

# Wildfire Risk, Our Homes, and Our Health

PART 1

## Risk Analysis

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**On the Cover:**  
Cameron Peak Fire,  
Northern Colorado, 2020



Marshall Fire,  
Boulder County, 2021

***In December 2021, the most destructive wildfire in Colorado’s history destroyed over 1,100 homes and killed two people in a matter of hours. The speed, intensity, and timing of the Marshall Fire took many Coloradans by surprise. December isn’t considered a high wildfire month, and some of the homes were in low-to moderate-wildfire risk areas surrounded by grass and shrubs. However, Colorado’s wildfire landscape has evolved over the past few decades. Wildfires no longer just occur in forested areas in the late spring and summer months.***

Wildfire risk is a complex puzzle that depends on a combination of weather, climate, vegetation, and human activity factors. Almost every home in Colorado experiences some risk of a wildfire each year, but a community’s characteristics, mitigation practices, and resources can reduce a fire’s destruction.

The Colorado Health Institute (CHI) partnered with the Colorado Division of Insurance (DOI) to

better understand the intersection of wildfire risk, social factors, health, and community resilience across the state. Findings from this report will compliment a 2024 stakeholder insights report that will underscore mitigation and recovery challenges and share stakeholder proposed solutions for DOI and lawmakers that ensure homeowners and renters are equipped to safely live in Colorado.

## Colorado's Wildfire Risks

Wildfires have increased in size, frequency, and intensity in recent decades because of a combination of human activity, a changing climate, and certain forest management practices, such as [fire exclusion and suppression policies](#) that created a build up of fuels.<sup>1</sup> The number of wildfires occurring each year in Colorado spiked in the 2010s with over 3,000 fires each year between 2013 and 2020. (See Figure 1.)

Colorado's 20 largest and most destructive wildfires have occurred since 2001, with most occurring since 2016.<sup>2</sup> Wildfire season has predominantly been from May through September, but large and destructive fires now happen year-round.<sup>2,3</sup>

Wildfire risk varies by community and can have a disproportionate impact on people depending on where they live, their home's building materials, and demographic characteristics such as income, health issues, or age. Disproportionately impacted communities can experience additional physical, mental, and economic hardships during and after wildfire and related flooding events.

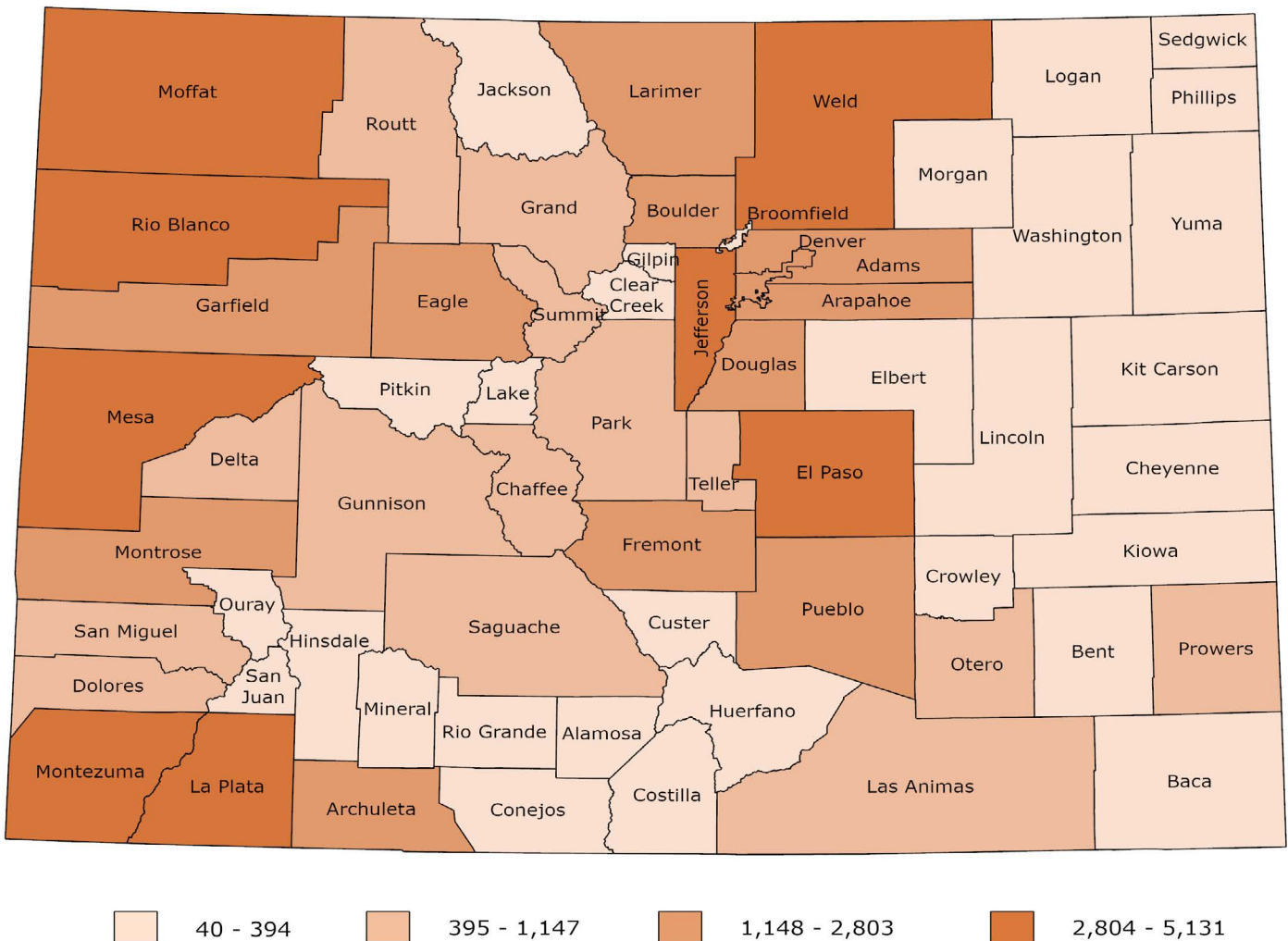
Colorado's forested mountain regions are no longer the state's only at-risk areas for destructive wildfires. At least one wildfire has occurred in every Colorado county since the early 1990s, because risk depends on a complex interaction of landscape factors such as vegetation, topography, and climate factors like prolonged drought. (See Map 1.)

Figure 1. Number of Wildfires by Year, 1992-2020<sup>26</sup>



Calwood Fire, Boulder County, 2020

Map 1. Number of Wildfires by County Between 1992-2020



About 2.9 million Coloradans (just under half of the state’s population), live in a wildland urban interface. The [wildland-urban interface](#), or WUI, is the area where structures and other human developments meet or intermingle with wildland vegetation. Some people choose to move to or remain in these more fire-prone areas, while others may have been pushed out of urban centers by Colorado’s growing

housing affordability crisis.<sup>4</sup> Land and housing is often more affordable on the outskirts of urban areas, creating more opportunities for homes and fire-prone areas to mix.<sup>5</sup>

Over 330,000 Colorado homes in 2023 had a moderate, high, or very high risk of damage from a wildfire, the second-highest level of exposure in the country.<sup>6</sup>

## CHI identified seven themes with accompanying examples that describe Colorado's diverse wildfire and related flooding landscape.

### 1. Wildfire risk is complex and exists to some degree in many Colorado communities.

For example, the grassy and agricultural Eastern Plains are not a stereotypical wildfire region, yet large fires do occur. A 32,000-acre fire burned in the northeast Colorado counties of Logan and Phillips in 2017, destroying a handful of homes and killing hundreds of farm animals.

### 2. A community's wildfire risk depends on a complex interaction of factors, including vegetation type, terrain, weather elements such as wind, drought conditions, and human interactions with and activities in the environment.

For example, some homes that burned in the Marshall Fire were located in lower fire-risk areas, but 100 mph winds and a record-setting warm and dry period created a prime environment for flames to spread quickly across the landscape.<sup>7</sup>

### 3. Less fire-prone areas often share a border with more fire-prone communities.

In Jefferson County for example, some cities like Arvada, Westminster, and Lakewood have land on the western side of their community designated with a higher risk for burning annually, while those on the eastern side have a lower designated risk.

### 4. Colorado's WUI is dynamic, with continuous changes in vegetative fuels, population, and infrastructure.

The definition of the WUI often changes based on the scale being assessed. The 2022 Colorado Wildfire Risk Assessment (COWRA) indicated that over one million people reside in a moderate to high risk WUI area, based on a statewide model of conditional flame length and housing density.<sup>8</sup>

### 5. Land ownership and terrain type influence wildfire activity and suppression efforts.

Federal land in northern Garfield County and southeastern Rio Blanco County is surrounded by large pockets of private land without roads, creating an access barrier for firefighters.<sup>9</sup> This can also impact egress routes, defined as road availability considering the evacuation potential of a surrounding population with major and minor roads nearby.

### 6. Most wildfires are started by humans, but an exact cause is undetermined for many fires.

Between 2010 and 2020, humans caused 80% of Colorado's wildfires, but investigators have only been able to determine the exact cause for 27% of those fires.<sup>10</sup> Understanding a fire's cause is an important part of creating prevention efforts to reduce or prevent wildfires from occurring in a similar manner.<sup>11</sup>

### 7. High-severity wildfires increase a community's risk for flooding and mudslide events.

(See breakout box below.) Mudslides near the Grizzly Creek Fire burn scar in 2021 closed Interstate 70 through Glenwood Canyon for weeks because of road damage.<sup>12</sup>

## Wildfire and Related Flooding Risk

Communities near burn scars are vulnerable to flash flooding or mudslides for years after a fire because fires drastically change the landscape. Newly charred trees and blackened mountainsides create the perfect conditions for floods and mudslides. Burned soil repels water, causing water to run off faster and carry debris downhill at high speeds.<sup>13</sup>

Most standard insurance policies do not cover flood damage, so homeowners in communities that could be impacted by fire-related flooding may be underinsured and require extra insurance protections for their homes.

## Wildfire Risk and Social Factors That Influence Health

While factors like land use, vegetation, wind, and drought influence an area's wildfire risk, social and demographic factors impact an individual, family, or community's ability to plan for, evacuate, and recover from a wildfire. Certain populations may be disproportionately affected by the impacts of wildfire. (See Table 1.)

**Table 1. Disproportionately Impacted Populations**

<p><b>People Earning Low Incomes</b></p>	<p>Income is strongly associated with health outcomes, environmental exposures, and access to health services.<sup>27</sup> This indicator describes how many people in a community live at or below 200% of the Federal Poverty Level, which is \$60,000 annually for a family of four.</p>
<p><b>People Who Are Housing-Cost Burdened</b></p>	<p>High housing costs reduce the amount of money people can spend on basic living expenses or products and services that promote health and well-being. A person or family is cost-burdened if they spend more than 30% of their monthly income on rent or a mortgage.<sup>28</sup> Additionally, high housing costs can impact a community's ability to prepare for and respond to wildfires. <a href="#">Higher living costs</a> create challenges recruiting and retaining land management officials, firefighters and other first responders.</p>
<p><b>People Who Experience Language Barriers</b></p>	<p>Limited English proficiency affects how well people can access services and understand information in their communities, such as public notices about environmental contamination.<sup>29</sup></p>
<p><b>People of Color</b></p>	<p>Systemic racism can affect health outcomes, environmental exposures, access to health services, and other social determinants of health for people of color. Communities that are mostly Black, Hispanic, or Native American experience 50% greater vulnerability to wildfires compared with other communities.<sup>29</sup></p>
<p><b>Older Adults</b></p>	<p>Colorado's older adult population is increasing, and people over 65 years of age can experience more vulnerability to environmental exposures such as air pollution and extreme heat. They also are more likely to have other conditions, such as heart disease or diabetes, that may increase risk from environmental exposures.<sup>30</sup></p>
<p><b>Young Children</b></p>	<p>Harmful pollutants can have a greater impact on children because they have smaller bodies. Some environmental exposures can affect growth and development, much of which occurs before 5 years of age.<sup>31</sup></p>
<p><b>People with Disabilities</b></p>	<p>Limited mobility and medical conditions can make it more difficult to respond to and cope with the effects of environmental or climate hazards.<sup>32</sup></p>

These factors are interconnected. Individuals, families, or communities facing multiple structural or systemic inequities — such as poverty, racism, or language barriers — may need additional resources to plan for, evacuate, and recover from wildfire.

## Additional Wildfire Risk Factors: Housing Materials and Underinsurance

In addition to the disproportionately impacted populations listed in Table 1, factors such as housing type and underinsurance impact the ability of an individual, family, or community to prepare for, evacuate, or recover from wildfires.

For example, the ignitability of a home is largely determined by building materials and design features. In the 2010 Fourmile Canyon Fire, Boulder County found that 100% of the homes built in the prior decade survived compared with only 63% of older homes. The newer homes had all gone through a county program that required fire-resistant building materials and minimized flammable vegetation.<sup>14</sup>

Underinsurance is another influential factor. About two out of every three homes in America are underinsured, meaning that millions of American homeowners are at risk of major financial loss should a disaster occur.<sup>15</sup> Many homes are underinsured for damage caused by flooding. Homeowners can also be underinsured for construction costs for rebuilding. Construction costs often rise after a disaster because the price of building materials and shortage of construction workers increase due to demand.<sup>16</sup> After the Marshall Fire, an analysis of insurance policies found that only 8% of homes had guaranteed replacement coverage — meaning the insurance policy provides coverage for replacement of the home with similar quality, square footage, etc. without a cap.<sup>17</sup>

Factors like housing type and underinsurance can be difficult to measure, but are important for understanding an individual, family, or community's wildfire resilience.



### Planning and Mitigation

Resiliency means the ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges, including human-caused and natural disasters, and to maintain quality of life, healthy growth, durable systems, economic vitality, and conservation of resources for present and future generations.<sup>18</sup>

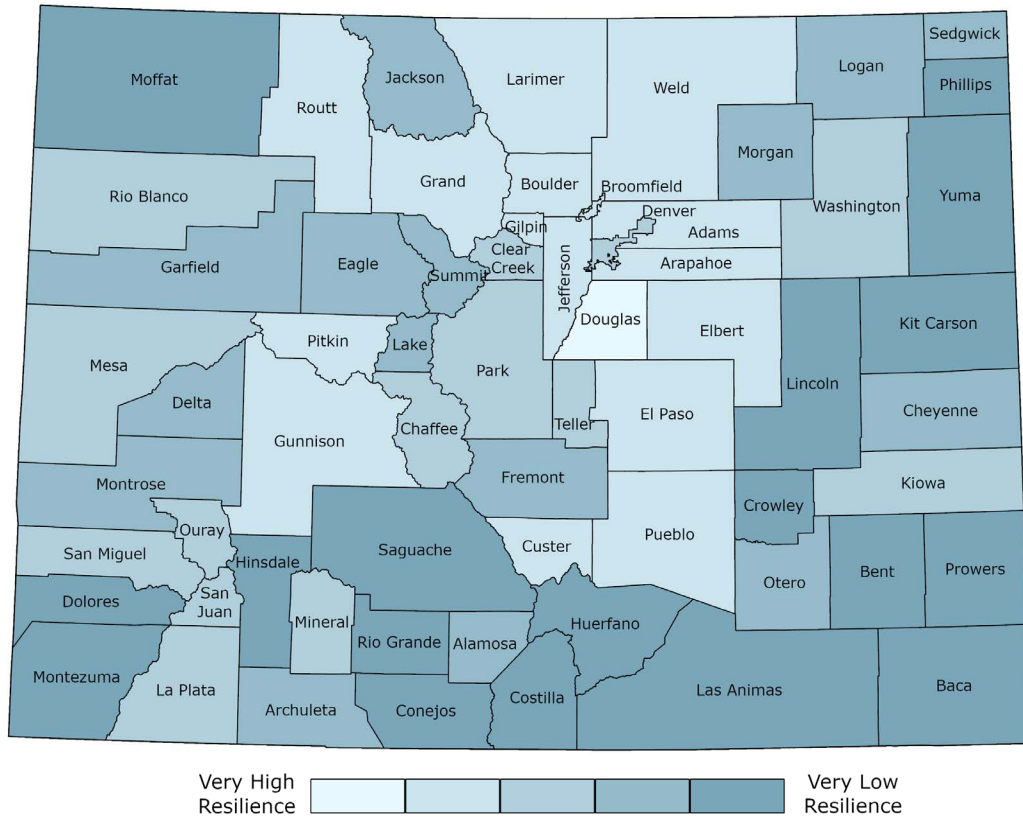
Some of Colorado's urban communities have more resources to plan for wildfires and mitigate risk than rural areas. The Federal Emergency Management Agency's (FEMA) community resilience risk index, [which uses 49 metrics](#) related to infrastructure, governance, human well-being, and economic assessment, ranks counties in southern and eastern Colorado as having low community resilience to withstand a natural disaster.<sup>19</sup> Colorado's only county to be categorized as having high community resilience, Douglas, is also the most affluent county in the state. (See Map 2.)

Almost every Colorado county has a FEMA-approved [County Hazard Mitigation Plan](#) that includes wildfire mitigation planning efforts. Additionally, most counties have a Community Wildfire Protection Plan (CWPP), which is a document developed and agreed upon by a community to identify how to reduce local wildfire risk. However, wildfire mitigation is also hyperlocal and county plans do not provide the level of detail needed to protect all communities.<sup>20</sup> Most community-level CWPPs, those created at the city, town, or homeowners' association level, are in urban or high-income areas. (See Map 3.)

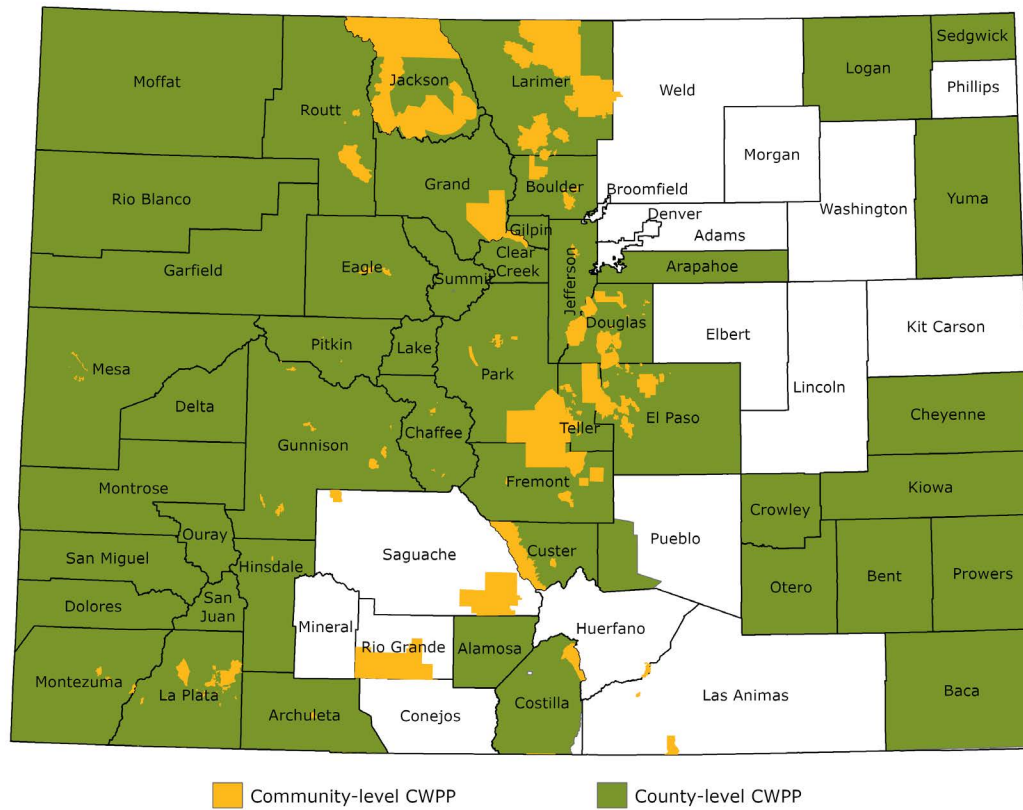
In addition to community resilience factors, individual- and family-level factors influence planning and mitigation. For instance, families earning low incomes may have fewer resources to prepare for disasters — such as making wildfire-resistant modifications to homes.



Map 2. Community Resilience Index Rating, by County<sup>34</sup>



Map 3. Local Community Wildfire Protection Plans by County and Community<sup>33</sup>



## Evacuation

Evacuation from certain communities is more difficult due to road availability. Some communities only have a single access point, and thick wildfire smoke can make evacuations in nearby communities more difficult. Wildfire smoke decreases visibility, but it can make anyone exposed sick, especially people with certain health conditions such as asthma or heart disease, people who are pregnant, and young children.

<sup>21,22</sup>

In addition, evacuations may be more difficult for people with impaired mobility (such as older adults or people with disabilities), people without a car, or people who face language barriers to accessing timely information.

## Recovery

Wildfires can affect an individual, family, or community's physical, mental, and financial health and well-being.

Wildfires cause emotional distress that can be heightened for children, older adults, and first responders.<sup>23</sup> Individuals and families experience distress from the destruction and loss of their homes, belongings, and community, as well as the threat to their personal safety. After a wildfire, individuals may experience post-traumatic stress disorder, depression, and generalized anxiety that can persist for years.<sup>24</sup>

Wildfires disproportionately affect families and communities that earn low incomes, as they often lack insurance and resources to rebuild or move elsewhere. Major catastrophes increase a county's poverty rate because they encourage those who have higher incomes and resources to leave, while families earning low incomes stay and face greater economic hardship.<sup>25</sup>



## Conclusion and Next Steps

Wildfires have impacted all 64 counties in Colorado since the early 1990s, underscoring the need to understand risk at the local level. Effective wildfire mitigation, prevention, and recovery planning are essential to safeguard the health and well-being of Coloradans, particularly those who are most vulnerable. Additionally, meaningful collaboration between the state government, policymakers, insurance carriers, local authorities, and other groups like Forest Service offices is essential.

This report assesses the unique characteristics of the local and regional environment, population demographics, and availability of community resources that influence wildfire risk and resilience.

While each community in Colorado faces distinct risk factors, they share a common need for comprehensive guidance and resources. These resources should support local risk assessments, empower communities, facilitate policy development, and enable strategic action planning to both mitigate and adapt to the growing threat of wildfires driven by climate change.

CHI's next phase of this work will engage community partners — including homeowners, renters, local government officials, community-based organizations, insurance providers and officials, and policymakers — to ensure that their voices and perspectives are integrated into the planning and decision-making processes.

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