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Visitor Characteristics, Attitudes, and Use Patterns in the Bob Marshall Wilderness Complex, 1970-82

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RESEARCH SUMMARY

Visitors to the Bob Marshall Wilderness complex, which includes the Bob Marshall Wilderness, the Great Bear Wilderness, and the Scapegoat Wilderness, were studied in 1982 as they also had been studied in 1970. Questionnaires were basically identical, and were returned by over 500 visitors in 1970 and by almost 800 in 1982. Both summer and fall use were studied.

The major change was a shift from predominantly horse use in 1970 to mainly backpacker use in 1982. Both horse and hiker use increased, but hiker use grew much faster than horse use. Many other changes seemed to stem from this basic shift: shorter stays, smaller parties, a smaller proportion of visits with outfitters, some shift in activities from more consumptive to more contemplative, more summer and less fall use, and less dependence on wood fires. Other changes in use were: less weekend peaking and less concentrated use. These changes imply lower potential for impacts to resources on a per-party basis.

Most visitor characteristics remained about the same or changed only moderately from 1970 to 1982. The essentially unchanged characteristics included urban/rural residence, type of social group, age distribution, high levels of overall wilderness experience, and club membership. Modest changes from 1970 to 1982 included more visitors from out of State, more women, higher educational levels, more visitors in professional and technical occupations, and less previous experience in the Bob Marshall complex, especially for backpackers. These changes also reflect the shift to more backpacker use. Many changes in visitor characteristics seem to point to slower future growth in use.

In a few cases attitudes shifted sharply, in contrast to general stability in attitudes. Complaints about trails were six times as common in 1982 as in 1970,

and support for high standard trails and bridges grew. Support for allowing some natural forest fires started by lightning to burn also increased. Crowding and conflict, particularly dissatisfaction among hikers with horse use, were mentioned more. Reasons for visiting wilderness shifted, paralleling the shift from more consumptive use (hunting, fishing) to more contemplative (enjoying scenery, relaxation, escaping civilization), but solitude and avoidance of mechanized recreation were important reasons both years. Numbers of other visitors met per day grew moderately, and accounted for about 45 percent of the variation in opinions of numbers met (too many, too few, etc.). Satisfaction levels were about the same both years, but were negatively associated with numbers met per day. With the single striking exception of desiring improved trails, visitors became more opposed to facilities and more supportive of actions to preserve natural ecosystems, and supported minimum impact use practices more. Littering was thought to be reduced, but vegetation and soil impacts were seen as worse. Desired campsite solitude was usually found, but less often in 1982 than in 1970. There was little or no change in the importance visitors attached to wilderness, factors satisfying visitors, feelings of crowding, campsite solitude standards, and attitudes about most existing and potential regulations.

The trends in recreational use in the Bob Marshall complex offer managers time to deal with problems without being overwhelmed by rapidly escalating use and impacts. Trail deterioration is the top priority problem, followed by campsite impacts and horse-hiker conflicts. High education levels and personal commitment to wilderness suggest that education would be an effective management tool. Most visitors believe the Bob Marshall complex still provides a high-quality wilderness experience that deserves to be protected by managers.

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INTRODUCTION

Effective planning for the management of outdoor recreational use requires not only knowledge of the current situation but also indications of the dynamics of change. Without some grasp of the nature of recreational use, and of visitor characteristics, behavior, satisfactions, attitudes, and preferences, and how they are changing, at least in general terms, management often will be misdirected and inefficient. Attention is likely to be focused on old problems, vaguely defined, some of which may have actually faded away, others of which may have intensified, and some of which have evolved into different issues.

WILDERNESS TRENDS

Wilderness management suffers particularly from the lack of information on visitor use and dynamics. Compared to most types of recreation, wilderness visitors are more widely dispersed, use is relatively light, and observation and contact by managers are limited. Furthermore, the wilderness experience is complex and subtle, with many important features that are not outwardly observable; for example, visitor evaluations of levels of solitude or crowding experienced.

Finally, many wilderness managers seek to be as light-handed and nonregulatory as possible, using information and education as major management techniques. Several studies suggest that visitors prefer information and education approaches over regulatory styles of management (Stankey 1973; Lucas 1980, 1983). This nonregulatory approach requires information about visitors' behavior, knowledge, experience, attitudes, and preferences to be well designed and focused, particularly because of the controversy that often surrounds many wilderness management decisions. Any evaluation of the effectiveness of management actions, both regulatory and non-regulatory, requires some information on changes—or lack of changes—in the relevant visitor characteristics. For example, if managers encourage visitors to use campstoves instead of wood fires, does the proportion using stoves increase? If managers strive to disperse campers at attraction sites, does this happen and do campers perceive more campsite solitude? If they attempt to reduce party size, do they succeed?

Trends can be analyzed for a variety of aspects of recreational use: amount of use, types of use, visitor activities, characteristics, and so on. Amount of use is probably the easiest to measure, although in fact the basic use data for most wildernesses are of such low accuracy that trends are difficult to identify, with estimation errors usually overwhelming actual changes. Trends in wilderness participation have been analyzed, primarily at a nationwide level, for National Forest Wilderness (Petersen 1981). The average annual rate of growth in use from 1965 has been about 4 percent, with lower rates more recently than earlier, and somewhat faster growth in newly designated wilderness than in areas established earlier.

Trends in the characteristics of wilderness use and users are harder to measure, requiring a visitor survey for most characteristics. Perhaps because of this difficulty, these trends have been little studied. Only four related studies were found. One was based on repeat surveys of visitors to the Allagash River in Maine (Cieslinski 1980). Three surveys were conducted, but the first, in 1966, is not comparable with those in 1973 and 1975. Data for only eight variables were reported, and only use by large parties changed substantially, declining over the 2 years. Data from mandatory permits showed use more than doubling from 1966 to 1979, while parties became smaller and stays shorter.

The second was a study of recreational use of the Rattlesnake area north of Missoula, MT, a National Forest area which was designated partly as a National Recreation Area and partly as wilderness in 1980 (Corti and others 1982). Use measurements were made in 1977 and 1981. Total use declined but use of the wilderness grew moderately and groups became smaller. Questionnaire surveys were also conducted in 1978 and 1981. There were no changes in the distribution of male and female visitors, occupations, or education, and only a slight tendency for 1981 visitors to have less previous experience in the area than 1978 visitors.

A third study was concerned mainly with the effects of use limits on visitation to the backcountry in Yosemite National Park, but included some data on trends in use patterns and visitor characteristics (Van Wagendonk 1981). Total use rose rapidly to 1975, but declined a little from then to 1979, apparently not

because of use rationing, which began in 1974. Age and education data from two separate surveys only a few years apart (1973 and 1975-76) (not repeat surveys focused on trends), showed little change in age, education, and income, but the proportion of female visitors increased. There was no trend in either party size or length of stay. Perhaps because of use limits, more people visited before and after the peak month of August, and also spread out a little more evenly.

The fourth study analyzed changes in the Boundary Waters Canoe Area in Minnesota from 1961 to 1966 (Lucas 1967). Paddling canoeists and boat campers increased the most, and use became less geographically concentrated. More visitors came from outside Minnesota in 1966 than 1961. Parties became slightly larger, but stays became shorter.

Wilderness use has grown greatly since passage of the Wilderness Act in 1964, public environmental attitudes seem to have changed, and a new generation has entered the scene. Yet, beyond a general feeling that numbers of visitors have been increasing, most wilderness managers are forced to operate with not much more than guesses and speculation about changes in the characteristics of the wilderness visitors, what they do, how they do it, and what they think about wilderness, about area conditions, or about present or potential management actions.

BOB MARSHALL TREND STUDY

In 1982, visitors to the Bob Marshall complex were studied, as they also had been in 1970 (Lucas 1980). The main objective was to determine trends in characteristics of use, use patterns, visitor experiences, characteristics and attitudes about the wilderness and its management. The Bob Marshall complex consists of three contiguous National Forest Wildernesses—the Bob Marshall, the

Great Bear, and the Scapegoat—on both sides of the Continental Divide in the Rocky Mountains south of Glacier National Park (fig. 1). The Bob Marshall contains 1,009,000 acres (408 000 ha), the Great Bear 287,000 acres (116 000 ha), and the Scapegoat 239,000 acres (97 000 ha), for a total in the complex of a little over 1½ million acres (over 600 000 ha), or over 6 percent of all the wilderness acres in the National Forests at the time of the study. The three areas are described further in Lucas (1980).

All three areas were included in both the 1970 and 1982 studies. Although the Great Bear and Scapegoat were designated as wildernesses after the 1970 study, the Scapegoat in 1972 and the Great Bear in 1978, the same major access points were covered then as in 1982, thus creating no data comparability problems. Designation may have contributed to some changes in addition to the passage of time (Petersen 1981; McCool 1984). In 1982, some additional lightly used access points were sampled. Because use at these accesses was light, samples there were small, and overall data were little affected.

Most of the information collected in 1970 was repeated in identically worded questions in 1982. A few items that seemed low in priority were not repeated; for example, a question on income was dropped. A few new topics were investigated in 1982; for example, how people chose trailheads and campsites. Generally, these one-time data are not reported in this paper, which is focused on trends in these three wildernesses.

The studies in both years were designed to describe accurately the characteristics of use and users, not to estimate total use, and conclusions about trends in total use cannot be drawn from the study. Official agency estimates of total annual recreational use were 263,400 recreation visitor-days (based on 12-hour days) in 1982

for the complex. Estimated use of the Bob Marshall Wilderness grew from 114,500 visitor-days in 1970 to 178,200 in 1982, a 56 percent increase, or about 4 percent per year. Use estimates for the Scapegoat Wilderness were first available for 1973; use since then has grown from 16,400 to 27,900 visitor-days in 1982, a 70 percent increase in 10 years. The Great Bear Wilderness shows a 159 percent increase from 22,100 to 57,300 visitor-days from 1979 to 1982, with almost all of growth in estimated use occurring from 1981 to 1982. At least a 60 percent increase for the complex seems indicated by these official use estimates.

METHODS

Methods were essentially the same in both years. More detail on the 1970 methods is contained in Lucas (1980). Survey research adapted to the wilderness situation was the basic method.

Source of Samples

The study population was all adult visitors (defined as anyone 16 years old or older) entering the three areas in summer and fall. The basic method was personal contact of visitors, supplemented by temporary special registration stations.

Field workers—three in 1982, one in 1970—contacted all visitors entering or leaving at 34 trailheads on selected sample dates. (Sampling procedures are described below.) They briefly explained the study, and asked visitors 16 and older voluntarily to provide their names and addresses so that some of them could be selected for a mail questionnaire about their trip and their ideas about wilderness. In 1982, personal contact was used at all trailheads estimated by managers to average at least five visitors per week. In 1970, personal contact was used in the Bob Marshall, Great Bear, and at the major trailhead serving the Scapegoat Wilderness. Visitor cooperation was complete in 1970 and there was only one refusal in 1982.

Special portable trail registers were used in 1982 at 14 trailheads estimated to average at least one but less than five visitors per week. The same trail registers were used in 1970 at all Scapegoat Wilderness trailheads except the one main one (Indian Meadows), which was sampled by personal contact.

The special trail registers (fig. 2) explained that a study was in progress, asked visitors at least 16 years old to register as individuals (not just the group leader), and provide full mailing addresses. Cooperation was excellent. Field checking in 1970 indicated registration rates of 94 percent for hikers and 67 percent for visitors with horses. Informal observation in 1982 suggested similar high registration rates.

In both study years, visitors who entered at trailheads were included whether they crossed a wilderness boundary or not. Most sampled visitors entered the Bob Marshall in 1970 (the only area that had wilderness status then and an established boundary) and entered one of the three wildernesses in 1982.

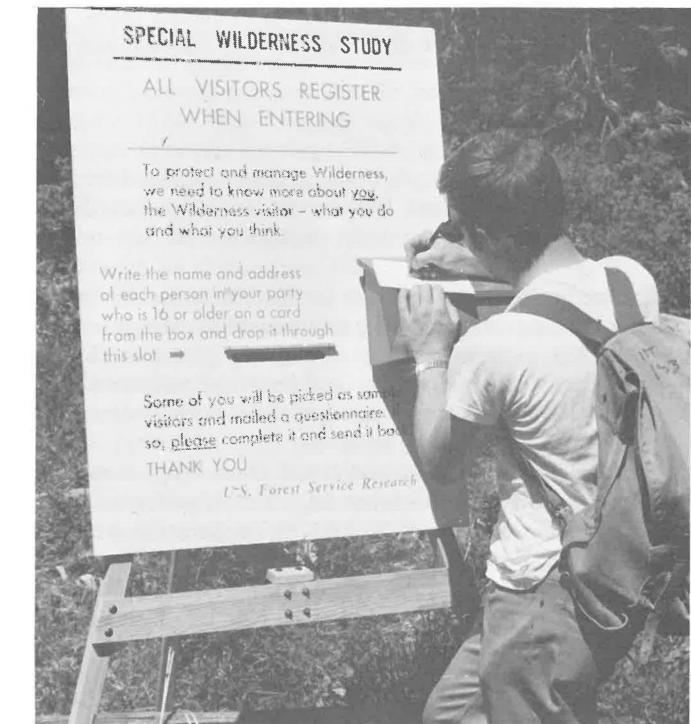


Figure 2.—The special trail registers placed at the lightly used trailheads in 1970 and 1982.

Mail Questionnaire Procedures

Names and addresses of selected visitors were entered in two lists. One list was in questionnaire serial number order. It was used to log in returned questionnaires and to prepare followup mailings. In 1970, up to five questionnaires, each with a different cover letter, were mailed at 2- to 3-week intervals to visitors sampled. In 1982, following procedures suggested by Dillman (1978), nonrespondents were sent a reminder postcard after 3 weeks, and, if no response was received, another questionnaire and cover letter were mailed 3 weeks later. Rates of return, a principal concern with mail surveys, were high in both years, as shown below:

	Number of questionnaires mailed	Number undeliverable	Completed and returned	Percent delivered returned
1970	552	8	502	91
1982	972	13	785	82

The main reason for the slightly lower rate in 1982 appears to be the effect of only up to three mailings in 1982 compared to up to five mailings to nonrespondents in 1970. The rate of return for the first three mailings in 1970 was 86 percent, little different from the 1982 rate of 82 percent. The questionnaire was also longer in 1982 than in 1970. The visitors who registered at the special stations in 1982 had an 83 percent rate of return, close to the 81 percent rate for the people contacted in person.

The other list of names and addresses was in alphabetical order to avoid sampling the same person repeatedly and unduly imposing on their cooperation. Less than

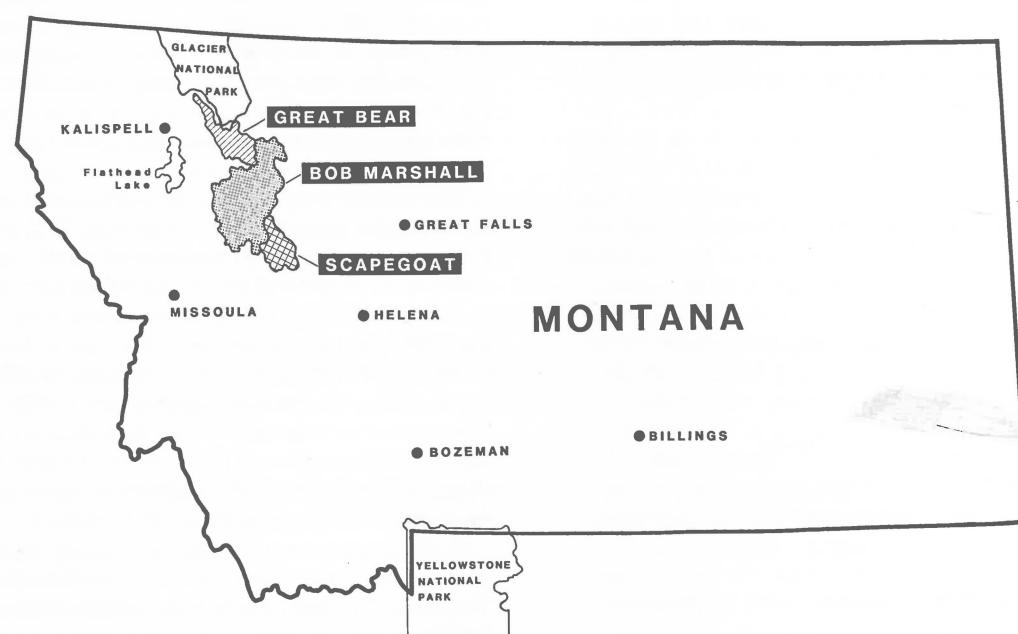


Figure 1.—Location of the Bob Marshall, Great Bear, and Scapegoat Wildernesses.

1 percent of the sampled persons were selected twice. They received a weight of 2. No one was selected more than twice.

Study Seasons

Sampling in 1982 began June 21 and continued with no interruptions through October 24. In 1970, sampling began a few days earlier, and ran until about November 20.

The earlier termination date in 1982 introduces some minor noncomparability. Big game hunting seasons in most of the wilderness complex began September 15 every year in the periods covered by these two studies and the October 24 termination of field work covered 5½ weeks of elk hunting activity.

Parts of the Scapegoat and Great Bear Wildernesses opened to hunting on October 24, 1982. However, a trail use measurement project in 1981, in cooperation with the National Forests managing the Bob Marshall, yielded day-by-day records of use on seven major trails on all sides of the area, and showed that use in late October and November dwindled to a low level. Hunting season dates were comparable in 1981 and 1982. Therefore, limitations on research funds resulted in a decision not to sample the few visitors anticipated in the late fall. Furthermore, in 1970, only 5 percent of the Great Bear Wilderness sample came from visits after October 24. The comparable figure for the Bob Marshall Wilderness was 4 percent, and for the Scapegoat Wilderness was only 2 percent. Thus, any possible noncomparability due to variation in dates can only be very small and cannot have any important effect on comparisons.

Sample Design

The sample design is complex, as is usually necessary in sampling wilderness visitors (Lucas and Oltman 1971). The general plan was to give every visitor to each study area wilderness the same chance to be sampled as every other visitor to the same area. In 1970 we did not try for the same intensity of sampling in each of the three areas, so samples from different wildernesses can only be combined after weighting. Within any single area, however, all visitors had an equal chance to be included in the survey. In 1982 we sampled the three contiguous wildernesses as a single area. Thus, in 1982, all visitors had an equal chance to be included, and data for the three areas can be combined without weighting.

Respondents can be classified by the areas visited and also by the primary area of the visit. Most comparisons, however, are made for the three areas as a single complex. Several factors led to this decision.

1. The aggregation of data produces more reliable estimates. The sample is much larger and less affected by the results of specific sampling schedules. It seems that results for the whole complex present much more accurate, representative data for the things measured than do data for each wilderness separately. Thus, comparisons between 1970 and 1982 are more meaningful for the entire complex than for individual wildernesses.

2. Visitors use the area as a single wilderness. Some travel through more than one of the designated wildernesses; about 6 percent of our sample did. Furthermore, some major trailheads serve two wildernesses; for example, the North Fork of the Blackfoot River trail is an important access to both the Scapegoat and Bob Marshall Wildernesses. So is the Benchmark trailhead. Schafer air field and Silvertip on the Spotted Bear River are important accesses to both the Great Bear and the Bob Marshall Wildernesses.

3. Management of the three wildernesses has become substantially unified. Four National Forests manage portions of the complex, but with coordinated planning. In fact, most of the individual wildernesses also have multiple National Forest management, so there is little difference in this regard between the complex and the areas that comprise it. The Scapegoat Wilderness is divided among three National Forests, the Bob Marshall between two, and only the Great Bear is in one National Forest.

The main sample design was a cluster sample, with paired selection of primary samples from unequal-sized clusters, with the clusters chosen with probabilities proportional to size (PPS) and subsampled with probabilities inversely proportional to size (Kish 1967, chapter 7). The PPS concept used estimates of average weekly use by the managers of each area as measures of "size." For example, imagine two trailheads, one (A) estimated to have 100 people entering per week, the other (B) estimated to have 10 per week. Trail A is 10 times as likely as B to be sampled (to receive direct trailhead checking). This sampling method means important major trails are almost sure to be sampled and guards against much time being wasted to produce few sample visitors; but it does not give every visitor an equal chance to be sampled. To achieve that, the persons whose names and addresses were obtained in each cluster at the different trailheads were then subsampled with probabilities inversely proportional to size. In the example, this means that persons on the list at A have only one-tenth the chance of being subsampled as persons at B. The probabilities proportional to size cancel out, and everyone has the same chance of being chosen in the final sample. In other words, a visitor at A is 10 times as likely as a visitor at B to have his or her name requested, but a visitor who gives his or her name at B is 10 times as likely to be mailed a questionnaire.

One reason for this seemingly roundabout procedure was to try to produce final clusters of about the same size. Equal, or at least reasonably close, cluster sizes are important to produce an efficient sample that will yield precise, unbiased estimates, given the size of the sample (Kish 1967). In the example, if one-half of the trail B people were sampled and one-twentieth of the trail A people, each cluster would consist of five people if use was what it was estimated to be. Variation between actual use for a sample time period compared to the estimated use introduces unavoidable variations in cluster size, of course.

Trails were chosen from summer and fall strata. In 1970, groups of weeks were used as the basic time unit

for sample selection. In 1970 the sample selection formulas yielded 40 clusters, each with a planned-for average size of about 12 people. In 1982 there were 74 clusters, based on 4-day weekday periods (Monday through Thursday) and 3-day weekends (Friday through Sunday), with a planned size of 10 people each.

There were some exceptions to this procedure in 1970. In the Bob Marshall and Great Bear Wildernesses, because first-stage sampling produced small samples, everyone contacted was sampled. This means the samples for these areas tend to overrepresent visitors who entered at what were estimated to be more heavily used entries. In 1982 the special registration signs at lightly used trailheads for the supplemental sample were in place continuously, resulting in a greater chance for these visitors to become involved in the survey than those contacted in person. Half of these registrants were sampled and, to avoid overrepresenting them, their responses were weighted down to provide equal representation with the basic cluster sample.

Because of differences between estimated use and actual use and chance variations, sample sizes varied from the sample-design goals to varying degrees (table 1).

Table 1.—Sample sizes by area, 1970 and 1982

Area	Year	Number of respondents	
		Unweighted	Weighted
Bob Marshall Wilderness	1970	125	—
	1982	396	310
Great Bear Wilderness	1970	78	—
	1982	166	111
Scapegoat Wilderness	1970	299	—
	1982	184	110
Bob Marshall complex	1970	502	—
	1982	1746	531

¹This total is less than the 785 questionnaires returned because of exclusion of 39 responses from visitors who were not within the specified sample population (nonrecreationists such as guides, trail crews, and researchers; underage visitors; persons not going beyond trailhead area such as berry pickers, etc.).

ANALYSIS

The analysis consists basically of cross tabulations of variables and comparisons for selected variables, particularly between 1970 and 1982. Comparisons between years and among areas usually are based on classification of visitors in terms of day-use or overnight visits, method of travel used, and either summer or fall use, or hunter or nonhunter visitors. (These last two classifications are very similar; only 1 percent of summer users hunted, while 75 percent of the fall visitors did.) Correlation analysis was used for a few relationships, especially for satisfaction and aspects of the trip experience. The results will be interpreted in terms of management implications.

Statistical confidence intervals have been calculated for most important factors for 1982. Because of the difficulty of calculating confidence intervals for complex, clustered

samples, this was not done for all 1970 data. The 95 percent confidence interval—plus or minus two standard deviations—is shown in the tables. For data where confidence intervals are available for both 1970 and 1982, they appear to be approximately equal, with slightly larger confidence intervals for the 1970 data, primarily due to smaller sample size in 1970. This rough equality probably would also apply to other data where 1970 confidence intervals are unavailable. Readers can judge statistical significance for themselves. Differences greater than the sum of confidence intervals for the 2 years are clearly statistically significant; lesser differences involve some overlap of confidence intervals and the possibility that the difference reflects sampling variation.

Statistical tests such as chi-square generally have not been presented. With the large sample sizes, even small differences—too small to have substantive importance—are statistically significant, so there is nothing to be gained by such tests.

Group and Individual Frames of Reference

For all three areas in both years, data can be presented either for individuals (16 years of age or over) or for groups. This was achieved by tagging one randomly selected respondent from each group and using only those respondents for basic descriptive data that logically refer to the group. Examples include group size, route of travel, length of stay, and method of travel. Other variables, such as personal socioeconomic data, activities, and attitude, were tabulated on an individual basis. A few variables, such as length of stay, are worth looking at from both perspectives. In 1982, few groups had more than one person sampled (table 2). In 1970, however, multiple respondents from the same group were more common. Thus, fewer different groups were sampled, providing less data on group characteristics.

Table 2.—Distribution of sample among "party representatives"¹ and other members of the party, percentage of total, Bob Marshall complex, 1970 and 1982

Year	"Party representatives"	Other party members
1970	50	50
1982	74	26

¹"Party representatives" consisted of one respondent per group. For groups with more than one respondent, this was the person whose questionnaire was logged in first.

USE CHARACTERISTICS

Some recreation use characteristics shifted from 1970 to 1982, and others remained essentially unchanged. The pattern of shifts and stability described below for various use characteristics generally seems to present a moderate evolution, and to form a logical pattern, which appears consistent with probable general trends in wilderness recreation.



Figure 4.—Almost all visitors traveling with outfitters used horses.

over this period. During much of this time, no new outfitter permits were issued, so this lack of growth may be close to the actual situation.

Activities

From 1970 to 1982, the proportions of visitors engaged in most of the activities in the complex showed little or no change, and the average number of reported activities remained nearly the same for both years in each area and for the complex (table 7). Fishing (fig. 5), hiking, and photography are the three major activities, the only ones generally participated in by over half of the visitors. All but fishing grew in popularity from 1970 to 1982. Fishing participation dropped slightly. Hunting was the only activity with a substantial decline in participation rates from 1970 to 1982.

Swimming, a minor activity, increased in participation rates. Nature study stayed moderately high, increasing slightly. Mountain climbing was very rare everywhere both years.

In general, there appears to be a slight shift from the more consumptive uses (hunting and fishing) to the more contemplative activities (photography, nature study, hiking).

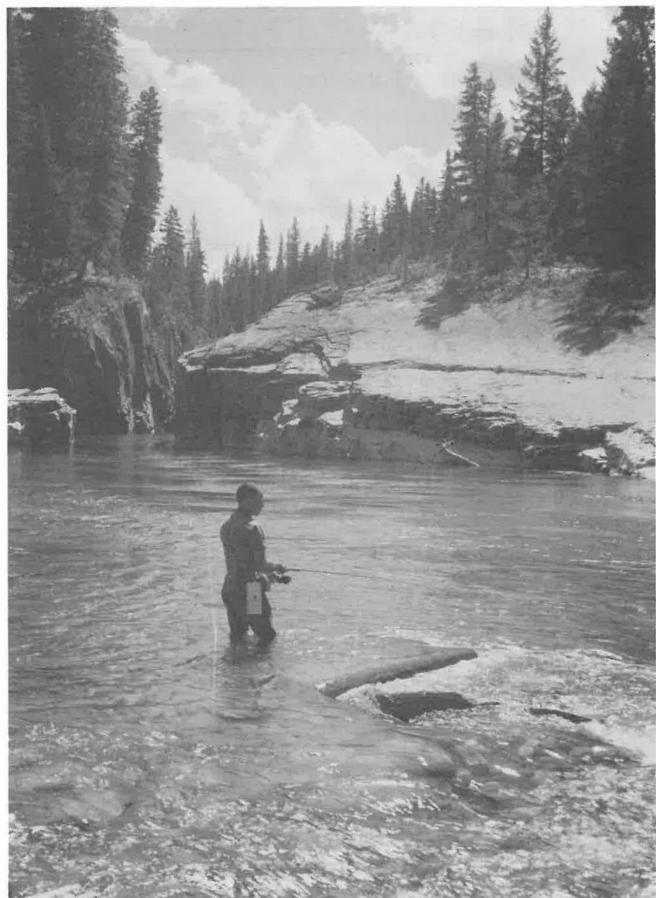


Figure 5.—More than half of the visitors fished in both 1970 and 1982.

Fire and Stove Use

Campfires and wood gathering for fires can create substantial impacts (Cole and Dalle-Molle 1982). Total reliance on wood fires dropped from 1970 to 1982 (table 8). The proportion of visitors who had a gas stove, either alone or in combination with wood fires (usually cooking on the stove and using the wood fire for warming or for its charm), almost doubled (fig. 6).

Some of the visitors in 1970 who reported no campfire or gas stove probably used wood stoves, typically in a wall tent, often at an outfitter's camp, rather than doing without any source of heat. If the 1982 figure for wood stoves (the last column in table 8), and no fire or stove at



Figure 6.—A smaller proportion of visitors cooked over campfires in 1982 than in 1970, and more used petroleum-fueled stoves.

all (the first data column), are combined, they are very similar to the 1970 "no fire or gas stove" data. Backpackers used stoves more and depended on wood fires less than horse travelers both years.

The most recent figures reemphasize a point made in reference to the 1970 data (Lucas 1980) and stressed by Hammitt (1982) that a campfire has strong appeal as a symbol of a traditional camping experience, even to campers who cook on a stove. Over 80 percent of the visitors using stoves also had campfires in both years (in 1982, 44 percent of all campers had a gas stove, but 37 percent of the total had a wood fire in addition to the gas stove, at least sometime, or 84 percent of those with stoves).

Banning all campfires would require major changes in visitor behavior. Minimum impact camping education, however, could stress ways of building small, "symbolic" fires. Such fires could have little impact, potentially less than cooking fires because they can be smaller, can burn more irregular down wood, consume less wood, and can sometimes more easily or conveniently be located on a resistant site than a cooking fire, which often has more limiting requirements for placement. Hammitt (1982) suggests that a small lantern might be a substitute for esthetic fires, and points out a number of ways to reduce campfire impacts short of a total ban.

These trends suggest the potential for some reduction in campfire impacts at campsites, a favorable change.

Wildlife Observation

Most visitors highly value the observation of wildlife in wilderness. This includes hunters and nonhunters. The wilderness setting probably enhances most observations of wildlife, and wildlife populations and behavior are relatively natural and unmodified.

Visitors were generally successful in observing major wildlife (table 9). The questionnaire listed the seven species in the table (plus an additional category—"bear, not sure which kind"), and asked if the visitor had seen each. Most species were observed by about the same proportion of visitors in both years. Elk, probably the species of greatest interest to most visitors, were the main important exception (fig. 7). Elk were observed by a smaller proportion of visitors in 1982 compared to 1970. More than half of the elk hunters, however, saw elk in 1982, a slightly higher percentage than 1970 (table 10). The percentage of hunters seeing deer also increased from 1970 to 1982.

In 1982, nonhunters more often saw grizzly bears, moose, and bighorn sheep than did hunters, about the same number of mountain goats, somewhat fewer deer (61 percent of nonhunters reported seeing deer, compared to 74 percent of hunters). They saw half as many black bears and only about one-third as many elk as hunters (17 percent of nonhunters saw elk versus 51 percent of hunters). In 1970, more nonhunters saw moose and sheep, about as many saw deer and goats, but fewer saw bears and elk.

Hunting

Elk hunting is a traditional activity in all three wildernesses, with deer hunting a secondary quarry for most hunters. Elk hunting success declined from 24 to 18 percent from 1970 to 1982 (table 10). Hunting regulations were more restrictive in 1982 than in 1970; during the early part of the 1982 season only antlered bulls could be taken, while both bulls and cows were legal in 1970. The percentage of hunters taking an elk was almost identical in all three areas in 1982.

Deer were seen more often than elk, but the proportion of hunters taking deer was not greatly different than for elk—higher in 1970 than 1982 (table 10). This is almost surely a reflection of most hunters' preoccupation with elk, which probably caused many of them to pass up shots at deer.

The sample of hunters of other species—bears, goats, sheep, and moose—was too small to analyze.

Table 7.—Activities participated in, Bob Marshall complex, 1970 and 1982

Year	Percentage of total visits involving activity							Average number of activities	
	Fish	Hunt	Hike	Photog-	Nature	Mountain			
				raphy	study	climb	Swim	Other ¹	
1970	61±8	2 ³²	60	56	26	0.3	11	17	2.7
1982	57±7	16±7	68±5	61±5	28±5	.8±1	17±4	15±3	2.6±0.1

¹"Other" was made up mainly of rafting and of people flying to the Schafer air field in the Great Bear Wilderness who had no appreciable ground travel.

²Confidence intervals not available for any activities in 1970 except fishing.

Table 8.—Use of wood fires and gas camp stoves in the Bob Marshall complex, 1970 and 1982

Year	Percentage of total campers ¹					
	No fire or stove	Wood fire only	Wood stove (in tent)	Gas stove only	Both fire and gas stove	Had a gas stove
1970	4	73	Not asked	4	19	23
1982	1±1	51±6	3±1	7±2	37±5	44±6

¹Day-users excluded.



Figure 7.—The distribution of recreational use of trails, off-trail travel, and campsites in the Bob Marshall Wilderness complex, summer and fall, 1982.

Table 9.—Wildlife observation in the Bob Marshall complex, 1970 and 1982

Year	Percentage of visits on which respondents reported seeing:								
	Any major wildlife	Grizzly bear	Black bear	Bear, species unknown	Elk	Deer	Mountain goat	Bighorn sheep	Moose
1970	83	1	12	3	36	64	9	4	11
1982	70±7	3±2	8±2	1±1	23±6	63±8	13±4	4±2	6±5

Table 10.—Hunter observation and success for deer and elk, by area, 1970 and 1982

Area	Year	Percentage of total hunter visits			
		Elk	Deer	Saw	Got
Bob Marshall Wilderness	1970	46	25	40	40
	1982	51	18	74	7
Great Bear Wilderness	1970	74	41	80	13
	1982	36	18	74	18
Scapegoat Wilderness	1970	27	5	83	25
	1982	57	16	73	22
Bob Marshall complex	1970	48	24	54	33
	1982	51	18±1	74	14±1

Table 11.—Time of entry in the Bob Marshall complex, by season, weekday or weekend, and month

Year	Percentage of total visits									
	Summer	Fall	Weekday	Weekend and holiday	June	July	Aug.	Sept.	Oct.	Nov.
1970	66	34	31	69	3	44	16	17	18	2
1982	80±8	20±8	42±11	58±11	3	39	35	15	9	-1

¹November was not sampled in 1982.

Timing of Use

Summer is the main season of use in the three-wilderness complex in both 1970 and 1982 (table 11), and in each individual area. The concentration of use in the summer increased from 1970 to 1982.

Use on weekdays, defined as Monday through Thursday, was lighter than on weekends, defined as Friday through Sunday, plus Independence Day and Labor Day (table 11). The weekend rush was less pronounced in 1982 than in 1970.

July had the most use in both years. The 1982 sample indicates more August use than in 1970, and less October use. The other months were similar in both years. The monthly use figures need to be treated as general indications because of the effects caused by random selection of sampling points—some popular places being sampled on busy days in one month, with other sampling dates falling on lightly used places or times in another month.

USE DISTRIBUTION

Wilderness recreational use typically is distributed very unevenly among different wildernesses, among trailheads in a wilderness, and over the trail system and campsites of a wilderness (Lucas 1980; Stankey and others 1976). Uneven use distribution has implications for resource impacts, visitor solitude or congestion, trail maintenance, and visitor informational contacts.

Entry Point Use

All three of the wildernesses have concentrated use at a few popular trailheads (table 12). Each area's most used trailhead accounts for more than one-third of all 1982 visits, and the top two account for about half or more. In both years, and in all three areas, the most used half of the trailheads receive about 90 to 100 percent of all estimated visits.

Table 12.—Cumulative percentage of total use accounted for by varying number of entry points, ranked from most to least used, by area, 1970 and 1982

Entry points, ranked by number of visits	Bob Marshall Wilderness		Great Bear Wilderness		Scapegoat Wilderness		Bob Marshall complex 1982
	1970	1982	1970	1982	1970	1982	
1	45	34	85	32	68	40	11
2	62	48	92	47	78	53	20
3	75	57	100	60	85	64	29
4	83	64	100	68	91	73	35
5	89	70	100	74	95	80	40
6	93	75	100	81	100	86	46
7	95	79	100	86	100	91	50
8	97	84	100	90	100	95	55
9	98	88	100	94	100	98	58
10	100	91	100	96	100	100	62
11	100	93	100	98	100	100	65
12	100	95	99	100			67
13	100	97	99				70
14	100	98	100				72
15	100	99	100				74
16	100	100	100				76
17	100	100	100				78
18	100						80
19	100						82
20	100						83
21							85
22							86
23							88
24							89
25							90
26							91
27							92
28							93
29							94
30							95
31							96
32							97
33							98
34							99
35							99
36							99
37							99
38							99
39							99
40							100
41							100
42							100
43							100
44							100
45							100
46							100
47							100
48							100
Total sampled	16	19	11	18	12	11	48

The 1982 data for the entire wilderness complex, for all 48 trailheads where use was sampled, show that just the seven most used trailheads had half of all use (table 12). The most used half had about 90 percent of total visits.

Trailhead use was less concentrated in 1982 than in 1970 in each area, and particularly in the Great Bear Wilderness. I believe use has dispersed, partly as a result of visitor attempts to avoid heavily used areas, probably particularly by the summer backpackers who are now more common. In the Great Bear, the extreme concentration at the Schafer air field has decreased, apparently as visitor awareness of other access points has grown. Some of the Great Bear trailheads with relatively more use in 1982 are reached by logging roads that had been built only a few years before the 1970 survey and may not have been widely known. There has not been any specific information effort to encourage visitors to disperse.

As for monthly use patterns, trailhead use should be compared with caution. The sample is fairly small even at popular trailheads and very small at lightly used ones. Estimates of total use are subject to large variation due to random chance; for example, the trailheads sampled the few days before the hunting season opened were busy, whereas those sampled a week earlier were usually quiet. Weather at sampling time influenced use at specific trailheads. The sample was designed to estimate accurately the overall characteristics of use and users, but, inevitably, not total amounts of use or distribution in great detail.

Routes of Travel and Trail Use

The uneven use of trailheads results in uneven use of trails. In fact, trail use is more uneven than trailhead use because of variation in the distances visitors travel and uneven choice of alternate routes at trail junctions. Figure 7 presents the pattern of visitor flows over the Bob Marshall complex in 1982.

Use is heaviest east of Holland Lake, but also heavy on a number of other trail segments including: from Holland Lake over the Swan Range and down both Gordon and Big Salmon Creeks; from the Meadow Creek trailhead south up the South Fork of the Flathead; to Stanton Lake; south up the Middle Fork; around the Schafer air field (east, west, south, and to Flotilla Lake); from the South Fork of the Teton River over Headquarters Pass to Gates Park; from Benchmark down the South Fork of the Sun River and up its West Fork; from Indian Meadows to Heart and Webb Lakes; and north up Monture Creek over Hahn Pass and down to Youngs Creek. Many other trail segments had only light use, and some, even with data from almost 750 parties, had no sampled use. The most lightly used areas are often not the most remote, and some remote areas, for example, around Big Prairie, are heavily used.

Because of small samples, use was not mapped for the Bob Marshall or Great Bear Wilderness in 1970. The overall pattern in the Scapegoat Wilderness was quite similar in 1970 (fig. 8) and 1982 (fig. 7).

Only a few of the sampled parties did not actually cross the wilderness boundary, although in many places the boundary is distant from trailheads. Entering the wilderness were 98 percent in the Great Bear, 92 percent in the Bob Marshall, and 91 percent in the Scapegoat Wilderness. Thus, the study results represent use of the legally defined wilderness well, even though visitors to the undeveloped peripheral wildlands were not excluded from the sample.

For the three-wilderness complex, there were only modest changes in the frequency distribution of distance traveled per trip (table 13). In 1982 there were more very short trips (not over 5 miles [8 km]) and, at the other extreme, very long trips (over 50 miles [83 km]) than in 1970. Most of the increase in very long trips occurred in the Bob Marshall Wilderness, and most of the increase in very short trips was in the Great Bear Wilderness. The pattern of trip length in the Scapegoat Wilderness was very similar in both years.

SCAPEGOAT WILDERNESS

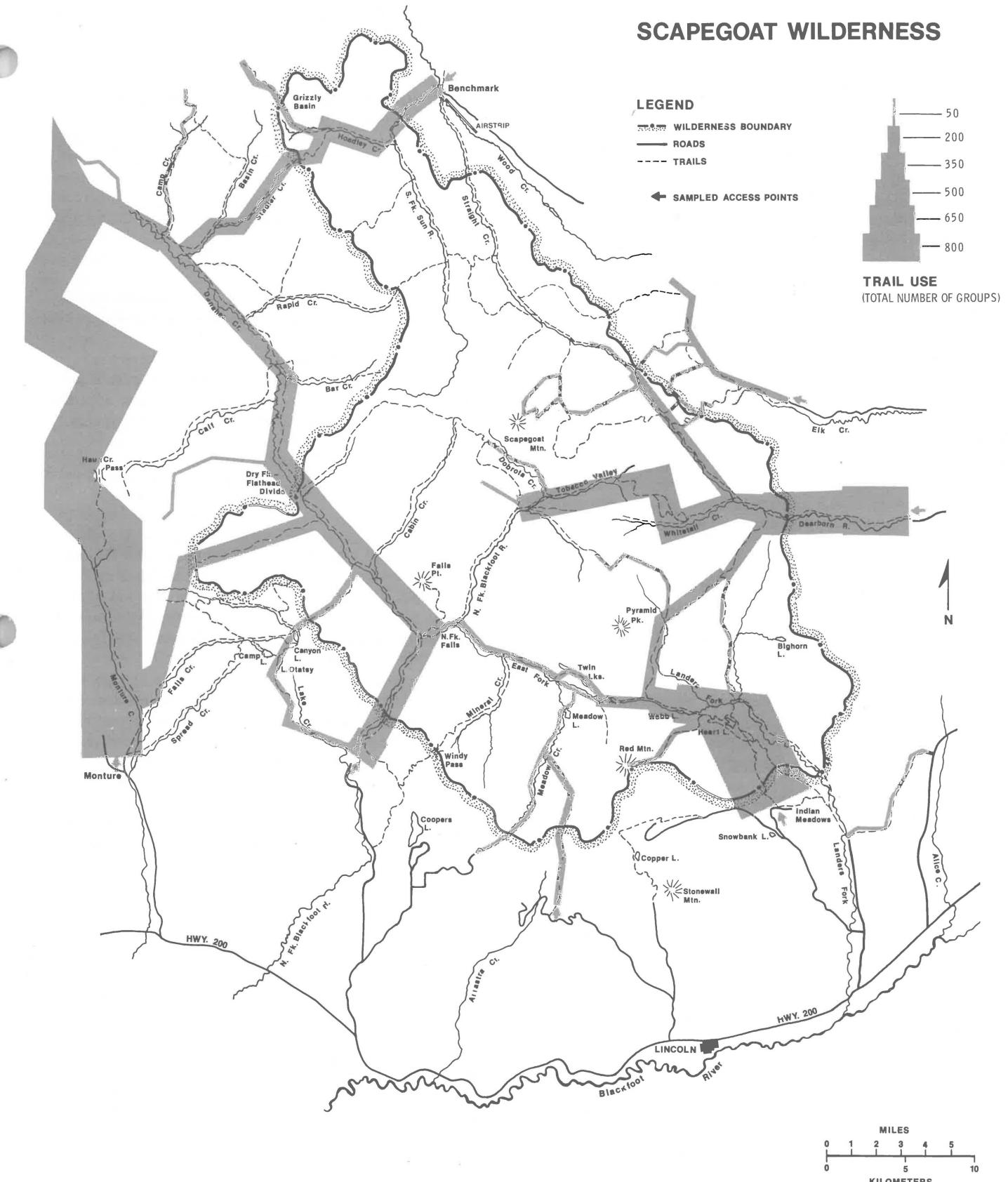


Figure 8.—The distribution of recreational use of trails in the Scapegoat Wilderness, summer and fall, 1970.

Table 13.—Total distance traveled beyond roads in the Bob Marshall complex, 1970 and 1982

Year	Average distance traveled, miles, round trip	Percentage of total groups traveling indicated number of miles, round trip					
		5 or less	6-10	11-20	21-30	31-50	51 or more
1970	28	3	17	29	15	22	14
1982	30±4	7	11	25	20	17	20

Unlike many wildernesses studied elsewhere (Lucas 1980), most trips in the Bob Marshall complex are fairly long, averaging about 30 miles (48 km) both years (table 13). Problems of congestion and impacts are probably not as concentrated in the periphery of the Bob Marshall complex as is the case in many other areas.

Off-trail travel is rare in the Bob Marshall, much of which is steep and heavily forested. Only 10 percent of the visitors showed any off-trail travel on the maps of their routes in both years. About half of those who did indicate off-trail travel covered 5 miles (8 km) or less cross-country. There was little difference among various methods of travel.

This suggests that trails in this wilderness are a powerful management tool; they largely control where visitors go, what they see, and where most impacts will occur.

Campsite Use

Campsite use is also concentrated. Many campsites in figure 7 were estimated to be occupied less than 30 nights in 1982 (the "light" category), but a number were estimated to be used over 120 nights (the "very heavy" category), or almost constantly. Campsite use in 1970 was not analyzed in detail.

Readers should be particularly cautious of overinterpreting campsite use data on the map for two reasons. First, the data are based on information supplied by visitors who indicated on questionnaire maps where they camped and how long. Because campsites could not be located precisely on the small-scale maps, some locations are undoubtedly erroneous. Second, even if all visitor-supplied data were exact, samples for individual campsites are small—in effect, the sample is stretched thin—and therefore subject to large variances.

Consistent with the relatively long trips in the Bob Marshall complex, many parties camp at a number of different sites on a trip. In 1982, about 46 percent of all campers used only one campsite, but 20 percent used two, 13 percent used three, 6 percent used four, and 15 percent used five or more different campsites. In 1970, campers used fewer sites; 70 percent used only one, 13 percent used two, and 12 percent used three to five. The trend toward use of more campsites is another reflection of the shift toward more backpacker use because backpackers used more campsites than horseback travelers both years. Hunters were more likely to operate from one base camp; in 1982,

78 percent of the hunters used only one campsite, 14 percent used two sites, 8 percent used three to five campsites, and none used over five.

This use pattern suggests that most campsites are usually not used for extended periods of time, except in the fall, and then usually by visitors with horses, with the resulting potential for concentrated, cumulative impacts.

Summary of Use Characteristics

From 1970 to 1982, the Bob Marshall complex experienced a major change in use: backpackers began to outnumber horse users. The traditional style of travel, saddle horses and a pack string, is no longer the majority. Most other changes seem to stem from this basic shift: shorter stays, smaller parties, a smaller proportion with outfitters, some shift in activities from more consumptive to more contemplative, more summer use and less fall use, more moving from one campsite to another.

Other changes are less obviously related to the growth of backpacking: weekend peaking down, use less concentrated at access points, and less dependence on wood campfires. Wilderness managers will find this good news because most of these changes mitigate the impacts of growing use—probably up at least 60 percent from 1970 to 1982. The potential for impact from the average party should be less in the 1980's than in 1970, even if visitors' level of concern and skill were assumed to be unchanged.

VISITOR CHARACTERISTICS

Residence

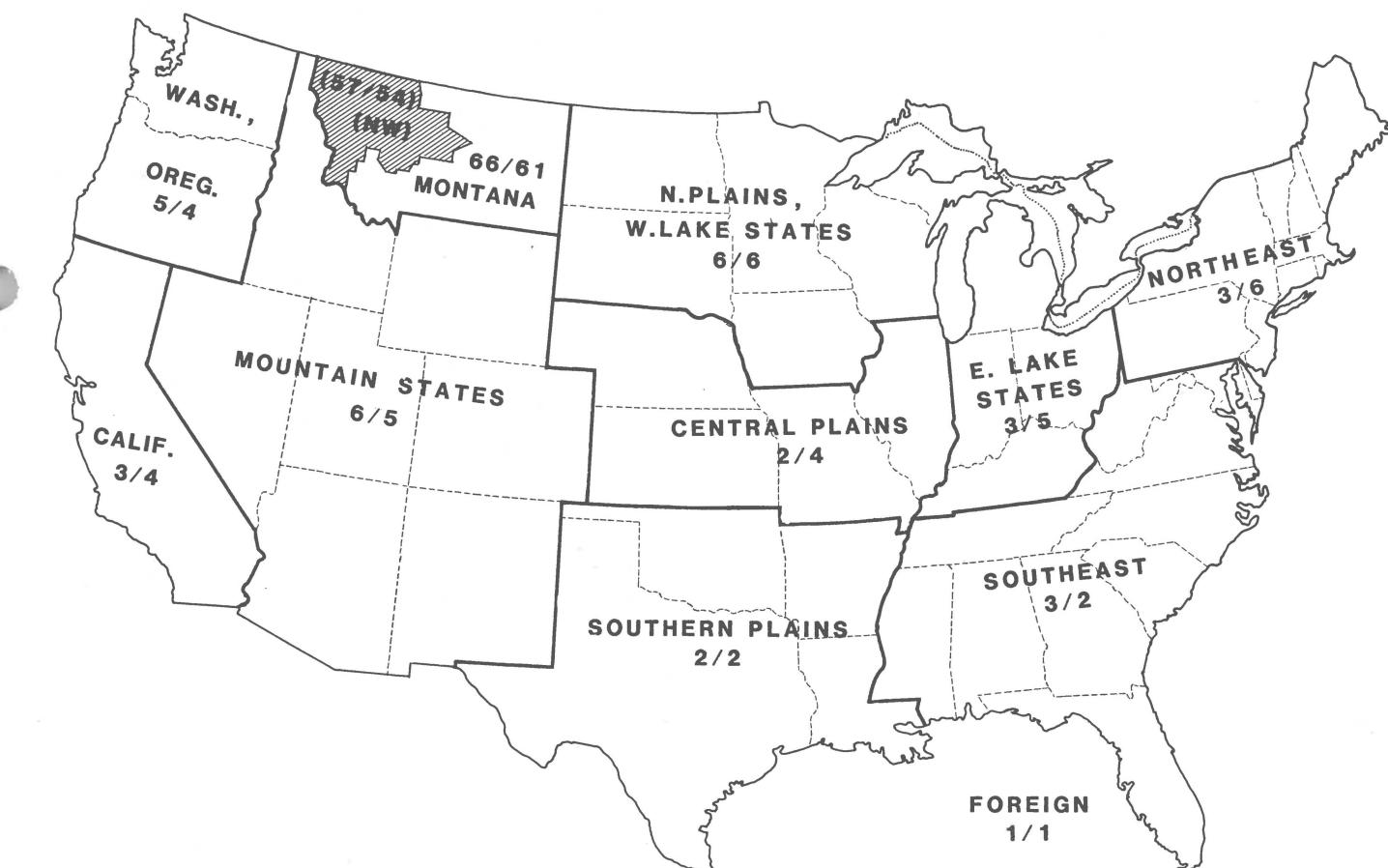
Visitors to the Bob Marshall Wilderness complex come from all regions of the United States and even foreign nations, but more than 60 percent are from Montana (table 14). About 54 percent of the 1982 visitors are from northwestern Montana (fig. 9)—the areas closest to the wilderness. The 1970 figure was 57 percent from the same area. From 1970 to 1982, however, the proportion of visitors from outside Montana increased, especially from the central plains, eastern Lake States, and the Northeast, whose share grew from 8 to 15 percent.

In 1982 the Bob Marshall Wilderness drew the most out-of-State visitors, 43 percent, while the Great Bear and Scapegoat Wildernesses each had about 37 percent out-of-State visitors. This suggests that the Bob Marshall Wilderness is better known nationally than the two relatively new wildernesses.

Table 14.—Area of residence for visitors, Bob Marshall complex, 1970 and 1982

Visitor residence ¹	Percentage of total visits	
	1970	1982
Montana	66	61±4
Mountain States (except Montana)	6	5
California	3	4
Washington, Oregon	5	4
Northern Plains, western Lake States	6	6
Central Plains	2	4
Southern Plains	2	2
Eastern Lake States	3	5
Southeast	3	2
Northeast	3	6
Foreign	1	1

¹See figure 9 for definitions of visitor residence regions.



KEY : 6/5 PERCENT OF TOTAL VISITORS, 1970/'82

Figure 9.—Most visitors to the Bob Marshall Wilderness complex both years lived in Montana, mostly in northwestern Montana, but the proportion coming from outside Montana, especially the northeastern quarter of the Nation, increased from 1970 to 1982.

The Scapegoat Wilderness showed the most pronounced shift in visitor origins from 1970 to 1982, going from an overwhelmingly local clientele (86 percent from Montana) in 1970 to a much more national visitation pattern in 1982 (62 percent from Montana, 38 percent from outside the State). The proportion of visitors to the Scapegoat Wilderness from about every region of the country outside Montana grew from 1970 to 1982.

The percentage of hikers and of horse travelers from out of State in 1982 was almost identical (about 40 percent of the total in each case). Rafters were less often from out of State (27 percent of all rafters). These represent shifts from 1970, when horse users were more likely to be from out of State than hikers (41 vs. 30 percent), and when no sampled rafters were from outside Montana. Apparently national awareness of the Bob Marshall complex as a place to visit to backpack or float rivers has grown over time.

Hunters were slightly more often from out of State than nonhunters in 1982—42 percent of hunters compared to 39

percent of nonhunters. Campers in 1982 were also more often from out of State than day-users—42 percent of campers compared to 29 percent of day-users. Here also there are shifts from 1970, when hunters were substantially more often from outside Montana than were nonhunters (42 vs. 29 percent), and campers over twice as likely to be from out of Montana as day-users (34 vs. 16 percent). It seems that in 1970 the Bob Marshall complex had acquired considerable national publicity as a place for a wilderness hunting trip, traveling with horses, but was not well known for other types of wilderness experiences, except locally. This changed by 1982, as the area became more widely appreciated for a variety of forms of recreation.

Information programs conducted in Montana can potentially reach about 60 percent of all visitors to the Bob Marshall Wilderness complex. A substantial proportion of the 40 percent who live elsewhere travel with outfitters who can be an important channel for information on wilderness values and appropriate behavior. Other out-of-State visitors will be more difficult to contact. A diverse educational effort seems necessary. Some general wilderness education needs to be conducted nationally. Contacts with ranger stations and supervisors' offices need to be recognized as very valuable and should be used fully, and some contact on the ground, at trailheads or in the wilderness, can supplement other approaches.

Over 70 percent of the day-users were from Montana, which may imply either a need for more local opportunities for short day hikes or rides outside wilderness, or for more information to increase local residents' awareness of such opportunities.

Urban/Rural Residence

Most of the visitors to the Bob Marshall Wilderness complex are from small- to medium-sized urban areas—in 1982 about 60 percent were from urban areas, but only 8 percent were from large cities (over 1 million people). This is little different from 1970, when 65 percent were from urban areas, and only 5 percent from large cities. This reflects the fact that most visitors were from Montana, which has no large cities.

The pattern of urban/rural residence for different types of visitors was generally stable from 1970 to 1982. In both years, hikers and rafters were substantially more urban than horse users, and hunters were less urban than non-hunters. The only shift was for day-users compared to campers; in 1970, day-users were more urban than campers, but the reverse was true in 1982. The differences were not large either year.

Urban residents make up 51 percent of the Montana population, and 50 percent of the Montana visitors to the Bob Marshall complex were from urban areas, compared to 74 percent of the visitors from outside Montana, which is also equal to the 74 percent of total U.S. population which lives in urban areas. Thus there is little support in the data from either Montana or out-of-State visitors for the idea that wilderness visitors, at least to this wilderness, are disproportionately from urban areas, presumably seeking escape from urban conditions.

In 1970 the childhood residence ("most of the years before you were 18") of visitors was much more rural than their current residence—56 percent had grown up in rural and small-town surroundings, but only 35 percent still lived in such places. By 1982, however, the difference between childhood and current residence had narrowed; 47 percent had a rural childhood residence and 40 percent currently lived in rural areas.

Some people may be attracted to wilderness by the contrast between rural surroundings in childhood and the pressures of city living in adulthood (Lucas 1980). Wilderness visits may thus fulfill a longing for open spaces and contact with nature for people who have not entirely adapted to city living, so the notion runs. At an earlier stage in America's history, a major migration from rural to urban areas indeed took place. In 1970, there were 21 percent more visitors who had grown up in rural areas or small towns than who currently lived there—about twice the magnitude of the shift in the general population. This lends some support to the "nostalgia theory." In 1982, the difference was only 7 percent for visitors, but again about twice the shift for the general population.

Thus, there still is support for the theory in the 1982 figures, but its effect is weakening as fewer people experience rural-to-urban migration, and in the future its effect would likely disappear. This could lead to some slight dampening of the rate of growth of wilderness visitation.

The fact that most visitors are from urban areas, and that this is most true for the visitors not using horses, may contribute to less visitor understanding of horses and the practical problems faced by horse handlers, and less tolerance of horses' impacts.

Sex

Most visitors are males in both years, but the proportion of female visitors grew from 20 percent in 1970 to 30 percent in 1982. Women were fewer during the hunting season, but again 1982 was different than 1970, with 9 percent of all visitors being female compared to only 3 percent in 1970. There was little difference among different travel methods in the proportion of female visitors. A wider cross-section of society now benefits from wilderness than in 1970 (fig. 10). Education efforts need to be attuned to both men and women.

Types of Groups

The distribution of different types of social groups was almost identical between the two years. A majority of visitor groups consisted of families (including parts of families and families with friends) in both 1970 and 1982 (table 15). Groups of friends, without family ties, were the second most common type of visitor group, and, again, the percentage is almost unchanged between the 2 years. Groups sponsored by organizations such as Scouts, churches, the American Forestry Association, Sierra Club, or Backcountry Horsemen were only 2 or 3 percent of all groups both years. Solitary visitors were not common either year, making up 6 percent of the sample both years.



Figure 10.—Women increased from 20 percent to 30 percent of all visitors from 1970 to 1982.

The pattern of types varied with method of travel, length of stay (campers or day-use), and season of use. Almost all of the solitary visitors were hikers in both years, and most of the organization-sponsored groups were also hikers. The proportion of family groups and groups of friends was about the same for horse users, hikers, and other travel methods in 1982, but in 1970, horseback travelers were mainly groups of friends rather than families, much more so than hikers.

Day-users were more often family groups than were overnight campers both years, and more often alone. Campers were more often groups of friends and with organizations than were day-users.

Summer visitors were about twice as likely to be alone as fall visitors both years, and all organization groups visited in the summer both years. In 1982, groups of friends were somewhat more common in fall than in summer, but family groups were about the same in both seasons. In 1970, however, friends far outnumbered families in the fall, while families were more common than friends in the summer.

Thus, from 1970 to 1982, the predominance of family groups seems to have spread more uniformly across travel methods and seasons. This is consistent with the increased proportion of female visitors. This trend could suggest increased benefits through strengthened family ties.

Table 15.—Type of group, Bob Marshall complex, 1970 and 1982

Year	Type of group, as a percentage of total group visits				Percentage of groups with children
	Family (all or part), with or without friends	Friends (unrelated)	Club or organization	Alone	
1970	55	36	3	6	38
1982	55±5	37±5	2±2	6±2	NA

Age

There was no appreciable shift in the distribution of various age groups from 1970 to 1982 (table 16). Almost half of the visitors in both years were 25 to 44 years old.

Age is often a contentious issue in debates about wilderness allocation. Some people express the idea that wilderness is inaccessible to older people (Norgard and others 1979). Table 16 show only modest underrepresentation of the 45 and older group among Bob Marshall complex visitors compared to the general population. The 25 to 44 age group is overrepresented; the 15 to 24 group is about equally represented in the wilderness and in the general population. The younger age group, 14 and under, is underrepresented, although the youngest children account for much of this underrepresentation.

The figures for the United States population in table 16 show an aging trend that could eventually have a negative effect on future growth in wilderness recreational use. Nevertheless, the short-run effect could be the opposite. In 1980 the proportion of the population in the 25 to 44 bracket increased, and this is the group from which the largest number of wilderness visitors come. This age group is projected to increase until about 1995 and then decline, while the 45 to 64 age group will increase greatly until it peaks about 2015, while the 10 to 24 age group remains fairly constant or declines slightly (Marcin and Lime 1977).

Table 16.—Age distribution, Bob Marshall complex, 1970 and 1982, and for the United States population, 1970 and 1980

Year	14 and under	15-24	25-44	45 and over
Percentage of Total Visitors				
1970	11	17	48	24
1982	10	21	48	21
Percentage of Total Population, United States				
1970	28	18	24	30
1982	22	18	29	31

Education

Of all the social characteristics, the one that most distinguishes wilderness visitors is high education levels, and particularly high levels of study beyond college graduation. Education levels in 1982 were even higher than in 1970 (table 17). The contrast with national figures is striking. In 1982, 32 percent of the United States population went beyond high school. But 70 percent of the wilderness visitors not only went to college, 26 percent had postgraduate educations. Educational levels in Montana are slightly higher than for the Nation as a whole, but not enough to account for any appreciable portion of the high levels of visitor education.

In fact, the educational disparity between the general population and wilderness visitors is even greater than the figures in table 17 suggest. This is because census data on years of schooling are available only for persons 25 years or older, most of whom have completed their education. But the wilderness visitor data include some people as young as 16. About 20 percent of the sample respondents were under 25, and many were currently students, so that their current education level is usually lower than it would be when they were 25.

Education is generally the best socioeconomic determinant of leisure choices (Settle and others 1978), but the reasons for this extremely strong association of education and wilderness use are unstudied, to my knowledge. Several possible hypotheses come to mind. First, highly educated persons may gravitate to occupations with working conditions and stress that enhance the appeal of contrasting conditions in wilderness. Second, education may develop curiosity and interest about the natural world and hence interest in and enjoyment of wilderness. A third possibility is that curiosity and interest about nature may motivate people to seek more education, as well as wilderness recreation. Or, finally, the social influences of a university community may encourage wilderness recreation as part of life style, although this still leaves the unanswered question—why is wilderness recreation a prominent part of that life style? Perhaps all of these speculations have some truth.

In both study years, hikers had higher educational levels than visitors traveling with horses or rafting. In

1982, over half of the hikers were college graduates and almost one-third were or had been graduate students. Nonhunters had over twice as high a proportion of college graduates and graduate students as hunters in 1982, and day-user educational levels were slightly higher than for campers.

These findings are further confirmation of other studies (Lucas 1980; Hendee and others 1978). They stress again how unusually appropriate educational approaches could be in managing wilderness visitors. The audience of prospective wilderness visitors should be capable of understanding complex ideas, often should have knowledge of related topics, and should be skilled information processors. It also lends support to the idea, I think, that explanations of the reasons for recommended practices could increase acceptance and application in contrast to simple do's and don'ts.

Educational levels of the general population rose from 1970 to 1980, but it appears that future increases will be smaller, which might suggest a future slowing down in the rate of growth in wilderness use.

Occupations

Visitors in professional and technical occupations were the largest proportion both years (table 18). Professional and technical occupations (such as accountants, engineers, doctors, nurses, teachers, religious workers, and scientists) were even more common in 1982 than in 1970. Most other occupational groups were about equally represented both years, although students and homemakers were less common in 1982 than in 1970, and craftsmen, skilled and semiskilled workers, and laborers (blue-collar workers) were more common in 1982.

The drop in homemakers may be exaggerated because of sample selection. In both years individuals were sampled, not group leaders, but in 1970 the proportion of people in the same group who were sampled was higher than in 1982 (table 2). Thus, there was more opportunity for husbands to fill out the questionnaire, even though it was addressed to the wife, in 1982 than in 1970, when both husband and wife more frequently received questionnaires.

A number of occupations are overrepresented among visitors to the Bob Marshall complex compared to the

Table 18.—Occupational distribution, Bob Marshall complex, 1970 and 1982; and United States, 1970 and 1980

Occupation ¹	Percentage of total visits			
	Bob Marshall complex 1970	Bob Marshall complex 1982	United States population ² 1970	United States population ² 1980
Professional and technical	32	37 ± 4	8	9
Students	17	11	5	4
Homemakers	9	4	25	21
Craftsmen, operatives ³ , and laborers	14	18	20	21
Clerical, sales, service	9	10	20	23
Business managers	9	8	6	7
Farm managers and workers	4	5	3	2
Military	3	2	2	1
All others, including retired and unemployed	3	5	11	12

¹Based on the 1960 Census of Population Classified Index of Occupations and Industries (U.S. Department of Commerce, Bureau of the Census, 1960).

²Based on persons 16 years of age or older.

³Includes a variety of skilled and semiskilled occupations such as assembly line workers, butchers, gas station attendants, etc.

national population: professional and technical, about four times as common among visitors as among the general population, and students and farmers (table 18). Other occupations are underrepresented: homemakers, clerical, sales and service workers, and the retired, unemployed, and other category. In both years the proportion of professional and technical occupations and of students was higher for hikers than other visitors; 42 percent of hikers were in the professional and technical category in 1982. Businessmen, farmers, and blue-collar workers were more common among horseback travelers than hikers. Also in both years, fall visitors (three-fourths hunters) were less likely to be from the professional and technical professions or students, and much more likely to be blue-collar workers.

Previous Experience

How wilderness visitors behave, how much skill they have, how they evaluate their visit, and what they prefer are all shaped by their background experience. Most visitors to the Bob Marshall complex have visited some wilderness before—78 percent both years (table 19). In 1982, fewer (44 percent) visitors had previously visited the Bob Marshall complex than in 1970 (55 percent).

Most of the visitors with wilderness experience were introduced to wilderness while young. Both years close to 40 percent of the experienced visitors first visited wilderness before they were 16. About two-thirds had begun visiting wilderness by the time they were 25. About one-third were introduced to wilderness by their parents. The 1982 visitors were introduced to wilderness slightly younger than were 1970 visitors.

Both years visitors averaged three wilderness trips per year, and just under 10 total days annually in wilderness. This indicates a pattern of fairly frequent, fairly short trips, as well as considerable experience.

Hikers had more often visited some wilderness before than had horse users and river floaters both years. In 1970, hikers also more often had visited the Bob

Table 19.—Wilderness experience, Bob Marshall complex, 1970 and 1982

Experience level	1970		1982	
	Percentage of total visits			
Number of previous visits to Bob Marshall complex:				
0	45	56 ± 5		
1-2	18	16		
3-5	17	14		
6+	20	14		
Previous visits to any wilderness	78	78 ± 5		
<hr/> <i>Averages</i> <hr/>				
Number of wilderness visits in previous 12 months	3.0	3.0		
Number of days in wilderness in previous 12 months	9.9	9.8		
<hr/> <i>Percentage of total visits by experienced visitors¹</i> <hr/>				
Age at first wilderness visit:				
10 or less	18	19		
11-15	19	20		
16-25	28	31		
26 and over	35	30		
First wilderness trip with parents	35	33 ± 5		

¹Includes only those with previous visits to any wilderness (78 percent of the total).

Marshall complex before, although the people with many previous visits—10, 20, even 50 or 60 visits—were more often horseback travelers. In 1982 this was reversed, however, and almost 60 percent of the backpackers were new to the Bob Marshall complex, compared to about 44 percent of the horseback travelers. Both years hikers tended to make more wilderness visits per year than other visitors, but, because the trips were shorter, they spent slightly fewer total days in wilderness over the previous 12 months than horse users. Hikers tended to be introduced to wilderness at a younger age than horse users or river floaters.

Table 17.—Education level distribution, Bob Marshall complex, 1970 and 1982; for the United States population and Montana, 1970 and 1980

Area	Year	16 or more ¹						(17 or more) ²
		0-8	9-11	12	13-15	more ¹	more ²	
<hr/> <i>Percentage of total visits</i> <hr/>								
Bob Marshall complex	1970	4	13	24	18	41	(28)	
	1982	2	7	22	23	47 ± 5	(26)	
United States population ³	1970	28	17	34	10	11	(NA)	
	1980	17	14	37	15	17	(NA)	
Montana population ³	1970	25	16	34	14	11	(NA)	
	1980	14	11	38	19	18	(NA)	

¹College graduates, usually.

²Graduate study, in most cases (also included in totals for "16 or more").

³Based on persons 25 years of age or older.

Hunters tended to have less general wilderness experience than nonhunters both years, but more experience with the Bob Marshall complex.

The lower level of visitor experience with the Bob Marshall complex itself in 1982 compared to 1970 is another indication of growing interest in the area, drawing more new visitors longer distances. The stability over 12 years in all of the other measures of experience is striking, and probably means that about the same sort of audience, in terms of experience, will face managers for many years.

The high level of experience needs to be considered in planning education efforts. Most visitors already have developed a certain wilderness behavior, right or wrong, and education usually is not starting with a clean slate. Changing bad habits is probably more difficult than starting fresh. On the other hand, the general familiarity with wilderness conditions might enhance education efforts. The early introduction to wilderness for many visitors may suggest that current wilderness education efforts directed at grade school or junior high school young people could be reaching prospective visitors at an opportune stage in their lives.

Information Sources

Use of education and information is an important wilderness visitor management tool and the major alternative to regulations. In 1982, visitors were asked if they had contacted the Forest Service for information in person, by telephone, or by writing; this question was not asked in 1970. Only 22 percent of the visitors had any contact with the managing agency (table 20). Only 13 percent had personal contact (fig. 11). Most visitors had maps both years, and these were usually Forest Service maps.

Horseback travelers and hunters both had less contact with the Forest Service than hikers, and were less likely to have Forest Service maps or any maps. This may be influenced by the higher level of experience in the Bob Marshall complex. Hikers were much more likely to have Geological Survey topographic maps than were other visitors.

The low level of agency contact is cause for concern. Efforts to increase contact seem to be needed, such as improving the amount and quality of available information to provide more incentive to the public for contacting the Forest Service, modified office hours to increase opportunities for visits by the public, and news stories to increase public awareness of information services available. Using maps to convey important information,

for example, on minimum impact camping practices, seems worthwhile because maps are used by most visitors, although how much of such messages is read and their effectiveness is largely unstudied. Trailhead and backcountry contacts seem to be useful supplements to voluntary visitor contacts with the agency. Information in regional and national media also seems likely to reach some people missed by other techniques. Special efforts to reach hunters and horse users seem to be needed, especially because of their more limited contact with the agency and their potential for substantial impacts.



Figure 11.—Only 13 percent of the visitors had personal contact with Forest Service personnel in 1982.

Table 20.—Information sources used, Bob Marshall complex, 1970 and 1982

Year	Contacted Forest Service	Visited Forest Service office	Had any map	Had Forest Service map	Had other maps only	Had a guide- book
-----Percentage of total visits-----						
1970	NA	NA	72	46	11	0
1982	22±3	13±3	63±6	39±5	14	2

Club Membership

A large majority of visitors to the Bob Marshall complex belong to no wilderness, conservation, or outdoor recreation clubs; in 1970, 69 percent did not; in 1982, 75 percent did not (table 21). Both years only 7 or 8 percent belonged to any wilderness-oriented club.

Both years horsemen were slightly more likely to be club members, with only minor differences in patterns of types of clubs, except that in 1982, horsemen were much more likely to belong to Backcountry Horsemen (which was organized after 1970) than were hikers (6 percent compared to less than 1 percent).

Hunters were less likely to belong to clubs in 1970, but had a slightly higher membership rate than nonhunters in 1982. Both years hunters were less likely to be members of wilderness organizations and more likely to belong to local recreation clubs such as rod and gun clubs.

Most club members belonged to only one club, but in 1982, hikers were more likely to belong to more than one club than horsemen. In 1970, the opposite was true.

Low club membership means that education efforts focused on clubs, although useful, only reach a small percentage of visitors and need to be supplemented with other educational approaches. This fact also lays to rest the notion that wilderness is mainly used by members of wilderness clubs.

Table 21.—Membership in wilderness-oriented conservation and outdoor recreation clubs, Bob Marshall complex, 1970 and 1982

Membership	Percentage of total visits	
	1970	1982
Number of clubs belonged to:		
0	69	75±3
1	18	15
2	7	6
3 or more	6	4
Wilderness-oriented clubs only ¹	4	4
Resource conservation clubs only ²	8	5
Both wilderness and conservation clubs	4	3
Backcountry Horsemen	NA	3
Local outdoor recreation clubs	9	6
Combination other than wilderness and conservation	6	4

¹Sierra Club, Wilderness Society, Friends of the Earth, American Wilderness Alliance, Montana Wilderness Association.

²American Forestry Association, Audubon Society, National Wildlife Federation, and similar organizations.

Summary of Visitor Characteristics

Many visitor characteristics remained about the same from 1970 to 1982. Those that changed did so only moderately. The essentially stable characteristics included urban/rural residence, social groupings, age, overall wilderness experience, and club memberships. Modest changes characterized area of residence (more

visitors from out of State, especially from the central plains, north-central, and northeastern regions of the United States), sex (more female visitors), educational levels (higher), occupations (more professional or technical), and previous experience in the Bob Marshall (less). These changes seem to fit together consistently as expressions of increased visits by backpackers relative to other visitor types. Many of the user characteristics suggest slower future growth in visitation.

VISITOR ATTITUDES

Visitor attitudes alone do not determine wilderness management decisions, but they are important factors to consider in defining problems, setting standards for area conditions, and selecting management actions. Most use patterns and visitor characteristics described so far only changed moderately from 1970 to 1982, and many were almost unchanged. Have attitudes changed more, with implications for possible changes in management?

Attitude data will be presented and trends assessed for (1) general attitudes about the importance of wilderness and about wilderness appeals, (2) various aspects of carrying capacity issues, and (3) alternative management policies and actions.

General Attitudes

About three-fourths of all visitors both years said that wilderness was "extremely important" to them (table 22). Over 90 percent said wilderness was at least "very important." There is a slight tendency for 1982 visitors to report lower levels of personal importance. In both years day-users gave lower importance ratings than campers, probably because of less involvement with wilderness, at least on the sampled visit. Hunters also gave lower importance ratings both years, perhaps because for some of them the importance of the hunt itself tended to overshadow the wilderness aspects of the experience. Rafters also gave lower ratings, particularly in 1982, suggesting that the experience of floating a particular river may have been prominent compared to the wilderness setting—not unlike some hunters.

This high level of personal commitment to wilderness is part of the base for visitor education as a management tool, another advantage managers have in using educational approaches with wilderness visitors.

The appeals of wilderness, that is, the reasons people chose to visit a wilderness instead of some other type of recreational area, were approached differently in the two years. In 1970 the question was open ended, with no suggested answers (table 23). When asked this way, fishing emerged as the most often cited reason, with enjoyment of scenic beauty and hunting close behind, followed by experiencing solitude, escaping civilization, and avoiding mechanized recreation.

In 1982, respondents were asked to rate the importance of 10 appeals (table 23). Rankings of appeals varied from 1970, but how much of the variation is due to the different format of the question and how much to shifts over time cannot be determined. Nevertheless, the 1982 data present an interesting picture of the relative importance of different appeals. Enjoying scenic beauty

Table 22.—Importance of wilderness to visitors, Bob Marshall complex, 1970 and 1982

Year	Extremely important	Very important	Fairly important	Not very important	Not at all important
Percentage of total visits					
1970	77	19	3	1	0
1982	73±4	20±3	6±1	1±1	0

Table 23.—Importance of various appeals of wilderness, Bob Marshall complex, 1970 and 1982

	1970		1982		
	Percent citing	Ranking	Importance		
			Very	Some-what	Not
Percentage of total visits					
Experience solitude	15	4	49±5	34	16
Avoid mechanized recreation	4	6	63±5	23	14
Escape civilization	8	5	69±4	24	7
Scenic beauty	20	2	85±3	14	1
To fish	22	1	37±6	35	28
To hunt	19	3	23±6	11	66
To relax	1	7	70±4	26	4
To exercise	—	10	29±4	45	26
To develop skills	1	7	21±4	47	33
Face challenge	1	7	32±4	40	28

was ranked first by a wide margin. Relaxing, which barely was mentioned in 1970, was second, followed closely by escaping civilization and avoiding mechanized recreation. Experiencing solitude was fifth, and fishing dropped to sixth from first.

Recognizing the lack of full comparability between the 2 years, one could very cautiously speculate that there seems to be some shift from the consumptive, activity-oriented appeals (hunting and fishing) to more contemplative appeals (scenery, relaxation, escaping civilization). Of these, only escaping civilization seems to be substantially wilderness-dependent. Solitude and avoidance of mechanized recreation, two key characteristics of wilderness recreation in the Wilderness Act and thus clearly wilderness-dependent, are both moderately strong appeals in each year. Although the ratings of the personal importance of wilderness slipped slightly from 1970 to 1982, the personal definitions of wilderness in 1982, as reflected in ratings of various appeals, may be a bit more aligned with wilderness-dependent qualities.

Carrying Capacity

What has usually been called "carrying capacity" is a complex issue involving the effects of amount, type, timing and distribution of use, and of visitor behavior on both resources and on other visitors' experiences. Visitor attitudes toward and perceptions of these effects are vital to their interpretation. One approach to determining visitor attitudes is to consider levels of satisfaction and factors associated with it.

SATISFACTION

Visitors were asked "How well satisfied were you, personally, with this trip into the wilderness? What kind of a grade would you give it?" Available answers had both letter grades and adjectives, such as "A, very good," "B, good." Satisfaction levels overall were high both years, with 90 percent giving their experience an A or a B (table 24). There was almost no change from 1970 to 1982.

Satisfaction varied among certain types of visitors. Hunters expressed lower satisfaction in both 1970 and 1982 than nonhunters. In 1982, horsemen reported higher satisfaction than hikers, but in 1970 there was no difference. Campers expressed substantially higher satisfaction than day-users in 1982, but 1970 was slightly reversed. The lower satisfaction among hunters probably results from their preoccupation with hunting, as shown in their answers to questions about the importance of wilderness and wilderness appeal. Hunting success was not high, and this probably affected hunters' overall satisfaction. The difference that showed up in 1982 between horseback and hiking visitors and campers and day-users probably stems from differences in each type of users' expectations and standards. Results of questions about reasons for satisfaction and evaluation of certain conditions encountered which will be presented help clarify these differences.

After reporting their overall satisfaction, visitors were asked to identify specific satisfactions and dissatisfactions. The satisfying factors were similar in 1970 and

Table 24.—Overall satisfaction and major factors affecting it, 1970 and 1982

	Percentage of total visits	
	1970	1982
Satisfaction level	A	56
	B	34
	C	8
	D	1
	F	1
Factors affecting satisfaction	Environment and scenery	49
	Solitude, lack of crowding	12
	Crowding, conflict	7
	Good hunting, fishing	16
	Poor hunting, fishing	10
	Good trails, facilities	10
	Poor trails	2
	Litter	NA
	Wildlife observation	NA

1982. The major satisfying factor both years was the scenery and natural environment (table 24). The next two most common satisfying factors, in order, both years were good hunting and fishing, and solitude or lack of crowding. However, the pattern of dissatisfaction is different in 1982 and 1970. Crowding and visitor conflict were mentioned three times as often in 1982 as in 1970 (table 24), and complaints about poor trails were six times as common in 1982 (fig. 12). Clearly these two critical factors, solitude (which was mentioned more often in 1982 than in 1970, both as a source of satisfaction and as a source of dissatisfaction) and visitor impacts, at least to trails, were perceived as much more significant in 1982.

The major changes in attitude toward trail conditions and crowding probably resulted from changes in the visitor population (particularly more backpackers and more visitors making their first trip to the Bob Marshall complex) and changes in the conditions they experience. Nevertheless, overall satisfaction did not decline. This result is consistent with the two-factor theory of satisfaction (McCool 1984), which holds that satisfaction and dissatisfaction are two separate, independent factors, rather than two ends of a single continuum, and are not additive to produce an overall measure of satisfaction.

Different types of visitors varied little in terms of satisfactions. Hiker or horse user, day-user or camper, hunter or nonhunter cited about the same sorts of satisfactions both years. There are a few obvious exceptions for hunters compared to nonhunters; hunters cited hunting success and nonhunters did not, while fishing success was cited much more often by nonhunters. Dissatisfactions varied more. Visitors traveling by different means cited general crowding with about the same frequency (about 8 percent in 1982), but hikers complained much more about too many horse parties. Littering drew complaints from only about 5 percent in 1982, with hikers complaining a little more than horse users, but hikers mentioned horse manure as a dissatisfaction much



Figure 12.—Complaints about muddy and eroded trails were six times as common in 1982 as in 1970.

more often than did horse travelers. Hikers also were somewhat more likely to cite poor trails as a source of dissatisfaction than were others in 1982 (14 percent compared to 10 percent for horseback riders). Hiker trail complaints stressed muddy conditions, which they often attributed to heavy horse use. Horsemen complained more about down trees, lack of brushing out, and lack of signs.

NUMBER OF PARTIES ENCOUNTERED AND VISITOR REACTIONS

Most visitors to the Bob Marshall Wilderness complex experienced low levels of encounters with other parties both years (table 25). The proportion meeting an average of one to two parties a day rather than none rose from 1970 to 1982, but the frequency of over two encounters per day was little changed. The overall average number of other parties met per day rose from 1.3 to 1.6 from 1970 to 1982. For campers the increase was from 1.0 to 1.2. This is substantially less than the assumed 60 percent increase in total use from 1970 to 1982, probably because of more evenly distributed use, and visitors' efforts to avoid one another.

There was almost no change in the pattern of opinions about the number met between the 2 years (table 25). Almost no one felt they met too few other visitors, most felt they met "about the right number," and about one-fourth both years felt they met too many others. Both years about 13 percent reported that numbers met did not matter to them.

This lack of change is consistent with the only slight increase in numbers of encounters both years. It does not seem obviously consistent, however, with the greatly

Table 25.—Average number of other parties met per day on the trip, distribution of average numbers met by each party, opinion of numbers met, and association of numbers met and opinion, Bob Marshall complex, 1970 and 1982

Type of visitor	1970			1982		
	All	Campers	Day-users	All	Campers	Day-users
Overall average	1.3	1.0	3.2	1.6 ± 0.3	1.2	3.0
<i>Percentage of total visitors</i>						
Average numbers met per day:						
0	36	42	5	24	26	17
1-2	46	48	45	57	63	35
3-5	14	9	35	14	9	33
6-10	2	1	9	4	2	11
11-20	1	0	6	1	0	4
Over 20	0	0	0	0	0	0
Opinion of numbers met:						
Too few	2	2	1	2	1	3
About right	60	52	67	61	60	63
Too many	24	32	15	24	27	13
Didn't matter	14	12	17	13	11	20
Association of average numbers met per day and opinion of numbers met ¹	0.45	0.54	0.71	0.44	0.50	0.65

¹Association measured by gamma.

increased frequency of "crowding and conflict" as a dissatisfaction reported before. Two explanations seem possible. First, visitors may be reacting more intensely to meeting more visitors than they prefer. In 1982, 20 percent listed "crowding and visitor conflicts" as a dissatisfaction, which nearly equals the 24 percent who said they met "too many," and most of these two crowding responses came from the same people. This type of shift in standards for solitude would be consistent with the shift from consumptive to nonconsumptive use styles previously described.

Second, the dissatisfaction answers seem to reflect conflict more than sheer numbers. In 1982, only 8 percent of the visitors listed crowding or sheer numbers encountered as a source of dissatisfaction and less than 1 percent listed too many other hunters, fishermen, or floaters. One percent mentioned other parties camped too close to them. Four percent listed how others behaved and 5 percent cited littering. But 7 percent cited "too many horse parties," and another 4 percent mentioned horse manure as a dissatisfaction (fig. 13). As mentioned before, the hikers were the source of almost all of the complaints about numbers of horse parties and manure. Eleven percent of the hikers complained of too many horse parties, and 6 percent about manure, compared to only 6 percent who reported meeting too many other visitors. Horseback travelers, in contrast, listed too many other visitors in 10 percent of the cases, too many horse parties only 1 percent, and manure 0.5 percent. Complaints about behavior of other visitors and about littering were both twice as common by hikers as horseback parties.

In 1970 there was a minor conflict between horse users and backpackers. But the conflict has grown as total use has increased, and as backpackers have



Figure 13.—Complaints about the impacts caused by horses, particularly from hikers, grew from 1970 to 1982.

increased and have become a larger proportion of Bob Marshall complex visitors relative to the long-established, traditional horse use. The backpackers have somewhat different expectations about wilderness conditions, as evidenced by their greater sensitivity to littering and inappropriate behavior.

Numbers of encounters are fairly strongly associated with opinions of numbers met (table 25). In 1982, 44 percent of the variation in opinion of numbers met was accounted for by the average number met; in 1970, 45 percent. Other research (Stankey 1973) indicates that

Table 26.—Association of satisfaction¹ and measures of solitude, measured by gamma, Bob Marshall complex, 1970 and 1982

Measures of solitude	1970	1982
Average number of other parties met per day:		
All parties	-0.32	-0.17
Large parties	-.33	-.07
Horse parties	-.18	-.14
Success in finding campsite solitude	-.38	-.19
Perception of:		
Number of parties met	-.36	-.32
Impact conditions ("wear and tear")	-.31	-.35
Litter in area	-.07	-.24

¹Satisfaction was coded 5 for A, 4 for B, etc., so a negative value for gamma means that as encounters increase or opinions become more unfavorable, satisfaction declines.

opinions about the numbers met were undoubtedly influenced also by the types of parties met (size of group, method of travel), where they were met (on trail or at campsite, near trailhead or deep in wilderness), and how they acted (considerate, etc.). In addition, visitors vary in their standards for acceptable levels of encounters; three per day could be just right for some people, but far too many for others. Thus, a very strong association between opinions of numbers met and average numbers met, considered in isolation, would not be likely.

If complaints about numbers met, types of visitors met, and so on, are indications of meaningful problems, one would expect that satisfaction should be affected. Some studies, almost all of wild rivers, have shown little or no association (Nielsen and Shelby 1977; Heberlein 1977; Graefe and others 1984). Studies of wildernesses with trail-oriented use, however, have shown stronger associations (Lucas 1980). This was the case in the Bob Marshall complex in both 1970 and 1982. All of the associations were negative, in the expected direction, ranging from weak up to moderately strong, although weaker in 1982 than in 1970 (table 26).

Because the 1982 questionnaire specifically asked about the importance of various wilderness appeals, it is possible to compare those who said solitude was very important to those who said it was not important. The relation of average number of parties met per day to satisfaction was about the same for both high and low solitude importance groups, contrary to expectations. Satisfaction was more related to feelings about numbers met (too many, about right, too few) for visitors for whom solitude was important than for those for whom it was not; gammas were 0.31 and 0.08, respectively. Also, the relation of feelings about numbers met to average numbers met per day was much stronger among the high-solitude-importance visitors; gamma was 0.57 for these visitors compared to 0.15 for low-solitude-importance visitors.

Previous research has shown that most wilderness visitors prefer not to meet larger parties and some would prefer not to meet horse parties (Stankey 1973). Most visitors to the Bob Marshall complex met few large parties. In 1970, 57 percent met none, and only 8 percent

met over five large parties on their entire trip. In 1982 the figures were nearly identical—58 and 9 percent, respectively. Meetings with horse parties were more common. In 1970, only 23 percent met none, 63 percent met one to five other horse parties, and 14 percent met over five. In 1982, again the figures were very similar—26, 63, and 11 percent, respectively.

CAMP SITE SOLITUDE

Wilderness visitors find solitude at campsites more important than solitude while traveling (Stankey 1973). The fairly strong association between satisfaction and success in finding desired campsite solitude (table 26) also supports this conclusion, although, again, the association in 1982 is weaker than in 1970. Wilderness visitors usually prefer no other parties camped within sight or sound (Lucas 1980). The Bob Marshall complex visitors are no exception (table 27). There was a tendency for 1982 visitors to accept a few more nearby camps than 1970 visitors (fig. 14). Despite this more lenient standard in 1982, visitors said they had more trouble finding campsites that met their standard (table 27). Still, even in 1982, almost two-thirds of the visitors succeeded in camping where solitude conditions met their preference every night on their trip.

Table 27.—Number of other camps nearby desired by overnight visitors and success in finding such campsites, 1970 and 1982

Year	Camps desired			Success in finding desired campsite solitude		
	0	1	2	3 or more	Every night	Some nights
<i>Percentage of total visits</i>						
1970	86	7	4	3	76	18
1982	81 ± 4	7	6	6	63	33



Figure 14.—Most visitors both years preferred a campsite isolated from the sight and sound of other campers.

PERCEIVED CHANGES IN AREA QUALITY

Visitors who have been to the Bob Marshall complex before can provide comparisons of changes in area conditions as they perceive them. Their comparisons may be helpful in assessing carrying capacity issues—are conditions becoming more deteriorated, stable, or improving in the view of experienced visitors? There is some good news; in 1970 over one-third of the experienced visitors felt conditions on their current trip were worse than on earlier visits, but in 1982 only 16 percent felt that way (table 28). The proportion feeling conditions were "about the same" rose from just over half in 1970 to just over three-fourths in 1982. Hikers and horse users differed very little.

Some of the changes mentioned before in use patterns toward smaller parties, and more even distribution among trailheads and over time may have contributed to this more favorable view of trends in area quality.

Visitors were also asked why they felt as they did about changes in area quality. The main reasons in 1970 were more crowding, more worn and littered conditions, and worse hunting and fishing, in that order (9, 5, and 3 percent, respectively, gave these answers). In 1982 it was quite different; complaints about trails became one of the main responses, but answers critical of crowding, fishing, and hunting dropped a little, and criticism of worn, littered conditions almost disappeared. Comments about litter in 1982 are interesting; less than 1 percent

Table 28.—Perceived change in area quality by repeat visitors, 1970 and 1982

Year	Area quality now, compared to earlier		
	Better	About the same	Worse
Percentage of total visits			
1970	12	52	36
1982	8±2	76±4	16±3

expressed negative views, and about as many said there was less litter than on earlier trips. Litter conditions are clearly perceived as improved (fig. 15).

This is consistent with another question specifically about evaluation of litter conditions. In 1970, 65 percent rated litter conditions as good, but by 1982, 80 percent did. I believe that littering conditions actually are much better now than earlier, due to cleanup work by managers and improved visitor behavior, and it appears to be paying off in better visitor experiences.

In contrast, specific ratings of soil and vegetation impacts declined. In 1970, 22 percent rated such conditions fair to poor, but by 1982, 31 percent gave such negative evaluations. Campsites in the Bob Marshall Wilderness tend to have larger areas impacted and to exhibit more damage to trees than campsites in other wildernesses that have been studied (Cole 1983). These conditions were most objectionable to hikers, 36 percent of whom rated them as only fair to poor in 1982, compared to 21 percent of those traveling with horses. The increase in hikers may explain much of the increase in low ratings. Together with far more complaints about trail conditions, there is clearly a growing problem of visitor impacts (fig. 16).

Many of these problems of impacts and user conflicts potentially can be managed by regulating use, informing and educating visitors, and providing facilities. What do visitors think of some of these alternative actions, and how have their attitudes about them shifted?

RATIONING AND USE CONTROL

Visitors both years strongly supported "restricting the number of visitors to an area if it is being used beyond capacity," with over three-fourths answering that this is desirable, and only 12 to 14 percent saying it was undesirable. (Some visitors were neutral.) The question as worded is hard to disagree with; the contention would be over what visitors define as "beyond capacity."

Visitors were asked about several types of use control. One that was strongly rejected both years was issuing permits that listed assigned camping areas. In 1970, 75 percent rated this undesirable, and in 1982, 79 percent disapproved. Such tight regulation, which is similar to the system used in a few national parks, apparently was considered to take away too much freedom. Limits on party size were supported. In 1970 only 19 percent felt a 12-person-per-party limit was undesirable, and in 1982 just 22 percent expressed disapproval. (A 15-person limit was in effect in 1982. The 12-person party size wording was retained for comparability.)



Figure 15.—Visitors perceived substantially less litter in 1982 than in 1970.



Figure 16.—Visitors rated both campsites and trails as more impacted by use in 1982 than in 1970.

wildernesses, although not in the Bob Marshall complex. It was not supported by most Bob Marshall complex campers; 57 percent said it was undesirable, 9 percent were neutral, 10 percent said it was desirable in high-use areas, and only 24 percent favored it throughout the area. Horseback travelers and rafters were most negative, and hikers least negative, but all opposed this common regulation.

REGULATIONS

Other regulations, not directed at controlling use, were also studied. Requiring registration was favored about three to one, but more strongly in 1970 than in 1982.

"Prohibiting wood fires where dead wood is scarce (requiring use of gas stoves)" was opposed in 1970 by 46 to 31 percent, but favored in 1982, 48 to 41 percent. Campers, who are much more affected by a fire ban than day-users, were less favorable, and the 1982 margin of support by campers dropped to 46 percent in favor versus 43 percent opposed.

"Eliminating grazing by visitors' horses (require carrying horse feed)" was rejected by horse travelers, over three to one in 1970, and over two to one in 1982. The major difference was that in 1982 about 20 percent of the horse users answered that eliminating grazing was desirable in high-use areas, an answer that was not included in 1970.

"Allow visitors to catch fish to eat in the wilderness but not to bring out" was favored by 50 percent to 30 percent opposed in 1970 (with the rest neutral), and 58 to 26 percent in 1982. The idea behind this question was that catching a few fish for dinner can be an important part of a wilderness experience, but coming to catch a lot of fish to fill the freezer at home is an inappropriate, highly consumptive use. Because of its large size and remoteness, the Bob Marshall complex probably has less of this "stock the freezer" fishing than many wildernesses.

OTHER MANAGEMENT POLICIES

Wilderness rangers working in the field are well accepted, favored by almost a 5-to-1 margin both years. About one-third of the 1982 visitors said they met a "ranger" on their trip, although this probably includes some contacts with trail crews, game wardens, and others besides wilderness rangers.

Administrative use of chain saws for trail clearance was accepted, but by a wider margin in 1970 than 1982—about two to one in 1970, compared to 46 percent in favor and 32 percent against in 1982. Nine percent favored chain saw use only in high-use areas in 1982; 37 percent favored their use in general. A modest shift toward a somewhat more purist, less convenience-oriented view seems to have occurred.

The wilderness goal of a natural ecosystem, interfered with as little as possible by man, has tended to exhibit a double standard. Aquatic ecosystems have often been almost ignored, and stocking fish where none occurred naturally has been common, even with species of fish not native to the area. Visitors, however, either do not see the contradiction or accept it. "A natural fishery—no

stocking and barren lakes left barren" was rejected by almost a 55 to 20 percent margin in 1970, and by 48 percent versus 28 percent in 1982. Still, there has been some shift toward a more ecologically oriented perspective.

"Natural forest fires started by lightning" were opposed in 1970 (45 percent against to 26 percent in favor), but favored in 1982 (49 percent in favor to 32 percent against). This is a major turnaround. Natural fire policies in wilderness were very new in 1970, and such a policy did not exist in the Bob Marshall complex. By 1982 such policies were more common, including the Bob Marshall complex, and people had had more opportunity to learn about it. Most seem to be accepting the idea; there was little variation in attitudes among visitors traveling in different ways, between hunters and nonhunters, and day-users and campers (fig. 17). Again, the more ecologically oriented view has gained strength.



Figure 17.—Natural fire and other natural ecological processes were supported by more visitors in 1982 than in 1970.

TRAILS

The major user facility in the Bob Marshall complex, as in most other wildernesses, is the trail system. A number of questions were related to trails and bridges.

"High standard trails (wide, steady grades, fairly straight)" were favored in 1970, but much more so in 1982 (table 29). Forty percent favored high standard trails only in high-use areas in 1982. Horseback travelers favored high standard trails more than did other types of visitors.

"Low standard trails (somewhat like a game trail—narrow, grade varies, winding, not the shortest route)" were favored by more than a 4-to-1 margin in 1970, and by over a 3-to-1 margin in 1982 (table 29). Hikers were more supportive than horse users. There seems to be growing support for higher standard trails, perhaps relating to the sharp increase in the frequency of complaints about trail conditions discussed before. In 1970, low standard trails had more support than high standard, but this was reversed by 1982. Technically, trail design standards (width, alignment, grade) are unrelated to maintenance condition (muddy spots, erosion, down trees), but respondents probably linked the two and may have responded largely in terms of maintenance conditions, which are recognized by managers as a problem.

"Leaving some areas with no trails" was strongly supported—by 70 percent in 1970 and 73 percent in 1982. Horseback travelers and hikers differed little on this issue.

"A few trees blown down across the trail, maybe one or two per mile" produced a wide split of opinion in 1970—35 percent said "desirable," 35 percent were neutral, 30 percent said "undesirable." In 1982, again, opinion was more supportive of higher standard trails—only 22 percent said "desirable," 37 percent were neutral, and 41 percent said "undesirable." Horseback travelers were the most negative.

"Bridges over creeks where hikers would otherwise get wet feet" were opposed by a small margin in 1970, but favored in 1982, especially in high-use areas, particularly by hikers.

"Bridges over rivers that are dangerous for hikers to wade or for horses to ford" were favored four to one in 1970, and over seven to one in 1982 (fig. 18).

All of these questions show the same trend—a growing desire for higher standard, safer trails in 1982 than in 1970. Some of this may be due to shifting visitor populations and some may result from deteriorating trail conditions encountered, but these two effects cannot be separated.

OTHER FACILITIES

"Outhouses (pit toilets)" were favored and opposed equally in 1970, but opposed almost two to one in 1982. "Cemented rock fireplaces" were opposed three to one in 1970 and over four to one in 1982. Loose rock fire rings were narrowly favored in 1970 but more strongly favored in 1982—47 percent in favor to 29 percent opposed (fig. 19). "Pole corrals for horses at campsites" were favored in 1970 by about four to three, and by a very narrow margin in 1982, with horsemen much more

Table 29.—Visitor opinions of high and low standard trails, 1970 and 1982

Year	High standard			Low standard		
	Desirable	Neutral	Undesirable	Desirable	Neutral	Undesirable
Percentage of total visits						
1970	45	23	33	63	22	15
1982	A ¹ 32±3	B 40±4	12±3	16±2	52±4 7±2	23±4 18±3

¹In 1982, there were two possible desirable responses—A, "desirable," and B, "desirable in more heavily used parts of wilderness, but not in more lightly used parts."



Figure 18.—Excepting bridges over large, dangerous rivers, most facilities received only limited support.



Figure 19.—Loose rock fire rings, high-standard trails, and bridges were the only facilities supported by more visitors in 1982 than in 1970.

favorable than hikers. Split log picnic tables were opposed two to one in 1970, over three to one in 1982.

Visitors do not seem to be in favor of more comfort and convenience items. Only the minimal loose rock fire rings received increased support in 1982 (the area has never had constructed fireplaces). This conflicts with managers' perceptions of fire rings as undesirable and efforts to remove them. Considered in the light of more purist standards for other facilities and for ecological conditions, the support for higher standard trails seems inconsistent at first glance. It is possible that it is a protest against trail conditions that are widely recognized as poor.

INFORMATION SOURCES

In using information as a management tool, it is helpful to know what visitors think of some means of providing information.

Guidebooks were strongly supported (about 10 to 1), a bit more so in 1970 than 1982. Detailed, accurate maps were almost universally considered desirable both years.

Onsite information in the form of signs explaining natural features or historical events were opposed in 1970 by about two to one, but were favored by a small margin in 1982. It is possible that although the question was worded to exclude directional trail signs, some respondents still thought of directional signs. If so, it may be one more indication of the concern about trail conditions. Complaints about lack of directional signs were common, especially from horse travelers.

Visitors who said they had contacted the Forest Service in 1982 were asked how well the information they got met their needs; 51 percent said "very well," 36 percent said "fairly well," and 13 percent said "not very well." As described before, wilderness rangers are well accepted.

ACCEPTABLE VISITOR BEHAVIOR

Wilderness managing agencies have worked hard to educate visitors in minimum-impact wilderness use techniques. Several questions provide a chance to see how much effect this education has had.

"Pack it in, pack it out" is one of the messages used longest, and there are signs of progress. In 1970, most visitors said burying unburnable garbage was desirable, but in 1982, over two to one said it was undesirable. In 1982, visitors were also asked about "packing unburnable garbage out of the wilderness." Over 90 percent said this was desirable (although 30 percent also said, on the

earlier question, that burying it was desirable). Almost no one was neutral on any of the questions about garbage.

Two questions about campfires were asked only in 1982 as the issue of campfire impacts has become of more concern. Visitors responded overwhelmingly (over 5 to 1) that campers should "use only dead wood on the ground for campfires." Hikers were more supportive than horse parties, who, of course, can more easily carry saws and axes. Visitors were also asked about "encouraging visitors to remove fire rings and all evidence of campfires when breaking camps." About 60 percent of campers said this was desirable, 21 percent said undesirable, and 18 percent didn't care, although most campers had said loose rock fire rings at a campsite were desirable. Perhaps many wilderness campers know the recommended practice but follow it poorly because they do not consider fire rings an undesirable mark on the land.

Summary of Attitudes

Some attitudes shifted sharply, some moderately, and some very little from 1970 to 1982. The sharp changes were mainly related to trails. Complaints about poor trails shot up sixfold, and support for high standard trails and bridges grew substantially. Support for allowing some lightning fires to burn also increased markedly. Crowding and conflict, particularly hiker dissatisfaction with horse users, grew substantially.

There were moderate shifts in reasons for visiting the wilderness, paralleling the shift in activities from more consumptive to more contemplative. Numbers of other visitors met per day grew moderately. Except for trails, attitudes moved in the direction of fewer facilities and improvements, and toward support for more natural ecosystems. Minimum impact use practices were accepted more in 1982. There was less littering. Vegetation and soil impacts were perceived as deteriorating. Desired campsite solitude was harder to find.

Little or no change occurred in the importance visitors attached to wilderness, their satisfaction levels, factors satisfying visitors, feelings of crowding, campsite solitude standards, and attitudes toward most regulatory actions, such as support for rationing use, opposition to assigned campsites, and support for party size limits, trailless areas, and for wilderness rangers.

SUMMARY

1. More Backpackers

The growth in backpacking is the major shift in recreational use of the Bob Marshall complex from 1970 to 1982. In 1970, visitors traveling with horses outnumbered hikers about 3 to 2. By 1982, the balance was reversed and hikers outnumbered horse users about 3 to 2. From 1970 to 1982, horse use grew, probably about 20 percent, while hiker use grew well over 100 percent. This change is the key to many of the other changes in use patterns, visitor characteristics, and attitudes. Few of the changes are large ones, however, and overall there is considerable stability in the recreational situation in this large wilderness complex.

2. Lower Impact Potential

Use characteristics have shifted toward a slightly lower potential for resource impacts. In addition to the shift to predominantly backpacker use, parties are smaller, stays are shorter, and there is slightly less fishing and hunting, and more photography and nature study. Visitors have become less dependent on wood fires. Weekend peaks in use have become less pronounced. Use has become less concentrated at popular places.

3. Shifts Not Linked to Impacts

Other changes, not necessarily related to the potential for impacts, are a larger proportion of visitor use in the summer rather than fall, a smaller proportion of visitors with outfitters, a little less observation of wildlife, and a smaller proportion of hunters taking game.

4. Typical Use Still Similar

Typical use in 1982 still consists of long trips—long in days (about 5) and distance covered (20 to 30 miles [33 to 50 km])—by small parties, most with fewer than five people. The typical visitor now is hiking, but nevertheless almost 40 percent of the visitors are using horses—an unusually high percentage. The typical visitors come in the summer; are on their own without an outfitter; go fishing, photographing, and do a few other things; see some deer and perhaps other large mammals; and enter at one of a few popular trailheads. Except for the shift from horse to hiker, this sketch would apply generally in 1970 about as well as in 1982; the changes are modest.

5. User Characteristics Changed Little

The kinds of people who visit the Bob Marshall complex were very similar in 1970 and 1982. The major shift, and even it is not really large, is toward a higher percentage of nonresidents as the wilderness has become more widely known for a variety of types of recreation, not just elk hunting. But more than half of the visitors are still Montanans, usually from northwestern Montana. Women make up a larger proportion of visitors in 1982 than in 1970. The high education levels in 1970 were even higher in 1982 and even more visitors were in professional and technical occupations. A number of characteristics remained essentially unchanged: most visitors are from urban areas, are family groups, are young adults, and more than three-fourths have visited wildernesses before (but more were making their first visit to the Bob Marshall complex in 1982 than in 1970, particularly for backpackers). Few contact the Forest Service managers of the area for information, but most have maps. Less than one-tenth belong to a wilderness-oriented club, and most do not belong to outdoor recreation or conservation organizations.

6. Trail Complaints and More User Conflict Main Attitude Changes

Two changes stand out among visitor attitudes. The most pronounced is far more complaining about trail conditions and more support for higher standard trails. Less intense, but still growing, is conflict among hikers and horse users. Hikers, in particular, express more

objections to horses and their impacts in 1982 than in 1970. There appears to be a small shift in motives for visiting wilderness, paralleling the shift in activities from more consumptive (hunting and fishing) to more contemplative appeals (scenery, relaxation, escaping civilization). Solitude and avoidance of mechanized recreation were moderately strong both years.

7. Solitude Diminished But Still High

Most visitors met relatively few other visitors, averaging only a little over one other party per day, but nevertheless encounters were more frequent in 1982. A campsite isolated from others was a little harder to find in 1982, but still about two-thirds found it.

8. Less Litter, More Impacts

Experienced visitors felt overall conditions were more stable, less often deteriorating in 1982 than in 1970. Visitors perceived littering to be less of a problem in 1982, but felt that impacts to vegetation and soils were worse.

9. More Purist Attitudes, Except Toward Trails

Visitor attitudes about management policies and practices showed some shift toward a more natural wilderness ecologically, with less support for facilities and improvements, except trails, where there was a strong shift toward higher standard trails and bridges—a seeming anomaly that probably is linked to the great increase in complaints about trail conditions. Awareness of appropriate, low-impact camping practices grew from 1970 to 1982.

10. Satisfaction and Many Other Attitudes Stable

Both years, most visitors attached high personal importance to wilderness, and reported high levels of overall satisfaction, with similar reasons for satisfaction. There was little or no change in attitudes about most regulations. Desirable campsite solitude standards were close both years.

MANAGEMENT IMPLICATIONS

1. A Chance to Catch Up

Wilderness managers many places have often felt overwhelmed. Use was growing rapidly, conditions were deteriorating, and problems were compounding. Managers felt as though they were on a treadmill that kept speeding up. This does not seem to be the case in the 1980's in the Bob Marshall complex. Use patterns have shifted toward activities with lower impacts; visitors know more about minimizing impacts; litter has lessened; and although use has increased, the rate of growth in use has probably slowed and may slow more

in the future. If managers can solve the problems they face in the area, the gains need not be quickly swamped by new use pressures.

2. Trails the Main Problem

The main problem stands out sharply: bad trail conditions, particularly mudholes and erosion. All types of visitors agree on this; it is not a hiker versus horse user problem. The solutions include more maintenance, reconstruction, and relocation. Lack of money and personnel are the main constraints.

3. Campsite Impacts Also a Problem

There also are indications from visitors that campsite impacts to vegetation and soil are a growing concern. Closure of some campsites, their replacement by more durable sites, and continued stress on educating visitors in minimum impact camping practices are the main elements in solutions (Cole 1983). Monitoring of campsite conditions will also be essential. Some regulations, for example group size limits, may need to supplement education, at least until new norms for visitor conduct are established.

4. User Conflict a Growing Concern

The third problem is the growing conflict between hikers and horse users. It is not extreme, but efforts to reduce it seem warranted by visitors' reactions. The solutions are neither clear nor simple. Education must be a major element. Education programs could strive to reduce conflicts (by not keeping horses right in camp, or by hikers giving horses the right of way, for example), and also to build more understanding and tolerance of other types of visitors. Publicizing where horse use is common and where it is not might help particularly sensitive hikers to reduce their contacts with horse parties.

5. Natural Role of Fire Accepted

Visitor acceptance of natural, prescribed fire has grown, and does not seem to be a serious barrier to allowing fire to more nearly play its natural role.

6. Visitor Education Has Advantages

High education levels and commitment to wilderness should render visitors particularly amenable to management through informational programs.

7. Successes

A lot of management efforts seem to be working, for example litter control and cleanup. Visitors still experience high levels of solitude, see wild animals, and report high satisfaction overall with their wilderness experiences. Comparisons of many earlier and later conditions suggest that managers "keep up the good work."

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Trends from 1970 to 1982 in the Bob Marshall Wilderness complex of three adjacent wildernesses were analyzed. Data on use characteristics, use distribution, visitor characteristics, and visitor attitudes were compared. The greatest changes were increases in hiker use compared to horse use, and much more dissatisfaction with trail conditions.

KEYWORDS: wilderness, trends, recreational use, use distribution, visitor characteristics, visitor attitudes, satisfaction, carrying capacity
