

Using WiRē Data to Study the Relationship Between Mitigation and Evacuation Preparedness

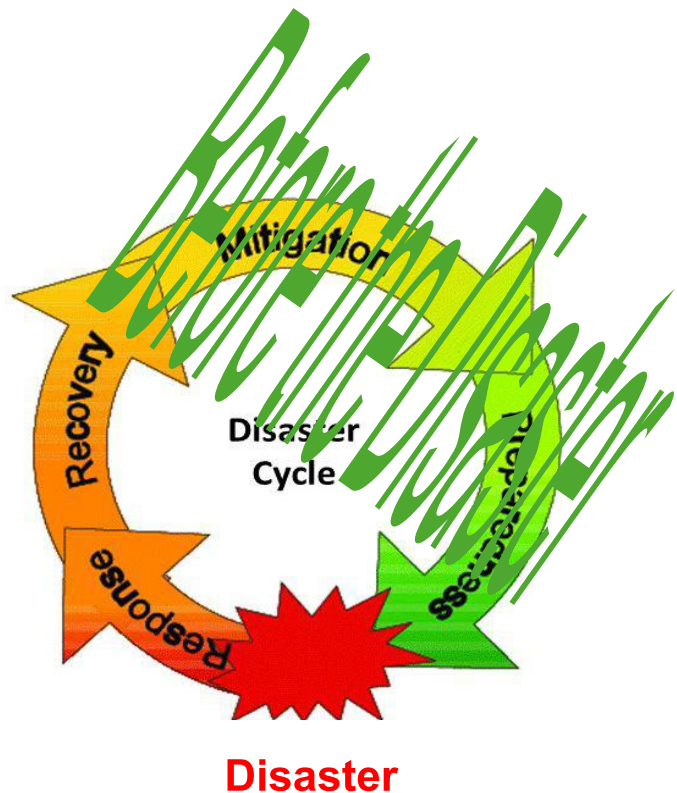
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Background



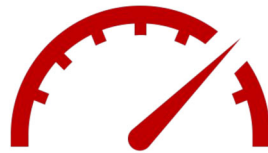
- The disaster cycle presents a simplified version of the four phases of disaster management.
- We focus on the two phases of the disaster cycle that happen before a wildfire occurs.
 - **Mitigation and Preparedness**
- We ask the question, are mitigation and preparedness actions complements or substitutes?

Research Questions

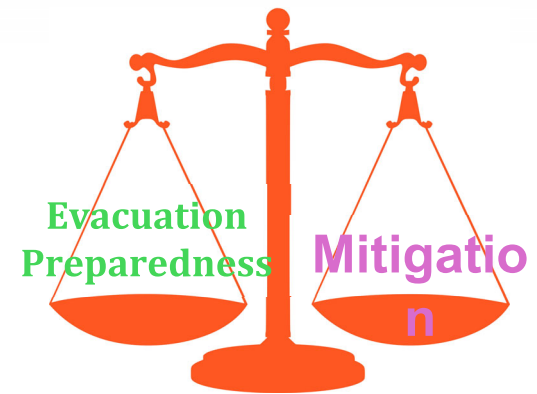
We use the **WiRē compiled dataset** to analyze the following questions:



Which types of households are more likely to be prepared to evacuate?



Are households who are at greater risk of wildfire more prepared to evacuate?



Are mitigation actions and evacuation preparedness complements or substitutes?

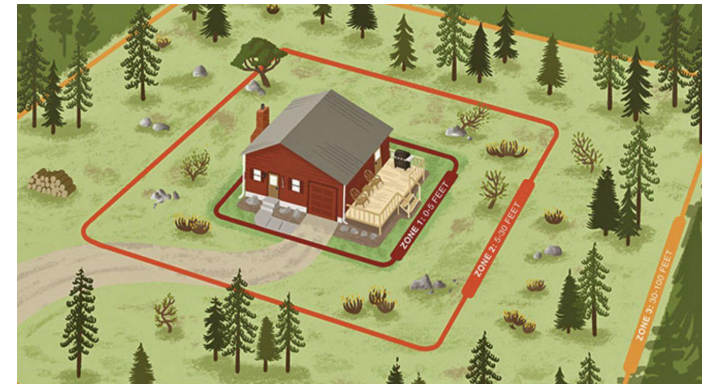


Evacuation Decisions

- Unpredictable wildfires may require swift evacuation of WUI residents.
- Having an evacuation plan can greatly improve the time and likelihood a household is able to effectively evacuate. (Kuligowski, 2022)
- Preparations are important to help emergency management organizations and reduce costs for response and rescue operations.

Mitigation Decisions

- Previous WiRē research has shown that homeowners' mitigation decisions are related to...
 - Risk Perception
 - Engagement with neighbors
 - Information from local community sources
 - Perceived effectiveness of mitigation
 - Other complex social considerations
- **We ask, how are these mitigation decisions related to decisions about evacuation preparedness?**



Preview of Findings



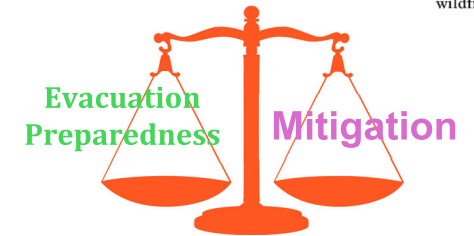
Which types of households are more likely to be prepared to evacuate?

- Households who have **evacuated in past.**
- Households who believe there is a **higher chance there is a wildfire on their property in the next year.**
- Households who **engage with their local community about wildfire.**



Are households who are at greater risk of wildfire more prepared to evacuate?

No. Households overall parcel **risk** is not correlated with their evacuation **preparedness.**



Are mitigation actions and evacuation preparedness complements or substitutes?

Complements. Households who complete some wildfire risk **mitigation actions** are more likely to complete evacuation **preparation actions.**

WiRē Compiled Dataset



Rapid wildfire risk assessments by professionals

based on attributes related to:

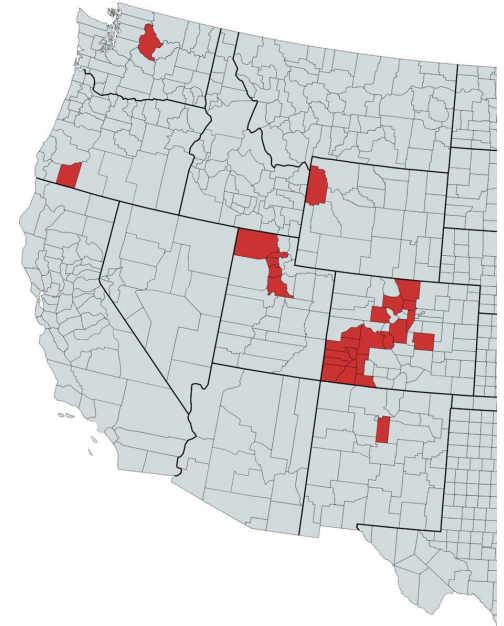
- building materials
- vegetation near the home
- background fuels
- topography
- access for evacuations and the fire department



Social surveys of residents in the study area

to investigate homeowners':

- evacuation preparations
- risk mitigation behaviors
- perceptions of wildfire risk
- demographics



Evacuation Preparedness Data

Do you have an evacuation plan for the **people** in your household?

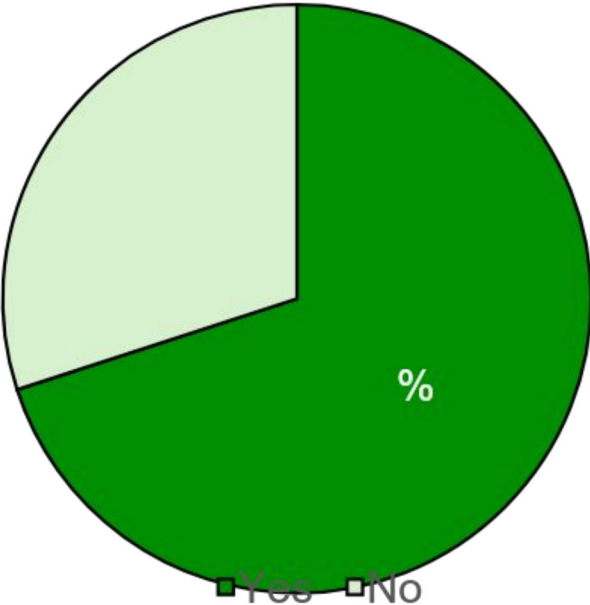
- For your **pets**?
- For your **livestock**?



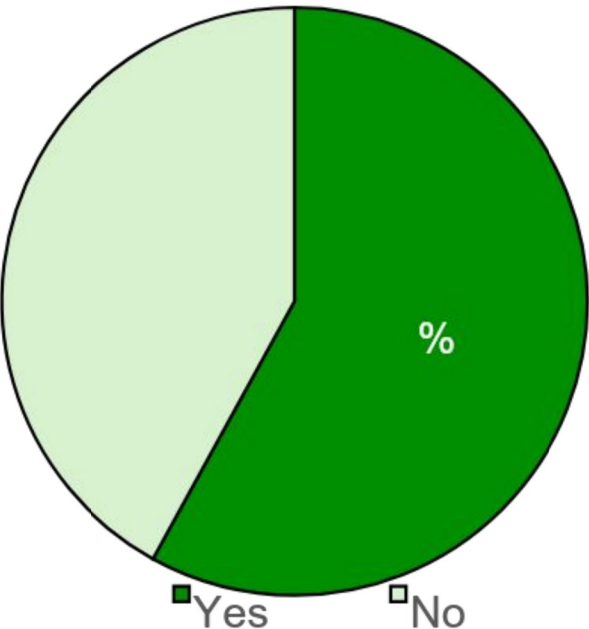
- Have you signed up for wildfire notifications?
- Identify places to evacuate to?
- Identify place to stay during a long-term evacuation?
- Identify what to take and what to leave behind during an evacuation?
- Create a checklist for steps to take before evacuating?
- Pack a “go” bag
- Discuss evacuation with my neighbors

Evacuation Planning

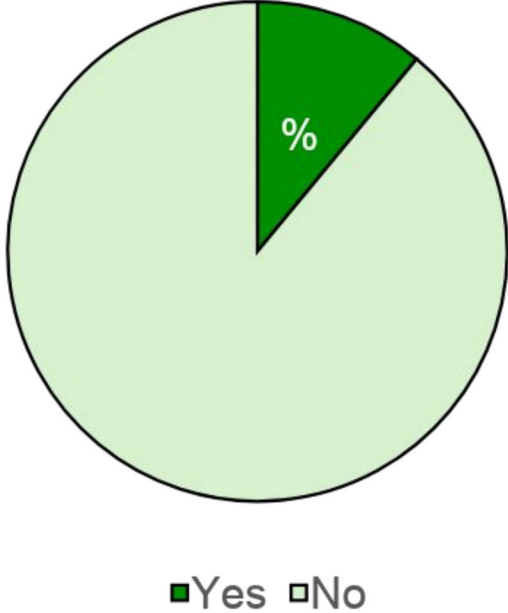
Evacuation Plan for your **Family**



Evacuation Plan for your **Pets**



Evacuation Plan for your **Livestock**



Preliminary Results: These findings are subject to change upon final analysis and publication. (6/18/24, n=6264)



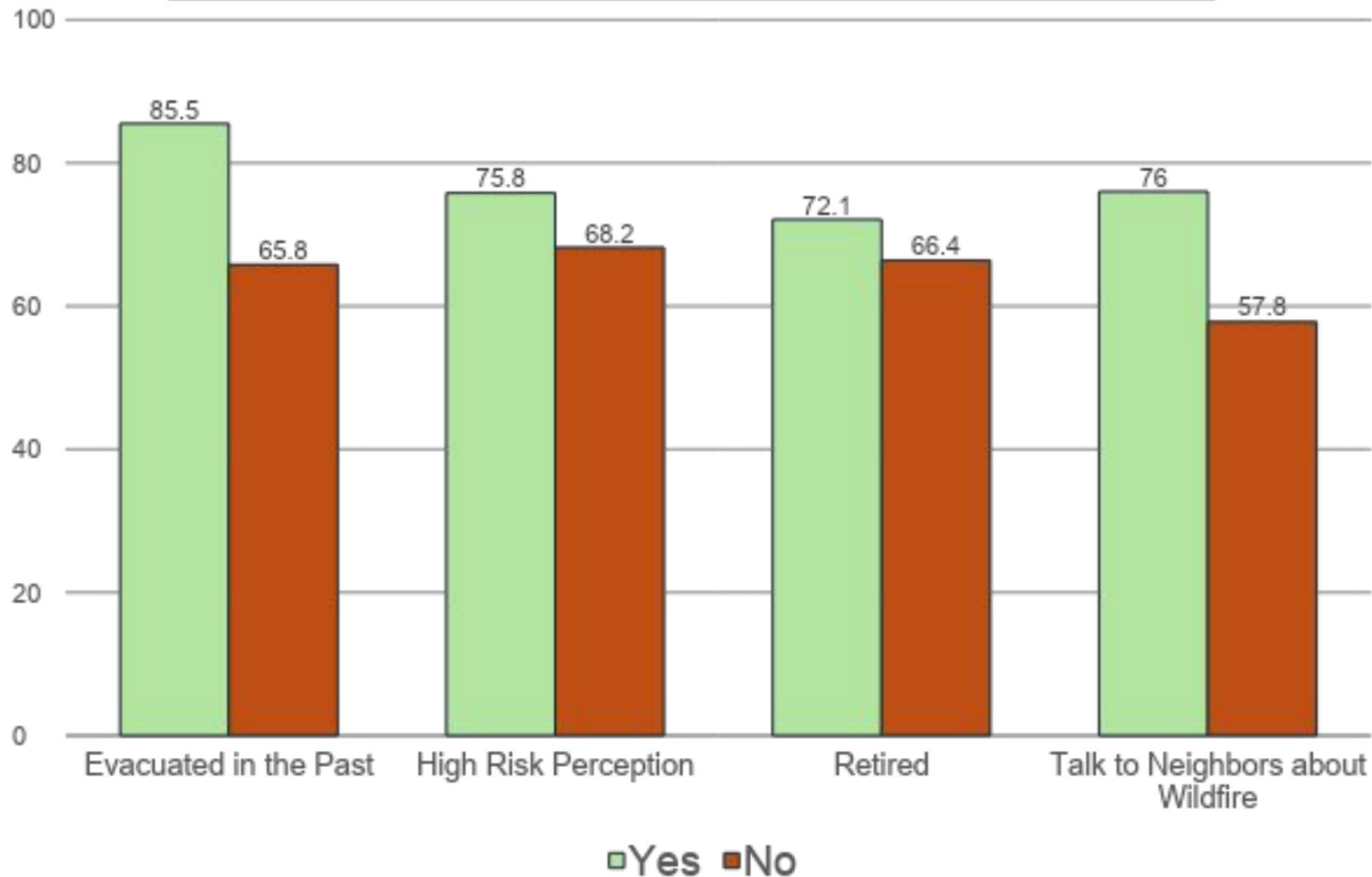
Household Survey Evacuation Questions

- **63%** of households have identified what to take and what to leave behind during an evacuation.
- **60%** of households have identified place to stay during a long-term evacuation.
- **58%** of households have identified how they will be notified about an evacuation.
- **57%** of households have identified places to evacuate to.
- **56%** of households have signed up for wildfire notifications.
- **38%** of households have packed a “go” bag.
- **30%** of households have created a checklist for steps to take before evacuating.
- **29%** of households have discussed evacuation with their neighbors.

Preliminary Results: These findings are subject to change upon final analysis and publication. (6/18/24, n=2349)



Percentage of Households with an Evacuation Plan



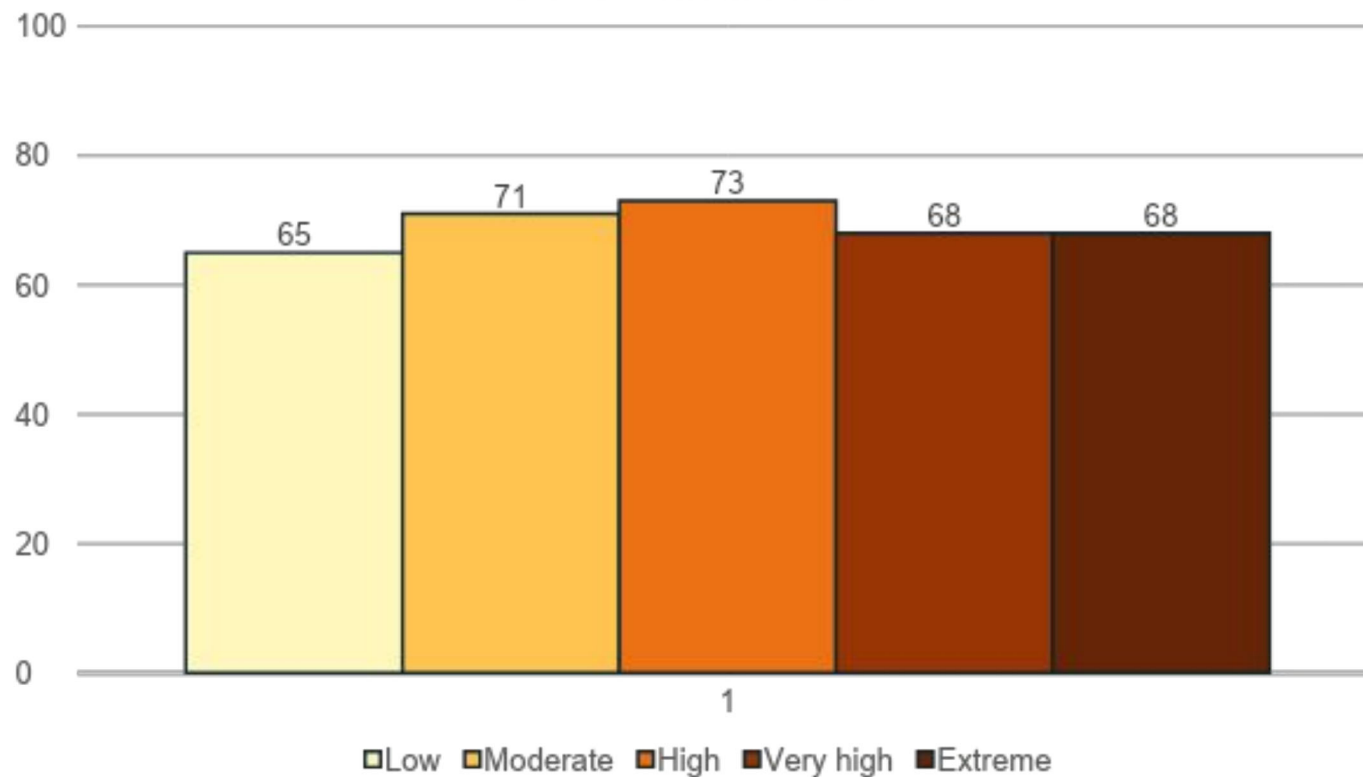
Households **more likely to have an evacuation plan** are those who...

- Have evacuated in the past.
- Believe there is a higher than 50% chance there is a wildfire on their property in the next year.
- Are retired.
- Talk to their neighbors.

Preliminary Results: These findings are subject to change upon final analysis and publication. (6/18/24, n=6191)

Parcel-Level Risk **Does Not** Predict Having an Evacuation Plan

Percent of Households with Evacuation Plan by Parcel Level Wildfire Risk



Households with a higher parcel level wildfire risk are **just as likely** to have an evacuation plan as households with lower parcel level wildfire risk.



Preliminary Results: These findings are subject to change upon final analysis and publication. (6/18/24, n=2349)

Mitigation Data

We combine these 5 attributes, which are plausibly controllable by a homeowner, to create a mitigation score for a household.

Defensible Space



Defensible space
(vegetation)



Defensible space (other
combustibles)



Roof Material



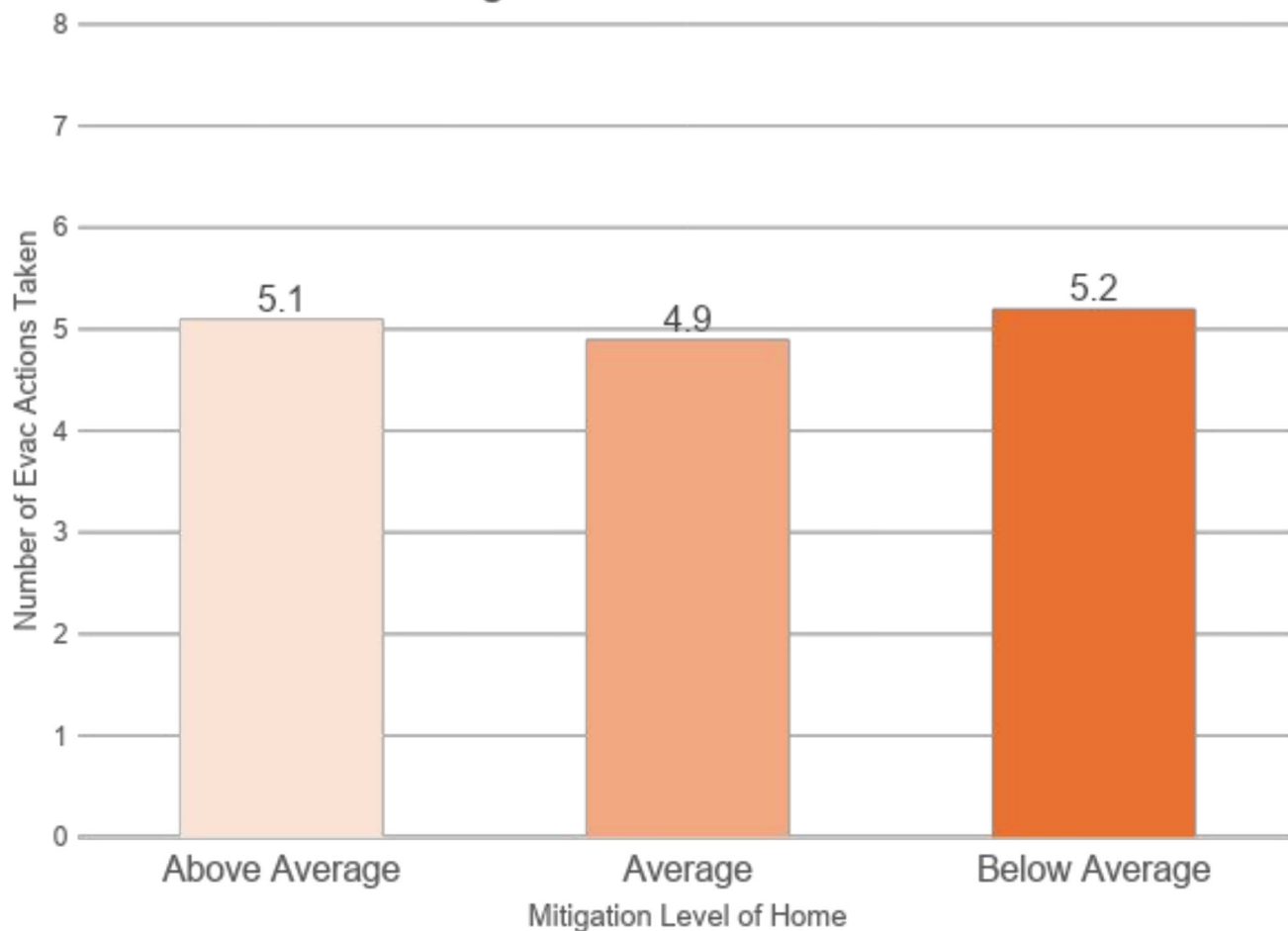
Siding Material



Attachments (combustibles)

Structure

Number of Evacuation Preparation Actions Taken by Mitigation Level of Home



- No statistical difference in the number of evacuation preparedness actions taken by households with high or low mitigation characteristics.
- However, **mitigation characteristics** may not perfectly align with household **mitigation activities**.

Preliminary Results: These findings are subject to change upon final analysis and publication. (6/18/24, n=2349)

Complements or Substitutes?

- We don't see any relationship between households with better **mitigation characteristics** and those with better **evacuation preparedness**.
- We want to understand when a household completes some **mitigation actions** how that impacts the **evacuation preparedness actions** they complete.

They Are Complements!

- When controlling for other confounding factors, we start to see a complementary relationship.
 - Households who do more mitigation actions are those who are more likely to be prepared to evacuate.
- For example,
 - If a household does a mitigation action, such as moving combustibles from within 5 feet to over 30 feet away from their home, they are likely to have done 1 to 2 more evacuation preparation items.



Other Results

- All of the following community wildfire activities are very strongly correlated with evacuation preparedness.
 - Talking with your neighbors about wildfire
 - Participating in a community wildfire preparedness event
 - Meeting with wildfire professionals



Conclusions

- Encouraging households to complete some mitigation actions can be a beneficial step in improving evacuation preparedness among households in the WUI.
 - Mitigation actions and evacuation preparedness seem to be complementary.
- Both emergency management and wildfire mitigation organizations could benefit from joint messaging about preparedness and mitigation actions.

Thanks!!

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WiRē Team

