



2. EMISSIONS INVENTORY AND REGIONAL AIR QUALITY MODELING

MATES VI TAG MEETING #3 - MAY 30, 2024

Sang-Mi Lee, Ph.D.

Planning and Rules Manger

Planning, Rule Development, and Implementation

OUTLINE

- Modeling Capabilities and Frameworks
- Emissions Inventory
- Overview of MATES V
- Modeling Framework for MATES VI
- Neighborhood Scale Modeling

SOUTH COAST AQMD'S REGIONAL MODELING CAPACITY

Regional Modeling for State Implementation Plans (SIP)

- CMAQ-WRF-SMOKE-EMFAC-MEGAN
- SAPRC07 Chemical Mechanism with AERO6
- 4km by 4km spatial resolution
- Full photochemistry and transport
- Criteria pollutant focused

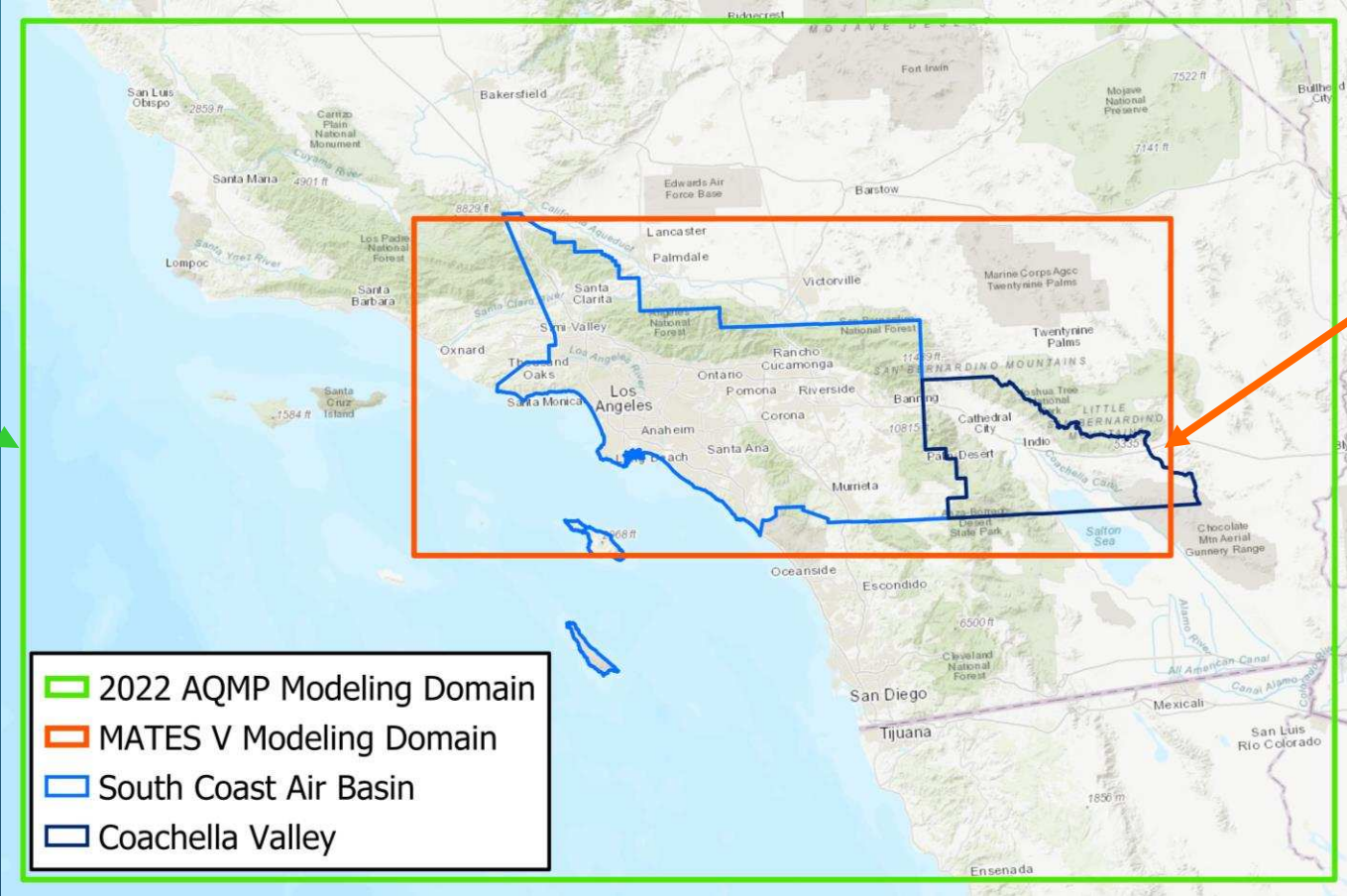
MATES/Exposure Modeling

- CAMx with rTRAC
- SAPRC07 Chemical Mechanism with AERO6
- 2km by 2km resolution
- Full Photochemistry and transport
- Tracking relatively inert species such as diesel PM with rTRAC
- Air toxics

SIP VS. MATES V MODELING DOMAINS

**4-km Resolution
156 x 102 grid cells**

**2-km Resolution
180 x 80 grid cells**



EMISSIONS INVENTORY – POINT AND AREA SOURCES

- Point Sources

- Facilities emitting > 4 tons per year of NO_x, VOC and SO_x, 100 tons per year of CO are required to report their emissions annually
- This include both criteria pollutants and selected toxics air contaminants (TACs)
- Facilities subject to AB2588 hot spot program report 177 different TACs every four years

- Area Sources

- Estimated from county/region/State-wide consumption, throughputs or activities



EMISSIONS INVENTORY – ON AND OFFROAD MOBILE SOURCES

- On-Road Mobile Sources

- Travel Activity Data from Southern California Association of Governments
- Emission Factors from EMFAC. The latest U.S. EPA approved version is 2021, while version 202Y is under development



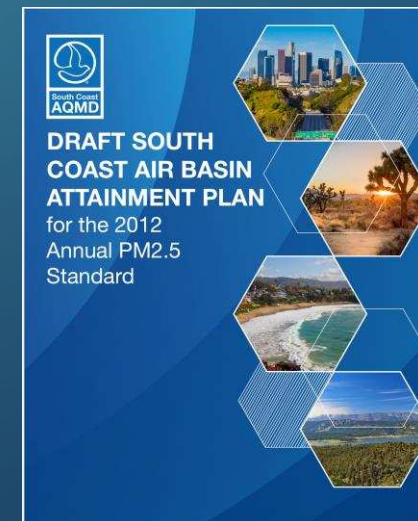
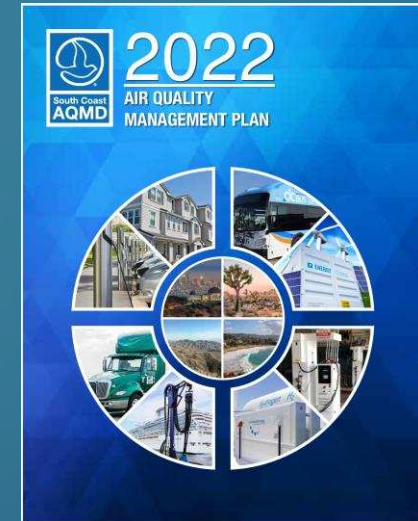
- Off-Road Mobile Sources

- Category-specific activity data and emission factors



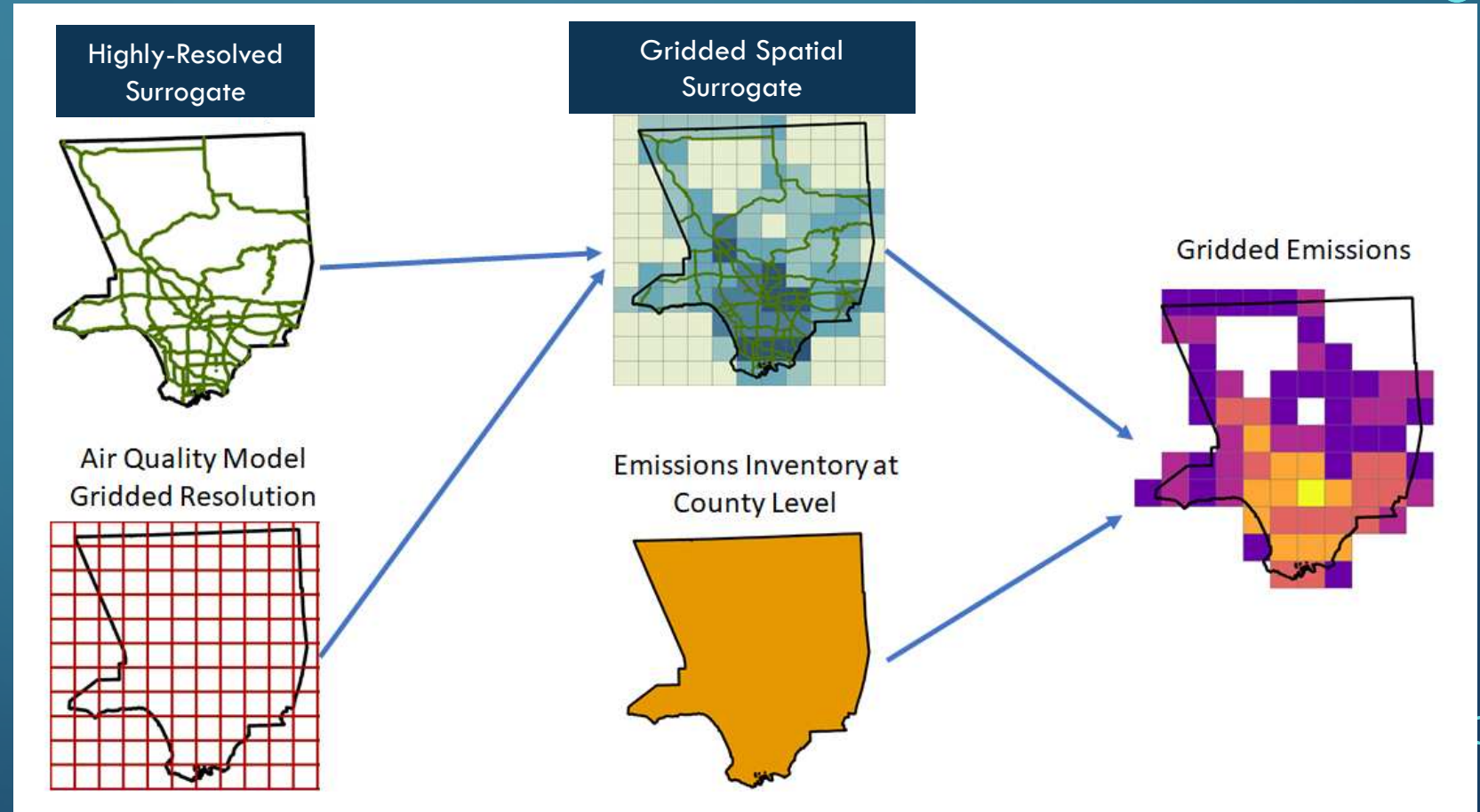
AVAILABLE EMISSIONS INVENTORY

- The latest inventory was developed to support the 2022 AQMP and the PM2.5 attainment Plan
- 2018 served as the base year of which emissions were estimated based on year specific activities, throughput, populations, etc
- The base year emissions were projected forward and backward based on socioeconomic projections and historic data, respectively
- 2025 would be the MATES VI modelling year
- When new data are developed in next several years to support upcoming State Implementation Plan/Air Quality Management Plan development, they will be reflected as much as feasible



CONVERTING SIP EMISSIONS TO MODEL-READY EMISSIONS

- Need to convert county-wide aggregated emissions into model-ready inputs:
 - Spatial allocation
 - Temporal allocation
 - Chemical speciation

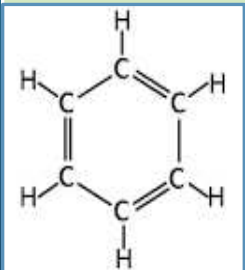


CHEMICAL SPECIATION



Criteria Air Pollutants (CAP)

- VOC, NO_x, SO_x, NH₃, PM_{2.5} and Pb

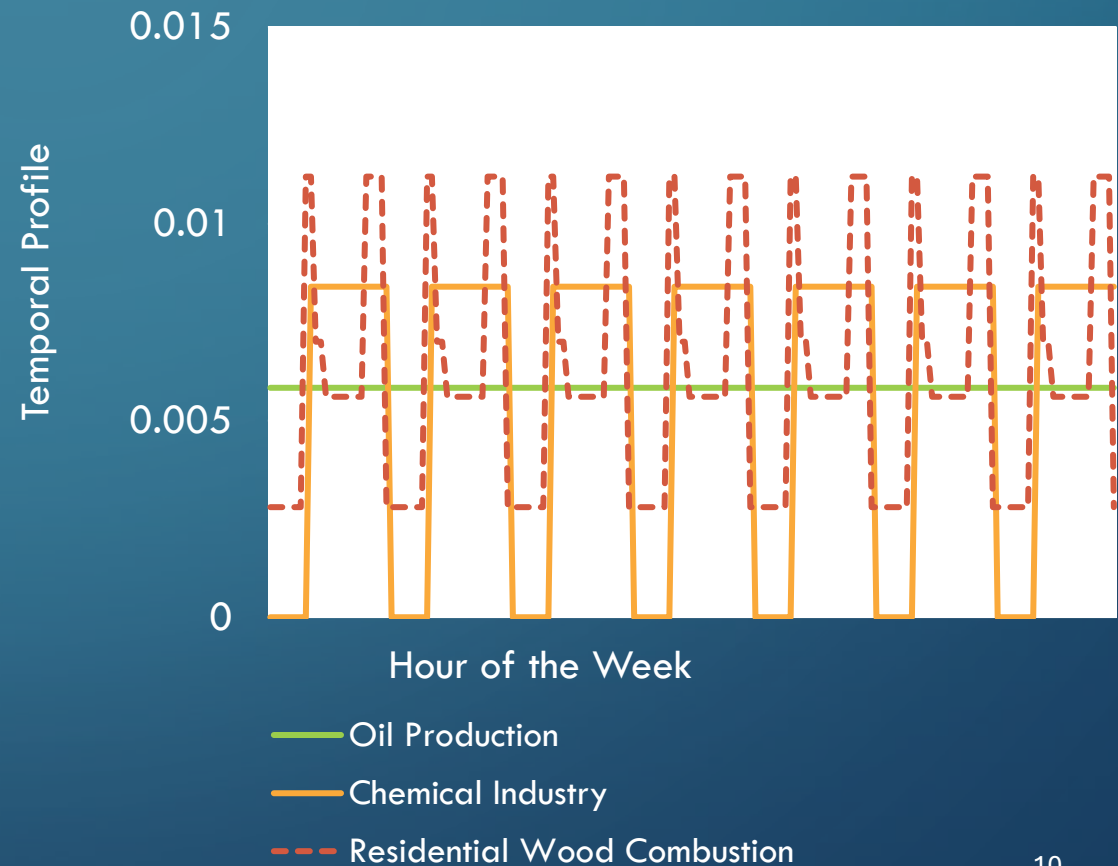


Toxic Air Contaminants (TAC)

- Large Facilities: 24 TACs reported annually
- Other Sources: Speciation of TACs based on speciation profiles
- Total Organic Compounds are used for gaseous phase TACs
- TSP is used for particle phase TACs

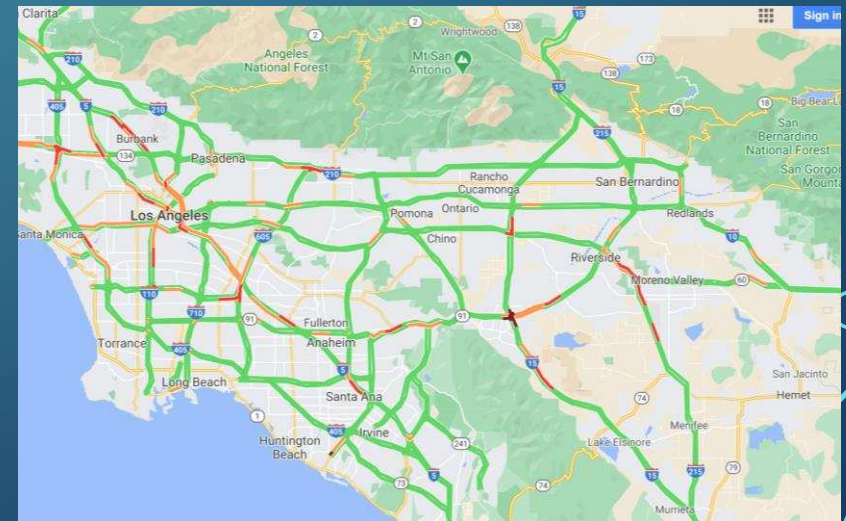
TEMPORAL PROFILES

- Temporal profiles are used to allocate average day emissions to hourly emissions
- Profiles include monthly, day-of-week and hourly profiles for all sources
- Hundreds of unique temporal surrogates for individual source categories



ALLOCATING ON-ROAD MOBILE SOURCE EMISSIONS

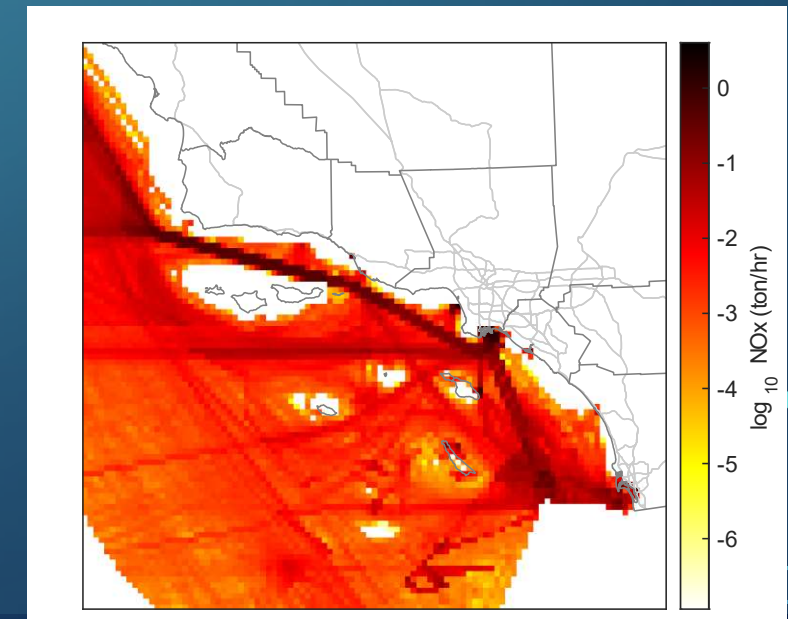
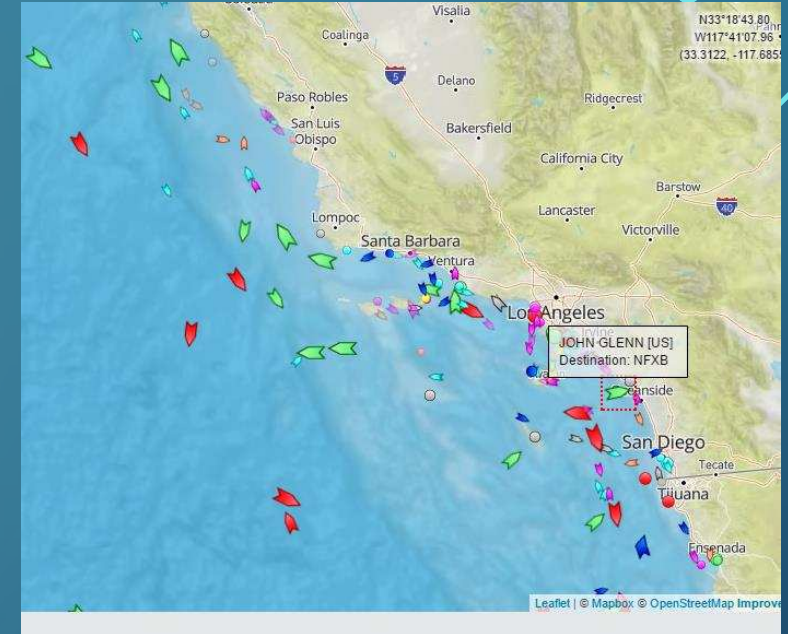
- Based on real-time sensor data
- Light and Medium duty vehicles
 - California Department of Transportation Performance Measurement System (Caltrans PeMS)
 - > 9000 traffic detector
- Heavy duty vehicles
 - PeMS detectors in conjunction with algorithm to separate vehicle size (Kwon et al., 2003)



ALLOCATING OCEAN GOING VESSELS EMISSIONS

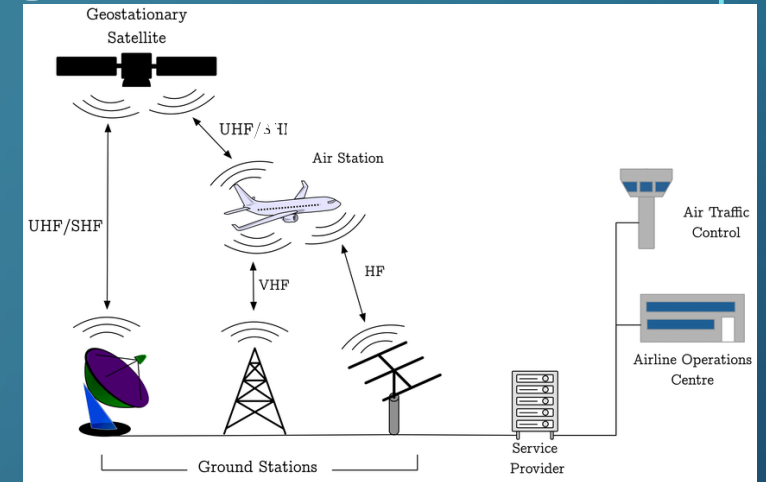
- Automated Identification System (AIS) as provided by Marine Cadastre
- AIS transponders provides vessel speed, position, type and operational mode

Vessel Types	Operational Modes
Cargo (all types)	Transit
Military	Anchorage
Passenger	Maneuvering
Tanker	Hotelling

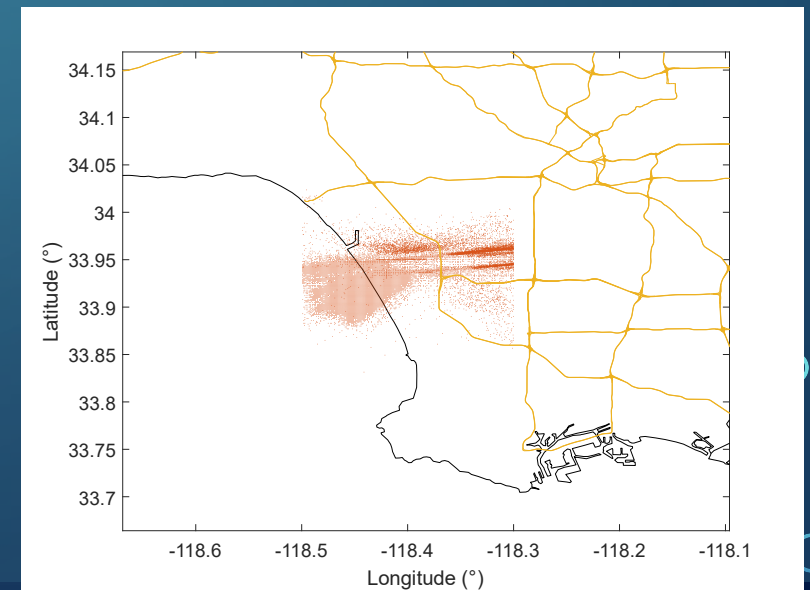


ALLOCATING AIRCRAFT EMISSIONS

- Aviation Environmental Design Tool (AEDT), Federal Aviation Administration's official model was employed to estimate aircraft emissions
- Aircraft Communication Addressing and Reporting System (ACARS) data was used for spatial allocation for large airports
- CARB's Gridded Aircraft Trajectory Emissions (GATE) is used temporal allocation of emissions and spatial allocation for small airports



Source: Smith et al. 2016, <http://dx.doi.org/10.1109/ICNSURV.2016.7486395>



MATES V MODELING

Chemical
Transport Model

CAMx RTRAC v6.50

Modeling Period

May 1, 2018 – April 30, 2019, the same as the measurement period

Modeling Domain

South Coast Air Basin and majority of Coachella Valley

Emissions

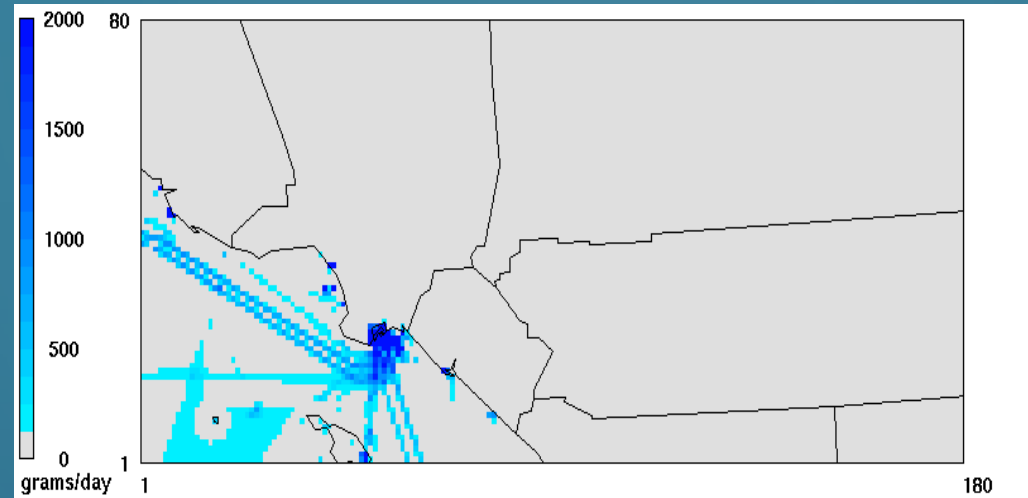
Based on the 2016 AQMP inventory with available updates

Meteorological
Fields

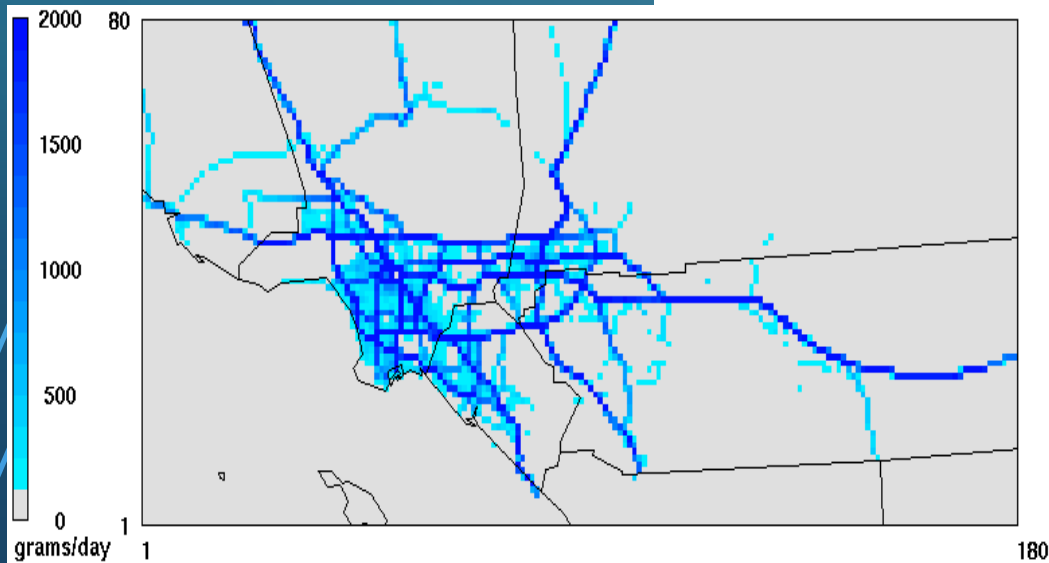
Weather Research and Forecast (WRF) model

ANNUAL AVERAGE DAILY DIESEL PM EMISSIONS

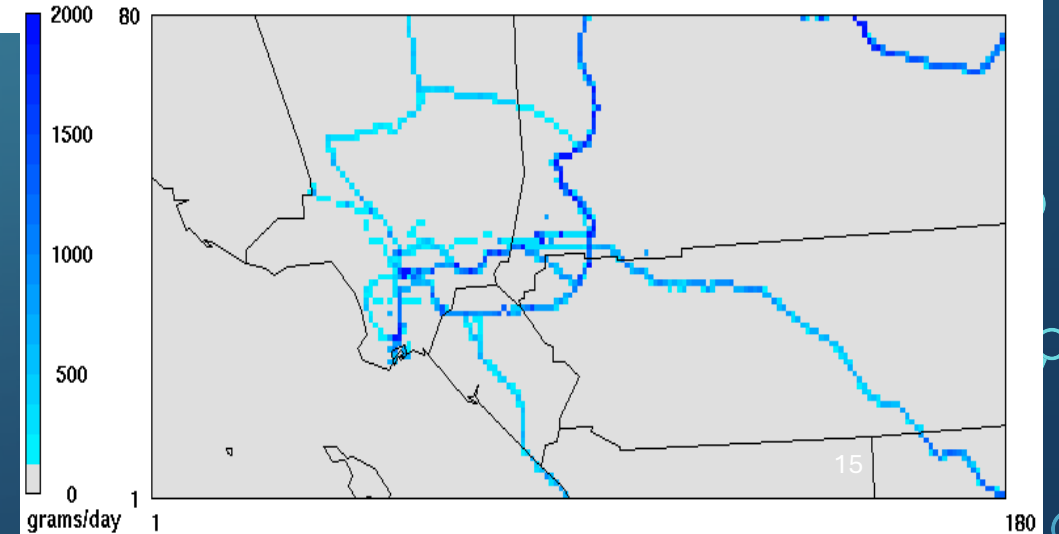
Ocean Going Vessels and Commercial Harbor Craft



On-Road Mobile Sources



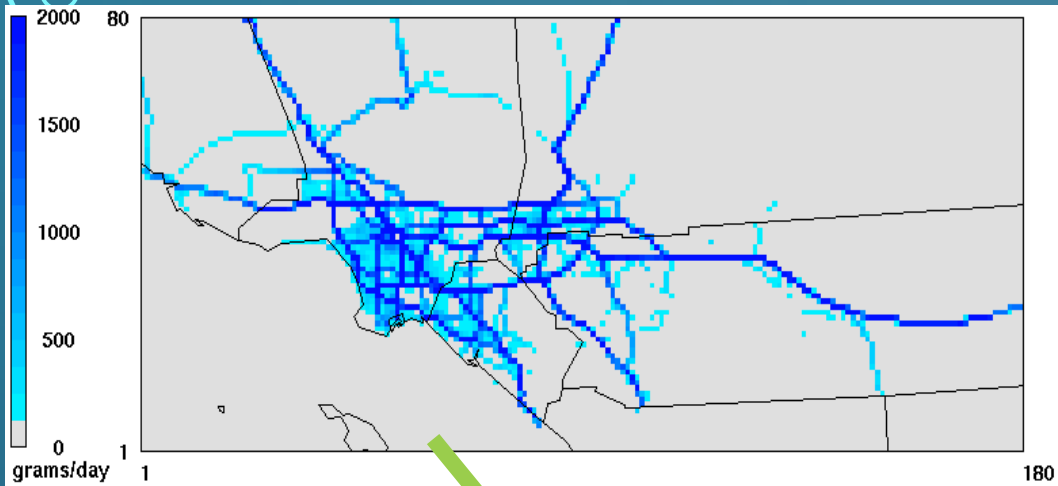
January 4, 2008 0:00:00
= 0 at (43,1), Max=18534 at (51,24)



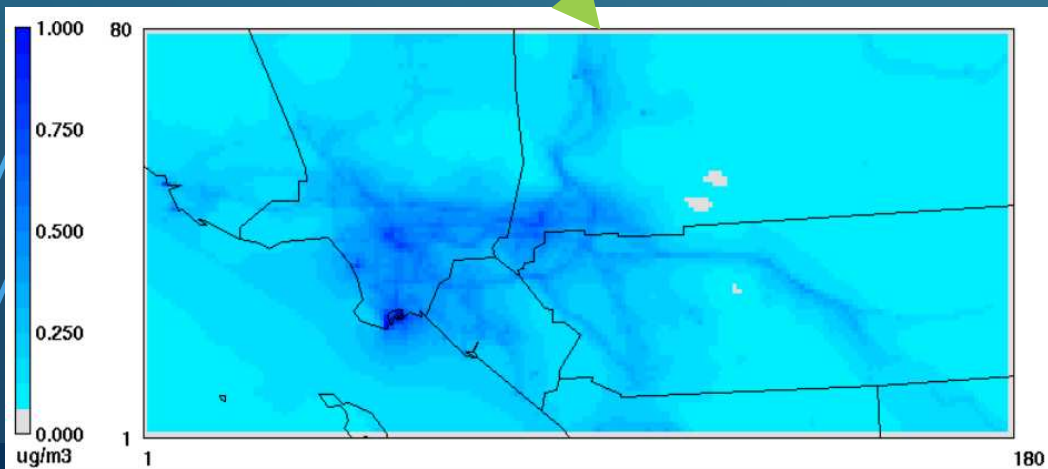
Locomotive

MODELING AIR TOXIC EXPOSURE

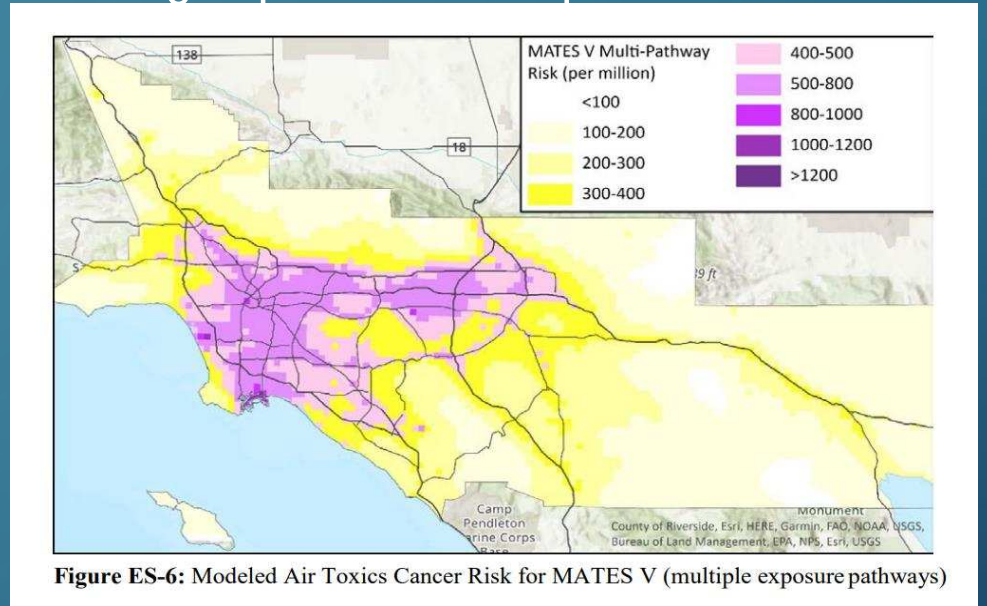
Spatially and Temporally Resolved Emissions
Tracking Criteria Air Pollutants and Toxics



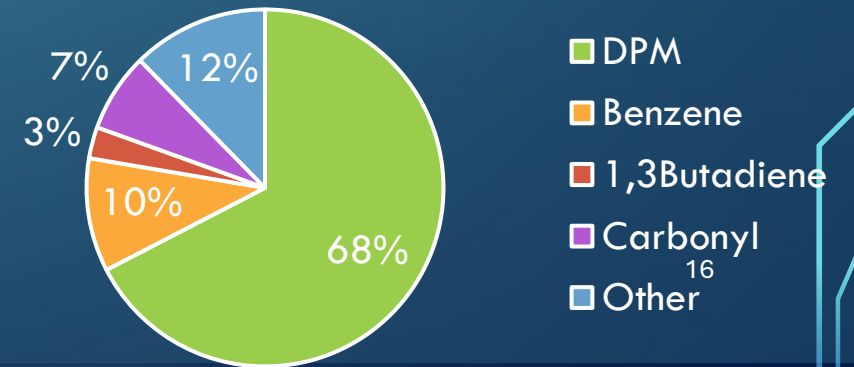
Transport and Chemistry of
Primary and Secondary Air Toxics



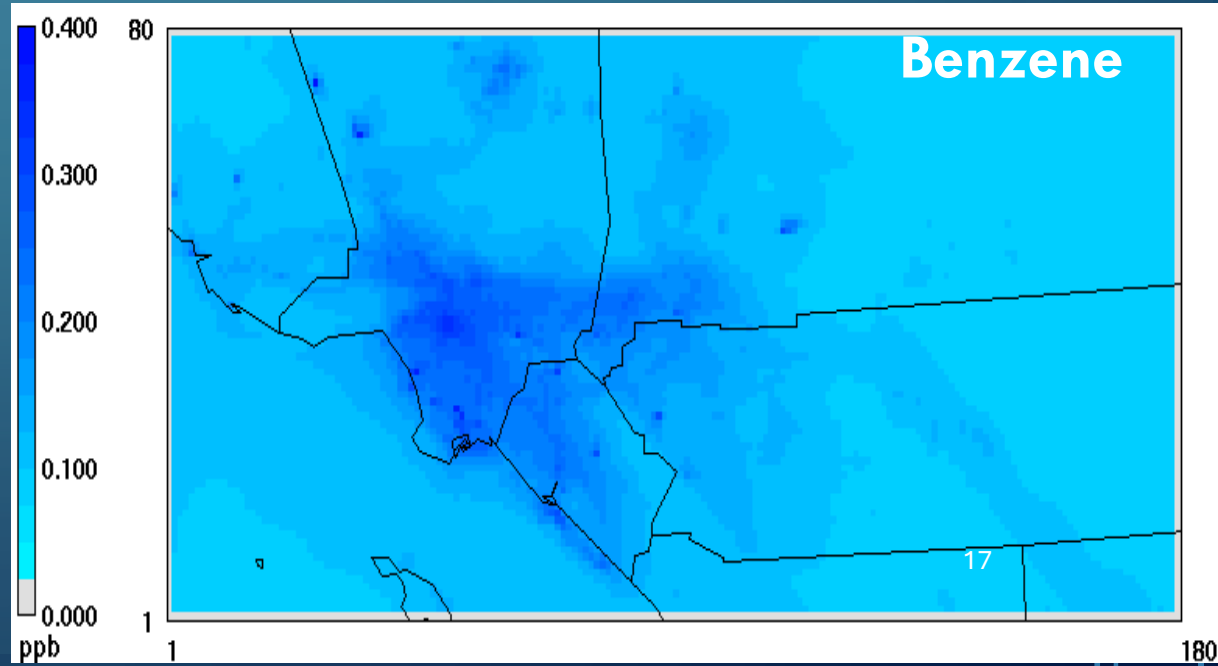
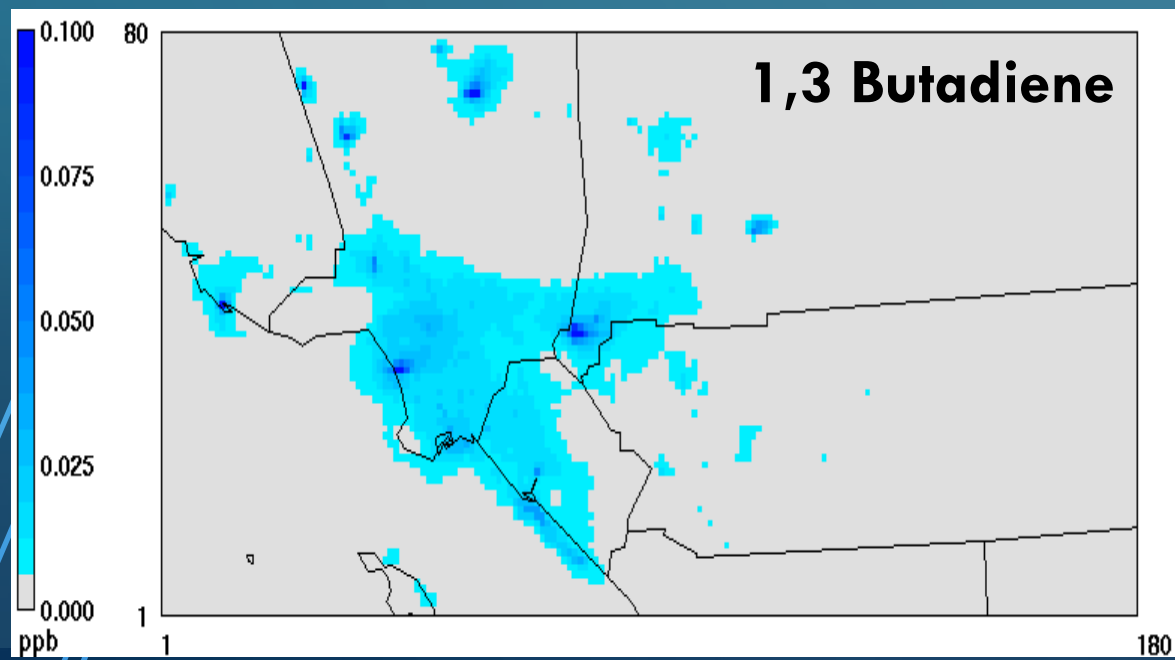
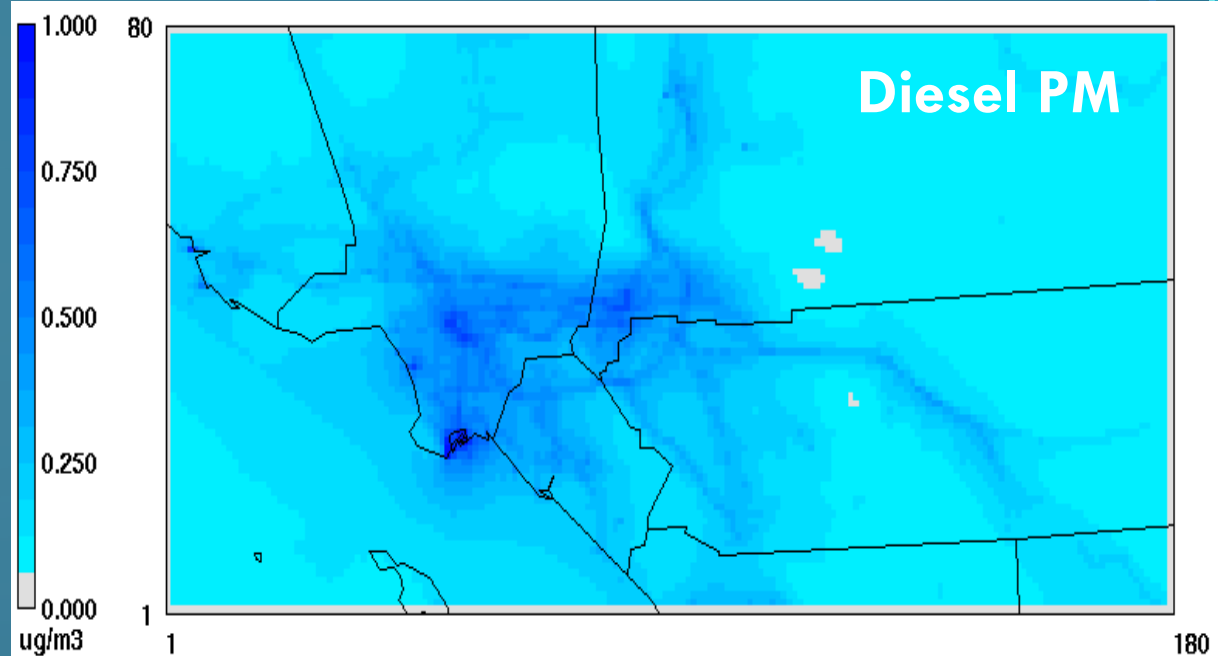
Calculating Exposure and Population Cancer Risk



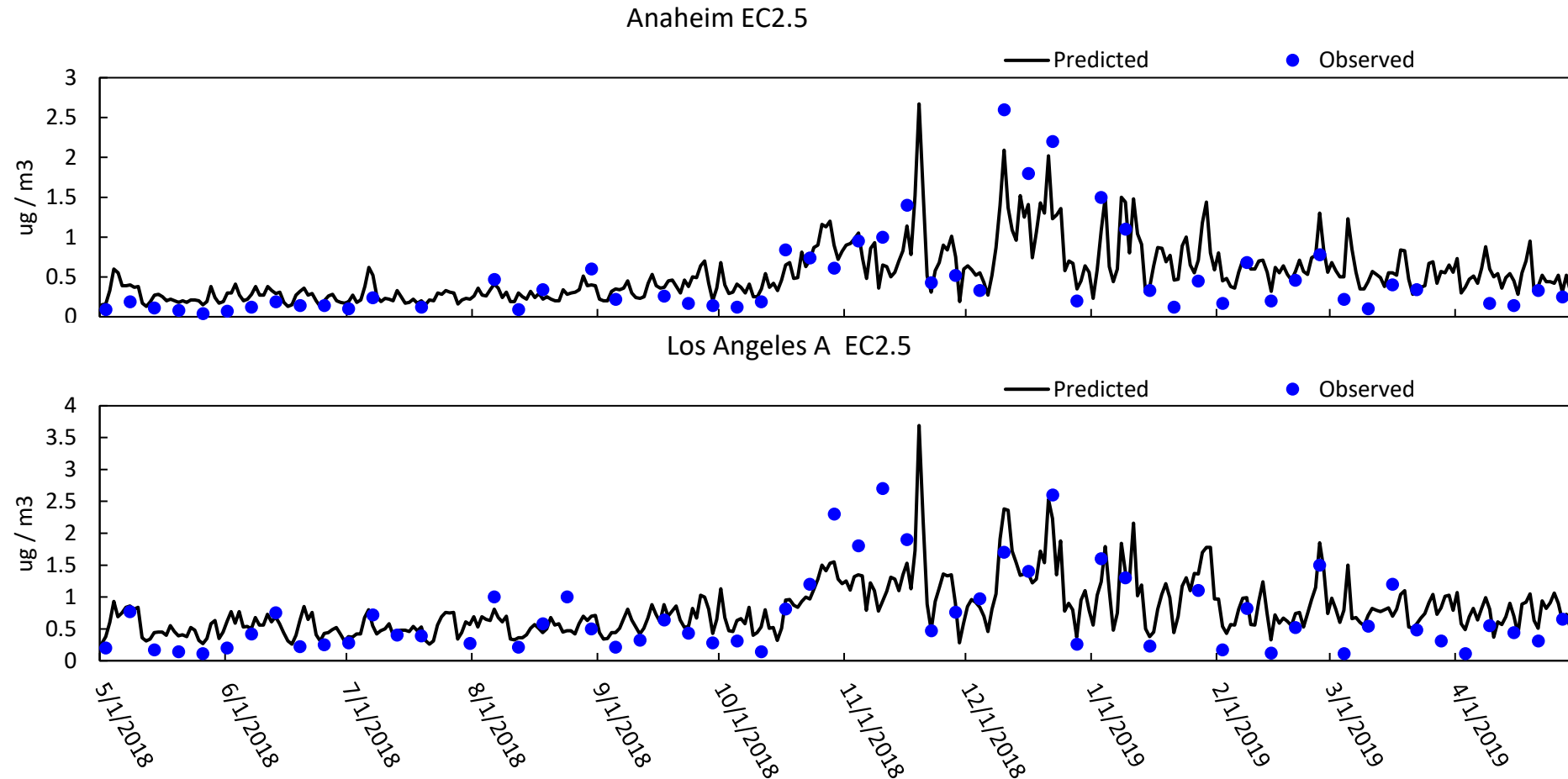
Toxics Contribution to Cancer Risk



MODELED ANNUAL AVERAGE CONCENTRATIONS OF TOP AIR TOXICS



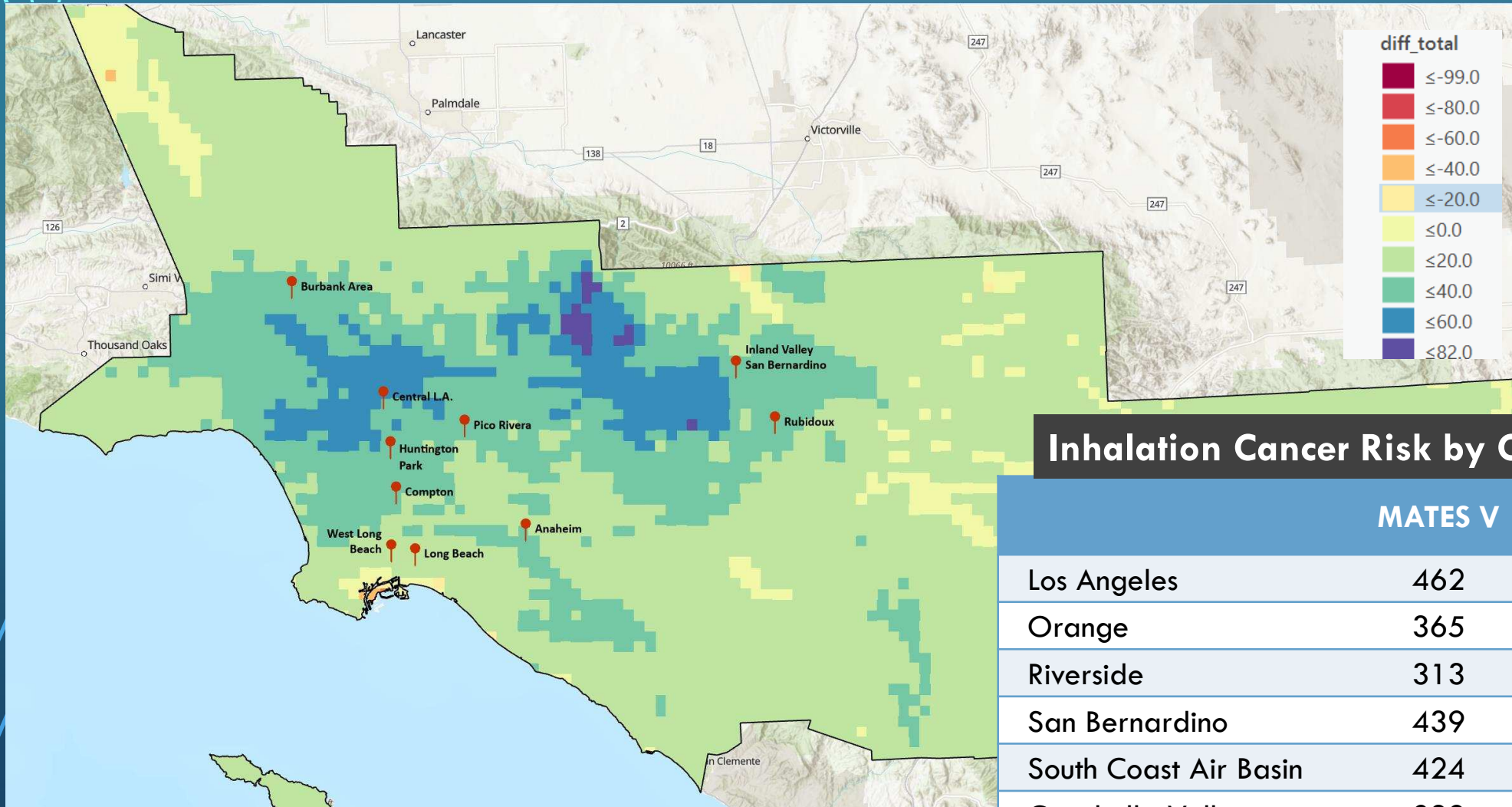
MODELED AND OBSERVED DAILY EC2.5 CONCENTRATIONS



MODELING FRAMEWORK FOR MATES VI

- Evaluating the transition from CAMx to CMAQ modeling framework
- An in-house algorithm to track relatively inert chemical species in CMAQ was developed
- Pros:
 - All emissions and modeling capabilities already developed for SIP modeling
 - Streamlined process and consistency among modeling efforts
- Cons:
 - Potential discrepancy from previous MATES modeling results

PRELIMINARY DIFFERENCES IN INHALATION ONLY CANCER RISK: CMAQ MINUS CAMX



Inhalation Cancer Risk by County (per million)

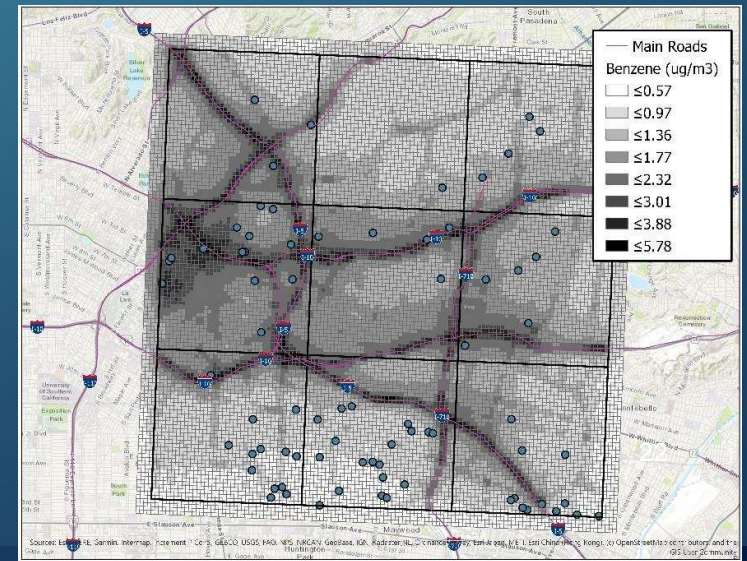
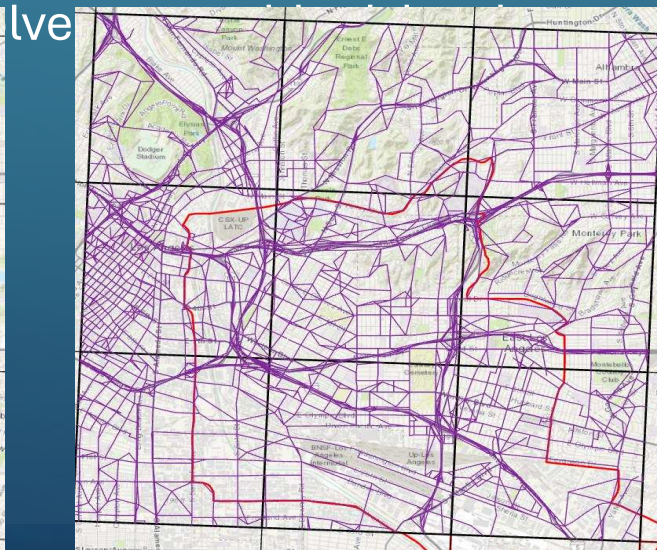
	MATES V	CMAQ	Difference (%)
Los Angeles	462	489	5.9%
Orange	365	382	4.5%
Riverside	313	329	5.1%
San Bernardino	439	472	7.6%
South Coast Air Basin	424	448 ²⁰	5.7%
Coachella Valley	239	236	-1.2%

NEIGHBORHOOD SCALE MODELING

- U.S. EPA AirToxScreen
 - Hybrid modeling with CMAQ at 12 km resolution and AERMOD dispersion modeling
 - Provides annual cancer risk modeling
 - The latest version transitioned from census tract to census block unit
- CARB's California Air Toxic Assessment (CATA)
 - Hybrid modeling with CMAQ at 2 km resolution and CALPUFF puff modeling
 - Receptor modeling at census block resolution
- SIP modeling
 - The latest SIP revision to attain federal 2012 PM_{2.5} standard
 - Hybrid modeling with CMAQ at 4 km and AERMOD at 100-meter resolution
 - Dispersion modeling is used to enhance the steep gradients in PM_{2.5} around the near-road monitor

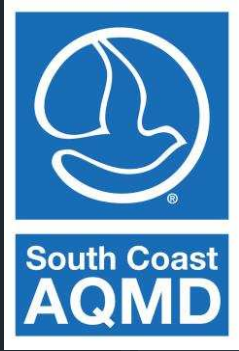
NEIGHBORHOOD MODELING APPROACH

- Exploring hybrid approach to improve resolution of important sources, depending on resource availability
 - Dispersion modeling with AERMOD
 - Integrate high resolution dispersion modeling for inert air toxics
 - Line source modeling for on-road mobile sources
 - Polygon source modeling for railyard, airports and ports
 - Point source modeling for large facilities



SUMMARY

- South Coast AQMD has an extensive modeling and emissions inventory capacities to support SIP development, cancer risk estimates and source specific concentration/risk estimates
- MATES VI will rely on the latest SIP modeling framework with available updates in emissions and likely transition to CMAQ with tracer algorithm
- Neighborhood scale modeling will be explored using a hybrid modeling approach integrating traditional photochemical transport and dispersion modeling capabilities



3. How MATES Data is used to Inform Issues in Environmental Justice Communities

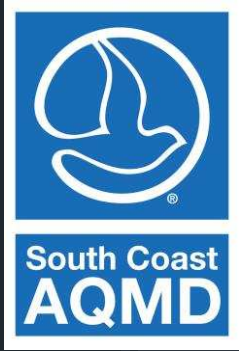
Nish Krishnamurthy, Ph.D.
Air Quality Specialist

Diversity, Equity, and Inclusion with Community Air Programs

Mohammad Sowlat, Ph.D.
Program Supervisor, AB 617 Air Monitoring
Advanced Monitoring Technologies Branch
Monitoring and Analysis Division

MATES VI Technical
Advisory Committee Mtg. #3

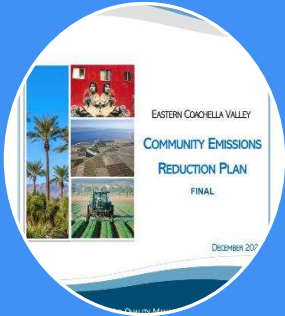
May 30, 2024



Assembly Bill 617 (AB 617) Overview

Overview of AB 617

- Signed into law July 26, 2017
- Invests resources and focuses on localized actions to reduce air pollution in communities disproportionately impacted by air pollution
- Purposeful and ongoing involvement of community members towards the emission reductions goals



Community Air Plans

- Community Emission Reductions Plans (CERPs)
- Community Air Monitoring Plans (CAMPs)



Clean Technology Investments



Rules Requiring Best Available Retrofit Control Technology (BARCT)



Easier Access to Emissions Data

AB 617-Designated Communities Statewide

South Coast AQMD AB 617 Communities

2018-Designated Communities

- East Los Angeles, Boyle Heights, West Commerce (ELABHWC)
- Wilmington, Carson, West Long Beach (WCWLB)
- San Bernardino, Muscoy (SBM)

2019-Designated Communities

- Eastern Coachella Valley (ECV)
- Southeast Los Angeles (SELA)

2020-Designated Community

- South Los Angeles (SLA)



Community Emission Reductions Plans (CERPs)

CERP Elements

Air Quality
Priorities



Goals



Strategies



Objectives

CERP Strategies

Air Monitoring

Focused Enforcement

Inter-Agency Collaboration

Incentive Programs

Public Information and Outreach

Rules and Regulations

Community Engagement

Community Steering Committee (CSC)

Residents

Community Leaders

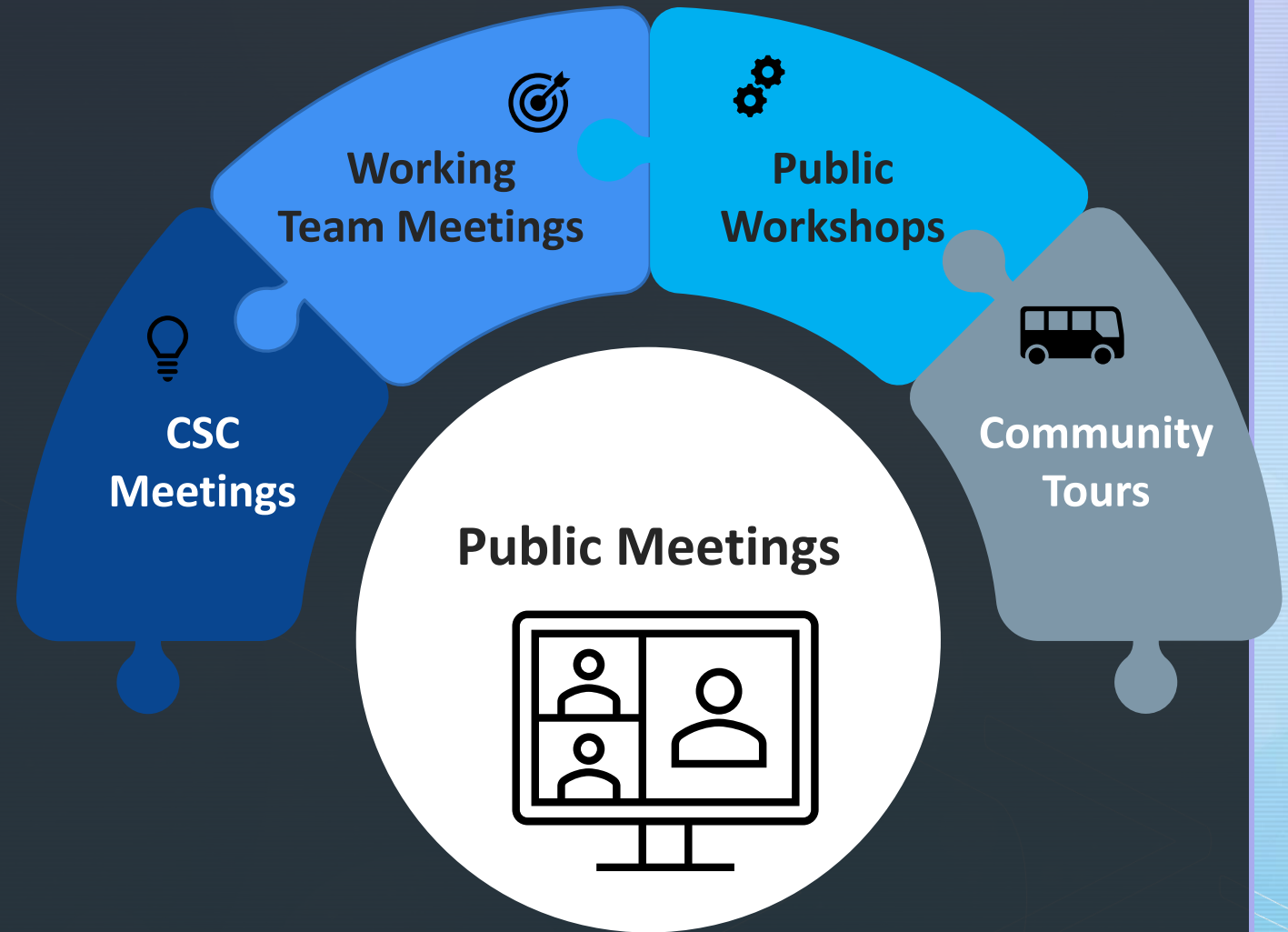
Community Organizations

Tribal Organizations

Government Agencies

Businesses

Industry



AB 617 Community Selection Requirements

Exposure to Air Pollution

- Concentrations of air pollutants
- Density of air pollution and magnitude of emissions
- Cancer risk estimates

Sensitive Populations

- Proximity of sensitive receptors (homes, schools, hospitals, and daycare centers) to emissions sources

Other Measures of Air Pollution Vulnerability

- Public health data for air quality-related impacts (e.g., asthma, heart disease, low birth weights, and premature mortality)
- Socioeconomic factors (e.g., poverty levels, unemployment rates)

Community-Identified Factors for Community Selection

Air Pollution Sources

Diesel sources (freeways, trucks, warehouses, railyards)

Oil production & processing (wells, refineries)

Landfills, scrap yards, hazardous waste sites

Proximity/ Land-Use Factors

Schools near air pollution sources/
industrial areas

Concentration of industries

Green spaces

Population Factors

Population density

Low income

Communities of color

Access to healthcare

Asthma, cancer rates

Education levels

Children & elderly

Data Used for Community Selection

MATES IV – South Coast AQMD

- Regional **air toxics** study
- Air toxics **cancer risk**
- **Diesel** particulate matter (DPM) accounts for two-thirds of risk
- **Multiple pollution sources** (e.g. heavy-duty trucks, chrome plating, refineries, light-duty vehicles, etc.)

Schools and Day Care Centers

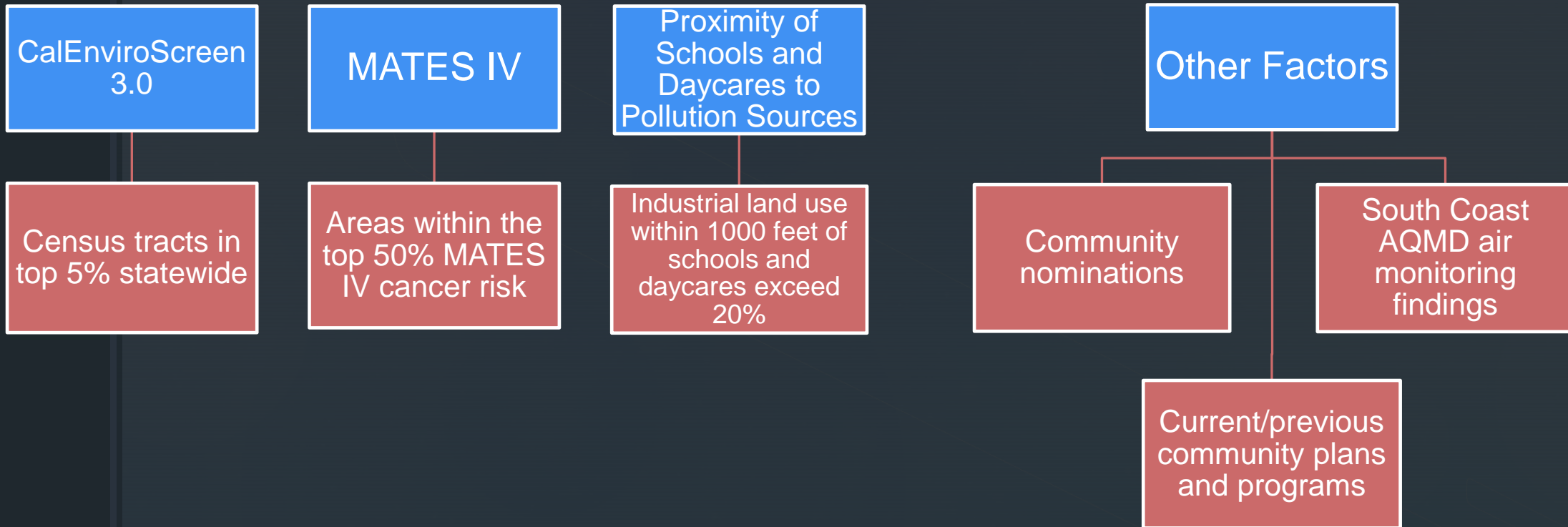
- **Schools and day care centers** with **industrial zones** or **freeways** within 1000 feet

CalEnviroScreen 3.0 –OEHHA*

- Pollution factors and sources:
 - Ozone, particulate matter 2.5 microns or less (PM 2.5), **DPM**
 - Drinking water contaminants
 - Pesticide use, toxic releases, traffic density
 - Cleanup sites, groundwater threats, **hazardous waste** generators and facilities, impaired water bodies, **solid waste** sites and facilities
- Population factors:
 - **Asthma**, heart disease, low birth weight
 - **Educational attainment, housing burden, linguistic isolation, poverty, unemployment**

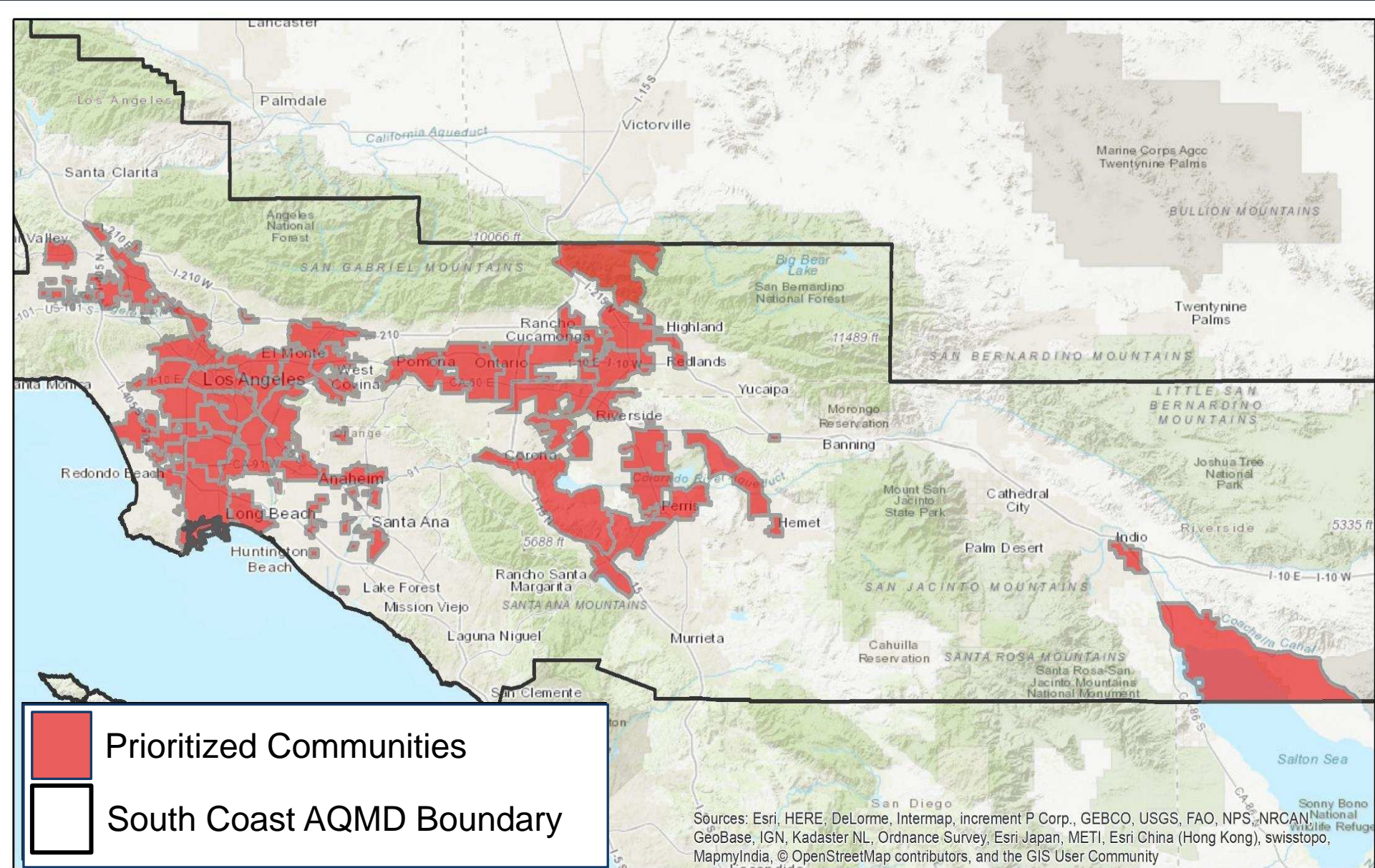
* Office of Environmental Health Hazard Assessment (OEHHA) released CalEnviroScreen 4.0 in October 2021 and can be found [here](#)

Criteria Used for Community Selection

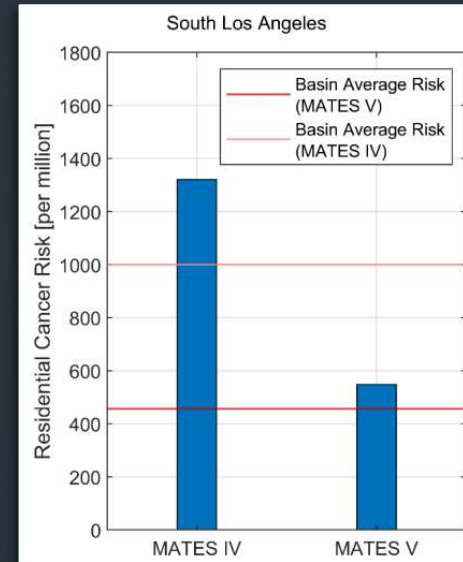
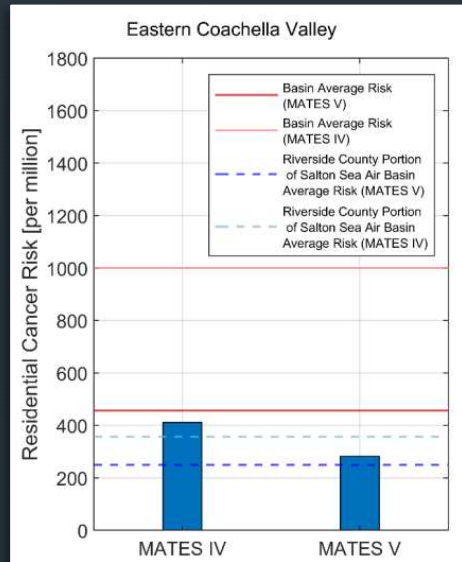
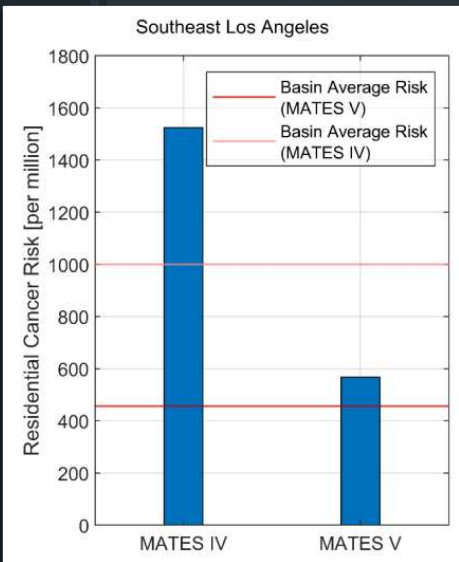
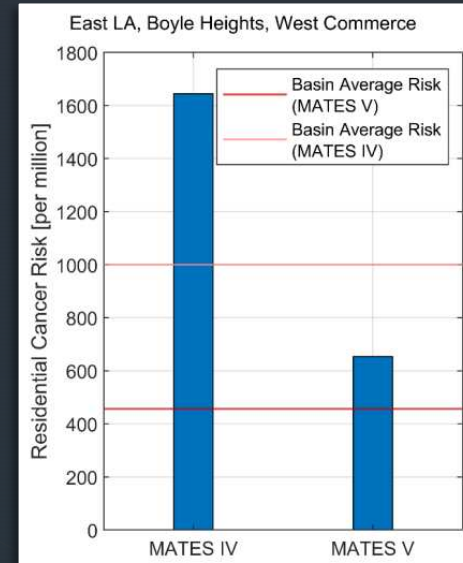
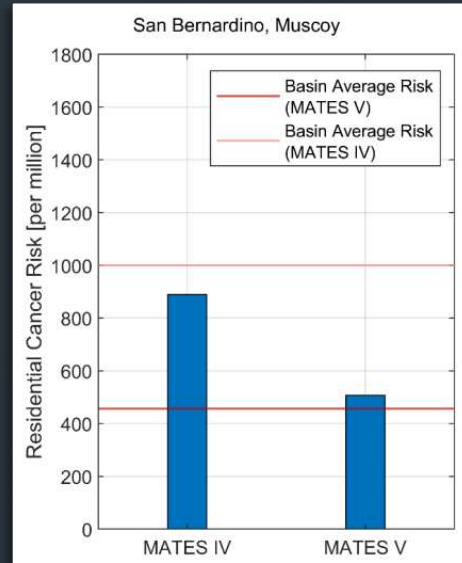
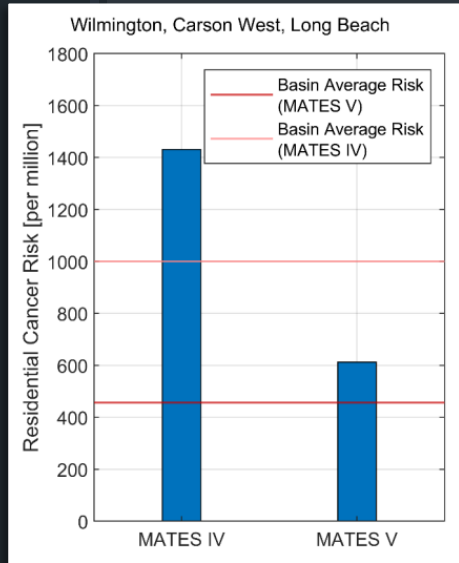


- Criteria approved or suggested by community members during community meetings and other forms of engagement

Communities Identified



Using MATES to Assess Progress



- MATES is one of the tools to assess progress towards meeting South Coast AQMD's AB 617 goals

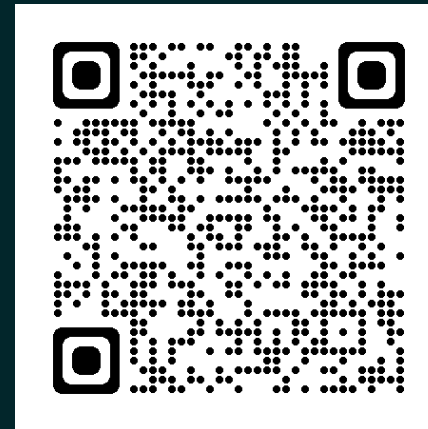
* Air toxics cancer risk for South Coast AQMD's six AB 617 communities can be viewed in 2021 MATES V report [here](#)

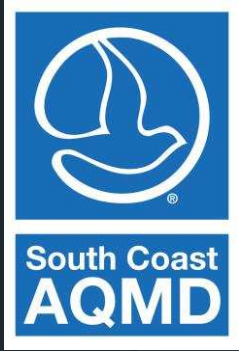
Contacts and Program Information

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South Coast AQMD AB 617
Homepage:
www.aqmd.gov/AB617





Leveraging MATES V Results in AB 617 CAMP Development and Implementation

CERP and CAMP

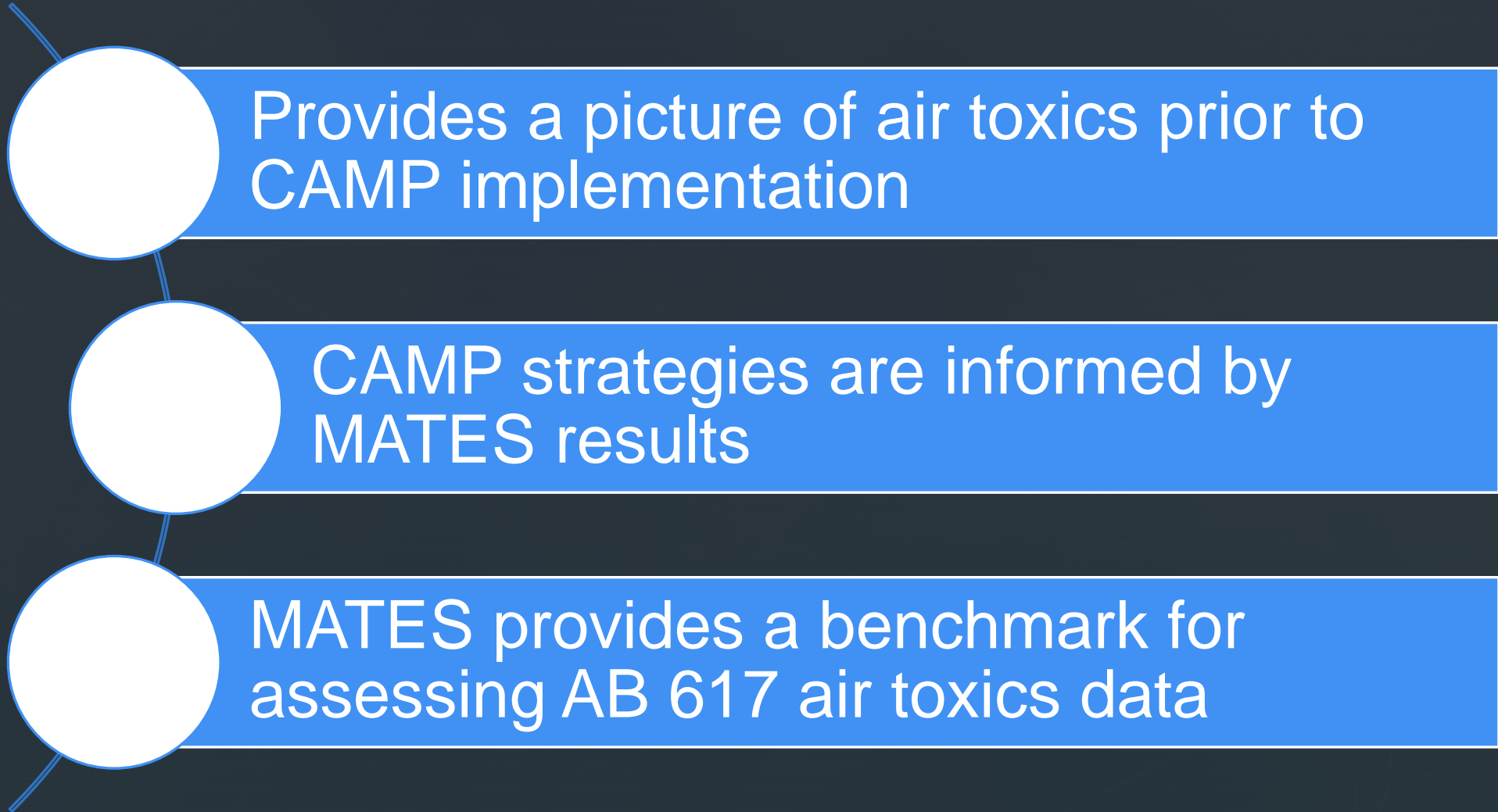
**Community Emissions Reduction Plan
(CERP)**

**Community Air Monitoring Plan
(CAMP)**

Provides a blueprint for achieving air pollution emission and exposure reductions to address the community's highest air quality priorities

Provides a detailed plan for air monitoring activities to address or evaluate the community's highest air quality priorities

Overview of MATES Applications in AB 617 CAMP Development and Implementation

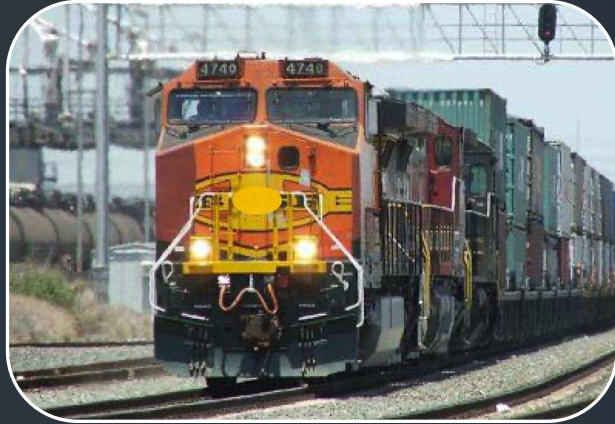


Provides a picture of air toxics prior to
CAMP implementation

CAMP strategies are informed by
MATES results

MATES provides a benchmark for
assessing AB 617 air toxics data

Diesel PM



Railyard



Ports



Truck Traffic

- Main driver of cancer risk based on MATES studies
- Sources of Diesel PM have been identified as top air quality priorities by several communities

Monitoring Approach for Diesel PM

- Black carbon (BC) is measured continuously as a Diesel PM Tracer
- Particle Number (PN) and NO_x are measured continuously as Diesel Exhaust Markers
- These measurements expand on continuous measurements from MATES by performing measurements at more sites
- Addition of mobile hyperlocal monitoring surveys allows for capturing neighborhood-scale variations



Fixed-Site Monitoring

Objectives

Provide real-time data in the community; Support CERP

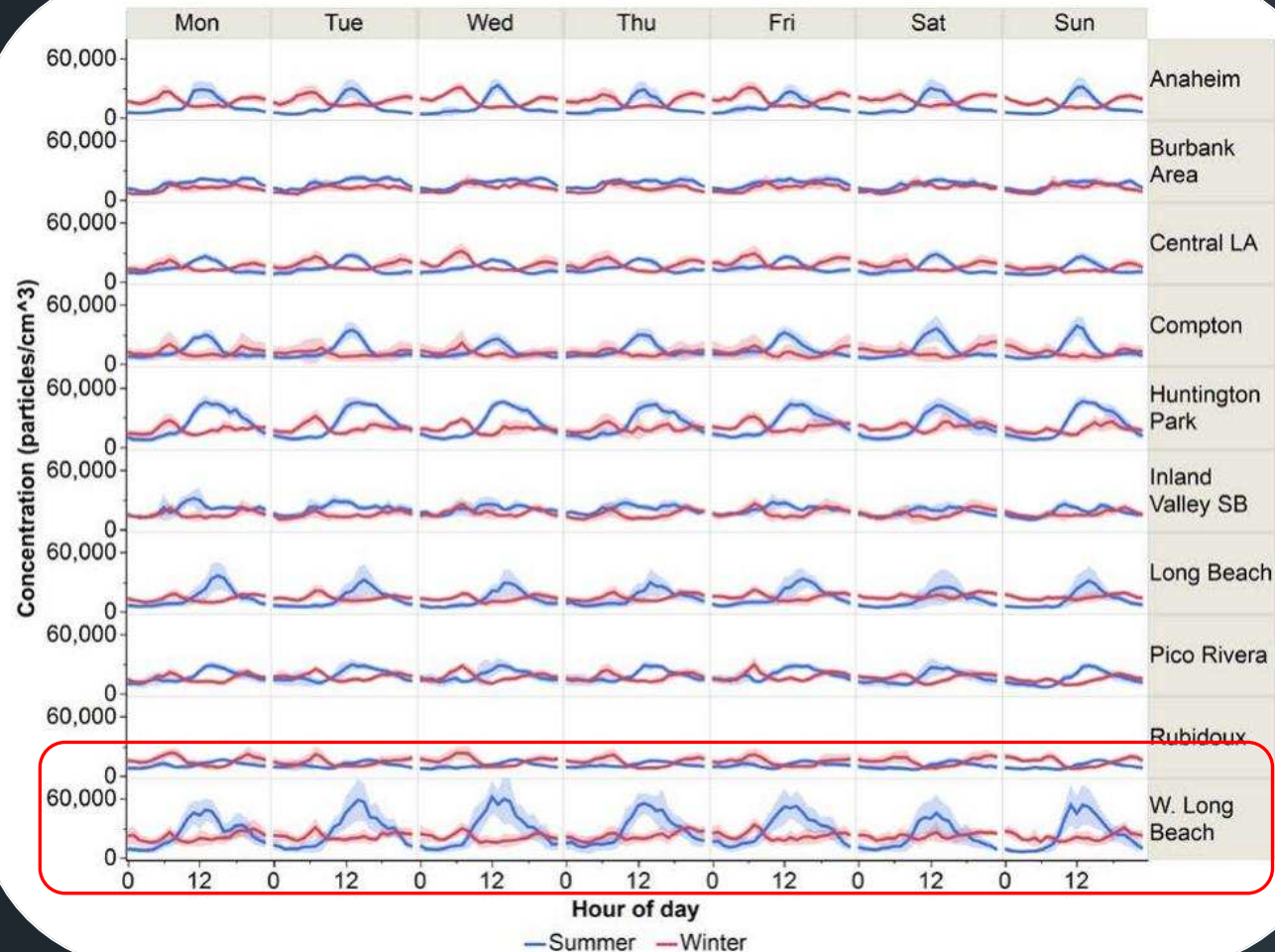


Mobile Monitoring Surveys

Objectives

Identify areas with elevated levels of diesel emissions; assess potential community impact

Particle Number Concentrations Measured during MATES V



West Long Beach Trends:

- Sharp peak at noon during the summer months
- Elevated PN levels at nighttime during the winter
- Previous research supports these findings
- Time-resolved speciation data lacking

Bridging the gap...

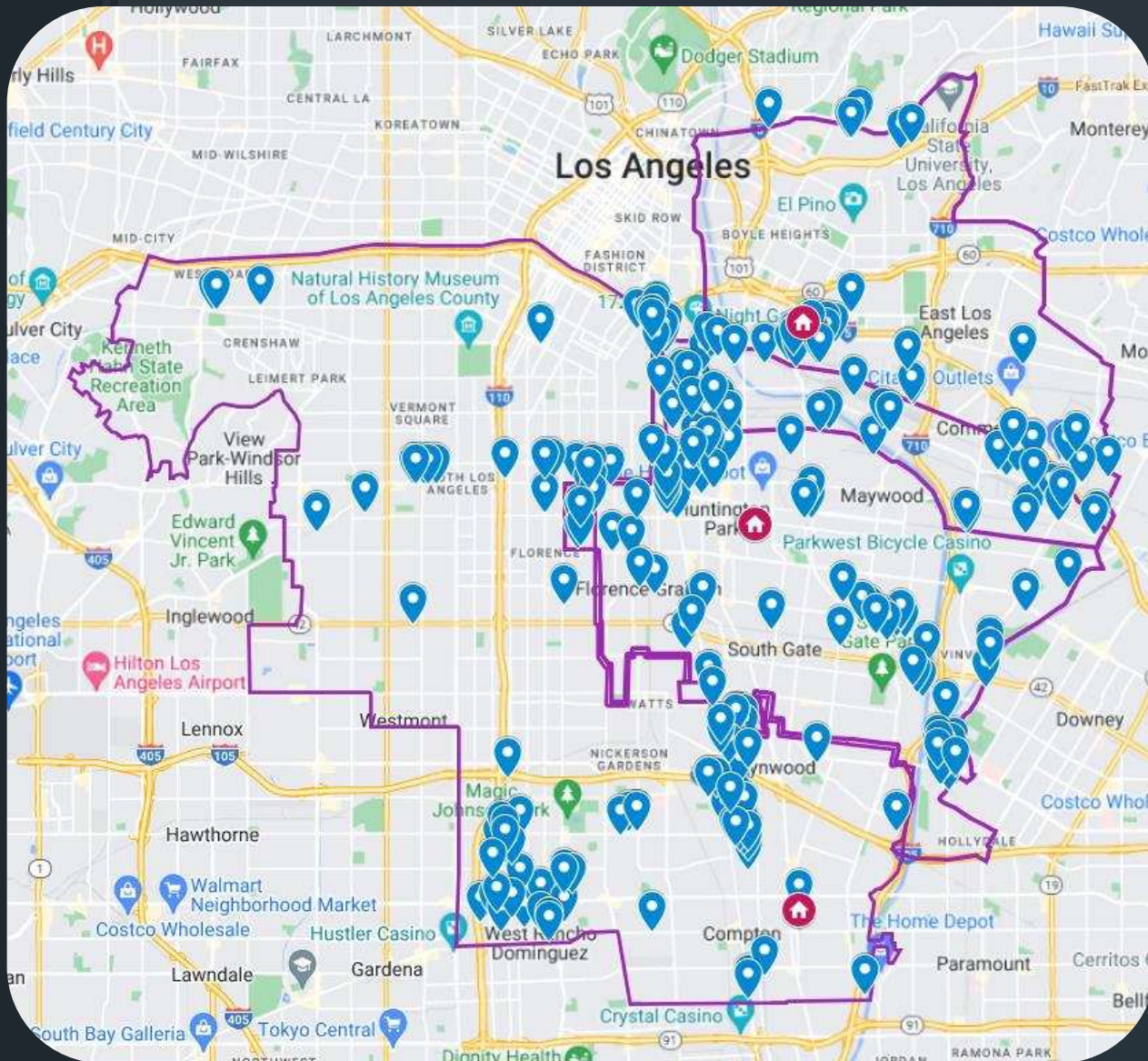
U.S. EPA's Enhanced Air Quality Monitoring for Communities Grant: Enhanced Measurements of PM_{2.5} Chemical Composition and Size Distribution in Wilmington, CA




Project Objectives

- Proposed site will include continuous measurements for full PM speciation, providing new information on composition, sources, and formation mechanisms of PM_{2.5} for the nearby community
- Measurements will support CAMP implementation in WCWLB community, particularly with regard to Ports air quality priority

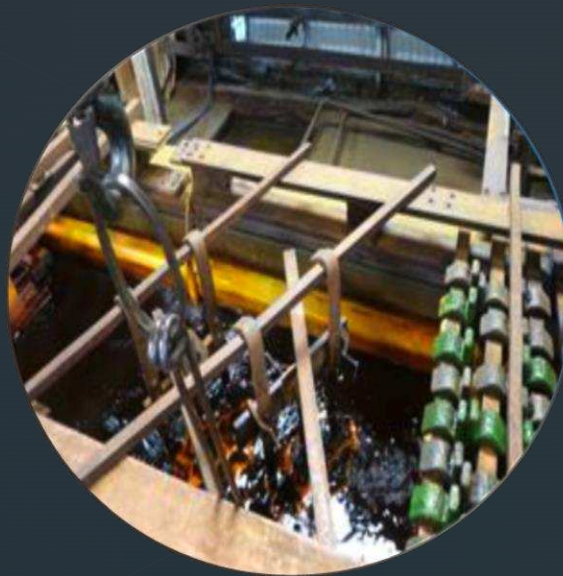


East LA, Boyle Heights West Commerce (ELABHWC), Southeast LA (SELA), and South LA (SLA) Communities



-  Metal Facilities
-  Community Boundary
-  Monitoring Station

~ 300 metal processing facilities that emit air toxic metals (e.g., Cr, Ni, As, Pb)



Monitoring Approach for Air Toxic Metals

- Elements and metals, including air toxic metals are measured continuously
- Builds on MATES measurements
- Focuses on continuous measurements to improve source characterization
- Addition of mobile hyperlocal monitoring surveys allows for capturing neighborhood-scale variations



Fixed-Site Monitoring

Objectives

Provide real-time data in the community; support CERP

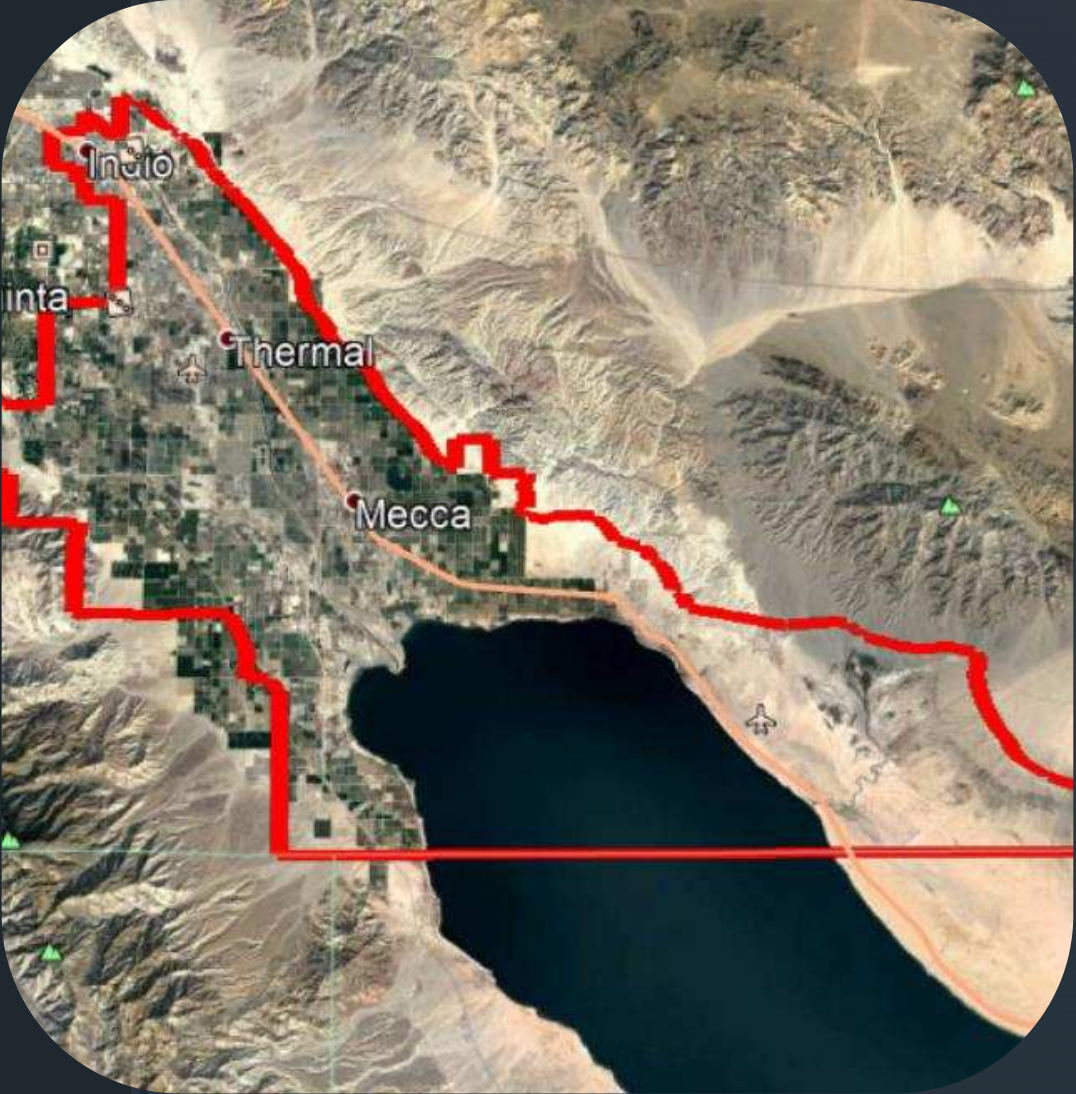


Mobile Monitoring Surveys

Objectives

Identify areas with elevated levels of metals; assess potential community impact

Eastern Coachella Valley Community



Salton Sea



Open Burning



Diesel Mobile Sources



Fugitive Road Dust



Green Leaf Power Plant



Pesticides

MONITORING APPROACH



Sample Collection

EC/OC
Ions

Elements and Metals
Morphology (SEM)



Continuous Measurements

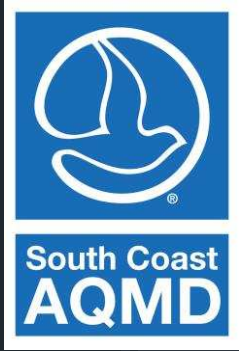
BC/OC

Elements and Metals
PM & Gaseous
Pollutants

- Monitoring approach modelled after MATES
- Continuous measurements component was added for improved results
- Established a baseline so progress can be measured against MATES VI measurements

Question

How can MATES VI data be leveraged for development and implementation of AB 617 CAMPs and/or other community air monitoring programs?



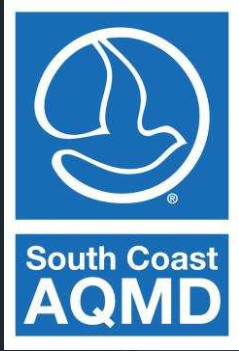
4. Leveraging Measurements from Other Air Toxics Monitoring Programs into MATES VI

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MATES VI Technical
Advisory Committee Mtg. #3

May 30, 2024



Leveraging South Coast AQMD Air Toxic Monitoring Programs into MATES VI

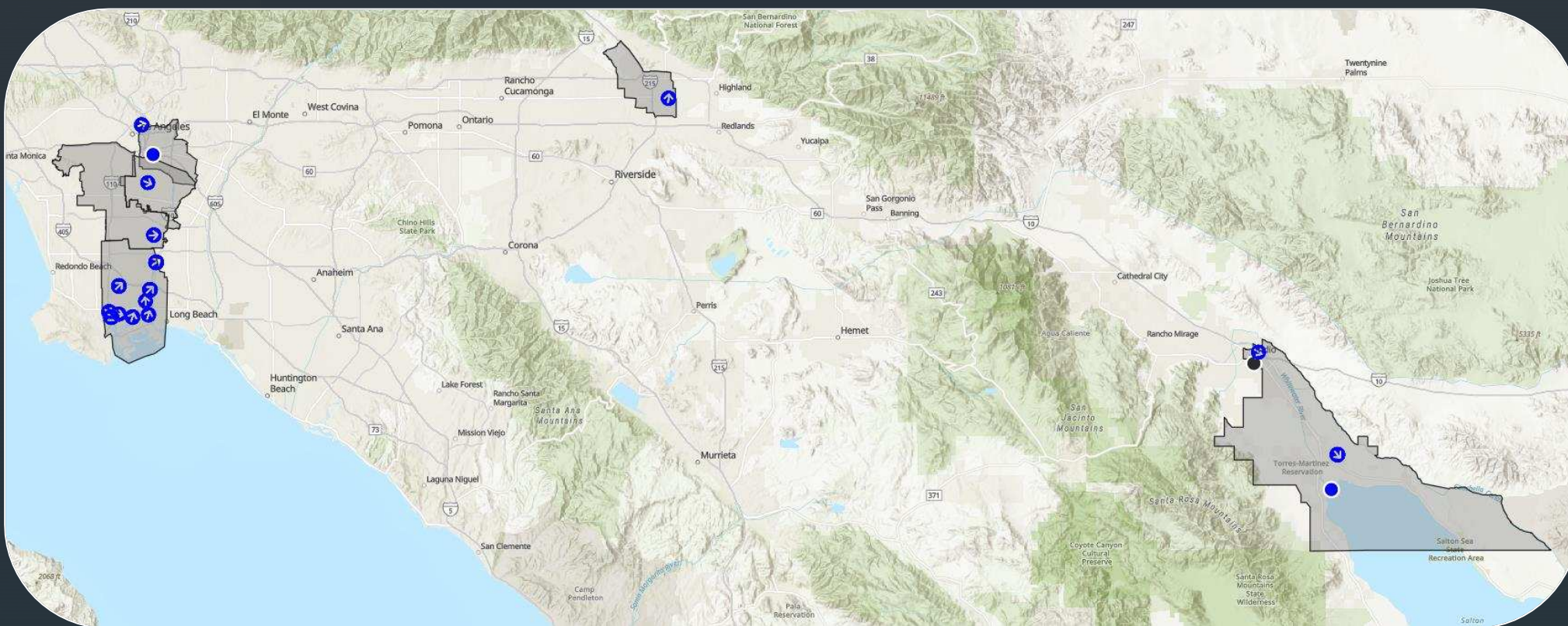
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Overview of South Coast AQMD's Air Toxic Monitoring Programs

- Assembly Bill (AB) 617
- Rule 1180 – Refinery Community and Fenceline Air Monitoring
- Chemical Speciation Network (CSN)
- National Air Toxics Trends Stations (NATTS)
- Photochemical Assessment Monitoring Stations (PAMS)
- Special Monitoring and Incident Response Programs

AB 617 – Fixed Monitoring

- Air monitoring at a total of 17 stations located in 6 communities
- Pollutants measured include:
 - Criteria air pollutants (PM2.5, PM10, CO, SO2, O3)
 - Diesel PM/exhaust tracers (BC, Particle Number (PN), NOx)
 - Particulate metals, including air toxics (Ni, Cr, Pb, As)
 - VOCs (e.g., BTEX)
 - Other Compounds (H2S, CH4)



<http://xappprod.aqmd.gov/AB617CommunityAirMonitoring/Home/Index>

AB 617 – Mobile Monitoring



Diesel PM Mobile Platform

PM, PN, BC, NO_x

Truck Traffic
Railyards



Multi-Metal Mobile Platform

Particulate Metals

Metal-Processing Facilities
Auto Body Shops



Optical Remote Sensing Platform

BTEX, Total Alkanes,
SO₂, HCHO, CH₄

Refineries
Oil Wells



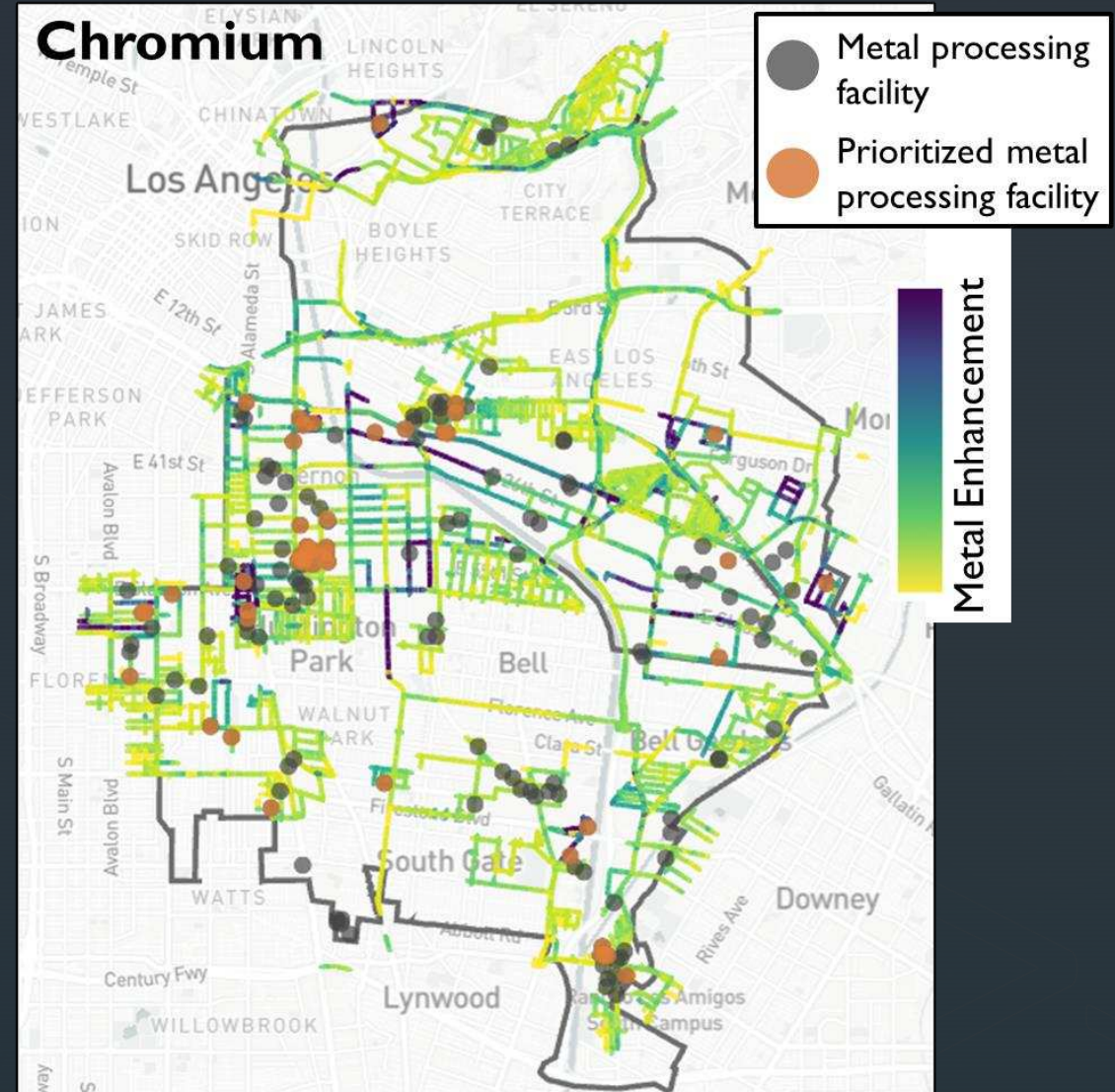
PTR-MS Mobile Platform

VOCs

Rendering &
Waste Facilities
Auto Body Shops

Multi-Metal Mobile Monitoring in AB 617 Communities

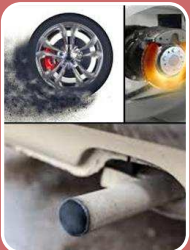
- Maps are created for multiple metals
- Areas with relatively elevated levels of metals are determined
- Preliminary source apportionment revealed 3 main sources:
 - Industrial emissions
 - Non-exhaust traffic emissions
 - Resuspended soil



General observations



Relatively elevated levels of metals were observed near some clusters of metal processing facilities



Consistent elevated levels of metals were observed on freeways, major roadways, and on- and off-ramps



Elevated levels of mineral dust tracers highlight the impact of resuspended dust

Actions for MATES VI



A **comprehensive road dust air monitoring study** at two near-road sites will be conducted as part of the Multiple Air Toxics Exposure Study (MATES VI)



A site in Eastern Coachella Valley (ECV) community with major dust issues is included in MATES VI

Rule 1180: Community and Refinery Fenceline Air Monitoring Network

Fenceline Air Monitoring

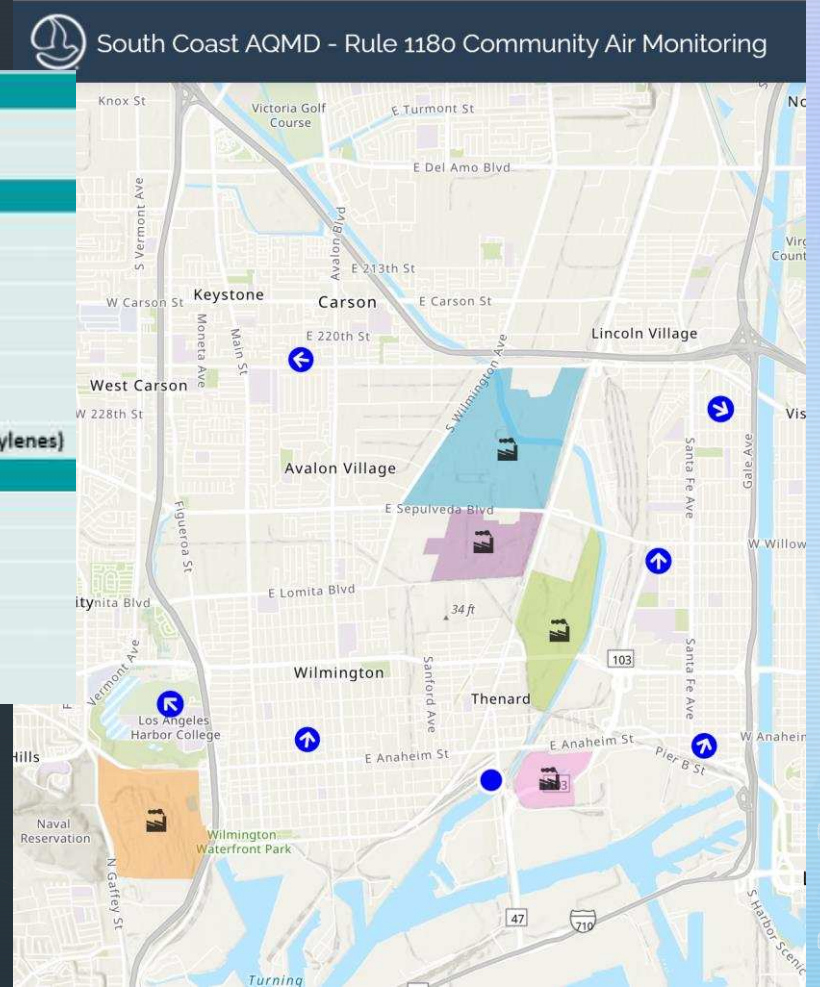
- Refineries: fenceline air monitoring of air toxics and other pollutants

Community Air Monitoring

- South Coast AQMD: network of air monitoring stations in communities adjacent to refineries

Criteria Air Pollutants
Sulfur Dioxide
Nitrogen Oxides
Volatile Organic Compounds
Total VOCs (Non-Methane Hydrocarbons)
Formaldehyde
Acetaldehyde
Acrolein
1,3-Butadiene
Styrene
BTEX Compounds (Benzene, Toluene, Ethylbenzene, Xylenes)
Other Compounds
Hydrogen Sulfide
Carbonyl Sulfide
Ammonia
Black Carbon
Hydrogen Cyanide
Hydrogen Fluoride*

*For refineries using Hydrogen Fluoride



<https://xappprod.aqmd.gov/Rule1180CommunityAirMonitoring/>

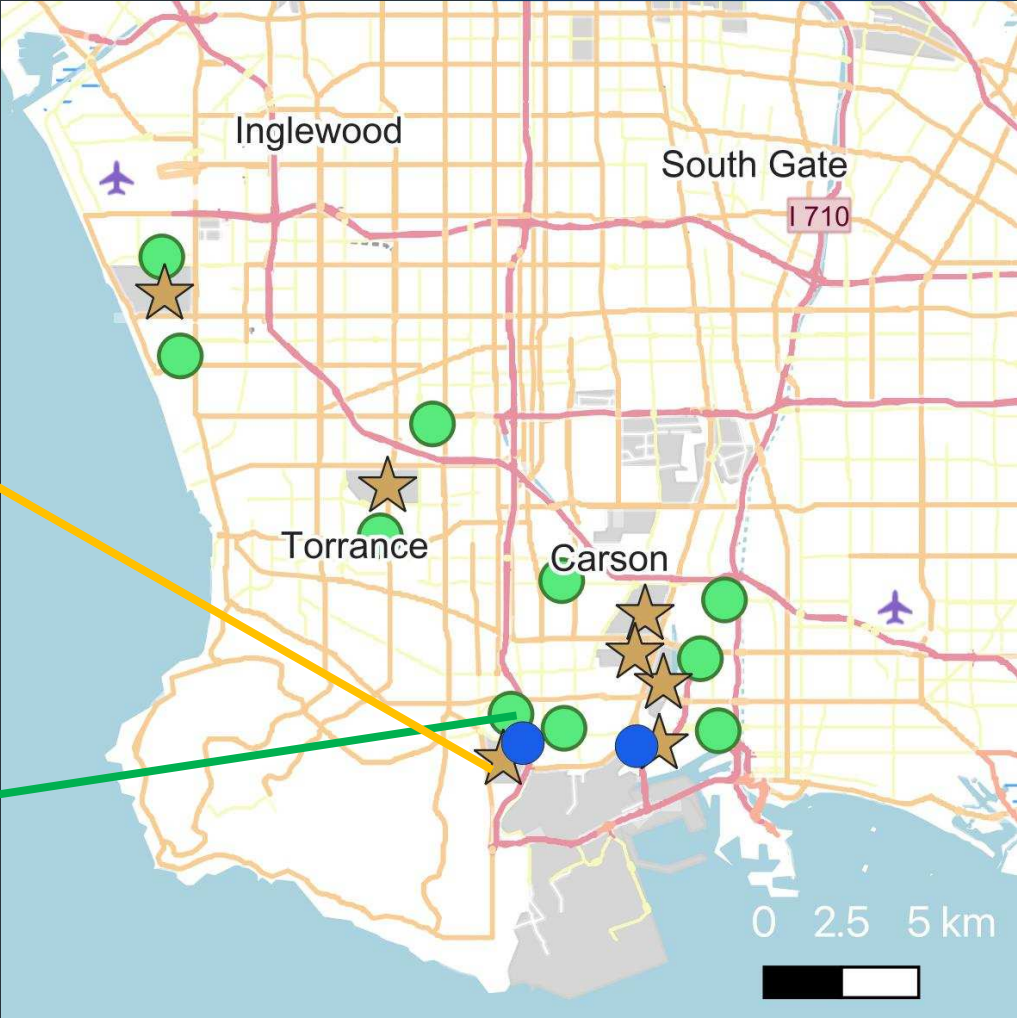


- Fenceline*
- - - Open path
- ◆ Reflector
- UV-DOAS
- OP-FTIR
- H₂S
- BC
- UV-DOAS
- OP-FTIR
- H₂S
- BC
- Met

*Approximate fenceline

- Optical Tent
- Open Path
- ◆ Reflector

- ★ Refinery
- Community Station
- Partial Station



Harbor Park Community Monitoring Station

National Air Toxics Trends Stations (NATTS) Program

Objectives

Assessing trends and emission reduction program effectiveness;

Assessing and verifying air quality models (e.g., exposure assessments, emission control strategy development, etc.);

Providing data as direct input to source-receptor models.

<https://www3.epa.gov/ttnamti1/natts.html>

National Air Toxics Trends Stations (NATTS) Program

- Two Sites within South Coast AQMD's jurisdiction
 - Central Los Angeles (CELA) & Riverside-Rubidoux
- Air toxics measured
 - Metals (PM10)
 - VOCs
 - Carbonyls
 - PAHs
 - Cr VI
- 1 in 6 days schedule



U.S. EPA's Chemical Speciation Network (CSN) Program

Objectives and data uses

- Assessing trends in mass component concentrations and related emissions, including specific source categories;
- Characterizing annual and seasonal spatial variation of aerosols;
- Determining the effectiveness of implementation control strategies;
- Helping to implement the PM_{2.5} standard by using speciated data as input to air quality modeling analyses;
- Aiding the interpretation of health studies by linking effects to PM_{2.5} constituents;
- Understanding the effects of atmospheric constituents on visibility impairment and regional haze.

U.S. EPA's Chemical Speciation Network (CSN) Program

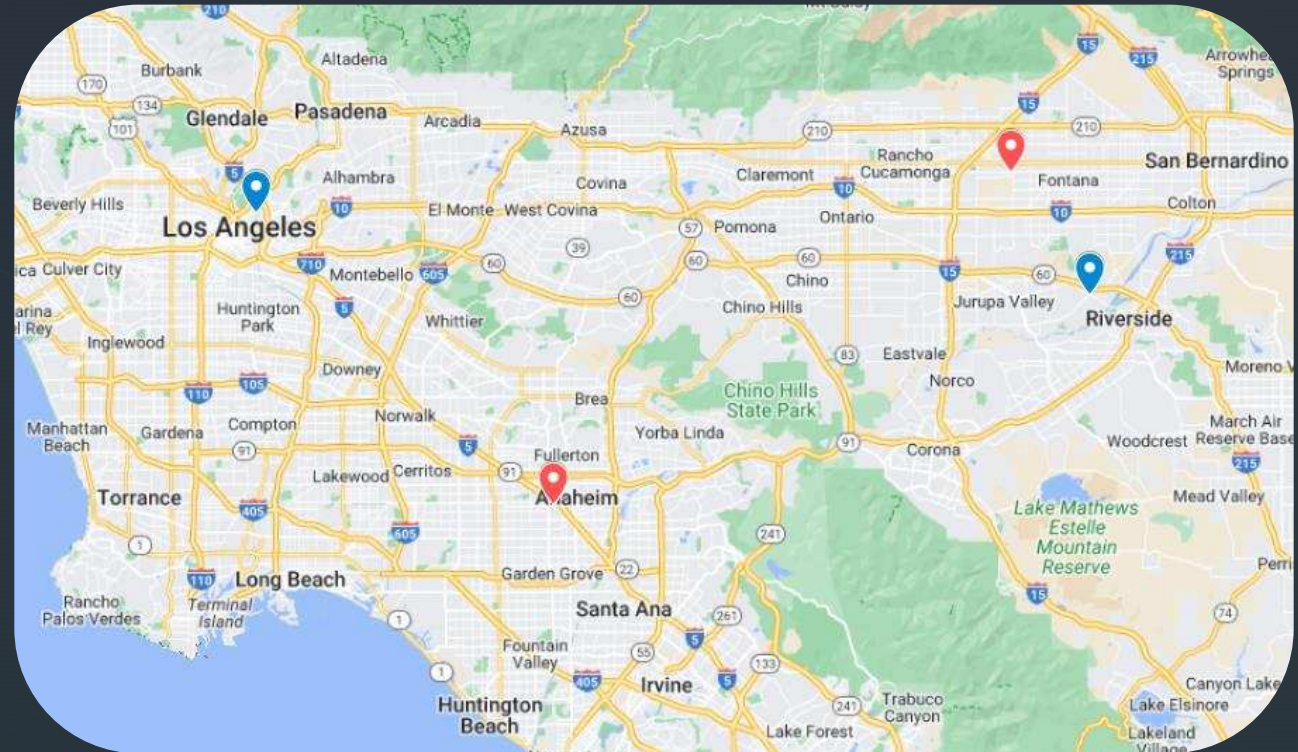
- Two Sites within South Coast AQMD's jurisdiction
 - CELA & Rubidoux
- PM2.5 Speciation
 - Elements and metals
 - Ions
 - EC/OC
- 1-in-6 days schedule



<https://www.epa.gov/amtic/chemical-speciation-network-csn-general-information>

South Coast AQMD's PM2.5 Speciation Program

- Separate from U.S. EPA's CSN program
- Speciated data is used to develop implementation plans and support atmospheric/health effects related studies.
- Four Sites within South Coast AQMD's jurisdiction
 - CELA, Rubidoux, Fontana, and Anaheim
- PM2.5 Speciation
 - Elements and metals; Ions; EC/OC
- 1-in-6 days schedule



Photochemical Assessment Monitoring Stations (PAMS) Program

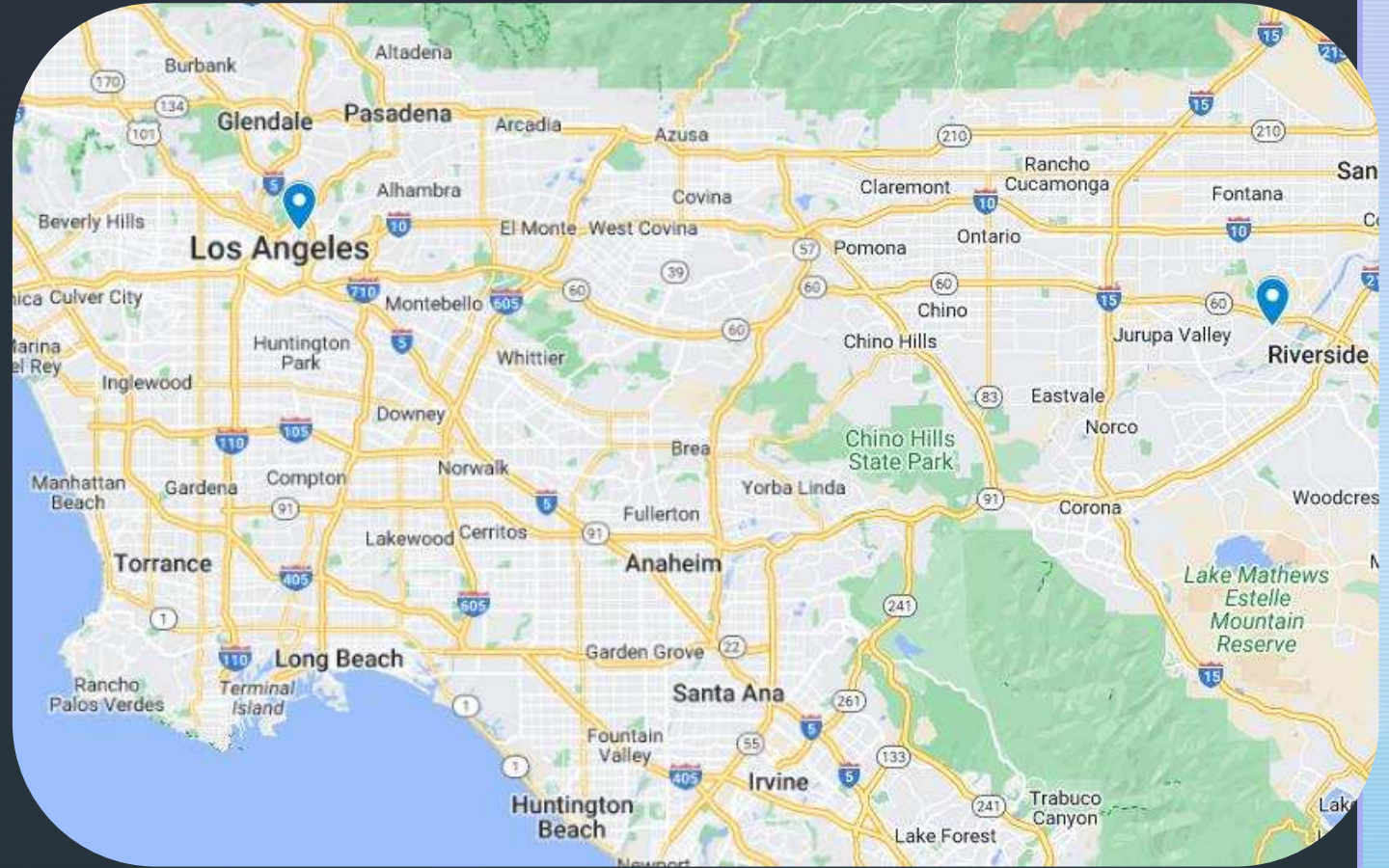
Objectives

Develop a database of ozone precursors and meteorological measurements to support ozone model development.

Track the trends of important ozone precursor concentrations.

Photochemical Assessment Monitoring Stations (PAMS) Program

- Two sites within South Coast AQMD's jurisdiction
 - CELA, Rubidoux
- VOCs
 - 24-hour time-integrated sampling throughout the year (1-in-6 days schedule)
 - Hourly measurements during intensive season
- Carbonyls
 - Three 8-hour sampling during intensive season
 - 24-hour time-integrated sampling throughout the year (1-in-6 days schedule)



Incident Response Programs and Special Monitoring/Emission Investigation Projects

- Shorter-term, smaller scale projects
- Investigations are launched due to:
 - Community complaint
 - Chemical spills/air toxic releases
 - Fires and wildfires
- Air toxics and odorous compounds are targeted, including:
 - Elements and metals (e.g., Ni, As, Pb, Cr)
 - VOCs (e.g., BTEX, EtO)
 - H₂S and CH₄

Incident Response Program and Special Monitoring/Emission Investigation Projects



Tustin Hangar Fire Incident Response

Multi-Metals Mobile Platform Survey
Deposition Glass Plate Sample Deployment
Grab Sample Collection
Air toxic metals and asbestos



EtO emission investigation

Mobile monitoring surveys
Grab Sample Collection
Method development for EtO sampling and analysis protocols



All American Asphalt – Air Monitoring Initiative

Grab Sample Collection
VOCs (BTEX) and Methylene Chloride

Question

How can data from these monitoring programs be leveraged for MATES VI study?



Air Toxics Monitoring in South Coast

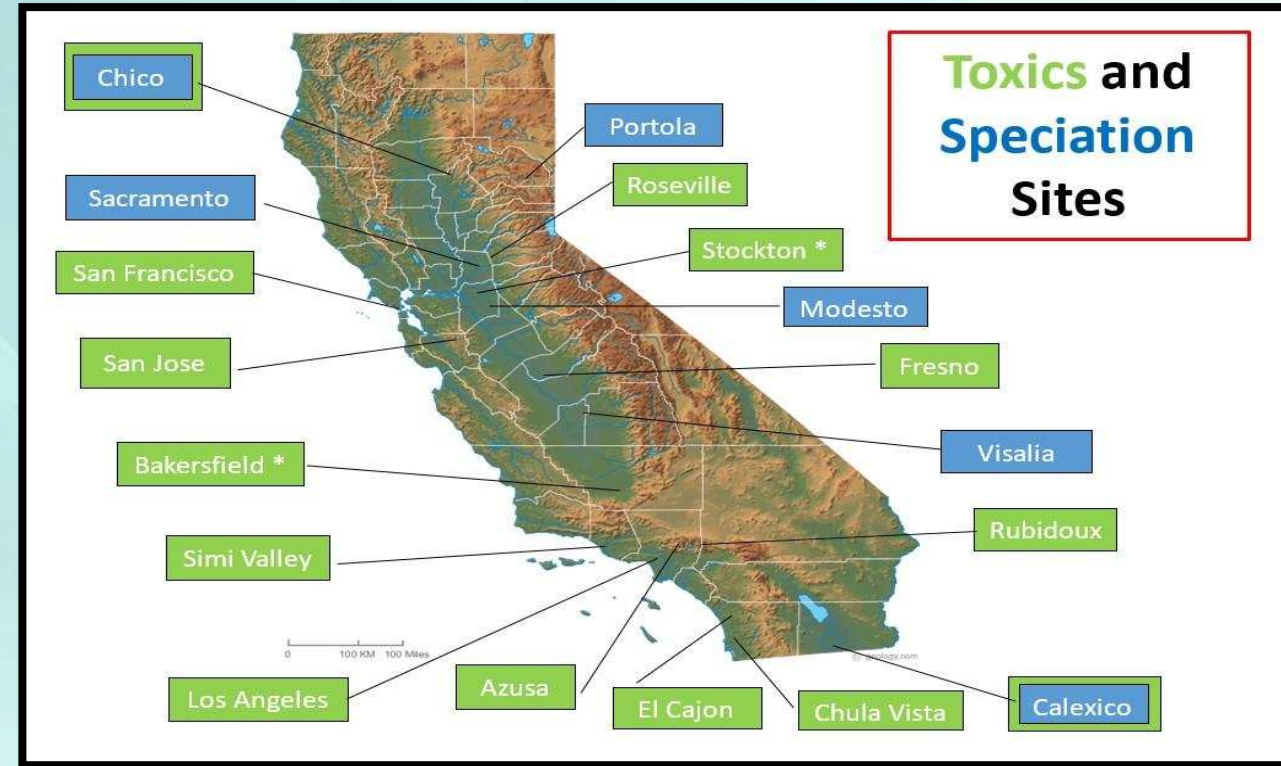
May 30, 2024

CARB Toxics Program

Developed in Response to Toxic Air Contaminant Identification and Control Act (AB 1807, 1983)

Program Goals

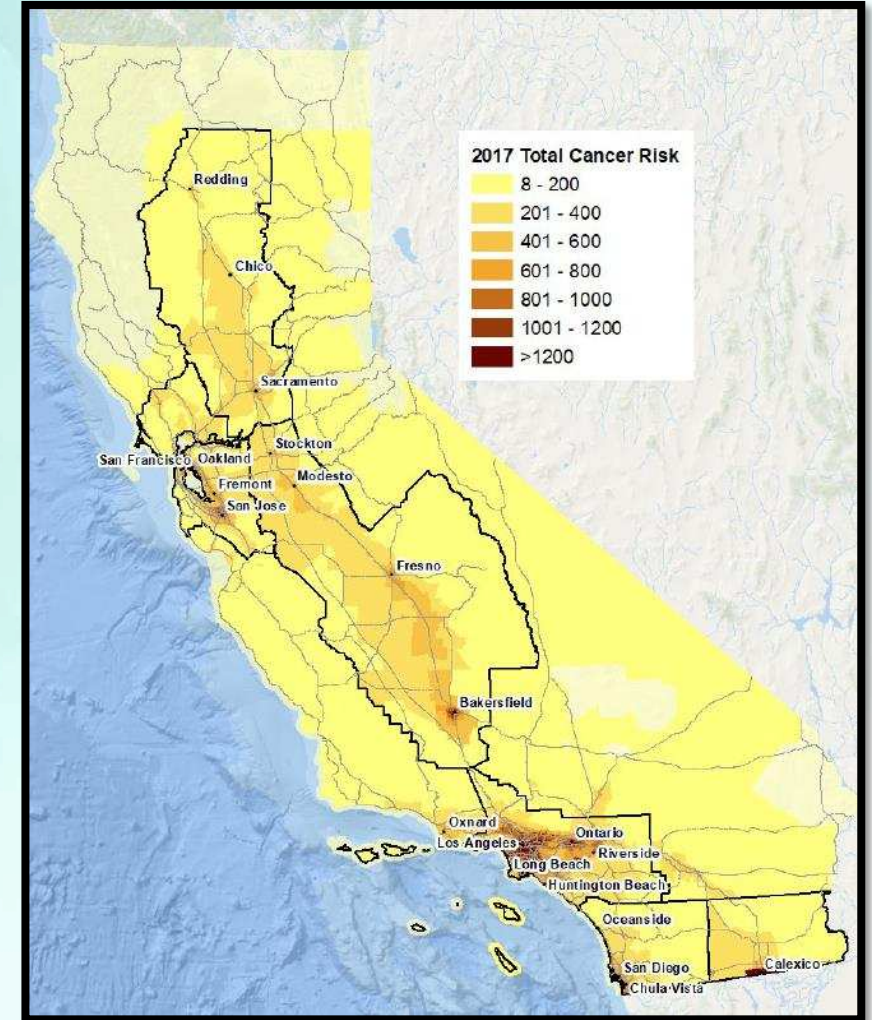
- Identify specific air toxics
- Identify significant exposure to toxics
- Address health impacts, evaluate control measures



- 14 sites statewide (including Rubidoux, Los Angeles, and Azusa)
- 1-in-12 day schedule
- Aromatic and other VOCs, aldehydes, metals, hexavalent chromium, aerosol speciation

California Air Toxics Assessment (CATA)

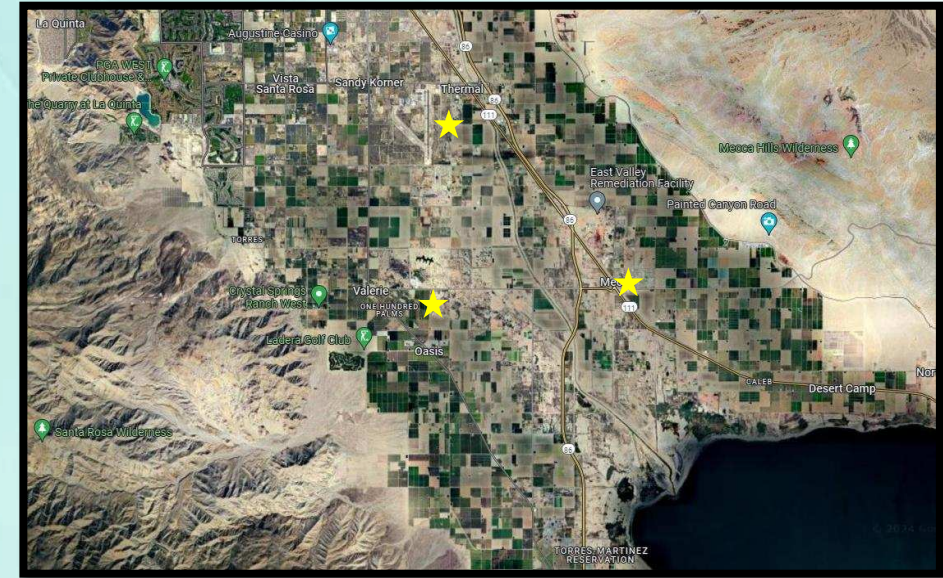
- Assesses exposure levels and associated health risks arising from the inhalation of toxic air pollutants and tracks risk reduction trends statewide over time
- Supports other regulatory programs and policies AB2588, AB617, EJ, ATCMs, CalEnviroScreen
- Complements air toxics monitoring and serves as a bridge between national and air basin assessments
- 2012 assessment completed in 2019, 2017 assessment released in 2023 (report with on-line interactive GIS dashboards), 2021 assessment underway



California Air Toxics Assessment (CATA) Technical Report Fig ES-3, 2023

Pesticide monitoring in Eastern Coachella Valley

- CARB conducted pesticide air monitoring in support of the Eastern Coachella Valley (ECV) AB617 Community Emissions Reduction Plan (CERP)
- Methyl isothiocyanate (MITC), 1,3-dichloropropene (1,3-D) and chloropicrin
- Sampling 4 days per week for 13 weeks in Nov 2022 – Feb 2023
- Similar air monitoring support underway for the Arvin/Lamont AB617 community (San Joaquin Valley)

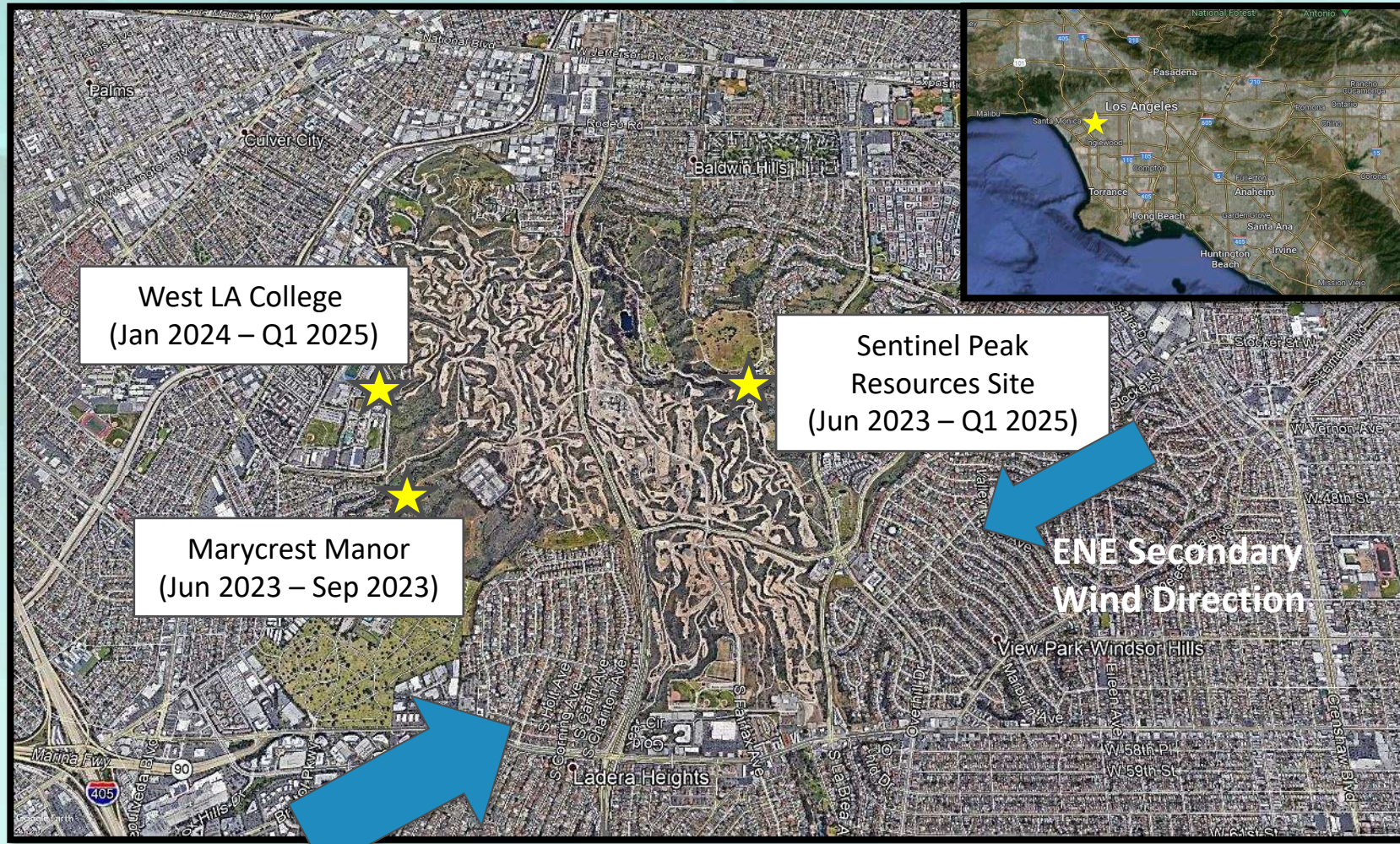


Pesticide sampling sites in ECV



Samplers at the Mecca Fire Station site

SNAPS Stationary Monitoring: Inglewood Oil Field



- **Eastern edge of oil field (Site 1):** Sentinel Peak Resources Site (near Kenneth Hahn State Recreation Area)
- **West of oil field (Site 2):** West LA College / Marycrest Manor
- **Duration:** 12 months (ending Q1 2025)
- **Mobile monitoring:** Covering communities surrounding the oil field (multi-day campaigns each quarter)

WSW Prevailing Wind Direction

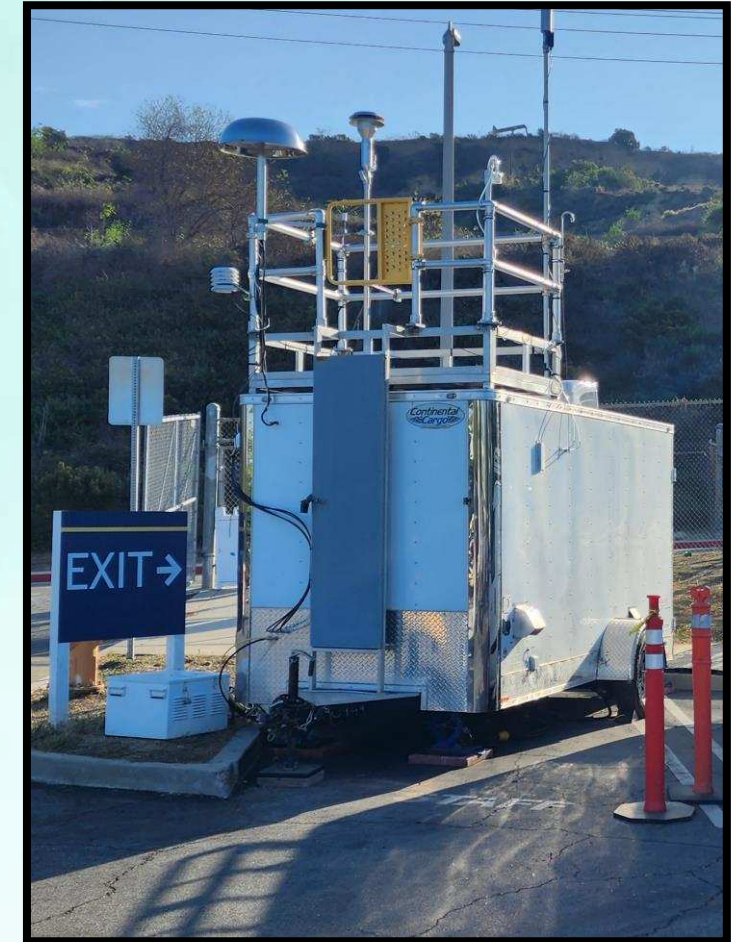
Study of Neighborhood Air near Petroleum Sources (SNAPS)

Program Goals

- Characterize air quality in neighborhoods close to oil and gas extraction facilities
- Assess potential cumulative air quality impacts from all surrounding sources



CARB SNAPS monitoring platform at Inglewood Oil Field – June 2023



CARB SNAPS monitoring platform at West LA College – January 2024

SNAPS Measurements

On-site Measurements (hourly)

- CH₄, H₂S, O₃, PM_{2.5}, BC, CO (posted to website in near real-time)
- GC-MS for VOCs, Xact XRF for metals

Discrete Measurements (24-hr)

- 1-in-6 and quarterly schedules
- Compounds include aromatics, aldehydes, PAHs, sulfur-containing compounds, metals, hexavalent chromium

Mobile Measurements

- CH₄, C₂H₆, H₂S, NO_x, BC continuously (1Hz)
- BTEX and other VOC measurements, functional group scanning continuously, lab scans when stationary for 15 - 30 minutes



SNAPS Reporting

- Near real-time public dashboard
 - Time series of key pollutants
 - Regional comparison
 - NAAQS comparison
- Mid-monitoring summaries to the community
- Data analysis report*
 - Air quality data analysis (CARB)
 - Health Risk Assessment (OEHHA)
- Published Dataset

