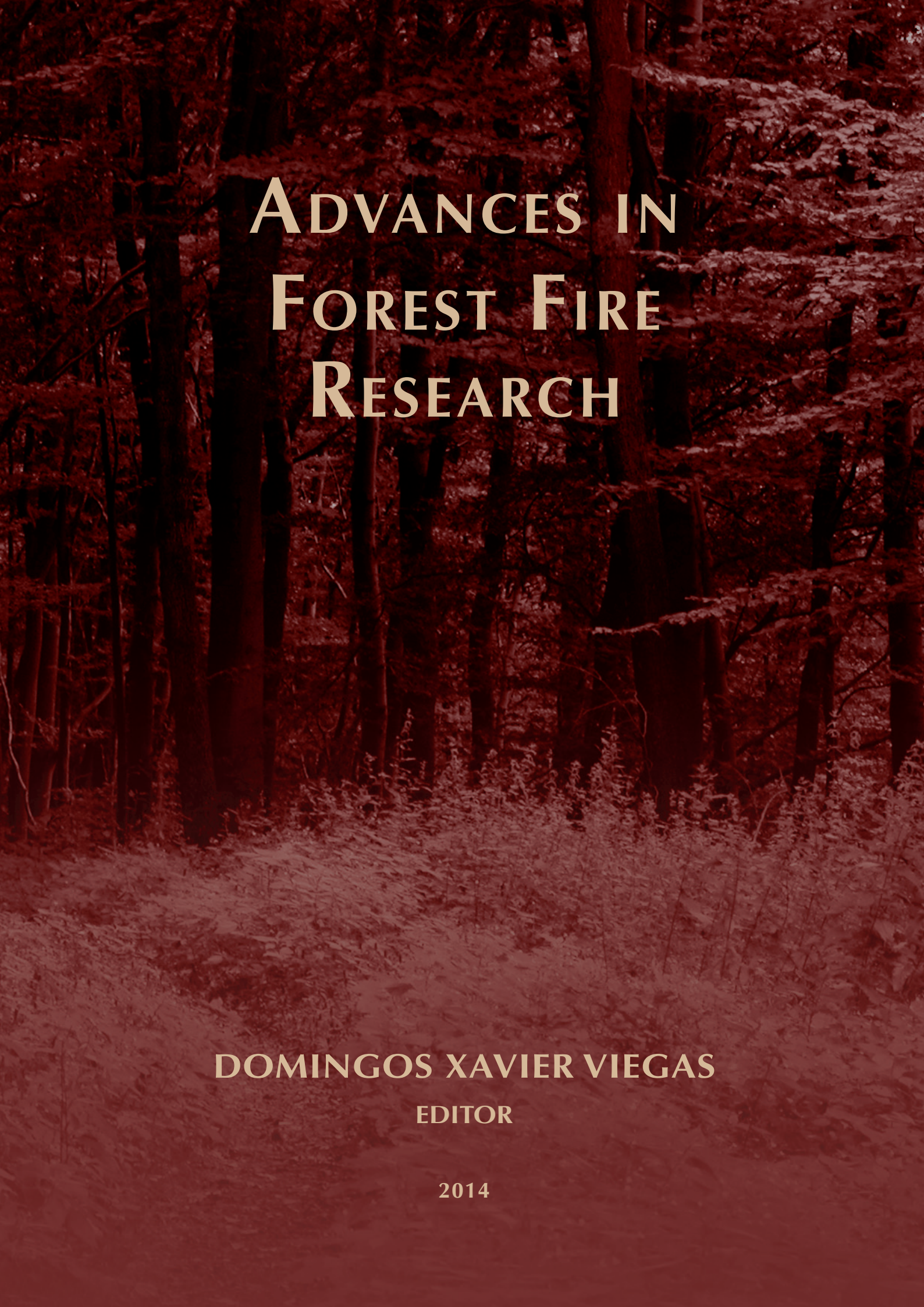

Advances in Forest Fire Research

DOMINGOS XAVIER VIEGAS

EDITOR

2014

Risk assessment to achieve fire adapted communities in the US

David Calkin[a], Jack Cohen[b], Mark Finney[b], and Matt Thompson[a]

[a] *US Forest Service Rocky Mountain Research Station, Forestry Sciences Laboratory, Missoula, MT, USA, decalkin@fs.fed.us and mpthompson02@fs.fed.us*
[b] *US Forest Service Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT, USA, mfinney@fs.fed.us and jcohen@fs.fed.us*

Keywords: Risk Assessment, Cohesive Strategy, WUI

1. Extended Abstract

The US Cohesive Strategy on Wildfire Management has established three primary goals: 1) Fire Adapted Communities, 2) Fire Resilient Landscapes, and 3) Safe and Effective Fire Response. Risk assessment has been put forward as an organizing framework to achieve these established goals. However, there is considerable uncertainty in identifying the most effective way to reach the goals and how the goals complement or compete with each other in reducing potential future losses to human development and natural resource values from wildfire while recognizing the critical ecological importance of wildfire within fire adapted ecosystems.

In this presentation we focus on the application of a wildfire risk assessment framework to achieve fire adapted communities. To start we identify the sequence of events and necessary conditions that lead to Wildland Urban Interface (WUI) disasters, and outline a structured framework to examine the risk components that influence expected wildfire losses with particular emphasis on goal 1, Fire Adapted Communities. WUI disasters where numerous structures are destroyed with potential human fatalities typically follow a common sequence of events (see Figure 1). Environmental conditions related to the location of the community relative to potential severe wildfire behaviour, numerous homes susceptible to ignition, and high severity fire weather overwhelm and limit the effectiveness of firefighting resources resulting in WUI fire disasters.

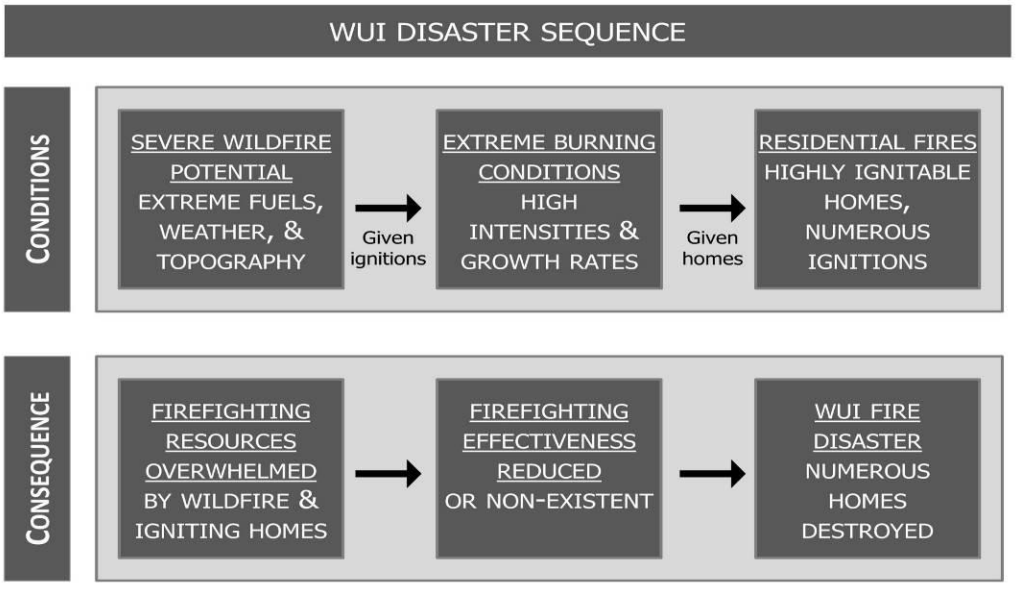

Figure 1. The WUI disaster sequence (taken from Calkin et al. 2014).

Evaluation of risk mitigation options to eliminate WUI fire disasters begins with the questions of what the appropriate wildfire management objectives are, how risk mitigation options realistically vary in terms of cost, the likely effectiveness if those options, and the appropriate identification of who bears the responsibility. Figure 2 presents a conceptual framework of mitigation objectives and methods to achieve those objectives in reducing the risk to life and property within the WUI.

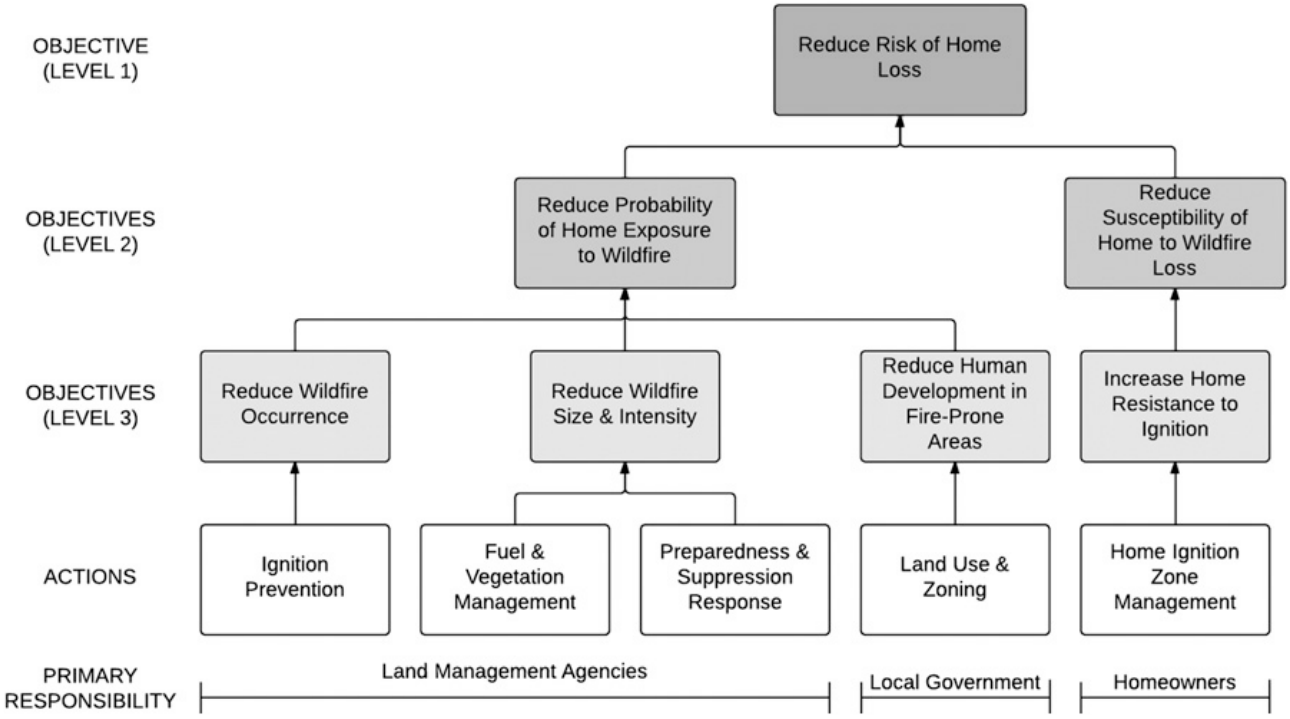

Figure 2. Conceptual framework of risk reduction to reduce risk to life and property.

Public land management agencies with wildfire management responsibilities in the US have focused significant attention on efforts to reduce the size and intensity of wildfire through aggressive suppression efforts and fuel treatment programs that focus effort within and adjacent to the WUI (US Public Law 108-148, 2003). However, extensive research has demonstrated that the destruction of residential structures is defined by the conditions of the structure itself and a 30 m buffer that surrounds the structure (see for example Cohen, 2000, 2010); an area which is typically private land. Public land agencies face several challenges in implementing aggressive fuel treatment programs near populated areas include limited budgets, sensitivity to smoke from prescribed burns, and concern that escaped prescribed fires may increase risk to the community (Calkin *et al*. 2011). Additionally, most WUI fire disasters occur under extreme wildfire conditions when suppression resources fail to contain the fire. Therefore, the ability of traditional fire management response to limit WUI fire disasters is limited.
We suggest the current paradigm that views wildland urban interface disasters as a failure of wildfire control needs to be reframed to recognize the inevitability of wildfire and that these disasters can best be prevented by focusing on the home ignition conditions. This is not to suggest that public land agencies do not have a significant role in achieving fire adapted communities. Significant investments in fuels treatments are necessary to maintain the environmental quality and landscape amenities that draw people to these environments. Application of these concepts will require engagement and risk sharing from all parties involved in fire management within the WUI. However, the described approach presents an opportunity to effectively and efficiently achieve fire adapted communities within the US.

2. **References**

Calkin, D.E., J.D. Cohen, M.A. Finney, and M.P. Thompson. 2014. How risk management can prevent future wildfire disasters. Proceedings of the National Academy of Sciences. 111(2): 746-751.

Calkin, D.E., M.A. Finney, A.A. Ager, M.P. Thompson, K.G. Gebert. 2011. Progress towards and barriers to implementation of a risk framework for Federal wildland fire policy and decision making in the United States. Forest Policy and Economics. 13(5): 378-389.

Cohen JD (2000) Preventing disaster, home ignitability in the wildland-urban interface. *J. For.* 98(3):15-21.

Cohen J (2010) The wildland-urban interface fire problem. *FREMONTIA* 38(2,3):16-22.

US Public Law 108-148 (2003) Healthy forests restoration act of 2003. Healthy Forest Restoration Act.