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# California's Wildfire Hazard & Vulnerable Populations

IEPR Workshop August 2, 2018  
California Energy Commission

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California Department of Public Health



Climate Change and Health Equity Program

**California Department of Public Health  
Climate Change and Health Equity Program**

<https://www.cdph.ca.gov/Programs/OHE/Pages/CCHEP.aspx>

**CalBRACE**

<https://www.cdph.ca.gov/Programs/OHE/Pages/CalBRACE.aspx>

**Climate Change and Health Vulnerability Indicators**

<https://discovery.cdph.ca.gov/ohe/CCHViz/>





A photograph showing the aftermath of a disaster, likely a fire or explosion. In the center, a brick chimney stands tall, rising from a large, jagged pile of rubble and debris. The surrounding area is filled with charred trees and scattered wreckage. The sky is blue with white clouds. The text 'Direct Impacts' is overlaid in large, bold, dark letters across the top half of the image.

# Direct Impacts

**Burns (injury and death)**

**Displacement**

**Traumatic stress (mental health)**

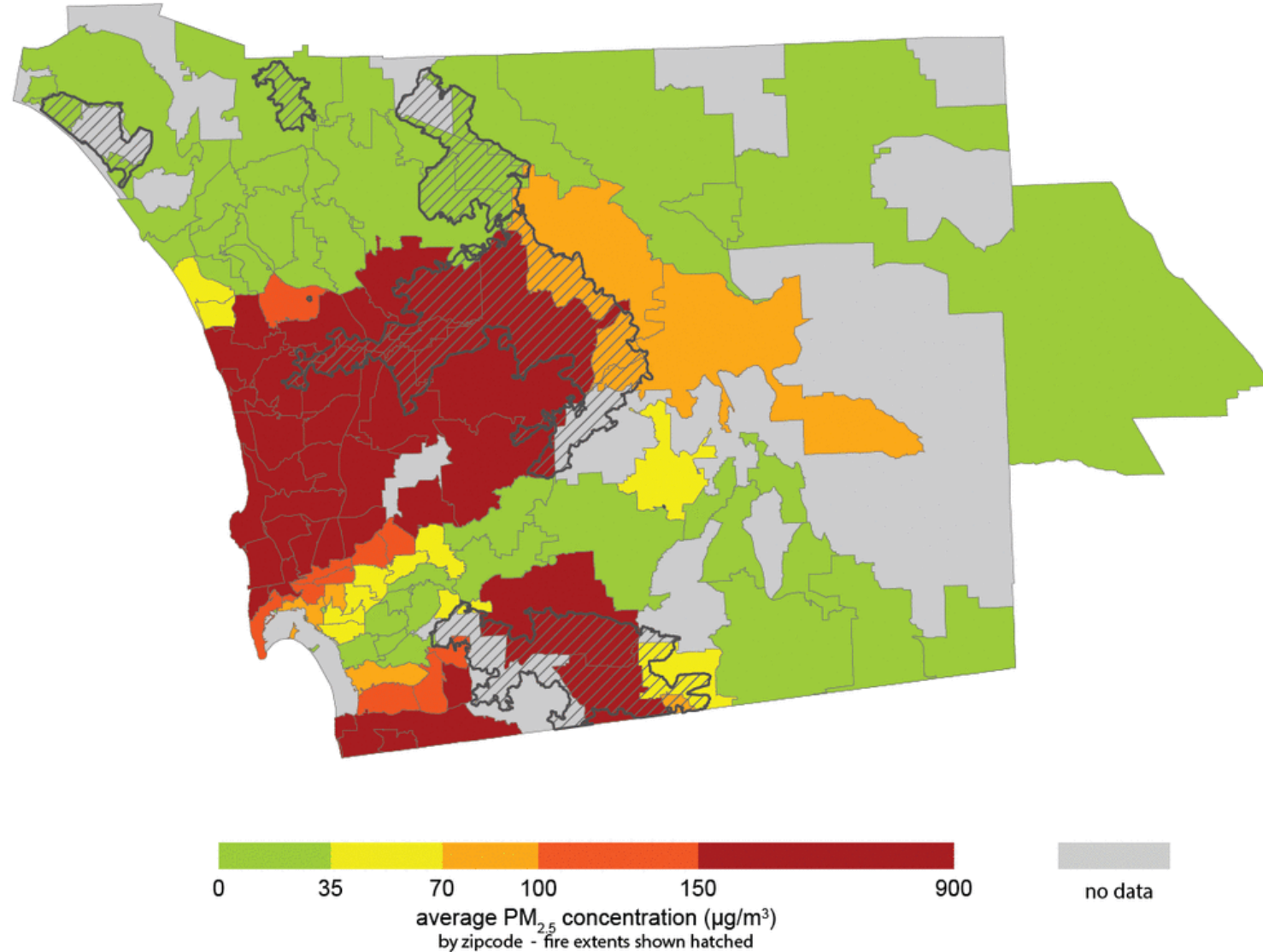


An aerial photograph showing a large-scale wildfire. Thick, dark smoke billows from the ground, partially obscuring the landscape. The terrain appears to be a mix of dry vegetation and open land. The smoke is dense and spreads across a significant portion of the frame.

# **Indirect Impacts**

**Smoke inhalation**  
**Asthma and cardiovascular**  
**disease**

# Day 1



Hutchinson, Justine A., Jason Vargo, Meredith Milet, Nancy HF French, Michael Billmire, Jeffrey Johnson, and Sumi Hoshiko. "The San Diego 2007 wildfires and Medi-Cal emergency department presentations, inpatient hospitalizations, and outpatient visits: An observational study of smoke exposure periods and a bidirectional case-crossover analysis." *PLoS medicine* 15, no. 7 (2018): e1002601.



# exposure

**Exposure** is contact between a person and one or more biological, chemical, or physical stressors, including stressors affected by climate change.



# sensitivity

**Sensitivity** is the degree to which people or communities are affected, either adversely or beneficially, by climate variability and change.



# capacity

**(Adaptive) Capacity** is the ability of communities, institutions, or people to adjust to potential hazards, to take advantage of opportunities, or to respond to consequences.



**VULNERABILITY of Human Health to Climate Change**



## HEALTH IMPACTS

Injury, acute and chronic illness (including mental health), developmental issues, and death.

# exposure

# sensitivity

# capacity

ENVIRONMENTAL EXPOSURES	Extreme Heat Days	Projected number of extreme heat days <sup>1</sup>
	Air Quality (PM <sub>2.5</sub> )	Three-year annual mean concentration of particulate matter (PM <sub>2.5</sub> ) <sup>3, 6</sup>
	Air Quality (ozone)	Three-year ozone concentration exceedance above state standard <sup>3, 6</sup>
	Wildfires	Percent of population currently living in high risk fire hazard zone <sup>*4, 6</sup>
	Sea Level Rise <small>(in coastal areas)</small>	Percent of population living in 100-year flood zone and 55 inches of sea level rise <sup>*2, 6</sup>
POPULATION SENSITIVITY	Children	Percent of population aged less than 5 years <sup>6</sup>
	Elderly	Percent of population aged 65 years or older <sup>6</sup>
	Poverty	Percent of population whose income in the past year was below poverty level <sup>*7</sup>
	Education	Percent of population aged $\geq 25$ years with less than high school educational attainment <sup>*7</sup>
	Outdoor Workers	Percent of population employed and aged $\geq 16$ years working outdoors <sup>*7</sup>
	Vehicle Ownership	Percent of occupied households with no vehicle ownership <sup>*7</sup>
	Linguistic Isolation	Percent of households with no one aged $\geq 14$ years speaking English <sup>*7</sup>
	Physical Disability	Percent of population with physical disability (ambulatory disability) <sup>*8</sup>
	Mental Disability	Percent of population with mental disability (cognitive disability) <sup>*8</sup>
	Health Insurance	Percent of population without health insurance <sup>9</sup>
ADAPTIVE CAPACITY	Violent Crime Rate	Number of violent crimes per 1,000 residents <sup>10</sup>
	Air Conditioning	Percent of households without air conditioning <sup>*11, 6</sup>
	Tree Canopy	Percent of area not covered by tree canopy <sup>*12, 6</sup>
	Impervious Surfaces	Percent of area covered by impervious surfaces <sup>*12, 6</sup>



**exposure**      **sensitivity**      **capacity**

**7%**

of California's population lives in  
high risk areas for wildfire  
(present-day)

**70%**

of those persons live in places  
where the majority of people live  
in high risk wildfire areas

**exposure**      **sensitivity**      **capacity**

Residents living in majority high risk places are

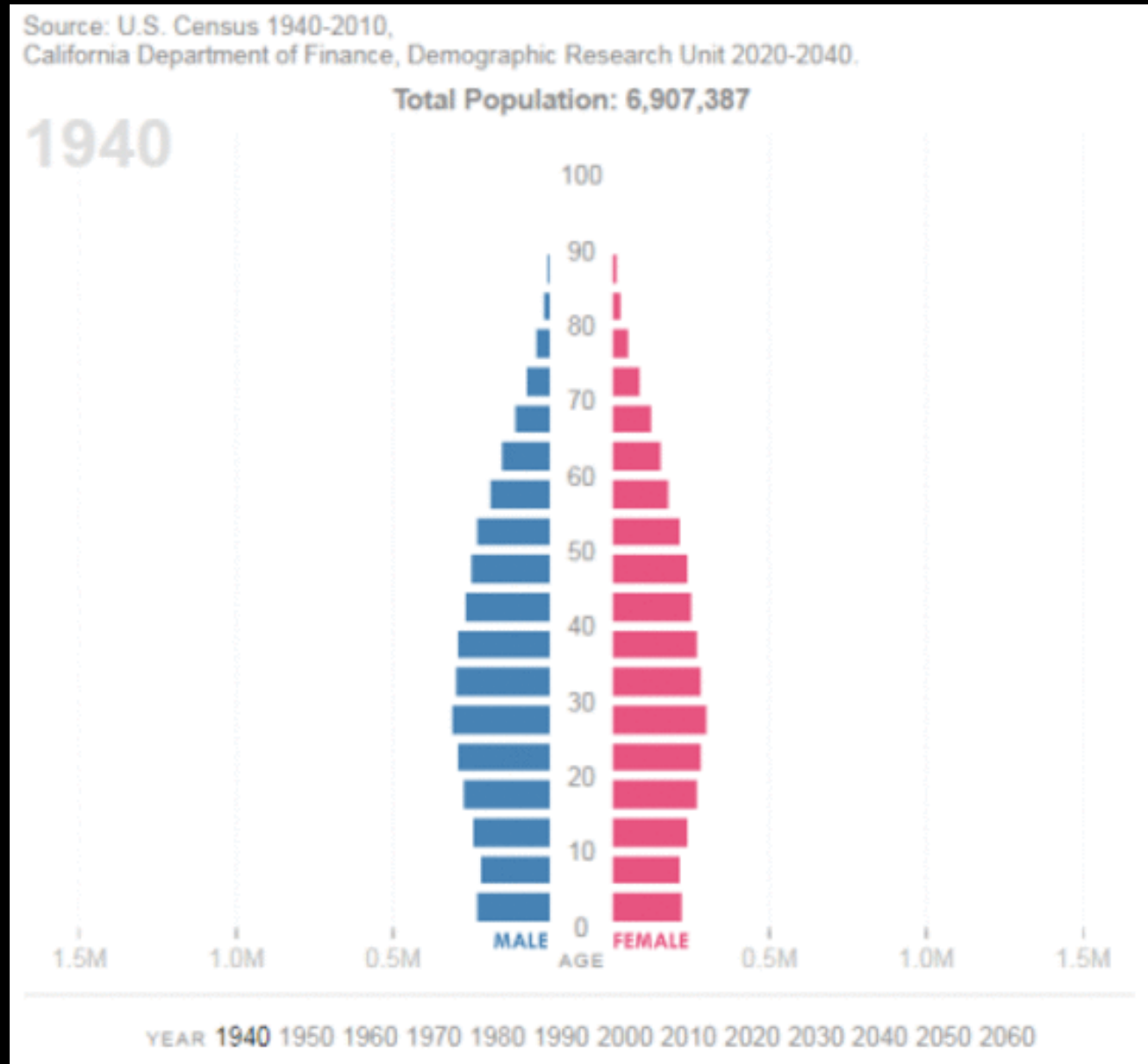
**1.25x**

as likely to be over 65.

People aged 65 and older are especially vulnerable to the health impacts of climate change. Especially those who may be socially isolated or dependent on care.



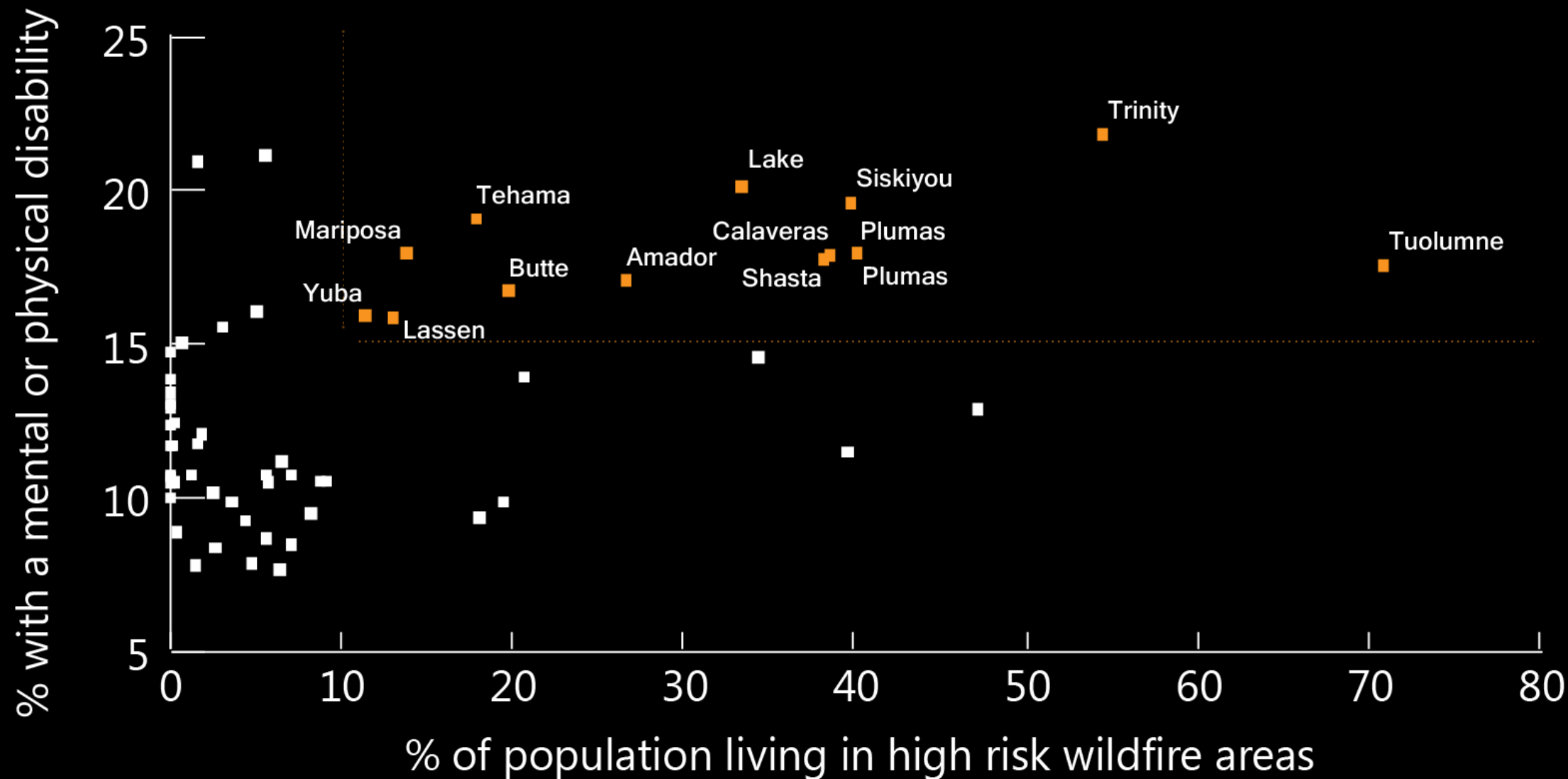
# exposure sensitivity capacity



# exposure

# sensitivity

# capacity

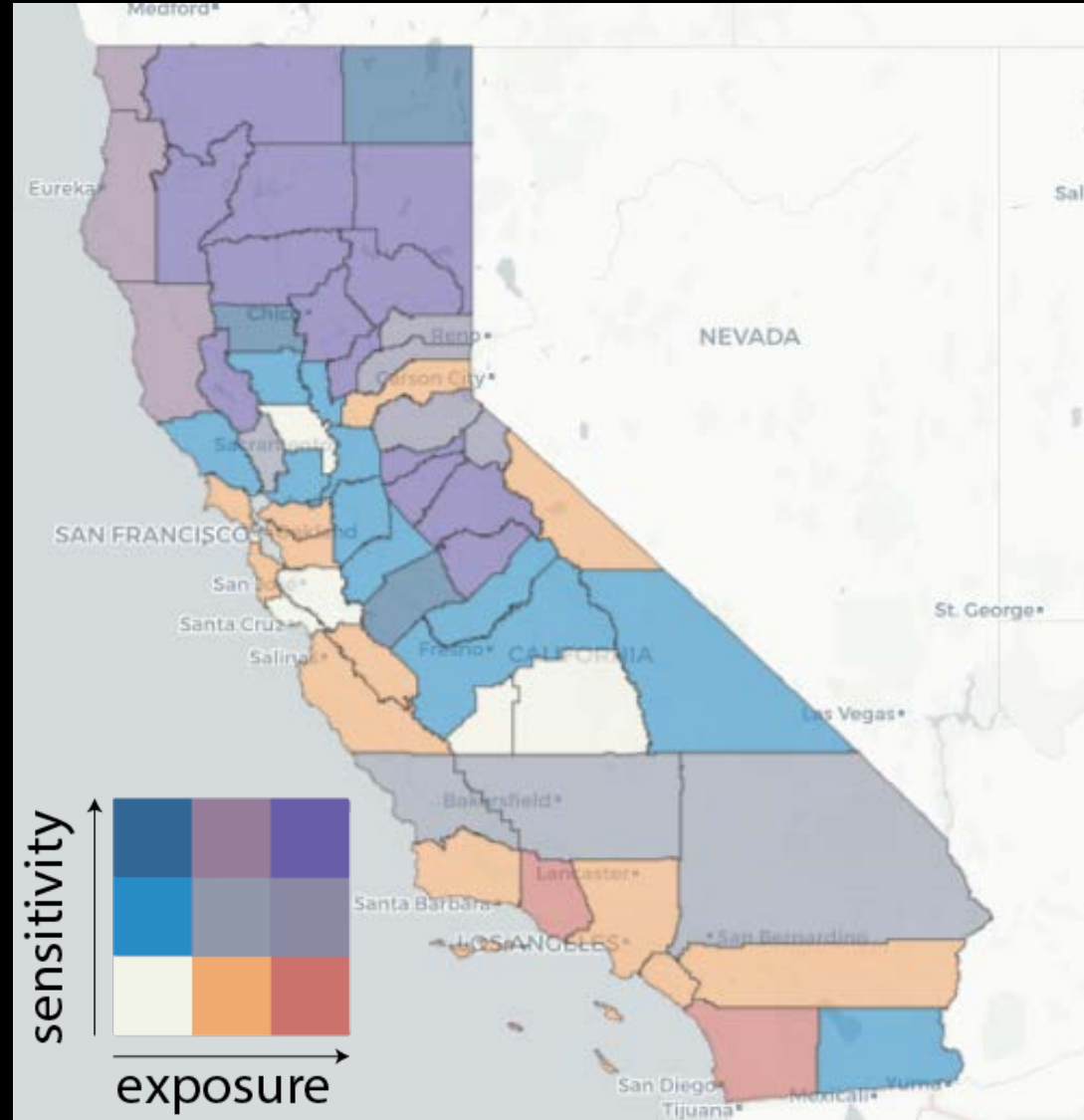




# exposure

# sensitivity

# capacity



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