



# **Key Opportunities and Challenges for Community Investment in Community Disaster Resilience Zones**

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## Executive Summary

Disaster resilience requires proactive measures, yet many Community Disaster Resilience Zones (CDRZs)—areas identified by the Federal Emergency Management Agency (FEMA) as highly vulnerable due to economic, environmental, and social factors—lack the resources to build resilient infrastructure. When disasters strike these zones, the impacts are devastating, often resulting in severe infrastructure failure, public health crises, and exorbitant recovery costs. In addition, CDRZs usually suffer from limited aid from governmental sources.

SPIN Global, a public benefit corporation dedicated to disrupting disasters and reducing the suffering they cause, seeks to identify opportunities for impact investing. SPIN Global is looking to invest between \$100 million and \$50 billion in resilience projects that both improve disaster resilience and provide economic opportunities to marginalized communities. This report aims to assist SPIN Global in identifying unmet categorical needs that private equity can address using resources such as FEMA’s CDRZ designations.

The report focuses on identifying challenges and opportunities for resilience investment in wildfire. Wildfire was chosen as the natural disaster to study as it is the most common type of natural disaster in the states with the highest numbers of CDRZs. In addition, the report applies the developed methodology to four counties containing CDRZs located in different states from different areas of the country with a high or relatively high risk for wildfire on FEMA’s National Risk Index (NRI). Counties containing CDRZs in these states were then given a composite score based on their NRI wildfire risk, expected annual loss from wildfire, social vulnerability, and community resilience. The counties chosen to study using the developed measure were Elmore County, Idaho, Gila County, Arizona, Los Angeles County, California, and Miami-Dade County, Florida.

The methodology developed includes the creation of four policy matrices and a scoring system to identify challenges and opportunities for wildfire resilience investment. The first matrix examines the legislative and policy landscape. This element evaluates regulations and policies aimed at preventing wildfire, such as fire-resistant building codes, zoning regulations, utility preparedness, and forest management. Assessing the legislative and policy environment is critical because robust regulations enhance wildfire prevention, improve community preparedness, and create a favorable foundation for resilience investments.

The second matrix evaluates the economic landscape. This element looks at a county’s finances, economic health, current investment in wildfire resilience, and the state of the insurance market. Looking at economic factors in the context of private investing is crucial because it helps predict whether the county has the financial capacity to repay debt and sustain investments while building wildfire resilience.

The third matrix evaluates the degree of community voice integration. This element examines how a county incorporates community voice and engagement into its current strategy to mitigate wildfire risk and build resilience. Considering community voice is helpful in deciding on resilience investments because it can help predict whether local needs and knowledge will shape community decision-making, which can lead to more equitable and effective outcomes.

The fourth matrix assesses current infrastructure investment opportunities to improve a county's resilience to wildfire, focusing on transportation, water, energy, and health infrastructure. Addressing infrastructure needs is critical in the context of resilience investments because the continuity of essential services during disasters helps to accelerate recovery efforts.

Each county of interest is given a score for each of the policy matrices that indicates the degree to which the county has met the criteria for that policy area. A final composite score, which consists of the county's mean score for the four policy areas combined is used as an indication of how favorable the county is for resilience investment.

While the analysis on this report focuses on identifying challenges and opportunities for wildfire resilience in counties containing CDRZs, the methodology developed in this paper can also be used for considering investment in non-CDRZ counties as well. In addition, the developed methodology can be adapted to explore resilience investments related to other types of natural disasters. However, this would require adapting the legislative and policy and infrastructure policy matrices to reflect the hazard-related needs of the natural disaster under consideration.

Since the methodology developed in this report is data-driven, lack of data availability can limit the applicability of some of the matrices in some cases. While most of the information used in the analysis of the selected CDRZ counties was easily accessible, there were a few instances where it was difficult or not possible to find the required information for the policies matrix from publicly available sources on the internet. Particularly, this applied to the community voice policy matrices for Miami-Dade County, where lack of information made it impossible to evaluate the county in that area. However, information regarding the legislative and policy landscape of the counties was uniformly available through publicly available sources and seemed to be the most robust of the measures in this regard. As a result, difficulties in obtaining information may result in scores that do not accurately reflect the actual conditions for wildfire resilience investments.

This report outlines a structured, data-driven framework for evaluating private investments to enhance disaster resilience in counties containing CDRZs, focusing on wildfire threats in high and relatively high NRI risk communities. The methodology created employs scoring matrices to systematically assess legislative, communal, economic, and infrastructural factors, enabling a holistic evaluation of resilience-building opportunities. The findings aim to guide SPIN Global's Community Disaster Resilience Fund in making strategic, sustainable investments that improve disaster preparedness in marginalized communities.

## Project Team Members

The project team is composed of the following four members:



**Facundo Pibida** is pursuing his Master of Public Policy with a concentration in international development. He brings experience in economic policy analysis and international development to the project. He has completed internships with the Organization of American States' Department for Effective Public Management, the Wilson Center's Latin American Program, and the Niskanen Center's Immigration Policy Department.

**Hannah Markus** is pursuing her Masters of Public Policy, with a concentration in health policy. She brings experience in community and national advocacy, health policy analysis, and project management experiences to this project. She serves as Special Assistant within Maryland Medicaid's Office of Innovation, Research, and Development.



**Sarah Gimont** is pursuing her Masters of Public Administration with a concentration in environmental policy at the George Washington University Trachtenberg School of Public Policy. She brings experience in federal affairs related to environment, climate, and disaster recovery policy to the project. She currently serves as the Associate Government Relations Director at a nonprofit focused on climate adaptation.

**Yolanda D. Heman-Ackah** is a joint degree candidate at The George Washington University Trachtenberg School of Public Policy and Law School, pursuing a M.P.P. and J.D. degree. She also is an M.D. voice surgeon. In addition to her courses in law and policy, she has taken courses at Trachtenberg in emergency disaster management and brings this subject matter expertise to the project.



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## **Project Rationale**

### **Problem Statement**

Disaster resilience requires a proactive approach that can be costly to implement. Additionally, disaster hazard management has traditionally been reactive because of the unpredictable nature of hazard occurrence. Community Disaster Resilience Zones (CDRZs) are federally defined areas of the country that are at or above the 65th percentile for low income or are at the 90th percentile for loss risk for agriculture, building, and population loss, energy cost, disease, housing cost, legacy pollution, transportation barriers, wastewater discharge, and poverty. These loss risks limit the ability of CDRZs to build a resilient infrastructure through their own local resources.

Consequently, when a CDRZ faces a disaster hazard, the destruction created by the hazard may result in loss of life, the inability of medical facilities to efficiently or effectively care for the infirm, failure of power and utility infrastructure resulting in long periods of power loss, lack of heat, and inability to cook for the community, worsening living conditions for community residents, contamination of water sources, the limited availability of potable water, exposure of the community to water borne illnesses, and exorbitant costs of rebuilding and restoring the community to functional levels. Governmental sources of aid to communities for use in building resilience are limited.

### **Objectives**

The purpose of this project is to identify hazards and threats associated with a disaster type that threatens CDRZs, identify infrastructure enhancements that may improve resilience of a community to that disaster hazard, create a methodology for assessing CDRZs level of resilience to that disaster and for determining whether the legislative, economic, and community engagement environments are favorable for infrastructure investments aimed at improving resilience of the community to the disaster.

### **Research Questions**

The specific research questions to be answered are:

1. What natural disaster has the highest threat risk to counties identified by FEMA as containing CDRZs?
2. Within the counties identified by FEMA as containing CDRZs and that are at high or relatively high risk for that disaster, can counties be ranked based on their social vulnerability, resilience, risk, and an estimated annual loss to identify those with the least resilience?
3. Can a methodology for assessing challenges and opportunities for investment be created that incorporates an evaluation of a community's legislative and policy initiatives that relate to resilience to the identified hazard?
4. Can a methodology for assessing challenges and opportunities for investment be created that incorporates an evaluation of a community's economic landscape that identify its favorability for investment in resilience to the identified hazard?

5. Can a methodology for assessing challenges and opportunities for investment be created that incorporates an evaluation of a community's integration of community voice that may enhance investment in resilience to the identified hazard?
6. Can a methodology for assessing challenges and opportunities for investment be created that incorporates an evaluation of a community's opportunities for infrastructure investment that may enhance the community's resilience to the identified hazards?

## Background

### SPIN Global Project Request

This report was requested by SPIN Global, a public benefit corporation focused on reducing the physical, social, and economic suffering caused by disasters.<sup>1</sup> While SPIN Global has primarily worked to 'disrupt disasters' by providing a suite of consulting services, it has recently launched a new Community Disaster Resilience Fund to build resilience in underserved communities.

Through the Fund, SPIN Global will invest private capital into public benefit projects that both improve disaster resilience and provide economic opportunities to marginalized communities. The Fund was established to address the fact that most communities do not have the funds available to build much needed resilient infrastructure and that the government funding currently available is inadequate and difficult to access.

Low-income and marginalized communities in the United States (U.S.) also often have difficulty seeking federal or state funds as they often do not have the resources to identify, apply for, or manage a grant or loan.<sup>2</sup> Yet, there is a need to build resilient infrastructure in the U.S. quickly and proactively.

SPIN Global aims to address these challenges through the Community Disaster Resilience Fund. Through the Fund, SPIN Global will invest between \$100 million to \$50 billion in resilience projects in underserved communities. This level of funding has the potential to be transformational, given that the total available funding for the FEMA Building Resilience Infrastructure and Communities (BRIC) grant program, which is one of the largest resilience grant programs at the federal level, is only \$1 billion annually.<sup>3</sup>

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<sup>1</sup> SPIN Global. (n.d.). *Why We Exist*. Retrieved from SPIN Global: [https://www.spinglobal.org/#why\\_we\\_exist](https://www.spinglobal.org/#why_we_exist).

<sup>2</sup> Bast, C., Argento-McCurdy, H., & Hoffman, E. (2024, Jan 4). *4 Ways the Federal Government Can Enhance Technical Assistance to States and Cities*. Retrieved from Center for American Progress: <https://www.americanprogress.org/article/4-ways-the-federal-government-can-enhance-technical-assistance-to-states-and-cities/#:~:text=Existing%20federal%20technical%20assistance%20infrastructure,and%20local%20government%20are%20left>.

<sup>3</sup> Federal Emergency Management Agency. (2024, September 9). *Fiscal Year 2023 Notices of Funding Opportunities for Hazard Mitigation Assistance Grants*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/grants/mitigation/learn/notice-funding-opportunities/bric-fma/fy2023-nofo#:~:text=For%20this%20grant%20cycle%2C%20%24800,Communities%20\(BRIC\)%20grant%20program](https://www.fema.gov/grants/mitigation/learn/notice-funding-opportunities/bric-fma/fy2023-nofo#:~:text=For%20this%20grant%20cycle%2C%20%24800,Communities%20(BRIC)%20grant%20program).



As SPIN Global considers what projects to invest in through the Fund, it has asked George Washington University Trachtenberg School of Public Policy and Public Administration students to assist in identifying unmet categorical needs that private equity can address using resources such as FEMA's CDRZ designations.

## **Project Approach**

To fulfill SPIN Global's request and to answer the research questions, this report develops a decision matrix to help guide investment in counties that encompass CDRZs. In developing the matrix, the report examines the opportunities and challenges to investing private capital in these areas through the lenses of the legislative and regulatory environment, economic environment, infrastructure projects, and the value of community voice. It then creates a scoring system based on these metrics in relation to disaster resilience. To narrow the scope of the project to ensure feasibility within the time frames, the report focuses the matrix on wildfire resilience. The decision to choose wildfire is explained further in the methodology section of this report.

The report additionally attempts to apply the matrix to four counties that are vulnerable to wildfire in order to test its utility. The four counties are Elmore County, Idaho, Gila County, Arizona, Los Angeles County, California, and Miami-Dade County, Florida. These counties were selected via a process outlined in the methodology section of this report. Challenges to applying the matrix to Miami-Dade County, Florida are discussed. After applying the matrix to the four selected counties, the report discusses the results of the application, including associated limitations.

## **The Definition of Resilience**

As this report examines the concept of resilience and methods to increase resilience within the limited context of wildfire hazards, it is important to first define resilience. Resilience is a complex concept with many different definitions and uses. This project will take FEMA's definition of resilience, which was outlined in the Agency's recently released National Resilience Guidance:

“Resilience is the ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions.”<sup>4</sup>

This definition, as detailed in the National Resilience Guidance, represents a holistic vision of resilience that incorporates a resilient people, society, economy, and built and natural environment. Further, in the guidance, FEMA stresses that resilience includes not just disaster recovery and response, but also prevention, protection, and mitigation. This project takes a similar, all-encompassing view of resilience.

## **Importance of Wildfire Resilience**

Since 2000, wildfires have destroyed tens of thousands of structures and impacted 2,000 communities in states across the country. They can also alter natural landscapes, which leads to post-fire hazards such as

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<sup>4</sup> Federal Emergency Management Agency. (2024, August). *National Resilience Guidance: A Collaborative Approach to Building Resilience*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_national-resilience-guidance\\_august2024.pdf](https://www.fema.gov/sites/default/files/documents/fema_national-resilience-guidance_august2024.pdf).

flooding, erosion, and debris flow which can negatively impact water systems, community infrastructure, and public safety. Wildfire smoke also poses negative health effects, with short-term exposure resulting in such respiratory and cardiovascular issues.<sup>5</sup> Additionally, wildfires are expected to increase in frequency, size, and severity in the coming years due to issues associated with climate change. Further, wildfire suppression and reactive rehabilitation after a wildfire has occurred is expensive, with costs nationwide estimated to be tens or even hundreds of billions of dollars.<sup>6</sup> Given that wildfires are only expected to increase in frequency, size, and severity in the coming years, it is critical to build resilience to wildfire in order to protect public health and safety as well as the built and natural environment.<sup>7</sup>

## Identifying Communities to Invest in

### Community Disaster Resilience Zones

As suggested by SPIN Global, this paper uses CDRZs as the initial frame of analysis to determine eligible communities to invest in. The aim of the CDRZ program is to build resilience by driving public and private investment to disadvantaged communities most vulnerable to natural hazards.<sup>8</sup>

The program was established in the Community Disaster Resilience Zones Act of 2022 (P.L. 117-225, CDRZA), which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act to require FEMA to identify and designate communities most vulnerable to natural hazards as CDRZs. The Act requires that the 50 census tracts with the highest individual risk ratings be designated as CDRZs.<sup>9</sup> It also instructs FEMA to account for geographic balance when designating CDRZs, requiring that coastal, inland, urban, suburban, rural, and Tribal areas be taken into consideration. Additionally, CDRZs must include at least 1 percent of census tracts with the highest risk rating in each state.<sup>10</sup> CDRZ designations last for five years and FEMA must review and update designations every five years.<sup>11</sup>

FEMA announced the designation of the first 483 CDRZs in September 2023.<sup>12</sup> To identify these initial CDRZs, FEMA used the National Risk Index (NRI) and the Climate and Economic Justice Screening

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<sup>5</sup> U.S. Environmental Protection Agency. (n.d.). *Health Effects Attributed to Wildfire Smoke*. Retrieved from U.S. Environmental Protection Agency: <https://www.epa.gov/wildfire-smoke-course/health-effects-attributed-wildfire-smoke>.

<sup>6</sup> Wildland Fire Mitigation and Management Commission. (2023, September). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. Retrieved from U.S. Department of Agriculture: <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>7</sup> Wildland Fire Mitigation and Management Commission. (2023, September). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. Retrieved from U.S. Department of Agriculture: <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>8</sup> Federal Emergency Management Agency. (2023, November 27). *Community Disaster Resilience Zones*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/partnerships/community-disaster-resilience-zones>.

<sup>9</sup> Federal Emergency Management Agency. (2023, November 27). *Community Disaster Resilience Zones*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/partnerships/community-disaster-resilience-zones>.

<sup>10</sup> 42 U.S.C. §5136.

<sup>11</sup> 42 U.S.C. §5136.

<sup>12</sup> Federal Emergency Management Agency. (2023, September 6). *FEMA Designates First Communities to Receive Targeted Assistance for Hazards Resilience*. Retrieved from Federal Emergency Management Agency:

Tool (CEJST), two national level datasets that identify communities at risk of natural hazards and climate impacts.<sup>13</sup>

The NRI is discussed in further detail below. The CEJST, developed and maintained by the Council on Environmental Quality (CEQ), is a publicly-available, interactive dataset and tool that identifies communities experiencing burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.<sup>14</sup>

## The National Risk Index

This report also leverages the NRI to identify counties on which to focus. The NRI, developed and maintained by FEMA in collaboration with other public and private stakeholders, is a publicly-available, interactive dataset and tool that identifies the communities across the country most at risk for 18 natural hazards. To determine risk, the NRI employs a risk equation made up of three components: expected annual loss, social vulnerability, and community resilience.<sup>15</sup>

## Selection of Disaster to Study

In choosing the disaster to study, it was decided that the natural disaster that is associated with the highest risk in states with the most CDRZs would be chosen. In choosing this disaster, the research was begun by first analyzing the NRI for each natural disaster that affects the 50 states and the District of Columbia.<sup>16</sup> The disasters are rated on the NRI on a five-point scale from Very High Risk to Very Low Risk of occurring based on geographical region at both the County level and the Census Tract level. The list of natural disasters rated on the NRI is shown in Table 1.

An evaluation was made of the states with the most census tracts and counties at risk for all disasters, beginning with an analysis of which states had the most FEMA designated CDRZs.<sup>17</sup> See Figure 1. California, Texas, and Florida are the states with the most FEMA designated CDRZs.<sup>18</sup> See Figure 2. California and Florida are the states most at risk for all disasters.<sup>19</sup> See Figures 3 and 4. Wildfire is the

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<https://www.fema.gov/press-release/20230906/fema-designates-first-communities-receive-targeted-assistance-hazards>.

<sup>13</sup> Federal Emergency Management Agency. (2023, September 6). *FEMA Designates First Communities to Receive Targeted Assistance for Hazards Resilience*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/press-release/20230906/fema-designates-first-communities-receive-targeted-assistance-hazards>.

<sup>14</sup> Council on Environmental Quality. (n.d.). *Climate and Economic Justice Screening Tool: About*. Retrieved from Climate and Economic Justice Screening Tool: <https://screeningtool.geoplatform.gov/en/about>.

<sup>15</sup> FEMA. (n.d.). *National Risk Index: Determining Risk*. Retrieved September 29, 2024, from: FEMA.gov <https://hazards.fema.gov/nri/determining-risk>.

<sup>16</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from: <https://hazards.fema.gov/nri/map#>.

<sup>17</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

<sup>18</sup> Kaufman, L. (2023, September 6). FEMA Names Nearly 500 U.S. Communities as "Resilience Zones". *Bloomberg*. Retrieved September 29, 2024, from <https://www.bloomberg.com/news/articles/2023-09-06/nearly-500-us-communities-named-resilience-zones-by-fem>.

<sup>19</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

natural disaster with the greatest risk in these states. *See* Figures 5-9. An analysis was then made of the natural disasters with the highest risk in the states with the most CDRZs. Wildfire is the disaster with the highest NRI in the states with the most FEMA designated CDRZs. *See* Figure 10. Wildfire was then chosen as the disaster for study.

**Table 1. Natural Disasters Listed in FEMA National Risk Index.<sup>20</sup>**

Avalanche	Heat wave	Strong wind
Coastal flooding	Hurricane	Tornado
Cold wave	Ice storm	Tsunami
Drought	Landslide	Volcanic activity
Earthquake	Lightning	Wildfire
Hail	Riverine flooding	Winter weather

### Selection of CDRZs to Study

After it was decided that wildfire would be the disaster of interest, the CDRZs to be evaluated were then selected. The decision was made to choose CDRZs from states within different regions of the country where there are large areas of the state that rank relatively high or high for wildfire risk on FEMA's NRI and who have a moderate to high number of CDRZs within the state.<sup>21, 22</sup> California, Florida, Arizona, and Washington were the states chosen based on these criteria.

Because CDRZs are census tracts within a county and because a single county can have more than one designated CDRZ, the decision was then made to choose a CDRZ county from each of these states that scored the worst among the other CDRZs within the state in the areas of wildfire risk (Figure 5), expected annual loss from wildfire (Figure 11), social vulnerability (Figure 12), and community resilience (Figure 13), based on the scores given to the corresponding CDRZ county by FEMA (Figure 14).<sup>23</sup> The scores were ranked on a scale of 1 to 5, with a score of very high in wildfire risk, expected annual loss, and social vulnerability was rated as 1, relatively high as 2, relatively moderate as 3, relatively low as 4, and very low rated as 5. For community resilience, a rating of very low was given a score of 1, relatively low a score of 2, relatively moderate a score of 3, relatively high a score of 4, and very high a score of 5.

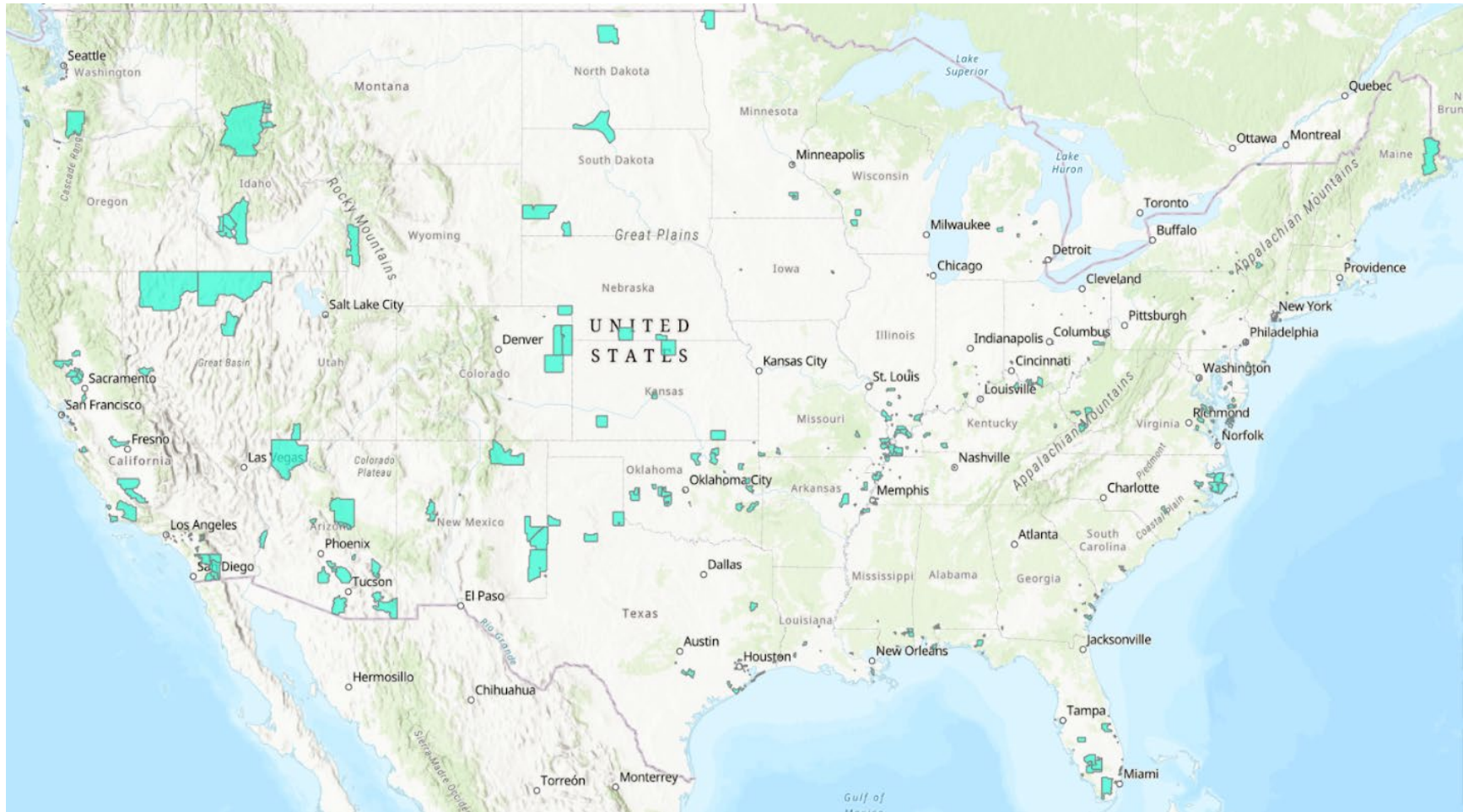
<sup>20</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

<sup>21</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

<sup>22</sup> Kaufman, L. (2023, September 6). FEMA Names Nearly 500 U.S. Communities as "Resilience Zones". *Bloomberg*. Retrieved September 29, 2024, from <https://www.bloomberg.com/news/articles/2023-09-06/nearly-500-us-communities-named-resilience-zones-by-fema>.

<sup>23</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

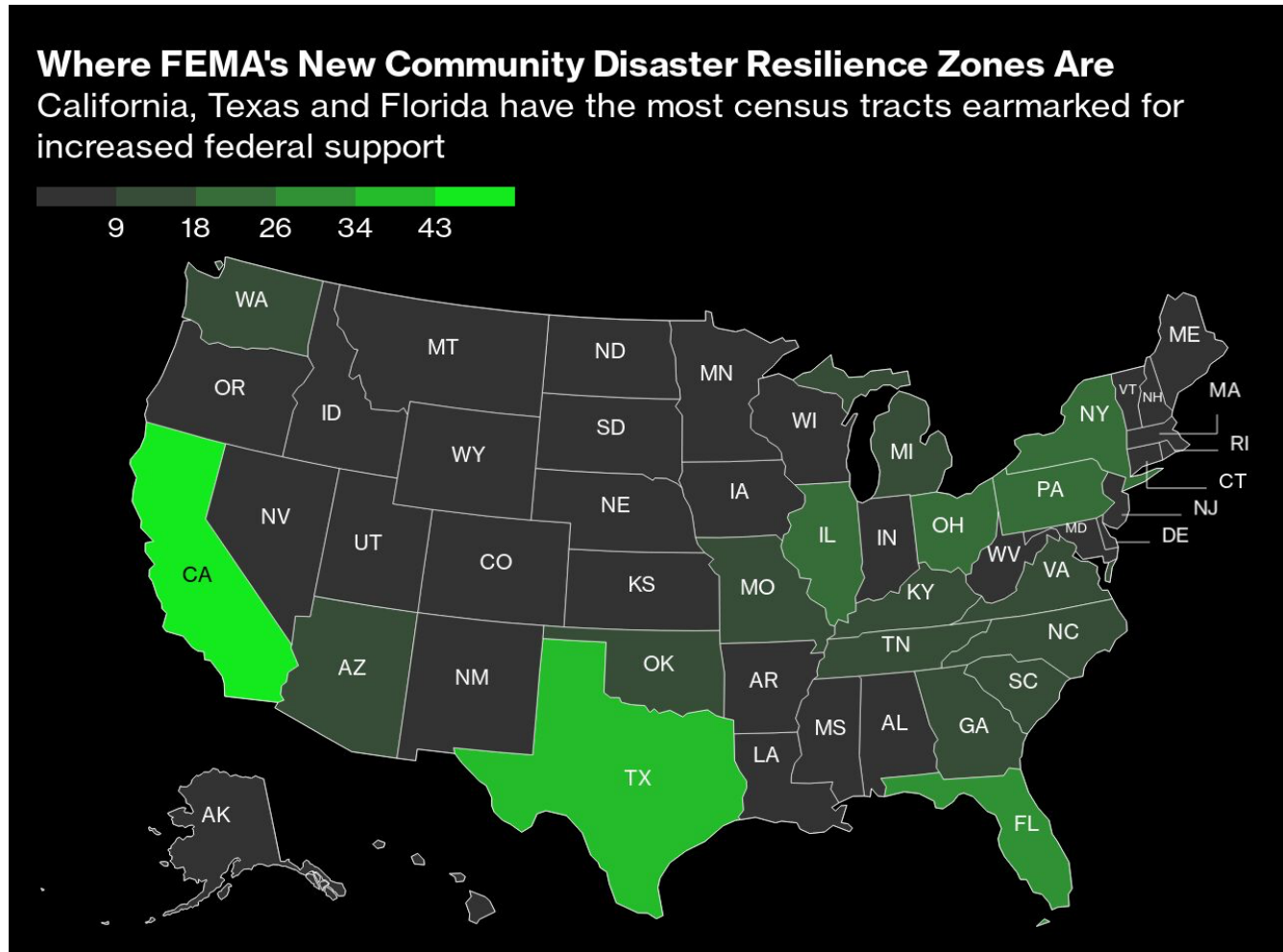
**Figure 1. FEMA Community Disaster Resilience Zones.**<sup>24</sup>



CDRZ census tracts are in green.

<sup>24</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

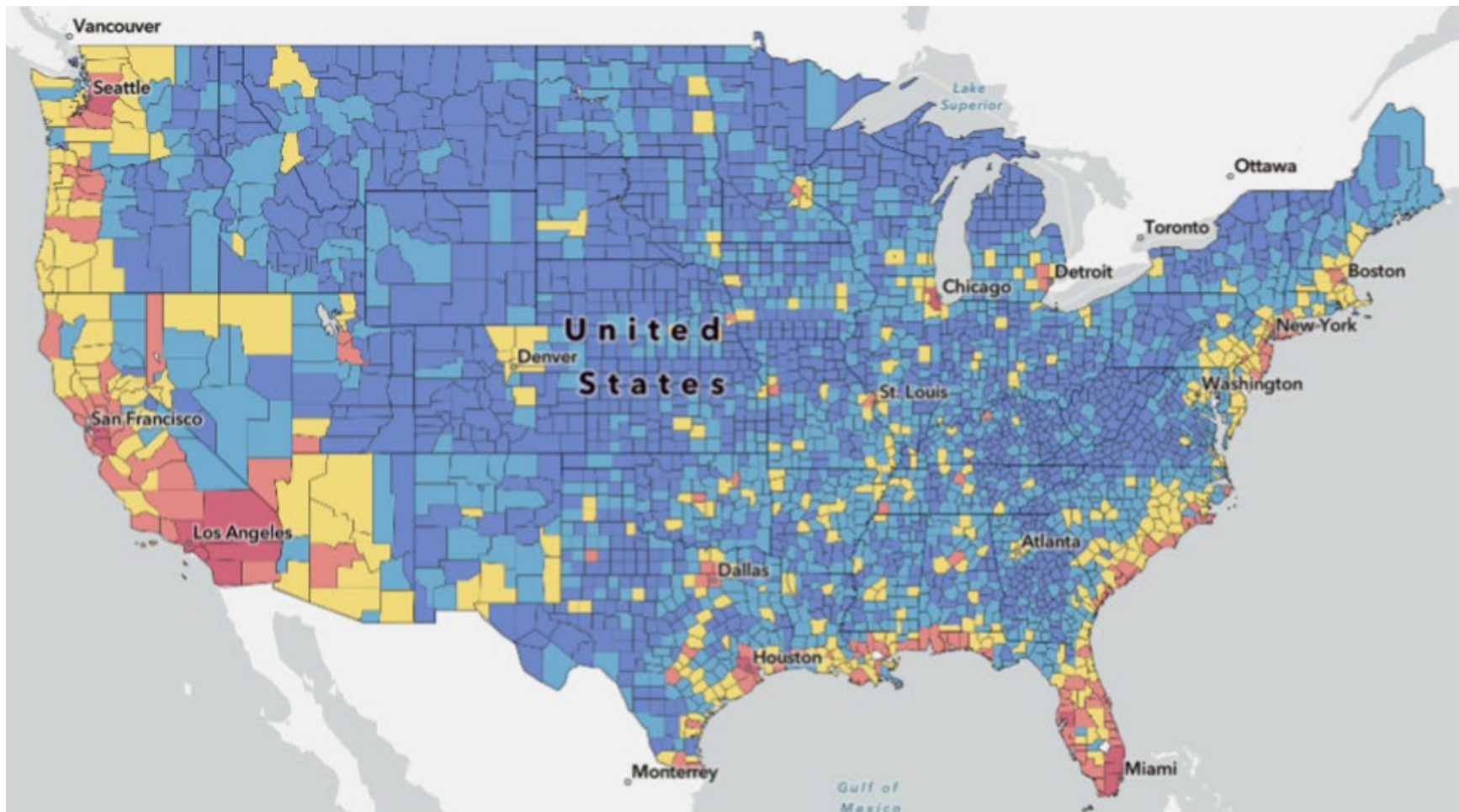
**Figure 2. States With the Most CDRZ Designations.**<sup>25</sup>



<sup>25</sup> Kaufman, L. (2023, September 6). FEMA Names Nearly 500 U.S. Communities as "Resilience Zones". *Bloomberg*. Retrieved September 29, 2024, from <https://www.bloomberg.com/news/articles/2023-09-06/nearly-500-us-communities-named-resilience-zones-by-fema>.

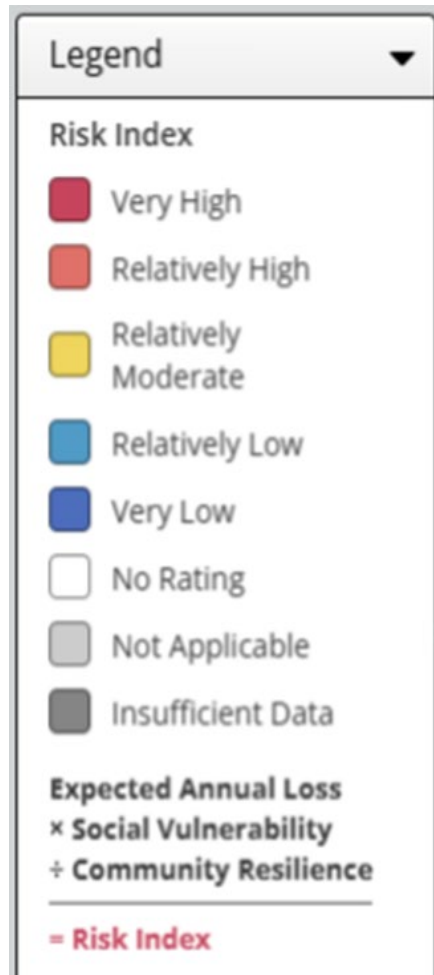


**Figure 3. FEMA National Risk Index – All Natural Disasters.**<sup>26</sup>



<sup>26</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

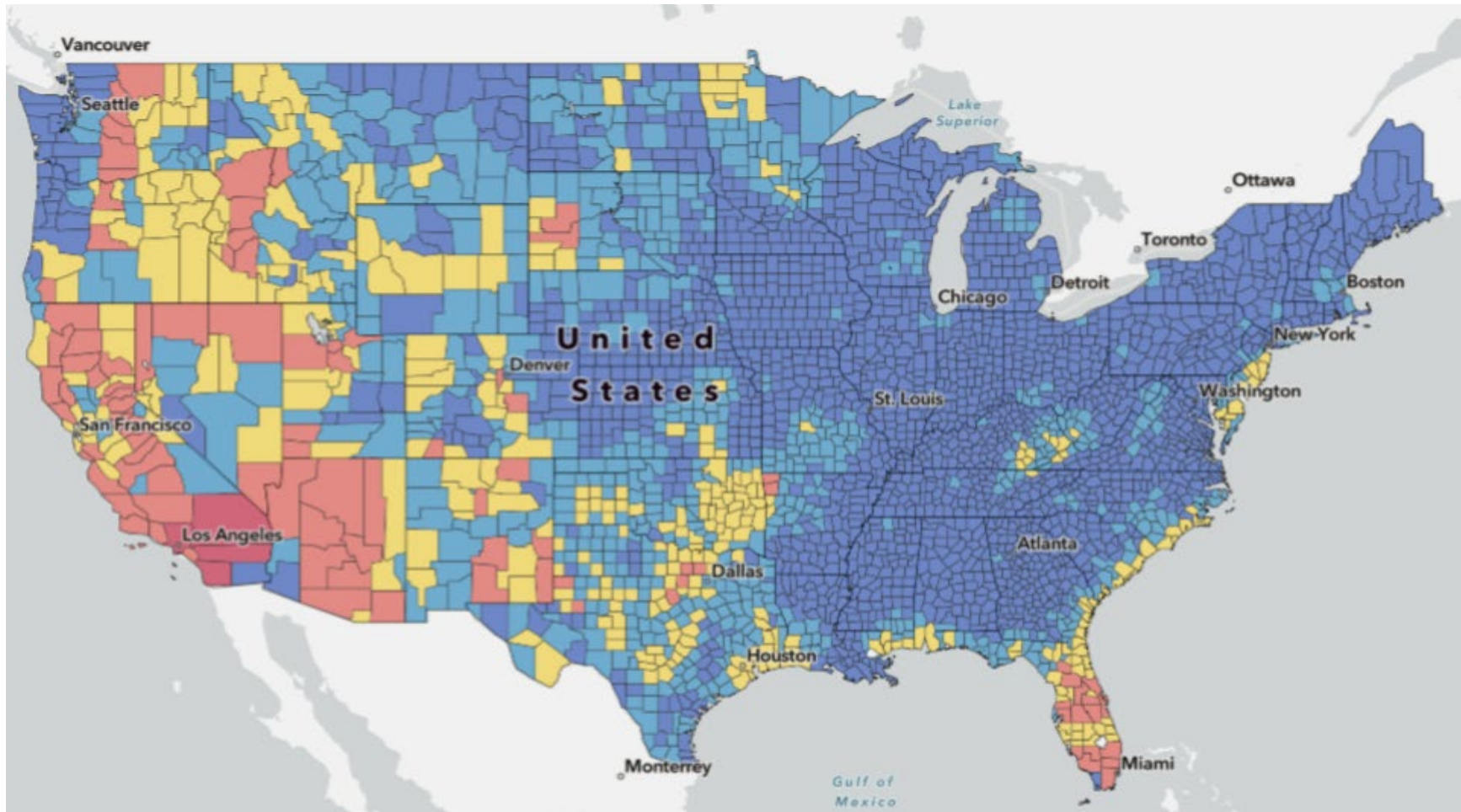
**Figure 4. Legend for FEMA National Risk Index Maps.**<sup>27</sup>



<sup>27</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

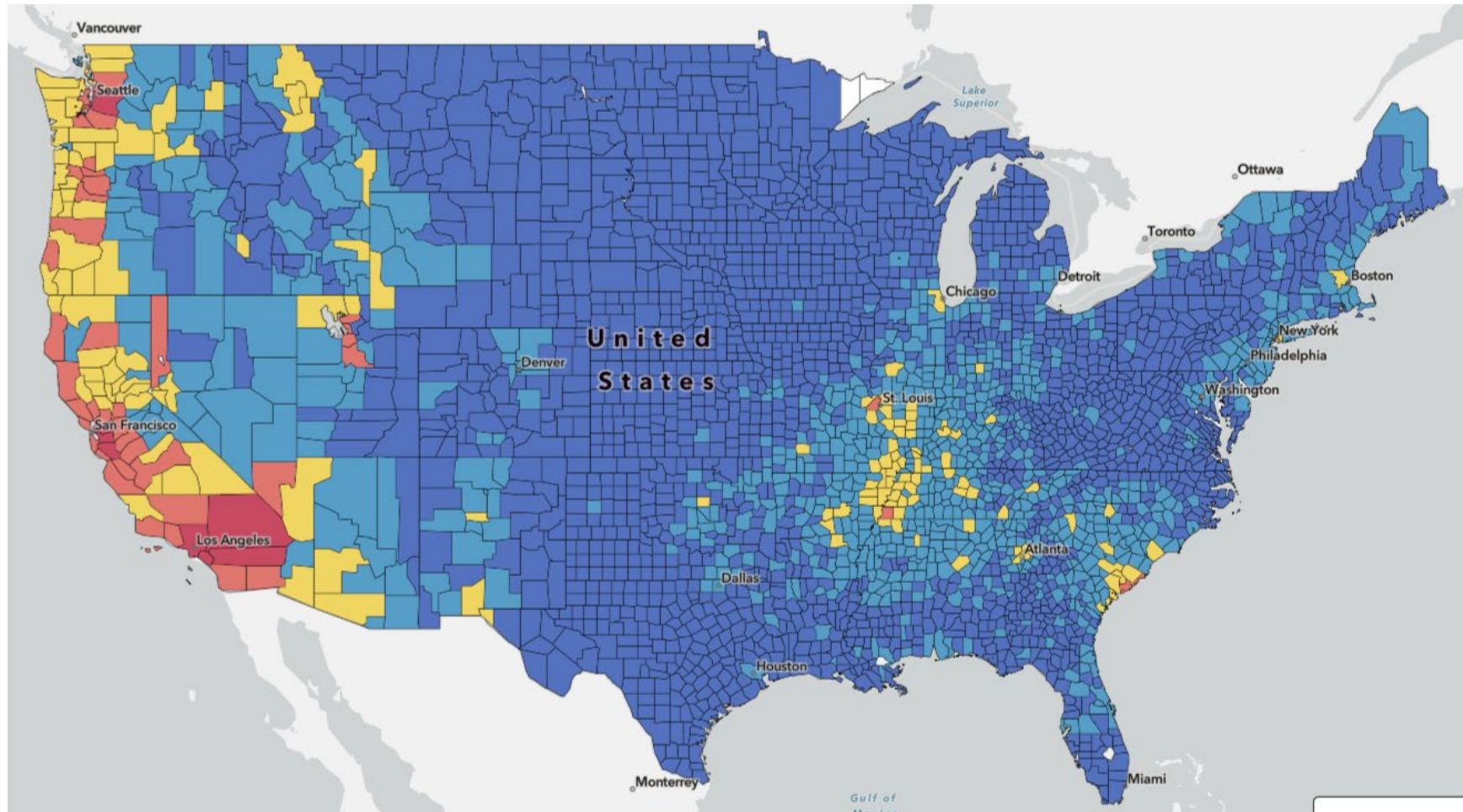


**Figure 5. FEMA National Risk Index for Wildfire Risk.**<sup>28</sup>



<sup>28</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

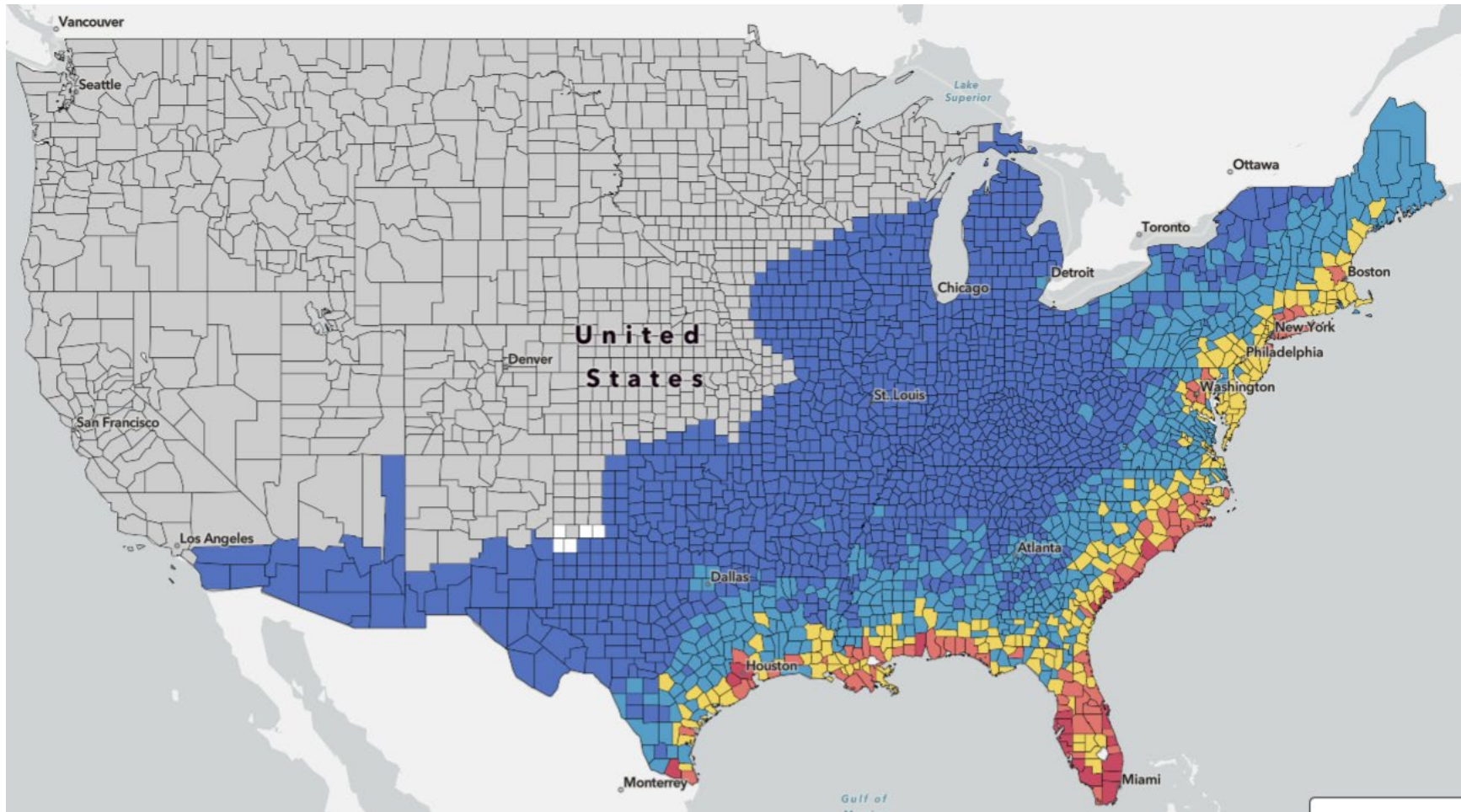
**Figure 6. FEMA National Risk Index for Earthquake.**<sup>29</sup>



<sup>29</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

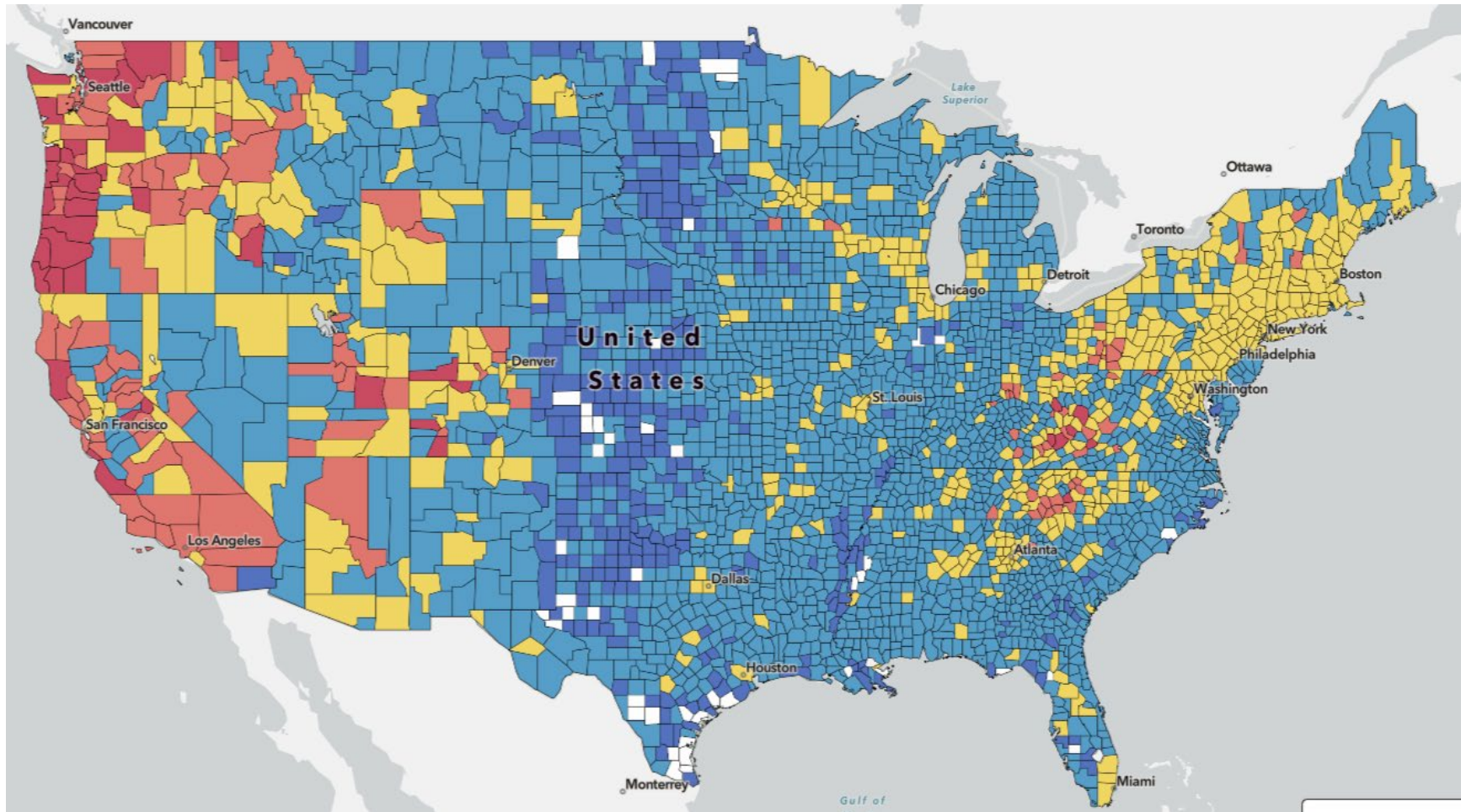


**Figure 7. FEMA National Risk Index for Hurricane.**<sup>30</sup>



<sup>30</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

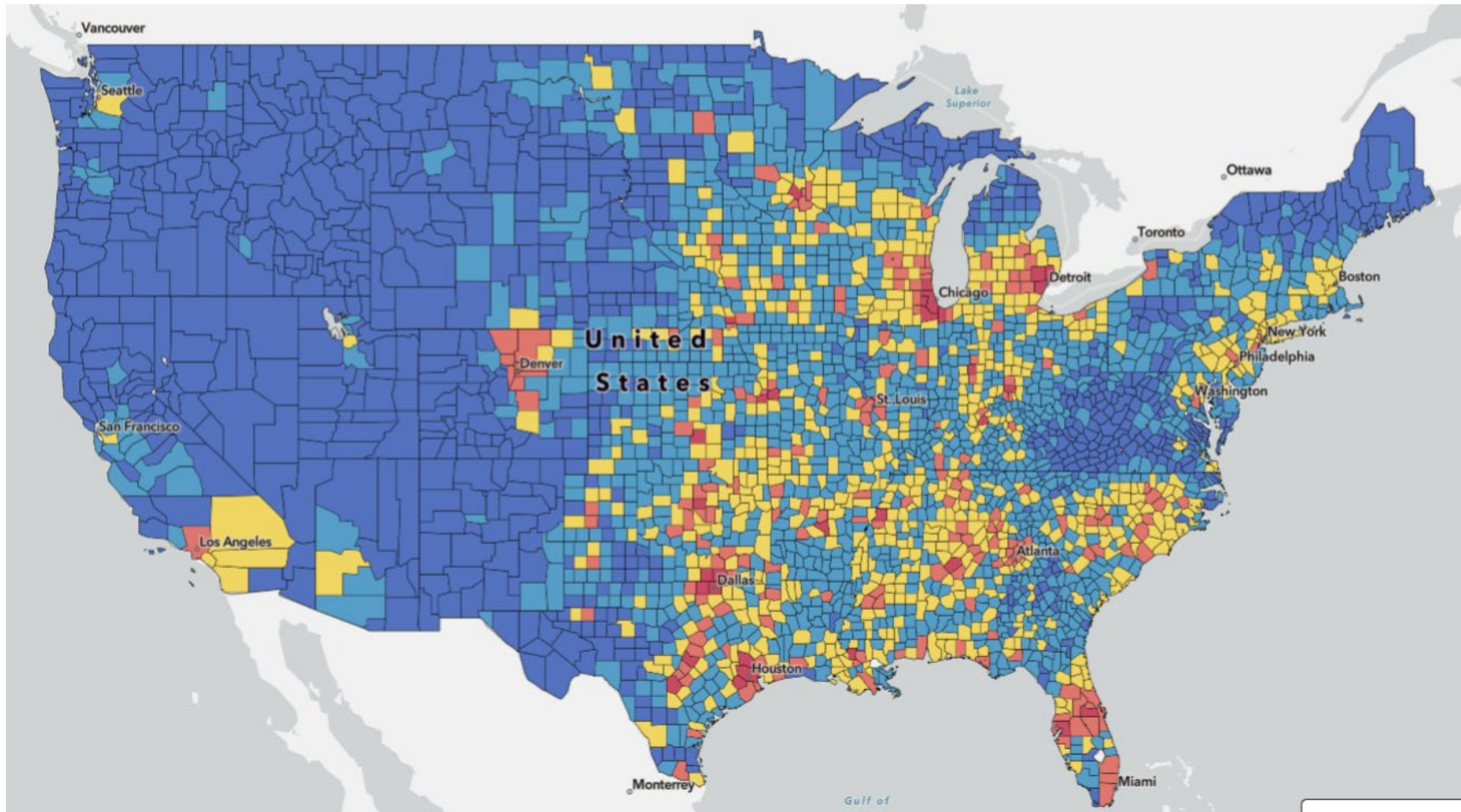
**Figure 8. FEMA National Risk Index for Landslide.<sup>31</sup>**



<sup>31</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

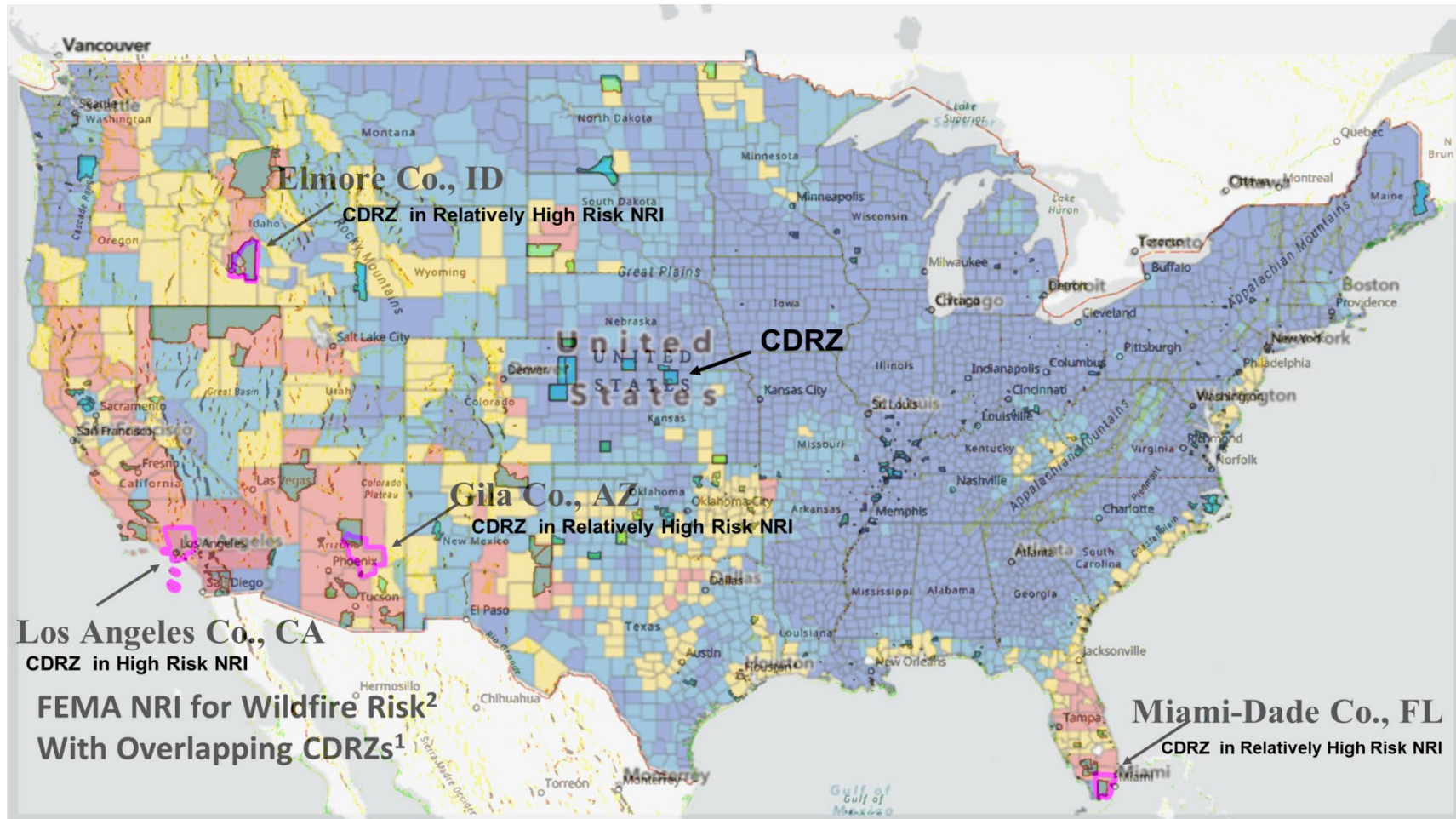


**Figure 9. FEMA National Risk Index for Tornado.**<sup>32</sup>



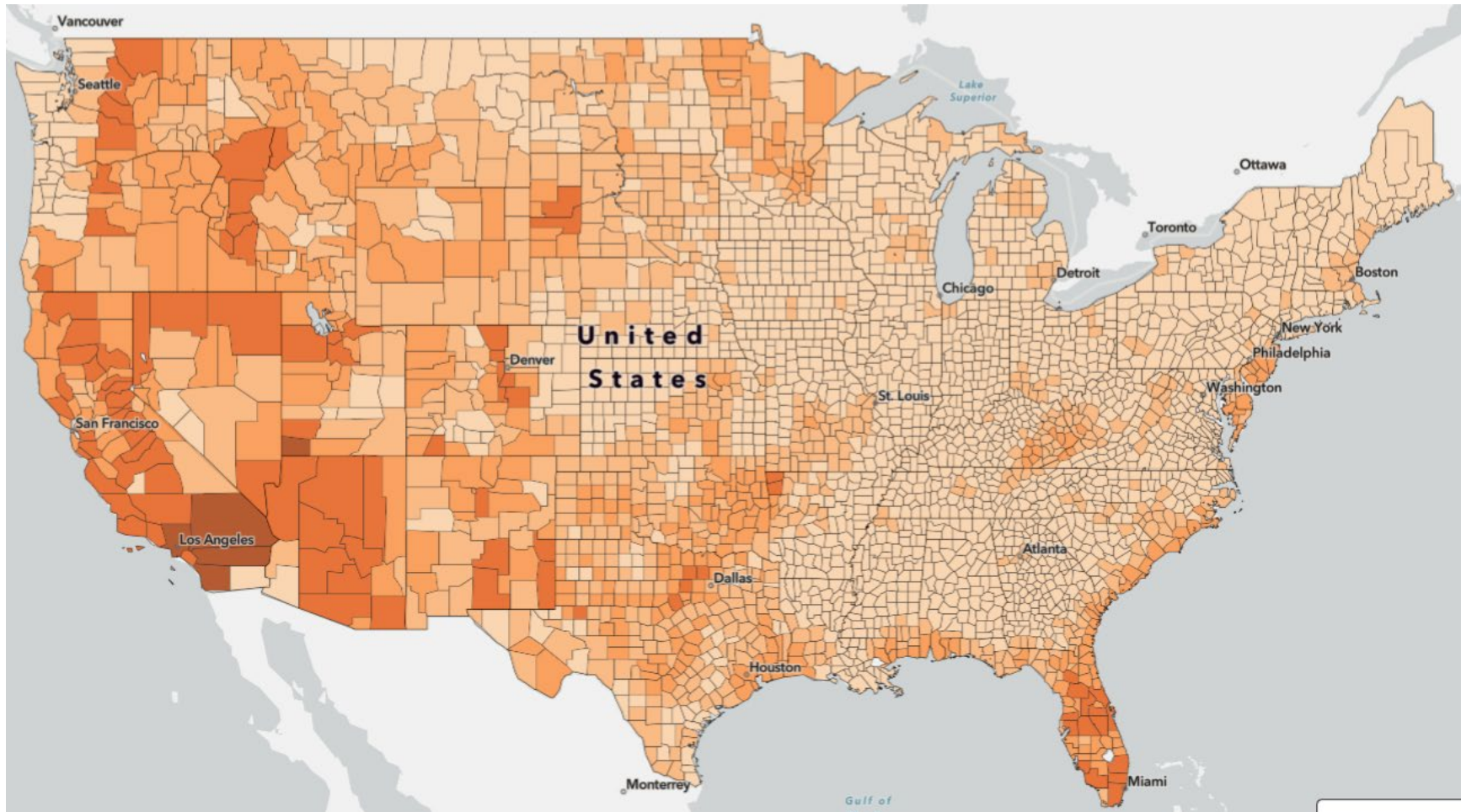
<sup>32</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

Figure 10. Overlay of CDRZs and Wildfire NRI Map.



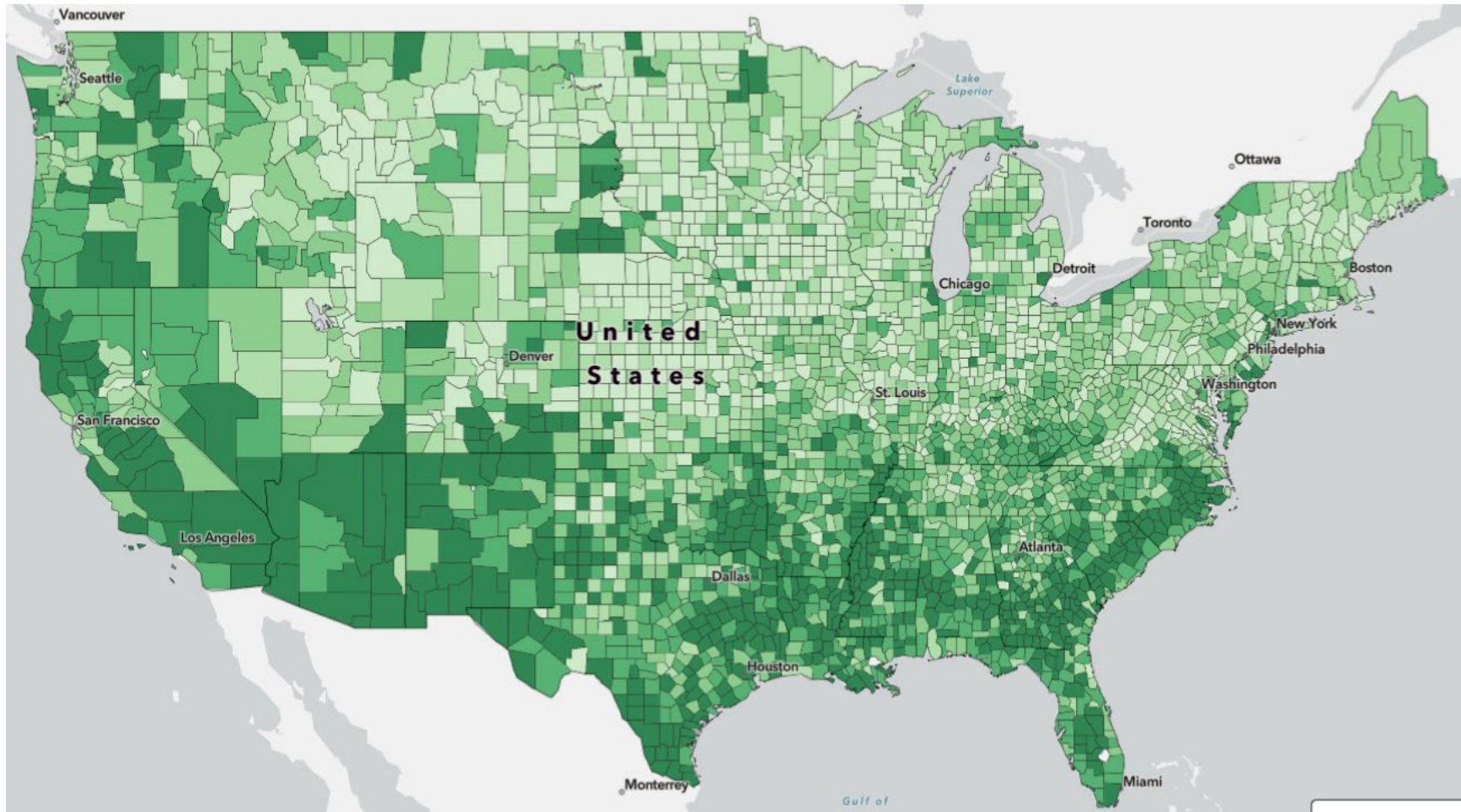


**Figure 11. FEMA Expected Annual Loss from Wildfire Index.<sup>33</sup>**



<sup>33</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

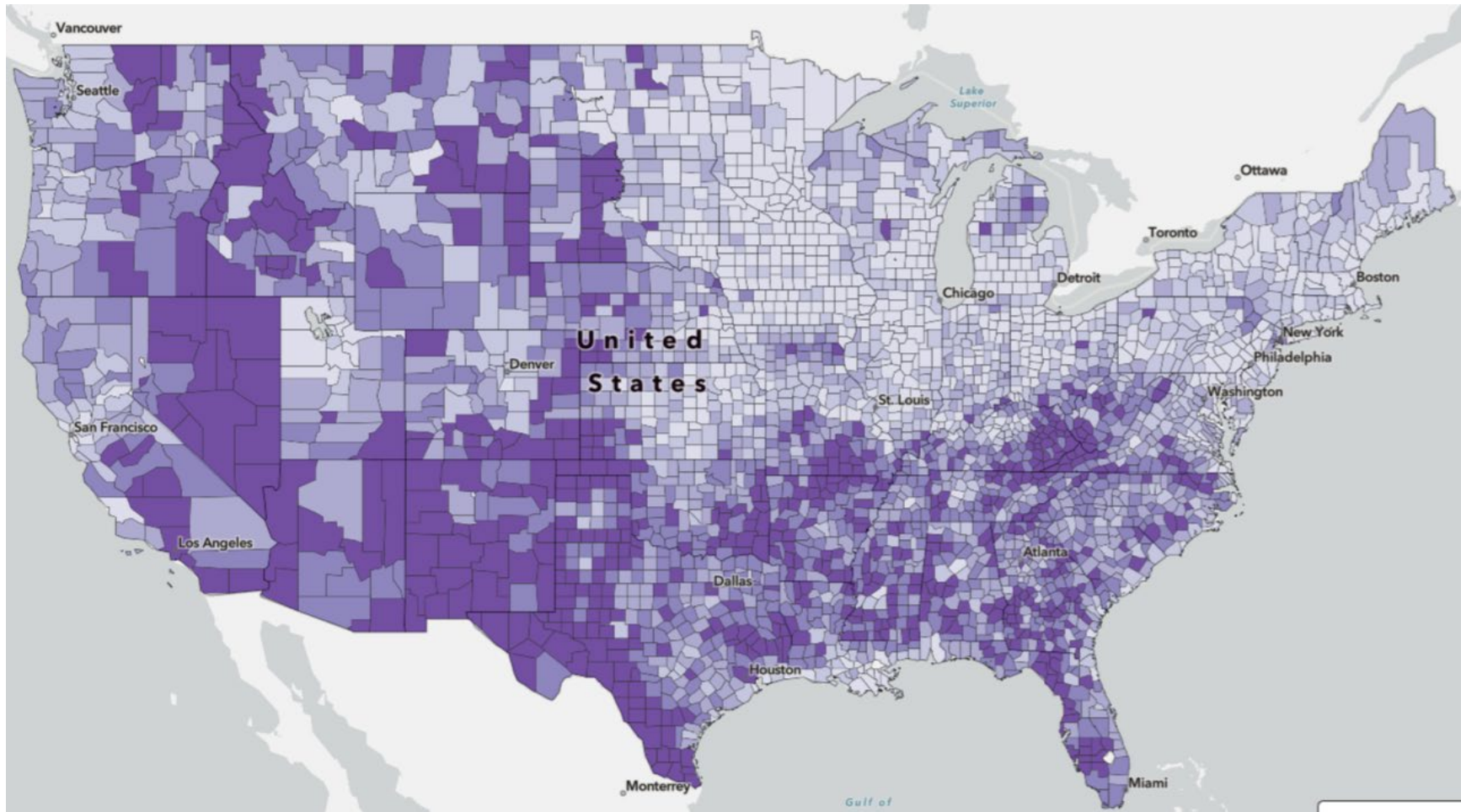
**Figure 12. FEMA Social Vulnerability Index.**<sup>34</sup>



<sup>34</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

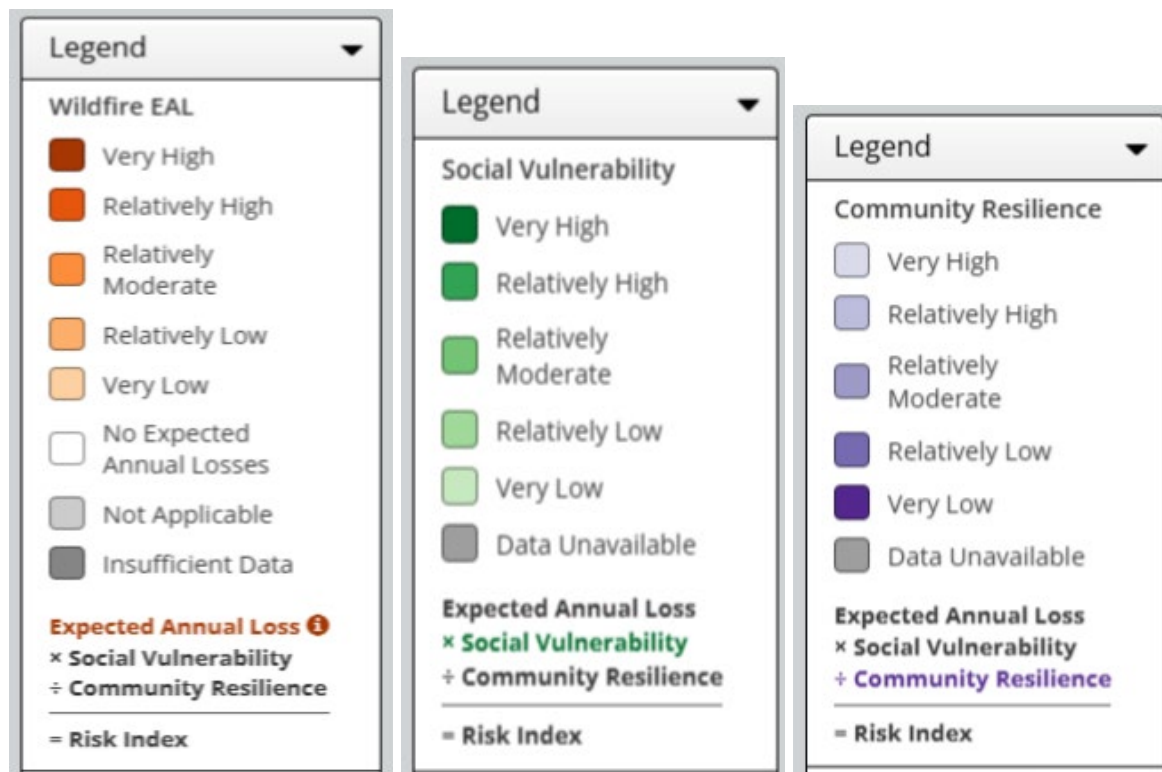


**Figure 13. FEMA Community Resilience Index.**<sup>35</sup>



<sup>35</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

**Figure 14. FEMA Legends for Expected Annual Loss from Wildfire, Social Vulnerability Index, and Community Resilience Index.**<sup>36</sup>



### Composite Scores for Ranking Counties with CDRZs

A composite score equal to the sum of each score on wildfire risk, wildfire estimated annual loss, social vulnerability, and community resilience was given to each CDRZ county such that a composite score of 0 to 4 signifies a very low resilience, 5 to 8 a relatively low resilience, 9 to 12 a relatively moderate resilience, 13-16 a relatively high resilience, and 17-20 a high resilience.

CDRZs with a composite resilience score of very low to relatively low were chosen for study. If two CDRZ counties tied for the lowest composite score within their state, then the county that had the highest CDRZ population was chosen as the county of interest for study. If none of the CDRZs within the chosen state had a composite score for wildfire resilience that was low or very low, then another state in that region of the country with a relatively high or very high wildfire risk was chosen for study.

The composite resilience score and the individual scores for the CDRZ counties in each state chosen for study are shown in Tables 2-6. The counties chosen for study are designated in green, those with equivalent composite scores are designated in yellow.

<sup>36</sup> FEMA. *Hazards National Risk Index*. Retrieved September 29, 2024, from FEMA.gov: <https://hazards.fema.gov/nri/map#>.

## Arizona

Arizona has 15 CDRZs located within 9 counties. See Figure 15. Cochise, Gila, and Mohave Counties tied for the lowest Composite Resilience Score, each with a Composite Resilience Score of 6, relatively low resilience. See Table 2. Mohave County had one designated CDRZ, with a population of 3,187.<sup>37</sup> Gila County had two designated CDRZs, with populations of 2,431 and 5,371, total population for both CDRZs combined being 7802.<sup>38,39</sup> Cochise County had two designated CDRZs, with populations of 2,540 and 1,924, total population for both CDRZs combined being 4,464.<sup>40,41</sup> Because Gila County had the highest population in its two CDRZs, it was the chosen county for Arizona.

**Table 2. Scoring for Counties in Arizona with CDRZs.**

County	Wildfire Risk	Expected Annual Loss	Social Vulnerability	Resilience	Composite Score
Cochise	2	2	1	1	6
Coconino	2	2	1	3	8
Gila	2	2	1	1	6
Graham	3	3	1	2	9
La Paz	4	4	1	1	10
Mohave	2	2	1	1	6
Pima	2	2	1	2	7
Pinal	2	2	1	2	7

<sup>37</sup> Data Central. (2024). *How Many People Live in Census Tract 9501.01, Mohave County, Arizona*. Retrieved September 29, 2024, from 2020 Decennial Census: <https://data.indystar.com/census/total-population/white-population-change/census-tract-950101-mohave-county-arizona/140-04015950101/>.

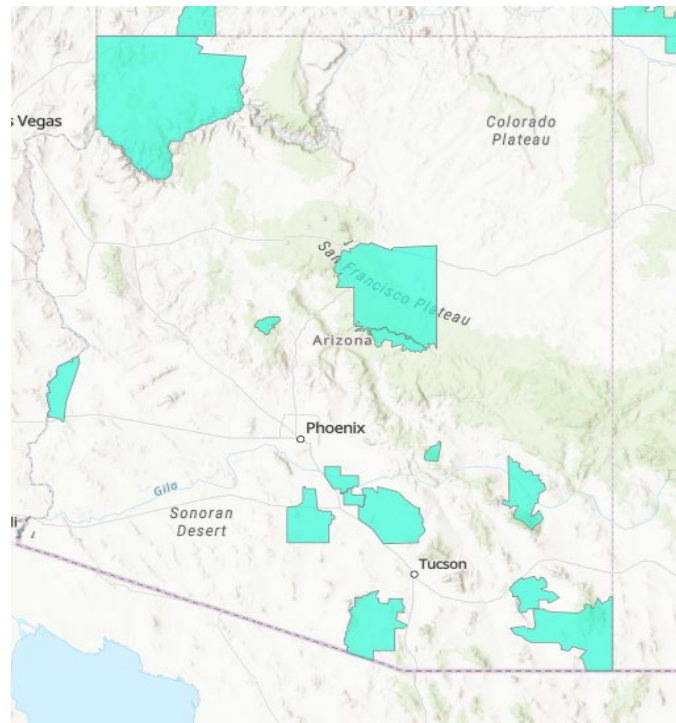
<sup>38</sup> Census Reporter Profile. (2022). *Census Tract 2, Gila, AZ*. Retrieved September 29, 2029, from American Community Survey 5-year estimates: <https://censusreporter.org/profiles/14000US04007000200-census-tract-2-gila-az/>.

<sup>39</sup> Census Reporter Profile. (2022). *Census Tract 12, Gila, AZ*. Retrieved September 29, 2024, from American Community Survey 5-year estimates: <https://censusreporter.org/profiles/14000US04007001200-census-tract-12-gila-az/>.

<sup>40</sup> Data Central. *How Many People Live in Census Tract 2.03, Cochise County, Arizona*. Retrieved September 29, 2024, from 2020 Decennial Census: <https://data.ydr.com/census/total-population/total-population-change/census-tract-203-cochise-county-arizona/140-04003000203/>.

<sup>41</sup> Data Central. *How Many People Live in Census Tract 5.01, Cochise County, Arizona*. Retrieved September 29, 2024, from 2020 Decennial Census: <https://data.courierpress.com/census/total-population/total-population-change/census-tract-501-cochise-county-arizona/140-04003000501/>.

**Figure 15. FEMA Designated CDRZs in Arizona.**<sup>42</sup>



CDRZ census tracts are in green.

## Washington

Washington has 12 CDRZs in 4 counties. None of the CDRZ counties had a Composite Resilience Score for wildfire in the very low or relatively low range. *See* Table 3. Thus, no CDRZs were chosen from Washington state. The decision was made to evaluate neighboring Idaho state instead. *See* Figure 16.

**Table 3. Scoring for Counties in Washington with CDRZs.**

County	Wildfire Risk	Expected Annual Loss	Social Vulnerability	Resilience	Composite Score
Skamania	4	3	4	2	13
Grays Harbor	5	5	1	3	14
Pierce	4	4	3	4	15
King	4	4	4	4	16

<sup>42</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

**Figure 16. FEMA Designated CDRZs in Washington.**<sup>43</sup>

CDRZ census tracts are in green.

## Idaho

Idaho has 8 CDRZs in 4 counties *See* Fig. 17. The lowest Composite Resilience Score for wildfire was 8, which was the score in both Idaho and Elmore Counties. *See* Table 4. Idaho county has one CDRZ with a population of 6,728.<sup>44</sup> Elmore County has 3 CDRZs, with populations of 3,033, 4,996, and 5,526, for a total CDRZ county population of 13,555.<sup>45</sup> Elmore County was chosen as the CDRZ county for Idaho.

**Table 4. Scoring for Counties in Idaho with CDRZs.**

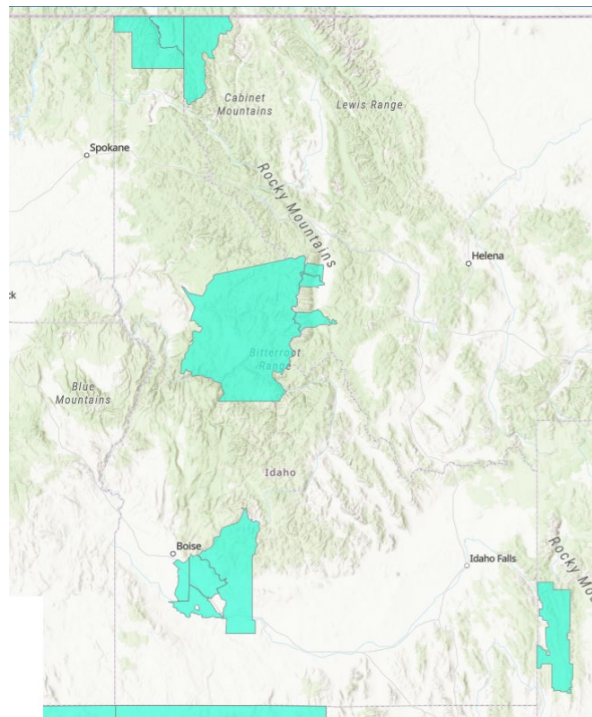
County	Wildfire Risk	Expected Annual Loss	Social Vulnerability	Resilience	Composite Score
Idaho	2	2	3	1	8
Ravalli	2	2	4	2	10
Elmore	2	2	2	2	8
Ada	2	2	5	5	14

<sup>43</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

<sup>44</sup> Census Tract 9601, Idaho County, Idaho. (n.d.). *Census Tract*. Retrieved September 29, 2024, from Data Commons: <https://datacommons.org/browser/geoId/16049960100>.

<sup>45</sup> Data Central. (n.d.). *How Many People Live in Census Tract 9604.01, Elmore County, Idaho*. Retrieved September 29, 2024, from 2020 Decennial Census: <https://data.lansingstatejournal.com/census/total-population/total-population-change/census-tract-960401-elmore-county-idaho/140-16039960401/>.



**Figure 17. FEMA Designated CDRZs in Idaho.**<sup>46</sup>

CDRZ census tracts are in green.

## California

California has forty-six (46) designated CDRZs in 18 counties and one Tribal reservation. *See* Figure 18. For the purposes of this paper, the Tribal reservation was not included in the analysis. Los Angeles County had the lowest Composite Resilience Score, 6, of all of the CDRZ counties in California, and it was chosen as the CDRZ county for California. *See* Table 5.

**Table 5. Scoring for Counties in California with CDRZs.**

County	Wildfire Risk	Expected Annual Loss	Social Vulnerability	Resilience	Composite Score
Alameda	3	2	3	5	13
Butte	2	2	1	4	9
Colusa	4	4	2	2	12
Kern	2	2	1	1	6
Los Angeles	1	1	1	1	4

<sup>46</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

## Key Opportunities and Challenges for Community Investment in Community Disaster Resilience Zones

Madera	2	2	1	1	6
Monterey	2	2	1	2	7
Morongo Reservation					0
Napa	3	3	2	4	12
Orange	2	2	3	1	8
Riverside	1	1	1	2	5
Sacramento	3	3	2	4	12
San Bernadino	1	1	1	3	6
San Diego	1	1	2	1	5
San Francisco	5	4	3	5	17
Santa Barbara	2	2	1	3	8
Santa Clara	2	2		4	8
Sutter	4	4	1	3	12
Yolo	4	4	2	4	14

**Figure 18. FEMA Designated CDRZs in California.**<sup>47</sup>



CDRZ census tracts are in green. Areas of northern California not in view have no CDRZs.

<sup>47</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

## Florida

Florida has 20 CDRZs in 14 counties. *See* Figure 19. The lowest Composite Resilience Score was 7, which was the score in both Hendry and Miami-Dade Counties. *See* Table 6. Hendry County had two CDRZs, with populations of 392 and 7,050 each, for a total CDRZ population of 7,442.<sup>48</sup> Miami-Dade County had 2 CDRZs, with populations of 5,640 and 6,813 each, for a total CDRZ population of 12,453.<sup>49, 50</sup> Because Miami-Dade County had the highest population in its CDRZs, it was the chosen CDRZ county for Florida.

**Table 6. Scoring for Counties in Florida with CDRZs.**

County	Wildfire Risk	Expected Annual Loss	Social Vulnerability	Resilience	Composite Score
Bay	4	4	3	2	13
Brevard	2	2	3	3	10
Broward	2	2	2	3	9
Charlotte	3	3	2	1	9
Collier	2	2	2	2	8
De Soto	3	3	1	1	8
Hendry	2	3	1	1	7
Hillsborough	2	2	2	3	9
Indian River	3	3	3	3	12
Martin	3	3	3	3	12
Miami-Dade	2	2	1	2	7
Palm Beach	2	2	2	2	8
St. Lucie	3	3	2	3	11
Washington	4	4	1	1	10

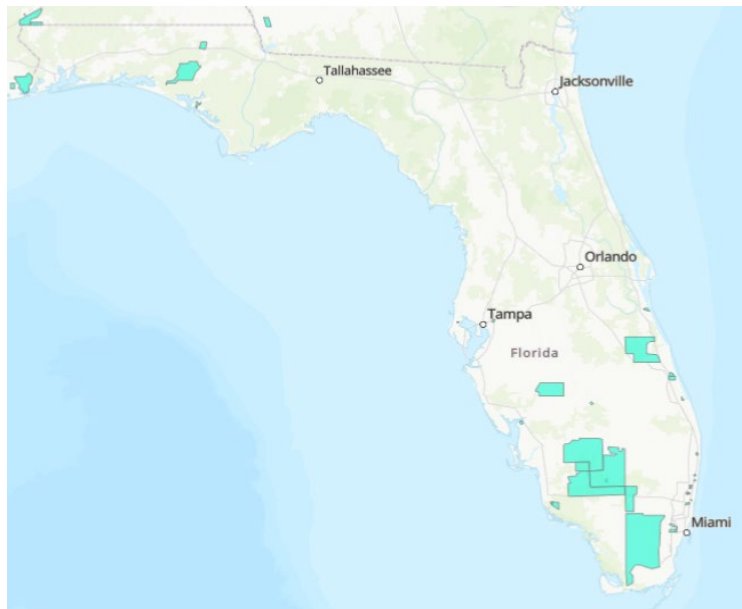
<sup>48</sup> Data Central. *How Many People Live in Hendry County, Florida*. Retrieved September 29, 2024, from 2020 Decennial Census: <https://data.reporternews.com/census/total-population/total-population-change/hendry-county-florida/050-12051/>.

<sup>49</sup> Data Commons. *Census Tract 115, Miami-Dade County, Florida*. Retrieved September 29, 2024, from Demographics: [https://datacommons.org/tools/timeline#&place=geoId/12086011500&statsVar=Count\\_Person](https://datacommons.org/tools/timeline#&place=geoId/12086011500&statsVar=Count_Person)

<sup>50</sup> Data Commons. *Census Tract 90.10, Miami-Dade County, Florida*. Retrieved 29 September, 2024, from Census Tract: <https://datacommons.org/browser/geoId/12086009010>.



**Figure 19. FEMA Designated CDRZs in Florida.**<sup>51</sup>



CDRZ census tracts are in green.

## Background on Selected CDRZ Counties

### Gila County, Arizona

Gila County is located in central Arizona and is the eleventh largest county in the state by total area, encompassing 4,757.6 square miles of land.<sup>52</sup> The county has experienced 24 wildland fires encompassing over 1,000 acres or costing more than \$1 million in the last decade. Additionally, First Street, a leading climate risk financial modeling firm, estimates that 99 percent of all properties in the county, including residential and commercial properties and social service and infrastructure facilities, are at risk of being affected by wildfire within the next 30 years.<sup>53</sup>

### Elmore County, Idaho

Elmore County is located in southwestern Idaho and is the sixth largest county in the state by total area, encompassing 3,075.1 square miles of land.<sup>54</sup> The county has experienced six major wildland fires in the last decade.<sup>55</sup> Additionally, First Street estimates that 99 percent of all properties in the county, including

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<sup>51</sup> FEMA. *Community Disaster Resilience Zone Viewer*. Retrieved September 29, 2024, from FEMA.gov: <https://experience.arcgis.com/experience/e3bb8cb79d124a0ca38a05e48afb6fd6/page/Community-Disaster-Resilience-Zone-Viewer/>.

<sup>52</sup> U.S. Census Bureau. (n.d.) *Gila County, Arizona*. Retrieved from U.S. Census Bureau: [https://data.census.gov/profile/Gila\\_County,\\_Arizona?g=050XX00US04007](https://data.census.gov/profile/Gila_County,_Arizona?g=050XX00US04007).

<sup>53</sup> First Street. (n.d.). *Does Gila County have Wildfire Risk?* Retrieved from First Street: [https://firststreet.org/county/gila-county-az/4007\\_fsid/fire](https://firststreet.org/county/gila-county-az/4007_fsid/fire).

<sup>54</sup> U.S. Census Bureau. (n.d.) *Twin Falls County, Idaho*. Retrieved from U.S. Census Bureau: [https://data.census.gov/profile/Twin\\_Falls\\_County,\\_Idaho?g=050XX00US16039](https://data.census.gov/profile/Twin_Falls_County,_Idaho?g=050XX00US16039).

<sup>55</sup> Elmore County. (n.d.). *Emergency Management*. Retrieved from Elmore County: <https://elmorecounty.org/emergency-management/>.

residential properties and social service and infrastructure facilities, are at risk of being affected by wildfire within the next 30 years.<sup>56</sup>

### **Los Angeles County, California**

Los Angeles County is located in southern California and is the eleventh largest county in the state by total area, encompassing 4,060.2 square miles of land.<sup>57</sup> The county has experienced 16 wildfires encompassing over 1,000 acres since 2016.<sup>58</sup> Additionally, First Street estimates that 39 percent of all properties in the county, including residential and commercial properties and infrastructure and social facilities, are at risk of being affected by wildfire within the next 30 years.<sup>59</sup>

### **Miami-Dade County, Florida**

Miami-Dade County is located in southern Florida and is the third largest county in the state by total area, encompassing 1,899.9 square miles of land.<sup>60</sup> Between 1988 and 2018, the county experienced 12 significant wildfires.<sup>61</sup> Additionally, First Street estimates that 25% of properties in the county, including residential and commercial properties and infrastructure and social facilities, are at risk of being affected by wildfires within the next 30 years.<sup>62,63</sup>

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<sup>56</sup> First Street. (n.d.). *Does Elmore County have Wildfire Risk?* Retrieved from First Street: [https://firststreet.org/county/elmore-county-idaho/16039\\_fsld/fire](https://firststreet.org/county/elmore-county-idaho/16039_fsld/fire).

<sup>57</sup> U.S. Census Bureau. (n.d.). *Los Angeles County, California*. Retrieved from U.S. Census Bureau: [https://data.census.gov/profile/Los\\_Angeles\\_County,\\_California?g=050XX00US06037](https://data.census.gov/profile/Los_Angeles_County,_California?g=050XX00US06037).

<sup>58</sup> California Department of Forestry and Fire Protection. (n.d.). *2024 Incident Archive*. Retrieved from California Department of Forestry and Fire Protection: <https://www.fire.ca.gov/incidents/2024>.

<sup>59</sup> First Street. (n.d.). *Los Angeles County Fire Factor*. Retrieved from: [https://firststreet.org/county/los-angeles-county-ca/6037\\_fsld/fire](https://firststreet.org/county/los-angeles-county-ca/6037_fsld/fire).

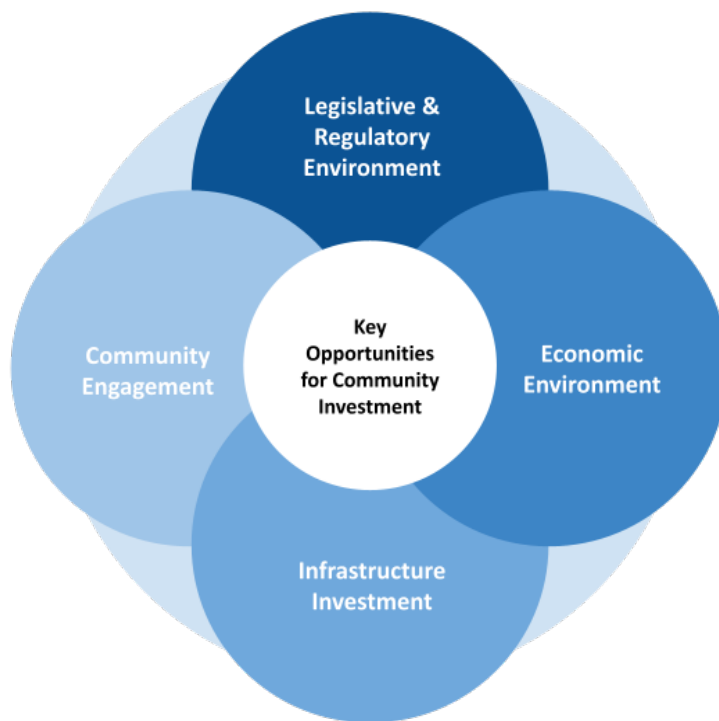
<sup>60</sup> U.S. Census Bureau. (n.d.). *Miami-Dade County, Florida*. Retrieved from U.S. Census Bureau: [https://data.census.gov/profile/Miami-Dade\\_County,\\_Florida?g=050XX00US12086](https://data.census.gov/profile/Miami-Dade_County,_Florida?g=050XX00US12086).

<sup>61</sup> Florida Department of Agriculture and Consumer Services. *Significant Wildfires in Florida 1981-2018*. Retrieved from fdacs.gov: <https://www.fdacs.gov/Forest-Wildfire/Wildland-Fire/Significant-Wildfires-in-Florida-1981-2018>.

<sup>62</sup> First Street. (n.d.). *Does Miami-Dade County have Wildfire Risk?* Retrieved from: [https://firststreet.org/county/miami-dade-county-fl/12086\\_fsld/fire](https://firststreet.org/county/miami-dade-county-fl/12086_fsld/fire)

<sup>63</sup> First Street (n.d.). *Does Miami-Dade County have Wildfire Risk?* Retrieved from: [https://firststreet.org/county/miami-dade-county-fl/12086\\_fsld/flood](https://firststreet.org/county/miami-dade-county-fl/12086_fsld/flood).

## Identifying Challenges and Opportunities for Investment in CDRZs to Build Wildfire Resilience



### Legislative and Policy Environment

The purpose of governmental policies in promoting resilience to wildfires is to balance investing in fire suppression with measures to prevent wildfires in the long term, such as reducing fuel loads, restoring ecosystems to natural fire patterns, and educating the public.<sup>64</sup> Government agencies prepare communities at risk for wildfire for resilience by implementing land use policies that limit the risk of wildfire, incentivize better land management, encourage stronger coordination across sectors to reduce conflicting land practices, and support research initiatives to gather wildfire data and analyze patterns of spread.<sup>65</sup> See Figure 20.

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<sup>64</sup> Western Fire Chiefs Association. (2024, March 1). What is the Government Doing to Prevent Wildfires? Wilsonville, Oregon, USA. Retrieved September 22, 2024, from <https://wfca.com/wildfire-articles/government-doing-to-prevent-wildfires/>.

<sup>65</sup> Western Fire Chiefs Association. (2024, March 1). What is the Government Doing to Prevent Wildfires? Wilsonville, Oregon, USA. Retrieved September 22, 2024, from <https://wfca.com/wildfire-articles/government-doing-to-prevent-wildfires/>.

**Figure 20. Community Planning Tools to Reduce Wildfire Risk<sup>66</sup>**



Wildfire poses health risks both during and after a blaze because of extreme smoke exposure.<sup>67</sup> Outdoor workers, unhoused individuals, children, older adults, and people with diabetes, heart disease, and respiratory illnesses are most prone to respiratory problems, heart attacks, strokes, and premature death from exposure to wildfire smoke.<sup>68</sup> Smoke preparedness includes an alert system, a system for air filtration, and a plan for sheltering.<sup>69</sup> Communities can build resilience to smoke and other hazards through the construction of multi-hazard resilience hubs.<sup>70</sup>

<sup>66</sup> National Association of Counties. (2022). *Building Wildfire Resilience: A Land use Toolbox for County Leaders*. Resource Library. Retrieved on November 24, 2024, from <https://www.naco.org/resources/building-wildfire-resilience>.

<sup>67</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

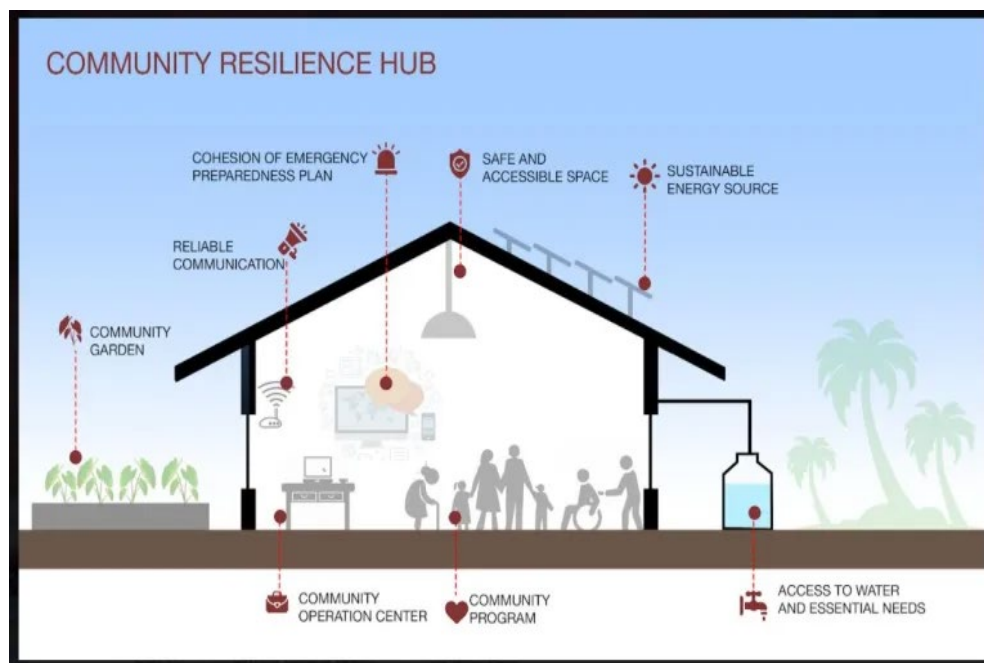
<sup>68</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

<sup>69</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>70</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

Resilience hubs are indoor community spaces designed to foster public safety, security, and wellbeing during emergencies, including the provision of clean indoor air, heating, ventilation, and air conditioning powered by clean energy resources.<sup>71</sup> See Figure 21. Multi-hazard resilience hubs are built to have the capacity to prepare the community for and withstand multiple hazards, including smoke, extreme heat, hurricanes, tornadoes, winter storms, and power outages.<sup>72</sup> Local governments who have policies and legislation that creates funding for households and public spaces to improve indoor air-quality during heavy smoke, including multi-hazard resilience hubs, are able to better mitigate the health effects of extreme smoke exposure on vulnerable populations and help improve accessibility and equity concerns facing these populations.<sup>73</sup>

**Figure 21. Multihazard Resilience Hub<sup>74</sup>**



Incorporating fire considerations into local governmental land use planning helps to strengthen wildfire resilience coordination across sectors, increase transparency, and reduce conflicts among approaches.<sup>75</sup> Such legislation should prescribe the location of new buildings to minimize fire spread.<sup>76</sup> Such zoning

<sup>71</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

<sup>72</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

<sup>73</sup> Federation of American Scientists. (2023, April 24). Wildland Fire Policy Recommendations. Retrieved September 22, 2024, from <https://fas.org/publication/wildland-fire-policy-recommendations/>.

<sup>74</sup> Center for Resilient Neighborhoods. *About Action 15: "Resilience from the Inside Out."* University of Hawai'i and Cerene. Retrieved on November 24, 2024, from <https://cerenehawaii.org/about-cerene/about-action-15/>.

<sup>75</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>76</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

regulations should limit the types of uses allowed on particular pieces of property and determine the density of development.<sup>77</sup>

In planning the community, fire prevention and spread should be considerations in the design of neighborhoods, business districts, utilities, and public water supply infrastructure.<sup>78</sup> The community water supply infrastructure is particularly vulnerable to contamination following wildfires, so resiliency plans to protect the integrity of the water supply infrastructure is an important aspect of protecting a community from wildfire disaster.<sup>79</sup>

Legislative and policy approaches should include targeted investment in prevention and early detection measures, which can result in significant cost-savings for a community and can avoid significant loss and damage.<sup>80</sup> The development by the government of systematic and operational fire danger rating and early warning systems with action triggers based on fire danger ratings is important for localities at risk for wildfire.<sup>81</sup> Such warning systems should be integrated into weather forecasting.<sup>82</sup> See Figure 22. Fire prevention and detection activities represent a sound return on investment when there is increasing fire risk and usually save more than pre-prevention estimates.<sup>83</sup> Fire use regulations and policies to educate fire users help reduce ignition risk.<sup>84</sup>

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<sup>77</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>78</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>79</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>80</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>81</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

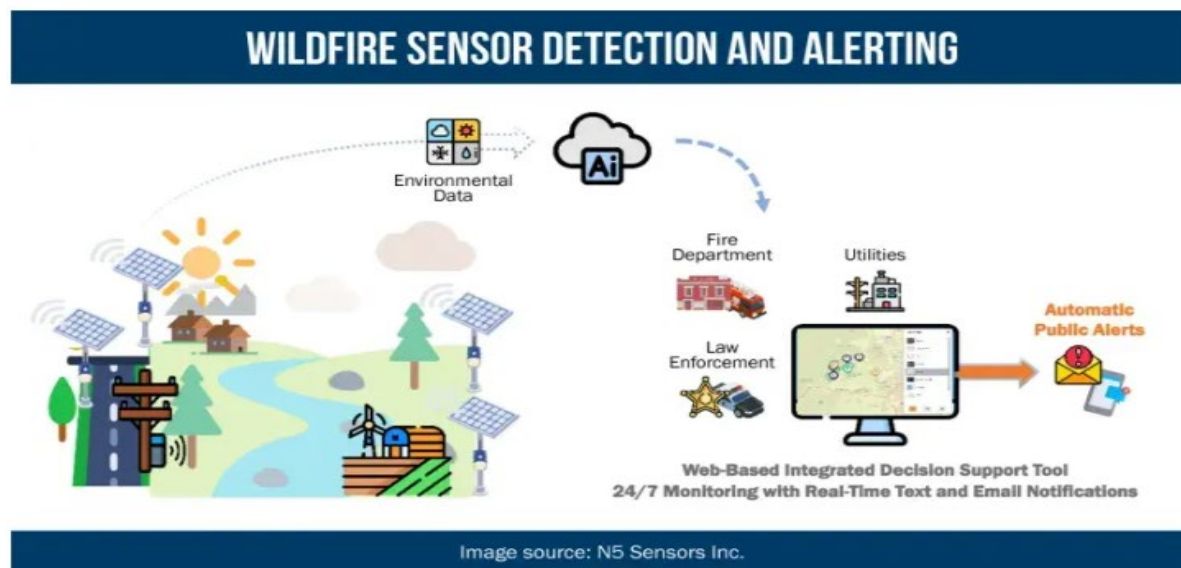
<sup>82</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>83</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>84</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).



**Figure 22. Wildfire Detection and Alert System**<sup>85</sup>



Governmental investments that enhance the adaptive capacity of the community are also important.<sup>86</sup> Technology improvements that allow for both public safety power shutoffs and reactive shutoffs of power equipment when they are found to be at risk or involved in a fire help to limit spread.<sup>87</sup> Legislation should include requirements for utility companies to implement fire mitigation plans that address infrastructure maintenance and improvements that include ignition resistant utility poles (metal instead of wood), conductors, and insulated lines and that require vegetation management to lessen the risk of fire spread to utility structures.<sup>88</sup> Additionally, legislation that broadens the width of rights-of-way for utilities assists utility companies in the implementation of infrastructure improvements to assist with fire prevention strategies.<sup>89</sup> The establishment and maintenance of fuel breaks within the community plan help with fire containment.<sup>90</sup> See Figure 23.

<sup>85</sup>Science and Technology. *Technology to Reduce the Impacts of Wildfires*. Department of Homeland Security. Retrieved on November 24, 2024, from <https://www.dhs.gov/science-and-technology/technology-reduce-impacts-wildfires>.

<sup>86</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>87</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf); Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>88</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>89</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>90</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

**Figure 23. Vegetation Management Surrounding Utility Poles Helps with Fire Containment.<sup>91</sup>**



Governmental policies and legislation for forest and grassland management to help mitigate wildfire risk are extremely important for communities at high risk for wildfire.<sup>92</sup> Reduction of fuel through controlled burning and planned grazing are essential aspects of impact mitigation strategies.<sup>93</sup> Vegetation near communities should be thinned.<sup>94</sup> The use of beneficial fire, through prescribed fire and cultural burning, can be used to reduce fuel and assist with strategic landscape-scale planning.<sup>95</sup> Mechanical thinning and the use of harvest and targeted grazing are other means by which the legislature can regulate fuel reduction.<sup>96</sup> See Figure 24. The timing of burning for agriculture and pastures should be regulated to help avoid fire escape.<sup>97</sup>

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<sup>91</sup> Bonneville Power Administration. *Prioritizing Public Safety Before, During, and After a Wildfire*. Land & Right of Ways Resources. Retrieved on November 24, 2024, from <https://www.bpa.gov/environmental-initiatives/land-and-right-of-ways/land-and-right-of-ways-resources/wildfires-and-public-safety>.

<sup>92</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>93</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>94</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

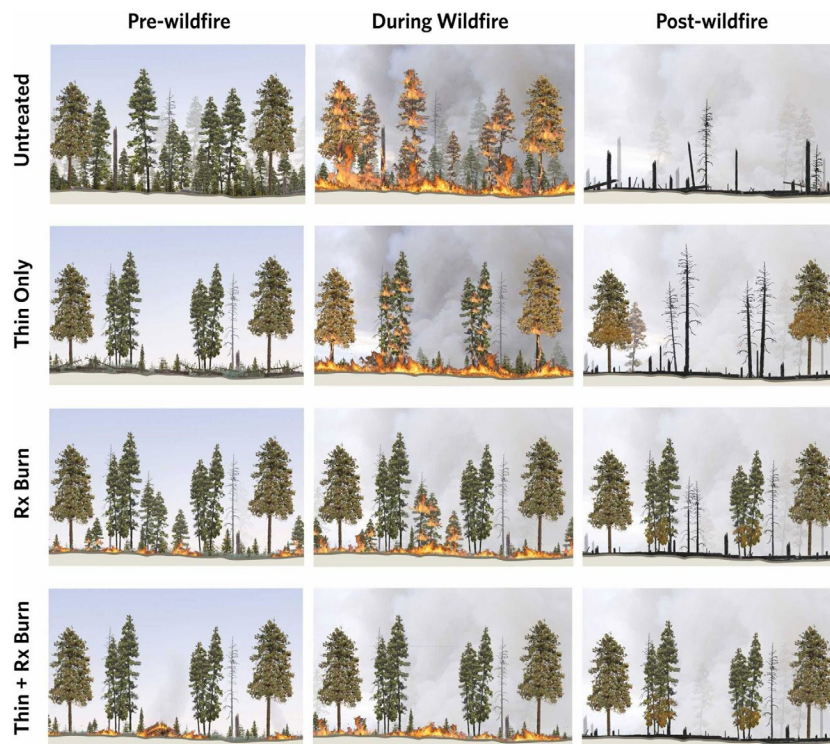
<sup>95</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>96</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>97</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).



**Figure 24. Effect of Controlled Burning and Thinning on Wildfire Prevention.**<sup>98</sup>



Building codes that establish fire-resistant construction standards help build community resilience to wildfire by reducing asset vulnerability.<sup>99</sup> Legislation that promotes the retrofitting of existing building structures to resist ignition helps to promote wildfire resiliency.<sup>100</sup> Existing building structure regulations should promote the replacement of vents, sheathing, and siding with flame and ember resistant vents and openings and the replacement of wood shake roofs with flame and fire resistant roofing.<sup>101</sup> For new construction, legislation that promotes conditions that reduce the probability of ignition increases wildfire resiliency.<sup>102</sup> Such legislation should include mandates for the use of ignition-resistant construction materials in the design and construction of new buildings, significant remodels, rebuilds, and retrofits.<sup>103</sup>

<sup>98</sup> USDA Forest Service. *Science Review Shows Fuel Treatments Reduce Future Wildfire Severity*. Phys.org. Retrieved on November 24, 2024, from <https://phys.org/news/2024-06-science-fuel-treatments-future-wildfire.html>.

<sup>99</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>100</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

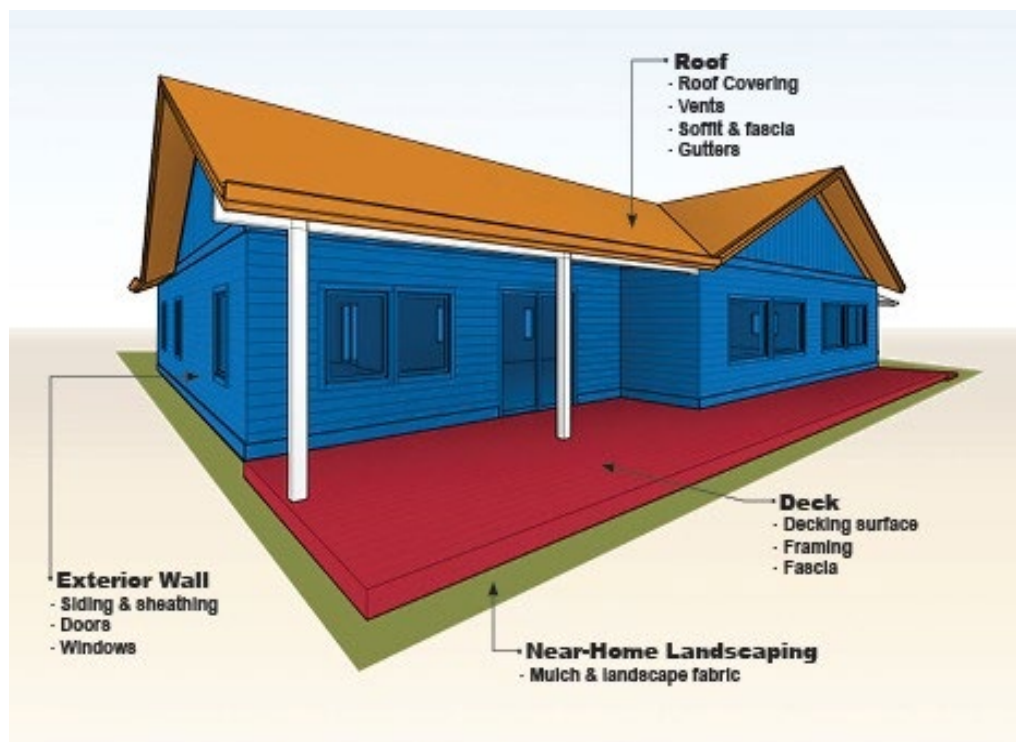
<sup>101</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>102</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>103</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

See Figure 25. The adoption of building codes or standards and its enforcement by the local government should include science-based building codes and standards that govern construction, design, and site development, such as California's Building Code Chapter 7A, NFPA Urban Interface Code, or the International Wildland-Urban Interface Code.<sup>104</sup>

**Figure 25. Fire-resistant Building Materials in Design**<sup>105</sup>



Tax incentives and tax credits, particularly to retrofit existing structures when old buildings are not mandated to be retrofitted, help to build a complete fire-resistant community.<sup>106</sup> Additionally, subsidies and cost-sharing opportunities for underserved, low income, or otherwise disadvantaged households in areas at high risk for wildfire to help cover the costs of critical wildfire resiliency measures and structural improvements, including retrofits, can be particularly helpful for socially vulnerable communities who are less likely to participate in wildfire risk reduction programs on their own accord.<sup>107</sup>

<sup>104</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>105</sup> UNDRR. (2018). *USA: Building a Wildfire-Resistant Home: Codes and Costs*. Prevention Web. Retrieved on November 24, 2024, from <https://www.preventionweb.net/news/usa-building-wildfire-resistant-home-codes-and-costs>.

<sup>106</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>107</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

Regulations that require an all-hazards risk disclosure for real estate transactions (similar to a flood-risk disclosure requirement) help inform home buyers of wildfire risks associated with purchasing the home so that they are better prepared to make decisions to mitigate the risks.<sup>108</sup> They also help to promote greater individual responsibility and consideration of risks both in preparing a home for sale and in the purchasing process, and they help with education of homeowners about risk reduction, implementation, and governmental support resources.<sup>109</sup>

Regulations for community landscape planning that proscribe the positioning of adjacent vegetation and that discourage the inappropriate planting of fire-prone species help to minimize the risk of damage from fires and the development of fire-prone ecosystems.<sup>110</sup> Landscape policies and legislation should build synergies and manage trade-offs among different land uses that can represent sources of fire ignition and spread.<sup>111</sup> Regulations should prescribe the conditions for maintaining vegetation around a building or structure, including the condition of the vegetation, the removal of all vegetation immediately adjacent to a building or structure, maintaining a perimeter around a building or structure that is clear of vegetation and combustible materials (such as firewood and barbecue grills), and the removal of debris from gutters.<sup>112</sup> See Figure 26.

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<sup>108</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

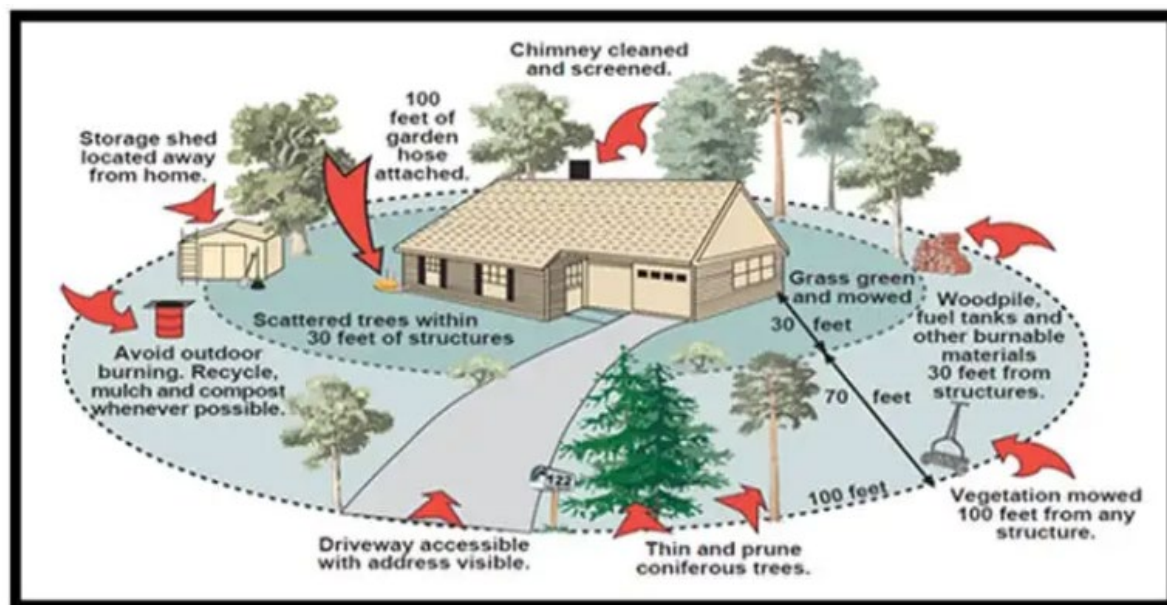
<sup>109</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>110</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf).

<sup>111</sup> World Bank Group. (2020, March). *World Bank Policy Note: Managing Wildfires in a Changing Climate*. Retrieved from [https://www.profor.info/sites/default/files/PROFOR\\_ManagingWildfires\\_2020\\_final.pdf](https://www.profor.info/sites/default/files/PROFOR_ManagingWildfires_2020_final.pdf); Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

<sup>112</sup> Wildland Fire Mitigation and Management Commission. (2023). *On Fire: The report of the Wildland Fire Mitigation and Management Commission*. USDA. Retrieved September 22, 2024, from <https://www.usda.gov/sites/default/files/documents/wfmmc-final-report-09-2023.pdf>.

**Figure 26. Landscape Planning for Fire Prevention**<sup>113</sup>



## Legislative and Policy Environment Matrix

A legislative policy matrix was created to assess each of the chosen CDRZ counties on eight different general policy areas: 1) building codes, 2) zoning regulations, 3) landscape regulations, 4) forest and grassland management, 5) smoke preparedness, 6) utility preparedness, 7) alert system, and 8) overall risk reduction. See Table 7 for the Legislative Policy Matrix form template.

Each of the four counties is ranked on a scale of one to five. *See* Table 7. The scores have the following meanings: 1) one indicates that there is no regulation/legislation or system in place either in the government or in the community; 2) two indicates no regulation/legislation in place but the community has been educated about its importance; 3) three indicates no regulation/legislation in place but the government has discussed a plan; 4) four indicates a government run system in place without legislation or a regulation; 5) five indicates a government system and regulation in place.

The criteria “building codes” includes regulations that require a fire-resistant design for buildings or structures, the use of fire-resistant construction material, codes for new construction, significant remodels, rebuilds, and retrofits, and/or tax incentives, credits, subsidies, or cost-sharing to promote fire-resistant construction.

The criteria “zoning regulations” includes regulations that limit the types of uses on particular pieces of property based on its fire hazard, regulations that limit the density of development, and regulations that limit the proximity of structures to one another.

<sup>113</sup> LAM Tree Service. *How to Create Defensible Space*. Retrieved on November 24, 2024, from <https://www.lamtree.com/tree-info-resources/creating-firewise-landscape-colorado-foothills/>.

The criteria “landscape regulations” includes regulations that prescribe the condition of vegetation surrounding structures, that limit vegetation immediately adjacent to structures to no less than 5 feet, that limit the presence of combustible materials within 5 feet of a structure, and/or that require the removal of debris from gutters.

The criteria “forest and grassland management” includes regulations that prescribe fuel reduction through beneficial fire and cultural burning, mechanical thinning, harvest and targeted grazing, and/or regulated burning of agriculture and pastures.

The criteria “smoke preparedness” includes an air filtration system (individual dwelling or community), a sheltering plan or location, and/or a multi-hazard community resilience hub.

The criteria “utility preparedness” includes utility infrastructure maintenance requirements, utility infrastructure improvement requirements, coordination requirements with wildland fire authorities, public safety power shutoffs, reactive shutoffs, utility right-of-way requirements, and/or vegetation management policies.

The criteria “alert system” includes technology improvements for an alert or fire danger warning system or forecast.

The criteria “overall risk reduction” includes regulated fire use, education of fire users, wildfire risk disclosure requirements for real estate sales, and/or containment.

The average score for each of the subsections of the main categories became the score for that category. Each category was then weighted equally, and the overall legislative policy score was the mean score for each of the eight categories.

**Table 7. Legislative and Policy Landscape Matrix**

	<b>Building Codes</b>	<b>Zoning Regulations</b>	<b>Landscape Regulations</b>	<b>Forest and Grassland Management</b>	<b>Smoke Preparedness</b>	<b>Utility Preparedness</b>	<b>Alert System</b>	<b>Overall Risk Reduction</b>	
	Fire-resistant design	Land Use Restriction	Vegetation Condition	Beneficial Fire	Air Filtration	Maintenance	Fire Forecast	Fire Use	
	Fire-resistant material	Development Density	Adjacent Vegetation	Cultural Burning	Sheltering	Improvements	Alert System	Fire Education	
	New construction	Building Proximity	Adjacent Combustibles	Mechanical Thinning	Resilience Hub	Fire Authority Coordination		Risk Disclosure	
	Retrofits/ rebuilds/ remodels		Gutter Debris Removal	Grazing		Shut-Offs		Containment	
	Incentives			Regulated Burning		Vegetation/ Right-of-Way			
Mean Score									Overall Mean

**Table 8. Scoring Scale for Legislative and Policy Landscape Matrix**

Score	1	2	3	4	5
	No regulation or community activity	No regulation but community educated	No regulation but governmental plan	Government system without regulation	Government system and plan



## Economic Landscape

Evaluating the economic landscape of a county when investing in wildfire resilience is essential to ensure that the county will be able to pay its debt back and that the investment will achieve its goal of building wildfire resilience.

One aspect when deciding whether to invest in a resilience project is to examine the county's finances. This component assesses the county's financial health to determine its capacity to repay debt. There are multiple components that can be looked at to assess a county's financial situation.

The first component is the county's credit rating. A credit rating is a grade given to a government to assess its ability to repay debt in general terms or related to a specific debt based on multiple factors, including the county's credit history.<sup>114</sup> Credit ratings are assigned by credit rating agencies, such as S&P Global, Moody's, and Fitch ratings.<sup>115</sup> While each credit agency has its scale, credit ratings by one agency can be translated to an equivalent from another agency.

Credit ratings allow investors to get a glimpse of how likely it is that a government will fulfill its obligation. Counties with a credit rating that falls in the investment grade category indicate that investing in such a county is considered safe, indicating a low risk of the county not being able to fulfill its obligations. The minimum credit rating to fall under the investment grade category is a BBB- grade by S&P and Fitch, and a Bbb3 by Moody's.<sup>116</sup> The investment grade category can be divided into 5 subcategories.<sup>117</sup> The highest rating is represented in the prime subcategory, which is for credit ratings of AAA by S&P and Fitch and Aaa for Moody's.<sup>118</sup> The second highest subcategory is upper investment grade, for credit ratings between AA+ and AA- for S&P and Fitch and Aa1 to Aa3 for Moody's.<sup>119</sup> The third subcategory is upper medium grade, which is for credit ratings between A+ and A- from S&P and Fitch and A1 to A3 from Moody's.<sup>120</sup> The last subcategory is the lower medium grade, which is for credit ratings between BBB+ and BBB- from S&P and Fitch and Bb1 to Bb3 from Moody's.<sup>121</sup>

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<sup>114</sup> Chen, J. (2024, June 19). *Investment Grade Credit rating details: What does it mean?* Investopedia. Retrieved October 30, 2024, from <https://www.investopedia.com/terms/i/investmentgrade.asp>

<sup>115</sup> Chen, J. (2024, June 19). *Investment Grade Credit rating details: What does it mean?* Investopedia. Retrieved October 30, 2024, from <https://www.investopedia.com/terms/i/investmentgrade.asp>

<sup>116</sup> Chen, J. (2024, June 19). *Investment Grade Credit rating details: What does it mean?* Investopedia. Retrieved October 30, 2024, from <https://www.investopedia.com/terms/i/investmentgrade.asp>

<sup>117</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>118</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>119</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>120</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>121</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>



A county that cannot get the minimum credit rating to fall into the investment grade category falls under the non-investment grade, commonly known as “junk.”<sup>122</sup> A county that receives a score that falls under this category is a county that is considered too risky to invest in as the county might not be able to pay its debts on time.<sup>123</sup> As a result, investors usually demand higher interest rates to compensate for the increased risk.

**Figure 27. Credit Rating Scale Equivalents<sup>124</sup>**

Moody's	S&P	Fitch	
Aaa	AAA	AAA	Prime
Aa1	AA+	AA+	High grade
Aa2	AA	AA	
Aa3	AA-	AA-	
A1	A+	A+	Upper medium grade
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	Lower medium grade
Baa2	BBB	BBB	
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	Non-investment grade speculative
Ba2	BB	BB	
Ba3	BB-	BB-	
B1	B+	B+	Highly speculative
B2	B	B	
B3	B-	B-	
Caa1	CCC+	CCC	Substantial risk
Caa2	CCC		Extremely speculative
Caa3	CCC-		Default imminent with little prospect for recovery
Ca	CC	CC	
	C	C	
C			In default
/	D	D	
/			

"Junk"



Another component to look at when assessing a county’s financial situation is the ratio of its budget that is allocated to debt services funds. Debt services funds accounts represent the amount of money a government allocates to pay principal and interest on its long-term debt.<sup>125</sup> A higher debt service fund to total budget revenue can indicate that a county is using a large amount of its income to pay for debt, which could result in lower government funding going to other areas. In addition, a low debt service fund to revenue ratio indicates a county has more to pay its debt.

<sup>122</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>123</sup> Zolio Market Commentary. (2017, September 4). *What are credit ratings and who makes them?* Zolio. Retrieved October 30, 2024, from <https://zolio.com/what-are-credit-ratings-and-who-makes-them/>

<sup>124</sup> Wolf Street. (n.d.). *Corporate Credit Ratings by the Big Three US Credit Rating Agencies: Credit Risk and Risk of Default.* Retrieved October 30, 2024, from <https://wolfstreet.com/credit-rating-scales-by-moodys-sp-and-fitch/>

<sup>125</sup> Tuovila, A. (2024, April 24). *Debt service: An overview of calculations and ratios.* Investopedia. Retrieved October 30, 2024, from <https://www.investopedia.com/terms/d/debtservice.asp>

The third subcomponent assesses whether a county has a balanced or surplus budget, or if it runs a deficit. Having a budget deficit, especially for multiple years, can cause a country to accumulate debt that becomes unsustainable.<sup>126</sup> As a result, a county could face higher interest rates, leading to increased time a county takes to pay off its debts. A county might also be forced to cut local programs it can no longer afford to offer. Lastly, a county with repetitive budget deficits has a higher risk of default, meaning that the county cannot fulfill its obligations.<sup>127</sup>

The insurance market is a key component to evaluate when assessing whether to invest in communities at high risk of wildfires as it protects households, businesses, and governments in the event of a disaster that causes property damage, disrupting economic activity. One aspect when evaluating the insurance market is insurance costs. Insurance companies set their premium costs based on multiple factors, including the probability that someone will file a claim. If threats to natural disasters increase, then it is expected that insurance will raise their prices to avoid running into losses. As a result, high insurance costs and increase in costs indicate a higher probability that a claim will be filed for the insured property. In addition, high increases in insurance costs can lead to increases in the number of uninsured properties in an area, leading to an increase in the number of households and businesses vulnerable to a disaster. In the event of a natural disaster, high uninsurance rates would lead to disruptions in economic activity and property values, resulting in a loss of tax revenue for governments.

The second component of the economic landscape is the state of insurance in the country. Because we are assessing resilience investment in areas with a high risk of wildfires, these areas are at higher risk of suffering from wildfires that can affect economic activity. In addition to rising insurance costs, the existence of caps in the amount insurance companies can charge for premiums can also cause disruptions in the insurance market. While the existence of premium caps can mitigate high increases that lead to insurance becoming unaffordable, they can also cause insurance companies to leave the market if they estimate that providing insurance in a certain area would cause losses to the company. High levels of uninsured property owners make counties more vulnerable to economic disruptions as it increases difficulties for rebuilding.

In addition to looking at increases in the cost of insurance, it is also important to look at which policies, if any, have been put in place by state and local governments to address this issue. These types of policies can take multiple forms. One of them is through the existence of reinsurance programs. Reinsurance allows insurance companies to get insurance to mitigate their risk of suffering economic losses due to high numbers of claims after a natural disaster.<sup>128</sup> Another policy that can be used is implementing Fair Access to Insurance Requirements (FAIR) plans. FAIR plans are government provided and act as an insurance of last resort to ensure that property owners in high-risk areas can get access to affordable

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<sup>126</sup> IMF Publications. (1996, September). *Confronting Budget Deficits*. International Monetary Fund. Retrieved October 30, 2024, from <https://www.imf.org/external/pubs/ft/issues3/issue3.pdf>

<sup>127</sup> IMF Publications. (1996, September). *Confronting Budget Deficits*. International Monetary Fund. Retrieved October 30, 2024, from <https://www.imf.org/external/pubs/ft/issues3/issue3.pdf>

<sup>128</sup> Lueck, S. (2019, April 3). *Reinsurance Basics: Considerations as States Look to Reduce Private Market Premiums*. Center on Budget and Policy Priorities. Retrieved October 31, 2024, from <https://www.cbpp.org/research/reinsurance-basics-considerations-as-states-look-to-reduce-private-market-premiums>

insurance.<sup>129</sup> In addition to reinsurance and FAIR plans, governments can subsidize insurance plans, covering insurance costs that are not affordable to either the insurance companies or the policyholders.

The existence of current wildfire resilience investments and programs in the respective counties can provide valuable insights on the economic environment of a county. The existence of current wildfire resilience investments and programs can provide validation that investing in a county can have a positive return on investment as assessed by other entities. In addition, it increases the likelihood that an investment made by SPIN Global in wildfire resilience will be able to achieve its objective of building resilience as it will be complemented by other investments or programs. These investments or programs can be implemented by the local government itself, the federal and state governments, or by non-governmental Organizations (NGOs) or the private sector.

Economic indicators are another important factor when deciding to invest in wildfire resilience, as they can provide insights into the health of a county's economy. A county with a strong and stable economy is more likely to generate sufficient revenue to repay its debt, ensuring the financial sustainability of investments.

One of these indicators is the real GDP growth rate of the county. Real GDP growth rates show how much an economy is growing by looking at increases in economic activity within a county.<sup>130</sup> It is an important indicator to look at as it signals an increase in economic activity, which can lead to increases in tax revenues for counties. Is it important to look at real GDP growth rates and not nominal GDP growth rates since the latter does not account for inflation.<sup>131</sup>

Another economic indicator that can provide information on a county's economic performance is the median household income. This indicator provides information about the economic situations of households in a region. When looking at investing in counties with a high-level risk of wildfires, it is useful to look at this indicator as higher median incomes can indicate better resistance to disruptions caused by wildfires as well as provide counties with a higher tax base.

Median household income data helps evaluate the wellbeing of its population. While looking at GDP provides income for the whole population, the median household income looks at how income is distributed in society. Low median household income levels can signal income inequality and financial distress, leading counties to have a weak tax base and higher population dependent on government assistance.

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<sup>129</sup> National Association of Insurance Commissioners. *Fair Access to Insurance Requirements (FAIR) Plans*. National Association of Insurance Commissioners. (2024, March 20). Retrieved October 31, 2024, from <https://content.naic.org/cipr-topics/fair-access-insurance-requirements-fair-plans>

<sup>130</sup> Callen, T. (n.d.). *Gross domestic product: An economy's all*. Finance and Development. Retrieved October 31, 2024, from [https://www.imf.org/external/pubs/ft/fandd/basics/pdf/callen\\_gdp.pdf](https://www.imf.org/external/pubs/ft/fandd/basics/pdf/callen_gdp.pdf)

<sup>131</sup> Callen, T. (n.d.). *Gross domestic product: An economy's all*. Finance and Development. Retrieved October 31, 2024, from [https://www.imf.org/external/pubs/ft/fandd/basics/pdf/callen\\_gdp.pdf](https://www.imf.org/external/pubs/ft/fandd/basics/pdf/callen_gdp.pdf)

The unemployment rate, which measures the percentage of the labor force that is not employed, can also provide a picture of the health of an economy.<sup>132</sup> A high unemployment rate indicates that an economy cannot generate enough jobs for its population.<sup>133</sup> As a result, counties with high unemployment rates can be more vulnerable to experiencing future decreases in income and increases in the percentage of the population dependent on government assistance.

Based on the mentioned factors, we created the following matrix shown as Table 9 and scoring system to evaluate wildfire resilience investments based on a county's economic landscape. It uses the following four criteria 1) county finances, 2) insurance market, 3) current resilience investment programs, and 4) economic indicators. Each criteria is scored on a scale of 1 to 5.

The criteria "county finances" includes credit ratings, debt services fund, and budget balance. The scores have the following meanings: 1) one is assigned to non-investment grade credit ratings, debt service fund ratios above 20% and budget deficits above 20%; 2) two is assigned to lower medium credit ratings, debt service fund ratios between 15% and 20\$, and budget deficits between 5% and 10%; 3) three is assigned to upper medium credit ratings, debt service fund ratios between 10% and 15%, and budget deficits between 0% and 5%; 4) four is assigned to high grade credit ratings, debt service fund ratios between 5% and 10% and balanced budgets or surplus budgets between 0% and 5% ; 5) five is assigned to prime credit ratings, debt service fund ratios below 5%, and budget surplus over 5% of budget.

The criteria "insurance market" includes insurance costs and policies to avoid market disruptions. The scores have the following meanings: 1) one is assigned to significant increases in insurance premiums and higher cost than the national average and no policies exist to increase access to insurance; 2) two is assigned to little to medium increases in insurance premiums and higher cost than the national average and policies to avoid further disruptions in early stage creation; 3) three is assigned to significant increases to insurance premiums but costs are near national average and there are policies to avoid further disruptions in advanced stage creation; 4) four is assigned to significant increases in insurance premiums but costs remain lower than the national average and specific policies to avoid further disruptions are in place but not fully implemented; 5) five is assigned to little to no increases in insurance premiums, insurance premiums and specific policies to avoid further disruptions are in place and implemented.

The criteria "current resilience investment programs" includes local programs and investments, federal and state programs and investments, and NGO and private sector programs and investments. The scores have the following meanings: 1) one is assigned to no investments or programs in place; 2) two is assigned to existence of programs to build resilience with an educational focus but with no financial component; 3) three is assigned to existence of programs to build resilience with support to apply for financial assistant or the existence of investment statewide for resilience but no information of distribution to the county; 4) four is assigned to existence of investments in place but targeting wildfire recovery or resilience in other areas; 5) five is assigned to existence of investments targeting wildfire resilience.

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<sup>132</sup> Öner, C. (n.d.). *Unemployment: The Curse of Joblessness*. Finance & Development. <https://www.imf.org/external/pubs/ft/fandd/basics/unemploy.htm>

<sup>133</sup> Öner, C. (n.d.). *Unemployment: The Curse of Joblessness*. Finance & Development. <https://www.imf.org/external/pubs/ft/fandd/basics/unemploy.htm>

The criteria “economic performance” includes the unemployment rate, GDP growth rate and median household income. The scores have the following meanings: 1) one is assigned to unemployment rate over 10%, median household income under \$30,000, and negative or no real GDP growth rate; 2) two is assigned to unemployment rate between 7% and 10%, median household income between \$30,000 and \$50,000, and real GDP growth rates between 0% and 1%; 3) three is assigned to unemployment rate between 5% and 7%, median household income between \$50,000 and \$75,000, and real GDP growth rates between 1% and 2.5%; 4) four is assigned to unemployment rate between 3% and 5%, median household income between \$75,000 and \$100,000, and real GDP growth rates between 2.5% and 4%; 5) five is assigned to unemployment rate under 3%, median household income above \$100,000, and real GDP growth rates above 4%.

**Table 9. Economic Landscape Matrix**

	County Finances	Insurance Market	Current Wildfire Resilience Investments and Programs	Economic Performance	
	Credit Rating	Insurance Costs	Local Level	Unemployment Rate	
	Debt Service Fund	Policies to Increase Access to Insurance	Federal and State Level	GDP Growth	
	Budget Balance		Private Sector and NGOs	Median Household Income	
Mean Score					Overall Mean

**Table 10. County Finances Scoring Scale**

Score	1	2	3	4	5
	Non-investment grade credit rating; debt service fund ratio above 20%; budget deficit above 20%	Lower medium credit rating; debt service fund ratio between 15% and 20%; budget deficit between 5% and 10%	Upper medium credit rating; debt service fund ratio between 10% and 15%; Budget deficit between 0% and 5%	High grade credit rating debt service fund ratio between 5% and 10%; Balanced budget or surplus between 0% and 5%	Prime Credit Rating; Debt service fund ratio below 5%; Budget surplus of over 5% of budget

**Table 11. Insurance Market Scoring Scale**

Score	1	2	3	4	5
	Significant increases in insurance premiums and higher cost than national average; No policies to avoid market disruptions	Little to medium increases in insurance premiums and higher cost than national average; Policies to avoid further disruptions in early-stage creation	Significant increases to insurance premiums but costs near national average; Policies to avoid further disruptions in advanced stage creation	Significant increases in insurance premiums but costs remain lower than national average; Specific policies to avoid further disruptions in place but not fully implemented	Little to no Increases in insurance premiums, insurance premiums; Specific Policies to avoid further disruptions in place and implemented

**Table 12. Current Resilience Investments and Programs Scoring Scale**

Score	1	2	3	4	5
	No investments or programs in place	Existence of programs to build resilience with an educational focus but with no financial component	Existence of programs to build resilience with support to apply for financial assistant	Existence of investments in place but targeting wildfire recovery or resilience in other areas	Existence of investments targeting wildfire resilience

**Table 13. Economic Performance Scoring Scale**

Score	1	2	3	4	5
	Unemployment rate over 10%; median household income under \$30,000; real GDP growth rate at or below 0%	Unemployment rate between 7% and 10%; median household income between \$30,000 and \$50,000; real GDP growth rates between 0% and 1%	Unemployment rate between 5% and 7%; median household income between \$50,000 and \$75,000; real GDP growth rate between 1% and 2.5%	Unemployment rate between 3% and 5%; median household income between \$75,000 and \$100,000; real GDP growth rates between 2.5% and 4%	Unemployment rate under 3%; median household income above \$100,000; real GDP growth rates above 4%

## Integrating Community Voice

Community voice and engagement refer to the active participation of community members in decision-making processes that affect their lives, particularly during crisis situations like natural disasters.<sup>134</sup> This approach is crucial in addressing disasters such as wildfires because it ensures that the unique needs, knowledge, and priorities of the community are recognized and integrated into preparedness and response strategies. Engaging residents helps to build trust, improve communication, and foster a sense of ownership over safety initiatives, ultimately leading to more effective disaster response and recovery efforts.<sup>135</sup> Additionally, incorporating local insights can enhance resilience by promoting tailored solutions that reflect the community's strengths and vulnerabilities. For example, community-driven initiatives can lead to the development of local evacuation plans or firebreaks that align with residents' experiences and local geography.<sup>136</sup> Research shows that communities with strong engagement are better equipped to recover from disasters and adapt to future risks.<sup>137, 138</sup>

Considering community voice in the context of evaluating private investment in resilience is crucial because local communities are often the most impacted by the outcomes of these investments. Engaging community members ensures that their needs, priorities, and knowledge are reflected in decision-making processes, leading to more equitable and effective solutions. Additionally, community involvement fosters trust and collaboration between residents, investors, and policymakers, which can enhance the long-term sustainability and success of resilience initiatives. Without considering community input, there is a risk that investments may overlook or exacerbate existing vulnerabilities, particularly for marginalized groups, and fail to address the root causes of resilience challenges.

Preparing for and assessing community voice and engagement can be challenging due to the complexities of relationships, social and cultural environments, and political landscapes. However, it is essential to involve the communities affected by any initiative, program, or policy, as their insights are vital to the outcomes. Engaging community members allows them to share their opinions, concerns, and feedback, leading to planning and decision-making processes that are more equitable. This inclusion ensures that initiatives genuinely reflect the specific wants and needs of the communities they serve.

To illustrate the spectrum of community engagement in disaster preparedness and response, it is helpful to differentiate between meaningful and insignificant examples of participation. Meaningful engagement occurs when community members are actively involved in shaping strategies, influencing decision-

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<sup>134</sup> Community Engagement 101: Ultimate Beginner's Guide" <https://visiblenetworklabs.com/guides/community-engagement-101/>. Visible Network Labs. Received October 21, 2024.

<sup>135</sup> Paton, D., & Johnston, D. (2001). Disasters and Communities: Vulnerability, Resilience, and Preparedness. *Disaster Prevention and Management*, 10(3), 204-212. doi: 10.1108/09653560110391238.

<sup>136</sup> Yiqing Liu, Lei Cao, Dongdong Yang, Bruce C. Anderson, "How social capital influences community resilience management development," *Environmental Science & Policy*, Volume 136, 2022, Pages 642-651, ISSN 1462-9011, doi: 10.1016/j.envsci.2022.07.028.

<sup>137</sup> Aldrich, Daniel P. (2012) "Building Resilience: Social Capital in Post-Disaster Recovery". The University of Chicago Press.

<sup>138</sup> Aldrich, D. P., & Meyer, M. A. (2015). "Social Capital and Community Resilience." *American Behavioral Scientist*, 59(2), 254-269. doi: 10.1177/0002764214550299.



making, and directly contributing to solutions. In contrast, insignificant engagement often involves token gestures that do not genuinely consider community input or fail to facilitate real dialogue.<sup>139</sup>

**Figure 28. Community Forum<sup>140</sup>**



### **Integrating Community Voice Matrix**

The following table highlights examples of both categories, providing a clearer understanding of how community involvement can impact disaster resilience and response efforts. By examining these examples, we can better appreciate the value of authentic engagement in fostering stronger, more resilient communities.

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<sup>139</sup> Community Engagement 101: Ultimate Beginner's Guide" <https://visiblenetworklabs.com/guides/community-engagement-101/>. Visible Network Labs. Received October 21, 2024.

<sup>140</sup> Photo by Henri Mathieu-Saint-Laurent from Pexels: <https://www.pexels.com/photo/man-in-gray-sweater-talking-to-audience-8348624/>.

**Table 14. Integrating Community Voice Matrix**

Characteristic of Integrating Community Voice	Examples of Meaningful Engagement	Examples of Insufficient Engagement
<b>Community Engagement and Empowerment</b>		
<u><i>Identifying and Reaching Marginalized Groups</i></u> How will the program identify and reach out to historically marginalized groups within the community to ensure their specific needs and concerns are addressed?	Conduct community workshops to gather input on disaster preparedness plans, ensuring diverse voices that represent different parts of the community are included in final recommendations/plans.  Partner with local organizations to conduct outreach specifically targeting marginalized groups, ensuring their wants and needs are included in planning.	Organize a single meeting with limited promotion, leading to low attendance and missed community insights.  Use only generic flyers for outreach, which may not effectively reach non-English speakers or low-income residents.
<u><i>Training and Resources</i></u> What training or resources will be provided to community members to empower them to engage effectively in the planning process?	Offer training sessions on emergency preparedness tailored to different community demographics (e.g., seniors, single parents) with accessible materials.	Provide a one-size-fits-all manual that does not address the unique circumstances of different community members.
<u><i>Trust Building</i></u> What specific strategies will be employed to foster trust between community members and program facilitators?	Create regular community forums where residents can voice concerns and receive updates from program facilitators, fostering a sense of partnership.	Host occasional meetings without follow-up, leading to community skepticism about the program's intentions.
<b>Accessibility and Inclusivity</b>		
<u><i>Language and Communication Barriers</i></u> How will the program address language barriers and ensure accessibility for individuals with disabilities or those requiring different forms of communication?	Provide materials in multiple languages and offer sign language interpretation at all events to ensure all may understand and access materials and event speakers.	Use only English in communications and provide no accommodations for those with disabilities, excluding significant portions of the community.

## Key Opportunities and Challenges for Community Investment in Community Disaster Resilience Zones

<u><i>Cultural Sensitivity</i></u> In what ways will the program address and recognize power dynamics and barriers to engagement, ensuring that decision-making processes are inclusive and sensitive to the cultural and contextual needs of the community?	Involve community elders in the planning process to ensure cultural practices and values are respected in disaster response strategies.	Develop plans without consulting cultural representatives, leading to initiatives that may not resonate with or serve the community effectively.
<b>Sustainability and Continuous Improvement</b>		
<u><i>Feedback Adaptation</i></u> How will the program adapt engagement strategies based on feedback received during initial outreach efforts to ensure continuous improvement?	Conduct post-event surveys to gather community feedback on engagement strategies and adjust approaches based on that input.	Ignore community feedback after events, sticking to predetermined strategies without adjusting.
<b>Collaboration and Partnerships</b>		
<u><i>Role of Local Organizations</i></u> What role will local organizations and community leaders play in the planning and implementation processes to enhance credibility and relatability?	Form partnerships with local schools, religious institutions, and nonprofits that have long-term connections and relationships to the community to enhance outreach and build credibility.	Operate in isolation without collaborating with existing community structures, leading to distrust and low participation.
<b>Monitoring and Evaluation</b>		
<u><i>Feedback Loops</i></u> What follow-up processes will be implemented to report back to the community on how their input has shaped decision-making?	Create a community newsletter detailing how input was integrated into planning, ensuring ongoing dialogue.	Provide no follow-up communication, leaving community members uninformed about how their input was used.
<u><i>Data Collection Tools</i></u> What tools and metrics will be utilized to collect and analyze community feedback and engagement data, and how will these insights translate into actionable improvements and data-driven decisions?	Utilize surveys and focus groups to gather detailed insights on community needs, and analyze this data to inform decision-making.	Collect anecdotal feedback without formal tools or analysis, leading to decisions based on insufficient information.

Storytelling and Lived Experiences		
<u><i>Integrating Personal Narratives</i></u> How will the program create space for storytelling and lived experiences to inform planning, and how will this be integrated into decision-making?	Host storytelling events where community members share their disaster experiences, which are then used to shape future resilience plans.	Fail to incorporate personal narratives into planning, leading to a lack of relatable and culturally relevant strategies.
Transparency and Accountability		
<u><i>Transparency in Reporting</i></u> How will the program ensure transparency in its reporting and documentation processes to stakeholders, including community members, funders, and the public, and how will feedback be incorporated into ongoing program development?	Publish regular reports on the program's progress and challenges, inviting community feedback on future directions.	Keep reporting vague and infrequent, leading to distrust among community members regarding how their input is valued.

These subtopics can help structure discussions and focus efforts on key areas for enhancing community voice in disaster response planning.

To further assess the effectiveness of community engagement initiatives, we can use a scoring index that evaluates various aspects of integrated community voice and engagement. This index will consider factors such as the level of participation, the diversity of voices included, the transparency of the decision-making process, and the tangible outcomes resulting from community input. The following scoring scales outlines the criteria used to measure these components, providing a structured approach to understanding how well communities are involved in shaping their disaster preparedness and response strategies.

This section applies directly to what the county has done, or is doing, to engage the community within the process of hazard mitigation, rather than external actors. While reviewing additional community resources was considered, for the purposes of this report and brevity, this methodology was only applied to the study counties. This limits the analysis to where governmental activity is involved, or aware of, communal resources.

To apply these scoring scales, the paper investigates the CDRZ county public websites for natural hazard mitigation. Once identified, we reviewed the county website for program or policy implementation and planning documents. Additionally, county websites were reviewed for any information about public processes and for accessibility by examining whether materials were made available in multiple languages. Below is the step-by-step approach for researching these aspects using a structured framework:

To research county websites for the information included in the scoring scales provided, it's necessary to evaluate how effectively counties address various aspects of community engagement, marginalized group outreach, cultural sensitivity, trust-building, and other key areas. The methodology used in this report begins with identifying relevant sections on the county website, such as "Community Engagement," "Outreach Programs," "Diversity and Inclusion," "Public Participation," "Community Services," and "Equity Initiatives." Additionally, reviewing annual reports or strategic plans for hazard mitigation can provide insights into how the county prioritizes outreach and engagement, while specific programs targeting groups like youth, seniors, people with disabilities, or minority communities can highlight targeted efforts for marginalized populations.

### **Identifying and Reaching Marginalized Groups**

Counties should make deliberate efforts to identify marginalized groups and create targeted outreach strategies to ensure their voices are heard during the mitigation planning process. Effective outreach goes beyond general announcements to engage with groups that are often overlooked, such as people with disabilities, immigrants, or low-income communities. In this methodology, within the county website and annual reports, materials were reviewed to ensure minority and marginalized communities were identified. Then programs or initiatives specifically designed for these groups were identified, including outreach materials in multiple languages or accessibility features for the hearing-impaired.

### **Training and Resources**

A county's commitment to empowering the community is reflected in its training programs. These should be designed to equip staff with the skills to engage diverse populations, as well as provide resources for marginalized communities to be more involved in decision-making. Available annual reports and website materials to assess whether the county offers specialized training, such as cultural competency, diversity awareness, or community organizing, and if resources for empowerment (e.g., workshops or grants) are made available.

### **Trust Building**

Trust is foundational to community engagement, and counties need to foster ongoing, transparent relationships with the public. This can be achieved through consistent, open forums, town halls, or other forms of public dialogue, where officials not only listen but also follow up on concerns raised by the community. To assess trust building, we assessed whether mitigation plans included any information about public processes such as future meetings for open forums, public comment periods, and educational materials about hazard mitigation.

### **Language and Communication Barriers**

Addressing language and communication barriers is crucial for ensuring equitable access to services. Counties should provide translation services and accessible materials to serve non-English speakers or



people with disabilities. This could include translated documents, interpreters at meetings, or websites optimized for screen readers, making sure that information is accessible to everyone. This was reviewed by assessing the county's website for materials in different languages and resources available to individuals hard of hearing or translations into different languages during public meetings.

### **Cultural Sensitivity**

Cultural sensitivity in county planning reflects an understanding of diverse community values and traditions. Effective counties integrate cultural perspectives into their decision-making processes, ensuring that their programs and services are relevant and respectful. This was reviewed by looking for mentions of collaborations with cultural groups, advisory boards, or initiatives that celebrate or acknowledge the county's cultural diversity.

### **Feedback Adaptation**

It is essential for counties to not only collect community feedback but also demonstrate how that input influences decision-making and policies. Strong feedback loops involve ongoing engagement with residents, particularly marginalized groups, to ensure their concerns are addressed and incorporated into county planning. We looked for on the county website if they provide regular updates via media, press releases, or meeting, that expressed how public feedback has been used and what changes have been made as a result.

### **Role of Local Organizations**

Local organizations play a key role in amplifying community voices and building credibility, especially when they represent marginalized groups. To assess this, annual reports were reviewed to see if counties actively partnered with these organizations to co-create, or administer, programs that met the needs of vulnerable populations. To do so, evidence of collaboration, such as joint events, community outreach efforts, or advisory roles for local organizations in planning processes were identified.

### **Feedback Loops**

Ongoing feedback loops are essential for keeping the community engaged and informed. County plans were reviewed to see if they included plans to communicate regularly with the public, providing updates on how their feedback has been used and what actions are being taken.

### **Data Collection Tools**

Effective data collection tools allow counties to gather meaningful insights from community members and use that data to inform decision-making. This was reviewed by assessing county plans and annual reports to assess whether they employed a variety of methods, such as surveys, focus groups, and online platforms, to collect input from diverse populations.

### **Integrating Personal Narratives**

Personal stories and narratives are powerful tools for humanizing data and fostering empathy in the planning process. County websites and planning documents were reviewed for opportunities for residents, particularly those from marginalized communities, to share their experiences through storytelling events or public forums. Additionally, public forum websites were reviewed to see if public comments were available.

### Transparency in Reporting

Transparency in reporting is essential for building trust between the county and its residents. County websites were reviewed for accessible reports detailing their actions, progress on initiatives, and how community feedback has been used.

**Table 15. Identifying and Reaching Marginalized Groups Scoring Scale**

Score	1	2	3	4	5
	Little effort to identify or engage marginalized communities.	Outreach strategies with minimal connection to marginalized groups.	General outreach methods to all community members, no specific targeting efforts toward marginalized communities.	Identified marginalized groups in the county but did not define targeted outreach methods.	Identified and adopted targeted outreach efforts, ensuring marginalized voices are included.

**Table 16. Training and Resources Scoring Scale**

Score	1	2	3	4	5
	Very little engagement or training; community voices largely ignored.	Minimal training available; community empowerment is not prioritized.	Training provided but lacks focus on specific community needs.	Training opportunities, with some attention to diverse community demographics.	Extensive training tailored to community needs and ongoing empowerment initiatives.

**Table 17. Trust Building Scoring Scale**

Score	1	2	3	4	5
	Rare engagement results in low community trust and high skepticism.	Limited meetings and follow-up.	Ad-hoc meetings held; trust is somewhat established but lacks depth.	Some forums were held, but consistency and follow-up could improve.	Regularly scheduled, open forums and continuous engagement foster strong trust.

**Table 18. Language and Communication Barriers Scoring Scale**

Score	1	2	3	4	5
	No efforts made to address accessibility or language barriers.	Minimal attention to accessibility needs, leading to exclusion.	Basic accommodations offered, but significant barriers remain.	Good language support, though some areas for improvement exist.	Comprehensive accommodations for language and disabilities, ensuring inclusivity.

**Table 19. Cultural Sensitivity Scoring Scale**

Score	1	2	3	4	5
	Little regard for cultural differences; planning largely disconnected.	Limited cultural sensitivity; few voices from different backgrounds consulted.	Acknowledgment of cultural dynamics, but minimal active involvement.	Consideration of cultural needs, but not fully integrated into the planning process.	Active involvement of cultural representatives in planning, honoring community values.

**Table 20. Feedback Adaptation Scoring Scale**

Score	1	2	3	4	5
	Little to no effort for sustainable engagement.	Limited focus on long-term engagement; primarily reactive strategies.	Some effort is made for sustainability, but lacks a structured approach.	Good engagement strategies established, with some areas for ongoing improvement.	Systems in place for ongoing engagement and feedback, ensuring sustainability.

**Table 21. Role of Local Organizations Scoring Scale**

Score	1	2	3	4	5
	Limited input, minimal impact on credibility and relatability.	Basic participation, some insights but limited influence.	Active involvement that improves credibility and relatability but does not include identified marginalized groups.	Significant engagement, fostering trust and enhancing impact. Considers some historically marginalized or vulnerable groups.	Central to planning and implementation and includes marginalized groups, driving initiatives and ensuring high credibility and relatability.

**Table 22. Feedback Loops Scoring Scale**

Score	1	2	3	4	5
	Very little communication back to the community.	Rare and not provided on website, follow-up on community input.	Feedback is provided occasionally, but not consistently.	Regular feedback shared, though some updates may lack detail.	Ongoing communication and updates provided to the community based on their input.

**Table 23. Data Collection Tools Scoring Scale**

Score	1	2	3	4	5
	Very few tools used; minimal analysis of community feedback, leading to decisions made without sufficient information.	Limited data collection methods employed; insights gathered but rarely used for decision-making.	Basic tools are used to gather feedback, but the connection to actionable improvements is inconsistent.	Good use of several data collection methods, with most insights translated into decisions; minor gaps in real-time application.	Comprehensive and varied data collection tools are in place (e.g., surveys, focus groups, digital feedback mechanisms) that actively inform decision-making and lead to actionable improvements.

**Table 24. Integrating Personal Narratives Scoring Scale**

Score	1	2	3	4	5
	Very few personal narratives gathered; little acknowledgment in planning processes.	Limited opportunities for storytelling; narratives are rarely considered in planning.	Some space for personal narratives exists, but integration into decision-making is minimal.	Strong focus on personal narratives with some integration into planning; occasional storytelling events are held.	Active facilitation of storytelling opportunities that are integral to planning; narratives are systematically incorporated into decision-making processes.

**Table 25. Transparency in Reporting Scoring Scale**

Score	1	2	3	4	5
	Very little transparency; infrequent reports create distrust among community members.	Limited reporting processes; stakeholders are often left uninformed about program developments.	Basic reporting occurs, but infrequency or vagueness limits transparency; some feedback is considered.	Good transparency with regular updates provided, though some details may be lacking; community feedback is occasionally integrated.	Regular and clear reporting processes in place, with detailed documentation accessible to stakeholders; feedback is actively sought and incorporated into program development.

## Infrastructure Investment

When selecting counties in which to invest private dollars in resilience, it is necessary to evaluate the viable infrastructure resilience investment opportunities within relevant communities. This paper offers a framework to assess such opportunities with regard to wildfire within five different infrastructure categories: transportation, water, energy, housing, and health.

### Evaluating Transportation Infrastructure Opportunities

Transportation infrastructure can be damaged by wildfire, through heat or by fallen trees and other debris, and by post-fire hazards, including flooding, debris flow, and landslides. Roads are particularly vulnerable, with road exposure to fire increasing 58 percent between 2000 and 2019.<sup>141</sup> Additionally, roads can be the point of origin of wildfires.<sup>142</sup> Further, wildfires can reduce visibility on roads, leading to safety issues.

However, the resilience of transportation infrastructure to wildfire is vital. Transportation is critical not only to evacuation and fire response efforts, but also to the functioning and strength of local communities and economies. Additionally, impacts to transportation systems can slow wildfire recovery efforts by making it harder to bring in the necessary resources to rebuild communities. As such, investing in the resilience of transportation infrastructure to wildfire is a critical opportunity for SPIN Global.

While airports, railways, and public transit are impacted by wildfires, this paper will focus specifically on the wildfire resilience of road networks, including bridges. This is because of their unique vulnerability to wildfire, their importance to the functioning of communities, and that they fall under local, state, or federal jurisdiction in the United States.

This paper recommends focusing on the following types of projects in order to increase the resilience of transportation infrastructure to wildfire and uses these types of projects as criteria in evaluating communities:

### *Infrastructure Hardening*

Elements of transportation infrastructure, including culverts, guardrails and signposts, traffic signals, and roads themselves can be damaged directly by wildfires. Wildfires may melt plastic and wood elements of transportation infrastructure, and in some cases superheated steel or concrete may become brittle or

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<sup>141</sup> Modaresi Rad, A., Abatzoglou, J.T., Kreitler, J. *et al.* (2023, September 25,). *Human and infrastructure exposure to large wildfires in the United States*. *Nat Sustain* **6**, 1343–1351. <https://doi.org/10.1038/s41893-023-01163-z>.

<sup>142</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.



crack.<sup>143</sup> Additionally, during fire events use of low-volume pavements by heavy vehicles carrying fire suppression materials may increase, causing degradation.<sup>144</sup>

One method of mitigating potential wildfire damage to transportation infrastructure is through system hardening. Hardening efforts can include:

- Replacing plastic culverts with those made from inert materials so that they remain functional both during and after a wildfire;<sup>145</sup>
- Replacing wooden guardrails and signposts with those made from inert materials so they remain functional both during and after a wildfire;<sup>146</sup>

### *Creation of Defensible Space*

Defensible space is a natural or landscaped area near a structure that is maintained in order to reduce the risk of wildfire.<sup>147</sup> By managing vegetation near roads and creating fire breaks, defensible space can reduce the amount of fuel available for wildfires to burn and also help ensure evacuation routes remain available.<sup>148</sup> Additionally, defensible space can also reduce the possibility of ignition from vehicles and humans and lessen the direct impacts of fire on road infrastructure.<sup>149</sup>

To create defensible space, several vegetation management and fuel break efforts can be taken. These efforts can include:

- Creating setbacks for vegetation along roads to less the potential for roadside ignition;<sup>150</sup>
- Creating vegetation-free zones along roads to act as a fuel break;<sup>151</sup>

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<sup>143</sup> Bradley, Allan, RPF, P.Eng., Kurowski, Matt, P.Eng., M.Sc. (2022, October). *Wildfire Risks to Resource Roads in British Columbia. Project Number: 301015337*. Retrieved from The Government of British Columbia: [https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/engineering-publications-permits/fpinnovations/wildfire\\_risks\\_to\\_resource\\_roads.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/engineering-publications-permits/fpinnovations/wildfire_risks_to_resource_roads.pdf).

<sup>144</sup> Muench, Steve., Ram, Prashant., Smith, Kurt., Van Dam, Tom. (2023, March 12) *Pavement Resilience State of Practice*. FHWA-HIF-23-006. Retrieved from: <https://www.fhwa.dot.gov/pavement/concrete/pubs/hif23006.pdf>.

<sup>145</sup> Caltrans., Department of Transportation Planning. (2023, May). *Climate Adaptation Strategies for Transportation Infrastructure*. Retrieved from: <https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/office-of-smart-mobility-and-climate-change/fy23-24-adaptation-strategies-transportation-infrastructure-05102024v2-a11y.pdf>.

<sup>146</sup> California Department of Transportation Department of Transportation Planning. (2023, May). *Climate Adaptation Strategies for Transportation Infrastructure*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/office-of-smart-mobility-and-climate-change/fy23-24-adaptation-strategies-transportation-infrastructure-05102024v2-a11y.pdf>.

<sup>147</sup> California Department of Transportation. (n.d.). *Natural Resources and Wildfire Adaptation*. Retrieved from California Department of Transportation: <https://dot.ca.gov/programs/maintenance/natural-resources-and-wildfire-adaption>.

<sup>148</sup> California Department of Transportation. (n.d.). *Creating Safer Corridors*. Retrieved from California Department of Transportation: <https://dot.ca.gov/programs/public-affairs/mile-marker/fall-2020/resilient-highways>.

<sup>149</sup> California Department of Transportation. (n.d.). *Natural Resources and Wildfire Adaptation*. Retrieved from: <https://dot.ca.gov/programs/maintenance/natural-resources-and-wildfire-adaption>.

<sup>150</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.

<sup>151</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department

- Creating vertical fuel breaks through vegetation removal or mowing;<sup>152</sup>
- Implementing prescribed burns;<sup>153</sup>
- Replacing vegetation with less flammable species;<sup>154</sup> and
- Other efforts.

### Protection

Post-fire hazards including flooding, erosion and sedimentation, landslides, rockslides, avalanches, and debris flow can damage transportation infrastructure such as roads and bridges and culverts. Damage from these hazards can make transportation networks unsafe or unusable for a period of time, as well as destroy them entirely. Currently, mitigation is often reactive. However, there is a critical need to be proactive in resilience planning around reducing the risk of post-fire hazards to transportation infrastructure.

There are various methods of protecting transportation infrastructure from post-fire hazards. including:

- Installing debris basins and racks above vulnerable transportation infrastructure;<sup>155</sup>
- Widening culverts to make them resilient to landslides;<sup>156</sup>
- Installing or creating debris fins, debris deflectors, and debris sweepers to keep debris away from transportation infrastructure;<sup>157</sup> and
- Other efforts.

### Evaluating Water Infrastructure Opportunities

Wildfires can impact water infrastructure both during and after the fire event. Wildfires can both damage infrastructure, including service lines, pumps, and meters, and also lead to water contamination from watershed impacts upstream, the melting of pipes, and depressurization.

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of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.

<sup>152</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.

<sup>153</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.

<sup>154</sup> Refai, Razim. (2020, March). *Bridges & Wildfire Events: Identifying Information Gaps in Bridge Protection in the Context of Resistance to Wildland Fire Events*. Retrieved from Government of British Columbia: [https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/engineering-publications-permits/fpinnovations/bridges\\_and\\_wildfire\\_identifying\\_information\\_gaps.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/engineering-publications-permits/fpinnovations/bridges_and_wildfire_identifying_information_gaps.pdf).

<sup>155</sup> Wildfire Ready Watersheds. (n.d.). *Value At Risk: Transportation Network*. Retrieved from Wildfire Ready Watersheds: <https://www.wildfirereadywatersheds.com/transportation>.

<sup>156</sup> California Department of Transportation Division of Research, Innovation and System Information. (2020, June 12). *Roadside Design Strategies for Fire Presuppression: Survey of Practice*. Retrieved from California Department of Transportation: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>.

<sup>157</sup> Johnson, Peggy A., Sheeder, Scott A. (2008, October). *Controlling Debris at Pennsylvania Bridges*. Retrieved from Commonwealth of Pennsylvania: <https://www.pa.gov/content/dam/copapwp-pagov/en/penndot/documents/research-planning-innovation/planning/research-and-implementation/documents/controlling%20debris%20at%20pa%20bridges.pdf>.

However, the resilience of water infrastructure to wildfire is vital. Water is critical not only to firefighting activities, but to public health and safety. Additionally, a lack of usable water can slow wildfire recovery efforts, as individuals will not be able to return home without access to clean water. As such, investing in the resilience of water infrastructure to wildfire is a critical opportunity for SPIN Global.

This paper recommends focusing on the following types of projects in order to increase the resilience of water infrastructure to wildfire and uses these types of projects as criteria in evaluating communities:

### *Infrastructure Hardening*

Wildfires in developed areas can damage water distribution systems and their components, including source water infrastructure, tanks, pumps, service lines, and customer property.<sup>158</sup> Damage to these components can lead to water contamination and service disruption. For example, thermal damage can lead to the melting of plastic pipes and other products throughout the system, which can lead to the accumulation of volatile organic compounds into the water supply.<sup>159</sup> Additionally, pipes that are damaged during a fire event can cause the water system to depressurize, leading to contamination. Depressurization can also occur due to loss of power caused by a wildfire.<sup>160</sup>

One method of mitigating potential wildfire damage to water infrastructure is through system hardening. Hardening efforts can include:

- Identifying and/or procuring backup power sources to prevent depressurization;<sup>161</sup>
- Installing physical interconnections with nearby water distribution systems to prevent depressurization and also provide a viable water supply;<sup>162</sup>
- Improving distribution system components, including adding pressure zone separations, installing backflow prevention device and auto-shutoff meters and valves, and limiting plastic use;<sup>163</sup>

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<sup>158</sup> Whelton, A. J., Seidel, C., Wham, B. P., Fischer, E. C., Isaacson, K., Jankowski, C., MacArthur, N., McKenna, E., & Ley, C. (2023). The Marshall Fire: Scientific and policy needs for water system disaster response. *AWWA Water Science*, 5(1). <https://doi.org/10.1002/aws2.1318>.

<sup>159</sup> Landers, Jay. (2022, October 3). *Wildfires pose growing threat to drinking water systems*. Retrieved from American Society of Civil Engineers: <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/article/2022/10/wildfires-pose-growing-threat-to-drinking-water-systems>.

<sup>160</sup> Whelton, A. J., Seidel, C., Wham, B. P., Fischer, E. C., Isaacson, K., Jankowski, C., MacArthur, N., McKenna, E., & Ley, C. (2023). The Marshall Fire: Scientific and policy needs for water system disaster response. *AWWA Water Science*, 5(1). <https://doi.org/10.1002/aws2.1318>.

<sup>161</sup> Whelton, A. J., Seidel, C., Wham, B. P., Fischer, E. C., Isaacson, K., Jankowski, C., MacArthur, N., McKenna, E., & Ley, C. (2023). The Marshall Fire: Scientific and policy needs for water system disaster response. *AWWA Water Science*, 5(1). <https://doi.org/10.1002/aws2.1318>.

<sup>162</sup> Whelton, A. J., Seidel, C., Wham, B. P., Fischer, E. C., Isaacson, K., Jankowski, C., MacArthur, N., McKenna, E., & Ley, C. (2023). The Marshall Fire: Scientific and policy needs for water system disaster response. *AWWA Water Science*, 5(1). <https://doi.org/10.1002/aws2.1318>.

<sup>163</sup> Whelton, A. J., Seidel, C., Wham, B. P., Fischer, E. C., Isaacson, K., Jankowski, C., MacArthur, N., McKenna, E., & Ley, C. (2023). The Marshall Fire: Scientific and policy needs for water system disaster response. *AWWA Water Science*, 5(1). <https://doi.org/10.1002/aws2.1318>.

- Hardening surface infrastructure, including using heat resistant materials for components as valve boxes and meter pits;<sup>164</sup>
- Installing hard measures to catch sediment and other debris above surface water storage components, including debris basins, rock nets, and settling ponds;<sup>165</sup>
- Relocating structures away from floodplain and active stream corridors;<sup>166</sup>
- Installing rainfall and flow measurement gages to serve as a warning system for downstream impacts of a wildfire;<sup>167</sup> and
- Other measures.

### *Watershed Protection*

Wildfires affect watersheds, negatively impacting both water quality and water availability. With regard to water quality, by removing vegetation and reducing the absorption capabilities of soils wildfires can increase vulnerability of watersheds to runoff and erosion.<sup>168</sup> This in turn causes contaminants, including ash, nutrients, sediments, heavy metals, and other toxins, to wash downstream into water supplies. With regard to water quantity, wildfires can negatively affect groundwater availability by up to two years given the loss of vegetation to absorb water.<sup>169</sup> Additionally, wildfires pose a public safety risk as they can result in an increased flood risk due to the loss of vegetation.<sup>170</sup>

Increasing the resilience of watersheds to wildfire is a critical issue given that forested areas account for the source of 60 to 65 percent of the drinking water in the United States.<sup>171</sup> Protection most often takes the form of watershed and stream restoration. These efforts can include:

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<sup>164</sup> Landers, Jay. (2022, October 3). *Wildfires pose growing threat to drinking water systems*. Retrieved from American Society of Civil Engineers: <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/article/2022/10/wildfires-pose-growing-threat-to-drinking-water-systems>.

<sup>165</sup> Wildfire Ready Watersheds. (2022, December). *Post-Fire Hazards and Water Infrastructure Fact Sheet*. Retrieved from Wildfire Ready Watersheds: [https://engineuity.egnyte.com/dl/9OYi9vqsZ9/05H\\_WRW\\_Fact\\_Sheet\\_-\\_Water\\_Infrastructure.pdf](https://engineuity.egnyte.com/dl/9OYi9vqsZ9/05H_WRW_Fact_Sheet_-_Water_Infrastructure.pdf).

<sup>166</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>167</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>168</sup> Moore, Andrew. (2020, October 16). *After the Blaze: How Wildfires Can Impact Drinking Water*. Retrieved from North Carolina State University College of Natural Resources: <https://cnr.ncsu.edu/news/2020/10/wildfires-impact-water/#:~:text=%E2%80%9CWhen%20a%20reservoir%20is%20filled,%24100%20million%2C%20according%20to%20Hallema>.

<sup>169</sup> Union of Concerned Scientists. (2022, June). *Fire and Water in the Western United States: How Worsening Wildfires Threaten Water Resources in the West*. Retrieved from Union of Concerned Scientists: <https://www.ucsusa.org/sites/default/files/2022-06/fire-water-western-us.pdf>.

<sup>170</sup> Federal Emergency Management Agency. (2020, November). *Flood Risks Increase After Fires*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_flood-after-fire\\_factsheet\\_nov20.pdf](https://www.fema.gov/sites/default/files/documents/fema_flood-after-fire_factsheet_nov20.pdf).

<sup>171</sup> Steckelberg, A., Wolfe. (2024, July 29). A surprising byproduct of wildfires: Contaminated drinking water. *The Washington Post*. Retrieved from The Washington Post: <https://www.washingtonpost.com/climate-environment/interactive/2024/wildfire-drinking-water-supply-danger/>.

- Replanting native vegetation after a wildfire to prevent erosion, thereby protecting water quality and physical structures from flooding;<sup>172</sup>
- Building structures in streams and floodplains to reduce flooding and catch sediment and nutrients;<sup>173</sup>
- Reconnecting floodplains to increase flood storage;<sup>174</sup>
- Restoring floodplains to allow for storage of sediment and debris;<sup>175</sup>
- Realigning streams to protect downstream communities from post-fire floods;<sup>176</sup>
- Creating secondary and overflow channels to allow for additional conveyance;<sup>177</sup>
- Improving stream corridor function;<sup>178</sup> and
- Other measures.

### *Water Treatment*

Wildfires can affect water quality in multiple ways during and immediately after the fire, as well as long-term. For example, fires can result in the accumulation of fine particulate matter, such as ash, and other contaminants in the water supply. Additionally, chemicals found in fire-fighting foam, such as per- and

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<sup>172</sup> Reiter, Erika., Rhoades, Chuck. (2024, January 12). *Sprucing up high-elevation forests: Teaming up to improve post-fire watershed health*. Retrieved from The U.S. Department of Agriculture:: <https://research.fs.usda.gov/rmrs/news/featured/sprucing-high-elevation-forests-teaming-improve-post-fire-watershed-health>.

<sup>173</sup> Reiter, Erika., Rhoades, Chuck. (2024, January 12). *Sprucing up high-elevation forests: Teaming up to improve post-fire watershed health*. Retrieved from The U.S. Department of Agriculture:: <https://research.fs.usda.gov/rmrs/news/featured/sprucing-high-elevation-forests-teaming-improve-post-fire-watershed-health>.

<sup>174</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>175</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>176</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>177</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.

<sup>178</sup> Colorado Water Conservation Board. (2024, February 13). *Wildfire Ready Watersheds Program Innovates Solutions to Post-Fire Flood Before the Flames Begin*. Retrieved from Colorado Water Conservation Board: <https://cwcb.colorado.gov/news-articles/wildfire-ready-watersheds-program-innovates-solutions-to-post-fire-flood-before-the>.



polyfluoroalkyl substances (PFAS), can enter drinking water sources.<sup>179</sup> Additionally, water distribution systems can become contaminated if they are depressurized during a fire event.<sup>180</sup>

It is critical to have a supply of clean water before, during, and after a wildfire. Improving and adjusting water treatment processes can help to ensure that water remains available for communities vulnerable to wildfire. These efforts can include:

- Creating source water redundancy;<sup>181</sup>
- Establishing raw water quality thresholds for the use of backup water sources or treatment processes;<sup>182</sup>
- Improving and establishing procedures for residuals handling;<sup>183</sup>
- improving and upgrading treatment systems and technology;<sup>184</sup> and
- Other measures.

### Evaluating Energy Infrastructure Opportunities

Energy infrastructure, particularly electric infrastructure, is vulnerable to wildfires. Energy infrastructure can be damaged by wildfires, which can cause power disruption and result in significant financial burdens to bring equipment back online.

Energy infrastructure can also cause wildfires. For example, fallen power lines that are still energized can come into contact with dry vegetation or overgrown vegetation can come into contact with functional power lines and other utility equipment. Additionally, power disruption is also caused when utilities implement Public Safety Power Shut Offs (PSPSs) to reduce the risk of wildfire.<sup>185</sup>

To reduce the risk of wildfire caused by energy infrastructure and to avoid damages to electric infrastructure caused by wildfires, it is necessary to increase resilience. Power service is necessary to public health and safety and to the functioning of local communities and economies. Additionally, wildfires caused by electric utilities negatively affect energy affordability, clean energy development,

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<sup>179</sup> Gumapas, Leo A., Kachurk, Kelly., Kesteloot, Kurt., Wandersee, Michael, Wendt, DeVault., Zimmerman, Dara. (2023, July 31). *Wildland Fires Could Be Putting Your Drinking Water at Risk*. Retrieved from National Park Service: <https://www.nps.gov/articles/000/wildland-fires-could-be-putting-your-drinking-water-at-risk.htm>.

<sup>180</sup> Landers, Jay. (2022, October 3). *Wildfires pose growing threat to drinking water systems*. Retrieved from American Society of Civil Engineers: <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/article/2022/10/wildfires-pose-growing-threat-to-drinking-water-systems>.

<sup>181</sup> Wildfire Ready Watersheds. (2022, December). *Post-Fire Mitigation Strategies*. Retrieved from Wildfire Ready Watersheds: [https://engineuity.egnys.com/dl/vuZktxZyZE/02P\\_WRW\\_Quick\\_Start\\_-\\_Hazard\\_Mitigation.pdf](https://engineuity.egnys.com/dl/vuZktxZyZE/02P_WRW_Quick_Start_-_Hazard_Mitigation.pdf).

<sup>182</sup> Wildfire Ready Watersheds. (2022, December). *Post-Fire Mitigation Strategies*. Retrieved from Wildfire Ready Watersheds: [https://engineuity.egnys.com/dl/vuZktxZyZE/02P\\_WRW\\_Quick\\_Start\\_-\\_Hazard\\_Mitigation.pdf](https://engineuity.egnys.com/dl/vuZktxZyZE/02P_WRW_Quick_Start_-_Hazard_Mitigation.pdf).

<sup>183</sup> Wildfire Ready Watersheds. (2022, December). *Post-Fire Mitigation Strategies*. Retrieved from Wildfire Ready Watersheds: [https://engineuity.egnys.com/dl/vuZktxZyZE/02P\\_WRW\\_Quick\\_Start\\_-\\_Hazard\\_Mitigation.pdf](https://engineuity.egnys.com/dl/vuZktxZyZE/02P_WRW_Quick_Start_-_Hazard_Mitigation.pdf).

<sup>184</sup> Wildfire Ready Watersheds. (2022, December). *Post-Fire Mitigation Strategies*. Retrieved from Wildfire Ready Watersheds: [https://engineuity.egnys.com/dl/vuZktxZyZE/02P\\_WRW\\_Quick\\_Start\\_-\\_Hazard\\_Mitigation.pdf](https://engineuity.egnys.com/dl/vuZktxZyZE/02P_WRW_Quick_Start_-_Hazard_Mitigation.pdf).

<sup>185</sup> California Public Utilities Commission. (n.d.). *Public Safety Power Shutoffs*. Retrieved from California Public Utilities Commission: <https://www.cpuc.ca.gov/psps/>.

and, in some areas, the housing market.<sup>186</sup> As such, investing in the resilience of energy infrastructure to wildfire is a critical opportunity for SPIN Global.

This paper recommends focusing on the following types of projects in order to increase the resilience of energy infrastructure to wildfire and uses these types of projects as criteria in evaluating communities:

### *Infrastructure Hardening*

Wildfires can burn utility poles, damage substations and transformers, and other elements of energy infrastructure. Additionally, energy infrastructure can contribute to the rapid spread of wildfires both by causing ignition and also by contributing to the spread of the fire. One method of improving the resilience of energy infrastructure to wildfire and also to prevent wildfires caused by energy infrastructure is through system hardening. Hardening efforts can include:

- Undergrounding power lines and other assets to prevent damage to infrastructure and reduce the risk of ignition;<sup>187</sup>
- Installing sectionalization devices to allow for de-energization of targeted sections of the grid to reduce the impacts of PSPS events;<sup>188</sup>
- Replacing wood poles with fire-resistant ones and increasing line spacing to increase their resilience to flames and lessen their ability to contribute to the spread of fire;<sup>189</sup>
- Upgrading poles and lines to account for higher wind speeds;<sup>190</sup>
- Installing covered power lines;<sup>191</sup>
- Employing sprays, fabric wraps, sleeves, and barriers to protect at-risk infrastructure;<sup>192</sup> and
- Others.

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<sup>186</sup> Macomber, Eric., Mastrandrea, Michael D., Wara, Michael. (2024, May). *Climate change and utility wildfire risk: A proposal for a federal backstop*. Retrieved from Hamilton Project: [https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522\\_THP\\_Climate\\_Wildfire\\_Proposal.pdf?\\_ga=2.174270368.302718370.1731249594-156638032.1731249594](https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522_THP_Climate_Wildfire_Proposal.pdf?_ga=2.174270368.302718370.1731249594-156638032.1731249594).

<sup>187</sup> Macomber, Eric., Mastrandrea, Michael D., Wara, Michael. (2024, May). *Climate change and utility wildfire risk: A proposal for a federal backstop*. Retrieved from Hamilton Project: [https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522\\_THP\\_Climate\\_Wildfire\\_Proposal.pdf?\\_ga=2.174270368.302718370.1731249594-156638032.1731249594](https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522_THP_Climate_Wildfire_Proposal.pdf?_ga=2.174270368.302718370.1731249594-156638032.1731249594).

<sup>188</sup> Macomber, Eric., Mastrandrea, Michael D., Wara, Michael. (2024, May). *Climate change and utility wildfire risk: A proposal for a federal backstop*. Retrieved from Hamilton Project: [https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522\\_THP\\_Climate\\_Wildfire\\_Proposal.pdf?\\_ga=2.174270368.302718370.1731249594-156638032.1731249594](https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522_THP_Climate_Wildfire_Proposal.pdf?_ga=2.174270368.302718370.1731249594-156638032.1731249594).

<sup>189</sup> Panossian, Nadia, and Tarek Elgindy. 2023. *Power System Wildfire Risks and Potential Solutions: A Literature Review & Proposed Metric*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-80746. <https://www.nrel.gov/docs/fy23osti/80746.pdf>.

<sup>190</sup> Panossian, Nadia, and Tarek Elgindy. 2023. *Power System Wildfire Risks and Potential Solutions: A Literature Review & Proposed Metric*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-80746. <https://www.nrel.gov/docs/fy23osti/80746.pdf>.

<sup>191</sup> U.S. Department of Energy Grid Deployment Office. (2023, October 25). *Protecting our Electric Grid from Wildfire*. Retrieved from U.S. Department of Energy: <https://www.energy.gov/gdo/articles/protecting-our-electric-grid-wildfire>.

<sup>192</sup> Electric Power Institute. (2024, April 22). *Wildfire Risk Reduction Methods*. Retrieved from Electric Power Institute: <https://www.epri.com/research/products/000000003002030230>.

### *Vegetation Management*

Vegetation management near transmission lines and other key elements of energy infrastructure can reduce the amount of fuel available for wildfires to burn. It can also reduce the potential for ignition from either fallen poles or other downed infrastructure coming into contact with vegetation or vegetation coming into contact with intact infrastructure.

Vegetation management forms can take several forms, including:

- Trimming and removing trees and shrubs near power lines;<sup>193</sup>
- Removing flammable material near wood structures;<sup>194</sup>
- Pole brushing to remove flammable material at the base of poles;<sup>195</sup> and
- Others.

When discussing vegetation management, it is important to note that many utilities face a number of right-of-way and other regulatory issues in accessing areas necessary to perform vegetation management.<sup>196</sup>

### *Situational Awareness*

Situational awareness is a key strategy to increase the resilience of energy infrastructure and reduce the potential of wildfires caused by energy infrastructure. Situational awareness provides grid operators and other key stakeholders with an understanding of what is happening throughout the system.<sup>197</sup> It allows for increased proactivity as well as response.

Situational awareness efforts can include:

- Installing weather stations at asset height or enhancing meteorological resources;<sup>198</sup>

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<sup>193</sup> Ciampoli, Paul. (2024, June 6). *Utilities Adopt Various Strategies to Mitigate Against the Threat of Wildfires*. Retrieved from American Public Power Association: <https://www.publicpower.org/periodical/article/utilities-adopt-various-strategies-mitigate-against-threat-wildfires#:~:text=Vegetation%20management%3A%20Clearing%20hazard%20trees,of%20ignition%20during%20fire%20season.>

<sup>194</sup> Bonneville Power Administration. (2024, May). *BPA 2024 Wildfire Mitigation Plan*. Retrieved from Bonneville Power Administration: <https://www.bpa.gov/-/media/Aep/wildfire/wildfire-mitigation-plan.pdf>.

<sup>195</sup> Southern California Edison. (2024, November 24). *2023-2025 Wildfire Mitigation Plan Process and Evaluation Guidelines* Retrieved from Southern California Edison: <https://www.sce.com/sites/default/files/AEM/Wildfire%20Mitigation%20Plan/2023-2025/SCE%202025%20WMP%20Update%20R1.pdf>.

<sup>196</sup> Bruzgul, Judsen., Weisenfeld, Neil. (2023, November 17). Wildfire Risks in the US are soaring. Here's what utilities can do. *Utility Dive*. Retrieved from Utility Dive: <https://www.utilitydive.com/news/utility-mitigate-wildfire-risks-power-safety-shutoff-resilience/700139/>.

<sup>197</sup> Electric Power Institute. (2024, April 22). *Wildfire Risk Reduction Methods*. Retrieved from Electric Power Institute: <https://www.epri.com/research/products/000000003002030230>.

<sup>198</sup> Macomber, Eric., Mastrandrea, Michael D., Wara, Michael. (2024, May). *Climate change and utility wildfire risk: A proposal for a federal backstop*. Retrieved from Hamilton Project: [https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522\\_THP\\_Climate\\_Wildfire\\_Proposal.pdf?\\_ga=2.174270368.302718370.1731249594-156638032.1731249594](https://www.hamiltonproject.org/wp-content/uploads/2025/05/20240522_THP_Climate_Wildfire_Proposal.pdf?_ga=2.174270368.302718370.1731249594-156638032.1731249594).

- Increasing the frequency of component inspection, including through the use of drones and LiDAR;<sup>199</sup> See figure 29.<sup>200</sup>
- Improving and deploying modeling technology to better prepare for and mitigate the impacts of wildfire;<sup>201</sup>
- Installing grid and environmental sensors to monitor the physical and electrical conditions of the grid and the environment more broadly;<sup>202</sup> and
- Others.

**Figure 29. Drone Monitoring Powerlines**



### Evaluating Housing Infrastructure Opportunities

Housing in both rural and urban areas is vulnerable to wildfire. However, the risk is particularly high for lower-density areas in the wildland-urban interface (WUI).<sup>203</sup> Houses are impacted by direct and indirect ignition during wildfires. Direct ignition occurs when embers land on combustible elements of a building. Indirect ignition happens when embers land on combustibles near a building and the resulting flames impact a component of a building.<sup>204</sup>

Additionally, impacts of wildfire on housing infrastructure extends beyond the immediate need to repair and rebuild to socio-economic factors. For example, the lack of housing caused by a wildfire can affect businesses due to loss of workers and a customer base. It can also negatively impact a locality's finances due to loss of tax revenue. Therefore, improving the resilience of housing to wildfire is essential and investing in the resilience of housing to wildfire is a critical opportunity for SPIN Global.

This paper recommends focusing on the following types of projects in order to increase the resilience of housing infrastructure to wildfire and uses these types of projects as criteria in evaluating communities:

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<sup>199</sup> Panossian, Nadia, and Tarek Elgindy. 2023. Power System Wildfire Risks and Potential Solutions: A Literature Review & Proposed Metric. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-80746. <https://www.nrel.gov/docs/fy23osti/80746.pdf>.

<sup>200</sup> McCormick, John. (2020, September 11). California Utilities Hope Drones, AI Will Lower Risk of Future Wildfires. *Wall Street Journal*. Retrieved from Wall Street Journal: <https://www.wsj.com/articles/california-utilities-hope-drones-ai-will-lower-risk-of-future-wildfires-11599816601>.

<sup>201</sup> U.S. Department of Energy Grid Deployment Office. (2023, October 25). *Protecting our Electric Grid from Wildfire*. Retrieved from U.S. Department of Energy: <https://www.energy.gov/gdo/articles/protecting-our-electric-grid-wildfire>.

<sup>202</sup> Electric Power Institute. (2024, April 22). *Wildfire Risk Reduction Methods*. Retrieved from Electric Power Institute: <https://www.epri.com/research/products/000000003002030230>.

<sup>203</sup> C40 Cities Climate Leadership Group., C40 Knowledge Hub. (2021, August). *How to protect urban lives, health and property from wildfire*. Retrieved from C40 Cities: [https://www.c40knowledgehub.org/s/article/How-to-protect-urban-lives-health-and-property-from-wildfire?language=en\\_US](https://www.c40knowledgehub.org/s/article/How-to-protect-urban-lives-health-and-property-from-wildfire?language=en_US).

<sup>204</sup> Hawks, Steven., Hedayati, Faraz., Quarles, Stephen L. (2023, April). *Wildland Fire Embers and Flames: home Mitigations That Matter*. Retrieved from Insurance Institute for Business & Home Safety: <https://ibhsl.wpenginepowered.com/wp-content/uploads/Home-Mitigations-that-Matter-FINAL.pdf>.

### *Infrastructure Hardening*

Home hardening is an essential strategy to increase resilience to infrastructure. Many elements of a home are vulnerable and contribute to the spread of wildfire including roofs, gutters, vents, and more. There are a number of hardening measures that can be implemented, including:

- Replacing roofs with a fire-resistant materials or coverings;<sup>205</sup>
- Covering gutters with a noncombustible cover;<sup>206</sup>
- Replacing vents with noncombustible ones and placing a noncombustible mesh screen over the vent;<sup>207</sup>
- Building and/or increasing access to affordable housing outside of high-risk areas;<sup>208</sup>
- Improving the energy efficiency of housing;<sup>209</sup>
- Replacing single-pane windows with multi-pane ones and using tempered glass;<sup>210</sup> and
- Others.

### *Creation of Defensible Space*

Defensible space is an integral part of increasing wildfire resilience for housing infrastructure as it creates a buffer between homes and potential fires in open areas.<sup>211</sup> See Figure 30.<sup>212</sup> Introducing defensible space not only helps prevent fires from spreading from open spaces to structures but can help to prevent the spread of fire among structures in the built environment.<sup>213</sup> Defensible space is particularly critical for

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<sup>205</sup> Hawks, Steven., Hedayati, Faraz., Quarles, Stephen L. (2023, April). *Wildland Fire Embers and Flames: home Mitigations That Matter*. Retrieved from Insurance Institute for Business & Home Safety: <https://ibhsl.wpenginepowered.com/wp-content/uploads/Home-Mitigations-that-Matter-FINAL.pdf>.

<sup>206</sup> Hawks, Steven., Hedayati, Faraz., Quarles, Stephen L. (2023, April). *Wildland Fire Embers and Flames: home Mitigations That Matter*. Retrieved from Insurance Institute for Business & Home Safety: <https://ibhsl.wpenginepowered.com/wp-content/uploads/Home-Mitigations-that-Matter-FINAL.pdf>.

<sup>207</sup> Hawks, Steven., Hedayati, Faraz., Quarles, Stephen L. (2023, April). *Wildland Fire Embers and Flames: home Mitigations That Matter*. Retrieved from Insurance Institute for Business & Home Safety: <https://ibhsl.wpenginepowered.com/wp-content/uploads/Home-Mitigations-that-Matter-FINAL.pdf>.

<sup>208</sup> U.S. Climate Resilience Toolkit. (n.d.). Options Database. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/content/options-database>.

<sup>209</sup> U.S. Climate Resilience Toolkit. (n.d.). Options Database. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/content/options-database>.

<sup>210</sup> Hawks, Steven., Hedayati, Faraz., Quarles, Stephen L. (2023, April). *Wildland Fire Embers and Flames: home Mitigations That Matter*. Retrieved from Insurance Institute for Business & Home Safety: <https://ibhsl.wpenginepowered.com/wp-content/uploads/Home-Mitigations-that-Matter-FINAL.pdf>.

<sup>211</sup> Federal Emergency Management Agency. (2023, June). *Marshall Fire Mitigation Assessment Team: Homeowner's Guide to Reducing Wildfire Risk Through Defensible Space*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_marshall-fire-mat-homeowners-guide-defensible-space.pdf](https://www.fema.gov/sites/default/files/documents/fema_marshall-fire-mat-homeowners-guide-defensible-space.pdf).

<sup>212</sup> Oregon Trail Electric Cooperative. (2024, June 11). *Area Resources and Awareness Focus on Wildfire Preparedness in Eastern Oregon*. Retrieved from Oregon Trail Electric Cooperative: <https://economicdevelopment.otec.coop/news/p/item/57802/area-resources-and-awareness-focus-on-wildfire-preparedness-in-eastern-oregon>.

<sup>213</sup> Federal Emergency Management Agency. (2023, June). *Marshall Fire Mitigation Assessment Team: Homeowner's Guide to Reducing Wildfire Risk Through Defensible Space*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_marshall-fire-mat-homeowners-guide-defensible-space.pdf](https://www.fema.gov/sites/default/files/documents/fema_marshall-fire-mat-homeowners-guide-defensible-space.pdf).



housing given that during a major wildfire, first responders are unlikely to be able to defend individual homes.<sup>214</sup>

There are several efforts that can be taken to create or strengthen defensible space around housing, including:

- Reducing or eliminating hazardous fuels, whether they are vegetative or not;
- Planting fire-resistant vegetation and avoiding hazardous plants;
- Employing mosaic planting and fuel breaks;
- Reducing ladder fuels including tall tree branches, grasses, and shrubs;
- Creating communal defensible space within neighborhoods;<sup>215</sup> and
- Others.

**Figure 30. Defensible Space**



### *Technology Deployment*

Technology deployment, both inside and outside individual homes, can help to increase the resilience of housing to wildfire. Technology can provide advance warning of approaching wildfires, protect homes from embers and heat, and slow the approach of fires. Examples of technology that can be deployed to increase resilience include:

- Using sensors and mapping to detect wildfires as they are starting and before they start to spread;<sup>216</sup>
- Aluminum wrap that acts as a shield to protect homes by deflecting embers and heat;<sup>217</sup>
- Spraying fire-retardant gel on vegetation to slow the approach of wildfires;<sup>218</sup> and
- Others.

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<sup>214</sup> Federal Emergency Management Agency. (2023, June). *Marshall Fire Mitigation Assessment Team: Homeowner's Guide to Reducing Wildfire Risk Through Defensible Space*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_marshall-fire-mat-homeowners-guide-defensible-space.pdf](https://www.fema.gov/sites/default/files/documents/fema_marshall-fire-mat-homeowners-guide-defensible-space.pdf).

<sup>215</sup> Federal Emergency Management Agency. (2023, June). *Marshall Fire Mitigation Assessment Team: Homeowner's Guide to Reducing Wildfire Risk Through Defensible Space*. Retrieved from Federal Emergency Management Agency: [https://www.fema.gov/sites/default/files/documents/fema\\_marshall-fire-mat-homeowners-guide-defensible-space.pdf](https://www.fema.gov/sites/default/files/documents/fema_marshall-fire-mat-homeowners-guide-defensible-space.pdf).

<sup>216</sup> Federal Emergency Management Agency. (2024, November 11). *Technology to Reduce the Impacts of Wildfire*. Retrieved from Federal Emergency Management Agency: <https://www.dhs.gov/science-and-technology/technology-reduce-impacts-wildfires>.

<sup>217</sup> Masterson, Victoria. (2022, January). This tech could protect your home from wildfires. Retrieved from World Economic Forum: <https://www.weforum.org/stories/2022/01/climate-change-wildfires-protection-homes/>.

<sup>218</sup> Masterson, Victoria. (2022, January). This tech could protect your home from wildfires. Retrieved from World Economic Forum: <https://www.weforum.org/stories/2022/01/climate-change-wildfires-protection-homes/>.

### Evaluating Health Infrastructure Opportunities

Wildfires can negatively impact the structural integrity, operations, and accessibility of healthcare facilities. For example, wildfires can force healthcare facilities to evacuate, which is a difficult and complex process.<sup>219</sup> Additionally, healthcare facilities can be impacted by transportation disruptions caused by wildfires, which can make it difficult for providers and patients to access the facility.<sup>220</sup> Further, hospitals may lose power due a wildfire which could affect the functioning of critical technology.

Healthcare facilities located in rural areas are particularly vulnerable, given the lack of redundancy built into the health system in those areas. Additionally, a recent study found that 55 percent of nursing homes in the West were exposed to elevated wildfire risk.<sup>221</sup>

However, it is essential to ensure that healthcare facilities are resilient to wildfire given the important role they play during and after a wildfire. This includes responding to the injuries and illnesses caused by the wildfire itself and also continuing to provide care to the broader public not directly impacted by the fire. As such, investing in the resilience of health infrastructure to wildfire is a critical opportunity for SPIN Global.

This paper recommends focusing on the following types of projects in order to increase the resilience of health infrastructure to wildfire and uses these types of projects as criteria in evaluating communities:

#### *Infrastructure Hardening*

Hardening health infrastructure is a critical strategy for increasing the resilience of healthcare facilities to wildfire. Hardening can help to ensure the safety of the physical structure of the facility as well as the operations inside. Hardening efforts can include:

- Ensuring a backup source of water to sustain critical operations;<sup>222</sup>
- Ensuring a backup source of power for critical technology;<sup>223</sup>

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<sup>219</sup> Neil Singh Bedi, Caleb Dresser, Akash Yadav, Andrew Schroeder, and Satchit Balsari: Wildfire Threat to Inpatient Health Care Facilities in California, 2022. American Journal of Public Health 113, 555\_558, <https://doi.org/10.2105/AJPH.2023.307236>.

<sup>220</sup> Neil Singh Bedi, Caleb Dresser, Akash Yadav, Andrew Schroeder, and Satchit Balsari: Wildfire Threat to Inpatient Health Care Facilities in California, 2022. American Journal of Public Health 113, 555\_558, <https://doi.org/10.2105/AJPH.2023.307236>.

<sup>221</sup> Neil Singh Bedi, Caleb Dresser, Akash Yadav, Andrew Schroeder, and Satchit Balsari: Wildfire Threat to Inpatient Health Care Facilities in California, 2022 American Journal of Public Health 113, 555\_558, <https://doi.org/10.2105/AJPH.2023.307236/>.

<sup>222</sup> Connor, Cecil. (n.d.). *Navigating Wildfires, Heat, and Drought: Safeguarding Rural Texas Communities and Hospitals*. Retrieved from Texas Hospital Insurance Exchange: <https://thie.com/wildfires/#~:text=Defensible%20Space%20Creating%20buffer%20zones,retrofits%20to%20mini,mize%20flame%20vulnerability.>

<sup>223</sup> Attila J Hertelendy, Courtney Howard, Cecilia Sorensen, Jamie Ranse, Ejemai Eboreime, Sarah Henderson, Jeffrey Tochkin, Gregory Ciottone. Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires; The Lancet Planetary Health. Volume 8, Issue 8. 2024. Pages e588-e602. ISSN 2542-5196. [https://doi.org/10.1016/S2542-5196\(24\)00144-X](https://doi.org/10.1016/S2542-5196(24)00144-X).

- Using fire-resistant materials in facility construction or renovation;<sup>224</sup> and
- Others.

### *Creation of Defensible Space*

As with other types of infrastructure, defensible space is critical to increasing the resilience of healthcare facilities to wildfire. By creating fire breaks and managing vegetation near critical health infrastructure, defensible space can reduce the amount of fuel available for wildfires to burn and also prevent wildfires from impacting structures.

To create defensible space around health infrastructure, several efforts can be taken, including creating and maintaining fire breaks and removing brush around community buildings and healthcare facilities, among others.<sup>225</sup>

### *Air Quality Monitoring and Response*

Given the negative impacts of wildfires on air quality, air quality monitoring and alerts is a key component of increasing the resilience of health infrastructure to wildfire. Air quality monitoring and alerts can help to improve response both by alerting health care providers and other stakeholders to the issue but also for communicating with the public on steps they should take in order to avoid overburdening the healthcare system. Additionally, ensuring air quality in healthcare facilities is critical to prevent evacuation.<sup>226</sup>

There are also several infrastructure projects that can be pursued in order to address air quality monitoring and response. These projects include:

- Acquiring and deploying a community air quality monitoring system;<sup>227</sup>
- Installing air filtration systems and portable scrubbers in hospitals and other healthcare facilities;<sup>228</sup>
- Isolating emergency department ventilation systems and using recirculated air during

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<sup>224</sup> Colorado Health Facilities & Emergency Division. (2018, May 31). *Health Facility Preparedness 2018 Colorado Wildfire Season*. Retrieved from Colorado Health Facilities and Emergency Medical Services Division: <https://drive.google.com/file/d/1VgWY3SEvLjNlbe3uJuWodFJqQIRlP08J/view>.

<sup>225</sup> Attila J Hertelendy, Courtney Howard, Cecilia Sorensen, Jamie Ranse, Ejemai Eboreime, Sarah Henderson, Jeffrey Tochkin, Gregory Ciotton. Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires; *The Lancet Planetary Health*. Volume 8, Issue 8. 2024. Pages e588-e602. ISSN 2542-5196. [https://doi.org/10.1016/S2542-5196\(24\)00144-X](https://doi.org/10.1016/S2542-5196(24)00144-X).

<sup>226</sup> U.S. Climate Resilience Toolkit. (n.d.). *Health Care Facilities Maintain Indoor Air Quality Through Smoke and Wildfires*. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/case-studies/health-care-facilities-maintain-indoor-air-quality-through-smoke-and-wildfires#:~:text=This%20study%20emphasizes%20the%20role,the%20effects%20of%20wildfire%20smoke>.

<sup>227</sup> U.S. Climate Resilience Toolkit. (n.d.). *Options Database*. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/content/options-database>.

<sup>228</sup> U.S. Climate Resilience Toolkit. (n.d.). *Health Care Facilities Maintain Indoor Air Quality Through Smoke and Wildfires*. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/case-studies/health-care-facilities-maintain-indoor-air-quality-through-smoke-and-wildfires#:~:text=This%20study%20emphasizes%20the%20role,the%20effects%20of%20wildfire%20smoke>.

emergencies;<sup>229</sup>

- Building public emergency shelters that provide clean air during wildfires;<sup>230</sup> and
- Others.

## Infrastructure Investment Matrix and Scoring Scale

Table 26 provides a matrix template for infrastructure opportunity. To evaluate each county's infrastructure project opportunity, this paper analyzes the relevant County Hazard Mitigation Plan (HMP), the relevant Community Wildfire Protection Plan (CWPP), and the relevant State Hazard Mitigation Plan (SHMP). It examines each plan for a reference to a specific project type. If a specific project type is referenced in all three plans, the county receives a score of 5 for that project type. If the specific project type is mentioned in two of the three plans, it receives a score of 4 for that project type. If a specific project type is mentioned in one of the three plans, it receives a score of 3 for that project type. If a specific project type is not mentioned in any of the plans, it receives a score of 2. If the project type is not relevant to the county being considered, it receives a score of 1. Additionally, if the county does not have a specific plan, whether it is an HMP, CWPP, or SHMP, then the project type is considered not included in that plan.

This scoring system leverages the relevant County HMP and SHMP because counties and states are required to have these plans in place in order to receive funding through several Federal Emergency Management (FEMA) hazard mitigation grant programs.<sup>231</sup> Having a County HMP or SHMP in place means that the locality or state has dedicated time and resources to hazard mitigation and indicates that they would be open to outside funding to increase their resilience. Additionally, the mention of a specific project type in a County HMP or SHMP means that the locality or state has already acknowledged the need for this type of project, and so there would be some level of community support to pursue such a project. Additionally, this project type has already been identified as useful for that specific locality or state.

Currently, all 50 states, the District of Columbia, and five territories including American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands have hazard mitigation plans approved by FEMA. 24,800 local governments and 230 tribal governments have FEMA-approved or approvable-pending adoption mitigation plans.<sup>232</sup>

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<sup>229</sup> U.S. Climate Resilience Toolkit. (n.d.). *Health Care Facilities Maintain Indoor Air Quality Through Smoke and Wildfires*. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/case-studies/health-care-facilities-maintain-indoor-air-quality-through-smoke-and-wildfires#:~:text=This%20study%20emphasizes%20the%20role,the%20effects%20of%20wildfire%20smoke.>

<sup>230</sup> U.S. Climate Resilience Toolkit. (n.d.). *Options Database*. Retrieved from U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/content/options-database>.

<sup>231</sup> Federal Emergency Management Agency. (2024, September 24). *Hazard Mitigation Plan Status*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/status>.

<sup>232</sup> Federal Emergency Management Agency. (2024, September 24). *Hazard Mitigation Plan Status*. Retrieved from Federal Emergency Management Agency: <https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/status>.

CWPPs, authorized and defined in the Healthy Forests Restoration Act in 2003, outline local priorities for wildfire risk mitigation. These are localized plans that are community-driven that have been shown to go beyond wildfire risk reduction to community capability building.<sup>233</sup> Additionally, the U.S. Forest Service's Community Wildfire Defense Grant Program provides funding to develop and revise CWPPs.<sup>234</sup> If a community has a CWPP in place, it has indicated an intense focus on reducing wildfire risk. Additionally, if a specific project type is referenced in the CWPP, that project type is an acknowledged need that has support from the local community. All three plan types indicate that the relevant county has some need and local support for a specific project type. SPIN Global can use this information to evaluate counties to invest in.

**Table 26. Infrastructure Investment Matrix**

	<b>Transportation Infrastructure Project Type</b>	<b>Water Infrastructure Project Type</b>	<b>Energy Infrastructure Project Type</b>	<b>Housing Infrastructure Project Type</b>	<b>Health Infrastructure Project Type</b>	
	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	
	Creation of Defensible Space	Watershed Protection	Creation of Defensible Space	Creation of Defensible Space	Creation of Defensible Space	
	Protection	Water Treatment	Situational Awareness	Technology Deployment	Air Quality Monitoring and Response	
Mean Score						Overall Mean

**Table 27. Infrastructure Investment Matrix Scoring Scale**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Project irrelevant	Mentioned in none of the 3 plans	Mentioned in 1 out of 3 plans	Mentioned in 2 out of 3 plans	Mentioned in all 3 plans

<sup>233</sup> Fire Adapted Communities. (n.d.) *Community Wildfire Protection Plan and Data Library*. Retrieved from Fire Adapted Communities: [https://fireadapted.org/cwpp-database/#:~:text=Community%20Wildfire%20Protection%20Plans%20\(CWPPs,developed%20across%20the%20United%20States.](https://fireadapted.org/cwpp-database/#:~:text=Community%20Wildfire%20Protection%20Plans%20(CWPPs,developed%20across%20the%20United%20States.)

<sup>234</sup> U.S. Forest Service. (n.d.). *Community Wildfire Defense Grant Program*. Retrieved from U.S. Forest Service: <https://www.fs.usda.gov/managing-land/fire/grants/cwdg>.

## Results

In examining the potential for enhancing community resilience within the selected CDRZs, we use the methodology outlined above to assess the opportunities and challenges associated with investing in these areas, particularly in the context of wildfire risks. Wildfires pose significant threats to both urban and rural communities, exacerbated by factors such as climate change and land management practices. By focusing on four strategically chosen counties, this approach aims to illuminate how this methodology can be applied in different jurisdictions and risks to identify specific vulnerabilities and resilience capacities present in these regions.






Utilizing the scoring index, we assess each CDRZ's wildfire risk, expected annual loss, social vulnerability, and overall resilience to identify research-informed unmet categorical needs in CDRZs that will help shape investment targets in communities. This framework allows us to develop a composite score that highlights the areas in most urgent need of intervention. Through this analysis, we aim to identify investment opportunities and strategies that can bolster community resilience against wildfires while also addressing underlying social vulnerabilities.

The application of each of the matrices to the four counties is detailed in Appendices 1-4. Table 8 summarizes our findings using the developed policy matrices. Of the four counties that underwent analysis, Los Angeles County had the most active ordinances and policies to protect the county from wildfire ignition and spread, but all three counties were in the general range of 3.5 - 4. Los Angeles County had the most favorable economic environment. Gila County, AZ, Elmore County, ID, and Los Angeles County, CA had similar scores in infrastructure and community voice. Miami-Dade County, FL had the worst score of all of the counties in legislation and policies to protect the county from wildfire and could not be readily assessed in the other three areas of economic, infrastructure, and community voice environment.

**Table 28. Final Policy Scoring Matrix**

County	Legislative & Policy Mean Score	Economic Mean Score	Infrastructure Mean Score	Community Voice Mean Score	Average Mean Score
Gila Co., AZ	3.5	3.4	3.1	3.3	3.3
Elmore Co., ID	3.7	3.3	3.4	3	3.4
Los Angeles Co., CA	4.1	4	2.9	3	3.6
Miami-Dade Co., FL	1.9	2.9	2.3	-	-

### Legend

 Unfavorable 1 – 1.5	 Slightly Unfavorable 1.6 – 2.5	 Neutral 2.6 – 3.5	 Slightly Favorable 3.6 – 4.5	 Favorable 4.6 – 5
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## Usability of Legislative & Policy Matrix

The legislative and regulatory information described by the matrix was easy to find for each of the counties. Gila, Elmore, and Los Angeles counties have sections or chapters within their county ordinances designated to wildfire prevention. Some of the counties referenced the state legislative code within their ordinances where the state law provided the provisions for the county. Miami-Dade County did not have wildfire specific ordinances, and all of the wildfire prevention efforts for the state of Florida are managed by the Forest Service. For Miami-Dade County, it took more work than the other counties to find the legislative policy information. Once the information was found, the matrix, itself, was easy to use. The legislative information from each of the counties readily fit within the categories within the matrix.

The matrix was able to effectively differentiate between counties with more active legislation aimed at preventing wildfire spread and loss within and those with less active legislative enactments. Because most fire-resistant building materials are able to withstand fire for certain lengths of time, it does make a difference in preventing the spread of wildfire when the legislature mandates wildfire prevention efforts for property owners because fire prevention on one structure is highly dependent on the ability to withstand fire on nearby and adjacent structures. Thus, full community effort and involvement is necessary for resilience, and a robust legislative code helps to set the tone for the community. From the perspective of an investor, the presence of fire prevention legislation will likely help to protect the investment from future loss due to wildfire for these reasons.

## Usability of Economic Landscape Matrix

The economic information described by the matrix was easy to find for each county in most cases. Information from the insurance market, current wildfire resilience investments, and economic performance were easy to find for the four counties. This information relies primarily on data from government databases, government reports, announcements from state and local government agencies, and news articles. For the budget finances indicators, information can be challenging for certain counties. Regarding credit ratings, information for Gila and Elmore counties was more limited, probably due to being smaller counties. No credit rating information was available for Elmore County. In addition, credit ratings for Gila County could only be found from S&P Global. In contrast, credit rating information for Los Angeles and Miami-Dade counties was easily available from three major credit rating agencies. In addition, budget information was challenging for Los Angeles and Miami-Dade counties. For Los Angeles County, debt service funds and budget balances were available from a county report detailing the county's appropriations. For Miami-Dade County, the information was not available as it was not possible to find a full county budget. Once the information is collected, the matrix is easy to use and all information fits within the categories.

In addition to county financial indicators, real GDP data was not available for Gila and Elmore County. To address this issue, we used the implicit price deflator<sup>235</sup> at the national level to get an estimate of Real GDP based on nominal GDP to assess growth rates for the two counties in real terms. While variation in

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<sup>235</sup> The implicit price deflator is the ratio of nominal to real GDP. It measures how much of the change in nominal GDP is due to changes in prices. Source: The Investopedia Team. (2024, June 5). *What is the GDP price deflator and its formula?* Investopedia. Retrieved December 5, 2024, from <https://www.investopedia.com/terms/g/gdppricedeflator.asp>

prices in these two counties may not necessarily vary in the exact proportion as prices at the national level, they provide a more accurate estimate of growth rates compared to using nominal GDP data.

Despite the challenges of obtaining county financial information, the economic matrix was able to effectively differentiate between counties where economic and insurance market factors are more favorable. Examining current investments in wildfire resilience provides insights on other agents (public and private), seeing it worth investing in wildfire resilience in a CDRZ county. At the same time, examining insurance costs and policies to mitigate insurance unaffordability and unavailability provide insight on how insurance companies evaluate disaster risk and potential economic losses as well as how counties vulnerable to natural disasters are prepared in case of a disaster. In addition, looking at the county finances and economic indicators provide insight on a county's fiscal and economic health. From the perspective of an investor, the information on this matrix helps evaluate the wildfire resilience investment climate in each county.

### **Usability of Community Voice Integration Matrix**

The Community Voice Integration Matrix provides a useful framework for evaluating how well counties integrate community feedback into their hazard resilience planning. By examining key aspects such as community engagement, accessibility, trust-building, sustainability, and inclusivity, the matrix allows for a comprehensive assessment of how well marginalized groups are represented and how community input is incorporated in decision-making. This approach highlights the varying degrees of success across different counties in engaging their residents, particularly those from vulnerable and historically underserved communities.

For example, Gila County, Arizona, performs well in areas like trust-building and feedback adaptation, with regular community meetings and strong outreach strategies. However, the county's efforts fall short in language accessibility, as there are no multilingual resources provided, potentially excluding non-English-speaking residents from the planning process. The feedback loops established in Gila County, while commendable, could be further strengthened with clearer mechanisms for how community feedback influences planning and decision-making.

Similarly, Elmore County, Idaho, shows some strength in monitoring and evaluation, with established feedback loops and regular updates through webinars and media releases. Yet, the county's efforts in cultural sensitivity and language accessibility are weak, as it lacks targeted outreach to culturally diverse populations and does not provide multilingual materials. Additionally, the lack of integration of personal narratives or lived experiences in Elmore's plans limits the relatability and inclusivity of the process, reducing the potential for community members to see their unique needs reflected in the plan.

In Los Angeles County, California, while there is strong transparency and collaboration with local organizations, the integration of community voice is limited by the absence of personal narratives and the lack of culturally sensitive outreach. The county's reliance on public forums and media releases for feedback, while beneficial, may not fully capture the perspectives of those who are less digitally connected or who face language barriers. This reflects a broader need for more inclusive data collection tools, such as surveys or focus groups, that can engage a wider range of residents in the planning process.

Finally, Miami-Dade County, Florida, lacks a clear infrastructure for integrating community voice into its wildfire resilience plans, making it impossible to assess community engagement effectively. This highlights the importance of establishing formal mechanisms for engaging residents and soliciting input from diverse community groups, especially in areas where wildfire risks may be increasing.

The Community Voice Integration Matrix serves as a valuable tool for assessing how counties incorporate diverse community perspectives into their wildfire resilience efforts. While some counties excel in areas like trust-building and collaboration, there are significant opportunities for improvement in areas such as accessibility, cultural sensitivity, and data collection tools.

This matrix can serve as a tool that can help SPIN Global to 1) clarify project funding priorities, *e.g.*, funding counties with established community networks vs. counties that aim to improve community engagement and infrastructure improvements and 2) help to identify new ways to support communities in engaging their residents, ensuring resilience efforts are more efficient and equitable.

Using this tool, SPIN Global can help to ensure historically marginalized communities are not only heard but actively involved in decision-making processes to create a more equitable and sustainable hazard resilience strategy.

### **Usability of Infrastructure Investment Matrix**

The Infrastructure Investment Opportunity Matrix provides a useful framework for analyzing infrastructure investment opportunities to improve a county's resilience to wildfire. It focuses on transportation, water, energy, and health infrastructure in particular given the importance of this infrastructure to the functioning of society as well as the various threats they face from wildfire. The scoring system is also helpful in analyzing the level of local and state support for a specific infrastructure project type, and for determining whether the county or state itself is invested in resilience. This is due to the fact that counties and states must have a hazard mitigation plan in place in order to apply for certain FEMA grant programs. Having a plan in place shows a commitment to resilience. Additionally, by leveraging the county's Community Wildfire Protection Plan (CWPP), the scoring system adds another layer in to determine the county's commitment to addressing wildfire.

Finding information to complete the matrix for Miami-Dade County, Elmore County, Idaho, Gila County, Arizona, and Los Angeles County, California was relatively simple. All counties had a hazard mitigation plan and all three states had a state hazard mitigation plan. However, only Elmore and Gila counties had CWPPs, though Los Angeles County is currently developing one.

Further, in developing the matrix this report put together a list of example projects and infrastructure improvements that comprise the different criteria. These examples are infrastructure projects that SPIN Global may wish to examine more in depth as they search for and evaluate projects.

### **Recommendations**

The analysis of the selected CDRZs highlights how the framework and decision matrix is generalizable. By employing a data-driven approach that integrates community risk assessment, social vulnerability

metrics, and resilience evaluations, we have created a framework for deciding in what disaster types and communities to invest.

The methodology for selecting the CDRZs in which to invest can be used in situations where multiple grant proposals are received for the same disaster type resilience effort. In that case, the CDRZs with the lowest composite resilience score would indicate the greatest need. Alternatively, where multiple grant proposals are received for different disaster types, the composite resilience score matrix gives a framework for deciding which disaster type to consider funding first.

The policy matrices that were most useful in differentiating the four selected communities were the legislative and policy matrix and the economic landscape matrix. Both of these matrices provided information directly related to the risk of the investment. For the legislative matrix, a higher score is associated with more legislation to protect the value of the investment. For the economic matrix, a higher score is associated with a lower likelihood of default on the investment.

The community voice integration matrix likely has the greatest benefit in identifying ways to help a community who is chosen for funding to engage their residents to maximize the benefit of resilience efforts through community engagement. Additionally, this can help clarify the types of projects SPIN Global is most interested in funding—such as those that already have established community networks and engagement, or initiatives focused on enhancing these vehicles alongside infrastructure improvements. This is especially important to consider in marginalized communities and existing community ties.

The infrastructure investment opportunity matrix, though not as helpful in finding CDRZs in which to invest in the abstract, likely will be more beneficial once specific project proposals are received. In aligning the proposal with the infrastructure resilience needs and rating the proposal based on its ability to meet those aspects mentioned in the infrastructure matrix, the strength of a specific, individual proposal relative to other proposals will likely be better delineated. Additionally, the matrix may help in determining what types of infrastructure projects are most needed within a specific county and what types of projects have been most overlooked.

There are a few drawbacks associated with the infrastructure investment opportunity matrix, however. These include the fact that counties that do not have an HMP or CWPP or whose state does not have a SHMP will score lower, even if the project type is listed in another plan that is not included in the scoring system. Additionally, this scoring system may disadvantage less resourced communities that do not have the ability to put together an HMP or CWPP or whose state is unable to write a SHMP. SPIN Global may want to evaluate other indicators of infrastructure need than these three plans and incorporate them into the matrix.

Thus, when faced with multiple proposals for resilience efforts from different CDRZs and related to different hazard threats, the methodology for determining a composite resilience score will likely be helpful in determining the overall resiliency need. Once proposals in areas facing the greatest need are chosen, the legislative and policy, economic landscape, and infrastructure investment opportunity matrices will likely be helpful in deciding which project is likely the most favorable investment. Once a

project is chosen, the community voice integration matrix will likely be helpful in helping to guide the community in community engagement efforts.

## **Transferability**

This report develops a methodology for evaluating private resilience investments in counties with CDRZs. The hazard explored with this methodology was wildfire, and the counties with CDRZs at high risk for wildfire were considered using four criteria for identifying challenges and opportunities. This report focuses its analysis on CDRZs as they are the communities most vulnerable to natural hazards and face recovery challenges. However, the methodology developed in this report can also be used to identify challenges and opportunities for investments in counties that do not have CDRZs.

In addition, the four criteria used to identify challenges and opportunities can be applied for resilience investments in other types of natural hazards, with the risks within each matrix based on the threats posed by the specific hazard chosen. However, some adjustments should be made to the policy matrices outlined in this report to ensure that the evaluation criteria are relevant to the natural hazard resilience investments being considered. The criteria in the legislative and policy matrix should be adjusted to include policies and legislative actions to support risk reduction for the natural hazard that resilience investments are being considered. For the economic landscape matrix, the current resilience investments and programs criteria scoring should be adjusted to score counties based on the existence of current resilience investments and programs in the natural hazard that resilience investments are being considered. Lastly, the components that integrate the infrastructure matrix should be changed to identify the viable infrastructure resilience investment opportunities relevant to the natural hazard of interest.

## **Limitations**

The methodology developed in this report relies on the availability and trustworthiness of data to ensure a thorough and correct evaluation of a county's performance. The report intended to evaluate challenges and opportunities for resilience investments in Miami-Dade County, Florida, in addition to the three assessed counties. During the data collection process for Miami-Dade County, there were challenges to obtaining data for the voice matrix. Therefore, while an assessment of challenges and opportunities for wildfire resilience investment in Miami-Dade County is provided, the evaluation of this county may not be reflective of the actual challenges and opportunities.

## **Conclusion**

In conclusion, this report presents a structured framework for evaluating private investment opportunities aimed at enhancing disaster resilience within Community Disaster Resilience Zones. The team's collaborative efforts in developing the methodology—grounded in extensive research—allowed for a nuanced understanding of the key hazards, challenges, and opportunities for strengthening infrastructure in high-risk, low-resource communities, with a particular focus on wildfire resilience. Through comprehensive research and analysis, the team identified critical factors impacting resilience-building, and crafted scoring matrices to systematically assess legislative and regulatory, communal, economic, and infrastructural influences. These contributions form the foundation for a robust, data-driven approach to

evaluating and scoring potential infrastructure investments, for a holistic assessment of project applications.

Through the methodology developed, the natural disaster with the highest threat risk to counties identified by FEMA as containing CDRZs was identified as wildfire. The methodology for designing a resilience composite score based on FEMA's social vulnerability, resilience, wildfire risk, and wildfire estimated annual loss was able to identify counties with high or relatively high wildfire risk that faced the least resilience within these counties with CDRZ designated areas. The legislative and policy matrix was feasible for evaluating a community's legislative and policy initiatives that favor investment in wildfire resilience for that community and distinguishing those counties from others with less favorable legislative and policy initiatives. The economic landscape matrix was useful in identifying economic factors within a community that may render it a more favorable investment risk. The community voice integration matrix was less useful in distinguishing communities' integration of community voice but may be beneficial in evaluating community voice integration during restructuring. The infrastructure matrix may prove helpful in identifying a community's opportunities for infrastructure investment based on the current infrastructure of the community. These findings may prove beneficial in assisting SPIN Global's Community Disaster Resilience Fund in making informed, strategic decisions that will enhance disaster preparedness and contribute to the long-term, sustainable hazard preparedness in low resilience communities.

## **Disclaimer**

In accepting this capstone project and report from the Capstone Team, Client acknowledges that the project and report are a result of student participation in their Capstone Project related to earning their Master of Public Administration, Master of Public Policy, and/or Master of Arts in Environmental and Sustainability Policy (ESP or ENRP) degrees at the George Washington University's Trachtenberg School of Public Policy and Public Administration ("Student Project").

Accordingly, Client understands the Student Project was primarily created and conducted for the benefit of the education of the members of the Capstone Team and agrees that the Student Project may or may not result in a specific and responsive deliverable for consideration by the Client. Furthermore, Client acknowledges that the Student Project is provided to Client "as-is" without any approval, endorsement, representation, or warranty of any kind, either express or implied, by the University, its faculty, staff, or students, including without limitation, any warranty of non-infringement, implied warranties of merchantability and fitness for a particular purpose, or representations regarding quality or accuracy. Additionally, Client releases the University, its faculty, staff and students from any claims relating to any damages suffered by Client as a result of Client's use of or reliance on the Student Project.



## Appendices

### Appendix 1. Analysis – Legislative and Regulatory Environment

#### Gila County, AZ

Gila County, Arizona’s policy matrix score sheet is shown in Table A.1.1.

##### *Building Codes*

The county, itself, does not have any building code provisions or regulations.<sup>236</sup> However, the State of Arizona has statewide building codes for fire resistance.<sup>237</sup> All new building construction in Arizona, including additions, modifications, or changes in use, must comply with the International Building Code and maintain a fire-resistance-rated construction.<sup>238</sup> Existing construction is exempt from these requirements.<sup>239</sup> There are no tax credits or other incentives for fire resistant construction, remodeling, rebuilds, or retrofitting.

##### *Zoning Regulations*

Gila, Co. has zoning regulations that limit the proximity of accessory buildings to a main building structure to no more than 10 feet away.<sup>240</sup> The county also has a designated density plan and limits on building proximity that are incorporated into the ordinance based on building type and zone.<sup>241</sup>

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<sup>236</sup> Gila County Community Development. (2014). *Gila County Residential Building Code Handbook*. Gila County, AZ Government. Retrieved October 20, 2024, from

[https://cms3.revize.com/revize/gilaaz/2014bldgsafety/building\\_code\\_handbook\\_\\_2014.pdf](https://cms3.revize.com/revize/gilaaz/2014bldgsafety/building_code_handbook__2014.pdf).

<sup>237</sup> Arizona Fire Code 2012, *Chapter 7 Fire-Resistance-Rated Construction*. Retrieved October 20, 2024 from <https://up.codes/viewer/arizona/ifc-2012/chapter/7/fire-resistance-rated-construction#7>; Office of the State Fire Marshal’s Duties and Responsibilities. *AZ State Statute and Fire Code*. Arizona Department of Forestry and Fire Management. Retrieved October 20, 2024 from <https://dffb.az.gov/az-state-statute-and-fire-code>.

<sup>238</sup> Arizona Fire Code 2012, *Chapter 7 Fire-Resistance-Rated Construction*. Retrieved October 20, 2024 from <https://up.codes/viewer/arizona/ifc-2012/chapter/7/fire-resistance-rated-construction#7>; 2018 International Building Code. (2021) *Chapter 7 Fire and Smoke Protection Features*. ICC. Retrieved October 20, 2024, from <https://codes.iccsafe.org/content/IBC2018P6/chapter-7-fire-and-smoke-protection-features>.

<sup>239</sup> Arizona Fire Code 2012, *Chapter 7 Fire-Resistance-Rated Construction*. Retrieved October 20, 2024 from <https://up.codes/viewer/arizona/ifc-2012/chapter/7/fire-resistance-rated-construction#7>.

<sup>240</sup> Zoning Ordinance for Unincorporated Areas of Gila County, Arizona, Ordinance NO. 2015-04. Retrieved on November 3, 2024 from

[https://agenda.gilacountyaz.gov/docs/2015/REGULAR/20150915\\_242/3341\\_3341\\_Ordinance%20No.%202015-04.pdf](https://agenda.gilacountyaz.gov/docs/2015/REGULAR/20150915_242/3341_3341_Ordinance%20No.%202015-04.pdf); Zoning Ordinance for Unincorporated Areas of Gila County Arizona. (2022). Retrieved on November 3, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/community\\_development/Zoning/Gila%20County%20Zoning%20Ordinance%20-%20Revised%2003-15-2022.pdf](https://cms3.revize.com/revize/gilaaz/government/community_development/Zoning/Gila%20County%20Zoning%20Ordinance%20-%20Revised%2003-15-2022.pdf).

<sup>241</sup> Zoning Ordinance for Unincorporated Areas of Gila County Arizona. (2022). Retrieved on November 3, 2024, from

[https://cms3.revize.com/revize/gilaaz/government/community\\_development/Zoning/Gila%20County%20Zoning%20Ordinance%20-%20Revised%2003-15-2022.pdf](https://cms3.revize.com/revize/gilaaz/government/community_development/Zoning/Gila%20County%20Zoning%20Ordinance%20-%20Revised%2003-15-2022.pdf).

### *Landscape Regulations*

Gila County does not currently have regulations or legislation that limit vegetation or landscaping adjacent to or surrounding building structures but does provide community education through guidance documents.<sup>242</sup>

### *Forest and Grassland Management*

Gila has a Community Wildfire Protection Plan that has been in place since 2004 and that was last updated in 2022.<sup>243</sup> The primary goal of the plan is to collaborate with the state and federal governments and other funding sources to prioritize fuel reduction and to treat areas susceptible to structural ignitability. The plan is for prescribed fires to reduce dead and down fuel loading, understory vegetation fuels, slash fuels, piled fuels, and overstory fuels. The cost over 10 years is estimated to be approximately \$82,250,000, primarily funded through Wildland Fire Hazardous Fuels 12 Fuels Reductions accounts with significant need for supplemental partnership funding.<sup>244</sup>

### *Smoke Preparedness*

Gila recognizes the need for sheltering options, particularly for unhoused individuals, but has not yet implemented an emergency sheltering system.<sup>245</sup> In none of their preparedness documents is there any mention of plans for a resilience hub or a consolidated area for air filtration. Nor is there any guidance on home air filtration systems to protect from extreme smoke exposure.

### *Utility Preparedness*

Arizona Public Service (APS) is the state's largest and longest service electric company since 1886.<sup>246</sup> It subscribes to a Statewide Comprehensive Fire Mitigation Program that includes an integrated vegetation

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<sup>242</sup> Gila County Health & Emergency Management. (2024). *It's Time for 'Zone Defense' in Gila County*. Gila County, AZ. Retrieved on October 20, 2024, from <https://readygila.com/posts/930>.

<sup>243</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>244</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>245</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>246</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCo](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCo)

management project within APS's rights-of-way.<sup>247</sup> APS has stated that it needs support in their vegetation management efforts, including assistance with prescribed fires to reduce fuel loading around company assets.<sup>248</sup> APS's Defensible Space Around Poles program has been in existence since 2015 and aims to clear vegetation under 60,000 poles once every 3 years.<sup>249</sup> Arizona and APS recently implemented a public safety power shutoff prophylactically when weather conditions create an extreme fire risk with the goal of preventing wildfires.<sup>250</sup>

#### *Alert System*

Gila County recently implemented an emergency alert system whereby local authorities will send an emergency alert to mobile phones of residents and those who register with the system for emergency alerts.<sup>251</sup> Fire forecast services are provided through the U.S. Forest Service.<sup>252</sup>

#### *Overall Risk Reduction*

Gila County has ordinances that prohibit both within all National Forest lands within the Tonto Forest and all unincorporated areas of Gila County the building, maintaining, attending, or use of fire (including charcoal or briquettes but makes exceptions for gas and propane barbeque grills), smoking outside unless there is at least a 3 feet perimeter that is barren of any flammable material, welding or operating a torch with an open flame, discharging a firearm (including recreational target shooting), and use of a chainsaw

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untyCWPP\_Final\_032322.pdf; Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>247</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>248</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>249</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>250</sup> Arizona Emergency Information Network. *Public Safety Power Shutoff*. State of Arizona. Retrieved on November 3, 2024, from <https://ein.az.gov/public-safety-power-shutoff>.

<sup>251</sup> Emergency Management Division. (2022). *Road Closures & Fire Updates*. Gila County, AZ. Retrieved on November 3, 2024 from

[https://www.gilacountyaz.gov/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/index.php](https://www.gilacountyaz.gov/government/health_and_emergency_services/gilaem_eoc/index.php).

<sup>252</sup> USDA Forest Service. *Alerts and Notices Map: Gila National Forest*. Retrieved on November 3, 2024 from <https://www.fs.usda.gov/alerts/gila/alerts-notice>.

or other equipment with an internal combustion engine between the hours of 9 am and 8 pm in the city (and never in the forest).<sup>253</sup> Gila has several websites with community education materials regarding fire risk safety measures.<sup>254</sup> Attempts at containment within Gila include plans to treat high priority areas alongside roads with compost to encourage low fire risk plant species to replace existing vegetation in these locations that pose a greater risk of fire ignition.<sup>255</sup> Funding resources are needed to supplement these efforts.<sup>256</sup> Wildfire risk disclosure is not required for real estate sales.<sup>257</sup>

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<sup>253</sup> Gila County, AZ Ordinance No. 2021-01. *Open Outdoor Fire*. Retrieved on October 20, 2024, from <https://cms3.revize.com/revize/gilaaz/Ordinance%20No.%202021-01.pdf>; Gila County. *Tonto National Forest and Gila County Fire Restrictions No Campfires, No Recreational Shooting*. Retrieved on October 20, 2024, from <https://cms3.revize.com/revize/gilaaz/Ordinance%20No.%202021-01.pdf>; Bureau of Land Management. *Arizona Fire Restrictions*. Retrieved on October 20, 2024, from <https://www.blm.gov/programs/public-safety-and-fire/fire/regional-info/arizona/fire-restrictions>.

<sup>254</sup> Gila County Health & Emergency Management. (2024). *It's Time for 'Zone Defense' in Gila County*. Gila County, AZ. Retrieved on October 20, 2024, from <https://readygila.com/posts/930>; Gila County. *Tonto National Forest and Gila County Fire Restrictions No Campfires, No Recreational Shooting*. Retrieved on October 20, 2024, from <https://cms3.revize.com/revize/gilaaz/Ordinance%20No.%202021-01.pdf>; Bureau of Land Management. *Arizona Fire Restrictions*. Retrieved on October 20, 2024, from <https://www.blm.gov/programs/public-safety-and-fire/fire/regional-info/arizona/fire-restrictions>.

<sup>255</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>256</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 20, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>257</sup> Arizona Association of Realtors. (2023). *Buyer Advisory: A resource for Real Estate Customers*. Retrieved on November 3, 2024 from [https://www.aaronline.com/wp-content/uploads/\\_mediavault/2023/03/17/Buyer-Advisory-March-2023-Copy.pdf](https://www.aaronline.com/wp-content/uploads/_mediavault/2023/03/17/Buyer-Advisory-March-2023-Copy.pdf).

**Table A.1.1. Gila County, AZ – Legislative and Policy Matrix**

	<b>Building Codes</b>	<b>Zoning Regulations</b>	<b>Landscape Regulations</b>	<b>Forest and Grassland Management</b>	<b>Smoke Preparedness</b>	<b>Utility Preparedness</b>	<b>Alert System</b>	<b>Overall Risk Reduction</b>	
	Fire-resistant design	Land Use Restriction	Vegetation Condition	Beneficial Fire	Air Filtration	Maintenance	Fire Forecast	Fire Use	
	5	5	2	3	1	3	5	5	
	Fire-resistant material	Development Density	Adjacent Vegetation	Cultural Burning	Sheltering	Improvements	Alert System	Fire Education	
	5	5	2	n/a	3	3	5	4	
	New construction	Building Proximity	Adjacent Combustibles	Mechanical Thinning	Resilience Hub	Fire Authority Coordination		Risk Disclosure	
	5	5	2	3	1	4		1	
	Retrofits/ rebuilds/ remodels		Gutter Debris Removal	Grazing		Shut-Offs		Containment	
	5		2	n/a		5		3	
	Incentives			Regulated Burning		Vegetation/ Right-of-Way			
	1			3		4			
Mean Score	4.2	5	2	3	1.7	3.8	5	3.3	Overall Mean: 3.5

## Elmore County, ID

Elmore County, Idaho's policy matrix score sheet is shown in Table A.1.2.

### *Building Codes*

There are both county level and state level statutes governing fire-resistant building construction in Elmore County, Idaho. Elmore County fire resistant ordinances apply to new subdivisions, new roads within subdivisions, new construction, alterations, moving, or change of use of residential, commercial, or industrial structures in any zoning district.<sup>258</sup> The county requires that all roofs be constructed with fire-resistant materials that have a Class C or better rating, including all roof repairs and replacements.<sup>259</sup> Only non-combustible roofing materials are allowed; wood or shake shingles, wood roofing, and roofing materials with less than a Class C rating are prohibited.<sup>260</sup> Structures that are deemed uninhabitable, such as greenhouses, garages, carports, and sheds, are exempt from these fire-resistant requirements.<sup>261</sup> The State of Idaho requires use of fire-resistant exterior walls, fire-resistant fire blocking and draft stopping designs, smoke barriers, smoke partitions, fire walls, fire barriers, and fire partitions in building structure design.<sup>262</sup> Neither Idaho nor Elmore County offer tax incentives or subsidies for fire-resistant construction, rebuilds, or remodels.

### *Zoning Regulations*

Elmore County has established wildfire urban interface (WUI) overlay zones, which provide for additional land development requirements for land areas threatened by potential wildfire.<sup>263</sup> The WUI is superimposed over the general zoning designations of specific designated areas.<sup>264</sup> These additional restrictions include land use restrictions, density restrictions, and building proximity restrictions.<sup>265</sup>

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<sup>258</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>259</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>260</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>261</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>262</sup> Idaho Fire Code 2015. Chapter 7 Fire and Smoke Protection Features. Retrieved on November 3, 2024, from <https://up.codes/viewer/idaho/ifc-2015/chapter/7/fire-and-smoke-protection-features#7>; Idaho Building Code 2018. Chapter 14 Exterior Walls. Retrieved on November 3, 2024 from <https://up.codes/viewer/idaho/ibc-2018/chapter/14/exterior-walls#14>; Idaho Firewise. (2024). *Fire Resistant Homes: Building Materials*. Retrieved on November 3, 2024 from <https://idahofirewise.org/firewise-homes/firewise-building-materials/>.

<sup>263</sup> Amended Zoning and Development Ordinance, Title 7 Zoning and Development, Chapter 2 - Land Use Tables, Zoning Districts and their Base Densities, Overlay Districts and Boundaries (2018). Retrieved on November 3, 2024 from <https://elmorecounty.org/land-use-and-building-department/zoning-dev-ordinance/>.

<sup>264</sup> Amended Zoning and Development Ordinance, Title 7 Zoning and Development, Chapter 2 - Land Use Tables, Zoning Districts and their Base Densities, Overlay Districts and Boundaries (2018). Retrieved on November 3, 2024 from <https://elmorecounty.org/land-use-and-building-department/zoning-dev-ordinance/>.

<sup>265</sup> Amended Zoning and Development Ordinance, Title 7 Zoning and Development, Chapter 2 - Land Use Tables, Zoning Districts and their Base Densities, Overlay Districts and Boundaries (2018). Retrieved on November 3, 2024 from <https://elmorecounty.org/land-use-and-building-department/zoning-dev-ordinance/>.



### *Landscape Regulations*

Elmore county prohibits the placement of any combustible within 25 feet of any structure, including dry vegetation and Christmas trees.<sup>266</sup> The county defines three defensible space management zones surrounding buildings and structures and has specific regulations regarding what types of material may be located within each zone.<sup>267</sup> Zone 1 includes a 30 feet perimeter surrounding a structure – this area should be free of all flammable vegetation (including firewood).<sup>268</sup> Within Zone 1, no plants are to be located within 3-5 feet of any structure that has wood, log, or other flammable siding.<sup>269</sup> If the house or structure has noncombustible siding, the owner may plant widely spaced low growing shrubs or other “fire wise” plants.<sup>270</sup> The county prefers that no trees be planted within Zone 1; however, if a tree is planted within this zone, it must not be coniferous, and it is considered to be part of the building structure (for purposes of defining the Zones).<sup>271</sup> Zone 2 lies between Zones 1 and 3 and extends 75-125 feet from the structure depending upon various factors.<sup>272</sup> No stressed, diseased, dead, or dying trees or shrubs are to be located within Zone 2.<sup>273</sup> Larger trees and shrubs within Zone 2 are to be thinned so that there is no less than 10 feet between crowns.<sup>274</sup> Zone 3 is the area of a traditional forest and extends from the edge of the defensible space to the property boundary.<sup>275</sup>

### *Forest and Grassland Management*

Elmore County engages in some fuel reduction measures, including controlled burns, but acknowledges that more active development and implementation of fuel reduction projects, including targeted grazing

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<sup>266</sup> Elmore County, ID Ordinance No. 2012-02. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2019/05/2012-02-fire-ban.pdf>.

<sup>267</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>268</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>269</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>270</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>271</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>272</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>273</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>274</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

<sup>275</sup> Title 6 Elmore County Zoning and Development Ordinance, Chapter 12 - Fire Prevention and Wild Fire Mitigation Standards and Regulations Applying to All Districts. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2018/11/chapter-12-fire-prevention-and-wild-fire-mitigation.pdf>.

and regulated burning, and management of noxious and invasive species is a priority to improve wildfire resilience.<sup>276</sup>

#### *Smoke Preparedness*

Elmore County engages the public in educational activities to inform its citizens of the health risks associated with wildfire smoke but does not offer any recommendations regarding air filtration or sheltering during extreme smoke exposure except to stay indoors.<sup>277</sup> Elmore County does not have a resilience hub and has no current plans to build one.

#### *Utility Preparedness*

Idaho Power will institute a public safety power shutoff when wildfire risk is high due to extreme weather conditions.<sup>278</sup> Idaho has recognized the need to develop legislation to allow electric utilities to manage vegetation and remove at-risk trees within designated rights-of-way and easement areas where the utilities do not currently have such rights.<sup>279</sup> Idaho Power has ongoing wildfire prevention efforts including replacing poles, conductors, and switches, wrapping wood poles in fire-resistant mesh, adding spark prevention equipment and upgrading uses to power lines, and trimming vegetation.<sup>280</sup> The public utility companies have their own individual wildfire prevention plans which they coordinate with local and state governments and file with the Idaho Public Utility Commission, but are not required to do so.<sup>281</sup>

#### *Alert System*

Elmore County has a wildfire warning system that has been in effect since 2011.<sup>282</sup> The county has identified a need for funding for a full-time geographic information system and an emergency access plan

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<sup>276</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>; First Street. (2024). *Does Elmore County have Wildfire Risk?* Retrieved on November 3, 2024, from [https://firststreet.org/county/elmore-county-idaho/16039\\_fsid/fire](https://firststreet.org/county/elmore-county-idaho/16039_fsid/fire).

<sup>277</sup> Central District Health. *Air Quality*. Retrieved on November 3, 2024, from <https://cdh.idaho.gov/environmental-health/hazards/air-quality/>.

<sup>278</sup> Idaho Power. (2024). *What is a Public Safety Power Shutoff?* Retrieved on November 3, 2024 from <https://www.idahopower.com/outages-safety/wildfire-safety/what-is-a-psps/#:~:text=Sometimes%2C%20Idaho%20Power%20shuts%20off,others%20to%20experience%20a%20SPS..>

<sup>279</sup> Gov. Brad Little. (2024). *Wildfire Report Recommendations*. Retrieved on November 3, 2024, from <https://gov.idaho.gov/wp-content/uploads/2024/08/2024-wildfire-report.pdf>.

<sup>280</sup> Idaho Power. *Protecting the Grid*. Retrieved on November 3, 2024, from <https://www.idahopower.com/outages-safety/wildfire-safety/protecting-grid/>.

<sup>281</sup> Idaho Public Utilities Commission. *Wildfire Public Safety*. Retrieved on November 3, 2024, from <https://puc.idaho.gov/Page/Utility/39>; Idaho Power. (2024). *Wildfire Mitigation Plan*. Retrieved on November 3, 2024, from <https://docs.idahopower.com/pdfs/Safety/WildfireMitigationPlan.pdf>.

<sup>282</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

but has not yet developed either.<sup>283</sup> The county operates a fire restrictions map for known fires, but not a danger rating system to forecast wildfire before it occurs.<sup>284</sup>

### *Overall Risk Reduction*

Elmore County has fire use restrictions in its county ordinance that forbids all forms of open outdoor fires, including campfires, warming fires, all explosives, model rockets, tracer bullet discharges, exploding targets, welding, and trash burning.<sup>285</sup> The state further restricts the use of motor vehicles offroad and the use of private firework displays.<sup>286</sup> Elmore has community education forums and plans to develop more public education programs regarding wildfire risk and prevention strategies.<sup>287</sup> Elmore County acknowledges that projects are needed to create fuel breaks along highway corridors but has not yet fully developed or implemented any.<sup>288</sup> Neither Elmore County nor Idaho require wildfire risk disclosure in real estate sales.

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<sup>283</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>284</sup> Department of Lands. *Fire Restrictions Finder*. Retrieved on November 3, 2024, from <https://www.idl.idaho.gov/fire-management/fire-restrictions-finder/#:~:text=Fire%20restrictions%20have%20not%20yet,map%20in%20its%20own%20window>.

<sup>285</sup> Elmore County, ID Ordinance No. 2012-02. Retrieved on November 3, 2024, from <https://elmorecounty.org/wp-content/uploads/2019/05/2012-02-fire-ban.pdf>.

<sup>286</sup> Fire Restrictions Plan. (2024). *Idaho Fire Restrictions Plan 2024*. Retrieved on November 3, 2024, from [https://www.idl.idaho.gov/wp-content/uploads/sites/2/2024/06/FINAL\\_2024-IDAHO-FIRE-RESTRICTIONS-PLAN.pdf](https://www.idl.idaho.gov/wp-content/uploads/sites/2/2024/06/FINAL_2024-IDAHO-FIRE-RESTRICTIONS-PLAN.pdf).

<sup>287</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>288</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

**Table A.1.2. Elmore County, ID – Legislative and Policy Matrix**

	Building Codes	Zoning Regulations	Landscape Regulations	Forest and Grassland Management	Smoke Preparedness	Utility Preparedness	Alert System	Overall Risk Reduction	
	Fire-resistant design	Land Use Restriction	Vegetation Condition	Beneficial Fire	Air Filtration	Maintenance	Fire Forecast	Fire Use	
	5	5	5	4	2	3	3	5	
	Fire-resistant material	Development Density	Adjacent Vegetation	Cultural Burning	Sheltering	Improvements	Alert System	Fire Education	
	5	5	5	n/a	2	3	5	3	
	New construction	Building Proximity	Adjacent Combustibles	Mechanical Thinning	Resilience Hub	Fire Authority Coordination		Risk Disclosure	
	5	5	5	3	1	4		1	
	Retrofits/rebuilds/remodels		Gutter Debris Removal	Grazing		Shut-Offs		Containment	
	5		5	3		4		2	
	Incentives			Regulated Burning		Vegetation/Right-of-Way			
	1			3		3			
Mean Score	4.2	5	5	3.3	1.7	3.4	4	2.8	Overall Mean: 3.7

## Los Angeles County, CA

Los Angeles County, California's policy matrix score sheet is shown in Table A.1.3.

### *Building Codes*

The County of Los Angeles has fire resistant design and construction building code requirements for both new and existing structures and buildings.<sup>289</sup> Additionally, the State of California has a home hardening initiative to retrofit, harden, and create defensible space for homes at risk to wildfires.<sup>290</sup> The initiative provides financial assistance for home hardening activities to low- and moderate-income households who live in communities of high social vulnerability.<sup>291</sup>

### *Zoning Regulations*

Los Angeles County is currently in the process of drafting an ordinance that discourages high density and intensity development in Very High Fire Hazard Severity Zones (VHFHSZs).<sup>292</sup> The county does not currently have land use restriction ordinances.

### *Landscape Regulations*

Los Angeles County has landscape ordinances that divide the area surrounding buildings and structures into three zones: A, B, and C.<sup>293</sup> Zone A is the perimeter adjacent to the structure to 30 feet away; Zone B is 30 feet to 100 feet away from the structure; and Zone C is 100 – 200 feet away from the structure or to the property line.<sup>294</sup> Zone A must be maintained free of all firewood, manure, compost and other combustible materials as well as free of flammable vegetation or other combustible growth, including ornamental plants and trees known to be flammable.<sup>295</sup> Homes in areas of high risk for hazardous fire must also keep Zone B free of these.<sup>296</sup> All buildings must maintain the roof free of any leaves, needles or other dead vegetative growth.<sup>297</sup> Additionally, all landscape plans must be approved by the Fuel Modification Unit, use hardscape to add space between flammable vegetation and the structure, and

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<sup>289</sup> 2023 City of Los Angeles Fire Code - Full Code (2024). Retrieved on November 6, 2024, from <https://codes.iccsafe.org/content/CACLAFC2023P1/chapter-11-construction-requirements-for-existing-buildings>.

<sup>290</sup> Cal OES. *California Wildfire Mitigation Program*. Governor's Office of Emergency Services. Retrieved on November 6, 2024 from <https://www.caloes.ca.gov/office-of-the-director/operations/recovery-directorate/hazard-mitigation/california-wildfire-mitigation-program/>.

<sup>291</sup> Cal OES. *California Wildfire Mitigation Program*. Governor's Office of Emergency Services. Retrieved on November 6, 2024 from <https://www.caloes.ca.gov/office-of-the-director/operations/recovery-directorate/hazard-mitigation/california-wildfire-mitigation-program/>.

<sup>292</sup> LA County Planning. (2024). *Community Wildfire Protection Ordinance*. Long Range Planning, Retrieved on November 4, 2024 from <https://planning.lacounty.gov/long-range-planning/community-wildfire-protection-ordinance/>.

<sup>293</sup> County of Los Angeles Fire Department Forestry Division. *Forestry Fuel Modification*. County of Los Angeles, California. Retrieved on November 6, 2024 from <https://fire.lacounty.gov/forestry-fuel-modification/>.

<sup>294</sup> County of Los Angeles Fire Department Forestry Division. *Forestry Fuel Modification*. County of Los Angeles, California. Retrieved on November 6, 2024 from <https://fire.lacounty.gov/forestry-fuel-modification/>.

<sup>295</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024, from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

<sup>296</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024, from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

<sup>297</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024 from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

eliminate vertical continuity so that plants reach a mature height that is less than 2 feet beneath medium and large trees.<sup>298</sup>

#### *Forest and Grassland Management*

Los Angeles County is in the process of developing a plan for fuel reduction and targeted vegetation management.<sup>299</sup>

#### *Smoke Preparedness*

Because air pollution is a chronic problem for Los Angeles, when there is added wildfire smoke, the health risks magnify significantly.<sup>300</sup> There are both community driven efforts to retrofit buildings into resilience hubs that provide air filtering and sheltering and also function as cooling centers.<sup>301</sup> Most of the efforts are community driven, but the City of Los Angeles has begun the process of retrofitting existing community centers into resilience hubs as well.<sup>302</sup> During emergencies, Los Angeles County's Incident Response System will post on its website resilience hubs where residents can assemble for sheltering.<sup>303</sup>

#### *Utility Preparedness*

Los Angeles County has ordinances requiring vegetation clearance of 10 feet surrounding any power line or support structure.<sup>304</sup> The Los Angeles Department of Water & Power (LADWP) has policies requiring the use of alternative material for power poles instead of wood, conductor insulation requirements, yearly clearance tree trimming, and yearly patrol of conductors to ensure that vegetation does not encroach upon the clearance.<sup>305</sup> LADWP is currently looking to explore new technologies to better assess and mitigate risk.<sup>306</sup> California law requires public utility companies to develop their own wildfire mitigation plans and

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<sup>298</sup> County of Los Angeles Fire Department Forestry Division. *Forestry Fuel Modification*. County of Los Angeles, California. Retrieved on November 6, 2024 from <https://fire.lacounty.gov/forestry-fuel-modification/>.

<sup>299</sup> LA County Planning. (2024). *Community Wildfire Protection Ordinance*. Long Range Planning, Retrieved on November 4, 2024, from <https://planning.lacounty.gov/long-range-planning/community-wildfire-protection-ordinance/>; Governor's Office of Planning and Research. (2024). *Los Angeles County - Integrated Wildfire Safety Plan*. ResilientCA.org. Retrieved on November 6, 2024, from <https://resilientca.org/case-studies/los-angeles-county-integrated-wildfire-safety-pl/>.

<sup>300</sup> Erin Stone. *Resilience Hubs*. LAist (July 31, 2023). Retrieved on November 6, 2024, from <https://laist.com/brief/news/climate-environment/how-resilience-hubs-can-help-communities-face-the-heat-and-the-climate-emergency>.

<sup>301</sup> Erin Stone. *Resilience Hubs*. LAist (July 31, 2023). Retrieved on November 6, 2024, from <https://laist.com/brief/news/climate-environment/how-resilience-hubs-can-help-communities-face-the-heat-and-the-climate-emergency>.

<sup>302</sup> Erin Stone. *Resilience Hubs*. LAist (July 31, 2023). Retrieved on November 6, 2024, from <https://laist.com/brief/news/climate-environment/how-resilience-hubs-can-help-communities-face-the-heat-and-the-climate-emergency>.

<sup>303</sup> County of Los Angeles. Incident Response. Retrieved on November 6, 2024, from <https://lacounty.gov/emergency/>.

<sup>304</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024, from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

<sup>305</sup> Los Angeles Department of Water & Power. (2024). *2023 - 2025 Wildfire Mitigation Plan*. Retrieved on November 6, 2024 from <https://www.ladwp.com/sites/default/files/2024-06/2024%20LADWP%20Wildfire%20Mitigation%20Plan.pdf>.

<sup>306</sup> Los Angeles Department of Water & Power. (2024). *2023 - 2025 Wildfire Mitigation Plan*. Retrieved on November 6, 2024 from <https://www.ladwp.com/sites/default/files/2024-06/2024%20LADWP%20Wildfire%20Mitigation%20Plan.pdf>.



does not prescribe requirements for the development of them.<sup>307</sup> New rights-of-way for utility must provide access for vegetation management.<sup>308</sup> The utility companies in Los Angeles County provide public safety shutoffs when there is heightened wildfire risk.<sup>309</sup>

#### *Alert System*

LA County has in place a fire danger rating system that forecasts burn indices and live fuel moisture for different zones in the county daily to alert the public to high fire danger days.<sup>310</sup> The daily outputs are broadcast on the LA County FD's website (<https://fire.lacounty.gov/fire-weather-danger/>).<sup>311</sup>

#### *Overall Risk Reduction*

Los Angeles County requires a permit to maintain or start a bonfire, rubbish fires, use or sell explosives, operate vehicles carrying flammable and combustible liquids, operate a firearm, or perform other outdoor fire burning activities.<sup>312</sup> The county's Defensible Space Program has a legal mechanism for declaring properties with vegetation posing fire hazards a "public nuisance" and for enforcing such removal.<sup>313</sup> The county also offers public education materials on how to protect homes and property from wildfire and how to plan and prepare for wildfire emergencies.<sup>314</sup> Los Angeles County has ordinances to promote containment, including a requirement that all roads be cleared 10 feet on each side of all flammable vegetation and other combustible growth.<sup>315</sup> The county is working on other measures to promote containment.<sup>316</sup> Los Angeles County has disclosure requirements for the sale of homes located in Very High Fire Safety Hazard Zones.<sup>317</sup>

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<sup>307</sup> California Senate Bill No. 901, Chapter 626. Retrieved on November 6, 2024, from [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201720180SB901](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB901); California Assembly Bill No. 1054, Chapter 79. Retrieved on November 6, 2024, from [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201920200AB1054](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1054).

<sup>308</sup> California Senate Bill No. 901, Chapter 626. Retrieved on November 6, 2024, from [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201720180SB901](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB901); California Assembly Bill No. 1054, Chapter 79. Retrieved on November 6, 2024, from [https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201920200AB1054](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1054).

<sup>309</sup> Southern California Edison. *Public Safety Power Shutoff*. Retrieved on November 6, 2024, from <https://www.sce.com/outage-center/outage-information/pmps#:~:text=What%20is%20a%20Public%20Safety,is%20disabled%20in%20your%20browser>.

<sup>310</sup> Los Angeles County Fire Department. (2023). *2023 Fire Plan*. Retrieved on November 6, 2024, from <https://www.osfm.fire.ca.gov/media/a0wjlazf/2023-los-angeles-county-unit-fire-plan.pdf>.

<sup>311</sup> Los Angeles County Fire Department. (2023). *2023 Fire Plan*. Retrieved on November 6, 2024, from <https://www.osfm.fire.ca.gov/media/a0wjlazf/2023-los-angeles-county-unit-fire-plan.pdf>.

<sup>312</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024, from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

<sup>313</sup> County of Los Angeles Fire Department. *Fire Hazard Reduction Programs*. County of Los Angeles California. Retrieved on November 6, 2024, from <https://fire.lacounty.gov/fire-hazard-reduction-programs/>.

<sup>314</sup> Los Angeles Regional Fire Safe Council. (2023). *Learn. Prepare. Survive*. MySafe:LA. Retrieved on November 6, 2024 from <https://www.wildfirela.org/>.

<sup>315</sup> Los Angeles County Code of Ordinances, Title 32 Fire Code. Retrieved on November 6, 2024, from [http://lacounty-ca.elaws.us/code/coord\\_title32](http://lacounty-ca.elaws.us/code/coord_title32).

<sup>316</sup> LA County Planning. (2024). *Community Wildfire Protection Ordinance*. Long Range Planning. Retrieved on November 4, 2024 from <https://planning.lacounty.gov/long-range-planning/community-wildfire-protection-ordinance/>.

<sup>317</sup> Los Angeles Fire Department. *Fire Zone*. Retrieved on November 6, 2024, from <https://lafd.org/fire-zone#:~:text=Beginning%20January%201%2C%202021%20AB38,became%20available%20for%20this%20purpose>.

**Table A.1.3. Los Angeles County, CA Legislative and Policy Matrix**

Building Codes	Zoning Regulations	Landscape Regulations	Forest and Grassland Management	Smoke Preparedness	Utility Preparedness	Alert System	Overall Risk Reduction	
Fire-resistant design	Land Use Restriction	Vegetation Condition	Beneficial Fire	Air Filtration	Maintenance	Fire Forecast	Fire Use	
5	1	5	n/a	4	5	5	5	
Fire-resistant material	Development Density	Adjacent Vegetation	Cultural Burning	Sheltering	Improvements	Alert System	Fire Education	
5	3	5	n/a	4	2	5	4	
New construction	Building Proximity	Adjacent Combustibles	Mechanical Thinning	Resilience Hub	Fire Authority Coordination		Risk Disclosure	
5	3	5	3	4	3		5	
Retrofits/ rebuilds/ remodels		Gutter Debris Removal	Grazing		Shut-Offs		Containment	
5		5	n/a		4		5	
Incentives			Regulated Burning		Vegetation/ Right-of-Way			
5			n/a		5			
Mean Score	5	2.3	3	4	3.8	5	4.8	Overall Mean: 4.1

## **Miami-Dade County, FL**

Miami-Dade County, Florida currently does not have any ordinances or policies specific to wildfire prevention or resilience.<sup>318</sup> The State of Florida relies on the Florida Forest Service to prevent, detect, and suppress wildfires wherever they may occur within the state.<sup>319</sup> No other specific regulations, statutes, or ordinances exist for wildfire prevention within the state.

### *Building Codes*

Miami-Dade County has no wildfire specific building codes.<sup>320</sup> The Florida Forest Service has issued guidelines for the community on fire-resistive construction and retrofits.<sup>321</sup>

### *Zoning Regulations*

Miami-Dade County has no wildfire specific zoning regulations.<sup>322</sup>

### *Landscape Regulations*

Miami-Dade County has no wildfire specific landscape regulations.<sup>323</sup> The Florida Forest Service has issued education for the community on ways to keep the home safe from fire through landscaping choices.<sup>324</sup>

### *Forest and Grassland Management*

The Florida Forest Service offers community guidance on wildfire fuel reduction and maintains Florida's prescribed fire programs.<sup>325</sup>

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<sup>318</sup> Miami-Dade County Code of Ordinances, Chapter 14. Fire Prevention. Retrieved on November 10, 2024 from [http://miamidade.elaws.us/code/coord\\_ch14](http://miamidade.elaws.us/code/coord_ch14).

<sup>319</sup> Florida Statute Title XXXV, Chapter 590. Section 590.01. (2024) Retrieved on November 10, 2024 from [http://www.leg.state.fl.us/statutes/index.cfm?App\\_mode=Display\\_Statute&Search\\_String=&URL=0500-0599/0590/Sections/0590.01.html](http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0500-0599/0590/Sections/0590.01.html).

<sup>320</sup> Miami-Dade County Code of Ordinances, Chapter 14. Fire Prevention. Retrieved on November 10, 2024 from [http://miamidade.elaws.us/code/coord\\_ch14](http://miamidade.elaws.us/code/coord_ch14); Miami-Dade County Code of Ordinances, Chapter 8. Building Code. Retrieved on November 10, 2024 from [http://miamidade.elaws.us/code/coord\\_ch8](http://miamidade.elaws.us/code/coord_ch8); State Fire Marshal. (2023). *Florida Fire Prevention Code*. Retrieved on November 10, 2024 from <https://myfloridacfo.com/division/sfm/bfp/florida-fire-prevention-code>.

<sup>321</sup> Florida Department of Agriculture and Consumer Services. (2024). *Fire Resistive Construction*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/For-Communities/Firewise-USA/Fire-Resistive-Construction>; Florida Department of Agriculture and Consumer Services. (2024). *Florida Firewise Retrofit Demonstration House*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/For-Communities/Firewise-USA/Florida-Firewise-Retrofit-Demonstration-House>.

<sup>322</sup> Miami-Dade County Code of Ordinances, Chapter 33. Zoning. Retrieved on November 10, 2024 from [http://miamidade.elaws.us/code/coord\\_ch33](http://miamidade.elaws.us/code/coord_ch33).

<sup>323</sup> Miami-Dade County Code of Ordinances. Chapter 18A. Miami-Dade County Landscaping Ordinance. Retrieved on November 10, 2024 from [http://miamidade.elaws.us/code/coord\\_ch18a](http://miamidade.elaws.us/code/coord_ch18a).

<sup>324</sup> Florida Department of Agriculture and Consumer Services. (2024). *Will Your Home Survive a Wildfire?* Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/For-Communities/Firewise-USA/Will-Your-Home-Survive-a-Wildfire>; Florida Department of Agriculture and Consumer Services. (2024). *Create Defensible Space Around Homes*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/For-Communities/Firewise-USA/Create-Defensible-Space-Around-Homes>.

<sup>325</sup> Florida Department of Agriculture and Consumer Services. (2024). *Prescribed Fire in Florida*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/Wildland-Fire/Prescribed-Fire>; Florida Department of Agriculture and Consumer Services. (2024). *Wildfire Fuel Reduction*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/For-Communities/Firewise-USA/Wildfire-Fuel-Reduction>.

*Smoke Preparedness*

Miami-Dade County does not have a smoke preparedness program or a multi-hazard resilience hub. The county does offer storm shelters during disasters.<sup>326</sup>

*Utility Preparedness*

Miami-Dade County does not have a system for public utility public safety shutoffs when there is a heightened risk of wildfire.

*Alert System*

Florida Forest Service operates a website that alerts the community to wildfire risk and fire forecasts.<sup>327</sup>

*Overall Risk Reduction*

Miami-Dade County does not have fire use restrictions for recreational fires.<sup>328</sup> The county also does not have wildfire risk disclosure requirements for real estate sales or ordinances to promote wildfire containment.

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<sup>326</sup> Miami-Dade County. (2024). *Storm Aides for Everyone (SAFE)*. Retrieved on November 10, 2024 from [https://www.miamidade.gov/global/service.page?Mduid\\_service=ser1519420150744488](https://www.miamidade.gov/global/service.page?Mduid_service=ser1519420150744488).

<sup>327</sup> Florida Department of Agriculture and Consumer Services. (2024). *Fire Weather and Forecast*. Retrieved on November 10, 2024 from <https://www.fdacs.gov/Forest-Wildfire/Wildland-Fire/Fire-Weather>.

<sup>328</sup> Miami-Dade County. (2024). *Open Burn Permit*. Retrieved on November 10, 2024 from [https://www.miamidade.gov/global/permit.page?Mduid\\_permit=per1518193325458214](https://www.miamidade.gov/global/permit.page?Mduid_permit=per1518193325458214).

**Table A.1.4. Miami-Dade County, FL Legislative and Policy Matrix.**

	<b>Building Codes</b>	<b>Zoning Regulations</b>	<b>Landscape Regulations</b>	<b>Forest and Grassland Management</b>	<b>Smoke Preparedness</b>	<b>Utility Preparedness</b>	<b>Alert System</b>	<b>Overall Risk Reduction</b>	
	Fire-resistant design	Land Use Restriction	Vegetation Condition	Beneficial Fire	Air Filtration	Maintenance	Fire Forecast	Fire Use	
	2	1	2	3	1	1	4	1	
	Fire-resistant material	Development Density	Adjacent Vegetation	Cultural Burning	Sheltering	Improvements	Alert System	Fire Education	
	2	1	2	n/a	4	1	4	2	
	New construction	Building Proximity	Adjacent Combustibles	Mechanical Thinning	Resilience Hub	Fire Authority Coordination		Risk Disclosure	
	2	1	2	2	1	1		1	
	Retrofits/ rebuilds/ remodels		Gutter Debris Removal	Grazing		Shut-Offs		Containment	
	2		2	n/a		1		1	
	Incentives			Regulated Burning		Vegetation/ Right-of-Way			
	1			2		1			
Mean Score	1.8	1	2	2.3	2	1	4	1.3	Overall Mean: 1.9

## Appendix 2. Analysis – Economic Environment

### Gila County, Arizona

#### *County Finances*

Gila County allocated 1.43% of its fiscal year 2025 balanced budget to the debt service fund.<sup>329</sup> The county has not received an overall credit rating by any of the three major credit agencies. However, the county's latest bonds issued in 2019 and 2020 to refund revenue obligations received a score of AA by S&P Global.<sup>330</sup>

#### *Insurance Market*

The insurance market in Arizona has been experiencing an increase in costs, with property owner insurance having a cumulative increase of 63% between 2019 and 2023 in the cost of insurance premiums, the highest rise of any state. However, the current average insurance cost is \$2,345, which is lower than the national average of \$2,478.<sup>331</sup>

The state government has announced measures to address the increase in costs. These policies include helping consumers manage the severity of risks through public outreach and education, encouraging the adoption of mitigation strategies to make communities more resilient to wildfires, working with insurers to recognize mitigation programs, providing resources for homeowners to find coverage, and encouraging direct consumer-insurer engagement.<sup>332</sup> However, there is no information on specific actions the legislature took to address the issue.

#### *Current Wildfire Resilience Investments and Programs*

The county implemented the Community Wildfire Protection Plan (CWPP) in 2015 and updated it in 2021. While the plan does not provide funding for wildfire resilience, it provides steps for communities to reduce the risk of wildfire damage.<sup>333, 334</sup>

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<sup>329</sup> Gila County Board of Supervisors. (2024, July 16). *Gila County Fiscal Year 2024-2025 Budget*. Gila County, AZ. Retrieved November 1, 2024, from <https://www.gilacountyaz.gov/Website%20Budget%202025.pdf>.

<sup>330</sup> S&P Global. (2020, October 12). Gila County. Retrieved November 1, 2024, from <https://disclosure.spglobal.com/ratings/en/regulatory/instrument-details/sectorCode/PUBFIN/entityId/22976/issueId/1579839>.

<sup>331</sup> KNAU Staff. (2024, October 10). *Wildfire risk is making home insurance more expensive in Northern Arizona*. KNAU Arizona Public Radio. Retrieved from November 1, 2024, from <https://www.knau.org/knau-and-arizona-news/2024-10-10/wildfire-risk-is-making-home-insurance-more-expensive-in-northern-arizona>.

<sup>332</sup> Arizona's Department of Insurance & Financial Institutions. (n.d.) *Homeowners Insurance*. Retrieved November 1, 2024, from <https://difi.az.gov/homeownersinsurance>.

<sup>333</sup> Gila County, AZ. (2022, March 15). Northern Gila County Community Wildfire Protection Plan (CWPP). Retrieved November 2, 2024, from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>334</sup> Gila County. (2021, March 15). Southern Gila County Community Wildfire Protection Plan (CWPP). Retrieved November 2, 2024, from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).

Gila County received a \$609,000 award from the U.S. Forest Services to invest in water storage systems maintenance for wildfire protection<sup>335</sup>, and a \$250,000 FEMA grant for investing in post-wildfire flood resilience<sup>336</sup>. In addition, the Arizona state Department of Emergency and Military Affairs allocated \$400,000 in July 2024 to address wildfires that affected 1,000 acres of land in the county.<sup>337</sup>

There are no investments in wildfire resilience made by NGOs and the private sector in Gila County.

### *Economic Performance*

Gila County has an unemployment rate of 4%<sup>338</sup>, the average 5-year real GDP growth rate is 4.89%<sup>339</sup> and the median household income is \$55,242.<sup>340</sup>

**Table A.2.1. Gila County, AZ Economic Landscape Matrix**

	County Finances	Insurance Market	Current Wildfire Resilience Investments and Programs	Economic Performance	
	Credit Rating	Insurance Costs	Local Level	Unemployment Rate	
	4	3	2	4	
	Debt Service Fund	Policies to Increase Access to Insurance	Federal and State Level	GDP Growth	
	5	2	5	5	
	Budget Balance		Private Sector and NGOs	Median Household Income	
	4		1	3	
Mean Score	4.3	2.5	2.7	4	Overall Mean 3.4

<sup>335</sup> Gila County. (2024, April 16). *Authorization to advertise Invitation for Bids No. 032124 - Northern Gila County Water Storage System Project*. Retrieved November 2, 2024, from [https://agenda.gilacountyaz.gov/agenda\\_publish.cfm?id=&mt=ALL&get\\_month=4&get\\_year=2024&dsp=agm&seq=8679&rev=0&ag=640&ln=39171&nseq=8691&nrev=0&pseq=8671&prev=0#ReturnTo39171](https://agenda.gilacountyaz.gov/agenda_publish.cfm?id=&mt=ALL&get_month=4&get_year=2024&dsp=agm&seq=8679&rev=0&ag=640&ln=39171&nseq=8691&nrev=0&pseq=8671&prev=0#ReturnTo39171).

<sup>336</sup> Bolla, D. C. (2024, November 4). *FEMA helps to map Gila County floodplains*. Payson Roundup. Retrieved November 6, 2024, from [https://www.paysonroundup.com/news/fema-helps-to-map-gila-county-floodplains/article\\_00f3a286-97fa-11ef-b6d9-e7a438054574.html](https://www.paysonroundup.com/news/fema-helps-to-map-gila-county-floodplains/article_00f3a286-97fa-11ef-b6d9-e7a438054574.html).

<sup>337</sup> Office of the Arizona Governor. (2024, July 12). *Governor Katie Hobbs Directs \$400,000 to Address Watch Fire in Eastern Arizona*. Retrieved November 2, 2024, from <https://azgovernor.gov/office-arizona-governor/news/2024/07/governor-katie-hobbs-directs-400000-address-watch-fire-eastern>.

<sup>338</sup> Federal Reserve Economic Data. (2024, October 30). *Unemployment rate in Gila County, AZ*. Retrieved November 2, 2024, from <https://fred.stlouisfed.org/series/AZGILA7URN>.

<sup>339</sup> Federal Reserve Economic Data. (2023, December 18). *Gross Domestic Product: All Industries in Gila County, AZ*. Retrieved November 2, 2024, from <https://fred.stlouisfed.org/series/GDPALL04007>; <https://fred.stlouisfed.org/series/A191RI1Q225SBEA>.

<sup>340</sup> Data USA. (2023). *Gila County, AZ*. Data USA. Retrieved November 02, 2024, from <https://datausa.io/profile/geo/gila-county-az>.



## Elmore County, Idaho

### *County Finances*

Elmore County 2025 allocated 1.43% of its fiscal year 2025 balanced budget to the debt service fund.<sup>341</sup> The county has not received an overall credit rating by any of the three major credit agencies.

### *Insurance Market*

Idaho has experienced increases in property insurance as a result of increased disaster risk. Between 2021 and 2023, property insurance increased by 20%, and they are expected to increase by 17% in 2024.<sup>342</sup> However, costs remain at \$1,918, below the national average.<sup>343</sup> In addition, insurers have started to limit their participation in areas at high risk of wildfires.<sup>344</sup>

Idaho's Department of Insurance is currently considering implementing Wildfire Risk Reinsurance and Mitigation Pool to provide voluntary reinsurance to insurance companies in wildfire risk areas. In addition, the state is considering providing grants to property owners in high wildfire risk areas. There are no current plans to launch a FAIR program.<sup>345</sup>

### *Current Wildfire Resilience Investments and Program*

Elmore County has the multi-hazard mitigation plan and the Community Wildfire Protection Plan (CWPP) plan updated in 2021.<sup>346</sup> While it does not provide funding at the local level, the program provides support to apply for federal grants, educate communities on how to reduce the risk of wildfire damage and prioritize infrastructure plans that take into consideration wildfire risk mitigation.<sup>347</sup>

Elmore County has not received direct funding from the federal government for wildfire resilience investment. The Bipartisan Infrastructure Law provided Idaho with \$14.5 million for investing in wildfire

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<sup>341</sup> Elmore County, ID. (2023). *FY 2024 County Budget*. Retrieved November 03, 2024, from <https://elmorecounty.org/wp-content/uploads/FY2024-County-Budget.pdf>

<sup>342</sup> The Courier Times. (2024, October 31). *Why Idaho home insurance premiums have increased by 17% in 2024*. InsuranceNewsNet. Retrieved November 03, 2024, from <https://insurancenewsnet.com/oarticle/why-idaho-home-insurance-premiums-have-increased-by-17-in-2024-insurify>

<sup>343</sup> The Courier Times. (2024, October 31). *Why Idaho home insurance premiums have increased by 17% in 2024*. InsuranceNewsNet. Retrieved November 03, 2024, from <https://insurancenewsnet.com/oarticle/why-idaho-home-insurance-premiums-have-increased-by-17-in-2024-insurify>

<sup>344</sup> The Courier Times. (2024, October 31). *Why Idaho home insurance premiums have increased by 17% in 2024*. InsuranceNewsNet. Retrieved November 03, 2024, from <https://insurancenewsnet.com/oarticle/why-idaho-home-insurance-premiums-have-increased-by-17-in-2024-insurify>

<sup>345</sup> The Courier Times. (2024, October 31). *Why Idaho home insurance premiums have increased by 17% in 2024*. InsuranceNewsNet. Retrieved November 03, 2024, from <https://insurancenewsnet.com/oarticle/why-idaho-home-insurance-premiums-have-increased-by-17-in-2024-insurify>

<sup>346</sup> Elmore County Emergency Management. (2021). *Elmore County, Idaho Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County. Retrieved November 03, 2024, from <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>

<sup>347</sup> Elmore County Emergency Management. (2021). *Elmore County, Idaho Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County. Retrieved November 03, 2024, from <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>

resilience and fuel reduction. However, there is no information on how much will be invested in Elmore County.<sup>348</sup>

The Rocky Mountain Elk Foundation provided \$2 million to Idaho as part of their wildfire restoration commitment to improving wildlife habitat.<sup>349</sup> While resources were allocated to Elmore County, there is no information on how much was given.<sup>350</sup>

#### *Economic Performance*

Elmore County has an unemployment rate of 3.4%,<sup>351</sup> the 5-year average GDP growth rate is 4.21%<sup>352</sup> and the median household income is \$55,000.<sup>353</sup>

**Table A.2.2. Elmore County, ID Economic Landscape Matrix**

	County Finances	Insurance Market	Current Wildfire Resilience Investments and Programs	Economic Performance	
	Credit Rating	Insurance Costs and availability	Local Level	Unemployment Rate	
	1	3	2	4	
	Debt Service Fund	Policies to Increase Access to Insurance	Federal and State Level	GDP Growth	
	5	2	3	5	
	Budget Balance		Private Sector and NGOs	Median Household Income	
	4		3	3	
Mean Score	3.3	3	2.7	4	Overall Mean 3.3

<sup>348</sup> Corbin, C. (2023, December 1). *Bipartisan Infrastructure Law provides \$14.5 million for wildfire resilience in Idaho*. Idaho Capital Sun. Retrieved November 03, 2024, from <https://idahocapitalsun.com/briefs/bipartisan-infrastructure-law-provides-14-5-million-for-wildfire-resilience-in-idaho/>

<sup>349</sup> Rocky Mountain Elk Foundation. (2020, July 24). *RMEF, partners award \$2 million in Idaho*. Retrieved November 03, 2024, from <https://rmef.org/elk-network/rmef-partners-award-2-million-in-idaho/>

<sup>350</sup> Rocky Mountain Elk Foundation. (2020, July 24). *RMEF, partners award \$2 million in Idaho*. Retrieved November 03, 2024, from <https://rmef.org/elk-network/rmef-partners-award-2-million-in-idaho/>

<sup>351</sup> Federal Reserve Economic Data. (2024, October 30). *Unemployment rate in Elmore County, ID*. Retrieved November 3, 2024, from <https://fred.stlouisfed.org/series/IDELMO9URN>

<sup>352</sup> Federal Reserve Economic Data. (2023, December 18). *Gross Domestic Product: All Industries in Elmore County, ID*. Retrieved November 3, 2024, from <https://fred.stlouisfed.org/series/GDPALL16039>; <https://fred.stlouisfed.org/series/A191RI1Q225SBEA>

<sup>353</sup> Data USA. (2023). *Elmore County, ID*. Data USA. Retrieved November 03, 2024, from <https://datausa.io/profile/geo/elmore-county-id>

## Los Angeles County, California

### *County Finances*

Los Angeles County operates on a balanced budget. The last available information from its debt service fund is from 2021, when the county allocated 2.1% of its total revenue to paying its long-term debts.<sup>354</sup> The county received an Aa1 credit score from Moody's in the high-grade category, and prime scores (i.e., AAA) from S&P and Fitch.<sup>355</sup>

### *Insurance Market*

Insurance premiums in LA county have increased between 20 and 34% this year,<sup>356</sup> with the average cost of insurance in the county being \$1,566.<sup>357</sup> A big factor that contributes to the lower prices is the existence of price caps. However, price caps have caused insurance companies to limit or not renew insurance policies.<sup>358</sup>

California has the California FAIR Plan, which acts as a last resource insured with limited coverage. The FAIR plan covers up to \$3 million for home properties and 20\$ million for business properties. In addition, it offers up to a 20% discount on the wildfire portion. In 2022, California's Insurance Commission started requiring insurance companies to decrease premiums if property owners take action to decrease the risk of wildfires. In addition, the commission announced its new instance strategy to improve the insurance market by getting a commitment by insurance companies to cover at least 85% of high wildfire risk communities.<sup>359</sup>

### *Current Wildfire Resilience Investments and Program*

Los Angeles County launched the Integrated Wildfire Safety Plan. The program received \$73,795 from local funding in addition to \$175,315 from the state.<sup>360</sup>

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<sup>354</sup> Hansen, J., & Gaytan-Burrell, B. (2021, October 1). *Los Angeles County; Appropriations; General Obligation*. S&P Global Ratings. Retrieved November 4, 2024, from <https://ttc.lacounty.gov/wp-content/uploads/2021/11/SPReportOct-01-2021.pdf>.

<sup>355</sup> Los Angeles County Treasurer and Tax Collector. (2024, June 12). *Los Angeles County Achieves Highest Credit Ratings From Two Major Ratings Agencies*. County of Los Angeles. Retrieved November 04, 2024, from <https://lacounty.gov/2024/06/12/los-angeles-county-achieves-highest-credit-ratings-from-two-major-ratings-agencies/>

<sup>356</sup> Granda, C. (2024, September 5). *New rule will allow some California home insurance rates to increase. here's why*. ABC7 Los Angeles. Retrieved November 04, 2024, from <https://abc7.com/post/new-rule-will-allow-california-home-insurance-rates-increase-officials-say-stabilize-market/15268826/>

<sup>357</sup> Howard, P. (2024, November 1). *Best Homeowners Insurance in Los Angeles, CA (2024)*. Policygenius. Retrieved November 04, 2024, from <https://www.policygenius.com/homeowners-insurance/california/los-angeles/>

<sup>358</sup> Granda, C. (2024, September 5). *New rule will allow some California home insurance rates to increase. here's why*. ABC7 Los Angeles. Retrieved November 04, 2024, from <https://abc7.com/post/new-rule-will-allow-california-home-insurance-rates-increase-officials-say-stabilize-market/15268826/>

<sup>359</sup> CA Department of Insurance. (2024). *Commissioner Lara unveils next steps in his strategy to expand coverage options for Californians in areas of high wildfire risk*. Retrieved November 04, 2024, from <https://www.insurance.ca.gov/0400-news/0100-press-releases/2024/release023-2024.cfm>

<sup>360</sup> Governor's Office of Planning and Research. (n.d.). *Los Angeles County - Integrated wildfire safety plan*. State of California. Retrieved November 04, 2024, from <https://resilientca.org/case-studies/los-angeles-county-integrated-wildfire-safety-pl/>

In 2022, Los Angeles County received \$3.78 million from the federal government for rebuilding efforts from the damage caused by the 2018 wildfires.<sup>361</sup>

In addition to government investments and programs, the Los Angeles Wildfire Resilience Alliance is a public/private partnership between the Los Angeles Fire Department and MySafe: LA with the goal of building more resilient neighborhoods and reducing wildfires threats to properties and people.<sup>362</sup> The program itself does not invest in resilience projects, but it does provide resources to the local community to reduce wildfire risk.<sup>363</sup>

### *Economic Performance*

Los Angeles County has an unemployment rate of 2.1%<sup>364</sup>, the average 5-year GDP growth rate is 1.96% and the median household income is \$82,516.<sup>365, 366</sup>

**Table A.2.3. Los Angeles County, CA Economic Landscape Matrix**

	County Finances	Insurance Market	Current Wildfire Resilience Investments and Programs	Economic Performance	
	Credit Rating	Insurance Costs and availability	Local Level	Unemployment Rate	
	5	3	4	5	
	Debt Service Fund	Policies to Increase Access to Insurance	Federal and State Level	GDP Growth	
	5	5	4	3	
	Budget Balance		Private Sector and NGOs	Median Household Income	
	4		2	4	
Mean Score	4.7	4	3.3	4	Overall Mean 4

<sup>361</sup> City News Service Los Angeles. (2022, August 20). *LA County gets \$3.78 million in wildfire recovery funds*. Spectrum News. Retrieved November 04, 2024, from <https://spectrumnews1.com/ca/southern-california/wildfires/2022/08/20/la-county-gets--3-78-million-in-wildfire-recovery-funds>

<sup>362</sup> Los Angeles Regional Fire Safe Council. (2024). The Los Angeles Wildfire Resilience Alliance. Retrieved November 04, 2024, from <https://www.wildfirela.org/wildfire-alliance/>

<sup>363</sup> Los Angeles Regional Fire Safe Council. (2024). The Los Angeles Wildfire Resilience Alliance. Retrieved November 04, 2024, from <https://www.wildfirela.org/wildfire-alliance/>

<sup>364</sup> Federal Reserve Economic Data. (2024, October 30). *Unemployment rate in Los Angeles County, CA*. Retrieved November 04, 2024, from <https://fred.stlouisfed.org/series/CALOSA7URN>

<sup>365</sup> United States Census Bureau. (2023). Los Angeles County, California. Retrieved November 04, 2024, from [https://data.census.gov/profile/Los\\_Angeles\\_County,\\_California?g=050XX00US06037](https://data.census.gov/profile/Los_Angeles_County,_California?g=050XX00US06037)

<sup>366</sup> <https://fred.stlouisfed.org/series/REALGDPALL06037>

## Miami-Dade County, FL

### *County Finances*

There was no accessible information regarding Miami-Dade County's budget, knowing the county's debt service fund and budget balance. The county received a Aa2 credit score from Moody's, an AA score from S&P, and an AA+ from Fitch, putting it in the high-grade category from the three major credit agencies.<sup>367,368,369</sup>

### *Insurance Market*

Homeowner Insurance premiums have increased by 42% between 2022 and 2023 in Florida.<sup>370</sup> As a result, between 15% and 20% of homeowners do not have home insurance, higher than the national average of 12%.<sup>371</sup> In addition, the state has one of the highest insurance costs in the country at \$6,000.<sup>372</sup>

Policies have been implemented at the state level in Florida to address access to property insurance concerns. Some of these programs include the My Safe Florida, which includes grants match of up to \$10,000 for homeowners that invest in hurricane mitigation for their property.<sup>373</sup> In addition, Florida has implemented policies to reduce the easiness of filing lawsuits against insurance companies to increase incentives for insurers to enter the insurance market.<sup>374</sup>

### *Current Wildfire Resilience Investments and Program*

Miami-Dade County has a local mitigation strategy office that works to eliminate the long-term risks of natural hazards by matching projects with funding programs (e.g., funding from FEMA).<sup>375</sup> The county itself does not fund projects, but it can match funding from other sources, although there is no information available on how much the county has invested.<sup>376</sup>

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<sup>367</sup> Moody's. (2024, October). Miami-Dade (County of) FL. Retrieved November 05, 2024, from

<https://www.moody.com/credit-ratings/Miami-Dade-County-of-FL-credit-rating-600007713/summary>

<sup>368</sup> S&P Global Ratings. (2024, July 9). Miami-Dade County, FL 2024A Special Obligation Bonds Rated "AA"; Outlook Stable. Retrieved November 05, 2024, from <https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/type/HTML/id/3211290>

<sup>369</sup> Fitch Ratings. (2024a, July 1). Miami-Dade County (FL) [General Government]. Retrieved November 05, 2024, from <https://www.fitchratings.com/entity/miami-dade-county-fl-general-government-credit-summary-96249395>

<sup>370</sup> Grossman, H. (2023, July 21). With premiums raising an average of 42% in Florida, homeowners finding insurance at pricey proposition. Islander News. Retrieved November 05, 2024, from [https://www.islandernews.com/realestate/with-premiums-raising-an-average-of-42-in-florida-homeowners-finding-insurance-at-pricey-proposition/article\\_37914c1e-2733-11ee-8559-ff35f3797e3a.html](https://www.islandernews.com/realestate/with-premiums-raising-an-average-of-42-in-florida-homeowners-finding-insurance-at-pricey-proposition/article_37914c1e-2733-11ee-8559-ff35f3797e3a.html)

<sup>371</sup> The Miami Herald Editorial Board. (2024, May 30). *A predicted hectic hurricane season + uninsured homeowners. what could go wrong?* Miami Herald. Retrieved November 05, 2024, from <https://www.miamiherald.com/opinion/editorials/article288826435.html>

<sup>372</sup> Carbonaro, G. (2024, June 27). *Florida's insurance crisis could get even worse*. Newsweek. <https://www.newsweek.com/florida-insurance-crisis-could-get-even-worse-1918060>

<sup>373</sup> Department of Financial Services. (2024). *Program FAQs*. My Safe Florida Home. Retrieved November 5, 2024, from <https://mysafehome.com/>

<sup>374</sup> CRC Group. (n.d.). Florida aims to rebuild homeowners market with reform law. <https://www.crcgroup.com/Tools-Intel/post/florida-aims-to-rebuild-homeowners-market-with-reform-law>

<sup>375</sup> Miami-Dade County. (n.d.). Projects that protect. Retrieved November 05, 2024, from <https://www.miamidade.gov/global/emergency/projects-that-protect.page>

<sup>376</sup> Miami-Dade County. (n.d.). Projects that protect. Retrieved November 05, 2024, from <https://www.miamidade.gov/global/emergency/projects-that-protect.page>

The U.S. Economic Development Agency recommended that the federal government allocate \$19 million to the Miami-Dade Economic Development office to fund the South Florida ClimateReady Tech Hub to advance sustainability and resilience investment related to the climate crisis.<sup>377</sup> However, there is no information on whether the investment has been made. In addition, there is no information on funding made by the state.

There are no investments in wildfire resilience made by NGOs and the private sector in Miami-Dade County.

#### *Economic Performance*

Miami-Dade County has an unemployment rate of 2.1%,<sup>378</sup> the average 5-year GDP growth rate is 3.12%,<sup>379</sup> and the median household income is \$64,215.<sup>380</sup>

**Table A.2.4. Miami-Dade County, FL Economic Landscape Matrix**

	County Finances	Insurance Market	Current Wildfire Resilience Investments and Programs	Economic Performance	
	Credit Rating	Insurance Costs and availability	Local Level	Unemployment Rate	
	5	1	3	5	
	Debt Service Fund	Policies to Increase Access to Insurance	Federal and State Level	GDP Growth	
	1	5	3	4	
	Budget Balance		Private Sector and NGOs	Median Household Income	
	1		1	3	
Mean Score	2.3	3	2.3	4	Overall Mean 2.9

<sup>377</sup> U.S. Economic Development Administration. (n.d.). South Florida climateready Tech Hub. Retrieved November 05, 2024, from <https://www.eda.gov/funding/programs/regional-technology-and-innovation-hubs/2023/South-Florida-ClimateReady-Tech-Hub?q=%2Ffunding%2Fprograms%2Fregional-technology-and-innovation-hubs%2F2023%2FSouth-Florida-Climate-Resilience-Tech-Hub>

<sup>378</sup> Federal Reserve Economic Data. (2024, October 30). Unemployment Rate in Miami-Dade County, FL. Retrieved November 5, 2024, from <https://fred.stlouisfed.org/series/FLMIAM6URN>

<sup>379</sup> Federal Reserve Economic Database. (2023b, December 18). Real gross domestic product: All industries in Miami-Dade County, FL. Retrieved November 5, 2024, from <https://fred.stlouisfed.org/series/REALGDPALL12086>

<sup>380</sup> Data USA. (2023). *Miami Dade County, FL*. Data USA. Retrieved November 5, 2024, <https://datausa.io/profile/geo/miami-dade-county-fl>

### Appendix 3. Analysis – Integrating Community Voice

This analysis examines how the selected counties integrate community voice into their wildfire resilience plans, focusing on key aspects such as community engagement, accessibility, trust-building, and sustainability. By evaluating the counties’ approach to identifying marginalized groups, providing resources, and fostering collaboration, this report highlights areas of strength as well as opportunities for improvement in ensuring that all community members are actively involved in wildfire resilience efforts. The following sections delve into specific elements of community engagement and empowerment within the county’s wildfire protection strategy.

#### Gila County, Arizona

##### *Community Engagement and Empowerment*

###### *Identifying and Reaching Marginalized Groups*

Gila County offers two publicly available Community Wildfire Protection Plan which split the county by northern and southern regions of the jurisdiction.<sup>381,382</sup> Within the planning document, both regions identify local partners, stakeholders, and at-risk community members including residential landowners, businesses and non-profit organizations, as well as faith-based groups. While they call out these overarching groups, they do not call out specific partners in this report.

Additionally, both reports include community assessments that target local and tribal communities by fire department districts.

###### *Training and Resources*

Both regions of the county prioritize developing “a county ordinance for fire adapted communities”.<sup>383</sup> The county emphasizes the importance of training and resources for community members and local organizations to effectively respond to wildfire risks. By providing educational materials and workshops, the plan aims to empower residents with the knowledge and skills needed for preparedness and response. However, the report could benefit from detailing specific training programs and resource availability to ensure that all community members have access to vital information and support.

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<sup>381</sup> Northern Gila County. (2022). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 26, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>382</sup> Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 26, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>383</sup> Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved on October 26, 2024 from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).



### *Trust Building*

Each report provides a list of recommendations for enhancing public education and outreach in order to reduce wildfire risk. At the end of each report, the county regions offer priorities to meet local needs and solutions to addressing them. This includes ramping their public education campaign and outreach methods.

In all priority areas, the county regions are proposing regular meetings with the community which will allow for community input.

### ***Accessibility and Inclusivity***

#### *Language and Communication Barriers*

Gila County utilizes straightforward language, making it relatively easy to understand. However, it does not offer translations or multilingual options, which could limit comprehension among non-English speakers or those with different literacy levels.

#### *Cultural Sensitivity*

Gila County references diverse cultural and historical contexts of the Gila County community, acknowledging the importance of local customs in emergency management. This sensitivity fosters trust and engagement with various community groups, though it could enhance representation of specific cultural practices further. However, the reports do not identify key subpopulations outside of broader group terms, *i.e.*, tribal groups.

### ***Sustainability and Continuous Improvement***

#### *Feedback Adaptation*

Gila County mentions several times public forums for community members to weigh in their thoughts on the county's proposed mitigation plans. While the report highlights the importance of community feedback, it could provide more specific mechanisms for how this feedback will be integrated into future planning and actions. Clear pathways for residents to share their thoughts would strengthen this aspect.

### ***Collaboration and Partnerships***

#### *Role of Local Organizations*

Local organizations are acknowledged as key players in implementing the strategies outlined in the report. This recognition reinforces the importance of leveraging local knowledge and resources to address wildfire risks, enhancing community engagement.

### ***Monitoring and Evaluation***

#### *Feedback Loops*

Gila County discusses the establishment of feedback loops to ensure that community input is regularly considered. While the intention is clear, detailing how these loops will function in practice would strengthen the report's responsiveness to community needs.

### *Data Collection Tools*

Gila County mentions the use of data collection tools and methodologies for assessing wildfire risks and impacts, such as public surveys. However, it could benefit from more specific examples of these tools and how they engage the community in the data-gathering process.

### *Storytelling and Lived Experiences*

#### *Integrating Personal Narratives*

Gila County largely focuses on factual information and data, which may limit its relatability. It does not offer personal narrative reports. By integrating more personal stories and lived experiences, the report could create a stronger narrative that resonates with community members and highlights the human aspect of wildfire preparedness.

### *Transparency and Accountability*

#### *Transparency in Reporting*

Gila County demonstrates transparency through clear documentation of its processes, data sources, and decision-making criteria. By openly sharing the methods used to assess wildfire risks and the rationale behind chosen strategies, the report builds trust with community stakeholders. However, to enhance transparency further, it could include more details on how decisions are made, who is involved in those decisions, and how the community can access ongoing updates or participate in future planning. This would foster greater community engagement and accountability.

**Table A.3.1. Gila County Integrated Community Voice Scores**

Characteristic of Integrating Community Voice	Scores
<b>Community Engagement and Empowerment</b>	
<i>Identifying and Reaching Marginalized Groups</i>	4
<i>Training and Resources</i>	4
<i>Trust Building</i>	5
<b>Accessibility and Inclusivity</b>	
<i>Language and Communication Barriers</i>	1
<i>Cultural Sensitivity</i>	3
<b>Sustainability and Continuous Improvement</b>	
<i>Feedback Adaptation</i>	5
<b>Collaboration and Partnerships</b>	
<i>Role of Local Organizations</i>	4
<b>Monitoring and Evaluation</b>	

<i>Feedback Loops</i>	3
<i>Data Collection Tools</i>	4
<b>Storytelling and Lived Experiences</b>	
<i>Integrating Personal Narratives</i>	0
<b>Transparency and Accountability</b>	
<i>Transparency in Reporting</i>	3
<b>Mean Score</b>	<b>3.3</b>

## Elmore, Idaho

### *Community Engagement and Empowerment*

#### *Identifying and Reaching Marginalized Groups*

In the Elmore County Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update, the report includes a section that identifies racial and ethnic groups, but it does not provide an in-depth analysis of the needs or challenges faced by these groups or look at other subpopulations, such as age, disability, or socioeconomic status.<sup>384</sup> More attention could be paid to understanding the unique barriers to access that marginalized populations might face when engaging with public processes. This would involve not only identifying these groups but also understanding how to effectively reach them with relevant information.

#### *Training and Resources*

To keep residents informed, webinars and media releases are issued as new information becomes available, ensuring that updates reach a broad audience. These tools help to distribute important information regarding planning initiatives, but the frequency and accessibility of these resources could be enhanced. It's important to ensure these offerings are easy to understand and accessible for residents with varying levels of digital literacy.

#### *Trust Building*

Only two public meetings were held in different parts of the county, which limits opportunities for engagement. Holding more frequent and varied meetings in multiple locations could help build trust by demonstrating a commitment to inclusivity and ensuring that all residents, including those from marginalized communities, have opportunities to participate. Greater outreach efforts would also help in creating an environment of transparency and reliability.

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<sup>384</sup> Elmore County Emergency Management. (2021). *Multi-Hazard Mitigation Plan 2020 Update Community Wildfire Protection Plan 2021 Update*. Elmore County, Idaho. <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

## ***Accessibility and Inclusivity***

### ***Language and Communication Barriers***

It is unclear whether public materials and reports have been translated into multiple languages, which may pose barriers for non-English-speaking residents. Without clear evidence of multilingual outreach, it's difficult to assess whether all community members have equal access to the information. Translating documents and offering interpretation services would increase accessibility and help ensure that language is not a barrier to participation.

### ***Cultural Sensitivity***

While the identification of communities within the county is a key part of planning efforts, there is no clear evidence of targeted outreach and communication strategies tailored to the specific cultural needs of different groups. It's important to recognize the diversity of cultural practices and communication preferences within the community and adapt outreach methods accordingly to ensure that all groups are effectively reached and represented.

## ***Sustainability and Continuous Improvement***

### ***Feedback Adaptation***

A copy of the planning mitigation report was made available to the public and open for comment, providing residents with the opportunity to voice their opinions. Public forums are also held to gather community input, but it is unclear how well information about these comment periods and forums is communicated to residents. Ensuring that information is widely disseminated and easy to access is crucial to increasing public participation and feedback.

## ***Collaboration and Partnerships***

### ***Role of Local Organizations***

Local representatives, including those from hospitals, school districts, and emergency management teams, were involved in the planning process, ensuring that key community institutions have a voice. However, diverse community organizations that represent marginalized populations—such as those serving immigrant, low-income, or individuals with disabilities—were not specifically identified or included in the planning team. Including these groups would help ensure that the perspectives of all segments of the population are considered.

## ***Monitoring and Evaluation***

### ***Feedback Loops***

Webinars and media releases provided residents with updated information, ensuring that the public is kept informed throughout the process. These mechanisms allow for consistent feedback loops, keeping residents engaged and up to date. However, it's important to ensure that these channels are accessible to everyone, including those who may not have regular internet access or those who are less familiar with digital tools.

*Data Collection Tools*

The county relied on a variety of existing databases, reports, maps, and local sources for data collection, but it has not actively gathered new data directly from the community. While these existing tools provide valuable insights, collecting direct input from residents—especially marginalized groups—would offer a more comprehensive understanding of community needs and priorities. This could be done through surveys, interviews, or community focus groups to gather diverse perspectives.

*Storytelling and Lived Experiences**Integrating Personal Narratives*

The planning process does not appear to integrate the personal voices, experiences, or perspectives of community members, which could limit the depth and relevance of the planning efforts. Including community narratives in the process would add authenticity and a deeper understanding of the lived experiences of residents, especially those from underrepresented or marginalized groups.

*Transparency and Accountability**Transparency in Reporting*

Elmore county maintained a high level of transparency in its reporting, utilizing regular meetings, press releases, flyers, newspaper ads, and website updates<sup>385</sup> to keep residents informed. These efforts help ensure that the public remains engaged and aware of ongoing processes. However, continued efforts to make these reports more accessible, through plain language and targeted outreach, could further increase transparency and inclusivity.

**Table A.3.2. Elmore County Integrated Community Voice Scores**

Characteristic of Integrating Community Voice	Scores
<b>Community Engagement and Empowerment</b>	
<i>Identifying and Reaching Marginalized Groups</i>	4
<i>Training and Resources</i>	3
<i>Trust Building</i>	3
<b>Accessibility and Inclusivity</b>	
<i>Language and Communication Barriers</i>	1
<i>Cultural Sensitivity</i>	2
<b>Sustainability and Continuous Improvement</b>	
<i>Feedback Adaptation</i>	4
<b>Collaboration and Partnerships</b>	

<sup>385</sup> *Emergency Management*. Elmore County. Accessed November 8, 2024. <https://elmorecounty.org/emergency-management/>.

<i>Role of Local Organizations</i>	3
<b>Monitoring and Evaluation</b>	
<i>Feedback Loops</i>	5
<i>Data Collection Tools</i>	3
<b>Storytelling and Lived Experiences</b>	
<i>Integrating Personal Narratives</i>	0
<b>Transparency and Accountability</b>	
<i>Transparency in Reporting</i>	5
<b>Mean Score</b>	<b>3</b>

## Los Angeles County, California

### *Community Engagement and Empowerment*

#### *Identifying and Reaching Marginalized Groups*

Los Angeles County’s wildfire mitigation efforts focus on high-hazard regions but do not specify which populations are at the greatest risk, and it remains unclear whether any equity analysis was conducted. In contrast, the County’s Emergency Operations Plan adopts a “Whole Community Approach,” informed by FEMA’s framework, which takes into account diverse community needs, including race, ethnicity, language, age, broadband access, and vehicle availability, to guide preparedness and resource capacity planning.<sup>386</sup>

#### *Training and Resources*

The reports and website related to the Los Angeles County Wildfire Mitigation Plan<sup>387</sup> do not provide clear information about available training resources for the community. This lack of transparency on training could hinder effective community preparedness, especially for vulnerable or less-informed groups.

#### *Trust Building*

To build trust within the community, the County holds regular meetings in five different neighborhoods, where citizens can engage directly with decision-makers.<sup>388</sup> Additionally, board presentations, public

<sup>386</sup> Los Angeles County Emergency Plans. *County of Los Angeles Operational Area Emergency Operations Plan*. November 2023. Accessed November 8, 2024. <https://ceo.lacounty.gov/wp-content/uploads/2023/11/County-of-Los-Angeles-OAEP-2023-Final-for-Website.pdf>.

<sup>387</sup> Los Angeles County Department of Water & Power. *2023 - 2025 Wildfire Mitigation Plan*. June 2024. Accessed November 8, 2024. <https://www.ladwp.com/sites/default/files/2024-06/2024%20LADWP%20Wildfire%20Mitigation%20Plan.pdf>

<sup>388</sup> Los Angeles County Department of Water & Power. *2023 - 2025 Wildfire Mitigation Plan*. June 2024. Accessed November 8, 2024. <https://www.ladwp.com/sites/default/files/2024-06/2024%20LADWP%20Wildfire%20Mitigation%20Plan.pdf>

comment opportunities on planning documents, and media outreach, including press releases and social media, help keep the public informed and involved in the decision-making process.

### ***Accessibility and Inclusivity***

#### ***Language and Communication Barriers***

Los Angeles County generally employs straightforward language in its wildfire mitigation materials, making it accessible to a broad audience. However, a significant barrier remains in the lack of multilingual resources or translations, which may exclude non-English speakers or individuals with limited literacy from fully understanding the information.

#### ***Cultural Sensitivity***

Although the Los Angeles County Emergency Operations Plan considering the demographics of its communities, it is unclear how these considerations are effectively communicated to ensure cultural sensitivity and meet the needs of diverse groups.<sup>389</sup> More explicit strategies to engage with communities in a culturally relevant way could improve outreach efforts.

### ***Sustainability and Continuous Improvement***

#### ***Feedback Adaptation***

The County provides ongoing updates to its reports, creating opportunities for public input and adjustment of plans based on community feedback. This iterative process helps refine the strategies and ensure that the wildfire mitigation plans remain responsive to emerging needs.

### ***Collaboration and Partnerships***

#### ***Role of Local Organizations***

The County partners with both national and local organizations, such as the American Red Cross and Emergency Network Los Angeles, to address service gaps and provide additional support to communities.<sup>390</sup> These partnerships help to enhance the effectiveness of disaster preparedness and recovery efforts, particularly in underserved areas.

### ***Monitoring and Evaluation***

#### ***Feedback Loops***

The County provides ongoing updates to its reports, creating opportunities for public input and adjustment of plans based on community feedback. This iterative process helps refine the strategies and ensure that the wildfire mitigation plans remain responsive to emerging needs.

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<sup>389</sup> Los Angeles County Emergency Plans. *County of Los Angeles Operational Area Emergency Operations Plan*. November 2023. Accessed November 8, 2024. <https://ceo.lacounty.gov/wp-content/uploads/2023/11/County-of-Los-Angeles-OAEOP-2023-Final-for-Website.pdf>.

<sup>390</sup> Los Angeles County Emergency Plans. *County of Los Angeles Operational Area Emergency Operations Plan*. November 2023. Accessed November 8, 2024. <https://ceo.lacounty.gov/wp-content/uploads/2023/11/County-of-Los-Angeles-OAEOP-2023-Final-for-Website.pdf>.



### *Data Collection Tools*

Los Angeles County employs an independent contractor to gather public feedback through forums, which adds credibility and impartiality to the process.<sup>391</sup> However, relying solely on public forums limits the breadth of data collection, and additional strategies, such as surveys or focus groups, could provide a more comprehensive understanding of community needs.

### *Storytelling and Lived Experiences*

#### *Integrating Personal Narratives*

There is no clear evidence that personal narratives or direct community voices are integrated into the County’s wildfire mitigation plans. This could be an important avenue for building stronger connections with marginalized groups and ensuring their concerns are reflected in planning.

### *Transparency and Accountability*

#### *Transparency in Reporting*

Los Angeles County demonstrates a high level of transparency in its wildfire mitigation efforts by publishing annual reports, independent evaluations, and detailed planning documents on its website. These resources, which include performance metrics and outcome-based evaluations, provide the public with insight into progress, gaps, and ongoing improvements in the County’s preparedness and response strategies.

**Table A.3.3. Los Angeles County Integrated Community Voice Scores**

Characteristic of Integrating Community Voice	Scores
<b>Community Engagement and Empowerment</b>	
<i>Identifying and Reaching Marginalized Groups</i>	5
<i>Training and Resources</i>	0
<i>Trust Building</i>	5
<b>Accessibility and Inclusivity</b>	
<i>Language and Communication Barriers</i>	1
<i>Cultural Sensitivity</i>	0
<b>Sustainability and Continuous Improvement</b>	
<i>Feedback Adaptation</i>	
<b>Collaboration and Partnerships</b>	
<i>Role of Local Organizations</i>	5

<sup>391</sup> Los Angeles County Emergency Plans. *County of Los Angeles Operational Area Emergency Operations Plan*. November 2023. Accessed November 8, 2024. <https://ceo.lacounty.gov/wp-content/uploads/2023/11/County-of-Los-Angeles-OAEO-2023-Final-for-Website.pdf>.

Monitoring and Evaluation	
<i>Feedback Loops</i>	5
<i>Data Collection Tools</i>	3
Storytelling and Lived Experiences	
<i>Integrating Personal Narratives</i>	0
Transparency and Accountability	
<i>Transparency in Reporting</i>	5
<b>Mean Score</b>	<b>2.9</b>

### Miami-Dade County, FL

Because Miami-Dade County does not have a county-wide infrastructure dedicated to wildfire prevention strategies or community engagement. Community engagement could not be assessed.

## Appendix 4. Analysis – Infrastructure Investment

### Gila County, Arizona

Gila County published its most recent HMP in 2019. Arizona published its most recent SHMP in 2023. The County has two Community Wildfire Protection Plans (CWPPs) - one for Northern Gila County and one for Southern Gila County. Both were published in 2022. Idaho's last SHMP was published in 2023.

### *Transportation Infrastructure*

#### *Infrastructure Hardening*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	Not mentioned in either CWPP.

#### *Creation of Defensible Space*

County HMP	SHMP	CWPP(S)
The 2019 HMP includes a mitigation action to support fuel reduction in order to protect existing and future buildings and infrastructure in the City of Globe. <sup>392</sup> This could apply to transportation infrastructure.	The 2023 SHMP includes a mitigation action involving working with state agencies to mitigate wildfire risk to state owned infrastructure, including through vegetation maintenance, thinning, and perimeter	The Southern Gila CWPP includes a priority to implement fuel reduction treatments and to create defensible space in high-risk areas, including along roads and evacuation routes. <sup>394</sup>

<sup>392</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>394</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Gila County. (2021). *Southern Community Wildfire Protection Plan*. Retrieved from

	development, which could be applied to the state highways located in Gila County. <sup>393</sup>	
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*Protection*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	<p>The 2023 SHMP includes a mitigation action related to post-wildfire debris flow that involves developing a predictive understanding of post-fire debris flow and trigger rainfall intensities and providing this information to federal, local, and tribal entities to help in planning mitigation efforts. This action could help to inform planning related to protection of transportation infrastructure.<sup>395</sup></p> <p>The 2023 SHMP also includes a mitigation action related to working with local entities to leverage FEMA's Fire Mitigation Assistance Grants Program for post-fire debris flow protection.<sup>396</sup></p> <p>Further, the 2023 SHMP includes a mitigation action involving working with state agencies to mitigate wildfire risk</p>	The 2022 Northern Gila CWPP acknowledges the connection between fires, floods, and watershed impacts and recommends identifying the most at-risk areas and zones where post-fire flooding might occur. <sup>398</sup>

Gila County:

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).

<sup>393</sup> Arizona Department of Emergency and Military Affairs. (2023). *Hazard Mitigation Plan*. Retrieved from Arizona Department of Emergency and Military Affairs: [https://dema.az.gov/sites/default/files/2023-11/SHMP\\_2023\\_Final.pdf](https://dema.az.gov/sites/default/files/2023-11/SHMP_2023_Final.pdf).

<sup>395</sup> Arizona Department of Emergency and Military Affairs. (2023). *Hazard Mitigation Plan*. Retrieved from Arizona Department of Emergency and Military Affairs: [https://dema.az.gov/sites/default/files/2023-11/SHMP\\_2023\\_Final.pdf](https://dema.az.gov/sites/default/files/2023-11/SHMP_2023_Final.pdf).

<sup>396</sup> Arizona Department of Emergency and Military Affairs. (2023). *Hazard Mitigation Plan*. Retrieved from Arizona Department of Emergency and Military Affairs: [https://dema.az.gov/sites/default/files/2023-11/SHMP\\_2023\\_Final.pdf](https://dema.az.gov/sites/default/files/2023-11/SHMP_2023_Final.pdf).

<sup>398</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Gila County. (2021). *Southern Community Wildfire Protection Plan*. Retrieved from Gila County:

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).

	to state owned infrastructure, including through post-fire debris flow protection, which could be applied to the state highways located in Gila County. <sup>397</sup>	
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## ***Water Infrastructure***

### *Infrastructure Hardening*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP(S)</b>
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	The 2022 Northern Gila WPP adding or replacing screens on public or private utility infrastructure, which could apply to water infrastructure. <sup>399</sup>

### *Watershed Protection*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP(S)</b>
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	The 2022 Northern and Southern Gila CWPPs outline several recommended actions for protecting watersheds by reducing fuels.

### *Water Treatment*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP(S)</b>
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	Not mentioned in either CWPP.

## **Energy Infrastructure**

### *Infrastructure Hardening*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP(S)</b>
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	The 2022 Northern and Southern Gila CWPPs recommend adding or replacing screens on public or private utility infrastructure, which could apply to energy infrastructure.

<sup>397</sup> Arizona Department of Emergency and Military Affairs. (2023). *Hazard Mitigation Plan*. Retrieved from Arizona Department of Emergency and Military Affairs: [https://dema.az.gov/sites/default/files/2023-11/SHMP\\_2023\\_Final.pdf](https://dema.az.gov/sites/default/files/2023-11/SHMP_2023_Final.pdf).

<sup>399</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

		It also outlines several recommended actions for removing fuels near power infrastructure. <sup>400</sup>
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#### *Creation of Defensible Space*

County HMP	SHMP	CWPP(S)
The 2019 HMP includes a mitigation action to support fuel reduction in order to protect existing and future buildings and infrastructure in the City of Globe. <sup>401</sup> This could apply to energy infrastructure.	Not mentioned in 2023 SHMP.	The 2022 Northern and Southern Gila CWPP recommends removing dead or dry vegetation within five feet of public or private utility infrastructure, which could apply to energy infrastructure. <sup>402</sup>

#### *Situational Awareness*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	Not mentioned in either CWPP.

### **Housing Infrastructure**

#### *Infrastructure Hardening*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	The 2022 Northern Gila CWPP recommends adding or replacing screens on homes to make them more fire-resistant. <sup>403</sup>

#### *Creation of Defensible Space*

<sup>400</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Gila County. (2021). *Southern Community Wildfire Protection Plan*. Retrieved from Gila County:

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).

<sup>401</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>402</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Gila County. (2021). *Southern Community Wildfire Protection Plan*. Retrieved from Gila County:

[https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).

<sup>403</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

County HMP	SHMP	CWPP(S)
<p>The 2019 HMP includes several wildfire mitigation projects related to creating defensible space and reducing fuels in relation to housing infrastructure, including:</p> <ul style="list-style-type: none"> <li>• Educating the public on wildfire fuel reduction on private property<sup>404</sup></li> <li>• Supporting fuel reduction in order to protect existing and future buildings and infrastructure in the City of Globe, which could apply to housing infrastructure<sup>405</sup></li> <li>• Maintaining sites in the city of Payson where private property owners can dispose of wildfire fuels<sup>406</sup></li> <li>• Create defensible space on private property in Rim Country<sup>407</sup></li> <li>• Creating defensible space on private property in WUI areas along the Gila River</li> </ul>	Not mentioned in 2023 SHMP.	<p>The 2022 Northern Gila CWPP recommends removing dead or dry vegetation within 5 feet of homes. It also includes the priority of creating fuel disposal opportunities for property owners.<sup>408</sup></p>

### Technology Deployment

County HMP	SHMP	CWPP(S)
The 2019 HMP includes at least one wildfire mitigation project	Not mentioned in 2023 SHMP.	Not mentioned in either CWPP.

<sup>404</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>405</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>406</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>407</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>408</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

related to monitoring and alerts, which involves using weather gauges to allow for early warning of wildfire to prevent loss of property in the Northern Tonto Basin. <sup>409</sup>		
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## Health Infrastructure

### *Infrastructure Hardening*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	The 2022 Northern and Southern Gila CWPP recommend adding or replacing screens within hospitals and other healthcare infrastructure to be more fire-resistant. <sup>410</sup>

### *Creation of Defensible Space*

County HMP	SHMP	CWPP(S)
The 2019 HMP includes a mitigation action to support fuel reduction in order to protect existing and future buildings and infrastructure in the City of Globe. <sup>411</sup> This could apply to health infrastructure.	Not mentioned in 2023 SHMP.	The 2022 Northern and Southern Gila CWPPs recommend removing dead or dry vegetation within five feet of hospitals and other healthcare infrastructure. <sup>412</sup>

<sup>409</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>410</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Gila County. Retrieved November 2024, from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Southern Gila County. (2021). *Community Wildfire Protection Plan*. Gila County. Retrieved from [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf).

<sup>411</sup> Gila County. (2019). *Multi-Jurisdictional Local Hazard Mitigation Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/GC\\_MJHMP\\_Final\\_10.08.19.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/GC_MJHMP_Final_10.08.19.pdf).

<sup>412</sup> Gila County. (2022). *Northern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022NoGilaCountyCWPP\\_Final\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022NoGilaCountyCWPP_Final_032322.pdf); Gila County. (2021). *Southern Community Wildfire Protection Plan*. Retrieved from Gila County: [https://cms3.revize.com/revize/gilaaz/government/health\\_and\\_emergency\\_services/gilaem\\_eoc/docs/2022SoGilaCountyCWPP\\_Final\\_printable\\_032322.pdf](https://cms3.revize.com/revize/gilaaz/government/health_and_emergency_services/gilaem_eoc/docs/2022SoGilaCountyCWPP_Final_printable_032322.pdf).



*Air Quality Monitoring and Response*

County HMP	SHMP	CWPP(S)
Not mentioned in the 2019 HMP.	Not mentioned in 2023 SHMP.	Not mentioned in either CWPP.

**Table A.4.1. Gila County Infrastructure Project Opportunity Matrix**

Transportation Infrastructure Project Type	Water Infrastructure Project Type	Energy Infrastructure Project Type	Housing Infrastructure Project Type	Health Infrastructure Project Type	
2	3	3	3	3	
Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	
5	3	4	4	4	
Creation of Defensible Space	Watershed Protection	Creation of Defensible Space	Creation of Defensible Space	Creation of Defensible Space	
4	2	2	3	2	
Protection	Water Treatment	Situational Awareness	Technology Deployment	Air Quality Monitoring and Response	
Mean Score	3.7	2.7	3	3.3	3
					Overall Mean: 3.1

**Elmore County, Idaho**

The 2021 Elmore County Community Wildfire Protection Plan (CWPP) is incorporated into the county's Hazard Mitigation Plan (HMP). The last Elmore County HMP was updated in 2020 and the last Idaho SHMP was published in 2023.

***Transportation Infrastructure****Infrastructure Hardening*

County HMP & CWPP	SHMP
<p>The 2020 Elmore County HMP includes several mitigation strategies that could address the vulnerability of transportation infrastructure to wildfire through infrastructure hardening, including:</p> <ul style="list-style-type: none"> <li>• Repairing and replacing rural road markers, weight ratings and bridges, and other signage, which offers an opportunity to replace such signage with fire-resistant materials.</li> <li>• Working with the U.S. Forest Service on the replacement of critical forest routes, which offers an opportunity to make these</li> </ul>	<p>The 2023 SHMP includes providing fire-resistant building materials and establishing incentives for existing structures to be hardened against wildfire as a potential opportunity to mitigate wildfire hazards.<sup>414</sup> This could be applied to transportation infrastructure.</p>

<sup>414</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<p>routes fire-resistant and install all-weather materials.</p> <ul style="list-style-type: none"> <li>Replacing several bridges with two-lane structures, which offers an opportunity to make these bridges fire-resistant.<sup>413</sup></li> </ul>	
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*Creation of Defensible Space*

County HMP & CWPP	SHMP
The 2020 Elmore County HMP emphasizes the importance of fuels reduction and includes several mitigation strategies that address the vulnerability of transportation infrastructure to wildfire through the creation of defensible space, including creating fuel breaks along highway corridors and other roads, including by mowing and planting. <sup>415</sup>	The 2023 SHMP includes creating and maintaining defensible space around structures and infrastructure as a potential opportunity to mitigate wildfire hazards. <sup>416</sup> This could apply to transportation infrastructure.

*Protection*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

*Water Infrastructure*

*Infrastructure Hardening*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	The 2023 SHMP includes providing fire-resistant building materials and establishing incentives for existing structures to be hardened against wildfire as a potential opportunity to mitigate wildfire hazards. <sup>417</sup> This could apply to water infrastructure.

*Watershed Protection*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

<sup>413</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>

<sup>415</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>

<sup>416</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<sup>417</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

*Water Treatment*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

**Energy Infrastructure**

*Infrastructure Hardening*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	The 2023 SHMP outlines the mitigation strategies included in Idaho Power's 2023 Wildfire Plan, which includes system hardening. Additionally, the SHMP includes providing fire-resistant building materials and establishing incentives for existing structures to be hardened against wildfire as a potential opportunity to mitigate wildfire hazards. <sup>418</sup> This could apply to energy infrastructure.

*Creation of Defensible Space*

County HMP & CWPP	SHMP
The 2020 Elmore County HMP emphasizes the importance of fuels reduction and includes several mitigation strategies that address the vulnerability of energy infrastructure to wildfire through the creation of defensible space, including creating a fire break in relation to a solar panel array. <sup>419</sup>	The 2023 SHMP includes creating and maintaining defensible space around structures and infrastructure as a potential opportunity to mitigate wildfire hazards. <sup>420</sup> This could apply to energy infrastructure.

*Situational Awareness*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

**Housing Infrastructure**

*Infrastructure Hardening*

County HMP & CWPP	SHMP
The 2020 County HMP includes several wildfire mitigation strategies that could be applied to housing infrastructure: securing funding for	The 2023 SHMP includes providing fire-resistant building materials and establishing incentives for existing structures to be hardened against wildfire

<sup>418</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<sup>419</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>420</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<p>permanent, high-visibility address signs for rural homes to replace low-visibility signs.<sup>421</sup> Such a replacement would allow emergency responders to more quickly find homes and respond to wildfires, thereby potentially lessening the severity of a wildfire.</p> <p>The 2020 County HMP additionally includes a strategy to develop and implement hazardous fuels reduction projects to protect individual homes and subdivisions.<sup>422</sup></p>	<p>as a potential opportunity to mitigate wildfire hazards.<sup>423</sup> This could apply to housing infrastructure.</p>
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### *Creation of Defensible Space*

<b>County HMP &amp; CWPP</b>	<b>SHMP</b>
<p>The 2020 Elmore County HMP emphasizes the importance of fuels reduction and includes several mitigation strategies that address the vulnerability of housing infrastructure to wildfire through the creation of defensible space, including developing and implementing hazardous fuels reduction projects to protect individual homes and subdivisions.<sup>424</sup></p>	<p>The 2023 SHMP includes creating and maintaining defensible space around structures and infrastructure as a potential opportunity to mitigate wildfire hazards.<sup>425</sup> This could apply to housing infrastructure.</p>

### *Technology Deployment*

<b>County HMP &amp; CWPP</b>	<b>SHMP</b>
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

## **Health Infrastructure**

### *Infrastructure Hardening*

<b>County HMP &amp; CWPP</b>	<b>SHMP</b>
Not mentioned in 2020 HMP.	<p>The 2023 SHMP includes providing fire-resistant building materials and establishing incentives for existing structures to be hardened against wildfire</p>

<sup>421</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>422</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from State of Idaho: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>423</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<sup>424</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protect Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>425</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

	as a potential opportunity to mitigate wildfire hazards. <sup>426</sup> This could apply to health infrastructure.
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*Creation of Defensible Space*

County HMP & CWPP	SHMP
The 2020 County HMP highlights that, to reduce vulnerability to wildfire, potential WUI treatments may include vegetation and fuels treatment around homes and beyond the immediate home site. <sup>427</sup> This could apply to health infrastructure.	The 2023 SHMP includes creating and maintaining defensible space around structures and infrastructure as a potential opportunity to mitigate wildfire hazards. <sup>428</sup> This could apply to health infrastructure.

*Air Quality Monitoring and Response*

County HMP & CWPP	SHMP
Not mentioned in 2020 HMP.	Not mentioned in 2023 SHMP.

**Table A.4.2. Elmore County Infrastructure Project Opportunity Matrix**

	Transportation Infrastructure Project Type	Water Infrastructure Project Type	Energy Infrastructure Project Type	Housing Infrastructure Project Type	Health Infrastructure Project Type	
	5	3	3	5	3	
	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	
	5	2	5	5	5	
	Creation of Defensible Space	Watershed Protection	Creation of Defensible Space	Creation of Defensible Space	Creation of Defensible Space	
	2	2	2	2	2	
	Protection	Water Treatment	Situational Awareness	Technology Deployment	Air Quality Monitoring and Response	
Mean Score	4	2.3	3.3	4	3.3	Overall Mean: 3.4

**Los Angeles County, California**

Los Angeles County's most recent HMP was published in 2020. The most recent California SHMP was published in 2020. The County does not currently have a Community Wildfire Protection Plan (CWPP). However, it is currently in the process of developing one.

<sup>426</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

<sup>427</sup> Elmore County. (2021). *Multi-Hazard Mitigation Plan 2020 Update; Community Wildfire Protection Plan 2021 Update*. Retrieved from Elmore County: <https://elmorecounty.org/wp-content/uploads/Elmore-County-HMP-CWPP-2020-2021-Update-Final-Draft.pdf>.

<sup>428</sup> Idaho Office of Emergency Management. (2023). *2023 Hazard Mitigation Plan*. Retrieved from Idaho Office of Emergency Management: [https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11\\_15\\_23.pdf](https://ioem.idaho.gov/wp-content/uploads/2023/11/2023-SHMP-State-Mitigation-Final-11_15_23.pdf).

## Transportation Infrastructure

### Infrastructure Hardening

County HMP	SHMP	CWPP
The 2020 County HMP includes a potential mitigation action to fireproof coat critical facilities in Very High Hazard Severity Zones. This could apply to transportation infrastructure. <sup>429</sup>	The 2020 SHMP includes a potential opportunity for wildfire mitigation that revolves around using fire-resistant building materials. This could apply to transportation infrastructure. <sup>430</sup>	No current CWPP.

### Creation of Defensible Space

County HMP	SHMP	CWPP
The 2020 HMP includes a project to create defensible space around streets. <sup>431</sup>	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around creating and maintaining defensible space around infrastructure. This could apply to transportation infrastructure. <sup>432</sup>	No current CWPP.

### Protection

County HMP	SHMP	CWPP
Not mentioned in the 2020 County HMP.	The 2023 SHMP includes a mitigation action to build capacity within the Pre-Wildfire Geological Hazard Mitigation Planning & Post-Wildfire Hazard Identification Program through increased staff and resources. One of the program objectives is post-fire watershed	No current CWPP.

<sup>429</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>430</sup> State of California Governor’s Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor’s Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>431</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>432</sup> State of California Governor’s Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor’s Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

	<p>emergency assessment focused on hazards from debris flows, flooding, and rockfall.<sup>433</sup></p> <p>Additionally, the SHMP includes a mitigation action to develop regional modeling to assess the impacts of post-fire runoff, as well as post-fire flash floods and debris flow.<sup>434</sup></p>	
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## Water Infrastructure

### Infrastructure Hardening

County HMP	SHMP	CWPP
The 2020 County HMP includes a potential mitigation action to fireproof coat critical facilities in Very High Hazard Severity Zones. This could apply to water infrastructure. <sup>435</sup>	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around using fire-resistant building materials. This could apply to water infrastructure. <sup>436</sup>	No current CWPP.

### Watershed Protection

County HMP	SHMP	CWPP
Not mentioned in the 2020 County HMP.	The 2023 SHMP includes a potential opportunity to mitigate wildfire that revolves around removing invasive hazardous fuels in riparian areas in order to restore native habitat. <sup>437</sup>	No current CWPP.

<sup>433</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>434</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>435</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>436</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>437</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).



	<p>Additionally, the SHMP includes a mitigation action to build capacity within the Pre-Wildfire Geological Hazard Mitigation Planning &amp; Post-Wildfire Hazard Identification Program through increased staff and resources. One of the program objectives is post-fire watershed emergency assessment focused on hazards from debris flows, flooding, and rockfall.<sup>438</sup></p> <p>Further, the SHMP includes a mitigation action for post-event assessment for natural resource recovery, including watershed protection.<sup>439</sup></p>	
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*Water Treatment*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Energy Infrastructure**Infrastructure Hardening*

County HMP	SHMP	CWPP
The 2020 County HMP includes a potential mitigation action to fireproof coat critical facilities in Very High Hazard Severity Zones. This could apply to energy infrastructure. <sup>440</sup>	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around using fire-resistant building materials. This could apply to energy infrastructure. <sup>441</sup>	No current CWPP.

<sup>438</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>439</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>440</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>441</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

### *Creation of Defensible Space*

County HMP	SHMP	CWPP
Not mentioned in the 2020 County HMP.	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around creating and maintaining defensible space around infrastructure. This could apply to energy infrastructure. <sup>442</sup>	No current CWPP.

### *Situational Awareness*

County HMP	SHMP	CWPP
Not mentioned in the 2020 County HMP.	Not mentioned in 2023 SHMP.	No current CWPP.

### *Housing Infrastructure*

#### *Infrastructure Hardening*

County HMP	SHMP	CWPP
The 2020 HMP includes a potential mitigation action to expand the county's Brush Clearance Program to include a grant for low-income and/or older homeowners with properties that are noncompliant to implement a fire reduction plan. <sup>443</sup>	<p>The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around home hardening.<sup>444</sup> This includes installing and/or replacing roofing materials with non-combustible materials and providing incentives for existing structures to be hardened against wildfire.</p> <p>Additionally, the SHMP includes a mitigation action to provide support to communities to create programs that harden and retrofit residences, with an emphasis on equity.<sup>445</sup></p>	No current CWPP.

<sup>442</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>443</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>444</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>445</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services:

*Creation of Defensible Space*

County HMP	SHMP	CWPP
Not mentioned in 2020 HMP.	<p>The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around creating and maintaining defensible space around homes.<sup>446</sup></p> <p>Additionally, the SHMP includes a mitigation action to provide support to communities to create programs that establish defensible space around residences, with an emphasis on equity.<sup>447</sup></p>	No current CWPP.

*Health Infrastructure*

*Infrastructure Hardening*

County HMP	SHMP	CWPP
The 2020 County HMP includes a potential mitigation action to fireproof coat critical facilities in Very High Hazard Severity Zones. This could apply to health infrastructure. <sup>448</sup>	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves around using fire-resistant building materials. This could apply to health infrastructure. <sup>449</sup>	No current CWPP.

*Creation of Defensible Space*

County HMP	SHMP	CWPP
Not mentioned in 2020 County HMP.	The 2023 SHMP includes a potential opportunity for wildfire mitigation that revolves	No current CWPP.

[https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>446</sup> State of California Governor’s Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor’s Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>447</sup> State of California Governor’s Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor’s Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>448</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>449</sup> State of California Governor’s Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor’s Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

	around creating and maintaining defensible space around infrastructure. This could apply to health infrastructure. <sup>450</sup>	
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*Air Quality Monitoring and Response*

County HMP	SHMP	CWPP
The 2020 HMP includes continuing the county's Vegetation Management Program. <sup>451</sup> Part of the program is smoke management, including predicting where smoke or chemicals from a fire will drift. <sup>452</sup>	Not mentioned in the 2023 SHMP.	No current CWPP.

**Table A.4.3. Los Angeles County Infrastructure Project Opportunity Matrix**

	Transportation Infrastructure Project Type	Water Infrastructure Project Type	Energy Infrastructure Project Type	Housing Infrastructure Project Type	Health Infrastructure Project Type	
	4	4	4	4	4	
	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	
	3	3	3	3	3	
	Creation of Defensible Space	Watershed Protection	Creation of Defensible Space	Creation of Defensible Space	Creation of Defensible Space	
	3	2	2	2	3	
	Protection	Water Treatment	Situational Awareness	Technology Deployment	Air Quality Monitoring and Response	
Mean Score	2.2	3	3	3	3.3	Overall Mean: 2.9

**Miami-Dade County, FL**

Miami-Dade County last published its HMP in 2020. It does not have a CWPP. Florida last published its SHMP in 2023.

<sup>450</sup> State of California Governor's Office of Emergency Services. (2023). *California State Hazard Mitigation Plan Volume 1*. Retrieved from State of California Governor's Office of Emergency Services: [https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP\\_Volume-1\\_11.10.2023.pdf](https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf).

<sup>451</sup> Los Angeles County Chief Executive Office – Office of Emergency Management. (2020). *2020 County of Los Angeles All-Hazards Mitigation Plan*. Retrieved from Los Angeles County: <https://ceo.lacounty.gov/wp-content/uploads/2023/08/County-of-Los-Angeles-All-Hazards-Mitigation-Plan-APPROVED-05-2020.pdf>.

<sup>452</sup> County of Los Angeles Fire Department. (n.d.). *Fire Hazard Reduction Programs*. Retrieved from County of Los Angeles Fire Department: <https://fire.lacounty.gov/fire-hazard-reduction-programs/#1568739492655-2c36d68d-af55>.

***Transportation Infrastructure****Infrastructure Hardening*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Creation of Defensible Space*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
The 2020 HMP lists cutting brush and other fuel away from structures as a wildfire mitigation strategy. This could apply to transportation infrastructure. <sup>453</sup>	The 2023 SHMP outlines the use of prescribed fire and mechanical methods to reduce fuel loads and mitigate the risk of wildfire. It also emphasizes the importance of fuel breaks. <sup>454</sup> This could apply to transportation infrastructure.	No current CWPP.

*Protection*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

***Water Infrastructure****Infrastructure Hardening*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Watershed Protection*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Water Treatment*

<b>County HMP</b>	<b>SHMP</b>	<b>CWPP</b>
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

<sup>453</sup> Miami-Dade County (July 2020). *Miami-Dade County Local Mitigation Strategy*. Retrieved from Miami-Dade County: <https://www.miamidade.gov/fire/library/OEM/local-mitigation-strategy-part-1-strategy.pdf>.

<sup>454</sup> Florida Division of Emergency Management. (2023). *2023 Enhanced State Hazard Mitigation Plan*. Retrieved from Florida Division of Emergency Management: <https://flshmp-floridadisaster.hub.arcgis.com/>.

***Energy Infrastructure****Infrastructure Hardening*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Creation of Defensible Space*

County HMP	SHMP	CWPP
The 2020 LMS lists cutting brush and other fuel away from structures as a wildfire mitigation strategy. This could apply to energy infrastructure. <sup>455</sup>	The 2023 SHMP outlines the use of prescribed fire and mechanical methods to reduce fuel loads and mitigate the risk of wildfire. It also emphasizes the importance of fuel breaks. <sup>456</sup> This could apply to energy infrastructure.	No current CWPP.

*Situational Awareness*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

***Housing Infrastructure****Infrastructure Hardening*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Creation of Defensible Space*

County HMP	SHMP	CWPP
The 2020 HMP lists cutting brush and other fuel away from structures as a wildfire mitigation strategy. This could apply to housing infrastructure. <sup>457</sup>	The 2023 SHMP outlines the use of prescribed fire and mechanical methods to reduce fuel loads and mitigate the risk of wildfire. It also emphasizes the importance of fuel breaks. <sup>458</sup> This could apply to housing infrastructure.	No current CWPP.

<sup>455</sup> Miami-Dade County (July 2020). *Miami-Dade County Local Mitigation Strategy*. Retrieved from Miami-Dade County: <https://www.miamidade.gov/fire/library/OEM/local-mitigation-strategy-part-1-strategy.pdf>.

<sup>456</sup> Florida Division of Emergency Management. (2023). *2023 Enhanced State Hazard Mitigation Plan*. Retrieved from Florida Division of Emergency Management: <https://flshmp-floridadisaster.hub.arcgis.com/>.

<sup>457</sup> Miami-Dade County (July 2020). *Miami-Dade County Local Mitigation Strategy*. Retrieved from Miami-Dade County: <https://www.miamidade.gov/fire/library/OEM/local-mitigation-strategy-part-1-strategy.pdf>.

<sup>458</sup> Florida Division of Emergency Management. (2023). *2023 Enhanced State Hazard Mitigation Plan*. Retrieved from Florida Division of Emergency Management: <https://flshmp-floridadisaster.hub.arcgis.com/>.

**Health Infrastructure***Infrastructure Hardening*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

*Creation of Defensible Space*

County HMP	SHMP	CWPP
The 2020 HMP lists cutting brush and other fuel away from structures as a wildfire mitigation strategy. This could apply to housing infrastructure. <sup>459</sup>	The 2023 SHMP outlines the use of prescribed fire and mechanical methods to reduce fuel loads and mitigate the risk of wildfire. It also emphasizes the importance of fuel breaks. <sup>460</sup> This could apply to health infrastructure.	No current CWPP.

*Air Quality Monitoring and Response*

County HMP	SHMP	CWPP
Not mentioned in the 2020 HMP.	Not mentioned in the 2023 SHMP.	No current CWPP.

**Table A.4.4. Miami-Dade County Infrastructure Project Opportunity Matrix**

	Transportation Infrastructure Project Type	Water Infrastructure Project Type	Energy Infrastructure Project Type	Housing Infrastructure Project Type	Health Infrastructure Project Type	
	2	2	2	2	2	
	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	Infrastructure Hardening	
	3	2	3	3	3	
	Creation of Defensible Space	Watershed Protection	Creation of Defensible Space	Creation of Defensible Space	Creation of Defensible Space	
	3	2	2	2	2	
	Protection	Water Treatment	Situational Awareness	Technology Deployment	Air Quality Monitoring and Response	
Mean Score	2.3	2	2.3	2.3	2.3	Overall Mean: 2.7

<sup>459</sup> Miami-Dade County (July 2020). *Miami-Dade County Local Mitigation Strategy*. Retrieved from Miami-Dade County: <https://www.miamidade.gov/fire/library/OEM/local-mitigation-strategy-part-1-strategy.pdf>.

<sup>460</sup> Florida Division of Emergency Management. (2023). *2023 Enhanced State Hazard Mitigation Plan*. Retrieved from Florida Division of Emergency Management: <https://flshmp-floridadisaster.hub.arcgis.com/>.