

CalEnviroScreen: Identifying Communities with Cumulative Impacts

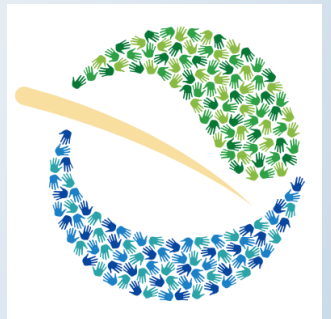
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Environmental Justice Program

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?

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

CUMULATIVE IMPACT OF A SINGLE CHEMICAL

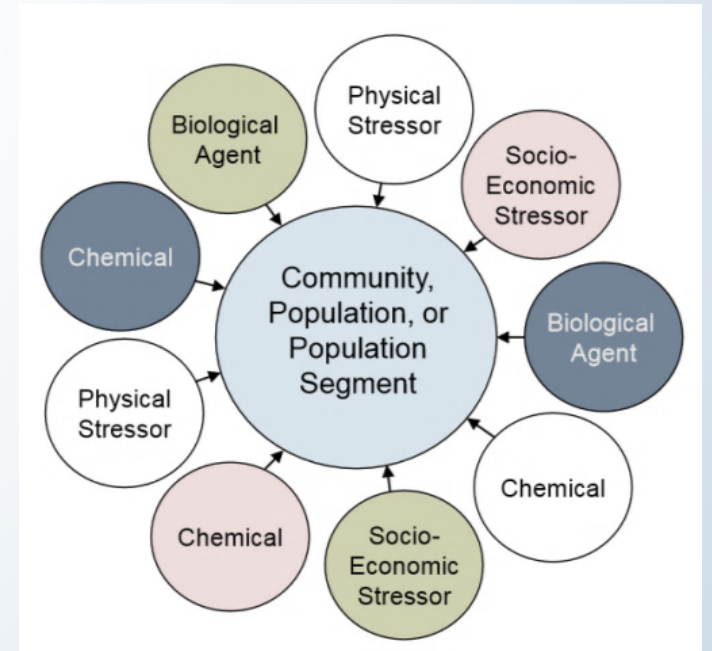
- Accumulation in the body due to chemistry
 - Fat and bone are common sites
 - Persistent, bioaccumulative and toxic chemicals such as dioxins, DDT, and PCBs.
 - Others: lead, PBDE flame retardants
- Accumulation of harm over time, even though the chemical may no longer be present
 - Carcinogens
 -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

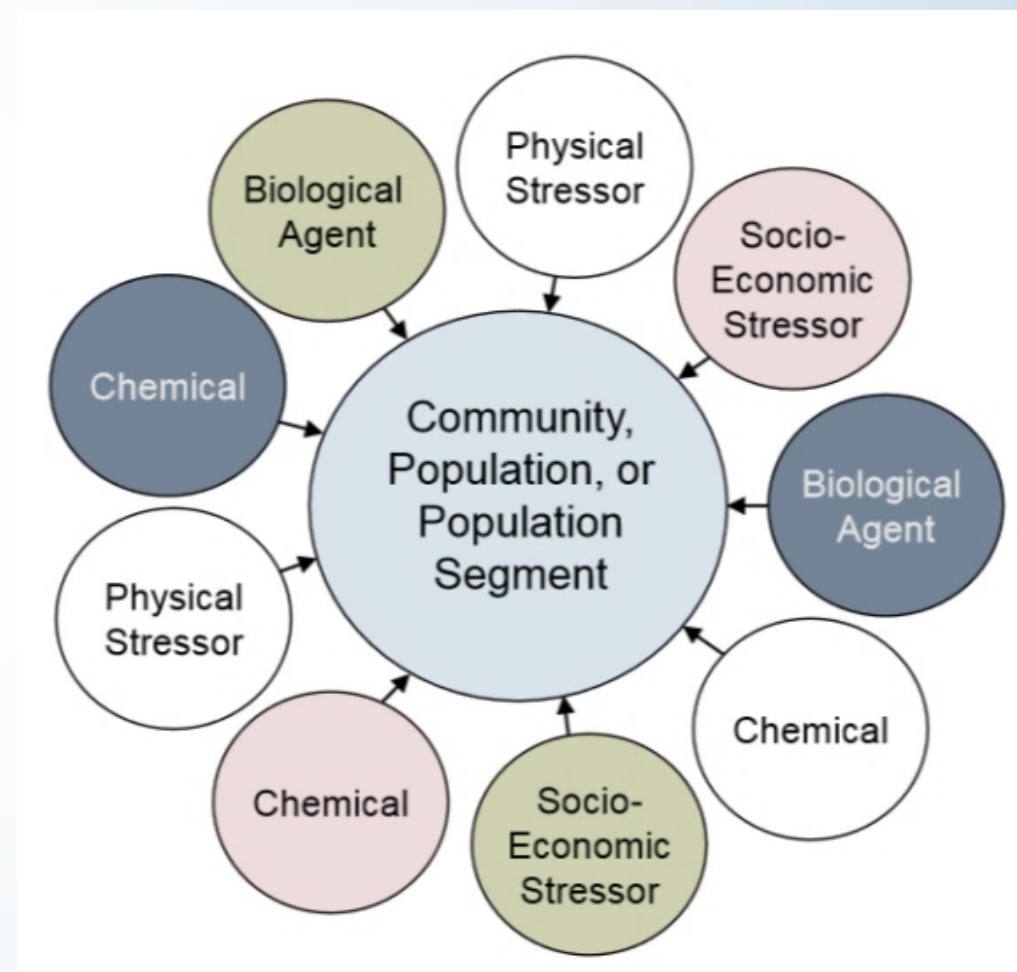
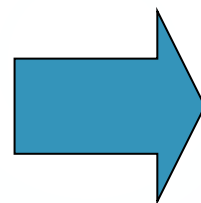
COMMUNITY-SCALE CUMULATIVE IMPACT ASSESSMENT AND ENVIRONMENTAL JUSTICE

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U.S. EPA

SHIFT IN EMPHASIS



U.S. EPA Framework for Cumulative Risk Assessment (2003)

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

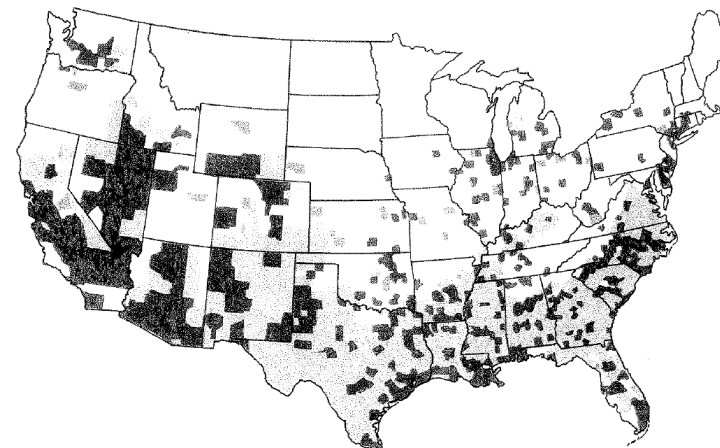
- “The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies.”
- **“...identify and address any gaps in existing environmental programs, policies, or activities that may impede the achievement 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
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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



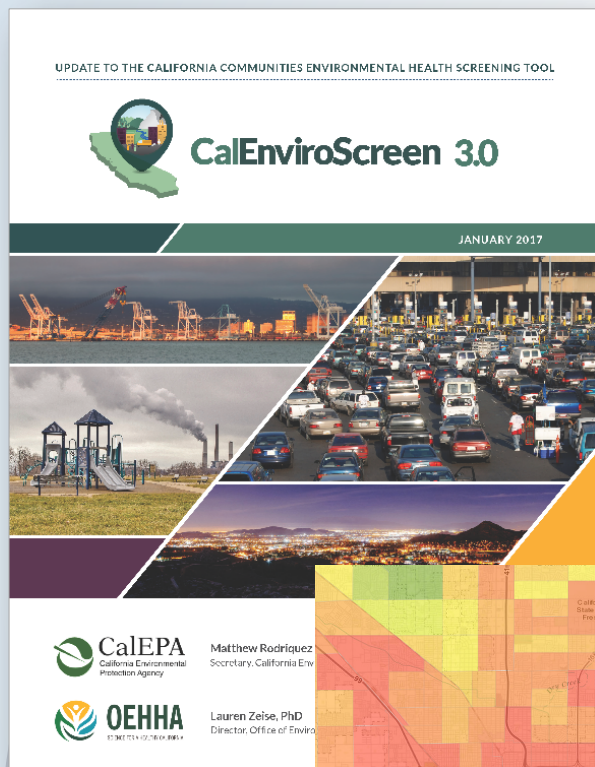
Sensitive Populations:
Populations with biological
traits or health status that
may magnify the effects of
pollutant exposures



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

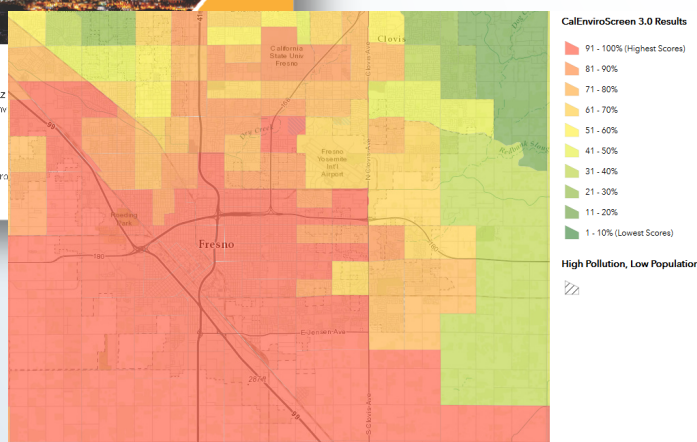


WHAT IS CalEnviroScreen?



➤ 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

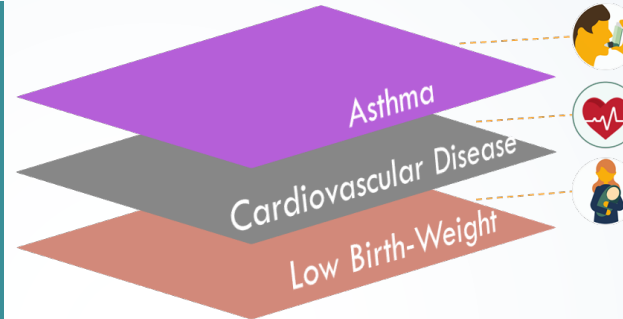


ENVIRONMENTAL EFFECTS

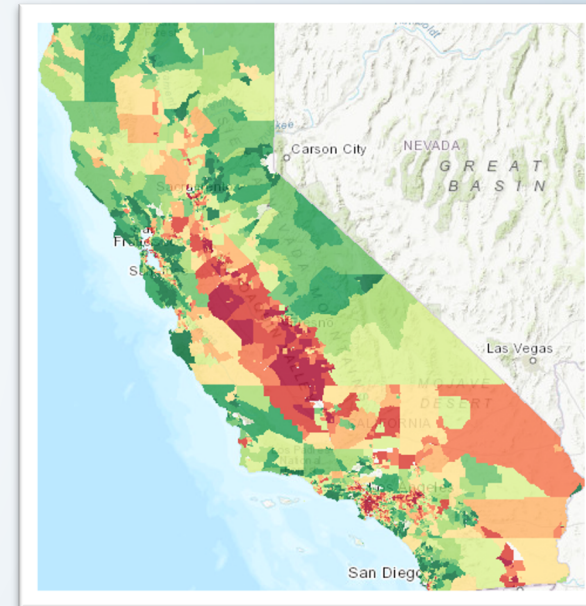
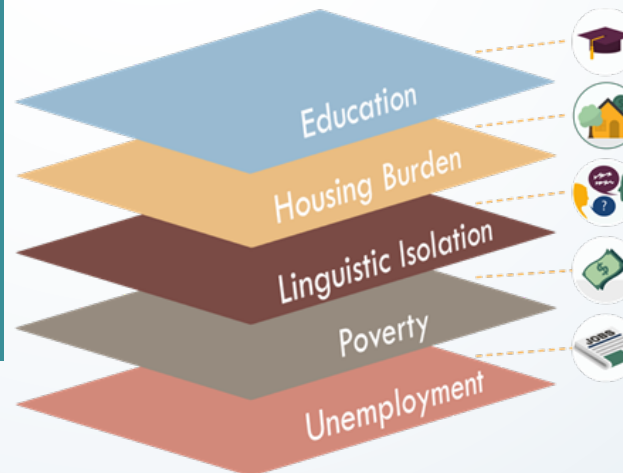


Population Characteristics

SENSITIVE POPULATIONS



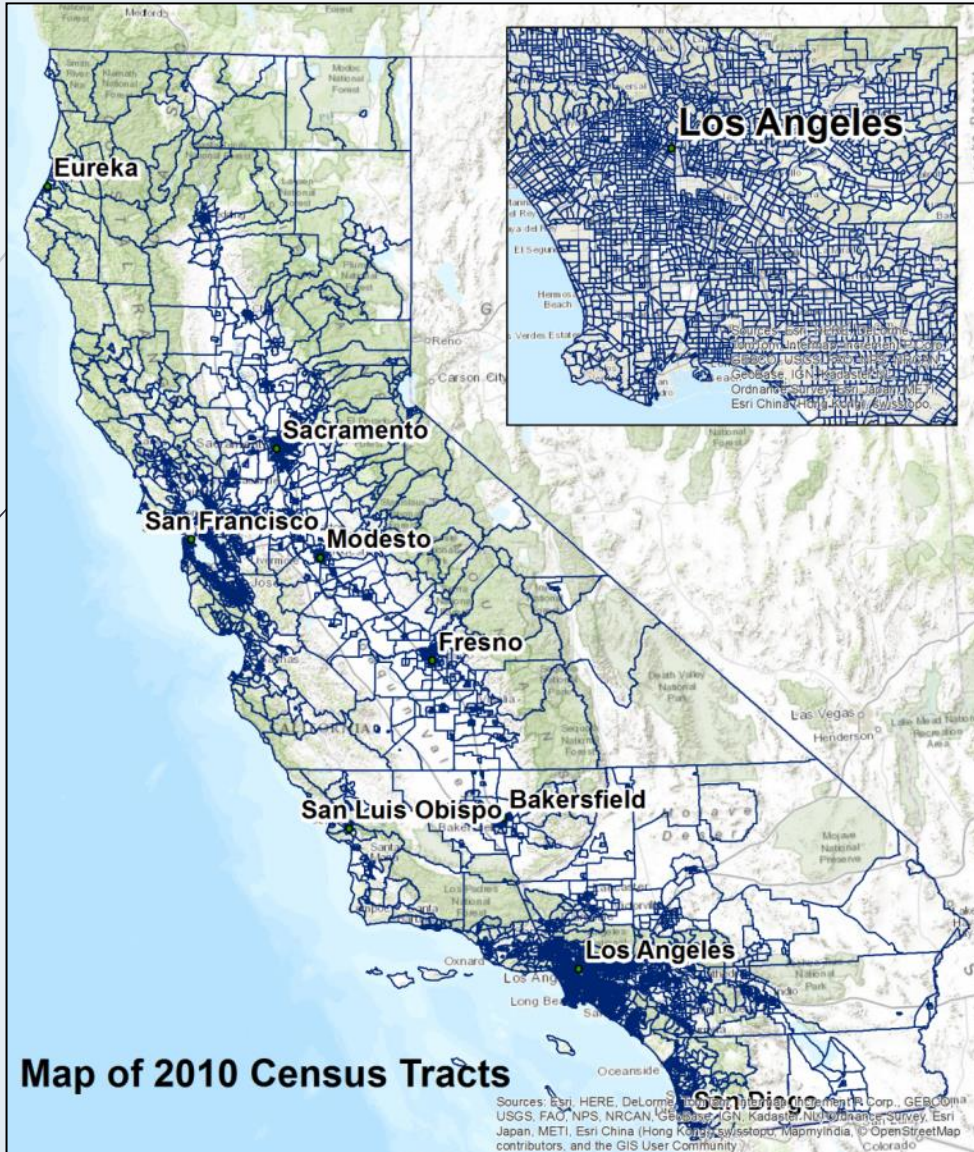
SOCIOECONOMIC FACTORS



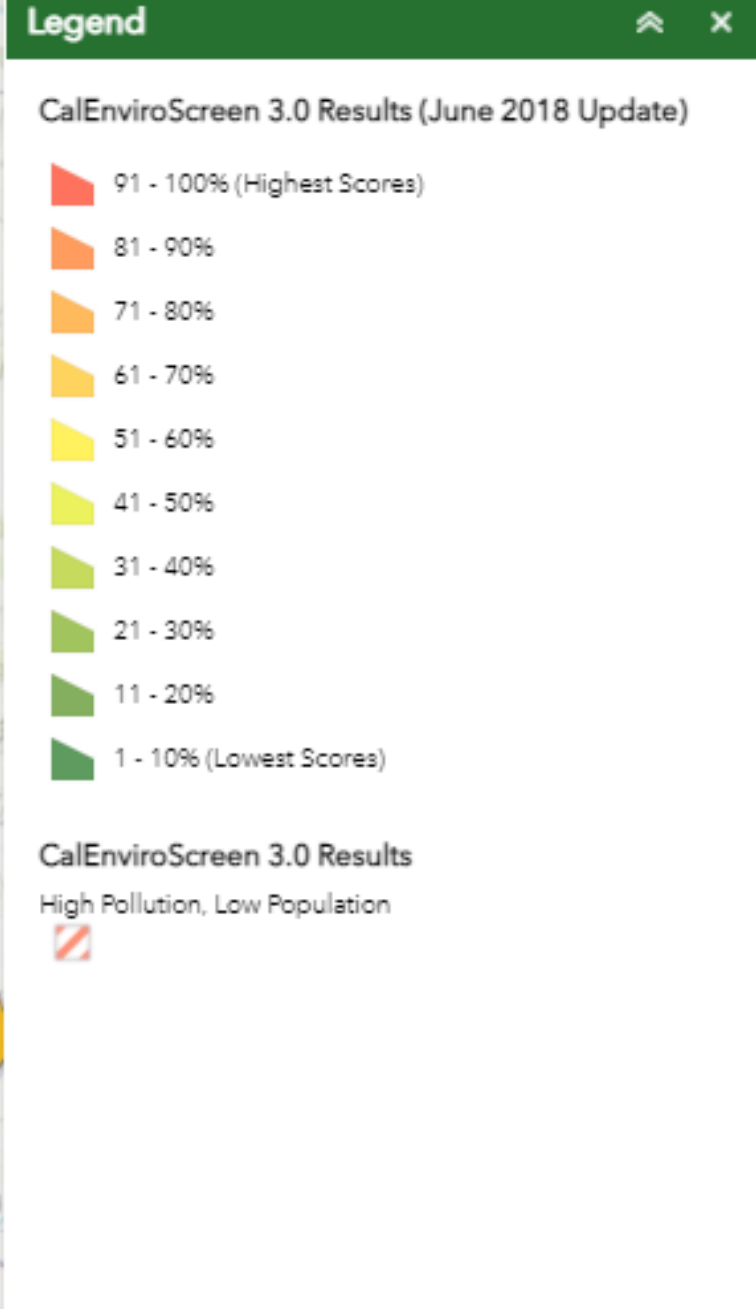
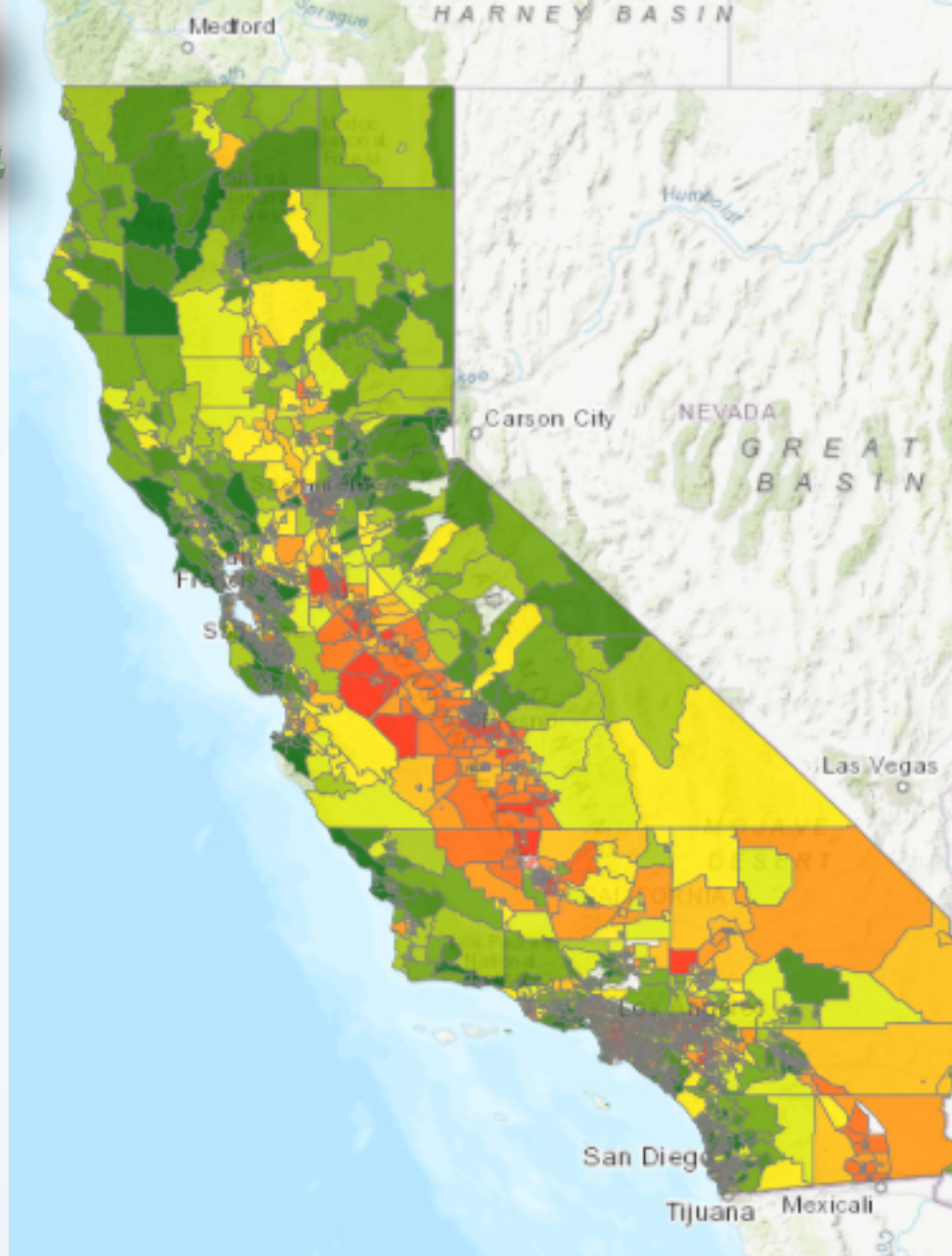
GEOGRAPHICAL UNIT: CENSUS TRACTS



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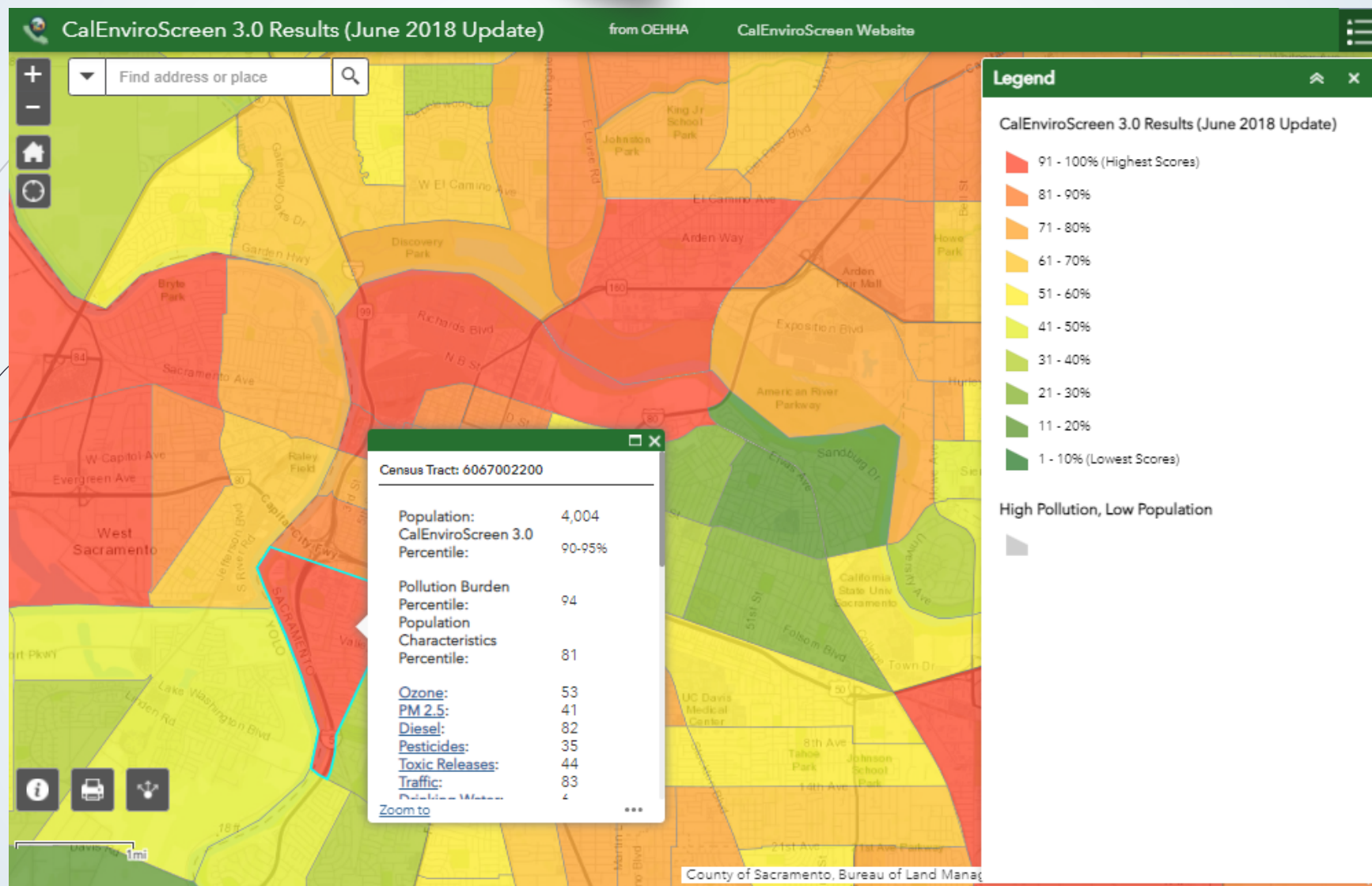
- 2010 Census Tracts
- Relatively fine scale
- ~8,000 census tracts in California
- ~4,000 people per tract (range 1,200 - 8,000)
- Commonly used



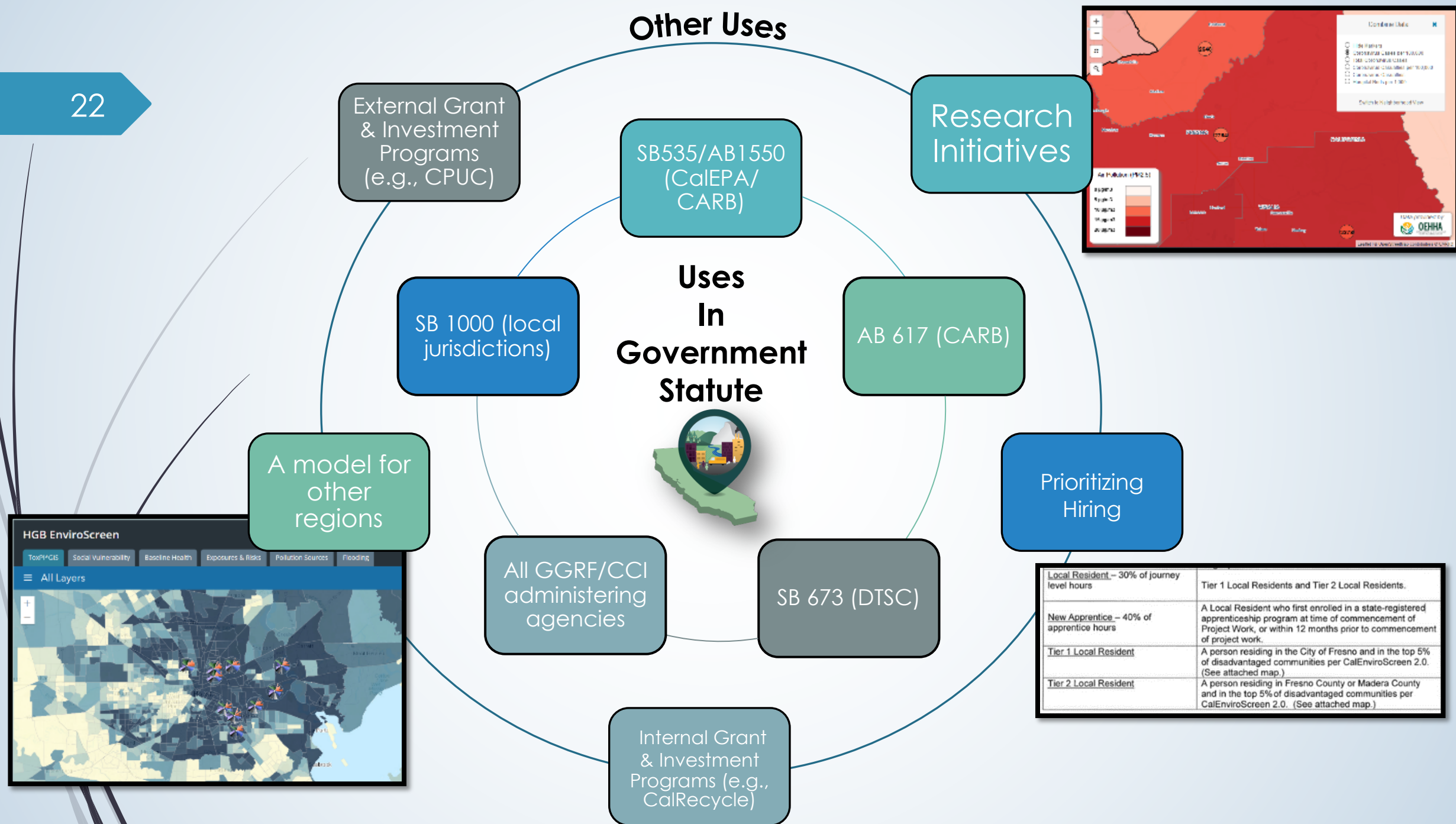
ONLINE TOOL



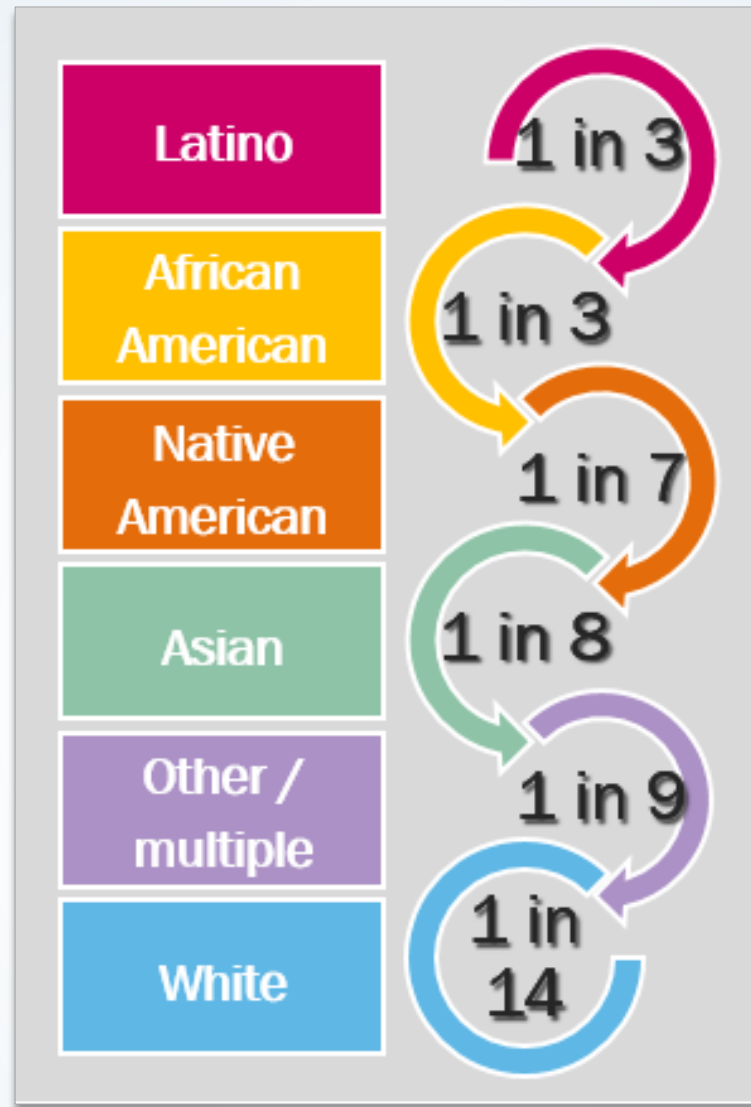
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Available at: <https://oehha.ca.gov/calenviroscreen>



CUMULATIVE IMPACTS AND RACIAL DIVIDE



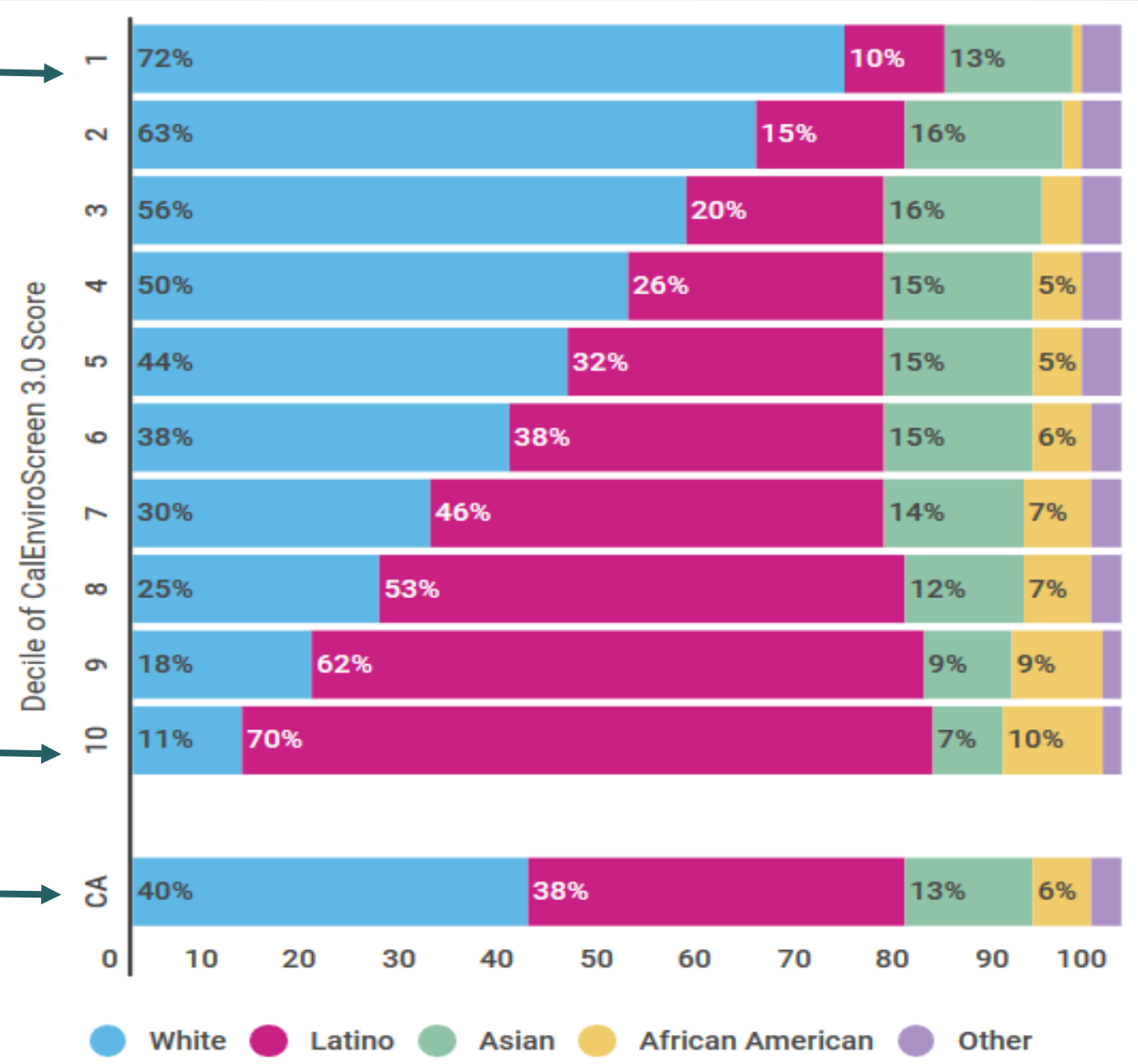
**FRACTION OF EACH RACIAL/ETHNIC GROUP
LIVING IN THE TOP 20% CENSUS TRACTS**



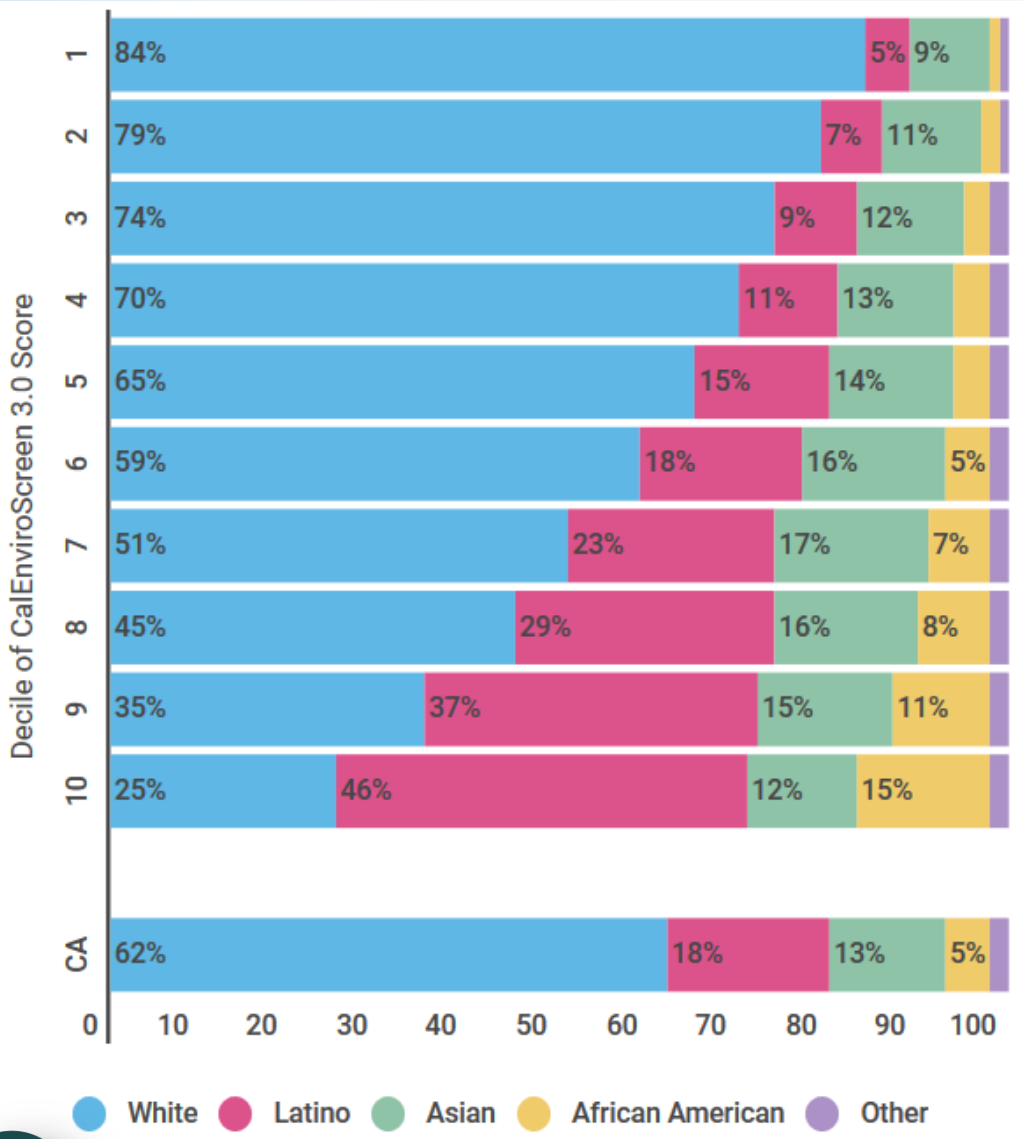
Least Burdened Areas

Most Burdened Areas

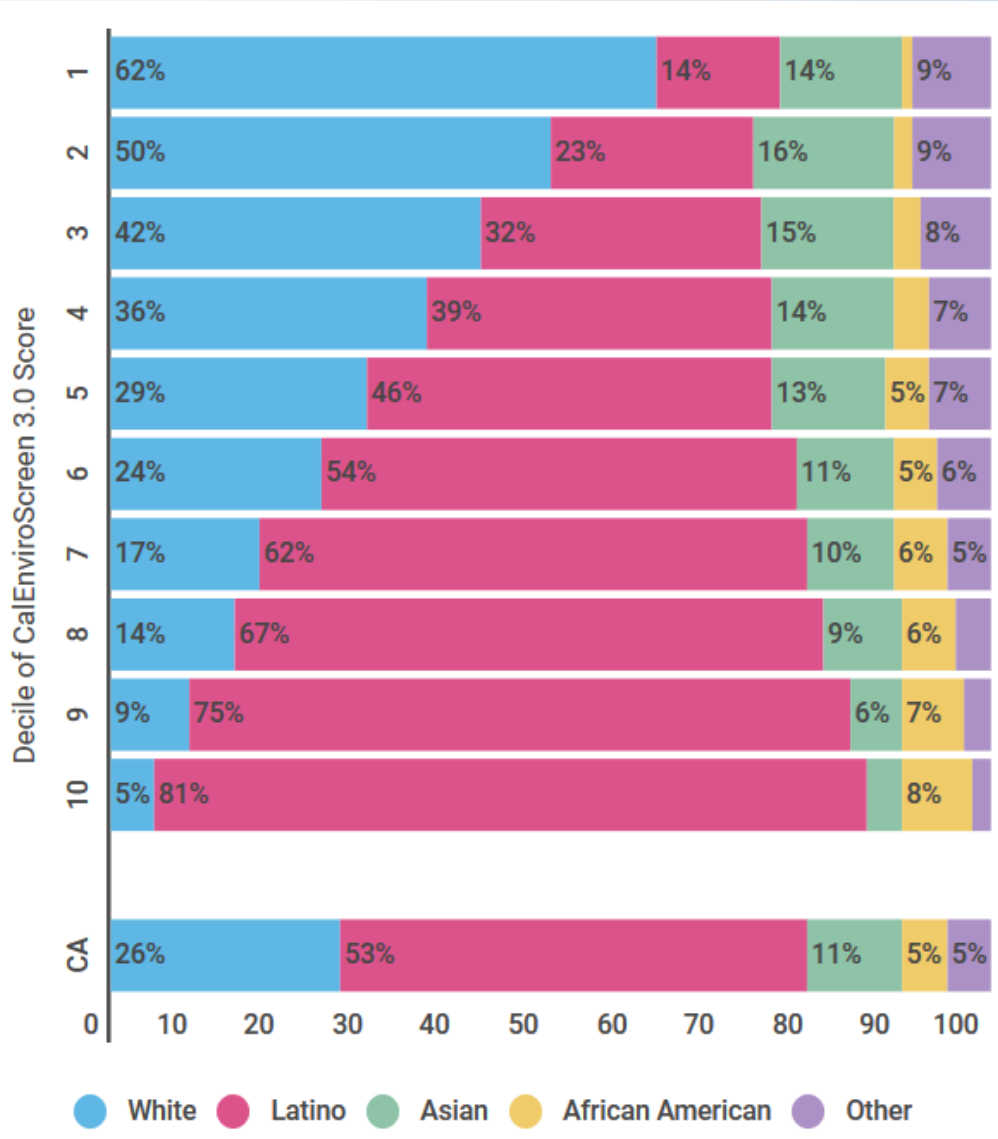
State



RACE/ETHNICITY FOR EACH DECILE OF CALENVIROSCREEN 3.0



ELDERLY

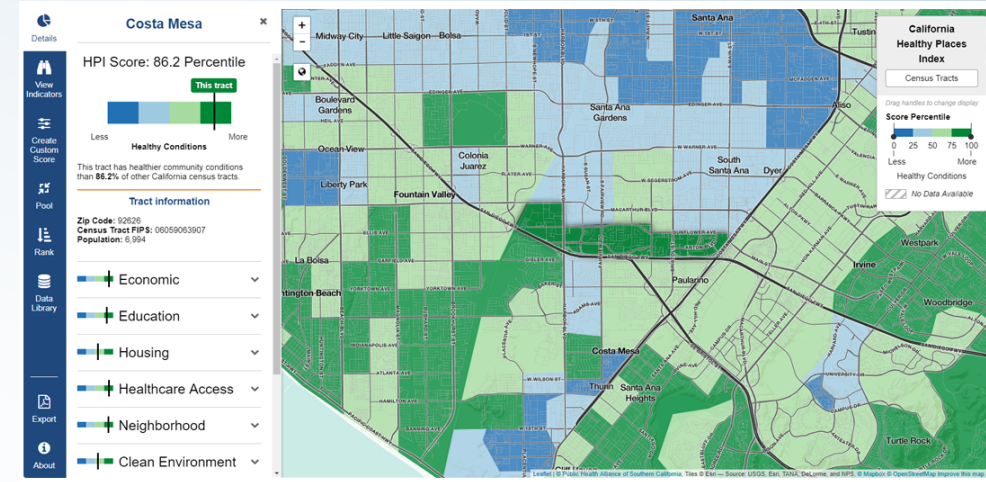


CHILDREN

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

CALIFORNIA ENVIRONMENTAL JUSTICE ALLIANCE

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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

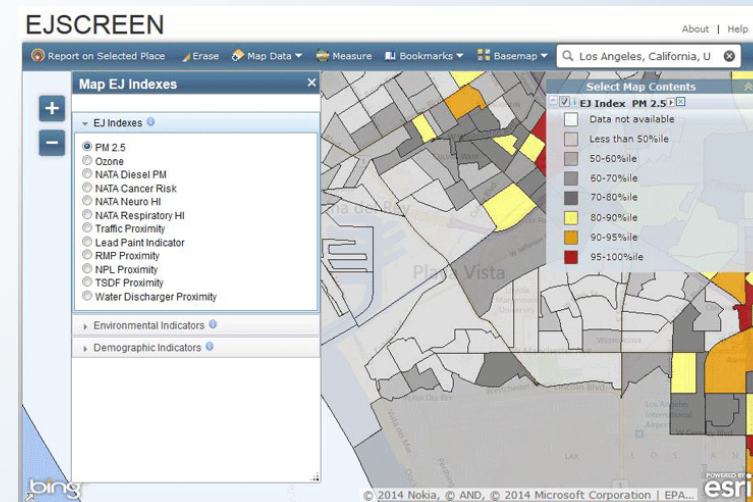
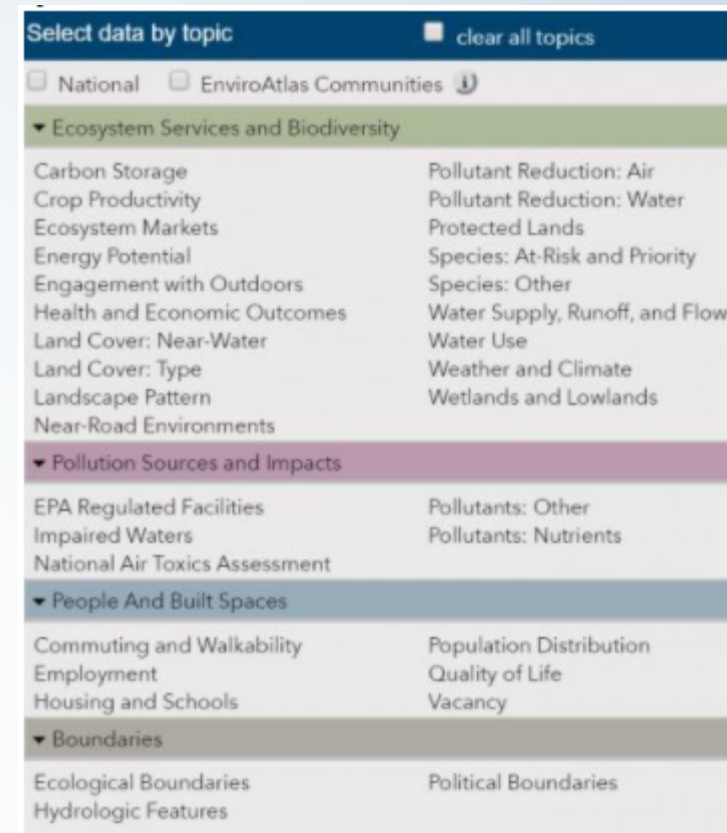
FEDERAL LEVEL

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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