CalEnviroScreen: A Tool for Evaluating California Communities

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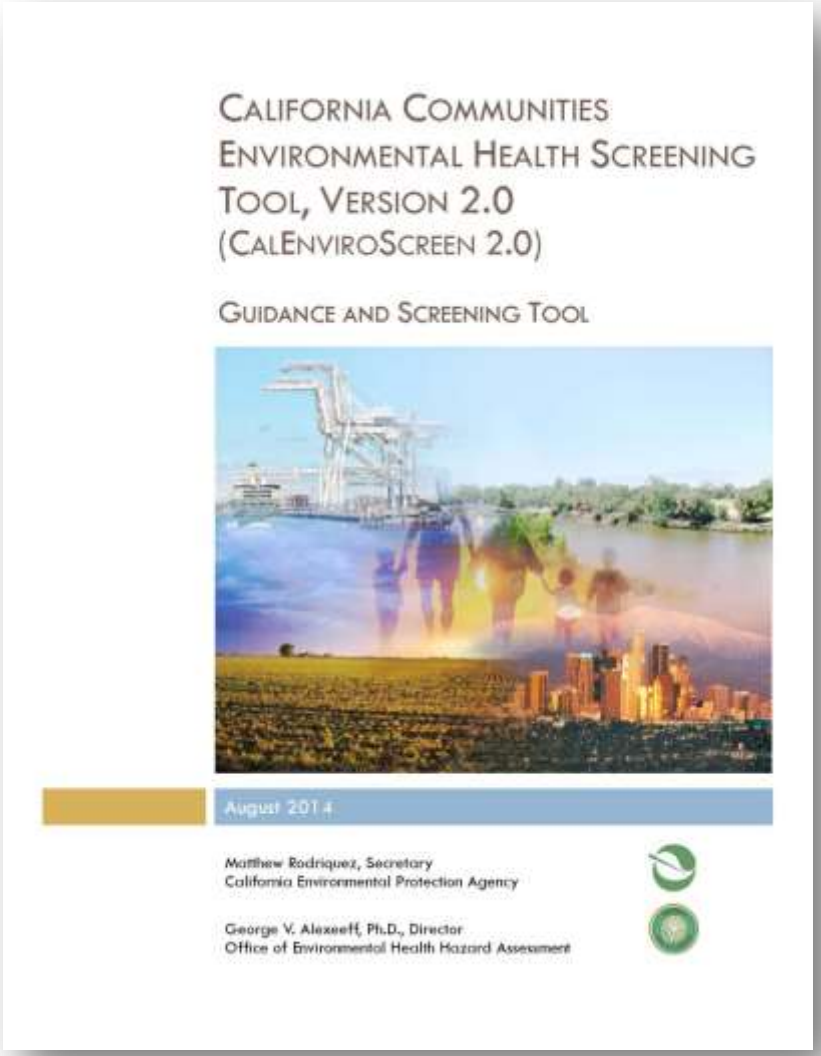
CalEnviroScreen



- Screening tool 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

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

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

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 geographic areas

Pollution Burden & Population Characteristics

Exposures	*Contact with pollution*
Environmental Effects	*Adverse environmental conditions caused by pollutants*
Sensitive Populations	*Populations with biological traits (including health status) that may magnify the effects of pollutant exposures*
Socioeconomic Factors	*Community characteristics that result in increased vulnerability to pollutants*

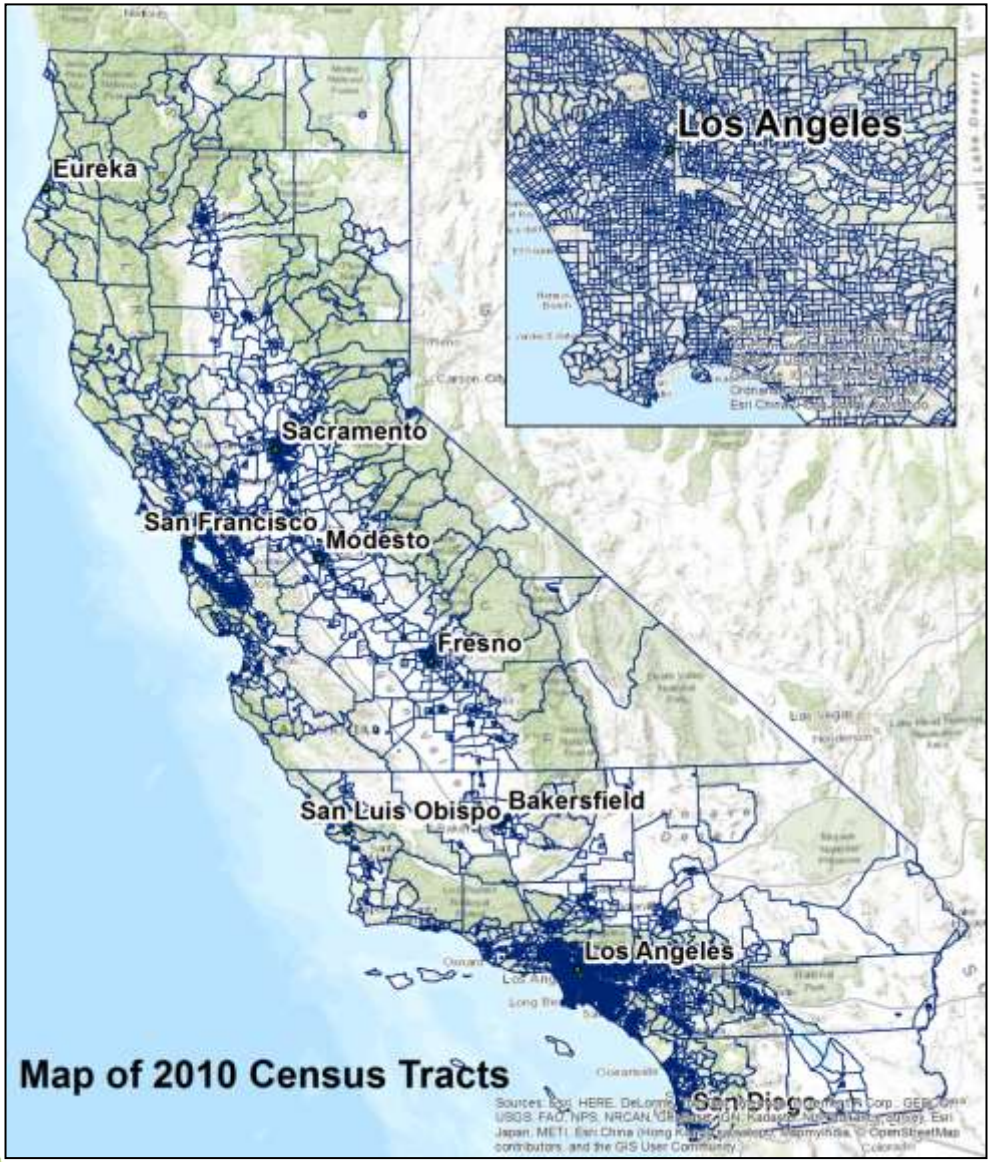
Criteria for indicator selection

- Provide a good measure of environmental or socioeconomic conditions
  - Pollution indicators should relate to issues that may be actionable by CalEPA
- Data qualities
  - Publicly available
  - Location-based information (e.g., address, latitude/longitude)
  - Statewide
  - Accurate
  - Current

Indicators Used

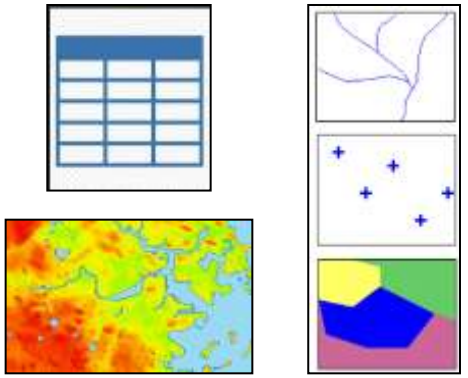
Pollution Burden		*Population Characteristics*	
Exposures	**Environmental Effects**	**Sensitive Populations**	**Socioeconomic Factors**
❑ PM 2.5 concentrations	❑ Cleanup sites	❑ Prevalence of children and elderly	❑ Educational attainment
❑ Ozone concentrations	❑ Groundwater threats (Leaking underground 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?



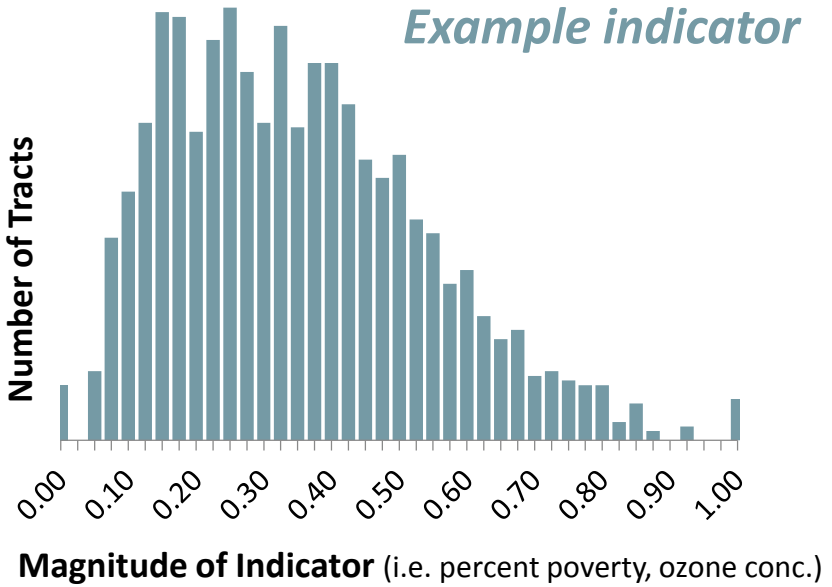
- Indicator datasets exist in different formats
  - Tabular, vector-based, spatial models

- Each 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.

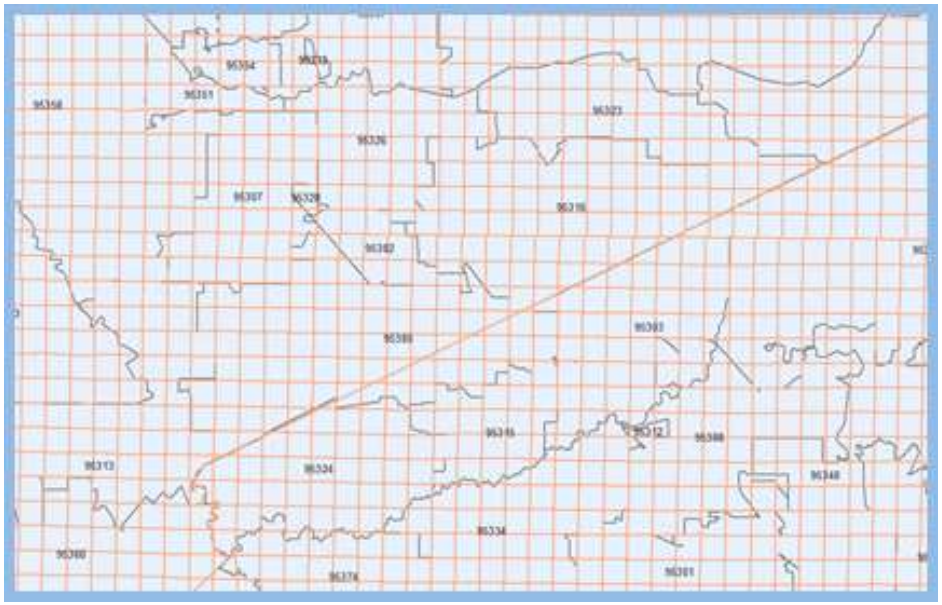
SCORING

- For each indicator, each census tracts is assigned a percentile value based on where it falls in the statewide distribution



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

INDICATOR EXAMPLE: PESTICIDE USE



Data source:

- Pesticide Use Reporting *(California Department of Pesticide Regulation)*

Indicator:

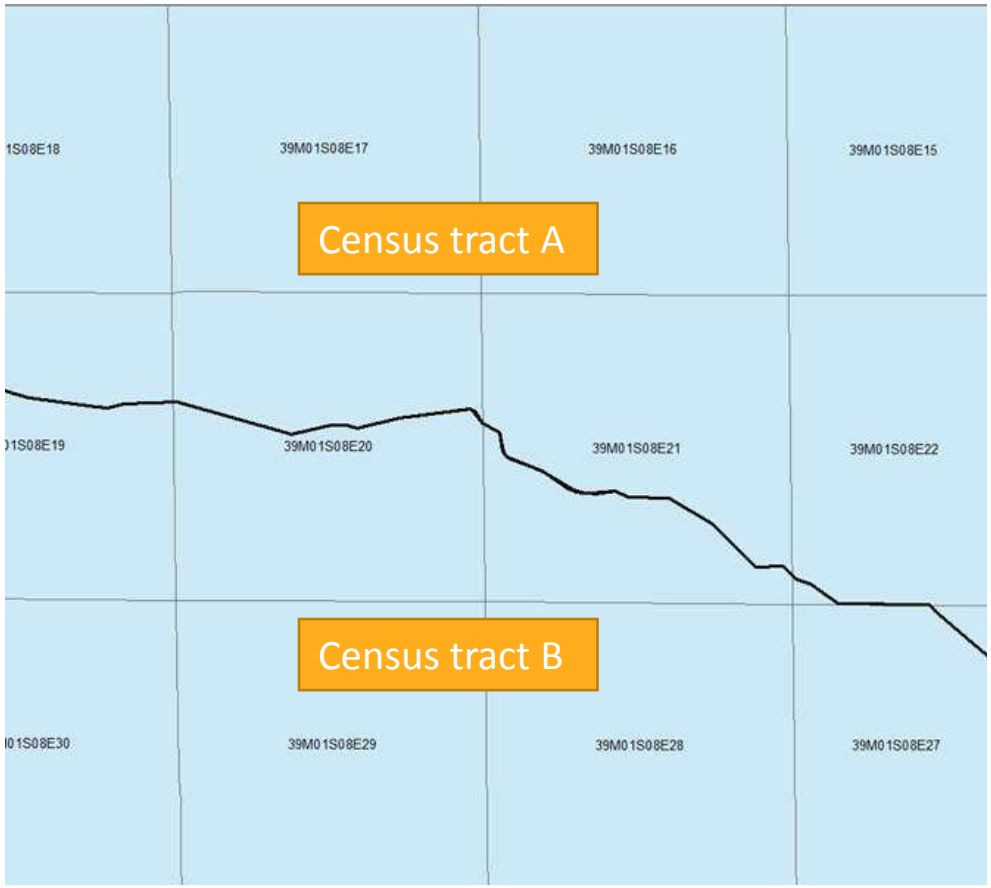
- Pounds of selected* production agricultural-use active ingredients per square mile (averaged over 2009-2011)

Raw data:

- Subset more toxic and higher exposure potential pesticides were used
- Pounds of pesticides applied in each 1×1 mile grid cell from the Public Land Survey System

**For a complete listing of the pesticides used, see our report: http://oehha.ca.gov/ej/ces2.html*

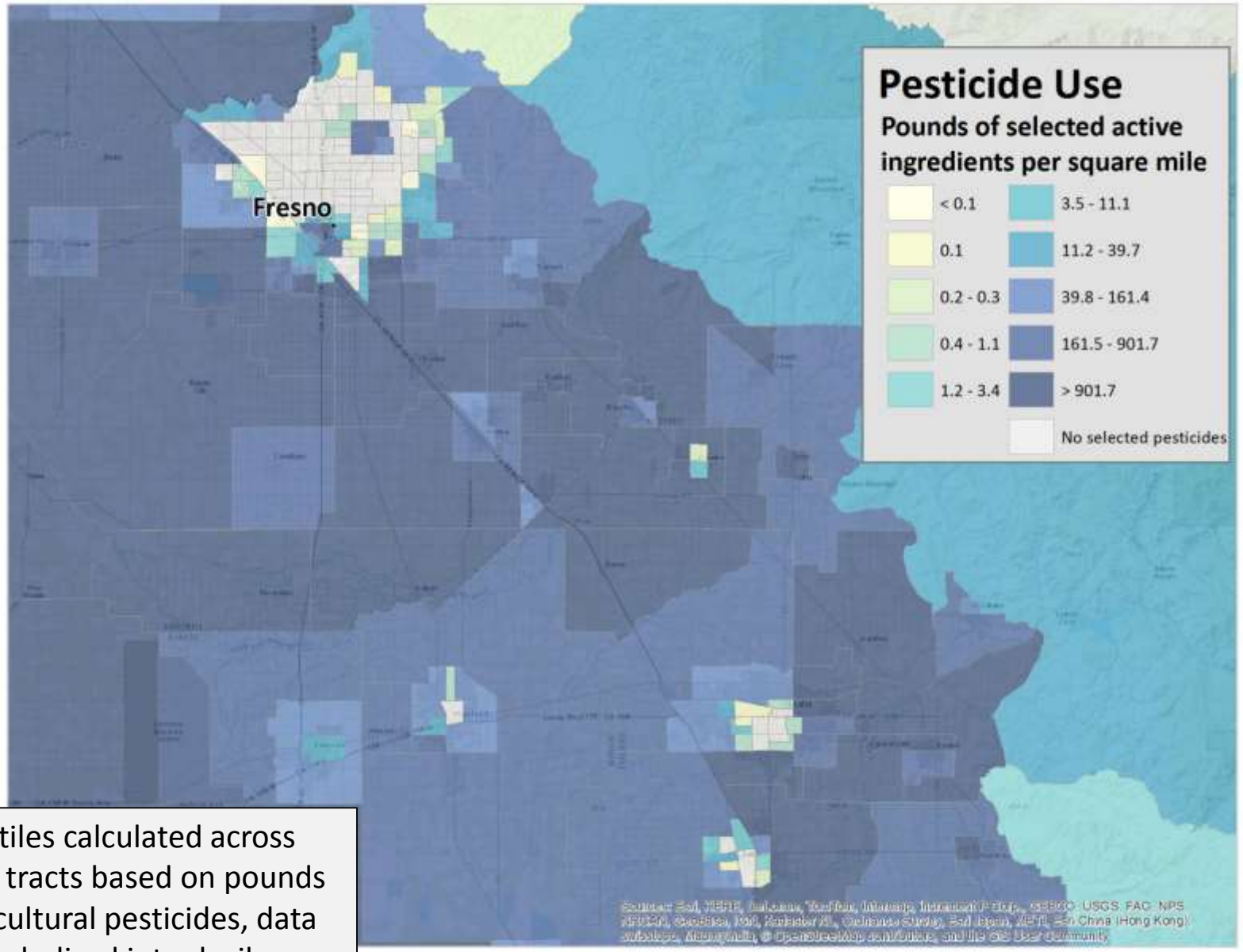
INDICATOR EXAMPLE: PESTICIDE USE



Analysis:

- 1 sq. mile grid (Sections) overlaid on all census tracts across California
- Area-apportionment method to associate each sections with multiple overlapping tracts
- Allocated proportion of pesticide use pounds per tract
- Total pesticides summed then averaged over 3 years by census tract

PESTICIDE USE RESULTS



Percentiles calculated across census tracts based on pounds of agricultural pesticides, data was symbolized into deciles.

INDICATOR EXAMPLE: CLEANUP SITES

www.epa.gov

Data source:

- EnviroStor Cleanup Sites Database
- *California Department of Toxic Substances Control & US EPA National Priorities List*

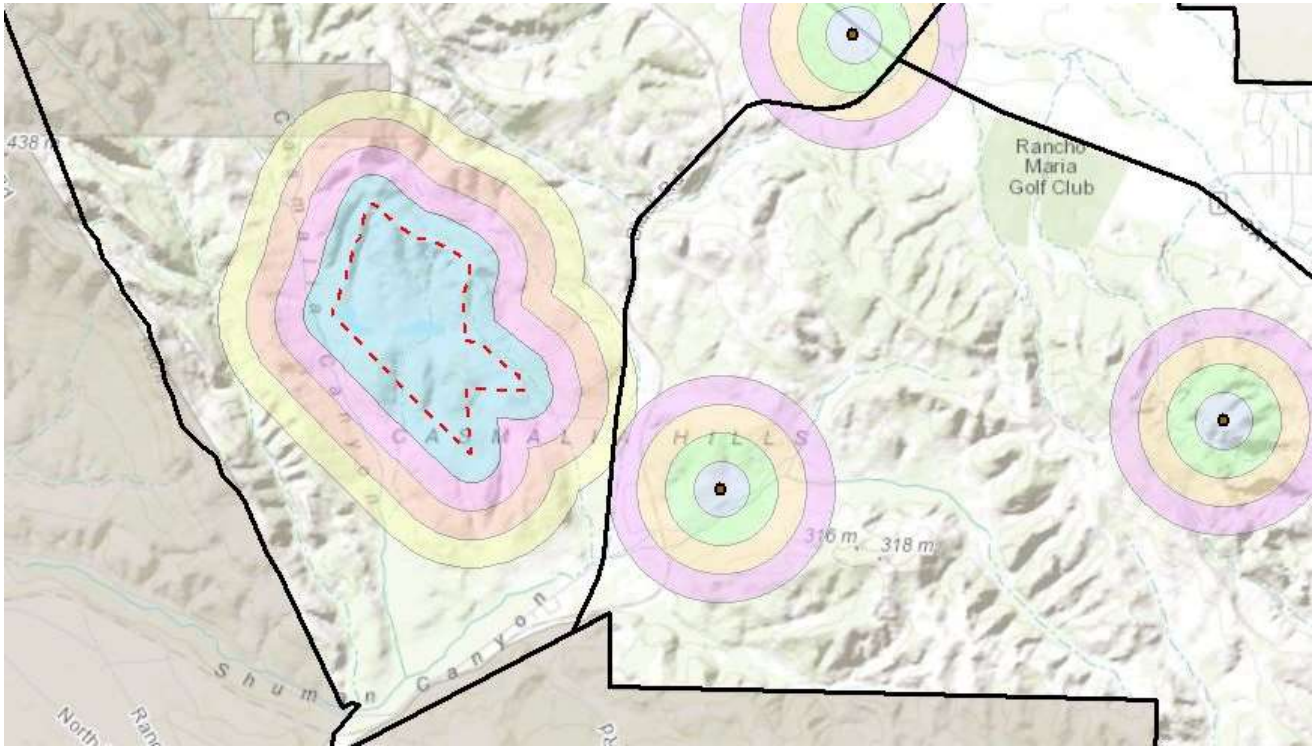
Indicator:

- Sum of weighted cleanup sites within each census tract.
- Federal Superfund, State Response, etc. categories.
- Weights adjusted weights based on the proximity to populations in census tract.

Raw data:

- Facility locations (points) and site boundaries (polygons)

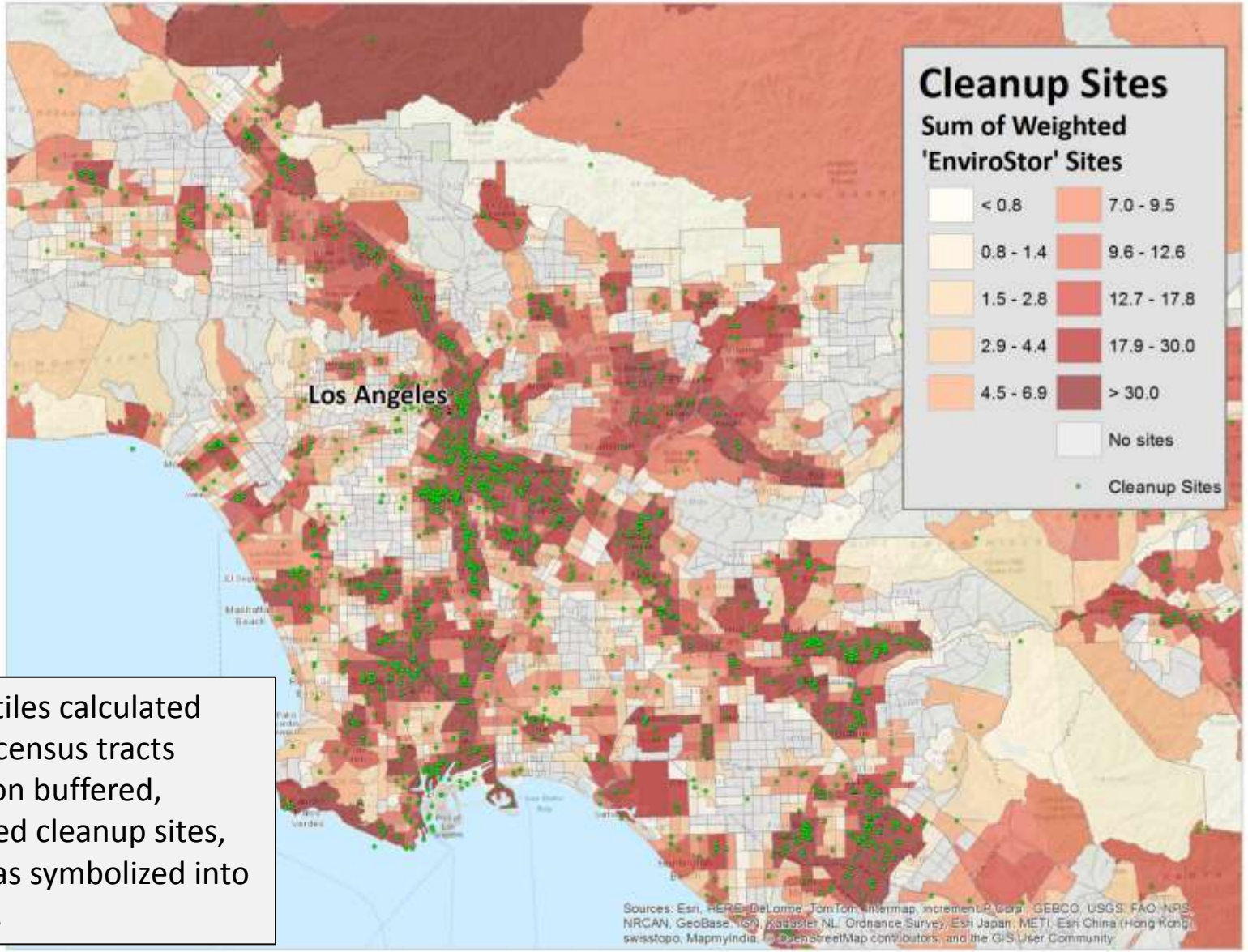
INDICATOR EXAMPLE: CLEANUP SITES



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 by tract

CLEANUP SITES RESULTS



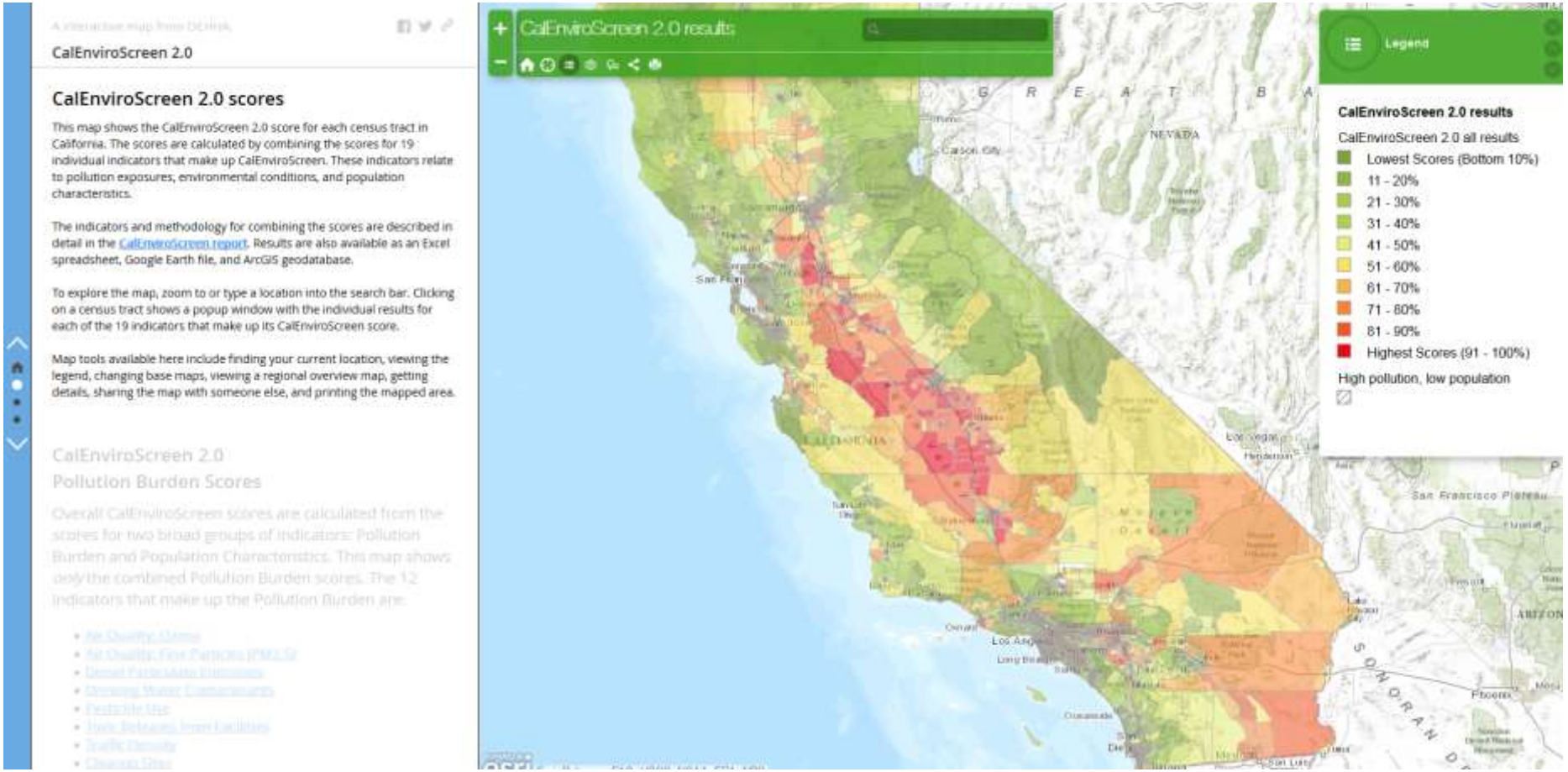
Percentiles calculated across census tracts based on buffered, weighted cleanup sites, data was symbolized into deciles.

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 file
  - ArcGIS geodatabase

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

ONLINE TOOL



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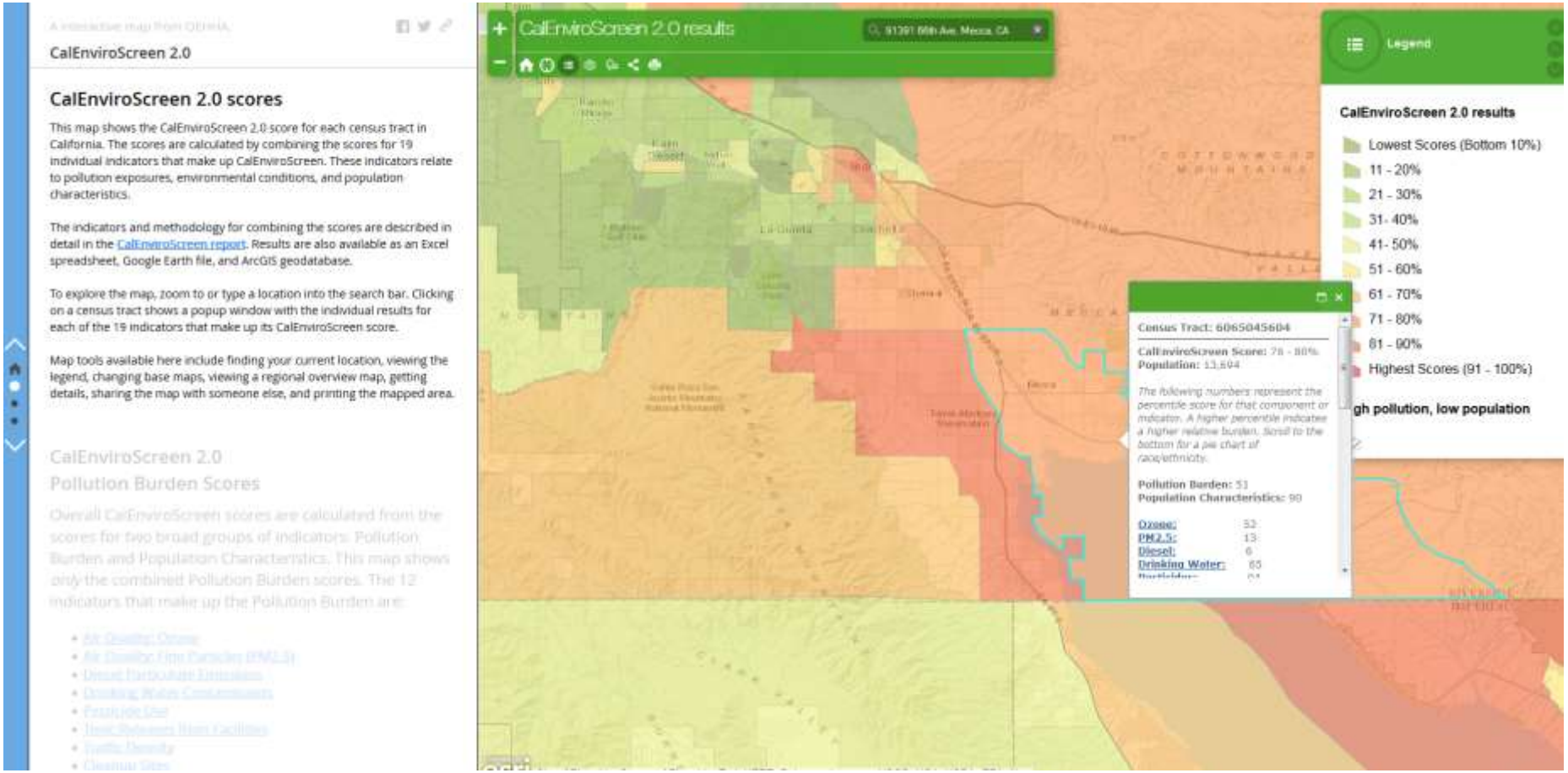

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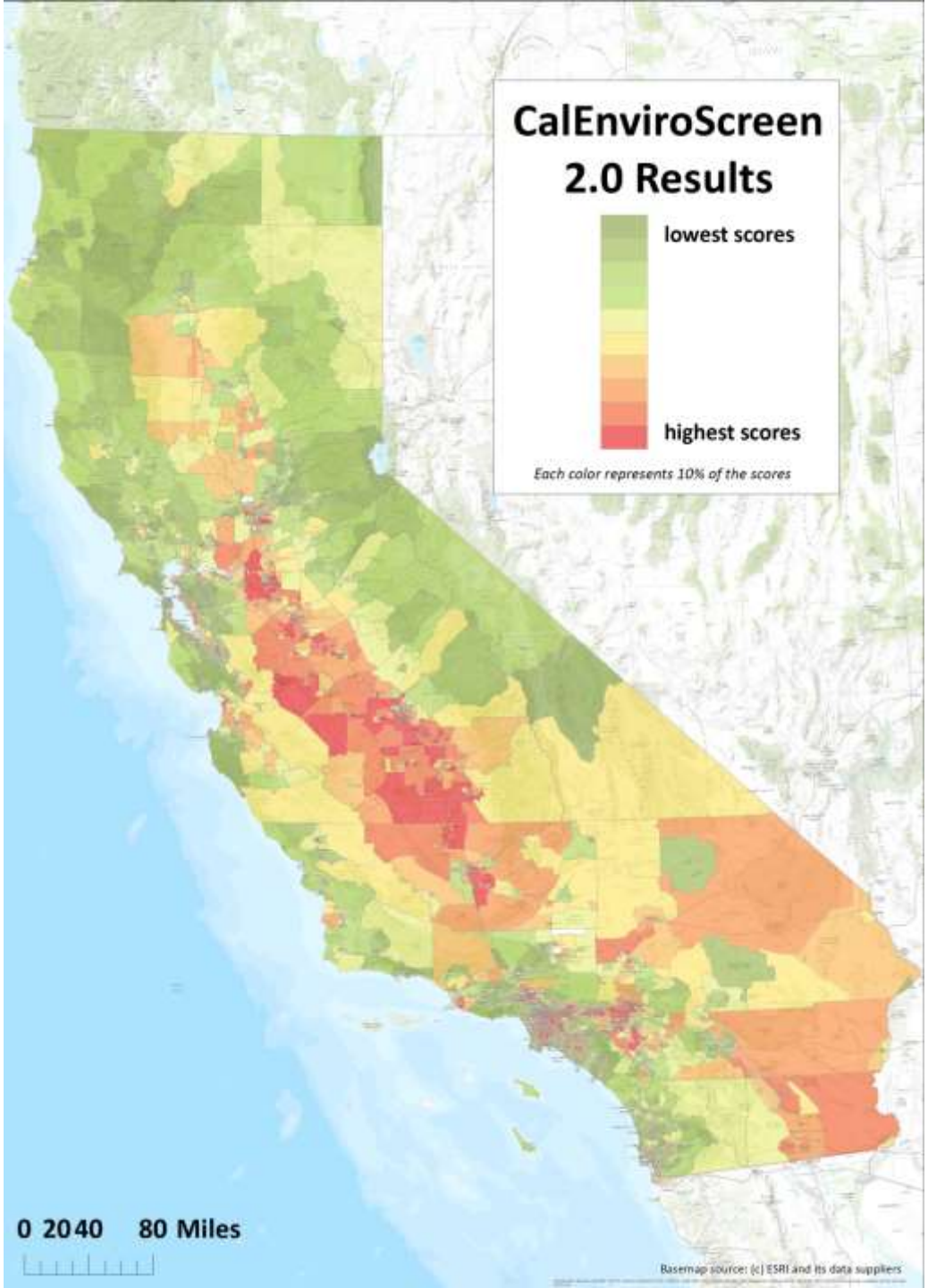
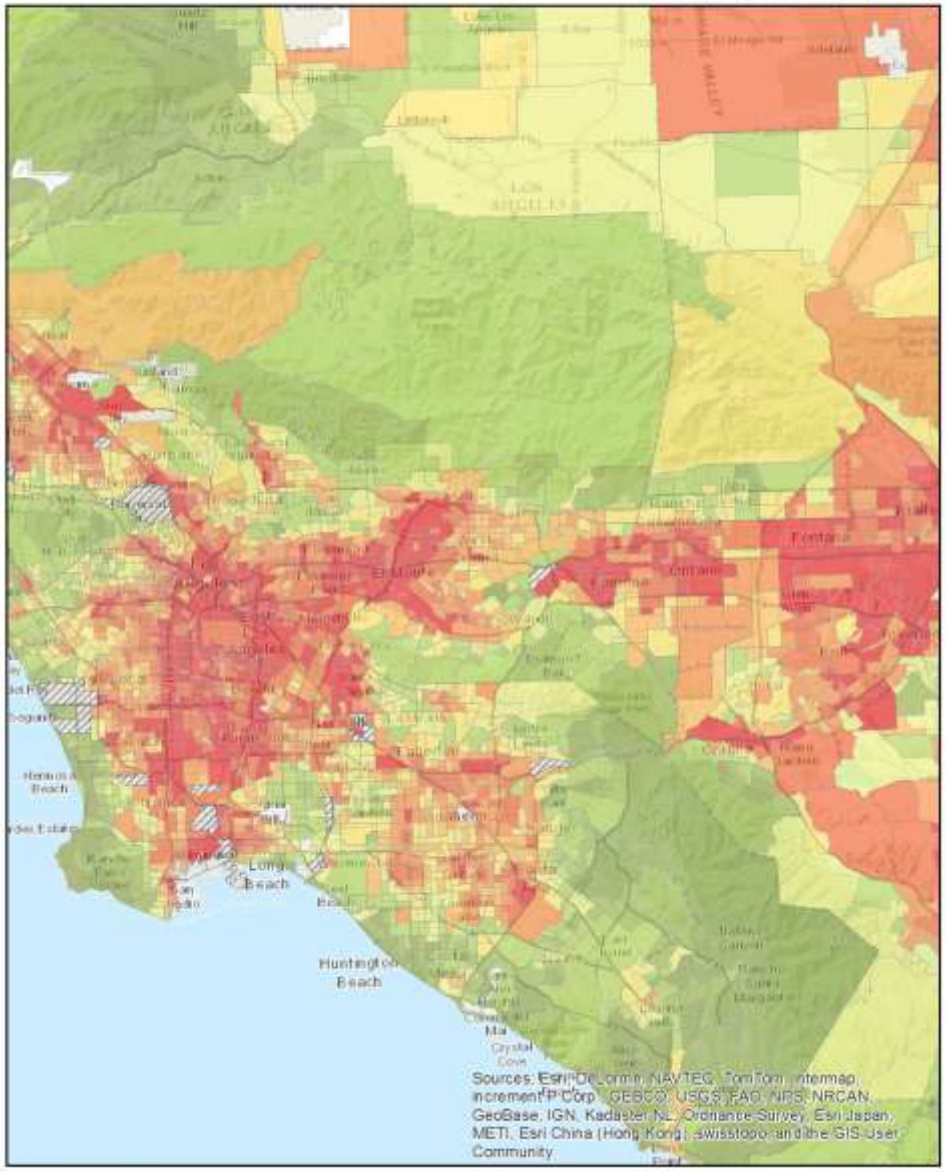

CalEnviroScreen
2.0 Results
lowest scores
highest scores
Each color represents 10% of the scores
0 20 40 80 Miles
Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

Top 20% pollution, low population

lowest scores — highest scores

Each color represents 10% of the scores



Los Angeles Area

0 5 10 20 Miles

Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

lowest scores — highest scores

Each color represents 10% of the scores

San Francisco Area

0 2.5 5 10 Miles

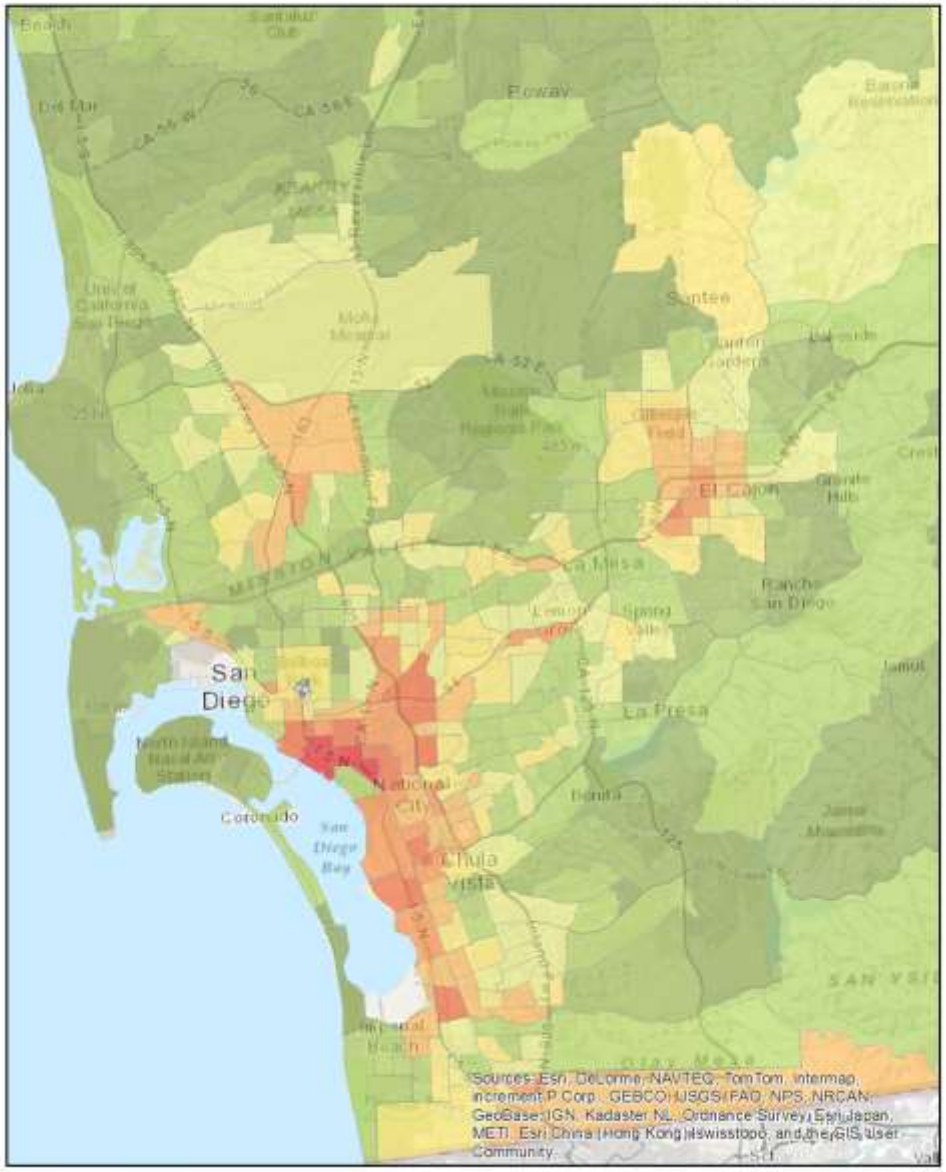
Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

Top 20% pollution, low population

lowest scores — highest scores

Each color represents 10% of the scores



San Diego Area

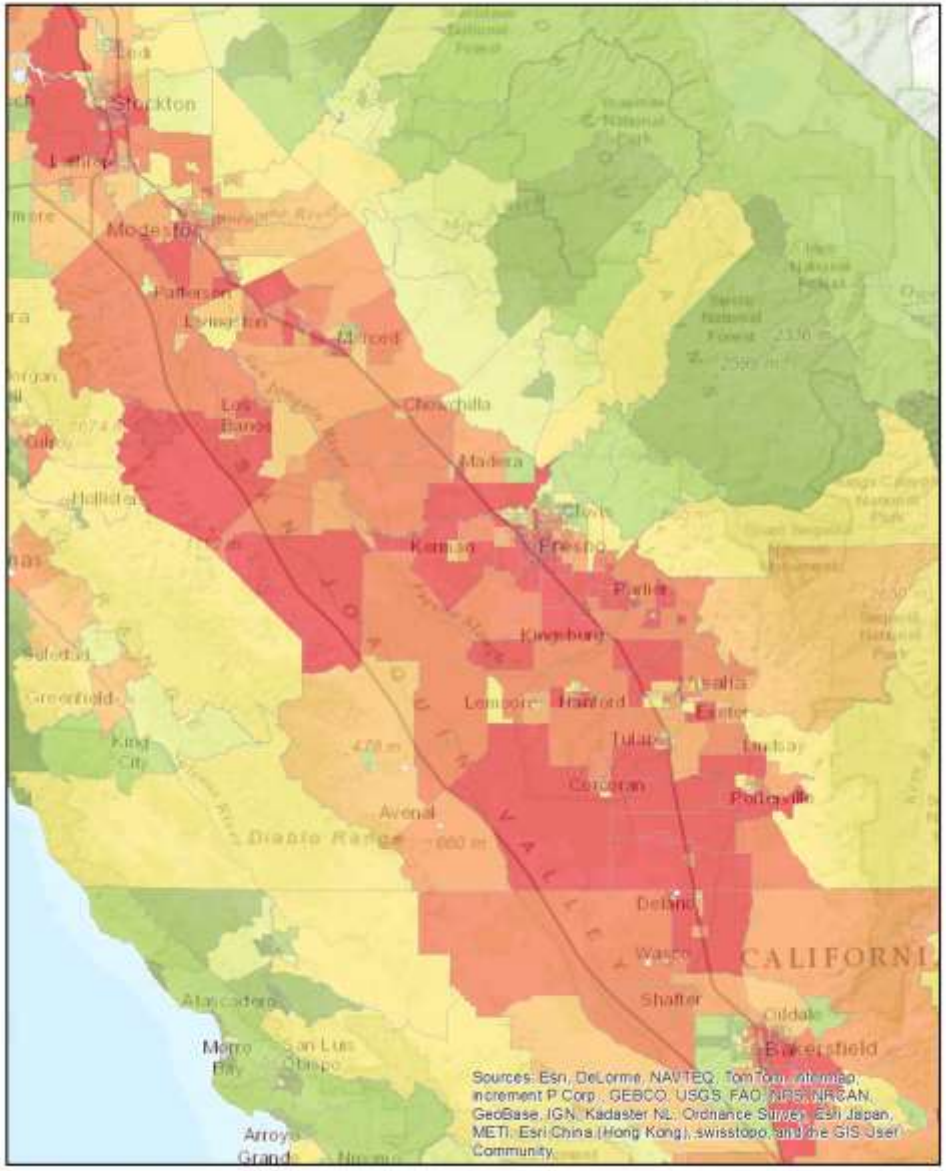
Basemap source: (c) ESRI and its data suppliers

0 — 2.5 — 5 — 10 Miles

CalEnviroScreen 2.0 Results

lowest scores — highest scores

Each color represents 10% of the scores



San Joaquin Valley

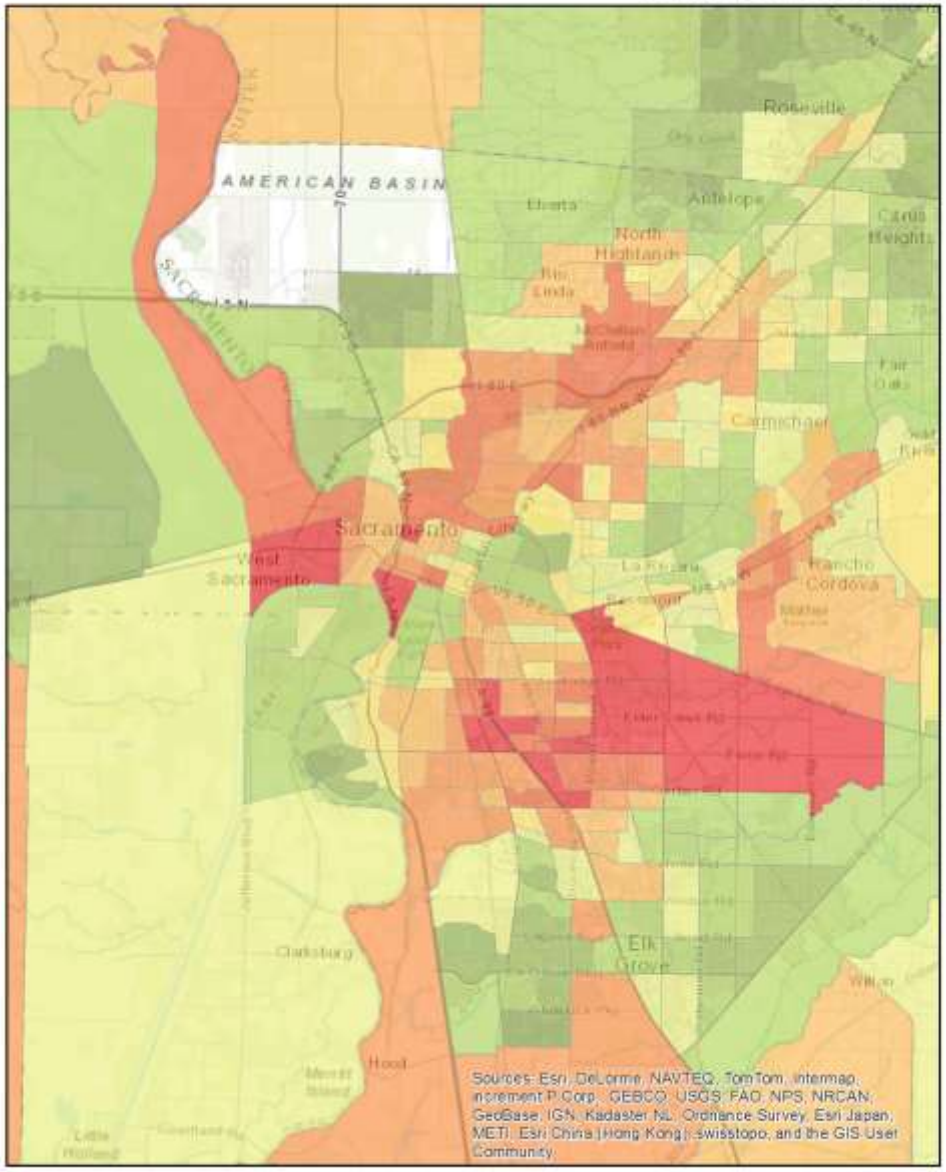
0 10 20 40 Miles

Basemap source: (c) ESRI and its data suppliers

CalEnviroScreen 2.0 Results

lowest scores — highest scores

Each color represents 10% of the scores



Sacramento Area

0 2.5 5 10 Miles

Basemap source: (c) ESRI and its data suppliers

How the Tool is Being Used

- Aid in ongoing planning and decision-making within CalEPA
  - Environmental Justice Small Grant program
  - Environmental Justice Compliance and Enforcement taskforce
  - Prioritize site-cleanup activities
- California Strategic Growth Council
  - Sustainable Communities Planning Grants
- California 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.

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- Academic expert panel who provided comments at a workshop in September 2012
- Graduate students assisting in the project

Thank you!

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more info: www.oehha.ca.gov/ej