Home design and retrofitting techniques for wildfire defense

Yana Valachovic
Steve Quarles
UC Cooperative Extension
May 4, 2018
Today’s presentation

➤ How homes burn from wildfire
➤ Near home vegetation and landscaping
➤ Vulnerabilities in home design
➤ Resources

Thank Dr. Steve Quarles, UC fire durability expert (emeritus) now with the Insurance Institute for Business and Home Safety (IBHS), and UC Master Gardener volunteers for many of these slides and ideas.
Homes were the most combustible part of the landscape
How a house burns from wildfire?

Ember / Firebrand

Flame Contact

Radiant Heat

Tennessee Division of Forestry
Embers

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

Angora Fire – South Lake Tahoe
Fountain Grove, Santa Rosa 2017
Know the basics of fire:

Fuel + Oxygen + Heat = Fire
Fuel + Weather + Topography = Fire Behavior

✔️ What can you control?

Fuel is... anything that will burn
– Dry or dead vegetation
– Wood siding, roofing, fencing
– Trees
– Woody shrubs or perennials
– Landscape mulch
Work from the house out

Defensible Space

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”
0-5 ft “noncombustible zone” to reduce chance of flame contact exposure

Effective defensible space must be present on all sides of the home
Fire resistant plant lists?

- All plants can burn regardless of how they are marketed
- Fire safe landscaping requires maintenance (pruning, irrigation, clean-up)
- Select low growing, open structured, less resinous, higher moisture content plants
- Native and drought tolerant can be options, if maintained well

Tubbs Fire, Rich Casale, NRCS
Mulch helps plants retain moisture, but it will burn too!

Use hardscape, rock mulch or lawns <5 feet from the home.
Simulated embers exposure on a house
Roof (Priority #1)
Litter accumulation creates exposure to the wall unit (not protected with roofing).
Embers can ignite litter in rain gutters

Plastic gutter vs metal gutter
Roof - Skylights
Vents (Priority #2)

- Through-roof (outlet)
- Gable end
- Under-eave (inlet)
- Foundation & other
Vents – Ember Entry
Vents – Mesh Size Use 1/8 inch or smaller

6 mm

3 mm

© Insurance Institute for Business & Home Safety
A=foundation vent with intumescent treatment (Vulcan),
B=through roof vent with steel wool, C= gable vent with baffles,
D= gable vent with intumescent (Embers Out)
Ridge vents – Vulnerable to debris accumulation
Exterior Walls – Vertical non-combustible zone
Stored building materials under a deck is vulnerable
Fence Vulnerability
A metal gate can help prevent spread to home via a fence ignition.
A neighbor’s house could be in the 5-30 ft zone—their condition can affect your survival.
Recommendations

- **Good practices:** remove stored fuels, debris, clean gutters
- **1. Roof:** install and maintain a Class A rated roof covering. Install a metal drip edge and address other edge of roof vulnerabilities
- **2. Vents:** upgrade to flame resistant and ember resistant
- **3. Non-combustible zone** should include the area 5’ near the house, under the entire foot print of the deck, and 6-inches vertically upward from the ground to the start of your siding
- **Redwood or cedar deck:** For ember resistance use a foil faced bitumen tape applied to the top on deck joists, ¼-inch gap between deck boards, and 24-inch on center joist spacing
- **CA Building Code Chapter 7A WUI construction:**
  - [http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_codes](http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_codes)
  - [http://osfm.fire.ca.gov/codedevelopment/wildfireprotectionbuildingconstruction](http://osfm.fire.ca.gov/codedevelopment/wildfireprotectionbuildingconstruction)
- **Home design, maintenance, and construction** can be more important than any individual fire resistant building product when addressing ember ignition. Poor installation and maintenance can increase the vulnerability of a given product to an ember exposure.
For more information visit:


- [http://ucanr.edu/sites/forestry/Wildfire](http://ucanr.edu/sites/forestry/Wildfire)
Figure 19. Important guidelines for creating and maintaining a home and landscape that can survive a wildfire threat.

Source: Stephen L. Quarles.

From: Home Survival in Wildfire Prone Areas