

# Home Survival in Wildfire-Prone Areas



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 **University of California**  
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# Take home points

- We don't fight earthquakes, tornados, or hurricanes. We **adapt** and build smarter.
- The majority of homes are lost from **embers**
- New building codes are helping
- Need to **incentivize** upgrades to existing homes
- PRC 4290 defensible space
  - ✓ **Need a 5-foot noncombustible zone**



# How a house burns from wildfire?

Ember / Firebrand

Insurance Institute for Business & Home Safety

Flame Contact

Radiant Heat

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Tennessee Division of Forestry

# Embers

Wind-blown embers are responsible for the majority of building ignitions



USDA FS, R5-TP-015

**Angora Fire – South Lake Tahoe**

## **Structure Survival Priorities for Wildland Fire :**

**① Roof / Edge**

**② Vents**



*Exposure from embers that may have been blown a mile or more. Embers can also ignite near-home vegetation and debris.*

**③ Vegetation/Defensible Space**

**④ Windows**

**⑤ Decks**

**⑥ Siding**



*Ember, radiant, and/or flame impingement exposures from near-home vegetation, other structures, and wildfire*



# Points of Entry

Roof to wall

Insurance Institute for Business and Home Safety

Rain gutter to roof edge

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Fence to house

Photo: Tom Welch

Ember entry via gable end vent

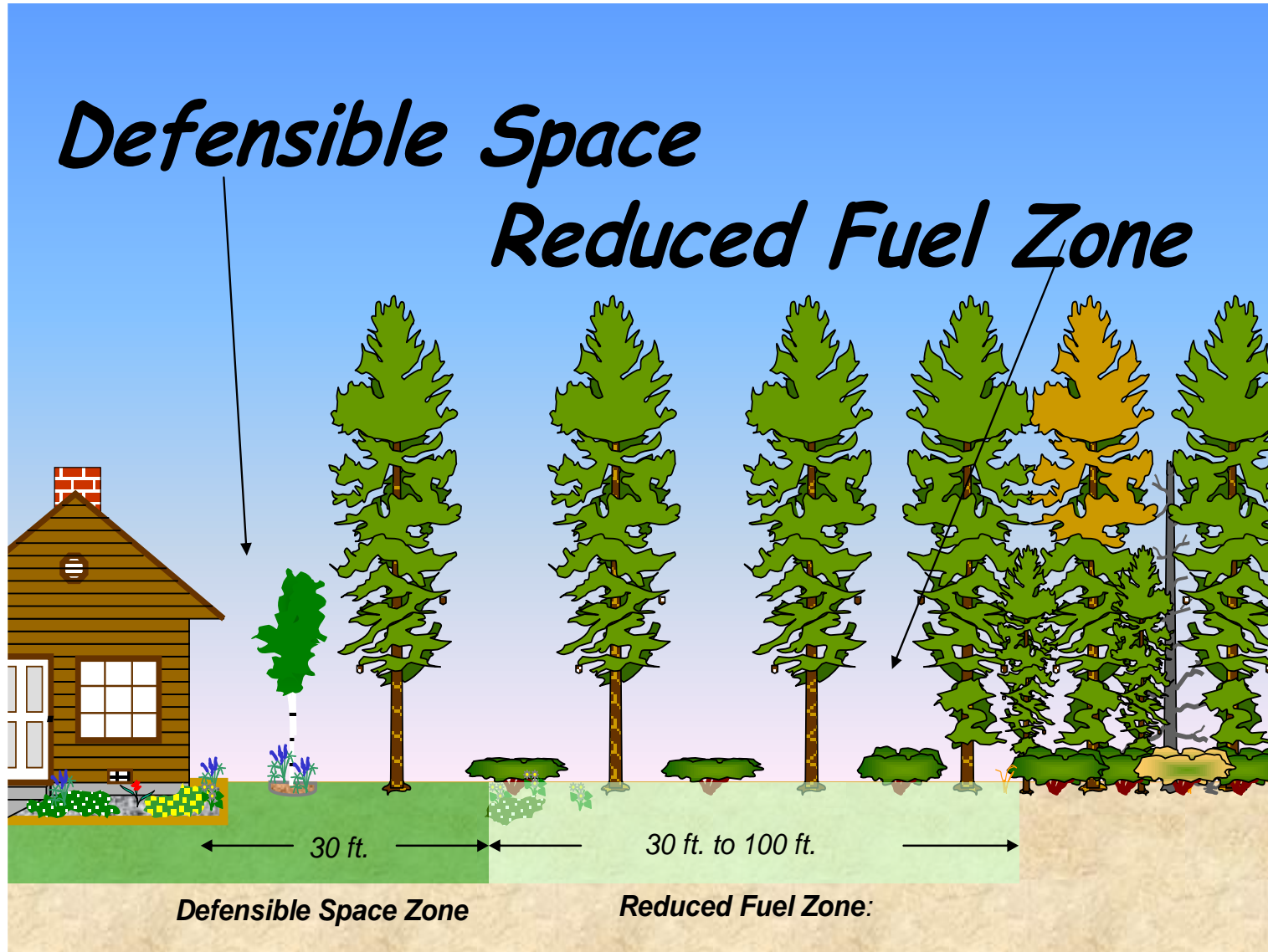
Ember entry via under-eave vents

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# PRC 4291 Defensible Space Two zones:

0'- 30' - Defensible Space Zone

30' - 100' - Reduced Fuel Zone







Outside Cushion

Ember  
damage  
in  
Paradise  
2018







**Carr Fire 2018: broken windows from burned shrubs near the house**

Photo Y. Valachovic



# Work from the house out

Defensible space includes:

**Zone 1:**  
0-5 feet “non-combustible zone”

**Zone 2:**  
5-30 feet “lean and green zone”

**Zone 3:**  
30-100 feet or to the property line  
“reduced fuel zone”





What does a Paradise  
Camp Fire survivor look  
like?





# For more information visit:

- [http://disastersafety.org/wpcontent/uploads/2017/03/WF\\_California\\_IBHS.pdf](http://disastersafety.org/wpcontent/uploads/2017/03/WF_California_IBHS.pdf)
- <https://disastersafety.org/ibhs/ibhs-nfpa-wildfire-research-fact-sheets/>



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## Home Landscaping for Fire

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More than 1,445 structures are destroyed by wildfire each year just within the jurisdiction of California's Department of Forestry and Fire Protection (CAL FIRE). However, many homes are also saved as a result of the owners' careful pruning and landscaping techniques that minimize ignition of vegetation and spread of fire to their homes (CAL FIRE 2005).

Incorporating fire safe concepts into the residential landscape is one of the most important ways you can help your home survive a wildfire. When conditions are dry and windy, the grasses, brush, trees, or other vegetation surrounding your home become a dangerous fuel source. Creating an area of defensible space (or area of reduced fuel) between your home and flammable vegetation reduces the risk of home ignition. When the vegetation is removed, pruned, or otherwise modified, the chance that its ignition will pose a serious threat to your home during a wildfire diminishes. Your home may be the most valuable investment you ever make. If you live in a high-risk fire hazard area, protect against the chance of losing that investment by implementing the recommendations in this publication.

Creating an area of defensible space does not mean you need a ring of bare dirt around your home. Through proper planning, you can have both a beautiful landscape and a fire safe home. The general concept is that trees should be kept furthest from your house, shrubs can be closer, and bedding plants and lawns may be nearest the house.

### VEGETATION ARRANGEMENT

From a wildfire fuel standpoint, vegetation is often described in terms of its vertical and horizontal arrangement. Sometimes the arrangement is described in terms of vertical or horizontal fuel continuity. Vertical fuel continuity is also referred to as 'ladder' fuels (Fig. 1).

Fire climbs neighboring trees like a ladder. To reduce the chance of fire climbing a tree, remove lower tree limbs 6 to 15 feet from the ground (or the lower third of branches on smaller trees).



Figure 1. Eliminate ladder fuels to minimize the movement of ground fire into the crown of a tree. Source: Riverside County Fire.

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## Home Survival in Wildfire-Prone Areas: Building Materials and Design Considerations

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### Introduction

Embers are the most important cause of home ignition. Recent research indicates that two out of every three homes destroyed during the 2007 Witch Creek fire in San Diego County were ignited either directly or indirectly by wind-dispersed, wildfire-generated, burning or glowing embers (Maranghides and Mell 2009) and not from the actual flames of the fire. These embers are capable of igniting and burning your home in several ways. In order to have a wildfire-safe home, two equally important factors must be implemented. 1) the wise selection of building materials and designs that will help the home resist the wildfire, and 2) the home must have adequate defensible space, based on the wise selection, placement, and maintenance of near-home vegetation.

There is a direct link between home survival, the vegetation management required in developing adequate defensible space around the home, and the building materials and design used to construct the home. The area where your vegetation should be managed (i.e., your defensible space) will depend on the particular topography and siting of the home on the property. Information included in this publication is focused on the home and is intended to provide information to help you make "fire wise" decisions regarding material choices and design decisions, whether you are building a new home or retrofitting your existing house. A considerable amount of information has been published in recent years on defensible space and vegetation management. Check with your local cooperative extension office or fire department for information appropriate to your area.

### Ignition of Homes in Wildfire-Prone Areas

Wildfires spread by a combination of a moving fire front and airborne burning and glowing embers. Building loss during wildfires occurs as a result of some part of the building igniting from one or more of the three basic wildfire exposures, which include 1) embers (also called *firebrands*), 2) radiant heat, and 3) direct flame contact. Embers are light enough to be blown through the air, and can result in the rapid spread of wildfire by *spotting* (in which embers are blown ahead of the main fire, starting other fires). Should these embers land on or near your house, they could just as



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## The Combustibility of Landscape Mulches



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