



Ecological Restoration Institute



Fact Sheet: Efficacy of Hazardous Fuel Treatments: A rapid assessment of the economic and ecologic consequences of alternative hazardous fuel treatments

May 2013

INTRODUCTION

The Office of Management and Budget (OMB), Government Accountability Office (GAO) and the United States Congress have repeatedly asked the Office of Wildland Fire in the Department of Interior (DOI) and the United States Forest Service (USFS) to critically examine and demonstrate the role and effectiveness of fuel reduction treatments for addressing the increasing severity and cost of wildland fire. Federal budget analysts want to know if and when investments in fuel reduction treatments will reduce federal wildland fire suppression costs, decrease fire risk to communities, and avert resource damage.

PERSISTENT QUESTIONS

In order to answer persistent questions related to wildfire economics and fuel treatment effectiveness, the Office of Wildland Fire contracted with the Ecological Restoration Institute at Northern Arizona University to conduct a neutral, third party analysis. The research and analysis team included university-affiliated and independent economists. The key findings for five persistent questions are summarized below.

1. Have the past 10 years of hazardous fuel reduction treatments made a difference? Have fuel reduction treatments reduced fire risk to communities?

- Using an evidence-based approach to objectively evaluate the relevant literature, we found that for the forest ecosystems that were examined, the evidence suggests that restoration treatments can reduce fire severity and tree mortality in the face of wildfire, and also increase carbon storage over the long-term.
- Studies that use the avoided cost approach to examine the cost of fire demonstrate that treatments result in suppression cost savings.
- Modeling studies that evaluate the effectiveness of fuels treatments in terms of changes in wildland fire size, burn probabilities, and fire behavior demonstrate that fuel treatments applied at the proper scale can influence the risk, size, and behavior of fire therefore reducing suppression cost.

- Modeling demonstrates that fuel reduction treatments are effective at reducing fire behavior (severity) where implemented, and can successfully reduce fire risk to communities. However, it also shows that fuel reduction treatments that occur at broader scales would have bigger impacts on the overall reduction of crown fire. Perhaps most importantly, the results show that WUI-only treatments result in areas of unchanged crown fire potential across the untreated landscape, therefore leaving it vulnerable to large, severe, and expensive (mega) landscape-scale fire.
- Although few studies exist on the topic, fuel reduction treatments significantly enhance the price of adjacent real estate, whereas homes in close proximity to a wildfire experience lower property values.



A firefighter works through the night to fight the 2011 Wallow Fire in eastern Arizona. Photo courtesy of ERI.

2. What are the relative values of treatment programs at the landscape scale? (Reframing Fire Regime Condition Class (FRCC) as an economic model.)

- A marginal analysis of benefit can be used to compare the relative value of alternative fire management strategies on a complex landscape instead of calculating actual dollar values. This approach allows managers to compare different treatment alternatives and assess which is economically more efficient without the need to calculate the total cost.
- Using a Colorado study site, it is possible to demonstrate that high level treatments (approximately 30% of the study site) will improve landscape condition by almost 20% over the current condition.

The Ecological Restoration Institute is dedicated to the restoration of fire-adapted forests and woodlands. ERI provides services that support the social and economic vitality of communities that depend on forests and the natural resources and ecosystem services they provide. Our efforts focus on science-based research of ecological and socio-economic issues related to restoration as well as support for on-the-ground treatments, outreach and education.

Ecological Restoration Institute, P.O. Box 15017, Flagstaff, AZ 86011, 928/523-7182, FAX 928/523-0296, www.eri.nau.edu

3. How can we improve current and future economic returns to restoration-based hazardous fuels reduction treatments?

- In the two ecosystems studied (ponderosa pine and mountain big sagebrush) it is more cost effective to treat degraded systems before they significantly depart from natural conditions.
- When short time horizons are used, such as 10 or 20 years, to evaluate the expected economic return from treatments, the value can appear to be negative. When the time horizon is lengthened to be consistent with the duration of expected effects of the treatment, the returns may be positive.
- The economic return on treatments is influenced by the ability to offset costs through sale of byproducts and/or biomass.

4. What are the fuel treatment, Wildland Urban Interface, and climate change effects on future suppression costs?

- Based on the analysis conducted for this project, the number of acres burned and total suppression cost increase with the amount of land classified as WUI intermix. Similar but smaller and statistically weaker effects are estimated for WUI interface.
- Extrapolations of WUI growth and weather variables suggest that if trends in these variables continue as they did in this analysis, wildfire acreage and suppression costs will increase in the future.

5. In conclusion: When or will investments in fuel reduction treatments lead to a reduction in suppression costs?

- Assessing the value of restoration and hazardous fuel treatments only in terms of reducing suppression costs is an inadequate analysis for understanding the full economic and ecologic value of treatments.
- Treatments designed to reduce *severe* fire behavior may contribute to a reduction in fire suppression costs.
- Proximity to the WUI and fire size are correlated with increases in suppression expenditures. A growing body of evidence demonstrates that WUI treatments are effective for reducing damage to communities. However, modeling shows that by failing to invest in treatments in the greater landscape, severe, landscape-scale fire will persist.
- By delaying restoration, the cost of treatments and the return on investment will be lower. It is more cost effective to restore systems before they depart significantly from desired conditions.

- If the current trends of development in the WUI and weather conditions consistent with the last 10 years continue, the cost of suppression and number of acres burned will likely increase. Addressing growth in the WUI and fire risk is essential to reducing suppression costs.



CHALLENGES

Understanding the ecologic and economic effectiveness of hazardous fuel and restoration treatments at the national level poses challenges that prevent simple answers to these questions. Complicating factors include:

- **Scale.** Geography, fuels, forest types, and fire regimes vary nationally and therefore do not lend themselves to an easy comparison for analysis.
- **Time and treatment effectiveness.** The relationship of a treatment to long-term risk reduction is contingent on the quality of the treatment at the start, vegetation type, maintenance, and additional factors such as climate change.
- **Fire is inevitable and the choices made to suppress a fire will influence fire cost.** Numerous analyses have concluded that the most expensive fires occur under extreme weather conditions and that these fires are a small percentage of the entire ignitions that occur in the country.
- **Although federal budget analysts are most interested in investments in treatments and how they may influence suppression costs at the federal level, the damage caused by fire is externalized across multiple levels of government and the private sector.** Analyzing the costs and benefits only in terms of federal programs is inadequate for understanding the full value of restoration treatments, wildfire suppression cost, and losses avoided. In addition, it will underestimate the total cost of inaction.
- **From a theoretical standpoint, the economic relationship between investments in treatments and a reduction in suppression costs is complicated.** The analysis cannot be reduced to the simple formula of X dollars invested in treatments will yield Y dollars of savings in suppression.

This Fact Sheet summarizes information from the following publication:

Ecological Restoration Institute. 2013. Efficacy of hazardous fuel treatments: A rapid assessment of the economic and ecologic consequences of alternative hazardous fuel treatments: A summary document for policy makers. Northern Arizona University. 28 pp. <http://library.eri.nau.edu/gsd/collect/erilibra/index/assoc/D2013004.dir/doc.pdf>