How Social Factors Affect Wildfire Risk and Evacuations

InfoViz Spring 2021

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Project Goals

Traditional approaches to assessing wildfire risk focus on biophysical indicators such as fuel and weather conditions, but this approach obscures the specific challenges experienced by vulnerable communities in the event of environmental disaster. Davies et al. addressed this gap by examining wildfire vulnerability from an environmental justice perspective that explored relationships between race, geography, and wildfire (2018). Their research uncovered racial and ethnic disparities in wildfire risks to communities, with census tracts that “were majority Black, Hispanic or Native American experiencing ca. 50% greater vulnerability to wildfire compared to other census tracts” (Davies et al., 2018). We hope to amplify this work by making this information more accessible to evacuation planners and the general public through information visualization. The goals of this project would be to communicate the additional challenges and risks faced by vulnerable populations in fire prone communities and the importance of considering human-centered factors during wildfire risk assessment and evacuation planning. To achieve this goal, we created a webpage with static and interactive visualizations that perform the following functions:

- Provide examples of how specific vulnerable populations (such as low income, older age, undocumented citizens) can have more challenging experiences when dealing with wildfires

- Introduce and explain a new metric that incorporates social factors when assessing wildfire vulnerability as proposed by Davies et al.
- Facilitate exploration of both biophysical and social risk factors throughout the state of CA through the use of interactive maps

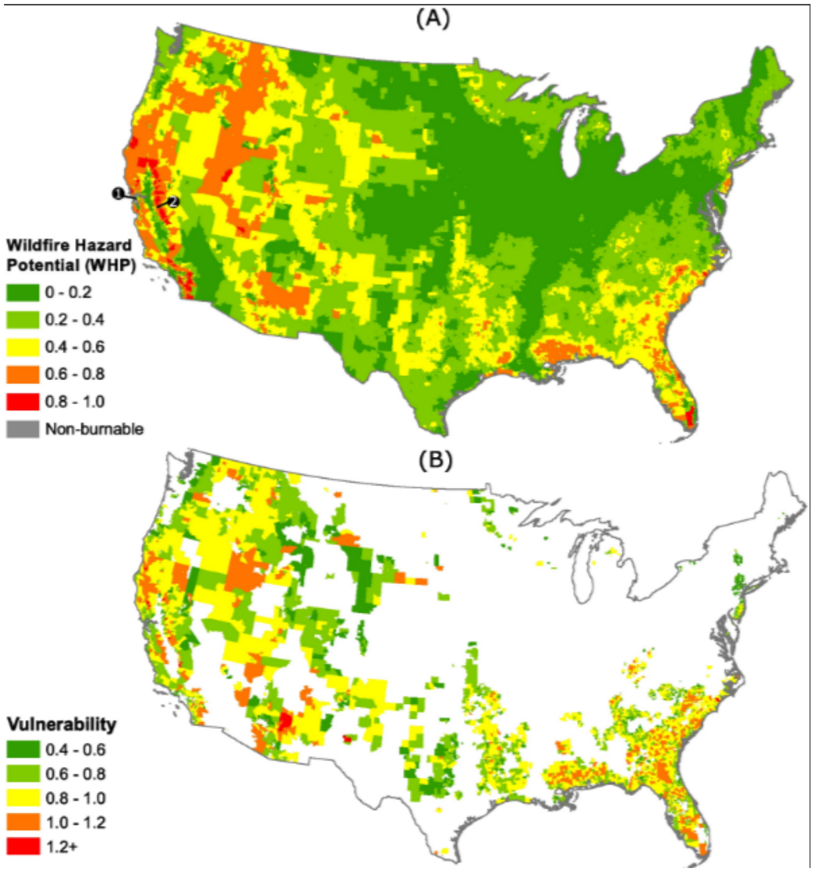
Discussion of Related Work

Heatmaps from “A Social Vulnerability Index for Disaster Management” - Davies et al.

The primary inspiration behind our visualization was a study conducted by Davies et al., which proposes a new metric for understanding wildfire vulnerability through a hybrid lens of biophysical and social factors[1]. While Davies et al. created a heatmap comparing WHP to Overall Vulnerability in their study (below), it is difficult to interpret at a base level and does not facilitate further exploration well (e.g., there are no clear boundaries, labels, tooltips, or interactive elements that guide exploration). During our review of their visuals, we were unable to glean any meaningful insights without reading the entire paper first. Additionally, these visuals only compare biophysical indicators to its newly proposed metric, instead of also comparing social indicators, which the paper also calculates.

It is understandable that these visuals were not optimized for interactivity, since they were the results of a more academically-oriented research paper in a nascent field. However, we found these maps to be potentially very informative and memorable and thus sought to redesign and expand on it as a component of our webpage. They were strong inspirations for our own interactive heatmaps; our current heatmaps can be seen as extensions of these visuals allowing for more interactivity, filtering by geography and risk metric, and comparisons.

[1] "A Social Vulnerability Index for Disaster Management - De Gruyter." https://www.degruyter.com/document/doi/10.2202/1547-7355.1792/html. Accessed 6 May. 2021.



California Wildfire Interactive Visualizations - PSE Healthy Energy

This visualization uses interactive Tableau dashboards to map out (1) Wildfire and Prescribed Burn Perimeters and (2) Air Quality and Wildfire events across California[2]. The first visual is helpful in understanding what areas of California have burned in the last 50 years, and to what extent they burned. This was a helpful reference to sanity check our heatmap of Wildfire Hazard Potential--we found that the higher risk counties on our map aligned with the areas of frequent burn in this visual. In contrast to our visuals, this map appears to map out the exact boundaries of the fire and includes a temporal element that can be interacted with.

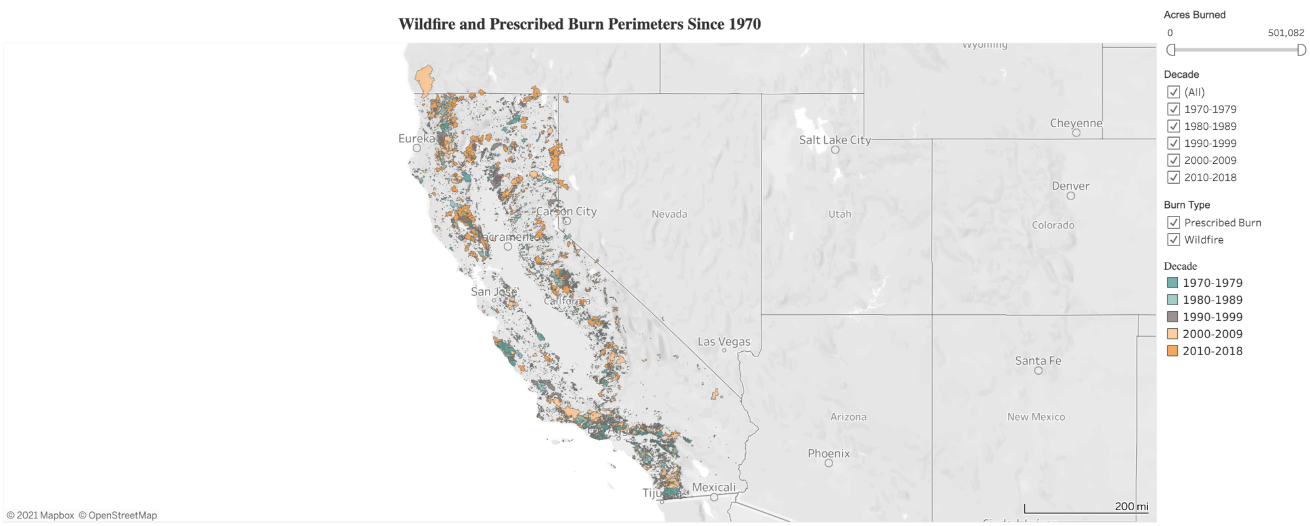
[2] "California Wildfire Interactive Visualizations - PSE Healthy Energy." https://www.psehealthyenergy.org/our-work/interactive-tools/california-wildfire/. Accessed 12 May. 2021.

The second map is helpful for understanding how wildfires affect air quality. It is interesting to see that in some cases, air quality is worse farther away from the fire; this is likely due to strong winds pushing ash and smoke primarily in one direction over large distances. Similar to our interactive maps, these maps express how wildfire risks vary by geography. While these visuals focus on more physical measures (actual fire spread, air quality), our maps focus on a broader (albeit less granular) scope of measures.

California Fire Perimeters

Where have fires burned in California over the last 50 years? The State has a long history of wildfires and a growing tendency to manage wildfire risk with prescribed burning. The below map therefore uses public CAL FIRE data to show wildfire and prescribed burn perimeters from 1970-2018. Use the filters at right to toggle between decades, fire size, and prescribed burn or wildfire. Hover over a fire to see its name, start date, end date, acreage burned, cause, and the primary fire protection agency for its geographic area. Zoom in to see city and neighborhood names, points of interest, and roads and highways.

Sample question: *Which urban areas have experienced fires over 5,000 acres in the last two decades?*



Wildfire and prescribed burn perimeters in California from 1970-2018. The user can modify which perimeters are shown by fire size, decade of ignition, and burn type using the filters on the right. Scroll over a perimeter to see the name of a fire, its cause, when it started and ended, how many acres it burned, and the primary agency responsible for fire protection in its area.
Source Data: CAL FIRE Open Data Hub Prescribed Burn and Wildfire Perimeter Shapefiles (2019)

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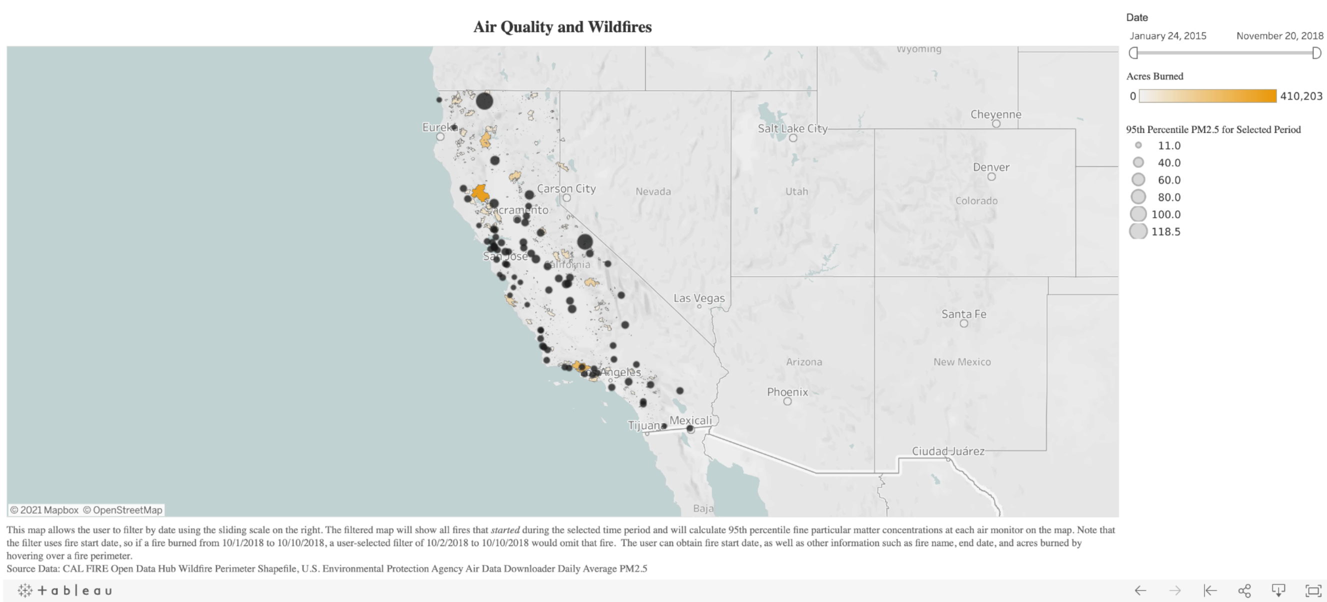
Sample question: *Which downwind areas experienced elevated $PM_{2.5}$ concentrations during the Tubbs Fire in fall 2017?*

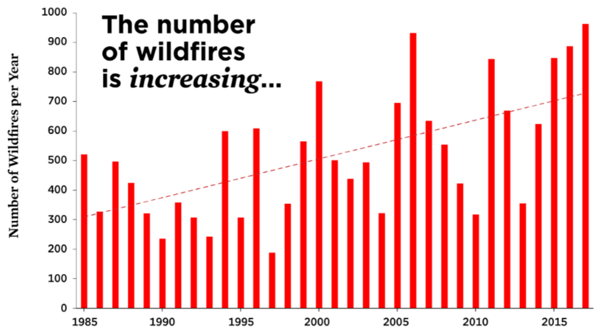


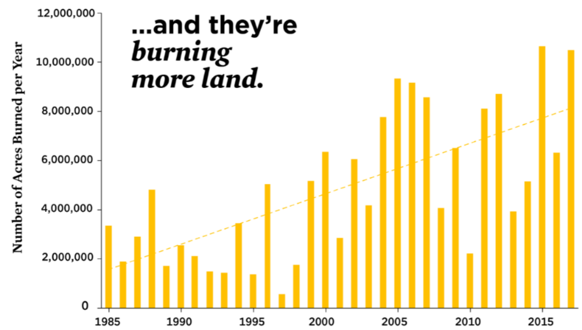
Infographic: Wildfires and Climate Change - Union of Concerned Scientists

This article from the Union of Concerned Scientists uses an infographic-like approach to educate readers about how wildfires are becoming increasingly more severe due to climate change[3]. There are three main sets of visualizations, which are accompanied by header and article text. The first two sets emphasize the growing damages from wildfires over time, primarily using bar graphs and one overlay of geographic boundaries to emphasize the size of impact. The last set of visualizations uses a cyclic representation of icons and accompanying text as well as a filled line chart to convey how climate change is a key contributor to the growing problem of wildfires. This relates to the infographic section of our visualization, which uses similar types of text (headings and supporting descriptions), iconography, and bar charts to convey and educational story of how social factors affect wildfire risk. Compared to this infographic, our visualization is more reliant on iconography and isotypes and caption-like text (as opposed to paragraph-style text).

[3] "Infographic: Wildfires and Climate Change | Union of Concerned ...." 8 Sep. 2020, https://www.ucsusa.org/resources/infographic-wildfires-and-climate-change. Accessed 12 May. 2021.

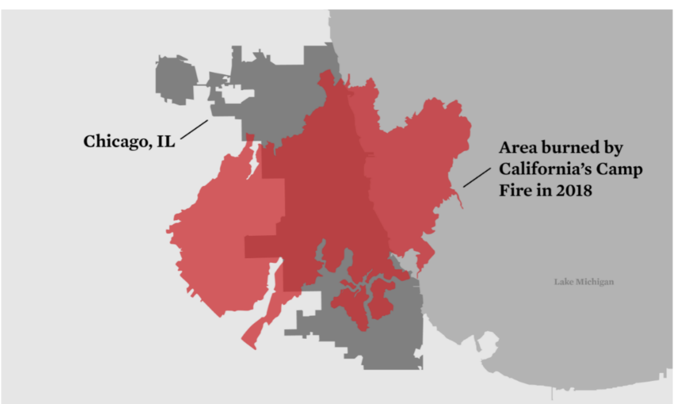
#1: Wildfires are getting worse

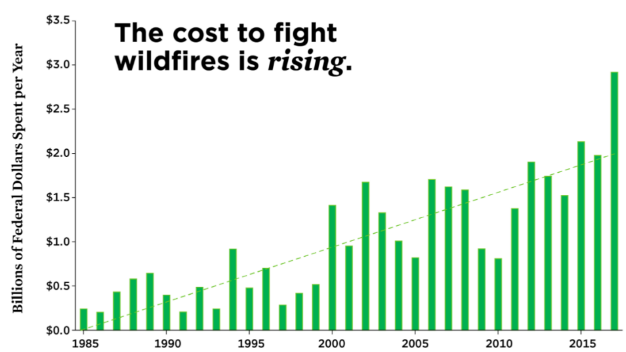




Data from the Monitoring Trends in Burn Severity program. MTBS only includes large fires in the United States (>500 acres for the eastern US, >1000 acres for the west). Prescribed fires removed.

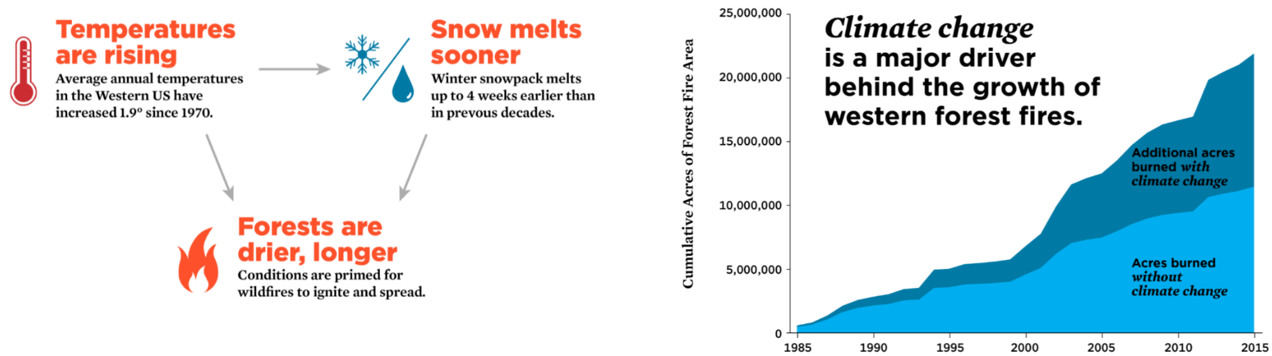
#2 Wildfires are causing more harm





On left, the perimeter of the massive Camp Fire is overlayed on Chicago. Federal suppression costs from the National Interagency Fire Center.

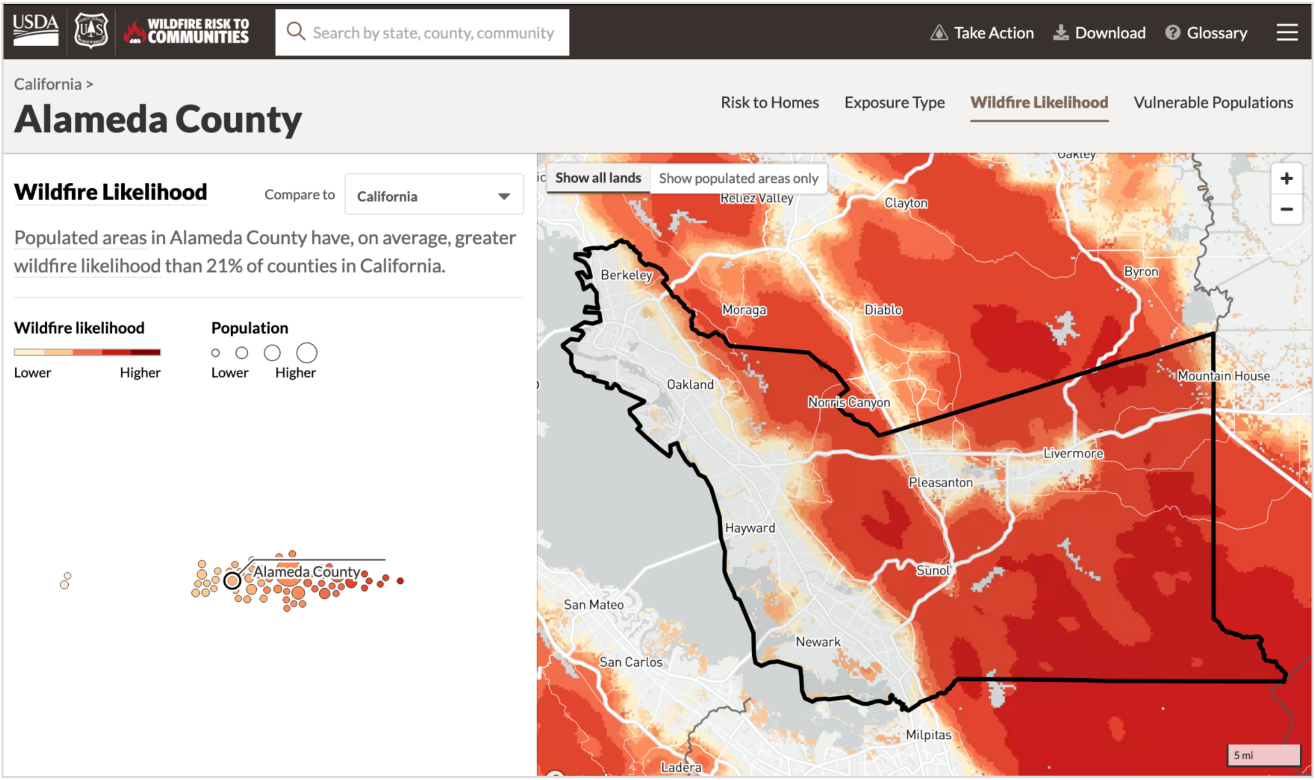
#3: Climate change is a key driver



Data shown are from John T. Abatzoglou and A. Park Williams, Impact of anthropogenic climate change on wildfire across western US forests, which models forest fire area as a function of fuel dryness both with and without climate change.

Wildfire Risk to Communities

We began our project by exploring existing information visualizations that attempt to incorporate wildfire risk and social vulnerability. One relevant information visualization came from *Wildfire Risk to Communities*, a website created by the US Forest Service that allows users to view wildfire risk according to four metrics: risk to homes, exposure type, wildfire likelihood, and vulnerable populations.



The website uses chloropeths to illustrate the varying levels of risk for three of the metrics and allows users to find locations on a map by state, county and community. Although the site acknowledges social vulnerability as a risk factor, it displays this data in table form and fails to visualize how social factors may exacerbate the threat of wildfire. Since our project also sought to communicate risk metrics in the form of wildfire hazard potential, adaptive capacity, and overall vulnerability, the visualizations from *Wildfire Risk to Communities* served as a useful reference for displaying similar types of information to a broad audience.

	Number		Percent	
Families in poverty	25,996	±961	6.8%	±0.2%
People with disabilities	153,134	±2,359	9.4%	±0.1%
People over 65 years	215,917	±2,334	13.1%	±0.1%
Difficulty with English	130,524	±2,659	8.4%	±0.2%
Households with no car	54,816	±1,434	9.6%	±0.2%
Mobile homes	6,874	±505	1.2%	±0.1%

Table from *Wildfire Risk to Communities* showing types of social vulnerability

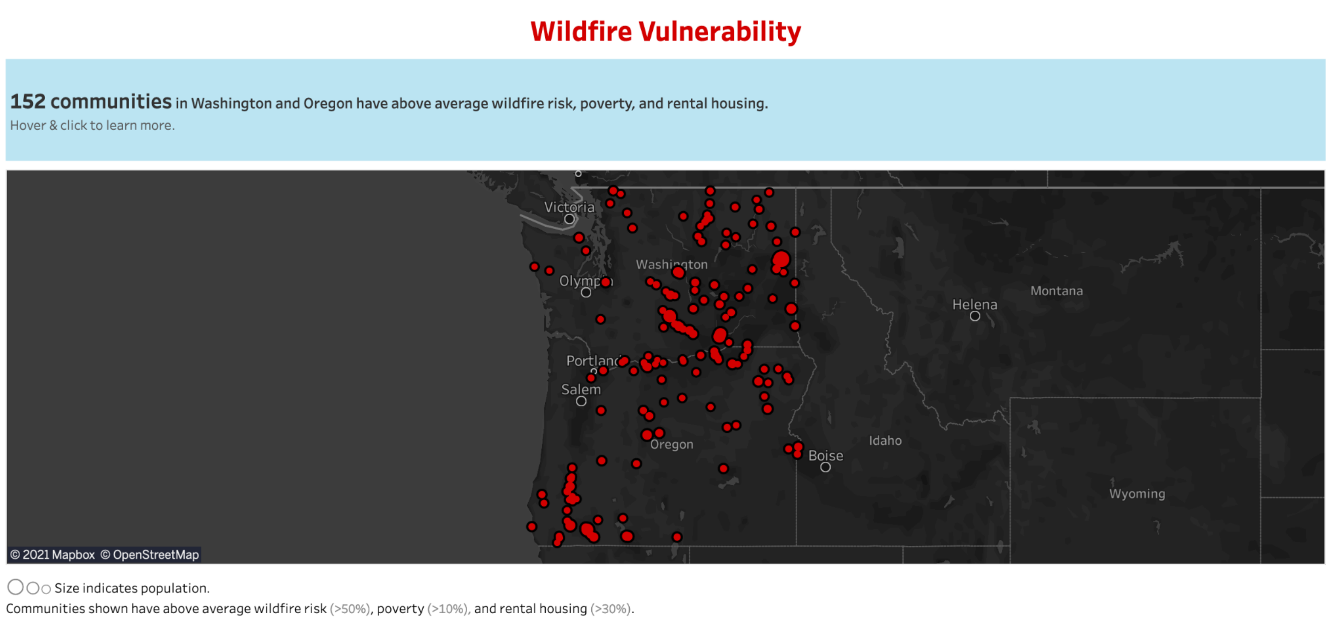
Marin County's 2020 Wildfire Protection Plan

Another site that we took inspiration from was a scrollytelly version of Marin County's 2020 Wildfire Protection plan created using ArcGIS's story map feature.

Since one of our project goals was to help explain the need to incorporate social vulnerability factors into wildfire risk assessment, we knew that storytelling would be a powerful method for introducing new information and persuading an audience of the need for action. We found the use of a scrollytelly to illustrate Marin Country's Wildfire Protection Plan to be a highly effective means of communicating a lot of technical information as it combined narrative with visuals that reinforced points raised in the text. We sought to replicate this effect in our project by using Tableau's story feature in one of the iterations of our designs.

Wildfire Vulnerability, Headwater Economics

We also found an interesting information visualization created by Headwater Economics, an independent, nonprofit research group that works to improve community development and land management decisions. They created an interactive visualization showing elevated wildfire risk alongside social vulnerability factors such as poverty and high rates of rental housing in the Pacific Northwest.



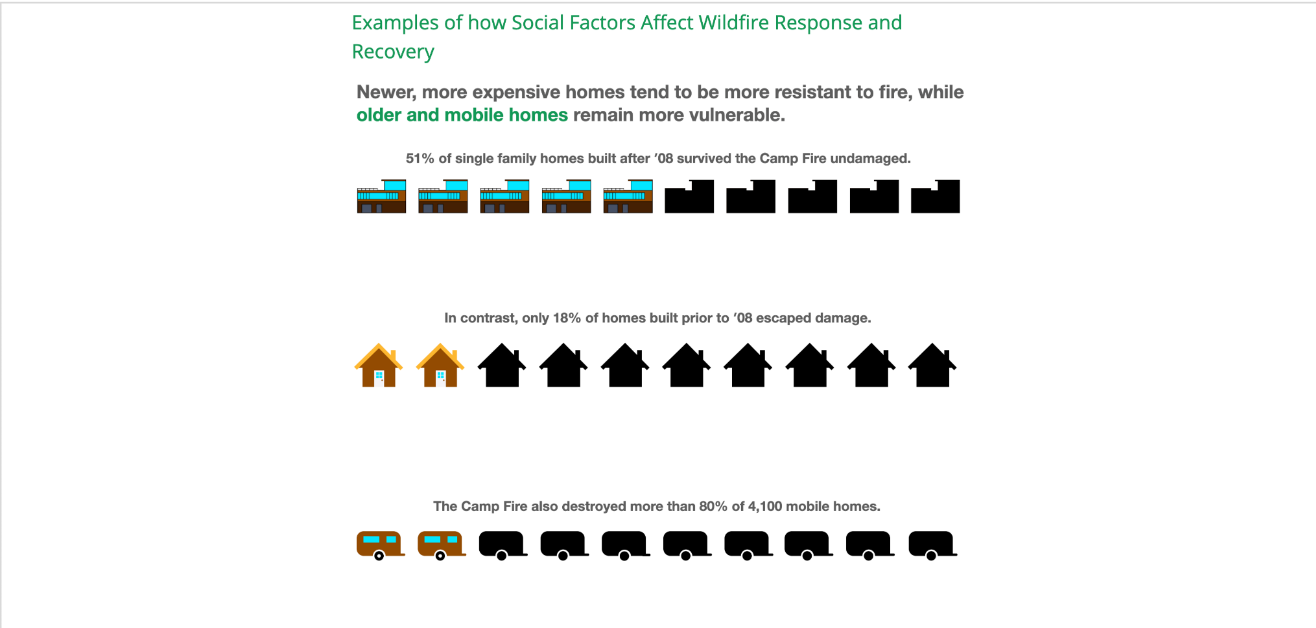
This visualization showed risk at the community level and used different size circles to communicate population differences. We appreciated the attempt to contextualize wildfire risk with socio-economic data, but also found the map less than helpful for quickly identifying areas of greatest vulnerability. Recognizing this shortcoming was helpful in guiding us towards types of visualizations that would be more effective at conveying this type of information.

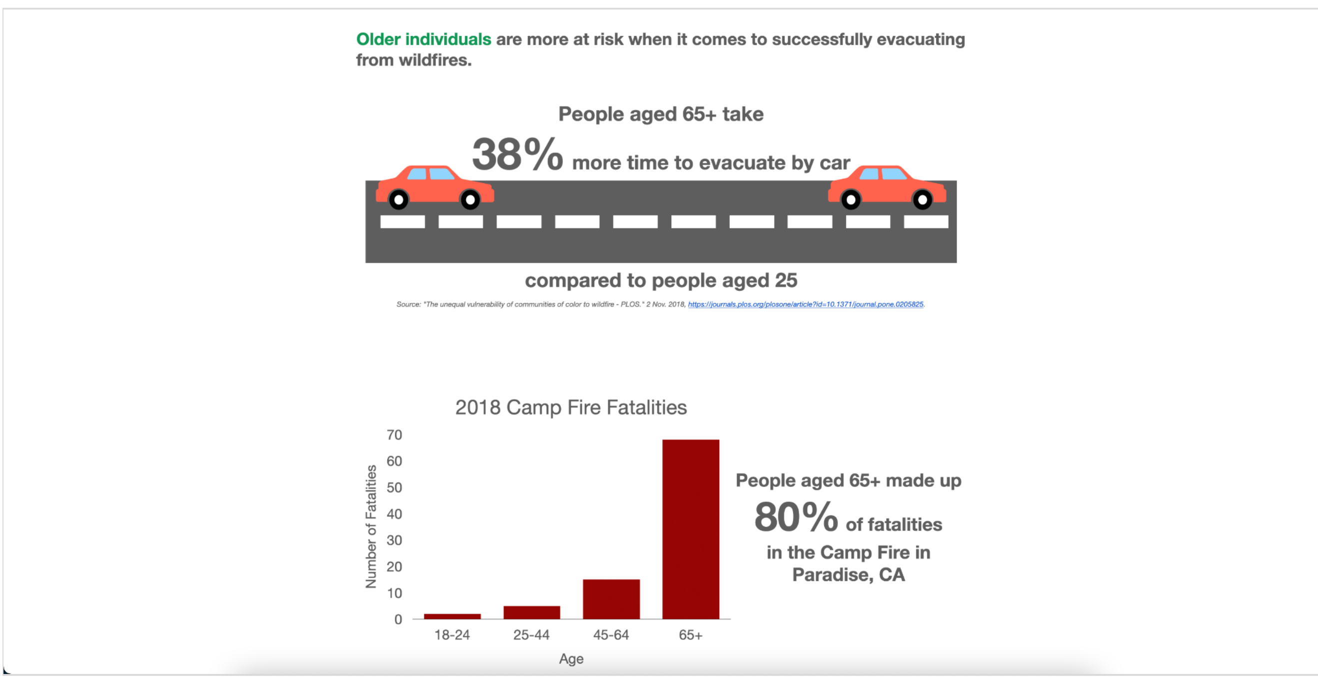
Visualization Walkthrough

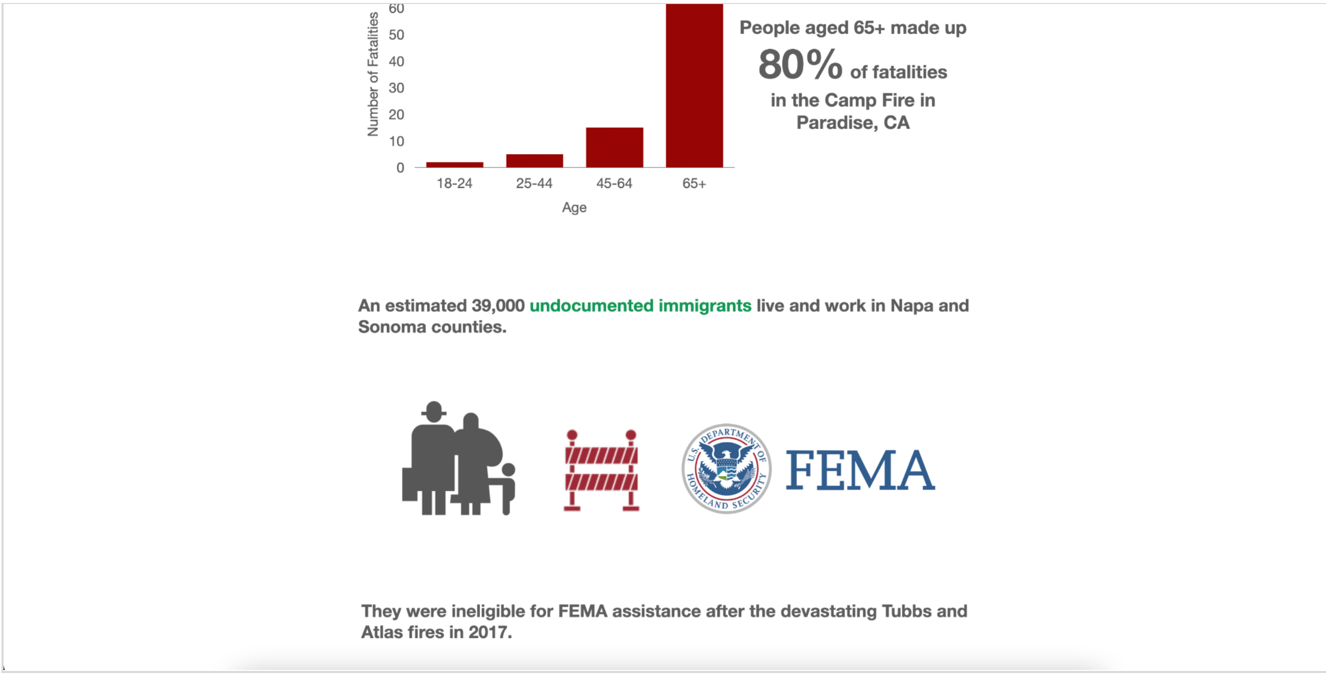
Section 1: Infographic-Style Introduction to Social Factors and Wildfire Risk

The header and introductory section of the webpage introduce the main topic of incorporating social factors into wildfire risk. It also defines social factors (Note that the list of social factors is condensed compared to the list presented in Section 3.2.1. This was done to keep the page more readable).

Below this introduction are examples of how some socially vulnerable populations are affected by wildfires, in comparison to normal populations. The information and iconography here were adapted from an infographic we created earlier in our design process and have been updated based on our usability tests to make the icons more representative of their accompanying statistics, as well as updated spacing and sequencing to make the examples more easily digestible. While it would have been ideal to include additional statistics spanning across more types of vulnerable populations, it was difficult to find additional data in this space.





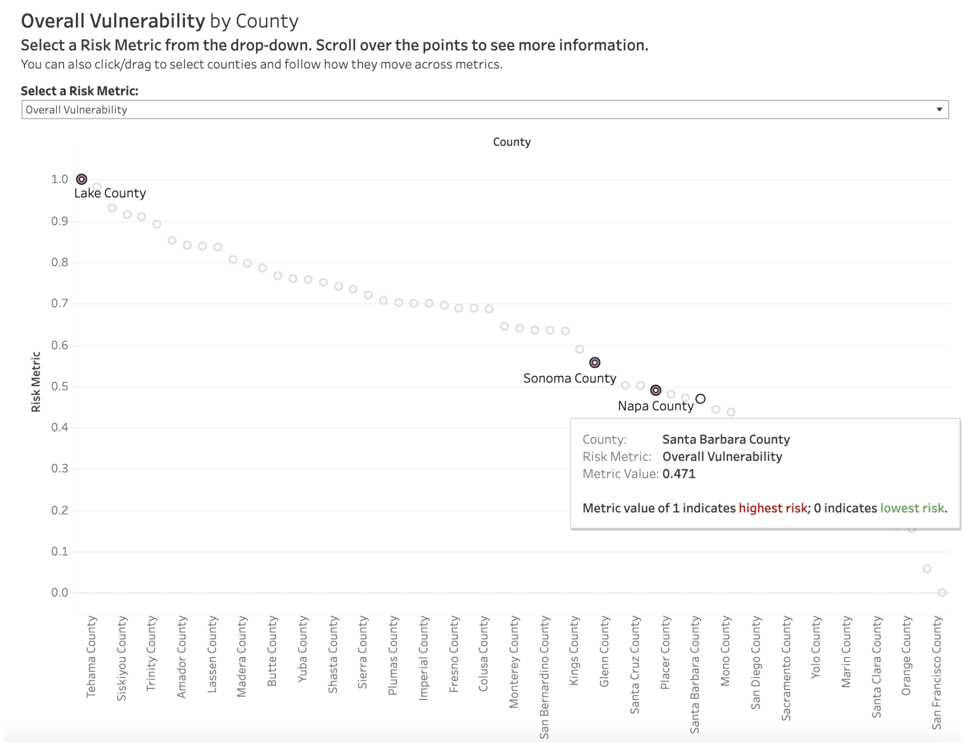


Section 2: Interactive Visualizations to Explore Wildfire Risk Metrics

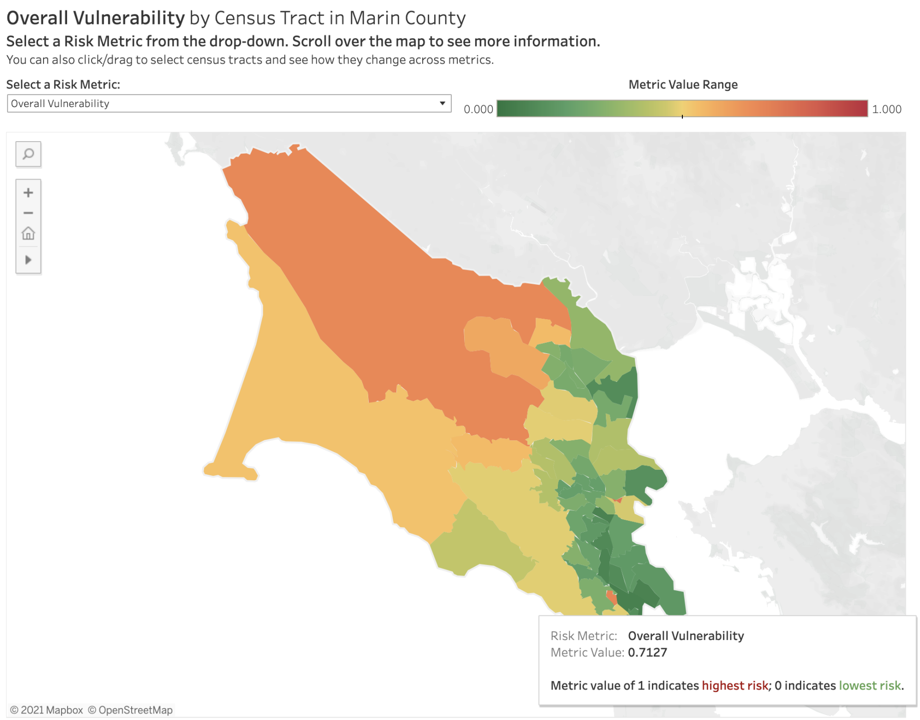
This section outlines the approach used by Davies et al. to calculate overall vulnerability to wildfire, incorporating social factors. Compared to previous iterations that immediately presented users with interactive heat maps, this section now starts with term definition with icons, as well as a link to the original research paper for more information.

This is followed by a scatter plot showing each California county's Wildfire Hazard Potential, Adaptive Capacity, and Overall Vulnerability. There is a drop-down menu to select which metric to look at. When pressed, an animation will trigger, reorganizing the points into a descending order based on the selected metric. Scrolling over each point also triggers a tool tip, which will indicate the county, risk metric, and metric value being examined. It will also provide an explanation to help interpret the metric value.

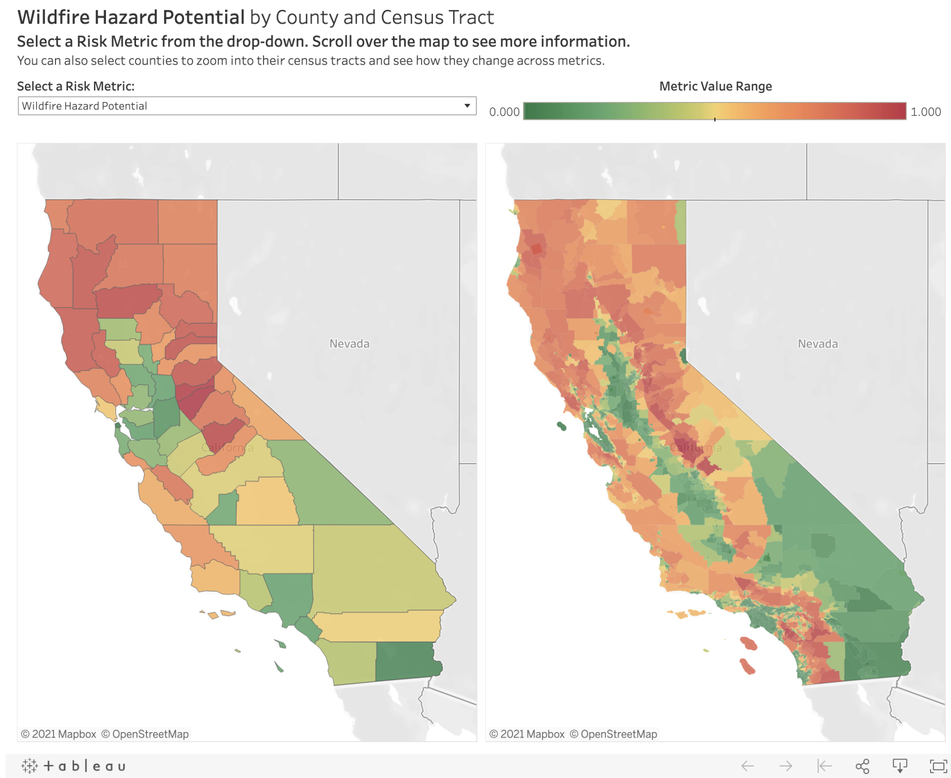
Specific points can also be selected to show their labels. This helps to track how selected counties “move” for each risk metric. To start, Lake, Sonoma, Napa, and Marin counties are highlighted as an example case study. Users are instructed to try selecting different risk metrics to see how risk interpretation changes by biophysical, social, and hybrid assessments. Additional text is provided to ensure that the reader understands that Sonoma, Napa, and Marin counties turn out to be more resilient to fire risk due to their strong adaptive capacity despite their relatively high risk of wildfire, while Lake county’s overall risk is exaggerated by poor adaptive capacity.



We also wanted to show how vulnerabilities exist at a more granular level, so we included an interactive map of Marin County, broken down into its census tracts. Similar to the previous visualization, users are able to select which risk metric they want to look at and can this time explore the geography of a county. Users are also posed with the questions of finding “pockets of vulnerability within Marin County” and whether these vulnerabilities can be more attributed to Wildfire Hazard Potential or Adaptive Capacity. There is also a tooltip similar to the above visualization to indicate the risk metric and metric value of a given census tract. While more information to help situate the user (e.g., a list of zip codes or cities in a given census tract) would have been helpful, we were unable to find such a data source that could be easily merged with our existing data in the time we had.



The final section shows an interactive map of California at the county and census tract levels. Users can select which index they would like to explore, select a county(s) to “zoom” into (i.e., see the census tract breakdown for a county), and compare index values using a tool tip. This visual is presented after providing initial context and definitions for understanding social vulnerability and wildfire risk, so that users are equipped to further explore areas they are curious about. Our hope is that this visual will reveal interesting insights on how vulnerability varies across counties and census tracts, such that users can gain an appreciation of how nuanced each community’s risk can be.


Wildfire Hazard Potential by County and Census Tract
Select a Risk Metric from the drop-down. Scroll over the map to see more information.
You can also select counties to zoom into their census tracts and see how they change across metrics.
Select a Risk Metric:
Wildfire Hazard Potential
Metric Value Range
0.000
1.000
Nevada
Nevada
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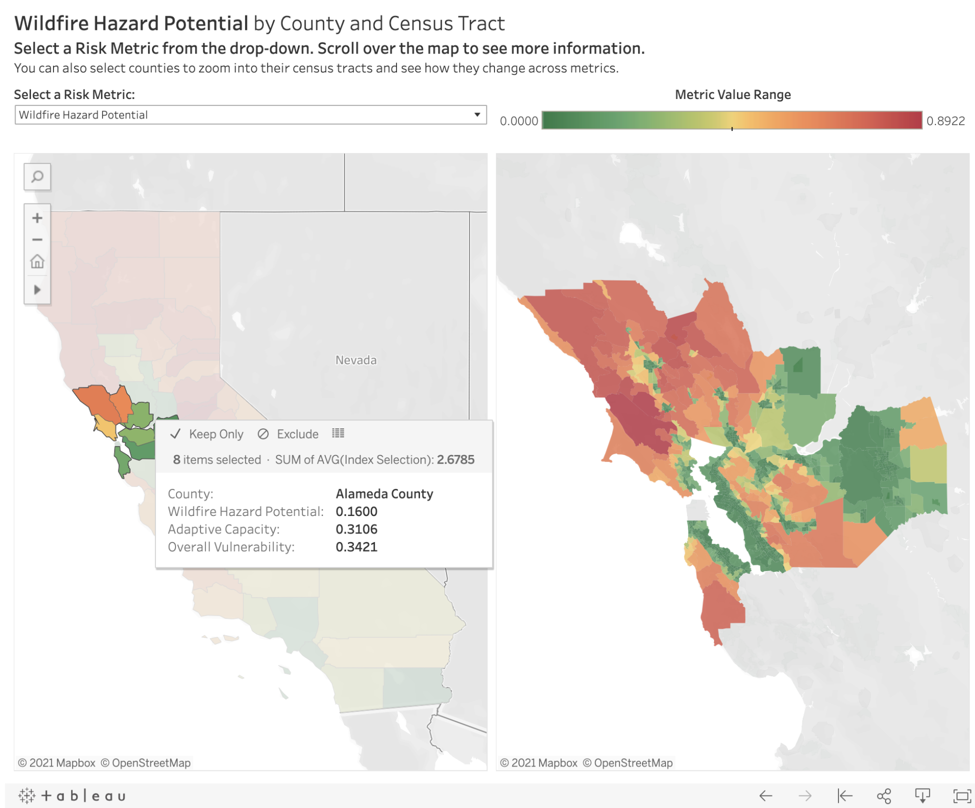
Wildfire Hazard Potential by County and Census Tract
Select a Risk Metric from the drop-down. Scroll over the map to see more information.
You can also select counties to zoom into their census tracts and see how they change across metrics.
Select a Risk Metric:
Wildfire Hazard Potential
Metric Value Range
0.0000
0.8922
Nevada
Keep Only
Exclude
8 items selected · SUM of AVG(Index Selection): 2.6785
County: Alameda County
Wildfire Hazard Potential: 0.1600
Adaptive Capacity: 0.3106
Overall Vulnerability: 0.3421
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Data

The website was made using the following data:

Statistics on socially vulnerable populations' responses to wildfires.

- This data was collected from a number of public resources including iii.org, americanprogress.org, pbs.org, plos.org, redding.com, and spotlightonpoverity.org. Statistics on different socially vulnerable populations are sparse and disparately located, requiring a larger number of sources[4,5,6,7,8].

Risk Metrics Detailing Wildfire Potential and Social Vulnerability in California

- This data was collected from the research paper by Davies et al., titled *The Unequal Vulnerability of Communities of Color to Wildfire.* Davies et al. conduct an analysis to measure the vulnerability of communities to wildfires, when considering both biophysical indicators and social factors.
- To understand biophysical risk, they reference the Wildfire Hazard Potential (WHP) of California, broken down into census tracts, which is provided by the United States Forest Service (USFS)[9]. They also normalize WHP to be between 0 to 1.
- To understand social factors, they estimate the "adaptive capacity" of each census tract using census data. They define adaptive capacity as "the ability of a census tract to

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[4] "Facts + Statistics: Wildfires | III." https://www.iii.org/fact-statistic/facts-statistics-wildfires. Accessed 6 May. 2021.
[5] "Before the Fire: Protecting Vulnerable Communities From Wildfire ...." 25 Jul. 2019, https://www.americanprogress.org/issues/green/reports/2019/07/25/472639/before-the-fire/. Accessed 6 May. 2021.
[6] "Camp Fire: By the Numbers | Fire in Paradise | FRONTLINE | PBS ...." 29 Oct. 2019, https://www.pbs.org/wgbh/frontline/article/camp-fire-by-the-numbers/. Accessed 6 May. 2021.
[7] "California wildfires: Here's why some homes survive the blaze." 11 Apr. 2019, https://www.redding.com/in-depth/news/2019/04/11/california-wildfire-prevention-protection-home/3412609002/. Accessed 6 May. 2021.
[8] "Northern California Fires Decimate Low-Income Communities ...." 25 Oct. 2017, https://spotlightonpoverty.org/spotlight-exclusives/northern-california-fires-decimate-low-income-communities/. Accessed 6 May. 2021.
[9] "Wildland fire potential: A tool for assessing wildfire risk and fuels ...." https://www.fs.usda.gov/treesearch/pubs/49429. Accessed 6 May. 2021.

absorb and adjust to disturbances, like wildfire, while minimizing damage to life, property, and services" and derive a quantitative metric for each census tract using a method proposed by Flanagan et al., which takes the weighted rank of a census tract across a number of social indices (listed in the table below)[10]. These values are then also normalized to be between 0 and 1. Counties with higher weighted ranking values (i.e., farther from 0) are considered to be less adaptive.

- Finally, Davies et al. calculate a metric for overall vulnerability to wildfires, by combining WHP and Adaptive Capacity into a value pair for each census tract and calculating each pair's Euclidean distance from the minimum WHP and Adaptive Capacity values (formula below).

Domain	Variable
Socioeconomic Status	• Persons below poverty level • Civilians (age 16+) unemployed • Per capita income
Language and Education	• Persons (age 25+) w/out high school diploma • Persons (age 5+) who speak English "less than well"
Housing and Transportation	• Housing in structures w/ 10+ units • Mobile homes • Households with >1 persons per room • Households with no vehicle available • Persons in institutionalized group quarters
Demographics	• Civilian noninstitutionalized population w/ disability • Single parent household w/ children under 18 • Persons age 65+ • Persons age 17-

Social Factors considered for calculating Adaptive Capacity

$$V = \sqrt{(AC - AC_{min})^2 + (WHP - WHP_{min})^2}$$

Formula for calculating overall vulnerability

[10] "A Social Vulnerability Index for Disaster Management - De Gruyter." https://www.degruyter.com/document/doi/10.2202/1547-7355.1792/html. Accessed 6 May. 2021.

- The resulting dataset is one where each row represents a census tract, its WHP, Adaptive Capacity, Overall Vulnerability, and accompanying census tract data used to calculate Adaptive Capacity.

Tools Used

Affinity Designer and Keynote were used to create the infographic-style visuals, Tableau was used to conduct exploratory data analysis and create the interactive visuals, and Github Pages was used to create the website (the Jekyll web theme was used).

Results

Usability Testing Overview

To evaluate our designs, we conducted usability tests with the goal of gauging how well the visualizations achieved their primary objectives of (1) educating users on what social factors affect wildfire vulnerability and (2) how these social factors affect vulnerability. The study of social factors in the context of wildfires is relatively nascent, leading to frameworks and terminology that can be esoteric in nature. Therefore, the focus of our usability study (and our visualizations as a whole) stayed on more fundamental goals of comprehension.

We conducted usability tests with three participants. The usability tests were carried out and recorded over Zoom. Each session lasted 35 - 40 minutes, and participants shared their screens while examining a series of visualizations on a website. We began each session by asking participants about their experience with information visualization, how often they looked at information visualizations, and their interest in learning about wildfires. We then provided participants with six brief tasks and asked them to think out loud while completing them. After each task, the test facilitator asked participants four questions. One of these questions was task specific while the other three sought to elicit information about what participants liked or disliked about each design; their reasons for liking or disliking something; and the questions they had after viewing each visualization. As participants completed each task, the notetaker captured quantitative data about task performance such as task time to completion as well as qualitative data from the participant's think-aloud or question responses.

Results

Quantitative Measures

The figures below show the time spent on each task, the number of questions asked on each, as well as the average and standard deviation for those values for each task.

For the time spent on task, we found that Task 2, 3, and 4 were the most time consuming on average, while Tasks 1, 2, and 6 were less time consuming. Note that the timing for P1 was measured differently from the measurements of P2 and P3 due to a logistical error on our part, explaining the lower time measurements for P1. This introduces bias into our analysis, but even when we view the timings of P2 and P3 only, we find the same tasks have the longest and shortest average times.

Time Spent on Task (in minutes)

	P1	P2	P3	Average Time	St. Dev.
Task 1	.25	1.5	2.43	1.39	1.09
Task 2	1	3	4.62	2.87	1.81
Task 3	1	2.67	3	2.22	1.07
Task 4	.5	3	4.37	2.62	1.96
Task 5	.5	3.5	.89	1.63	1.63

Task 6	1.75	1	.89	1.21	0.47

In terms of the number of questions asked by task, we found that tasks 3 and 4 had the highest number of questions asked on average, followed by Tasks 2 and 5, and then Tasks 1 and 6. Although Task 3 and 4 had the same number of questions on average, Task 3 may have been more confusing in general, since it was more consistently questioned by all participants compared to Task 4.

Number of Questions Asked by Participants

	P1	P2	P3	Average	St. Dev
Task 1	1	1	1	1	0
Task 2	2	2	1	1.67	0.58
Task 3	3	2	3	2.67	0.58
Task 4	2	6	0	2.67	3.06
Task 5	1	2	2	1.67	0.58
Task 6	2	1	0	1	1

Qualitative Measures

Task 1: First Impression of Site

All participants correctly identified the general topic of the site (considering social factors in evacuation planning), but they also raised interesting questions as part of their responses. P1 was curious about why we were focusing on evacuation planning specifically as opposed to other aspects of wildfire preparedness or response. P3 wondered about the current state of evacuation planning and expressed a desire for more background information about this topic. They also provided useful suggestions such as including a more succinct summary of the purpose of the site as part of the introduction.

Task 2: Visualizations Explaining How Social Factors Affect Evacuation, Damage and Recovery

All participants accurately reported the social vulnerabilities that were cited in our visualization. They especially liked the iconography used to represent different types of housing because they found it to be “clear,” and they could easily see the “quality of the homes” through the illustrations. One participant noted that a stronger connection could be made between socioeconomic status as represented by housing type and social vulnerability. Another participant wondered if other social factors that were not shown in the visualization might play a role in increasing vulnerability to wildfire.

Task 3: Social Factors Relating to Adaptive Capacity

All participants were able to interpret the scatterplots showing relationships between different social vulnerability metrics and overall vulnerability to wildfire, but were not able to fully explain two concepts related to these charts: adaptive capacity and overall vulnerability. They also expressed confusion about what the dots represented and the meaning of some of the labels on the y-axis.

Task 4: County-Level View of WHP, Adaptive Capacity, and Overall Vulnerability

All participants identified that these maps showed different risk metrics of the same counties. They also noted the severity of these metrics based on the color legend provided. However, they were not consistently able to determine that Overall Vulnerability (the rightmost chart) was a combination of the two other metrics. They also seemed to indicate confusion on what the differences were between the three metrics. One participant did not realize that a tool-tip could be used to identify each county and its corresponding metric value. All participants also expressed curiosity about how each of these metrics were calculated.

Task 5: Census Tract-Level View of WHP, Adaptive Capacity, and Overall Vulnerability

Two out of the three participants recognized that these visualizations showed data at a more granular level (i.e., census-tract level). The other participant was unaware of what census tracts were and was thus not able to identify this. Similar to Task 4, all participants did not successfully articulate how WHP combined with Adaptive Capacity generates Overall Vulnerability.

Task 6: Find the Overall Vulnerability of Alameda County using the Statewide Interactive Map

Two out of the three participants were able to properly filter the map to Overall Vulnerability and then use the tool-tip to identify the correct value. The other participant started their search using the census-tract level map (making it difficult to identify Alameda County) and did not recognize the filter that changes the value from WHP to Overall Vulnerability. None of the participants utilized the Search bar to find Alameda County. This section also defined the terms of WHP, Adaptive Capacity, and Overall Vulnerability very explicitly, which all participants found to be helpful.

Revisions based on Usability Testing Results

Based on the results of our usability testing, we identified five major takeaways to guide revisions to our designs.

Provide More Contextual Clarity / Background Information

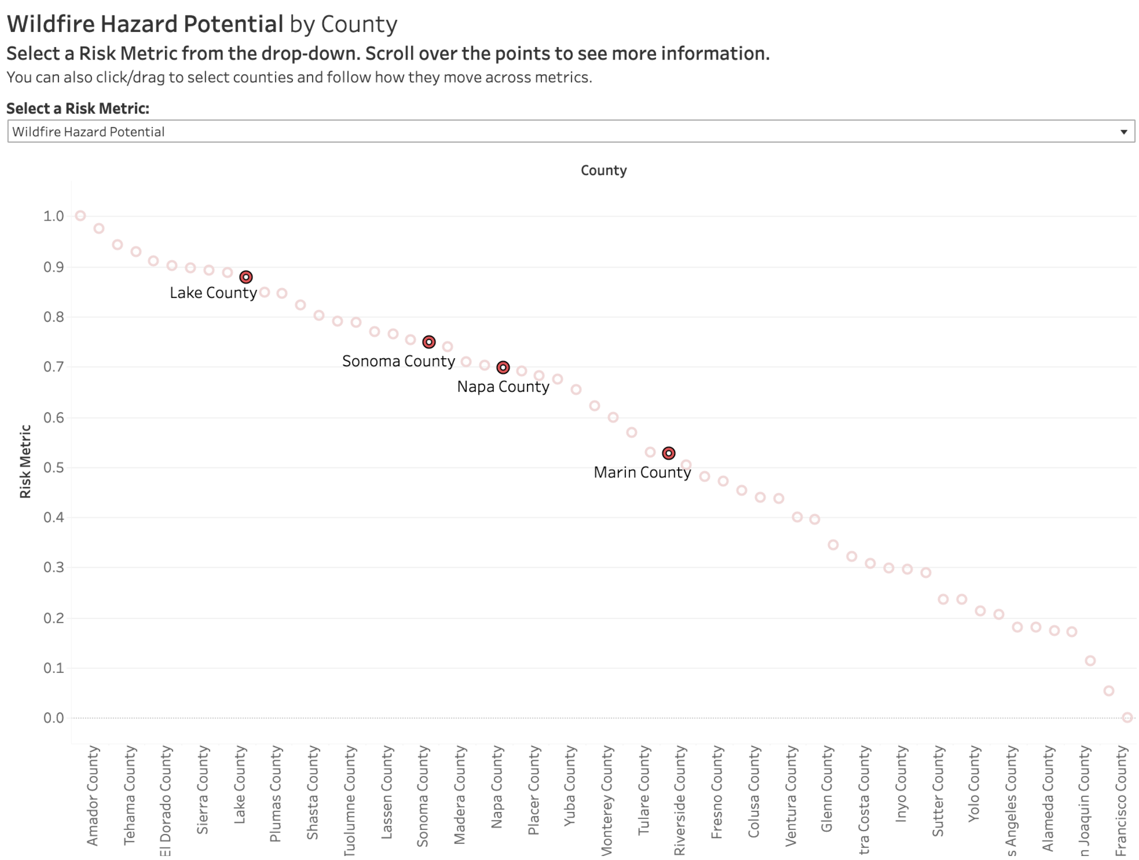
Given the questions raised by participants in response to the first task, we included more background information about the current state of evacuation planning in California in the site's introduction. This provides additional context for the decision to focus on this aspect of wildfire response and helps explain the importance of considering social factors in emergency response.

Define Terminology Earlier

We defined Wildfire Hazard Potential, Adaptive Capacity, and Overall Vulnerability earlier in the visualization (e.g., prior to showing the map visualizations) so that interpreting the map visualizations was easier. We also visualized the relationship between these concepts through the use of icons and simplified formula.

Clearly Indicate the Interactive Elements within Visualizations

Although all participants had previous experience using Tableau to create their own visualizations, there were still instances during the usability tests when they failed to notice opportunities for interaction such as the use of tooltips to find more information or modifying filters to identify a particular view. To address this, we described the range of interactions more explicitly in the text preceding visualizations with interactive component and incorporated feedback from Professor Marti Hearst in re-evaluating our visualizations based on how well they conveyed the underlying ideas. This led to the creation of a new visualization in our design, which uses filters to animate the change across risk indices.



Simplify the Scatter Plots for Interpretability and Interactivity

In response to the high time taken and questions raised when interpreting the scatter plots, we re-evaluate the scatter plots in our original design and ultimately decided to remove them. Since social factors are a component in the calculation of overall vulnerability, the correlations between these metrics are unsurprising and not meaningful. Visualizing their relationship provided little new information to the reader and were more effectively communicated by explaining in text, the types of social factors included within adaptive capacity.

Minimize Erroneous / Accidental Interactions

During general navigation of the webpage, we found that all participants accidentally interacted with the Tableau visualizations (e.g., zoomed in while scrolling down the page) and/or thought they broke a visualization due to its slow loading time. To minimize these erroneous and unexpected interactions, we disabled visualization magnification and panning for visualizations that do not warrant such interactivity. To minimize slow loading times, we adjusted the datasets for each visualization such that only the bare minimum data relevant to the visualization is included.

Link to Demo and Software

The website is live and can be found at wildfiresvi.github.io.

The code, images, and data used for this visualization can be found in this GitHub repository. Note that the Tableau dashboards use filtered down versions of the original data found in the GitHub repository to optimize performance.

Team Responsibilities

Project Component	Sub Component	Mandy	Andrew

Data Preparation	Data Sourcing	100%	0%
	Data Preprocessing	0%	100%
Visualizations	Infographic-Style Components	60%	40%
	Interactive Visualizations	20%	80%
	Web Development	0%	100%
User Testing	Test Design	100%	0%
	Recruitment	50%	50%
	Findings Analysis	60%	40%
Report Writing		60%	40%
Average Contribution		**50%**	**50%**