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Characteristics of PEOPLE WHO START FIRES... some preliminary findings¹

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Fire is a perennial threat to forests of the United States. In 1967, more than 125,000 forest fires were reported.² They burned 4,685,00 acres, despite fire protection expenditures totaling more than \$90 million. Ninety percent of the fires were caused by man himself. The origin of these fires were—in order of relative frequency—incendiarism, debris burning, smoking, lightning, machines, and campfires.

Since 1940, the Forest Service, U.S. Department of Agriculture, has been conducting studies designed to identify the characteristics of persons thought to be responsible for starting forest fires. These studies have sought to develop enough information about potential “high risk” persons to enable forest managers to carry out effective fire prevention programs. With such information, they could then focus their attention more directly on these persons than on all forest users.

Most studies on behavioral factors in man-caused forest fires have been done in the southeastern United States. The studies have found that woods burning was part of the regional culture, and was done in expectation that it would improve agricultural or forest resources.³

A few recent studies have focused on characteristics of “high risk” persons in the arid West, where most of the wildland fires are of unintended or accidental origin. In a survey of residents of Butte County, northern California, Folkman⁴ found that some of those who had high levels of wildland activity also had low knowledge of, and negative attitudes toward, fire prevention—and were classified as “high risk” forest users. In a similar study in Utah County, Utah, Christiansen, *et al.*⁵ were able to identify “high risk” forest users. But both the Butte County and the Utah County studies described the

Abstract: Recreationists or city dwellers are usually most often thought of as being responsible for starting forest fires. But a limited study showed that fire starters were more apt to be people who lived near and worked on the National Forests. They were relatively young and undereducated, and had “good reputations” in their communities. Employers held responsible for forest fires started by their employees most often had multiple fire violations, but “good reputations” in their communities. These and other characteristics of fire-starters were identified by analyzing 165 Fire Trespass Reports from the Forest Service’s California and Intermountain Regions.

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¹The study reported in this note was made in cooperation with the Department of Sociology, Brigham Young University, Provo, Utah.

characteristics of "high risk" users rather than people known to have *actually* ignited forest fires. Hence, they lack specific data needed in fire prevention programs.

To identify some characteristics of fire starters, we analyzed 165 Fire Trespass Reports filed by local Forest Service officers as part of their investigation of man-caused fires. The reports were not designed to be used for such analysis, but they have data that may help in characterizing fire-starters. The reports were from National Forests in the California and Intermountain Regions. They cover fires from 1956 to 1966. In all of the fires, man or an agency of man, such as a motor vehicle or a train, contributed to the start of the fire.

About one-third of the 165 fires analyzed were caused by faulty combustion equipment, such as vehicles with faulty wiring, mufflers, or spark arrestors. The next most frequent contributors of fire-starts were careless burning of garbage, and refuse, and careless use of matches (*table 1*).

PERSONS WHO STARTED FIRES

Employment: Forty-eight percent of the persons who actually started forest fires were working in the forest as employees of private firms. Twenty-three percent were in the forests for recreational purposes. Property owners, who were usually burning garbage or refuse, made up the next largest category of fire-starters (16 percent). The remaining fire-starters were either employed by some government agency (10 percent) or were travelers (3 percent).

Occupation: The occupations of fire-starters were often those of operatives (e.g., blasters, brakemen, sawyers, truck and tractor drivers), laborers, and students. These occupational characteristics are similar to those of the high fire-risk persons in the Butte and Utah County studies. More specifically, 40 percent of the fire-starters had operative, craftsmen, or foremen's jobs. In the United States generally, 31 percent of the labor force have such jobs.⁶ Nearly one-fourth (24 percent) of the fire-starters were either laborers or service workers compared with 21 percent holding such jobs in the United States. Nearly one-fifth (18 percent) of the fire-starters were students. Of the remaining fire-starters, 9 percent were farm or ranch managers, 4 percent had professional jobs, and 5 percent were unclassifiable. Less than 1 percent were listed as "housewives." Compared with the proportions in the United States population, housewives and professionals are particularly unrepresented among fire-starters. In the United States,

Table 1—*Causal factors in 165 man-caused forest fires, California and Intermountain Regions, 1955-1966*

Causal factors	Number	Percent
Faulty combustible equipment	58	35
Burning garbage and refuse	29	18
Matches	20	12
Campfires	14	8
Cigarettes	9	6
Explosives	7	14
Other (multiple factors, unknown sources, and spontaneous combustion)	28	17
Total	165	100

professionals made up about 14 percent of all workers in 1968, and married females made up about 23 percent of the entire population in 1967.

Size of community of residence: The findings of this study corroborate further the findings of the Butte and Utah County studies regarding place of residence of high-risk persons. Contrary to popular opinion, fire-starters are not usually city-raised-and-dwelling people. Rather they usually reside in relatively small towns. The average size of community in which fire-starters lived was 4,200 people. (All "averages" cited in this study are medians.) Only 12 percent of the fire-starters came from cities having populations of 100,000 or over. In contrast, 56 percent of the fire-starters lived in towns of less than 5,000 persons.

Financial standing: Eighty percent of those who started the forest fires analyzed in this study were judged by investigating officers to have "low" financial standing. These findings support those of the Butte and Utah County studies.

Reputation: Investigating officers determined the fire-starters' reputation in their communities of residence. Sixty-nine percent of the fire-starters were considered to have "good" reputations, 29 percent had "questionable" reputations, and 2 percent had "bad" reputations.

Past record of starting fires: Space was provided in the report form to record the past record of persons alleged to have started forest fires, but less than half of the 165 forms used in the study had this information. Of those forms having such information, about one in six indicated that the fire-starter had a previous record of forest fire violations.

Past police record: In only 15 of the 165 reports was an indication given of the past police record of persons alleged to have started forest fires. In 4 of the 15 instances the person did have a previous police record.

Damage costs charged against fire-starters: Whenever legal action is taken it is customary for the Forest Service to charge the cost of the forest fire to the person responsible for it. In 26 percent of the 165 fires analyzed, costs were charged to individuals alleged to have started fires. These damage costs charged to individuals averaged \$1,000.

Settlement of damage costs: In about half of the cases in which damage costs were charged against individuals, they settled the claims. The average amount paid for fire damages was \$583, or \$417 less than the average of the damage cost assessed.

EMPLOYERS HELD RESPONSIBLE FOR STARTING FOREST FIRES

When an individual's actions for which he was paid resulted in a forest fire, his employer was ordinarily held responsible for the fire. Some characteristics of employers held responsible for forest fires were identified in this study.

Type of employer: Ninety-one percent of the employers were private employers; 9 percent were public employers. Most of the activities engaged in by employers were connected with railroading, lumbering, or utilities (table 2).

Financial standing of employers: The financial standing of employers held responsible for starting forest fires was evaluated by the investigating officers. In 89 percent of the cases in which this determination was recorded, the employers were judged to have "good" or "very good" financial standings; 8 percent were judged to have "low" standings; and 3 percent "very low" financial standings.

Reputation of employers: The findings of investigating officers concerning the reputation of employers indicated that 98 percent of those evaluated had "good" reputations.

Employers' record of forest fire violations: Data were available about the past record of forest fire

violations by employers for 61 fires. In 80 percent of these fires, employers had a past record of fire violations. Most of those with a past record had multiple violations. Fifty-six percent had more than five violations on their records.

Damage costs charged against employers: Damage costs were reported as having been charged against employers on 92 of the 165 fire reports. The assessed charges ranged from less than \$500 to more than \$50,000. The charge assessed employers for starting forest fires averaged \$2,250—more than double that assessed to individuals.

Amount of settlement actually paid by employers: When damage costs were charged against employers for starting forest fires, they made a settlement of some kind 74 percent of the time. Conversely, 26 percent of the time no settlement was reportedly made. The amount of settlement made averaged about \$2,000, or \$250 less than the average amount assessed.

IMPLICATIONS OF FINDINGS

1. It is probably erroneous to think of recreationists (campers, hunters, fishermen, picnickers, etc.) as being the greatest threat to National Forests as igniters of forest fires. Rather, it is the person who spends a considerable amount of time working on forest lands, usually with machines which themselves ignite fires, who is the greatest threat. This is not to say that we should divert all of our attention away from recreationists. Fire prevention programs have worked well among them, and should even be augmented owing to the increased demands on the forests by recreationists. But the principal threat today still seems to come from persons who spend so much time in the forests that they may be overlooked as threats. They are likely to be ignorant of fire prevention practices, are irresponsible, become careless, have grudges toward their employers or Forest Service personnel, or are required by employers to operate unsafe machinery or vehicles.

2. Rather than finding the usual fire-starter living in big cities, holding a white-collar job, and having little experience in the forests, as had been expected, we found him to be living in a small, rural-oriented place where most people are involved in forest-related activities. This person was relatively young, somewhat poorly educated, and quite well thought of in the community.

3. When fires are started by these individuals and damage costs are charged against them, they avoid paying these costs about half of the time. A more

Table 2—Major activities engaged in by employers held responsible for starting forest fires

Activities	Number	Percent
Railroading	27	29
Lumbering	20	21
Utilities (electric, gas, telephone, etc.)	15	16
Farming and ranching	9	10
Mining and construction	9	10
Government	6	6
Other	6	6
Trucking	2	2
Total	94	100

vigorous and skillful program of investigation and prosecution is suggested if such action is to have the desired deterrent effect. The lesson that an individual is likely to be caught, prosecuted, and pay for a fire he starts will then not be lost upon others living in the community. Moreover, additional legislation on the State level is often needed to provide safeguards for burning of waste, smoking, etc.

4. Employers whose work operations require their workers to enter on and use the National Forests should be a major target of preventive programs. Most of these employers are probably considered as contributing positively to their communities. However, the evidence suggests that they frequently permit their employees to operate machines in ways which are apt to cause fires. Moreover, most of them continue to operate without effecting any preventive changes—even though they are responsible for numerous forest fires. When damage costs are assessed, such costs are usually settled at a lower figure than the assessed amounts when they are paid.

LIMITATIONS OF THE STUDY

This study has several limitations which should be acknowledged before any actions based on the findings can be considered. First, the findings apply only to National Forests in two Regions: California and Intermountain. Second, the data were not originally collected for the purpose of this analysis. Thus, about one-third of the reports collected had to be discarded because of missing data. The 165 reports used lacked completeness on many items. Third, and most important, the cases treated in Fire Trespass Reports represent only a minute fraction of the thousands of man-caused fires in the two Regions during the period studied. Such cases share the characteristics of those pertaining to other types of law offenders—only the unsuccessful or “unlucky” get caught. Given the nature of the offense, few fire starts are actually identified with the individual (or individuals) responsible. It seems quite possible that certain types of fire starters, such as woods workers, for example, have a greater probability of being identified than would more transient forest users.

RECOMMENDATIONS

1. Forest fire prevention programs should continue their present broad spectrum approach to all forest users. But an intensive emphasis should be focused on those individuals and organizations who enter the National Forests for work activities. For

example, more strict standards might be developed for spark-arrestors and other fire-prevention equipment. These standards should be enforced by trained inspectors.

2. Specifically-trained fire investigators should be employed on a regional and National Forest level to: (a) inspect periodically all equipment and practices used on the National Forests to eliminate those which might cause fires, and (b) investigate with the latest equipment and techniques all man-caused fires with a view to apprehending and prosecuting violators. Refusal of access to National Forest lands should be considered for repeating violators. Investigators with some legal training should be employed to insure that prosecution is made more effective than it now is.

3. Fire prevention on the local level should be continued by District Rangers and allied personnel of the Forest Service. Their role should be non-investigative, but positive so as to reduce feelings of hostility and aggression toward the National Forests and Forest Service personnel who are in close contact with the public.

4. Similar studies should be made with available data from other Forest Service Regions to determine the reliability of findings from this study. Moreover, fire reports should be designed to include more pertinent data regarding fire-starters, and investigators should be trained to obtain the data, so that a closer check can be made on the characteristics of fire-starters in the National Forests. (New reporting forms and procedures now being developed in the California Region give promise of providing more information about a much higher proportion of offenders in the future.)

NOTES

²U.S. Bureau of the Census. *Statistical abstract of the United States: 1968*. Washington, D. C. p. 644. 1968.

³Baird, A. W., and M. L. Doolittle. *Behavioral aspects of man-caused forest fires: A program of research*. (Paper presented at the 27th Annual Southern State Fire Control Conference and Southern Information and Education Chiefs' Meeting, Gatlinburg, Tenn., Miss. State Univ. 1966.)

⁴Folkman, William S. *Residents of Butte County, California: their knowledge and attitudes regarding forest fire prevention*. U.S. Forest Service Res. Paper PSW-25, Pacific SW. Forest & Range Exp. Sta., Berkeley, Calif. 32 p., illus. 1965.

⁵Christiansen, John R., William S. Folkman, J. Loraine Adams, and Pamela Hawkes. *Forest-fire prevention knowledge and attitudes of residents of Utah County, Utah, with comparisons to Butte County, California*. Soc. Sci. Res. Bull.

5, Dep. Soc., Coll. Soc. Sci., Brigham Young Univ., and U.S. Forest Serv., Pacific SW. Forest & Range Exp. Sta., 26 p., illus. 1969.

⁶U.S. Bureau of the Census. *Statistical abstract of the United States: 1968*. Washington, D. C. p. 319, 32, 10. 1968.

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