

Firewood Use in Idaho: Implications for Forest Management

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ABSTRACT—A survey shows that, demographically, firewood collectors on national forests in Idaho are fairly typical of Idahoans in general, if somewhat wealthier. The most important reason they collect firewood is to save money. However, the statewide average of 50.5 miles driven one way, each trip, to obtain an average of 5.9 cords of wood—and other collecting behaviors reported—challenges this motive. Contrary to many forest managers' belief that recreation is the primary motivation, respondents said recreation was the least important. Forest management decisions regarding permit fee structure, availability of wood, and collecting practices could have important consequences for collectors.

The challenge of serving a relatively new forest user—the firewood collector—has faced forest managers since late 1973, when USDA Forest Service Chief John R. McGuire announced that “permits to cut firewood will be granted without regard to where a person lives.” Prior to this time, only “bona fide settlers, miners, residents and prospectors” could get firewood permits (USDA Forest Service 1981).

In the past decade the firewood collector has become a significant factor in forest management. The firewood program administered by the Forest Service grew more than tenfold between 1972 and 1980, with 970,000 permits issued in 1980. National forests have often found it difficult to manage this growth, and many expect their firewood supply to be less than the demand projected for 1986–2000 (USDA Forest Service 1981). My study estimates that in 1980 over 480,000 trips were made to Idaho's national forests to collect firewood; nearly 20 percent of the total fiber removed that year was in the form of firewood.

Methods

A random sample of 1,096 of the 80,902 personal-use firewood permit holders on the 10 national forests in Idaho was sent a questionnaire in April 1981 using Dillman's (1978) procedures. The sample was stratified by forest to ensure statewide representation. Using two follow-ups, responses were received from 82 percent of the people surveyed. Twenty-eight nonrespondents were randomly selected and reached by telephone. There was no statistically significant difference ($\alpha = 0.05$) between them and respondents on the following variables: sex, education, place of residence, number of cords cut, use of wood as a main heating source, and average miles driven one way to obtain wood. Nonrespondents were younger, and more were in forest-related occupations. Thus, the

demographic characteristics of nonrespondents may be slightly different, but wood use and collecting behavior of nonrespondents is accurately reflected by respondents.

Who Are They?

The average age of firewood collectors in Idaho is 44.2 years with a range of 16–88. The median 1980 household income was \$19,000. The median household income in 1979 in Idaho was \$15,285 (U.S. Department of Commerce 1982). Skog and Watterson (1983) also report that in their nationwide survey higher income households were more likely to burn wood. The most frequently reported occupational category is professional (21.5 percent) followed by “retired” (14.9 percent). Only 5.5 percent of the respondents are in forest-related occupations. The average number of years of education is 13.2. Eighty-one percent of firewood collectors live in single-family dwellings and 90 percent own their own homes. When compared with the total population of Idaho, fewer national forest firewood collectors live on ranches or farms (table 1) and a larger proportion live in small towns of 5,000 people or fewer. It is likely that many ranchers and farmers have their own wood supply and do not need to collect on public land. In general, when compared with other surveys such as the Pacific Northwest Residential Energy Survey (1980), the forest user studied is a fairly typical Idahoan.

Collecting Behavior

Prior to this study, little information was available on firewood collecting behavior. Gray et al. (1982) report that firewood collectors in New Mexico drive an average of 42.0 miles one way and collect an average of 5 cords.

Idaho firewood collectors are willing to invest time and money to obtain firewood available on national forests. In addition to purchasing wood-burning equipment and a chain saw, they spent a considerable amount of money to transport the wood from the forest to their homes. Respondents average 50.5 miles (standard error = 1.74) one way, and they are willing to drive an average of 67.5 miles.

Table 1. Current residence of Idaho firewood collectors and Idahoans in general.

Current residence	Firewood collectors Percent	1980 census of population ¹ Percent
Rural (ranch or farm)	16.1	35.1
Town under 1,000	18.7	4.9
Town 1,000–5,000	23.2	14.3
Town 5,000–10,000	7.2	6.4
Town 10,000–50,000	22.5	25.5
City 50,000 or larger	12.3	10.9

¹SOURCE: U.S. Dept. Commerce 1981.

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Although this is a statistically significant difference ($\alpha = 0.001$), the two distances are correlated ($r = 0.77$), indicating that those who are now driving a long distance are willing to drive even farther in the future.

The distances driven vary considerably among parts of the state. Those in the heavily forested north drive less than 30 miles one way, whereas those in the southeast corner of the state drive up to 80 miles one way. Analysis of variance found a statistically significant ($\alpha = 0.001$) relationship between the distances driven and the collector's place of residence. Those in towns of population greater than 5,000 drive the greatest distance.

The average number of trips to collect firewood for a heating season is six. Thus, the average firewood collector drives about 600 miles to obtain firewood. This means that at present, firewood collectors on national forests in Idaho drive about 50 million miles annually. Since a significant portion of these miles are on Forest Service roads, forest managers are faced with many challenges related to road use policies, closures, conditions, and maintenance expenses.

The number of cords of wood cut in 1980 as reported by respondents averaged 5.9 (standard error = 0.15). This suggests that 480,000 cords of firewood were cut on national forests in Idaho. Forest supervisors' offices reported an estimated 520,000 cords. The vehicles used to transport firewood, the number of trips, and the median number of cords cut per trip (calculated from responses) are shown in table 2. Examination of the cords cut per trip for those not using trailers (which were a wide variety of sizes) showed that for some respondents the computed cords cut were greater than is physically possible for the size of vehicle reported. Using the capacity of the vehicle and the number of trips reported it was found that about half of the respondents overestimated the number of cords cut by an average of 1 cord. Therefore, using an average number of cords cut of 5.4 (4.9 for 50 percent and 5.9 for 50 percent of the population), the total number of cords of firewood cut on national forests in Idaho in 1980 is closer to 440,000.

Many forest managers have suggested yarding firewood to the road, and encouraging collectors to use slash piles. However, respondents report that decks or slash piles are the least preferred form of firewood. Seventy-five percent of the respondents prefer standing dead, and 20 percent prefer dead and down wood. Possible explanations for the preference for standing dead wood are that collectors enjoy felling trees, and that such wood is drier and cleaner. However, only 18 percent of the respondents are willing to walk more than 300 feet from their vehicles to collect firewood. Certainly, as the resource becomes scarcer it may become impossible to satisfy these preferences. Can forest managers plant or manage for desirable firewood species along road corridors and other easily accessible areas? More districts may need to adopt programs such as those on the White River Ranger District of the Mt. Baker-Snoqualmie National Forest in western Washington, where firewood collectors are doing subcommercial thinnings and are involved in alder conversion, re-yarding, and landing repiling programs (Wolfson 1982).

Forest managers need to adjust their working hours and days to manage the firewood resource. Not surprisingly, nearly 50 percent of the collecting is done on Saturday or Sunday when few Forest Service employees are in the woods. Over 90 percent of the collecting is done in the

summer and fall. The preferred species of wood varies with the forest where the firewood is collected and often reflects the species available rather than BTU content. For example, in southern Idaho, Douglas-fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta* var. *latifolia*) were preferred and in northern Idaho western larch (*Larix occidentalis*) is the preferred species.

Fees

At the time of the survey, two of the surveyed districts were charging fees. Now fees are charged on eight of Idaho's national forests. Fifty-seven percent of the respondents said they were willing to pay a permit fee to cut firewood. Preference for fees to be charged on a per-cord basis versus a one-time charge varied by region (table 3). The preference for a per-cord charge was highest in southeastern Idaho where firewood is relatively scarce. Better understanding of users' fee preferences will allow managers to develop fee structures that not only provide funds for management of the resource but also will be easily enforced. The timber staff officer on the Mt. Baker-Snoqualmie National Forest reports that when firewood is sold, people are more willing to participate in thinning programs and to use the resource wisely than when they are issued a free-use permit.

Table 2. Vehicles used to transport firewood, number of trips, and median number of cords cut per trip.

Vehicle used	Percent of respondents ¹	Average no. of trips	Median no. cords/trip ²
Half-ton truck, no trailer	31	6.7	.75
Half-ton truck, trailer	12	5.7	1.11
Three-quarter-ton truck, no trailer	19	6.3	.84
Three-quarter-ton truck, trailer	16	4.6	1.26
One-ton truck, no trailer	6	4.7	1.53
One-ton truck, trailer	1	5.6	1.54
Two-ton truck, no trailer	6	2.7	2.47
Two-ton truck, trailer	3	4.4	2.33

¹Remaining 6 percent reported a variety of vehicles.

²Computed from each respondent's reported number of cords cut and number of trips.

Table 3. Chi-square tests on Idaho firewood collectors' willingness-to-pay fees questions. Three Idaho national forests are in the Northern Region (Region 1) and seven are in the Intermountain Region (Region 4) of the U.S. Forest Service National Forest System.

Fee statement	Northern Region	Intermountain Region
	Percent	Percent
Would be willing to pay a permit fee to be able to cut more firewood.	46 (Significance = 0.07)	60
Would be willing to pay a fee for road oiling and maintenance.	18 (Significance = 0.02)	34
Would be willing to pay a fee to have wood yarded to the roadside.	42 (Significance = 0.06)	28
Prefer fees to be an annual one-time charge, not per cord.	78 (Significance = 0.0001)	44

Motivations

In informal discussions with Idaho's forest managers, the most frequently mentioned reasons for the dramatic increase in firewood use are that people collect firewood primarily as a form of family recreation, and that firewood is convenient in Idaho. Because of the inexpensive hydroelectric power available in much of the state, many forest managers do not see firewood collecting as an economical activity for most citizens. Survey participants were asked to rate nine reasons for collecting their own firewood on a six-point scale ranging from extremely important to not important. The highest-ranking reason given in both cases was "to save money." This was "extremely important" to 55 percent of the respondents and "very important" to 27 percent. The second-highest reason for using wood was "to reduce my use of utility company fuels" and the second-highest for collecting their own wood was "to be self-sufficient." Contrary to managers' beliefs, enjoyment of wood collecting as recreation received the lowest rating—only 8 percent said collecting as recreation was "extremely important," whereas 27 percent said it was of "little" or "no" importance to them.

Forest managers need to understand the motivations of firewood collectors if they are to predict the demand for this resource. Spencer (1982) reports little success in developing a model to predict the rate people are adopting wood energy, and he suggests that wood-burning attitudes and conservation activities may be very important in explaining wood users' behaviors. The data provided by respondents in this survey raise some interesting questions. Saving money was unequivocally stated as the most important reason for using and collecting firewood. If we use the figures and assumptions suggested by Hanley (1981) and the average round-trip miles driven by respondents, the average cost of collecting and burning a cord of wood is \$59.90 (\$11.67 per cord for purchase and maintenance of the wood-burning unit; \$7.83 per cord for chain-saw costs; and \$40.40 per cord to drive a half-ton truck 101 miles, round trip). Since the average collector cuts 5.9 cords, his estimated cost of collecting is \$353.41 per year. Yet, when asked about heating bill savings, the median amount saved was \$291. Since the estimated cost of collecting firewood exceeds the reported reduction in heating bills, it is possible that few Idaho firewood collectors have actually calculated the cost of collecting and using wood. In a Washington Water Power Company study (1982), it was found that the low cost of wood was the reason given for using wood by 70 percent of the respondents, but only 43 percent had actually calculated the costs and savings of using wood heat.

Will the demand for firewood decrease if collectors begin calculating the costs, or will the cost of alternative fuels increase enough to make firewood an economical alternative energy? It would appear that unless utility rates in the Pacific Northwest rise considerably more than they have (\$1.56 per kilowatt-hour in 1983 [Northwest Power Planning Council 1983])—and gasoline rates, permit fees, and other costs of collecting do not rise—the economics of collection may continue to be unfavorable.

Other Firewood Sources

After a few years of gathering their own wood, will today's collectors decide to purchase it? During the previous three years 20 percent of the respondents had pur-

chased wood. The following statistically significant differences were found between those who had purchased some wood and those who had not: women and urban residents were more likely to purchase wood; those who purchased wood had more years of education and were most likely to be professionals or housewives and least likely to be farmers, mill workers, truck drivers, unemployed, or in forest-related occupations. There was no relationship between wood purchasing and age, income, distance driven to collect, number of cords cut, or use of wood as a main heat source.

The highest-ranking reason for possibly purchasing wood in the future was a "decline in personal health." A reason that ranked distant second was "less wood available in the forest," followed closely by "higher prices for oil, gas, or electricity," and "have to drive farther to firewood areas." This indicates that many collectors intend to continue collecting as long as their health allows, assuming forest managers can provide enough firewood within a reasonable distance of their homes.

Some of the national forests' firewood collectors also collect on other lands (private 25 percent and other public 17 percent). Of those collecting on private lands, 39 percent did so on industry lands, 29 percent on lands owned by friends, 19 percent on lands owned by themselves or their families, and 13 percent on a combination of the above. Much of the private and other public forestland in Idaho is adjacent to or intermingled with national forestland. If forest managers do not coordinate their firewood management practices, permit charges, and permit conditions, they will probably need to spend considerable time on enforcement or education.

Respondents were also asked about their interest in wood fuel cooperatives to obtain firewood more efficiently. Fourteen percent of the respondents were interested in joining a cooperative and another 45 percent expressed an interest in obtaining more information about cooperatives before deciding. Cooperatives could reduce collection costs for the user and reduce management costs, because fewer individual wood gatherers would be in the forest. ■

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Does Wilderness Designation Lead to Increased Recreational Use?

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ABSTRACT—A study of recreation users in the Rattlesnake National Recreation Area and Wilderness prior to and following congressional designation of the area reveals little support for the commonly held belief that designation of areas inevitably leads to dramatic increases in visitor use. Results from the study suggest that changes in use patterns are probably more complex than once believed and that causal factors inducing such changes are many.

It is a common belief among many land managers and concerned recreationists that designation of previously unnamed or unclassified areas as "wilderness," "national park," or "national recreation area" inevitably results in rapid increases in recreational use (Johst 1982). Stankey (1977), for example, notes that "it is a common assumption that official designation . . . is, in a sense, a 'kiss of death' because it makes the area a target for 'trophy' collectors." A recent issue of a backcountry user newsletter furthered this belief by asserting that "wilderness designation historically increases use" (Anonymous 1983). The ostensible rise in visitation may be the result of a combination of factors such as the publicity surrounding the designation process, agency information that encourages people to visit the area, and perceptions of new visitors that areas so designated now provide previously unavailable opportunities. The "designation" hypothesis is based on the assumption that such factors serve to inform potential users of new recreational opportunities and that publicity is effective in influencing individual recreationists' decisions.

Concerns about such increases in use are legitimate. Designation may not be followed by adequate appropriations to manage the number of recreationists who may then begin to visit the area. Long-time visitors may fear competition for valued recreational places, and the potential increase in visitation may also bring unanticipated impacts, conflicts, and inappropriate uses. Increased use may cause additional damage to the area's resources and fewer opportunities for solitude.

Designation may have other consequences. In some cases, people may argue that because of the designation effect, the best way to protect an area is to avoid designating or classifying it (Johst 1982).

However, it has been difficult to determine empirically whether such designation effects actually occur. Often reliable recreation use statistics are not available for an area prior to designation, or the area prior to designation may not have been a separate reporting unit. Use estimates of questionable reliability also make identifying trends difficult. In some cases, managers may feel that use must have increased as a consequence of the designation process and subjectively raise use estimates accordingly.

What evidence exists with respect to wilderness areas suggests that the designation effect may not be as pronounced as once thought. Petersen (1981) found that newly designated wilderness areas do have a slightly higher percentage rate of annual increase in visitation than older areas. However, this higher percentage could be a result of a low initial visitation base. The higher visitation rate among new areas could also be affected by subjective estimation procedures. These factors may be more influential in raising visitation estimates than the actual designation process.

The Study

In order to test for the designation effect, reliable and preferably independent estimates of recreational use are needed before and after designation. Such use estimates do exist for the Rattlesnake National Recreation Area and Wilderness (RNRAW), designated by an act of Congress in October 1980. The RNRAW is located immediately north of Missoula, Montana, and encompasses approximately 60,000 acres, about half of which are designated wilderness lands. The RNRAW was created after several years of extensive and often heated public debate. Local and regional media carried numerous articles and reports about the Rattlesnake prior to its formal designation and establishment. The RNRAW is broadly representative of more recently designated wilderness areas where concerns about designation effects are frequently expressed (Zaslowsky 1984).

Access into the area has been limited to foot, horse, snowmobile, and—until mid-1984—motorcycle traffic. No automobiles are permitted for recreational purposes. While the southern boundary for the area is immediately