

Sacramento Winter Study Measuring Toxics from Wood Smoke

Air Sensors International Conference

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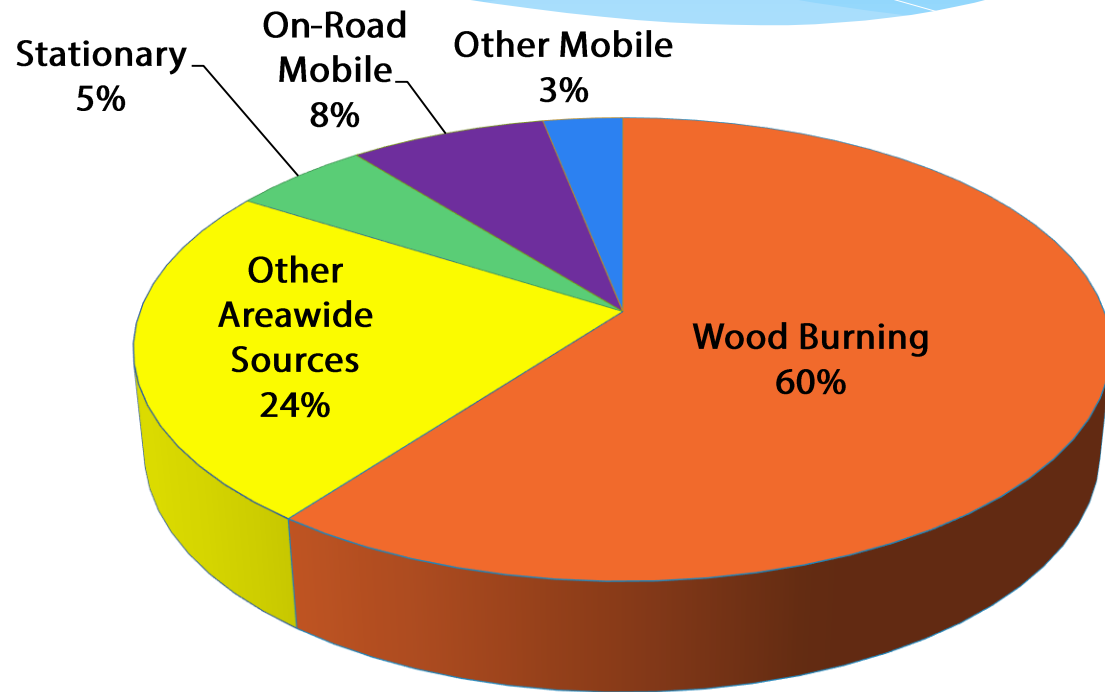
SACRAMENTO METROPOLITAN



AIR QUALITY
MANAGEMENT DISTRICT

PM is Bad for Your Health

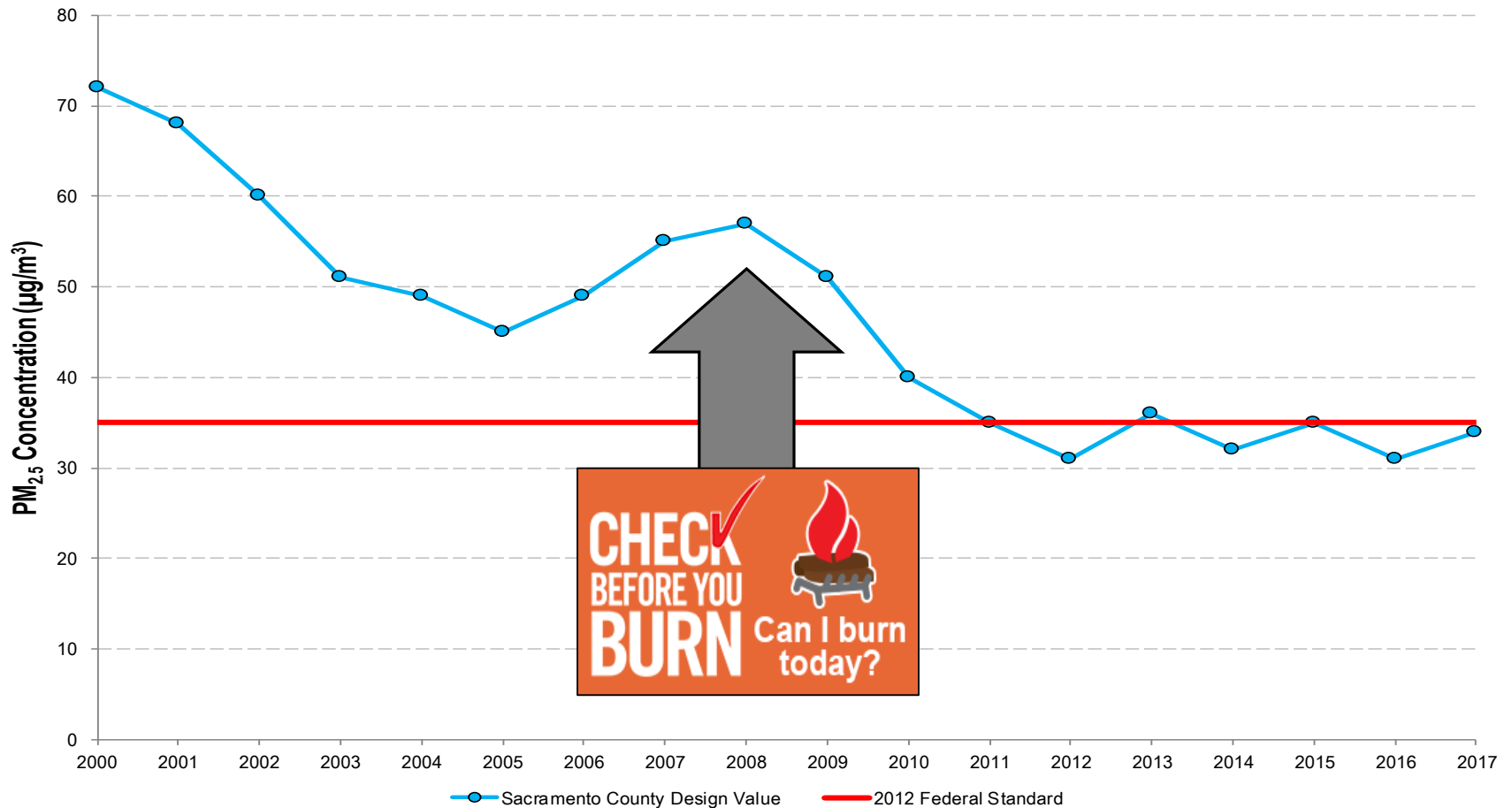
Wood smoke makes up **60%** of the PM_{2.5} emission inventory in Sacramento County on an average **winter** day



Source: 2016_SIP_V105_SAC_PM25. Accessed: 01/20/2017 13:36:38.

The Good News: Declining Since 2008

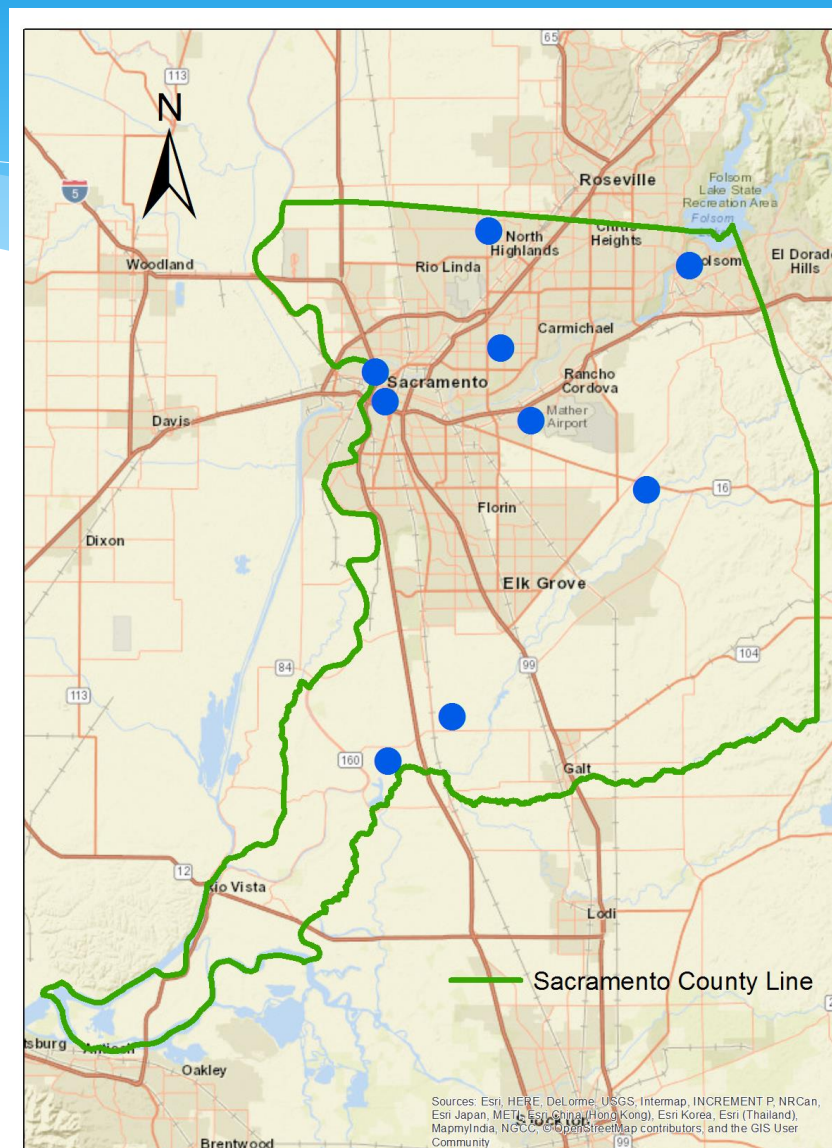
24-hour PM_{2.5} Design Value Trend for Sacramento County 2000-2017



District Monitoring Network

Monitoring Objectives

1. Public awareness and notification
 2. Demonstrate compliance with health standards
 3. Support research studies
- Received \$360,000 grant from EPA for **community monitoring of air toxics from wood smoke**
 - Study conducted during **Winter 2016-2017**



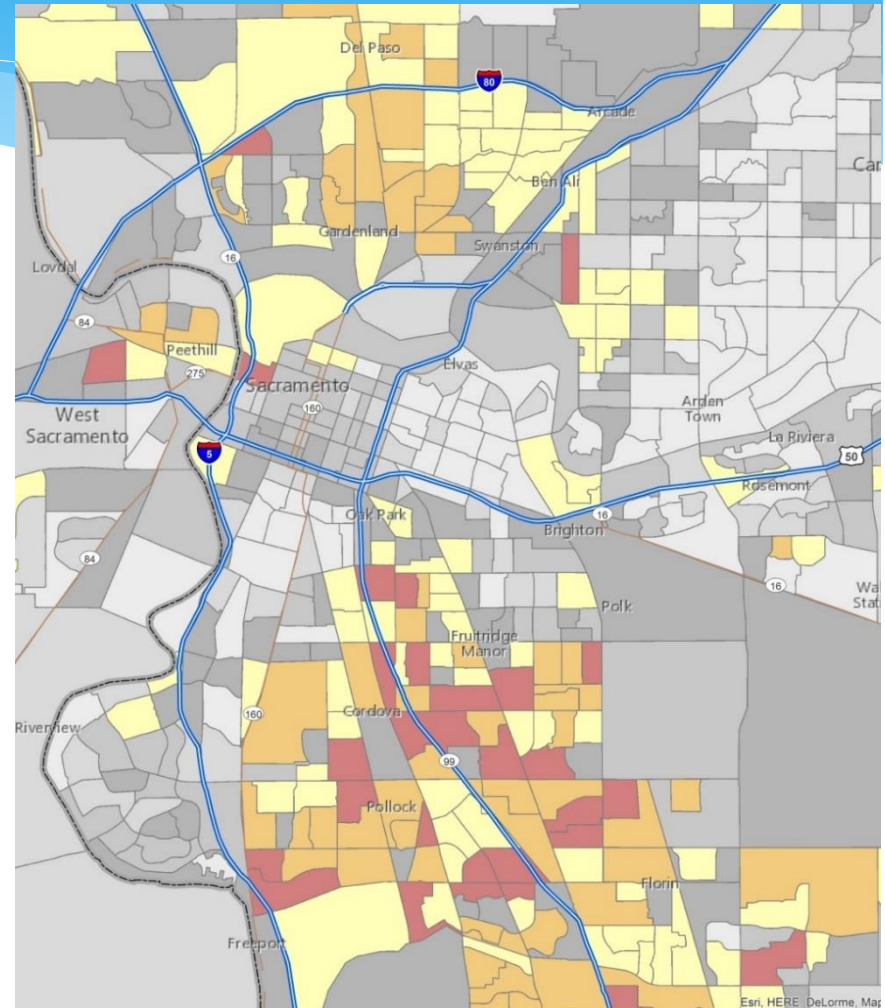
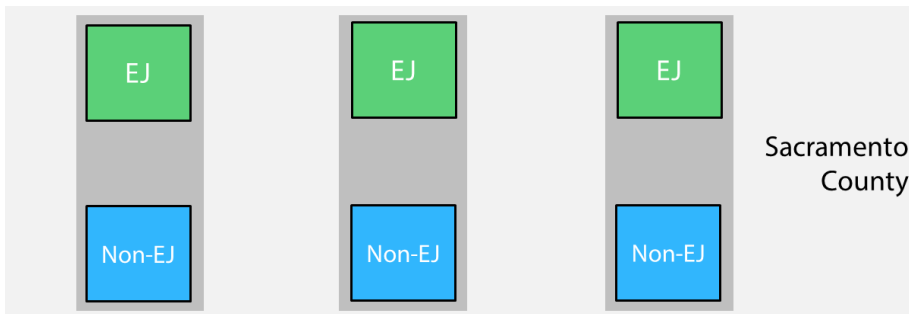
What questions did this study answer for our communities?

- What are the concentrations of air toxics?
- To what degree does wood smoke versus traffic contribute to air toxics?
- Are some communities disproportionately impacted by wood smoke than others?
- Are there outreach efforts that could assist in reducing this toxics exposure?



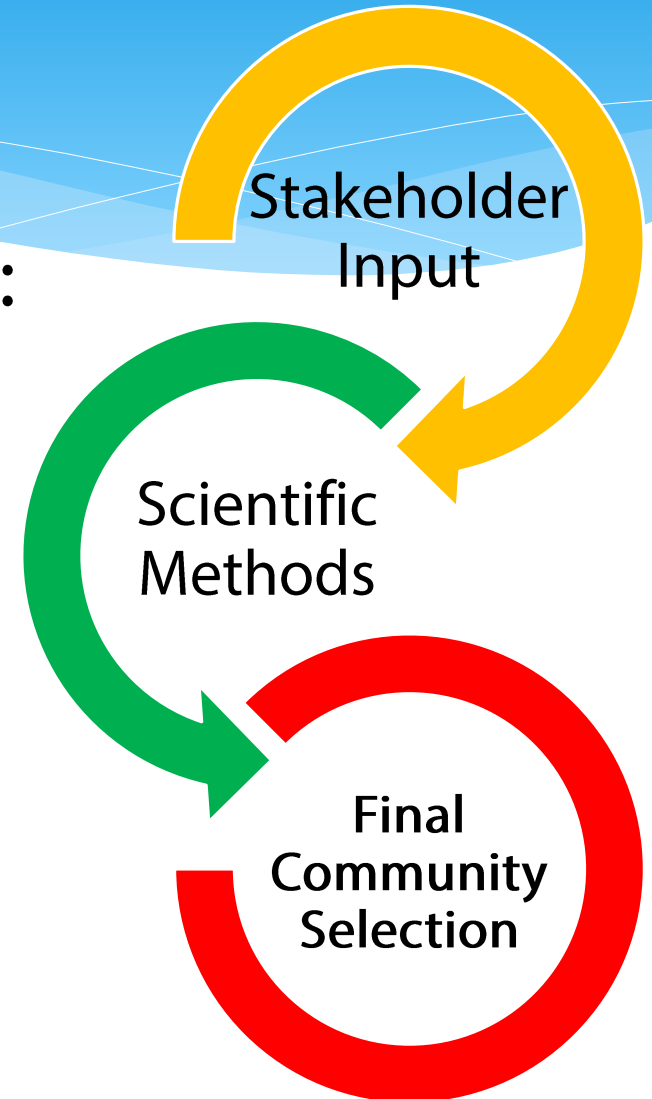
EPA's EJScreen Tool

- EPA developed a tool to identify EJ areas based on **demographic** and **environmental** information
- SMAQMD used EJ Screen tool as a **starting point** to help identify EJ and non-EJ areas
- Monitoring in six communities represented as three “pairs”



How Were the Communities Selected?

- To determine optimum locations, SMAQMD combined:
 - what is important to the **communities**
 - **scientific** considerations (terrain, meteorology, traffic, county coverage)



Three Types of Project Monitors

Tier 1: Existing regulatory sites



Tier 2: New temporary community sites



**Tier 3: New temporary tripod sites
(low cost monitors)**



Study Measurements

Pollutant	Technique	Duration	Sites	Tier 1	Tier 2	Tier 3	Use
Gaseous toxics^a	Canisters	12-hr	6 sites	X	X		Quantify individual gaseous toxics of high risk
Levoglucosan	Quartz filter	12-hr	3 sites	X			Apportion and relate PM and toxics from wood smoke
Black carbon, BC_{WB}, BC_{ff}	Aethalometer	1-hr	6 sites	X	X		Apportion and relate PM and toxics from wood smoke and other sources
PM mass	MetOne BAM	1-hr	2 sites	X			Relate PM to air toxics and wood smoke
	AirBeam (low-cost)	1-hr	15 sites	X	X	X	Obtain detailed community-scale data, relate to potential air toxics exposure

^a Toxics measured as part of this work include acetaldehyde, acrolein, naphthalene, acetonitrile, benzene, and 1,3-butadiene. All are listed by EPA as urban toxics and are among the highest health-risk drivers nationally. Iso-octane, a tracer for mobile-source emissions, will also be measured.

^b Levoglucosan is a tracer for wood smoke.

^c Midday-to-midday samples will be collected to capture peak wood smoke concentrations overnight and to simplify the ability to take back-to-back 24-hr samples without additional equipment.

Monitoring Site Challenges

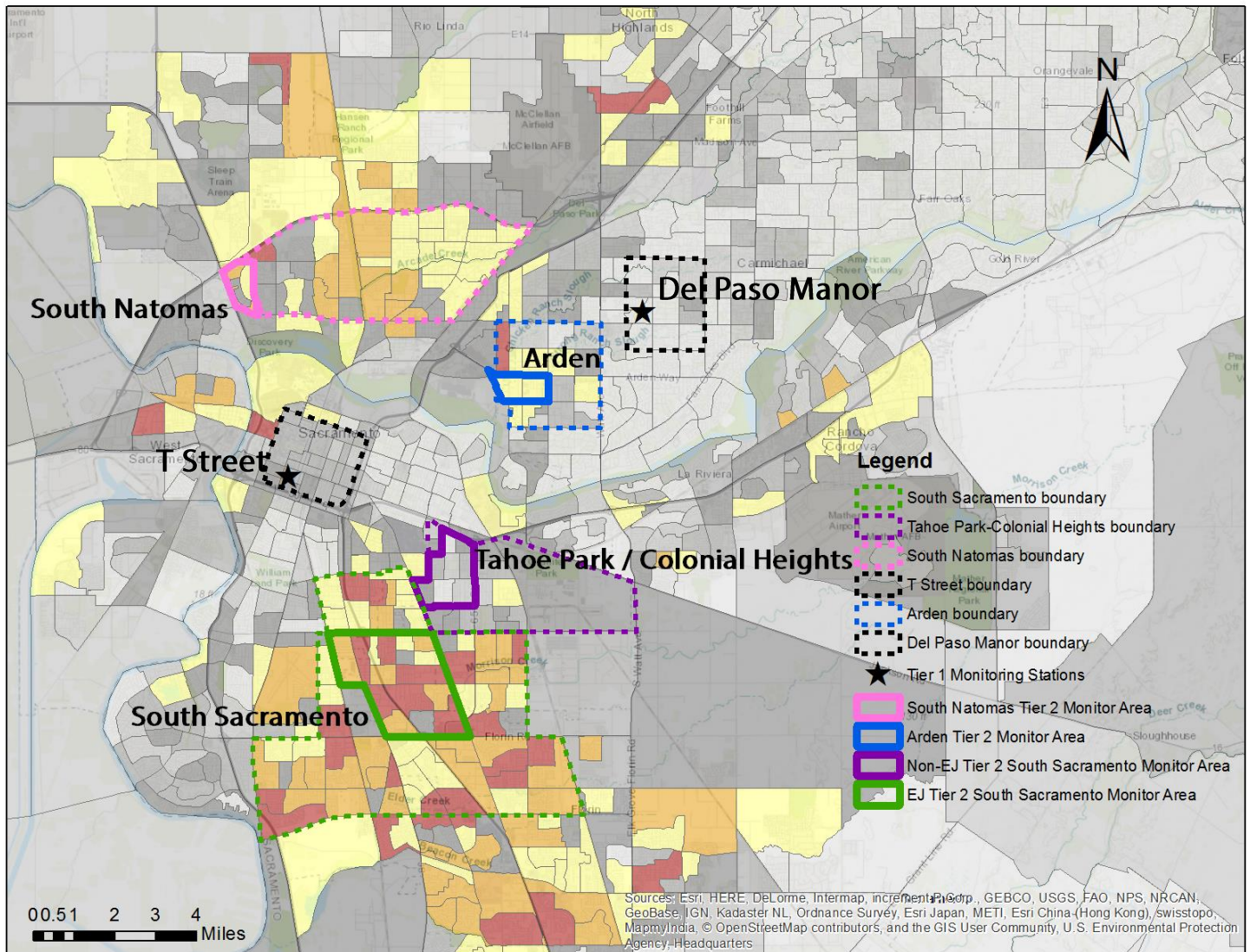


Tier 3 – AirBeam Setup

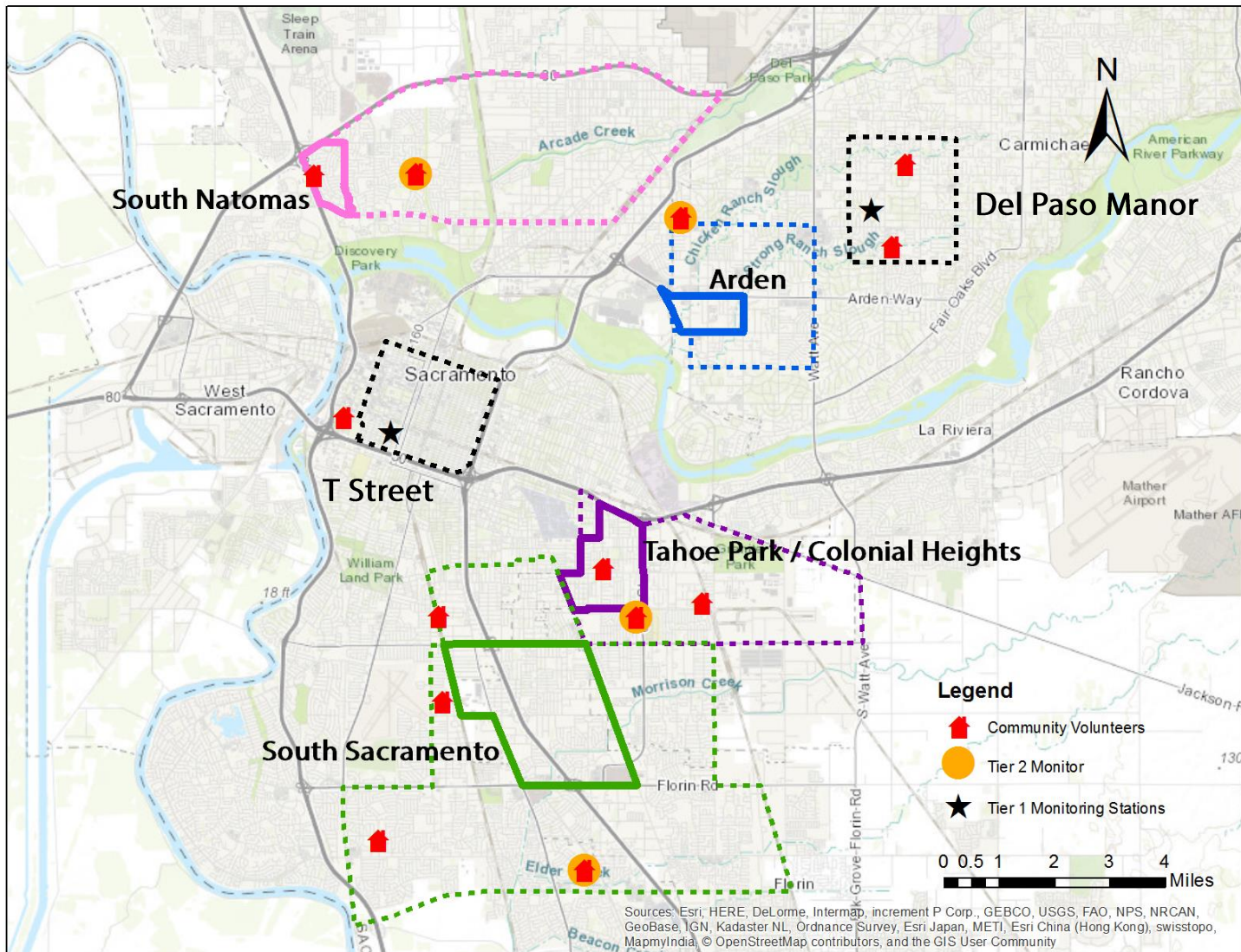


- All components were mounted on a tripod
- Solar panels with rechargeable batteries or power from an outlet were used to power the AirBeam and communications
- AirBeam was mounted underneath a “hat” so that rain/fog would not affect it
- Hardware box housed communications equipment

Study Communities



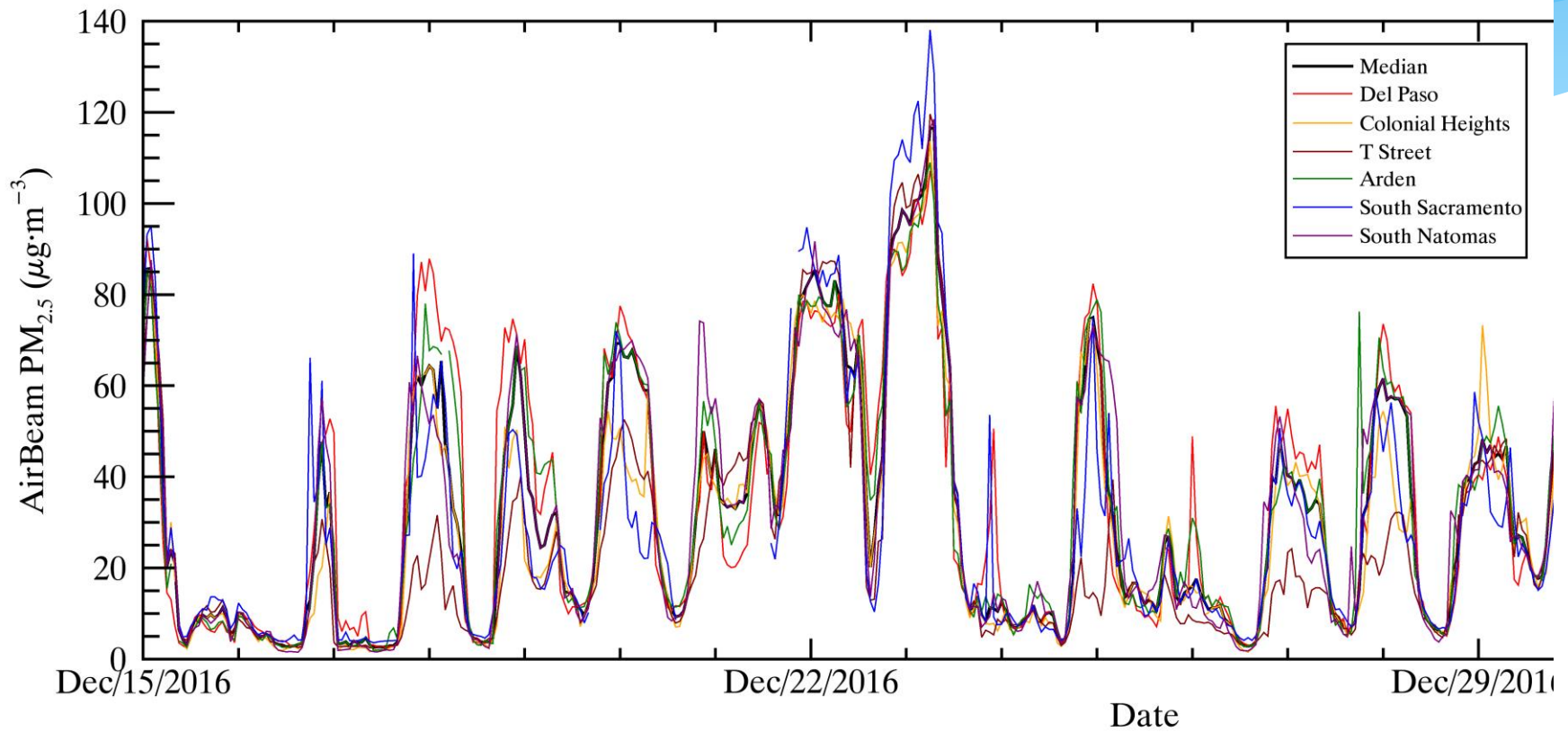
Study Monitoring Communities



Summary of Results for Sacramento

1. Smoke from wood burning does not significantly contribute to air toxic concentrations
2. Fossil fuel-related pollutants were highest in EJ communities
3. Wood burning indicators were highest in non-EJ communities
4. Phone survey results were consistent with measurements – there was more wood burning in non-EJ areas
5. Sensor to sensor, the low-cost sensors performed well during the study, with modest variation of PM concentrations between communities
6. Focus outreach (time of day, area, unaware residents)

Neighborhood Differences



More Study Results



Air Monitoring

Since 1960, the Sac Metro Air District has been monitoring outdoor air pollution in Sacramento County and now operates eight air quality monitoring stations across the county. An additional station is operated by the California Air Resources Board (CARB). The monitoring stations provide data that are essential to protecting public health, determining compliance with federal and state air quality standards and supporting air quality research.

Sacramento Toxics from Wood Smoke Study

The Sac Metro Air District conducted a Toxics from Wood Smoke Study in Sacramento County communities from December 2016 – January 2017. The study was made possible with funding from a Community Scale Air Toxics Ambient Monitoring grant award provided by U.S. EPA.

The study focused on four research questions:

1. What are the concentrations of Hazardous Air Pollutants (HAPs) in various communities in Sacramento?
2. To what degree does wood smoke contribute to toxics in these communities?
3. Are disadvantaged communities disproportionately impacted by toxics from wood smoke?
4. Are there changes that can be made to the Sac Metro Air District's air quality outreach program to reduce toxics from wood smoke?

Results and conclusions from this study are presented in a [final report](#).

Air Monitoring

Air Quality Information

Air Quality Plans

Air Quality Trends

Federal Planning

State Planning

Air Quality Pollutants and Standards

Budget & Finance

Climate Change

Sac Metro Air District Efforts

Local & Regional Efforts

Public Outreach

Things You Can Do

CEQA Guidance & Tools

GHG Verification Services

Community Air Protection

AB 617 & Mobile Source Incentives

Link:http://www.airquality.org/ProgramCoordination/Documents/Wintertime%20Air%20Toxics%20from%20Wood%20Smoke%20in%20Sacramento_Final%20Report.pdf

Study Team

SACRAMENTO METROPOLITAN



Sonoma Technology, Inc.
Innovative Environmental Solutions

Meta Research, Inc.



Many Local Groups Helped with Community Selection!



BREATHE
CALIFORNIA
of Sacramento-Emigrant Trails



City of

SACRAMENTO



Thank you!

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