Equity & Wildfire Resilience: *Recommendations for inclusive wildfire management in Ventura County*

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Spring 2022

A Bren School of Environmental Science & Management Group Project

In partnership with Ventura Regional Fire Safe Council

Kindling Equity

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Bren School of Environmental Science & Management

Signature Page

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Acknowledgements

Our work is a step in the direction of achieving greater equity in wildfire planning, response, and recovery, and we hope further work in this area continues to engage with the community.

We acknowledge that although there is no Chumash representation in our research, this project takes place on the unceded, ancestral lands and village sites of the Chumash people, as does UCSB. The systematic removal of Chumash influence contributes to the need to mitigate fire risk.

> *As we work together to prevent further damage to these lands and waters that support not only our livelihoods, recreation, lifestyles, research and education, we remember that the Chumash peoples of this area have been separated from these lands, unable to maintain livelihoods as they should, unable to recreate traditionally, unable to maintain their traditional lifeways freely, and unable to have the same access to their lands that we are provided, to do their own traditional research and educate their future generations.*
>
> *The Chumash people, are comprised of the descendants of Indigenous peoples removed from their Island of origin Limuw (santa cruz), Anyapac (anacapa), Wima (santa rosa) and Tuqan (san miguel), subjugated by 5 missions during Spanish colonization of the Central Coast, from Malibu to Ragged Point and inland to Bakersfield. The Villages upon which this University sits, were a safe haven for maritime travelers. A place alive with trading, hospitality and abundance. A place where knowledge of and from the surrounding areas, far and wide, was shared with all people of this place and its many visitors. A traditional place of sharing knowledge and education. A tradition this University has an obligation to remember.*
>
> *– Mia Lopez and David Pellow, UCSB Environmental Sciences Land Acknowledgement*

Our work is generously funded by Wonder Labs' Reimagining 2025: Living with Fire Design Challenge Program. This project is also supported by the mentorship of Dr. Shefali Juneja Lakhina of Wonder Labs, Amy Berry of the Tahoe Fund, Dr. Daniel Godwin of the Ember Alliance, and Dr. Faith Kearns of the California Institute of Water Resources.

We would also like to recognize The Dipaola Foundation for funding that supports the project.

We would like to thank our community partner, the Ventura Regional Fire Safe Council, our faculty mentor Dr. Sarah E. Anderson, our PhD advisor Louis Graup, and the Bren School of Environmental Science & Management for making this project possible.

We want to recognize the residents of Piru and Piru Community Council as well as the residents of Santa Paula of the Promotoras Y Promotores Foundation for their participation in our focus groups.

Lastly, we would like to acknowledge our external advisors Celine Moomey with Ventura County Fire, and Dr. Max Moritz with University of California Cooperative Extension for their guidance.

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Project Significance

Marginalized communities are particularly vulnerable to the effects of natural disasters like wildfire (Kolden & Henson, 2019; Laska & Morrow, 2006; Méndez et al., 2020). For example, wealthier, whiter, and more educated communities are more likely to have the resources to rebuild postfire, and to mobilize and demand government fire mitigation strategies, such as fuel treatments (Anderson et al., 2020). Thus, systemic inequities including poverty, poor vehicle access, and crowded households lead to disparities in community wildfire response (Palaiologou et al., 2019).

Because marginalized communities are particularly vulnerable to the impacts of wildfire, they must be meaningfully included in plans to mitigate – and increase resilience to – the effects of fire. In Ventura County, increased fire frequency and severity as a result of ongoing climate change threatens residents as it does across much of California (Syphard & Keeley, 2020). A targeted wildfire risk management plan for vulnerable communities is needed to increase resilience in the county, and protect the lives and livelihoods of residents.

Our client, Ventura Regional Fire Safe Council (VRFSC), is a non-profit organization with over a decade of experience leading education and collaborative planning efforts to reduce wildfire threat in Ventura County. They are updating the Community Wildfire Protection Plan (CWPP) under a recent CALFIRE grant to improve community-level preparation and response. They recognize that risks and concerns related to wildfire are different across demographics. As such, they seek to ensure that the revised CWPP equitably prepares communities throughout Ventura County for wildfire by specifically including marginalized communities in the planning process.

This project assists the VRFSC in identifying and engaging marginalized communities so that, when implemented, the new CWPP will equitably address community needs. We demonstrate effective methods and lessons learned for responsibly engaging historically-excluded residents in the development of wildfire management plans. Our findings will enable the reduction of vulnerability to wildfire by de-linking its connection to social marginalization through recommended CWPP initiatives and policies for VRFSC that increase community resilience.

This project has implications beyond Ventura County. In addition to supporting Ventura county-specific wildfire risk management, our methods of engagement and lessons learned are a model for other communities living with wildfire. Other communities and Fire Safe Councils in California and beyond can refer to these methods for identifying vulnerable populations and addressing social marginalization concerns in a management plan as a template for updating their own CWPPs. This work contributes to continued efforts to make community wildfire planning, and disaster planning more broadly, more responsive to the vulnerabilities of socially-marginalized communities.

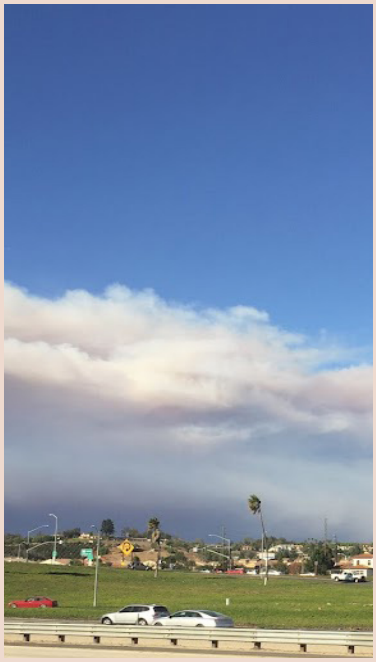
Objectives

1. Identify socioeconomically vulnerable populations at risk of wildfire in Ventura County and collect community feedback from them on wildfire planning and community needs.
2. Synthesize community feedback into written suggestions for the reduction of wildfire vulnerability to marginalized communities in Ventura County for Ventura Regional Fire Safe Council.
3. Produce a set of community engagement recommendations based on feedback and lessons learned from our research for organizations across the state/country to more effectively include historically-excluded communities in wildfire planning activities and share with the California Fire Safe Council to distribute statewide.

Background

Research on social inequity in wildfire preparation and response (Anderson et al., 2020; Méndez et al., 2020) drives the Ventura Regional Fire Safe Council, partnered with the Bren School of Environmental Science & Management, to specifically address how socially vulnerable populations can be included in wildfire planning. At the end of the 2021 fire season, two of the twenty most destructive fires in California's modern history were in Ventura County: the 2017 Thomas Fire which destroyed 1,063 structures, and the 2018 Woolsey Fire which destroyed 1,643 (CAL FIRE, 2021b). Fires in Ventura County are also some of the largest fires in California's modern history: the Matilija Fire (1932; 220,000 acres) and the Thomas Fire (2017; 281,893 acres) were both listed in the top 20 largest fires in the state as of 2021 (CAL FIRE, 2021a). The number of large, destructive wildfires is indicative of the consequential, widespread wildfire risk to people in Ventura County and necessitates widespread, equitable planning, preparation, and response (Hanan et al., 2020; Keeley & Syphard, 2019, 2020).

Thomas Fire



B. Baker, 2017

The 2017 Thomas Fire burned over 280,000 acres in Ventura and Santa Barbara Counties, significantly impacting community health and quality of life. The fire destroyed 1,063 structures and damaged 280 more (Saqui et al., 2017). In addition to direct damages, many people in Ventura and Santa Barbara County experienced poor air quality and interruption to safe drinking water access (Steve Scauzillo, 2017).

During the fire, language barriers stymied the distribution of emergency response information, and predominantly Latinx and Indigenous farmworkers were exposed to unhealthy levels of smoke as they worked. After the fire, working class people who commute to Santa Barbara from Ventura County for employment experienced disruptions to transportation and housing. Many county residents were barred from receiving disaster aid from the government due to their citizenship status (Méndez et al., 2020). While the damages were widely felt, the Thomas Fire disproportionately impacted socially vulnerable communities.

Multiple factors determine community wildfire risk: primarily biophysical characteristics of the environment, people's proximity to fire-prone landscapes in the wildland urban interface (WUI), and social stratification (Ojerio, 2008). In Ventura County, this combination of local environmental and social characteristics, and an expansive WUI, result in serious wildfire risk to communities living there.

Ventura County covers 1,845 square miles of the coast of Southern California and the inland coastal range. It is bordered by Santa Barbara County to the west, the Pacific Ocean to the south, Los Angeles County to the east, and Kern County to the north. Los Padres National Forest makes up much of the northern part of the county, so the population of 847,263 is concentrated in the south. The natural characteristics of the county contribute to its heightened fire risk. Diverse vegetation communities including subalpine forests, yellow pine forests, oak woodlands, coastal sage scrub, and chaparral scattered across rugged canyons are found throughout the county. These landscapes are fire-adapted, and historically burned naturally as well as anthropogenically by the Chumash, who traditionally used fire to facilitate the growth of useful plants (Timbrook et al., 1982).

The chaparral and grasslands found in Ventura County can burn in consecutive years and there is no evidence that fire suppression has led to increased fuel loading, fire size, or fire severity in these systems (Keeley et al., 1999). Thus, previous fires and prescribed burning do little to reduce the size of subsequent fires, though fuel reduction can still be an important way to create defensible space (Price et al., 2012). The climate throughout the county is a Mediterranean Dry-Summer Climate, characterized by relatively cool wet winters and hot dry summers (Timbrook et al., 1982). This climate is particularly conducive to fires, and CAL FIRE perimeter data shows that a high percentage of the county has been subject to burns since 1950 (Figure 1).

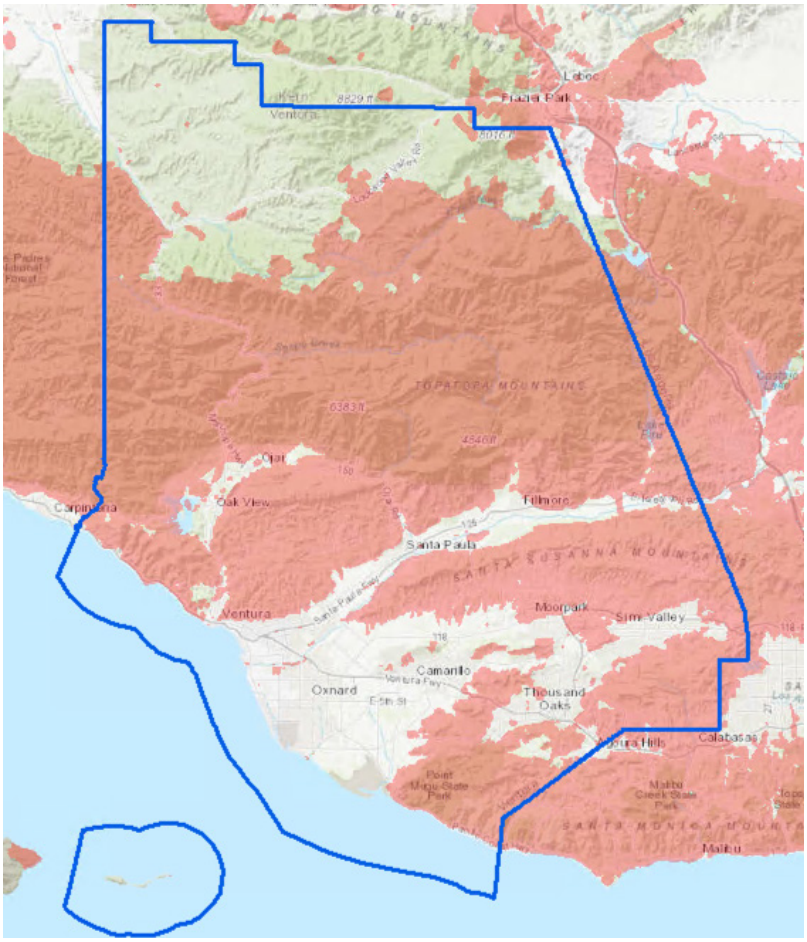


Figure 1. CalFire perimeter data of previous fires in Ventura County. Shown in rust color are aggregated fire perimeters since 1950. Ventura County is outlined in blue.

While vegetation type, windspeed, and topography drive the size and severity of wildfire, the presence of people predicts the risk of ignition (Syphard et al., 2008). Roads, trails, and housing developments increase the risk of ignition and as such, wildfire risk in Southern California is primarily a function of human population (Syphard et al., 2008). Contemporary fire return intervals in Ventura County are less than 20 years, more frequent than before colonization (Safford & Van de Water, 2014). Fire size and severit also increased in recent years (Potter, 2017; Safford & Van de Water, 2014). Temperature, topography, humidity, wind speed, fuel loading, human activity, and the existence of fire mitigation infrastructure determine the probability of fire ignition and severity.

Development of housing in the wildland-urban interface (WUI) leads to more destructive wildfires as more houses burn (Keeley et al., 1999). The WUI is where residences are interspersed with wild vegetation (Radeloff et al., 2018). Structures built in the WUI are particularly vulnerable to wildfire because of their proximity to flammable vegetation and because an increase in human activity leads to heightened risk of human-caused wildfire ignition. Despite these threats, the United States saw a 41% increase in the number of homes located in the WUI and a 31% increase in WUI land area from 1990-2010, making it the fastest-growing land use type in the lower 48 states in the time period (Radeloff et al., 2018). Thirty-two percent of homes in California are located in the WUI (Kramer et al., 2019).

While human proximity to wildlands is the primary driver of wildfire in the region, climate change will influence fire severity in Southern California. In part, this is because of an extension of the fire season due to extended drought and changing wind patterns (Syphard & Keeley, 2020). This necessitates adaptation by Southern California communities like Ventura County. Currently, there are sixteen high fire risk communities designated by CAL FIRE in Ventura County. An estimated 71% of the county's population (535,049 people) live in communities identified by CAL FIRE as at risk of wildfire (Ojai Valley Fire Safe Council, 2010). These numbers are only expected to increase as fire risk increases.

Individual and community vulnerability to wildfire can be difficult to conceptualize and measure despite the fact that risk from wildfire in the county is well-documented (Palaiologou et al., 2019). Social, geographic, and biophysical factors compound the likelihood of exposure to the negative outcomes of wildfire. In particular, social factors such as age, physical mobility, class, wealth, gender, race, language, and literacy have an impact on an individual or community's ability to plan for, cope with, or recover from an environmental disaster (Cutter et al., 2003). Social vulnerability is caused by lack of access to resources, including political power or representation, social networks, infrastructure and social supports, and the physical condition of individuals (Cutter et al., 2003). Here, we are interested in these social considerations that compound with biophysical risk: social vulnerability to wildfire.

A Note on Language

Social vulnerability is utilized widely in disaster response and preparation literature to describe the state of being likely to experience the adverse effects of a disaster and feel those effects more strongly than others as a result of a community's place in the sociopolitical hierarchy.

The term ***vulnerable*** can fail to acknowledge the systems that lead to this state of being. Social, economic, and political structures limit mobility, income and wealth-building, and political power of some demographic groups. Inequities are perpetuated along racial, economic, age, and gender divides, among others, and can be compounded by overlapping identities (Cutter et al., 2003; Laska & Morrow, 2006; Méndez et al., 2020).

Marginalization of people who belong to these demographics is the driving force behind the state of vulnerability (Walker & Fox, 2018).

This analysis focuses on ***vulnerability***, though it is important to consider it in the context of broader social ***marginalization***.

This project seeks to address the degree to which a community can respond to wildfire and recover postfire. As such, we utilize the term vulnerability throughout this project since demographic groups experiencing marginalization have a reduced capacity to mitigate and respond to disaster impacts (Laska & Morrow, 2006). Thus, these groups are more vulnerable to disaster effects. The lower capacity to respond to natural disasters is largely due to poverty, racial and ethnic discrimination, age and physical ability as a result of social stratification (Crowley, 2020; Cutter et al., 2003; Davies et al., 2018; Emrich et al., 2020; Hewitt, 2013; Ojerio, 2008). Marginalization results in resource inequities that limit housing options, evacuation response, and recovery capacity. After a natural disaster, households are often expected to be solely responsible for their own recovery, which can be particularly challenging for those without equal access to social aid whether due to language barriers, lack of knowledge, or outright discrimination (Laska & Morrow, 2006; Méndez et al., 2020). Effective disaster preparation efforts, such as wildfire planning, must attend to social inequities to ensure community resilience (Davies et al., 2018; Laska & Morrow, 2006; Méndez et al., 2020).

The focus on social vulnerability begins to disrupt the framing of disasters as "natural" events. Some scholars argue that while an event like a wildfire is the result of natural causes, disproportionate social impacts on certain people are a result of social, political and economic systems (Davies et al., 2018; Hewitt, 2013). This framing calls for systems-level solutions to decouple vulnerability to disaster and social marginalization.

Ventura Regional Fire Safe Council's leadership sees developing an updated Community Wildfire Protection Plan (CWPP) for the county as an opportunity to address social vulnerability in wildfire and increase county-wide resilience. Following guidelines set by the federal Healthy Forest Restoration Act the VRFSC is updating a CWPP under a two-year grant from the California State Fire Safe Council.

The Healthy Forests Restoration Act (2003) encourages communities to develop CWPPs to address the wildfire risk reduction policy gap that exists at the federal level. Fire mitigation activities (i.e. increasing "defensible space" between homes and vegetation) reduce the chances of structural damage during a wildfire (Syphard et al., 2014), and pre-fire emergency planning improves the ability of a community to endure a wildfire event (Kolden & Henson, 2019). The guidelines for creating CWPPs outlined in the Healthy Forests Restoration Act are broad, which allows communities to develop plans that accommodate unique local ecological and social factors (Jakes et al., 2011). Plans generally involve a collaboration among stakeholders and objectives to reduce structural ignitability, identify priority fuels treatment areas, restore the natural environment, and monitor progress (Ojerio et al., 2008). As such, the development of CWPPs can greatly benefit communities in fire prone areas.

In the first 10 years of the Healthy Forest Restoration Act, it is estimated that less than 10% of at-risk communities developed a CWPP (Jakes et al., 2011). There are no federal laws that dictate land-use planning and building practices with the goal of reducing wildfire risk (Jakes et al., 2011). This leaves local governments and communities to decide how best to protect residential areas from wildfire. Typically, local governments utilize zoning policies, building codes, or other ordinances to do so and the burden of compliance often falls on the residents (Kramer et al., 2019).

Grantors of fire mitigation projects are more likely to fund communities with a developed CWPP because they demonstrate an expressed need by the community that funding can meet (Kate Furlong, pers. communication). Although CWPP working groups are encouraged to focus planning efforts on "high risk" communities, risk is generally defined in the context of spatial and environmental factors, rather than socioeconomic features. This is largely true of most federal wildfire planning efforts, which tend to focus on areas of high biophysical risk with less emphasis on social vulnerability (Ojerio, 2008).

Ventura County's current CWPP, prepared in 2010 by the Ojai Valley Fire Safe Council, focuses on reducing biophysical risk to communities. Its highest priority actions are vegetation management projects where potential wildfire threatens life, property, infrastructure, and agricultural assets. Its second priority is vegetation management projects where wildfire threatens watersheds or important ecological systems. Wildfire safety education is the third priority. The plan implements weed abatement notices and home hardening, which entails home improvements and vegetation clearing that help protect a home in the event of a wildfire. The plan proposed 43 projects ranging from chipper days to education initiatives and ecological restoration. The listed projects are concentrated in larger population centers, namely Ventura and Thousand Oaks, and areas with active local Fire Safe Councils, such as Ojai.

Current CWPP Strategies and Projects

Weed abatement notices: property owners are notified that they must reduce the vegetation on their properties (Ojai Valley Fire Safe Council, 2010)

Home hardening: making homes more resistant to ember intrusion through physical modifications of the structure and creation of defensible space around the home through vegetation management (Hardening Your Home, n.d.)

Defensible space: a buffer zone created between the home and surrounding vegetation or wildland areas to help prevent homes from catching fire and to reduce the risk of ember intrusion (Defensible Space / PRC 4291, n.d.)

Chipper-days: days when the Fire Safe Council pays to bring a wood chipper to a community so that residents can get rid of green waste ("Ventura Chipper Dates," n.d.)

The primary purpose of a countywide CWPP is to guide future actions of county and city fire departments, property owners, business-owners, homeowner associations, and other interested parties in their efforts to reduce the wildfire threat to the county and in individual communities. The recent Thomas Fire and Woolsey Fire illuminated a need to update the county-wide CWPP (Kate Furlong, pers. communication). In Ventura County, 6.1% of families live in poverty and 4.3% of households do not have access to a car. Approximately 15% of the population is over 65, 10.9% of the population has a disability, and 9.5% face language barriers. The language barrier in Ventura County exceeds the national average (U.S. Department of Commerce, 2020).

It is not known how many other CWPPs include considerations of equity, community capacity, or social vulnerability, but it is apparent the practice is not yet widespread. While there are a few CWPPs that address some types of social vulnerability, we did not find any examples of CWPPs that specifically address the vulnerabilities of immigrants or non-English speakers. Similarly, we did not find data on how considering social vulnerability in CWPPs might improve outcomes during a wildfire event. However, literature on the shortcomings of wildfire preparedness and response (Davies et al., 2018; Méndez et al., 2020; Ojerio, 2008; Palaiologou et al., 2019) and the disproportionate impacts of natural disasters more broadly on socially marginalized groups clearly points to a need for more inclusivity and intentional efforts to sever the link between marginalization and vulnerability to wildfire (Domingue & Emrich, 2019; Emrich et al., 2020; Flores et al., 2021; Laska & Morrow, 2006). The lack of literature on the effectiveness of more inclusive CWPPs may be because they are not yet widespread in the wildfire planning arena, that each plan is unique to a community, and that there is no centralized CWPP authority. Despite the lack of literature, CWPPs are a prominent tool in community-based wildfire management and planning and are effective in reducing biophysical risk through vegetation clearing and other planning projects (Jakes et al., 2011). Therefore, CWPPs can help communities to address social vulnerability to wildfire on the community scale, especially if developed with effective community engagement and application of an equity lens.

There are a number of notable CWPPs that do incorporate social vulnerability. Oregon's Josephine, Jackson, and Walker Range counties developed CWPPs in collaboration with social services, which included funneling funds towards fuels mitigation for low-income homeowners (Jackson County, 2017; Ojerio et al., 2008; University of Oregon Community Service Center & Oregon Partnership for Disaster Resilience, 2017; Walker Range Community Wildfire Protection Plan, 2012). Additionally, the Forest Guild of New Mexico produced a methodology for evaluating community capacity to respond to wildfire and has since encouraged communities to incorporate this factor in their CWPPs (Ojerio, 2008). Taos, NM was the first community to use the community capacity assessment to consider social vulnerability in its CWPP (Taos Pueblo CWPP Core Team & Lissoway, 2009).

The updated Ventura County CWPP must consider social stratification and marginalization and offer mitigation strategies given the organization's influence on community wildfire resilience. More information is needed to understand the relationship between social marginalization and wildfire preparation and recovery, which communities in Ventura are most impacted, and what their unique circumstances and needs are. This project aims to address the data gap and offer policy recommendations so that wildfire managers can collaborate with communities to more robustly reduce fire risk for all Ventura residents.

Methods

To meet the project objectives of 1) identifying vulnerable populations, 2) synthesizing community feedback, and 3) producing policy and community engagement recommendations, we implemented a mixed methods approach. A survey of Ventura County residents was distributed to illustrate residents' concerns about wildfire, their prior experiences with wildfire, and the barriers to preparation for wildfire that they face (Appendix A.2). The survey responses confirmed that socially vulnerable groups face additional challenges relating to wildfire preparation and response. Existing spatial data was then used to identify where socially vulnerable groups coincide with biophysical fire threat in Ventura County. Two focus groups along the California Highway 126 corridor, known as the Heritage Valley, further illuminated the specific lived-experiences of people living at the intersection of socially vulnerable communities and high biophysical threat of wildfire.

Survey and Survey Analysis

A survey of Ventura County residents' perceptions of and concerns related to wildfire served as the primary method of qualitative data collection for this project. The survey investigated how race, class, ethnicity, gender, age, and mobility can compound and impact people's ability to prepare for, respond to, cope with, and recover from wildfire. To account for the potential barriers to participation that may affect groups with higher social vulnerability factors, survey distribution was designed to solicit responses from groups identified as potentially socially vulnerable through a literature review. This was done by distributing the survey with the help of established community organizations in socially vulnerable areas of the county.

VRFSC and local community organizations, including Ventura County Fire Department and Mixteco Indigena Community Organizing Project (MICOP), Promotoras Y Promotores Foundation, Piru Community Council, Westside Community Council, and other local Fire Safe Councils circulated the survey online, available via Qualtrics in both English and Spanish. The electronic survey was disseminated via email, VRFSC's website, and social media pages (such as Instagram). It was available August 27, 2021 through January 9, 2022. Ventura Regional Fire Safe Council also collected a small number of paper surveys at a community event, and community partners distributed paper surveys to predominantly Spanish-speaking residents. As an incentive to participate, respondents had the option to enter into a raffle for one of five $25 Visa gift cards.

The UCSB Office of Research on Human Subjects reviewed the survey and accompanying protocols and approved them as exempt from further review. Participants gave informed consent through a form preceding the survey that transparently communicated project goals, data use, and the risks of participation (Appendix A.1). The survey was 24 questions long, including 6 questions related to social demographics, 7 questions on wildfire experience and response, and 6 questions related to the CWPP and wildfire planning. Some questions were multiple selection (check all that apply) and others were short answer. To minimize bias in the survey, questions were framed neutrally. Multiple selection response options included "other" for respondents to write in unique responses, and all questions were optional.

In total, 489 people responded to the survey. Their answers were downloaded from Qualtrics, anonymized, and stored in a secure location for analysis. Data cleaning and analysis primarily utilized R in RStudio (4.1.2). Prior to analysis, responses where the respondent declined to answer all questions of interest were eliminated, which reduced the number of responses to 422. A further 18 responses from zip codes outside of Ventura County were eliminated, leaving 404 survey responses for analysis. Among total survey respondents, 90% speak English at home and 78% identify their race as white

alone. Most respondents identify as women (73%). Thirty-nine percent of respondents are over the age of 65. According to the 2019 American Community Survey, 61% of Ventura County residents speak English at home, 84% of the population identify as white alone, 21% of Ventura County is over 65, and women make up 51% of the population (Table 1).

To assess whether the survey demographics are representative of the demographics of Ventura County, chi-square tests of the demographic variables age, income, race, gender, and language spoken at home were used to compare the sample against the demographics of the American Community Survey (2019). The chi-square tests confirmed that the survey sample was not representative of Ventura County, yielding p-values of less than 0.05 for all variables (age, income, race, gender, and language spoken at home).

Table 1: Comparison of Ventura County Demographics with Survey Respondent Demographics

Demographic Variable	Proportion in ACS 2019	Proportion in Survey	P-value (from chi-squared test)
Gender			
Woman	0.51	0.73	$p < 0.05$
Man	0.49	0.27	
Age			
18-24	0.12	0.07	
25-34	0.17	0.07	
35-44	0.16	0.09	$p < 0.001$
45-54	0.17	0.18	
55-64	0.17	0.27	
65-74	0.12	0.27	
75+	0.09	0.12	
Race			
American Indian & Alaska Native	0.01	0.01	
Asian	0.08	0.03	
Black or African American	0.02	0.01	$p < 0.001$
Native Hawaiian & Pacific Islander	0.001	0.002	
Two or More Races	0.05	0.16	
White	0.84	0.78	
Income			
Less than $10,000	0.03	0.05	
$10,000 - $14,999	0.02	0.02	
$15,000 - $24,999	0.05	0.01	
$25,000 - $34,999	0.05	0.02	$p < 0.001$
$35,000 - $49,999	0.09	0.06	
$50,000 - $74,999	0.14	0.13	
$100,000 - $149,999	0.15	0.24	
$150,000 - $199,999	0.20	0.15	
$200,000 or more	0.12	0.19	
Language Spoken at Home			
English	0.61	0.90	$p < 0.001$
Not English	0.39	0.10	

Note: P-values are from a chi-squared test of whether the distributions in the county and the survey sample are different. Thus, smaller p-values indicate the survey sample is unrepresentative of the county population for that demographic attribute.

Raking weighted the survey results so that they were proportional to the population of Ventura County. Following the methodology described by the American National Election Study and the accompanying R package "anesrake" (Pasek, 2018), a weighting factor was calculated for each survey response based on the particular demographics of the respondent. These weighted data served as the basis for all subsequent analyses.

Three of the survey questions were used as the basis for indexes. The questions used were: "In what way(s) has your household been affected by wildfire? Check all that apply", "If you worry about wildfire, what concerns you most? Check all that apply," and "Is there anything that would make it difficult for your household to evacuate during a wildfire? Check all that apply." (Appendix A.2). Each response checked was given a value of one, except the null responses "I have not been affected by wildfire," "I do not worry about wildfire", and "No, I could easily evacuate," respectively, which were given a value of zero. These values were summed in an additive index for each question. One index, hereafter referred to as the "wildfire impacts index," represented the number of past effects that the respondent had experienced, and another represented the number of worries regarding the topic of wildfire that the respondent expressed. The final index represented the count of eacuation barriers that the respondent reported facing. In all cases, the response of "Other" was scored a value of one, even when the respondent selected "Other" and wrote in more than one additional answer in the provided text-box.

Each index measures distinct underlying factors. Each potential response was uncorrelated with other potential responses, while the null response was negatively correlated with all other potential responses. Principal Component Analysis revealed that variance in all three indices is irreducible, indicating that there is no mutual underlying factor between potential responses. The components explaining the largest amount of variance explained 23.02% for the effects of wildfire index, 23.85% for the worries index, and 22.25% for the barriers to evacuation index. As such, each potential response should be considered as an individual factor, justifying the use of a simple additive index.

To assess evacuation preparedness in different demographic groups in Ventura County, we performed ordinal logistic regression using the "polr" function in the MASS R package (Venables & Ripley, 2002). Responses to the survey question "Do you currently feel prepared to evacuate your home in the event of a wildfire?" served as the dependent variable. Potential responses were "no" (not prepared), followed by "somewhat" and "yes" (prepared). Independent variables that contribute to model fit make up the best fitting model since all independent variables that did not contribute were rejected. Home insurance status and pet ownership did not contribute to model fit. Age, gender, mobility concerns, language, time spent in Ventura, race, and income provided the best overall model fit. Mean Risk to Potential Structure (RPS) values per zip code served as a control for wildfire hazard. The wildfire impacts index was an independent variable to control for prior experience with wildfire and evacuation.

Using the same model inputs, ordinal logistic regression revealed the relationship between demographic groups and worries about wildfire and the relationship between demographic groups and barriers to evacuation. The worries about wildfire index score was the dependent variable in one model, and the barriers to evacuation index score was the dependent variable in a second model.

Many respondents chose not to disclose their income which resulted in a large amount of missing data, likely in a non-random pattern. We imputed the missing data using the predictive mean matching method in the mice package in R. This method of imputation works by predicting the value of the missing variable using regression, then randomly selecting a replacement value from five observations that are most similar to the predicted missing value. To decrease random variation, the process is then iterated 25 times and the results are pooled. We present three variations per each model: one without income, one with the imputed income, and one with non-imputed income that is missing 119 entries.

Spatial Analysis

We conducted a spatial analysis of wildfire risk and social vulnerability factors to identify socially vulnerable census tracts at high risk of wildfire in Ventura County. This information helped identify communities to hold focus groups in. Here wildfire risk is the "likelihood, intensity, and susceptibility to effects of wildfires on highly valued resources and assets" (Joe H. Scott et al., 2013). This is based on a set of biophysical characteristics, such as fuel, weather, and topography, as well as an evaluation of infrastructure and community assets at risk.

A raster layer produced by the US Forest Service called Risk to Potential Structures (RPS) was used to represent biophysical risk. Each cell has a value representing the likelihood of wildfire and intensity of wildfire-related risk to a home at a given location. More generally, it asks the question, "What would be the relative risk to a house if one existed here?" (Scott et al., 2020).

The U.S. Centers for Disease Control and Prevention's (CDC) social vulnerability index (SVI) represented social vulnerability. This layer considers 15 variables as indicators of socioeconomic vulnerability to disasters. These include measures such as poverty, lack of vehicle access, and crowded housing for each census tract. The SVI further divides these variables into four themes: socioeconomic status, household composition, race/ethnicity/language, and housing/transportation (Flanagan et al., 2011). Here, the aggregate SVI score that considers all four themes is the basis of the analysis. Individual census tracts are ranked relative to other census tracts based on indicator variables, then their rank for each variable is aggregated into a total vulnerability score.

The average RPS per census tract was found by using the Spatial Analyst toolbox in ArcGIS Pro. RPS and SVI were then displayed at the census tract level using bivariate colors. (Figure 2). This helped us identify areas that were both high in wildfire risk and social vulnerability.

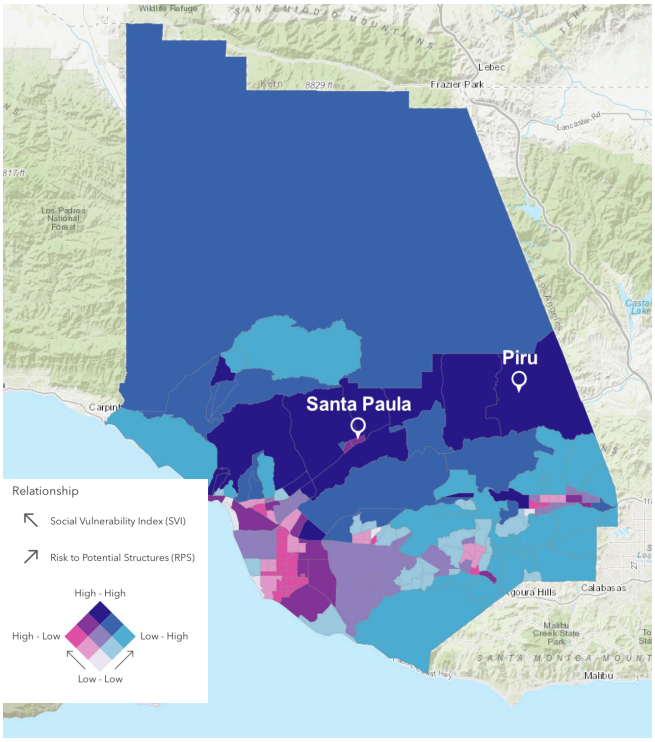


Figure 2. Map of Santa Paula and Piru overlain on SVI and RPS layers. Dark blue indicates areas with high SVI scores and high RPSI.

The Wildfire Hazard Potential raster layer (Dillon et al., 2015), a measure of the relative potential for wildfire that would be difficult for suppression resources to contain, was also analyzed and symbolized with SVI scores. This analysis yielded similar results (see Appendix D.1).

While our spatial analysis relies on CDC social vulnerability data, our use of the term "social vulnerability" in this report differs from the CDC. The CDC uses "social vulnerability" in reference to the social conditions that mitigate or exacerbate the "potential negative effects on communities caused by external stresses on human health," which includes natural disasters. These social conditions include poverty, lack of vehicle access and crowded housing (CDC, 2020). Although the CDC terminology differs slightly from ours (see Box on 8), CDC social vulnerability data is useful for broadly identifying areas of potential concern for the intersection of marginalization and wildfire risk.

Focus Groups

While data-driven spatial analyses of social vulnerability are useful, they cannot elucidate the lived experiences of vulnerable individuals or populations. Census data can be too large-scale or it can aggregate data according to arbitrary boundaries rather than community structure and can thereby inaccurately portray a population (Davies et al., 2018; Lee et al., 2008). Census data lacks information such as community-based preferences and opinions that are necessary to analyze vulnerability to wildfire. For this reason, we hosted focus groups in the areas we identified as high risk and experiencing high social vulnerability. The focus groups engaged people living in census tracts with high social vulnerability that were at high risk of wildfire, particularly low-income, migrant, or Spanish and Mixtec-speaking communities.

Community partners in the region helped to host focus groups in Piru and Santa Paula (Figure 2). Community organizations who partner with VRFSC connected the research team with residents; therefore, the conversations took place in established communities of people where some trust and relationships already exist. These organizations' members have low incomes, are predominantly Spanish speakers, or have some experience with community organization efforts on the Central Coast.

The conversations centered around three main questions to allow residents to steer the dialogue based on needs and interests:

- What is working well with wildfire prevention and response?
- What is missing?
- How can VRFSC support communities and fill in gaps?

(full list of questions in Appendix A.2)

The questions and accompanying protocol were reviewed and approved by the UCSB Office of Research on Human Subjects as an exempt project. The team also obtained informed consent from participants through a consent form that transparently communicated goals, data use, and the risks of participation, and through an oral explanation with the opportunity to ask questions in-person prior to the session. We conducted two focus groups in the Heritage Valley: an English conversation in Piru and a Spanish conversation in Santa Paula. In Piru, 5 residents participated for 45 minutes. In Santa Paula, 12 residents participated for one and a half hours. All participants were compensated for their time with $25 Visa gift cards. The notes from the focus groups were analyzed by the research team to identify major themes and ideas.

Results

The results reveal the differing needs, concerns, and lived experiences of Ventura County residents in relation to wildfire events. The survey broadly elucidated how county residents perceive, prepare for, and live with wildfire. The focus groups revealed the sentiments of the target demographic groups–residents from low income, Spanish-speaking households, and living in high wildfire risk areas. At times the survey results conflict with data collected from the focus groups, which underscores how different tools reach different populations, and that the target population's needs differ from the broader community.

Survey Analysis

Analysis of the survey data centered on the themes of evacuation preparedness and wildfire risk mitigation. This is because Ventura Regional Fire Safe Council is particularly concerned with evacuation, specifically whether residents are prepared to evacuate, and what barriers might prevent smooth evacuation. This analysis focused on responses to the following questions:

> ***Do you currently feel prepared to evacuate your home in the event of a wildfire?***
> ***Is there anything that would make it difficult for your household to evacuate during a wildfire?***

There was also particular interest in what wildfire risk mitigations survey respondents wanted most, as this could help guide the development of new strategies in the CWPP.

Many of the survey respondents had evacuated in the past, with 55% reporting that they had evacuated due to wildfire (Figure 3). Six people reported that they wanted to evacuate but could not. Other commonly reported effects of wildfire include impacts on well-being and stress, and impacts from smoke. These results suggest that wildfire is a salient issue for county residents with the majority feeling personally affected.

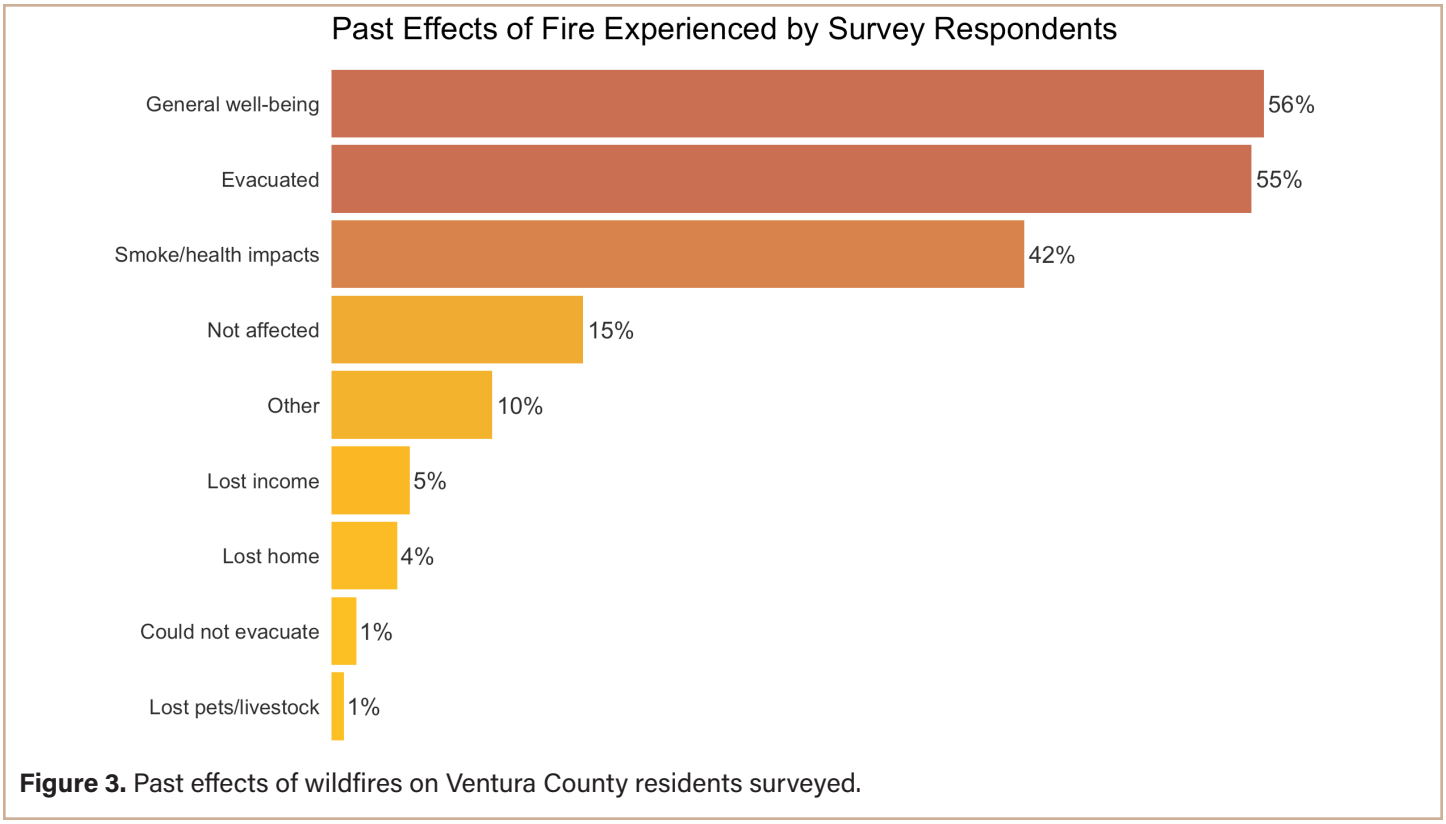


Figure 3. Past effects of wildfires on Ventura County residents surveyed.

Although wildfire is a salient issue for most Ventura County Residents, barriers to evacuation are not homogenous among the population. Forty-four percent of survey respondents reported that they could easily evacuate (Figure 4) while other residents reported impediments to leaving their home. Commonly cited barriers to evacuation included the lack of an alternative place to go, the desire to stay and defend property, and a lack of information about when evacuation was necessary. This broad range of evacuation experiences could be a result of the range of social demographics of survey respondents. However, these results may be disproportionately influenced by the majority of them who are white, older adults, and women.

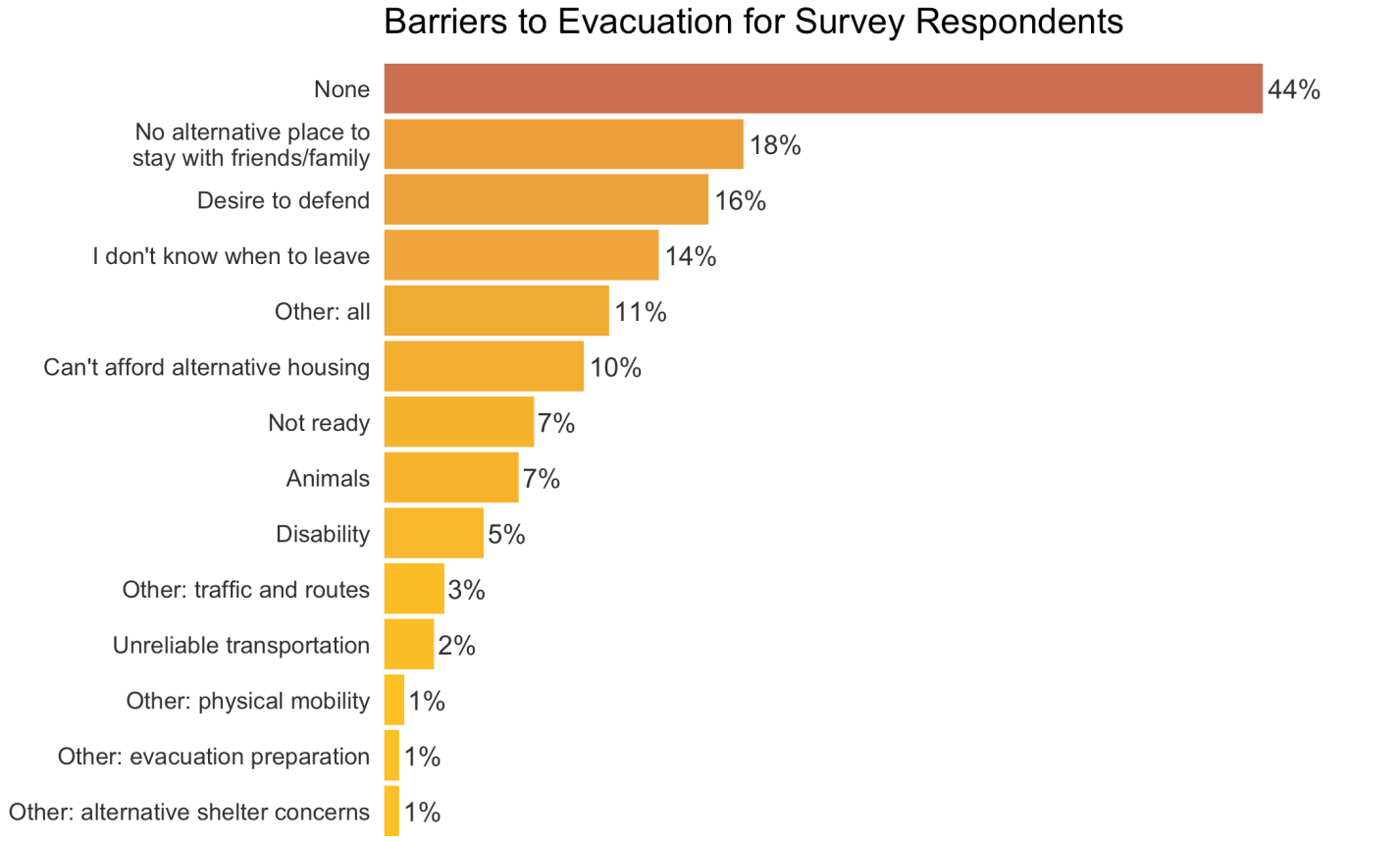


Figure 4. Barriers to evacuation for surveyed Ventura County residents. Barriers noted as "other" were not included in the survey, but were written in by individual survey respondents.

Many respondents took the opportunity to write in other barriers to evacuation that they have experienced, which provided more detailed information. Twelve respondents were concerned about traffic and a lack of alternative evacuation routes and four reported physical mobility challenges were a barrier to evacuation. Other issues raised were more individual to households. One respondent noted the loss of food, and the costs associated with it, as a result of evacuation, which is a particular issue for families experiencing food insecurity. Another worried about the impacts on their child with autism. These results show how a wildfire event can impact various facets of daily life for Ventura County residents.

As mentioned above, survey respondents were asked if they are prepared to evacuate to better understand which groups need additional resources before and during an evacuation. Possible responses were "no", "somewhat", and "yes". Ordinal logistic regression was then used to understand which demographic groups are more likely to indicate preparedness or lack of preparedness.

The model for evacuation preparedness that included the variables of age, gender, mobility concerns, language, time spent in Ventura, race, previous experience with evacuation, and income provided the best overall model fit (Appendix C.1). It also included mean wildfire hazard per zip code and prior experience with evacuation as potentially important controlling variables.

Due to the large number of respondents who declined to state their income, three models were finalized: one without income, one with imputed income data, and one that includes income but has 119 missing observations (Figure 5). In general, the models indicate similar results, with the exception of the independent variables of gender and language spoken at home. Income was insignificant in both the evacuation preparedness models including stated income and imputed income.

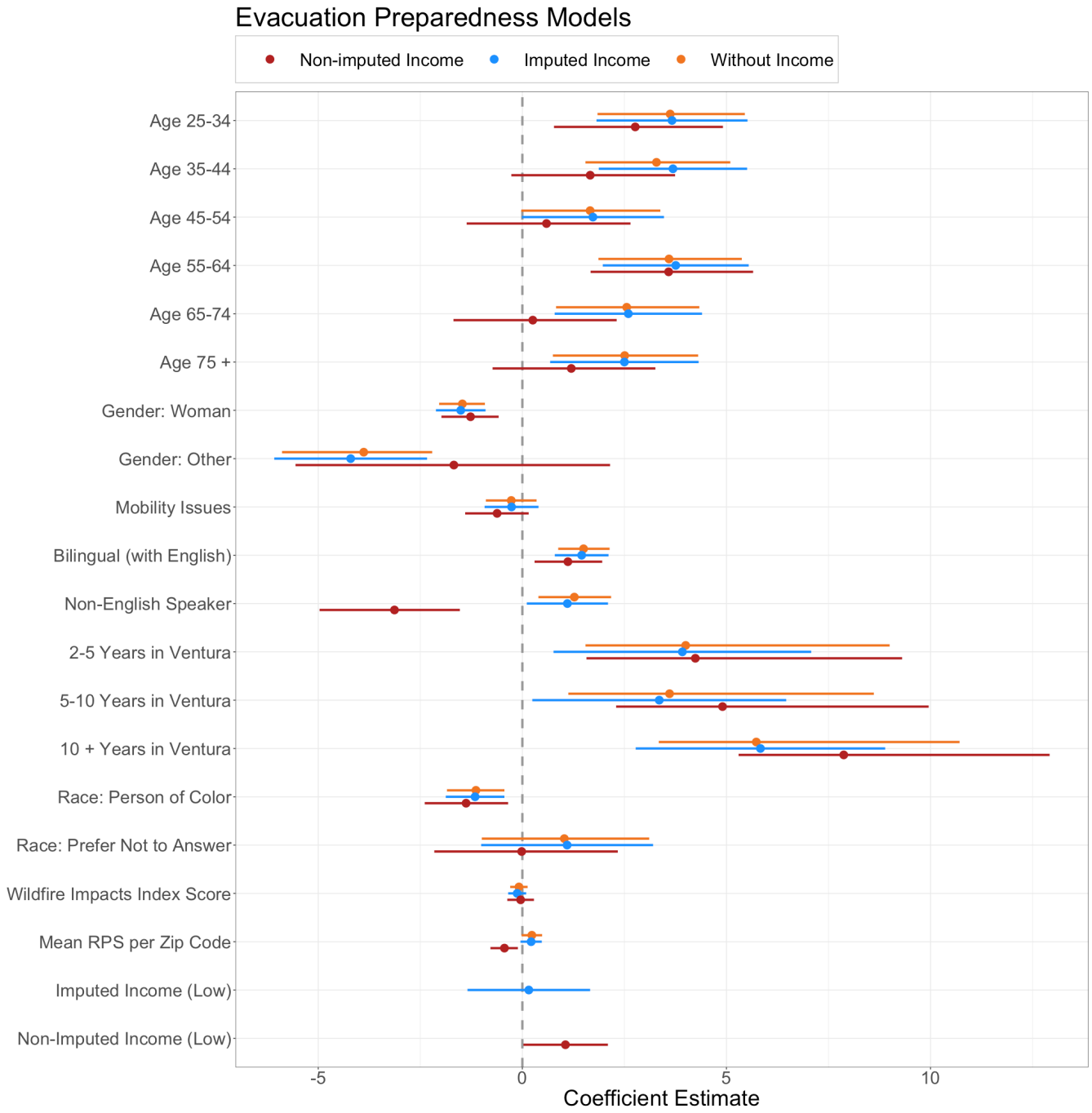


Figure 5. Coefficient plot of three best models for evacuation preparedness. Certain groups like long-time Ventura residents, men, and bilingual people are more likely to feel prepared to evacuate. In contrast, women, people with mobility issues, and people of color are less likely to feel prepared to evacuate.

Figure 5 shows that there are significant differences in stated evacuation preparedness across age groups, gender, and income levels. The 18-24 year olds are the least likely to indicate they are prepared to evacuate compared to other age groups; all other age groups were more likely to indicate they are "somewhat prepared" or "prepared" to evacuate, although 45-54 year olds is not significantly different. Respondents identifying as women were less likely to indicate that they were "somewhat prepared" or "prepared" to evacuate than men. Those who indicated their gender identity as non-binary, other, or who prefered not to disclose their gender were even less likely than women to indicate they were "prepared", except in the model including income, which had insignificant results. Respondents identifying as a person of color (respondents who indicated their race was anything other than white alone) were less likely to indicate they were prepared than white people, and this was consistent across all models.

Non-English speaking and bilingual survey respondents reported higher evacuation preparedness than English speakers. In all models, people who indicated they spoke English and another language were more likely to report being prepared than those who spoke English alone. In two models, non-English speakers were more likely to report being prepared than those who spoke English alone. However, in the model including income but missing data, non-English speakers were less likely to report being prepared to evacuate. In the survey, 2 out of 9 non-English speakers indicated they were not prepared to evacuate, 4 out of 9 indicated they were somewhat prepared, and 3 out of 9 indicated they were prepared to evacuate. Because there are so few responses from non-English speakers, these models may not accurately reflect Ventura County's non-English speaking population.

The most dramatic results indicate differences in evacuation preparedness based on residence time in Ventura. People who have lived in the county for more than 10 years had between 3.35 and 4.23 higher log odds of reporting being prepared to evacuate than people who had lived in Ventura for less than one year. This finding was consistent across all models. These observations indicate that this may be due to long-time residents' previous experience with wildfire evacuation, however, when we added previous evacuation experience to the model as a controlling variable, the trend of increasing preparedness with time spent in Ventura County remained. Alternatively, this finding could also be influenced by their familiarity with evacuation routes, community resources and established social networks.

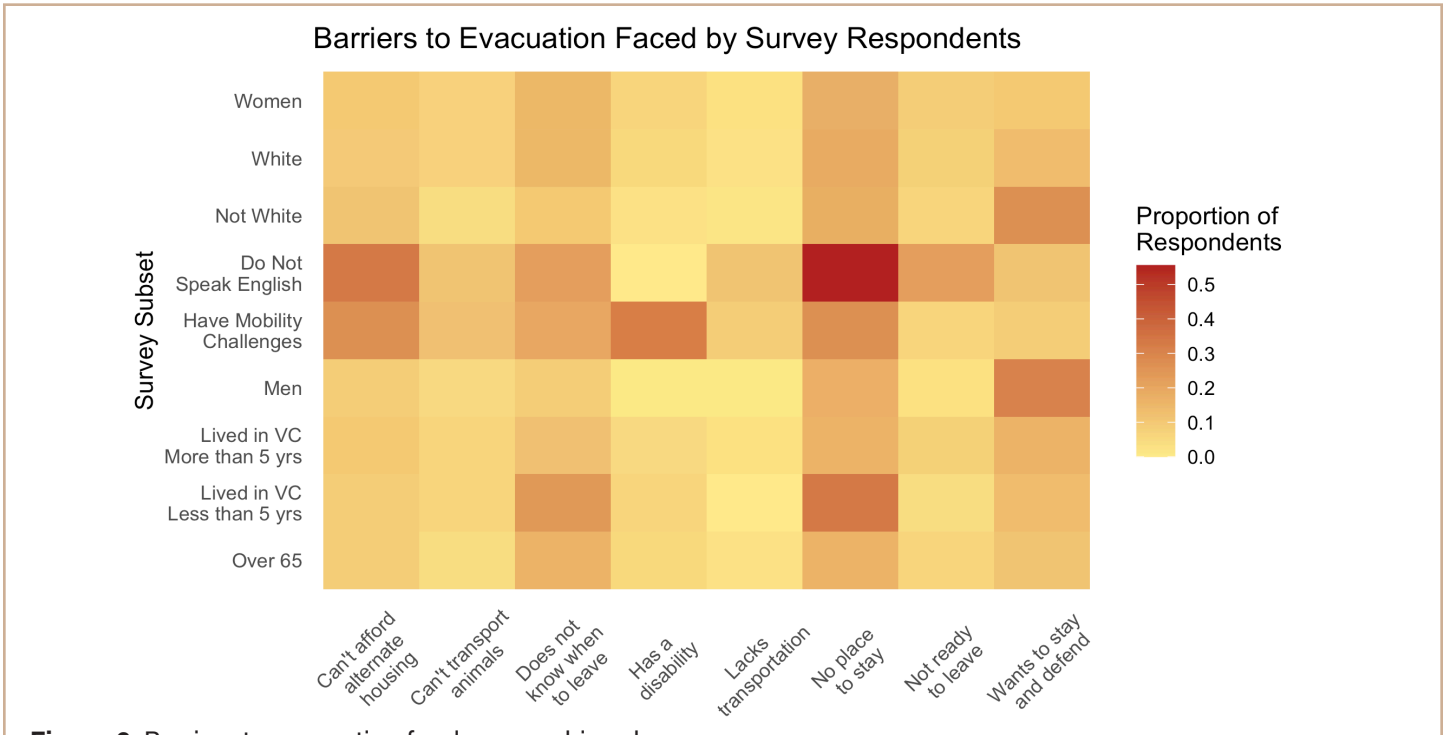


Figure 6. Barriers to evacuation for demographic subgroups.

After identifying groups that may be less prepared to evacuate, the focus shifted to investigating their specific barriers to evacuation. Figure 6 shows reported barriers to evacuation by demographic. Many people with mobility issues indicate that their disability is a barrier to evacuation. Additionally, many non-English speakers and recently established Ventura County residents indicated a lack of information about when to evacuate is a barrier. Not having an alternative place to stay in the event of an evacuation is an issue for many non-English speakers. Men are more likely to state the desire to stay and defend their home is a barrier to evacuation. Lack of transportation, both for themselves and for animals, are not major barriers to evacuation for any group. Respondents identified a lack of an adequate alternative shelter as the most common concern.

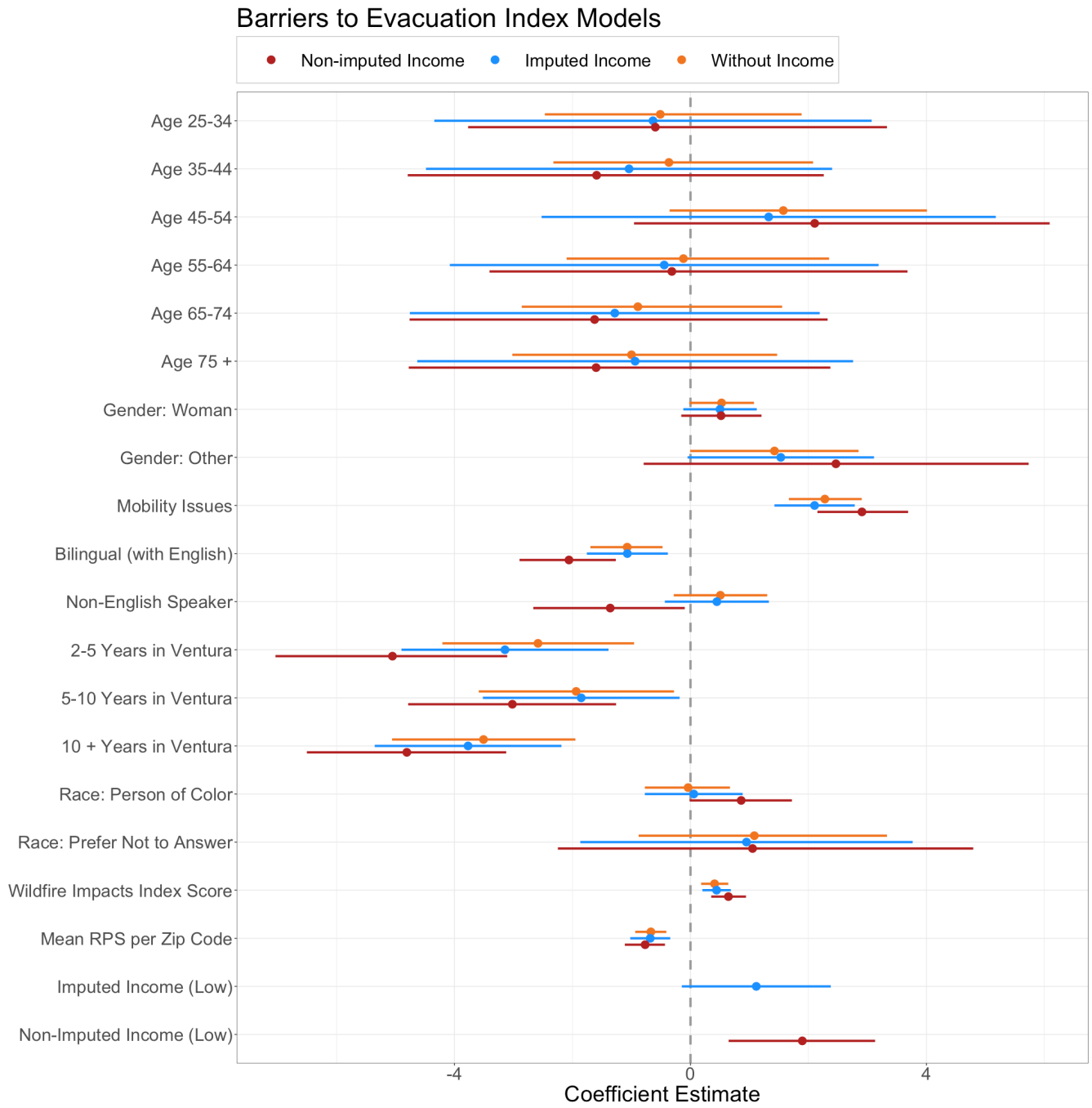


Figure 7. Coefficient plot of three models for barriers to evacuation index. Non-mobility challenged people, long-time Ventura residents, bilingual people, and people living in high risk areas report fewer barriers to evacuation. People with mobility issues, recent Ventura County transplants, and people living in lower risk areas of Ventura County are more likely to report facing more barriers to evacuation. Age, gender, race, and non-English speaking are insignificant in these models.

Ordinal logistic regression was used to assess the relationship between demographic groups and an additive index of evacuation barriers (see Methods). Again, there are three models: one including income but missing observations, one with missing income observations imputed, and one not including income. These models (Figure 7) show that people with mobility issues are significantly more likely to report facing more barriers to evacuation, while bilingual individuals and long-term residents are more likely to report facing fewer barriers. Living in a zip code associated with higher mean risk to potential structure values is also associated with a decrease in the number of barriers faced (Appendix C.3). These models reinforce that systematic challenges to evacuation are associated with certain demographic groups.

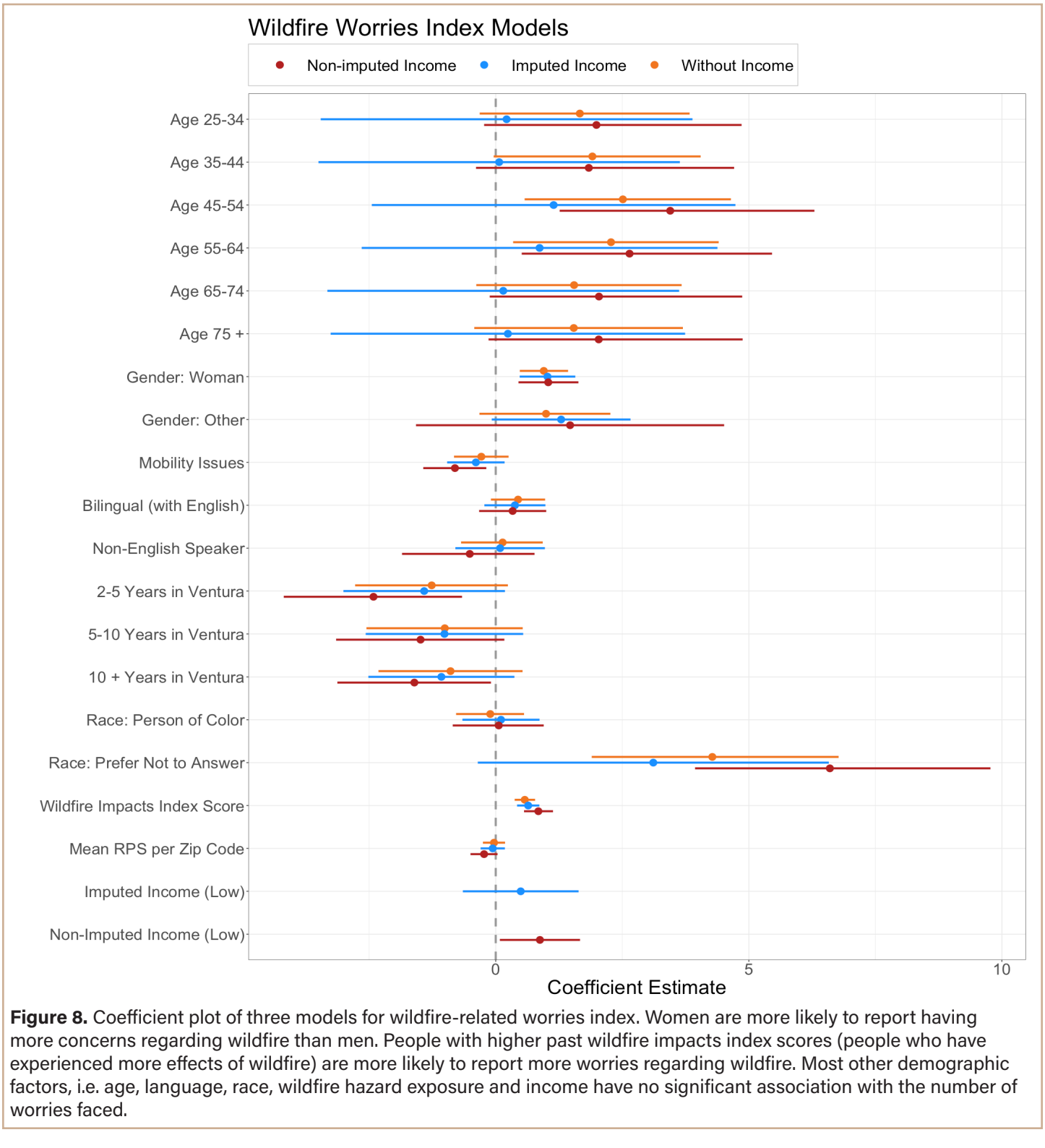


Figure 8. Coefficient plot of three models for wildfire-related worries index. Women are more likely to report having more concerns regarding wildfire than men. People with higher past wildfire impacts index scores (people who have experienced more effects of wildfire) are more likely to report more worries regarding wildfire. Most other demographic factors, i.e. age, language, race, wildfire hazard exposure and income have no significant association with the number of worries faced.

Ordinal logistic regression was also used to model how demographic groups and social identities relate to the number of worries about wildfire that survey participants reported (Figure 8). The 'worries about wildfire' additive index was used as the dependent variable, while age, gender, mobility status, language, time lived in Ventura, race, the wildfire impacts index, and mean RPS per zip code were independent variables. Similar to the other modeling efforts, there are three models: one with income but missing approximately 25% of income observations, one in which we imputed the missing data, and one not including income. While women and people with higher past wildfire impacts index scores are significantly associated with an increase in concerns, most independent variables result in a non-significant relationship with the number of "worries" (Appendix C.2). This indicates that although certain groups report facing additional barriers to evacuation, concerns about wildfire afflict Ventura County residents more evenly. This reinforces the concept that wildfire is a very salient issue for residents across the county, but certain groups may have more barriers to wildfire preparation.

Risk mitigation actions survey respondents want in their communities can guide VRFSC's programming efforts. Many survey respondents are particularly concerned about proactive fire mitigation practices undertaken by the government and utility companies, such as electrical infrastructure maintenance and arboreal work (Figure 7). Some respondents mentioned considering controlled burning informed by Indigenous practices. Other highly desired actions included evacuation preparation and community emergency planning (Figure 7). One respondent suggested developing community trainings in renter communities to prepare them to "help one another to evacuate safely" and give them the tools "to remain safe as possible here on the property" if evacuation is not an option. These responses demonstrate the depth of residents' understanding of wildfire risk and possible solutions in their communities.

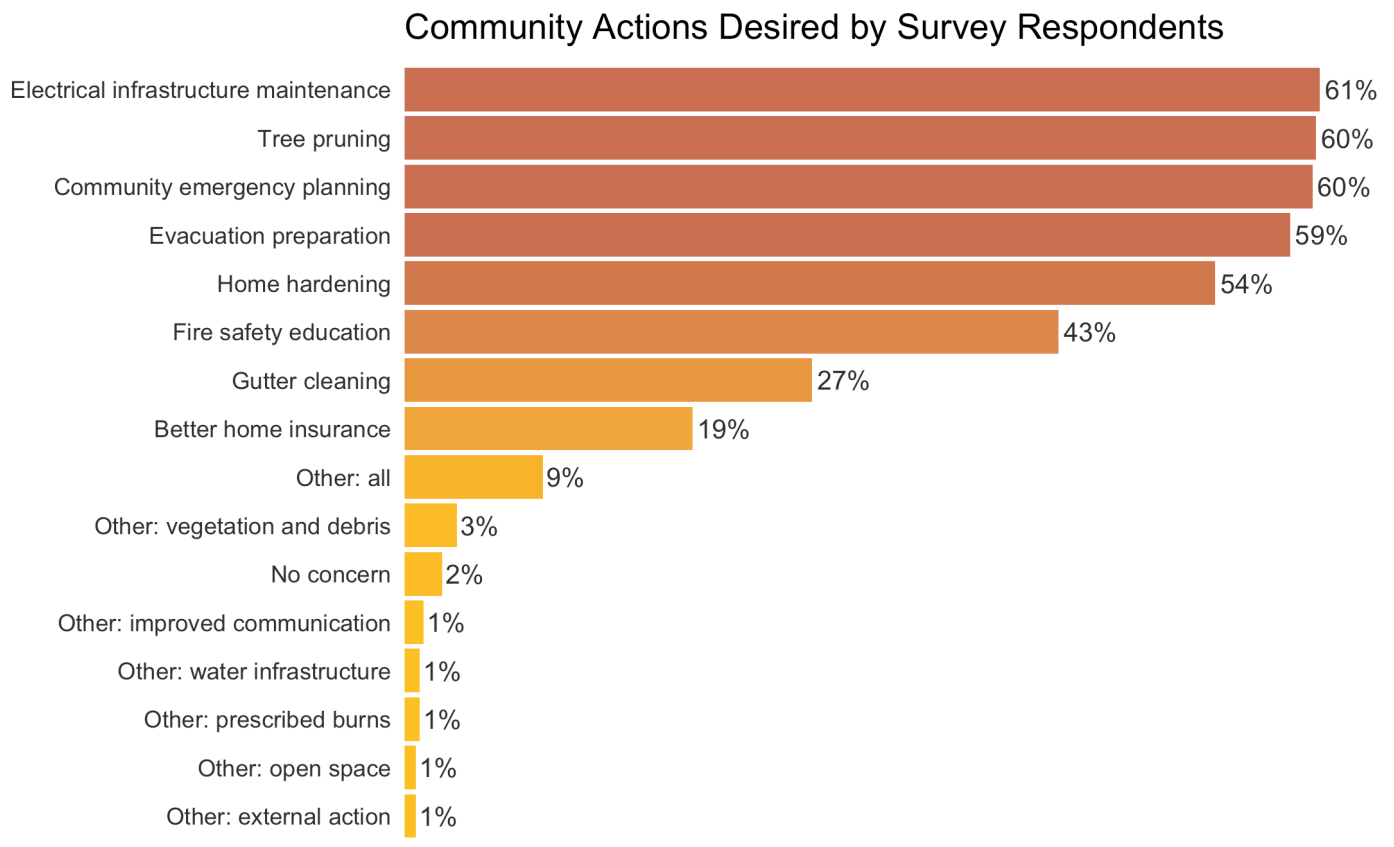


Figure 9. Desired community actions to reduce and mitigate wildfire. Community actions noted as "other" were not included in the survey, but were written by individual survey respondents.

The same survey question can be used to elucidate the wildfire mitigation preferences of Ventura County demographic subsets (Figure 9). Non-English speakers commonly selected actions at the household scale, such as home hardening and gutter cleaning, as top priorities for wildfire safety actions. The other demographic groups prioritized community emergency planning and electrical infrastructure maintenance, which are broad-scale actions unlikely to require individual action (Figure 10). This may be due to differing perceptions of the efficacy of wildfire mitigation strategies, or it to a historical reliance on individual-level risk mitigation activities among non-English speakers due to exclusion from broader-scale risk mitigation activities. These results demonstrate that demographic groups have different preferences regarding wildfire mitigation strategies, which indicates the need for tailored risk mitigation, preparation, wildfire education, and community engagement opportunities.

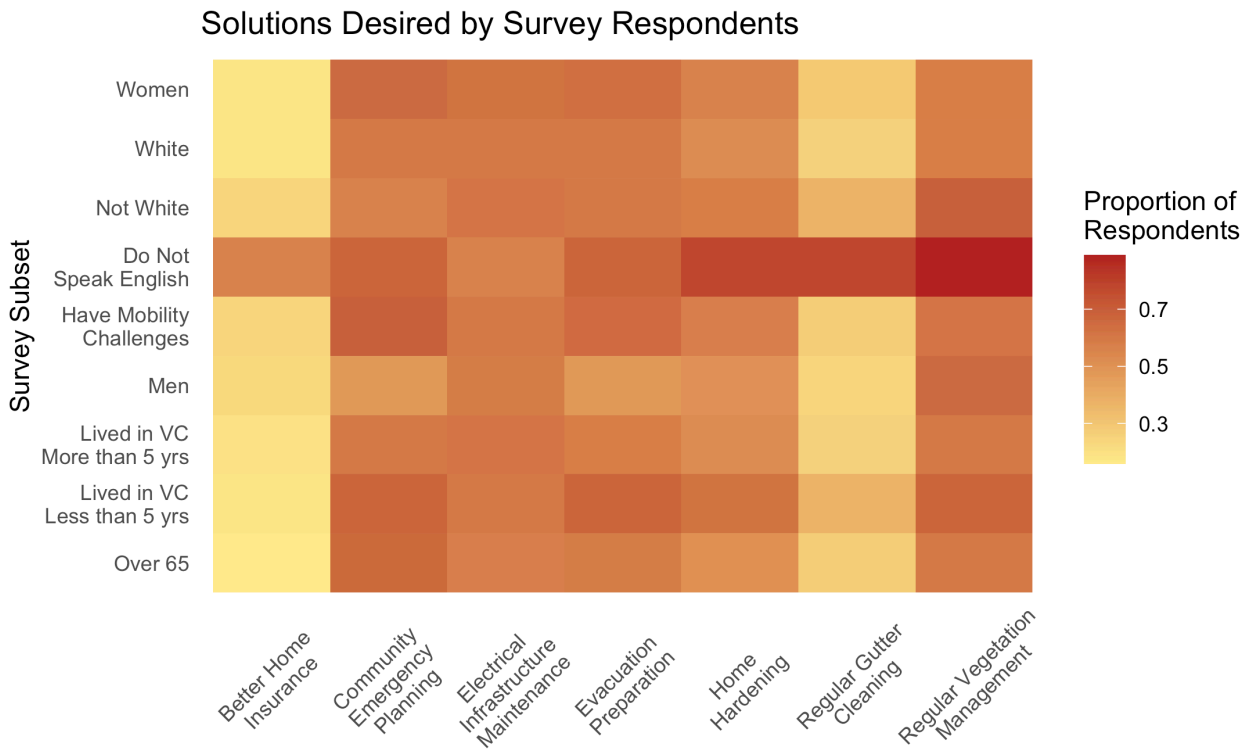


Figure 10. Desired community actions by subset.

These results also reveal that, on average, white, English-only speakers, and male residents espouse different attitudes related to wildfire threat and community planning. White, English speaking, and male respondents prefer wildfire mitigation techniques that occur on a community scale and may require institutional investment, such as electrical infrastructure maintenance compared to traditional, individual-level action such as home hardening. However, these data reflect nuances across social groups regarding differing attitudes related to evacuation. Most of these groups had experience successfully evacuating their home, although less so for men and non-English speakers. Perhaps relatedly, men and non-white residents were more likely to report that the desire to remain at home and defend their property from a wildfire was a barrier to evacuation. More information is needed to understand the root cause of these relationships, yet these results suggest that perceptions of risk and evacuation experience are connected to individual evacuation response.

Ventura County residents who are non-English speakers, are not white, live with disabilities, or have lived in the county for less than 5 years have unique experiences related to wildfire, revealing significant disparities that future wildfire planning should address. All of these groups report they are less prepared to evacuate. Additionally, non-English speakers and people with disabilities more often

report they do not have access to alternative shelter or cannot afford it, which is a significant barrier to evacuation. One non-English speaker wanted to evacuate but were unable to in the past. These respondents are also more concerned about wildfire impacts on health and work or school attendance than other groups. Residents with limited mobility were more concerned with electrical and water infrastructure, likely because they are more reliant on these systems during an emergency.

Social marginalization and vulnerability to wildfire are linked, and the intersections of social identity and vulnerability feed into limitations of the models. The models that include non-imputed income exclude respondents who chose not to disclose their income. There is likely a systematic reason that people chose not to report their income; those at the extremes of the income scale may be uncomfortable disclosing their income. Non-English speaking respondents who did not report their income also reported being prepared to evacuate. Omitting these responses results in a bias that understates evacuation preparedness among non-English speakers.

The small sample size (9) of non-English speakers survey participants not only made it harder to conduct a robust statistical analysis, but it also demonstrated that a written survey is not the ideal method for reaching these communities. The language question only asked participants to state the language(s) they spoke at home, not their preferred language. This may have incorporated speakers who are most comfortable communicating in a language other than English within the bilingual category, making an exploration of the relationship between language and wildfire risk more difficult. Alternative methods, such as the focus groups, appear to be more effective methods for targeting and meaningfully engaging historically excluded populations.

Focus Groups

> *"It's hard to know when to leave. It's a complicated decision, because people go to a shelter in Oxnard but if you need to work the next day then you might lose wages so it's really hard."*
>
> *Santa Paula focus group participant*

The survey captured a broad range of wildfire perspectives across Ventura County, whereas the focus groups elicited a more nuanced understanding of the target demographic groups–low income, Spanish speaking, and living in high wildfire risk areas–who were not as well-represented in the survey. Marginalized communities were more difficult to reach through survey methods alone, therefore focus groups in targeted communities supplemented survey findings. Both focus group conversations centered around three themes: strengths and gaps in current wildfire prevention and response, and how VRFSC can support communities and fill in gaps. In these focus groups, residents detailed their lived experience with wildfire and enhanced current understanding of the barriers to resilience and possible points of intervention.

The two focus groups engaged participants from distinct, social demographic groups. In Piru, participants were mostly older men that were homeowners and represented a majority lower to middle income community. Most residents had long-standing ties to the community and had lived there for many years. The Santa Paula focus group engaged mostly middle-aged women (72%) with children. Several of the participants mentioned they are involved with Indigenous and Latinx organizing efforts in Ventura County. Others participate in "promotora" or community health promoter organizing efforts locally, and are similarly very engaged residents. All participants were native-Spanish speakers. Many participants reported living in denser central Santa Paula, as opposed to the less populous edges of town closer to the WUI.

Participants in both focus groups were particularly concerned about evacuation. In Santa Paula, this concern centered on families' ability to evacuate and stay together. They expressed that many families do not have the vehicle capacity to evacuate all their children at once, necessitating multiple trips. One resident was concerned about losing their job should they evacuate to Oxnard and not return the next day for work, making the decision to evacuate their family all the more difficult. Additionally, the valley has limited evacuation routes which makes it challenging for residents to get out quickly. This was a particular concern in Piru, where there are only two roads out of the development. Both groups expressed the need for evacuation and shelter-in-place planning.

> *"It's very emotional for the kids, they worry about fires that are far away, they have a lot of anxiety, they're really traumatized."*
>
> *"My kids are traumatized, but even we are traumatized. It took 2-3 hours for some people to leave. There weren't enough exits."*
>
> *Santa Paula focus group participants*

The focus groups also called for improved communication strategies, including requests for physical signs and flyers in Piru, and more Spanish and Mixteco accessible communications in Santa Paula. Piru participants noted that older residents may prefer non-digital communication about wildfire education and wildfire risk mitigation. Santa Paula participants noted that there are insufficient Spanish resources on wildfire prevention, evacuation, and response, including emergency notifications. They also noted that some older adult and Indigenous members of their community also have difficulty accessing information because wildfire notifications are primarily dispersed via cell phones and social media, or text-heavy written materials. They reported that many Indigenous community members do not speak English or Spanish fluently, and emphasized the need for more visual resources. In spite of these limitations, participants in both groups noted that they use personal social networks to notify friends, family, and other community members about acute wildfire threats using applications such as Whatsapp groups and speaking with neighbors in person.

The Santa Paula focus group expressed explicit concern for the effect of wildfire on mental health, particularly the mental and emotional well-being of children in their community. They noted that their children exhibit fear and anxiety in response to nearby wildfire events that do not directly impact their community. These residents mentioned that psychological resources at school were insufficient in addressing their needs. One woman acknowledged that she, too, felt traumatized by past wildfire events, though focused on the emotional impact on her children. These anxieties relate to both immediate wildfire response and residents' abilities to successfully recover. In contrast, residents of Piru focused on biophysical risks rather than the mental or emotional burden of fires.

> *"The last big fire we had here, I told my neighbors in person because they're older and they wouldn't know otherwise."*
>
> *Santa Paula focus group participant*

The Thomas and Woolsey Fires both destroyed the homes of many Ventura County residents and brought hazardous air quality for extended periods. As residents mentioned in the Santa Paula focus group, poor air quality is particularly a problem for farm workers who are forced to choose between working to keep their jobs and feed their families, or lose income. While both fires occurred several years ago, people remembered these wildfire effects keenly, which demonstrates that wildfire is a salient issue in these communities.

In summary, the focus groups further revealed that low to middle income and non-English speaking people in Ventura County have differing needs, perceptions, and concerns regarding wildfire compared to the broader population. Specifically, they reported barriers to receiving important wildfire information, safely evacuating, and quickly recovering from wildfire events compared to the majority of county residents represented through the survey results. Additionally, they raised concerns around language access and mental health. These findings indicate that wildfire risk mitigation and wildfire preparedness activities do not uniformly accommodate communities. In fact, interventions that are broadly applicable may systematically exclude residents who are particularly vulnerable to wildfire.

Discussion

Research Findings

The findings reveal that needs and barriers related to wildfire safety for Ventura County residents are influenced by social identity and residence time, which has implications for future wildfire management efforts. Current wildfire planning and management do not equitably prepare all residents for wildfires, as they fail to address the needs of non-English speakers, women, communities of color, and newer residents who are shown to be especially vulnerable to wildfire impacts. Wildfire management agencies and groups like Ventura Regional Fire Safe Council (VRFSC) must diversify wildfire planning strategies and shift their focus to address these needs and reduce community vulnerabilities. They must also consider the distinct needs of each community, since socially marginalized groups are not a monolith. Residents who identify with multiple marginalized community groups can face amplified vulnerabilities to disasters due to these overlapping identities (Emrich et al., 2020; Flores et al., 2021; Laska & Morrow, 2006; Méndez et al., 2020). For example, a Latina woman may face heightened vulnerability compared with a white woman due to the dual ways that social marginalization hinders her ability to respond to and recover from a wildfire. While this project does not extend to this level of detail, wildfire managers and organizations should consider how these dynamics impact communities they serve. This will be community-specific, and this enhanced understanding of vulnerability can help managers create more applicable wildfire programming and policy. Below is an analysis of the ways different social identities influence wildfire vulnerability in Ventura County.

Age and Vulnerability

Based on the survey results, the 18-24 year-old age group is the least prepared to evacuate during a wildfire, possibly due to the financial and social precarity young adults face as they leave the social safety nets associated with home and school (Kent, 2010). Since this group was underrepresented in the survey and focus groups, more information is needed to understand their particular vulnerabilities. Establishing partnerships with youth organizations or local schools present opportunities for intervention and deeper engagement.

After young adults, middle-aged respondents (45-54) and older adults (65+) were the least likely to be prepared to evacuate. Perhaps childcare, eldercare and other family responsibilities are barriers to middle-aged respondents' ability to evacuate. Households with more dependents and young children encounter more difficulties responding to disaster, in part due to the additional strain on household resources (Crowley, 2020; Cutter et al., 2003; Laska & Morrow, 2006). In the survey, older adults did not report that mobility limitations are a barrier to evacuation, which contradicts prevailing research findings on social vulnerability and disasters (Crowley, 2020; Cutter et al., 2003). They indicated that they do not know when to leave or do not have alternative shelter, which supports research indicating that populations with a higher proportion of adults over 65 are associated with higher post-disaster

shelter needs (Crowley, 2020). Emergency wildfire notifications may not adequately reach these populations, pointing to a need for more targeted and accessible communications that may be less reliant on technology. A deeper analysis of the impact of social capital, or the connections individuals have with others in their community, could be helpful for understanding these vulnerabilities. Research indicates this has significant influence (Cutter et al., 2003). Social capital may be especially important for socially isolated, older adults. Therefore, community programming and engagement efforts that center relationship-building among residents provide a possible solution. Additional interventions include targeted communication for these groups and efforts to create strong, local social networks that can serve as support systems during a crisis.

Gender and Vulnerability

> *"We have kids with disabilities, so it's hard to be sure you have all of the medication, and there isn't time to get everything. It's hard to know what to bring and have the essentials prepared in time because we don't know in advance. People here have 6-7 kids, so it's difficult to know how to get [everyone] out."*
>
> *Santa Paula focus group participant*

Survey respondents who identify as women are less likely to report being prepared to evacuate during a wildfire. This finding aligns with other social marginalization and natural disaster research, which indicates that vulnerability disparities along gender lines are due to social inequalities that result in lower wages and the additional care-taking responsibilities that women typically hold (Crowley, 2020; Cutter et al., 2003; Laska & Morrow, 2006). Survey respondents who identified as women were also significantly more likely to report having a multitude of concerns regarding wildfire (see results, Figure 8), possibly due to the additional pressures of child and elder care which often fall on women. The focus group discussions provided additional details on how this impacts Ventura County communities, which are useful in planning. Mothers in the Spanish-speaking focus group reported that family size and children with disabilities posed additional challenges to evacuation preparation and evacuating all household members in one vehicle. These findings implicitly reveal that in their community, women bear the responsibility of household disaster planning. In response to this need, wildfire programming should offer additional support to these households. Additionally, wildfire communications materials and educational opportunities should target and accommodate women and caretakers as they are more likely to lead household emergency response.

Race, Ethnicity, and Vulnerability

The survey and focus group findings also support research that identifies disproportionate challenges for communities of color during disaster response. Race, particularly due to the way discrimination and systemic exclusion affects adaptive capacity, can increase vulnerability to wildfire (Davies et al., 2018). Non-white (one or more races) respondents reported less wildfire evacuation preparedness. Natural disaster response disparities due to race are attributable to racial and ethnic discrimination, inequities in political power and access to social services, and inaccessible disaster communications and recovery funding (Crowley, 2020; Cutter et al., 2003; Emrich et al., 2020; Laska & Morrow, 2006). This project does not capture the nuances of these inequities nor how different communities of color differ in their wildfire preparation, recovery assets, and barriers. However, the results, coupled with the literature findings, imply that wildfire managers must target communication materials and programming for these groups in ways that address or compensate for the barriers to resilience caused by social inequity (Davies et al., 2018).

Survey design issues posed a barrier to a more thorough quantitative analysis of the possible links between ethnicity and wildfire risk. The demographic categories included in the survey match the census to facilitate the comparison of the survey sample to Ventura County demographics. “Hispanic” is an ethnicity category in the U.S. census, not a race category. The survey did not ask respondents whether they identified as Hispanic or Latinx. Thus, this analysis could not include this community’s wildfire vulnerabilities from survey data alone. Instead, answers from Spanish-speaking survey respondents and data from the Spanish-speaking focus group results served as proxies to compensate for the missing data. This work demonstrates the challenges and limitations of surveying, and highlights that focus groups are a useful tool for gathering nuanced, population-specific information about wildfire response.

While the survey did not include a Latinx ethnicity question, the Spanish-speaking focus group provided key insights into the barriers to wildfire preparation and response of these groups. These conversations highlighted that lack of financial resources coupled with linguistically inaccessible communications hinder household wildfire preparation and recovery. This finding aligns with literature that demonstrates that the lack of linguistically accessible emergency notifications and relief can slow disaster recovery for Latinx populations (Domingue & Emrich, 2019; B. D. Williams & Webb, 2021).

While the citizenship status of focus group members is unknown, focus group participants reported social connections with undocumented, Mixtec farmworkers in the region and familiarity with the issues they face. These challenges exist at the intersection of citizenship status, language barriers and ethnic discrimination. The undocumented population in Ventura and Santa Barbara counties is broadly estimated at over 9 percent (Méndez et al., 2020). Research on wildfire recovery in Ventura shows that Mexican Indigenous (Mixtec), undocumented communities do not receive adequate communications regarding wildfire threat and do not qualify for federal aid (Domingue & Emrich, 2019; Méndez et al., 2020). Wildfire managers and agencies can address these disparities by offering communications and programming in targeted languages and establishing sources of financial support outside of federal recovery funds. However, addressing the social marginalization causing these disparities is outside the scope of their work and requires broader systems and policy change.

Program and Policy Recommendations

The survey results and the depth of local knowledge provided through focus groups together provide the basis for a set of Community Wildfire Protection Plan (CWPP) recommendations to reduce vulnerability for marginalized groups. Based on the findings, recommendations for future planning and management activities are grouped into the following three categories: 1) an expansion of traditional risk mitigation strategies, 2) approaches to expand community engagement and decision making, and 3) novel approaches that shift the current role of wildfire managers.

Targeted Traditional Strategies

The results indicate gaps in traditional wildfire risk mitigation strategies that leave some Ventura communities vulnerable, and highlight the need for more targeted, accessible and inclusive programming. Current educational and wildfire preparation efforts do not adequately reach all communities who are most vulnerable to wildfire.

In particular, non-English speaking households' desire for more preparation and education about individual actions indicate that current opportunities may not be sufficiently accessible in their native language. The focus group conversations revealed a greater need for workshops and educational materials offered in Spanish and Mixteco. While VRFSC provides written materials in Spanish, these materials are not readily available on their website (Ventura Regional Fire Safe Council, 2022). Furthermore, educational materials such as evacuation check-lists are text-heavy and are inaccessible to populations with low literacy rates. This was a particular concern indicated by Spanish-speaking focus group participants who suggested that materials that rely on images would be more accessible, especially for Mixteco communities.

Targeted outreach, and educational workshops and materials that are offered in other highly-spoken languages in Ventura, such as Spanish, would make traditional programming more accessible. This communications approach can reach broader audiences and facilitate collaboration among different stakeholders for common wildfire planning goals (Paveglio et al., 2018). However, further scoping within these communities is needed to address other potential barriers to participation such as workshop times and location and the ongoing COVID-19 pandemic. Programs should offer incentives to facilitate participation by offering food and childcare to reduce barriers to participation in communities who are already overburdened by social inequity or are under-resourced. Further engagement through existing organizational partnerships could identify specific barriers that then inform more inclusive educational programming.

Traditional wildfire risk mitigation strategies from the individual to community level can be adjusted and targeted to better serve marginalized groups. The survey revealed differing preferences for wildfire risk mitigation strategies among various demographic groups. In particular, non-English speakers favored individual risk mitigation actions that reduce the biophysical risk of wildfire to homes and property, while all other demographic groups favored institutional-level risk mitigation activities such as electrical infrastructure maintenance and community emergency planning in addition to home hardening and vegetation management. It is possible that non-English speakers have been historically excluded from larger-scale risk mitigation projects, and thus favor actions that they can take themselves. This distrust is particularly justified for undocumented immigrants, given that these communities face deportation risks and have historically been excluded from disaster relief by public agencies (Crowley, 2020; Domingue & Emrich, 2019; Méndez et al., 2020). Alternately, it is possible that assistance with biophysical risk mitigation strategies such as home hardening, vegetation management through chipper days, are not available or accessible to non-English speakers. Through

targeted education and engagement strategies for community-scale risk mitigation projects, and linguistically appropriate assistance for individual level actions, wildfire organizations can make mitigation strategies more equitable and begin to rebuild trust with historically-excluded communities (Domingue & Emrich, 2019).

Finally, most of the vulnerable groups also indicated that more effective messaging regarding evacuation orders is needed. This highlights that improved evacuation preparation information and communications channels are necessary to help these groups confidently make decisions about their safety. By closing the gaps between current program efforts and these communities' needs, wildfire managers and organizations can reduce community vulnerabilities, and increase evacuation preparedness and response. This could result in wide-reaching effects, particularly faster and safer wildfire response among all community members.

Community Engagement Strategies

This research and the work it builds upon are initial steps to identifying marginalized communities' needs and barriers to wildfire resilience; expanding programming to meaningfully engage them outside of top-down planning processes is a necessary next step to ensuring these communities have a voice in wildfire management. Grassroots approaches can increase residents' capacity to adapt to wildfire and facilitate community-agency collaboration (Ireni-Saban, 2013; Paveglio et al., 2018). For example, focus groups and informal community meetings provide opportunities for target audiences to direct the conversation to topics of interest and share nuanced details about their lived experience as seen in the focus groups conducted in this project. These engagement methods would allow managers to ask follow-up questions and build trust with community members. With diversified communication, communities have direct channels for sharing feedback that managers can use to create more responsive programming. Focus group conversations were well received by the community. Additional conversations with the marginalized communities identified and groups we did not engage that compensate participants would be helpful to further identify unique vulnerabilities and assets in the county. Groups to consider include disabled, housing-insecure, youth, and older-adult communities. Direct engagement with these groups offers managers and agencies like VRFSC the opportunity to identify vulnerabilities and connect residents with the planning process.

Based on this project's findings, future research efforts could build community knowledge and capacity by incorporating place-based and community-based participatory research approaches. While community members are aware of wildfire risks and what is needed to reduce their vulnerability, they do not have access to the proper channels to communicate that knowledge directly with wildfire managers and agencies. By directly participating in information gathering, these communities can ensure diverse needs are accounted for. These research strategies require deep engagement with residents and would illuminate how social and environmental factors converge during wildfire events, as well as ways residents successfully mitigate negative impacts (Kolden & Henson, 2019). Empirical research should be supplemented by "ground truthing" findings based on community perspectives and experiences, which would allow officials to understand and address the unique needs and vulnerabilities of residents (Méndez et al., 2020). Participatory research improves the quality of research findings, builds community skills, and can lead to systemic change in instances of environmental inequity (Davis & Ramírez-Andreotta, 2021). It is also important to appropriately compensate residents for their time and expertise, to avoid perpetuating existing inequities. As organizations like VRFSC and wildfire management agencies strengthen their relationships with community members, formalized decision-making bodies could further incorporate community expertise and facilitate community-led management and planning efforts. Community advisory councils are one strategy for successfully including residents in environmental planning (Davis &

Ramírez-Andreotta, 2021). This approach would offer frequent, direct contact with the community and provide a bidirectional communications channel for managers and community, helping to remove the guesswork involved in community engagement. These strategies offer ways to meaningfully elicit community feedback and enable communities to have more agency in wildfire management and planning in the long-term.

Existing CWPPs do not typically include qualitative research; however, qualitative community engagement and empowerment methods are key to including vulnerable groups in wildfire management. The Forest Guild of New Mexico produced a methodology for evaluating community capacity to respond to wildfire and has since encouraged communities to incorporate this factor in their CWPPs. Taos, NM was the first community to implement it in a CWPP (Ojerio et al., 2008). Additionally, the Forest Guild developed recommendations for including vulnerable populations in the CWPP. They recommend facilitating broad community engagement through multiple avenues, and open and transparent planning processes to ensure that needs of vulnerable groups are addressed in these planning documents (Ojerio et al., 2008). Insight on how a community can best prepare based on their needs can ensure that the actions taken will increase future preparedness and resilience.

Wildfire agencies and organizations must directly and intentionally engage historically-excluded communities to make wildfire planning truly inclusive. The survey results reflect the perspectives and preferences of a largely white, female, English-speaking audience over 65 years old. While the focus groups captured some diversity, we still did not reach all communities in Ventura County. Wildfire managers and support agencies should establish and maintain relationships with local community organizations and social service agencies to both identify strategies to engage diverse audiences and actively involve them in the planning process. However, these strategies should not be approached as a box to check and can run the risk of merely being performative.

> *"Where else is there to stay in Piru if you can't get out?"*
>
> *Piru focus group participant*

Instead, managers will need to build community-agency collaboration. Members of our Piru focus group noted that no one had ever come to the community and asked what they need before now, which indicates that while collaboration building is welcome, it has not been a focus in the past. Management agencies and organizations should thoughtfully consider where along the "consultation" to "empowerment" spectrum community members can feasibly influence planning decisions and transparently communicate that to community partners to clarify expectations (Environmental Protection Agency, 2022). This range of community engagement levels begins with the lowest level, simply informing or consulting with residents. Alternatively, the most engaging levels would give community members more agency and decision-making power in the wildfire planning process. Identifying engagement level capacity helps prevent future harm to communities, who could come to distrust managers that express desire to involve them in decision making but do not have the tools or capacity to integrate feedback or include community throughout the planning process. In some cases, community advisory councils fail to shift decision-making power to impacted communities and lead to systems change (Cole & Foster, 2001; Davis & Ramírez-Andreotta, 2021). This is because traditional, top-down structures did not change and could not adequately incorporate collaborative decision-making from non-traditional experts, so it is important to plan engagement at the outset. The level of engagement managers are able to support may evolve over time, though "empowerment" should be the goal if agencies aim to deeply engage marginalized communities and enact systems-level change. However, managers should be respectful of the time and other resources these communities are asked to invest in community planning activities. Marginalized groups are often overburdened and resource limited, so managers should facilitate participation, respect community time, and compensate participants.

Finally, meaningful community co-leadership strategies may challenge existing decision-making structures, upset management culture, and shift power away from traditional hierarchies. Therefore, agencies and organizations should prepare leadership and personnel for these changes in support of more inclusive wildfire planning overall.

Novel Approaches

Finally, the research results imply that novel approaches that address the vulnerabilities of marginalized communities are necessary, which requires a significant shift in traditional wildfire management and planning strategies. Some Spanish-speaking focus group participants mentioned that a community emergency relief fund would be a helpful resource for households who cannot access federal aid due to citizenship status. A model for this includes Central Coast Alliance United for a Sustainable Economy's (CAUSE) 805 UndocuFund, which established a mutual aid fund for undocumented Ventura residents to address income losses related to the Thomas Fire (CAUSE, n.d.).

> *"What's helped me is being involved in organizations, like CAUSE. I learned about fires from them more than from emergency organizations."*
>
> *Santa Paula focus group participant*

Strategies that wildfire planning and response organizations employ should include enhanced collaboration with other local agencies, such as transportation and public health, and with non-profit organizations (Auer, 2021). Collaboration with organizations with similarly aligned goals and target communities could create community-wide coalitions and allow groups to specialize, rather than requiring wildfire managers to build expertise in all areas. For example, VRFSC is developing partnerships with local public health organizations to reduce wildfire risk. Partnerships with social work clinics could support residents by addressing psychological stress and trauma associated with wildfire events, which were a challenge identified by Spanish-speaking focus group participants.

Wildfire managers and organizations should adapt successful approaches from other fields, including public health. Promotora (community health worker) programs are utilized in public health and environmental domains to educate residents and change health outcomes. These models rely on community experts who identify with the target population and can serve as peer educators, which is successful because of their cultural proximity to the people they are educating (Davis et al., 2020; Spinner & Alvarado, 2012; Yarber, Brownson, Jacob, et. al., 2015). This approach could improve wildfire safety education efforts as community trainers have the cultural, linguistic and community knowledge to effectively reach marginalized communities. Many of our Santa Paula focus group participants are promotoras, indicating that there is existing community capacity for this approach in Ventura County.

Finally, biases can influence how agencies support community wildfire response; therefore, wildfire managers should consider training on how and why social identity impacts wildfire vulnerability (Méndez et al., 2020). A number of social and psychological influences can bias wildfire management decisions (Thompson, 2014). For example, after the 2018 Thomas Fire, emergency services officials were surprised to learn how many local farm workers were Mexican-Indigenous. This is problematic because it highlights that disaster programming and relief cannot be adequately tailored to vulnerable communities if managers and officials do not know they exist. This invisibility can negatively impact post-disaster recovery programs for vulnerable groups, as evidenced in the 1989 Loma Prieta earthquake in California when federal aid workers failed to contract a sufficient number of bilingual workers (B. D. Williams & Webb, 2021). Furthermore, a California state auditor's report indicated that

marginalized communities are not fully considered in disaster emergency response (Méndez et al., 2020). In the case of post-hurricane emergency management, research has found that the majority of managers are overwhelmingly white and male, which can limit engagement with vulnerable communities (D. A. Williams & Jacobs, 2021). This also suggests the need for greater representation in the field. In challenging the biases that persist at the institutional level, managers will expand their ability to effectively engage with the communities that they serve. Training will be most impactful if agencies not only institute (un)learning, but also actualize the material in their regular duties.

Biases in wildfire planning also exist on a larger scale. Public officials and politicians are more responsive to residents with higher socioeconomic status and political pressure can affect response outcomes of wildfire managers, resulting in bias (Anderson et al., 2020; Thompson, 2014). These residents tend to have higher political participation, suggesting that increased political power for marginalized groups is also necessary to shift biases in wildfire planning. Ultimately, biases result in inequitable distribution of post-disaster aid for marginalized communities and must be eliminated to reduce vulnerability (Domingue & Emrich, 2019; Emrich et al., 2020).

The novel strategies suggested here expand beyond the scope of traditional wildfire management and planning, and borrow from other fields such as public health and community planning to center marginalized communities. Wildfire management and planning organizations can improve community engagement by adapting strategies from fields that regularly collaborate with marginalized communities.

Considerations for Future Research

This work is a step towards identifying those most vulnerable to wildfire and mitigating risk; however, future work is needed. The qualitative research methods utilized here reached a small subset of the Ventura County population and did not fully account for the diverse subsets of the population who may also exhibit unique vulnerabilities to wildfire. For example, we did not adequately reach people with disabilities, older adults, and people experiencing homelessness. Furthermore, we did not engage Indigenous Californian communities (primarily Chumash) in the research process. This represents an important gap as these communities have deep ties to the land and wildfire management expertise (Timbrook et al., 1982).

Future research that includes these populations is needed to expand understanding of the intersection between social marginalization and vulnerability to wildfire in Ventura County. Again, semi-structured focus groups and community-based participatory research approaches are useful tools for gathering this data. Additional research would help managers and organizations like VRFSC further target risk mitigation and education strategies to the needs of vulnerable communities to ensure equitable wildfire preparation and response.

Conclusion

In Ventura County, increased wildfire risk due to climate change and increased development along the urban edge will likely exacerbate existing vulnerabilities for marginalized communities. Therefore, future wildfire planning efforts should consider and address social vulnerability to reduce risk to human health and well-being.

This research provides evidence that disparities in wildfire preparedness and response exist based on patterns of social marginalization. This aligns with research indicating that systemic inequities

and social marginalization are linked to vulnerability to wildfire, and the disproportionate negative impacts of disasters more broadly. In particular, young adults, women, people of color, residents with disabilities, and newer residents in Ventura County are significantly less likely to be prepared to evacuate. Additionally, people with disabilities and newer residents report facing more barriers to evacuation. The focus group data indicate that language barriers exist, preventing Spanish and Mixtec-speaking communities from receiving the wildfire education and emergency notification communications needed to safely respond. More work is needed to determine the vulnerability of additional groups, such as older adults and residents with disabilities or facing homelessness. These inequities in wildfire preparation and response highlight opportunities for management agencies and Fire Safe Councils to address social vulnerability in CWPP revisioning.

Wildfire management agencies and organizations like VRFSC cannot address social marginalization directly, although they can work to delink marginalization and vulnerability through the planning process. The CWPP revision is one tool to reduce vulnerability to wildfire. Based on the research findings, we recommend that VRFSC continue striving to address social vulnerability in the next CWPP. This can be achieved by targeting education and outreach on home hardening strategies, fuels management and evacuation for vulnerable communities; increasing and diversifying opportunities for marginalized residents to meaningfully participate in the CWPP revision process; and incorporating approaches from other fields to grow community leadership and reduce bias within planning agencies.

These results and recommendations have planning and policy implications beyond Ventura County and are relevant to broader state and regional wildfire planning, especially as communities respond to increasing wildfire threat and occurrence. This research process and the lessons learned offer a template for agencies and other regional Fire Safe Councils seeking to gather data on local wildfire vulnerabilities. This work also provides organizations with ideas about how to engage these populations in CWPP revision processes. Additionally, the policy and planning recommendations provide examples to other California agencies and Fire Safe Councils of adapting traditional planning processes to address social vulnerability and support marginalized communities. The process and strategies employed rather than specific actions or programs are the most applicable to other communities, as these should depend on the unique circumstances, needs, and contexts of individual communities. These results and recommendations are adaptable and can be utilized in other communities to disrupt the link between social marginalization and vulnerability to wildfire to equitably increase community resilience in communities across California.

References

Anderson, S., Plantinga, A., & Wibbenmeyer, M. (2020). Inequality in Agency Responsiveness: Evidence from Salient Wildfire Events. *Resources For the Future*, 36.

Auer, M. R. (2021). Considering equity in wildfire protection. *Sustainability Science*, *16*(6), 2163–2169. https://doi.org/10.1007/s11625-021-01024-8

CAL FIRE. (2021a). *Top 20 Largest California Wildfires*. CAL FIRE. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

CAL FIRE. (2021b). *Top 20 Most Destuctive California Wildfires*. CAL FIRE. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

CAUSE. (n.d.). *Community Resilience in the Thomas Fire*. https://causenow.org/our-work/community-resilience-thomas-fire

CDC. (2020, January 31). *CDC SVI Documentation 2018 | Place and Health | ATSDR*. https://www.atsdr.cdc.gov/placeandhealth/svi/documentation/SVI_documentation_2018.html

Cole, L. W., & Foster, S. R. (2001). *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement*. New York University Press.

Crowley, J. (2020). Social Vulnerability Factors and Reported Post-Disaster Needs in the Aftermath of Hurricane Florence. *International Journal of Disaster Risk Science*, 13–23. https://doi.org/10.1007/s13753-020-00315-5

Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social Vulnerability to Environmental Hazards*. *Social Science Quarterly (Wiley-Blackwell)*, *84*(2), 242–261. https://doi.org/10.1111/1540-6237.8402002

Davies, I. P., Haugo, R. D., Robertson, J. C., & Levin, P. S. (2018). The unequal vulnerability of communities of color to wildfire. *PLoS ONE*, *13*(11), e0205825. https://doi.org/10.1371/journal.pone.0205825

Davis, L. F., & Ramírez-Andreotta, M. D. (2021). Participatory Research for Environmental Justice: A Critical Interpretive Synthesis. *Environmental Health Perspectives*, *129*(2), 026001. https://doi.org/10.1289/EHP6274

Davis, L. F., Ramírez-Andreotta, M. D., & Buxner, S. (2020). Engaging Diverse Citizen Scientists for Environmental Health: Recommendations from Participants and Promotoras. *Citizen Science: Theory and Practice*. https://doi.org/10.5334/cstp.253

Defensible Space / PRC 4291. (n.d.). Retrieved March 11, 2022, from https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/

Dillon, G., Menakis, J., & Fay, F. (2015). Wildland fire potential: A tool for assessing wildfire risk and fuels management needs. *In: Keane, Robert E.; Jolly, Matt; Parsons, Russell; Riley, Karin. Proceedings of the Large Wildland Fires Conference; May 19-23, 2014; Missoula, MT. Proc. RMRS-P-73. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 60-76.*, *73*, 60–76.

Domingue, S. J., & Emrich, C. T. (2019). Social Vulnerability and Procedural Equity: Exploring the Distribution of Disaster Aid Across Counties in the United States. *The American Review of Public Administration*, *49*(8), 897–913. https://doi.org/10.1177/0275074019856122

Emrich, C. T., Tate, E., Larson, S. E., & Zhou, Y. (2020). Measuring social equity in flood recovery funding. *Environmental Hazards*, *19*(3), 228–250. https://doi.org/10.1080/17477891.2019.1675578

Environmental Protection Agency. (2022). *Public Participation Guide: Selecting the Right Level of Public Participation*. https://www.epa.gov/international-cooperation/public-participation-guide-selecting-right-level-public-participation

Flanagan, B. E., Gregory, E. W., Hallisey, E. J., Heitgerd, J. L., & Lewis, B. (2011). A Social Vulnerability Index for Disaster Management. *Journal of Homeland Security and Emergency Management*, *8*(1). https://doi.org/10.2202/1547-7355.1792

Flores, A. B., Collins, T. W., Grineski, S. E., Griego, A. L., Mullen, C., Nadybal, S. M., Renteria, R., Rubio, R., Shaker, Y., & Trego, S. A. (2021). Environmental Injustice in the Disaster Cycle: Hurricane Harvey and the Texas Gulf Coast. *Environmental Justice*, *14*(2), 146–158. https://doi.org/10.1089/env.2020.0039

Hanan, E. J., Ren, J., Tague, C. L., Kolden, C. A., Abatzoglou, J. T., Bart, R. R., KENNEDY, M. C., Liu, M., & Adam, J. (2020). How climate change and fire exclusion drive wildfire regimes at actionable scales. *Environmental Research Letters*. https://doi.org/10.1088/1748-9326/abd78e

Hardening Your Home. (n.d.). Ready for Wildfire. Retrieved March 11, 2022, from https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/hardening-your-home/

Hewitt, K. (2013). Environmental disasters in social context: Toward a preventive and precautionary approach. *Natural Hazards*, *66*(1), 3–14. https://doi.org/10.1007/s11069-012-0205-6

Ireni-Saban, L. (2013). Challenging Disaster Administration: Toward Community-Based Disaster Resilience. *Administration & Society*, *45*(6), 651–673. https://doi.org/10.1177/0095399712438375

Jackson County. (2017). *Rogue Valley Integrated Community Wildfire Protection Plan* (p. 295) [CWPP]. Jackson County. https://jacksoncountyor.org/emergency/DesktopModules/Bring2mind/DMX/API/Entries/Download?EntryId=44009&Command=Core_Download&language=en-US&PortalId=13&TabId=1568

Jakes, P. J., Nelson, K. C., Enzler, S. A., Burns, S., Cheng, A. S., Sturtevant, V., Williams, D. R., Bujak, A., Brummel, R. F., Grayzeck-Souter, S., & Staychock, E. (2011). Community wildfire protection planning: Is the Healthy Forests Restoration Act's vagueness genius? *International Journal of Wildland Fire*, *20*(3), 350. https://doi.org/10.1071/WF10038

Joe H. Scott, Thompson, M. P., & David E. Calkin. (2013). *A Wildfire Risk Assessment Framework for Land and Resource Management*. https://www.fs.fed.us/rm/pubs/rmrs_gtr315.pdf

Keeley, J. E., Fotheringham, C., & Morais, M. (1999). Reexamining fire suppression impacts on brushland fire regimes. *Science (New York, N.Y.)*, *284*(5421), 1829–1832. https://doi.org/10.1126/science.284.5421.1829

Keeley, J. E., & Syphard, A. D. (2019). Twenty-first century California, USA, wildfires: Fuel-dominated vs. wind-dominated fires. *Fire Ecology*, *15*(1), 24. https://doi.org/10.1186/s42408-019-0041-0

Keeley, J. E., & Syphard, A. D. (2020, March). Nexus between Wildfire, Climate Change, and Population Growth in California. *Freemontia*, *47*(2), 4–13.

Kent, M. (2010, July). *Young U.S. Adults Vulnerable to Injuries and Violence*. PRB. https://www.prb.org/resources/young-u-s-adults-vulnerable-to-injuries-and-violence/

Kolden, C. A., & Henson, C. (2019). A Socio-Ecological Approach to Mitigating Wildfire Vulnerability in the Wildland Urban Interface: A Case Study from the 2017 Thomas Fire. *Fire*, *2*(1), 9. https://doi.org/10.3390/fire2010009

Kramer, H. A., Mockrin, M. H., Alexandre, P. M., & Radeloff, V. C. (2019). High wildfire damage in interface communities in California. *International Journal of Wildland Fire*, *28*(9), 641. https://doi.org/10.1071/WF18108

Laska, S., & Morrow, B. (2006). Social Vulnerabilities and Hurricane Katrina: An Unnatural Disaster in New Orleans. *Marine Technology Society Journal*, *40*, 16–26. https://doi.org/10.4031/002533206787353123

Lee, B. A., Reardon, S. F., Firebaugh, G., Farrell, C. R., Matthews, S. A., & O'Sullivan, D. (2008). Beyond the Census Tract: Patterns and Determinants of Racial Segregation at Multiple Geographic Scales. *American Sociological Review*, *73*(5), 766–791. https://doi.org/10.1177/000312240807300504

Méndez, M., Flores-Haro, G., & Zucker, L. (2020). The (in)visible victims of disaster: Understanding the vulnerability of undocumented Latino/a and indigenous immigrants. *Geoforum; Journal of Physical, Human, and Regional Geosciences*, *116*, 50–62. https://doi.org/10.1016/j.geoforum.2020.07.007

Ojai Valley Fire Safe Council. (2010). *Ventura County CWPP* (p. 69). https://vcfd.org/wp-content/uploads/2020/02/VCCommunityWildfireProtectionPlan.pdf

Ojerio, R. S. (2008). *Equity in Wildfire Risk Management: Does Socioeconomic Status Predict Involvement in Federal Programs to Mitigate Wildfire Risk?* [Thesis, Department of Planning, Public Policy & Management, University of Oregon]. https://scholarsbank.uoregon.edu/xmlui/handle/1794/7529

Ojerio, R. S., Lynn, K., Evans, A., DeBonis, M., & Gerlitz, W. (2008). *Resource Innovations, University of Oregon Forest Guild, New Mexico Watershed Research and Training Center, California*. 24.

Palaiologou, P., Ager, A. A., Nielsen-Pincus, M., Evers, C. R., & Day, M. A. (2019). Social vulnerability to large wildfires in the western USA. *Landscape and Urban Planning*, *189*, 99–116. https://doi.org/10.1016/j.landurbplan.2019.04.006

Pasek, J. (2018). *ANES Raking Implementation*. CRAN. https://cran.r-project.org/web/packages/anesrake/anesrake.pdf

Paveglio, T. B., Carroll, M. S., Stasiewicz, A. M., Williams, D. R., & Becker, D. R. (2018). Incorporating Social Diversity into Wildfire Management: Proposing "Pathways" for Fire Adaptation. *Forest Science*, *64*(5), 515–532. https://doi.org/10.1093/forsci/fxy005

Potter, C. (2017). Fire-climate history and landscape patterns of high burn severity areas on the California southern and central coast. *Journal of Coastal Conservation*, *21*(3), 393–404. https://doi.org/10.1007/s11852-017-0519-3

Price, O. F., Bradstock, R. A., Keeley, J. E., & Syphard, A. D. (2012). The impact of antecedent fire area on burned area in southern California coastal ecosystems. *Journal of Environmental Management*, *113*, 301–307. https://doi.org/10.1016/j.jenvman.2012.08.042

Radeloff, V. C., Helmers, D. P., Kramer, H. A., Mockrin, M. H., Alexandre, P. M., Bar-Massada, A., Butsic, V., Hawbaker, T. J., Martinuzzi, S., Syphard, A. D., & Stewart, S. I. (2018). Rapid growth of the US wildland-urban interface raises wildfire risk. *Proceedings of the National Academy of Sciences*, *115*(13), 3314–3319. https://doi.org/10.1073/pnas.1718850115

Safford, H. D., & Van de Water, K. M. (2014). *Using fire return interval departure (FRID) analysis to map spatial and temporal changes in fire frequency on national forest lands in California* (PSW-RP-266; p. PSW-RP-266). U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. https://doi.org/10.2737/PSW-RP-266

Saqui, C., Alton, A., Byrnes, D., Delarosa, G., Chapin, J., Miller, R., Dean, S., Crass, T., Kelley, P., Lomvardias, A., Kinsley, B., Snodgrass, J., Bergh, J., Russell, K., Hatch, M., & Harris, S. (2017). *Thomas Fire Investigation Report* (Wildland Fire No. 17CAVNC103156; p. 71). Ventura County Fire Department.

Scott, J. H., Brough, A. M., Gilbertson-Day, J. W., Dillon, G. K., & Moran, C. (2020). *Wildfire Risk to Communities: Spatial datasets of landscape-wide wildfire risk components for the United States*. Rocky Mountain Research Station. https://www.fs.usda.gov/rmrs/datasets/wildfire-risk-communities-spatial-datasets-landscape-wide-wildfire-risk-components-united

Spinner & Alvarado. (2012). *Salud Para Su Carozón—A Latino Promotora -Led Cardiovascular Health Education Program*. https://oce.ovid.com/article/00003727-201204000-00005/HTML

Steve Scauzillo. (2017, December 7). Here's why Ventura residents must boil their water for days as Thomas fire burns. *Daily News*. https://www.dailynews.com/2017/12/07/heres-why-ventura-residents-must-boil-their-water-for-days-as-thomas-fire-burns/

Syphard, A. D., Brennan, T. J., & Keeley, J. E. (2014). The role of defensible space for residential structure protection during wildfires. In *International Journal of Wildland Fire* (Vol. 23, p. 11). https://doi.org/10.1071/WF13158

Syphard, A. D., & Keeley, J. (2020). Why are so many structures burning in California? In *Fremontia* (Vol. 47, Issue 2, p. 2835).

Syphard, A. D., Radeloff, V. C., Keuler, N. S., Taylor, R. S., Hawbaker, T. J., Stewart, S. I., Clayton, M. K., Syphard, A. D., Radeloff, V. C., Keuler, N. S., Taylor, R. S., Hawbaker, T. J., Stewart, S. I., & Clayton, M. K. (2008). Predicting spatial patterns of fire on a southern California landscape. *International Journal of Wildland Fire*, *17*(5), 602–613. https://doi.org/10.1071/WF07087

Taos Pueblo CWPP Core Team, & Lissoway, J. (2009). *Community Wildfire Protection Plan* (p. 41) [CWPP]. Division of Natural Resources N.M. Association for Counties.

Thompson, M. P. (2014). Social, Institutional, and Psychological Factors Affecting Wildfire Incident Decision Making. *Society & Natural Resources*, *27*(6), 636–644. https://doi.org/10.1080/08941920.2014.901460

Timbrook, J., Johnson, J. R., & Earle, D. D. (1982). Vegetation Burning by the Chumash. *Journal of California and Great Basin Anthropology*, *4*(2), 163–186.

University of Oregon Community Service Center, & Oregon Partnership for Disaster Resilience. (2017). *Josephine County Multi-Jurisdictional Hazard Mitigation Plan* (p. 232) [CWPP]. Josephine County Emergency Management.

U.S. Department of Commerce. (2020). *A Profile of Wildfire Risk*. https://headwaterseconomics.org/apps/economic-profile-system/6111

Venables, W., & Ripley, B. (2002). *Modern Applied Statistics with S, 4th ed*. Springer. https://www.stats.ox.ac.uk/pub/MASS4/

Ventura Chipper Dates. (n.d.). *Ventura Regional Fire Safe Council*. Retrieved March 11, 2022, from https://venturafiresafe.org/ventura-chipper-dates/

Ventura Regional Fire Safe Council. (2022). *Ventura Regional FIre Safe Council Resources*. https://venturafiresafe.org/resources/

Walker, A. K., & Fox, E. L. (2018). Why Marginalization, Not Vulnerability, Can Best Identify People in Need of Special Medical and Nutrition Care. *AMA Journal of Ethics*, *20*(10), 941–947. https://doi.org/10.1001/amajethics.2018.941

Walker Range Community Wildfire Protection Plan (p. 94). (2012). [CWPP]. Walker Range. http://www.walkerrange.org/wp-content/uploads/2015/04/WR-CWPP-2012-final.pdf

Williams, B. D., & Webb, G. R. (2021). Social vulnerability and disaster: Understanding the perspectives of practitioners. *Disasters*, *45*(2), 278–295. https://doi.org/10.1111/disa.12422

Williams, D. A., & Jacobs, F. (2021). Landscapes of Trust: An Investigation of Posthurricane Engagement and Recovery. *Environmental Justice*, *14*(3), 188–197. https://doi.org/10.1089/env.2020.0043

Yarber, Brownson, Jacob, et. al. (2015). Evaluating a train-the-trainer approach for improving capacity for evidence-based decision making in public health. *BMC Health Services Research*, *15*. https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-015-1224-2

Appendicies
Appendix A: Survey
A.1 Survey Consent Form

Qualtrics Survey Software

English

Age Assertion and Consent Form

Age Assertion and Consent Form
This survey is part of a partnership between Ventura Regional Fire Safe Council and the University of California, Santa Barbara Bren School to understand how Ventura County residents prepare for, respond to, and recover from wildfire. Your participation in this survey will contribute to the development of a more inclusive Community Wildfire Protection Plan to make all Ventura County residents safer during a wildfire.

This work is also importantly supported by Wonder Labs' Reimagining 2025: Living with Fire Design Challenge Program.

We ask that one adult member of your household (over the age of 18) complete this survey on behalf of all household members. Please respond to this survey by October 31st. Your participation in this survey is completely voluntary and there are no serious anticipated risks of participating.

Your responses will be confidential and anonymous. All questions are optional. The survey consists of 24 questions and could take between 10-20 minutes to complete. By completing the survey you consent to sharing your opinions, perspectives and some personal information with the research team. All responses will be securely stored on an internal computer server and will remain anonymous.

To thank you for your time and energy, at the end of the survey you may opt in to a raffle to win one of 5 $25 Visa gift cards. Your contact information will not be

connected to your responses.

If you have any questions or concerns about the survey after completing it, or would like to stay engaged in this project please email Kate Furlong: kate@venturafiresafe.org or call Ventura Regional Fire Safe Council: (805) 746-7365.

Electronic Consent:

☐ By clicking this box, you agree that you have read and understand the above form, volunteer to participate, and assert that you are 18 years or older.

Default Question Block

1. What zip code do you live in?

2. Which languages do you speak at home? (please check all that apply)

- ☐ Arabic
- ☐ English
- ☐ Chinese (Mandarin, Cantonese)
- ☐ Korean
- ☐ Mixteco
- ☐ Spanish
- ☐ Tagalog
- ☐ Vietnamese
- ☐ Sign language
- ☐ Other(s)

3. How do you identify?

- ○ Woman
- ○ Man
- ○ Transgender
- ○ Non- binary
- ○ _____ Other
- ○ Prefer not to answer

4. Please identify your race (check all that apply)

- ☐ American Indian or Alaskan Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ _____ Some other race (please specify)
- ☐ Prefer not to answer

5. What is your age?

- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65-74
- ○ 75+

6. What is your household annual income?

7. When there is a wildfire in the area, how do you get information about it? Check all that apply.

- [ ] Neighbors
- [ ] Family/ friends in your area
- [ ] Family/ friends outside of your area
- [ ] Social media (Twitter, Facebook, Instagram, WhatsApp)
- [ ] Online neighborhood group (NextDoor, etc)
- [ ] Local news (TV, radio, website, app)
- [ ] Mobile phone emergency and weather alerts
- [ ] Public alerts/local law enforcement
- [ ] Other (please specify)
- [ ] None/ not applicable

8. Does any person in your household have mobility or access needs (for example, a disability)?

- ○ Yes
- ○ No

9. Do you have pets?

- ○ Yes
- ○ No

10. How long have you lived in Ventura County?

- ○ Less than one year
- ○ 2-5 years
- ○ 5-10 years

- ○ More than 10 years

11. Do you currently have homeowner or renters insurance for your home?

- ○ Yes
- ○ No

12. In what way/s has your household been affected by wildfire? Check all that apply.

- ☐ I have evacuated from my home
- ☐ I have wanted to evacuate but couldn't
- ☐ I lost housing/my home
- ☐ I lost a loved one
- ☐ I lost pets/livestock
- ☐ I lost income
- ☐ I experienced smoke and health impacts
- ☐ My general well-being (i.e. stress, fear) was affected
- ☐ _____ Other (please specify)
- ☐ I have not been affected

13. If you worry about wildfire, what concerns you most? Check all that apply.

- ☐ Home destruction/loss of personal items
- ☐ Personal injury or death
- ☐ Impact on family/loved ones
- ☐ Concerned about indoor pets
- ☐ Concerned about livestock and horses
- ☐ Poor air quality
- ☐ Disruptions to drinking water access

- [ ] Disruptions to electricity
- [ ] No place to go
- [ ] Missed days of work or school
- [ ] I don’t worry about wildfire
- [ ] _____ Other (please specify)

14. What kinds of community-wide actions would make you feel safer from a wildfire? Check all that apply.

- [ ] Better home insurance
- [ ] Regular tree pruning and plant maintenance
- [ ] Regular gutter cleaning
- [ ] Home hardening: activities that make your home more resistant to fire embers
- [ ] Evacuation preparation
- [ ] Electrical infrastructure maintenance
- [ ] Community emergency planning
- [ ] Fire safety education
- [ ] I don’t worry about wildfire
- [ ] _____ Other(please specify)

15. Do you currently feel prepared to evacuate your home in the event of a wildfire?

- ◯ Yes
- ◯ Somewhat
- ◯ No

16. Is there anything that would make it difficult for your household to evacuate during a wildfire? Check all that apply:

- [ ] I don’t have reliable transportation
- [ ] I have no alternative housing options with friends/family
- [ ] I am unable to afford alternative housing (hotel, motel, Airbnb, campsite, etc.)
- [ ] I don’t know when to leave/lack of communication
- [ ] I don’t have a way to transport my animals/don’t want to leave my animals
- [ ] I want to stay and defend my home
- [ ] I am not ready to leave
- [ ] I have a disability that makes evacuation difficult
- [ ] _____ Other (please specify)
- [ ] No, I could easily evacuate.

17.Do you feel involved in efforts by the community to prepare for and prevent wildfire?

- ○ Yes
- ○ No
- ○ I don't know
- ○ _____ Other

18. Do you feel there are enough opportunities for you to participate in community-wide activities for wildfire preparedness and evacuation planning?

- ○ Yes
- ○ No
- ○ Sometimes
- ○ Not sure
- ○ _____ Other (please specify)

19. Are you aware of the current Community Wildfire Protection Plan?

- ◯ Yes
- ◯ No
- ◯ I don't know

20.Are you aware of your local Fire Safe council?

- ◯ Yes
- ◯ No
- ◯ I don't know

Default Question Block

21. Would you be interested in providing input on a new Community Wildfire Protection Plan for Ventura County?

- ◯ Yes
- ◯ No
- ◯ I don't know
- ◯ I need more information

22. If yes, what is the best way to include you in the community consultations and planning processes?

- ◯ Surveys
- ◯ Small group discussions
- ◯ Town halls
- ◯ Volunteer opportunities
- ◯ Participation in a planning committee
- ◯ _____ Other(please specify)

23. How would you like to stay updated on improvements to the Ventura Community Wildfire Protection Plan?

- ◯ Email
- ◯ Phone
- ◯ Text
- ◯ Mail
- ◯ None

24. Would you like to share anything else about wildfire safety in your home or community?

Contact Form:

This survey is the first step in the creation of an updated County wide Community Wildfire Protection Plan for Ventura County. This survey will help inform gaps on Wildfire and general disaster evacuation preparedness and also provide basis for further exploration of these topics in a focus group. Would you like to be contacted to participate in a discussion regarding these survey results?

Your contact information will **not** be connected to your previous responses.

- ◯ Yes, I would like to be contacted regarding a focus group to further share my view on this study and be entered to win a $25 visa gift card
- ◯ No, I would not like to be contacted regarding a focus group but I would like to be entered to win a $25 Visa gift card
- ◯ I do not want to be contacted for either. Please do not enter me to win a gift card.

Contact Information:

*If you would **not** like to be contacted please enter nothing and submit.*

Email

Phone number (cell):

Please select your preferred method of contact

- ○ Email
- ○ Phone

Appendix B: Focus Group Facilitation Guides
B.1 Piru Facilitator's Guide

Facilitator's Guide: Kindling Equity Community Conversations (Piru)
All facilitators and support should read this complete guide before the focus group.

Roles needed:
- Facilitator(s)
- Notetakers (2+): should be in the back, close enough to hear but out of sight so as not to be a distraction
- Timekeeper: keeps track of time, communicates to facilitator how much time is left; manages audio recording; makes materials accessible to participants (see below)

Materials needed:
- Pens
- Sign-in sheet: include a place for participants to opt-in to receive email updates
- Hand sanitizer
- Disinfectant wipes
- Large post it sheets for writing notes/feedback
- Nametags
- Markers
- Masks
- Poster with agenda, and Fire Safe Council's contact information
- Gift cards

Agenda

Welcome (15 min): All facilitators should introduce themselves (name, role/affiliation to the project, community of residence) and others who are present, including but not limited to the Ventura Regional Fire Safe Council and student research team

- Introduce the topic of wildfire: Wildfire is a natural phenomenon that has historically occurred in this region. Because of increased temperatures and worsening drought, wildfires are more intense and happen more frequently. They can threaten the health and safety of our community, so it is important to know how to plan for and respond to them. That is why we are here today.
- Ventura Regional Fire Safe Council is working on an updated Community Wildfire Protection Plan, which will help our community plan for and respond to wildfires. We want this to be useful to everyone in the community. This is why we need your input. Your perspectives and opinions help us understand what the community needs and how the community can help. We really want to know what's currently working well in your communities, what's missing, and how Fire Safe can support future wildfire prevention, evacuation and response efforts. We will ask you questions about your life, opinions and experiences with wildfire, evacuation, and your opinions and ideas for wildfire planning.
- The information you share today will help the Fire Safe Council and wildfire managers create an updated Community Wildfire Protection Plan that addresses our community's needs and assets. We thank you for being part of this important work to make our community safer during a wildfire.
- We understand that wildfire affects people in this community in very real ways, and that this conversation may bring up difficult memories and emotions. There is space to share what comes up for you with the group, and you are welcome to take space by taking a break or leaving at any time. The group commits to respecting that everyone experiences and recovers from wildfire events differently.

Introduce Guidelines and answer participant questions (5 min):

- Thank participants for showing up!
- Tell participants that you are there to hear from them, that there are no right or wrong answers, and that your role is to simply guide discussions and make sure that everyone who wants to share has the opportunity to do so.
- Ask again if participants are comfortable with the audio being recorded during the main portion of the focus group; audio will be stored securely, transcribed into notes, and eventually destroyed. If people have more questions/concerns, direct them to the research team. If someone is not comfortable with audio/video recording, do not record and ensure there are at least two people who can take notes throughout.
- Introduce the conversation guidelines (below)
- Ask if anyone has questions or concerns, answer any questions that arise; let them know that they can ask questions at any time.

Guidelines

- Be safe: please keep your mask on at all times, except to drink water, and maintain a physical distance of 6 feet from others
- Step up/step back: be aware of the space you're taking up in the discussion; if you tend to speak up a lot in discussions, challenge yourself to make space for others; if you tend to stay quiet during discussions, challenge yourself to share your thoughts
- Be present: put away cell phones, other work and focus on the here/now
- One person speaks at a time
- Share the lessons, not the stories: After our discussion share ideas/concepts/major takeaways from the discussion, rather than sharing specifics/name
- Speak from personal experience: everyone has diverse lived experience training and expertise; share from what you know and be willing to admit what you don't know
- There are no right or wrong answers, so please share freely

Questions and Discussion (1 hour): Tell participants you will transition into the main portion of the focus group conversation when we will discussing what's working, what's needed, and how Fire Safe can support communities. Remind them that audio recording will now begin.

- Begin by asking the first overarching question, what about wildfire preparation and response is working well in your neighborhood. Allow participants to answer, and ask follow-up questions as needed to keep the conversation moving. It's likely there won't be time for participants to discuss all of the questions. If there is not much conversation generated from a question, feel free to move on to the next one. Pay attention to who is speaking the most and whether someone looks as if they might have something to say. Consider asking quieter participants "Would you like to share?" or asking the group "What do other folks think?"
- Aim to ask at least two questions from each section, and budget time accordingly.
- If someone brings up a point that is worth deeper exploration or needs clarification, ask follow-up questions: "Could you say more?" or "How so?"

Guiding Questions

The following are possible questions for discussion. Not all questions listed here will be relevant to each conversation. We will allow the conversation to evolve naturally, so questions not listed here are also likely to be a part of our conversation. The research team will listen to the conversation and observe participants as discussion goes on. They will pass on thoughts/suggestions to the facilitator to help guide discussion.

What's working well with wildfire prevention and response?

- Who/what sources do you most trust to get information about local emergencies? Are you able to get the wildfire information you need?
- During emergencies, who in your community do you reach out to?
- Where do they get their information?
- How do you communicate with them?
- What wildfire planning projects have been most useful to your community in the past?

What's are gaps in wildfire prevention and response? / What's missing?

- Do the wildfire preparations you and your community have made make you feel safe?
- What is missing?
- What would make your community feel safer or more prepared before, during, after a wildfire?
- What is most challenging about wildfire? Why?
- How has your community worked to recover after a wildfire, and what were the biggest challenges to recovering normalcy?
- Who do you worry will have the hardest time responding to, coping with, and recovering from a wildfire event in your community? Why?
- What does your community want or need to know about wildfire risk and prevention in your community?
- What are the long-term impacts of a wildfire?
- If you rent, are you comfortable asking your landlord to make home hardening improvements? Why or why not?
- Is there anything we haven't asked you that you think is important to share/that you want to share?

What is needed to improve evacuation?

- Do people in your community have safe, or refugee areas to stay in case of an evacuation?
- What challenges are there?

How can Fire Safe support communities & fill in gaps (prevention, education, etc)?

- How can Ventura County Fire Safe include your community in fire planning?
- What are ways your neighbors and the community have supported each other during a wildfire, if at all?
- How could Fire Safe and wildfire managers support those existing efforts? (what's needed?)

B.2 Santa Paula Facilitator's Guide

Facilitator's Guide: Kindling Equity Community Conversations (Santa Paula)
Programa en Espanol

Bienvenida (15 min): Todos los facilitadores deben presentarse (nombre, papel / afiliación al proyecto, comunidad de residencia) y a los representantes del Consejo Regional de Seguridad contra Incendios de Ventura (Ventura Regional Fire Safe Council or Fire Safe) y el equipo de investigación de Bren (los estudiantes).

- Presente el tema de los incendios forestales: los incendios forestales son un fenómeno natural que históricamente ha ocurrido en esta región. Debido al aumento de las temperaturas y la sequía, los incendios forestales son más intensos y ocurren con mayor frecuencia. Pueden amenazar a la salud y la seguridad de nuestra comunidad, por lo que es importante saber cómo planificar y responder a ellos. Por eso estamos aquí hoy.
- Ventura Fire Safe está creando un nuevo Plan Comunitario de Protección contra los Incendios Forestales, que ayudará a nuestra comunidad a planificar y responder a los incendios forestales. Queremos que esto sea útil para todos en la comunidad. Por eso necesitamos su opinión. Sus perspectivas y opiniones nos ayudan a comprender qué necesita la comunidad y cómo la comunidad puede ayudar. Realmente queremos saber qué funciona bien actualmente en sus comunidades, qué falta, y cómo Fire Safe puede apoyar a los esfuerzos futuros de prevención, evacuación y respuesta contra incendios forestales. Le haremos preguntas sobre su vida, opiniones y experiencias con incendios forestales, evacuación y sus opiniones e ideas para la planificación de incendios forestales.
- La información que usted comparta hoy ayudará a Fire Safe y los gerentes de incendios forestales a escribir un nuevo Plan Comunitario de Protección contra Incendios Forestales actualizado que tenga en cuenta las necesidades y las ventajas de nuestra comunidad. Le agradecemos por ser parte de este trabajo importante para hacer que nuestra comunidad sea más segura durante un incendio forestal.
- Entendemos que los incendios forestales afectan a sus vidas personales y que esta conversación puede traer recuerdos y emociones difíciles. Se pueden compartir lo que les surja con el grupo, o pueden tomar un descanso o irse en cualquier momento. El grupo se compromete a respetar que todos experimenten y se recuperen de los incendios forestales de manera diferente.

Presente las normas/acuerdos del grupo y responda a las preguntas de los participantes (5 min):

- ¡Gracias a los participantes por venir!
- Dígales a los participantes que los facilitadores está allí para escucharlos, que no hay respuestas correctas o incorrectas y que su papel es simplemente guiar las discusiones y asegurarse de que todos los que quieran compartir tengan la oportunidad de hacerlo.
- Pregunte nuevamente si los participantes se sienten cómodos con el audio y video que se graba durante la parte principal del grupo focal; el audio/video se almacenará de forma segura, se transcribirá en notas y, finalmente, se destruirá. Si las personas tienen más preguntas o inquietudes, pueden hablar con el equipo de investigación. Si alguien no se siente cómodo con la grabación de audio / video, no grabe y asegúrese de que haya al menos dos personas que puedan tomar notas en todo momento.
- Presente las normas de la plática/charla (a continuación)
- Pregunte si alguien tiene preguntas o inquietudes, responda a cualquier pregunta que surja; recuerdeles que pueden hacer preguntas en cualquier momento.

Normas/acuerdos del grupo

- Cuidense: mantenga su mascarilla puesta todo el tiempo, excepto para beber agua, y mantenga una distancia física de 6 pies de los demás
- Participar y escuchar: sea consciente del espacio que está ocupando en la charla; si tiendes a hablar mucho en las pláticas, intente a dejar que los demás participen; Si tiende a permanecer callado durante las discusiones, intente compartir sus pensamientos.
- Sea presente: guarde los teléfonos celulares, otros trabajos y concéntrese en el aquí / ahora
- Una persona habla a la vez
- Comparta las lecciones, no las historias: después de nuestra plática, comparte ideas / conceptos / conclusiones principales de la discusión, en lugar de compartir detalles
- Comparte su experiencia personal: todo el mundo tiene experiencias diversas; comparte lo que sabe y esté dispuesto a admitir lo que no sabe
- No hay respuestas correctas o incorrectas, así que compártelas libremente.

Presentaciones grupales (5 min): Diga a los participantes que guiará a un breve rompehielos en parejas para hacer que todos se sienten más cómodos. Si el grupo tiene más de 15 personas, pida a los participantes que se agrupen en parejas o de tres en tres con alguien que aún no conozcan. Pídales que compartan su nombre y lo que más les gusta de su comunidad o vecindario (que puede definirse por sí mismo). Abisales cuándo les queda un minuto más de la actividad.

Preguntas y discusión (1 hora): Dígales a los participantes que pasará a la parte principal del grupo focal cuando tratamos de qué está funcionando, qué se necesita, y cómo Fire Safe puede ayudar a las comunidades. Recuérdales que ahora comenzará la grabación de audio/video.

- Empiece por hacer la primera pregunta general, ¿qué funciona bien en su comunidad con respecto a la preparación y respuesta ante incendios forestales que funcionan bien en su vecindario? Permita que los participantes respondan y haga mas preguntas si es necesario para mantener la conversación. Es probable que no haya tiempo para que los participantes discutan todas las preguntas. Si no se genera mucha conversación a partir de una pregunta, no dude en pasar a la siguiente. Preste atención a quién habla más y si alguien parece tener algo que decir. Considere preguntar a los participantes más tranquilos "¿Le gustaría compartir?" o preguntar al grupo "¿Qué piensan los demás?"
- Trate de hacer al menos dos preguntas de cada sección y ten en cuenta la hora.
- Si alguien menciona una idea que merece una exploración más profunda o necesita una aclaración, haga preguntas: "¿Podría decir más?" o "¿Cómo es eso?"

Preguntas

Las siguientes son posibles preguntas. No todas las preguntas enumeradas aquí serán relevantes para cada conversación. Permitiremos que la conversación evolucione de forma natural, por lo que es probable que las preguntas que no figuran aquí también formen parte de nuestra conversación. El equipo de investigación escuchará la conversación y observará a los participantes a medida que avanza la discusión. Pasarán sus pensamientos / sugerencias al facilitador para ayudar a guiar la discusión.

¿Qué funciona bien con la prevención y respuesta a incendios forestales?

- ¿En quién / qué fuentes confía más para obtener información sobre emergencias locales? ¿Puede obtener la información sobre incendios forestales que necesita?
- Durante las emergencias, ¿a quién en su comunidad se comunica?
- ¿De dónde obtienen su información estas personas?
- ¿Cómo se comunica usted con ellos?
- ¿Qué proyectos de planificación de incendios forestales han sido más útiles para su comunidad en el pasado?

¿Qué falta para la prevención y respuesta a los incendios forestales en su comunidad?

- ¿Las preparaciones y los proyectos para incendios forestales que usted y su comunidad les han hecho lo hacen sentir seguro?
- ¿Que falta?
- ¿Qué haría que su comunidad se sintiera más segura o más preparada antes, durante y después de un incendio forestal?
- ¿Cómo pueden las personas de su comunidad involucrarse en estos proyectos?
- ¿Qué es lo más se preocupa sobre los incendios forestales? ¿Por qué?
- ¿Que ha hecho su comunidad para recuperarse después de un incendio forestal y que es lo que costara mas para volver a la normalidad?
- ¿A quién se preocupa que le resulte más difícil responder, afrontar y recuperarse de un incendio forestal en su comunidad? ¿Por qué?
- ¿Qué quiere o necesita saber su comunidad sobre el riesgo y la prevención de incendios forestales en su comunidad?
- ¿Cuáles son los impactos a largo plazo de un incendio forestal?
- Si alquila, ¿se siente cómodo pidiéndole al dueño que haga mejoras para el fortalecimiento del hogar? ¿Por qué si o por qué no?
- ¿Qué tipo de recursos para la preparación de incendios forestales están disponibles en español?
- ¿Que falta?
- ¿Ha afectado el idioma la forma en que obtiene la información sobre incendios forestales que necesita?
- ¿Hay algo que no le hayamos preguntado que crea que es importante compartir o que desea compartir?

¿Qué se necesita para mejorar la evacuación?

- ¿Cuáles son algunos de los retos para evacuar su vecindario, si los hay?

¿Cómo puede Fire Safe apoyar a las comunidades aportar lo que falta (prevención, educación, etc.)?

- ¿Cómo puede Ventura County Fire Safe involucrar a su comunidad en la planificación de incendios?
- ¿Cuáles son las formas en que sus vecinos y la comunidad se han apoyado mutuamente (unos a otros) durante un incendio forestal, si es que lo han hecho?
- ¿Cómo podrían los administradores de incendios forestales y Fire Safe apoyar esos esfuerzos existentes? (¿qué se necesita?)

Otro (si hay tiempo)

- ¿Han cambiado las formas en que las personas de su comunidad responden a los incendios forestales en los últimos diez años? ¿Cómo?
- ¿Cuántos amigos cercanos o familiares tienes cerca? ¿Podrían proporcionarle comida, refugio u otra ayuda durante un incendio forestal?
- ¿La pandemia de COVID-19 cambió la forma en que su comunidad respondió a los incendios forestales en 2020? 2021?

Appendix C: Model Tables

C.1 Evacuation Preparedness Models

Evacuation Preparedness Model Including Imputed Income

term	estimate	standard error	t value	p.value	b	df	dfcom	fmi	lambda	m	riv	ubar
Age: 25-34	3.6663910	0.9406884	3.8975616	0.0001161	0.0186270	355.2575	367.7877	0.0273523	0.0218919	25	0.0223819	0.8655227
Age: 35-44	3.6894545	0.9239391	3.9931793	0.0000792	0.0169211	356.0046	367.7877	0.0260708	0.0206146	25	0.0210486	0.8360655
Age: 45-54	1.7290290	0.8850210	1.9536588	0.0515172	0.0110059	359.3058	367.7877	0.0200529	0.0146134	25	0.0148301	0.7718160
Age: 55-64	3.7577947	0.9091550	4.1332826	0.0000445	0.0076523	361.7755	367.7877	0.0150583	0.0096283	25	0.0097219	0.8186045
Age: 65-74	2.5969095	0.9179758	2.8289521	0.0049342	0.0159308	356.5523	367.7877	0.0251142	0.0196611	25	0.0200554	0.8261116
Age: 75+	2.4998650	0.9251091	2.7022382	0.0072129	0.0097873	360.6848	367.7877	0.0173274	0.0118935	25	0.0120367	0.8456480
Gender: Woman	-1.5090067	0.3085413	-4.8907773	0.0000018	0.0136657	241.4213	367.7877	0.1562541	0.1492931	25	0.1754930	0.0809854
Gender: Other	-4.2062037	0.9512654	-4.4216930	0.0000136	0.0683265	310.2116	367.7877	0.0844111	0.0785270	25	0.0852190	0.8338463
Mobility Concern: Yes	-0.2646098	0.3357677	-0.7880742	0.4312766	0.0097307	299.4889	367.7877	0.0957820	0.0897637	25	0.0986158	0.1026200
Language: English and Another Language	1.4531001	0.3346310	4.3423951	0.0000188	0.0064510	327.0648	367.7877	0.0656099	0.0599135	25	0.0637319	0.1052689
Language: Non-English Language	1.1034358	0.5048468	2.1856847	0.0299148	0.0434766	215.7659	367.7877	0.1849268	0.1774065	25	0.2156673	0.2096546
Lived in Ventura: 2-5 years	3.9197625	1.6050502	2.4421432	0.0150922	0.0685086	351.7001	367.7877	0.0331394	0.0276567	25	0.0284434	2.5049373
Lived in Ventura: 5-10 years	3.3540642	1.5817460	2.1204821	0.0346413	0.0110764	364.0025	367.7877	0.0100287	0.0046042	25	0.0046255	2.4904010
Lived in Ventura: More than 10 years	5.8328155	1.5543950	3.7524668	0.0002037	0.0074167	364.5796	367.7877	0.0086161	0.0031924	25	0.0032027	2.4084304
Race: Person of color	-1.1581852	0.3653437	-3.1701251	0.0016581	0.0038451	350.1970	367.7877	0.0354527	0.0299598	25	0.0308851	0.1294771
Race: Prefer not to answer	1.0967960	1.0710592	1.0240293	0.3064997	0.0024500	364.9640	367.7877	0.0076444	0.0022212	25	0.0022261	1.1446198
Wildfire Impacts Index Score	-0.1268993	0.1121456	-1.1315589	0.2586759	0.0008646	316.7371	367.7877	0.0773041	0.0714962	25	0.0770015	0.0116774
Mean RPS per Zip Code	0.2148639	0.1329344	1.6163153	0.1069895	0.0010127	327.3342	367.7877	0.0652954	0.0596018	25	0.0633793	0.0166183
Imputed Income: 1Low	0.1580511	0.7376559	0.2142612	0.8316984	0.3755125	32.1058	367.7877	0.7337940	0.7177119	25	2.5424796	0.1536032
No|Somewhat	5.4077028	1.7714784	3.0526497	0.0024346	0.0066987	364.9644	367.7877	0.0076432	0.0022200	25	0.0022249	3.1311689

Evacuation Preparedness Model Including Non-Imputed Income

term	estimate	standard error	t value	p value
Age: 25-34	2.7650590	1.0476223	2.6393665	0.0083061
Age: 35-44	1.6620483	1.0134421	1.6400032	0.1010045
Age: 45-54	0.5914405	1.0183865	0.5807624	0.5614006
Age: 55-64	3.5836616	1.0106941	3.5457429	0.0003915
Age: 65-74	0.2555110	1.0159433	0.2515012	0.8014266
Age: 75+	1.1984383	1.0113448	1.1849948	0.2360195
Gender: Woman	-1.2692081	0.3569181	-3.5560205	0.0003765
Gender: Other	-1.6777609	2.0436030	-0.8209818	0.4116566
Mobility Concern: Yes	-0.6188181	0.3960768	-1.5623692	0.1182010
Language: English and Another Language	1.1159588	0.4211836	2.6495780	0.0080592
Language: Non-English Language	-3.1330474	0.8723907	-3.5913352	0.0003290
Lived in Ventura: 2-5 years	4.2379259	1.6513960	2.5662687	0.0102799
Lived in Ventura: 5-10 years	4.9038534	1.6309044	3.0068308	0.0026399
Lived in Ventura: More than 10 years	7.8737430	1.6220028	4.8543337	0.0000012
Race: Person of color	-1.3783856	0.5192853	-2.6543900	0.0079452
Race: Prefer not to answer	-0.0165731	1.1207331	-0.0147877	0.9882016
Wildfire Impacts Index Score	-0.0419753	0.1665329	-0.2520542	0.8009992
Mean RPS per Zip Code	-0.4390804	0.1714343	-2.5612167	0.0104306
Non-Imputed Income: Low	1.0555262	0.5257562	2.0076344	0.0446822
No|Somewhat	6.4654918	1.8497236	3.4953828	0.0004734
Somewhat|Yes	10.3400240	1.9115292	5.4092942	0.0000001

Evacuation Preparedness Model Not Including Income

term	estimate	standard error	t value	p value
Age: 25-34	3.6214193	0.9210684	3.9317595	0.0000843
Age: 35-44	3.2856245	0.9076196	3.6200458	0.0002946
Age: 45-54	1.6603869	0.8703532	1.9077163	0.0564279
Age: 55-64	3.5929820	0.8968386	4.0062751	0.0000617
Age: 65-74	2.5566040	0.8965697	2.8515395	0.0043508
Age: 75+	2.5066800	0.9088640	2.7580364	0.0058150
Gender: Woman	-1.4695634	0.2855989	-5.1455496	0.0000003
Gender: Other	-3.8860821	0.9017193	-4.3096363	0.0000164
Mobility Concern: Yes	-0.2717370	0.3164781	-0.8586281	0.3905457
Language: English and Another Language	1.4990730	0.3206569	4.6750063	0.0000029
Language: Non-English Language	1.2732331	0.4530758	2.8101986	0.0049511
Lived in Ventura: 2-5 years	4.0009538	1.5736058	2.5425388	0.0110050
Lived in Ventura: 5-10 years	3.6062540	1.5828657	2.2783070	0.0227083
Lived in Ventura: More than 10 years	5.7310901	1.5515180	3.6938600	0.0002209
Race: Person of color	-1.1378434	0.3584557	-3.1742925	0.0015020
Race: Prefer not to answer	1.0278157	1.0477889	0.9809378	0.3266234
Wildfire Impacts Index Score	-0.0832518	0.1087632	-0.7654410	0.4440090
Mean RPS per Zip Code	0.2325341	0.1280961	1.8153101	0.0694763
No|Somewhat	5.3307271	1.7636906	3.0224843	0.0025071
Somewhat|Yes	8.4692256	1.7928510	4.7238869	0.0000023

C.2 Wildfire Worries Index Models

Worries Index Model Including Imputed Income

term	estimate	standard error	t value	p.value	b	df	dfcom	fmi	lambda	m	riv	ubar	p value
Age: 25-34	0.2145737	1.7634147	0.1216808	0.9043358	2.5541236	20.51574	376	0.8666124	0.8542133	25	5.8593381	0.4533428	0.9031518
Age: 35-44	0.0676239	1.7198577	0.0393195	0.9689960	2.3903043	21.65175	376	0.8533759	0.8404299	25	5.2668386	0.4719941	0.9686357
Age: 45-54	1.1437073	1.7313843	0.6605739	0.5157902	2.4154812	21.85010	376	0.8510489	0.8380116	25	5.1732827	0.4855912	0.5088856
Age: 55-64	0.8663687	1.6964709	0.5106888	0.6145600	2.2996471	22.42444	376	0.8442955	0.8310013	25	4.9172049	0.4863806	0.6095690
Age: 65-74	0.1484085	1.6786353	0.0884102	0.9303244	2.2408600	22.74751	376	0.8404907	0.8270569	25	4.7822479	0.4873220	0.9295506
Age: 75+	0.2401566	1.6939253	0.1417752	0.8884751	2.2624792	23.32367	376	0.8337031	0.8200294	25	4.5564637	0.5164045	0.8872576
Gender: Woman	1.0226914	0.2779752	3.6790747	0.0003297	0.0206579	144.41528	376	0.2878354	0.2780405	25	0.3851192	0.0557860	0.0002341
Gender: Other	1.2921277	0.6960424	1.8563922	0.0646136	0.0713276	241.90041	376	0.1600318	0.1531157	25	0.1807988	0.4102944	0.0633977
Mobility Concern: Yes	-0.3923168	0.2884428	-1.3601199	0.1748176	0.0077241	298.69921	376	0.1025410	0.0965519	25	0.1068705	0.0751662	0.1737920
Language: English and Another Language	0.3786388	0.3053059	1.2401948	0.2168065	0.0237116	152.62914	376	0.2740115	0.2645603	25	0.3597307	0.0685516	0.2149033
Language: Non-English Language	0.0870196	0.4490639	0.1937800	0.8465045	0.0277524	251.64745	376	0.1498555	0.1431256	25	0.1670321	0.1727959	0.8463482
Lived in Ventura: 2-5 years	-1.4137290	0.8108138	-1.7435928	0.0822968	0.0676261	288.11376	376	0.1131159	0.1069807	25	0.1197966	0.5870878	0.0812301
Lived in Ventura: 5-10 years	-1.0132186	0.7907478	-1.2813422	0.2010024	0.0453449	319.61252	376	0.0811518	0.0754199	25	0.0815721	0.5781234	0.2000735
Lived in Ventura: More than 10 years	-1.0737066	0.7333319	-1.4641483	0.1441497	0.0412929	315.31502	376	0.0856374	0.0798561	25	0.0867865	0.4948310	0.1431534
Race: Person of color	0.1036510	0.3859315	0.2685735	0.7885979	0.0356547	162.79952	376	0.2580198	0.2489602	25	0.3314873	0.1118622	0.7882579
Race: Prefer not to answer	3.1127751	1.7097466	1.8206061	0.0769885	1.9167077	35.99672	376	0.6982217	0.6819079	25	2.1437434	0.9298576	0.0686668
Wildfire Impacts Index Score	0.6412072	0.1115542	5.7479442	0.0000000	0.0025339	190.09899	376	0.2199251	0.2117610	25	0.2686507	0.0098091	0.0000000
Mean RPS per Zip Code	-0.0589853	0.1218535	-0.4840671	0.6288247	0.0025559	217.76635	376	0.1864596	0.1790221	25	0.2180596	0.0121901	0.6283382
Imputed Income: 1Low	0.4936548	0.5627900	0.8771562	0.3865096	0.2126679	34.27034	376	0.7144906	0.6983008	25	2.3145599	0.0955580	0.3804018
1|2	-1.3008178	1.7628509	-0.7379057	0.4655191	2.0713855	34.79799	376	0.7094405	0.6932072	25	2.2595294	0.9534025	0.4605717
2|3	-0.4372290	1.7836412	-0.2451328	0.8078222	2.1407195	34.11579	376	0.7159828	0.6998067	25	2.3311874	0.9550276	0.8063536
3|4	0.3698482	1.7829764	0.2074330	0.8368999	2.1349057	34.25739	376	0.7146154	0.6984267	25	2.3159439	0.9587028	0.8356717
4|5	0.9864703	1.7856452	0.5524448	0.5842351	2.1426343	34.21273	376	0.7150461	0.6988614	25	2.3207301	0.9601891	0.5806437
5|6	1.8112777	1.7787917	1.0182630	0.3156612	2.1206564	34.40094	376	0.7132342	0.6970332	25	2.3006914	0.9586173	0.3085530
6|7	2.6759271	1.7904014	1.4945962	0.1442931	2.1659493	33.81892	376	0.7188659	0.7027176	25	2.3638046	0.9529499	0.1350199
7|8	3.5391332	1.7976190	1.9687894	0.0571800	2.1788757	33.96869	376	0.7174087	0.7012462	25	2.3472374	0.9654033	0.0489773
8|9	4.9309497	1.8267523	2.6992985	0.0106241	2.2171932	35.02912	376	0.7072500	0.6909992	25	2.2362378	1.0311430	0.0069486
9|10	12.5540457	11.0375505	1.1373942	0.2561743	6.2127970	340.06301	376	0.0585572	0.0530365	25	0.0560069	115.3662111	0.2553735

Worries Index Model Not Including Income

term	estimate	standard error	t value	p value
Age: 25-34	1.6611518	1.0171016	1.6332212	0.1024225
Age: 35-44	1.9091787	0.9994921	1.9101488	0.0561141
Age: 45-54	2.5118266	0.9957479	2.5225528	0.0116506
Age: 55-64	2.2774230	0.9911521	2.2977533	0.0215758
Age: 65-74	1.5480645	0.9900771	1.5635797	0.1179163
Age: 75+	1.5417603	1.0088624	1.5282167	0.1264588
Gender: Woman	0.9492926	0.2431667	3.9038751	0.0000947
Gender: Other	0.9937197	0.6495834	1.5297800	0.1260712
Mobility Concern: Yes	-0.2847127	0.2747798	-1.0361483	0.3001329
Language: English and Another Language	0.4408614	0.2730691	1.6144682	0.1064259
Language: Non-English Language	0.1358435	0.4103512	0.3310419	0.7406128
Lived in Ventura: 2-5 years	-1.2649699	0.7606502	-1.6630114	0.0963101
Lived in Ventura: 5-10 years	-1.0066821	0.7788999	-1.2924410	0.1962045
Lived in Ventura: More than 10 years	-0.8930727	0.7151783	-1.2487413	0.2117597
Race: Person of color	-0.1080073	0.3423296	-0.3155068	0.7523769
Race: Prefer not to answer	4.2788350	1.2193997	3.5089685	0.0004498
Wildfire Impacts Index Score	0.5737287	0.1027842	5.5818761	0.0000000
Mean RPS per Zip Code	-0.0343989	0.1116269	-0.3081593	0.7579611
1|2	-0.0930546	1.2053614	-0.0772006	0.9384640
2|3	0.8761685	1.2150232	0.7211126	0.4708403
3|4	1.7429946	1.2206002	1.4279816	0.1532971
4|5	2.3624434	1.2225385	1.9324083	0.0533091
5|6	3.1381216	1.2216185	2.5688229	0.0102045
6|7	4.0025262	1.2203558	3.2798027	0.0010388
7|8	4.8260276	1.2273335	3.9321241	0.0000842
8|9	6.1852276	1.2535354	4.9342266	0.0000008
9|10	14.1540393	11.2005599	1.2636903	0.2063412

Worries Index Model Including Non-Imputed Income

term	estimate	standard error	t value	p value
Age: 25-34	1.9894559	1.2164044	1.6355219	0.1019397
Age: 35-44	1.8387844	1.2190692	1.5083511	0.1314647
Age: 45-54	3.4472465	1.2009109	2.8705265	0.0040979
Age: 55-64	2.6435290	1.1753607	2.2491216	0.0245048
Age: 65-74	2.0395053	1.1872699	1.7178110	0.0858311
Age: 75+	2.0347327	1.1970832	1.6997421	0.0891795
Gender: Woman	1.0371633	0.3017857	3.4367543	0.0005887
Gender: Other	1.4691155	1.4252390	1.0307853	0.3026415
Mobility Concern: Yes	-0.8058141	0.3174162	-2.5386670	0.0111276
Language: English and Another Language	0.3341060	0.3376913	0.9893829	0.3224759
Language: Non-English Language	-0.5133261	0.6646949	-0.7722733	0.4399526
Lived in Ventura: 2-5 years	-2.4151603	0.8924542	-2.7062007	0.0068058
Lived in Ventura: 5-10 years	-1.4849417	0.8410966	-1.7654830	0.0774826
Lived in Ventura: More than 10 years	-1.6076046	0.7652208	-2.1008375	0.0356552
Race: Person of color	0.0591498	0.4586443	0.1289666	0.8973841
Race: Prefer not to answer	6.6012652	1.4279818	4.6227936	0.0000038
Wildfire Impacts Index Score	0.8422328	0.1459681	5.7699775	0.0000000
Mean RPS per Zip Code	-0.2301296	0.1363496	-1.6877913	0.0914513
Non-Imputed Income: Low	0.8731083	0.4031270	2.1658391	0.0303235
1|2	-0.0849661	1.3676955	-0.0621235	0.9504645
2|3	1.2421141	1.3848290	0.8969441	0.3697488
3|4	2.2064191	1.3917990	1.5853001	0.1128982
4|5	2.8069658	1.3936506	2.0141101	0.0439980
5|6	3.6524371	1.3918835	2.6240968	0.0086879
6|7	4.7839074	1.3883484	3.4457542	0.0005695
7|8	6.0785832	1.4039192	4.3297244	0.0000149
8|9	8.7029397	1.5512505	5.6102736	0.0000000
9|10	27.6760593	1.5512506	17.8411269	0.0000000

C.3 Evacuation Barriers Index Models

term	estimate	standard error	t value	p.value	b	df	dfcom	fmi	lambda	m	riv	ubar	p value
Age: 25-34	-0.6355013	1.7899756	-0.3550335	0.7258635	2.5585527	22.55102	380	0.8437567	0.8304882	25	4.8992956	0.5431178	0.7225645
Age: 35-44	-1.0412627	1.6739593	-0.6220358	0.5393884	2.1336594	25.74590	380	0.8063757	0.7918969	25	3.8053102	0.5831340	0.5339183
Age: 45-54	1.3256287	1.8571612	0.7137930	0.4828081	2.7702818	22.15388	380	0.8484230	0.8353300	25	5.0727515	0.5679547	0.4753552
Age: 55-64	-0.4449128	1.7619193	-0.2525160	0.8027707	2.4174766	24.24566	380	0.8238410	0.8098854	25	4.2599855	0.5901841	0.8006423
Age: 65-74	-1.2828413	1.6897123	-0.7592069	0.4545833	2.1689606	25.90091	380	0.8045872	0.7900589	25	3.7632406	0.5994087	0.4477288
Age: 75+	-0.9376275	1.7911177	-0.5234874	0.6053717	2.4952637	24.32615	380	0.8228981	0.8089125	25	4.2332036	0.6130285	0.6006351
Gender: Woman	0.5009877	0.3150353	1.5902588	0.1139489	0.0265129	145.36517	380	0.2875609	0.2778258	25	0.3847074	0.0716738	0.1117765
Gender: Other	1.5310166	0.8009681	1.9114577	0.0575182	0.1381539	181.86100	380	0.2323537	0.2239578	25	0.2885897	0.4978698	0.0559458
Mobility Concern: Yes	2.1038850	0.3453556	6.0919378	0.0000000	0.0238361	194.57440	380	0.2158616	0.2078428	25	0.2623757	0.0944810	0.0000000
Language: English and Another Language	-1.0700565	0.3478770	-3.0759626	0.0024298	0.0266773	177.86517	380	0.2377808	0.2292580	25	0.2974510	0.0932739	0.0020982
Language: Non-English Language	0.4475826	0.4475315	1.0001143	0.3183148	0.0326548	228.12614	380	0.1767497	0.1695637	25	0.2041863	0.1663235	0.3172552
Lived in Ventura: 2-5 years	-3.1443176	0.8919413	-3.5252518	0.0004876	0.0698135	306.92572	380	0.0971284	0.0912642	25	0.1004298	0.7229532	0.0004231
Lived in Ventura: 5-10 years	-1.8520137	0.8480291	-2.1839036	0.0296343	0.0321050	349.16064	380	0.0518440	0.0464284	25	0.0486890	0.6857641	0.0289693
Lived in Ventura: More than 10 years	-3.7700152	0.8045918	-4.6856247	0.0000040	0.0308035	346.60196	380	0.0549236	0.0494859	25	0.0520623	0.6153323	0.0000028
Race: Person of color	0.0558187	0.4199280	0.1329245	0.8944284	0.0451654	152.38457	380	0.2758155	0.2663728	25	0.3630901	0.1293675	0.8942531
Race: Prefer not to answer	0.9497536	1.3999647	0.6784126	0.5008809	1.1291700	46.38414	380	0.6154143	0.5991817	25	1.4948959	0.7855643	0.4975101
Wildfire Impacts Index Score	0.4427347	0.1223227	3.6193991	0.0003628	0.0023946	231.06263	380	0.1735604	0.1664378	25	0.1996705	0.0124725	0.0002953
Mean RPS per Zip Code	-0.6818299	0.1703297	-4.0029998	0.0001431	0.0124113	76.84430	380	0.4588126	0.4449083	25	0.8015041	0.0161044	0.0000625
Imputed Income: 1Low	1.1158383	0.6246647	1.7862996	0.0816149	0.2427834	40.09278	380	0.6634603	0.6470808	25	1.8335096	0.1377112	0.0740508
0|1	-2.8108348	1.7279409	-1.6266962	0.1111445	1.7959251	42.79059	380	0.6419073	0.6255525	25	1.6706017	1.1180176	0.1038016
1|2	-0.5718805	1.7216025	-0.3321792	0.7413899	1.7910001	42.41723	380	0.6448012	0.6284391	25	1.6913486	1.1012751	0.7397540
2|3	0.1529247	1.7217420	0.0888197	0.9296473	1.8004461	42.00611	380	0.6480200	0.6316512	25	1.7148179	1.0919317	0.9292252
3|4	1.8092798	1.7269418	1.0476785	0.3007884	1.8130281	41.93114	380	0.6486107	0.6322408	25	1.7191703	1.0967786	0.2947868
4|5	3.3194286	1.7387491	1.9090901	0.0623685	1.7296847	46.98424	380	0.6112176	0.5950130	25	1.4692151	1.2243763	0.0562505

Evacuation Barriers Index Model Not Including Income

term	estimate	standard error	t value	p value
Age: 25-34	-0.5117914	1.0806752	-0.4735849	0.6357960
Age: 35-44	-0.3651497	1.0907360	-0.3347737	0.7377958
Age: 45-54	1.5742071	1.0837177	1.4525988	0.1463352
Age: 55-64	-0.1194185	1.1064348	-0.1079309	0.9140505
Age: 65-74	-0.8918599	1.0964377	-0.8134160	0.4159796
Age: 75+	-0.9998710	1.1163846	-0.8956331	0.3704487
Gender: Woman	0.5266793	0.2790588	1.8873420	0.0591143
Gender: Other	1.4242056	0.7242858	1.9663584	0.0492572
Mobility Concern: Yes	2.2780430	0.3148887	7.2344386	0.0000000
Language: English and Another Language	-1.0727485	0.3114825	-3.4440092	0.0005732
Language: Non-English Language	0.5074665	0.4035750	1.2574281	0.2085987
Lived in Ventura: 2-5 years	-2.5849201	0.8197526	-3.1532931	0.0016144
Lived in Ventura: 5-10 years	-1.9380035	0.8351708	-2.3204875	0.0203145
Lived in Ventura: More than 10 years	-3.5083202	0.7820268	-4.4861891	0.0000073
Race: Person of color	-0.0398142	0.3673773	-0.1083742	0.9136989
Race: Prefer not to answer	1.0823056	1.0342311	1.0464833	0.2953379
Wildfire Impacts Index Score	0.4082036	0.1174686	3.4750015	0.0005109
Mean RPS per Zip Code	-0.6711240	0.1343870	-4.9939658	0.0000006
0|1	-2.4299135	1.3001665	-1.8689248	0.0616333
1|2	-0.1852524	1.2912947	-0.1434625	0.8859249
2|3	0.5072089	1.2878354	0.3938460	0.6936947
3|4	2.0328628	1.2889700	1.5771218	0.1147675
4|5	3.5322697	1.3363139	2.6432934	0.0082104

Evacuation Barriers Index Model Including Non-Imputed Income

term	estimate	standard error	t value	p value
Age: 25-34	-0.5958710	1.9223186	-0.3099751	0.7565799
Age: 35-44	-1.5909365	1.9078278	-0.8338994	0.4043377
Age: 45-54	2.1058682	1.9158132	1.0992033	0.2716794
Age: 55-64	-0.3155205	1.9238809	-0.1640021	0.8697295
Age: 65-74	-1.6252269	1.9206530	-0.8461845	0.3974498
Age: 75+	-1.5997493	1.9342654	-0.8270578	0.4082043
Gender: Woman	0.5179811	0.3459868	1.4971123	0.1343641
Gender: Other	2.4655097	1.5620840	1.5783465	0.1144860
Mobility Concern: Yes	2.9065825	0.3914743	7.4247081	0.0000000
Language: English and Another Language	-2.0595334	0.4153136	-4.9589841	0.0000007
Language: Non-English Language	-1.3600944	0.6524302	-2.0846588	0.0371003
Lived in Ventura: 2-5 years	-5.0520998	0.9959143	-5.0728257	0.0000004
Lived in Ventura: 5-10 years	-3.0193115	0.8912379	-3.3877728	0.0007046
Lived in Ventura: More than 10 years	-4.8080975	0.8529812	-5.6368156	0.0000000
Race: Person of color	0.8595662	0.4405025	1.9513310	0.0510177
Race: Prefer not to answer	1.0525560	1.9012878	0.5536016	0.5798515
Wildfire Impacts Index Score	0.6434538	0.1502130	4.2836085	0.0000184
Mean RPS per Zip Code	-0.7685576	0.1733735	-4.4329590	0.0000093
Imputed Income: Low	1.8959715	0.6326013	2.9971034	0.0027256
0|1	-3.4891475	2.0581091	-1.6953171	0.0900153
1|2	-1.2475491	2.0454355	-0.6099186	0.5419157
2|3	-0.2521126	2.0376748	-0.1237256	0.9015325
3|4	1.2634219	2.0346176	0.6209628	0.5346241
4|5	3.7568434	2.1354996	1.7592339	0.0785378

Appendix D: Additional Maps

D.1 Wildfire Hazard Potential symbolized with Social Vulnerability Index