CalEnviroScreen 2.0 Update

San Joaquin Valley Partnership
June 20, 2014
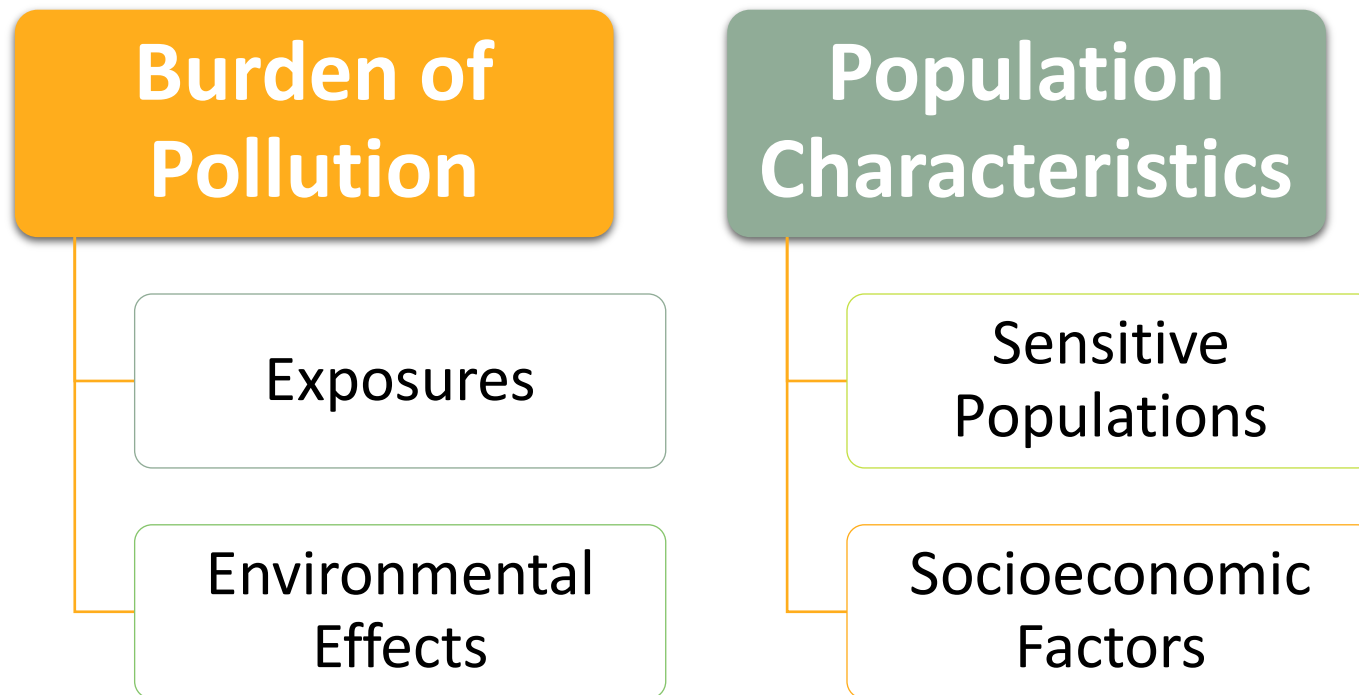
FOCUS OF CALENVIROSCREEN

"...exposures, public health or environmental effects from the combined emissions and discharges in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socioeconomic factors, where applicable and to the extent data are available."

-- Definition of "cumulative impacts" by CalEPA Interagency Working Group on Environmental Justice

CALENVIROSCREEN MODEL

Burden of Pollution

Exposures

Environmental Effects

Population Characteristics

Sensitive Populations

Socioeconomic Factors

CALENVIROSCREEN VERSION 2.0

DRAFT CALIFORNIA COMMUNITIES
ENVIRONMENTAL HEALTH SCREENING
TOOL, VERSION 2.0
(CALENVIROSCREEN 2.0)

GUIDANCE AND SCREENING TOOL

April 2014 Draft

Matthew Rodriquez, Secretary
California Environmental Protection Agency

George V. Alexeeff, Ph.D., Director
Office of Environmental Health Hazard Assessment

- Broad picture of the relative burdens California communities face from environmental pollution

- 19 indicators of environmental, health, and socioeconomic conditions

- Census tract scale

- Guidance on potential uses of tool
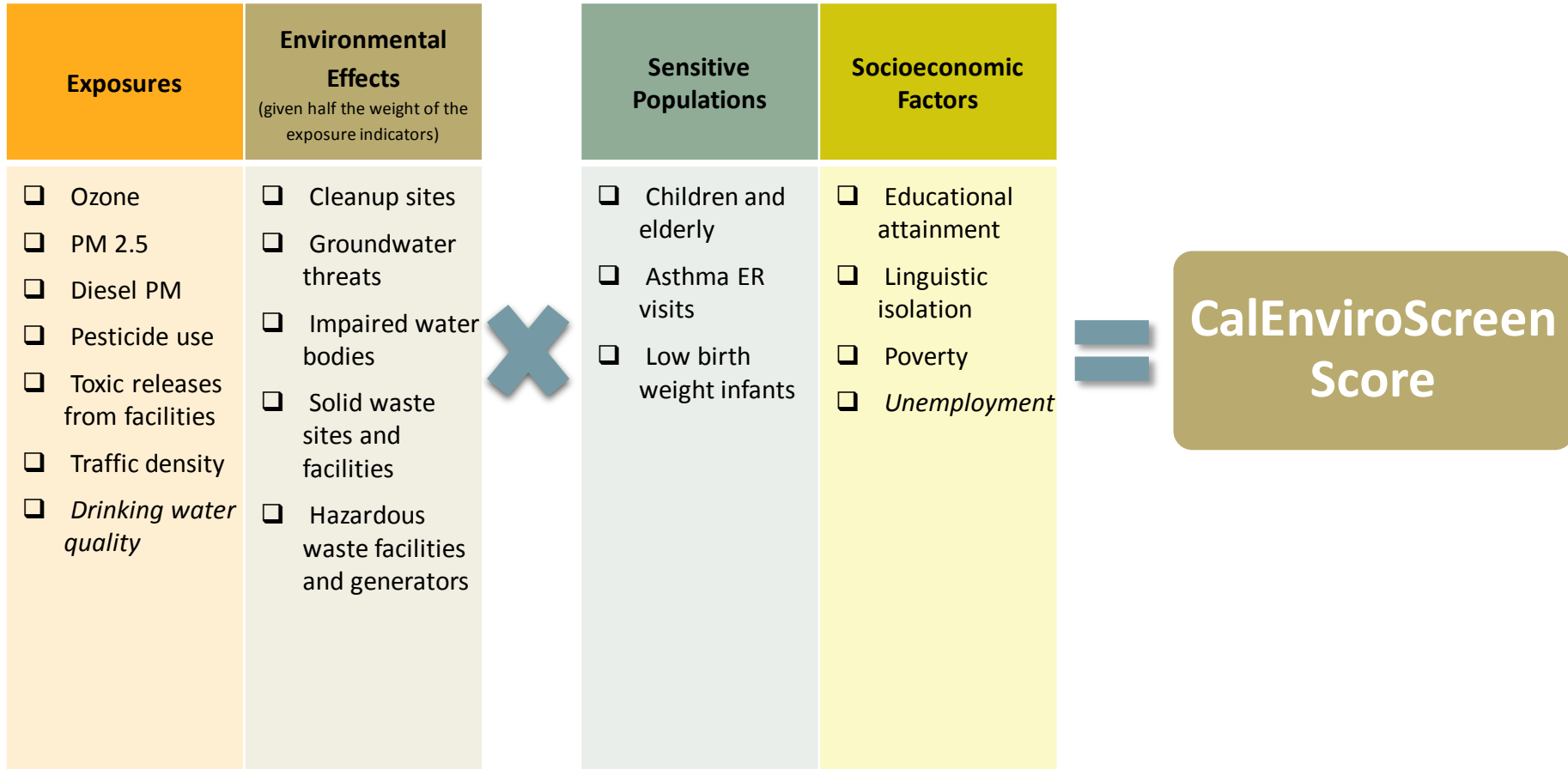
CALENVIROSCREEN 2.0 INDICATORS

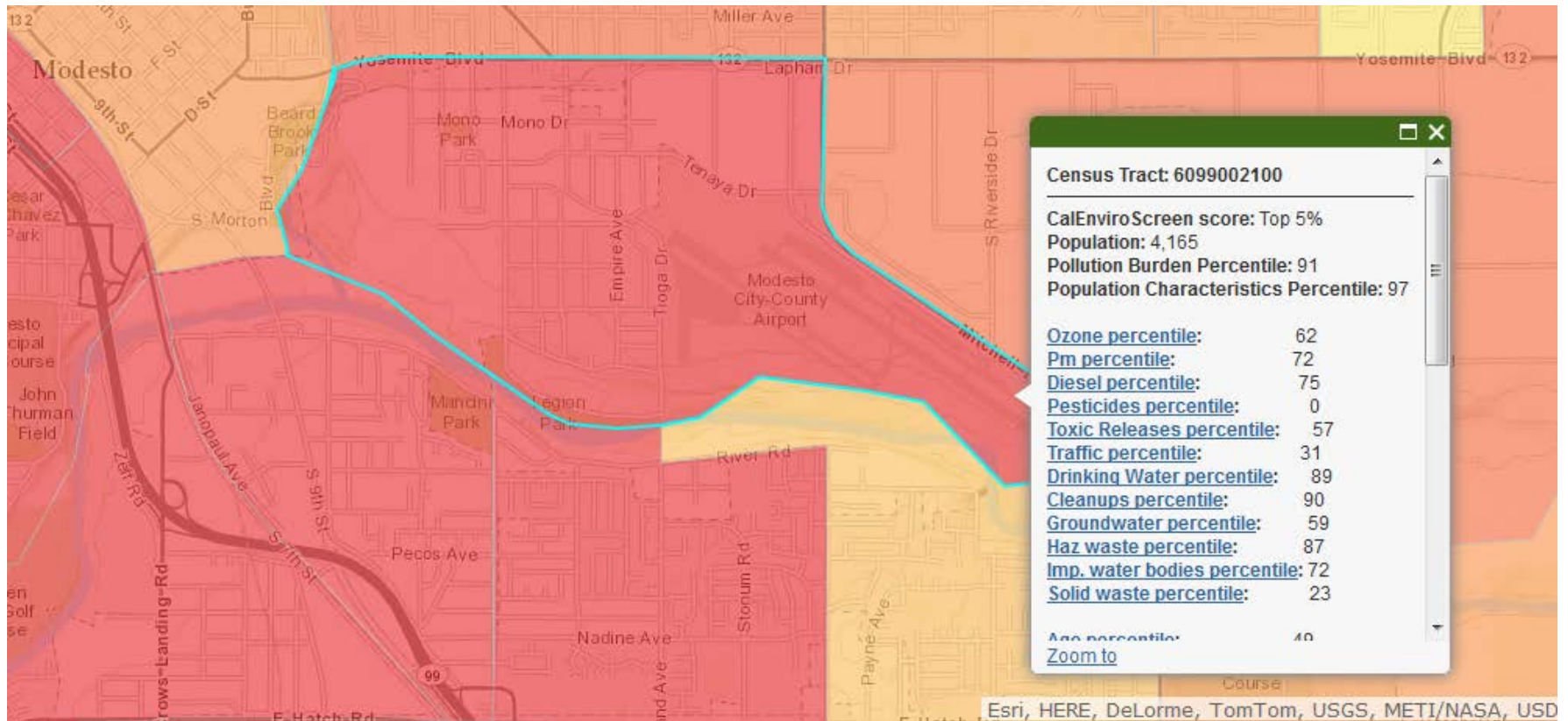| Exposures	Environmental Effects	Sensitive Populations	Socioeconomic Factors
❑ Ozone ❑ PM 2.5 ❑ Diesel PM ❑ Pesticide use ❑ Toxic releases from facilities ❑ Traffic density ❑ *Drinking water quality*	❑ Cleanup sites ❑ Groundwater threats ❑ Impaired water bodies ❑ Solid waste sites and facilities ❑ Hazardous waste facilities and generators	❑ Children and elderly ❑ Asthma ER visits ❑ Low birth weight infants	❑ Educational attainment ❑ Linguistic isolation ❑ Poverty ❑ *Unemployment*

Scoring Method

- Each census tract is scored for each indicator
  - For example, 75% percentile is higher than 75% of other census tracts in California.

- CalEnviroScreen score is calculated by combining all indicator scores

- Scores allow comparison of different areas

Pollution Burden

Exposures	Environmental Effects (given half the weight of the exposure indicators)
☐ Ozone	☐ Cleanup sites
☐ PM 2.5	☐ Groundwater threats
☐ Diesel PM	☐ Impaired water bodies
☐ Pesticide use	☐ Solid waste sites and facilities
☐ Toxic releases from facilities	☐ Hazardous waste facilities and generators
☐ Traffic density	
☐ *Drinking water quality*	

Population Characteristics

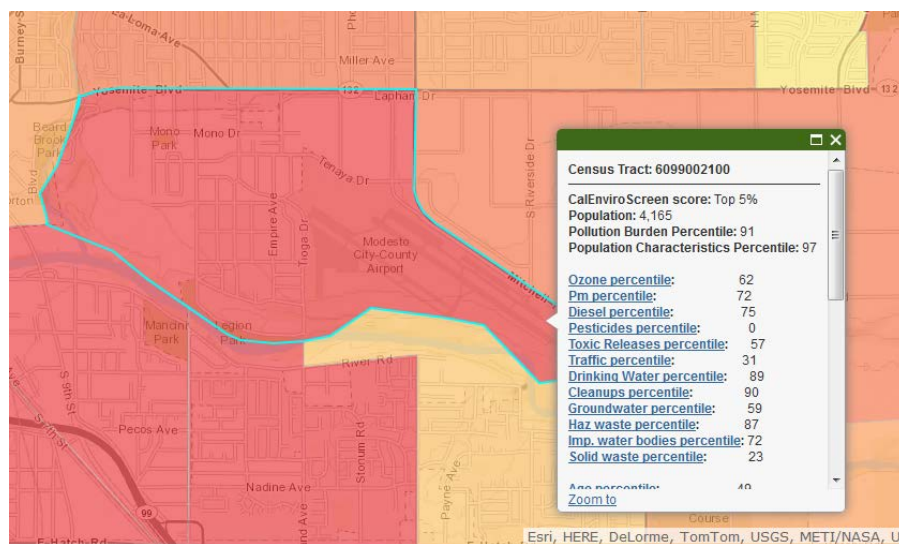| Sensitive Populations	Socioeconomic Factors
☐ Children and elderly	☐ Educational attainment
☐ Asthma ER visits	☐ Linguistic isolation
☐ Low birth weight infants	☐ Poverty
	☐ *Unemployment*

✕

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CalEnviroScreen Score
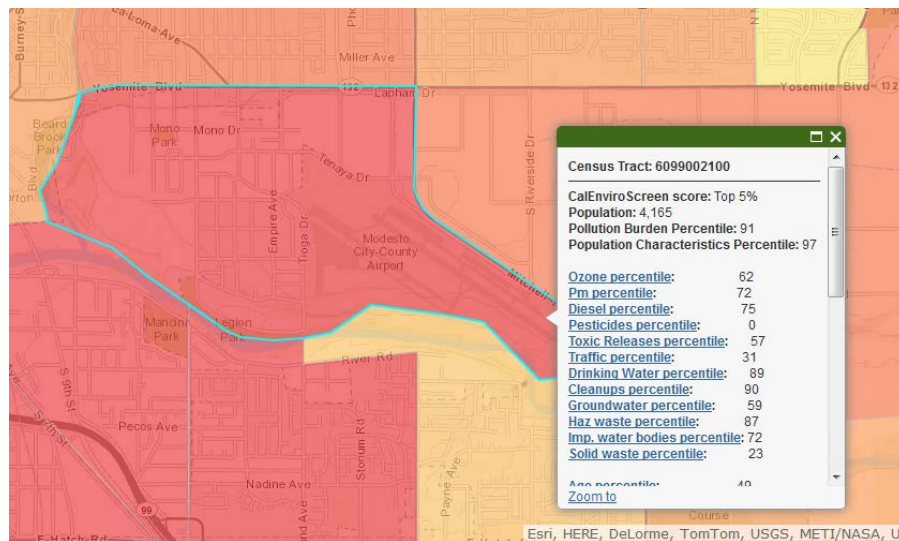
EXAMPLE CENSUS TRACT

Exposure Indicators

| Indicator	Ozone (concentrations)	PM 2.5 (concentrations)	Diesel PM (emissions)	Pesticide Use (lbs./sq. mi.)	Toxic Releases (RSEI toxicity-weighed releases)	Traffic (density)	Drinking Water (index)
Raw Value	0.08533	13.97318	25.83	0	516.1300	611.3606	80.10663
Percentile	62	72	75	0	57	31	89

Environmental Effects Indicators

Indicator	Cleanup Sites (weighted sites)	Groundwater Threats (weighted sites)	Hazardous Waste Facilities/Generators (weighted sites)	Impaired Water Bodies (number of pollutants)	Solid Waste Sites/Facilities (weighted sites)
Raw Value	30	20.25	1.11	7	0.5
Percentile	90	59	87	72	23

Sensitive Populations

Indicator	Children (<10) and Elderly (>65) (percent)	Asthma (rate per 10,000)	Low Birth Weight (percent)
Raw Value	24.7	63.02	0.05176
Percentile	49	83	62
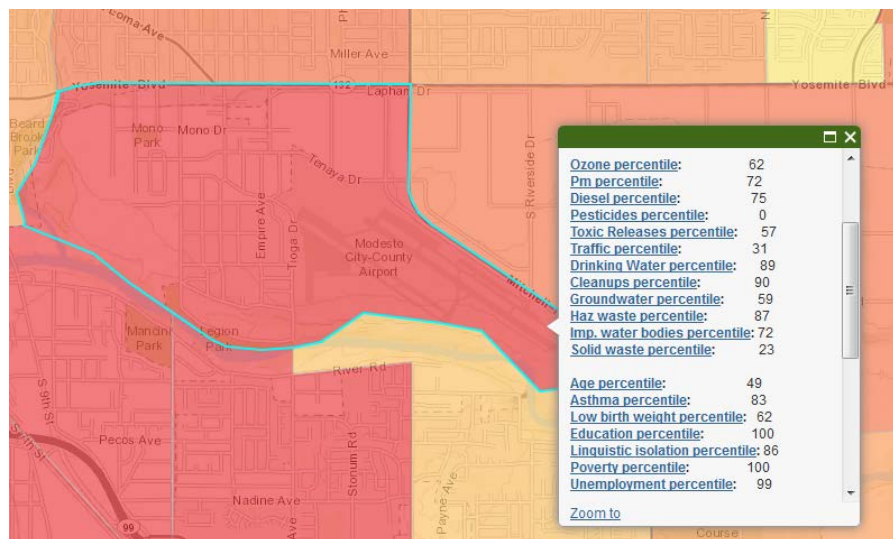
Socioeconomic Indicators

Indicator	Educational Attainment (percent)	Linguistic Isolation (percent)	Poverty (percent)	Unemployment (percent)
Raw Value	70.5	23	87.48896	29.65
Percentile	100	86	100	99
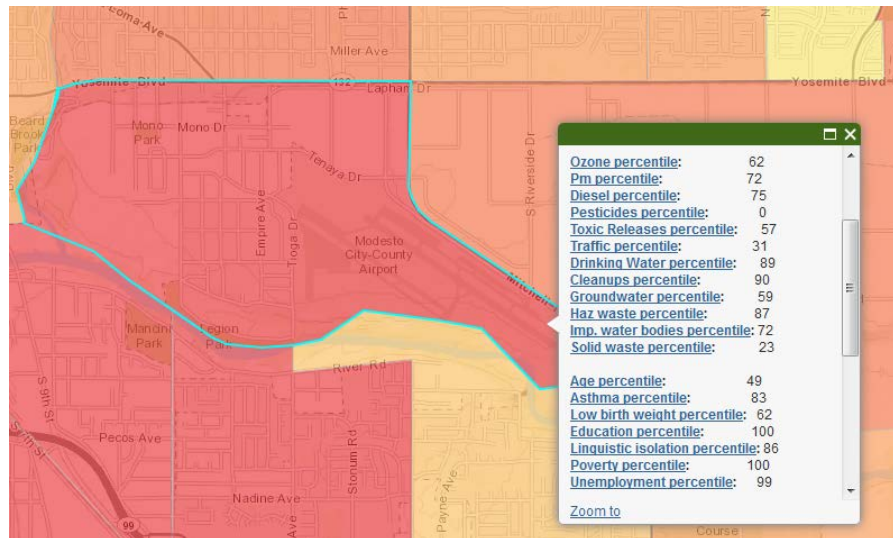
DRAFT CALENVIROSCREEN 2.0 PROPOSED CHANGES
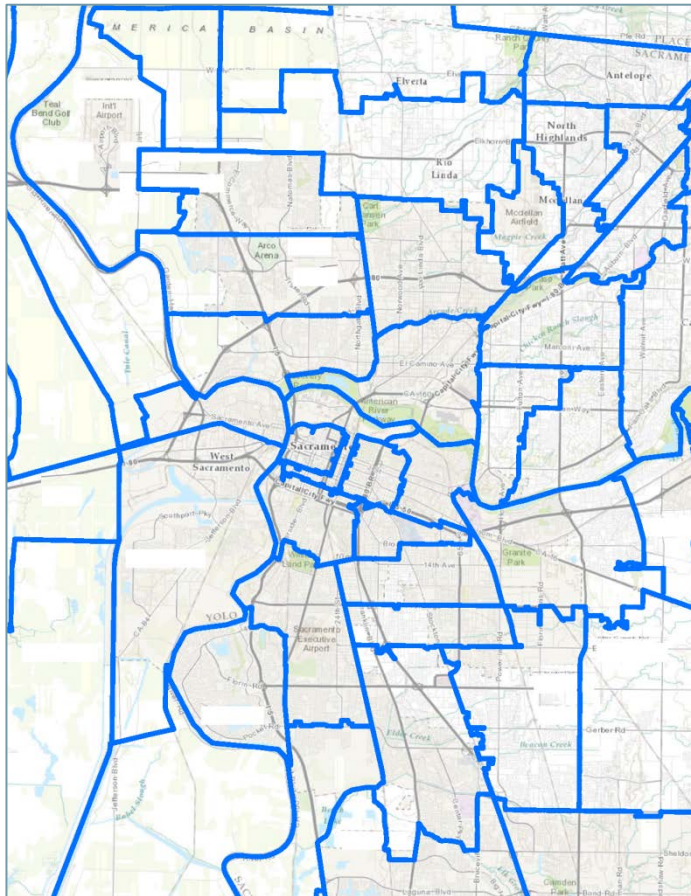
- ZIP code ⇨ census tracts
- Use newer data when available
- Improve toxic release data used
- Incorporate proximity to people for environmental hazards

- New socioeconomic indicator: *unemployment rate*
- New exposure indicator: *drinking water quality*
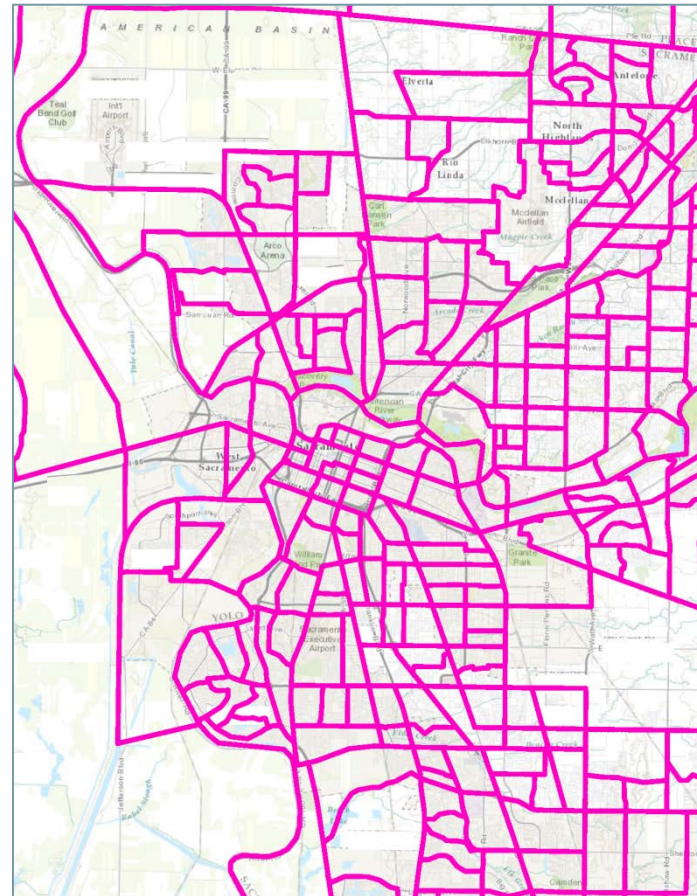- Incorporation of additional data on tribal lands

ZIP CODES ➡ CENSUS TRACTS

ZIP CODE SCALE

CENSUS TRACT SCALE

EXPOSURE INDICATORS

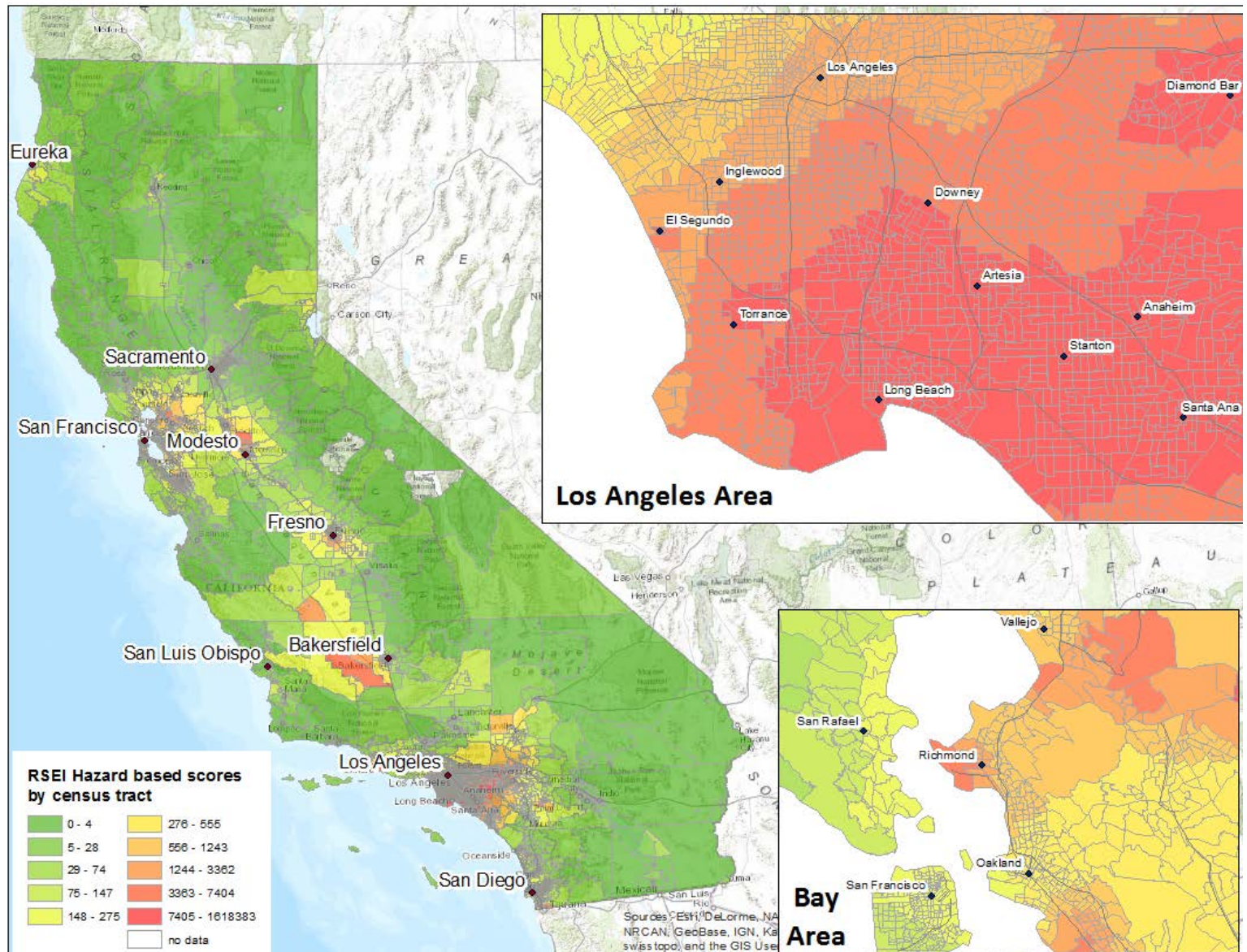| Indicator	Proposed Changes
Air Quality: Ozone	Model to census tract; new year of data
Air Quality: PM2.5	Model to census tract; new year of data
Diesel Particulate Matter	Allocate to census tract
Pesticide Use	Allocate to census tract; added 3 pesticides, new year of data
Traffic Density	Allocate to census tract
Toxic Releases from Facilities	Use modeled risk screening environmental indicators from U.S. EPA
Drinking Water Quality	New indicator: Toxicity-weighted water quality

TOXIC RELEASES INDICATOR: RSEI

- Transition to U.S. EPA's Risk Screening Environmental Indicators (RSEI)

  - Computer-based screening tool

  - Uses Toxic Release Inventory (TRI) release data

  - Uses emission locations and weather to model how chemicals spread in air (in 810m-square grid units)

  - Combines air concentrations with toxicity factors

- Improvements offered by using RSEI data

  - Comprehensive modeling of chemical dispersion

  - Improvements in accuracy of facility locations and stack heights

TOXIC RELEASE DISTRIBUTION (RSEI BY CENSUS TRACT)

Los Angeles Area

Bay Area

RSEI Hazard based scores by census tract

0 - 4	276 - 555
5 - 28	556 - 1243
29 - 74	1244 - 3362
75 - 147	3363 - 7404
148 - 275	7405 - 1618383
no data	

DRINKING WATER QUALITY INDICATOR

Tiers of Geographic Boundaries

More Information Available

Public Water Systems:
A) Known service boundaries
B) Approximated service boundaries

"Delivered" Community Water Systems Sources
- Treated
- If treated not available:
  - Combined wells
  - Untreated wells
  - Raw wells, if others not available

Groundwater Basins:
C) Approximated systems groundwater quality

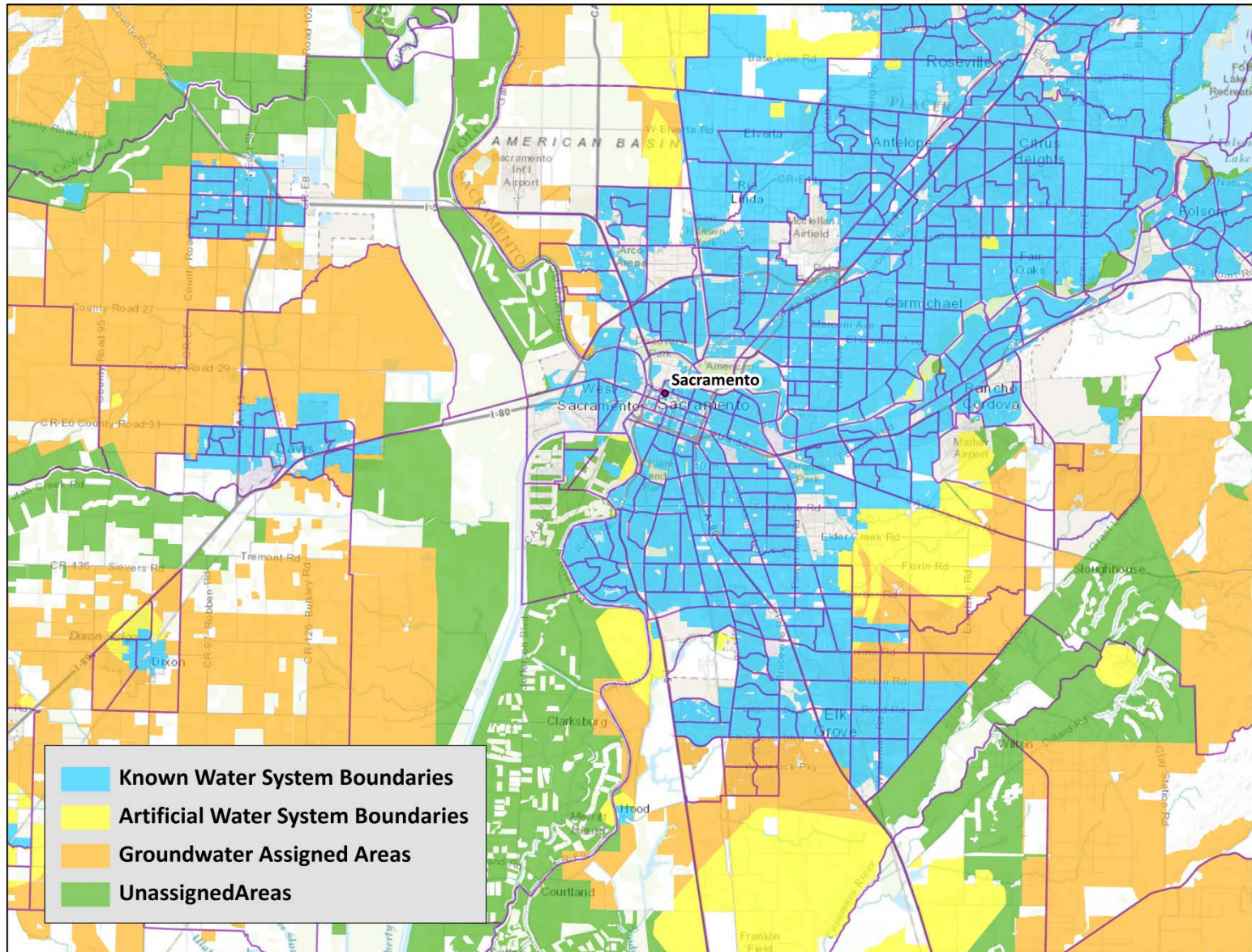**All Public Water System Sources**
- Any available ambient groundwater data

Data from other groundwater quality projects:
- USGS Priority Basins
- GAMA Domestic Well Project

Less Information Available

DRINKING WATER SYSTEM BOUNDARIES

Legend:
- Known Water System Boundaries
- Artificial Water System Boundaries
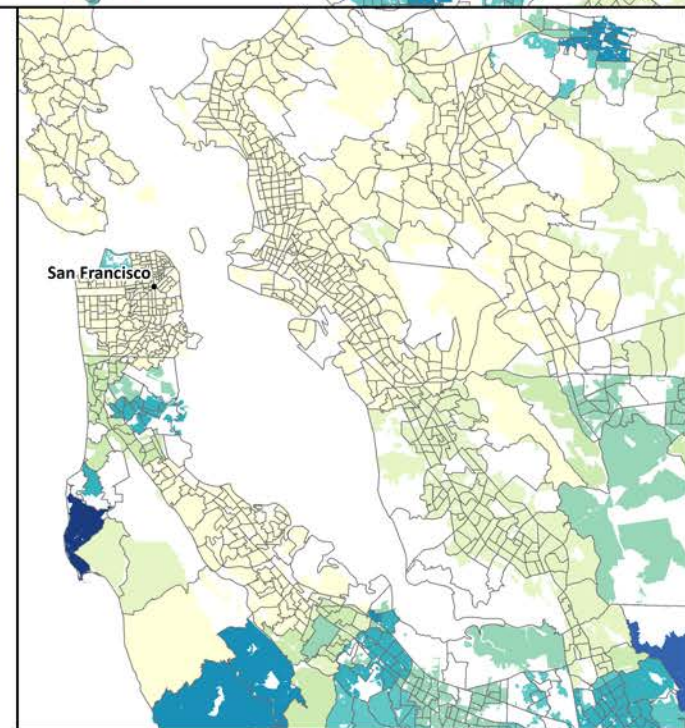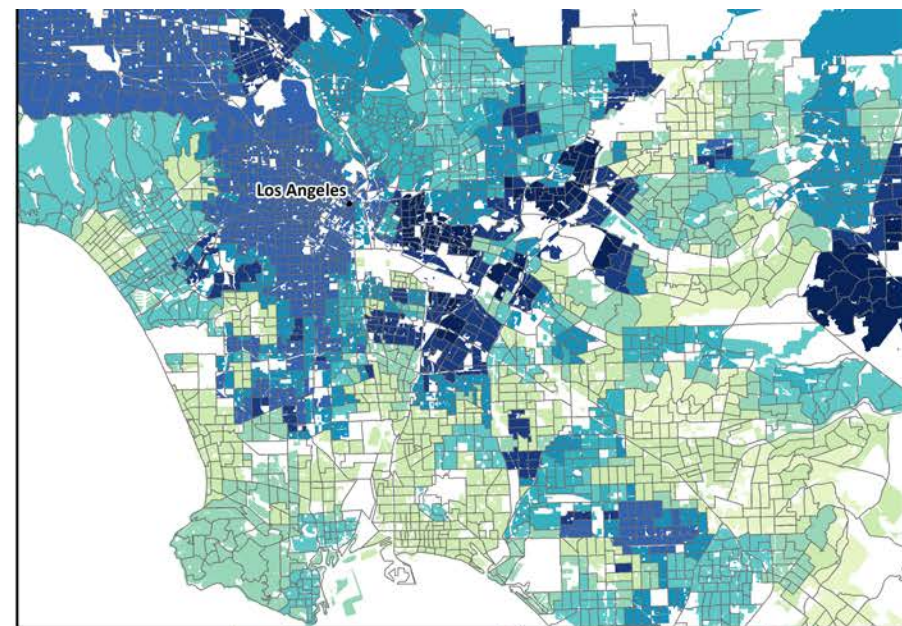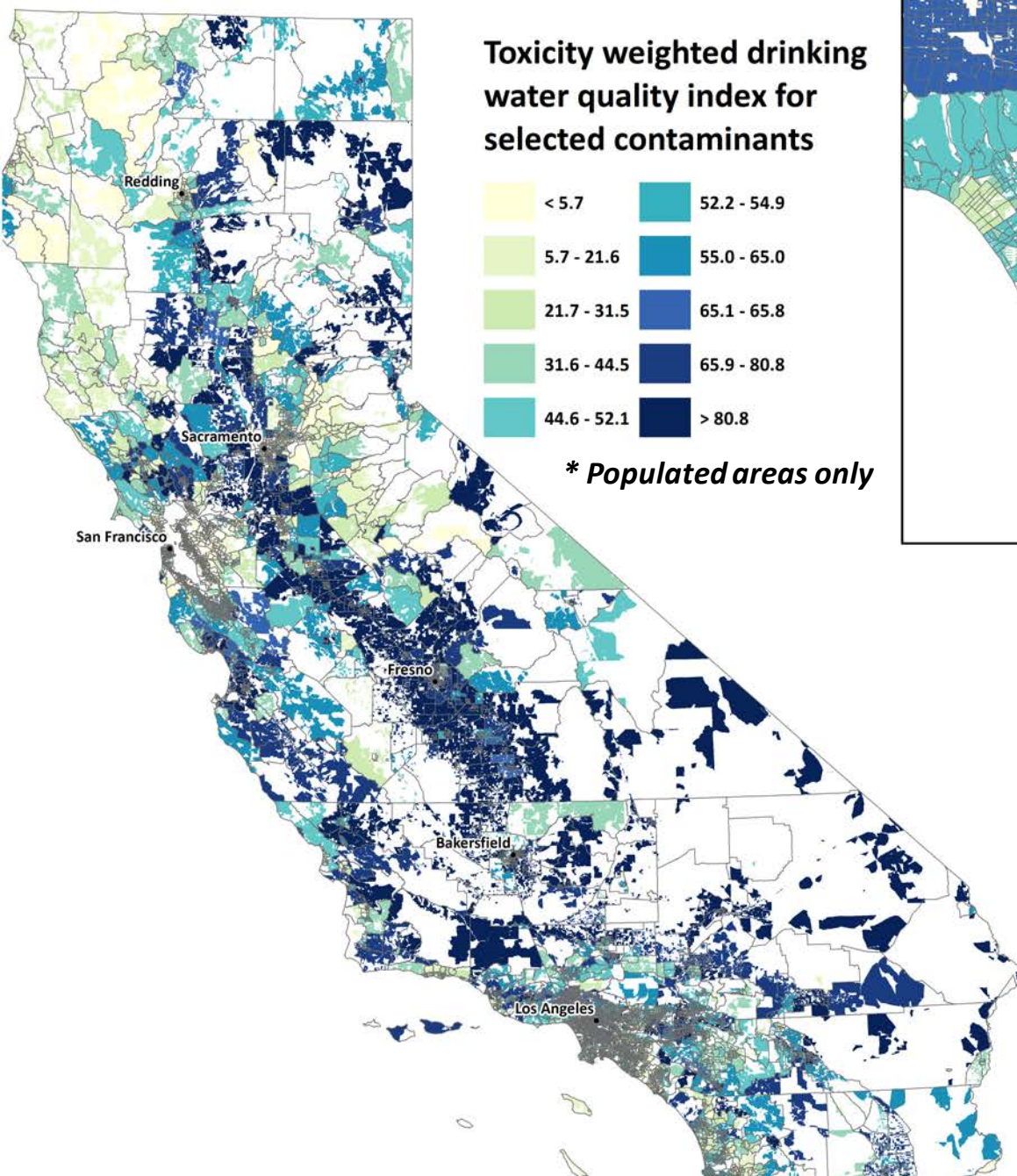- Groundwater Assigned Areas
- UnassignedAreas

DRINKING WATER QUALITY

- Join systems with delivered water quality data (2008-2013)

- Score delivered water with a toxicity-weighted water quality index

  - Public Health Goals (PHGs) used for relative toxicity

  - Carcinogens and non-carcinogens evaluated separately

Carcinogenic Contaminants	PHG
Arsenic	0.004 µg/l
Benzene	0.15 µg/l
Cadmium	0.04 µg/l
Carbon Tetrachloride	0.1 µg/l
Dibromochloropropane (DBCP)	0.0017 µg/l
Hexavalent Chromium	0.02 µg/l
Methyl-tert-Butyl-Ether (MTBE)	13 µg/l
Radium-226	0.05 pCi/l
Tetrachloroethylene (PCE)	0.06 µg/l
Total Trihalomethanes (THM)	0.8 µg/l*
Trichloroethylene (TCE)	1.7 µg/l
Uranium	0.43 pCi/l

Non-Carcinogenic Contaminants	PHG
Barium	2 mg/l
Lead	0.2 µg/l
Mercury	1.2 µg/l
Nitrate (NO_3)	45 mg/l
Perchlorate	6 µg/l
Toluene	150 µg/l
Total Coliform Rule Violation	--
Xylene	1800 µg/l

Toxicity weighted drinking water quality index for selected contaminants

< 5.7	52.2 - 54.9
5.7 - 21.6	55.0 - 65.0
21.7 - 31.5	65.1 - 65.8
31.6 - 44.5	65.9 - 80.8
44.6 - 52.1	> 80.8

Populated areas only

ENVIRONMENTAL EFFECTS INDICATORS

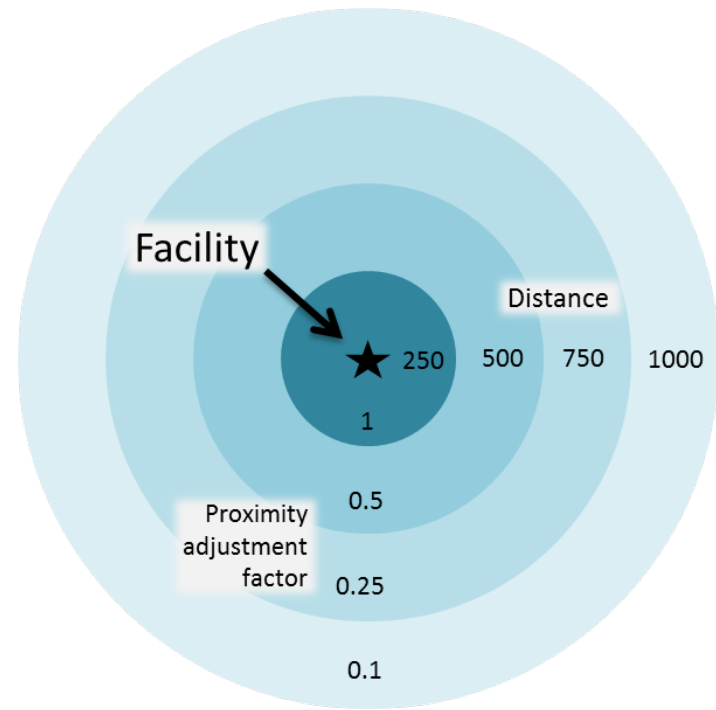| Indicator	Proposed Changes
Cleanup Sites	Apply adjustment to sites based on distance from people; allocate to census tracts; update data
Hazardous Waste Facilities and Generators	Hazardous waste generators: Allocate to census tracts; remove small quantity generators; new year data
	Permitted hazardous waste handling facilities: Apply adjustment to facilities based on distance from people; allocate to census tract
Solid Waste Sites and Facilities	Apply adjustment to facilities based on distance from people; allocate to census tracts; update data
Impaired Water Bodies	Apply adjustment to water bodies based on distance from people; allocate to census tracts,
Groundwater Threats	Apply adjustment to sites based on distance from people; allocate to census tracts; update data

ADJUSTMENT FOR PROXIMITY TO PEOPLE

PROXIMITY ADJUSTMENT

Greater scores for hazardous sites and facilities that are closer to where people live.

Applies to *Cleanups, Groundwater Threats, Solid Waste, Hazardous Waste* indicators

MULTI-RING BUFFER

SENSITIVE POPULATIONS INDICATORS

Indicator	Proposed Changes
Age: Children and Elderly	Census tract values
Asthma Emergency Department Visits	Allocate ZIP code data to census tracts
Low Birth Weight Infants	Spatially modeled to census tract calculate more reliable estimates, especially for tracts with few births

Socioeconomic Factor Indicators

Indicator	Proposed Changes
Educational Attainment	Census tract estimates; update to (2008-2012)
Linguistic Isolation	Census tract estimates; update to (2008-2012)
Poverty	Census tract estimates; update to (2008-2012)
Unemployment	New indicator: Unemployment rate census tract estimates (2008-2012)

UNEMPLOYMENT

- Evidence showing increased likelihood of underlying physical and mental health problems among unemployed

  - Greater susceptibility to exposures of environmental pollution

- Some degree of correlation with poverty and education attainment, indicating a unique contribution

- Unemployment data from U.S. Census Bureau's American Community Survey

  - 5-Year estimates at the census tract level (2008-2012)

  - Population over 16 in the civilian labor force. Labor force excludes students, homemakers, volunteer workers, institutionalized, military on active duty, retired, and people not looking for work.

UNEMPLOYMENT RATE RESULTS

Unemployment rates by census tract

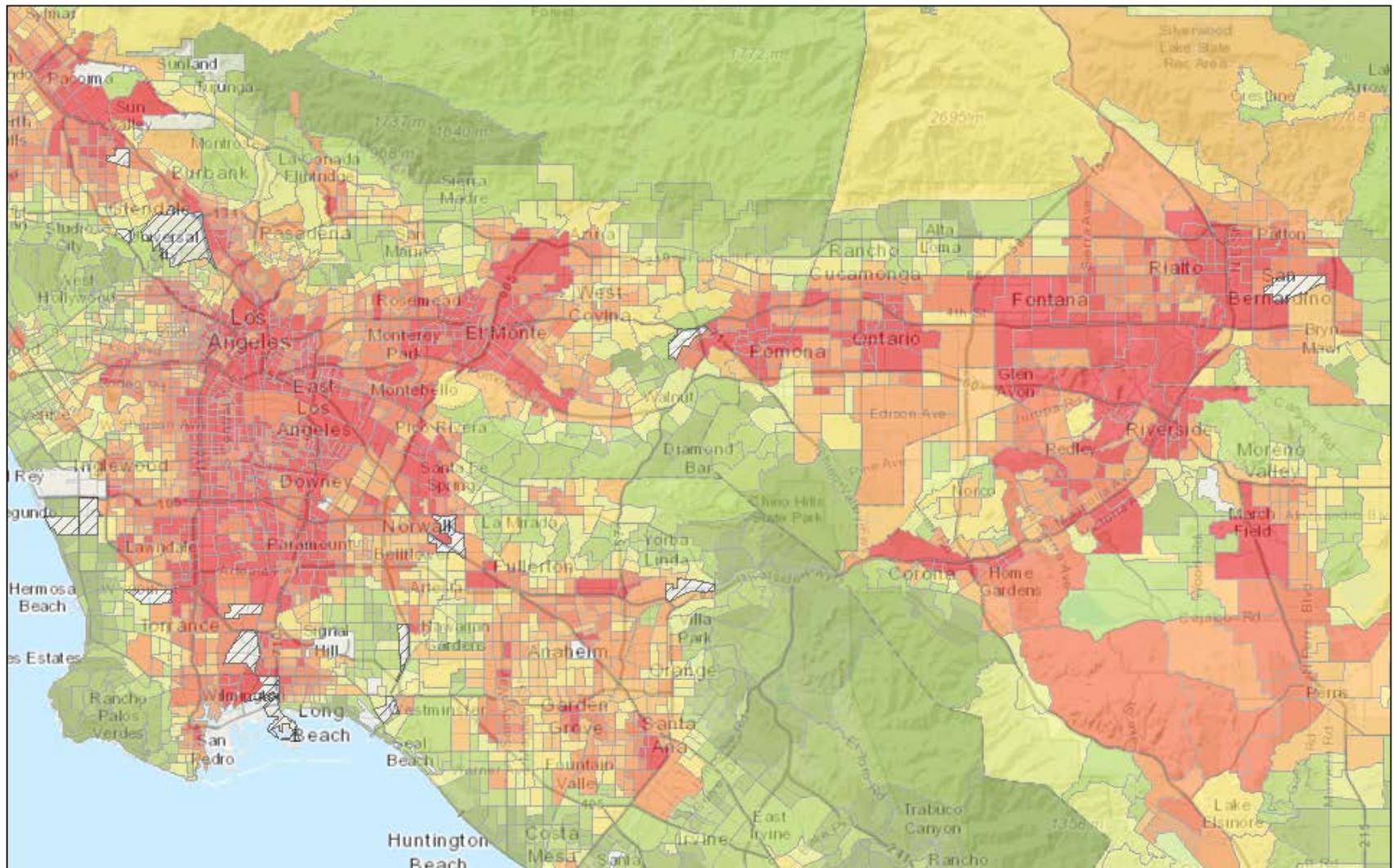|	
0.0 - 5.4	10.6 - 11.8
5.5 - 6.8	11.9 - 13.3
6.9 - 8.1	13.4 - 15.4
8.2 - 9.3	15.4 - 18.4
9.4 - 10.5	18.5 - 72.3
unreliable estimates	

Los Angeles Area

Bay Area
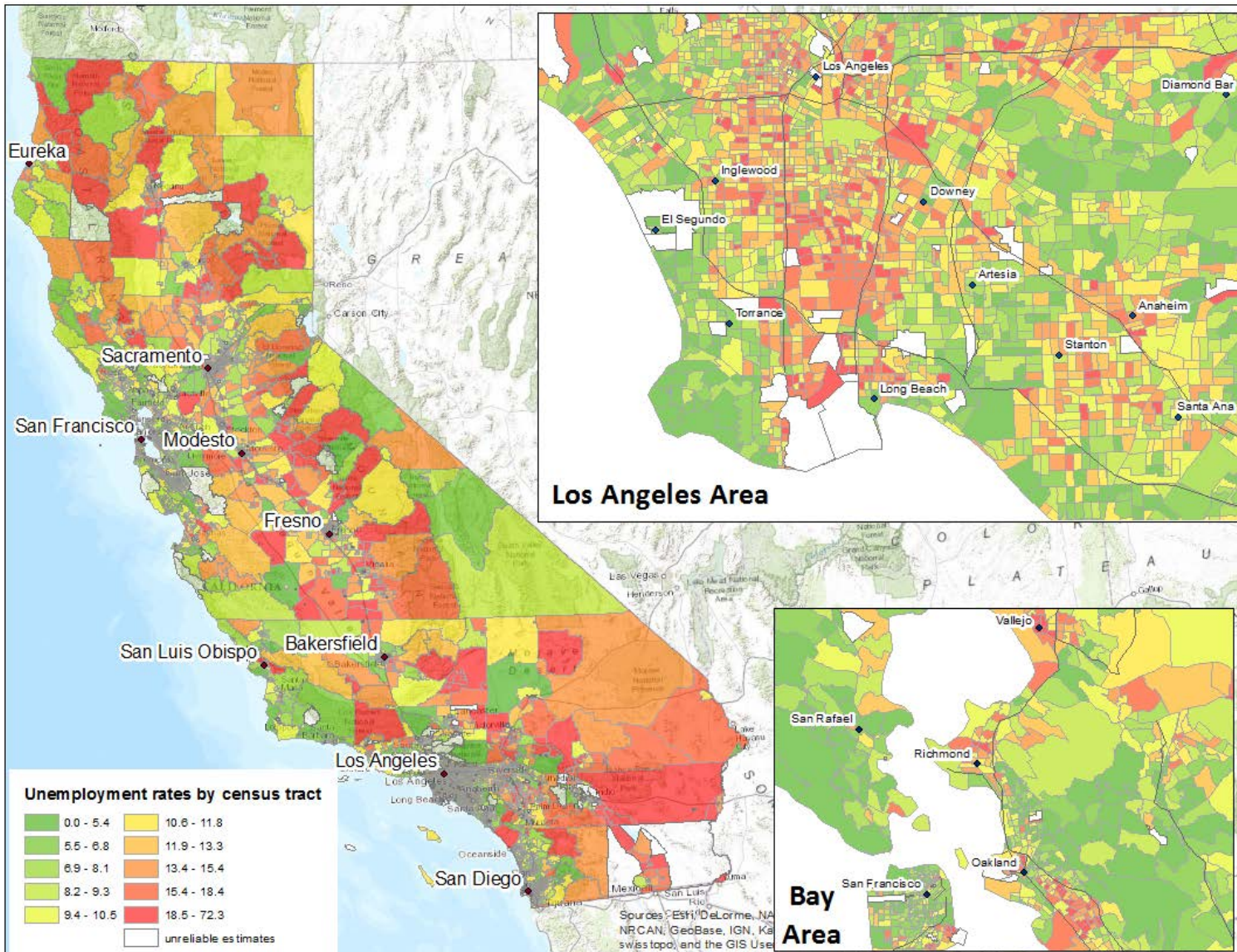
CALENVIROSCREEN 2.0 RESULTS
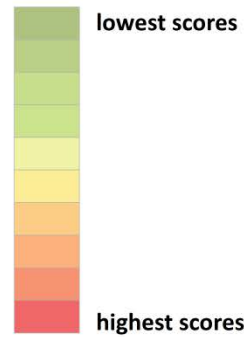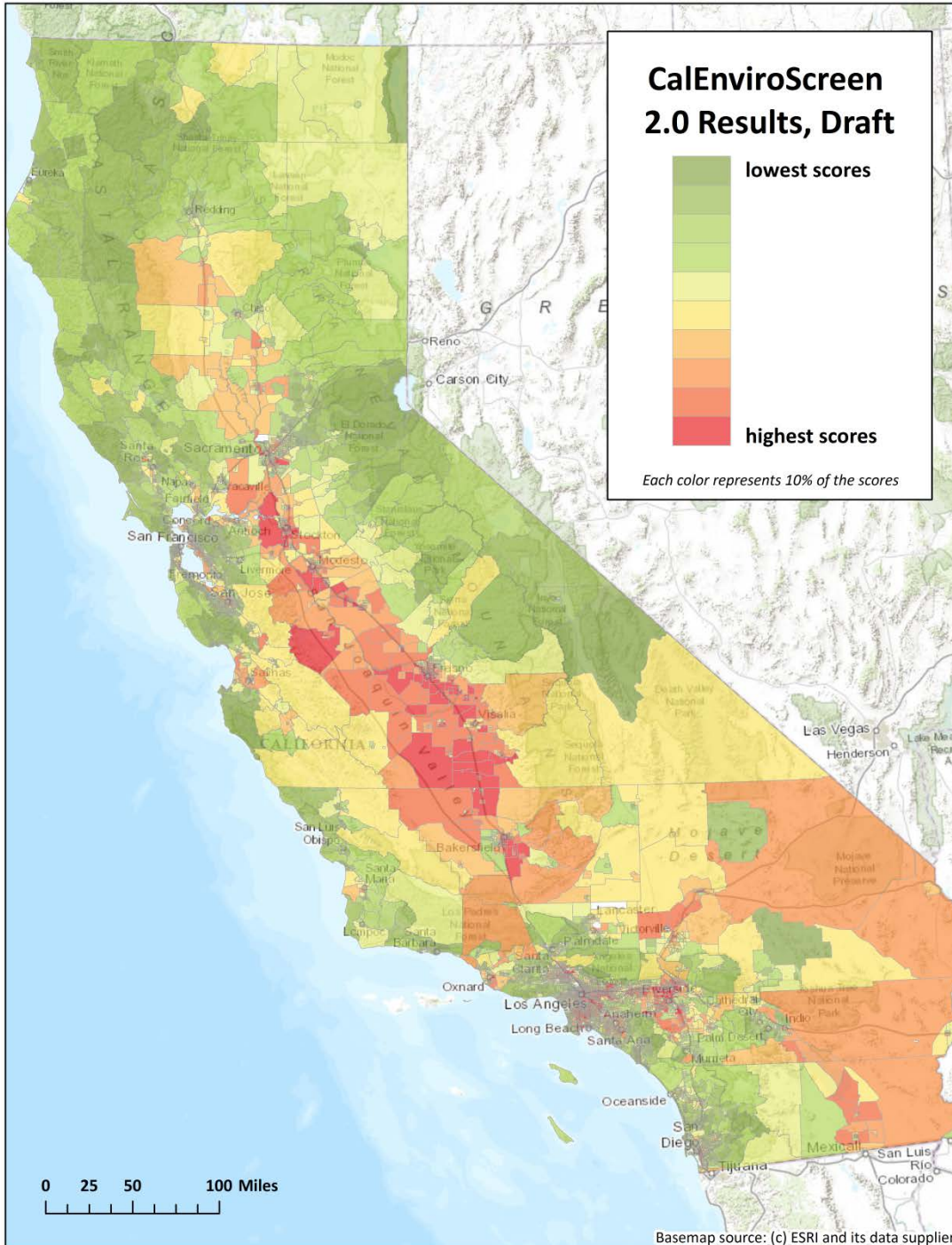
CALENVIROSCREEN
VERSION 2.0,
DRAFT RESULTS

CalEnviroScreen 2.0 (draft) All Results Map

May 13, 2014

CES2.0 draft results

CI10grps

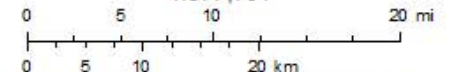|		
Lowest Scores (Bottom 10%)	-	Highest Scores (11 - 20%)
-	-	Highest Scores (Top 10%)
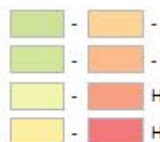
CES2_0results_highpollution

1:577,791

0   5   10   20 mi

0   5   10   20 km

oehha_arcgis

OVERLAP OF CES 1.1 WITH CES 2.0
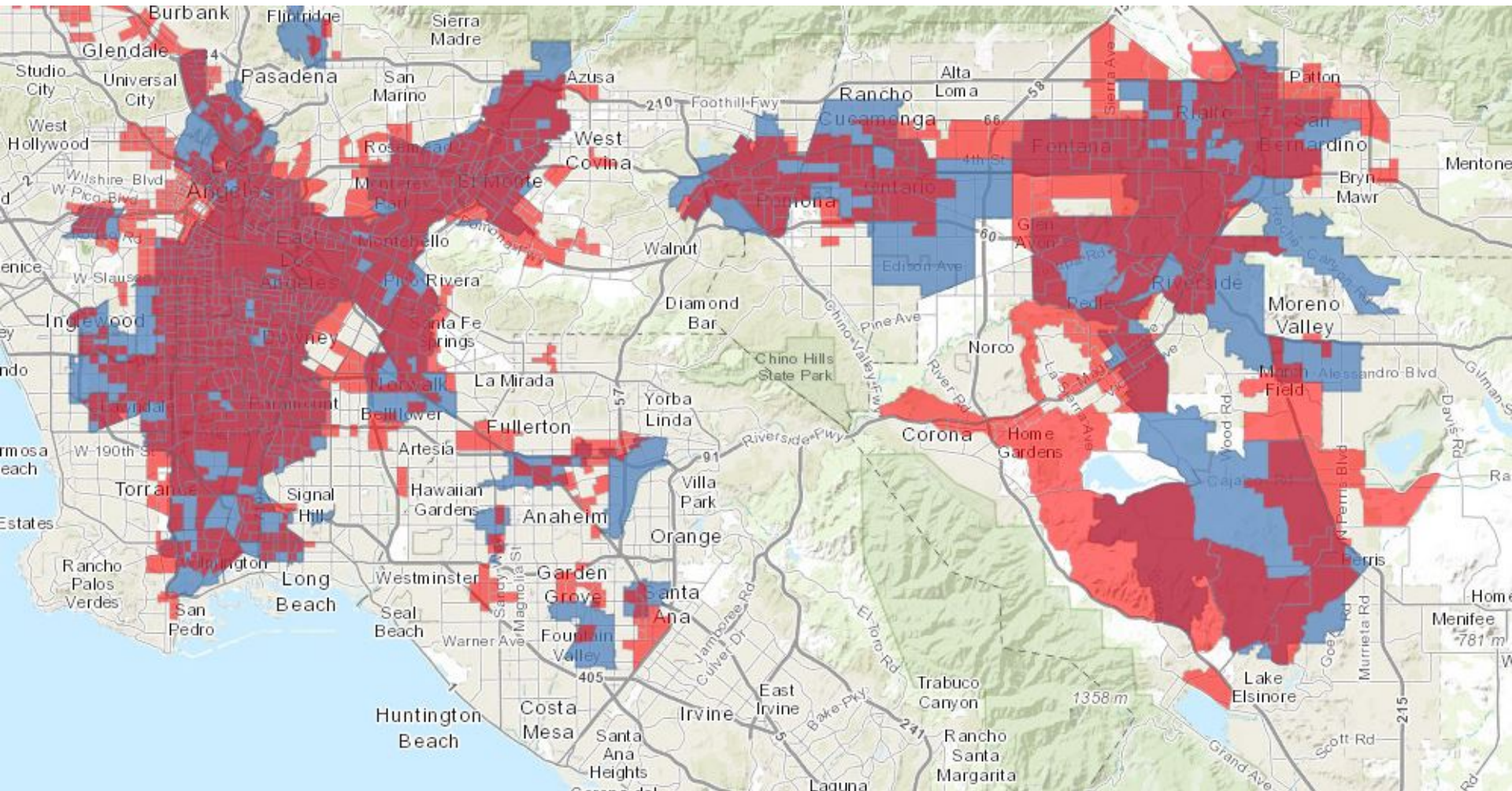
DRAFT CALENVIROSCREEN 2.0 RESULTS
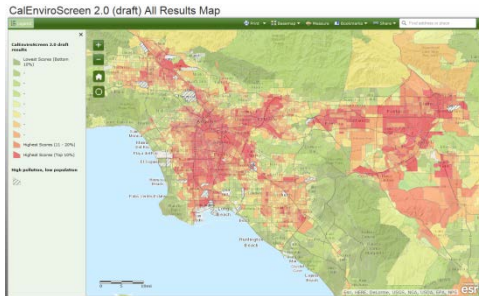
All CalEnviroScreen 2.0 Scores by Census Tract

Highest Scoring 10% and 20% CalEnviroScreen 2.0 Census Tracts
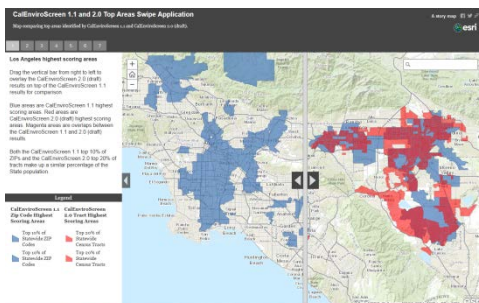
Overlay of CalEnviroScreen 2.0 (Top 20%) with CalEnviroScreen 1.1 (Top 10%)
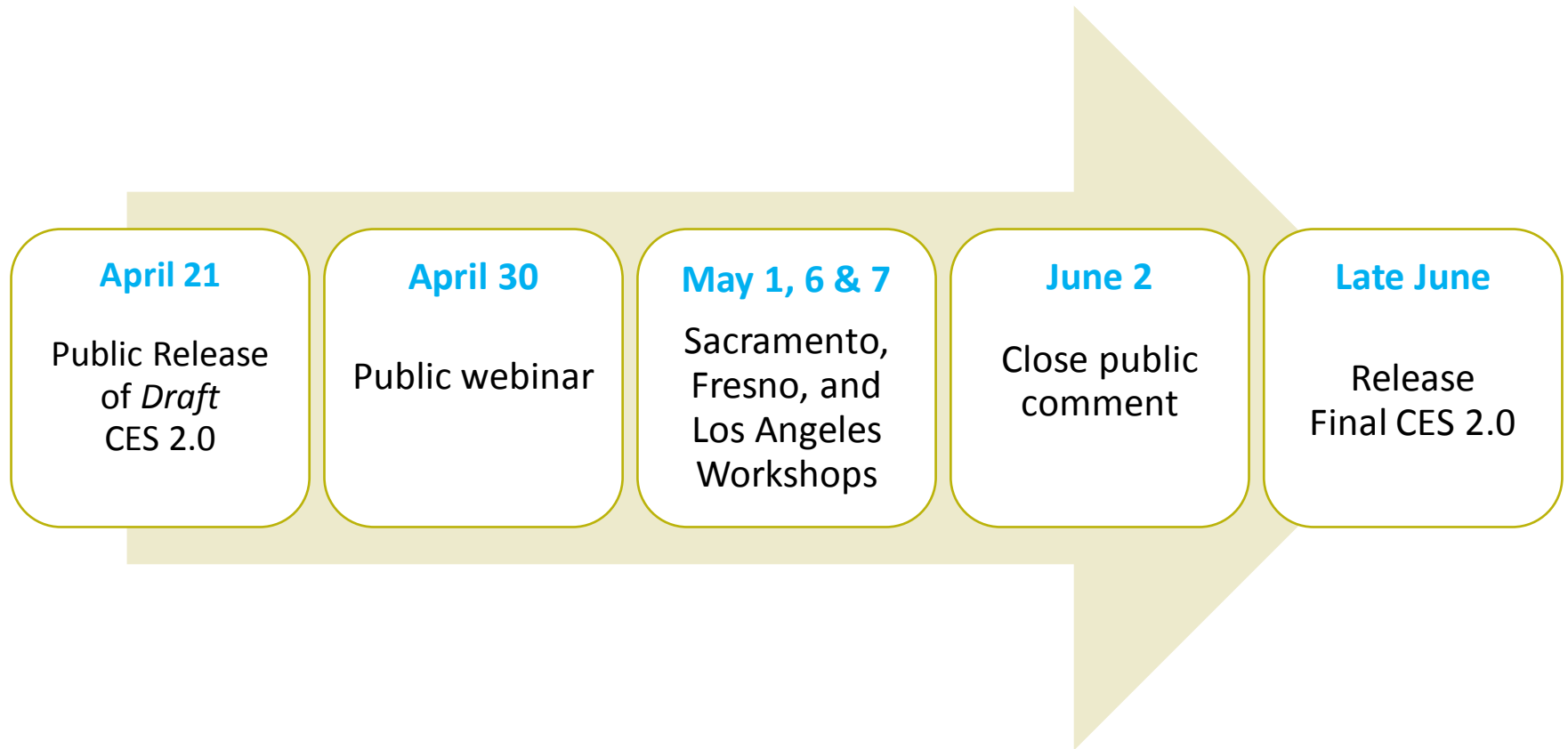
USES OF CALENVIROSCREEN

- To aid ongoing planning and decision-making within CalEPA

  - Environmental Justice Small Grant program
  - Promote greater compliance with environmental laws
  - Prioritize site-cleanup activities

- Strategic Growth Council
  - First use of CalEnviroScreen outside of CalEPA

- SB 535 (De Leon, 2012)
  - CalEPA shall identify "disadvantaged communities" for investment opportunities based on geographic, socioeconomic, public health and environmental hazard criteria.

TIMELINE

April 21

Public Release of *Draft* CES 2.0

April 30

Public webinar

May 1, 6 & 7

Sacramento, Fresno, and Los Angeles Workshops

June 2

Close public comment

Late June

Release Final CES 2.0

QUESTIONS & DISCUSSION