

# Marshall Fire Unified Research Survey



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Images

## Wave 1 Technical Report

August 2022

Marshall Fire Recovery and Resilience Working Group

[marshallresilience.com](http://marshallresilience.com)

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# Project Background

On December 30, 2021, the climate-enabled and weather-driven Marshall Fire destroyed 1,084 homes and damaged 149 more in the communities of Louisville, Superior, and unincorporated Boulder County, becoming the most destructive fire in Colorado's history. For these and the growing number of communities facing a new set of risks due to climate change, key questions now emerge: How are communities impacted in the short and long term? What factors influence individuals' and community decisions about how to rebuild and recover? How can communities increase resilience and make people safer in the face of an expanding set of threats?



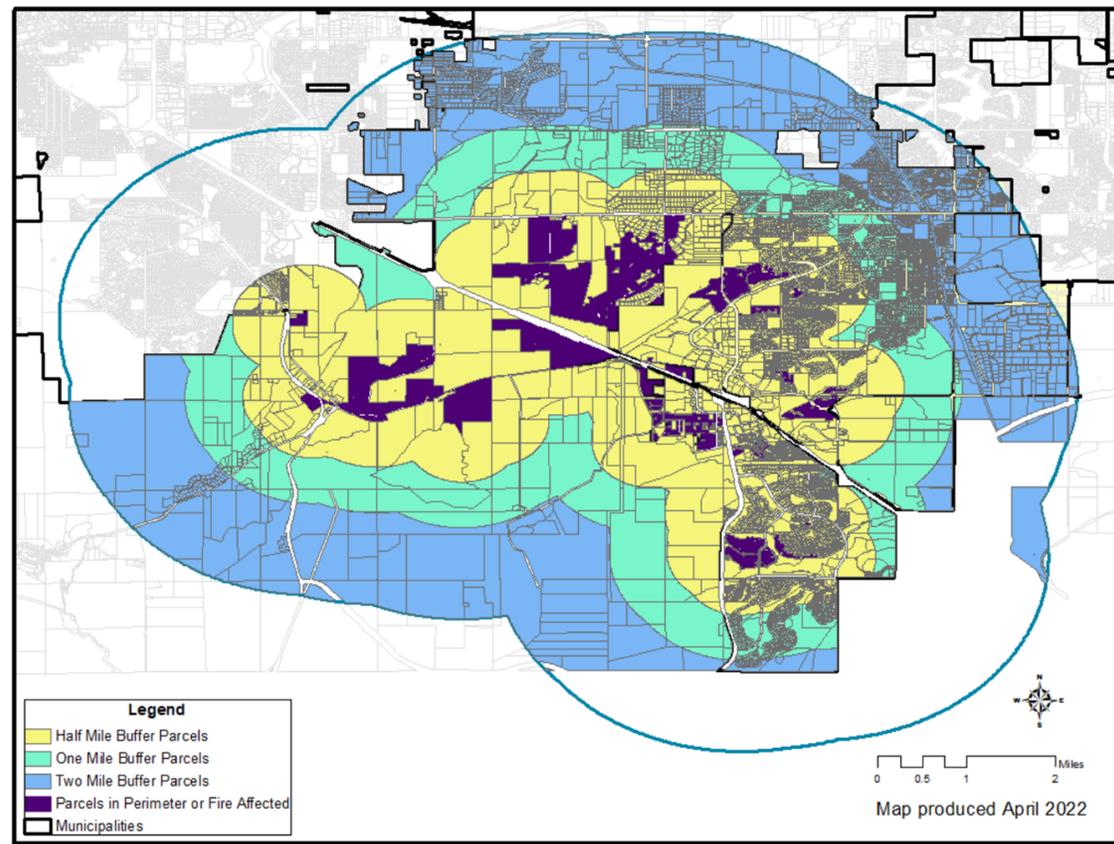
The **Marshall Fire Recovery & Resilience Working Group** formed in response to the disaster to help answer some of these questions. The team worked alongside 30+ national and international researchers to create a single survey, the **Marshall Fire Unified Survey**, with the goal of reducing survey burden on the affected community and doing high-quality research. This novel, collaborative approach to survey design sought to balance community needs and concerns with those of the research community through pretests with community organizations and regular feedback.

# Project Background

The survey was conducted online through the survey software Qualtrics. Participants were recruited via letters sent to their physical address. Given that many families lost their homes, we relied upon the post office and a mail center to identify forwarding addresses. The letters contained QR codes and weblinks through which individuals could access the survey. All residences within the burn perimeter were recruited (1961 households) along with a random sample of 700 households within ½ mile, 400 households ½ to 1 mile, and 400 households 1-2 miles from the perimeter. The sample area covered most of the City of Louisville and the Town of Superior, as well as areas of unincorporated Boulder County (referred to as "Boulder" in the results that follow).

The survey ran from May 12 to July 19, 2022. Two additional waves of the survey will be conducted in October 2022 and April 2023 in order to gain a better understanding of how the recovery process unfolds over time.

### Buffered Sampling Frame



# Characteristics of the Sample

Our survey resulted in 831 completed responses for a response rate of 24%. Over half of respondents lived within the fire perimeter (58.7%) which follows our sampling strategy to recruit everyone that lived within the perimeter. About a quarter of respondents lost their homes, while another half of the sample reported some level of damage: 5% of were not living in their homes at the time of the survey, while 44% had damage but were living in their homes. The remaining quarter of respondents reported no structural or smoke/ash damage.

	<b>Total</b>	<b>Boulder</b>	<b>Louisville</b>	<b>Superior</b>
N (% of sample)	831	104 (12.6)	402 (48.4)	325 (39.1)
Response rate	24.2%	24.1%	24.4%	23.9%
<b>Location of Home</b>				
Perimeter (%)	484 (58.2)	66 (63.5)	192 (47.8)	226 (69.5)
Half mile (%)	202 (24.3)	13 (12.5)	107 (26.6)	82 (25.2)
One mile (%)	77 (9.3)	9 (8.7)	52 (12.9)	16 (4.9)
Two mile (%)	68 (8.2)	16 (15.4)	51 (12.7)	1 (0.3)
<b>Impact of Marshall Fire</b>				
Complete loss (%)	209 (25.2)	29 (27.9)	121 (30.1)	59 (18.2)
Damaged, living there (%)	368 (44.3)	30 (28.9)	145 (36.1)	193 (59.4)
Damaged, not living there (%)	43 (5.2)	4 (3.9)	21 (5.2)	18 (5.5)
No damage, living there (%)	198 (23.8)	38 (36.5)	111 (27.6)	49 (15.1)
No damage, not living there (%)	4 (0.5)	1 (1.0)	1 (0.3)	2 (0.6)
No response	9 (1.1)	2 (1.9)	3 (0.8)	4 (1.2)

# Characteristics of the Sample

	<b>Total</b>	<b>Boulder</b>	<b>Louisville</b>	<b>Superior</b>
<b>Ownership status</b>				
Primary residence, homeowner (%)	771 (93.1)	95 (91.4)	383 (95.8)	293 (90.4)
Primary residence, renter (%)	32 (3.9)	2 (1.9)	12 (3.0)	18 (5.6)
Other (%)	25 (3.0)	7 (6.7)	5 (1.3)	13 (4.0)
<b>Gender</b>				
Female	474 (57.1)	50 (48.1)	241 (60.0)	183 (56.5)
Male	298 (35.9)	41 (39.4)	138 (34.3)	119 (36.7)
Non-binary/transgender/other or declined	58 (7.0)	13 (12.5)	23 (5.7)	22 (6.8)
<b>Age (n=766)</b>				
18-34	60 (7.8)	4 (4.2)	15 (4.1)	41 (13.7)
35-54	318 (41.5)	25 (26.0)	151 (40.8)	142 (47.3)
55+	388 (50.7)	67 (69.8)	204 (55.1)	117 (39.0)
<b>Race/Ethnicity (n=767)</b>				
Non-Hispanic White	691 (90.1)	89 (93.7)	346 (93.2)	256 (85.1)
Persons of Color	76 (9.9)	6 (6.3)	25 (6.7)	45 (14.9)

# Evacuation & Emergency Alerts

**Who answered these questions?** All survey respondents were asked an initial question about whether they were in their homes during the fire emergency. People who WERE in their homes were asked additional questions about their evacuation experience, while people who were not in their homes were asked where they were during the event and when they returned after the fire.

**What is the purpose of this section?** To understand and assess how respondents were informed of the need to evacuate, the factors that promoted or impeded evacuation, and the locations where evacuees initially stayed. This information could help improve evacuation methods and warning messages in future events.

The Marshall Fire occurred during the winter holiday season, and many residents were traveling at the time of the fire.

About 79% of respondents reported being in their home on December 30, 2021, during the fire emergency. Of those who were not at home, 18% were somewhere else in Boulder County, 33% were somewhere in Colorado outside Boulder County, 40% were somewhere in the United States outside Colorado, and 9% were outside of the United States. Of those who were in their home, 94% evacuated.

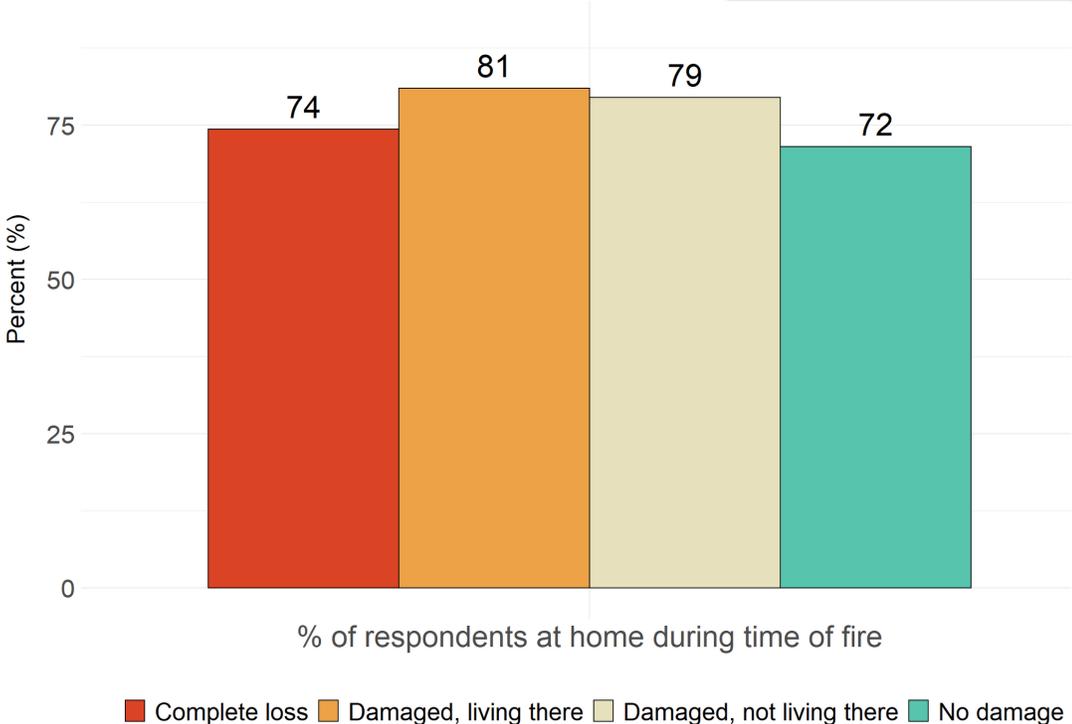


Fig 1: Percentage of respondents that were home at the time of the fire

# Evacuation & Emergency Alerts

Below are percentages of at-home respondents who received different types of messages informing them of the need to evacuate on December 30. Reflecting public commentary and media reporting concerning the lack of official notification, 62% were first alerted when they saw smoke or flames (or smelled smoke, 40%). Informal networks were the most prevalent message source, with 27% receiving a text message and 23% receiving a telephone call on a mobile device from another person, i.e., a friend, family, neighbor, or coworker. 20% reported receiving a text message from an authority, which is consistent with media reporting and Boulder County’s After Action Report (AAR). The percentages reveal that mobile devices and new media channels were more prominent than traditional mass media channels.

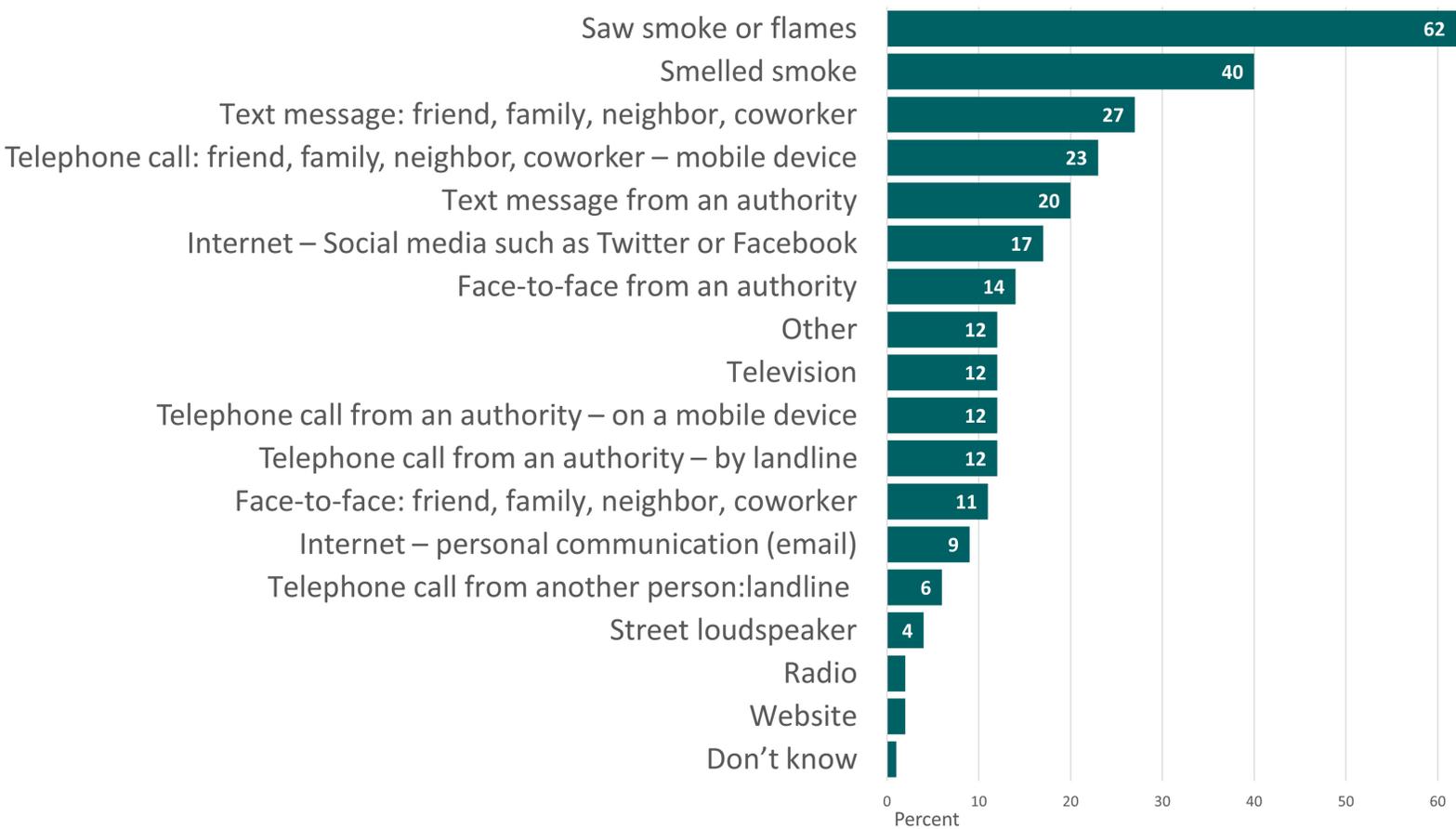


Fig 2: Evacuation notification types

# Evacuation & Emergency Alerts

Researchers deem alerts and warnings effective if they result in appropriate protective action and minimal delay. The following are the approximate amounts of time that respondents believed had passed between first learning of the need to evacuate and leaving their home. Nearly 62% of people who evacuated reported doing so in 30 minutes or less.

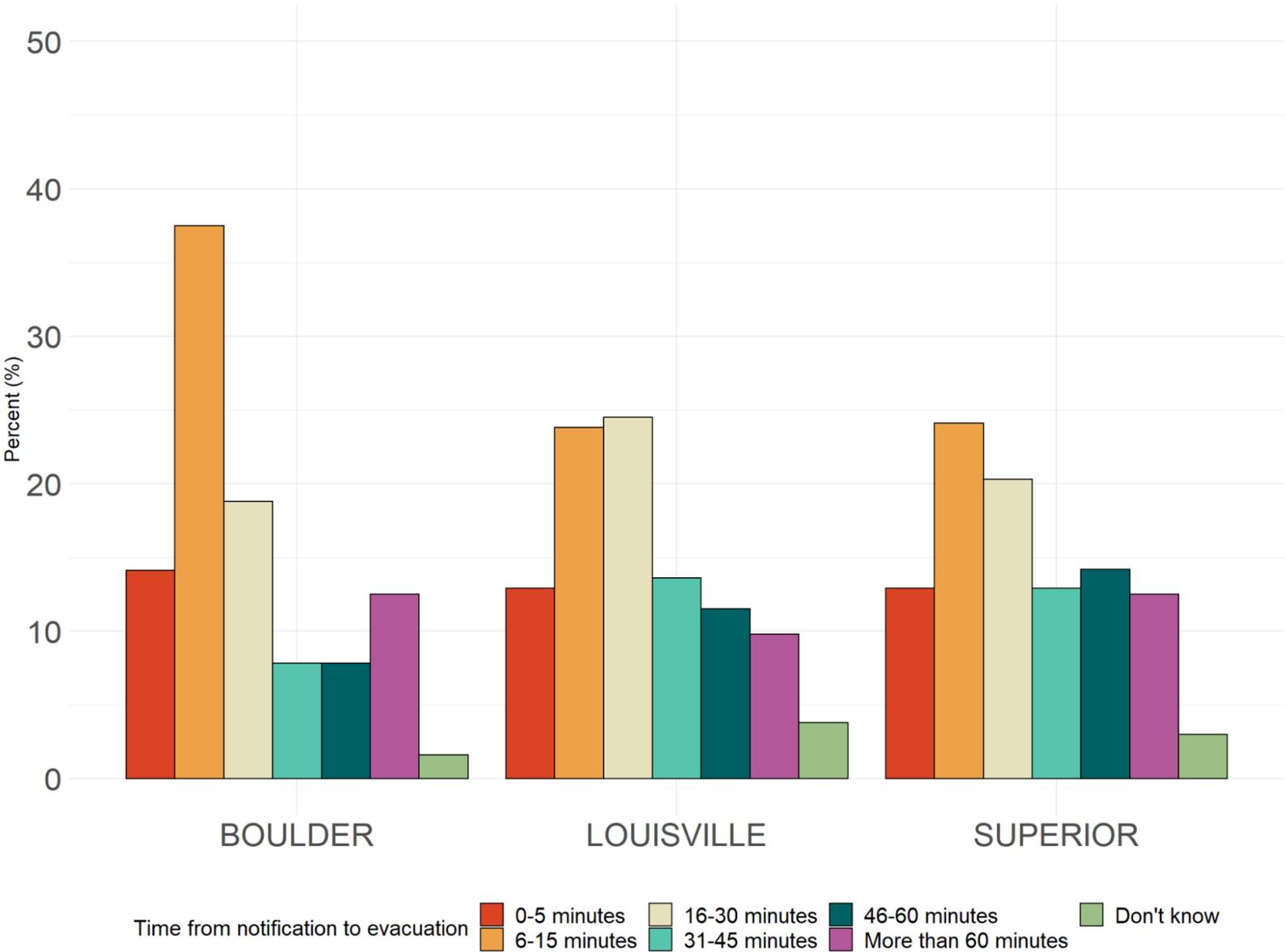


Fig 3: Time to evacuation

# Home & Environmental Impacts

## Who answered these questions?

Respondents who had returned to live in the homes where they lived before the fire. Residents who experienced a complete loss and those who had damage and had not returned home did not answer these questions.

**What is the purpose of this section?** To understand how respondents experienced changes to air and water quality after the Marshall Fire. This information can shed light on how long and to what extent air and water quality may be affected in future events.

Overall, most survey participants agreed that the air quality outside in their neighborhood was safe before (85.5% “Strongly Agree” or “Somewhat Agree”) and after (87.7% “Strongly Agree” or “Somewhat Agree”) the Marshall Fire without much difference by distance from the fire perimeter. However, perception of the quality of the air inside their homes before and after the fire did differ by proximity to the fire, with higher perceived indoor air quality for respondents living farther from the Marshall Fire perimeter.

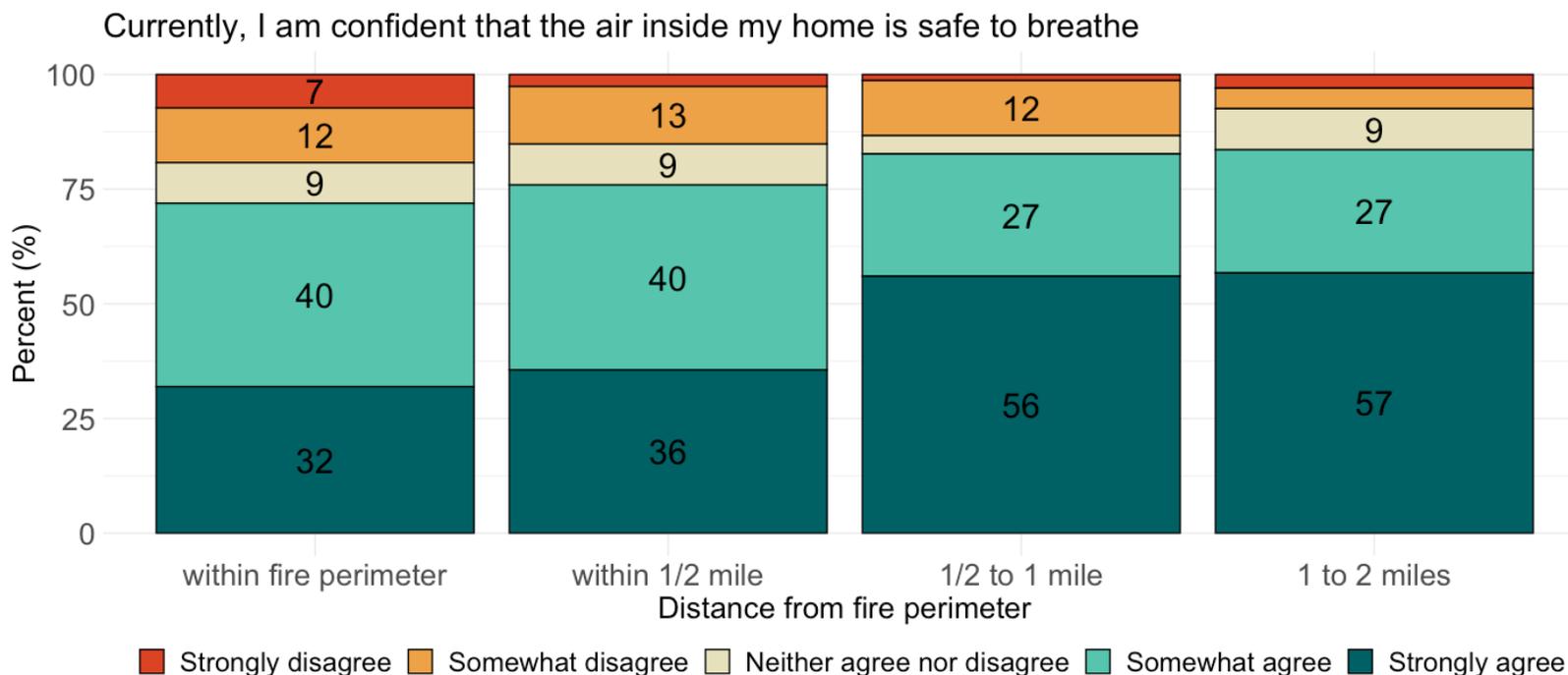


Fig 4: Air quality perceptions inside the home after the fire.

# Home & Environmental Impacts

People who lived closer to the fire perimeter were also more likely to report that their home smelled different when they first returned home after the fire.

When you returned home after the fire, did it smell differently inside your home than it did before the Marshall Fire?

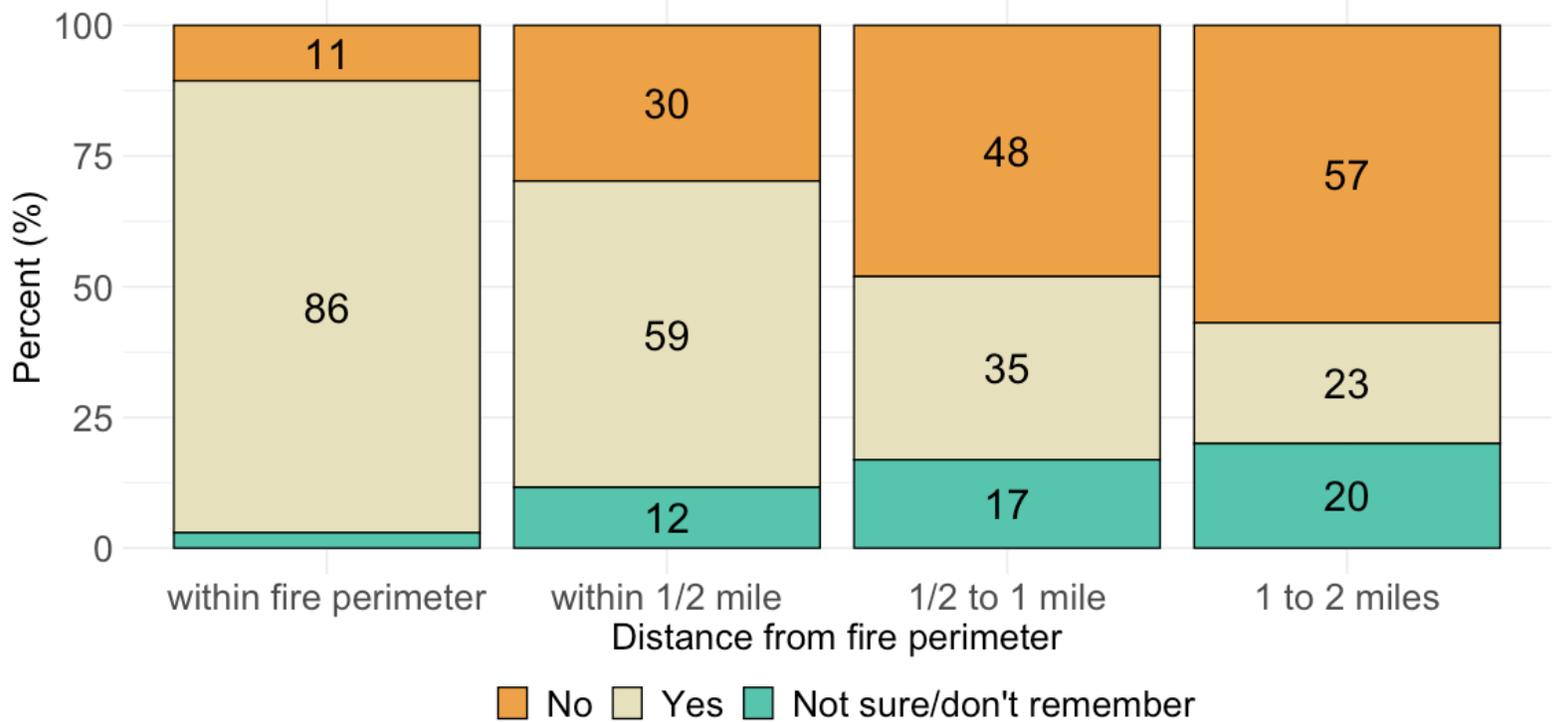


Fig 5: Air smell inside the home after fire.

# Home & Environmental Impacts

People who reported that their home smelled differently after the fire were slightly more likely to disagree that the air quality inside their home was safe to breathe.

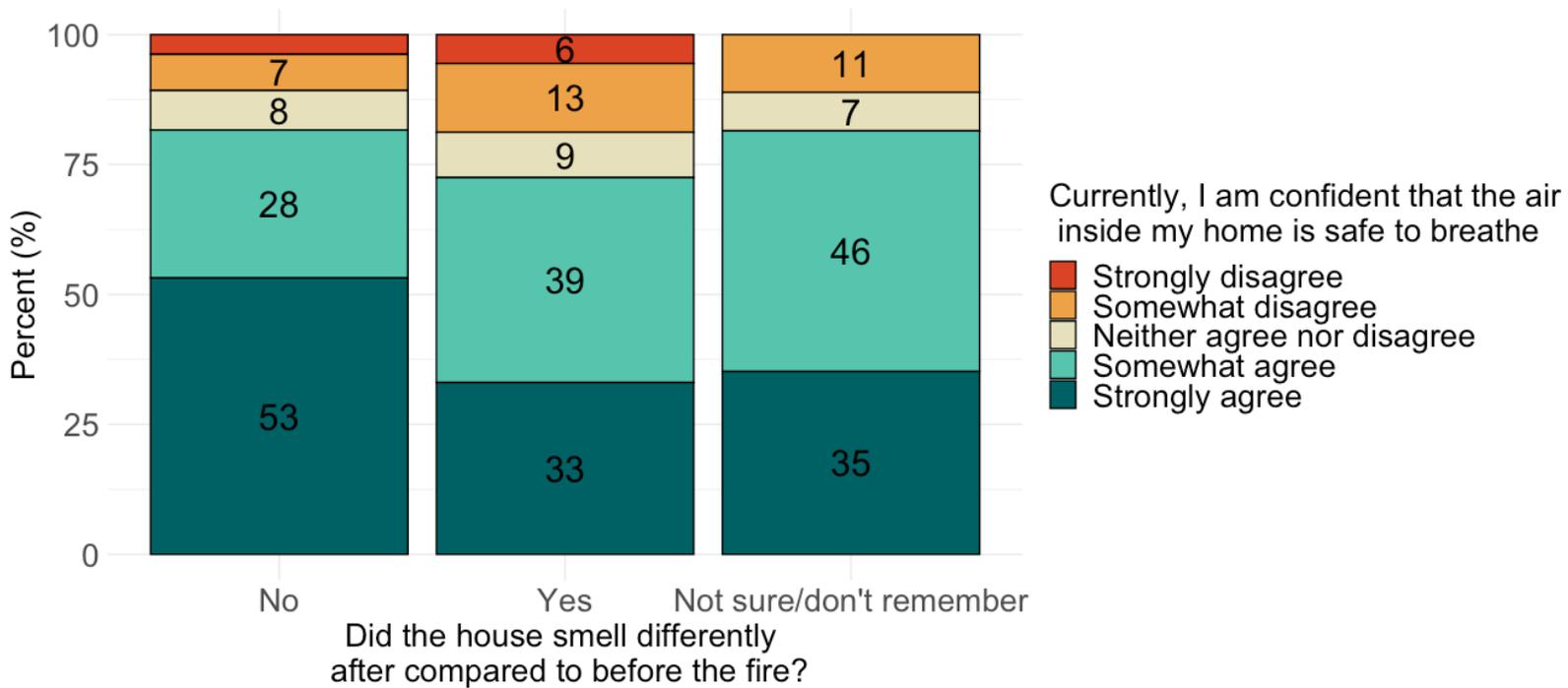


Fig 6: People who are confident in air quality by differences in smell of air inside their home.

# Remediation & Cleaning

## **Who answered these questions?**

Survey respondents who did not experience a complete loss.

## **What is the purpose of this section?**

There are many remediation options available to people, many of which have not been tested for efficacy. Understanding which were used and how they relate to other questions in our survey may provide insight into what remediation activities are most effective.

Many respondents had completed or planned to complete some form of remediation and cleaning in their home due to the fire. Nearly all respondents (96%) who were living in their home and had damage had already completed some form of household cleaning. Looking at those who had damage and were not living there, a large majority of individuals, 64% had already completed cleaning with another 34% planning to do it. Many respondents who reported no damage to their home still completed household cleaning due to the fire (40%).

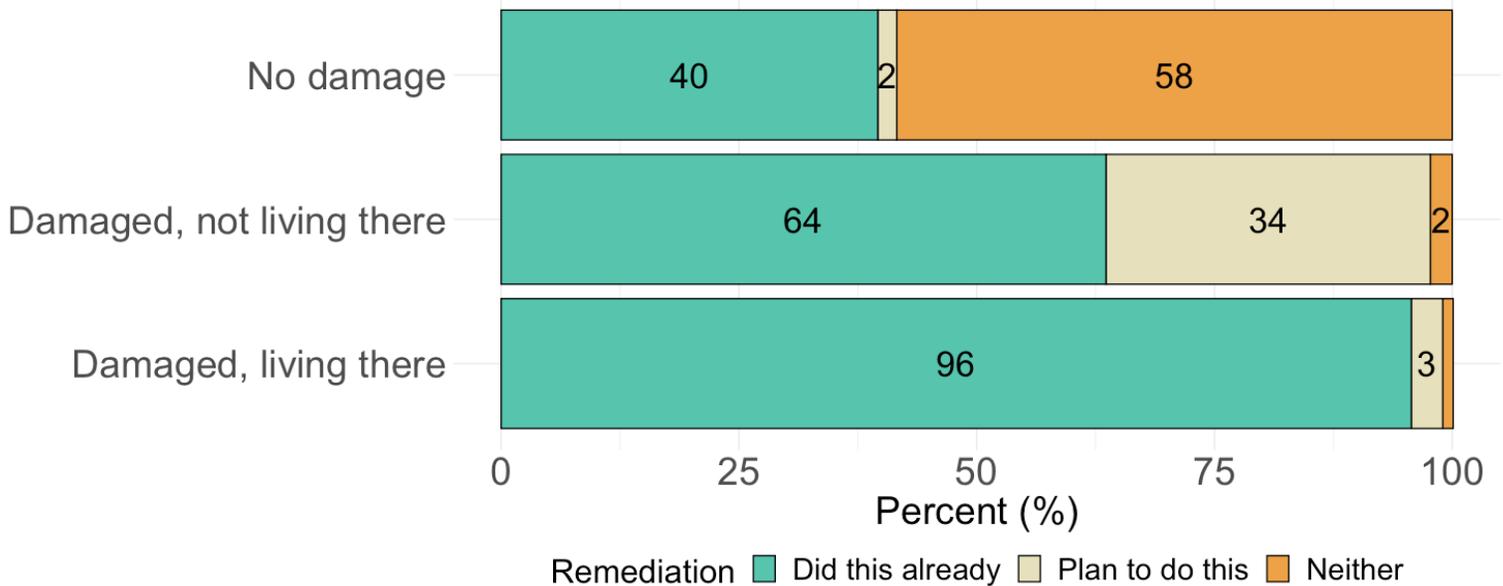


Fig 7: Percentage of respondents who have completed some form of remediation/cleaning in their home (or hired cleaners).

# Remediation & Cleaning

Wildfires clearly affect air quality in many ways, one of which is the air quality inside the home. The majority of respondents in each damage category said they completed or had plans to complete actions to improve their home air quality (such as changing air filters or using air purifiers).

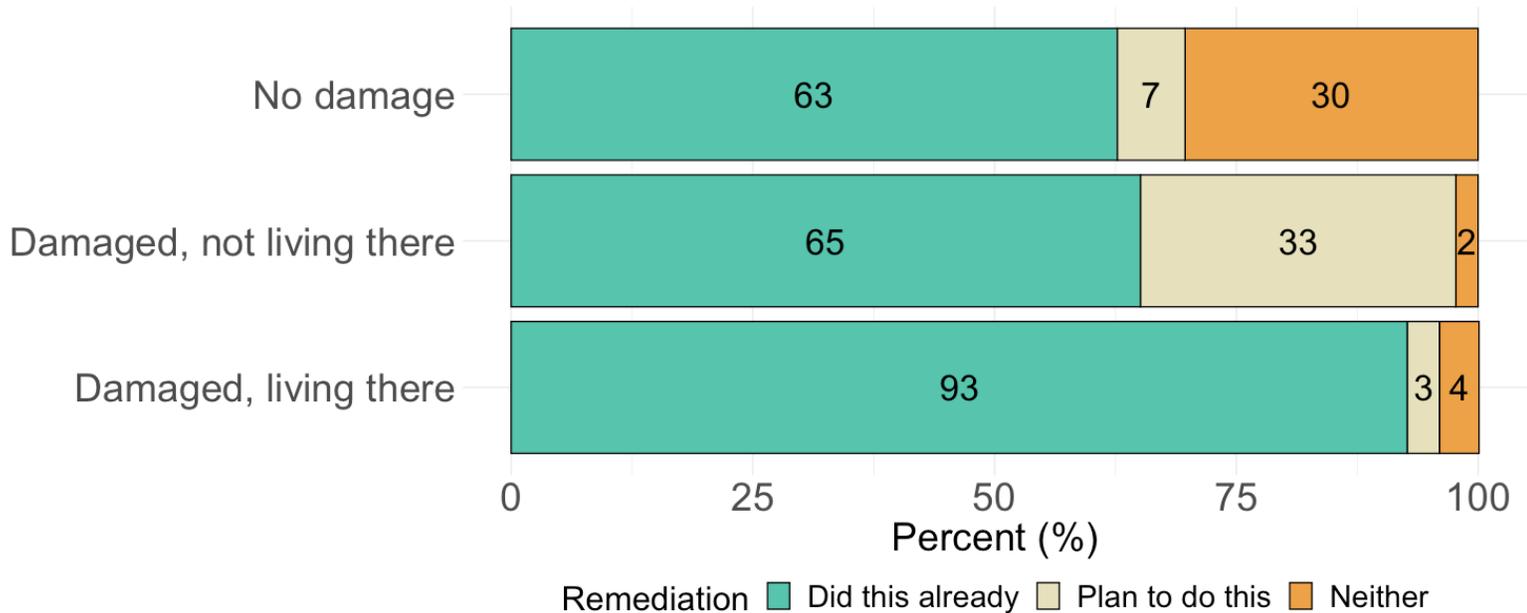


Fig 8: Percentage of respondents who had taken actions to improve air quality inside their home (changing air filters or using purifiers, for example).

# Rebuilding Decisions

## Who answered these questions?

Respondents who experienced a complete loss or had damage and were not living at home.

## What is the purpose of this section?

These questions will help to better understand decision-making by disaster survivors, which may help future disaster-stricken communities overcome potential barriers to long-term community recovery.

People who lost homes or had significant damage due to the Marshall Fire are now faced with a difficult decision: whether to remain in the community or move away. For respondents that did have a complete loss of their home, the majority in all three communities said they would definitely or probably rebuild: Superior (80%), Louisville (79%), and Boulder (71%).

By Community: Likelihood of rebuilding

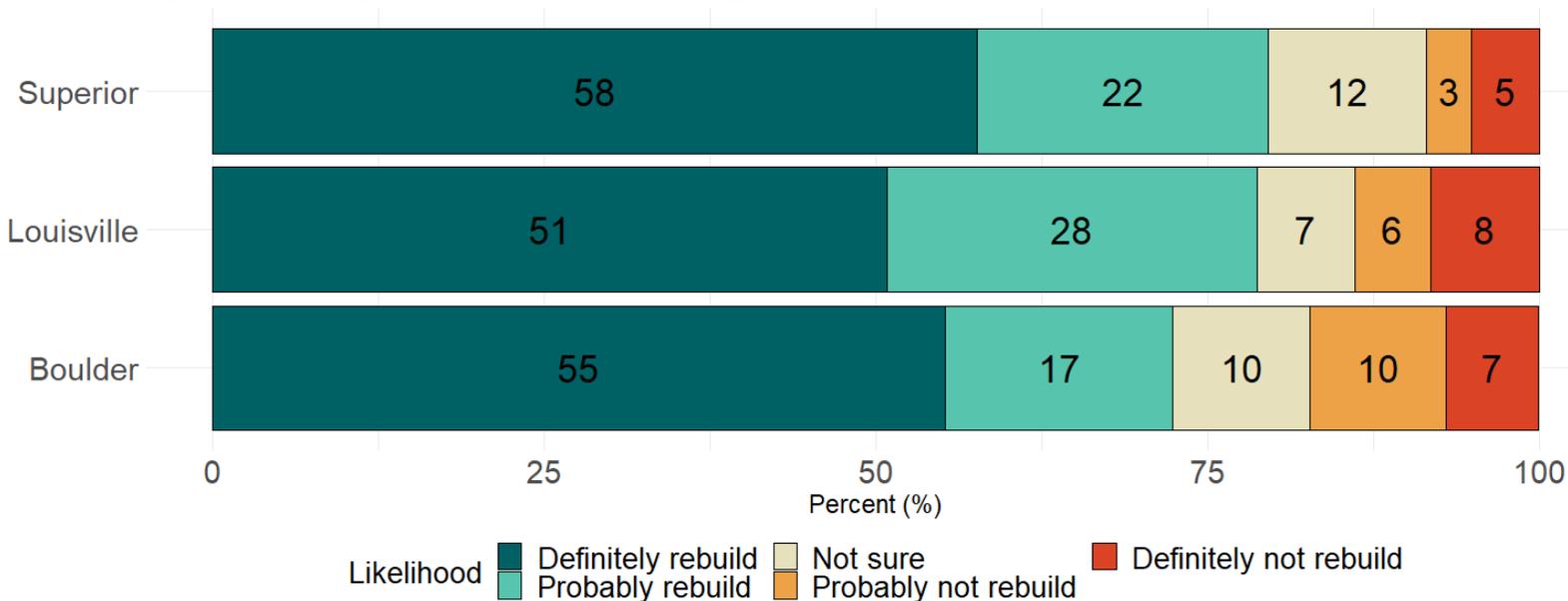


Fig 9: Likelihood of rebuilding for respondents who lost homes

# Rebuilding Decisions

Underinsurance has been a major challenge for those who lost homes in the Marshall Fire. Of our survey respondents who had a complete loss, only 8.2% reported that they expect their insurance to cover the full cost of rebuilding. About a third expect insurance to cover 75-99% of their costs, while 42% reported being insured for 50-75% of their expected costs and 11% expect that their insurance will cover less than 50% of rebuilding costs.

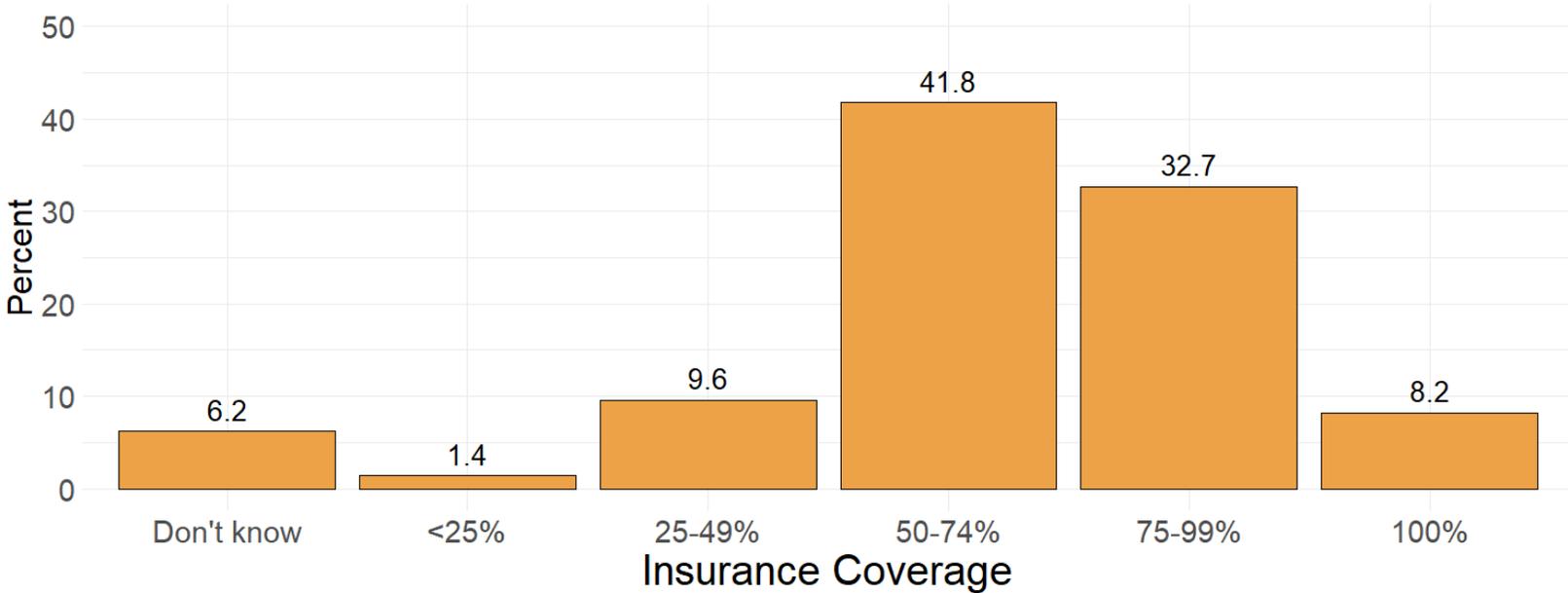


Fig 10: Insurance coverage among complete loss respondents.

# Rebuilding Decisions

When asked to rate the importance of different factors affecting their rebuilding decisions, costs were rated as the most important factor across all communities. Time to rebuild was the second most important factor in Louisville and Superior, while Boulder County respondents rated retirement planning as their second most important factor. Louisville respondents were more likely to rate building codes as an important factor in their decisions compared to other respondents. As explained in the next section, energy efficiency building codes have been a major policy topic across the affected communities, and in Louisville in particular.

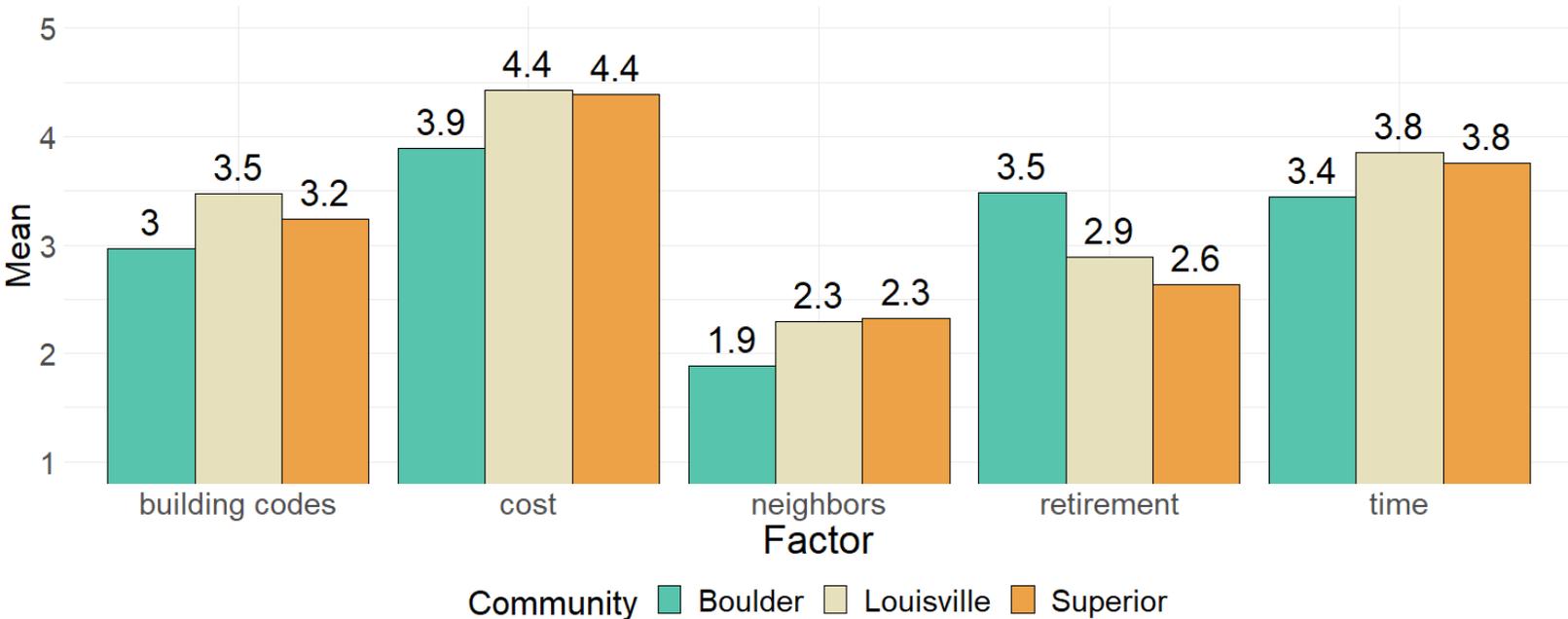


Fig 11: Average importance ratings for factors affecting rebuilding decisions: 1=Not very important, 5=Extremely important

# Participatory Processes & Policy Support

**Who answered these questions?** All survey respondents.

**What is the purpose of this section?** This section includes questions about engagement in recovery decision-making and residents' support of local government recovery policies. These data will help us better understand how local governments can best engage their residents during recovery and when and how communities recover effectively.

The Marshall Fire led to a large increase in community participation among survey respondents: while about 65% of respondents said they had not participated in any local meetings, neighborhood meetings, or local fire risk/preparation meetings before the fire, after the fire nearly 60% reported attending fire-related meetings, over 25% contacted a local elected official, 31% contacted local government staff, and 22% gave comments during a public meeting. Superior residents were more likely to have attended a fire-related meeting, while Louisville residents were more likely to have contacted local elected officials.

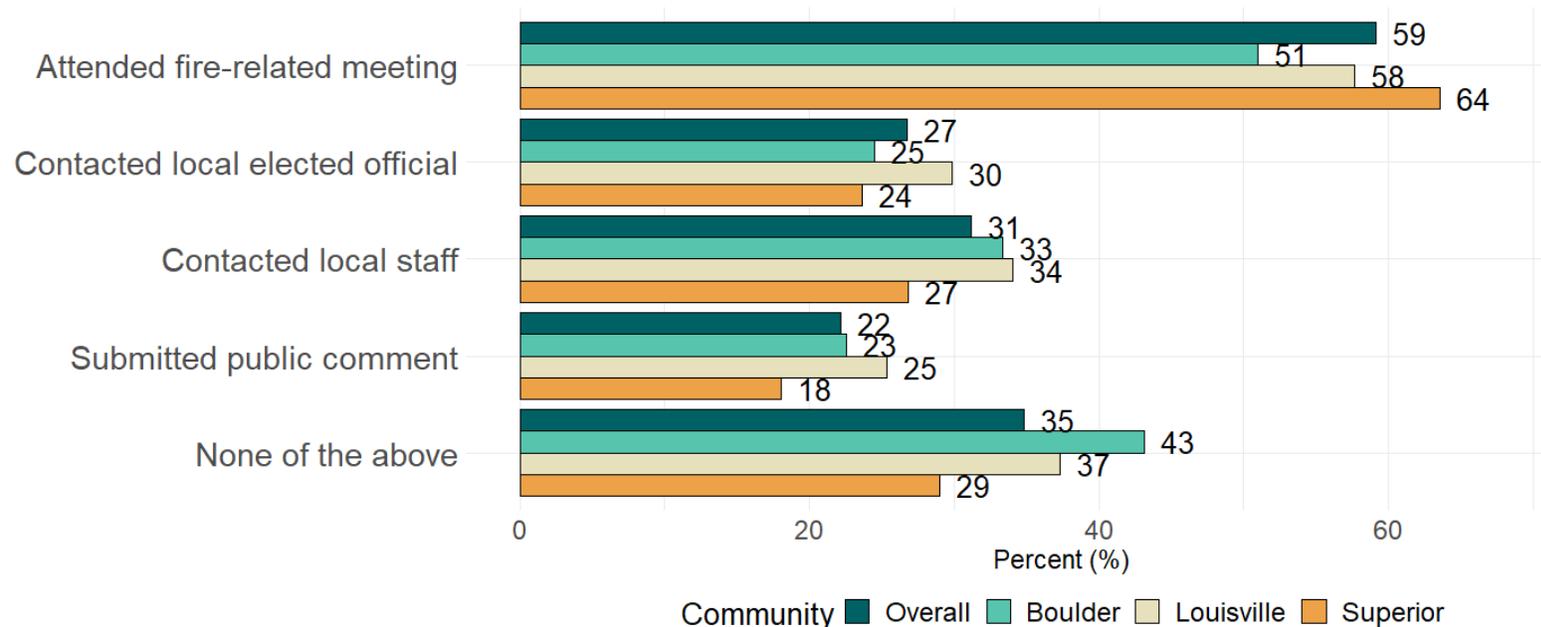
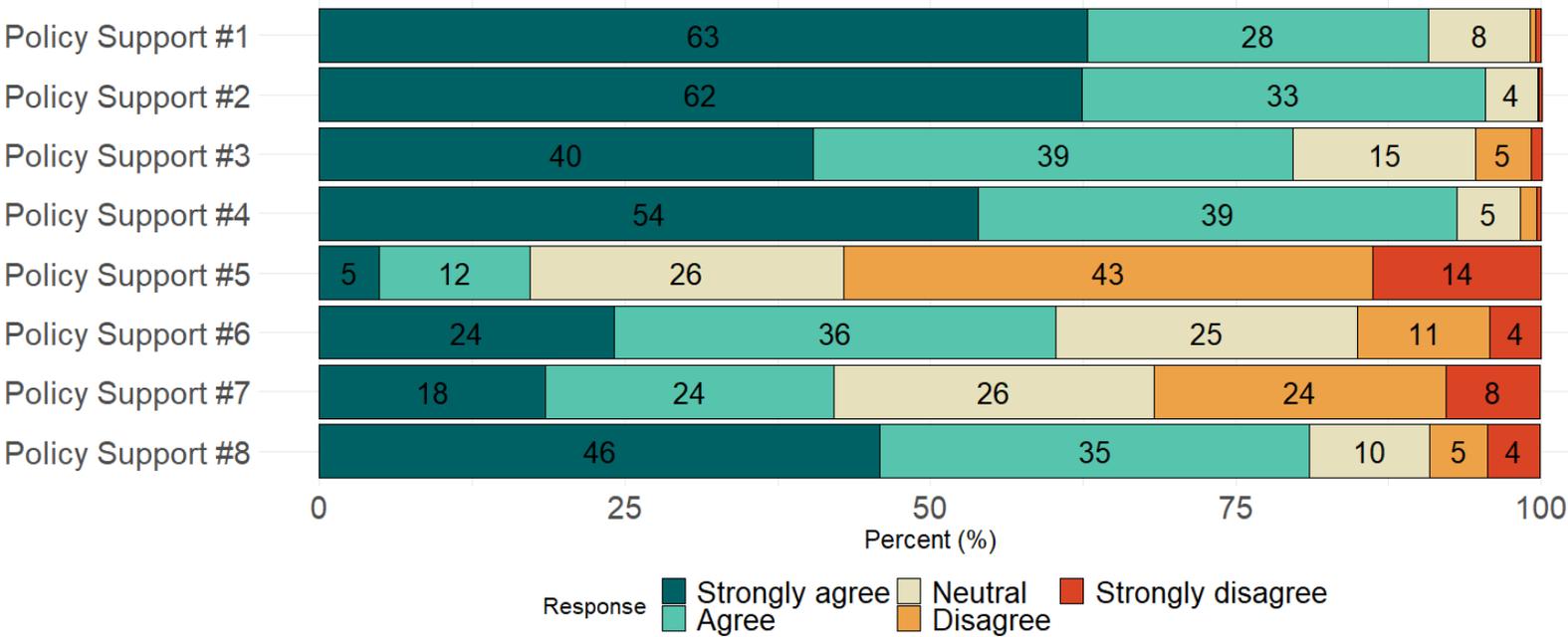


Fig 12: Percent of respondents who participated in a public policy processes post-fire.

# Participatory Processes & Policy Support

Respondents showed strong support for policies strengthening emergency response protocols (91% in favor), and for implementing a disaster recovery plan for future disasters (95% in favor) Respondents also believe that wildfire risks in their community need to be reassessed (93% in favor), and that the building standards in place before the fire were not adequate (56% agree). Moving forward, 60% of respondents believe residential building codes should be strengthened so as to reduce wildfire risk.



**Full statement text:**

- (1) Emergency response protocols and policies should be strengthened.
- (2) Our community should have a disaster recovery plan in place for future disasters.
- (3) Land use policies, such as zoning and open space management, should be changed to help prevent future wildfire impacts.
- (4) Wildfire risks in our community should be reassessed.
- (5) Building standards in place prior to the Marshall Fire are adequate to reduce wildfire risks.
- (6) Residential building codes should be strengthened to reduce risks of future fires, even if it increases the cost of rebuilding.
- (7) Energy efficiency standards in place before the Marshall Fire are too restrictive, making rebuilding too expensive
- (8) Local energy efficiency standards are important to address climate change.

Fig 13: Percent of respondents indicating support or non-support of policy decisions post-fire.

# Participatory Processes & Policy Support

Residential energy efficiency building codes have been a major (and at times contentious) policy topic since the fire, with variation across the three jurisdictions in the codes that were in place when the fire occurred and the decisions around these codes post-fire. These differences are reflected in survey results. The majority of respondents across communities agree that local codes are important to address climate change. However, we see some variation across communities in attitudes toward the specific codes in place at the time of the Marshall Fire. In Louisville, which had the most stringent building codes before the fire, residents were more likely to agree that "Energy efficiency standards in place before the Marshall Fire are too restrictive, making rebuilding too expensive" (45% agree), compared to 42% of Superior and 33% of Boulder respondents.

By Community: Energy efficiency standards are too restrictive

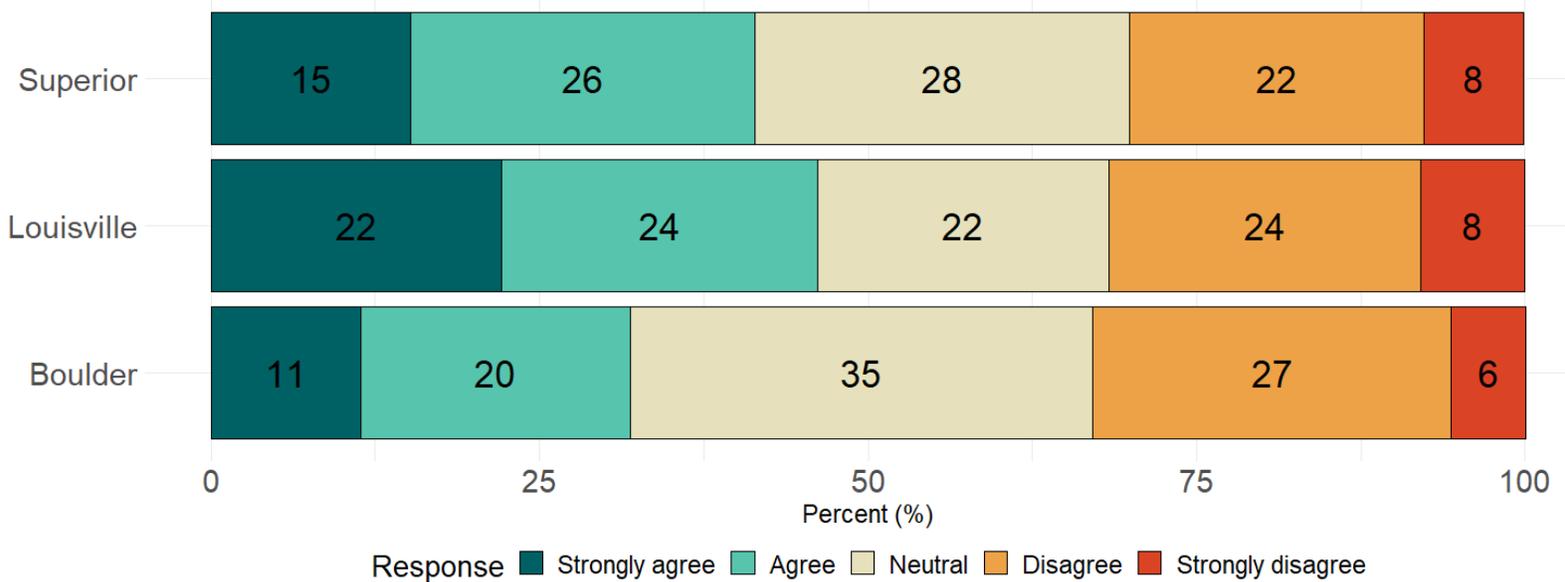


Fig 14: Percent of respondents supporting or opposing energy efficiency standards, by community

# Participatory Processes & Policy Support

Those who experienced a complete loss or severe damage were also more likely than those who had less damage to agree that current energy standards are too restrictive.

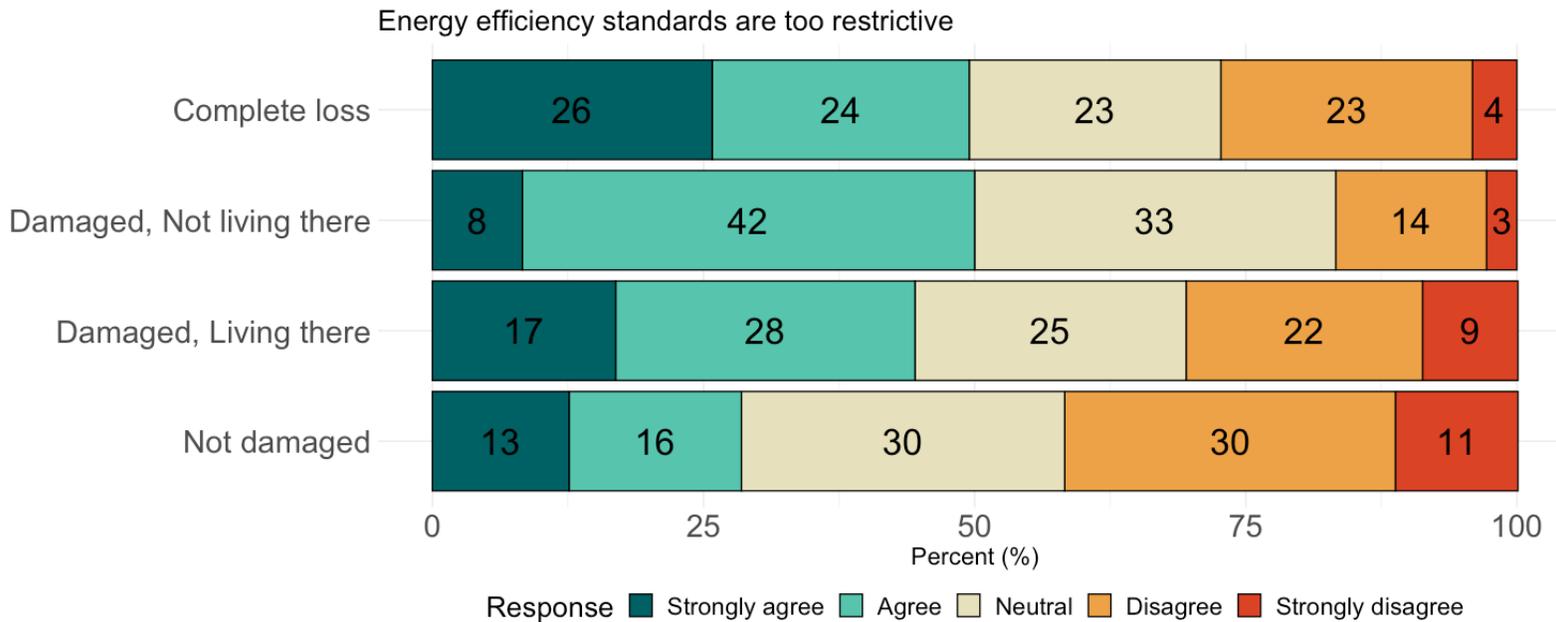


Fig 15: Percent of respondents supporting or opposing energy efficiency standards by damage category.

# Physical Health

## Who answered these questions?

All survey respondents.

## What is the purpose of this section?

To understand and assess how the many impacts of the Marshall Fire may have affected people's physical health.

This information may help in understanding the health impacts of urban wildfires as they are very different from wildfires that predominantly burn vegetation.

Generally speaking, most respondents indicated that their health was Good or better across the sample. However, complete loss respondents had the lowest frequency of considering their physical health very good or excellent (67%) compared with damaged, not living there (77%), damaged, living there (72%), no damage, living there (74%), and no damage not living there (75%).

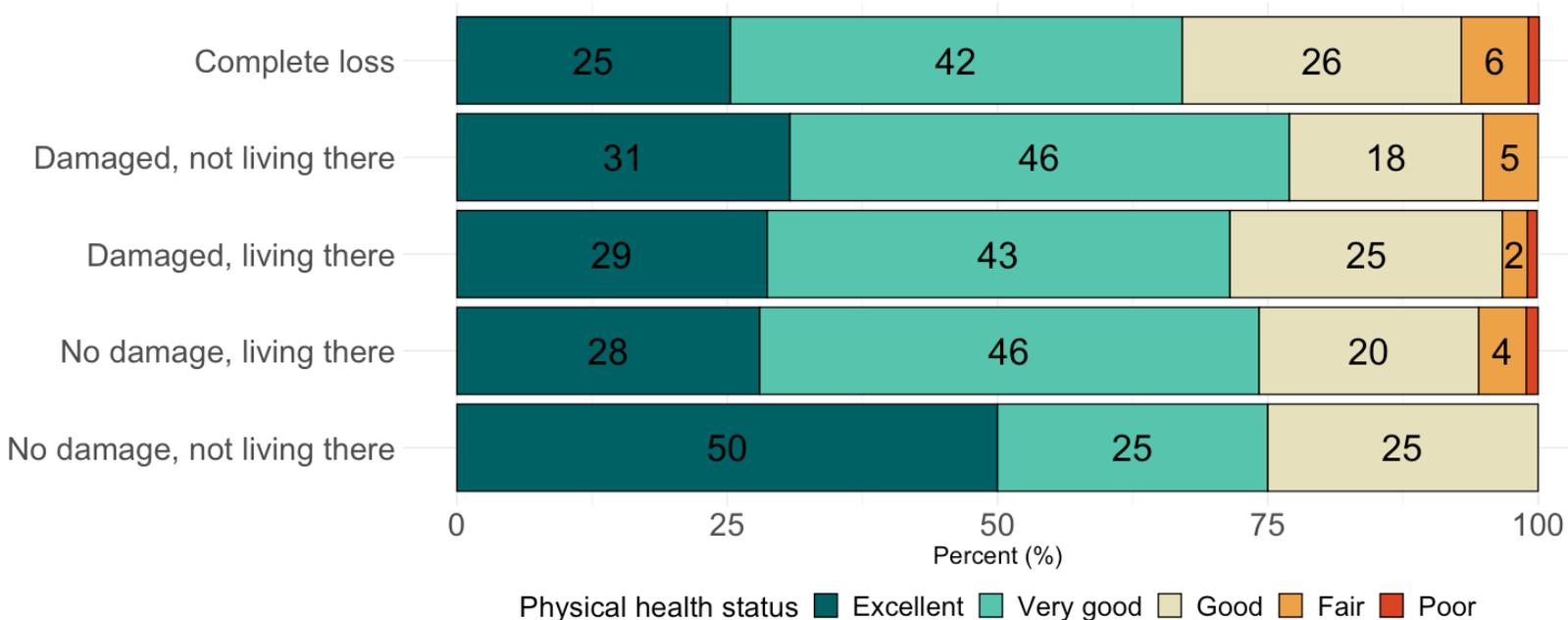


Fig 16: Physical health responses of respondents.

# Physical Health

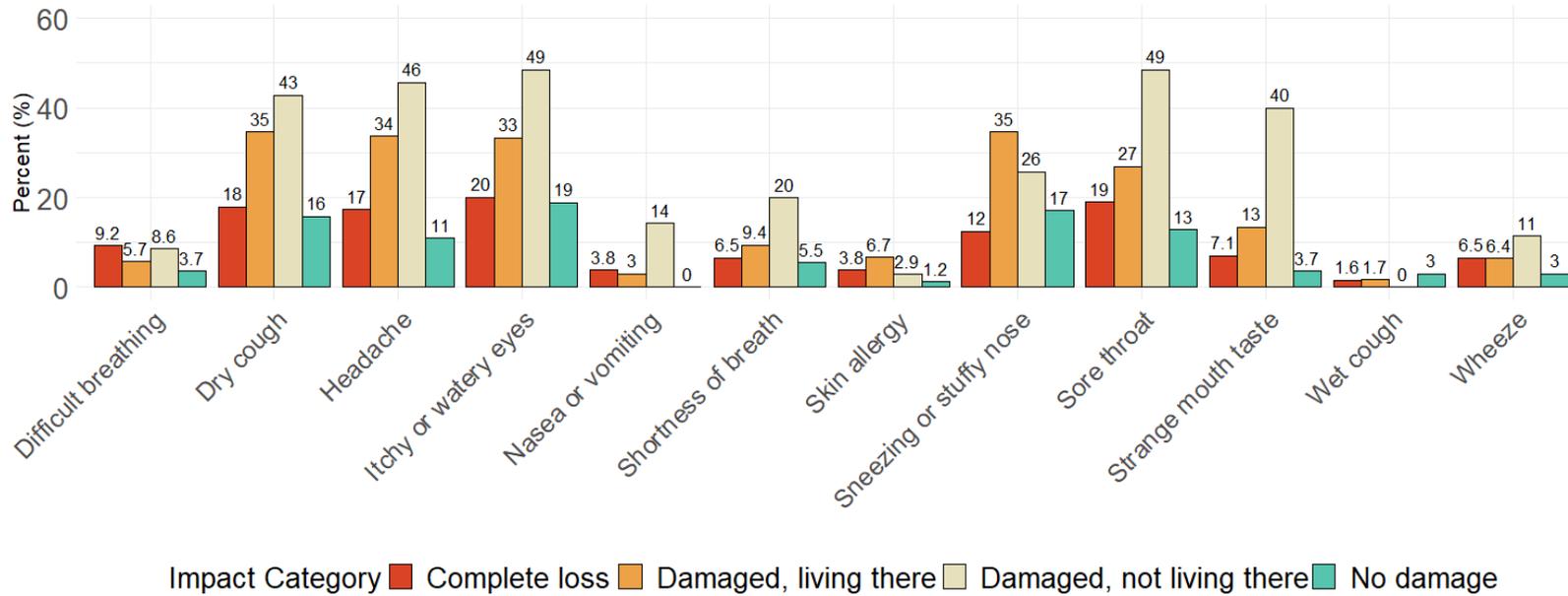


Fig 17: Physical health symptoms related to fire.

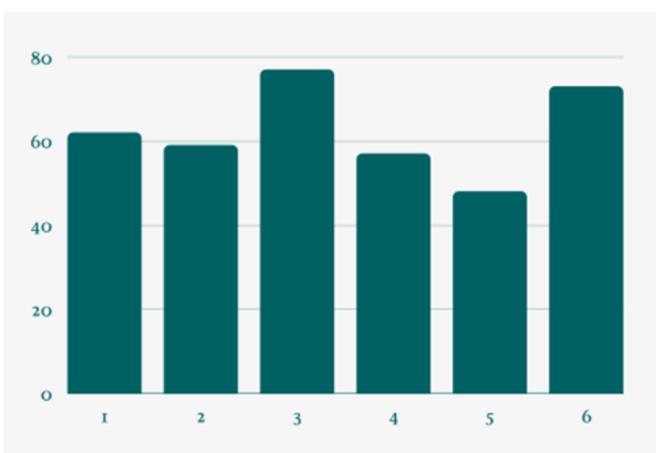
Respondents indicated differing levels of physical health symptomatology across subgroups with the damaged, not living there subgroup expressing greater frequency of many of the above symptoms. These individuals may be visiting their damaged homes frequently and experiencing health impacts as a result, influencing their decision not to return until remediation is completed. The next group showing increased frequency of symptoms is damaged, living there. People living in damaged homes may be more likely to experience symptoms given their proximity to damaged materials (household items, structure damage, etc).

## Who answered these questions?

All survey respondents.

## What is the purpose of this section?

Information in this section includes a focus on experiences, thoughts, feelings and behaviors that may be associated with mental health challenges and long-term recovery after this event. This information may help in the design of future programming designed to support mental health and the recovery process.



### Statements

- 1-I have more of an appreciation for the value of my own life.
- 2-I am more confident that I can handle difficulties.
- 3-I am more likely to prioritize what is important in life.
- 4-I have more of a sense of closeness with others.
- 5-I am stronger than I thought I was.
- 6-I have learned a great deal about how wonderful people are.

While most indicated their mental health was excellent to good (18% - Excellent, 38% - Very good, 27% - Good), 12% indicated it was fair to poor (11% - Fair, 1% - Poor). Additionally, 25% of participants provided a distress rating of 5 or above (out of 10, with 10 being the worst). Most of these were ratings between 5-7 (21% of the 25% total), indicating a moderate degree of distress.

Many respondents endorsed unexpected benefits as a result of the fire. Many agreed or strongly agreed with each of the statements associated with "post-traumatic growth": I have more of an appreciation for the value of my own life (62%); I am more confident that I can handle difficulties (59%); I am more likely to prioritize what is important in life (77%); I have more of a sense of closeness with others (57%); I am stronger than I thought I was (48%); and I have learned a great deal about how wonderful people are (73%).

Fig 18: Unexpected benefits as a result of the fire, % indicating agreement within whole sample

Participants expressed confidence in their own ability to recover from the fire one year from the date of survey, with 78% indicating that they were somewhat, very or completely confident about recovery. In contrast, participants were less confident in the ability of the community to recover, with 64% indicating that they were not at all or only a little confident. An additional 27% were somewhat confident, with only 7% very confident and 2% completely confident in the ability of the community to recover one year from date of survey.

## Confidence in own and community's ability to recover after 1 year

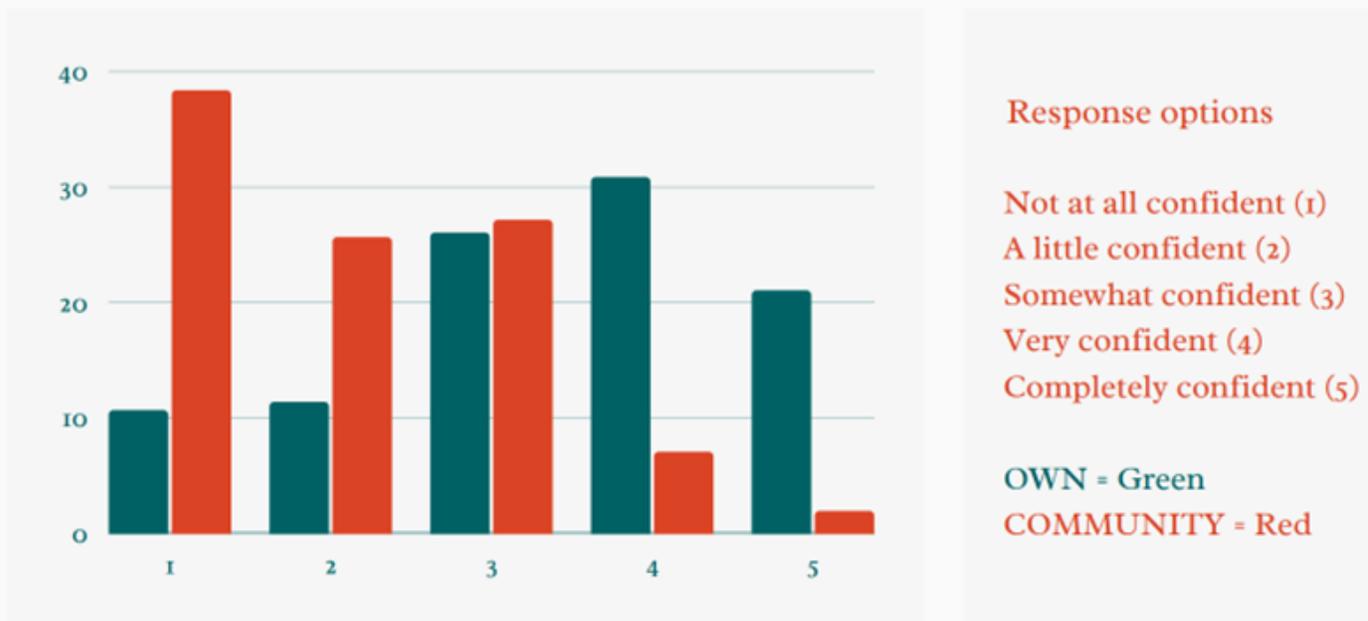


Fig 19: Confidence in ability to recover from fire after one year.

# Social Capital & Support

## Who answered these questions?

All survey respondents.

## What is the purpose of this section?

To understand what kinds of relationships help communities to react, evacuate, and recover when crisis strikes.

Most people reported that they have adequate social support in times of need. For example, 95% agreed or strongly agreed with the statement, "My family or close friends will help me when I am in trouble." Additionally, 78% agreed with the statement, "My acquaintances (such as coworkers) will help me when I am in trouble."

We also asked about actual support needed and received. In total, 44% indicated that they needed emotional support after the fire. Of these, 89% received the needed support. In addition, 46% indicated they have needed financial or material support, with 93% of these having received at least some of the support needed.

Those reporting greater support from family and friends are reporting less distress, better overall mental health, fewer symptoms of depression, anxiety and PTSD (all significant correlations).

About half of respondents in each jurisdiction believe local elected officials will help in times of crisis.

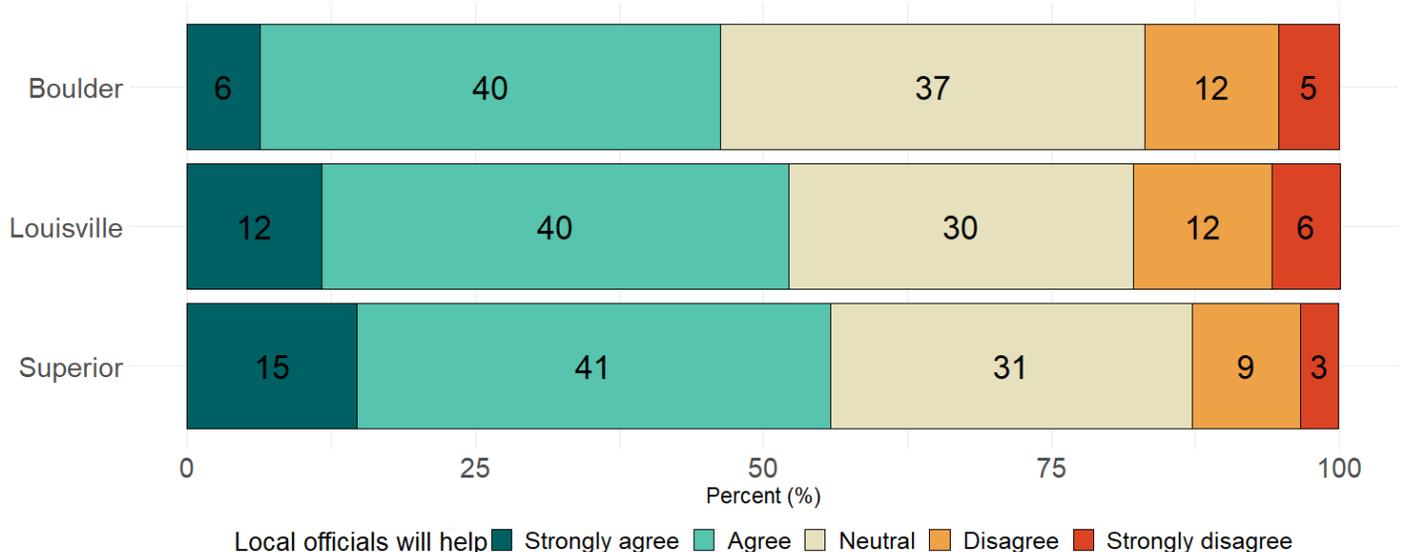


Fig 20: Percentage of respondents who believe local elected officials will help in times of trouble.

# Social Capital & Support

Most survey respondents have received at least some of the financial support they needed related to the fire.

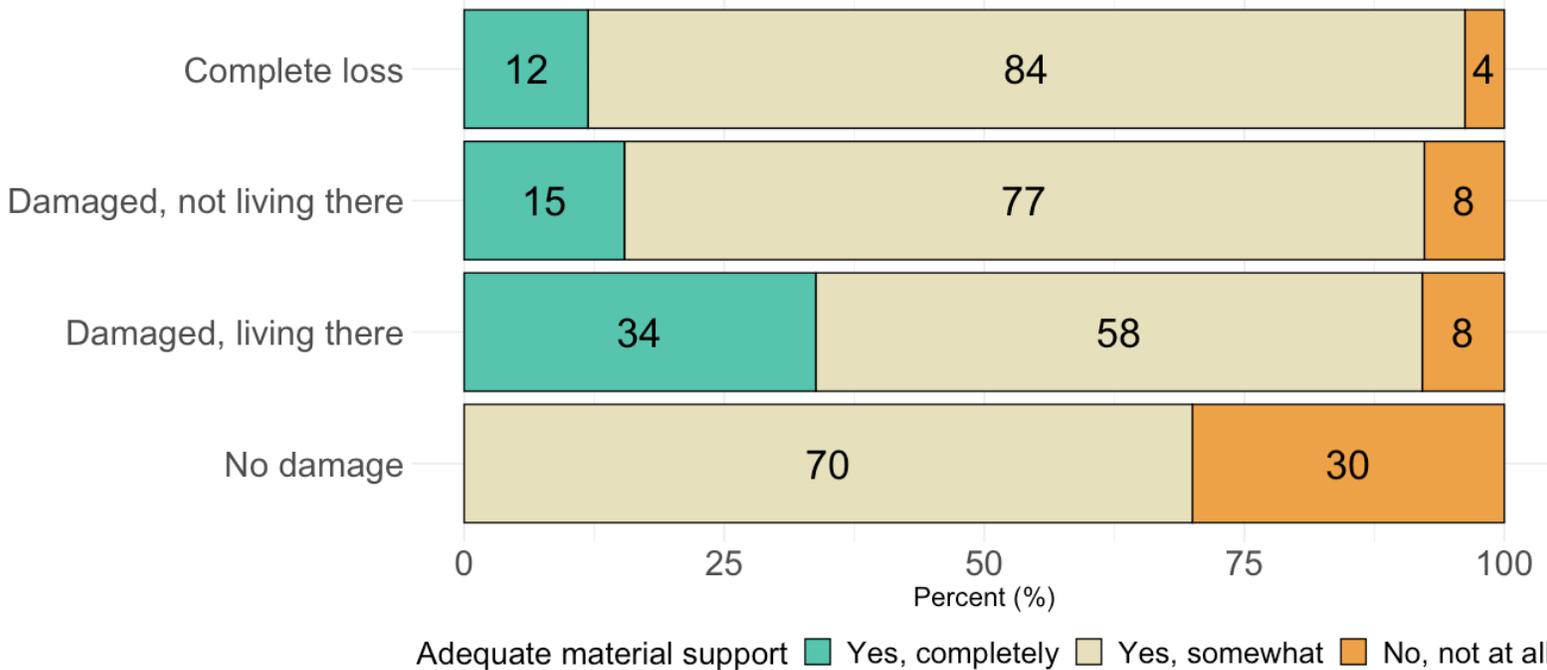


Fig 21: Percentage of residents who received the financial support they needed related to the fire.

We asked respondents whether they believed we can move towards a more equitable community. About half of respondents believe they can move towards a more equitable community, with lower levels of agreement among those who experienced a complete loss.

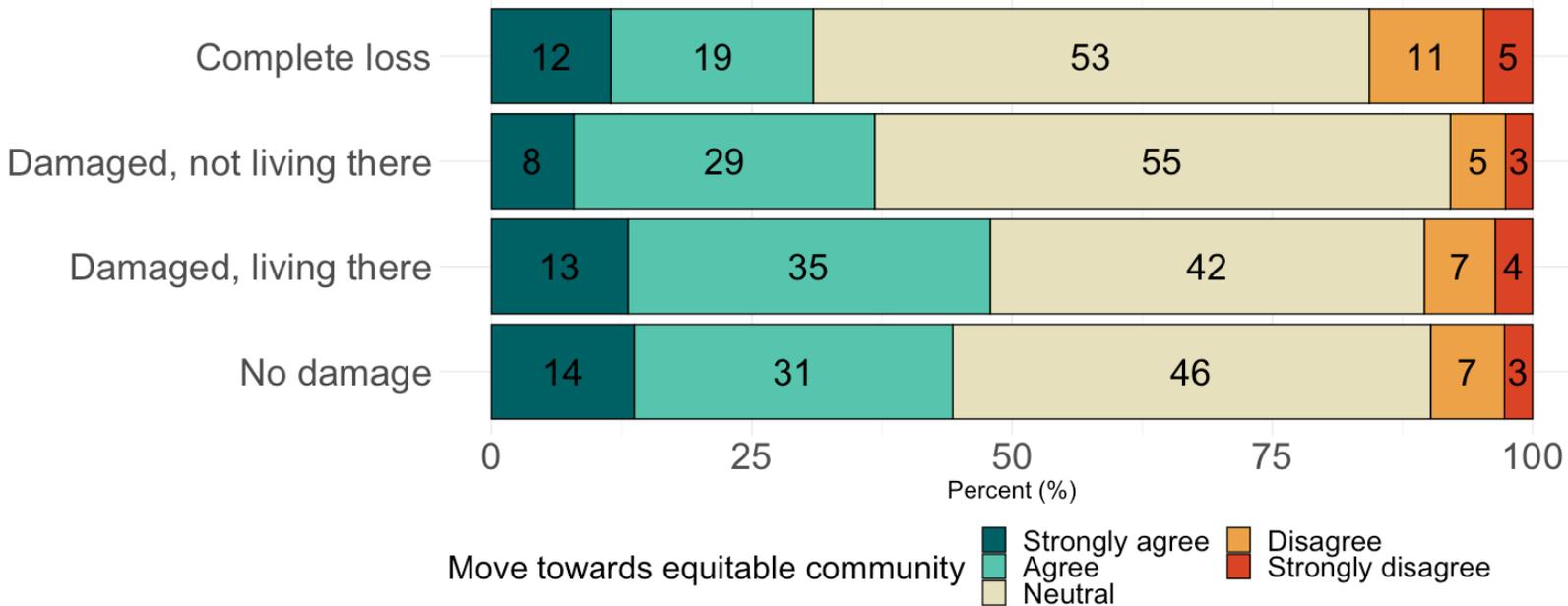


Fig 22: Percentage of residents who believe they can move towards a more equitable community.

# Reminders of the Fire

## **Who answered these questions?**

All survey respondents.

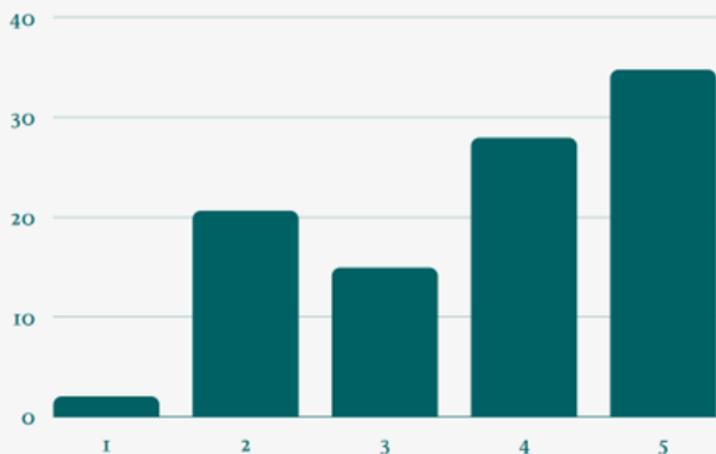
## **What is the purpose of this section?**

To understand how reminders of difficult events (for example, through the media, and in our immediate environment) may be associated with mental health challenges and the recovery process. This information may help in the design of future programming designed to support recovery.

When participants were asked how often they experience reminders of the fire, over half said, "nearly every day" or "multiple times each day."

We also asked respondents about the types of reminders they have been experiencing. The top five types of reminders were: Conversations with others (88% of respondents); Sites or smells on the drive to and from my neighborhood (86%); Reminders related to the weather (dry or windy days) (85%); News, programs or social media that I come across without actively searching for fire related content (79%); Sights or smells in my immediate neighborhood (64%).

Those reporting more frequent reminders of fire are also reporting greater distress, poorer overall mental health, symptoms of depression, anxiety, PTSD and guilt (all significant correlations).



## **Response options**

Never/rarely (1)

A few times per week/1-2 days per week (2)

Half of the days each week/3-5 days per week (3)

Nearly every day each week/6-7 days per week (4)

Every day, multiple times per day (5)

Fig 23: Percentage of respondents experiencing reminders of the fire.

# Climate Change Beliefs

## Who answered these questions?

All survey respondents.

**What is the purpose of this section?** These questions have been used in many studies to understand differences in the way people see the world and approach problems.

We asked participants whether they agreed or disagreed with statements about climate change and the environment. Respondents generally agreed that climate change contributed to the Marshall Fire, that climate change will result in similar fires occurring more often, and that climate change is a serious problem. Interestingly, respondents whose homes were damaged and who were not living there were most likely to agree with these statements.

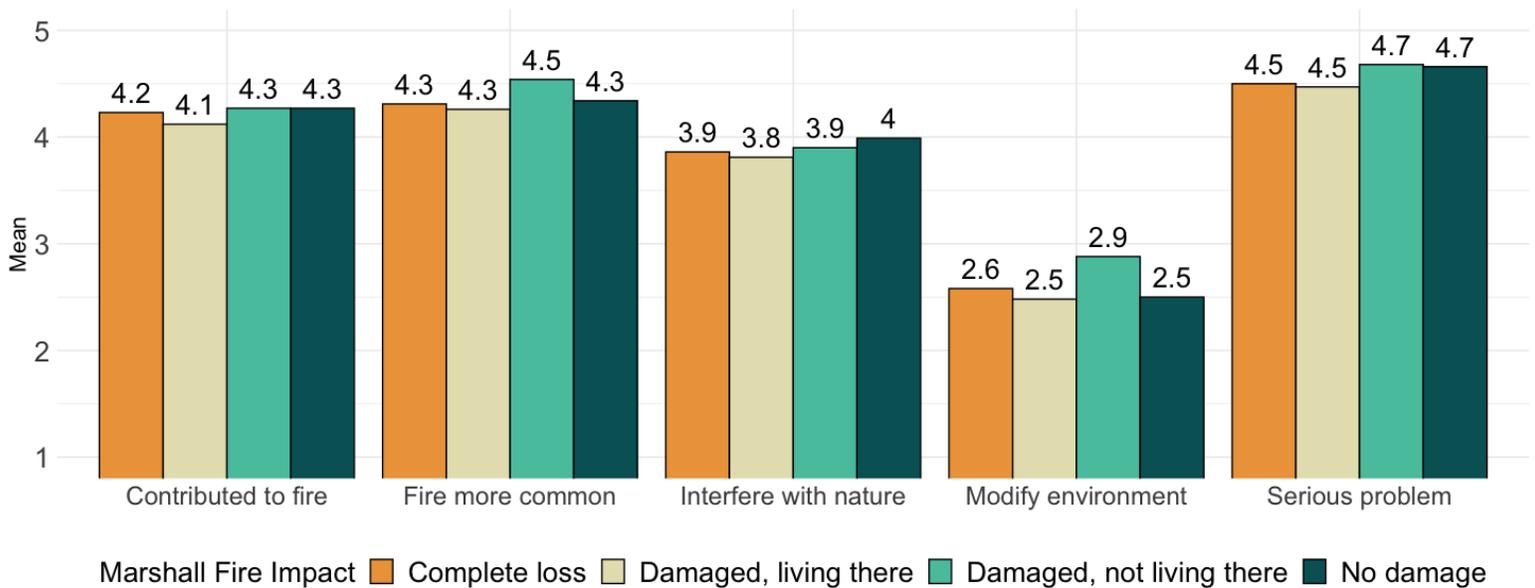


Fig 24: Average level of agreement with statements about climate change, with 1=strongly disagree and 5=strongly agree.

### Full statement text:

1. Climate change contributed to the Marshall Fire.
2. Fires like the Marshall Fire will become more common in our community in the future.
3. Humans have the right to modify the natural environment to suit their needs.
4. When humans interfere with nature, it often produces disastrous consequences.
5. Global climate change is a very serious problem.

# Key Takeaways

- As has been widely reported elsewhere, respondents reported challenges with the **emergency alert system**, with less than 20% of respondents receiving official evacuation notices during the Marshall Fire event.
- The Marshall Fire has had wide-ranging **economic, physical, and emotional impacts** on the affected communities.
  - In addition to the destruction of homes and property the fire created, residents across the affected area were concerned about **impacts on their air quality**, with most households taking measures like cleaning their air filters or using air purifiers. These measures can be costly.
  - Many residents reported **physical health symptoms** after the fire such as headaches, sore throats, coughs, and itchy eyes. People who experienced damage to their homes but not a complete loss were more likely to report these symptoms.
  - About a quarter of respondents reported high levels of **distress** when the survey was conducted, several months after the fire.
  - Fire victims are still affected by fire through **consistent reminders** in their everyday life.
  - Many people report **unexpected benefits** of having experienced the fire, including an appreciation for life and an acknowledgment of the supportive responses of those around them.
  - Despite these benefits, the majority showed **little confidence in their community's ability to recover from the fire in one year**.
- For those who lost homes, **rebuilding costs** are a major concern, with the majority of respondents reporting various levels of **underinsurance**.
- Within the affected communities, most people believe that **climate change is a serious threat and that local action is needed** to increase energy efficiency and improve community resilience.
  - Across communities, the vast majority of respondents agree that **disaster recovery plans need to be strengthened and that land use and building standards should be strengthened** to reduce wildfire risks.
  - For people that experienced a complete loss, and for Louisville residents in particular, **concerns about the costs of adhering to strong energy efficiency codes have eroded support for these policies**.
  - Addressing these cost concerns through incentive and rebate programs may be effective strategies to guide a green recovery process.