CalEnviroScreen: A Tool for Evaluating California Communities

October 13, 2014

Walker Wieland, Office of Environmental Health Hazard Assessment

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."

-- Working definition of "cumulative impacts" by Cal/EPA Interagency Working Group on Environmental Justice

Basis of Concern for Cumulative Impacts

- Numerous studies have shown that multiple pollution sources are disproportionately concentrated in low-income communities with high-minority populations.
- Studies have reported communities with certain socioeconomic factors (i.e. low-income, low-education) have increased sensitivity to pollution.
- Combination of multiple pollutants and increased sensitivity in these communities can result in higher cumulative pollution impacts.
- Issues reviewed in:
  - California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. "Cumulative Impacts: Building a Scientific Foundation", (2010) Sacramento, CA http://oehha.ca.gov/ej/pdf/CIReport123110.pdf

Development of CalEnviroScreen

2008+

Nine public meetings of the Cumulative Impacts and Precautionary Approaches Work Group.

December 2010

Framework report released *Cumulative Impacts: Building a Scientific Foundation*

July 2012

First CalEnviroScreen draft report released for public comment.

Summer-Fall 2012

12 public workshops, academic workshop, 1,000 oral and written comments. Revised draft released

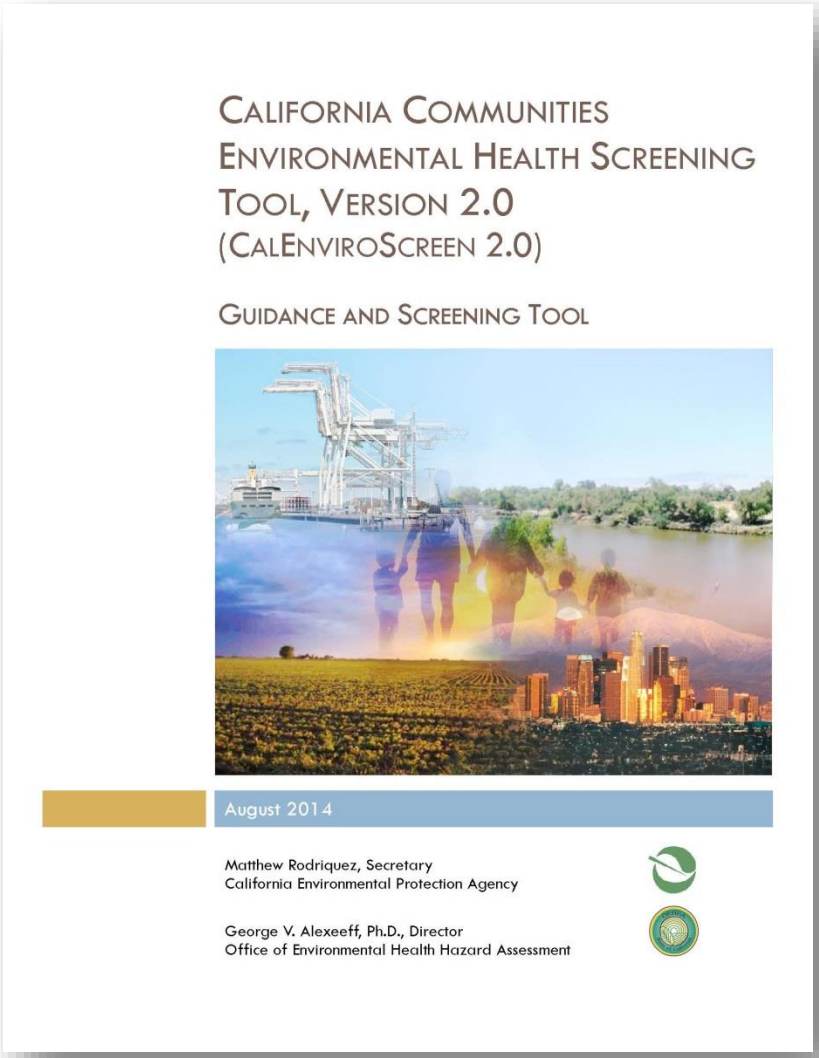
April and September 2013

CalEnviroScreen 1.0 and 1.1 finalized.

April and August 2014

CalEnviroScreen 2.0 released for public comment and finalized

CalEnviroScreen 2.0



- Screening tool that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution and vulnerability
- Identifies 19 indicators of environmental and socioeconomic conditions
- Latest version August 2014

Features of Screening Tool

- Relatively simple
- Combines information from multiple media
  - Air, water, soil
- Data represent multiple factors
  - Exposures, environmental conditions, population sensitivity, health conditions, and socioeconomic factors
- Provides information at roughly community scale
  - Geography based
- Allows for comparison between geography

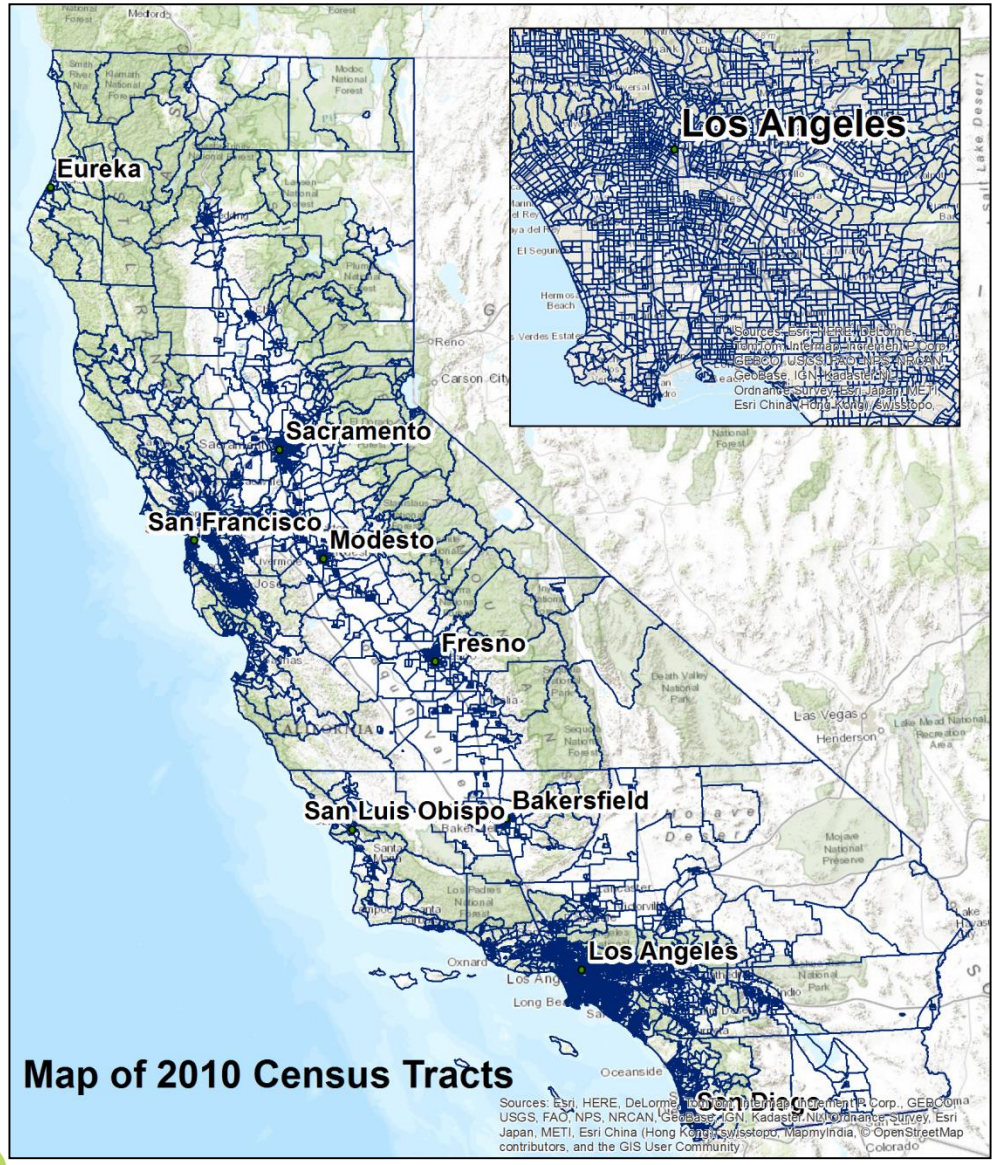
Criteria for indicator selection

- Provide a good measure of environmental or socioeconomic conditions
  - Pollution indicators should relate to issues that may be actionable by CalEPA
- Publicly available
- Statewide
- Location-based information (e.g., address, latitude/longitude)
- Good quality data (e.g., covers the state, accurate, current)

Indicators Used

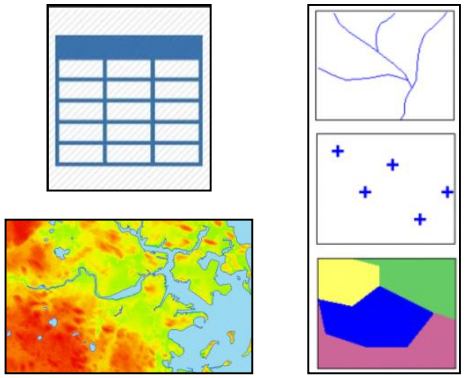
Pollution Burden		*Population Characteristics*	
Exposures	**Environmental Effects**	**Sensitive Populations**	**Socioeconomic Factors**
❑ PM 2.5 concentrations	❑ Cleanup sites	❑ Prevalence of children and elderly	❑ Educational attainment
❑ Ozone concentrations	❑ Groundwater threats (Leaking underground tanks and cleanups)	❑ Asthma emergency department visit rate	❑ Linguistic isolation
❑ Diesel PM emissions	❑ Impaired water bodies	❑ Rate of low birth weight births	❑ Poverty: Percent residents below 2x national poverty level
❑ Drinking water contaminants	❑ Solid waste sites and facilities		❑ Unemployment
❑ Pesticide use	❑ Hazardous waste facilities and generators		
❑ Toxic releases from facilities			
❑ Traffic density			

Geographical Unit: Census Tracts



- 2010 Census Tracts
- Relatively fine scale
- ~8,000 census tracts in California
- ~4,000 people per tract (range 1,200 -8,000)
- Commonly used

How Were Indicators Standardized to Census Tracts?



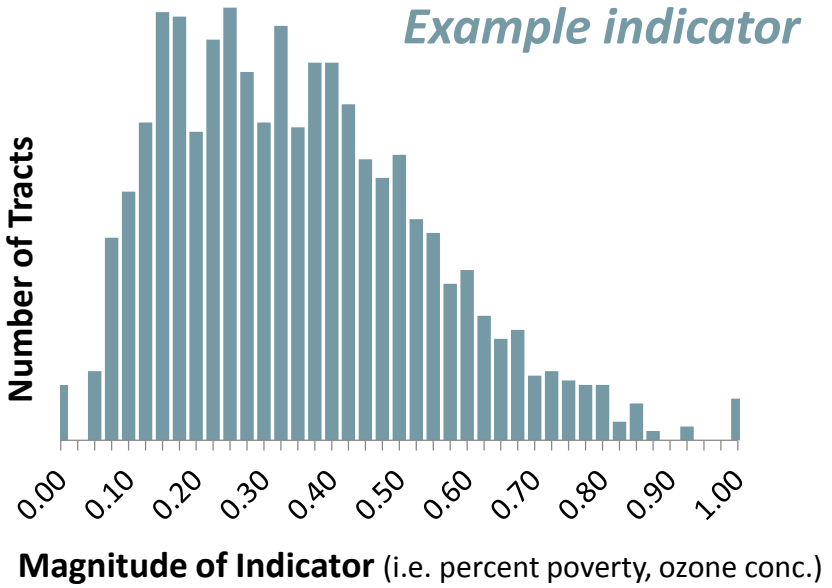
- Indicator datasets exist in different formats
  - Tabular, vector-based, spatial models

- Every indicator is summarized at census tract
  - For example, each tract was assigned a $PM_{2.5}$ concentration

- Unique methods implemented for each indicator
  - Spatial modeling, averaging, intersection with census tracts, etc.

SCORING

- For each indicator, all census tracts are assigned percentile values based on where they fall in the statewide distribution



Pollution Burden (10) × **Population Characteristics (10)** = **CalEnviroScreen Score (max 100)**

INDICATOR EXAMPLE: CLEANUP SITES

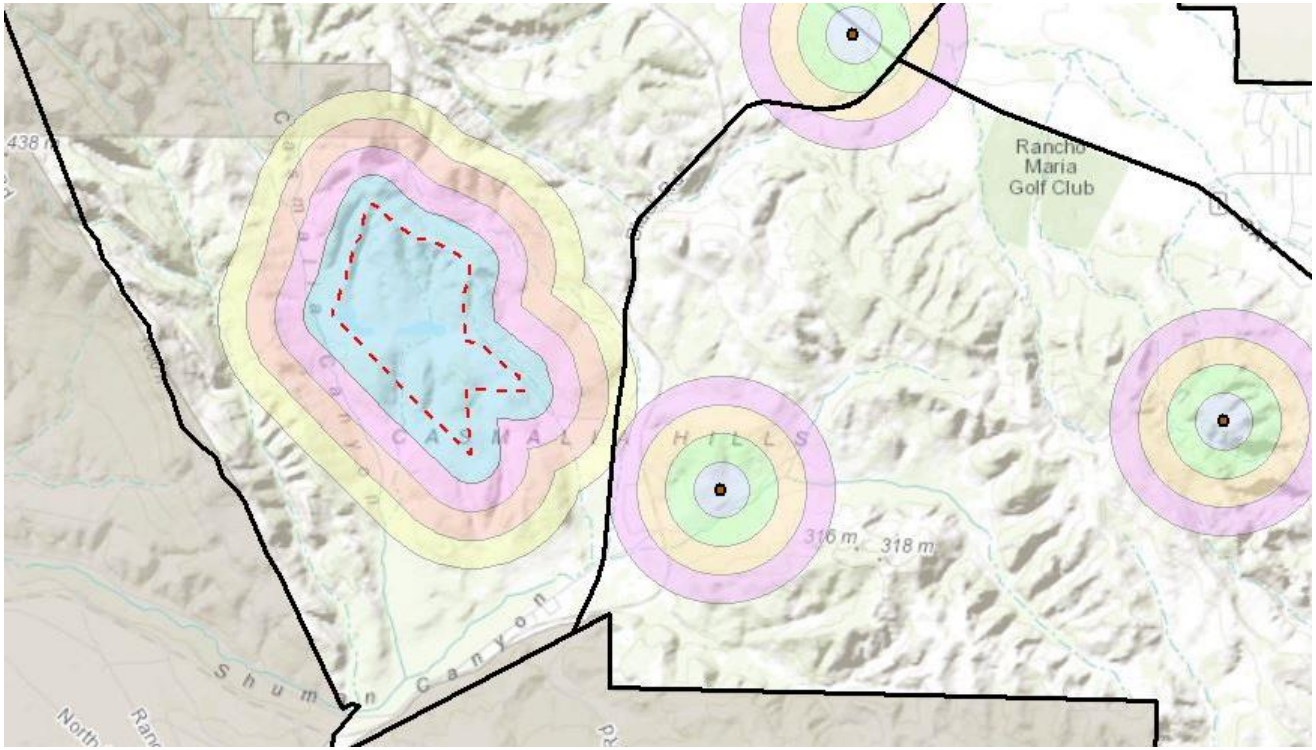
www.epa.gov

Data source: EnviroStor Cleanup Sites Database
(CA Department of Toxic Substances Control & US EPA National Priorities List)

Indicator: Sum of weighted cleanup sites within each census tract. Sites include Federal Superfund, State Response, etc. categories. Weights were adjusted based on the proximity to census tract.

Raw data: Facility locations (points) and site boundaries (polygons)

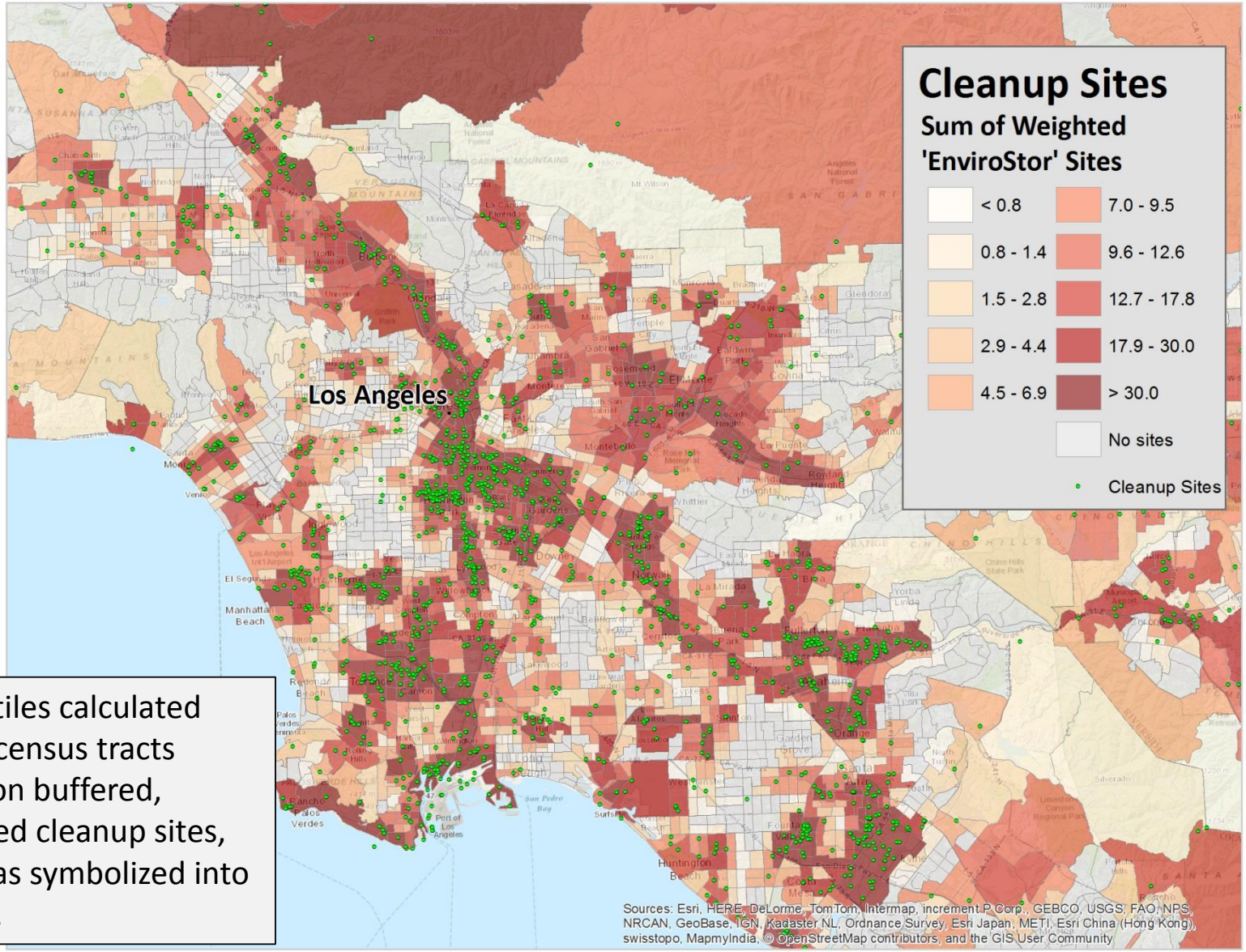
INDICATOR EXAMPLE: CLEANUP SITES



Analysis:

- Sites weighted based on type and status
- Multi-ring buffer with proximity adjustment factors
- Census tracts given score based on overlap with buffer
- Scores summed within tracts

CLEANUP SITES RESULTS



Percentiles calculated across census tracts based on buffered, weighted cleanup sites, data was symbolized into deciles.

INDICATOR EXAMPLE: DRINKING WATER

WHAT DOES THE INDICATOR DO?

- Compares census tracts across California based on delivered drinking water contaminant concentrations by water systems.
- Fits within the pollution burden category of CalEnviroScreen.

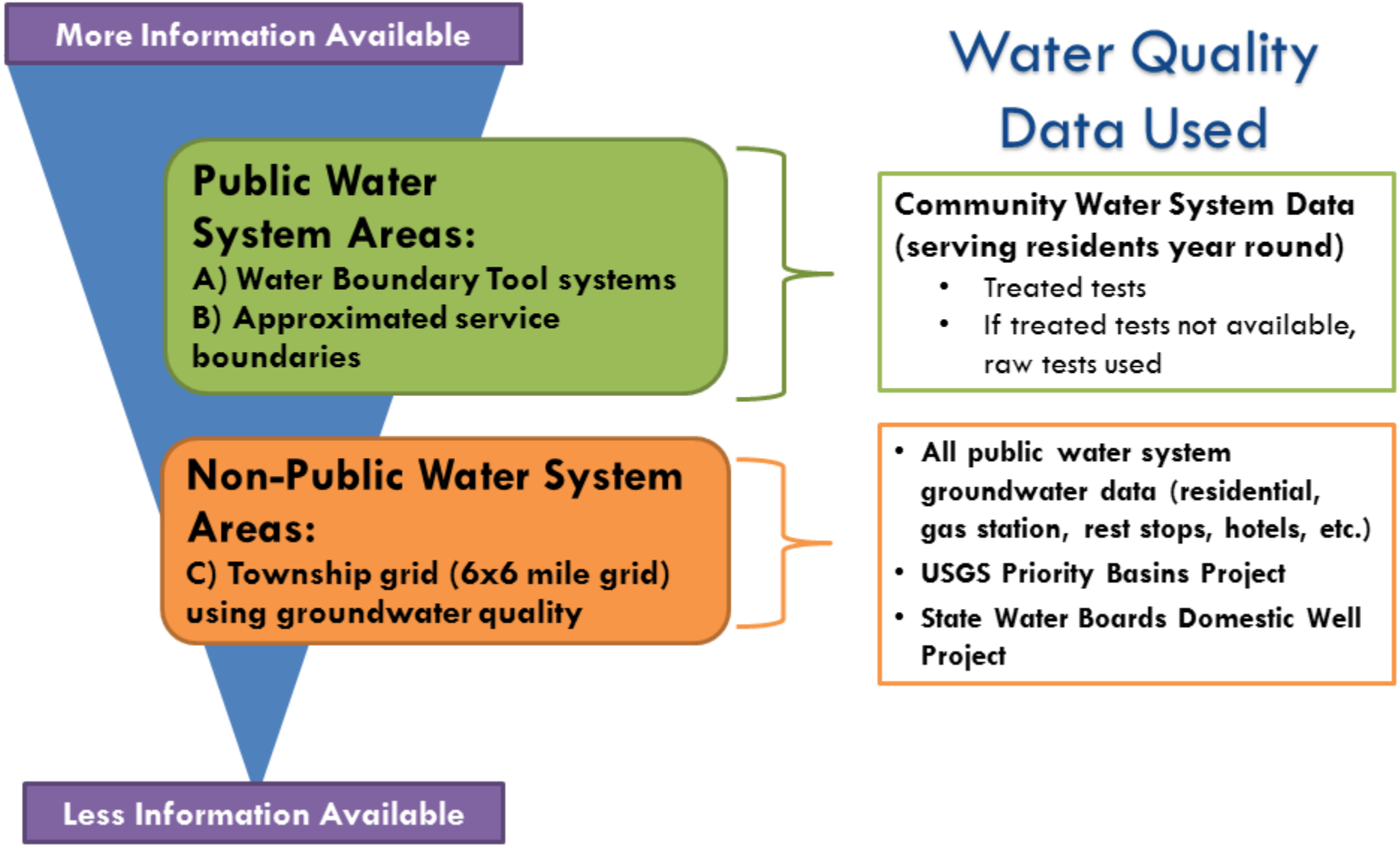
THE INDICATOR TAKES INTO ACCOUNT:

- Whether multiple contaminants are present.
- The measured level of contaminants in water.
- Whether the water system has received violations in the past.
- ❖ Geographically: There is more information available relating to the water people are drinking in certain areas of California *than* others.

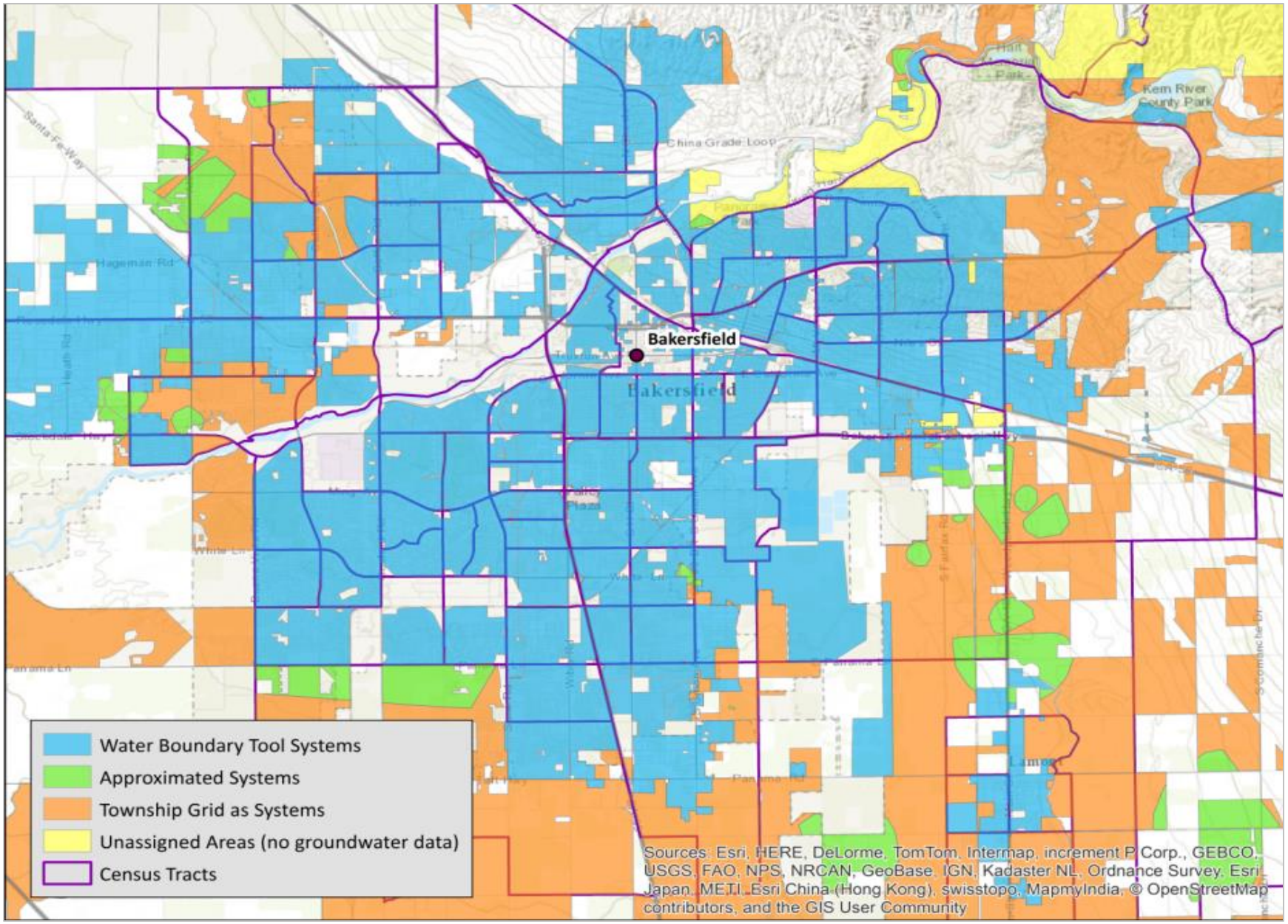
WHAT DOES THE INDICATOR NOT DO?

- Not a measure of a water service provider's current compliance with regulations.
- Does not indicate whether water is safe to drink.

Step 1: Developing Water System Boundaries



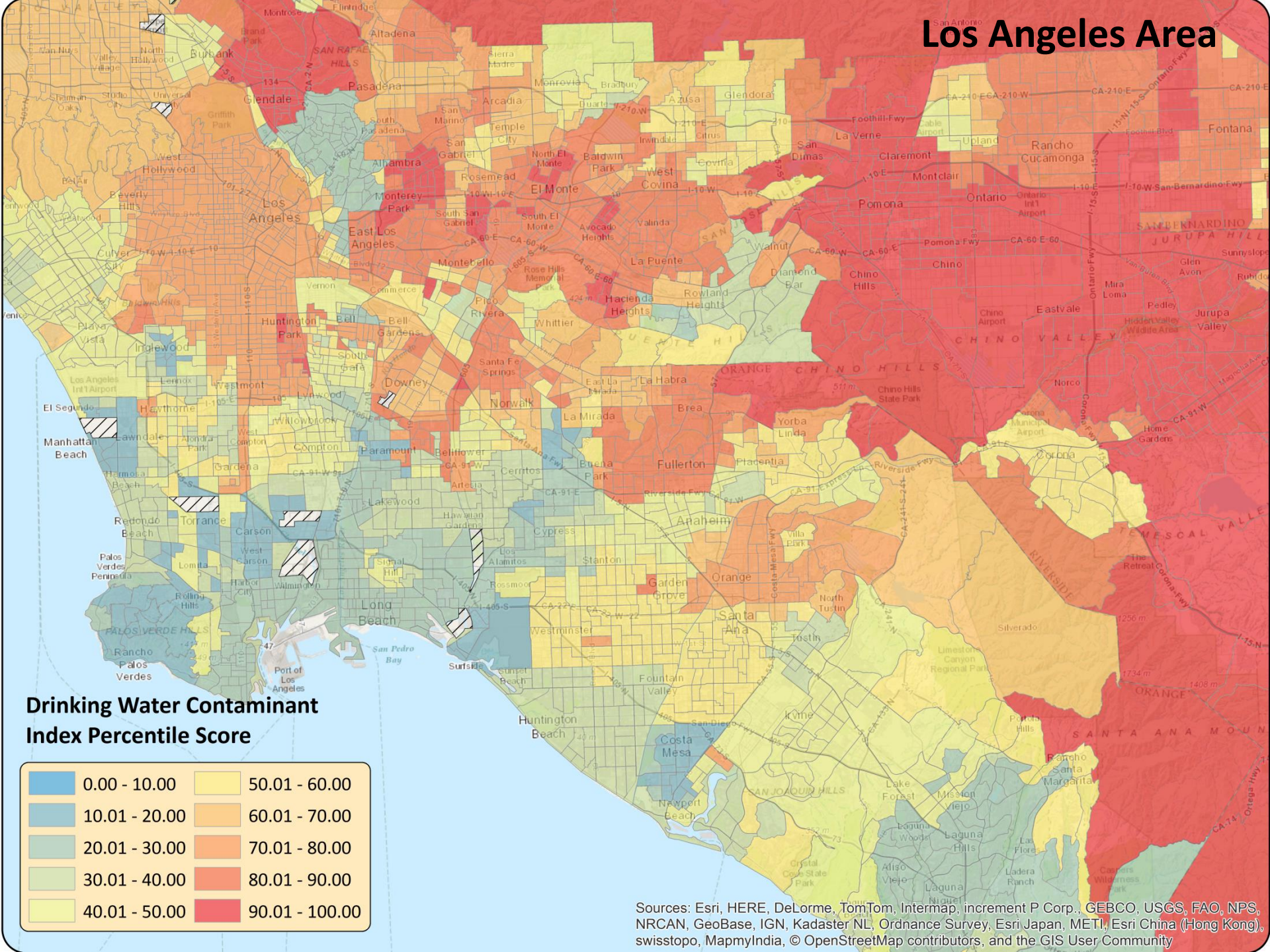
Drinking Water System Boundaries



Step 2: Developing A Drinking water Contaminant Index

- 12 ‘contaminants’ make up the index:
  - 10 contaminants + 2 types of violations
- Each contaminant received a percentile (rank)
- Each contaminant contributes an equal weight to the overall score
- Sum of the 10 individual contaminant percentiles plus “violations” index

Los Angeles Area

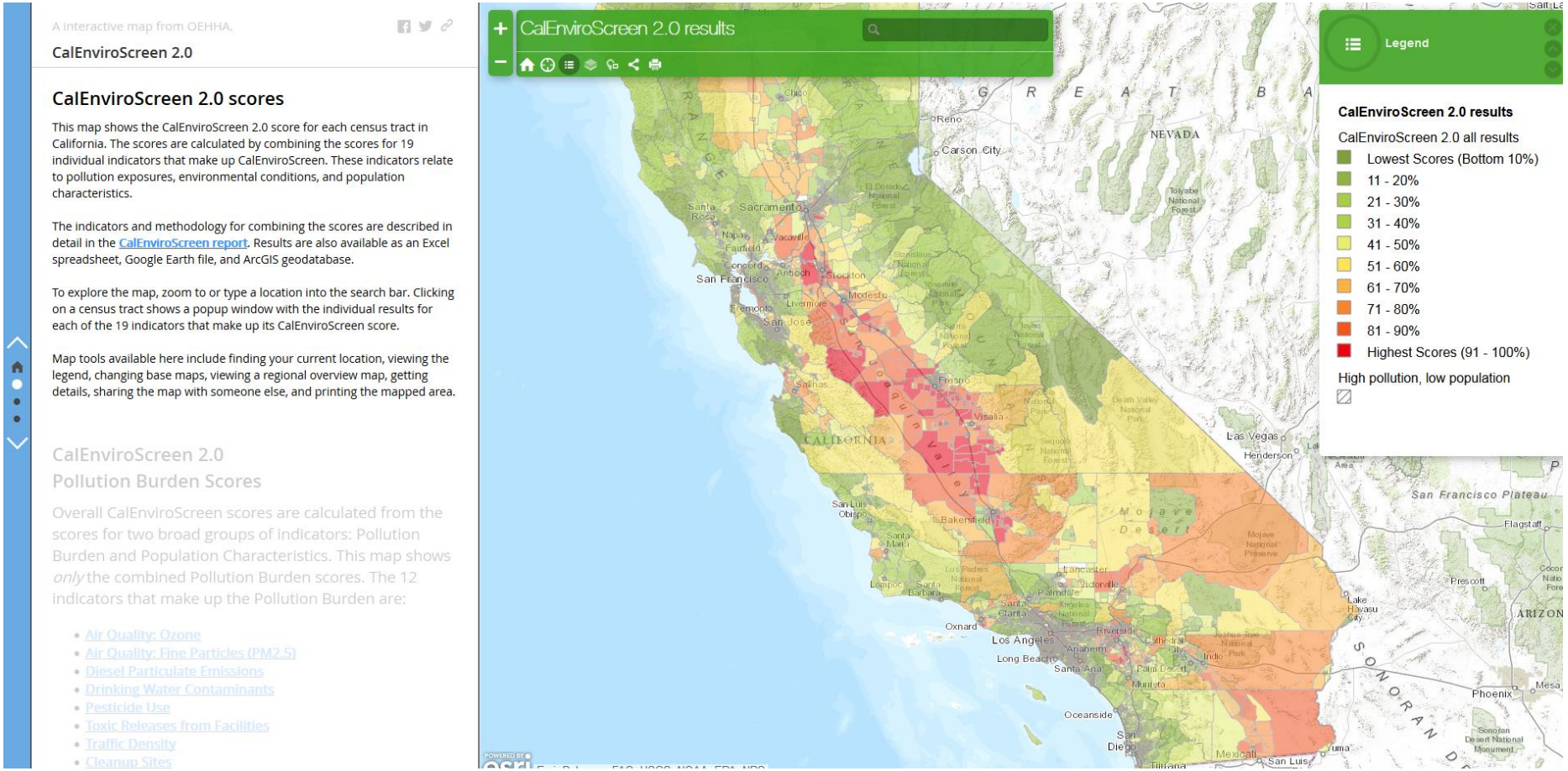


Publicly Available Results

- CalEnviroScreen Report
  - Maps for individual indicators
  - Description of each indicator
- Mapping Application
  - Online maps of results
- Other data
  - Excel spreadsheet of results by census tract
  - Google Earth results (overall; Top 5 & 10%)
  - ArcGIS geodatabase

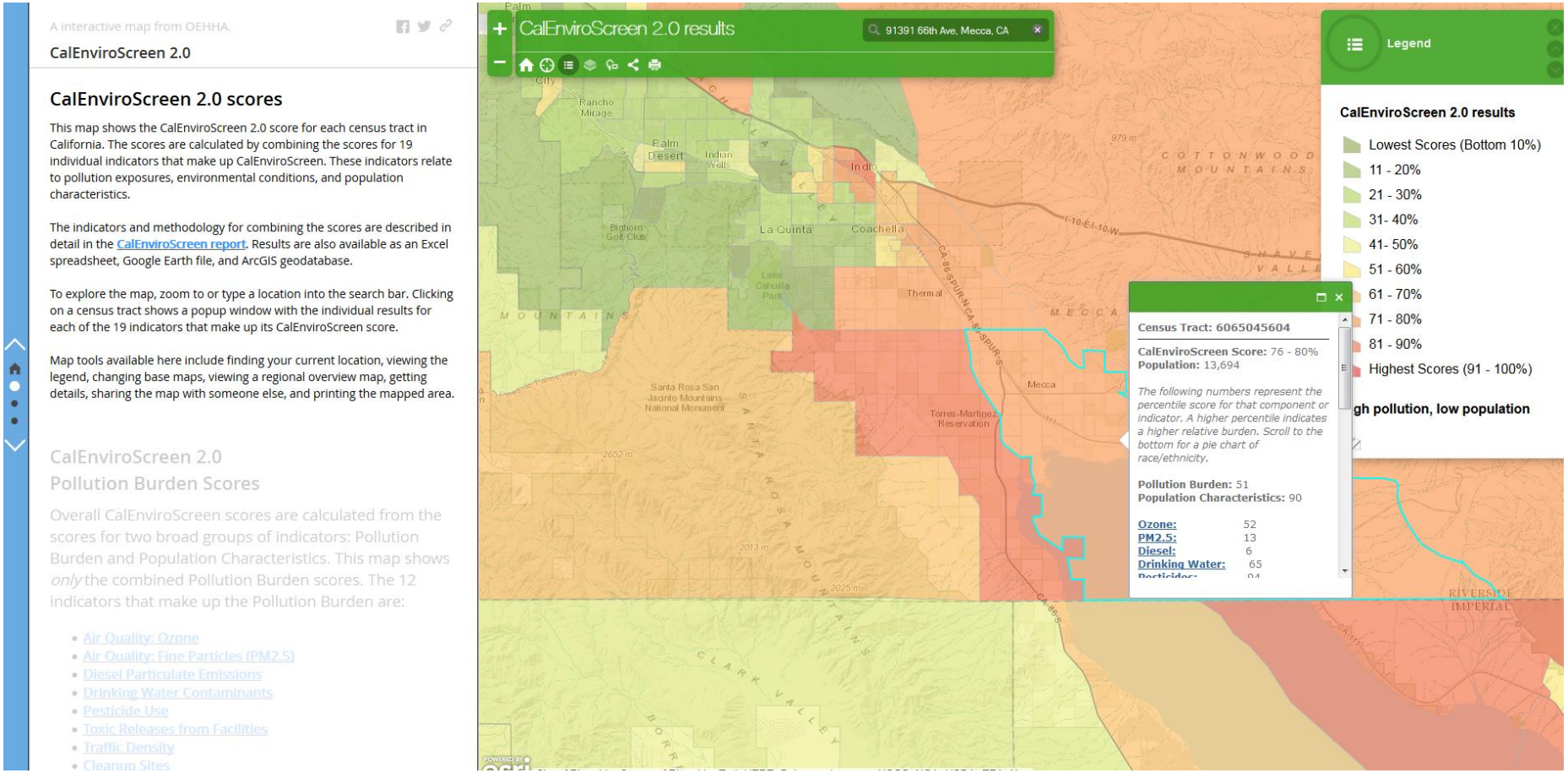
www.oehha.ca.gov/ej/ces2.html

ONLINE TOOL



Available at: oehha.ca.gov/ej/ces2.html

ONLINE TOOL



Available at: oehha.ca.gov/ej/ces2.html

How the Tool is Being Used

- Aid in ongoing planning and decision-making within Cal/EPA
  - Environmental Justice Small Grant program
  - Environmental Justice Compliance and Enforcement taskforce
  - Prioritize site-cleanup activities
- CA Strategic Growth Council
  - Sustainable Communities Planning Grants
- CA Senate Bill 535 (De Leon, 2012)
  - Cal/EPA shall identify “disadvantaged communities” for investment opportunities based on geographic, socioeconomic, public health and environmental hazard criteria.

GIS – NEXT STEPS

- Create Cal EPA internal web applications for sister Boards and Departments
  - Training, permitting, site prioritiziation
- Evaluate indicator data gaps, approaches for modifications
- Further develop public facing application

Acknowledgements

OEHHA :
John Faust
Laura August

George Alexeeff
Komal Bangia
Rose Cendak
Lara Cushing
Vanessa Galaviz
Allan Hirsch
Tamara Kadir
Julian Leichty
Carmen Milanes
Shankar Prasad
Andrew Slocombe
Karen Randles
Robbie Welling
Lauren Zeise

Cal/EPA :
Miriam Barcellona Ingenito
Arsenio Mataka
Gina Solomon

Other thanks:

- Cumulative Impacts and Precautionary Approaches Work Group
- CalEPA Boards and Departments who provided comments and data
- California Department of Public Health and the Public Health Institute who provided data
- Residents and stakeholders who participated in our regional workshops
- Dr. Tara Zagofsky, consultant and facilitator, University of California, Davis, Common Ground: Center for Cooperative Solutions
- Dr. Rachel Morello-Frosch and academic colleagues at the University of California, Berkeley
- Academic expert panel who provided comments at a workshop in September 2012
- Graduate students assisting in the project

Thank you!

email: Walker.Wieland@oehha.ca.gov
more info: www.oehha.ca.gov/ej