

THE IMPACT OF WILDLAND FIRE REDUCTION TECHNIQUES ON ATTITUDES TOWARD FUELS MITIGATION: A COMPARISON OF SPECIAL USE CABIN PERMITTEES AND OTHER HOMEOWNERS LIVING NEAR A NATIONAL FOREST

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Abstract: This study examines the impact of fuel mitigation and fire prevention programs on homeowners' attitudes toward and approval of fuel reduction techniques. This research is relevant to resource managers, from fire to recreation, who are responsible for a multitude of land uses and conditions. A mail questionnaire was used to collect data from three types of homeowners in the Big Bear Lake area of the San Bernardino National Forest, in San Bernardino County, California. Based on a half-day meeting with fire managers from federal and local authorities and a focus group with local residents many of whom were active in Fire Safe councils, we learned about various educational and mitigation programs offered and/or enforced by the appropriate authorities. The Forest Service implemented a fire safety program with special use cabin permittees that enforced defensible space standards, primarily through a periodic home and property inspection. Special use cabin permittees were required to comply or be subjected to fines. Permanent and seasonal homeowners in the area were not targeted with the same fire safety program; although many fire safety and fuel mitigation programs were administered locally. The results of this research shows special use cabin permittees, most of who are seasonal home users, and permanent homeowners who live in the area full-time have

high levels of experience with defensible space. These two types of homeowners exhibit strong positive attitudes toward defensible space over mechanical fuel reduction and prescribed burning. However, when asked if defensible space should be implemented in the local area all homeowner types held fairly high levels of approval for this fuel reduction technique.

Introduction

This study presents the impact of fuel mitigation and fire prevention programs on homeowners' attitudes toward and approval of fuel reduction techniques. This research is relevant to resource managers, from fire to recreation, which are responsible for a multitude of land uses and conditions. Often these programs contain a public outreach component involving residents and/or forest users. Based on meetings with federal and local fire managers and a focus group with local residents many of whom were active in Fire Safe councils, we learned about various educational and mitigation programs offered and/or enforced by the appropriate authorities. Specifically, the Forest Service implements a fire safety program with special use cabin permittees that enforces defensible space standards, primarily through a periodic home and property inspection (figure 1). Special use cabin permittees are required to comply or be subjected to fines. Permanent and seasonal homeowners in the area were not targeted with the same fire program, although many fire safety and fuel mitigation programs were administered locally.

Past research on wildland fire has studied people in a variety of settings ranging from visitors to a national park to homeowners commenting about practices near their homes. Bright and his



Figure 1. A special use cabin in San Bernardino National Forest

colleagues reported (1993) that two-thirds of the park visitor sample had a positive attitude toward supporting a controlled burn policy in a national park (conducted the year following a major fire at the park) and one-third had a negative attitude. Using contrived messages for the positive group (negative message) and negative group (positive message); attempts were made to change attitudes (particularly negative attitudes) and ultimately the intent to support the fuel reduction technique. Their results showed that factual evidence from a credible message source is needed to change beliefs, attitudes and intentions to support resource management policies. Jacobson and her colleagues reported (2001) experience with prescribed (previously called controlled) burning was correlated with positive attitudes toward prescribed burning, as well as increased knowledge levels. Individuals employed in natural resources or agriculture also exhibited positive attitudes and improved knowledge. Additionally, residents of Florida identified that prescribed burning prevents the onset of wildland fires; however, burning harms wildlife, may produce spreading fire, and leaves an ugly landscape. In another study of Florida residents, Loomis and his colleagues (2001) reported significant changes in attitudes toward prescribed burning (more positive) and knowledge about the impact of burning after residents were exposed to education materials about prescribed burning.

Few social science studies have considered several fuel reduction techniques. Winter and his colleagues (2002) conducted focus groups asking homeowners directly, as well as asking fire managers to comment about homeowners, about their beliefs, attitudes toward, and support for three fuel treatment approaches (i.e., prescribed burning, mechanical fuel reduction, defensible space). Comments suggested that several factors influenced these psychological elements including beliefs that an approach would produce certain outcomes, personal importance of related issues (e.g., vegetation preferences, smoke impacts on health, and personal property rights), situational specifics, and trust in the agencies managing resources and fuel build-ups. McCaffrey (2003) examined a set of different thinning techniques including herbicides, animals grazing, selective timber harvesting, salvage logging, hand thinning, and equipment thinning by asking wildland-urban

interface residents in Nevada which techniques were acceptable. She reported that several factors such as age, wildfire experiences, perception of fire risk, and perceptions of the agencies in fire planning influenced the acceptance of the fuel reduction techniques. While these studies shed light on the levels of attitudes toward and acceptance of fuel reduction techniques, few studies have examined how the type of residency a household has in the wildland-urban interface may influence their exposure to fuels mitigation, interest in learning more about wildland fire risks and how to make living in the WUI safer, or attitudes toward or support levels for fuel reduction techniques. These residency types represent the length of time a household spends in the WUI area, possibly investment in a home, and the degree of exposure to resource management on public lands. Thus, the purpose of this study is to test the influence of residency type (seasonal homeowners, permanent homeowners, and special use cabin permittees) on a set of experience, information seeking, and cognitive factors about fuel reduction techniques.

Methodology

This study began by considering several areas in the United States that had been identified as wildland-urban interface areas and that wildland fire was a significant issue to resource managers and local communities. One area selected for study was the Big Bear District of the San Bernardino National Forest (figure 2). This area is near the Los Angeles metropolitan area, actually located in San Bernardino County. Specifically, Arrowhead and Big Bear Lake areas were considered as residential areas that would provide a mix of permanent, seasonal, and special use cabin permittees. Based on meetings with fire managers from the Forest Service and local fire departments, many residential areas in Arrowhead and Big Bear Lake were suggested. Suggested areas were studied by the researchers and two communities/neighborhoods were selected as final study sites. Next, a list of names and addresses were purchased from a database firm in California when the local tax assessors were unable to provide a viable computerized list. A population of 5,531 permanent and seasonal home and land owners was identified in the two interface communities — Running Springs, a community west of Big Bear Lake, and Sugarloaf, a large neighborhood east of



Figure 2. Ranger district office from which research conducted.

Big Bear Lake. From this population, 1,000 households were sampled weighted by permanent and seasonal proportions. Additionally, a population of 463 Forest Service special use cabin permittees was identified with the assistance of the district Forest Service office. All cabin permittees were included in the sample.

Data were collected in fall 2001 using an eight-page mail questionnaire. A modified Dillman mail procedure was employed including two questionnaire mailings, a reminder postcard, and an incentive. Press releases were sent to two local papers to better inform mostly permanent residents that a study was in progress and those who received an envelope from Michigan State University should be encouraged to respond. An incentive of a Walmart gift certificate for one out of 250 households was offered. Response rates of 41% (n=119) for permanent homeowners, 34% (n=176) for seasonal homeowners, and 49% (n=224) for special use cabin permittees were achieved. Nonresponse bias was checked by comparing demographic characteristics of permanent homeowners to the available census data (1990). Respondents to the survey tended to be better educated, reported higher levels of income, and were more likely to be male in comparison to the general population.

Based on our meetings with fire managers, a resident focus group, and on-site inspection of neighborhoods, we anticipated special use cabin permittees to hold the highest level of experiences with defensible space practices because of the defensible space program targeted at them, followed closely by permanent homeowners. Seasonal homeowners were perceived by fire

Table 1. — Demographics of Homeowners in Selected Wildland-Urban Interface Areas of the San Bernardino National Forest, Big Bear Ranger District

Description of Respondents	Seasonal	Perm.	Spec. Use
Gender			
Male	61.0%	53.0%	64.0%
Female	39.0	47.0	36.0
Household Income			
Less than \$40,000	21.0%	28.0%	12.0%
\$40,000 to \$79,999	33.0	43.0	27.0
\$80,000 or more	46.0	29.0	61.0
Education Experience/Level			
Jr. or High School	21.0%	16.0%	10.0%
College	52.0	61.0	45.0
Graduate School	27.0	23.0	45.0

authorities and permanent homeowners to be less involved in local fire prevention efforts.

Results

Demographics. Respondents for all homeowner groups tended to be male, particularly with special use cabin permittees and seasonal homeowners (table 1). Special use cabin permittees and seasonal homeowners held higher levels of income than permanent homeowners. Over 50 percent of special use permittees earned \$80,000 or more household income (before taxes). Special use cabin permittees also held higher levels of educational attainment than seasonal or permanent homeowners. Nine out of ten permittees had some college or graduate school education.

Most of the respondents claimed California as their primary state of residency with 98% of permanent homeowners and 97% of both seasonal homeowners and special use cabin permittees. Most respondents were either employed full or part time or were retired. The greatest percentage (23%) of permanent homeowners lived most of their lives in a medium sized city (population 25,000 to 99,999); in comparison to the greatest percentage of seasonal homeowners (45%) and special use cabin owners (51%) lived most of their lives in a major city (one million or more). The majority of California respondents hold the perception that their home is serviced by a fire department and that there are fire hydrant located near their homes.

Table 2. — Homeowners' Past Experiences with Fuel Reduction Techniques

Past Experience With Fuel Reduction Techniques	Seasonal	Perm.	Spec. Use
A Prescribed Burn Occurred Near My Home	8.0%	45.4%	8.5%
A Mechanical Removal of Trees Has Occurred Near Home	22.4	22.7	29.9
Have Been Required to Remove Flammable Vegetation on My Property	69.0	67.2	71.0
Implemented a Defensible Space around My Residence	51.7	68.1	67.4

For example, 93% of permanent homeowners, 96% of seasonal homeowners and 88% of special use cabin owners believe there are hydrant in their neighborhoods. Approximately one out of every four households included an individual that suffers from respiratory or breathing problems.

Based on homeowners' response, all special use cabins were less than a half mile from National Forest land, while approximately half of all permanent (60%) and seasonal homeowners' (54%) homes were less than a half mile away. A greater number of seasonal homeowners (30%) purchased their homes within the last five years than other residents, while special use permittees owned their homes the longest (44% more than 20 years). Permanent (70%) and seasonal (74%) homeowners owned relatively the same size of land, a quarter to one acre, while 63 percent of special use permittees leased from the Forest Service less than one-quarter acre. Thirteen percent of seasonal homeowners reported owning greater than 10 acres.

Past Experience and Exposure to Fuel Reduction Techniques. Permanent homeowners had the highest level of experience with prescribed burning in their lifetime (table 2). Close to 50 percent of permanent homeowners indicated that a prescribed burn had occurred near their Big Bear Lake home, while less than ten percent of seasonal homeowners and special use permittees had experienced prescribed burning near their home ($X^2=90.0$,

Table 3. — Homeowners' Exposure to Wildland Fire Education and Outreach

Exposure to Wildland Fire Education and Outreach	Seasonal	Perm.	Spec. Use
Asked Local Fire Department about How to Reduce the Risk of Property Damage from Wildland Fire	5.7%	13.4%	12.9%
Asked Forest Rangers How to Reduce Risk of Property Damage Caused by Wildland Fire	2.9	11.8	22.3
Read Information on Home Protection from Wildland Fires	70.1	73.9	68.3

$p<.001$). Approximately one-quarter of all homeowners have seen mechanical fuel reduction, with a slightly greater proportion of special use permittees experiencing this form of fuel removal. Over two-thirds of all homeowners have been required (by some authority or neighborhood group) to remove flammable vegetation on their property. Special use cabin permittees (67%) and permanent homeowners (68%) were more likely to have complied with this request/mandate than seasonal home owners ($X^2=12.5$, $p<.01$).

Few homeowners (less than 15% of any of the homeowner groups) have worked with local fire departments to reduce property loss/damage risks (table 3). Permanent homeowners and special use permittees were more likely to ask local fire departments than seasonal homeowners ($X^2=6.6$, $p<.05$). A greater proportion of special use permittees (22%) had asked forest rangers about reducing property risks than seasonal (3%) or permanent (12%) homeowners ($X^2=32.4$, $p<.001$). Over two-thirds of all homeowners have read information on home protection from wildland fires.

Attitude Toward and Approval of Fuel Reduction Techniques. Permanent homeowners and special use cabin permittees held significantly stronger positive attitudes ($F=10.5$, $p<.001$) toward defensible space practices than seasonal

homeowners (table 4). Defensible space was described to homeowners in the survey instrument as “homeowners maintaining a fire-safe zone consisting of 30 feet around homes that is free of flammable vegetation.” Following strong positive attitudes toward defensible space, mechanical fuel reduction was also viewed moderately positive by all homeowner groups. Mechanical fuel reduction was described as “resource managers using chainsaws, brush mowers, and specialized machines to cut and remove shrubs, trees, and other fuels.” On average, homeowners were neutral towards prescribed burning. Prescribed burning was described as “resource managers using planned fire to reduce fuels, regenerate desired plant or animal species, and promote ecological health.” Overall, prescribed burning was viewed less positively by homeowners than defensible space or mechanical fuel reduction.

Table 4. — Homeowners’ Attitudes toward Fuel Reduction Techniques

Attitude Toward Fuel Reduction Techniques	Seasonal	Perm.	Spec. Use
	Mean (Scale was “-3” extremely negative to “3”extremely positive)		
Prescribed Burning	0.13	-0.17	-0.20
Mechanical Fuel Reduction	1.42	1.68	1.30
Defensible Space	1.50	2.20	2.10

In general, approval of the use of these fuel reduction techniques in the local area lagged attitude toward these techniques (table 5). On all of these approval ratings, homeowners were similar (meaning no statistically significant differences). Following attitude ratings, defensible space practices were approved for implementation at the highest levels, followed by mechanical fuel reduction and prescribed burning, which received a mix of neither approve or disapprove ratings.

Implications

All types of homeowners, on average, held strong positive attitudes toward fuel reduction efforts that they can perform (i.e., defensible space) as homeowners living in the wildland-urban interface. As expected, special use cabin permittees held some of the highest levels of experiences (required to remove vegetation, asked forest ranger for information) related to fuel reduction programs.

Special use cabin permittees were very similar to permanent homeowners on actual implementation of defensible space and attitudes toward defensible space. As expected, seasonal homeowners “lagged” permanent homeowners and cabin permittees in some fuel reduction programs (particularly requesting information from local fire department or ranger), however this does not seem to significantly influence attitudes or support for fuel reduction implementation by seasonal homeowners (other than lower positive attitudes toward defensible space). Overall these results suggest a fairly high level of support for defensible space across the three homeowner groups as the leading fuel reduction program. A very high level of reading of fire prevention materials (at least two-thirds of each segment) was found amongst all homeowners. Communication materials and their distribution may be critical for building awareness of and support for a hybrid of fuel reduction efforts in the Big Bear Lake area.

Table 5. — Homeowners’ Approval of Fuel Reduction Techniques

Approval of Fuel Reduction Techniques	Seasonal	Perm.	Spec. Use
	Mean (Scale was “-3” strongly disapprove to “3”strongly approve)		
Prescribed Burning	0.12	-0.10	0.05
Mechanical Fuel Reduction	1.16	1.11	0.80
Defensible Space	1.38	1.76	1.60

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