

# INTEREST GROUP OPINIONS ABOUT FUEL REDUCTION IN SOUTHERN APPALACHIA

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**Abstract**—Opinions of interested publics and interest groups ( $n = 640$ ) about fuel reduction (FR) in the Southern Appalachian Mountains were investigated through social survey using both pictorial and written questions. The study identified three discrete groups based on knowledge of forest history in the Southern Appalachian Mountains, attitudes toward social and ecological changes due to FR, credibility of public land management agencies as managers of forests, aesthetics of FR areas, and recreation activity participation. Results identified three groups of concerned publics labeled as conservation oriented, naïve perceptual, and preservation oriented. The conservation-oriented group was accepting of FR for specific reasons; the naïve-perceptual group disliked even minor charred views and stumps; the preservation group was skeptical of FR and characterized by wanting nature to be left alone. Detail rich results provide guidance in constructing different educational and persuasive messages specific to each of these three groups about forest management through FR in Southern Appalachia.

## INTRODUCTION

Concerned publics can help managers develop communication strategies that are responsive to people's values and attitudes toward prescribed fire and mechanical fuel reduction. In a survey of forest managers the two top constraints of implementing fuel-reduction techniques were negative public opinion and the close proximity to residential neighborhoods (Haines and others 2001). Much of the research on support of prescribed fire and fuel reduction has been conducted in the Pacific Northwest (Shindler and Neburka 1997; Toman and others 2004, 2006), yet little is known about the Southern Appalachia. Haines and others' (2001) study, as well as the lack of regional research, demonstrates the need to study perceptions of fuel reduction in the Southern Appalachia.

An understanding of the perceptions of prescribed fire and mechanical fuel reduction will help managers develop communication strategies for stakeholders. Approaches to communication include an understanding of source credibility, characteristics of message receivers, channel of delivery, situational factors, and message content (Ajzen 1992).

Most existing studies about public attitude toward fuel reduction have been conducted in the Western United States. One focus of these studies has been source credibility in terms of trust and what roles forest managers and stakeholders should play in fuel reduction. Local and State management agencies were trusted more so than Federal Agencies (Brunson and Shindler 2004, McCaffrey 2004, Shindler and Toman 2003, Toman and others 2006). Additionally, results documented that landowners perceived their role as limited to managing their own property, while expecting land managers to manage the forested areas surrounding their homes.

Characteristics of persons who might receive messages about fuel reduction have also been studied in Western States, focusing on demographics, attitudes of people in fire prone areas, knowledge of forest and fire ecology, knowledge of agencies, and ecological and aesthetic perceptions of fuel-reduction techniques (Shindler and Neburka 1997; Toman and others 2004, 2006). These studies suggested that residents were experienced and knowledgeable about fuel-reduction methods and outcomes.

Studies about channel of delivery, focused on how to communicate about fuel reduction, have echoed general persuasion studies that multiple approaches are needed (Bonar 2007). Several studies in the Western United States have evaluated communication content and strategy. Respondents endorsed interactive communication over static media. Sources of information perceived as useful ranged from high preference for local fire departments while recognizing that main stream media is sometimes useful (Brunson and Shindler 2004, McCaffrey 2004, Shindler and Toman 2003, Toman and others 2006).

Another aspect of communication research is understanding situational factors, combinations of variables that create interest or concern (Ajzen 1992). For instance, people living in fire prone areas in the West rarely viewed themselves as responsible for fuel reduction, only creating defensible space around their homes (McCaffrey 2004). Yet, these same individuals were insistent that they should have a role in local fire planning. Brunson and Shindler (2004) demonstrated that participants agreed that forest managers should use prescribed fire, mechanical fuel reduction, and livestock grazing as tools for minimizing fuel loads. However, they felt that prescribed fire should be used less often when near residential areas. This is evidence of how fuel-reduction

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strategies insensitive to situational and contextual issues might confuse or even anger involved publics.

As the last component of understanding the persuasion process (Ajzen 1992), message content is important. This step generally comes after there is an understanding of the variation in credibility of sources, potential receivers of the message, preferences and availability of channels, and situational factors. No studies testing message content on fuel reduction could be located.

The purpose of the study was to identify segments of stakeholders involved with forest issues in the Southern Appalachian Mountains. To accomplish this, a deeper understanding of stakeholder's fuel-reduction knowledge, preferences, and attitudes was needed.

## METHODS

The primary focus of this study was helping managers understand how and in what way to interact with individuals and their associated interest groups. In order for a manager to interact with the public, it is important for them to recognize that a stakeholder has a set of opinions. Knowledge of these opinions will help managers recognize and constructively respond to those concerns. Purposive sampling was used to limit data collection to publics potentially interested or involved with the topics of forest management and fuel reduction.

Research on opinion surveys has indicated that people without formulated opinions will answer survey questions they know nothing about, based only on the information in the wording of the question. For instance, Bishop (2004) has demonstrated that asking about President George W. Bush's social security initiative provides significantly greater levels of support from Republicans than when a question is asked about a social security initiative without reference to President Bush. Bishop (2004) described numerous other public opinion polls where it was obvious that respondents in random opinion polls readily answered questions about issues they knew nothing about. Considering that fuel reduction in Southern Appalachian Mountains is far less salient to the general public than social security, it seems counterproductive and misleading to survey people uninvolved in the topic. Consequently sampling was designed to minimize participation from disinterested parties. Numerous

studies have shown that interest and involvement with a topic are the best predictors of participation, and that public opinion polls based on random samples with aggressive followup procedures to encourage high-participation rates provide distorted results in terms of levels of respondents' awareness and involvement with issues (Bishop 2004).

## Sample Population

Three types of potential respondents were approached (table 1). Use of this sampling strategy does not produce accurate population parameters, yet this was not the intention of the study. The study purpose is to identify types of people based on existing interests and involvement with issues related to Southern Appalachian forests.

The initial contact was made by regular mail or Internet survey. All homeowners were contacted by mail. Onsite recreationists were given a choice of mail or Internet survey, and clubs and organizations were contacted through an email invitation to complete a Web-based survey. Only one reminder was sent to potential participants to minimize responses from disinterested participants being badgered into participating. The final sample size was 640, adequate for a segmentation study (Evans and Berman 1994). Hierarchical segment analysis was used to identify meaningful segments. Segments were then further described based on attitudes and beliefs.

## Measures

The segments were identified with the use of a knowledge test, visual perceptions of photographs, and by asking a series of questions on the acceptability of forest changes that potentially occur due to fuel-reduction practices. The questions on the acceptability of forest changes were gathered from studies mentioned in the literature review and recent outcomes of ecological effects of fuel reduction in the Southern Appalachian Mountains. The items measured social and ecological aspects of fuel reduction. Visual perceptions or acceptability were measured using a set of eight photographs recently subjected to chainsaw felling of shrubs, fire, both, or neither. Factor analysis was used to create composite variables from the scales. A composite score was created for the knowledge test. The 17 questions addressed knowledge of ecological effects of fire and history of the forests in Southern Appalachia. Responses were coded as not sure = 0, incorrect answers = -1, and correct answers = 1. Therefore,

**Table 1—Types of respondents approached to participate in this study**

Survey group	Technique used
Homeowners	People who lived within census blocks overlapping U.S. Forest Service land
Recreationists	People participating in hiking, equestrian, mountain biking, hunting, fishing, camping, climbing, picnicking, and Revolutionary War reenacting were approached on public forest lands
Interest groups	Conservation, preservation, hiking, and hunting clubs approached by email

the cumulative score was penalized for missing a question but not if the respondent admitted to not knowing the answer.

## RESULTS

The first segment identified through cluster analysis was the “preservation oriented” (PO) grouping (table 2). This group was moderately knowledgeable about the ecological effects of fire and the history of the forests in the Southern Appalachian region. The PO values were evident because this group was characterized by high acceptability of increasing the diversity of nongame animals. The group found an increase in dead and standing downed trees as moderately acceptable and had little acceptability of all other outcomes. The PO group preferred forests with visually thick stands of rhododendron (*Rhododendron maximum* L.) and mountain laurel (*Kalmia latifolia* L.). Forests with evidence of charred stumps and floors relatively free of ground plants were less acceptable to this group.

The second segment is the “conservation oriented” (CO) grouping (table 2). This group was highly knowledgeable on historical ecology of Southern Appalachia and the effects of fire. CO individuals prefer that management use fuel-reduction techniques to reduce rhododendron and wildflowers, increase dead material, prevent damage to residential structures, improve habitat for game and nongame species, leave visible signs of fire, and make it easier to walk through the forest. Visual preferences for CO respondents included photographs

with open floors, visible penetration, and those with signs of fuel reduction either by fire or mechanical treatments.

The final segment “naïve perceptual” (NP) tended to have the least amount of knowledge about fire, fuel reduction, and historical ecology (table 2). This group found moderately acceptable outcomes that prevent damage to property, decrease soil and water qualities, reduce rhododendron and mountain laurel, and easier to see and walk through the forest. This group found least acceptable outcomes that include improved game and nongame habitat, residual burn marks, and increased standing dead material. Visual preferences that demonstrated management techniques were lowest for this group.

## DISCUSSION

One caution is in order. Because of the type of sample and followup procedures used, the study results should not be interpreted as an opinion poll. Percentages of each group holding a particular view that could be inferred from the results tables do not reflect percentages of opinions present in the general public or the relative percentages of each group in the general population.

This research helped to replicate and extend the literature on stakeholders’ attitudes and perceptions of forest managers using fuel-reduction techniques. Results indicate that people

**Table 2—Standardized mean comparison of segment membership based upon knowledge of ecology and fuel reduction, acceptability of changes, and perceptual evaluation**

Variables (reliability score)	Preservation oriented	Conservation oriented	Naïve perceptual
Knowledge of Southern Appalachian ecology and fuel-reduction effects	Medium -0.20	High 0.82	Low -0.57
Changes/acceptability factors			
Decreased soil and water qualities (0.60)	Low -0.30	High 0.31	Medium 0.08
Reduction in rhododendron, mountain laurel, wildflowers (0.84)	Low -0.45	High 0.83	Medium -0.23
Improve habitat for nongame animals (0.88)	High 0.41	High 0.52	Low -1.1
Easier to see and walk through the forests, new plant growth (0.75)	Low -0.77	High 0.87	Medium 0.12
Prevent damage from wildfires to property (0.83)	Low -0.53	High 0.52	Medium 0.10
Residual burn marks on trees and reduce air quality (0.78)	Low -0.41	High 0.98	Low -0.48
Improve game habitat, turkey, deer, trout, and increase blueberry shrubs (0.69)	Low -0.11	High 0.36	Low -0.21
Increase dead standing and downed trees (0.78)	Medium 0.24	High 0.38	Low -0.61
Perceptual evaluation			
Charred areas evident with sprouting stumps, moderate visibility (0.85)	Medium -0.01	High 0.37	Low -0.33
Forest floor with rhododendron, limited visibility (0.68)	High 0.43	Medium -0.02	Low -0.48
Deep visual penetration, smooth ground surfaces (0.72)	Low -0.06	High 0.23	Low -0.14

support fuel-reduction techniques for various reasons. A deeper understanding of the different segments will help managers to recognize and respond to the concerns of stakeholders based upon existing attitudes and perspectives.

An important part of persuasive communication involves understanding the situational factors that help create interest or concern (Ajzen 1992). At least one study indicates that negative public opinion in the Southeastern United States is the top-ranked barrier to implementing fuel reduction (Haines and others 2001). Thus it is important for managers to understand the characteristics of individuals who possess negative public opinions on fuel reduction. An understanding of characteristics such as attitudes, knowledge of fire ecology, knowledge of agencies, and perceptions of fuel reduction (Shindler and Neburka 1997; Toman and others 2004, 2006) will help managers develop an open and interactive communication process.

## APPLICATIONS

This study should help in developing communication strategies in that it provides detailed description of knowledge, attitudes, and perceptions of stakeholders. The NP segment was least to moderately concerned about attitudes, perception, and knowledge. This suggests less interest than the other segments and thus peripheral routes to persuasion may be effective. This group is least likely to respond to messages that are developed with evidence and logic, and care must be used in the construction of such messages. PO and CO publics are more likely to respond to rational arguments that are consistent with existing attitudes, values, and perceptions (Petty and Cacioppo 1986).

This study demonstrated that interested stakeholders vary in their acceptability of fuel-reduction techniques. Managers can use this information to judge whether fuel reduction is the best option depending on the potential characteristics of the technique used and who will directly experience the outcome. CO individuals prefer open space with deep visual penetration and habitat where game species can easily be hunted. PO individuals prefer increases in nongame species. The lack of tolerance by the NP segment for residual burn marks, charred stumps, and standing dead or downed trees suggests minimizing signs of fuel-reduction techniques along roadsides, picnic areas, and trails.

There are several social and ecological outcomes of fuel reduction. Depending on knowledge, attitudes, and perceptions of stakeholders, the outcomes can either be acceptable or unacceptable. The results of this study suggest that PO and CO segments have the knowledge and attitudes in order to respond well to rational arguments about fuel reduction. PO individuals are more likely to respond to ecological arguments involving nongame species while CO individuals will respond to both ecological and utilitarian outcomes. The NP group will most likely be a challenging segment to communicate with due to their lack of knowledge, low attitude, and perceptions of fuel-reduction outcomes.

Thus, communication techniques may need to focus on persuasion instead of rational education messages.

This research demonstrates the variability of interested publics and suggests that communication techniques vary depending on the characteristics of the audience. The use of persuasive vs. educational techniques should vary depending on the audience. Attitudes or interested publics need to be accounted for when managers respond to concerns and questions. This research will be useful to help managers identify different segments and shape messages based on interests on concerned stakeholders.

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