Final Project Executive Summary

Environmental Inequalities of Wildfire in Santa Cruz County, California

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Introduction

Wildfire risk in California has intensified significantly over the past several decades (Jones et al., 2020), driven by climate change, prolonged fire suppression practices, and expanding development within the wildland-urban interface (WUI) (Radeloff et al., 2018). In Santa Cruz County, these environmental pressures intersect with a severe housing affordability crisis, producing uneven exposure to wildfire hazards across socioeconomic groups.

This project evaluates the spatial relationship between wildfire hazard, housing affordability, and social vulnerability in Santa Cruz County. Using a mixed-methods approach, the study identifies patterns of environmental inequality, where economically constrained populations are increasingly pushed into higher-risk wildfire zones. The findings demonstrate that wildfire exposure is not evenly distributed, but rather shaped by economic forces, land-use decisions, and policy gaps.

Study Area and Context

Santa Cruz County presents a distinct geographic and socioeconomic divide. Coastal communities such as Santa Cruz City, Capitola, and Aptos are characterized by relatively low wildfire exposure but extremely high housing costs. In contrast, inland mountain communities; including Boulder Creek, Ben Lomond, and Felton, are situated within High to Very High Wildfire Hazard Severity Zones but offer comparatively lower housing prices (Figure 1).

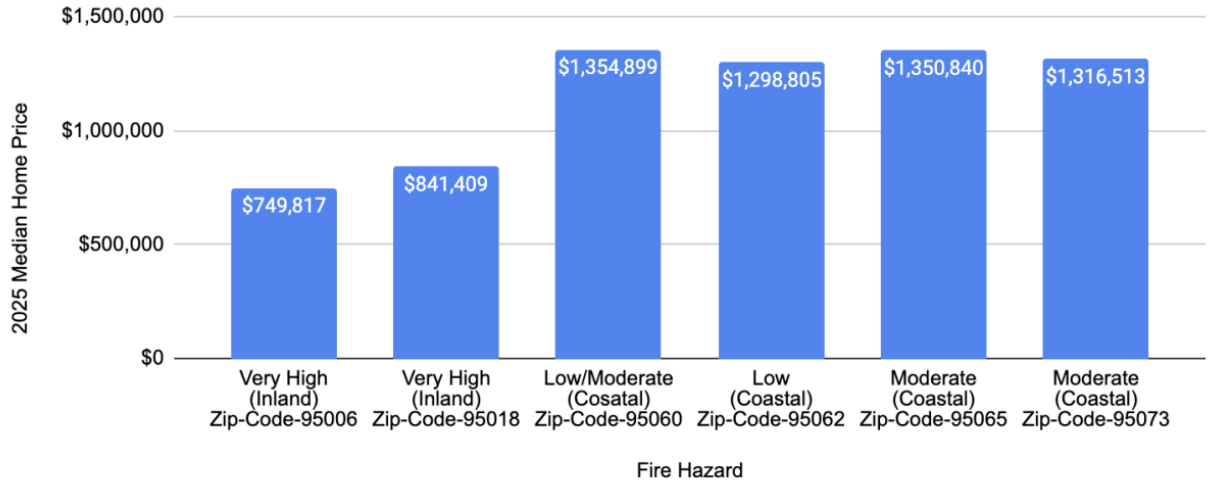

Figure 1. *Wildfire Hazard by Median Home Price (2025)*
Note. Comparison of wildfire hazard exposure among Santa Cruz residents by geographic location and median home price. Data obtained from Zillow (2025) and the Cal Fire Wildfire Hazard Severity Zone Map.

Over half of the county's population resides within the WUI, placing a substantial number of residents in fire-prone environments (County of Santa Cruz, 2021). The 2020 CZU Lightning Complex Fire, which burned approximately 135 square miles, exemplifies the destructive potential of wildfire in these inland regions and serves as a critical reference point for this study (California Department of Conservation, 2020).

Methods

This study employed a mixed-methods framework integrating spatial analysis, socioeconomic data, and policy review.

Geospatial analysis was conducted using Cal Fire's Wildfire Hazard Severity Zones Map and the CDC Social Vulnerability Index (Figure 2). These datasets were overlaid to identify areas where wildfire risk and vulnerable populations intersect. Additional data sources included U.S. Census Bureau datasets, housing market data from Zillow and Redfin, and local planning documents.

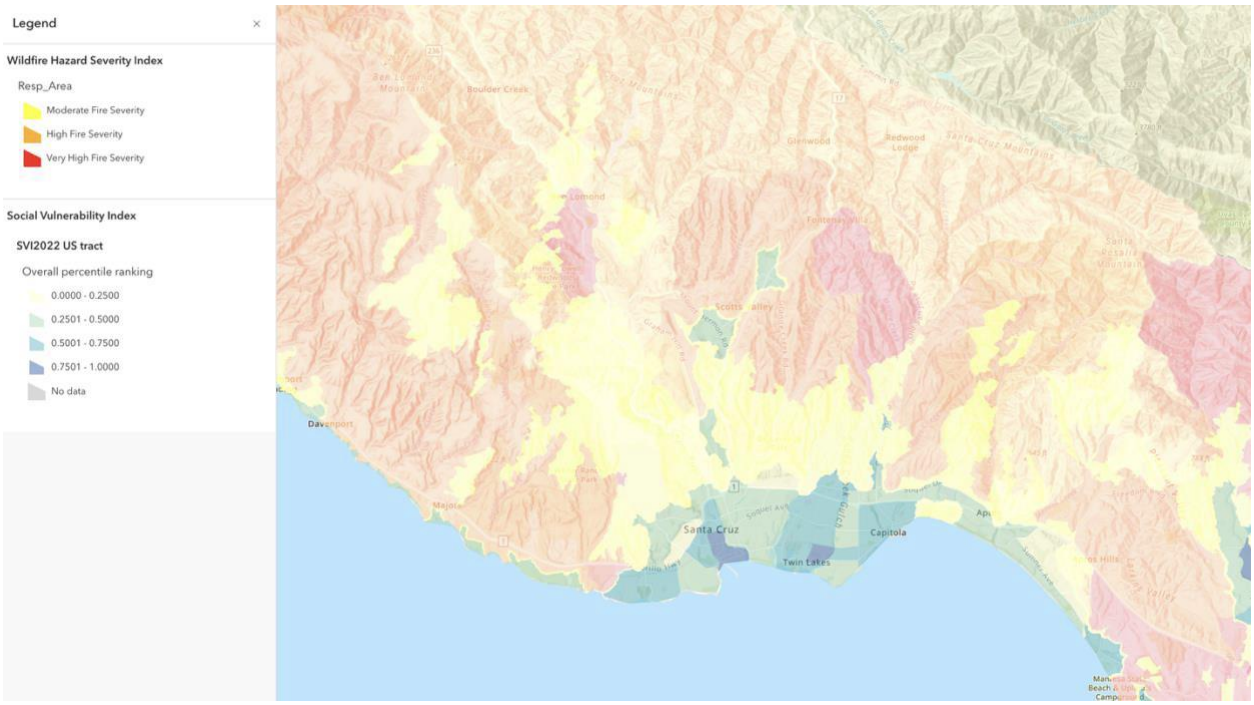

Figure 2. *Social Vulnerability and Wildfire Hazard Map*
Note. Spatial overlay of social vulnerability and wildfire hazard severity in Santa Cruz County. Created using data from the CDC's Social Vulnerability Index (CDC, 2022) and the Cal Fire Wildfire Hazard Severity Zones Map (Cal Fire, 2023).

Policy analysis incorporated review of the Santa Cruz County General Plan, state building codes, wildfire mitigation strategies, and insurance trends. Stakeholder perspectives from local agencies, fire departments, and community groups were also evaluated to provide context to the quantitative findings.

Key Findings

Wildfire hazard in Santa Cruz County is geographically concentrated in inland mountainous regions, where vegetation density, topography, and fuel loads contribute to high fire intensity and spread potential (Cal Fire, 2023). Coastal areas benefit from lower exposure due to marine influence and reduced fuel continuity.

Housing affordability plays a central role in determining where residents live relative to wildfire risk. Median home prices in coastal areas exceed $1.3 million, while inland WUI communities remain comparatively more affordable, with median prices ranging between approximately $750,000 and $840,000 (Zillow, 2025).

This disparity contributes to a pattern in which lower-income households are economically displaced into higher-risk areas. As a result, wildfire exposure is often linked to housing accessibility rather than individual preference.

The study identifies a clear environmental inequality in Santa Cruz County. Higher-income populations are more likely to reside in lower-risk coastal areas, while economically vulnerable populations are disproportionately exposed to wildfire hazards in the WUI. These findings are also in line with the broader social and environmental inequality trends nationwide (Greenberg et al., 2024).

Although some social vulnerability datasets suggest pockets of higher vulnerability concentrations in coastal urban areas, these findings may be limited by generalized datasets and local misrepresentations. Local economic pressures indicate that vulnerability extends beyond traditional metrics and is shaped by housing market dynamics.

Insurance trends further exacerbate vulnerability. Since 2020, thousands of homeowners in Santa Cruz County have experienced policy cancellations or non-renewals due to wildfire risk (Hickok, 2025). Many residents have been forced to rely on the California FAIR Plan, which provides limited coverage at significantly higher costs (California Department of Insurance, 2022).

These financial barriers reduce both preparedness and recovery capacity, particularly for lower-income households. Post-fire rebuilding efforts have been slow and uneven, highlighting systemic inequities in disaster recovery.

Emergency response capacity also varies across the county. Inland communities often rely on smaller, under-resourced fire departments, while coastal areas benefit from more robust, fully staffed agencies (Santa Cruz Regional 911, 2025). This imbalance contributes to increased wildfire risk and reduced resilience in WUI communities.

Spatial Analysis

The spatial overlay of wildfire hazard and social vulnerability highlights the geographic divide between inland and coastal regions. High and Very High Fire Hazard Zones are concentrated in the Santa Cruz Mountains and San Lorenzo Valley, while coastal zones remain comparatively lower risk.

A comparison of wildfire hazard and median home price further reinforces the relationship between affordability and exposure. Inland communities with the highest wildfire risk consistently exhibit lower housing costs, demonstrating a direct link between economic accessibility and environmental hazard.

Discussion

The findings of this study demonstrate that wildfire risk in Santa Cruz County is not solely an environmental issue, but also a social and economic one. Housing affordability constraints play a critical role in shaping exposure, effectively pushing lower-income populations into higher-risk environments (Greenberg et al., 2024).

Climate change and altered fire regimes amplify this issue by increasing fire frequency, intensity, and duration (Bailey, 2024). At the same time, historic land-use decisions and fire suppression practices have contributed to hazardous fuel accumulation, particularly in inland forested regions.

This intersection of climate, housing, and policy creates a compounding cycle of vulnerability. Residents with fewer financial resources face greater exposure, limited mitigation capacity, and more significant challenges in post-fire recovery.

Implications

The results of this study highlight the need for integrated policy solutions that address both wildfire risk and social equity.

Key policy considerations include:

- Expanding affordable housing development in lower-risk coastal areas.
- Restricting new development in High and Very High Fire Hazard Zones.
- Increasing funding for wildfire mitigation programs targeting vulnerable populations.
- Enhancing defensible space and home hardening assistance programs.
- Reforming insurance markets to ensure equitable access to coverage.

Incorporating social vulnerability into wildfire hazard mapping and planning processes is essential for developing more equitable risk reduction strategies.

Based on the findings, this study recommends:

1. Prioritizing affordable housing development in low-risk areas.
2. Limiting expansion of residential development within the WUI.
3. Increasing financial and technical support for wildfire mitigation efforts.
4. Investing in fire protection infrastructure in inland communities.
5. Implementing regulatory reforms to stabilize the insurance market.

These actions would help reduce disproportionate wildfire exposure and improve resilience among vulnerable populations.

Conclusion

Wildfire risk in Santa Cruz County reflects a broader pattern of environmental inequality shaped by climate change, housing affordability, and policy decisions. While wildfire is a natural hazard, its impacts are unevenly distributed across the population.

Lower-income residents are disproportionately exposed to wildfire risk due to limited access to safer housing options, reduced mitigation capacity, and systemic barriers to recovery. Addressing these inequalities requires coordinated efforts across land-use planning, housing policy, wildfire management, and insurance reform.

This study underscores the importance of integrating environmental and social considerations in wildfire risk management. Ensuring that wildfire safety is not determined by income or location is critical to building resilient and equitable communities in the face of increasing climate-driven hazards.

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