

How Forest Context Influences the Acceptability of Prescribed Burning and Mechanical Thinning

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Introduction

Understanding public perceptions of potential management actions and identifying where perceptions differ can help agencies understand and predict how they may react to management decisions. The effects of the public's beliefs and attitudes on fire management strategies have been explored, but the context in which these beliefs and attitudes exist may also be important. We describe the impact of contextual factors on public perceptions of doing prescribed burns, mechanical thinning, or no artificial fire management treatments. The contextual factors included proximity of the forest to urban areas, primary use of the forest (recreational vs. commercial), wildfire history, and current fire conditions in the forest. We compared the effects of contextual factors on the public's acceptance of fire management strategies across three geographic regions with different wildfire histories and experiences: the Front Range of Colorado (high recent wildland fire experience at the time of the study), southern Illinois (low wildland fire experience), and Metropolitan Chicago (no wildland fire experience). This study was part of a larger one, funded by the North Central Research Station of the USDA Forest Service that examined values, beliefs, attitudes, and context toward wildland fire and management (Bright and Carroll 2004).

Key Findings

If fire hazard is high or wildfire occurred recently, people want some mitigative action taken. If current conditions of a forest make a wildfire likely or if the forest recently experienced a wildfire, the public would like the land management agency to take some action to mitigate or eliminate the potential effects of those fires, by prescribed burns or mechanical thinning. Doing nothing in these two situations is not acceptable to a large proportion of the public. A particularly interesting finding is that when forests have little or no wildfire history, prescribed burning and mechanical thinning appear less likely to be supported. In these instances the current conditions are particularly important because no previous wildfire in an area may suggest that a wildfire in an upcoming season may be imminent.

People prefer use of prescribed fire in remote areas and thinning in more urban areas. Prescribed burning was supported more strongly for a rural forest than for a more urban one. The perception that prescribed burning in rural forests directly impacts people less may have played a role in this finding.



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On the other hand, if a forest was in a rural area, support for mechanical thinning decreased, perhaps because of the preference for prescribed burning in rural areas or the opposition to the use of obtrusive management in forests that are seen and experienced away from civilization. Moreover, mechanical thinning may have been perceived as being less dangerous to the public than prescribed burns in forests near urban areas.

Differences across study locations were small. For all three regions, current condition was the most important factor influencing acceptability of prescribed burning, mechanical thinning, and doing nothing, while primary use was least

important. The only significant difference among the regions was the relative importance of location and wildfire history on influencing public acceptance.

The public may have some understanding that forest conditions have an effect on the probability and severity of wildfire in a given area, but that understanding may not be complex or accurate enough. For example, our finding that the public is less likely to support prescribed burning and mechanical thinning in areas with little or no recent wildfire history suggests that people may interpret a lack of recent wildfires as an indication of a lower fire hazard. In many locations this is likely to be an inaccurate assessment and could hinder appropriate management actions in areas where there has not been fire or fire has been suppressed, and where prescribed burning or mechanical thinning are therefore warranted.

The complexity of factors that may influence public perceptions shows the importance of creating information campaigns that describe the fire science around wildfire management and decision-making. Regardless of the similarity of context effects on the acceptability of prescribed burning and mechanical thinning across study sites, results showed that many factors may affect support for management actions. Communicating the environmental and geographic context of wildfire management decisionmaking may help foster support for fire management decisions. Recognizing the importance of providing scientific information early allows agencies to create educational programs that explain the context of the decision and let the public know when prescribed burning and mechanical thinning are most appropriate and necessary. With public support, agencies can spend more time and money on

the resource rather than on legal battles and policy adjustments dictated by the courts, interest groups, or on battles for positive public opinion.

Detailed Findings

The first group of detailed findings below describes the main effects of each of the contextual factors on perceptions of prescribed burning, mechanical thinning, and doing no artificial treatments.

- **Current Conditions of the Forest.** In forests where current conditions suggested a wildfire was likely, support for both prescribed burning and mechanical thinning increased. If current conditions suggested a wildfire was unlikely, support for these two treatments decreased. Consistent with these findings, support for doing no artificial wildfire treatments decreased as the potential for wildfire in a forest increased. This was true for residents of all three regions.
- **Forest Proximity to Urban Areas.** For all regions studied, support for prescribed burning increased for a forest in a remote rural area and decreased in a more urban forest. The opposite was true for mechanical thinning. Support for doing no artificial wildfire treatments increased in a remote rural forest but decreased in a forest near an urban area.
- **Wildfire History.** In all regions studied, support increased for prescribed burning and mechanical thinning for a forest with recent wildfire history, but decreased for both treatments when there was little or no wildfire history. Support for doing no artificial wildfire treatments decreased when there was recent wildfire experience in a forest.
- **Primary Use of the Forest.** When the primary use of the forest was for outdoor recreation, support for prescribed burning and mechanical thinning decreased. Support for these treatments increased when the primary use of the forest was for commercial activities such as logging and mining. Primary use had no consistent effect on support for doing no artificial treatments.

The second group of findings describes the relative importance of each of the contextual factors on support for prescribed burning, mechanical thinning, and doing no artificial treatments.

- **Prescribed Burning.** By far, the most important contextual factor to influence support for prescribed burning was the current conditions of the forest. As noted above, if a wildfire was likely, support for prescribed burning as a treatment increased. For the Colorado Front Range and southern Illinois, the second most important factor was forest location followed by wildfire history. In Metropolitan Chicago the two were flipped, with wildfire history the second and forest history the third most influential factors. The primary use of the forest had little to no influence on support for prescribed burning in all regions.

- **Mechanical Thinning.** As with prescribed burning, the current condition of the forest was, by far, the most important contextual factor influencing support for mechanical thinning in all regions studied, with conditions making a fire likely increasing support for this treatment. Location of the forest was the second most important factor influencing support for mechanical thinning for the Colorado Front Range and Metropolitan Chicago, while wildfire history was the second most important factor for southern Illinois. In all regions, there was relatively little difference in impact on support for mechanical thinning between location of the forest and wildfire history. The primary use of the forest was the least important contextual factor influencing support for mechanical thinning.
- **No Artificial Treatments.** The current condition of the forest was, again, by far the most important factor influencing support for doing no artificial wildfire treatments. If current conditions made a wildfire likely, doing nothing was not supported as a treatment. Wildfire history was the second most important factor influencing support for the two Illinois strata but third most important for the Colorado Front Range. Location of the forest relative to an urban area was the second most important factor for Colorado Front Range residents and third for Chicago Metropolitan and southern Illinois residents. Primary use of the forest was again the least important factor in all regions studied.

Background

The shift from fire suppression to the use of prescribed burning and mechanical thinning has troubled some communities and groups with interests in forested areas because of the dangers associated with prescribed fires going awry and the impacts of heavy machinery and road building that accompany mechanical thinning. The public has expressed concern about these issues, and as a result, public perceptions of fire management have become an important consideration for agencies charged with managing areas susceptible to wildland fires.

Much of the social research has examined the impacts of knowledge, beliefs, and experience on perceptions of wildland fire and its management. A more recent line of research has examined the impact of situational factors, external to the individual, on perceptions of wildland fire and its management. Kneeshaw, Vaske, Bright, and Absher (2004) found that factors such as source of fire (human vs. natural) and potential impacts of fire (on air quality and forest health) influenced respondent perceptions of response to fires and fire conditions. We drew upon the Kneeshaw *et al.* (2004) research by exploring situational factors that influence support for specific management strategies: prescribed burning, mechanical thinning, and not treatment.

Methods

Research Design

One thousand names and addresses were randomly selected from each stratum using Survey Sampling, Inc. The three strata were selected as surrogates for wildfire experience in an area. One stratum included residents living near a national forest that had a recent wildfire. Residents of the Front Range of Colorado were selected for this stratum. A second stratum in southern Illinois included residents of a region near a national forest that experienced relatively little wildfire. A third stratum, Metropolitan Chicago, included residents of an urban area not located near a national forest. Dillman's (2000) Tailored Design Method was used to maximize response rate to a mail-back survey. Two mailings of the survey were conducted with a reminder postcard sent to nonrespondents between the two questionnaire mailings. Of the 3,000 surveys mailed, 475 were not deliverable. A total of 868 surveys were returned, resulting in a response rate of 34 percent (868/2,525). Nonresponse tests found very little substantive differences between respondents and nonrespondents on attitude toward prescribed burning and mechanical thinning.

Measurement of the Acceptability of Fire Management Treatments

Respondents were presented with eight scenarios followed by instructions to indicate, on a seven-point scale, if prescribed burning, mechanical thinning, and doing nothing were extremely, moderately, or slightly unacceptable or acceptable. For each scenario, respondents were told to consider a national forest that varied on four characteristics as follows:

- Location (in a remote unpopulated rural area vs. near a highly populated urban area).
- Primary use (outdoor recreation such as backpacking, viewing scenery, hiking, and camping vs. commercial activities such as logging or mining).
- Wildfire history (recent history of forest fire vs. little or no history).
- Current conditions (high likelihood of a fire in the near future vs. low likelihood).

Each contextual factor had two levels, requiring 16 (2^4) scenarios for a full factorial design. An orthogonal fractional factorial design was created to reduce the number of scenarios used on the questionnaire to eight, thereby systematically reducing the burden on respondents. Table 1 describes each of the eight scenarios based on the four contextual factors.

Table 1.—Scenario descriptions

| Scenario | Contextual factors | | | |
|----------|----------------------|--------------------|------------------|--------------------|
| | Location | Primary use | Wildfire history | Likelihood of fire |
| 1 | Near urban area | Outdoor recreation | Little or none | Low |
| 2 | In remote rural area | Commercial | Little or none | High |
| 3 | Near urban area | Outdoor recreation | Little or none | High |
| 4 | Near urban area | Commercial | Recent history | High |
| 5 | In remote rural area | Commercial | Little or none | Low |
| 6 | In remote rural area | Outdoor recreation | Recent history | High |
| 7 | Near urban area | Commercial | Recent history | Low |
| 8 | In remote rural area | Outdoor recreation | Recent history | Low |

Note: All factors have two levels.

Analyses

Conjoint analysis was used to determine if the study strata differed in their acceptability of prescribed burning, mechanical thinning, and doing nothing across contextual factors. The orthogonal design function of SPSS was used to examine the fractional factorial design used to create the eight scenarios. Using this design allowed us to directly assess the main effects of each of the factors on acceptability of fire management strategies. The two-level factors of location, primary use, wildfire history, and current conditions were independent variables, and the acceptability of prescribed burning, mechanical thinning, and doing nothing were the dependent variables.

References

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