A More Effective Approach for Preventing Wildland-Urban Fire Disasters

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Introduction

While extreme wildfire conditions are inevitable, disastrous community fire destruction is not. Local conditions, the characteristics of a home and its immediate surroundings within 100 feet (30 meters), principally determine home-structure ignitions. This defined area is called the home ignition zone (HIZ), and it informs us to see wildland-urban (WU) fires as a structure ignition problem and not a problem of controlling wildfires. Instead of depending on fire suppression or vegetation management away from the home or outside of the community, people can significantly reduce the potential for a structure to ignite within their own HIZ. And if they collectively do so through the entire community, they can effectively prevent WU fire disasters.

Inevitable Wildfires & Extreme Burning Conditions

Wildfire suppression has successfully controlled 95 to 98 percent wildfires with initial attack for over one-hundred years (Stephens and Ruth 2005). Paradoxically, the high degree of successful fire suppression has ensured the inevitability and increased likelihood of uncontrollable, extreme wildfires (Arno and Allison-Bunnell 2002; Williams 2013). Importantly, WU fire disasters have only occurred during these extreme wildfire conditions when fire control fails (Cohen 2010; Calkin et al. 2014).

Federal, state and local fire agencies continue to focus on wildfire suppression and pre-fire fuel breaks and shrub and forest fuel treatments as the principal approach for protecting communities (Finney and Cohen 2003; Cohen 2010). However, community fire destruction will continue to grow as long as wildfire suppression and vegetation treatments are the primary approach. While we may think that uncontrolled extreme wildfires means we will experience disastrous home destruction, the best available science indicates that we have practical opportunities for effectively creating ignition resistant homes and communities thereby preventing fire disasters without necessarily controlling wildfires or altering vegetation over space and time (Cohen 2000a; Cohen 2001; Cohen 2004; Cohen and Stratton 2008; Cohen 2010; Calkin et al. 2014; Cohen 2017).

Patterns of Home Destruction during Wildfires

Careful study of WU fire disasters has revealed readily observable patterns in extreme fire conditions - unconsumed vegetation post-fire, often remaining green, adjacent to and surrounding total home destruction (Cohen 2000b; Cohen and Stratton 2003a; Cohen 2003b; Cohen and Stratton 2008; Graham et al. 2012; Cohen 2017). The three photos (Figure 1) of home destruction with adjacent unconsumed shrub and tree vegetation indicate the following:

- High intensity wildfire did not continuously spread through the residential area as a wave or flood of flame.
- Unconsumed shrubs & trees adjacent to homes did not produce high intensity flames that ignited them.
- Homes could have only ignited from lofted burning embers on the home, low intensity surface fire spreading to contact the home, and in high density development, structure-to-structure fire spread.
- The ‘big flames’ of high intensity wildfires did not cause total home destruction.

Figure 1. Paradise, CA; 2018 Camp Fire Southwest CO; 2002 Missionary Ridge Fire 2007 Grass Valley Fire

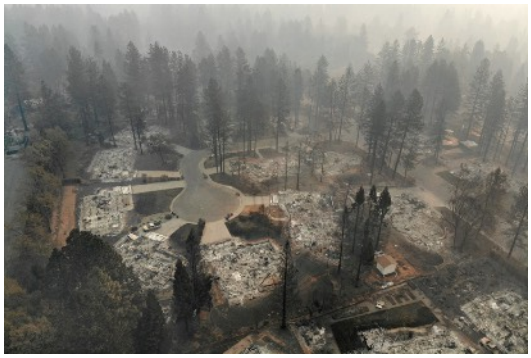

Figure 2

High intensity wildfires do not spread through communities that experience disastrous fire destruction as a wall of flames, because a community's streets, driveways, parking areas, building sites, etc. create gaps in the continuous tree and shrub canopies. These gaps limit high intensity wildfire spread (crown fires) (Cohen 2010). For example, Figure 2 shows a crown fire that spread to the community, but could not continue beyond the first residential street. Homes were engulfed in flames on the right side, but the crown fire terminated at the street. However, burning embers showered downwind resulting in several blocks of total home destruction (Cohen 2010). Extreme wildfire conditions initiate ignitions of structures in residential areas and then those burning residences become a source of embers for more ignitions of structures and vegetation resulting in further community destruction. The community fire spread continues hours after the wildfire passes and ceases to influence the community (Cohen and Stratton 2008; Cohen 2010).

Figure 3

The typical WU fire patterns indicate that conditions local to a structure principally determine structure ignitions, as burning embers are the principal source of home ignitions. The totally destroyed home in Figure 3 indicates burning embers as the only possible ignition source igniting the home directly or from flammable materials immediately adjacent to the home, or both. Burning embers are a given during extreme WU fire conditions; however, regardless of the distance burning embers travel, burning ember ignitions depend on the local conditions of the ignitable surfaces on or adjacent to a home.

An Effective Approach for Preventing WU Fire Disasters

Extensive experiments and research (Cohen 2004) has quantified "local ignition conditions" to be an area of a home and its immediate surroundings within 100 feet (30 meters). This area is called the home ignition zone (HIZ; Cohen 2010; NFPA 2018). The relatively small area of the HIZ principally determines home ignitions during extreme wildfires and defines WU fire destruction as a home ignition problem that can be prevented by readily addressing home ignition vulnerabilities within the HIZ without necessarily controlling wildfires through suppression or vegetation management.

For example, not having a flammable wood roof, removing flammable tree debris from the roof, rain gutters and decks, assuring nothing burns within 5 feet (1.5 m) of flammable walls and attachments, and covering vents with 1/8 inch (3 mm) mesh screen can significantly increase home ignition resistance. Clearing the HIZ of all vegetation is not necessary. As indicated by the typical patterns of WU fire destruction, shrub and tree canopies are not spreading high intensity fires through communities.

While extreme wildfires will evade control and inevitably spread to communities, WU fire disasters are **not inevitable**. We can effectively prevent WU fire disasters by reducing home ignitability. By having everyone do so we can protect the community. Ignition resistant communities will increase community fire protection effectiveness, life-safety options for residents and firefighters, and can decrease wildfire suppression costs by not ineffectively attempting control of extreme wildfires to prevent WU fire disasters. For more information on creating ignition resistant homes visit www.firewise.org (NFPA 2018).

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