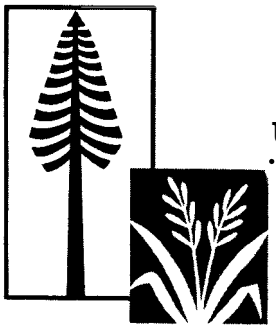
Residents of Butte County, California: Their Knowledge and Attitudes Regarding Forest Fire Prevention

William S. Folkman



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Contents

The Author

WILLIAM S. FOLKMAN is responsible for studies of the sociological problems in the prevention of man-caused forest fires. He joined the Pacific Southwest Station staff in 1962 after a career in sociological research and teaching with several universities and the U. S. Department of Agriculture's Agricultural Marketing Service and Economic Research Service in Washington, D. C. A native of Ogden, Utah, he holds a bachelor's degree in agriculture from Utah State Agricultural College, a master's degree in sociology from the University of Utah, and a doctorate in rural sociology from Cornell University. He has also studied at the American Graduate School of the University of Copenhagen in Denmark and at the University of Strasbourg in France.

Demands for recreational use of land, lakes, and rivers in forested areas are expanding at phenomenal rates. This growth has been stimulated by an increasing population, widening mobility, rising standards of living, increased personal income, more leisure time, and changing patterns of use of leisure time. The pressure for desirable residential sites has forced many families into intimate and continued contact with wildland areas. The increased tempo of electric power line and highway construction, as well as the traditional occupational uses of the forest, has brought expanding numbers of workers into the forests.

The greater use, mainly by urban-oriented forest publics, raises problems for those responsible for the management and protection of forests. Foremost among these problems is that of man-caused forest fires. Fortunately, the number of such fires does not increase in a geometric, or even arithmetic, progression with the number of people. Nevertheless, just staying abreast of the problem requires continued effort.

As in so many other situations the State of California presents a larger-than-life size reflection of this national problem. The highly touted Mediterranean-type climate coupled with the rugged and scenic terrain is, perhaps, largely responsible. Many people have been attracted by these qualities, and such qualities encourage them to spend much time out of doors. This has brought many people into a precarious contact with the high-risk forest environment created by this same combination of climatic and physical conditions.

Firefighting research has brought significant improvements in materials and techniques for combating fires. In fire prevention, some success has been achieved by an engineering approach. Experiments with fire retardant sprays for roadsides, fireproofing practices in campgrounds, clearing of fuels from around forest residences, and similar practices have resulted in improved means of modifying the environment around the forest publics.

Behavioral studies in fire prevention research are expected to lead to more effective means of modifying human behavior itself, rather than the environment, to achieve further reductions in fire starts. It is recognized, however, that an acceptable degree of control of wildfire will require a continued attention to all these approaches to the problem.

This paper reports on one aspect of a continuing study concerned with modifying human behavior with regard to the use of fire in high hazard wildland areas. [1] The study seeks to identify groups of people representing different degrees of risk from a fire prevention standpoint. It will aid in determining the direction of further studies, as well as serve as a benchmark from which to measure the effects of later program changes. This work is sponsored jointly by the California Division of Forestry and the Pacific Southwest Forest and Range Experiment Station.

Previous Studies

Use patterns stemming from frontier times have perpetuated the practice of essentially free and unlimited access to wildland areas, whether privately or publicly owned. The Forest Service policy traditionally has been that the National Forests belong to the American people and only under exceptional conditions or situations is restriction placed on entry. As a consequence, even the gross number of people visiting a given forest, or man-

[1] Herrmann, W. W., Callahan, R. B., Gray, David, and Porter, Seymour. **A research design for the prevention of man-caused forest fires, 1959-1960 Progress Report.** Los Angeles: Univ. So. Calif. 1961.

agement unit, is known only in the most general terms. Information regarding who these people are and what they do in the forest is very limited. Recent reports of the Outdoor Recreation Resources Review Commission [2] relieve some of this information gap for recreational uses. But its data are on a national basis, with only limited regional reporting.

Several studies, two dating back to the late 1930's, have been made in the Southeast and Ozark regions of the United States. [3] Without exception, they relate woods burning to the culture of the area. Burning was an important tool in land clearing. It was thought to improve grazing, control ticks, snakes, and other undesirable wildlife. Such burning was once a widely accepted practice. But of late, it is largely confined to a relatively small segment of the economically deprived, for whom it seems to serve as a means for expressing frustration and hostility, although, for some, a real or fancied economic advantage may be involved.

Except for the research conducted at the Pacific Southwest Station in recent years, there appears to have been no study of the behavioral aspects of man-caused fires outside the South. The results thus far indicate that in California the starting of wildfires is not culturally supported as it has been in the Southeast, although under certain conditions culturally patterned evasion of fire regulations is accepted in much the same way that traffic violations are.

To further test some of the research findings arising from the Station's earlier studies and to evaluate the effectiveness of various educational efforts, we selected a county to serve as a laboratory. A number of important considerations suggested a county as a unit of study. It is the smallest practical unit having some administrative autonomy and uniformity while still representative of the fire prevention problem. Butte County, in northern California, was selected after careful attention was given to the criteria set up for a test county. It has all of the major wildland uses, such as lumbering, recreation, and grazing; it includes both Forest Service and California Division of Forestry protection jurisdiction and its forests are essentially typical of the wildland areas of the State.

People from outside the county, of course, do visit the wildlands in Butte County, and thereby contribute to the local fire problem. The decision to confine the study to Butte County residents consequently requires some justification. In addition to the obvious difficulties of adequately sampling and interviewing forest users while they are at large in the forest, or of tracing them to their diverse home areas, there are positive reasons for confining the study to county residents. The study of a resident population provides an opportunity to determine how various types of wildland users compare with their neighbors who do not make use of these areas. Here we are concerned with their relative numbers, differences in socio-economic characteristics, levels of knowledge and attitudes regarding fire use and abuse, and other information. Both nonresidents and residents are exposed to the limited fire prevention education which may be conducted in the wildlands. But an effective fire prevention program requires a sustaining effort back home—something that could not be controlled for the nonresidents.

Such a program involves stepped up exposure to fire prevention messages through the various mass media; experimental changes in the frequency or method of personal contacts made by fire prevention personnel; and special work with schools, service organizations, and other groups whose members conceivably are exposed to the wildland environment through their occupational or recreation interests.

A necessary first step, and the focus of this study, was to determine the current level of attitudes and understanding of the residents of Butte County as they pertain to fire prevention. These levels were to be related to the amount and type of use of the wildland and other characteristics of the respondents. Such a benchmark is essential to measure the effects of future efforts in the county.

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[2] **ORRRC Study Reports.** Vols. 1 through 27. U. S. Government Printing Office, Washington, D.C. 1962.

[3] Hansbrough, Thomas R. **Analysis of man-caused fires in Louisiana.** 1961. (Unpublished doctor's thesis on file at Louisiana State Univ., Baton Rouge, La.).

Kaufman, Harold F. **Social factors in the reforestation of the Missouri Ozarks.** 1939. (Unpublished master's thesis on file at Univ. Missouri, Columbia, Mo.).

Shea, John P. **The psychologist makes a diagnosis.** 1939.(Unpublished rpt. on file at U.S. Forest Serv., Washington, D.C.).

Morris, John B. **Preliminary investigation of human factors in forest fires.** 1958. (Unpublished rpt. on file at Southern Forest Expt. Sta., U. S. Forest Serv., New Orleans, La.)

Method of Study

A representative sample of the resident population of Butte County was interviewed to obtain the data whereby the necessary benchmark could be established. An area sampling design was developed for the county, including urban and other presumably low risk areas and those where exposure to the high hazard areas is more direct and sustained. The sample was also designed to represent all age groups 14 years of age or over and not just household heads. The sample consisted of 851 potential respondents, about 1.4 percent of the eligible population. From this sample 761 completed the questionnaires, an attrition of 11 percent.

Failure to find respondents at home, in spite of repeated callbacks, accounted for about one-third of the non-response. Another one-third was due to refusals. Change of residence between time of listing and interviewing was responsible for 15 percent of the non-response. The remainder—a similar proportion—was attributable to serious illness or other barriers to communication. Non-response did not seem to effect the representativeness of the sample.

The representativeness of the sample was confirmed by relating comparable items (such as age, marital status, grades of school completed, and income) from the 1960 population census. Only in income did the parent population and the sample show a significant difference. Higher income groups appear to be over-represented in the sample. While it is possibly true that lower income groups actually were under-represented, the economic well-being of the county had improved markedly in the 4 years between the time of the national census and interviewing for this study. This might account for at least part of the difference.

The field work for the survey and some of the analysis were done in cooperation with the Survey Research Center, University of California, Berkeley. Interviewing was done by experienced interviewers furnished and supervised by the Survey Research Center. Experiment Station personnel participated in training the interviewers.

The series of questions used to measure the current levels of knowledge regarding fire risk, approved fire safety practices, and fire control regulations was developed in earlier, Station-supported research by the University of Southern California, modified in line with our most recent experience. [4] Attitudes associated with these areas of knowledge were measured by a series of questions, some of which were developed by the group at the University of Southern California, some by the Experiment Station, but none previously used in a study.

Findings

Exposure to the High Risk Forest Environment

To assess the degree of risk a particular type of wildland user represents, it is necessary to consider (a) the type of activity he engages in, (b) the season of the year when this takes place, (c) where it takes place, (d) how often it takes place, (e) the knowledge he possesses regarding safe use of fire in the vulnerable areas, and (f) his desire to use this knowledge consistently and properly.

Hunting, for example, is generally a solitary and back country sport. The typical hunter does not stay in an improved campground where hazards have been removed. He does not spend his time by a stream where a flipped cigarette has a fair chance of landing in water. He is not apt to camp near many other hunters who might put out any fire he may carelessly leave burning. In contrast to the skier, he puts himself in the most hazardous part of the wildland during the most hazardous season of the year. Indications are that he has a comparatively good knowledge of safe fire use. [5] But because of these other factors the hunter still constitutes a significant fire risk.

Other wildland users, for some different and some similar reasons, also constitute fire risks.

[4] Folkman, William S. **Levels and sources of forest fire prevention knowledge of California hunters.** U.S. Forest Serv. Res. Paper PSW-11, Pacific SW. Forest & Range Expt. Sta., Berkeley, Calif. 1963.

[5] Folkman, *op. cit.* p. *7.*

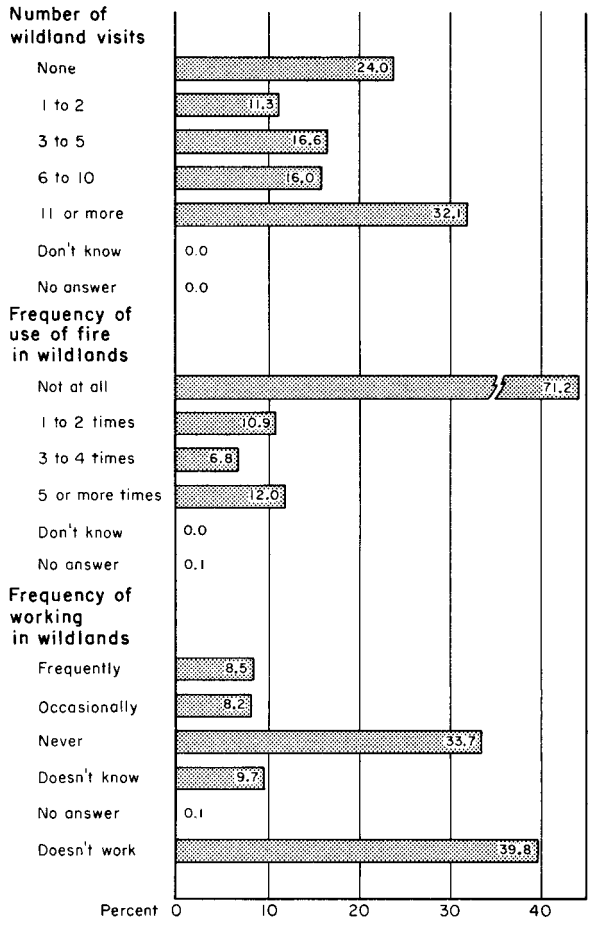

Figure 1.—Percentage distribution of certain wildland activities of Butte County residents, 1964.

Even the person whose only contact with wildland is driving through on a paved road may be a source of uncontrolled fire if he throws a lighted cigarette or match through the open window of his car. If he stops and pulls off the road he may unknowingly increase his potential for starting a fire. According to the response to one item in the Knowledge section of the questionnaire, 16 percent of the respondents were unaware that a fire can be started by exhaust sparks or sparks made by contact of metal parts of the car with rocks.

The results of this survey show that a rather high proportion of Butte County residents were exposed to the high risk environment of the wildlands of the county at some time or other, and thus in some degree must be considered as potential fire starters (fig. 1). Three-fourths of the respondents were in these wildlands at least once during the year preceding the interview. Nearly one-third were in areas of high fire danger on more than 10 occasions during this period. Many of these persons who were exposed to this highly inflammable environment used fire in these areas—whether for cooking, warming, recreational purpose, or in connection with their work. (This is aside from smoking as a use of fire.) Twenty-nine percent of the respondents admitted using fire in the wildland areas at least once, 12 percent five or more .times. Some under-reporting is possible because some respondents may have felt that an admission of use would be self-incriminating even though the use may have been entirely legitimate. The number reporting positively to a later question as to whether they had a campfire permit corresponds closely with the number reporting having used fire.

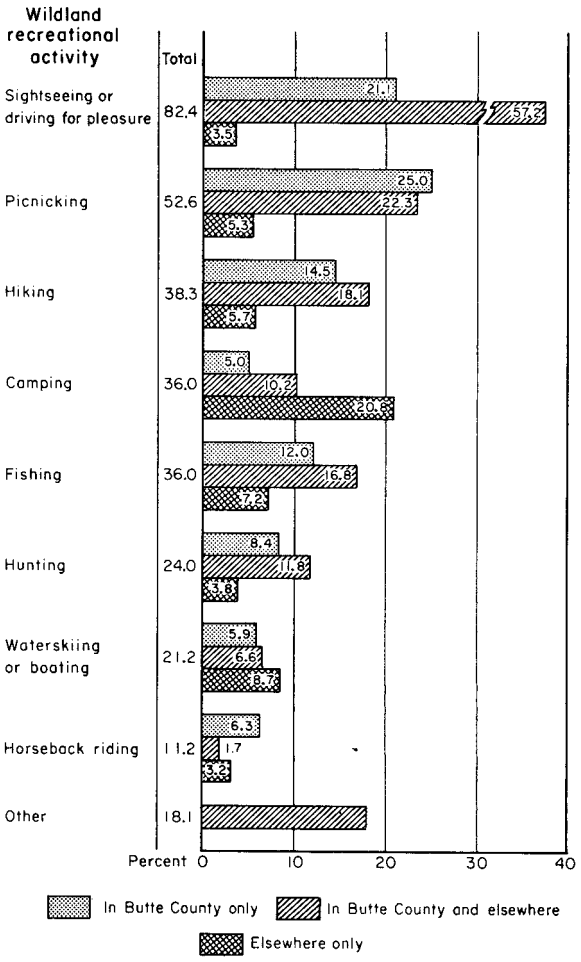

Figure 2.—Percentage distribution by type of wildland recreation engaged in by Butte County residents, 14 years of age and over, 1964.

Most of the wildland use is for recreational purposes, but 17 percent of the respondents reported that their work occasionally took them into the wildland areas of the county. One-half of these said that their work required them to be in these areas *frequently*.

It is a rare individual who does not get out into the wildlands in Butte County at some time during the year, if only for a pleasure drive or sightseeing excursion. Four out of five of the respondents reported having engaged in this activity (fig. 2). The next most frequent activity in terms of proportion participating, was picnicking, with half of the respondents involved. Hiking, the third most often reported, was cited by 38 percent. The other recreational activities, in order of frequency of mention, were fishing, camping, hunting, and water sports. Other miscellaneous activities, ranging from swimming to gold panning and bottle hunting, occupied the attention of 18 percent of the respondents.

The extent of participation in outdoor recreational activities by Butte County residents resembles that of people elsewhere in the West and throughout the United States (table 1). The only major difference is that hiking seems to be much more popular in Butte County than it does elsewhere.

As might be expected, there was a rather close interrelationship among some of the wildland activities. Campers, fishers, and hikers, for example, were also engaged to a significant extent in all other activities covered in the questionnaire. Picnickers and hunters tended to be involved in other outdoor activities to a slightly less degree, while horseback riders and water sports enthusiasts appeared to have even narrower interests.

When type of activity is related to frequency of use of fire, campers most often used fire, followed by those in the miscellaneous "other activities" category and hunters. Persons reporting these other activities used fire between 6 and 10 times on the average. Persons driving for pleasure and picnicking reported the lowest frequency of use of fire, but even these averaged between three and five occasions when they used fire in the wildland areas during the year.

Socio-economic Relationships

To be able to relate wildland activity to the characteristics of those involved has value to the wildland manager who is concerned with implementing a fire prevention program. By more precisely defining the publics he must deal with, he can more efficiently and effectively operate his

Table 1.--*Participation in outdoor recreational activities of Butte County residents compared with national and regional participation* [1/]

Activity	Percent participation		
	United States	West	Butte County
Camping	8	17	36
Sightseeing	42	55	
Driving for pleasure	52	56	82
Fishing	29	30	36
Hiking	6	9	38
Horseback riding	6	11	11
Hunting	[2/]13	[2/]14	24
Picknicking	53	54	53
Boating	22	23	21
Waterskiing	6	9	
Other activity	--	--	18

[1]Data for the United States and Western Region are from: Outdoor Recreation Resources Review Commission. National Recreation Survey. ORRRC Study Report 19, 394 pp., 1962. In a number of ways the data are not comparable. The national survey included respondents 12 years of age and over; the Butte County survey included those 14 years of age and over. The national survey data reported are for the period from June through August (except for hunting which is for September through December); the Butte County data are for the entire year.

[2]Period reported is September through December.

Table 2.--*Wildland activity related to certain socio-economic characteristics, Butte County, 1964*

Characteristic	Number of respondents	Total number of wildland visits					
		None	1-2	3-5	6-10	11+	Total
		Percent					
Age last birthday:							
10-24	168	10.7	10.7	20.2	13.7	44.7	100.0
25-34	102	19.6	11.8	11.8	23.5	33.3	100.0
35-49	190	20.5	10.5	17.4	20.0	31.6	100.0
50-64	173	25.5	11.0	18.5	12.1	32.9	100.0
65 and over	127	48.0	13.4	11.8	12.6	14.2	100.0
Not reported	1	100.0	--	--	--	--	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0
Sex:							
Male	369	16.8	8.1	15.2	19.8	40.1	100.0
Female	392	30.9	14.3	17.8	12.5	24.5	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0
Marital status:							
Single	141	16.3	10.6	13.5	15.6	44.0	100.0
Married	521	22.3	11.3	17.8	17.5	31.1	100.0
Widowed, divorced, or separated	99	44.5	12.1	14.1	9.1	20.2	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100 0
Years of schooling completed:							
0-7	79	43.0	13.9	7.6	11.4	24.1	100.0
8	113	38.1	8.0	22.1	9.7	22.1	100.0
Some high school	196	21.4	15.3	17.9	13.8	31.6	100.0
High school graduate	176	15.3	9.6	16.5	20.6	38.1	100.0
Some college	134	17.2	10.4	16.4	17.2	38.8	100.0
College graduate	63	22.2	7.9	14.3	25.4	30.2	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0
Occupational status:							
Employed:							
Fulltime	284	14.4	9.2	18.3	19.4	38.7	100.0
Part time	116	24.1	13.8	12.1	17.2	32.8	100.0
Not employed:							
Retired or disabled	100	49.0	13.0	10.0	10.0	18.0	100.0
Housewife	169	33.2	13.6	17.1	11.8	24.3	100.0
Student	90	8.9	7.8	23.3	18.9	41.1	100.0
Other	2	50.0	50.0	--	--	--	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0
Occupation:							
Professional,	48	16.7	12.5	8.3	22.9	39.6	100.0
Farmer, farm manager	18	5.6	16.7	16.7	33.3	27.7	100.0
Manager, official, proprietor	47	10.6	6.4	19.1	17.1	46.8	100.0
Clerical worker	67	11.9	16.4	17.9	17.9	35.9	100.0
Sales worker	33	12.1	9.1	15.2	33.3	30.3	100.0
Craftsman, foreman	50	10.0	6.0	16.0	26.0	42.0	100.0
Operative	52	23.1	11.5	9.6	13.5	42.3	100.0
Service worker	69	20.3	10.1	27.5	15.9	26.2	100.0
Farm laborer	33	27.2	6.1	15.2	18.2	33.3	100.0
Laborer	37	16.2	5.4	24.3	8.1	46.0	100.0
Not employed, retired	303	36.3	12.9	15.5	11.2	24.1	100.0
Not reported	4	25.0	25.0	--	--	50.0	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0

Table 2.--*Wildland activity related to certain socio-economic characteristics, Butte County, 1964, continued*

Characteristic	Number of respondents	Total number of wildland visits					
		None	1-2	3-5	6-10	11+	Total
		Percent					
Family income:							
Under $1,500	61	44.2	16.4	9.8	6.6	23.0	100.0
$1,500-$2,999	97	35.1	16.5	23.7	7.2	17.5	100.0
$3,000-$4,499	101	31.6	11.9	9.9	12.9	33.7	100.0
$4,500-$5,999	100	25.0	19.0	12.0	15.0	29.0	100.0
$6,000-$7,999	132	15.2	6.8	18.2	23.5	36.3	100.0
$8,000-$9,999	82	9.8	9.8	18.3	24.4	37.7	100.0
$10,000-$14,999	98	11.2	8.2	19.4	21.4	39.8	100.0
$15,000 and over	26	11.5	11.5	19.2	19.2	38.6	100.0
Not reported	64	35.8	1.6	18.8	9.4	34.4	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0
Residence:							
City	364	25.0	11.0	17.0	17.3	29.7	100.0
Suburb	144	12.5	9.0	19.4	16.0	43.1	100.0
Small town or village	139	31.7	12.2	14.4	12.2	29.5	100.0
Open country, farm	68	29.4	16.2	8.8	23.5	22.1	100.0
Open country, nonfarm	46	21.7	10.9	21.7	6.5	39.2	100.0
Total	761	24.0	11.3	16.6	16.0	32.1	100.0

program—using a broad gauge "shot gun" approach where necessary and narrowing in with specialized programs where feasible in special situations.

But the interrelatedness of certain outdoor activities mentioned earlier must continue to be kept in mind. Certain portions of the publics who are engaged in one activity also engage in other activities—some picnickers also fish and hike, many campers participate in a wide range of activities—so there is considerable overlap among the various wildland users.

Participation in wildland activities might be expected to be related to the social and economic characteristics of the participants. Wildland recreational activities have predetermining characteristics which condition participation in them, as pointed out in an ORRRC Report.[6] These characteristics include: time required to engage in the activity, monetary costs of engaging, level of physical activity involved, level of skill required, level of prestige or status achieved through participation, and the level of continuous learning enabled by participation, and others. That they are differentially distributed by age and sex, by type of occupation, by level of education, and so forth is to be expected. Work in wildland areas also might be expected to be influenced by such variables, but not necessarily in the same way.

The length of time a person had lived in Butte County was not significantly related to his rate of use of the wildlands. Whether he was native to the area or had moved there from another part of the State or elsewhere likewise was unrelated to such use. (Two-fifths of the respondents had always lived in Butte County, nearly one-third were from some other county in northern California, while the remaining 27 percent were nearly equally divided between former residents of southern California and other States.)

The location of former residence as to city, small town, or open country was also unrelated to wildland activity.

Looking first at a gross measure of wildland activity—total number of wildland visits during the year before the survey—we found that the proportion reporting no visits increased with age. The opposite was true of those reporting more than 10 visits per year (table 2). Males were found to have more wildland activity than females; marital status, related as it is to age, showed a similar relationship. Those who were single (mostly the younger respondents) often used the wildlands whereas the widowed, divorced, or separated (a

[6] Folkman, *op. cit.* p.4.

state developing more frequently with advances in age) did not. A high level of wildland activity was associated with higher educational attainment.

People who were employed, especially those working full time, were inclined to have a higher rate of wildland activity than those not employed. An exception is students, who had the highest rate of activity of any occupational status category. People whose occupation fell in the manager-proprietor category were found to be most active in the wildlands; nonfarm laborers, craftsmen, and professional workers were next most active. Service workers and farmers were the least active of any of the occupational groupings.

Wildlands activity is positively tied to income. The greater the total income of a family, the more likely a person is to have a high rate of activity.

Persons living in the suburbs had the highest activity rate; nonfarm residents of the open country ranked next. Those living in small towns or villages, as well as those living on farms, had the largest proportion reporting no wildland activity at all.

Relationships between participation in specific wildland activities and various social and economic characteristics are similar to those shown for total wildland activity (table 3).

In addition to the social and economic characteristics mentioned earlier, the survey also obtained information regarding the mass media channels used by the respondents as well as their organization ties. This information will also be used in later experiments in which exposure to fire prevention messages will be varied and methods of personal contact will be studied.

Although it sometimes seems that present day radio programming caters exclusively to a youthful audience, radio appeared to have a much broader audience in Butte County. Only 13 percent of the sample were in the teenage category, but three-fourths of the people interviewed said they listened to the radio daily, about one-third spending 2 or more hours per day listening (table 12, appendix). Only 10 percent said they did not listen at all. Local stations were listened to primarily, but a rather large minority said they listened to nonlocal (mostly Sacramento) stations most often. Seventy percent felt that radio gives adequate coverage of the local fire situation.

Television viewing was considerably more popular than radio listening (table 13, appendix). Three out of five reported 2 or more hours per day of viewing time. Most people (62 percent) watched the one local channel, but in parts of the county where reception is satisfactory some watched Sacramento channels or the Redding channel. The appraisal of the adequacy of fire situation coverage by television stations was similar to that of radio.

The *Chico Enterprise Record,* the *Oroville Mercury,* and the *Sacramento Bee* are the newspapers with the widest coverage in Butte County, but five others were reported with some frequency (table 14, appendix). Newspaper coverage of the local fire situation was rated adequate by a slightly higher proportion than so rated radio or television coverage.

As is true in other parts of the country, most people in Butte County were not affiliated with any organized groups (table 15, appendix). Twenty-eight percent reported that they belonged to some religious organization. This was the most frequently mentioned type of membership, followed by membership in business and fraternal organizations.

Knowledge about Fire Prevention

Knowledge about fire prevention and fire behavior was measured by a 20-item multiple choice test (table 16, appendix). The items were selected from those used in the previously mentioned hunter study,[7] with several items eliminated and several others revised according to previous experience.

The mean score (percent of items answered correctly) of the Butte County residents on the knowledge test was 58 percent (table 4). This contrasts with a score of 54 percent correct for those who reportedly had not been in the wildlands at all during the previous year, and 65 percent for those whose work took them into the wildlands frequently.

The pattern of relationship between knowledge scores and various socio-economic variables was similar to that shown between wildland activity and these same variables.

The following characteristics were found to relate to knowledge: Male respondents, those in the younger age groups, those with higher educational achievement and higher incomes, all showed significantly higher knowledge scores than did their opposite numbers.

Average knowledge scores in this survey are

[7]Folkman, *op. cit.* pp. 16-22.

Table 3.--*Relationship of wildland activities to certain socio-economic characteristics, Butte County, 1964*

Item	Working	Camping (Butte County)	Camping (outside county)	Fishing	Hiking	Horse-back riding	Hunting	Picnicking	Sight-seeing, driving	Water skiing, boating
Number reporting participation	458	116	236	274	292	86	183	401	627	164
Age	X	X	X	X	X	X	0	X	X	X
Marital status	X	X	X	X	X	X	X	X	--	X
Education	X	--	X	--	X	--	--	X	X	X
Job status	X	X	X	X	X	X	X	X	X	X
Type of work	X	--	X	0	X	--	X	--	--	--
Family income	X	--	–-	X	0	--	--	X	X	X
Sex	X	X	X	X	--	--	X	--	--	0
Race	--	--	--	0	--	--	--	--	X	--
Present residence	--	--	0	--	--	--	--	--	0	--
Previous residence	--	--	--	--	--	--	--	--	--	--
Migratory status	--	--	--	--	--	--	--	--	--	--

(X indicates significance at 0.001 level)
(0 indicates significance at 0.01 level)
(-- indicates no significance)

Table 4.--*Fire prevention knowledge score related to types of wildland activity, Butte County, 1964*

Activity	Number reporting activity	Mean score (percent correct)
Total	761	58
Frequency of wildland use:		
Not at all	183	54
1-2 times	86	60
3-5 times	126	61
6-10 times	122	62
11 or more times	244	62
Work in wildlands:		
Frequently	65	65
Occasionally	62	63
Never	256	59
Camping:		
In Butte County	116	64
Outside Butte County	236	61
Fishing	274	61
Hiking	291	62
Hunting	183	62
Picnicking	400	60
Sightseeing or driving for pleasure	627	60
"Other" activities	138	63

Table 5.--*Matrix of varimax rotated factor weights for the 18 attitude items in test instrument*

Attitude items	Dimensions				
	I	II	III	IV	V
1	0.077	0.123	0.564	-0.081	-0.145
2	.034	.336	.099	.055	.770
3	.097	- .109	.726	.050	.037
4	.001	.363	- .180	.552	.037
5	.266	.152	.453	.287	.144
6	.161	.093	.684	.126	- .110
7	- .026	- .033	.017	.824	.035
8	- .178	.432	.042	.559	- .011
9	.703	- .080	.071	.154	- .048
10	.399	- .002	.191	.109	- .379
11	- .313	.546	.114	.197	.082
12	.547	.290	.148	- .013	- .282
13	.697	- .140	.051	- .060	- .166
14	.619	.007	.182	- .187	.138
15	.057	.536	- .072	.174	.133
16	.453	-.210	.232	- .220	- .021
17	-.035	.748	- .080	- .020	- .072
18	.270	.218	.260	- .095	- .579
Proportion of total communality accounted for by factory[1/]	.130	.102	.100	.089	.072

[1]Total of all five factors is .493.

all well below the 79 percent achieved on the similar test administered to the licensed hunters of California in 1960.[8] On the basis of their high scores in the previous study, we anticipated that hunters would do equally as well in this one. On the basis of these data however, it would seem that the level of fire prevention knowledge of hunters differs little from that of other users of the wildland areas.

Several factors may be responsible for this wide difference between the two tests of what is essentially the same instrument. In the earlier study a mailed questionnaire was used; in the later study it was administered during a personal interview. The former situation would provide a more relaxed, unhurried atmosphere and an opportunity to resort to references or consultants while responding to the questions. This was not possible in the present survey. The earlier study sampled a State-wide population, while the present study is confined to one county.

About 3 out of 5 of the respondents in Butte County reported that they had observed a forest fire close at hand. Nearly a third of them said they had actually helped fight such a fire. Such intimate acquaintance with uncontrolled fire tends to be related to knowledge about fire prevention.

In California, fire danger is quite high throughout the dry season of the year, getting progressively higher as the season advances. But within this general pattern, there are usually one or more periods of relatively short duration when weather conditions produce a situation where the fire danger becomes extremely critical. Then, within a few days it returns to about where it was before. People who knew of this, and who in their own estimation were more aware of such critical fire situations, had higher scores on the knowledge test.

A list of 12 possible sources of fire prevention information was given on the questionnaire, and the respondents were asked to check the sources from which they had received most of their information. An average of three sources were selected. Television, forest ranger, and newspapers were the most frequently mentioned sources, with 39 percent of the respondents selecting each of them. Smokey Bear (36 percent) and radio (33 percent) were the next most frequently reported sources of knowledge. This represents considerable difference in the ranking of information sources from that found in the hunter study[9] where signs and Smokey Bear were among the top three and newspapers were down in seventh place. The nature of the Butte County sample, with a more normal distribution by age, sex, education, etc., probably affected the ranking, as did the more restricted area sampled. The use of signs for fire prevention purposes, for example, is much more prevalent in southern California than it is in this area.

Butte County residents were more familiar with burning permits (61 percent) than they were with campfire permits (47 percent). One-fourth in each instance had a vague idea of what they were, while 13 percent and 25 percent, respectively, did not know. Thirty-six percent of the respondents (or other family member) had obtained a burning permit during the past year, as compared to 29 percent who got a campfire permit.

Butte County experienced nearly 300 reportable forest fires during the year preceding the survey. Most people were of the opinion that there were fewer. Twenty-nine percent estimated under 50 fires. One-third of those interviewed would not hazard a guess. Only 13 percent overestimated the number of fires.

Eighty-one percent felt that fire prevention information was readily available in the county.

Attitudes Regarding Fire Prevention

Attitudes are elusive, frustrating things to research. However, their considered importance in determining human behavior is such as to force the attempt.[10] Being an internal condition, or mind set, an attitude cannot be measured directly. There is considerable justification, however, for maintaining that these opinions reasonably reflect existing attitudes regarding fire prevention.

To measure attitudes, respondents were asked 18 questions (table 17, appendix). This portion of the questionnaire consisted of statements to which a respondent could answer on a five-place scale with expressions ranging from "strongly agree" to "strongly disagree." To probe various

[8]Folkman, *op. cit.* p. 7.

[9]Folkman, *op. cit.* p. *9.*

[10] This persistent relationship to action is, in fact, the central focus of the psychologist's definition of attitude: "An individual's attitude toward something is his predisposition to perform, perceive, think and feel in relation to it." See Newcomb, Theodore. **Social psychology.** New York: Dryden Press, 1950. p. 118.

dimensions of attitude thought to be held about fire prevention, we included certain items, such as the nature of the problem, views about appropriate policy as to the problem, and how important it is to the individual. This was the first time the questionnaire had been used, and analysis showed the need for some changes in future use.

Principal component analysis with varimax rotation revealed five factors that accounted for 49.3 percent of the total commonality of the attitude questions (table 5). [11] The significant items comprising these factors were as follows :

I. Implementing Fire Prevention Program[12]
   1. More space in school textbooks should be given to fire prevention. (9) [13]
   2. I would like to see school children bring home fire prevention literature from school. (13)
   3. Fire Prevention people should establish closer relationships with the Boy Scouts and similar organizations. (14)
   4. Everyone should be required to attend a meeting at least once every 3 years where he would get information in fire prevention. (12)
   5. Fire prevention efforts in forests is money well spent. (16)
   6. Applicants for campfire permits should be required to pass an examination just as they do for a driver's permit. (10)

II. Salience of Fire Problem
   3. Forest fire danger in this area is highly overrated. (17)
   4. Schools should not be permitted to use school time for instruction in forest fire prevention. (11)
   1. Rangers should have much more important things to do than going around checking on forest visitors. (15)
   2. Fire prevention literature is a waste of taxpayer's money. (8)

III. Enforcement of Fire Regulations
   1. People who are careless with fire should be severely punished. (3)
   2. I should report people who break fire prevention rules in forest or brush areas. (6)
   3. Fire prevention instruction should be given to each person applying for a campfire permit. (1)
   4. Observing fire prevention rules is more important than obeying traffic regulations. (5)

IV. Assessment of Fire Prevention Program
   1. "Smokey Bear" does a poor job alerting the public to fire dangers. (7)
   2. Fire prevention literature is a waste of taxpayers' money. (8)
   3. Preventing forest fires is none of my concern. (4)

V. Regulation of Forest Use
   1. The National Forests belong to the public and people should be free to come and go as they please in them. (2)
   2. All persons entering a forest area should be required to register. (18)
   3. Applicants for campfire permits should be required to pass an examination just as they do for a driver's permit. (10)

Factor I, which accounts for more of the total commonality than any other factor, inexplicably is significantly related to only 3 of the 28 variables examined. The items making up this factor indicate that it is concerned with attitudes toward the means of implementing a fire prevention program. Failure of the factor to relate to the variables examined may mean that there is a highly unified feeling regarding this matter that transcends social and cultural differences.

Factor II, which appears to measure the importance which the respondents attach to the fire problem, was found to be significantly related to 25 of 28 different characteristics of these people (tables 6-9, appendix). The nature of the relationships indicates that those with the most frequent and varied contact with wildland areas and those who have had the most intimate experience with wildfire are most strongly concerned about the fire

[11] For a discussion of this method of analysis see, for example, Harmon, H. H. **Modern factor analysis.** 471 pp. Chicago: University of Chicago Press, 1960. Commonality refers to the extent to which the common factors account for the total unit variance of the variable. A cluster structure analysis method developed by R. C. Tryon, Psychology Department, University of California, Berkeley (BC TRY System of Factor and Cluster Analysis, U.C. Computer Center Library, Berkeley), was also used, but it proved less satisfactory in defining meaningful dimensions.

[12] Titles used in the various sets are primarily for identification and should not be considered as providing definitive descriptions or definitions of the content of the sets.

[13] Numbers in parentheses following items represent numbering used in the questionnaire.

problem. This concern also increases as amount of schooling and income increases.

Factor III, which relates to the enforcement of fire regulations, and Factor IV, which relates to the assessment of the fire prevention program, were found to be related to 12 and 8 of the 28 variables, respectively. In the main, these relationships were similar to those shown with Factor II.

Factor V contributed very little to the total commonality and probably should not be included in future uses of the test instrument. It would appear to be probing some other dimension quite unrelated to fire prevention—possibly personality factors or political orientation.

The stability of the variables making up each of the dimensions will need to be investigated in future studies.

Questions in, other parts of the questionnaire touched upon other aspects of fire prevention attitudes and related areas. It is quite apparent from these responses that Butte County residents are quite sensitive to the fire problem in their county, if not in their immediate locality. Eighty-eight percent of them felt that there was a moderate to great forest fire problem in the county. Most felt optimistic that this problem could be reduced.

In spite of such examples as the 1961 Bel Air Fire, however, 77 percent felt that their homes were in little or no danger from such a fire. Nearly one-third of their homes have brush or dry grass-covered land next to at least one side of their property. Many of these are built in a natural setting, with the brush and grass left essentially undisturbed. Residents in these more vulnerable localities were inclined to feel the fire problem somewhat more keenly (see Factor II, table 9, appendix).

An uncontrolled fire that burned timber was felt to be a very serious matter by 96 percent of the respondents. A brush fire was considered to be a very serious matter by 81 percent. But only 52 percent felt the same way about a grass fire.

Less than 1 percent of the people considered the fire control laws of California to be too strict. Over half felt they were about right, but two out of five said the laws were not strict enough. About the same proportion that felt the laws were about right also felt the enforcement of the laws in Butte County was about as it should be. Only one person felt that enforcement was too strict.

Nearly two-thirds of the respondents felt that the schools were doing a satisfactory job in fire prevention education for the children (one-fifth considered it excellent). Fourteen percent said the schools were doing a poor job, while 24 percent said they did not know.

Characteristics of High Risk Residents

A particularly serious problem to those responsible for fire prevention is people who have limited knowledge of fire behavior and fire prevention methods, and who have a low estimate of the seriousness of the forest fire problem in the area, but who are frequent users of the wildlands. To get some idea of the number of such persons, and to see in what ways they differ from others, the sample was first divided into quartiles on the basis of their knowledge scores, then further divided on the basis of their rating on Factor II (Salience of the Fire Problem) of the attitude scale. Those who fell in either the highest or lowest quartile on both these points were further divided on the basis of their wildland activity score. Of those who were in the lowest fourth on the basis of their knowledge-attitude scores, 14 were in the highest third in terms of their wildland activity scores. This may seem a rather insignificant number, but this represents about 2 percent of the total sample—projected to a total population basis, 1,000 to 1,200 persons in the county. These people were compared on a number of characteristics with those equally low in knowledge and attitude scores, but with little wildland activity, as well as with those with high scores and with the total sample (tables 10-15, appendix).

The small numbers involved makes the reported proportions subject to a high degree of variance. It is with this understanding that the major differences of the high risk group from the total sample are listed. These high risk people tended to be young (under 25 years of age), unmarried, and with a limited amount of schooling for their age. Equal numbers of each sex were involved. They may still have been in school, but if not, they were more apt to have only a part-time job in the operative, clerical, or laborer occupations. Few of them were the chief income earner for their family, and the total income for their families tended to be in the low to medium range. Their residential characteristics did not differ too markedly from the general population. However, they were mainly city or open country non-farm

residents. Most of them formerly lived in small towns. They appeared to spend less time than average listening to the radio, but their TV watching was higher than average. They were low in organizational membership except for religious and youth organizations.

In contrast, those with a similar high wildland activity level, but with high "knowledge-attitude" scores, had a more normal age distribution (except for a deficiency in the 65 years of age and over category) . They were predominantly married males and had higher than average years of schooling completed. They were employed full time, and their occupations were distributed across the full range of categories similar to that of the whole population. Their incomes tended to be higher than average and a high proportion lived in the suburbs.

Those whose wildland activity is minimal had equally distinctive characteristics, but because of their limited use of the wildlands they are not of direct concern to the fire prevention problem.

Summary and Conclusions

This paper reports data from a study of a representative sample of residents of Butte County, California. It relates the knowledge and attitudes regarding the use and abuse of fire in wildland areas with the various characteristics of wildland users and non-users.

Three-fourths of the respondents were found to make some use of the wildlands of the county. Nearly one-third admitted that their activity there involved the use of fire.

With use of the wildlands so widespread, it is difficult to give a meaningful description of the "typical" wildland user. But the most frequent users tended to be young (under 25 years of age), unmarried, male, and relatively well educated. They were employed full time in one of a wide range of occupations (excepting farming and the services), or were still in school. They came from suburban families with higher than average incomes.

Those persons most involved in wildland activities had the highest level of knowledge about proper fire use. Level of knowledge was also related to a number of socio-economic variables and to actual experience with forest fires.

Frequent users of wildlands who scored in the highest quartile on both the knowledge and attitude scales differed from other frequent users by being middle-aged, married, and employed full-time (few were students).

Response to attitude items indicated a strong and relatively uniform, positive feeling toward fire prevention. This was intensified by personal experience with wildfire and with extent of experience in wildland areas. There were also differences attributable to the socio-economic characteristics of the respondents.

Of particular importance to the fire prevention problem is a relatively small number who, although they are frequent users of the wildlands, have little knowledge of proper fire use and are indifferent to the problem. This group, scoring in the lowest quartile on both the knowledge and attitude scales, averages even younger in age than the other frequent users. Females were equally represented. Their low level of schooling for their age indicates a high proportion of dropouts and retardations. If not still in school, they tended to have low-paying part-time jobs.

Fire control administrators may well feel that the general level of knowledge regarding proper fire use in wildland areas should be improved. It is apparent that there are identifiable groups, or categories, of people within the general population who—in terms of their present levels of knowledge and attitude and in terms of their risk potential—are in particular need of improvement. It remains to be demonstrated to what extent a comprehensive action program can effectively change these levels. And, finally, it remains to be seen to what extent such changes will result in changes in the actual behavior of wildland users and a consequent reduction in fire starts.

Appendix

Table *6.--Analysis of variance relating five attitude dimensions with selected wildland experience characteristics, Butte County, 1964*

Characteristic	Number	Attitude dimensions [1/]				
		I	II	III	IV	V
Frequency of working in wildlands:						
Frequently	64	0.486	0.532	0.494	0.491	0.494
Occasionally	60	.499	.518	.487	.503	.482
Never	237	.511	.513	.500	.501	.489
Significance level		(2/)	(2/)	(2/)	(2/)	(2/)
Total number of wildland visits:						
None	154	.502	.467	.513	.488	.516
1-2	78	.493	.478	.495	.509	.507
3-5	120	.498	.496	.495	.504	.502
6-10	119	.513	.521	.489	.503	.499
11 or more	234	.495	.524	.503	.507	.493
Significance level		(2/)	.001	(2/)	(2/)	(2/)
Total recreational activity in wildlands [3/]						
0	139	.500	.478	.486	.491	.508
1	124	.501	.486	.500	.498	.508
2	133	.505	.513	.488	.499	.510
3	122	.504	.515	.504	.507	.503
4	69	.495	.524	.517	.533	.465
5	49	.492	.539	.507	.508	.491
6	16	.506	.525	.494	.538	.517
7	5	.442	.556	.529	.590	.501
Significance level		(2/)	.001	(2/)	(2/)	(2/)
Frequency of use of fire in wildlands:						
None	490	.501	.496	.499	.501	.508
1	48	.489	.477	.522	.510	.510
2	34	.513	.514	.538	.514	.522
3	26	.487	.505	.497	.501	.476
4	18	.484	.510	.497	.485	.449
5 or more	88	.500	.534	.484	.500	.472
Significance level		(2/)	.05	(2/)	(2/)	.01
Personal experience with forest fire--						
Observed forest fire close at hand:						
Yes	419	.500	.520	.487	.498	.498
No	282	.500	.473	.520	.507	.509
Significance level		(2/)	.001	.001	(2/)	(2/)
Ever forced to evacuate area endangered by fire:						
Yes	62	.483	.529	.490	.505	.494
No	643	.501	.498	.501	.501	.503
Significance level		(2/)	.05	(2/)	(2/)	(2/)
Ever had property destroyed:						
Yes	45	.587	.534	.495	.477	.512
No	655	.501	.500	.501	.502	.501
Significance level		(2/)	.05	(2/)	(2/)	(2/)

NOTE: Footnotes at end of table

Table 6.--*Analysis of variance relating five attitude dimensions with selected wildland experience characteristics, Butte County, 1964, continued*

Characteristic	Number	Attitude dimensions [1/]				
		I	II	III	IV	V
Ever helped fight fire:						
Yes	218	0.498	0.518	0.488	0.491	0.489
No	485	.501	.493	.506	.506	.508
Significance level		(2/)	.01	.05	(2/)	.05

[1] Individual items were scored on a 5-place scale with "Strongly agree" given a weight of 1, and "Strongly" disagree a weight of 5, so that the more positive the response the lower the score. Items making up Factors II and IV are all negative statements, however, so that a negative response represents a positive attitude. Scores for these two dimensions are thus the reverse of those for the other dimensions. (Reverse scoring these negative items did not affect the stability of the dimensions.)

[2] Not significant.

[3] Represents a summation of different types of activities engaged in (camping, fishing, picnicking, etc.) in wildland areas of county.

Table *7.--Analysis of variance relating five attitude dimensions with selected knowledge and attitude characteristics, Butte County, 1964*

Characteristic	Number	Attitude dimensions [1] I	II	III	IV	V
Knowledge of what a campfire permit is:						
Knows	346	0.506	0.524	0.492	0.502	0.491
Has vague idea	183	.493	.500	.519	.504	.510
Incorrect answer	27	.503	.482	.488	.510	.513
Significance level		(2/)	.01	.05	(2/)	(2/)
Assessment of forest fire danger to home:						
Serious danger	26	.511	.511	.502	.492	.494
Some danger	130	.478	.520	.499	.507	.519
Little or no danger	548	.504	.496	.501	.501	.498
Significance level		.05	.05	(2/)	(2/)	(2/)
Awareness of extreme fire situations in area:						
Yes	609	.499	.511	.500	.500	.501
No	95	.503	.439	.502	.513	.505
Significance level		(2/)	.001	(2/)	(2/)	(2/)
Personal awareness of critical fire situations compared to other people:						
More aware	221	.488	.531	.478	.498	.496
Less aware	38	.487	.475	.518	.519	.534
Same as others	444	.506	.488	.510	.502	.502
Significance level		(2/)	.001	.001	(2/)	(2/)
Significance of different types of forest fire--						
Feel that timber fire is:						
Very serious matter	673	.499	.505	.498	.503	.501
Moderately serious	29	.503	.433	.549	.496	.515
Not very serious	1	.437	.405	.562	.467	.473
Not serious at all	1	.735	.207	.715	.208	.553
Significance level		(2/)	.001	.01	.05	(2/)
Feel that brush fire is:						
Very serious matter	483	.496	.508	.491	.500	.505
Moderately serious	187	.504	.490	:526	.510	.495
Not very serious	23	.533	.457	.516	.501	.491
Not serious at all	6	.557	.508	.486	.529	.437
Significance level		(2/)	.05	.001	(2/)	(2/)
Feel that grass fire is:						
Very serious matter	360	.494	.513	.488	.500	.506
Moderately serious	287	.505	.493	.516	.504	.499
Not very serious	47	.514	.467	.501	.510	.491
Not serious at all	4	.502	.432	.588	.561	.530
Significance level		(2/)	.01	.01	(2/)	(2/)
Feeling regarding enforcement of fire control laws:						
Too strict	1	.273	.359	.496	.451	.593
Not strict enough	276	.478	.514	.494	.505	.514
About right	382	.512	.491	.505	.499	.494
Significance level		.001	.01	(2/)	(2/)	.05

[1] See Table 6 for explanation of method of determining dimensions.
[2] Not significant.

Table 8.--*Analysis of variance relating five attitude dimensions with selected personal characteristics, Butte County, 1964*

Characteristic	Number	Attitude dimensions [1/]				
		I	II	III	IV	V
Age:						
14-24	165	0.492	0.501	0.539	0.542	0.506
25-34	97	.503	.512	.513	.521	.514
35-49	182	.511	.521	.495	.488	.515
50-64	153	.505	.498	.473	.477	.484
65 and over	107	.482	.463	.477	.481	.488
Significance level		(2/)	.001	.001	.001	.05
Marital status:						
Single	135	.492	.496	.532	.532	.502
Married	483	.504	.511	.497	.496	.502
Widowed, divorced, or separated	87	.490	.456	.470	.485	.503
Significance level		(2/)	.001	.001	.001	(2/)
Sex:						
Male	341	.503	.509	.497	.493	.479
Female	364	.497	.494	.503	.510	.523
Significance level		(2/)	.05	(2/)	.05	.001
Years of schooling:						
0-4	22	.458	.415	.479	.481	.549
5-7	42	.492	.421	.474	.467	.506
8	100	.489	.471	.495	.498	.496
Some high school	185	.486	.488	.506	.513	.503
High school graduate	169	.510	.520	.501	.497	.500
Some college	128	.512	.539	.506	.513	.493
College graduate	33	.516	.526	.514	.498	.512
Post graduate	36	.538	.569	.493	.491	.518
Significance level		(2/)	.001	(2/)	(2/)	(2/)
Occupational status:						
Employed full time	271	.511	.519	.497	.495	.481
Employed part time	106	.482	.500	.500	.505	.517
Retired or disabled	80	.484	.463	.473	.468	.494
Housewife	156	.498	.490	.497	.499	.535
Student	90	.503	.499	.542	.550	.497
Other	2	.445	.523	.482	.596	.577
Significance level		(2/)	.001	.001	.001	.001
Occupation:						
Professional, technical	46	.522	.538	.516	.510	.505
Farmer, farm manager	16	.523	.485	.480	.489	.437
Manager, official, proprietor	45	.508	.529	.485	.493	.501
Clerical worker	64	.502	.516	.520	.527	.496
Sales worker	32	.502	.513	.480	.528	.480
Craftsman, foreman	49	.511	.532	.482	.503	.487
Operative	50	.484	.508	.512	.457	.467
Service worker	66	.509	.508	.515	.527	.510
Farm laborer	28	.496	.477	.484	.499	.507
Laborer	35	.480	.495	.528	.493	.473
Not applicable not employed	270	.494	.480	.494	.496	.520
Significance level		(2/)	.01	(2/)	.05	.01
Chief income-earner of household:						
Yes	345	.504	.500	.487	.486	.484
No	360	.495	.502	.513	.516	.519
Significance level		(2/)	(2/)	.001	.001	.001

NOTE: Footnotes at end of table

Table 8.--*Analysis of variance relating five attitude dimensions with selected personal characteristics, Butte County, 1964, continued*

Characteristic	Number	Attitude dimensions [1/]				
		I	II	III	IV	V
Family income:						
Under $1,500	54	0.484	0.453	0.475	0.494	0.494
$1,500-$2,999	86	.477	.468	.500	.497	.512
$3,000-$4,499	96	.489	.503	.486	.499	.509
$4,500-$5,999	96	.495	.499	.509	.504	.502
$6,000-$7,999	124	.503	.520	.507	.514	.500
$8,000-$9,999	78	.495	.533	.472	.502	.498
$10,000-$14,999	93	.520	.518	.515	.503	.487
$15,000-$19,999	17	.507	.549	.542	.493	.533
$20,000 and over	85	.551	.523	.483	.440	.501
Significance level		(2/)	.001	.05	(2/)	(2/)

[1] See table 6 for of method of explanation of determining dimensions.
[2] Not significant.

Table 9.--*Analysis of variance relating five attitude dimensions with selected residence characteristics, Butte County, 1964*

Characteristic	Number	Attitude dimensions [1]				
		I	II	III	IV	V
Residence:						
City	347	0.507	0.497	0.503	0.498	0.493
Suburb	135	.499	.520	.507	.505	.508
Small town or village	125	.472	.507	.491	.503	.517
Open country, farm	55	.500	.485	.507	.509	.504
Open country, nonfarm	43	.526	.477	.481	.508	.511
Significance level		.01	.05	(2/)	(2/)	(2/)
Place last lived:						
Always lived here	68	.491	.519	.516	.519	.505
Elsewhere, Butte	233	.502	.491	.502	.499	.497
Other county, N.	216	.506	.496	.493	.498	.501
Other county, S.	91	.493	.521	.498	.507	.522
Other state	96	.490	.506	.505	.499	.496
Significance level		(2/)	(2/)	(2/)	(2/)	(2/)
Fire risk rating of residential environment:						
Res. lot surrounded by built-up or cultivated land on all sides	493	.504	.497	.501	.501	.498
Res. lot adjacent to brush- and/or dry grass-covered land on at least one side	156	.491	.502	.499	.503	.517
Res. built in "natural" setting, surrounded or nearly surrounded by brush- and/or dry grass-covered land	56	.484	.531	.496	.508	.497
Significance level		(2/)	.05	(2/)	(2/)	(2/)

[1] See table 6 for explanation of method of determining dimensions.
[2] Not significant.

Table 10.--C*omparison of persons with extreme levels of wildland activity and fire prevention knowledge and attitude scores by selected socio-economic characteristics. Butte County. 1964*

Characteristic	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n=	(14)	(43)	(42)	(10)	(761)
	Percent				
Age:					
14-24	50.0	23.3	9.5	10.0	23.4
25-34	14.3	16.3	9.5	--	13.8
35-49	7.1	34.9	14.3	40.0	25.8
50-64	7.1	23.3	26.2	30.0	21.7
65 and over	21.5	2.3	38.1	20.0	15.2
Not reported	--	--	2.4	--	.1
Total	100.0	100.0	100.0	100.0	100.0
Sex:					
Male	50.0	62.8	23.8	40.0	48.5
Female	50.0	37.2	76.2	60.0	51.5
Not reported					
Total	100.0	100.0	100.0	100.0	100.0
Marital status:					
Single	50.0	23.3	14.3	10.0	18.5
Married	50.0	74.4	52.4	80.0	68.5
Widowed, divorced, or separated	--	2.3	33.3	10.0	13.0
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Race:					
White	85.8	97.7	88.1	100.0	97.5
Negro	7.1	--	7.1	--	1.3
Other	7.1	2.3	4.8	--	1.2
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Years of schooling completed:					
0-4	7.1	--	14.3	--	3.7
5-7	35.8	--	19.0	--	6.7
8	21.4	4.6	21.4	10.0	14.8
Some high school	28.6	20.9	23.8	20.0	25.8
High school graduate	--	42.0	14.3	20.0	23.1
Some college	7.1	18.6	2.4	20.0	17.6
College graduate	--	4.6	4.8	10.0	4.7
Post graduate	--	9.3	--	20.0	3.6
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Occupational status:					
Employed, full time	14.3	55.9	19.1	60.0	37.3
Employed, part time	21.4	16.3	7.1	10.0	15.3
Retired or disabled	7.1	4.6	35.7	--	13.1
Housewife	21.4	11.6	35.7	30.0	22.2
Student	35.8	11.6	2.4	--	11.8
Other	--	--	--	--	.3
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0

Table 10.--*Comparison of persons with extreme levels of wildland activity and fire prevention knowledge and attitude scores by selected socio-economic characteristics. Butte County. 1964, continued*

Characteristic	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n.=	(14)	(43)	(42)	(10)	(761)
	Percent				
Occupation:					
Professional, technical	--	9.3	--	20.0	6.3
Farmer, farm manager	--	2.3	--	10.0	2.4
Manager, official, proprietor	--	7.0	--	--	6.2
Clerical worker	7.1	11.7	2.4	--	8.8
Sales worker	--	7.0	--	--	4.3
Craftsman, foreman	--	9.3	2.4	10.0	6.6
Operative	14.3	9.3	9.5	10.0	6.8
Service worker	--	4.6	9.5	20.0	9.1
Farm laborer	7.1	4.6	--	--	4.3
Laborer	7.1	9.3	2.4	--	4.9
Not employed, retired	64.4	21.0	73.8	30.0	39.8
Not reported	--	4.6	--	--	.5
Total	100.0	100.0	100.0	100.0	100.0
Percent of respondents who are chief income-earner of household:	28.6	55.8	50.0	50.0	49.4
Family income:					
Under $1,500	7.1	2.3	28.9	10.0	8.0
$1,500-$2,999	14.3	2.3	33.3	--	12.8
$3,000-$4,499	35.8	11.7	11.9	30.0	13.3
$4,500-$5,999	14.3	16.3	7.1	20.0	13.1
$6,000-$7,999	7.1	27.9	7.1	10.0	17.3
$8,000-$9,999	--	16.3	--	20.0	10.8
$10,000-$14,999	7.1	11.6	2.4	10.0	12.9
$15,000-$19,999	--	4.6	--	--	2.5
$20,000 and over	--	--	--	.9	.9
Not reported	14.3	7.0	9.5	--	8.4
Total	100.0	100.0	100.0	100.0	100.0

Table 11.--*Comparison of persons with various levels of wildland activity and fire prevention knowledge and attitude scores by selected residential characteristics, Butte County, 1964*

Characteristic	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n=	(14)	(43)	(42)	(10)	(761)
	Percent				
Length of residence in neighborhood:					
Less than 1 year	21.4	25.6	11.9	30.0	18.4
1-2 years	7.1	9.3	9.5	10.0	17.5
3-5	21.5	18.6	11.9	10.0	17.6
6-10	14.3	14.0	31.0	10.0	12.2
10 or more	35.7	32.6	35.7	40.0	34.3
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Place last lived:					
Elsewhere, Butte County	42.9	39.6	31.0	10.0	32.3
Other county, N. Calif.	28.6	23.3	45.3	40.0	31.0
Other county, S. Calif.	14.3	14.0	7.1	30.0	12.9
Other state	7.1	14.0	9.5	10.0	14.4
Always lived here	7.1	9.3	7.1	10.0	9.3
Not reported	--	--	--	--	.1
Total	100.0	100.0	100.0	100.0	100.0
Present residence:					
City	57.2	41.9	52.4	20.0	47.8
Suburb	14.3	27.9	4.8	10.0	18.9
Small town or village	7.1	18.6	31.0	50.0	13.3
Open country, farm	7.1	4.6	4.8	20.0	8.9
Open country, nonfarm	14.3	7.0	7.1	--	6.1
Not reported	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Form of residence:					
City	28.6	46.5	50.0	70.0	46.7
Small town	42.9	27.9	19.0	10.0	25.1
Open country	21.9	16.3	23.9	10.0	18.8
Not applicable (always lived in area)	7.1	9.3	7.1	10.0	9.3
Not reported	--	--	--	--	.1
Total	100.0	100.0	100.0	100.0	100.0
Fire risk rating of residential environment:					
Res. lot surrounded by built up or cultivated land on all sides	42.9	51.2	78.6	70.0	69.4
Res. lot adjacent to brush- and/or dry grass-covered land on at least one side	42.9	32.6	16.7	--	22.3
Res. built in "natural" setting surrounded, or nearly surrounded by brush and/or dry grass-covered land	14.3	16.3	4.8	30.0	8.3
Not reported	--	--	--	--	
Total	100.0	100.0	100.0	100.0	100.0

Table 12.--*Comparison of persons with various levels of wildland activity and fire prevention knowledge and attitude scores by their radio-listening characteristics, Butte County, 1964*

Characteristic	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n:	(14)	(43)	(42)	(10)	(761)
	Percent				
Station listened to most frequently:					
KAOR, Oroville	21.4	16.3	4.8	--	10.0
KHSL, Chico	28.7	27.9	23.8	10.0	28.8
KPAY, Chico	14.3	23.4	16.7	40.0	20.0
KFPK, Sacramento	--	9.3	14.3	20.0	10.5
Other Sacramento stations	7.1	4.6	7.1	--	5.6
San Francisco stations	7.1	9.3	4.8	10.0	5.4
Other local stations	7.1	--	2.4	--	3.9
Other stations	--	2.3	--	--	1.3
Don't know, or no answer	--	2.3	2.4	10.0	1.2
Don't listen to radio	14.3	4.6	23.8	10.0	10.1
Both KHSL, KPAY equally	--	--	--	--	3.2
Total	100.0	100.0	100.0	100.0	100.0
Hours of listening per day:					
2 or more	14.3	27.9	33.3	30.0	32.6
1-2	35.7	34.9	23.9	30.0	25.8
Less than 1	14.3	25.6	9.5	20.0	16.8
Usually only once or twice a week	21.4	7.0	9.5	10.0	14.8
Not at all	14.3	4.6	23.8	10.0	10.0
Don't know, or no answer	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Feel radio gives adequate coverage of local fire situation	71.4	60.5	64.3	80.0	70.4

Table 13.--*Comparison of persons with various levels of wildland activity and fire prevention knowledge and attitude scores by their television viewing characteristics, Butte County, 1964*

Characteristic	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n=	(14)	(43)	(42)	(10)	(761)
	Percent				
Channel watched most frequently:					
Channel 12, Chico	85.7	44.2	71.4	50.0	61.5
Channel 3, Sacramento	--	16.3	4.8	10.0	9.2
Channel 10, Sacramento	--	2.3	--	--	1.8
Channel 13 Sacramento	--	--	--	--	.8
Sacramento, channel unspecified	--	2.3	2.4	--	1.2
Chico and other channel equally	14.3	11.6	7.1	20.0	10.2
Channel 7, Redding	--	14.0	4.8	10.0	7.5
Other	--	2.3	--	--	.7
Don't know or no answer	--	--	--	--	.5
Don't watch television	--	7.0	9.5	10.0	6.6
Total	100.0	100.0	100.0	100.0	100.0
Hours of watching per day:					
2 or more	71.5	55.8	60.0	50.0	59.6
1-2	21.4	23.3	21.4	30.0	19.6
Less than 1	--	11.6	--	--	6.3
Usually only once or twice a week	7.1	2.3	9.5	10.0	7.9
Not at all	--	7.0	9.5	10.0	6.6
Don't know or no answer	--	--	--	--	--
Total	100.0	100.0	100.0	100.0	100.0
Feel television gives adequate coverage of local fire situation	78.6	41.9	73.8	70.0	67.3

Table 14.--*Comparison of persons with various levels of wildland activity and fire prevention knowledge and attitude scores by their newspaper subscriptions, Butte County, 1964*

Item	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n=	(14)	(43)	(42)	(10)	(761)
	Percent				
Chico Enterprise Record	42.9	44.2	42.9	50.0	47.8
Oroville Mercury	42.9	37.2	9.5	--	24.7
Sacramento Bee	7.1	27.9	14.3	10.0	19.4
San Francisco Chronicle	--	18.6	2.4	--	9.7
San Francisco Examiner	7.1	18.6	9.5	20.0	10.6
Paradise Post Weekly	--	2.3	2.4	10.0	3.4
Gridley Herald	--	2.3	11.9	40.0	6.3
Appeal Democrat	--	--	7.1	10.0	4.1
Other	7.1	7.0	4.8	10.0	7.0
Feel newspaper gives adequate coverage of local fire situation	78.6	55.8	76.2	70.0	76.6

Columns do not add as some respondents recorded more than one paper.

Table 15. --*Comparison of persons with various levels of wildland activity and fire prevention knowledge and attitude scores by organizational membership, Butte County. 1964*

Organization	Wildland activity				All respondents
	Highest third		Lowest third		
	Knowledge-attitude scores		Knowledge-attitude scores		
	Lowest quartile	Highest quartile	Lowest quartile	Highest quartile	
n-	(14)	(43)	(42)	(10)	(761)
	Percent				
Civic	-	23.3	--	10.0	10.9
Business union, or farm	7.1	25.6	9.5	--	18.5
Fraternal	7.1	20.9	9.5	20.0	18.7
Religious	35.7	20.9	31.0	40.0	27.9
Youth	14.3	--	2.4	--	4.5
Outdoor club and conservation	- -	9.3	--	--	4.6
Social	7.1	7.0	2.4	10.0	3.8
Veterans	--	4.6	--	--	2.6
Other	--	9.3	2.4	--	2.4

Columns do not add as some respondents reported more than one organization.

Table 16.--*Items comprising the knowledge test, showing percentage distributions of responses to individual items*

(n=761)	*Percent*
1. Green trees and shrubs of California:	
Are very difficult to burn	19.6
Will not burn at all	1.6
Will catch fire and burn very rapidly	43.4*
Will burn only in the hot summer months	27.7
Do not know	7.7
2. If you take extra gasoline for your camp stove, you should carry it in:	
A glass jar or jug	1.6
A safety can	72.2*
A container in which flammable liquids are purchased	21.9
A plastic container such as is used in the kitchen	1.7
Do not know	2.6
3. The safest method for lighting cigarettes in the forest area is to use:	
Book-type safety matches	19.3
Strike anywhere, stick-type matches	1.2
Stick-type safety matches	8.3
A cigarette lighter	65.4*
Do not know	5.8
4. The surest way to put out a campfire, assuming all these methods are available, is to:	
Pour water on it	7.1
Completely cover with dirt	34.3
Pour water on it and stir thoroughly	56.6*
Spread out the embers and let it burn itself out	1.2
Do not know	.8
5. If you are negligent with your campfire or warming fire and it escapes to the property of another, whether privately or publicly owned, you are:	
Not liable for damages	.5
Criminally liable, but not civilly liable	4.3
Civilly liable, but not criminally liable	15.7
Both criminally and civilly liable	32.2*
Liable, but don't know which	37.6
Do not know	9.7
6. If you drive your car off the road in dry grass areas:	
Exhaust sparks can start a fire	18.3
Sparks made by contact of metal parts of the car with rocks can set fires	3.7
Both 1 and 2 are correct	61.8*
Neither 1 or 2 are correct	5.0
Do not know	11.2
7. A sign in a National Forest that reads Closed Area" means:	
That you may enter, but not smoke in the area	3.3
You may enter, but not build any campfires in the area	6.4
You may not enter the area	74.3*
You may not hunt or shoot within the area	5.6
Do not know	10.4
8. Windy weather:	
Tends to put out fires	.3
Affects only poorly built fires	.6
Makes necessary more precautions with fires	97.1*
Has little or no influence on fires	.4
Do not know	1.6

*Indicates correct response

Table 16.--*Items comprising the knowledge test, showing percentage distributions of responses to individual items, continued*

(n=761)	*Percent*
9. Prevention of man-caused forest fires ultimately depends upon:	
More and better trained personnel	6.4
More and better equipment	4.1
Public cooperation and recognition of personal responsibility	80.2*
Better techniques of fire fighting with the equipment we have	5.1
Do not know	4.2
10. When you are in a National Forest area in California, the law permits you to:	
Never smoke or build campfires	2.4
Smoke, but never build campfires	1.8
Smoke and build campfires only in areas so designated, during specified periods	85.4*
Smoke and build campfires only during the wet season	3.3
Do not know	7.1
11. "Humidity" is a measure of:	
Temperature of the air	7.5
Amount of rainfall that has fallen in last 24 hours	2.9
Percent of cloudiness during the daylight hours	.9
Amount of moisture in the air	81.2*
Do not know	7.5
12. "Watersheds" are:	
Areas where rain falls or snow melts to supply water to springs and creeks	47.1*
Structures over railroads for protection against heavy snow and rain	6.7
Buildings with gutters that run water to a cistern	3.4
Lakes and reservoirs which collect the water runoff from forests	20.4
Do not know	22.4
13. The time of day that forest fires typically will spread most rapidly:	
Sundown to midnight	8.8
Midnight to sunrise	4.3
10:00 a.m. to sundown	58.0*
Sunrise to 10:00 a.m.	4.5
Do not know	24.4
14. A fire is more apt to start where there is:	
Low temperature and low humidity	1.6
High temperature and low humidity	62.6*
High temperature and high humidity	21.9
Low temperature and high humidity	3.0
Do not know	10.9
15. A fire in the rotten vegetation found on the forest floor:	
Burns very rapidly--almost like a dry gunpowder train	18.6
Smolders slowly as in punk or cotton with little or no visible smoke	49.5*
Burns slowly along the top of the ground with easily detected production of smoke	17.1
Will not burn at all	1.8
Do not know	13.0
16. The chief cause of forest fires in Butte County is:	
Lightning	17.5
Campfires	5.9
Children playing with matches	3.0
Smokers' cigarettes and matches	58.8*
Do not know	14.8

*Indicates correct response

Table 16.--*Items comprising the knowledge test, showing percentage distributions of responses to individual items, continued*

(n=761)	*Percent*
17. The term "forest fire" means a fire which is burning out of control on lands covered wholly or in part by:	
Timber only	7.1
Timber and brush only	22.9
Timber, brush, and grass only	25.2
Timber, brush, grass, grain, or other flammable vegetation	39.5*
Do not know	5.3
18. The people responsible for starting most forest fires are:	
Hunters	12.4
Hikers	4.5
Campers	45.6
Local residents	10.4*
Do not know	27.2
19. Of the approximately 3,000 forest fires in California each year, what percent are human caused:	
10 percent	6.2
50 percent	19.4
70 percent	26.8*
90 percent	25.3
Do not know	22.3
20. Campfire permits are required for the use of:	
Gasoline or propane type camp stoves	2.2
Fire grates and charcoal burners	1.2
Open campfires	28.6
All of these	58.7*
Do not know	9.3

*Indicates correct response

Table 17.--*Items comprising the attitude test, showing percentage distributions of responses to individual items*

(n=761)	*Percent*
1. Fire prevention instruction should be given to each person applying for a campfire permit:	
Strongly agree	60.0
Agree	35.2
Undecided	2.5
Disagree	2.0
Strongly disagree	.3
Don't know, or no answer	--
2. The National Forests belong to the public and people should be free to come and go as they please in them:	
Strongly agree	15.9
Agree	31.3
Undecided	9.8
Disagree	30.5
Strongly disagree	12.1
Don't know, or no answer	.4
3. People who are careless with fire should be severely punished:	
Strongly agree	40.0
Agree	46.3
Undecided	10.2
Disagree	3.0
Strongly disagree	.1
Don't know, or no answer	.4
4. Preventing forest fires is none of my concern:	
Strongly agree	2.1
Agree	3.8
Undecided	1.4
Disagree	42.2
Strongly disagree	50.1
Don't know, or no answer	.4
5. Observing fire prevention rules is more important than obeying traffic regulations:	
Strongly agree	6.2
Agree	14.8
Undecided	38.5
Disagree	34.0
Strongly disagree	5.2
Don't know, or no answer	1.3
6. I should report people who break fire prevention rules in forest or brush areas:	
Strongly agree	29.0
Agree	59.7
Undecided	8.7
Disagree	2.2
Strongly disagree	.3
Don't know, or no answer	.1
7. "Smokey Bear" does a poor job of alerting the public to fire dangers:	
Strongly agree	2.3
Agree	4.9
Undecided	5.3
Disagree	58.8
Strongly disagree	28.7
Don't know, or no answer	--
8. Fire prevention literature is a waste of taxpayers' money:	
Strongly agree	2.0
Agree	2.0
Undecided	4.9
Disagree	61.9
Strongly disagree	29.2
Don't know, or no answer	.1

Table 17.--*Items comprising the attitude test, showing percentage distributions of responses to individual items, continued*

n=761)	*Percent*
9. More space in school textbooks should be given to fire prevention:	
Strongly agree	17.0
Agree	48.9
Undecided	21.2
Disagree	8.5
Strongly disagree	.9
Don't know, or no answer	3.5
10. Applicants for campfire permits should be required to pass an examination just as they do for a driver's permit:	
Strongly agree	16.2
Agree	44.7
Undecided	13.0
Disagree	24.0
Strongly disagree	1.8
Don't know, or no answer	.3
11. School should not be permitted to use school time for instruction in forest fire prevention:	
Strongly agree	1.6
Agree	4.7
Undecided	4.7
Disagree	64.1
Strongly disagree	24.4
Don't know, or no answer	.5
12. Everyone should be required to attend a meeting at least once every three years, where he would get information and instruction in fire prevention:	
Strongly agree	14.4
Agree	40.2
Undecided	13.9
Disagree	27.5
Strongly disagree	3.7
Don't know, or no answer	.3
13. I would like to see school children bring home fire prevention literature from school:	
Strongly agree	16.8
Agree	68.6
Undecided	7.9
Disagree	5.4
Strongly disagree	.9
Don't know, or no answer	.4
14. Fire prevention people should establish closer relations with the Boy Scouts and similar, organizations:	
Strongly agree	23.8
Agree	62.6
Undecided	10.2
Disagree	2.5
Strongly disagree	.4
Don't know, or no answer	.5
15. Rangers should have much more important things to do than going around checking on forest visitors:	
Strongly agree	2.5
Agree	8.9
Undecided	7.6
Disagree	62.2
Strongly disagree	18.3
Don't know, or no answer	.5
16. Fire prevention efforts in forests are money well spent:	
Strongly agree	39.0
Agree	57.1

Table 17.--*Items comprising the attitude test, showing percentage distributions of responses to individual items, continued*

(n=761)	*Percent*
16. Fire prevention efforts in forests are money well spent, contd:	
Undecided	2.8
Disagree	.6
Strongly disagree	.1
Don't know, or no answer	.4
17. Forest fire danger in this area is highly overrated:	
Strongly agree	2.0
Agree	5.4
Undecided	18.4
Disagree	56.2
Strongly disagree	16.3
Don't know, or no answer	1.7
18. All persons entering a forest area should be required to register:	
Strongly agree	19.6
Agree	45.0
Undecided	11.3
Disagree	21.4
Strongly disagree	2.4
Don't know, or no answer	.3