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# Determinants of residential Firewise behaviors in Central Oregon

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### ABSTRACT

As a result of climate change and past management practices, wildfires are becoming larger and occurring more frequently than ever before in the Western U.S. In order to mitigate the effects of this growing threat, fire management agencies such as the U.S. Forest Service have encouraged residents in at-risk communities to protect their homes, property and communities by adopting Firewise recommendations. Using annual random sample household surveys conducted in fire-prone central Oregon from 2011 to 2013, this study examines the impact of wildfire events (i.e., wildfire exposure and evacuation), risk perception, wildfire plan informedness, proximity to wildlands, and various demographic factors on resident Firewise behavior participation. Findings indicate that residents who have experienced a wildfire event, who are familiar with their county's Community Wildfire Protection Plan, who perceive wildfire risk to their community, and who live in proximity or within a wildland area, were significantly more likely to engage in Firewise behaviors than those residents without these experiences, orientations or household locations.

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## 1. Introduction

Over the last several decades, a confluence of events has necessitated the creation of a coordinated and comprehensive strategy concerning wildfires. Years of complete fire suppression that allowed for the buildup of fuels combined with hotter and dryer conditions caused by climate change have led to growing concerns about the potential for more frequent and severe wildfires. At the same time, more people are migrating into wildfire-prone areas

where urban development meets public wildlands known as the wildland–urban interface (WUI). Often, these new residents have not been exposed to wildfires and will not understand the threats associated with living near a wildland area (Brenkert-Smith, Champ, & Flores, 2006). In contrast, some people who have lived in these fire-prone areas for an extended period of time have grown accustomed to being protected from wildfires by the government and may no longer perceive any personal responsibilities in regards to wildfire mitigation. The costs associated with fighting wildfires in the WUI have also increased substantially in recent years and are predicted to double or even quadruple by the year 2025 (Gude, Cookson, Greenwood, & Haggerty, 2009).

A potential solution to this problem is the Firewise Communities program developed by the National Fire

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Protection Association with the purpose of encouraging the public to take responsibility for protecting their homes and communities. This educational program “teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action to prevent losses” (Firewise Communities, 2011a, para. 3). This program has been successful in encouraging residents in hundreds of communities to think about and participate in a number of wildfire mitigation strategies designed to save lives and property (Firewise Communities, 2011b). However, many people are either unaware of the threats posed by wildfire or do not know that there are individual behaviors that can help to reduce the threats (Kyle, Theodori, Asher, & Jun, 2010). There are a number of reasons why a person may not participate in wildfire mitigation, or Firewise, behaviors, and a better understanding of those reasons could be valuable for natural resource managers and policy makers trying to increase public participation in these activities.

The purpose of this study was to look at the wildfire mitigation behaviors of Central Oregon residents and determine the influence that wildfire risk assessment, household proximity to forests, wildfire information source and reliance, and previous exposure to wildfire has on residents’ decisions to participate in those activities. This study uses three years of random household surveys in fire-prone central Oregon to examine the determinants of Firewise behaviors. We will first discuss the study area and recent wildfire history and then will provide a literature review of the Firewise program, followed by our research methods and analyses.

### 1.1. Wildfire in the West and Central Oregon

In the last several decades wildfires annually burn millions of acres of forests across the United States. For example, in 2014 there were 63,612 wildfires in the U.S. burning an estimated 3,595,613 acres (U.S. Forest Service, 2014). According to many scientists and natural resource managers these fires have been increasing in size and intensity (Tullis, 2013). Some of the reasons given for the increase in frequency and intensity of these uncontrolled fires include, but are not limited to, increasing drought conditions in some areas including climate change, the movement of people and homes into the “wildland–urban interface” (WUI) areas, and prior management decisions that preferred fire suppression over allowing historically fire prone ecosystems to burn naturally (Moritz et al., 2014).

The question of how to approach the management of these larger, more intense, and more frequent wildfires in the U.S. has been fraught with much controversy. With the increasing movement of humans and their new physical structures into wildland forest and grassland areas—especially in the Western U.S.—there is a need to protect and preserve homes and human inhabitants. At the same time, suppression of fire keeps fire-prone ecosystems at greater risk, leading Ken Pimlott, Director of the California Department of Forestry and Fire Protection to observe (Tullis, 2013, p. 29): “The movement of people into the WUI, the fires they start there and infrastructure that needs protection, plus drought, climate, suppression—you combine

**Table 1**

Recent number of wildland fires in Oregon and acres burned.

Year	Number of wildland fires	Acres burned
2013	2,848	350,786
2012	963	1,256,049
2011	1,151	285,712
2010	1,315	93,731

Source: U.S. Forest Service (2014) *National Report of Wildland Fires and Acres Burned*. [https://www.nifc.gov/fireInfo/fireInfo\\_statistics.html](https://www.nifc.gov/fireInfo/fireInfo_statistics.html).

all of these things, and its creating more intense fires. It just becomes a larger problem.”

In central Oregon, fire is an important and natural part of the ecosystem with many plant and animal species dependent on wildfire for increased habitat and seed dispersal (Project Wildfire, 2007). Currently central Oregon is experiencing a rapid population increase. For example, in 2014, Deschutes County gained roughly 4,000 new residents, making it “the seventh fastest-growing metro area in the country” (Moore, 2015) and creating more opportunity for life and property loss due to more people living in the WUI. In addition, many newer residents may be less aware of wildfire risk if they have not previously lived in the WUI or been previously exposed to wildfire further exacerbating risk to themselves and their community.

It is estimated that fighting wildfires in Oregon costs on average \$110 million a year (Climate Central, 2013). With climate change increasing the risk of wildfire, central Oregon is particularly susceptible (see Table 1). Aside from the direct costs of protecting homes, property and lives in the WUI, there is also an “increased exposure to dangerous levels of air pollution, even in communities hundreds of miles from the fires themselves” (Climate Central, 2013, p. 1). Therefore, getting people to engage in fire prevention in the WUI in central Oregon would potentially decrease cost and severity of wildfires and protect against damage to homes, lives, and public health.

### 1.2. Firewise Communities

The Firewise Communities program was developed by the National Fire Protection Association (NFPA) as a way to encourage homeowners, property planners and developers, community leaders, and firefighters to develop local solutions to the problems caused by wildfire. The program is managed by the NFPA under the direction of the National Wildfire Coordinating Group’s Wildland Urban Interface Working Team (WUIWT), which is comprised of state and federal agencies including the Forest Service, U.S. Department of the Interior, U.S. Fire Administration as well as several others. The goal of this program is to save lives and property by educating people about how to live with and adapt to wildfires. This is accomplished using a number of methods including Firewise Communities Workshops, public education and an interactive website. The workshops are a series of seminars carried about by professionals from various backgrounds to educate individuals about the different Firewise behaviors and how they can best be implemented in the local community. There is no universal plan for protecting communities from wildfire as each community has unique characteristics that require

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