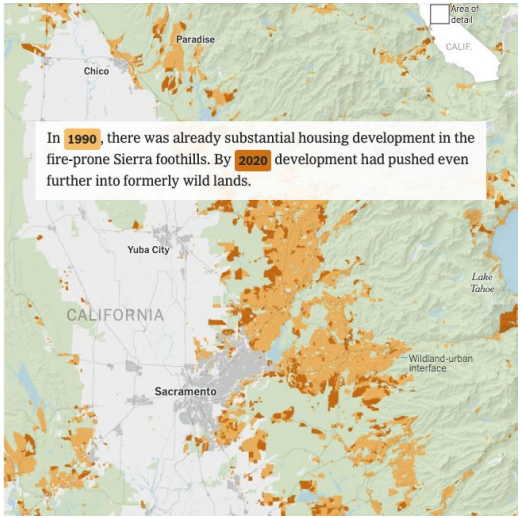
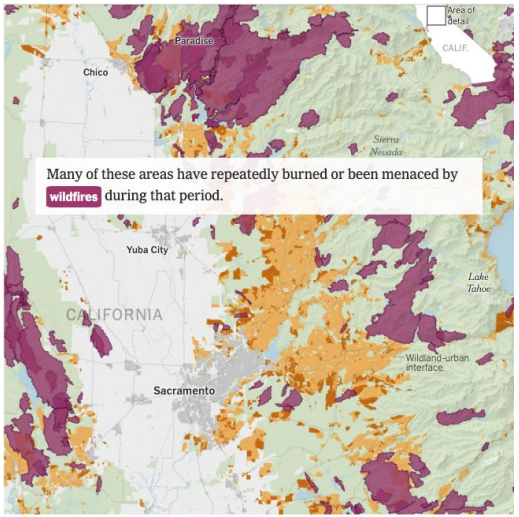
High spatial and temporal resolution census data reveal communities at risk along the wildland-urban interface (WUI) in California, USA

Shenyue Jia

Wildland-Urban Interface (WUI)

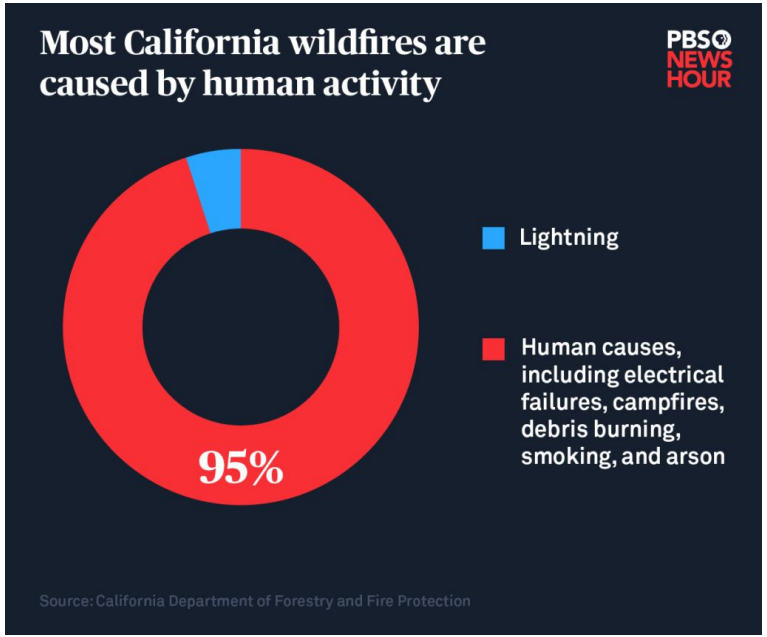
- Located on the outskirts of cities, where houses and other development are built near or among flammable wild vegetation

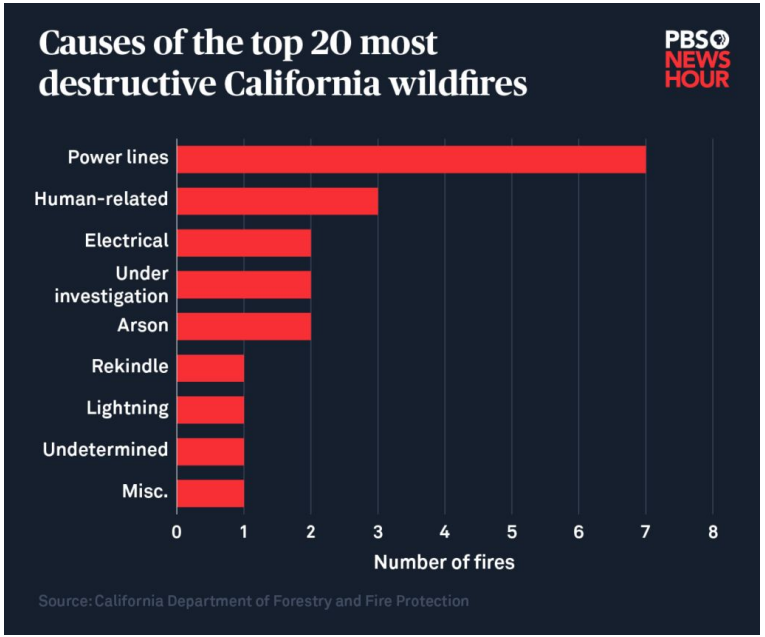




As Wildfires Grow, Millions of Homes Are Being Built in Harm's Way, New York Times, 2022/09/09

Why does population increase inside WUI matter?





California's catastrophic wildfires in 3 charts, PBS News, Sep 14, 2020

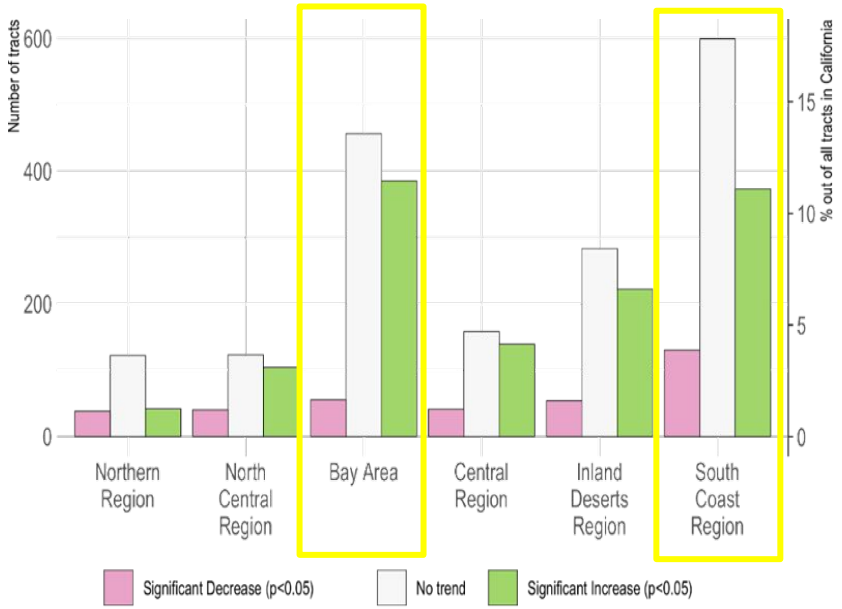
We all know population increased inside California. But where (more specifically)?

Reveal the temporal change based on yearly population data at the census tract level (2010 to 2019)

Understand the spatial distribution of significant population change

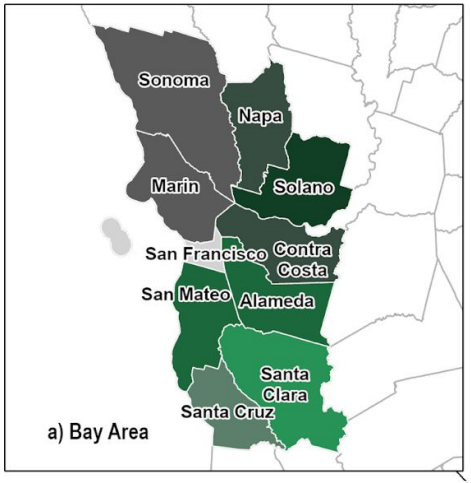
Possible drivers of change

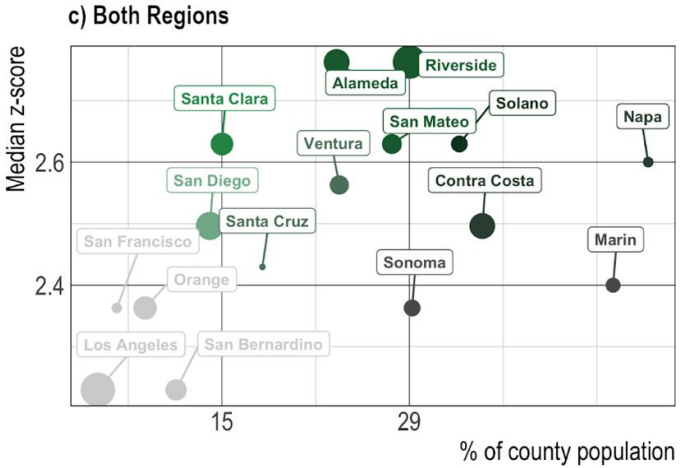
Significant increase in most regions in Calif.

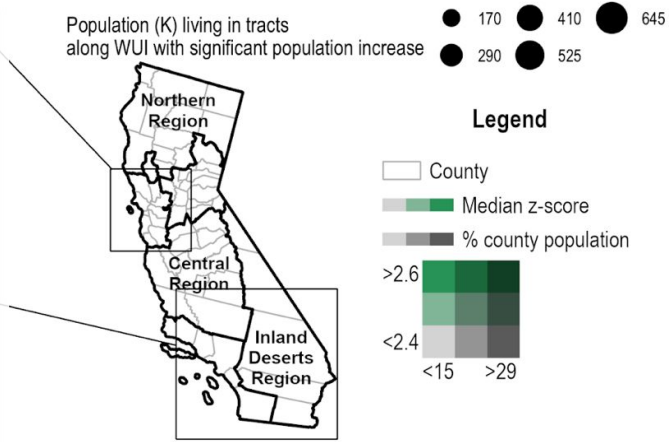


Trend analysis applied

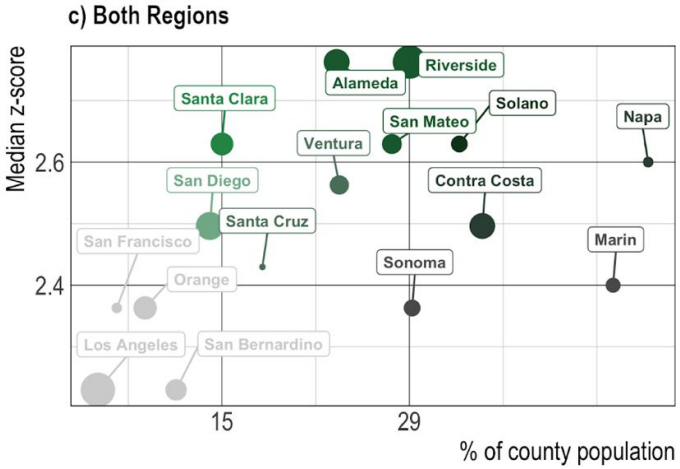
- Mann-Kendall test to confirm the direction of trend
- Poisson regression
- General linear regression

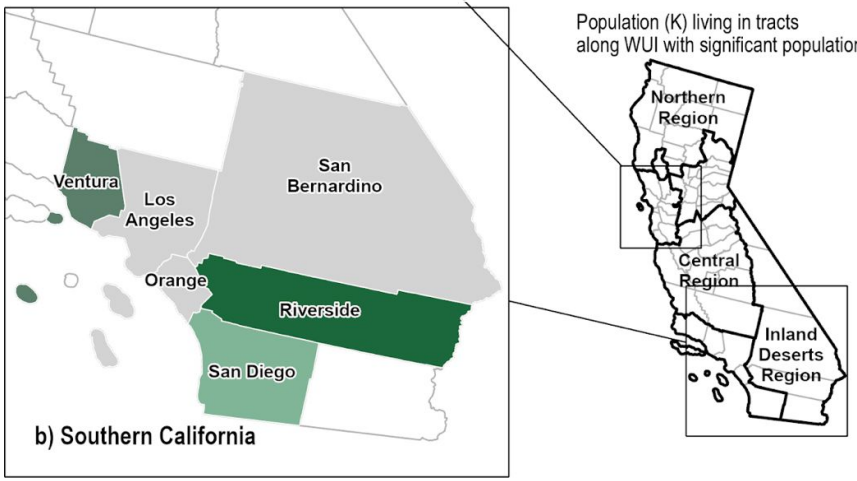


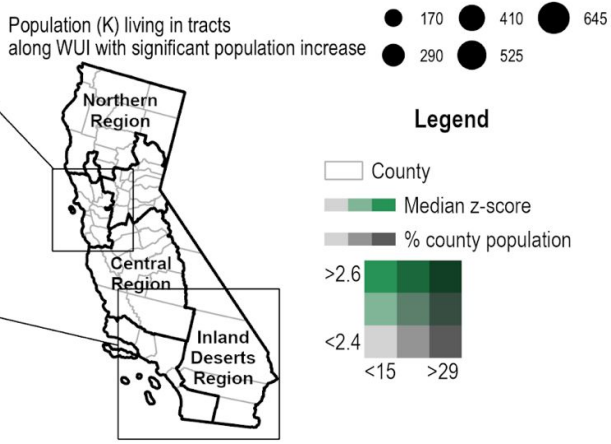




Bay Area: a large proportion of residents live in high-growth tracts in WUI



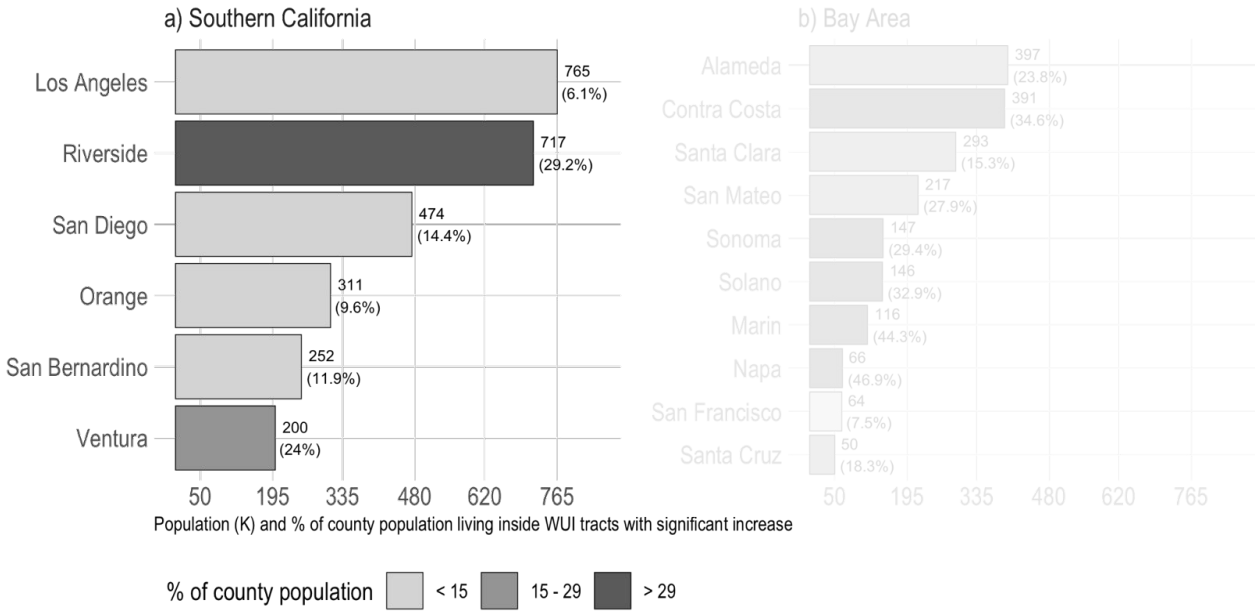




Southern California: a large population now lives in high-growth tracts (low in %)

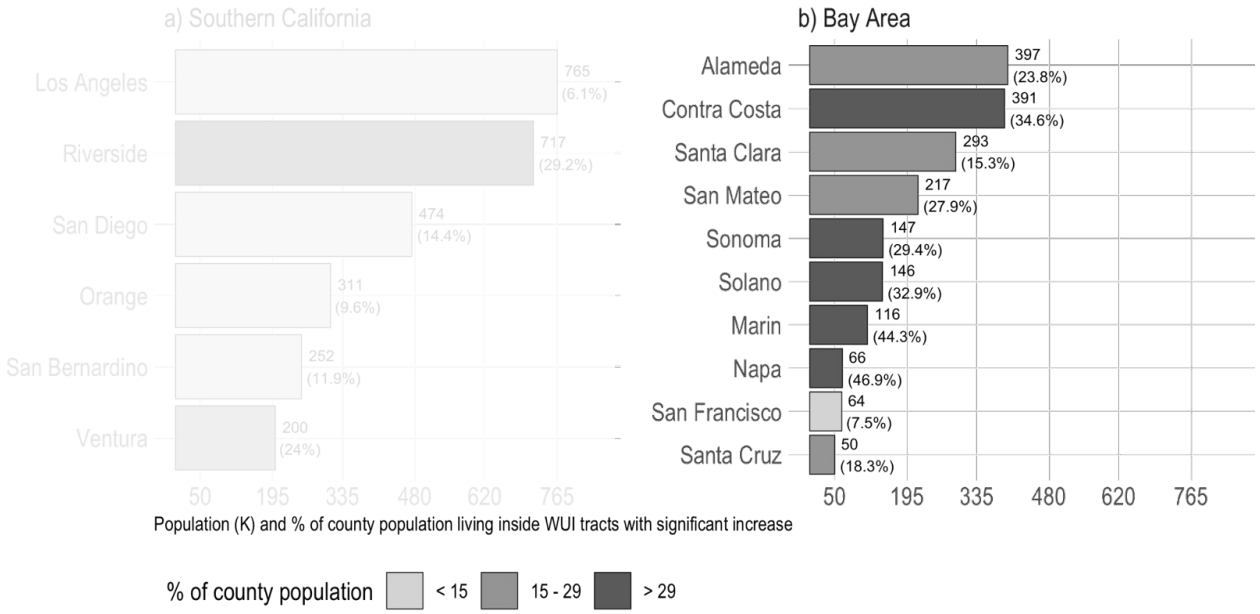
Southern California vs. Bay Area

Residents in WUI's high-growth tracts: large in numbers, low in % of county population

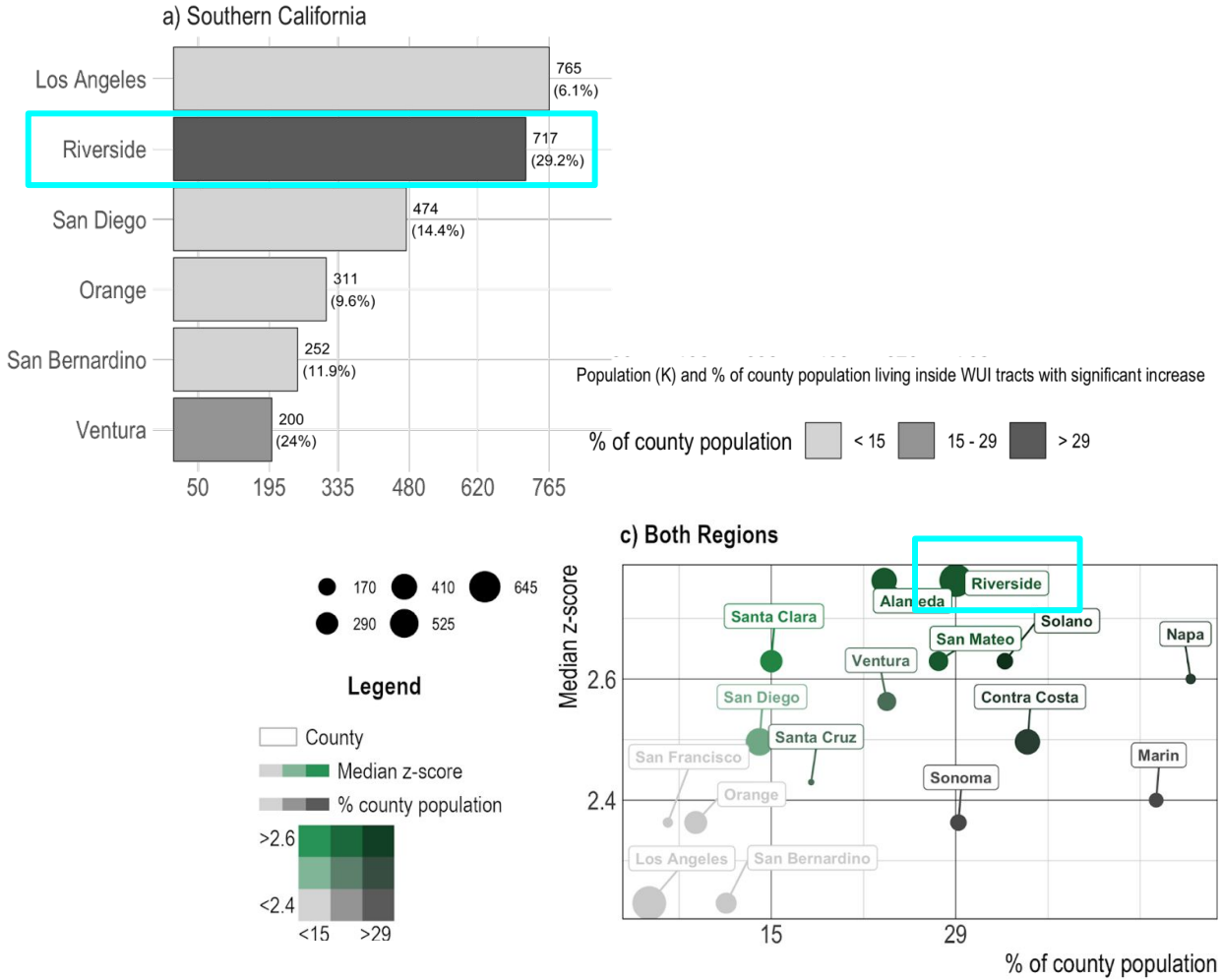


Southern California vs. Bay Area

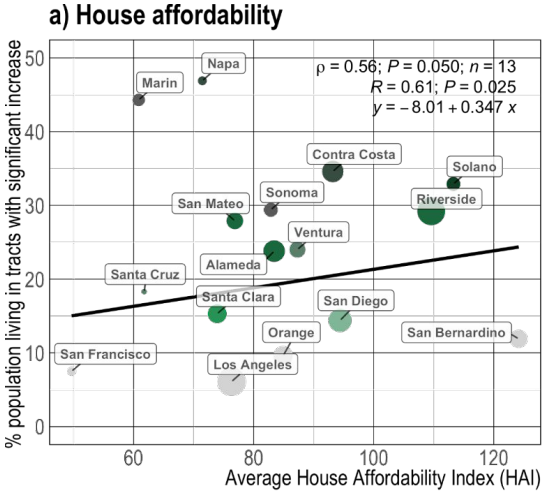
Residents in WUI's high-growth tracts: large in numbers, low in % of county population

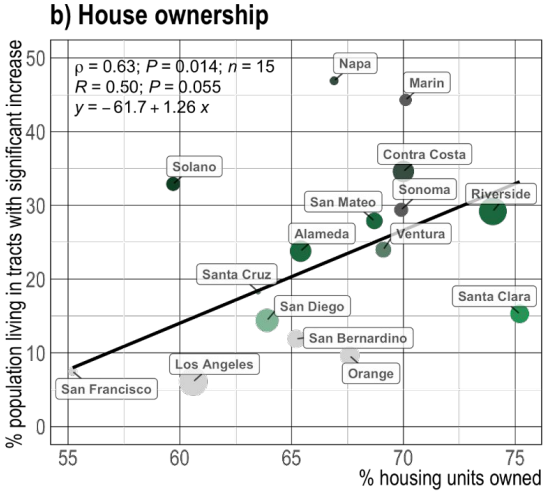


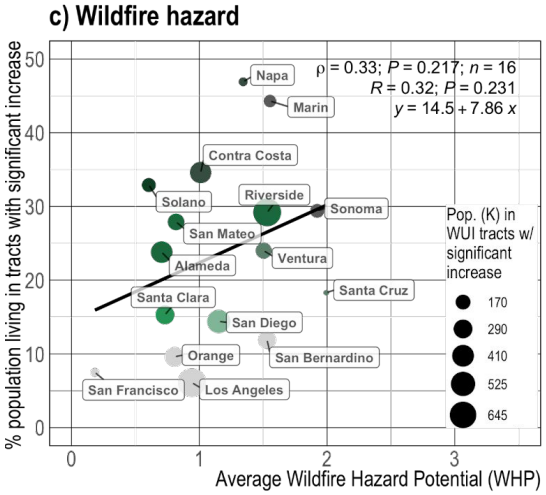
Residents in WUI's high-growth tracts: high in % of county population, low in numbers

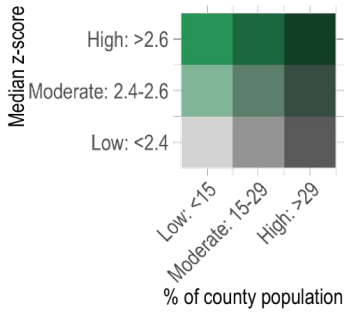


Riverside County: A large number of people now live in WUI's high-growth tracts and also account for a high proportion of county population









House affordability and ownership can explain a part of the increasing trend; Wildfire risk not so much

Findings

California's WUI has experienced **a significant population increase** during the past decade, particularly in Southern California and the Bay Area

Bay area counties exhibited the largest overall increase in population and a **higher proportion** of the population located within WUI tracts

However, the population increase within WUI zones encompassed considerably **more residents** in **Southern California** due to its larger population size

Population increase is driven by the **house affordability** in WUI, where homes can be built at a lower price **at the cost of elevated wildfire risk**

Why we ended up here? What does this trend mean for residents?

Shortage in housing supply due to population increase, limited building space, and zoning laws

Car-centered culture makes long-commute more tolerable

Significantly increase the chance of wildfire occurrence due to an increased level of human activities near fuels

Exposing the already-vulnerable communities living in the WUI to more risk of wildfire

Acknowledgements

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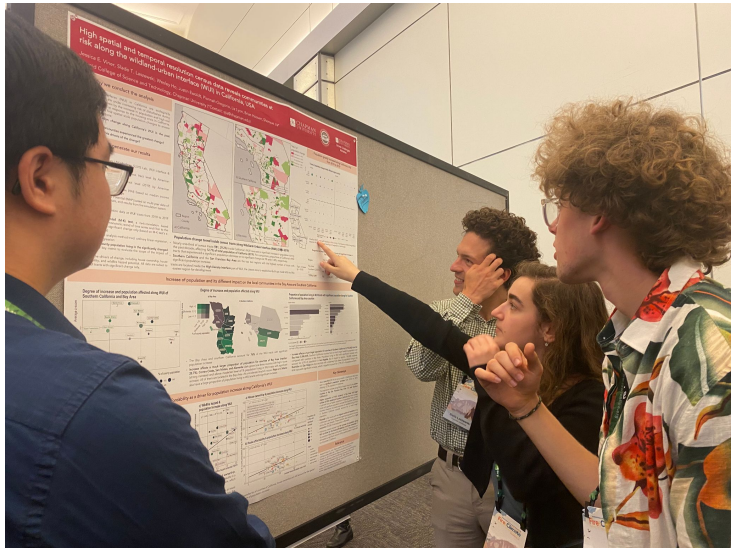
Grand Challenges Initiative



Students of Chapman University Grand Challenges Initiative presenting this work at IAWF Conference in June, 2022.