

RISKY BUSINESS

Managing Uncertainty: Risk Decision Process in the US Forest Service Fire for Benefit Program

Marc Rounsaville, Blue Jack Consulting

Fire managers in the US Forest Service routinely make decisions on fire for benefit with minimum data relative to strategic risk, such as base rates, statistically likely outcomes and objective evaluation of external influences. The influence of human factors is frequently unrecognized, poorly understood or ignored by the decision-makers. In this realm the risk decision is focused on the events at hand rather than the more strategic or long-range view. Clear dialog among stakeholders is frequently absent which allows acrimony to emerge.

Key Points

- Decision evaluation processes are lacking in the fire for benefit program.
- Accuracy of weather forecasts, a key input into fire behavior, degrade quickly after 5 days.
- Burnouts are not generally considered as an option on fire for benefit in the early stages.
- Fires for benefit generate more bad outcomes (escape/entrapment), are more expensive and accrue more exposure than prescribed fire.

Background: The US Forest Service conducts over 5600 prescribed burns annually with 3 to 5 escapes, and few accidents. In contrast, the fire for benefit program constitutes about 229 units per year, with an escape rate of 24 times prescribed fire. Numerous burnovers, structures lost and evacuations have occurred on these actions. The fire for benefit program continues to expand with little to no actions evident that would reverse the trend of escapes.

Methodology: Agency records, interviews with principals and interactive, facilitated engagement sessions in 2010 and 2011 were used to develop the data for analysis. Units treated, acres treated and escape data were from 2008- 2011 inclusive. Fires for benefit were compared to prescribed fires, as both require a go/no-go decision, both are dependent upon weather forecasts and a burn out operation on a fire for benefit would be operationally similar to a prescribed fire. Weather forecasting was surveyed to determine general accuracy over time.

Risk Complexity and the Wildland Firefighter

Ivan Pupilidy, USFS

Between 2000 and 2010 the US Forest Service and the Department of the Interior experienced 82 wildland fire fatalities. Our most recent organizational focus has been to eliminate fatalities. The chief of the USFS, in a letter to all employees, asked us to "suspend disbelief" with regard to the concept of a "zero fatality organization". This plea came while some field personnel argued that there was no way to eliminate fatalities without eliminating risk.

Risk is defined in many ways. Each individual has his or her own sense of risk, and each may be substantively different than the one held by the organizations. Rightly so, the risks that worry leaders are rarely those that kill workers. Risks and hazards are a naturally occurring phenomenon in the workplace. Individuals consciously and unconsciously assess hazards and makes adjustments based on their experience, perceived risk, accident potential, rewards and the individual's propensity to take risk. This seems rather obvious; however, the concept is very important as these factors affect the balancing behavior of the worker in complex ways. The worker is nearly constantly in the mode of optimizing to achieve personal and organizational

goals in the face of external and internal pressures. Optimization efforts are bounded by too much risk on one side and too little risk on the other.

Risk also changes when we recognize it. Behavior on a dangerous stretch of road or in an occupation, which requires an exposure to hazard (don't they all?), will change. This change in behavior changes the risk and normally averts the potential negative outcome. This is how work is normally conducted.

This talk will present the concepts described above and recommend developing a conscious approach to understanding the risks associated with complex environments. The presentation will demonstrate how risk and complexity science intersect in uncertainty. And it will offer a working definition of uncertainty for the wildland fire community (based on the work of Edgar Morin and Scott Page).

Risk Preferences and Probability Weighting in Wildfire Decision-Making: A Choice Experiment of US Federal Wildfire Managers

Michael Hand, USFS; David Calkin, USFS; Matt Thompson, USFS; Matt Wibbenmeyer, Collins Contracting

In the United States, wildland fire events are managed for numerous competing objectives in an environment of considerable uncertainty and political pressure. Federal wildfire management policy dictates that the magnitude of suppression response should be commensurate with the values at risk, and has embraced risk management as the appropriate paradigm for wildfire management. Economic theory suggests that over repeated wildfire events, a policy of risk neutrality will generate optimal wildfire management outcomes. Nevertheless, it is well established that human factors, including sociopolitical constraints and pressures, incentives facing fire managers and decision biases, have substantial influence over the ways in which individual fire events are managed. In particular, the existing incentive structure that allows substantial local socio-political influences on strategic decision-making may lead fire managers to overweight protection of private property. Over time, such behavior is likely to lead to inefficient uses of fire management resources and lead to strategies that may not be in the best interest of the land and society in general. This paper uses a choice experiment to measure attitudes among US wildfire managers toward several sources of risk and how the current decision environment may lead managers towards selection of strategies that may not align with long-term land management objectives. It represents one of the first stated choice studies to incorporate probability weighting, which allows for nonlinear effects of probability on utility. Implications of managers' current preference structure and risk attitudes to federal wildfire budgets are discussed.

Climate Impacts on Wildfire Policy and Practice

Crystal Kolden, University of Idaho; Tim Brown, Western Regional Climate Center

Over the last two decades, climate has been established as a primary driver of wildfire regimes in the US. Subsequently, many efforts have been undertaken to project future wildfire activity under a changing climate. These approaches do not currently account for the human response: how public agencies and private citizens react to the threat of wildfire and alter their environment and their practices in an attempt to mitigate that threat. Concurrently, federal wildland fire policies currently do not account for climate as a fire driver. Our primary objective