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## Fuels Planning: Science Synthesis and Integration

### Environmental Consequences Fact Sheet: 3

# Structure Fires in the Wildland-Urban Interface



Pacific Northwest  
Research Station



North Central  
Research Station

*Synthesizing  
Scientific Information  
for Fire and Fuels  
Project Managers*

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Fuels planning: Science synthesis and integration, an interagency research/management partnership to support the Ten-Year Fire Plan, led by Russell T. Graham, RMRS, and Sarah M. McCaffrey, NCRS.

### What Is the Problem?

National Fire Protection Association (NFPA) data indicate that wildfires destroyed approximately 9,000 homes between 1985 and 1994 in the United States. In 2002, a year when Arizona, Colorado, and Oregon had their largest wildfires on record, wildfires burned 835 homes. In 2003, wildfires destroyed an additional 4,000 homes. Although these numbers are large, the average annual loss of homes to wildfire represents less than 1 percent of the total number of residential fires. However, the loss of homes to wildfire has had a significant impact on Federal fire policy. The Cohesive Strategy, the revised Federal Wildland Fire Management Policy, the 10-Year Comprehensive Strategy, the National Fire Plan, and the Healthy Forests Restoration Act all address the need for protecting communities from wildfire.

### What Causes Home Ignition in the Wildland-Urban Interface?

A home's design, its exterior materials, and its relation to the immediate surrounding area determine its ignition potential. Homes ignite either from firebrands or from contact with the flaming front.

- An intense wildfire produces firebrand showers that can cause home ignition at distances even greater than ½ mile from the wildfire.
- Flames of high intensity canopy fires can be within 100 feet of a flammable surface to cause home ignition.
- Flames of low intensity surface fires can be within 10 to 15 feet of a flammable surface to cause home ignition.

### What Is the Home Ignition Zone?

The area within 100 feet of the home is the home ignition zone. It is the condition and distribution of the fuels in the home ignition zone that principally determine ignition potential during extreme wildfires. Although wildland fires are inevitable, wildland-urban fire disasters are not.



## How Can We Reduce Home Ignition Potential in the Wildland-Urban Interface?

Mitigating for home ignition must focus activities within and immediate to the residential area, for example, the home ignition zone. There are different actions for different types of ignition/fire:

**Firebrands**—Choosing nonflammable exterior building materials can reduce home ignition.

**High-intensity fires**—Thinning trees and pruning lower branches of trees within 100 feet of the home can significantly reduce high fire intensities and reduce home ignition potential.

**Low-intensity fires**—Choosing nonflammable exterior building materials and removing surface fuels from under, on, and within 15 feet of a flammable surface can reduce home ignition.

## Who Is Responsible for Reducing Home Ignition Potential in the Wildland-Urban Interface?

Because of the small area of the home ignition zone, it usually occurs on private property. Therefore, with a few exceptions, the responsibility for effectively reducing the home ignition potential belongs to homeowners. Where home ignition zones overlap, homeowners must cooperate in reducing the home ignition potential. Public land management agencies can facilitate homeowner mitigations, but these agencies cannot prevent residential fire disasters by actions taken outside the home ignition zone.

## What Are the Management Consequences of the Home Ignition Zone?

Because ignition potential in the home ignition zone is at a different scale and independent of fire behavior and fire effects in the surrounding ecosystem, managers can address the risk of homes burning (one community value) separately from landscape fire concerns (multiple community values). This suggests that how managers approach fire in our ecosystems should be different from how managers and residents prevent residential fire disasters and how they determine who must mitigate the home ignition zone. Given that wildland fires will occur under extreme fire conditions and that fire is an ecological process, the home ignition zone concept implies that we can experience extreme wildfires and at the same time prevent residential fire disasters.

### Where Do I Get Additional Information?

[www.firewise.org/](http://www.firewise.org/)

[www.firelab.org/fbp/fbresearch/wui/home.htm](http://www.firelab.org/fbp/fbresearch/wui/home.htm)

### Selected References

Cohen, Jack; Saveland, Jim. 1997. Structure ignition assessment can help reduce fire damages in the W-UI. *Fire Management Notes*. 57(4): 19–23.

Cohen, Jack D. 2000. Preventing disaster: home ignitability in the wildland-urban interface. *Journal of Forestry*. 98(3): 15–21.

Cohen, Jack D.; Butler, Bret W. 1998. Modeling potential ignitions from flame radiation exposure with implications for wildland/urban interface fire management. In: *Proceedings of the 13th conference on fire and forest meteorology*, vol. 1; 1996 October 27–31; Lorne, Victoria, Australia. Fairfield, WA: International Association of Wildland Fire: 81–86.

## Environmental Consequences Fact Sheets

Look for fact sheet topics from the Environmental Consequences Team including information about the effects of fire behavior and alternative treatment strategies, Wildlife Response Model, weed responses, riparian systems, soil erosion, restoration objectives, treated spaces, the Fire Effects Information System (FEIS), and the First Order Fire Effects Model (FOFEM).

## Fuels Planning: Synthesis and Integration

This fact sheet is one in a series being produced as part of a larger project supported by the USDA Forest Service to synthesize new knowledge and information relevant to fire and fuels management. Fact sheets address topics related to stand structure, environmental impacts, economics, and human responses to these factors. Information in the fact sheets is targeted for the dry forests of the Inland West, but is often applicable across broad regions of the country. For more information, please visit our Web site at: [www.fs.fed.us/fire/tech\\_transfer/synthesis/synthesis\\_index](http://www.fs.fed.us/fire/tech_transfer/synthesis/synthesis_index)

*The Fuels Planning fact sheets are based on preliminary findings. Information from fact sheets will be synthesized in an upcoming publication.*