

# CalEnviroScreen: Identifying Communities with Cumulative Impacts

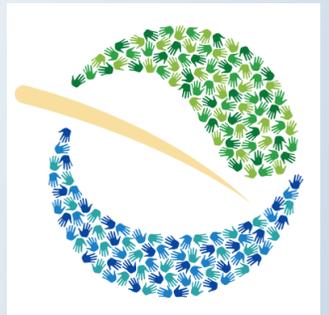
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Environmental Justice Program

California Environmental Protection Agency

February 4, 2021



# THREE QUESTIONS

- ▶ What is cumulative impacts?
- ▶ How does cumulative impacts tie with environmental justice?
- ▶ How do we address cumulative impacts in environmental justice communities?

# OUTLINE

- ▶ Why cumulative impacts and risk?
- ▶ Exposure to single chemicals and mixtures
- ▶ Community-scale cumulative impact assessment
  - ▶ CalEPA's *CalEnviroScreen*
- ▶ Cumulative Impacts and Racial Divide

# WHY CUMULATIVE IMPACTS AND RISK?

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# WHY EXAMINE CUMULATIVE IMPACTS AND RISKS?

Because chemical pollutants accumulate...

- ▶ ... over time.
  - ▶ DDT persistent in the environment and accumulates in fatty tissues
- ▶ ... across different places.
  - ▶ lead from paint in homes, soil from gasoline, drinking water, cosmetics, jewelry, toys, folk medicines
- ▶ ... via different routes.
  - ▶ PM from mobile, stationary, and area sources
- ▶ ... in multiplicity.
- ▶ ... unevenly.

This creates concerns for cumulative impacts and risks

## DIFFERENT AND OVERLAPPING MEANINGS FOR 'CUMULATIVE' ...

- ▶ Chemicals that accumulate in the body or the environment over time.
  - ▶ Flame retardants, DDT
- ▶ Chemicals that come from multiple sources, that produce the same effect.
  - ▶ Lead
- ▶ Multiple effects arising from multiple sources.
  - ▶ Community-scale impacts

# EXPOSURE TO SINGLE CHEMICALS AND MIXTURES

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# CUMULATIVE IMPACT OF A SINGLE CHEMICAL

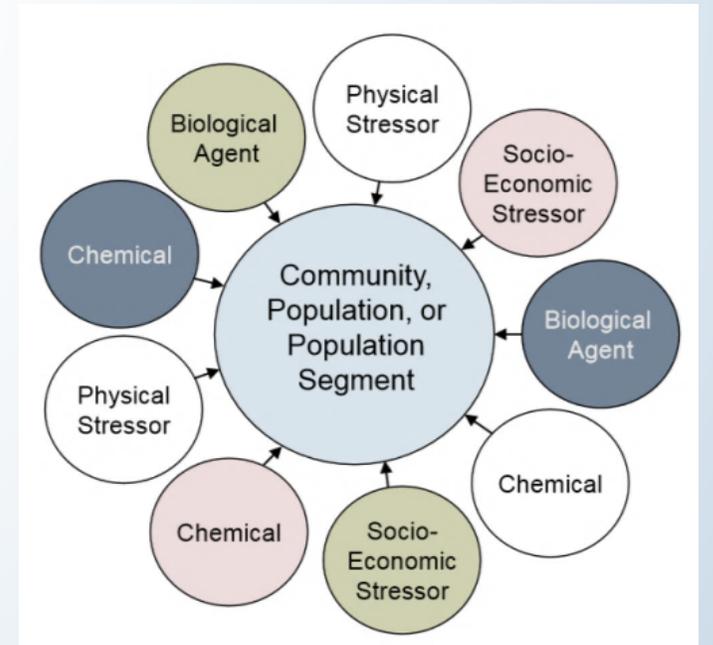
- ▶ Accumulation in the body due to chemistry
  - ▶ Fat and bone are common sites
  - ▶ Persistent, bioaccumulative and toxic chemicals such as dioxins, DDT, and PCBs.
  - ▶ Others: lead, PBDE flame retardants
- ▶ Accumulation of harm over time, even though the chemical may no longer be present
  - ▶ Carcinogens
  - ▶ Neurotoxins

# CHEMICAL MIXTURE TYPES

- ▶ Defined
  - ▶ Combinations created under specific circumstances
  - ▶ Example: diesel exhaust, environmental tobacco smoke
- ▶ Similar
  - ▶ Combinations with comparable properties
  - ▶ Example: organophosphate insecticides
- ▶ Coincidental
  - ▶ Combinations that occur by chance in a time or place
  - ▶ Example: urban air pollution

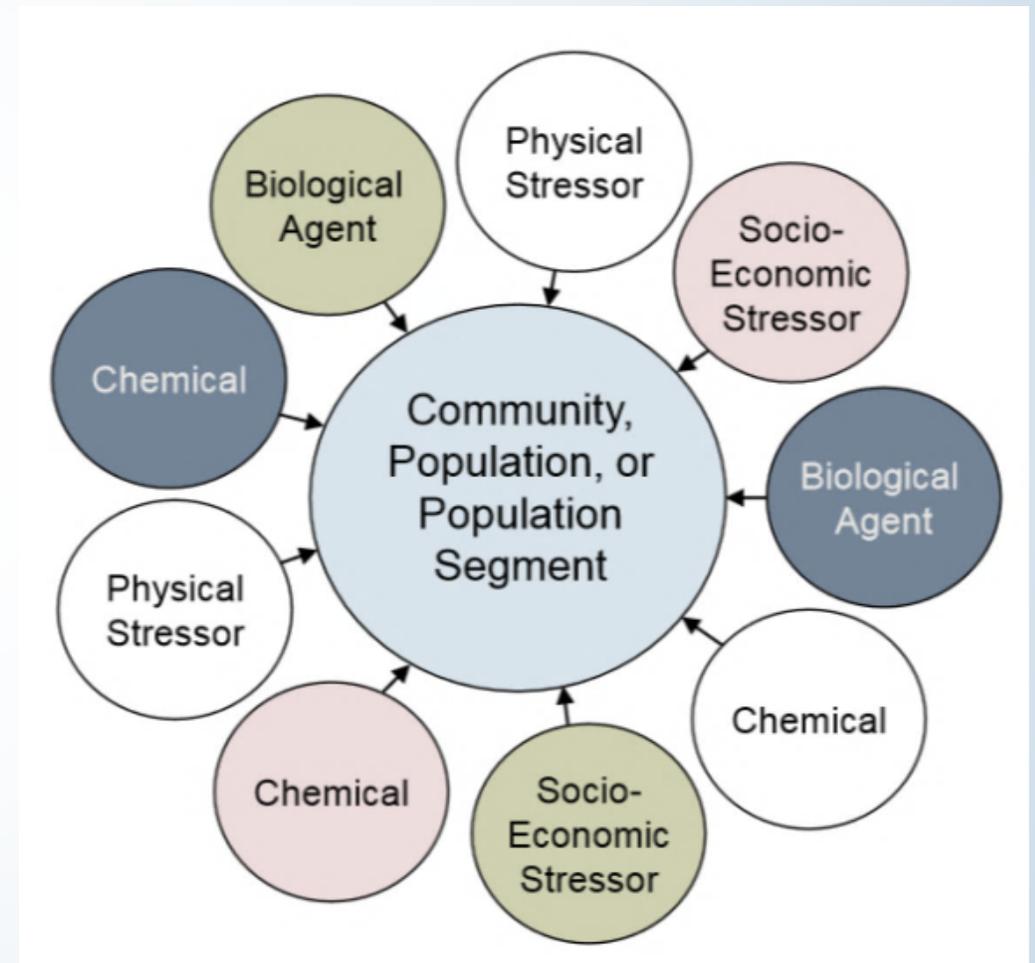
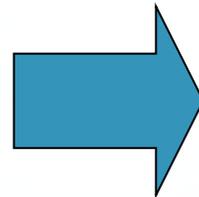
# COMMUNITY-SCALE CUMULATIVE IMPACT ASSESSMENT AND ENVIRONMENTAL JUSTICE

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U.S. EPA

# SHIFT IN EMPHASIS



# NEED FOR SIMPLER ANALYTIC TOOLS — CUMULATIVE IMPACT ASSESSMENTS

- Multiple chemical, physical, biological stressors
- Complex, multiple-route exposures
- Non-chemical stressors: human health, environmental conditions and vulnerable populations
- Population focus or geography-based
- Community stakeholder emphasis

# ENVIRONMENTAL JUSTICE IN CALIFORNIA: STATE LAWS

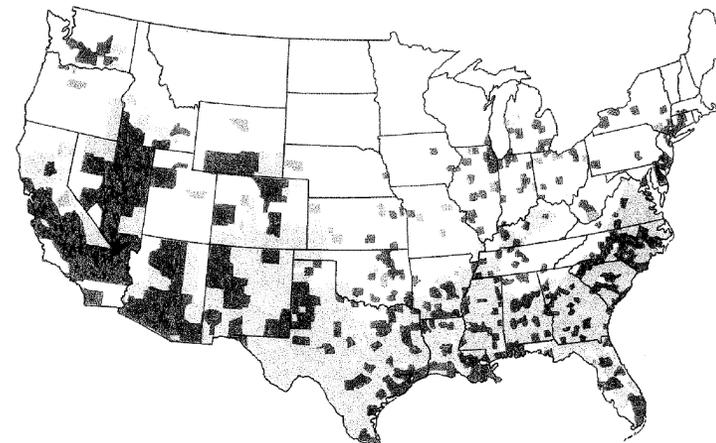
- ▶ “The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies.”
- ▶ **“...identify and address any gaps in existing environmental programs, policies, or activities that may impede the achievement of environmental justice.”**
  - ▶ Interagency Working Group on Environmental Justice
  - ▶ California Environmental Justice Advisory Committee

# BASIS OF ENVIRONMENTAL JUSTICE

- **Multiple pollution sources** disproportionately concentrated in low-income communities with high-minority populations.
- Socioeconomic stressors are associated with increased **sensitivity to pollution.**
- Combination of multiple pollutants and increased sensitivity results in **higher cumulative impacts**

## TOXIC WASTES AND RACE In The United States

A National Report on the Racial and Socio-Economic  
Characteristics of Communities  
with Hazardous Waste Sites



COMMISSION FOR RACIAL JUSTICE  
United Church of Christ  
©1987

# CALEPA DEFINITION OF CUMULATIVE IMPACTS

- **Exposures**, public health or **environmental effects**
- From the combined emissions and discharges in a geographic area
- Including environmental pollution from all sources (single and multi-media / routine and accidental)
- Taking into account **sensitive populations** and **socioeconomic factors**

— CalEPA Interagency Working Group on Environmental Justice



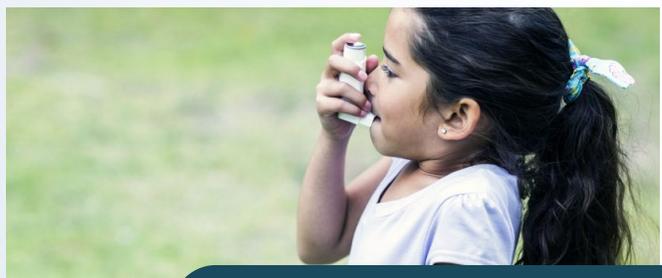
**Exposures:**  
*Contact with  
pollution*



**Environmental Effects:**  
*Adverse environmental  
conditions caused by  
pollutants*



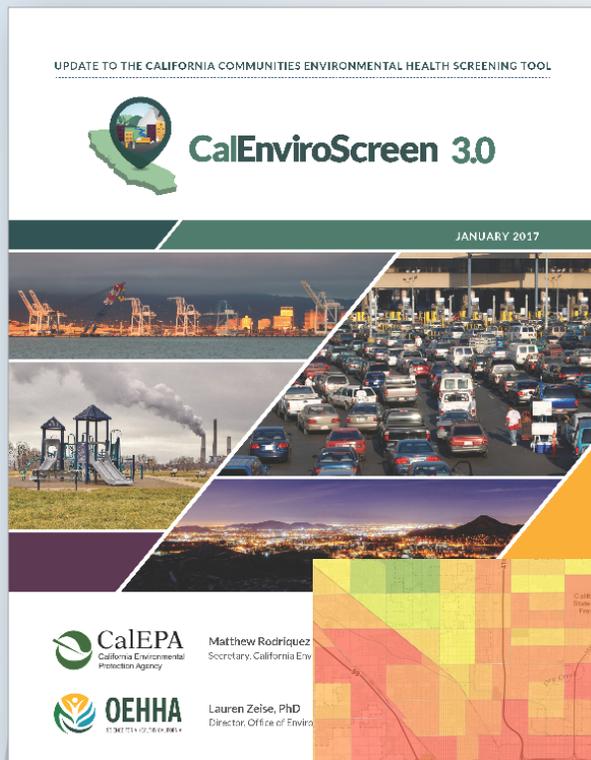
**Socioeconomic Factors:**  
*Community characteristics  
that result in increased  
vulnerability to pollutants*



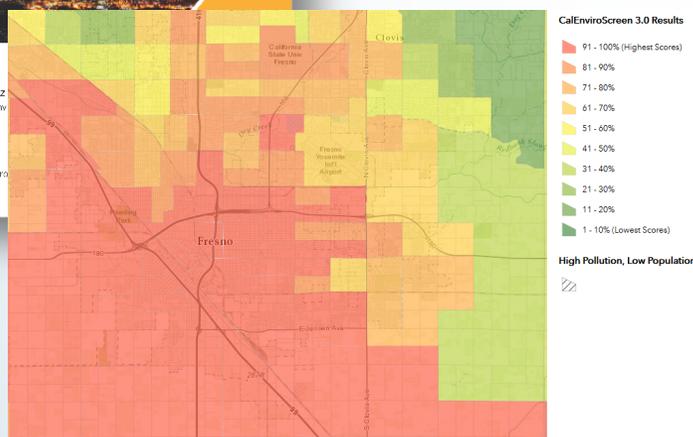
**Sensitive Populations:**  
*Populations with biological  
traits or health status that  
may magnify the effects of  
pollutant exposures*



# WHAT IS CALENVIROSCREEN?



- 20 indicators combined into a single score
  - 7 Exposures
  - 5 Environmental Effects
  - 3 Sensitive Populations
  - 5 Socioeconomic Factors



- Screening tool to compare cumulative impacts across California
- Version 3.0 released in 2017, preparing for an update in 2021

Available at: <https://oehha.ca.gov/calenviroscreen>

# CalEnviroScreen 3.0 Model



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Pollution Burden

## EXPOSURES

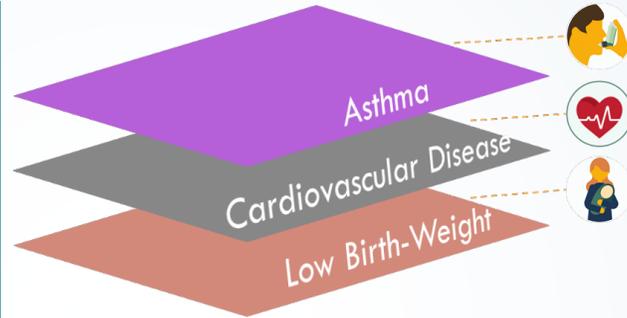


## ENVIRONMENTAL EFFECTS

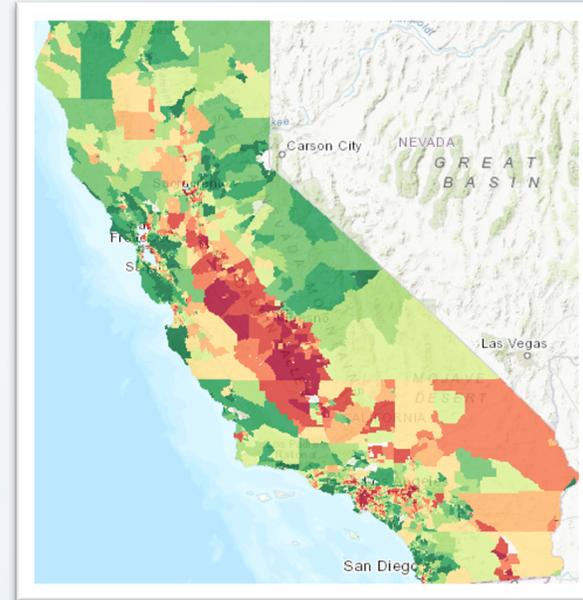
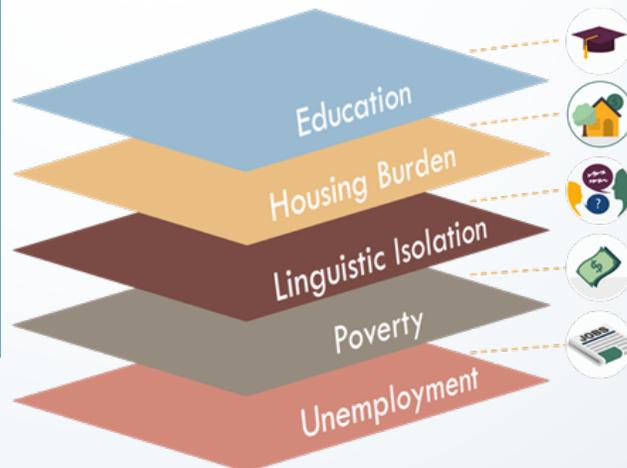


Population Characteristics

## SENSITIVE POPULATIONS



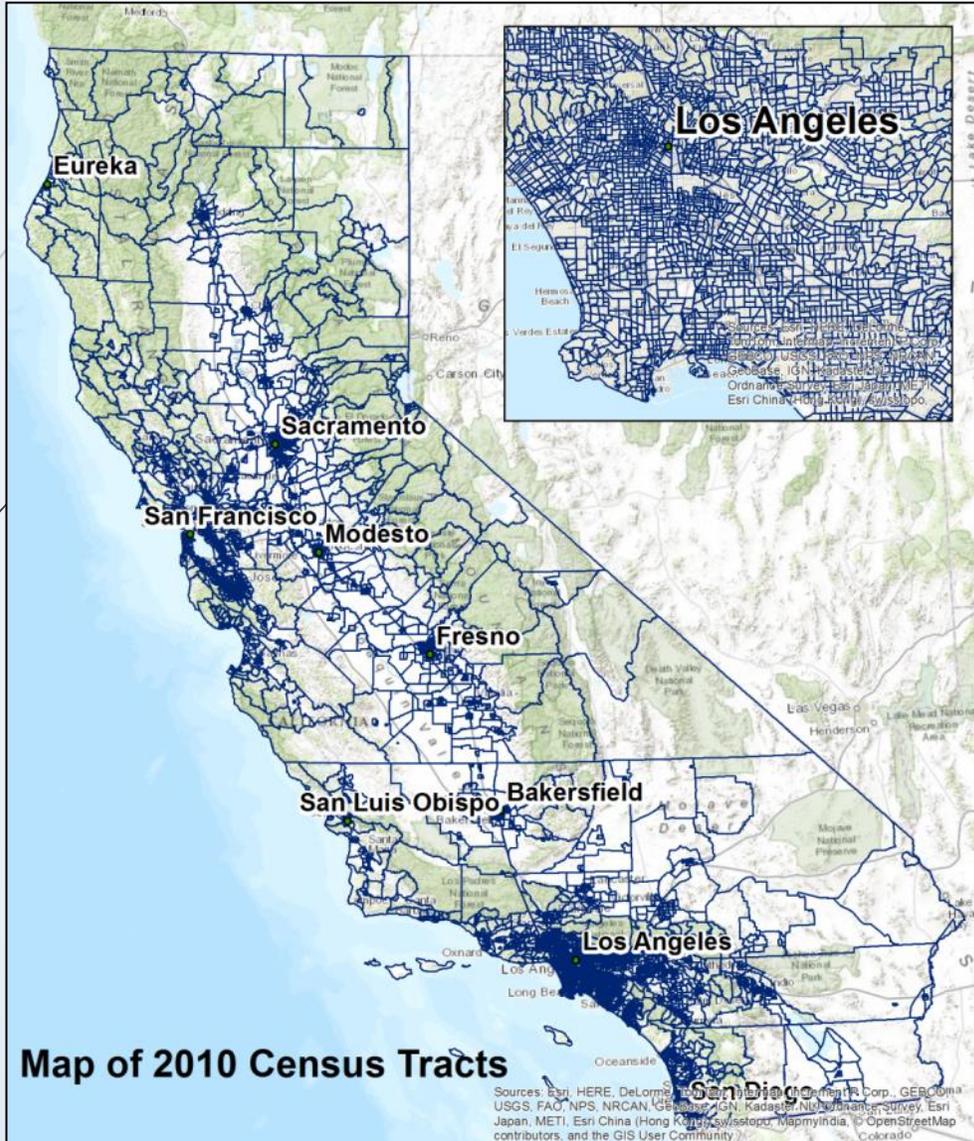
## SOCIOECONOMIC FACTORS



# GEOGRAPHICAL UNIT: CENSUS TRACTS

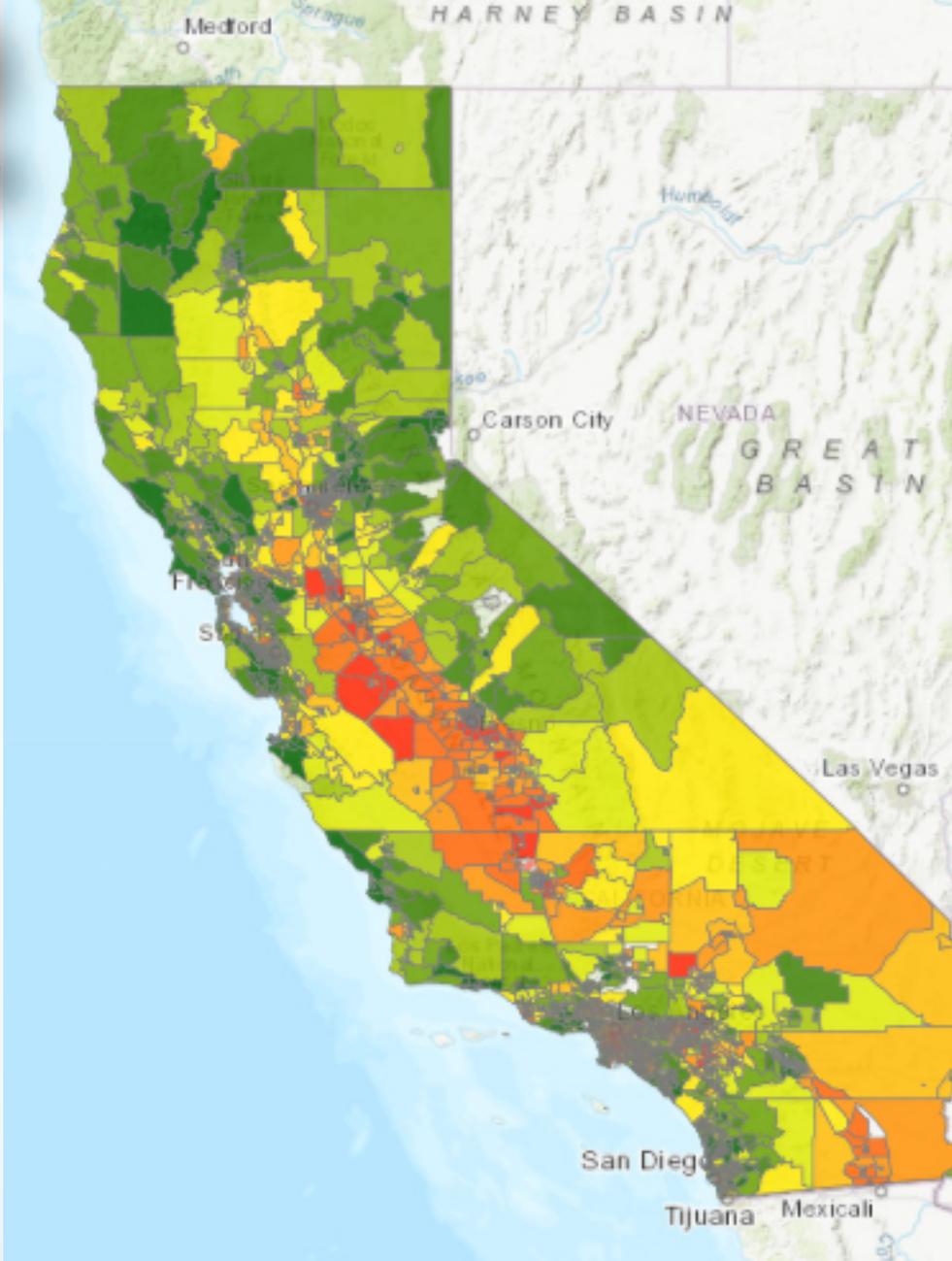


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- 2010 Census Tracts
- Relatively fine scale
- ~8,000 census tracts in California
- ~4,000 people per tract (range 1,200 - 8,000)
- Commonly used





### Legend

CalEnviroScreen 3.0 Results (June 2018 Update)

- 91 - 100% (Highest Scores)
- 81 - 90%
- 71 - 80%
- 61 - 70%
- 51 - 60%
- 41 - 50%
- 31 - 40%
- 21 - 30%
- 11 - 20%
- 1 - 10% (Lowest Scores)

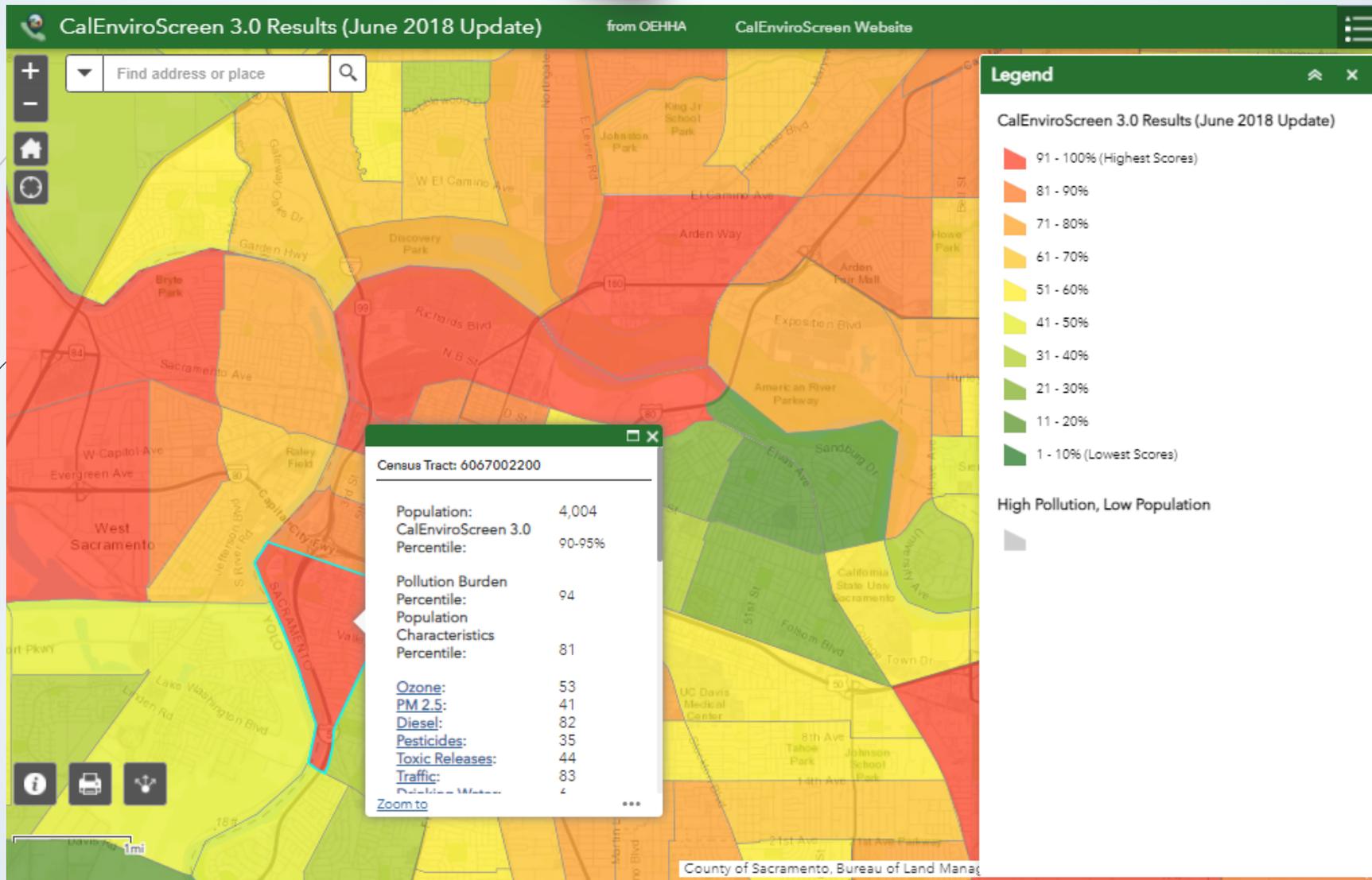
CalEnviroScreen 3.0 Results  
High Pollution, Low Population

A red and white diagonal striped icon, likely representing a specific category or status in the assessment results.

# ONLINE TOOL



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Available at: <https://oehha.ca.gov/calenviroscreen>

# Other Uses

External Grant & Investment Programs (e.g., CPUC)

SB535/AB1550 (CalEPA/ CARB)

Research Initiatives



## Uses In Government Statute



SB 1000 (local jurisdictions)

AB 617 (CARB)

Prioritizing Hiring

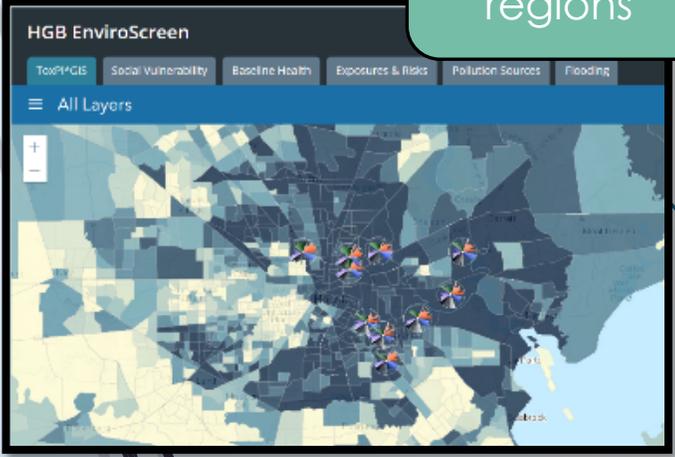
A model for other regions

All GGRF/CCI administering agencies

SB 673 (DTSC)

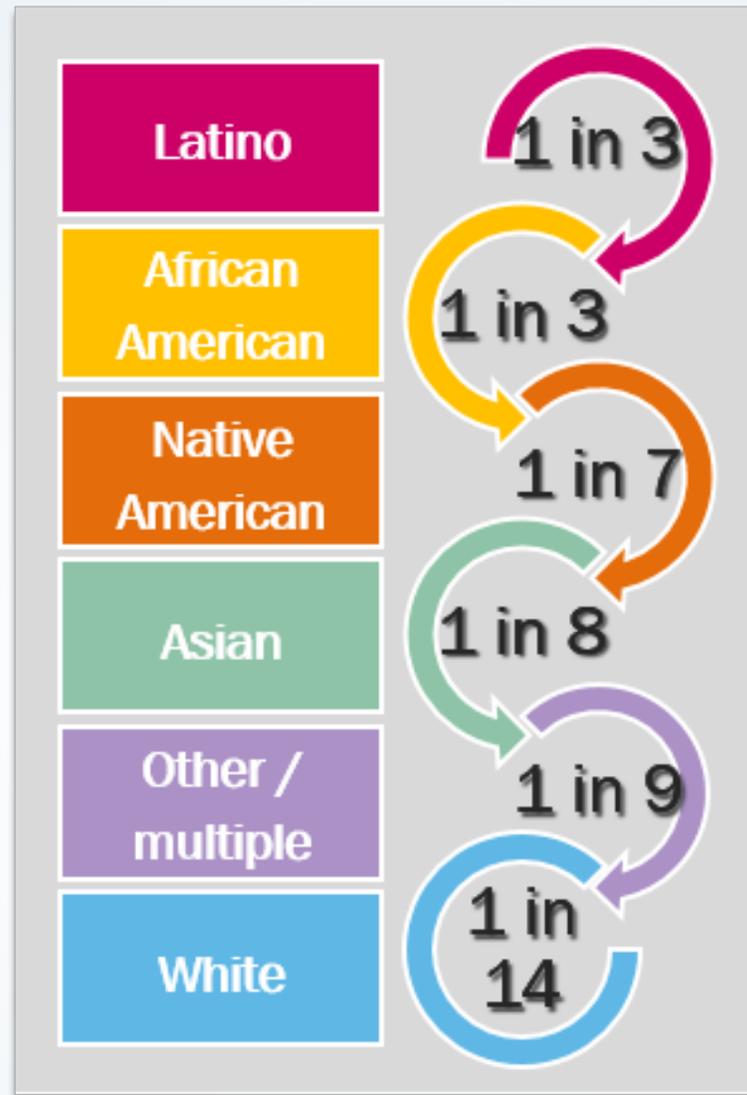
<b>Local Resident</b> – 30% of journey level hours	Tier 1 Local Residents and Tier 2 Local Residents.
<b>New Apprentice</b> – 40% of apprentice hours	A Local Resident who first enrolled in a state-registered apprenticeship program at time of commencement of Project Work, or within 12 months prior to commencement of project work.
<b>Tier 1 Local Resident</b>	A person residing in the City of Fresno and in the top 5% of disadvantaged communities per CalEnviroScreen 2.0. (See attached map.)
<b>Tier 2 Local Resident</b>	A person residing in Fresno County or Madera County and in the top 5% of disadvantaged communities per CalEnviroScreen 2.0. (See attached map.)

Internal Grant & Investment Programs (e.g., CalRecycle)



# CUMULATIVE IMPACTS AND RACIAL DIVIDE

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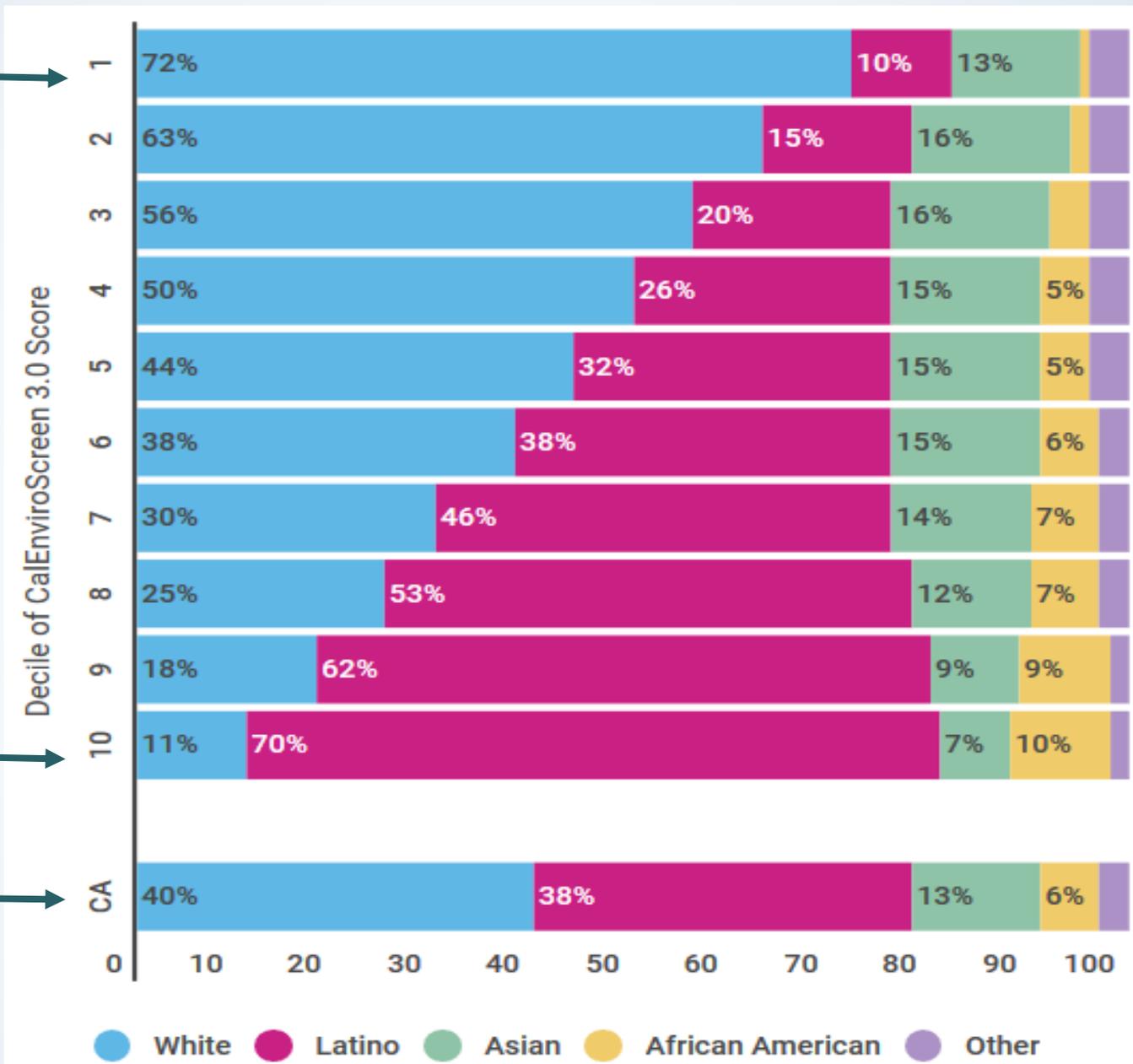
**FRACTION OF EACH RACIAL/ETHNIC GROUP  
LIVING IN THE TOP 20% CENSUS TRACTS**



Least Burdened Areas

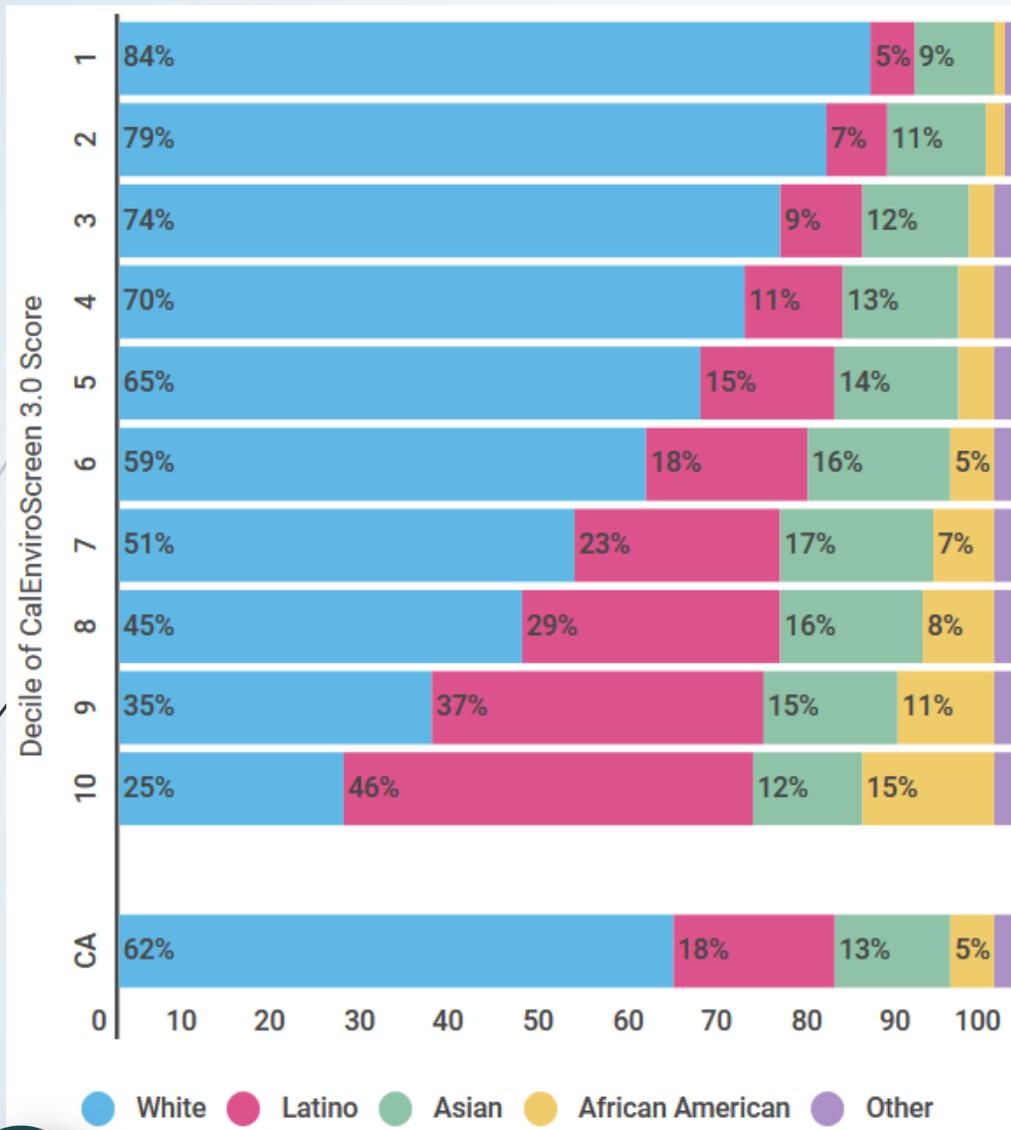
Most Burdened Areas

State

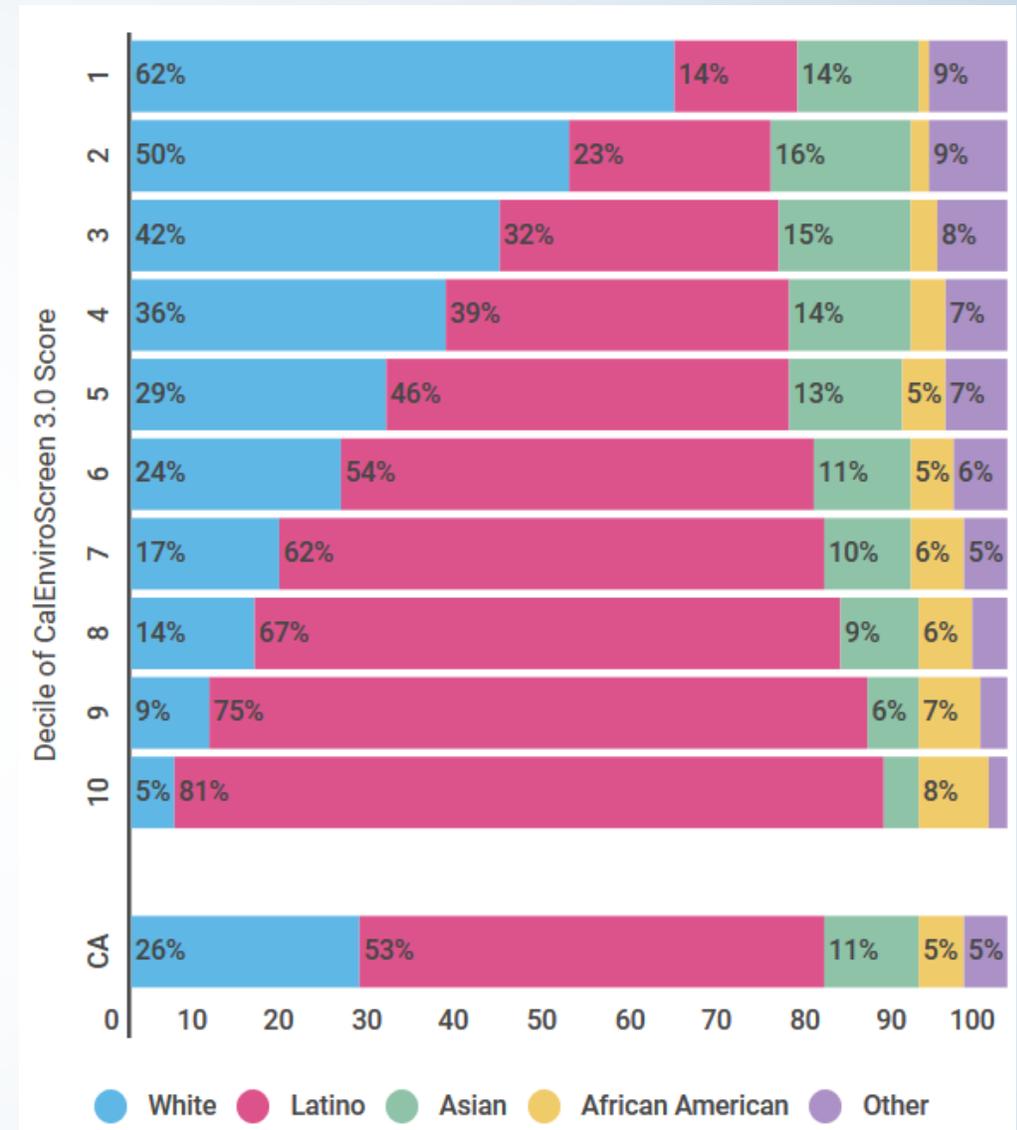


## RACE/ETHNICITY FOR EACH DECILE OF CALENVIROSCREEN 3.0





# ELDERLY



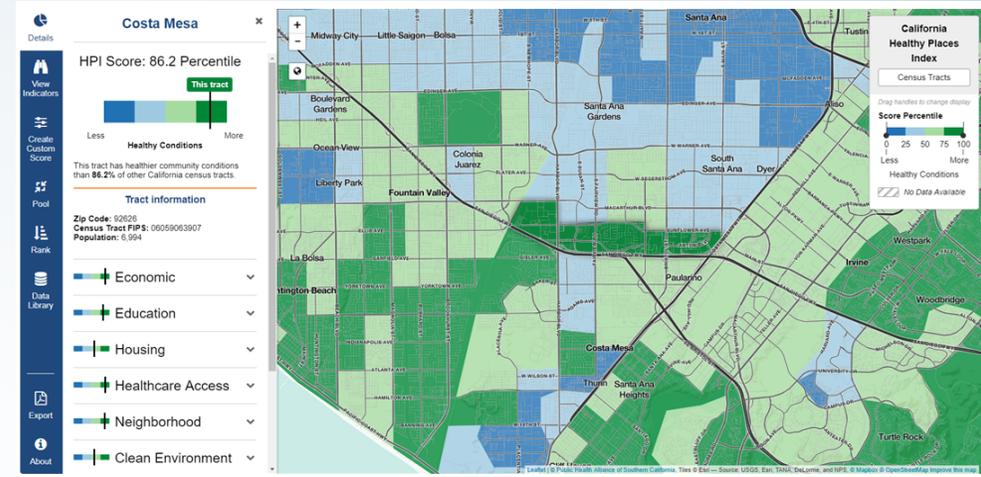
# CHILDREN



# OTHER RESOURCES

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- CEJA SB1000 Toolkit
- Public Health Alliance of Southern California Healthy Places Index
  - Economic, education, housing, healthcare access, neighborhood, clean environment
- CDPH Climate Change and Health Vulnerability Indicators for California
  - Environmental exposures, Population Sensitivity, adaptive capacity



ENVIRONMENTAL EXPOSURES	<b>Extreme Heat Days</b>	Projected number of extreme heat days <sup>1</sup>
	<b>Air Quality (PM<sub>2.5</sub>)</b>	Three-year annual mean concentration of particulate matter (PM <sub>2.5</sub> ) <sup>3, 6</sup>
	<b>Air Quality (ozone)</b>	Three-year ozone concentration exceedance above state standard <sup>3, 6</sup>
	<b>Wildfires</b>	Percent of population currently living in high risk fire hazard zone <sup>4, 6</sup>
	<b>Sea Level Rise (in coastal areas)</b>	Percent of population living in 100-year flood zone and 55 inches of sea level rise <sup>12, 6</sup>
POPULATION SENSITIVITY	<b>Children</b>	Percent of population aged less than 5 years <sup>7</sup>
	<b>Elderly</b>	Percent of population aged 65 years or older <sup>7</sup>
	<b>Poverty</b>	Percent of population whose income in the past year was below poverty level <sup>7</sup>
	<b>Education</b>	Percent of population aged $\geq 25$ years with less than high school educational attainment <sup>7</sup>
	<b>Outdoor Workers</b>	Percent of population employed and aged $\geq 16$ years working outdoors <sup>7</sup>
	<b>Vehicle Ownership</b>	Percent of occupied households with no vehicle ownership <sup>7</sup>
	<b>Linguistic Isolation</b>	Percent of households with no one aged $\geq 14$ years speaking English <sup>7</sup>
	<b>Physical Disability</b>	Percent of population with physical disability (ambulatory disability) <sup>7</sup>
	<b>Mental Disability</b>	Percent of population with mental disability (cognitive disability) <sup>7</sup>
	<b>Health Insurance</b>	Percent of population without health insurance <sup>7</sup>
	<b>Violent Crime Rate</b>	Number of violent crimes per 1,000 residents <sup>8</sup>
ADAPTIVE CAPACITY	<b>Air Conditioning</b>	Percent of households without air conditioning <sup>9, 6</sup>
	<b>Tree Canopy</b>	Percent of area not covered by tree canopy <sup>10, 6</sup>
	<b>Impervious Surfaces</b>	Percent of area covered by impervious surfaces <sup>10, 6</sup>

**CALIFORNIA ENVIRONMENTAL JUSTICE ALLIANCE**

WHO WE ARE - WHAT WE DO - NEWS - RESOURCES

SHARE THIS

**SB 1000 Toolkit: Planning for Healthy Communities**

**Download our full SB 1000 Toolkit below.**

A history of poor and discriminatory land use practices has put the majority of polluting industries in the backyards of the most disenfranchised local communities, right next to homes and schools. Consequently, low-income communities and communities of color are more likely to suffer from exposure to toxic chemicals, leading to higher rates of asthma, birth defects and cancers. For years, CEJA has been advancing state legislation to remedy these environmental injustices.

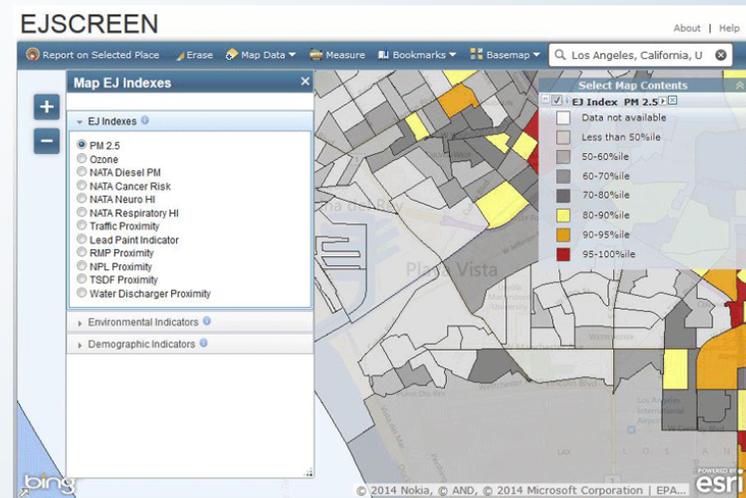
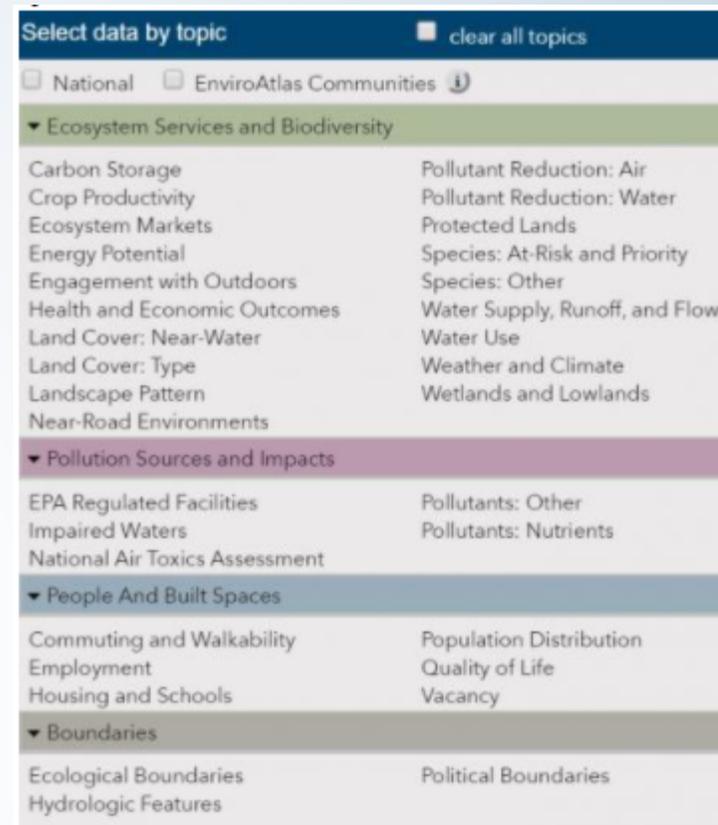
Equitable land use planning is now more likely to become a reality through SB 1000. The Planning for Healthy Communities

**SB 1000 Implementation Toolkit**  
Planning for Healthy Communities

# OTHER RESOURCES

## FEDERAL LEVEL

- EnviroAtlas
  - 400+ datasets
  - 4 categories: Ecosystem Services and Biodiversity, Pollution Sources and Impacts, People and Built Spaces, Boundaries
  
- EJSCREEN
  - 11 environmental indicators
  - 6 demographic indicators
  - 11 EJ indexes



# Thank you!

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