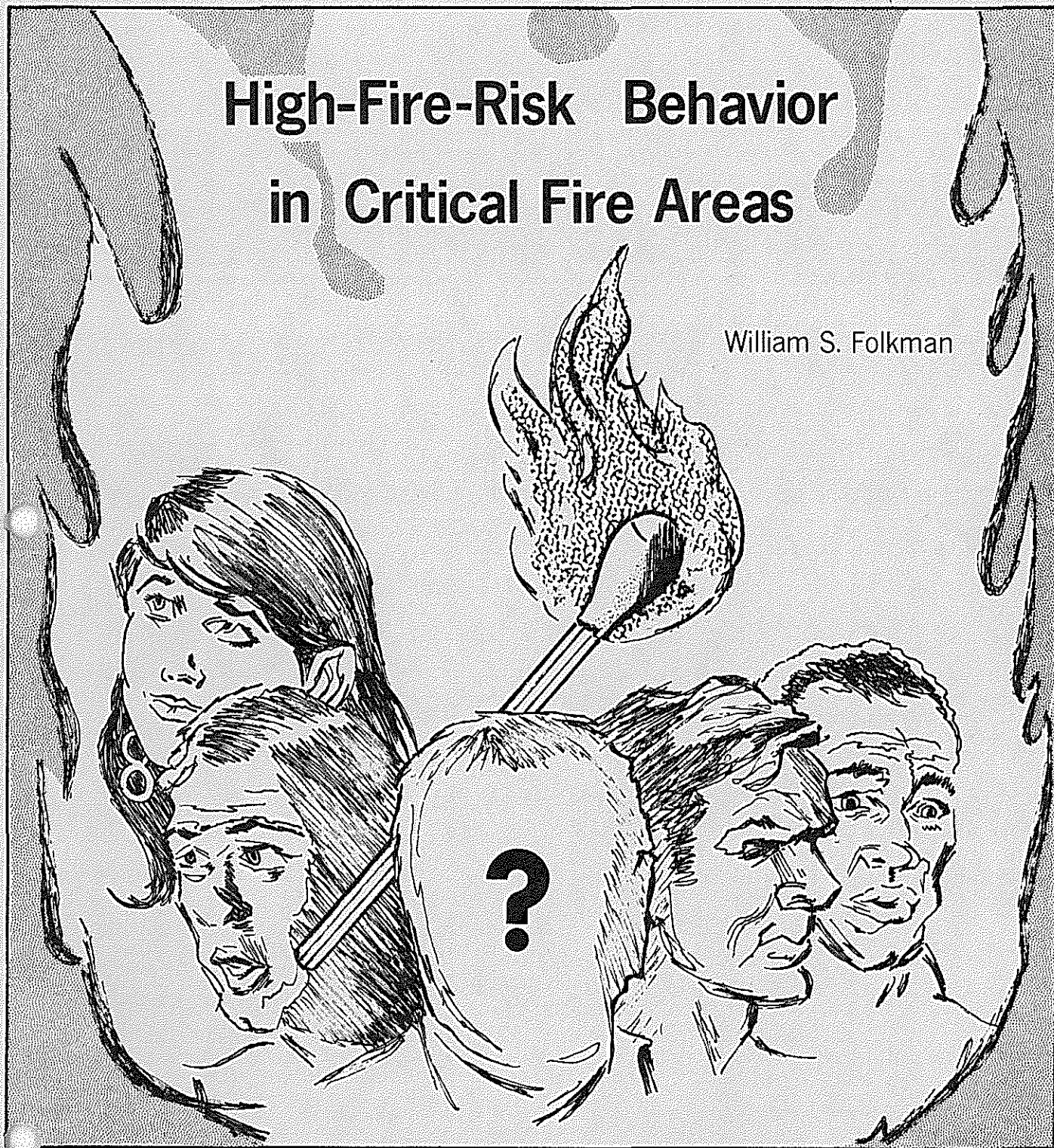


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PACIFIC SOUTHWEST Forest and Range Experiment Station

High-Fire-Risk Behavior in Critical Fire Areas

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SUMMARY

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Retrieval Terms: fire prevention; user characteristics; public attitude;
campfires; fire misuse; high-risk-fire behavior.

Little is definitely known about people who start forest fires. To date, the systematic research identifying high-risk people has been on the basis of indirect indicators—attitudes, knowledge, and frequent activity in wildlands. This study focuses on observation of actual behavior with fire in a wildland situation. The study was conducted within the San Bernardino National Forest in southern California, which has had a high incidence of man-caused fires. Observation/interviews were conducted in three types of areas: wilderness, established campground, and built-up commercial and residential areas. Interviews were attempted in every instance in which fire-related behavior was observed. The populations sampled in the three types of areas proved so diverse that it was not possible to combine them for statistical analysis as originally planned. The types of fire behavior observed also differed markedly from one area to another, as did the proportions of proper and improper use of fire.

The limited size and quality of the distinctly different samples from the three areas, and our inability to combine them, affected the results of our analysis. Few consistent differences appeared in comparisons between persons using fire and those not using it. When the comparison was between those using fire properly and those misusing it, the differences were

even fewer and less consistent. Differences in fire-related behavior were found to be associated more with differences in the activities typical of the different areas studied than with differences in personal characteristics.

Part of the problem may be attributed to the fact that each person was observed only for a very limited time. Consequently, chance frequently determined classification of behavior as safe or unsafe fire use.

Analysis on the basis of the indirect criteria (attitude and knowledge indicators) was equally inconclusive—supporting the conclusion that the difficulty was with the size of sample and the disparate characteristics of the populations studied.

It would not be appropriate, solely on the basis of this study, to say that persons who engage in fire-risk behavior differ in measurable ways from those who do not. This study does make it quite apparent, however, that all types of persons may behave in an unsafe manner under certain circumstances, although possibly some may represent a higher risk than others.

Also, the purpose for which a person is in the wildland has an important bearing on the amount and nature of the fire activity he will engage in, and consequently, on the fire risk he is apt to represent.

We know very little about the people who start forest fires. Although by their aggregate numbers and their cumulative damage they do create a critical problem in California, they are seldom apprehended or positively identified. We have no assurance that the few who do get caught are at all typical of the thousands who escape detection.

To date, the systematic research identifying people likely to show high-risk behavior has dealt with indirect indicators—that is, surveys have determined attitudes and knowledge related to fire-safe procedures for hazardous wildland areas. Those determined to have little knowledge of proper fire prevention procedures, or a poor attitude toward the subject, or both, are assumed to represent high risks. Although it seems logical to assume that there would be a strong correspondence between attitude and actual behavior, or between knowledge of what is proper and the actual performance of it, studies in other subject matter areas have shown that the relationship may be very weak or in some circumstances even reversed (Alwin 1973, DeFries and Ford 1969, Warner and DeFleur 1969, and Wicker 1969).

Because our previous attempts to identify the high

fire-risk types of people were thus inconclusive, this study was designed to focus on observation of actual behavior with fire. High-fire-risk behaving persons are seen as those whose use of fire is potentially dangerous, given the existing environment or situation. They were identified by a study team who went into a wildland critical fire area of southern California. There they observed and interviewed persons using fire or fire-hazardous equipment while in an occupational, recreational, or residential role. Through observation, the team identified those who engaged in appropriate and cautious behavior and those who did not. Then through interviews they obtained demographic, motivational, and other information designed to determine whether those who are fire cautious differ from those who are not, and if so, in what ways.

Southern California was chosen as a study area because the fires of disastrous proportions that occur at too-frequent intervals there have focused attention on the wildland fire problem. In selecting a particular National Forest, we considered the incidence of fires from smoking and campfires—leading sources of fires in California's National Forests.

METHODS

Related Research

Although the assumption is often made that fire use is related to individual characteristics, very few studies have attempted to directly identify the characteristics of persons who are, or have been, careless in their wildland fire behavior. Christiansen and Folkman (1971) studied records of adults apprehended after they had actually ignited forest fires, presumably unintentionally. Siegelman and Folkman (1971) studied apprehended youthful fire setters. The subjects in these two studies were selected from fire investigation reports; because data from this source were incomplete, and for other reasons, the samples were not representative. Consequently, these were exploratory studies, seeking hypotheses to be systematically tested at some future time.

The characterization of 165 fire starters presented by Christiansen and Folkman (1971) was tested systematically by the research reported here. Among the characteristics they noted are that most fire starters are employees working in the forest, few are housewives or professionals, a majority come from small towns, most have good reputations, and most em-

ployers held responsible for forest fires started by their employees are private employers in the railroad-ing, lumbering, or utilities industries.

The Butte County Survey (Folkman 1965) identified persons as high fire risks by their low scores on questionnaire items on fire prevention attitude and knowledge, as associated with high levels of wildland activities. These high-fire-risk persons tended to be young (under 25 years of age), unmarried, and with a limited amount of schooling for their age. A later survey (Folkman 1975) found that people 65 years of age, or older, who also have limited education and income but are frequent wildland visitors, are also a target group for attention in fire prevention work, on the basis of their attitude and knowledge scores. These findings also bear testing in wildland settings by observation of persons who actually engage in fire-risk behavior.

Some work has been done on behavior patterns possibly related to fire risk, such as littering and depreciative behavior in forest campgrounds.

Public Opinion Surveys, Inc. (1968) interviewed two nation-wide samples of adults in which the re-

spondents were asked to indicate whether, during the preceding month, they had littered in any of eight listed ways. Reported littering among adults 21 to 35 was found to be more than three times greater than among persons over 50, and nearly twice that for adults 35 to 49; men litter more than women; farmers and residents of the smallest communities (those under 2500) are more likely to litter than residents in the biggest cities.

McCool and Merriam (1970), found, in a Boundary Water's Canoe Area Study, that place of residence, group membership, and occupation affected sensitivity to litter and compliance with littering regulations. Groups from the local area were least sensitive to litter and complied least with littering regulations; organized groups (Boy Scouts, church groups) more frequently carried out their nonburnable trash than did nonorganized groups. Regulation compliance was greatest among managers, professionals, and students, and least among craftsmen, salesworkers, and operatives. McCool and Merriam also report that compliance was greatest when the communication on litter was conveyed with least anonymity.

Clark and others (1971), through systematic participant observation, recorded depreciative behavior in forest campgrounds. They found no strong relationship between age of camper and incidence of depreciative acts, although age groups differed in the types of acts committed. Teenagers most often violated campground rules (which included littering and traffic violations) and were less likely than adults or children to commit nuisance acts (excessive noise, unsupervised children, intentionally freed pets). Children were most likely to commit acts of vandalism.

Many studies have attempted to determine the characteristics of outdoor recreationists. Differences have been found in the characteristics of persons enjoying different forms of outdoor recreation (Sofranko and Nolan 1970) or different camping styles (Burch 1970; Burch and Wenger 1967; Hendee and others 1968; and West and others 1969). Also, characteristics of visitors to one public park do not necessarily match those of visitors to another (King 1965; Shafter 1965). Similarly, it is conceivable that how persons who are high fire risks differ from those who are not may depend upon the circumstances in which they find themselves.

Although these findings are helpful for comparative purposes, we must guard against assuming beforehand *either* that the high-fire-risk persons will have characteristics similar to the majority, *or* that they will represent an atypical minority.

Study Area

The study was conducted within the San Bernardino National Forest in southern California, which had the highest man-caused fire severity ratio, for the period 1963-72, of any U.S. National Forest.¹ The San Bernardino averaged 26 campfire associated fires per year during the 3-year period 1970-72, a considerable increase from the 5.1 fires per year from this cause in the previous decade. An average 20.5 fires per year were attributed to smoking.

Three types of areas within the Forest were selected for observation and interviews. One was within the San Geronio Wilderness Area; another was the developed campgrounds bordering the Wilderness, and the third was the built-up commercial and residential area about Big Bear Lake, about 25 miles from the campgrounds.

Interviewing Procedure and Sample

The method chosen was to observe fire-related behavior unobtrusively at the time of the first encounter with a given person or group of people. Consequently, the observer had no apparent influence on the observed behavior. Contact between groups in the wildland setting was limited, so that interviewing a member of one group did not affect later contact with other groups.

Observers judged fire use to be "proper" or "improper" on the basis of whether or not such use conformed to, or violated, some well-recognized fire-safety rule or regulation. Smoking while hiking and failure to clear to mineral soil to a 5-foot radius about a campfire are examples of improper fire use.

Interviews were attempted in every instance in which fire-related behavior was observed. If the incident involved more than one person, the observer mentally numbered each person in the group and selected one at random to interview. To maintain the independence of the sample, only one person per group was interviewed. Whenever there were no fire users available, other persons, not involved in any fire-related behavior, were generally interviewed. In the diffusely populated Wilderness Area, however, an interview was attempted with a member of every group encountered. No individuals or groups were interviewed more than once in the course of the study.

¹ DeBruin, Henry W. *Man-caused fire activity severity analysis*. Memorandum, May 29, 1973, on file, Forest Service, U.S. Department of Agriculture, Washington, D.C.

Some bias may have been introduced by the pattern of sampling. The San Geronio Wilderness Area and the campgrounds were very busy on weekends, but had relatively little use during the rest of the week. After a preliminary sortie, the study team decided to limit interviews in the Wilderness Area to weekends, as it was not worthwhile to backpack into the area for only a few interviews. Also, in the Wilderness Area, interviews were conducted along two major trails, which according to Forest Service figures, were used by about 65 percent of the visitors. It is possible that more experienced backpackers would tend to use the less frequented trails. Another source of bias may have been the reservation system in use. Reservations were often made weeks in advance. Those who appeared without advance reservations were shunted off into less frequently used trails, or to some other wilderness area. Thus, in our sample, there would tend to be over representation of the most "organized" users—possibly middle-class employed people, accustomed to using reservation systems. Nevertheless, the characteristics of our sample correspond closely to those of other studies of wilderness users (Burch and Wenger 1967; Hendee and others 1968).

In the campgrounds, our sample was more consistent and complete. An interview was attempted with a member of each group in which there was an observed instance of proper or improper fire behavior. The only major segment of campground users not fully represented were those who had trailers or campers, with no outside fires. Interviews were completed with over 80 percent of those observed to be engaged in fire-related behavior.

The sampling problem was most difficult in the built-up areas around Big Bear Lake. The interviewers had to work harder to persuade people to be interviewed, and there was a higher refusal rate. Almost the only fire-related behavior observed was smoking, as people moved about the streets and entered or left stores or automobiles. Those interviewed tended to be older, or to a lesser extent younger, than the average person encountered. Middle-aged people tended to be more hurried or busy, and we got more rejections from them. Because interviewers used the "wildland area" criteria in defining improper fire-related behavior, they observed few instances of im-

proper fire use in these built-up areas. If careless or unaware types of actions, which would be dangerous under more hazardous conditions, had been noted, more observations might have been made. But this procedure would require estimating the extent to which fire-risk behavior would be modified in more hazardous surroundings.

The characteristics of the persons interviewed vary so widely between the three samples that it is apparent that the samples represent three quite distinct populations (*Appendix, table 2*). Consequently, we have maintained their identity in the analysis, rather than combining them as originally planned.

Because of the limited size of the unaggregated samples and other inadequacies in the data, statistical tests of significance of differences were only used for heuristic purposes.

Respondents encountered in the wilderness, in contrast to those from the other two areas, tended to be young single males. Over half of them were currently enrolled in school, but still, on the average, they had completed more years of schooling than had those encountered in the other areas. Few were in nonwork status (retiree, housewife). This sample showed the highest proportion of persons employed in professional and technical jobs, but also the highest proportion of laborers. Their average total family income was noticeably higher than that of the other respondents.

In most characteristics, the respondents from the commercial/residential area represented the antithesis of respondents in the wilderness, with the campground users falling between these two groups. The sample of campground users did show the highest proportion of married and nonwhite respondents; although, even in this group, less than one in ten were in the latter category. It also showed the highest proportion of persons employed full time.

In summary, the sample obtained in the campgrounds is satisfactory; it fairly represents the population using this type of forest facility. The sample from the Wilderness Area is perhaps less representative of *all* users of the San Geronio Wilderness Area, but fairly represents those users of the most frequented portions of the Wilderness. Unfortunately, however, the sample from the commercial/residential area is little more than a sample of opportunity.

RESULTS

The samples from the three areas differed markedly from one another in the proportion of persons observed using fire properly and improperly, as follows:

	<i>Percent of persons observed</i>			
	<i>Commercial/ residential area (n=157)</i>	<i>Camp- ground (n=269)</i>	<i>Wilderness (n=122)</i>	<i>All areas (n=548)</i>
Fire use:				
Proper	73.9	65.4	53.3	65.1
Improper	2.5	32.7	18.8	21.0
None				
observed	23.6	1.9	27.9	13.9
Total	100.0	100.0	100.0	100.0

The samples differed not only in proportions of proper and improper fire use, but also in the types of fire behavior observed (*table 1*; note that *table 1* includes a few reports of two or more fire activities by a single individual, percentages in the tabulation by persons observed cannot be derived directly by summing from *table 1*).

In the commercial/residential area, where smoking was the major activity observed, most such behavior was not considered risky under the circumstances. A faulty spark arrester on a motorbike was the only other fire risk observed in this area. In the campgrounds, activity related to campfires was the most prevalent fire-risk behavior noted, and smoking was next in rank. Equipment misuse was also observed. Very few wilderness users were observed using smoking materials, partly, perhaps because of the high fire hazard, but also because persons encountered in the wilderness area proved less apt to be smokers than those in other wildland situations—only 25.4 percent for wilderness as opposed to 80.9 and 42.8 percent for commercial/residential and campground areas. The most frequently observed fire activity in the wilderness area was equipment use (pack stove); campfire use was next.

On the basis of observations and interviews, comparisons were made between persons who misused fire and those who used it properly, and between those who used fire in any form and those who did not use fire at all. The comparisons related fire use to socio-economic variables: age, sex, race, employment status, place of employment and residence, years of school completed, marital status, and family income. Variables describing amount or kind of wildland use were also evaluated: number of visits to wildland

areas, frequency of camping, use of portable stove, outdoor campfires, etc. Types of outdoor recreation engaged in, number and average number of members of group, and composition of group (i.e., immediate family, other relatives, fellow workers, friends, etc.) were also considered.

Some differences in characteristics appeared in comparisons between persons using fire and those not using it. When the comparison was between those using fire properly and those misusing it, fewer differences appeared.

In summary, persons using fire in the commercial/residential area tended to be younger, single, local wildland residents, employed in sales, operative, or service occupations. In the wilderness area, those using fire were most frequently married and not currently employed. In the campgrounds, they were more likely to be out of school and in occupations other than professional, technical, or laborer categories. Number of persons in the party appeared to be related to fire use in the campground and wilderness areas. Nonfire-users tended to be in parties somewhat larger than the median in campgrounds and slightly smaller than the median in the wilderness area.

No differentiation was possible between fire users and non-users in relation to the variables of race, working in a wildland area, number of visits to a wildland area, composition of the person's group, school grade completed, employment (self-employed or working for others), type of business or industry, and family income, in any of the three areas studied.

Few of the distinguishing characteristics that were evident in the user-nonuser comparisons appeared in comparison between those who used fire in a safe manner and those who used it in a way that was identified as risky. For the commercial/residential area, type of outdoor recreation preferred was different; those who used fire properly expressed a preference for camping and fishing, but those who used fire improperly opted for hiking, motorcycling, or just relaxing. Those who showed "risky" fire behavior in this area were equally divided among the young and those 65 years of age or over. Those who were widowed, divorced, or separated were more frequently observed to engage in fire-risky behavior; the fire-safe persons were most frequently found to be married.

In the campgrounds, the only variable that stood out was smoking. A greater proportion of those who used fire in a risky fashion proved to be smokers.

None of the variables considered was effective in

Table 1—*Proper and improper fire use observed in three areas of the San Bernardino National Forest, California, 1975*

Fire activity	Frequency of observation in . . .		
	Commercial/ residential area (n=157)	Campground (n=269)	Wilderness (n=122)
	Percent		
Smoking:			
Proper			
Smoked in 3 ft cleared area	59.9	11.2	4.1
Crushed smoke on mineral soil	8.9	1.5	.8
Broke match	—	.4	—
Other	1.3	2.6	—
Improper			
Smoked while hiking	1.3	—	—
Smoked while standing or sitting in uncleared area	—	7.1	1.6
Smoked in inadequately cleared area	.6	1.9	1.6
Discarded smoking materials in uncleared area	—	.7	—
No smoking reported	28.0	74.7	91.8
	100.0	100.0	100.0
Campfire:			
Proper			
In cleared circle, 10 ft	1.3	36.1	16.4
Left fire dead out	—	6.7	—
Other	—	—	5.7
Improper			
In cleared circle, less than 10 ft	—	7.8	1.6
Site not clear to bare soil	—	12.6	4.1
Made fire under overhead foliage	—	—	.8
Left fire unattended	—	1.1	—
Other	—	—	—
No campfire reported	98.7	35.7	71.4
	100.0	100.0	100.0
Debris burning:			
Proper—in cleared circle, 10 ft	—	.7	—
No debris burning reported	100.0	99.3	100.0
	100.0	100.0	100.0
Playing with fire:			
Proper—cleared area: activity ok	—	1.1	—
Improper—uncleared or prohibited area	—	.4	1.6
No playing with fire reported	100.0	98.5	98.4
	100.0	100.0	100.0
Equipment use:			
Proper			
10 ft clearance to bare earth	.6	16.7	36.9
Spark arrester ok	3.2	1.1	—
Improper			
Inadequate clearance or none	—	4.1	10.6
Faulty spark arrester or none	.6	—	—
No equipment use reported	95.5	78.1	52.5
	100.0	100.0	100.0

distinguishing proper from improper fire users in the wilderness area.

Although some differences were observed between persons who used fire (whether safely or unsafely), and those who did not use fire in any form, these differences were seldom consistent from one subpopulation to another. The few differences observed in

the comparison between fire-risk persons and fire-safe persons did not support the various sub-hypotheses proposed in this study. Therefore, the general hypothesis being tested—persons who engage in fire-risk behavior differ in measurable ways from persons who do not engage in fire-risk behavior—must be considered as unsupported on the basis of this study.

DISCUSSION

This study was undertaken with considerable trepidation. We were attempting for the first time to make meaningful observations of fire-risk behavior under wildland conditions. The failure to find distinctive differences between people observed in unsafe fire behavior and those not so observed was, of course, contrary to our expectations. The possibility that there is really no difference between the two groups has powerful implications for fire prevention planning and would require rethinking of research and application strategies. All of our previous experience has led to the understanding that some people, for various reasons, represent a higher fire risk than do others. Alternatively, therefore, we must question the adequacy of the study.

The size of the three subsamples, which we could not combine for analysis, was limited. The division on the basis of location (commercial/residential, campground, or wilderness) with further division on the basis of risk, meant that some categories contained only a few respondents.

Of necessity, the determinations made by our staff were random—only that fire-related activity observable at time of encounter was evaluated as fire safe or risky. A representative sample of fire users should thus have been assured. However, although all those persons observed engaged in unsafe fire behavior were properly placed in the fire risk category, many persons placed in the fire safe category may be there because at the time of encounter they did not happen to be behaving carelessly. Thus, there is a large element of chance in their classification as fire safe individuals. There is no assurance that further observation would not have revealed unsafe fire behavior. Similarly, differentiation between persons observed in fire-related behavior, as opposed to those not so observed, depends largely on chance.

Because of the inconclusive results of the observational analysis, an attempt also was made to differentiate high and low fire risk on the basis of the indirect

criteria used in previous studies (i.e., knowledge, attitude, and activity scores), but the results were equally inconclusive. A few variables showed up as being related to risk, but the relation was inconsistent between samples. This inconsistency supports the conclusion that the size and adequacy of sample and the disparate characteristics of the populations studied are responsible for the inconclusive findings. Although we cannot conclude that persons who show fire-risk behavior differ in measurable ways from those who do not, neither can we assume the opposite. Further research profiting from the experience of this study is needed to ferret out the subtle and complex factors related to fire-risk behavior. Such research might well take the form of detailed study of fire related behavior in high-risk situations, perhaps by participant observation. Findings would form the basis for hypotheses to be tested on a broader scale, giving particular attention to the difficult problems of rigorous sampling in such circumstances.

One point which this study does make quite plain, and one that needs to be made repeatedly, is that all types of persons may behave in an unsafe manner under certain circumstances. In our attempts to delineate high fire-risk "types," we are apt to forget that these delineations—like all predictions of human behavior—are based on probabilities. Some people may represent a higher risk than others, but everyone is a potential source of uncontrolled fire.

Another point to be stressed is that persons in the wildland for different purposes—camping in an established compound, backpacking, or whatever—are apt to differ quite markedly in the nature of the fire risk they represent. Such variations must be considered by fire management agencies who wish to influence behavioral changes of wildland users.

Although it is still desirable to identify those types of persons who, for whatever reason, are a higher fire risk than others, we must also recognize that we are *all* potential risks—in truth, the enemy is us.

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APPENDIX

Table 2—Selected social and demographic characteristics of persons observed during study of fire-related behavior, by observation area, San Bernardino National Forest, 1975

Characteristics	Commercial/ residential area (n=157)	Campground (n=269)	Wilderness (n=122)	Total (n=549)
	Percent			
Age:				
Under 20	17.9	9.0	24.6	15.1
20-24	8.3	15.0	24.6	15.3
25-29	15.4	15.4	9.0	14.0
30-44	21.8	36.8	31.1	31.2
45-64	25.6	20.7	10.7	19.8
65 and over	10.9	3.0	—	4.6
Total	100.0	100.0	100.0	100.0
Median years	35.8	32.5	25.0	32.1
Sex:				
Male	61.1	73.6	82.8	72.1
Female	38.9	26.4	16.4	27.7
Not reported	—	—	.8	.2
Total	100.0	100.0	100.0	100.0
Race:				
Chicano	1.9	5.9	—	3.5
White	97.5	91.8	96.7	94.5
Black	.6	1.1	1.6	1.1
Other	—	1.1	.8	.7
Not reported	—	—	.8	.2
Total	100.0	100.0	100.0	100.0
Marital Status:				
Married	52.2	75.1	46.7	62.2
Widowed, divorced or separated	14.0	8.6	4.9	9.3
Single	32.5	16.0	48.4	27.9
Not reported	1.2	.4	—	.6
Total	100.0	100.0	100.0	100.0
Schooling completed:				
0-4 years	—	—	—	—
5-7 years	.6	.7	.8	.7
8 years	5.1	1.5	2.5	2.7
Some high school	21.7	11.2	12.3	14.4
High school graduate	26.1	27.1	11.5	23.4
Some college	35.0	35.7	35.2	35.4
College graduate	5.7	12.6	18.0	11.9
Post-graduate	5.7	10.4	19.7	11.1
Not reported	—	.7	—	.4
Total	100.0	100.0	100.0	100.0
Currently enrolled in school:				
Yes	24.8	31.2	51.6	33.9
No	75.2	68.0	48.4	65.7
Not reported	—	.7	—	.4
Total	100.0	100.0	100.0	100.0

Table 2—Selected social and demographic characteristics of persons observed during study of fire-related behavior, by observation area, San Bernardino National Forest, 1975—Continued

Characteristics	Commercial/ residential area (n=157)	Campground (n=269)	Wilderness (n=122)	Total (n=549)
Percent				
Employment status:				
Employed, full time	46.5	66.5	53.3	57.8
Employed, part time	17.8	11.5	35.2	18.6
Unemployed	1.9	1.5	1.6	1.6
Retired	14.0	4.8	—	6.4
Student	7.6	8.2	9.0	8.2
Housewife	10.2	7.4	.8	6.8
Other	1.9	—	—	.5
Not reported	—	—	—	—
Total	100.0	100.0	100.0	100.0
Type of business:				
Agriculture, forestry, and fisheries	4.5	3.0	2.5	3.3
Mining	—	—	—	—
Construction	8.3	8.6	5.7	7.8
Manufacturing	14.0	17.5	13.9	15.7
Transportation, communications, and other public utilities	6.4	9.7	9.0	8.6
Wholesale and retail trade	18.5	10.0	11.5	12.8
Finance, insurance, and real estate	4.5	4.1	4.1	4.2
Business and repair services	4.5	3.7	1.6	3.5
Personal services	6.4	1.9	5.7	4.0
Entertainment and recreation services	6.4	2.6	3.3	3.8
Professional and related services	15.3	22.7	35.2	23.4
Public administration	5.1	6.7	4.1	5.7
Not reported	1.9	1.5	—	1.3
Does not apply	4.5	8.2	3.3	6.8
Total	100.0	100.0	100.0	100.0
Kind of work:				
Professional, technical, and kindred workers	16.6	22.3	37.7	24.1
Farmers and farm managers	—	.4	.8	.4
Managers, officials, and proprietors, except farm	5.1	8.6	5.7	6.9
Clerical and kindred workers	12.1	11.9	9.8	11.5
Sales workers	10.8	5.9	4.1	6.9
Craftsmen, foremen, and kindred workers	12.1	21.6	13.9	17.2
Operatives and kindred workers	12.1	10.4	4.1	9.5
Service workers	15.3	4.8	8.2	8.6
Laborers	8.3	3.0	10.7	6.2
Not reported or does not apply	7.6	11.2	4.9	8.8
Total	100.0	100.0	100.0	100.0

Table 2—Selected social and demographic characteristics of persons observed during study of fire-related behavior, by observation area, San Bernardino National Forest, 1975—Continued

Characteristics	Commercial/ residential area (n=157)	Campground (n=269)	Wilderness (n=122)	Total (n=549)
Family income (dollars):				
Under 1,500	2.5	—	.8	.9
1,500-2,999	1.9	1.5	.8	1.5
3,000-4,499	5.7	2.6	4.1	3.8
4,500-5,999	5.1	2.2	3.3	3.3
6,000-7,999	10.8	5.9	—	6.0
8,000-9,999	5.7	5.9	5.7	5.8
10,000-14,999	26.1	28.6	26.2	27.4
15,000-19,999	13.4	24.2	23.0	20.8
20,000 and more	14.0	20.4	33.6	21.5
Not reported	14.6	8.6	2.5	8.9
Total	100.0	100.0	100.0	100.0
Median	\$9,829	\$12,304	\$14,194	\$11,915
Residence:				
City	28.6	55.4	59.0	48.9
Suburb	8.8	30.3	30.3	24.4
Rural	8.8	10.9	9.8	10.1
Wildland	53.7	3.4	.8	16.6
Total	100.0	100.0	100.0	100.0

Folkman, William S.

1977. **High-fire-risk behavior in critical fire areas.** USDA Forest Serv. Res. Paper PSW-125, 12 p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif.

Observations of fire-related behavior of wildland visitors were made in three types of areas—wilderness, established campground, and built-up commercial and residential areas—within the San Bernardino National Forest, California. Interviews were conducted with all persons so observed. Types of fire-related behavior differed markedly from one area to another, as did the proportions of observed proper and improper use of fire. Persons who misused fire could not be distinguished from those who did not, when interview data were analyzed in relation to selected social and demographic characteristics. Small sample size and wide individual variation suggest why results were inconclusive.

Oxford: 431.3(794)—U301.153.

Retrieval Terms: fire prevention; user characteristics; public attitude; campfires; fire misuse; high-risk-fire behavior.

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