Northwest Fire Science Consortium
A JFSP FIRE SCIENCE EXCHANGE NETWORK

PATHOLOGY OF WILDFIRE RISK

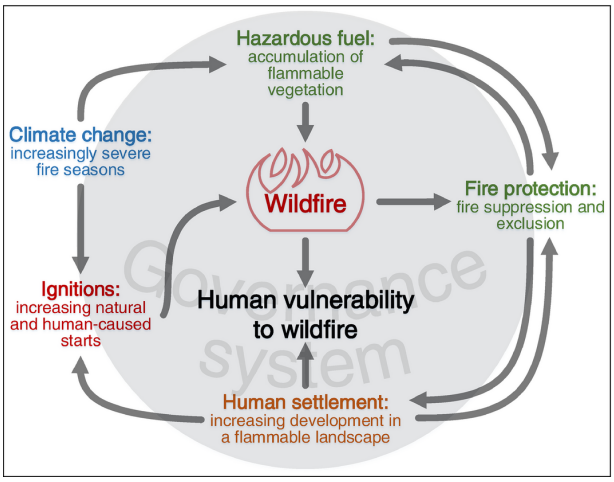
A CHARACTERIZATION OF SOCIAL AND ECOLOGICAL DIMENSIONS

RESEARCH BRIEF 11 • SUMMER 2016

Despite dramatic increases in suppression spending, the risk of life and property loss associated with wildfire has continued to rise in recent decades. Economic losses from wildfires have doubled in the United States and suppression expenses have tripled between 2002 and 2012 compared to the decade prior. Loss of property to wildfire has outpaced efforts to reduce wildfire risk through thinning and prescribed burning. Although wildfire risk is an increasingly global problem, its growing urgency in the Western United States—partially attributed to residential expansion into fire-prone areas—necessitates greater attention to management policies.

Burned area in the Okanogan-Wenatchee NF. Photo courtesy of Autumn Ellison, University of Oregon.

In this paper, researchers examine the problem of growing wildfire risk through a coupled natural and human systems (CNHS) perspective. They characterized the primary social and ecological dimensions of what they termed a socioecological pathology of wildfire risk in temperate forests, or "a set of complex and problematic interactions among social and ecological systems across multiple spatial and temporal scales." By paying particular attention to the wildfire risk governance system, which is influenced by both ecological conditions and diverse parties with competing goals, policies, and practices, the authors investigate strategies for reducing wildfire risk.



Wildfire risk in fire-prone temperate forests is a result of interacting positive feedback loops that link wildfire and human vulnerability. Figure presented in original article.

KEY FINDINGS

- Wildfire risk in temperate forests can be considered a socioecological pathology: a set of interrelated social and ecological conditions and processes that deviate from what is considered healthy or desirable (see figure at right).
- Finding solutions to the problem of wildfire risk requires a more complete specification of fire-prone temperate forests as coupled natural and human systems, and more attention to the complex interplay between the social and ecological conditions and processes that influence human decision making, i.e., the wildfire governance system.
- Building social networks of stakeholders and engaging stakeholders in scenario planning exercises can foster creative problem solving to reduce wildfire risk and restore fire to fire-prone temperate forests.

The Northwest Fire Science Consortium is a regional fire science delivery system for disseminating knowledge and tools, and a venue for increasing researcher understanding of the needs of practitioners.

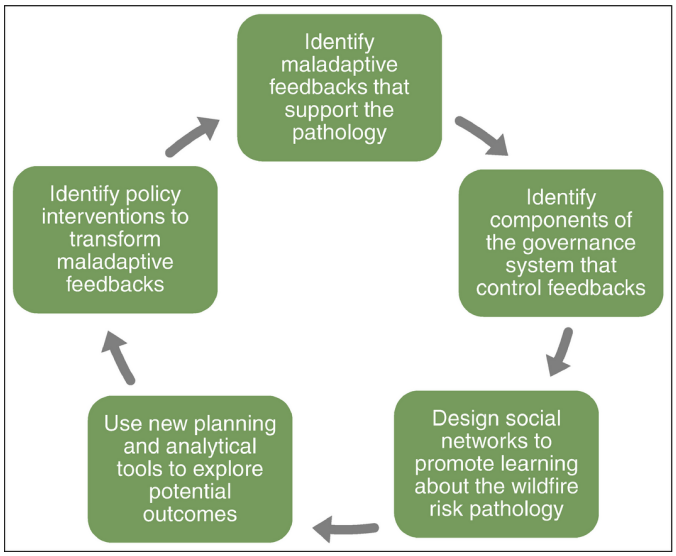
RESULTS

Connecting wildfire governance systems to wildfire risk

How property owners and forest stakeholders think about fire, whether as a risk or an ecological process, influences lines of communication that contribute to wildfire risk. These lines of communication result in policies that favor reducing short-term fire risk while ignoring long-term risk to forest environments. As more people set up residence in fire-prone temperate forests, wildfire governance systems favor protecting timber and property at the expense of restoring fire to these fire-adapted forests. Excessive fire suppression and inadequate fuels management exacerbates wildfire risk by allowing flammable vegetation to accumulate. Moreover, individuals may be likely to ignore accumulated fuels on their property, relying on public agencies to protect them from wildfire. These systems lead to a pathology that escalates wildfire risk.

Interrupting the destabilizing feedback loop through CNHS perspectives

Active intervention is necessary to respond to the pathology of wildfire risk in fire-prone temperate forests. This intervention involves identifying the destabilizing feedback loop that supports the pathology, identifying how current systems contribute to the pathology, and strategizing how to engage social networks to promote learning, employ new planning and analytical tools, and transform the destabilizing feedback loops (see figure below).



Components of a framework for addressing the pathology of wildfire risk in fire-prone temperate forests. Figure presented in original article.

Utilizing a coupled natural-human systems perspective in this intervention process can facilitate complex thinking about wildfire risk that considers fire a tool, and fire-prone temperate forests an ecosystem that requires balanced fire management practices. When agencies, organizations, and individuals work together, they can optimize their collective efforts and establish ecologically and socially sound methods of minimizing loss. These collaborations will contribute to innovative policies through scenario planning, learning more about governance systems and feedback loops, and educating the public in balanced wildfire practices.

MANAGEMENT IMPLICATIONS

This research suggests that without intervention, the destabilizing feedback loop of wildfire governance systems will place wildfire management policies and practices in the western United States further behind, escalating wildfire risk throughout the region. In order to mitigate the increasing risk, governance systems must encourage forest stakeholders and property owners to reassess wildfire perceptions and responses, balancing material interests with natural ecological processes. This shift in perspective can alleviate risk by disrupting the socioecological pathology. Instead of a suppression-only approach to wildfire management, a fire-adapted governance system will mediate risk through fuel treatments, restoration, and coordinated wildfire prevention efforts. Wildfire policies that emphasize coexistence between humans and nature are necessary. Fostering positive connection between property owners, agencies, and forest stakeholders through a CNHS framework will in turn lead to productive environmental and social policies involving fire-prone temperate forests while minimizing risk of loss to wildfire.

MORE INFORMATION

This brief is based on the following article :

Fischer, A.P., T. A. Spies, T. A. Steelman, C. Moseley, B. R. Johnson, J. D. Bailey, A. A. Ager, et al. 2016. Wildfire risk as a socioecological pathology. *Frontiers in Ecology and the Environment* 14 (5): 276-284. Available at: http://onlinelibrary.wiley.com/doi/10.1002/fee.1283/full.

Contact: *nw.fireconsortium@oregonstate.edu*

This research brief was funded by the Joint Fire Science Program.