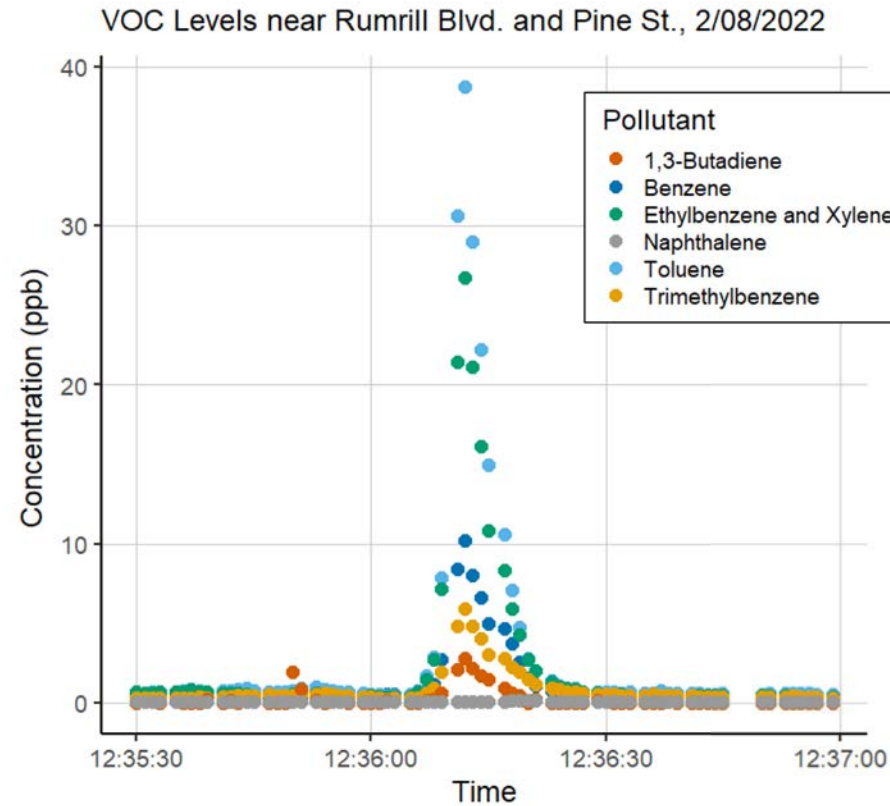
Other Monitoring Approaches

- Short-term air pollution studies using stationary portable monitors

- Public crowdsourced air quality sensor networks

- Long-term air monitoring stations

Tailored Local-Scale Monitoring Plans Developed with Community Members

- Each community experiences different conditions

- Plan a combination of methods to meet the needs
  - Screening level monitoring can identify areas with higher levels of pollutants of concern
  - Additional monitoring may be needed to better understand the extent of the issue or to identify the contributing source(s)

- Plan for how to manage, analyze, and present the data to help the community use it

Using Existing Monitoring Data

How can the Air District help:

- Identify existing datasets and make them more accessible

- Local-scale analysis of existing monitoring data of all types for overburdened communities

Example:

[Air Monitoring Data Inventory](#) prepared for AB 617 Path to Clean Air Community Air Monitoring Plan ([Español](#))

Questions

1. How do you want to use air monitoring data for your work?

2. How can the Air District help make existing monitoring data easier to understand and use?

3. How should we engage with the CAC and each community on monitoring data analyses or draft reports?

PUBLIC COMMENT

Ideas for Community Engaged Incident Response and Enforcement

Community Advisory Council Meeting
November 17, 2022

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Framing by Council Member Szutu

- From (Clean Air Act) to (Clean Air Act + AB617): Expanding the scope

- Invest in communities: Community-level monitoring and community-level enforcement

- Incident response program & community-engaged enforcement: both are based on community-level monitoring

- Combining the strength of the community and the strength of the Air District

Part 1: Presentation Outcomes

- Part 1: Discuss suggestions from Council Member Szutu

- Part 2: Begin CAC discussions regarding incident monitoring

- Part 3: Begin CAC discussions on the idea of "*Community Engaged Enforcement*" to utilize community help to enhance enforcement in specific areas and sources of concern

Part 2: Presentation Outline
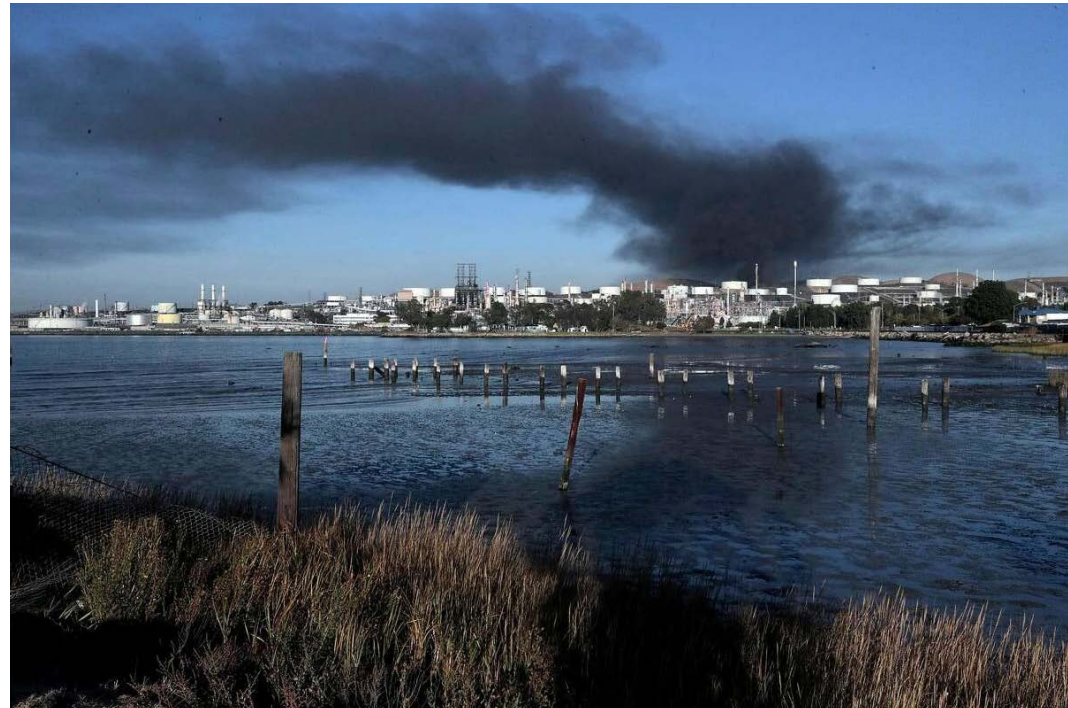
- Definition of Incidents and Current Air District Role

- Proposed Discussion Plan for CAC Members

- Questions for CAC Members

Definition of Incidents

Non-routine release of an air contaminant that may cause adverse health consequences, cause a public nuisance, or environmental damage (Regulation 3, Fees)

Example: October 15, 2019 NuStar Energy Incident in Crockett as seen from Rodeo

Air District Role During Incidents

- Air District Role:
  - Emergency Operations Plan, includes advising first responders and incident managers
  - Investigate violations of Air District regulations
- Air District Limitations:
  - Not an emergency response agency; not staffed with first responders.
  - Air District's measurements are designed for other goals (e.g. community-scale monitoring, enforcement of regulations, comparison with national standards).
  - We can get some information during incidents but there are many gaps with the Air District's current capabilities.

Discussion with Board of Directors: Proposed Goals

- Understand community concerns about incidents

- Understand monitoring approaches for incidents, including strengths and limitations

- Evaluate the costs and resources needed for incident monitoring, including relative to current backlogged work and other community monitoring priorities

- Decide whether to dedicate resources (and how much) to plan a program

Discussion with Board of Directors: Proposed Phases

Initial Scoping – Phase I (current)

- Learn about programs at other agencies and organizations that provide information about pollution during incidents or that we can learn from, including measurements and modeling
- Develop plan for Phase II

Community Engagement and Planning – Phase II (FYE 2024*)

- Community engagement
- Design and plan incident monitoring program, which may include multiple options with different levels of resourcing
- Outline roles and partnerships for Air District, other organizations, community members

Build Out and Launch – Phase III (FYE 2025*)

- Develop detailed monitoring plans based on approaches most suitable for addressing community concerns
- Hiring, training, and building partnerships
- Purchasing equipment

*Fiscal Year Ending (FYE) 2024 includes July 1, 2023 – June 30, 2024. FYE 2025 is July 1, 2024 – June 30, 2025. Phase II and III are dependent on resources being allocated by the Board in that year's budget and no barriers to hiring and onboarding staff.

Which types of incidents are you most concerned about?

- **Examples**
  - Facility fire
  - Unplanned upset or flaring
  - Hazardous materials release
  - Odors
  - Wildfire
  - Others?

What questions and goals do you have related to incidents?

- Examples
  1. What should I do to protect my health?
  2. What pollution is being emitted during the incident?
  3. What pollution is in the community?
  4. Which communities are being impacted by pollution?
  5. What are health impacts during an incident?
  6. What are longer term health impacts of multiple incidents?
  7. Who is causing the problem?
  8. Strong enforcement
  9. Incident prevention
  10. Others?

Part 3: Presentation Outline

- Discussion of ideas brought forward by Council Member Szutu:
  - Bi-monthly community engagement meetings in impacted communities led by the Compliance and Enforcement Division (C&E)
    - ❑ Overview of proposed meeting framework, agenda and communities to prioritize
  - Community Engaged Enforcement (CEE)
    - ❑ The proposed concept, purpose and importance of working together with communities
    - ❑ Next Steps

Presentation Requested Action

- Request CAC endorsement for Compliance and Enforcement to proceed with scheduling bi-monthly community meetings

- Request CAC guidance for *Community Engaged Enforcement*

Bi-Monthly Community Meetings

Proposed Meeting Framework and Agenda

- Engage in open discussions with communities about Air District Compliance & Enforcement efforts
  - Compliance Inspections and Investigations
  - Air Quality Complaint Investigation Process / How to Report a Complaint
  - Share C&E data about area and sources
- Virtual meetings where communities can meet the assigned Air District Inspector(s) and Supervisor
- Allow communities to share air quality concerns with staff and identify strategies for resolving compliance concerns
- Seek opportunities to improve enforcement processes

Bi-Monthly Community Meetings (cont'd)

Proposed Bi-monthly Community Meetings to Prioritize

➤Bayview Hunters Point
➤Vallejo
➤*Other upcoming AB 617 communities?*

Meetings with Current AB 617 Communities (as-needed)

➤West Oakland
➤Richmond / San Pablo
➤East Oakland

Community Engaged Enforcement (CEE)

Proposed Concept:

- Make use of community awareness and availability to help step up enforcement

- Proactively involve communities to better address air quality concerns and identify opportunities where communities may support Air District enforcement activities

# Community Engaged Enforcement (CEE) (cont'd)

Purpose / Goals:

- Utilizes community strength, resources, knowledge and expertise to identify area/sources of concern

- Helps bridge gaps between communities and C&E

- Allows C&E to target problem areas, solicit support from communities where needed to enhance enforcement, work efficiently and deploy resources appropriately

- Builds trust, improves communication and transparency

Community Engaged Enforcement (cont'd)

Next Steps:
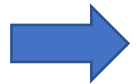
- **Incorporate recommendations from the CAC**
- Air District staff to begin exploring what community-based enforcement may look like
- Reach out to other Air Districts, state and local agencies to identify enforcement models for working together with communities
- Work through identified challenges to ensure efficiency in Air District enforcement work while developing a meaningful process that includes the community
- Present CAC with possible options for CEE at a later date

PUBLIC COMMENT

QUESTIONS?

Presentation Requested Action

- Request CAC endorsement for Compliance and Enforcement to proceed with scheduling bi-monthly community meetings

COUNCIL VOTE