



**BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT**

*Committed to Achieving Clean Air to Protect
the Public's Health and the Environment*

CARE Program Update Regional Studies

Phil Martien, Ph.D.

Bay Area Air Quality Management District

CARE Task Force Meeting

December 12, 2007

Regional Emissions, Modeling, and Health Indicators

- Regional TAC Emissions Updates
 - Update to 2005 annual emissions
 - Update toxic speciation profiles
 - Prepare model-ready emissions
- Preliminary Toxics Modeling
 - Year 2000 modeling
 - Diesel PM and reactive organic compounds
- Health Indicators Data
 - Birth outcomes, cancer, heart disease in addition to asthma

CARE Emissions Background

- Area sources and off-road mobile
 - PM10 and total organic gases (TOG) estimated
 - PM10 and TOG “speciated” to estimate toxic compounds
 - Spatial surrogates linked to sources to map emissions
- On-road mobile
 - Speciation – same as area & off-road
 - Roadway locations used to map emissions
- Point sources
 - Toxic compounds estimated from permit information
 - Locations determined from plant or stack coordinates

CARE Emissions Update

- Preliminary 2005 TAC emissions produced
- New speciation profiles applied, e.g. new EPA profile for diesel TOG emissions
- Revising construction emissions downward based on fuel use
- Generating emissions timing (seasonal, day-of-week) information for use in modeling
- 2 km x 2 km grid produced, testing 1 km x 1 km grid

Emissions Comparisons 2005 vs. 2000

- Area and non-road mobile TOG and PM10 emissions decreased slightly (~ 5 tons/day)
- On-road TOG emissions are 30% lower in 2005
- District-wide TAC emissions from point sources are about 8% lower in 2005

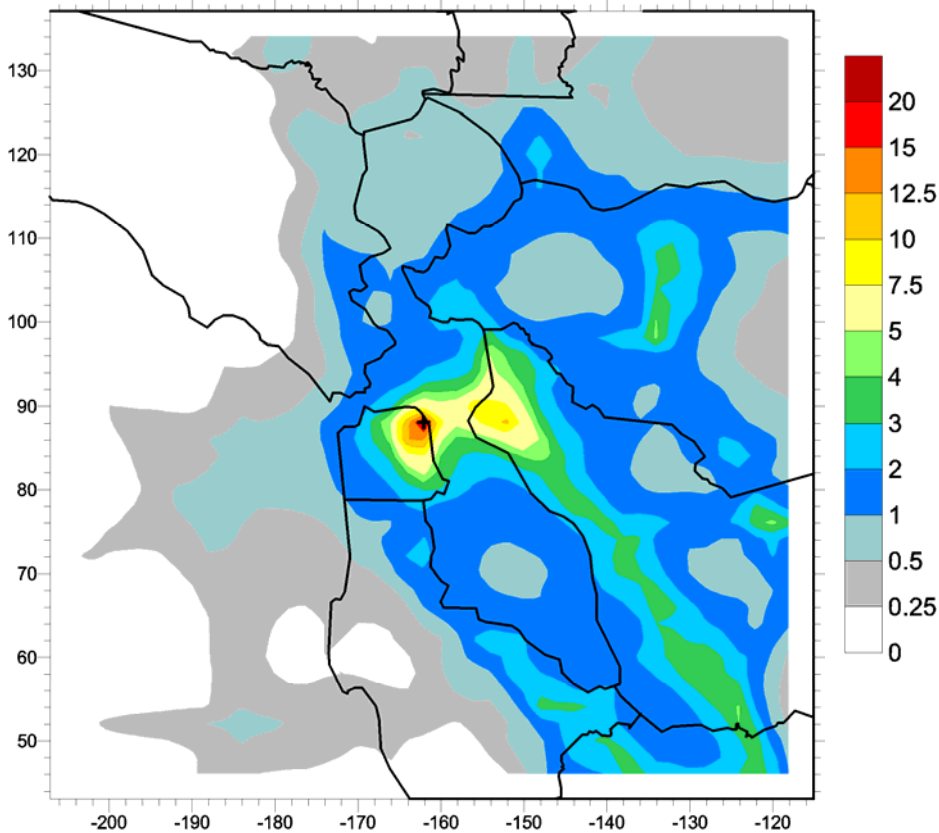
Additional TAC Emissions Findings

- New EPA profile for speciating diesel TOG:
 - More acetophenone and acrolein in emissions, adding to the non-cancer chronic and acute health risks
 - Larger fraction of chronic non-cancer and acute health risks now associated with diesel exhaust

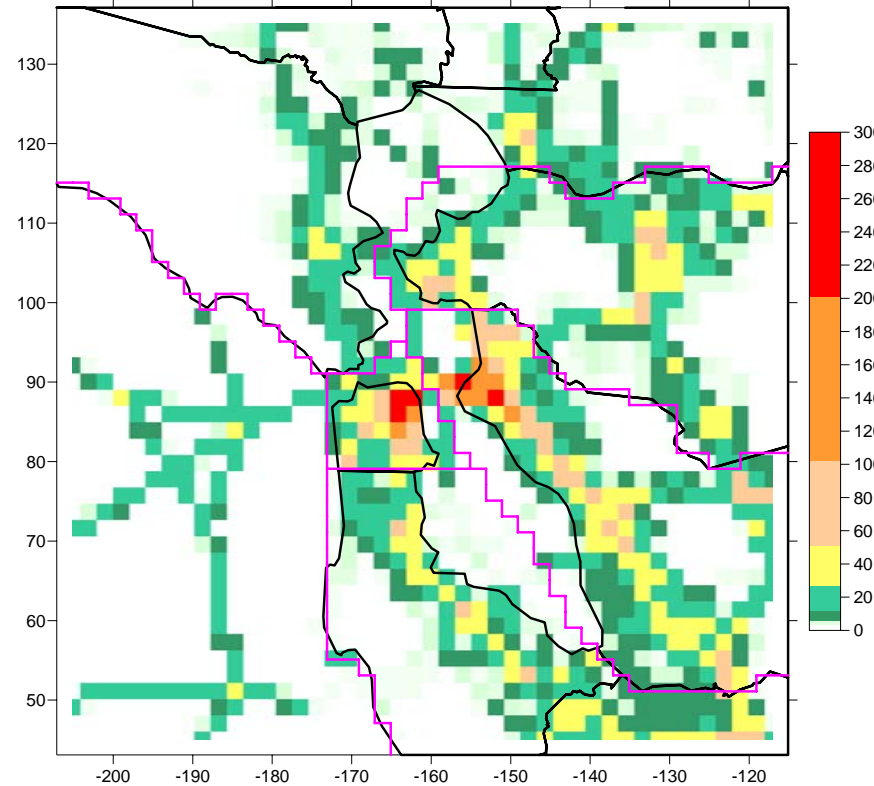
Preliminary Toxics Modeling

- Demonstration modeling using CAMx (year 2000)
- Diesel PM annual modeling
 - CARE annual/gridded toxics inventory (no point sources)
 - CARB annual CALMET meteorology
- Reactive organic compound episodic modeling
 - 2000 Central California Ozone Study episode
 - CARE annual/gridded toxics inventory
 - CARB MM5 meteorology

Preliminary DPM Modeling



Annual average DPM concentrations, $\mu\text{g}/\text{m}^3$

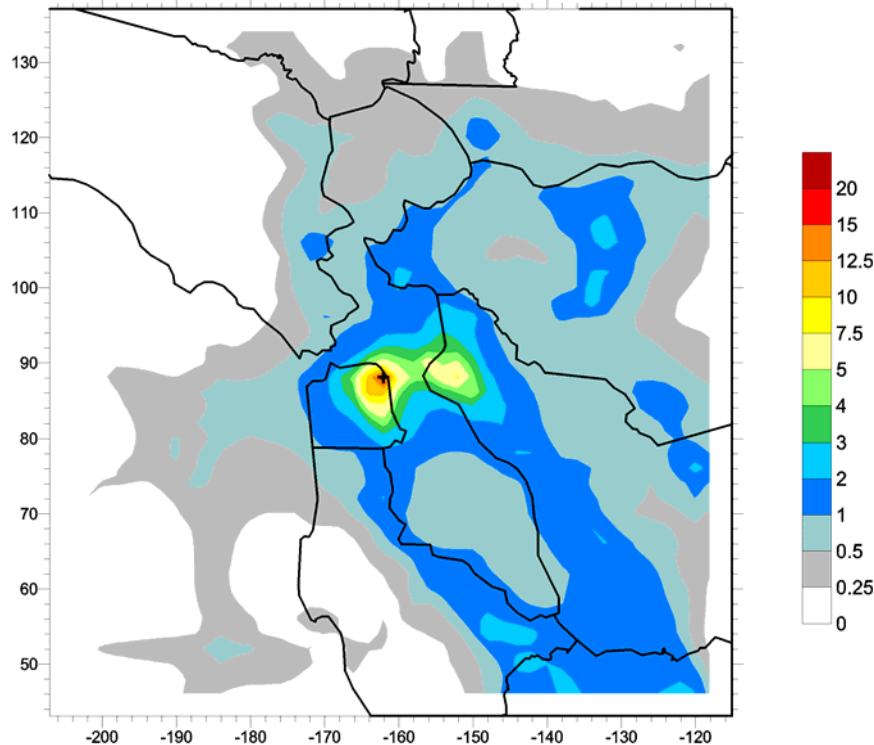


DPM emissions, lbs/day

Draft modeling results – suspect construction emissions are overestimated, further investigation required

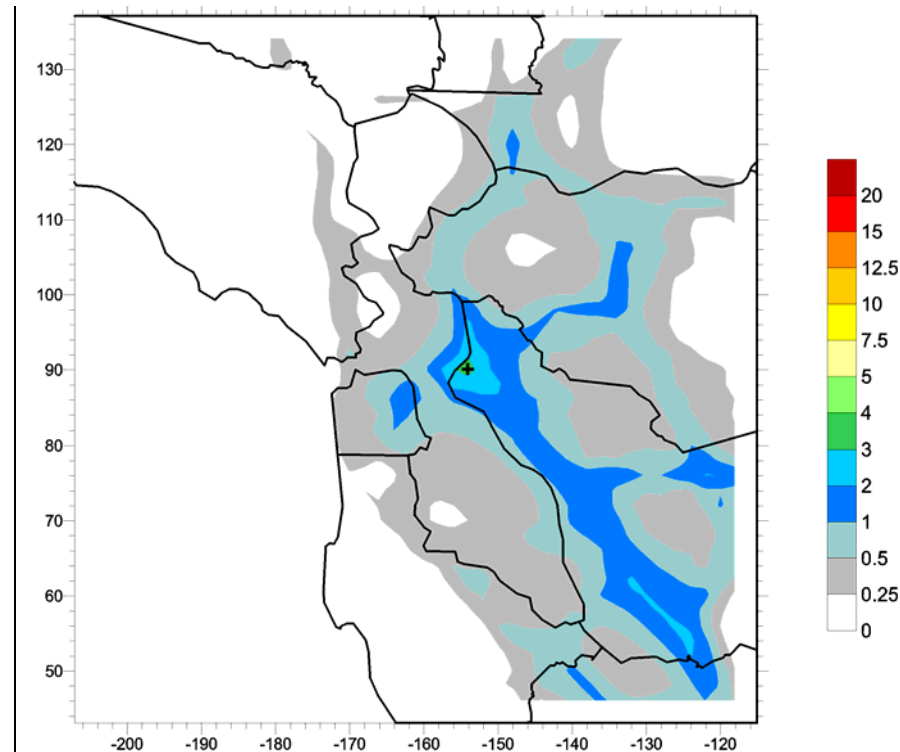
Preliminary DPM Modeling: Area vs. On-Road

Area and non-road mobile DPM



Annual average DPM
concentrations, $\mu\text{g}/\text{m}^3$

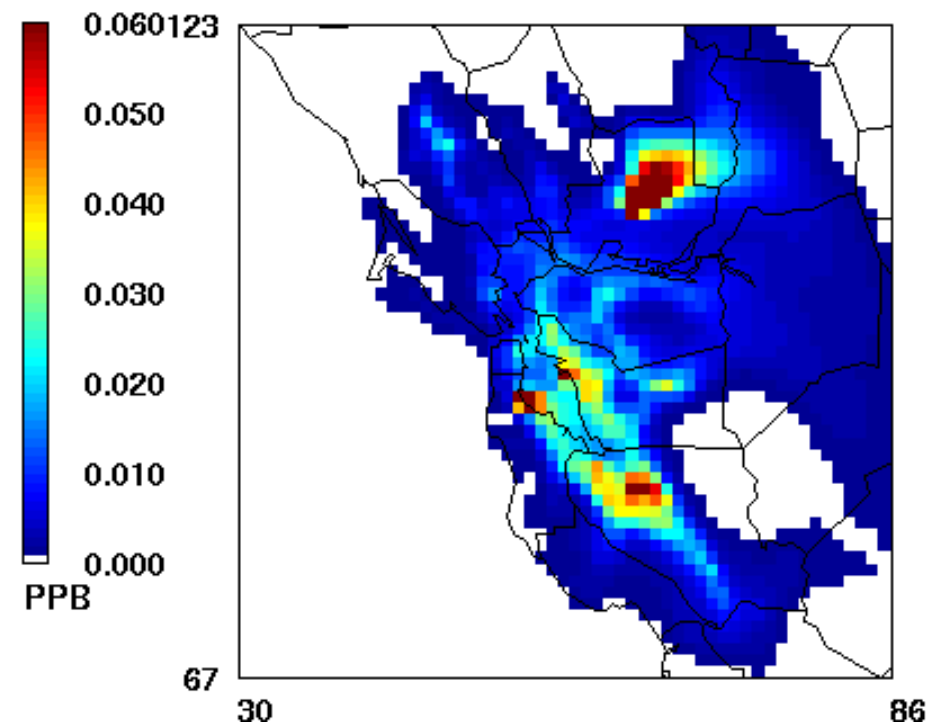
On-road mobile DPM



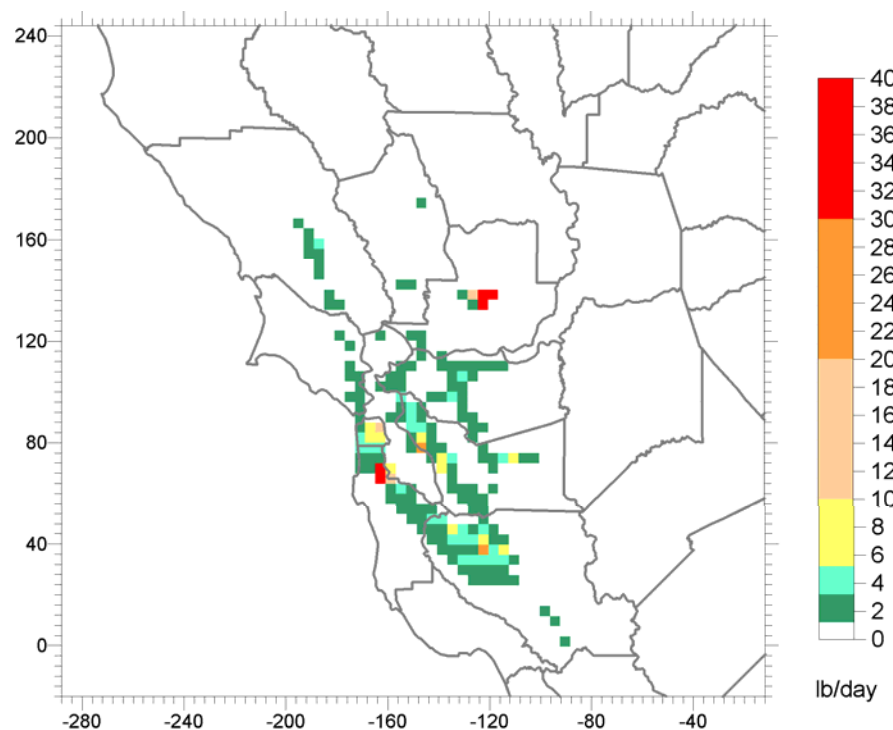
Annual average DPM
concentrations, $\mu\text{g}/\text{m}^3$

Draft modeling results – suspect construction emissions
are overestimated, further investigation required

Preliminary Primary Acrolein Modeling Results



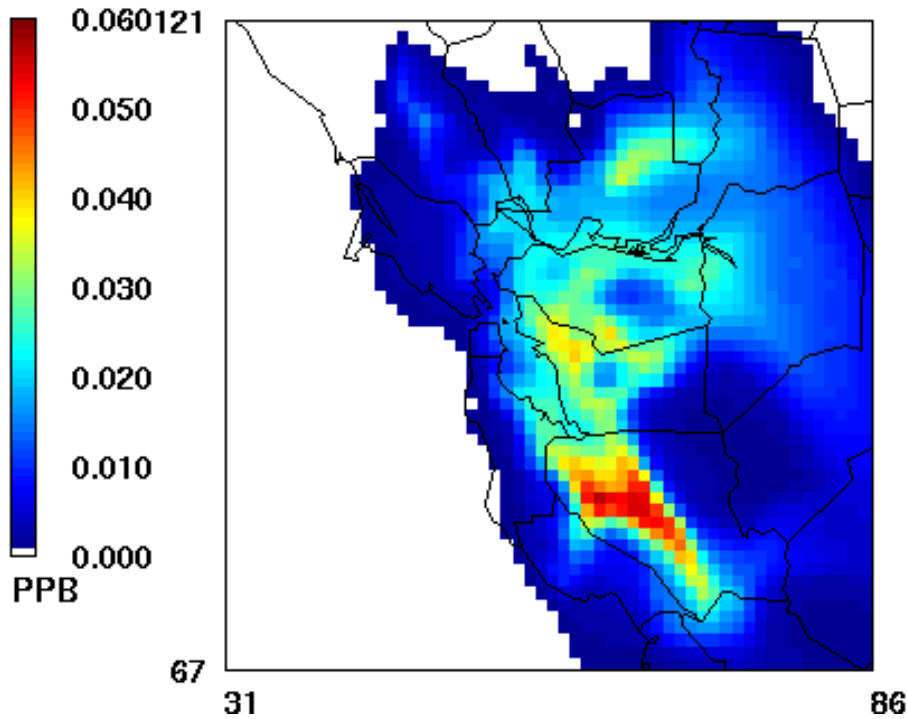
Daily average acrolein concentrations, ppb



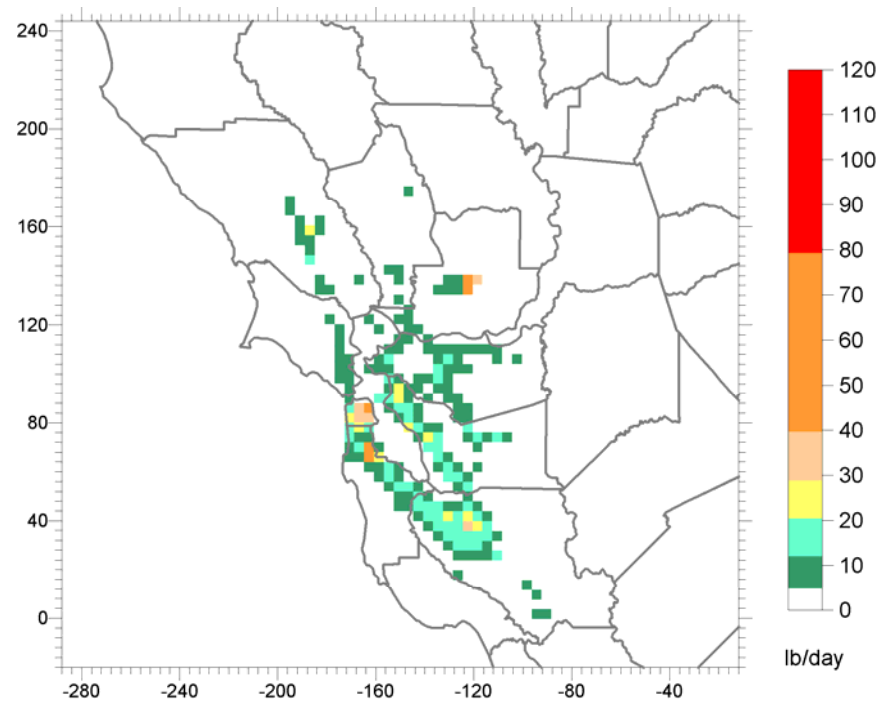
Acrolein emissions, lbs/day

Draft modeling results

Preliminary Secondary Acrolein Modeling Results



Daily average acrolein concentrations, ppb



1,3-butadiene emissions, lbs/day

Draft modeling results

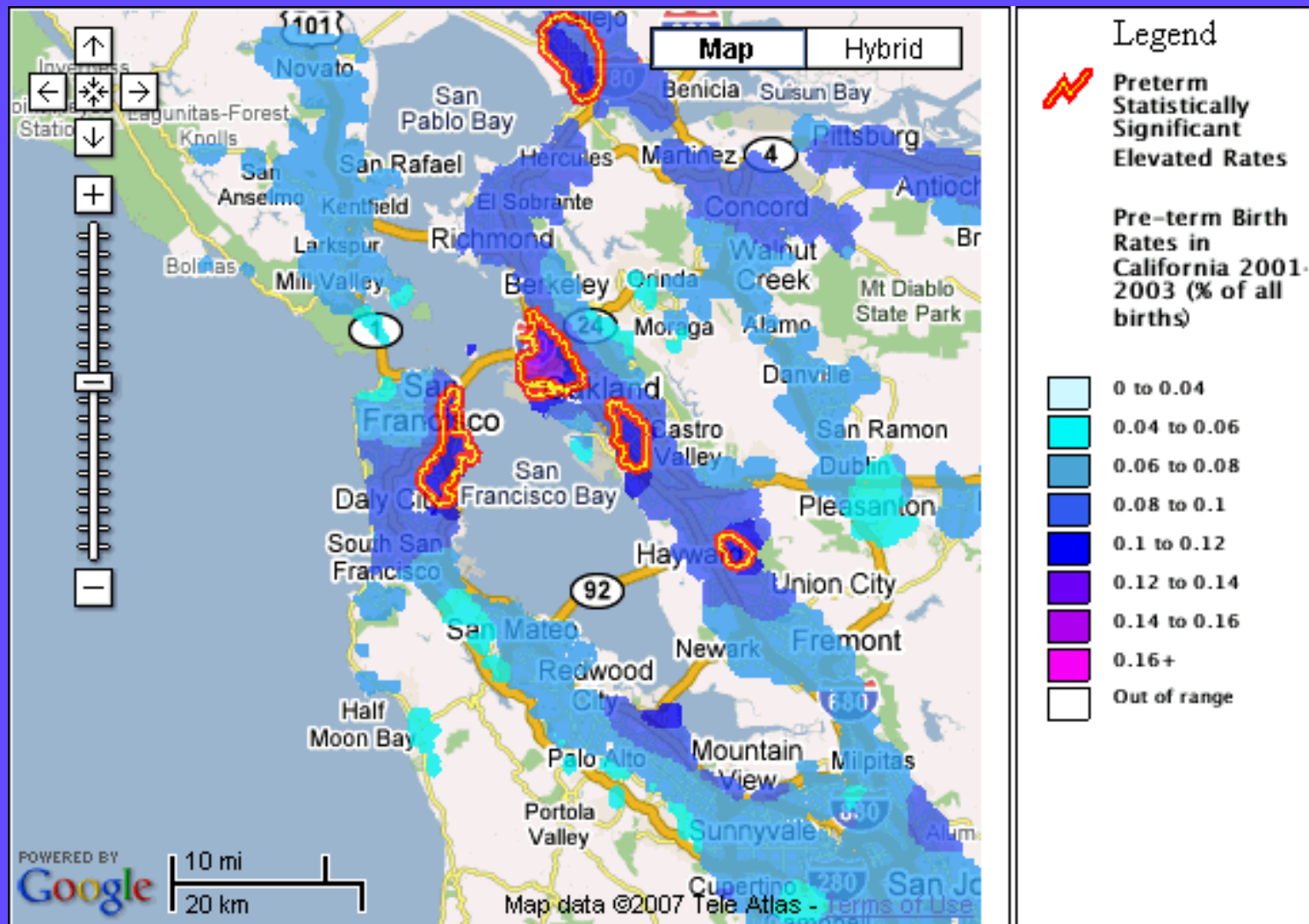
Health Indicators Data

Data	Source	Status
Rates of asthma and asthma hospitalizations	CDPH-EHIB Environmental Health Investigations Branch	Pending – Early 2008
Birth outcome data	Eric Roberts, CDPH	Pending – mid 2008
Rates of respiratory systems disease	DHS-OSHPD	We have 2004 mortality data by zip code from online resources
Life expectancy	Counties or CDHS	Not yet located

Health Indicators Data (cont.)

Data	Source	Status
Rates of asthma emergency department visits	CDPH-EHIB	Pending – early 2008
Rates of chronic obstructive pulmonary disease / hospit.	DHS-OSHPD	We have 2004 mortality data by zip code from online resources
Rates of cancer/ lung cancer	Northern California Cancer Registry	Obtained from NCCR
Rates of cardiovascular disease / hospit.	DHS-OSHPD	We have 2004 mortality data by zip code from online resources
Rates of congestive heart failure / hospit.	DHS-OSHPD	We have 2004 mortality data by zip code from online resources

Pre-term Birth Rates



Prototype from California Department of Public Health
 Environmental Health Investigations Branch
<http://www.ehib.org/preterm.jsp>

Acknowledgments

- Sonoma Technology Inc.
- ENVIRON Corporation
- California Air Resource Board