Home Survival in Wildfire-Prone Areas: Design & Maintenance Considerations

Ricky Satomi

UC Cooperative Extension
Forestry Advisor
Shasta, Trinity and Siskiyou

Slides adapted from Yana Valachovic, Steve Quarles, and UC Master Gardeners
How Structures Ignite

Radiation

Ember / Firebrand

Convection

Photo Credit: (Top Left) Tennessee Division of Forestry (Bottom Left, Right) Insurance Institute for Business & Home Safety
Stages of wildfire

Pre-fire: Embers assault the home

From Ramsay and Rudolph, CSIRO
Stages of wildfire

Pre-fire: Embers assault the home

Active Fire: Open flames approach the home

From Ramsay and Rudolph, CSIRO
Stages of wildfire

**Pre-fire:** Embers assault the home

**Active Fire:** Open flames approach the home

**Post-fire:** Burned material smolders

From Ramsay and Rudolph, CSIRO
Ember Ignition
What Can You Control?

• **Fire resistant structures** using appropriate designs and materials
• **5’ no burn zones** around structures
• **Defensible Space Zones**: 0’-30’ lean and green, 30’-100’ reduced fuels
• **Clear signage and access** for fire fighters and your evacuation
Work from the home -> out

Zone 1: (0 – 5 ft)
Non-combustible zone

Zone 2: (5 – 30 ft)
Lean and Green Zone

Zone 3: (30 – 100 ft)
Reduced Fuel Zone
Structural Failure Points

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
① Maintain Roofs + Gutters

Photo Credit: Insurance Institute for Business & Home Safety
Complex Roofs

① Complex Roofs

Carr Fire 2018 - gutter fire

Photo Credit: (Top Left) Insurance Institute for Business & Home Safety, (Top Right) University of California Cooperative Extension, (Bottom) Yana Valachovic
② Vents – 1/8” or less gaps
A = screening (embers) and intumescent honeycomb mesh (flame)
B = steel wool mesh (embers and flame)
C = screening and baffles (embers and flame)
D = screening and steel wool mesh (embers and flame)
Double-Pane Windows

Post-fire front

Dual-pane window

Warmer, greater thermal expansion

Cooler, lower thermal expansion

Thermal stress causes cracks at edge of glass resulting in glass breakage

335 C for tempered versus 112 C for annealed.

Photo Credit: Yana Valachovic
Vegetation -> Window Ignition

Photo Credit: Yana Valachovic
⑤ Attachments

Photo Credit: (Top Left, Top Right, Bottom Left) Insurance Institute for Business & Home Safety, (Bottom Right) Tom Welch
What Can You Control?

- **Fire resistant structures** using appropriate designs and materials
- **5’ no burn zones** around structures
- **Defensible Space Zones**: 0’-30’ lean and green, 30’-100’ reduced fuels
- **Clear signage and access** for fire fighters and your evacuation
Implementing Best Practices
Effective defensible space must be present on all sides of the home.

Photo Credit: University of California Cooperative Extension
What Can You Control?

• Fire resistant structures using appropriate designs and materials
• 5’ no burn zones around structures
• Defensible Space Zones: 0’-30’ lean and green, 30’-100’ reduced fuels
• Clear signage and access for fire fighters and your evacuation
Right Plant, Right Place

Photo Credit: El Dorado County UC Master Gardeners
Right Plant, Right Place

Photo Credit: El Dorado County UC Master Gardeners
Fire Resistant Plant List

• All plants BURN

• Right Plant, Right Place

• Maintenance: prune, irrigate, and clean up dead material

• Look for Resistant Qualities
What Can You Control?

• Fire resistant structures using appropriate designs and materials
• 5’ no burn zones around structures
• Defensible Space Zones: 0’-30’ lean and green, 30’-100’ reduced fuels
• **Clear signage and access** for fire fighters and your evacuation
Help Responders

- Saws n ‘Slaw
- Community Evacuation Zone
- Blue Dot Brigade
- Reflective Signage
- Big Red Fire Truck
More Considerations

• Early Evacuation

• What if strike teams arrive in the dark?

• What if first responders are Australian?
Home Landscaping for Fire

GLENN BADER, UCCE Livestock and Natural Resources Adviser, Santa Ysabel-Baja Counties; GASTON RIKAMURA, Area Forestry Specialist, Center for Forestry, UC Berkeley; MIKE DE LAAR, UCCE County Director and Natural Resources Adviser, Plumas-Sierra Counties; STEVE QUARLES, UCCE Forest Advisor, Mendocino-De Lave County.

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

STEPHEN J. QUARLES, UCCE-Natural Resources Adviser, Central Coast County; YANA VALACHOVIC, UCCE Forest Advisor, Madera County; GARY M. RIKAMURA, UCCE-Area Forestry Specialist, Shasta County; GLENN R. NADLER, UCCE Natural Resources Adviser, Santa Ysabel-Baja Counties; and MICHAEL J. DE LAAR, UCCE Natural Resources Adviser, Plumas-Sierra Counties.

Introduction

Factors are the most important cause of home ignitions. 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. These embers are capable of igniting and burning your home in several ways. To have a wildfire-safe home, the following important factors must be implemented:

1. The proper selection of building materials and their design that will help the home resist the wildfire. The home must be defensible in size, shape, and materials of construction.

2. The proper selection of building materials and their design that will help the home resist the wildfire. The home must have adequate defensible space, based on the site selection, placement, and maintenance of the home.

3. A direct link between home survival and the vegetation management required to develop a defensible space around the home and the building materials and design used to construct the home. The home should be of a size, shape, and materials that will not be damaged by the fire, and the defensible space shall be designed in such a way that the home is capable of resisting the fire. The home should be of a size, shape, and materials that will not be damaged by the fire, and the defensible space shall be designed in such a way that the home is capable of resisting the fire.