CALIFORNIA
AIR RESOURCES BOARD

Addressing Air Toxics
Status and Opportunities

April 23, 2026

Panelists:

Richard Boyd
CARB

Philip Fine, Ph.D.
BAAD

Moses Huerta
Paramount

David Edwards, Ph.D.
OEHHA

Joshua Apte, Ph.D.
UC Berkeley

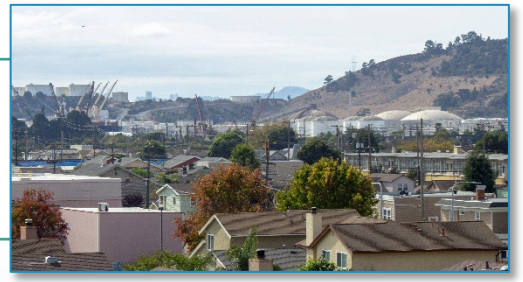
Richard Boyd

Chief – Transportation and Toxics Division

California's Air Toxics Program

Identifies and controls air toxics

Informs public of significant toxics exposures and reduces these risks



Addresses health impacts to communities, children, and other sensitive receptors

More stringent than the Federal Air Toxics Program

CARB

California's Air Toxics Program

- **AB 1807**: TAC ID & Control Program
  - Risk identification and risk management

- **AB 2588**: Air Toxics Hot Spots Program
  - Emissions inventory
  - Prioritization
  - Health risk assessment
  - Public notification
  - Risk reduction

*TAC= Toxic Air Contaminant

Accomplishments to Date

>30,000 sources

Have reduced emissions statewide

Addressing of regional, community & near-source risks

95-99%

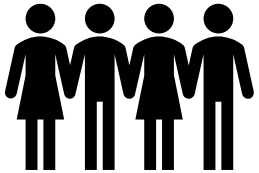
Emission reductions through control technologies on a per facility basis

Adoption of motor vehicle & fuel controls to reduce toxics

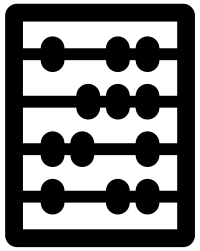
CARB

CARB's Toxics Program – Our History

What has happened over the past 30 years?



Community Advocacy

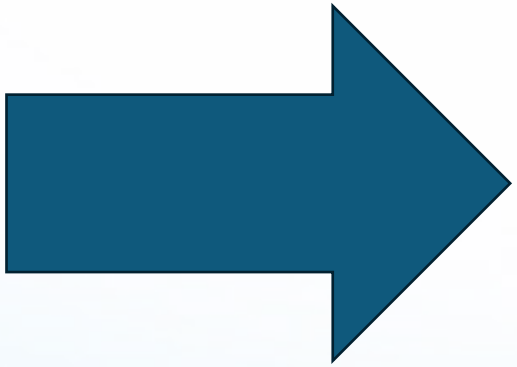


New Reporting Requirements

New Health Values

Enhanced Monitoring

Cumulative Exposure



Emerging issue:

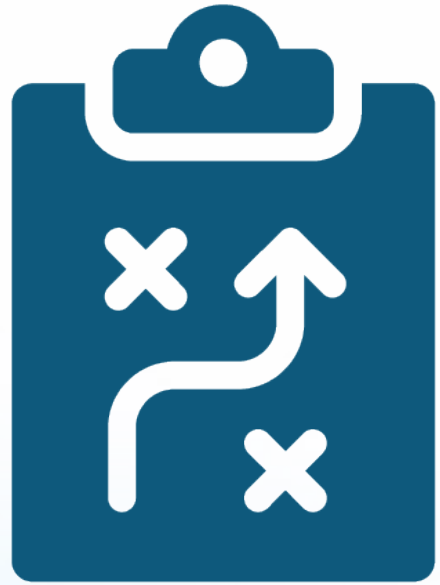
Increase of previously unidentified risk and emerging pollutants

CARB's Toxics Program Moving Forward

- Current program is incapable of meeting future challenges
- Need a unified, forward-looking strategy:
  - Modernize our toxic monitoring capabilities
  - Strengthen our foundational science
  - Strengthen and expand partnerships (districts, communities, sister agencies, industry, and academia)
  - Make information accessible and transparent
  - Work closely with our partners to ensure the best results

CARB's Toxics Program Moving Forward

- Refocus our resources and restructure where necessary
- Plan currently under development and will be presented to the Board in late 2026
  - Reinvigorate CARB's non-diesel toxics program
  - Articulate the reasons why we must act
  - Explain aspirations for future priorities



David Edwards, Ph.D.

Office of Environmental Health Hazard Assessment

OEHHA's Air Toxics Program

David Edwards, Ph.D.

Chief Deputy Director

Office of Environmental Health Hazard Assessment

AB 2588 : Hot Spots Program

OEHHA develops Health Guidance Values for high priority Hot Spots chemicals

Carcinogens: Inhalation Unit Risk (IUR)

- Used to estimate lifetime cancer risks associated with inhalation exposure to a concentration of 1 microgram per cubic meter in air

Non-carcinogens: Reference Exposure Levels (RELs)

- Airborne concentrations below which we do not expect health effects
- Acute (1-hour, infrequent); 8-hour (offsite worker); Chronic (lifetime)

AB 2588 : Hot Spots Program Process

OEHHA Internal	• Scientific literature review and evaluation; draft technical support document (TSD)
Public Comment	• Public workshops and written comments
SRP Review	• Technical review; revisions to the draft TSD
Adoption	• Final value added to Hot Spots Analysis and Reporting Program (HARP) for use in HRAs

Recent OEHHA Work

- IURs (carcinogens)
  - 1-Bromopropane (December 2022)
  - Cobalt update (August 2023)
  - Isoprene (January 2025)
- RELs (non-cancer)
  - Trivalent Chromium (August 2022)
  - 1-Bromopropane (April 2023)
  - Trimethylbenzenes (October 2023)
  - 1,4-Dichlorobenzene (July 2025)

Upcoming OEHHA Work

- IURs (carcinogens)
  - Ethylene Oxide
  - Acrolein
- RELs (non-cancer)
  - N-methylpyrrolidone
  - Carbon Disulfide

Future OEHHA Work

- Implement a process to develop expedited Hot Spots values
  - A mechanism to leverage existing work from within OEHHA and from other external entities to streamline document development while maintaining scientific rigor
    - Expedited values will go through the same process as traditional TSDs
    - Revise Hot Spots Guidance Document to include expedited process

- Support CARB's Criteria and Air Toxics Reporting Regulation
  - Provisional screening values developed using New Approach Methodologies (NAMs)

Philip Fine, Ph.D.

Bay Area Air District

Bay Area Air District

Air Districts and Air Toxics: Local Impacts and Local Action

CARB Board Study Session
Air Toxics Panel

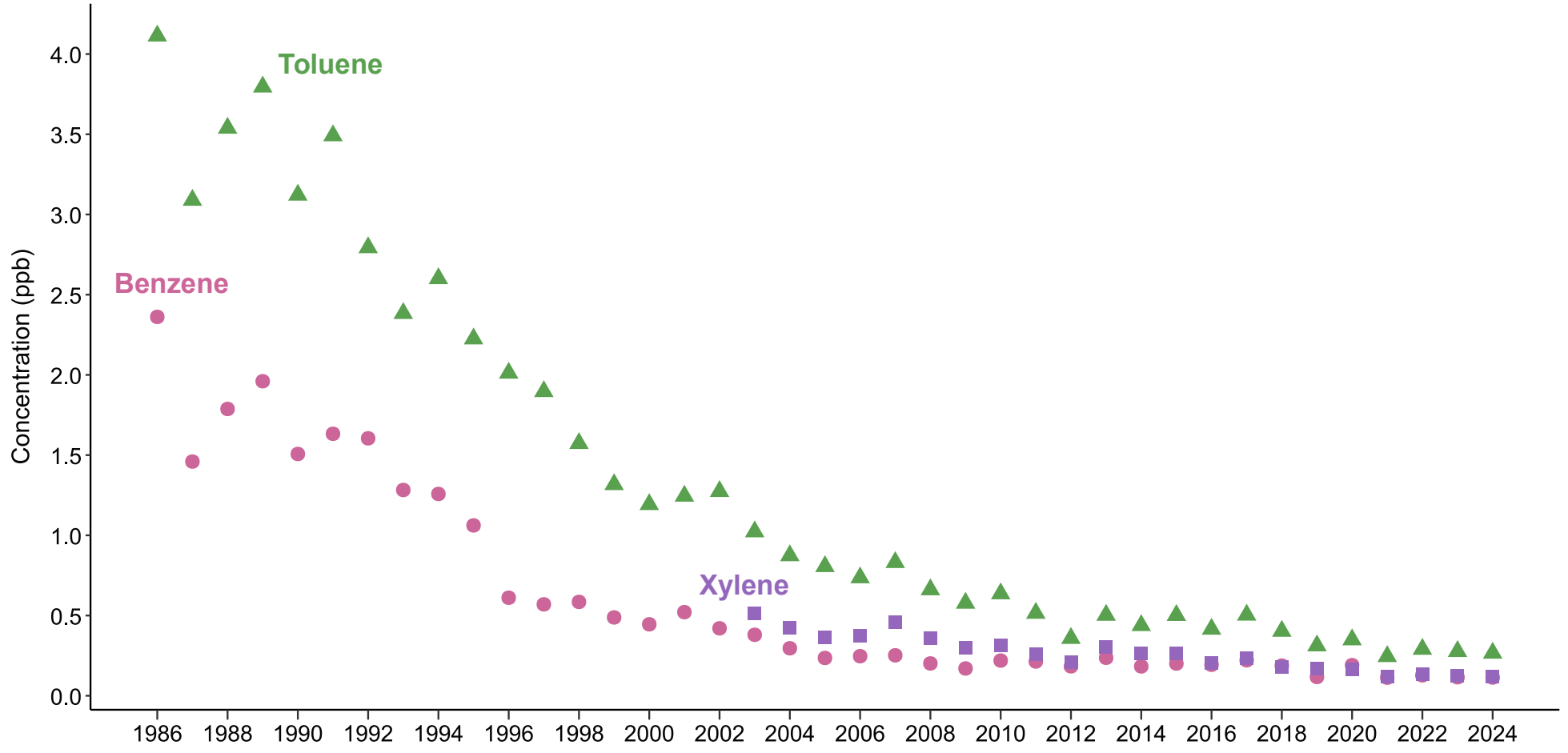
April 23, 2026

Philip Fine, Executive Officer

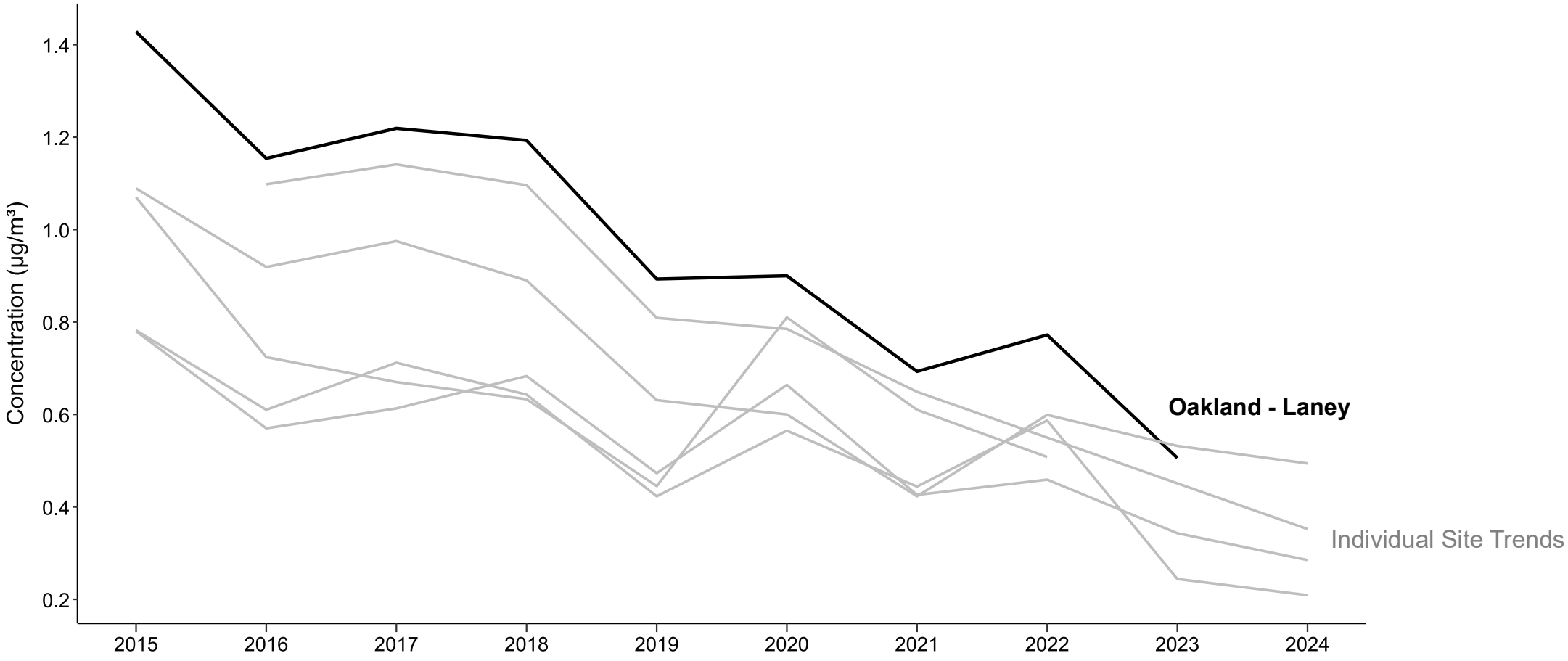
Air Toxics and Environmental Justice

- Almost all Environmental Justice Air Quality issues are due to air toxics exposure
- Localized impacts
  - Community/Neighborhood scale
  - Large disparities in exposure
  - Cumulative impacts
  - Land-use

Air Toxics Trends



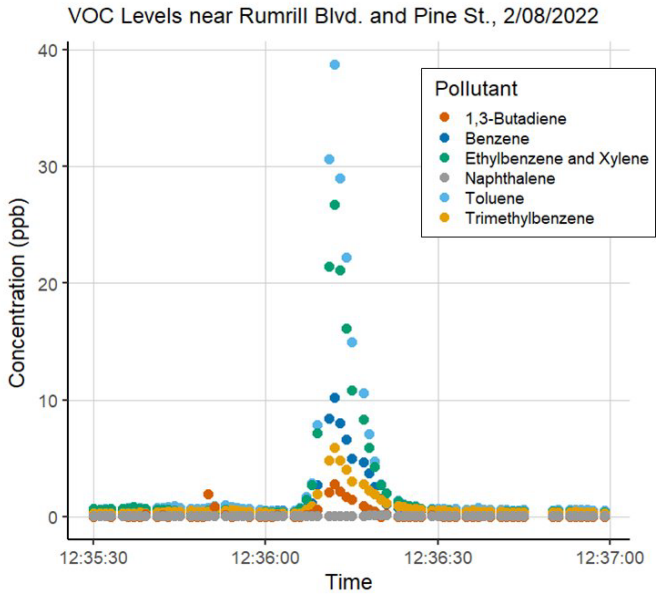
Annual Average Black Carbon Trends (indicator of diesel PM)



Bay Area Air District

Air Toxics Activities at Air Districts

- Risk Assessment
  - Air Toxics Monitoring – Local, Regional, Mobile
  - Air Toxics Modeling – Local, Regional
  - Emissions Inventory – State Reporting
- Risk Management
  - Air Toxics Regulations, with Enforcement
  - Permitting - Health Risk Assessments with Risk Limits, T-BACT Requirements
  - AB2588 Facility-Wide – Prioritization, HRAs, Notification, Risk Reduction
  - Comprehensive, Multi-pollutant Planning
- Community-Driven
  - AB617 – outreach, collaboration, monitoring, planning, action
  - Complaint response



Partnerships and Collaboration

- U.S. EPA
  - National Emission Standards for Hazardous Air Pollutants (NESHAPs)
- CARB
  - Air Toxics Control Measures
  - Monitoring Support
  - Air Toxics Emissions Reporting (CTR)
  - Mobile Source Measures
- OEHHA
  - Chemical Toxicity Assessments - Health-base Hazard Indices and Cancer Potency
  - HRA Methodologies
  - CalEnviroScreen
- Community – AB617, Community Knowledge
- Industry – Emissions Testing, Controls, Alternatives, Reformulation

Air Toxics Challenges

- UNCERTAINTY!
  - Hundreds of chemicals, source-types, locations
  - Monitoring can't be done everywhere, and is expensive
  - Emission factors can be highly uncertain, unknown, and hard to determine
  - Most stationary source air toxics impacts are from hard-to-measure fugitive (non-stack) emissions
  - Cumulative Impacts – Chemical Interactions, Non-Chemical Stressors
- Unfortunate Substitutions
  - Regulatory Reductions in ROG/VOCs
  - Low Volatility/Non-reactive Substitutes Later Found to be Toxic
- Difficulties in Permitting for Poorly Characterized or New Source Types
  - Composting
  - Pyrolysis/Gasification
  - Emerging High Tech
- Implementation of new OEHHA Assessments

Joshua Apte, Ph.D.

University of California, Berkeley

The road ahead in addressing air toxics

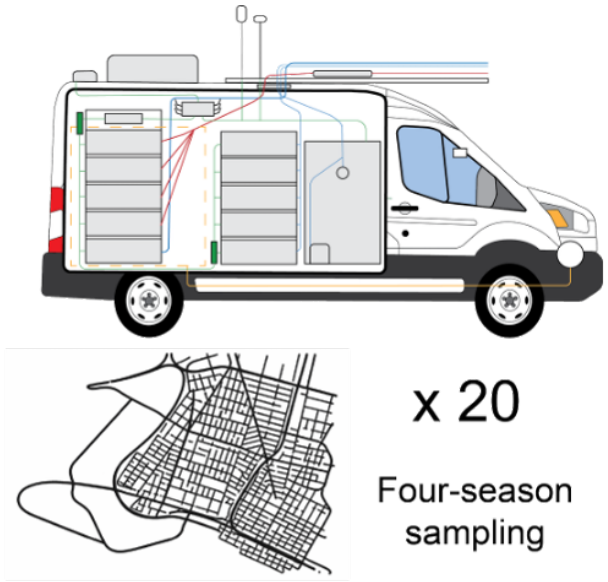
Joshua Apte
Associate Professor | UC Berkeley
apte@berkeley.edu

ARB Study Session
23 April 2026

Reducing disparities in air toxics exposure

Lessons from the DPM experience

Repeated field studies in West Oakland: 2015 - 2026



x 20

Four-season sampling

Repeatedly sample air pollution in community with mobile measurements

Generate high spatial resolution concentration maps

Street View

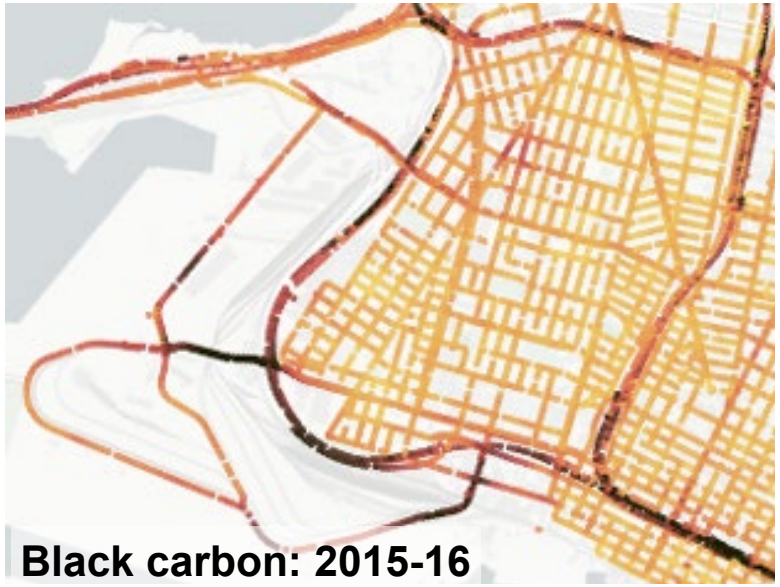
UC Berkeley Mobile Air Pollution Laboratory

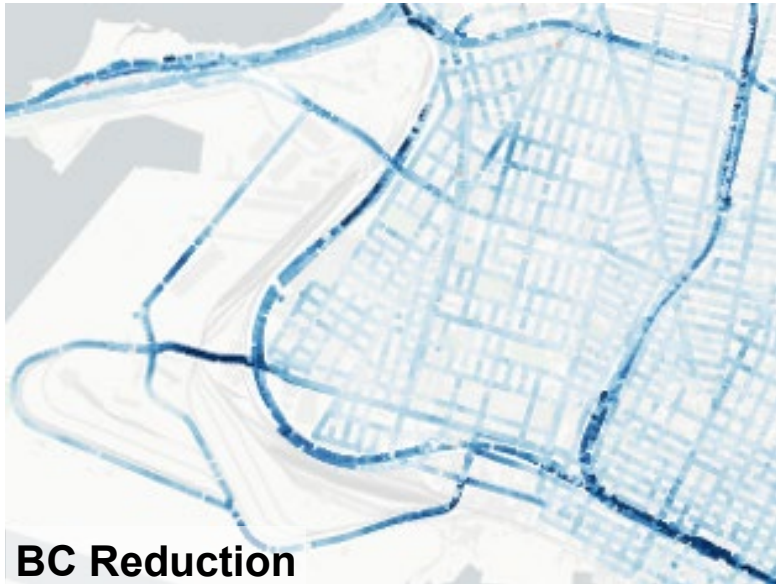
2015/16 2025/26

Conduct a decade apart and study changes

Cliff et al., *in prep*

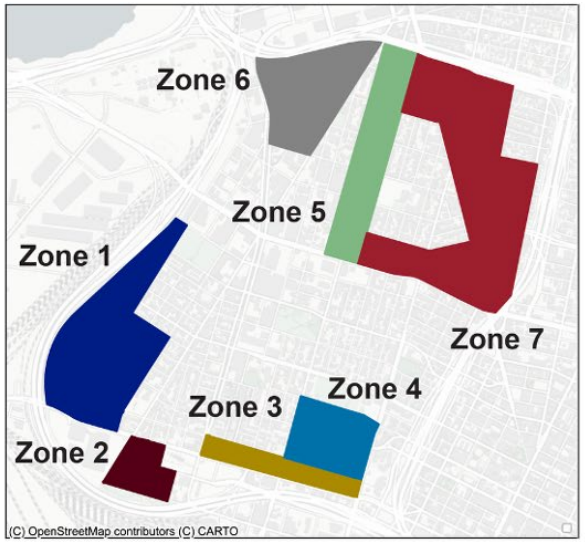
Dramatic improvements in West Oakland

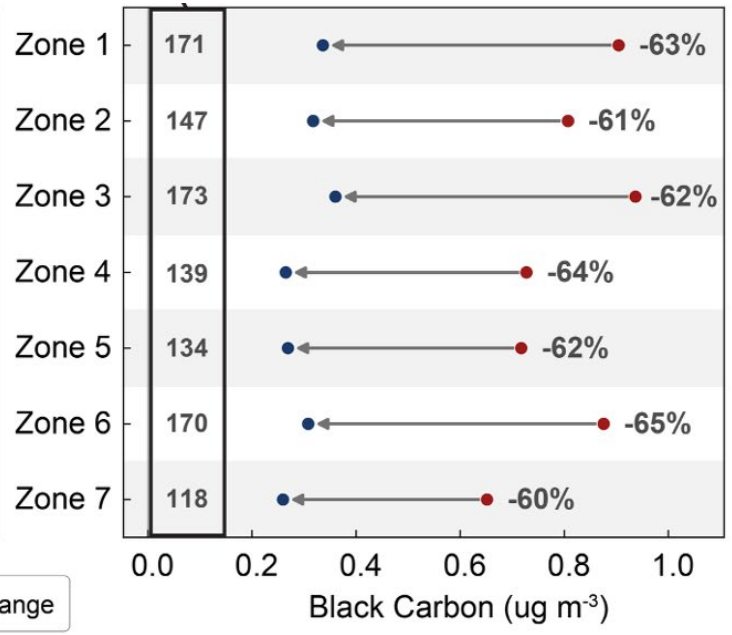




~60% reduction in DPM
2015 → 2025

Cancer risk reduction
~100-200 per million

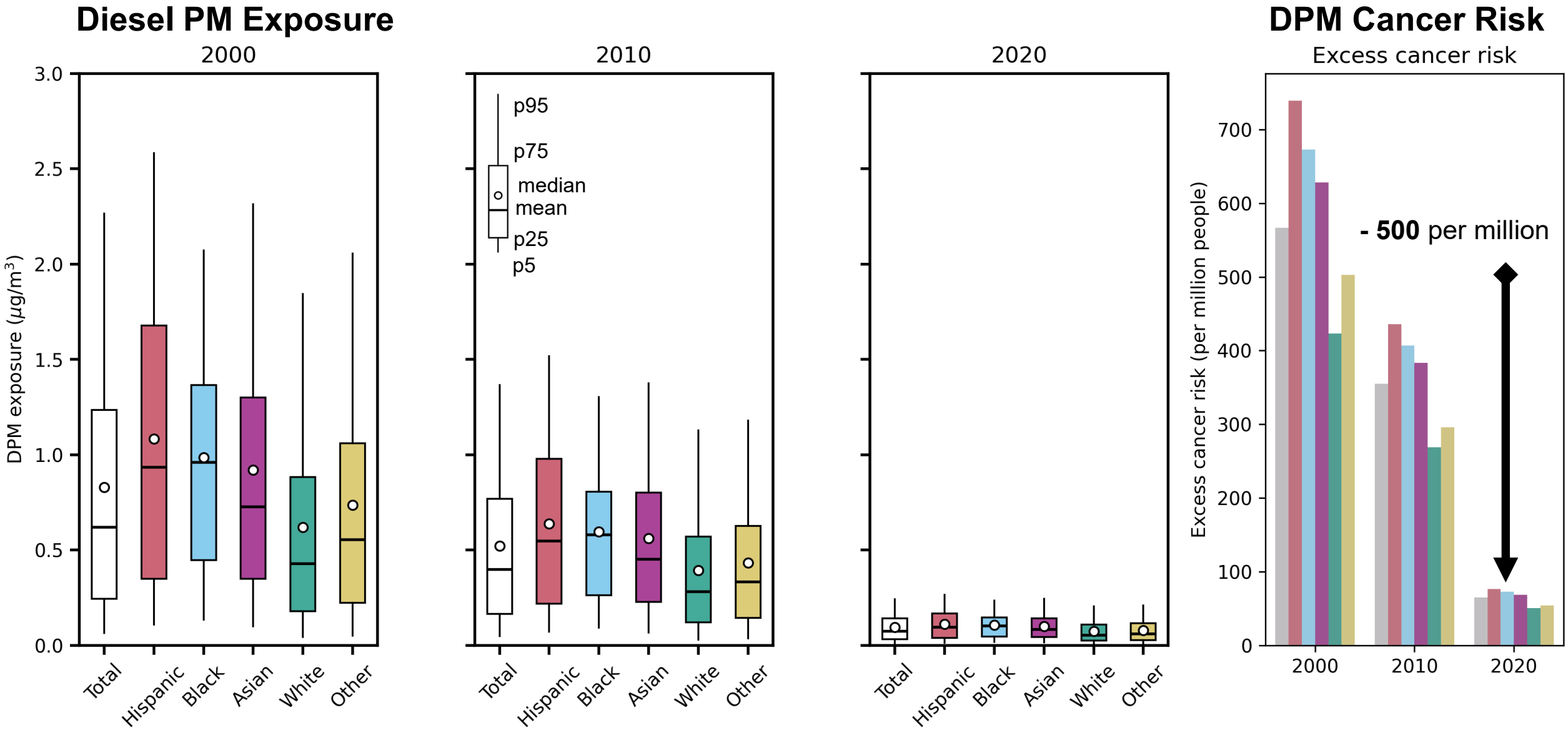




2015/16 2025/26 2015 → 2025 change

Apte et al., *ES&T* 2017; Cliff et al., *in prep*

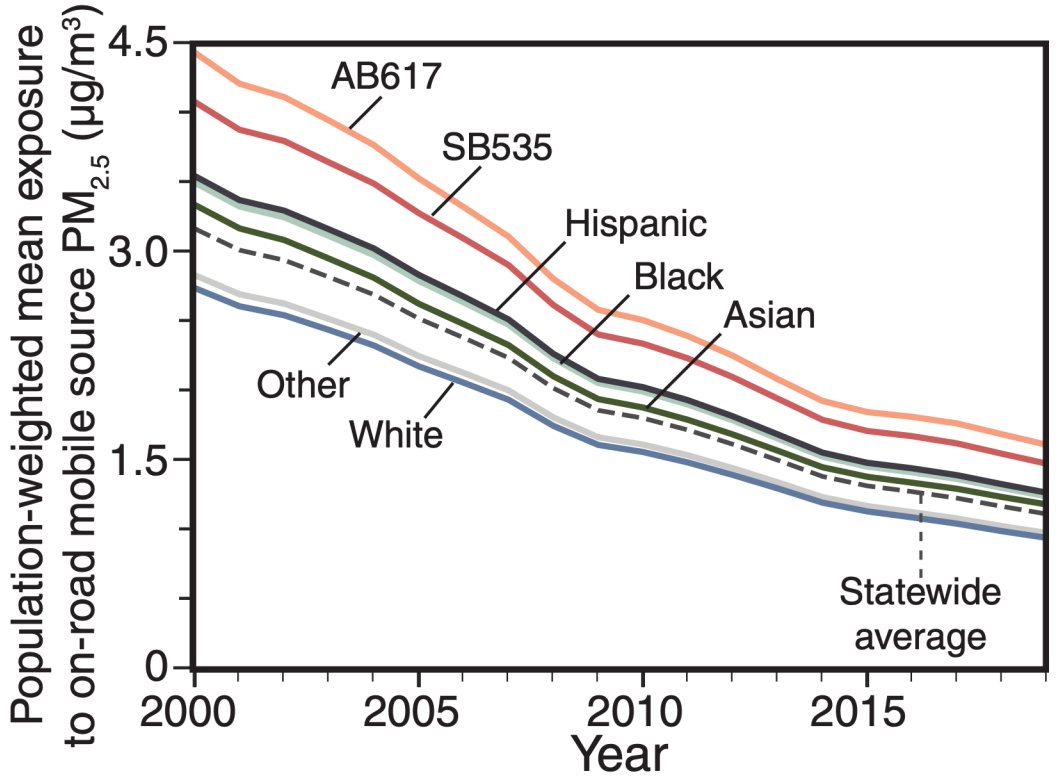
Statewide progress: shrinking DPM exposures & disparity



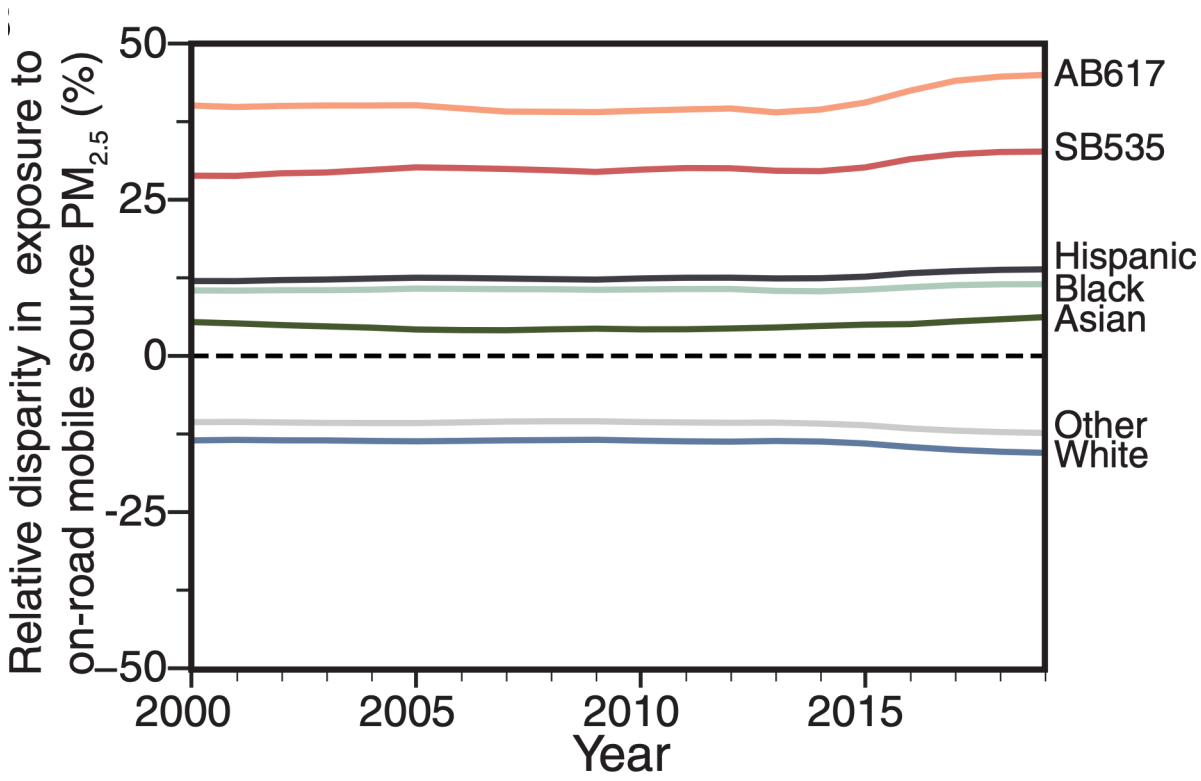
Speizer et al., *in prep*

Relative disparities persist despite large absolute improvement

D_A **Average $PM_{2.5}$ Concentration & Absolute Exposure Disparity**



D_R **Relative Exposure Disparity**



Koolik et al., *Science Advances* 2024; Bekbulat et al., *Science Advances* 2026

Conceptual framework for reducing disparities

Emissions
How much pollution is emitted from a given economic sector?

[g/yr emitted]

Average Exposure Factor
How much population-weighted exposure is caused per unit emitted?
[µg/m3 per g/yr emitted]

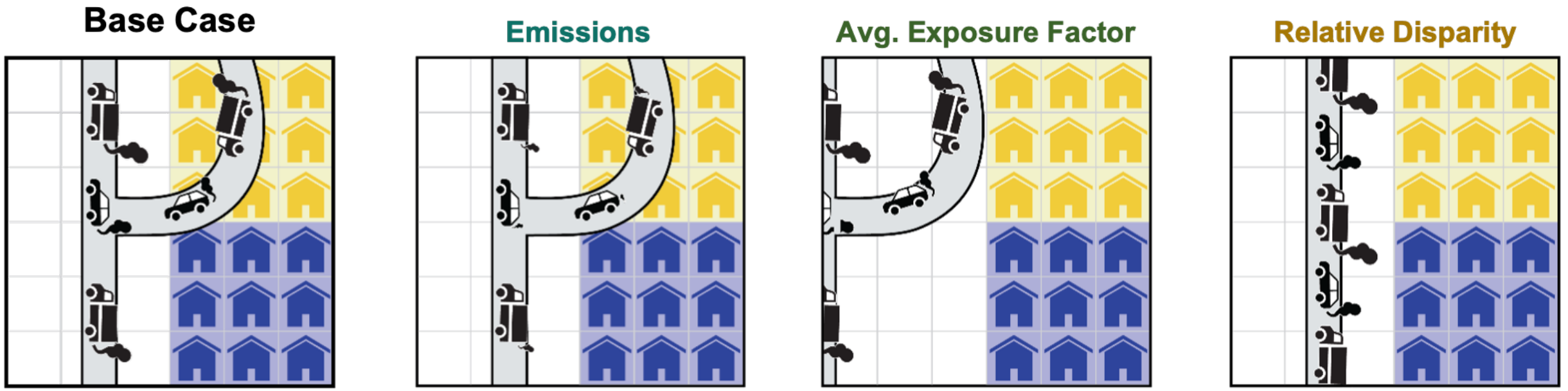
$$D_A = E \times \overline{XF} \times D_R$$

Absolute Disparity
How overburdened is a specific group compared to the full population?
exposure contrast [µg/m^3] between specific group and population

Relative Disparity
How disparately does the source of interest expose a specific group relative to the population-average?
[% increment in exposure relative to pop. avg.]

Koolik et al., *PNAS* 2025

Distinct “levers” for each component



Koolik et al., *PNAS* 2025

Data needs for tracking and targeting air toxics hotspots

(We're not starting from scratch!)

Combine measurements *and* models

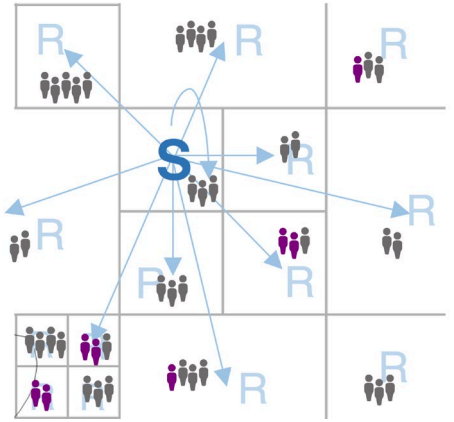
Measurements

- Reveal hotspots, track progress.
- Surprise us. Challenge our assumptions.
- Ground-truth our models.
- Challenges: costly, hyperlocal scale.

Models

- Represent exposures, disparities for large populations.
- Link sources and risk.
- Explore solutions in partnership with communities, academia.
- Challenge: inventory data has many gaps for toxics.

Source-Receptor Models



Connections

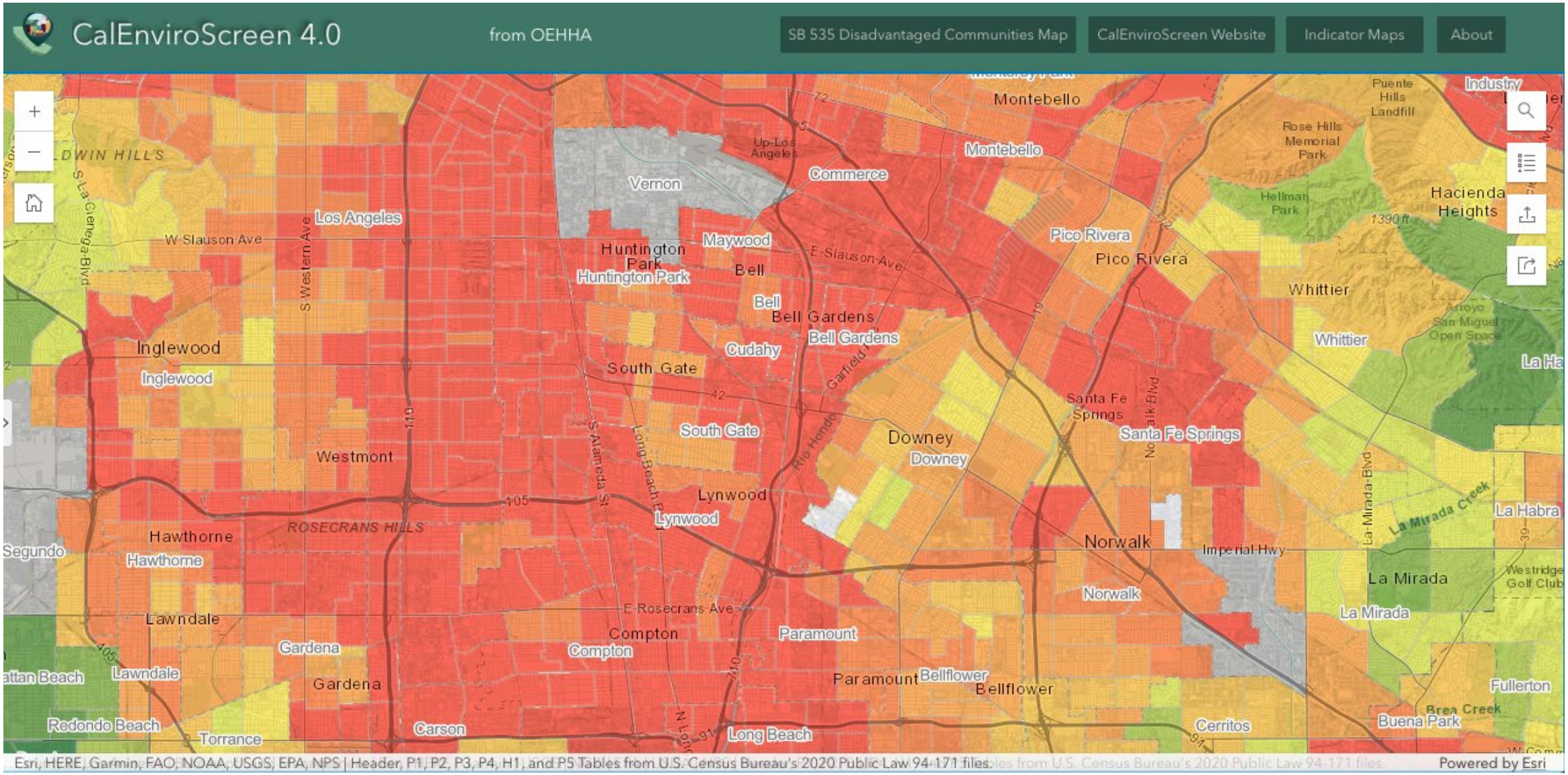
- Plan to connect models and measurements.
- Use models to inform where we most need measurements.
- Inverse models: use measurements to update our inventories.

Cliff et al., in prep; Apte et al., 2019; Manchanda et al., in review

Moses Huerta

Community Advocate
Resident of the City of Paramount

¿Qué es la salud ambiental?/ *What is environmental health?*


CalEnviroScreen 4.0
from OEHHA
SB 535 Disadvantaged Communities Map
CalEnviroScreen Website
Indicator Maps
About
Montebello
Puente Hills Landfill
Industry
Rose Hills Memorial Park
Hellman Park
Hacienda Heights
1390 ft
Vernon
Commerce
Up-Los Angeles
Los Angeles
W Slauson Ave
S Western Ave
S La Cienega Blvd
Maywood
E Slauson Ave
Huntington Park
Bell
Bell Gardens
Pico Rivera
Whittier
Arroyo San Miguel Open Space
Inglewood
Cudahy
South Gate
Santa Fe Springs
Norwalk Blvd
Downey
Garfield Ave
Rio Hondo
S Alameda St
Long Beach Fwy
Lynwood
Westmont
ROSECRANS HILLS
Hawthorne
Segundo
Norwalk
Imperial Hwy
La Mirada Blvd
La Mirada Creek
La Habra
La Mirada
Westridge Golf Club
E Rosecrans Ave
Lawndale
Compton
Paramount
Gardena
Bellflower
Fullerton
Brea Creek
Buena Park
Redondo Beach
Torrance
Carson
Long Beach
Cerritos
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | Header, P1, P2, P3, P4, H1, and P5 Tables from U.S. Census Bureau's 2020 Public Law 94-171 files.
Powered by Esri

Why Does Pollution in the Community Matter?

- Our communities have some of the worst pollution burdens in the state (seen on the previous map)
- Air pollution is harmful to our health, it can cause:
  - Lung and breast cancer
  - Birth defects
  - Reproductive damage
  - Irritation of the eyes, skin, nose, and throat
  - Lung problems
  - Problems in the liver
- Pollutants are released by different sources such as industrial companies and metal factories
- Toxic substances in the air can travel through the air, water, and soil, exposing more than a defined area

Air Monitoring in Maywood, Vernon, Bell, East Commerce, and Paramount

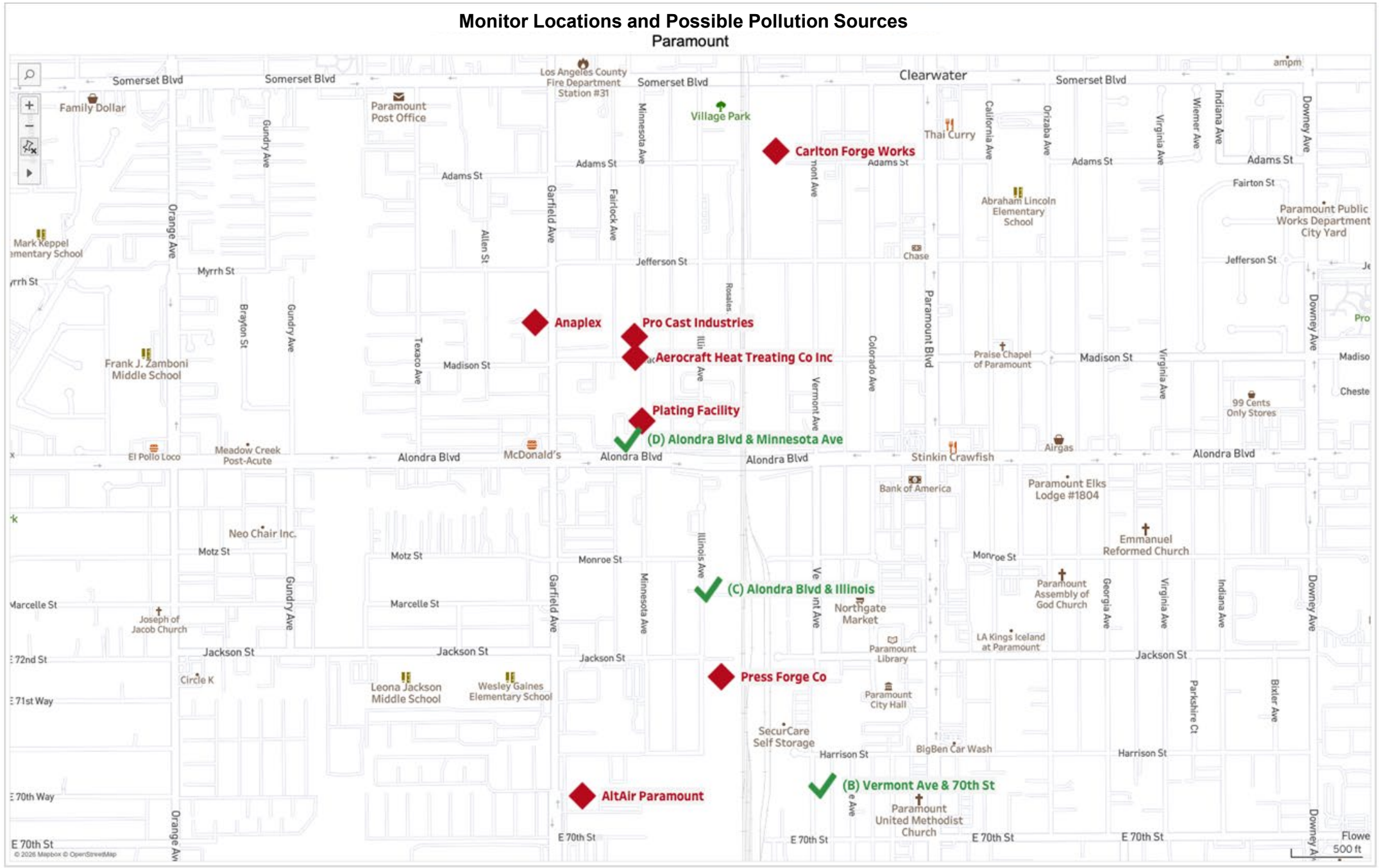
First resident-led air monitoring project and the Environmental Health Center. (*Paramount 2022*)

Expansion of the community-led air monitoring project and Comité Pro Uno. (*Maywood 2025*)

Monitor Locations and Possible Pollution Sources

Maywood / Vernon / Commerce / Bell

Monitor Locations and Possible Pollution Sources



How to Protect Yourself at Home

Protect Yourself from Polluted Soil and Dust

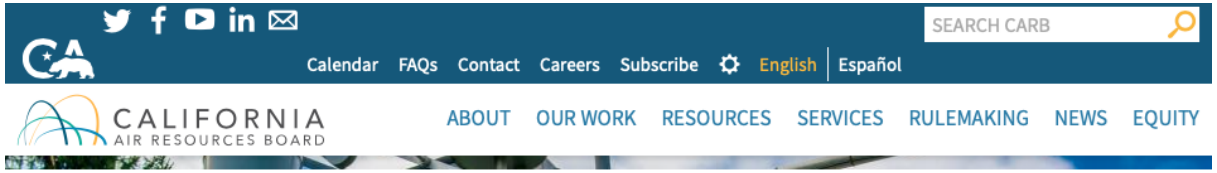
Wash your hands constantly

Remove or wipe the dirt off your shoes before entering your home

Use a wet mop or vacuum cleaner with a HEPA filter

Wipe off dust with a damp towel

Taken from an infographic by: Jennifer Ahumada (USC)



Community Air Monitoring in Maywood-Vernon-Bell-East Commerce

CATEGORIES

Topics Airborne Toxics

Programs Air Toxics Program

Type Community Air Protection

CONTACT

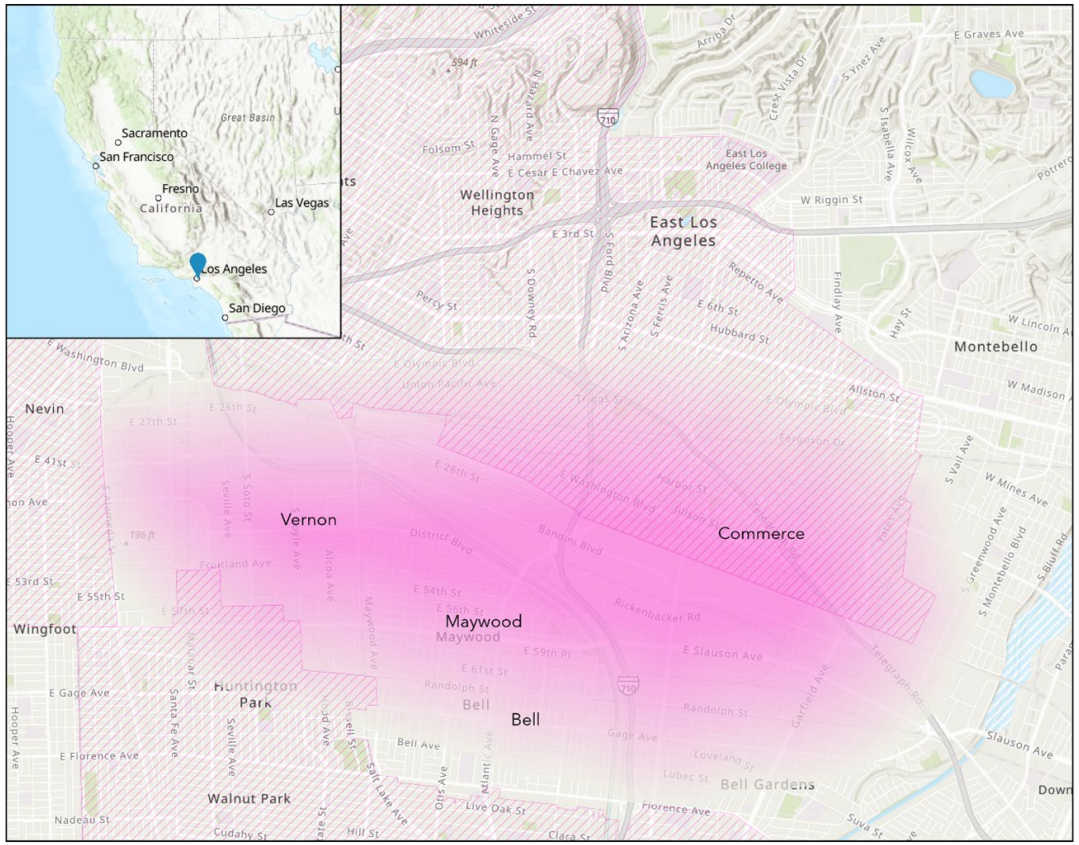
Air Toxics

Email airtoxics@arb.ca.gov

Background

Maywood-Vernon-Bell-East Commerce is a highly industrialized, urban community in Los Angeles County within the South Coast Air District that spans 13 square miles (see map below). This community has some of the worst pollution burdens within the State, as the maximum CalEnviroScreen (CES) score is at the 99th-percentile. Residents are exposed to various sources of pollution in the community, including:

- Facilities emitting air toxics
- Traffic
- Lead from housing
- EnviroStor cleanup sites
- Hazardous waste facilities



This project is part of *California Climate Investments*, a statewide initiative that commits billions of dollars from the Cap-and-Trade program to reduce greenhouse gas emissions, strengthen the economy, and improve public health and the environment, particularly in disadvantaged communities.