AB-617
Steering Committee Meeting

Perkins Elementary School

November 27, 2018

District Monitoring

David Shina, Senior Chemist Ambient Section
David Sodeman, Senior Chemist Source Test Section

District Monitoring Agenda

1. Suggest the recommended pollutants & parameters
2. Identify the equipment and labs for analyses
3. List sites researched by the District and those recommended by the committee.
4. Show the costs associated with items 1-2.
5. Steering Committee Discussion

Pollutants & Parameters

- Volatile Organic Compounds
- Diesel Emissions (Black Carbon)
- Metals
- Wind speed/wind direction (possibly)

Contractor Laboratory

- Why a third-party lab?
  - Laboratory space
  - Laboratory analyzers, support equipment, and software
  - Staffing
  - Meet CARB implementation Date

Volatile Organic Compounds

- Compounds and analysis defined by the federal Environmental Protection Agency
- The District and State have been sampling for these compounds at various locations throughout the county.
  - ✓ Ideal for historical data, trends, and comparisons
- We have in-house knowledge

List of Volatile Organic Compounds

1,1,1-Trichloroethane	4-Ethyltoluene	Dichlorotetrafluoroethane
1,1,2,2-Tetrachloroethane	4-Ethyltoluene	Ethyl acetate
1,1,2-Trichloroethane	4-Methyl-2-pentanone	Ethylbenzene
1,1-Dichloroethane	Acetone	Hexachlorobutadiene
1,1-Dichloroethene	Acetonitrile	o,m,p-Xylene
1,2,4-Trichlorobenzene	Acrolein	Methyl methacrylate
1,2,4-Trimethylbenzene	Acrylonitrile	Methylene Chloride
1,2-Dibromoethane	Benzene	Naphthalene
1,2-Dichlorobenzene	Benzyl chloride	n-Hexane
1,2-Dichloroethane	Bromoform	Styrene
1,2-Dichloroethane	Bromomethane	Tetrachloroethene
1,2-Dichloropropane	Carbon Tetrachloride	Toluene
1,3,5-Trimethylbenzene	Chlorobenzene	trans-1,2-Dichloroethene
1,3-Butadiene	Chloroethane	trans-1,3-Dichloropropene
1,3-Dichlorobenzene	Chloroform	Trichloroethene
1,4-Dichlorobenzene	Chloromethane	Trichlorofluoromethane
2-Butanone	cis-1,2-Dichloroethene	Trichlorotrifluoroethane
2-Methoxy-2-methylpropane	cis-1,3-Dichloropropene	Vinyl acetate
2-Methyl-1,3-butadiene	Dichlorodifluoromethane	Vinyl Chloride

Volatile Organic Compound Sampler

Volatile Organic Compound Costs per Site

- Xontech 901 = $11,000/unit
- Analysis = $250/analysis
  - Suggested contractor lab is Atmospheric Analysis Consulting in Ventura, California
  - Have worked with lab in past with good results
- For a sampling frequency of 1 day in 6, the annual cost=$15,250 (minimum)

Metals

- Those Metals that have been defined by the EPA National Toxics program
- EPA sampling and analysis procedures are published
- The District and CARB have been sampling for these metals at various locations throughout the county
  - Ideal for historical data, trends, and comparisons
- We have in-house knowledge

List of Metals

- Antimony
- Arsenic
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Lead
- Manganese
- Nickel
- Selenium

Metals Sampler

Metals Costs per Site

- Met One E-Sequential = $17,000/unit
- Sample media= $20/filter
- Analysis = $181/analysis
  - Contractor Laboratory= Australian Laboratory Services (ALS) in Kelso, Washington
- For a sampling frequency of 1 day in 6, the annual cost=$11,000 (minimum)

Elemental Carbon Laboratory-based

- Elemental Carbon is defined by the analysis process/procedure.
  - Thermal optical method
- The analysis procedure will be the same one that is used by two EPA national programs (Urban and National Parks)
- The EPA and CARB have been sampling for Elemental Carbon at two locations in the county
- District has limited in-house knowledge

Black Carbon Field-based

- Black Carbon is defined by the analysis process/procedure
  - Optical or photo acoustic
- The analysis procedure we will use is the one that has been commercially available since the late 1980s.
- Continuous black carbon is not currently being measured in County.
  - The technology was used for a different project in the county that ended ~20+ years ago.
- District has limited in-house knowledge

Particulate Monitoring

Carbon Analyses Costs per Site

- Elemental Carbon Lab-based:
  - Met One SuperSASS = $21,000/unit
  - Sample media= $20/filter
  - Contractor laboratory= $68/analysis
    - Desert Research Institute (DRI) in Reno, Nevada
  - For a sampling frequency of 1 day in 3, the annual cost=$10,858 (minimum)

- Black Carbon Field-based
  - Met One BC-1054= $15,000/unit

Support Equipment Costs

SHELTER

DATALOGGER

COMMUNICATION

Support Equipment Costs per Site

- Shelter= $10,000- $25,000
  - ✓ Using a small parking space footprint (5’ x 7’), not including fencing~ $17,000/unit
- Data logger= $10,000/unit
- Modem/communication= $100/month
- Electrical= $200/month (estimate)
- Fencing/moving/miscellaneous= $1,200/move

Summary of costs

Equipment	Elemental Carbon-filter	Black Carbon-continuous	Data Loggers	Gas sampler	Metals sampler	Shelter	Enclosure Installation	Electrical Installation	Total
	per unit	per unit	per unit	per unit	per unit	per unit	estimate	estimate	
10 AB-617 sites	$21,000	$15,000	$10,000	$11,000	$17,000	$17,000	$1,200	$1,200	$935,200
Sherman	$21,000	$15,000	n/a	n/a	$17,000	n/a	n/a	n/a	$53,000

Note A: 1 car/5 sites will be needed (~$35,000/car)

Note B: At least one spare for each suite of equipment will need to be purchased (not including the shelter)

Annual Costs

	Elemental Carbon Lab Analysis	Lab Gaseous Analysis	Metals Lab Analysis	Monthly Electricial	Camera	Total
Frequency	1:3 days days	1:6 days	1:6 days	estimate	estimate	
10 AB-617 sites	$10,858	$15,250	$11,000	$200	$20,000	$573,080
Sherman	$10,858	n/a	n/a	n/a	$20,000	$30,858

Non-School Sites

Home, 29th and Boston	I-5 on-ramp proximity= location good, but footprint too small.
Caltrans lot at 29th & Boston	Large footprint, power and security.
Chicano Park 1-Senior Center	Under construction
Chicano Park 2-Handball courts	One area between courts= small footprint, unknown power capability; will have to bore into cement for fence posts
Chicano Park 3-Gazebo area	One area by gazebo= would be obtrusive to accommodate the large footprint needed; Mercado biz area better (more bridge span coverage)
Chicano Park 4-by Mercado Biz	Several areas; best under bridge in Mercado biz parking lot
Chicano Park 5- Mercado Homes	Tight accommodations. Caltrans right next door.
Chicano Park 6-Cesar Chavez Parkway - near Interstate 5	Area is 1.5 blocks upwind (Chavez Campus) and it abuts Chicano Park; nearby power
Chicano Park 7-Caltrans yard	Large footprint, power and security. Also, large section of the bridge span is covered
SA Recycling	May need Caltrans property; power may be cost prohibitive?
Home in Logan Heights	Small footprint. Downwind is a community center type area-better?
Praxair	Dumpster area in alley; needs a long lead time for power drop

Caltrans Parking Lot vs. Home

Chicano Park Area

Chicano Park Area (Senior Center)

Chicano Park Area (Courts)

Chicano Park Area (Gazebo)

Chicano Park Area (Mercado Biz)

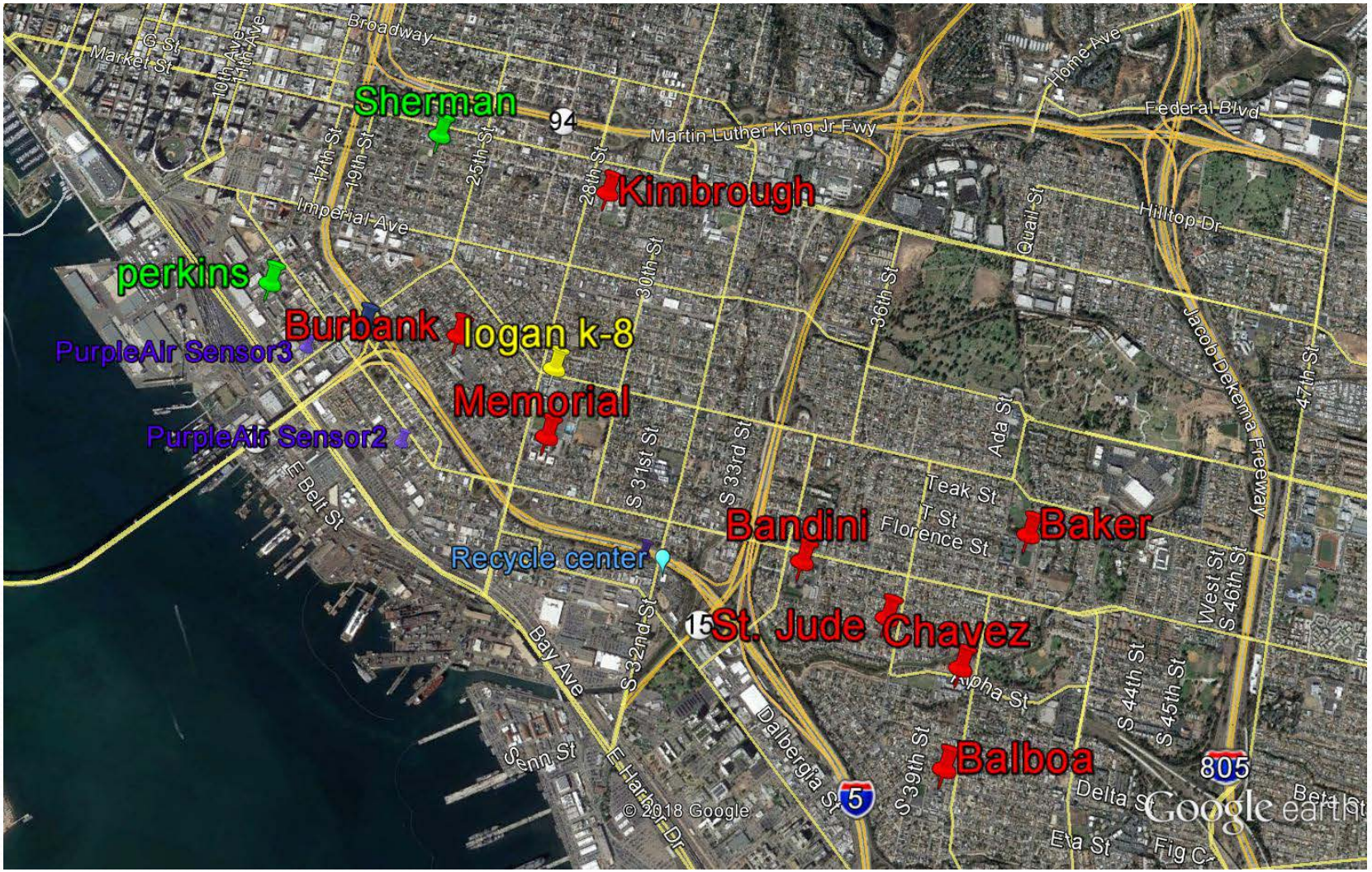
Chicano Park Area (Caltrans)

Recycling Center

Other Sites in Northern Portside

Logan Heights K-8 School	Limited space; Memorial JHS & Boys and Girls Club have more usable locations
Memorial Scholars & Athletes	Big campus; good siting possibilities
Emerson/Bandini Elementary	Good siting possibilities; possible power sources
Balboa Elementary School	Decent siting possibilities; possible power sources
Baker Elementary School	Good siting possibilities; possible power sources
Caesar Chavez Elementary School	SDUSD notified of our interest
St. Jude Academy 128	Good siting possibilities; possible power sources
Kimbrough Head Start	Excellent siting possibilities; possible power sources
Burbank School	Good siting possibilities; possible power sources
Perkins Elementary	Former permanent location; parking issues in the past
Sherman Heights School	Permanent location
Mercado Head Start Center	Severe space limitations. Power accessibility unknown.
Barrio Logan Child Development	No room. By VFW (slight possibility there)
Fire Station(s)	No room
Site on or near Navy housing	Run by private entity; perhaps near the medical center

Schools Northern Portside

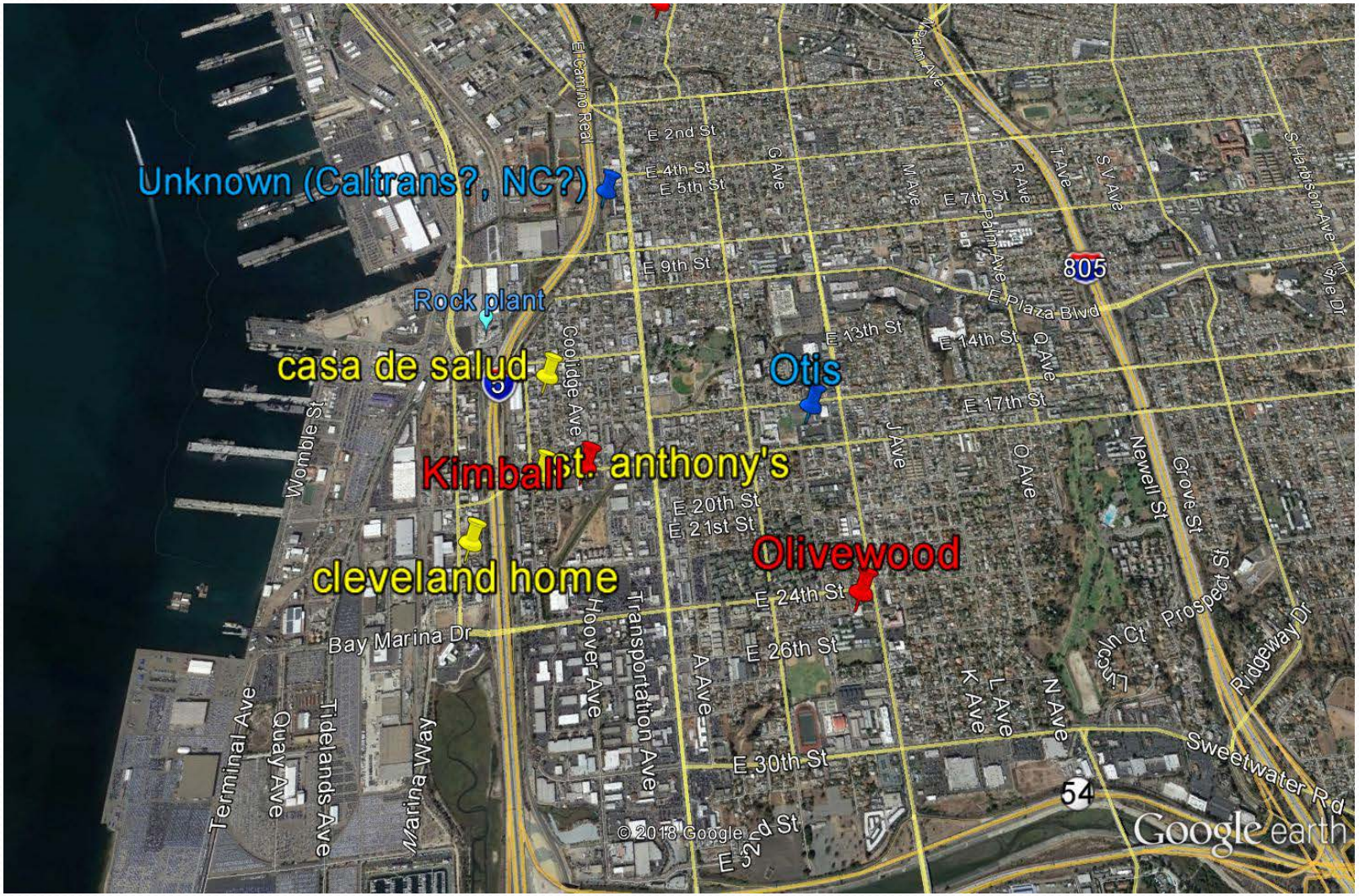


Overall Northern Portside

Summary of Sites in National City

5th and Roosevelt	Countless homes 2 blocks downwind & observed several trucks along Roos.
Kimball Elementary	Excellent site with power. Welding business nearby
Godschalk home on Cleveland Avenue	smallish footprint (one sampler?); Kimball School better
Auto body shops	Need input from steering committee
Casa de Salud	No room
Otis Middle & Elementary School	Large footprint for a full station, but outside of area(?)
Saint Anthony's Church	Kimball School better site & across the street
Olivewood Elementary School	Excellent site with power. Welding school nearby

Southern Portside Overall



Portside Overall

Contact Information

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- **General Information**
  - **Phone Number**
    - **(858) 586-2600**

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Source Attribution

AB 617 Community Air Protection Program

November 27, 2018

Outline

- Overview of Source Attribution
  - Statutory requirement
  - What are sources and source categories?
  - How does source attribution work?
  - How can it help meet the goals of AB 617 community monitoring?
- Methodologies for performing community-scale source attribution
- Questions/Feedba

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AB 617 Source Attribution Requirement

AB 617, H&SC §44391.2(b)(2) requires:

"A methodology for assessing and identifying the contributing sources or categories of sources, including, but not limited to, stationary and mobile sources, and an estimate of their relative contribution to elevated exposure to air pollution in impacted communities…"

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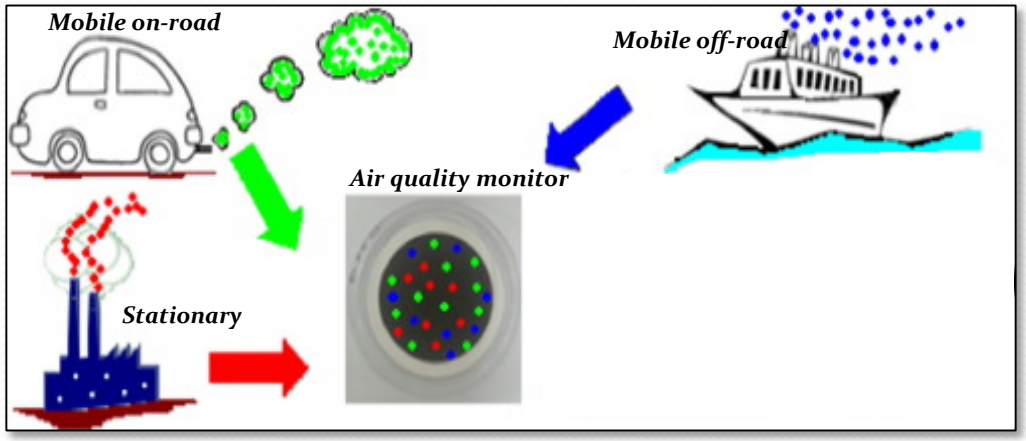
Sources and Source Categories

Source Category	Examples of Source Type
Stationary	Boilers, diesel engines, mineral processing facilities, paint/coating operations, chrome platers
Area-wide	Consumer products (hairspray, cleaning supplies), cooking, asphalt paving
Mobile (on-road)	Cars, trucks
Mobile (off-road)	Locomotives, ocean-going vessels, cranes, bulldozers, cargo-handling equipment

What is Source Attribution?



- Identification of sources or categories of sources contributing to community-scale air pollution
- Allows us to estimate the relative contribution of each category of emissions sources to the elevated air quality burden

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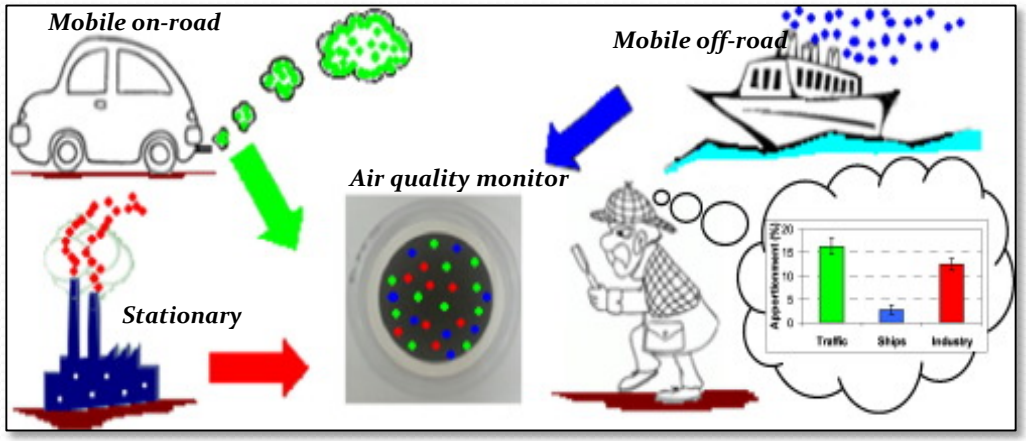

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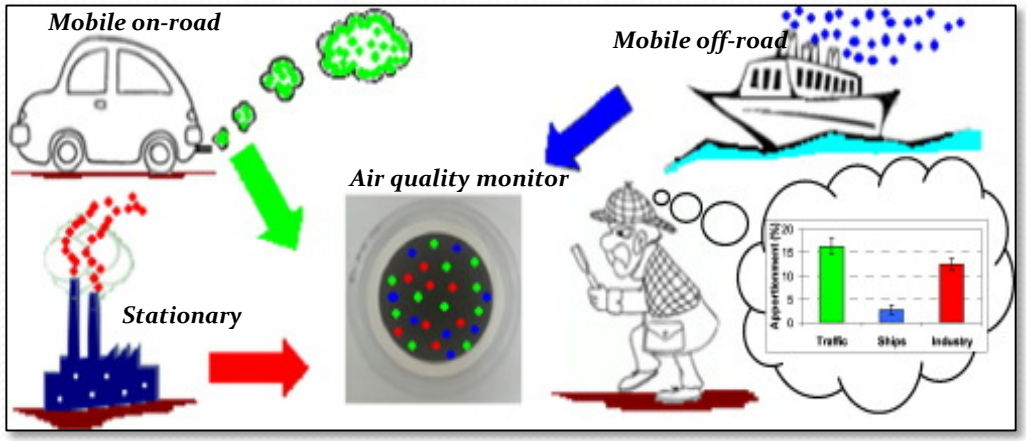
What is Source Attribution?

Meteorological Measurements



Air Quality Measurements

PM and its constituents

- ✓ Metals (Cr, Ni, Mn, Fe)
- ✓ Ions (sulfate, nitrate, etc.)
- ✓ Elemental & organic carbon (EC/OC)
- ✓ Organic compounds (Benzene, 1,3-Butadiene)

Volatile Organic Compounds (VOCs)

- Identification of sources or categories of sources contributing to community-scale air pollution
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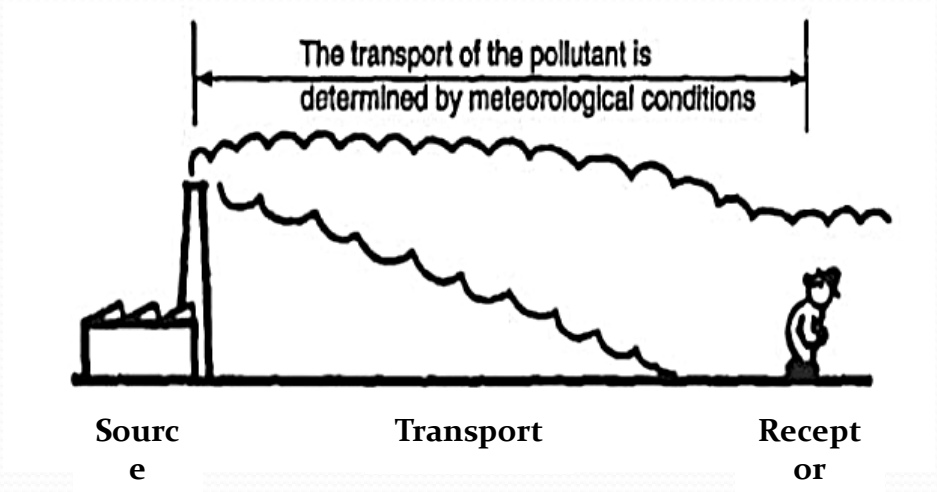
Types of Source Attribution



Source-Oriented Approaches

- Emissions inventory/ratios
- Air quality modeling

Receptor-Oriented Approaches

- Chemical Mass Balance (CMB)
  - Requires "fingerprint" of each source
- Positive Matrix Factorization (PMF)
  - Requires a lot of sampling data
- Back-trajectory/Inverse modeling
- Pollution roses

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Monitoring Plan Considerations

- **Monitoring to Inform Source Attribution**
  - What monitoring and/or meteorological data will be required to best utilize the recommended source attribution tools?

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Monitoring Data

- Pollutants of concern (community knowledge; emissions inventories)
- Number of monitoring stations (community size; number of sources; budget)
- Location of stations (source and sensitive receptor locations; power needs)
- Duration of monitoring (seasonal variation; number of samples)

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Meteorological Data

- Wind speed/direction, atmospheric pressure, temperature, relative humidity
- Number/location of monitoring stations (representative of local conditions)

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Summary

- Source attribution can identify sources or source categories contributing to the air quality burden in a community.
- Approaches can be source-oriented (inventory ratios, air quality modeling) or receptor-oriented (CMB & PMF).
- Monitoring and source attribution processes are iterative, constantly improving with new, more precise data and methodologies.
  - Results may be used to identify locations of concern within community.
  - Results may help focus monitoring on specific source types and/or facilities.

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Thank you!

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Back-Up Slides

Methods of Source Attribution

Emissions Inventory Ratios:

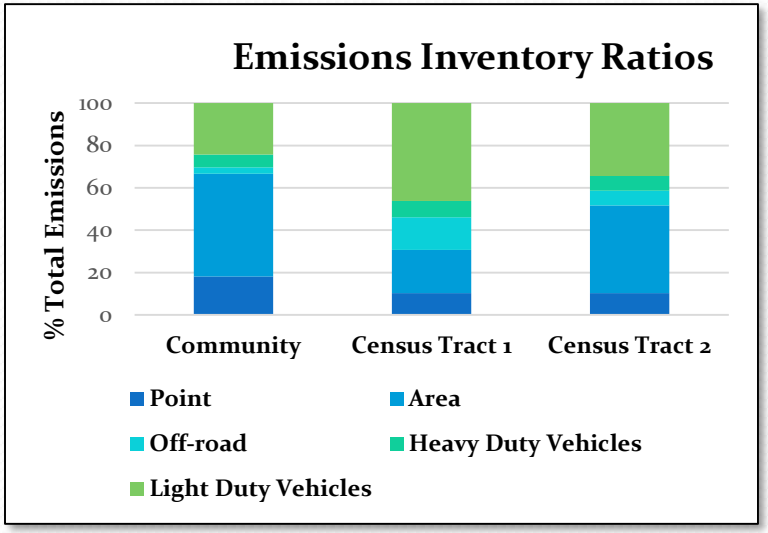
Identifies major source categories and pollutants impacting community using emissions inventories.

Outcome:

Results can help identify air pollutants of interest to be included in community air monitoring plan.

Data Requirements:

Emissions inventories developed by air district and CARB. No monitoring data needed.



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Methods of Source Attribution

Air Dispersion Modeling:

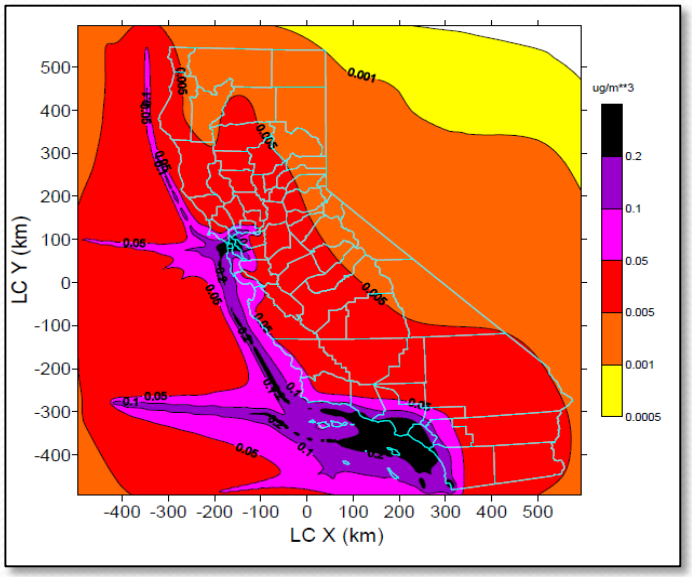
Determines how/where air pollutants travel from sources to the community.

Outcome:

Identifies specific locations where pollutants impact the community; helps identify potential sites for placement of monitors within community.

Data Requirements:

Basic emissions inventory data and wind direction/speed data.



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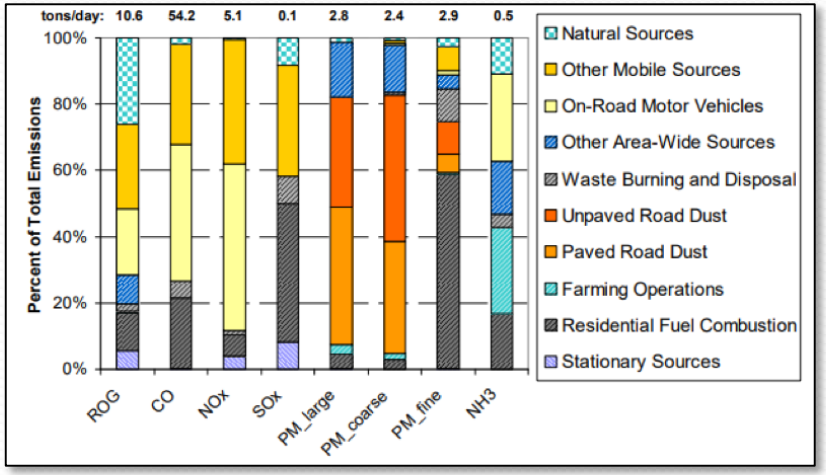
Methods of Source Attribution

Chemical Mass Balance (CMB):

Allows us to analyze monitoring data for fine-scale attribution of pollutants to distinct source categories.



Outcome:

Quantifies contributions from chemically distinct source categories; contributions from individual sources can't be determined.

Data Requirements:

Some monitoring data along with profiles ("chemical fingerprints") of sources impacting the community.

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Methods of Source Attribution

Positive Matrix Factorization (PMF):

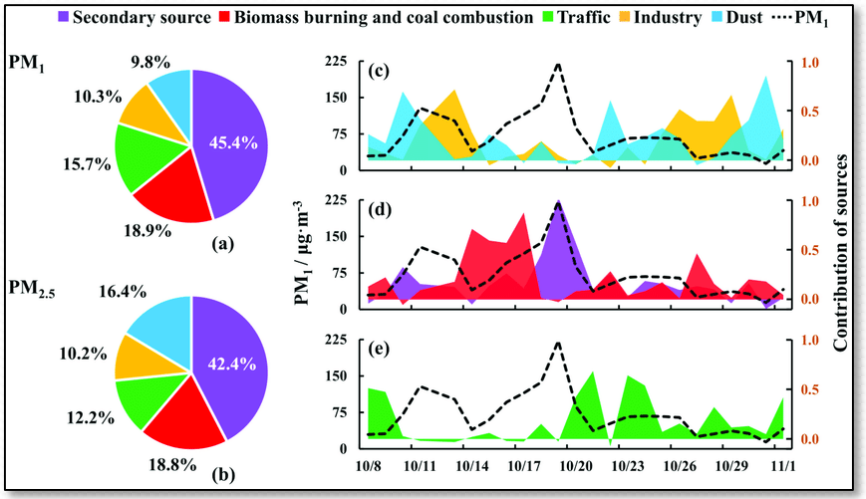
Allows us to analyze monitoring data for fine-scale attribution of pollutants to distinct source categories.

Outcome:

Precisely identifies source categories impacting a monitoring site, including sources not in inventory.

Data Requirements:

Extensive monitoring data. Knowledge of sources impacting the monitoring site (profiles) not necessarily required.



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