

The Homeowner View of Thinning Methods for Fire Hazard Reduction: More Positive Than Many Think¹

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Abstract

With the focus of the National Fire Plan on decreasing fire risk in the wildland-urban interface, fire managers are increasingly tasked with reducing the fuel load in areas where mixed public and private ownership and a growing number of homes can make most fuel reduction methods problematic at best. In many of these intermix areas, use of prescribed burning will be difficult, and it is likely that thinning will be the dominant method for fuel load reduction. Yet little research has been done on acceptability of different thinning methods, and the current understanding is based primarily on accepted conventional wisdom. A limited number of surveys found that two-thirds of respondents thought thinning in general an acceptable fire management tool, but they did not examine differences in acceptability of specific practices. However, understanding what homeowners think about particular methods, and what is associated with more supportive views, can provide critical assistance to managers as they develop fuel hazard reduction plans. A survey of homeowners in Incline Village, Nevada found that support for most thinning methods, except herbicide use, was quite high, but varied across respondents. Factors associated with acceptability of specific methods include perception of fire risk, previous direct and indirect wildfire experience, perception of the role of various agencies in fire planning, and age. Individual responses also appeared to be influenced by the local character of the environment around Incline Village, particularly the desire to protect the water clarity of Lake Tahoe.

Introduction

Decades of successful fire suppression and the movement of more people into wildland areas have created a significant fire hazard throughout the United States and increased the complexity of trying to reduce the hazard. The growing number of houses within areas that retain much of their natural state creates a marked problem for public agencies, as it complicates both firefighting efforts and attempts to reduce the hazard through pre-fire fuels management. More people in the woods create not just more houses to protect, but also more views on resource management that must be taken into consideration. As a result, homeowner support of different fuels management practices will be integral to successful fire mitigation efforts.

In wildland areas with a large number of houses, use of prescribed burning will be particularly difficult, and it is likely that thinning will be the dominant method for reducing the fuel load. Many recent newspaper headlines suggest that in many ways thinning is no less controversial a practice than prescribed burning. However, although a limited number of surveys have found that over two-thirds of respondents thought thinning in general an acceptable fire management tool (Shindler and others 1996; Shelby and Speaker 1990), they did not examine differences in acceptability of

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specific thinning practices. In part to fill this critical gap and provide a more nuanced understanding of public views on fuels management practices, a mail survey was administered to homeowners in Incline Village, Nevada (Incline 2001). The town was considered by many within the fire management community to have one of the more proactive and effective fire management programs at the time (National Commission 1994). This program worked closely with town residents and relevant government agencies to encourage vegetation management and use of defensible space protocols.

Study Site

Incline Village is located on the northeast shore of Lake Tahoe, an area renowned for its great beauty, clear water, and abundant recreational opportunities. Approximately 77 percent of the Tahoe watershed is USFS managed land, 12 percent is private, and the remaining 11 percent is California or Nevada state parks (Elliot-Fisk and others 1996). With such valuable natural amenities, the area has been subject to growing population pressures and urbanization since WWII. Most environmental concerns in the Basin revolve in some way around arresting the decrease in the remarkable water clarity of Lake Tahoe that has accompanied development.

Incline Village itself is a resort community surrounded by numerous possibilities for skiing, hiking, and boating. Reflecting its resort status, roughly half the residences are vacant for part of the year. Reflecting the recent mobile demography of the West, only 30 percent had lived in the same residence in 1985. Estimates for 1998 show that the resident population was 87 percent white, had a median age of 41, and a median household income of \$62,347 (Incline 2001). Although the area is unincorporated, and most local government is conducted in Reno, fire responsibilities, including fire education, are administered locally by the North Lake Tahoe Fire Protection District. Essentially a series of homes, condominiums, and shopping strips interspersed throughout the forest, Incline Village is a clear example of residential wildland intermix (RWI). With a high proportion of vacation homes and recent permanent residents in a recreation area surrounded by public lands, it fits well into the demographic portion of the current wildland fire hazard equation. As a wealthy and predominantly white community, Incline Village may not have the broad distribution of income levels and racial groups of many metropolitan areas; however, it is also not an entirely unique representation of a residential-wildland intermix community. Throughout the U.S., the West in particular, scenic rural areas are attracting significant numbers of affluent migrants (Riebsame 1997).

Incline Village is also a good example of the ecological portion of the RWI equation as it sits in the middle of a very significant wildfire threat created by past management practices. Clear-cutting in the late 1800's for local silver mines, and subsequent fire suppression, have created an even-aged, overly dense, white fir forest where drought and bark beetle attacks have left a significant portion of the Basin's trees dead or dying (Huntsinger and others 1998). Such a remarkably uniform and dense fuel load composed of weak and fire-susceptible trees creates conditions most favorable to a wildfire but unfavorable for those living in the Basin. Unwilling to wait for a catastrophic fire to create public support for fuels management, Incline's fire marshal in the late 1980's, Gerald Adams, began to take steps to decrease the

town's exposure through active education and mitigation work that included thinning and use of prescribed burns.

Methods

A mail survey was posted in June 1998 to a random sample of 643 individual property owners following Salant and Dillman's (1994) three wave approach. After bad addresses and undelivered surveys were subtracted, the study had a 46 percent response rate with a total of 279 usable questionnaires. Specific questions were then selected representing various factors—such as sense of responsibility, risk perception, knowledge levels—thought to influence attitudes and behavior in relation to fire management. Significant associations were then examined between these factors using Pearson's chi-square. Because the focus of the study was to identify *potential* factors that could help understand support for wildfire mitigation activities, a relatively low significance level (90 percent) was chosen: $p \leq 0.10$.

Although non-respondents were not contacted, survey respondents closely reflected two key variables that define the population of Incline Village, thereby reducing the risk of significant non-respondent bias. Fifty four percent indicated that they used their Incline property for less than 8 months of the year. This is comparable to the 53 percent of housing units found vacant in the 1990 census and to 1998 calculations that Incline Village had a permanent population of 9,354 residents and a summer population of around 18,000 (Incline 2001). In addition, 64 percent of respondents owned single family residences while 34 percent owned condominiums. This parallels 1990 census data where 34 percent of condominiums and 62 percent of non-condominiums were owner occupied.

In other respects, respondents were wealthier, better educated, and older than recent census demographics: over 57 percent of respondents had an income over \$100,000 (versus 23 percent of 1998 census estimates), 58 percent were over 55 (versus 34 percent of 1998 census estimates), and 47 percent had some post-graduate education (versus 8 percent from the 1990 census). Much of this is likely accounted for by the fact that U.S. Census data includes both homeowners and renters while this survey was sent only to homeowners who generally would be expected to be older and have higher income and education levels than the general population. For instance, the 1990 census data indicates that 67 percent of owners were over 45 whereas only 20.5 percent of renters were over 45. The proportion of male respondents was also higher (66 percent) than that of the 1998 census estimates (51 percent). As the survey requested that the person most responsible for landscape maintenance fill it out, and it is likely that men are often responsible for this, this difference was not unexpected. It is generally observed by those living in Tahoe that much of the population is wealthy and retired, so these results fit that expectation.

Results and Discussion

A portion of the survey focused on acceptability and knowledge related to six thinning methods (*table 1*). No definitions or photos were provided of any of the methods, so responses reflect individual respondent perceptions of what the terminology means. Overall, there was a high level of awareness of thinning as a fire mitigation technique (86 percent), which was also seen as a generally acceptable fuels management activity. Over 75 percent of respondents found four of the five

listed thinning methods at least somewhat acceptable. Hand thinning was most acceptable, with 80 percent of respondents finding its use fully acceptable. Contrary to beliefs that timber harvest is a controversial option, salvage logging and selective timber harvest were both fully acceptable to roughly three-quarters of respondents. Thinning with heavy equipment and use of grazing animals tended to be somewhat less acceptable. The one clearly unacceptable method was use of herbicides, with 50 percent finding them unacceptable.

Table 1—*Respondent views on acceptability of different thinning practices.*

| How acceptable is each thinning method? (n=237) | Acceptable pct | Somewhat acceptable pct | Not acceptable pct | Not sure pct |
|--|-----------------------|--------------------------------|---------------------------|---------------------|
| Hand thinning by work crews | 80 | 15 | 3 | 3 |
| Salvage logging | 75 | 18 | 1 | 6 |
| Selective timber harvest | 73 | 22 | 3 | 2 |
| Undergrowth thinning with heavy equipment | 52 | 26 | 15 | 7 |
| Grazing animals | 48 | 29 | 14 | 9 |
| Herbicides | 13 | 27 | 50 | 10 |

Respondents were asked to give reasons for any practice they found unacceptable. The few responses on timber harvest and salvage logging indicate that the main problem is distrust of commercial logging interests and the likelihood that they would take only mature trees that minimally contribute to the fire hazard, or leave the landscape damaged for decades. While heavy equipment was an issue due to air and noise pollution, the most frequently expressed concern was its potential to damage the soil and increase erosion. Grazing animals were seen by respondents as not practical in Incline given its steep slopes and resort nature: "Cows and goats roaming through Incline? Get real." By far the most comments were regarding herbicides which were seen as being completely unacceptable because they caused, as one respondent put it, "too much collateral damage." Specific reasons for unacceptability of herbicide use included potential negative effects on habitat and health of wildlife and humans, uncertainty of long-term effects, and potential toxic contamination of air, soil, and water.

One element unique to the area that clearly influenced non-acceptability of certain practices was concern about the water quality of Lake Tahoe. This was cited particularly in terms of herbicides getting into the lake and the potential erosion from use of heavy equipment and grazing animals. The surprisingly large proportion of residents who found timber harvest and salvage logging fully acceptable may be related to current logging practices in the Tahoe Basin. Any logging that takes place occurs under very strict conditions in order to minimize potential erosion. Tree removal in sensitive areas is only carried out by helicopter or when there is a snow pack to act as buffer between harvest equipment and soil. Such closely regulated logging may make residents less suspicious of potential environmental damage from timber harvest. The mixed response on grazing animals is possibly reflective of less familiarity with the process as grazing animals are not used much in the Tahoe Basin

or, as indicated earlier, by the sense that it may be appropriate but in places other than Incline Village.

In terms of predictive factors for approval of different thinning methods, risk perception and experience were associated with support for mechanical thinning methods. Respondents who found the fire hazard in Incline more severe were more likely to find salvage logging (80 percent vs. 65 percent), selective timber harvest (83 percent vs. 72 percent), and hand thinning (86 percent vs. 76 percent) acceptable than those who saw the hazard as less severe. Experience with wildfire also appears to be associated with support for use of timber harvesting and salvage logging. Direct experience made a respondent 15 percent more likely to find timber harvest acceptable, and indirect experience had a similar effect on increasing the acceptability of both timber harvest and salvage logging.

The clearest set of associations with acceptability of thinning practices was on the appropriate level of involvement of the individual, state, or federal government in local fire planning. Those who favored a major state or federal role were more willing to accept management methods that, by their nature, are most easily managed at the state or federal level. Those who favored either a major federal or state role were 12 to 16 percent more likely to find hand thinning, salvage logging, and selective timber harvest acceptable than those who favored a more limited federal or state role. Notably, favoring a major federal role had an even stronger effect on acceptability of using heavy equipment (23 percent more likely) but favoring a major state role had no significant relationship with acceptability of heavy equipment use.

Of demographic variables, age was a fairly consistent predictive factor and is likely due to generational differences—the immediate post WWII emphasis on large scale government resource management and Smokey Bear and the more individual oriented, less “government trusting” approach that became more common in the 1960’s. This is reflected in the association found between age and support for a major federal role in fire management, with those over 65 fourteen percent more likely to support a major federal role in local fire planning than respondents 45 to 65 and 18 percent more likely than those under 45 (*table 2*). Further reflecting this pattern is the positive association between age and approval of salvage logging, selective timber harvest, and heavy equipment thinning, with an increase in respondent age associated with a higher degree of acceptability for each method. All are activities requiring some level of large-scale (both financial and administrative) resource management.

Table 2—*The influence of respondent age on views about responsibility and acceptability of thinning practices.*

| Age yr | The federal government should have a major role in local fire planning pct (n=262) | Practice is an acceptable thinning method ¹ | | |
|-----------|---|--|-----------------------------------|-----------------------------------|
| | | Selective timber harvest pct (n=222) | Salvage logging pct (n=209) | Heavy equipment pct (n=210) |
| <45 | 65 ^b | 59 ^b | 71 ^a | 32 ^a |
| 45-64 | 69 | 77 | 76 | 58 |
| <65 | 83 | 80 | 93 | 66 |

¹ Somewhat acceptable and not acceptable were combined for this analysis; not sure was excluded

^a p<0.05; ^b p<0.10

Associations with views on herbicide use showed a very different, although often complementary, pattern (table 3). No relationship was found between risk perception or experience with fire and approval of herbicide use. Age showed a similar relationship to that of other thinning practices with older individuals more likely to find it acceptable, although with herbicides the balance is tilted towards the practice being unacceptable rather than acceptable. Retirees also were more likely to find the practice acceptable. Herbicide acceptability also had a significant association with gender, with women 15 percent more likely to find their use unacceptable. Although favoring a major state or federal role in planning for local fire management showed no association with acceptability of herbicide use, opinion on the appropriate individual role did, with those who favored a major individual role much more likely to find herbicides not acceptable than those who favored a lesser role.

Table 3—Influence of respondent demographic traits and sense of responsibility on unacceptability of herbicide use.

| Age yr | Herbicides are an unacceptable thinning method ¹ pct (n=202) |
|---|---|
| <45 | 77 ^a |
| 45-54 | 68 |
| 55-64 | 44 |
| <65 | 49 |
| Retired | 49 ^b |
| Not retired | 63 |
| Female | 67 ^b |
| Male | 52 |
| Role respondent felt the individual should have in local fire planning | |
| Major role | 64 ^a |
| Supporting or no role | 47 |

¹ Acceptable and somewhat acceptable were combined for this analysis; not sure was excluded

^a p<.05; b: p<.10

Conclusions

Results provide evidence that members of the public are capable of being supportive of most thinning practices. Although caution should be used in generalizing the results given Incline Village’s relatively high wealth and education levels, it should also be noted that a growing number of communities threatened by fire bear similar attributes and also have initiated education programs—so results may be more broadly applicable than at first glance. Notable is the importance of local environmental priorities in shaping acceptability, with concerns over a practice’s potential negative impact on Lake Tahoe’s water clarity being the most consistently stated reason for finding a practice unacceptable. While it is hardly surprising that herbicide use is unacceptable, it is surprising that salvage logging and selective timber harvest were acceptable to the vast majority of respondents. This may again be related to water quality concerns, with both these practices heavily

regulated in the Basin to minimize erosion. Also notable is the relationship between age, sense of responsibility, and acceptability of certain practices where there appears to be a division in views based on age, with older respondents more supportive of government involvement and larger scale thinning practices while younger residents favor greater individual involvement in fire planning and hold a stronger dislike of herbicides. These results suggest that no thinning practice, except perhaps herbicide use, is an automatically unacceptable method. Rather they suggest that acceptability can be tempered by local dynamics that may make some practices that are usually unacceptable less (or perhaps more) problematic in certain regions. It is thus important for fire managers to pay attention to local environmental issues, as well as the general age of the local population, in deciding the best thinning practices to use to reduce the fire hazard.

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