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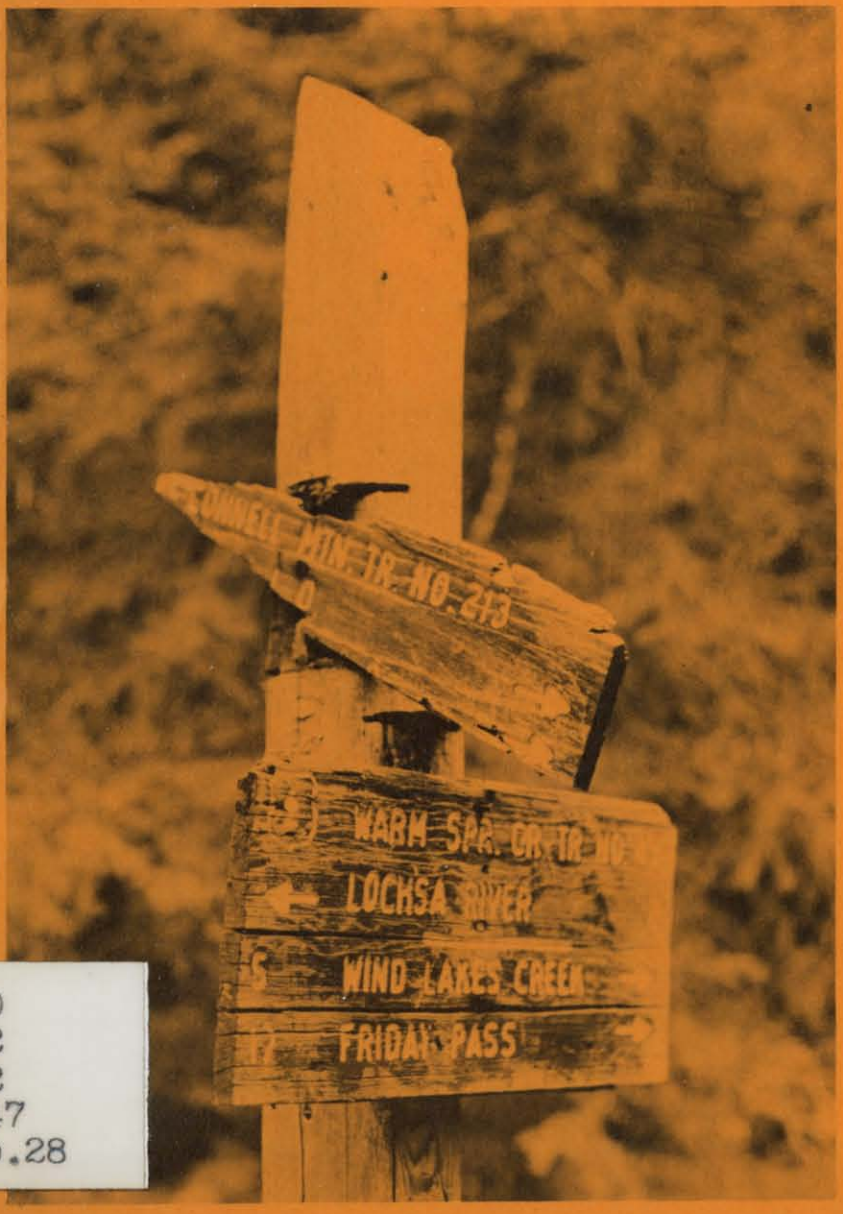
COMMUNICATING WITH THE WILDERNESS USER



James R. Fazio

Forest, Wildlife and Range
Experiment Station

Director
John H. Ehrenreich

Associate Director
A. A. Moslemi

University of Idaho
Moscow, Idaho 83843

ABSTRACT

The education of wilderness visitors is considered to be a generally accepted means of managing recreational use to reduce impact on natural resources and to protect or enhance social experiences. Communication is an important component of education. This bulletin is a summary of three studies conducted to help managers make better use of communication as a management device.

To facilitate ranking of agency effort, a test of "wilderness knowledge" was conducted with the results compared by user groups and socio-economic characteristics. The sources from which the test material was received by users and the channels through which it was communicated were also determined, to help suggest ways for reaching visitors most efficiently. Channels were also compared experimentally to determine which was most effective in reaching backcountry users in a national park and in increasing their knowledge of low impact camping techniques. Finally, mailed responses to backpackers' requests for information were analyzed for speed of reply, content, readability and graphic quality.

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James R. Fazio

UNIVERSITY OF IDAHO
FOREST, WILDLIFE AND RANGE EXPERIMENT STATION

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All photographs in this paper are by the author.

Communicating with the Wilderness User

James R. Fazio

PREFACE

A point of agreement among resource managers of every discipline is "the need for better communication," particularly with recreationists. The expression has, in fact, almost become a cliché, or perhaps even a scapegoat. Beyond recognizing that the need exists, emphasis is all too rarely given to effecting a solution.

The three studies that led to this report had a single ultimate objective—to help managers communicate more effectively with one special kind of recreationist, the wilderness visitor. The intent has been to identify which visitors should be given priority attention, and how information might best be transmitted to these target audiences. The attempt was a difficult one, and an initial one, but some of the results provide information that may be drawn upon and applied in a variety of management situations. Generalizations from such limited research must, of course, be regarded more as clues than as rules, but they are strides ahead of guesswork or unfounded opinion. Further research will refine the results and add to the growing body of knowledge that will eventually shape communication into a reliable and effective management tool.

It is hoped that the findings reported in the following pages will serve as aids to those persons who wish to employ communication as a management aid. Citations guide the reader to the comprehensive reports on these studies, and attempt to relate the work to most other studies done to date on communicating with wilderness visitors.

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The author is an Associate Professor and Chairman of the Wildland Recreation Management Program in the College of Forestry, Wildlife and Range Sciences at the University of Idaho, Moscow.

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INTRODUCTION

A basic premise underlying the three studies described in this bulletin is that wilderness has significant value. By definition, land designated for inclusion in the National Wilderness Preservation System may be expected to contain features of "scientific, educational, scenic or historical value" (U.S. Congress 1964). Also, it is becoming evident that wilderness provides an important contribution to the mental and physical well-being of its users, and to the economic well-being of enterprises and industries such as sporting equipment manufacturing and sales,[1] guiding and outfitting, and local tourist services.

Another premise is that the use of wilderness is growing; no reversal or slowing of the trend is anticipated. Indeed, the current energy situation may precipitate even greater usage by modifying vacation patterns, particularly those of young family groups who might already be predisposed to wilderness recreation. That conjecture aside, there is ample documentation of rising trends in popularity. In the 10 years following passage of the Wilderness Act in 1964, the ranks of backpackers are believed to have quadrupled, to as many as 10 million participants (Anonymous 1972, Pomeranz 1974). Frissell and Stankey (1972) have estimated annual growth of total wilderness recreation to be between 10 and 25 percent, and this growth rate is expected to continue for the foreseeable future (ORRRC 1962).

[1] According to one study, backpacking recreationists alone spend approximately $400 million annually for equipment and clothing (Pomeranz 1974).

A final premise is that increasing wilderness use can generally be associated with decreasing quality of the physical and social wilderness environment. Perhaps this was best stated by Aldo Leopold (1966), who wrote, "Barring love and war, few enterprises are undertaken with such abandon . . . or with so paradoxical a mixture of appetite and altruism, as that group of avocations known as outdoor recreation." Leopold's sagacity is particularly apparent when considering the outdoor recreation pursued by wilderness enthusiasts. This special form of recreation is unique not only in the ardor required for its pursuit, but also in the conditions of land that are necessary. The latter generally include both vast spaces and the virginity of primeval America, for most wilderness enthusiasts seek not only something to do, but a state of mind. And most who seek wilderness love wilderness, but as Leopold alludes, in the end appetite may destroy the very thing which is sought.

Studies on the severity of biophysical impacts are not numerous to date, but those available do indicate that the problem is far from minimal (ORRRC 1962, Snyder 1966, Barton 1969, Arno 1971, Hartesvelt et al. 1971, Frissel and Stankey 1972, Lime 1972, Taylor 1972, USDA Forest Service 1974, Schreiner and Moorhead 1976). Biophysical impacts resulting from increased recreational use were summarized by Bramlette (1977) and include

- decline in water quality of lakes and streams;
- depletion of natural fuels for campfires;
- unnatural changes in fish and wildlife populations;
- soil compaction and erosion along trails and at campsites;
- introduction and establishment of non-native species of plants and other organisms;
- changes in vegetation patterns due to human concentration and grazing stock;
- camping debris left behind, either under or on top of the ground, or in water sources;
- sites denuded of naturally occurring elements.

It may be that the biophysical environment is not the most sensitive indicator of recreational impact. Instead, it may well be the change or negative effect on the visitor's wilderness experience. Studies that have delved into this aspect of wilderness deterioration and support this contention include ORRRC 1962, Stankey 1971, Lime 1972 and Badger 1975.

Education as a Management Tool

Given that wilderness is of value to society, but that increasing use of this resource is leading to its deterioration, it becomes obvious that management strategies are required to deal with the problem. Some options available include 1) dispersal techniques, 2) user fees, 3) making access or travel difficult and 4) mandatory permits coupled to a system of rationing. A fifth management tool may be termed "user education." Of these alternatives, user education is undoubtedly the most palatable, least controversial, and possibly one of the most effective methods available in a democratic society (Fazio 1974, Hendee and Lucas 1974).

The importance of user education as a management tool was recognized as early as 1962 by the Outdoor Recreation Resources Review Commission. In its epic report to the President, the Commission wrote that "inappropriate and destructive wilderness recreation is frequently due to **inadequate skill and knowledge.**" It was also suggested that managing agencies should enlarge their public education programs concerning "wilderness purposes, regulations and wilderness regulation techniques" (ORRRC 1962). At about the same time, Stewart Brandborg (1963) was thinking along the same line. He wrote:

> *Most important is the work of public agencies in developing overall interpretive programs which create understanding and appreciation of wilderness and thus protect wilderness from the people who come to enjoy it.* (p. 29)

Little activity ensued, however, and only recently has there been evidence of public education being taken seriously by agencies in their management strategies for wilderness. Interest and intent, of course, are the first necessary steps. Yet, as with any management procedure, an understanding of the underlying concepts and techniques is essential. In the case of effectively using education as a management tool, it is imperative that managers consider the problems and opportunities of communicating with wilderness users, for it is **communication** that is the keystone in education.

The Communication Process

Communication has been defined by Cutlip and Center (1964) as "the interchange of thought or opinion by words, letters, or symbols where there is an effort to move an audience by the message given through the right channels to a desired goal." Essentially, communication is a flow of messages, and the ultimate purpose is to establish common understanding with a receiver of the messages (Gilbert 1975).

Communication theory suggests that communication is a complex process, with all parts inseparable. It would be naive to believe that any dissection and description of the process or its parts could be definitive. Even in the simplest, most straightforward transmission of a message betweeen two people, innumerable factors come into play. These may range from such fixed circumstances as the physiology of the nervous system to more temporary conditions such as the environment surrounding the communicators. Worse yet, to thoroughly understand what is

happening and why, an accurate knowledge of human psychology, especially motivations and attitudes, is necessary but not easily achieved.

Nonetheless, the problems associated with understanding communication should not deter applied research related to this process. The complexities are mentioned only to set limitations on what might be expected from the results of such research. Within the limitations, however, it is essential to examine the process as carefully as possible if improvement in its use is to be expected.

Specific components of the communication process have been recognized since Aristotle outlined his concept of "speaker-speech-listener" (Berlo 1966). Today there are dozens of models used to illustrate or study the phenomenon of communication; a highly simplified one is used in Figure 1.

Most models of the communication process contain, in one form or another, the following elements: 1) a sender, sometimes referred to as the information source, who 2) encodes a 3) message that is sent through some 4) channel and then 5) decoded by a 6) receiver. If understanding is to be achieved, there should also be opportunity for the process to be reversed, a feature referred to as feedback. Also, for the model to be complete, an array of physical (sex, age, etc.), psychological (attitudes, motivations, etc.), and social (culture, residency, etc.) factors must surround both sender and receiver.

In wilderness agency-visitor communication, the agency, as policymaker, may be considered the sender. An important factor in its array of characteristics affecting communication would be source credibility, a phenomenon beyond the scope of this study. Classic studies in this aspect of communication were conducted by Hovland et al. (1953).

Encoding is simply the process of translating thoughts or ideas into meaningful symbols that we normally recognize as writing, spoken language or other sounds, graphics or gestures. Decoding is essentially a reversal of the process, enabling cognition on the part of the receiver.

Messages in my studies dealt entirely with wilderness-related information. Channels, or mechanisms for transmitting the messages from sender to receiver, included word-of-mouth (via rangers, teachers and others), printed media, trail signs and certain electronic media.

Finally, the wilderness users or visitors were considered the receivers. Numerous studies have focused on the psychological and socio-economic backgrounds of wilderness users, including ORRRC 1962, Lucas 1964,

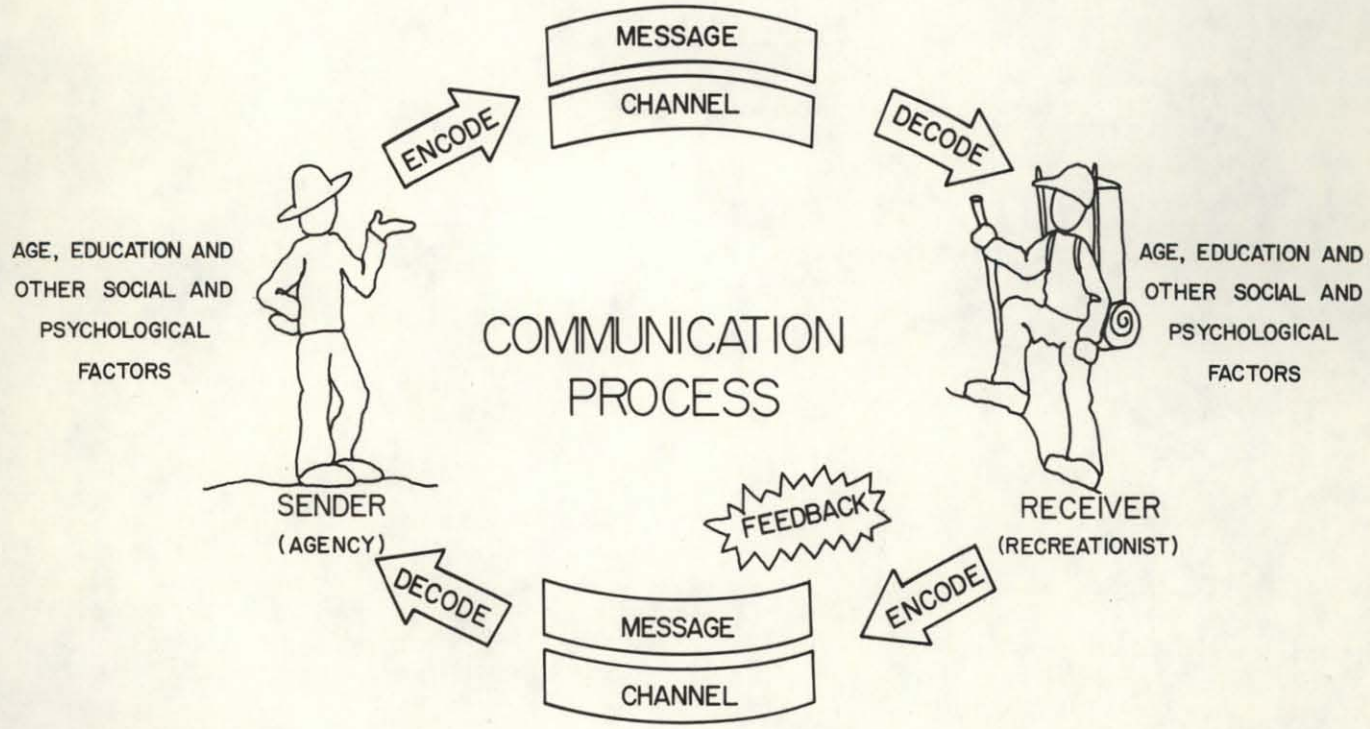


Figure 1. Simplified communication model.

Hendee 1967, Merriam and Ammons 1967, Stankey 1971, Thorsell 1971, Lime 1972, Oliveira 1973. USDA Forest Service 1974, Vaux 1975, and Stankey 1976. In the studies reported in this bulletin, no attitudinal measures are included, and no attempt was made to establish causal relationships between characteristics and communication patterns. Rather, the user was investigated from the standpoint of information possessed—specifically, how much wilderness knowledge was evidenced on a relative basis among user groups, the source from which this information originally was obtained, and the channel through which it was transmitted.

Communication research specifically related to wilderness has been sparse. However, research in the areas of nonwilderness interpretation, museology and communication phenomena in general has been abundant and is often applicable to agency-wilderness visitor communication. For additional references in these areas, consult Elliot-vanErp and Loomis 1973, Dick et al. 1974, and Sharpe 1976. Several studies combining principles of communication and decision-making are also in progress on the use of information to disperse wilderness users.[1]

Another area of communication research that is beyond the limitations of this report is theory on the diffusion of innovation. This active branch of research specializes in the flow of new ideas through a sequence of receiver awareness, testing, and adoption or rejection of the ideas. In the studies reported here, only the awareness of certain information was investigated, not an individual's opinions or beliefs toward the ideas, or ultimately his or her acceptance or rejection of them. Adoption of an idea, however, is a final and crucial phase of communication, and this area of research should be studied carefully by managers attempting to employ user education as a behavior-modifying technique. A classic study in this area was conducted by Ryan and Gross (1950); Rogers (1971) is one of several more recent researchers treating the topic in depth.

[1] Personal communication with Dr. Robert Lucas, USDA Forest Service, and Dr. Edward Krumpe, University of Idaho.

Part I

SELWAY-BITTERROOT WILDERNESS USERS: CHARACTERISTICS, INFORMATION SOURCES AND CHANNELS

The intent in this study was to obtain data on user characteristics for the purpose of comparing levels of wilderness knowledge, and to determine what sources and channels were recalled as having initially contributed to this knowledge. In essence, this was a study of the intended receivers in the communication process between managing agency and wilderness users. Graduate assistant William W. Bramlette conducted most of the work in this section. For greater detail, see Bramlette (1977) or Fazio and Bramlette (1977).

STUDY AREA AND METHODOLOGY

The wilderness area selected for this study was a portion of the 1.4 million-acre Selway-Bitterroot Wilderness Area (SBW) located in central Idaho. Three ranger districts were represented (Moose Creek, Lochsa and Powell) on two national forests (Clearwater and Nezperce). The area is bounded by the Selway River on the south and the wilderness boundary to the west and north. The latter nearly parallels the Lochsa River, with only a narrow corridor of semi-wilderness separating the two. The study boundary on the east follows the wilderness boundary around to Elk Summit trailhead, then turns south, following trail No. 421 until it intersects with the East Fork of Moose Creek.

The area covers about 543 square miles, with approximately 95 percent of users entering by way of six mainline trails and two landing strips. These eight portals were sampled on a systematized random basis during the spring, summer and autumn of 1976. It was believed the sample obtained would be characteristic of similar national forest wilderness users in the Northwest and northern Rocky Mountain regions of the United States. Moreover, the remote, dispersed nature of the study area and the full variety of legitimate wilderness uses available presented what are probably the extremes of difficulty in manager-user communication. Another factor contributing to the suitability of the area was that, despite its great size and ruggedness, recreational use was heavy enough to have caused noticeable impacts on the environment (USDA Forest Service 1974).

Data were obtained through a survey conducted at the portals, using the questionnaire displayed in Appendix A. Knowledge levels, sources and channels were derived from the responses to items 1 through 20. These questions were taken from a longer list contributed by Forest Service managers and research personnel, and researchers at the University of Idaho. The intent was to obtain a small number of questions representative of the breadth of wilderness knowledge that might be expected to affect behavior. After screening to remove questions that appeared invalid, pre-tests were used to identify and remove additional questions if too difficult or too easy. The resulting questions were used to probe wilderness knowledge in the following categories: items 1-4, *Wilderness Ethics* (i.e., manners, basics of low impact camping and compatibility with other users); items 5-8, *Biophysical* (i.e., the wilderness ecosystem and physical characteristics of the area); items 9-12, *Wilderness Concept* (i.e., provisions of the Wilderness Act and philosophy underlying creation of wilderness areas); items 13-16, *Wilderness Management* (i.e., tools and methods employed by the agency to manage wilderness); and items 17-20, *Personal Safety and Equipment* (i.e., equipment and methods that contribute to a safe and comfortable wilderness visit).

A research assistant explained the questionnaire, then waited while all party members 13 and older completed the form. All users encountered were surveyed, whether entering or leaving the area. The only exceptions were that outfitter clientele and river users were excluded, and group leaders were contacted supplementally through names taken from trailhead registers and agency correspondence. These leaders were then interviewed at their homes, as were several of the commercial outfitters holding permits in the area and a few horse users who objected to stopping at the trailheads.

RESULTS AND DISCUSSION

Six hundred-one SBW users completed usable questionnaire interviews (Table 1) in the 98 days of sampling among the eight portals.

Receiver Characteristics and Knowledge Levels

A first step in any communication effort is to learn as much as possible about the intended message receiver, or "target audience." Such background characteristics as sex, age, residency, experience with the topic in question and the like can help the sender shape the message more specifically and channel it more accurately for ultimate reception and, hopefully, acceptance by the intended receiver. This

Table 1. Sample size and response, by user groups, for total survey, Selway-Bitterroot Wilderness, 1976.

	User Groups									
	Backpackers	Group leaders	Group members	Day users	Outfitters	Horse campers	Pilots	Passengers	Hunters	Total
Respondents	289	34	42	16	8	61	35	71	45	601
Refusals	10	–	–	1	–	11	6	8	6	42
Unusable questionnaires	–	–	1	–	–	1	–	6	–	8

deliberate and planned approach to communication is sometimes referred to as a "rifle approach," as opposed to the more common and less effective "shotgun" approach.

One of the more important characteristics of the message receiver is level of knowledge about the topic being communicated. This information not only aids the sender in fashioning the message, but, in the case of multiple audiences and limited agents of transmission, it also is prerequisite to establishing priorities.

From the data obtained in this study, it was possible to construct a summary table of relative wilderness knowledge as it related to various characteristics of the user groups. The results are displayed in Table 2. Characteristics shown at the extremes were statistically different at the .05 level of confidence using Scheffe's multiple range test. Mean knowledge scores and detailed discussions of each characteristic are available in an unpublished master's thesis by Bramlette (1977).

Table 2 is helpful in identifying the characteristics of individuals who would be logical choices for a prioritized information campaign. It can also be used for decisions on tailoring communication messages to specific target groups. Ranking on the basis of some of the characteristics shown would be difficult or impossible, however. For example,

Table 2. Summary of relative wilderness knowledge scores as related to user characteristics, Selway-Bitterroot Wilderness Area, 1976.

Characteristic	Total Wilderness Knowledge Score Highest ⟵ ⟶ Lowest
Mode of travel	Foot — Stock — Airplane
Type of user	Outfitters, group leaders, backpackers . . . — Day users, hunters, plane passengers
Residence	Semi-locals — Locals — Non-locals
Age	19-34, 35-54 — 55-64 — 65+, 12-18
Highest education	Postgraduates — College — High school
Occupations	Professionals — Managers — Unemployed, clerical/sales
Family income	No statistically significant difference except that under $7,000 scored higher than $15,000-24,999.
Gender	Males — Females
Party leaders	Party heads — Party members
Experience levels:	
Age at time of first trip	No difference
Years of SBW experience	No difference except . . . — First time visitors
Total years of experience	No difference except . . . — First time visitors
Length of stay	No difference
Primary purpose of visit	Job-related — Extractive-symbolic (hunting, fishing, etc.)
Membership in pertinent organization	3 or more — 1-2 — None

As in other wilderness studies, most recreationists cooperated fully in the survey.

managers could not very well distinguish between visitors who hold clerical or sales positions and those who are professional. The most manageable approach to a prioritized information campaign would probably be through the use of activity-oriented user groups. Those defined for the purposes of this study are easily distinguishable. These are shown in Table 3, along with the mean knowledge score for each group.

The relative knowledge levels for overnight users are further compared in Figure 2 by topics included in the questionnaire test. A line graph, rather than a histogram, is used for clarity and is not meant to imply any relationship among the five topics. With few exceptions, the figure reveals a consistency between relative knowledge levels regardless of the wilderness topics tested. It might also be inferred that there exists differential knowledge depending on topic areas. For example, it would appear that most users possess less knowledge about wilderness management than they do about personal safety and equipment. While this may be true, the design of this study was not intended to test knowledge on an "absolute" basis, nor was it such that conclusions can be made about the degree of knowledge among topics.

Sources of Information

Knowing where users obtain wilderness information is important in directing communication efforts to those points where they will be most effective. For each knowledge question in the 20-item test, respondents were asked to recall the initial source of their answer. The sources were then summed by user groups and by information topics. They were also compared with **correct** answers to the test items. The results are displayed in Table 4 and Figure 3.

Forest Service

It is clear that wilderness users initially receive their information from a wide variety of sources other than the managing agency. The Forest Service, however, was cited nearly one-quarter of the time as the source of answers to the questions presented in the questionnaire. The Forest Service was also credited with relatively correct information; that is, for those questions answered correctly, respondents recalled the source of information to be the Forest Service 81 percent of the time. Information from the Forest Service on management topics was recalled the most, safety/equipment and biophysical information the least. This is an

Table 3. Differences in wilderness knowledge scores, compared by user groups, Selway-Bitterroot Wilderness, 1976.

User groups	N	Mean Knowledge Score (1-20)	Graphic representation of significant differences*
Outfitter	8	13.88	
Group leader	34	13.18	
Backpacker	289	10.81	
Group member	42	9.59	
Horse camper	61	8.84	
Pilot	35	8.58	
Day user	16	8.31	
Hunter	45	7.27	
Passenger	71	7.07	

* Scores separated by brackets are significantly different at the .05 level of confidence using Scheffe's multiple range test. For example, the mean score for hunters was not significantly different from that of pilots or day users, but it was different from those for backpackers or group leaders.

interesting inconsistency with data from content analysis of literature received from the Forest Service and the managing agencies. As will be seen in Part III of this report, safety/equipment and biophysical topics received the most coverage in wilderness-related literature produced by the agencies. Explanation at this point would be conjecture, but the finding does lend support to the possibility that agencies' printed literature is not very effective in communicating wilderness information. This will be examined further in the section on information channels and in Part II.

The few commercial outfitters and organized group leaders in the study appeared to obtain a relatively large amount of information from the managing agency, while hunters and horse campers obtained proportionally the least. It is intuitively clear why outfitters obtained so much information from the agency, but not so clear why horse

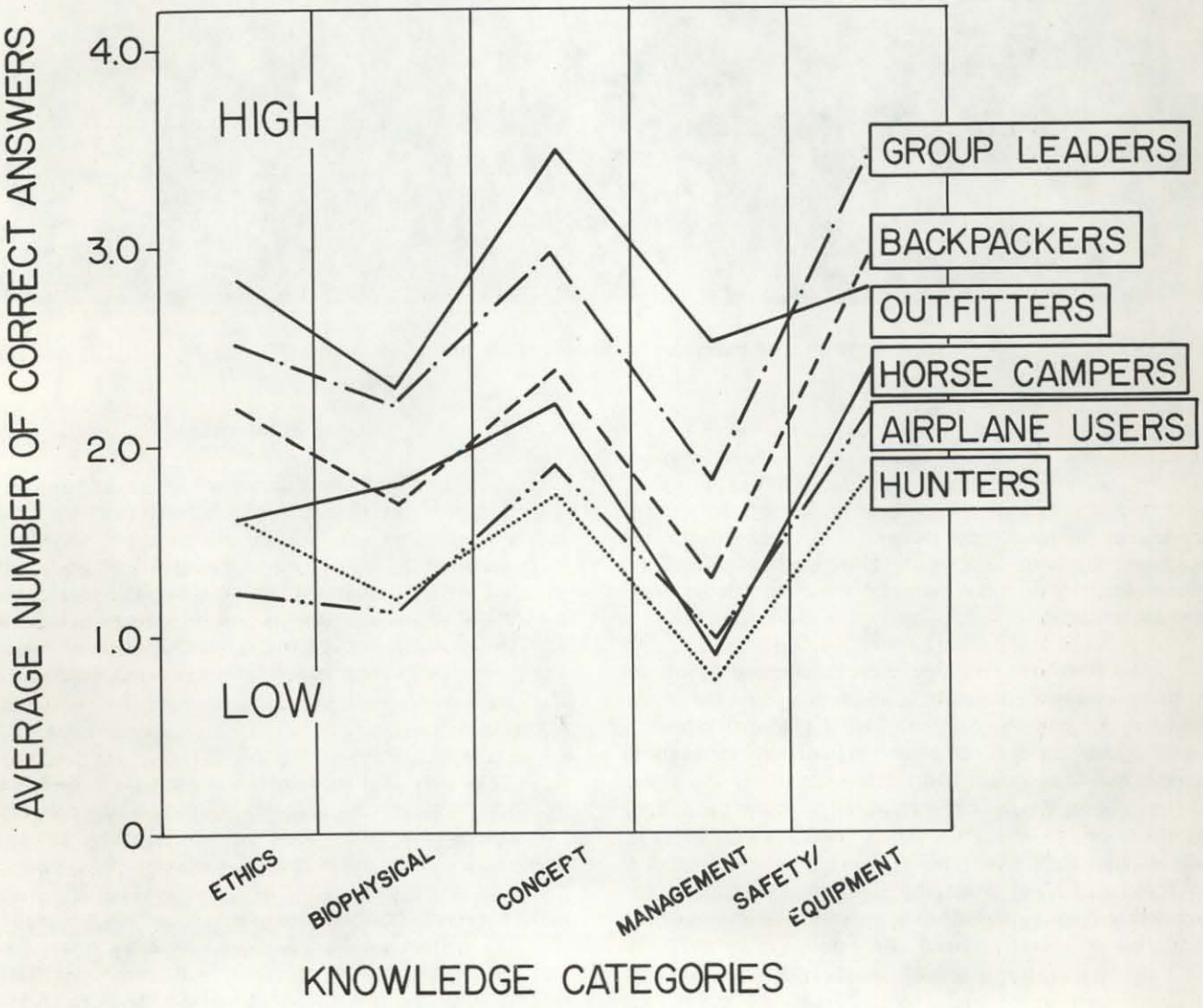


Fig. 2. Wilderness-related knowledge levels of user groups surveyed in the Selway-Bitterroot Wilderness Area, 1976.

Table 4. Source of information utilized, by user groups, Selway-Bitterroot Wilderness, 1976.

Receivers (User groups)	N	Information sources: Forest Service	Experience	Friend/ relative	Don't remember	College/ school	Organization	Unknown book author	Unknown author in magazine article	Unknown author in newspaper	Outdoor store	Outfitter	Unknown–in television program	Wilderness Act	Miscellaneous
Backpackers	289	25*	14	15	12	10	5	7	4	2	4	0.5	1	2	–**
Group leaders	34	31	13	7	11	9	13	3	2	2	3	1	1	2	1
Group members	42	22	11	9	11	22	9	6	1	2	1	1	1	1	1
Day users	16	28	18	17	8	12	2	4	2	1	2	3	1	–	1
Outfitters	8	54	20	4	2	2	4	–	1	–	3	2	–	6	–
Horse campers	61	20	23	17	15	8	6	2	3	3	1	1	1	0.5	–
Pilots	35	22	26	8	22	4	5	2	2	1	2	1	2	1	1
Passengers	71	22	28	14	13	8	4	3	3	2	1	1	1	–	–
Hunters	45	16	39	10	15	4	5	–	4	1	0.5	2	5	–	–
All users combined	601	24	18	13	13	9	6	5	3	2	3	1	1	1	1
Type of information received															
Ethics		22	27	18	11	3	9	4	2	–	1	2	–	–	–
Biophysical		20	23	13	12	16	2	4	2	3	–	2	2	–	–
Concept		37	18	10	13	5	2	3	3	4	–	–	1	4	–
Management		45	10	10	19	6	1	1	2	3	–	–	1	2	–
Safety/equipment		2	13	15	11	15	13	12	6	1	10	–	1	–	–

* Figures represent percentages.
** Rows may not sum to equal 100 percent due to rounding.

campers and hunters fell significantly lower on the scale. The Forest Service attempts to work closely with outfitter permittees through meetings, letters and personal visits. The opportunity certainly exists for considerable interaction with horse campers and hunters as well. These people are relatively local residents and fairly frequent wilderness users, which would allow contact with the agency. Nevertheless, they deviated markedly from what might have been expected from the amount of potential agency contact. Basing his opinion on informal dicussions with survey participants, Bramlette (1977) suggested that there exists a severe communication barrier between many horse users and the Forest Service. The heart of the problem appears to be differing perceptions of the purpose and uses of wilderness. This problem is probably accentuated because stock and airplane travel create specific impacts that have become targets for agency efforts to bring these uses into conformance with the concepts and protection of wilderness. For whatever reasons, it is apparent that information disseminated by the agency is not being received (or recalled) by a great many horse campers and hunters.

Experience

As may be seen in Table 4, "experience" was cited as the second most important information source (18 percent for all users combined). Any source listed by the respondent as "self-learned" was reclassified by the coder as "experience." It was apparent to interviewers on numerous occasions that when respondents failed to remember where they learned information, "self" or "experience" was cited rather than "don't remember." When this was detected in post-questionnaire discussion, the interviewer changed the response to "don't remember." Some unknown percentage of the "experience" category still belongs more correctly with "don't remember." However, through pre-testing and clarifying responses from participants during post-questionnaire interviews, we did find that a large amount of information actually was gained entirely through experience.

Unfortunately, experience is not the best teacher, according to data gathered. Respondents answered the question correctly only 60 percent of the time when they

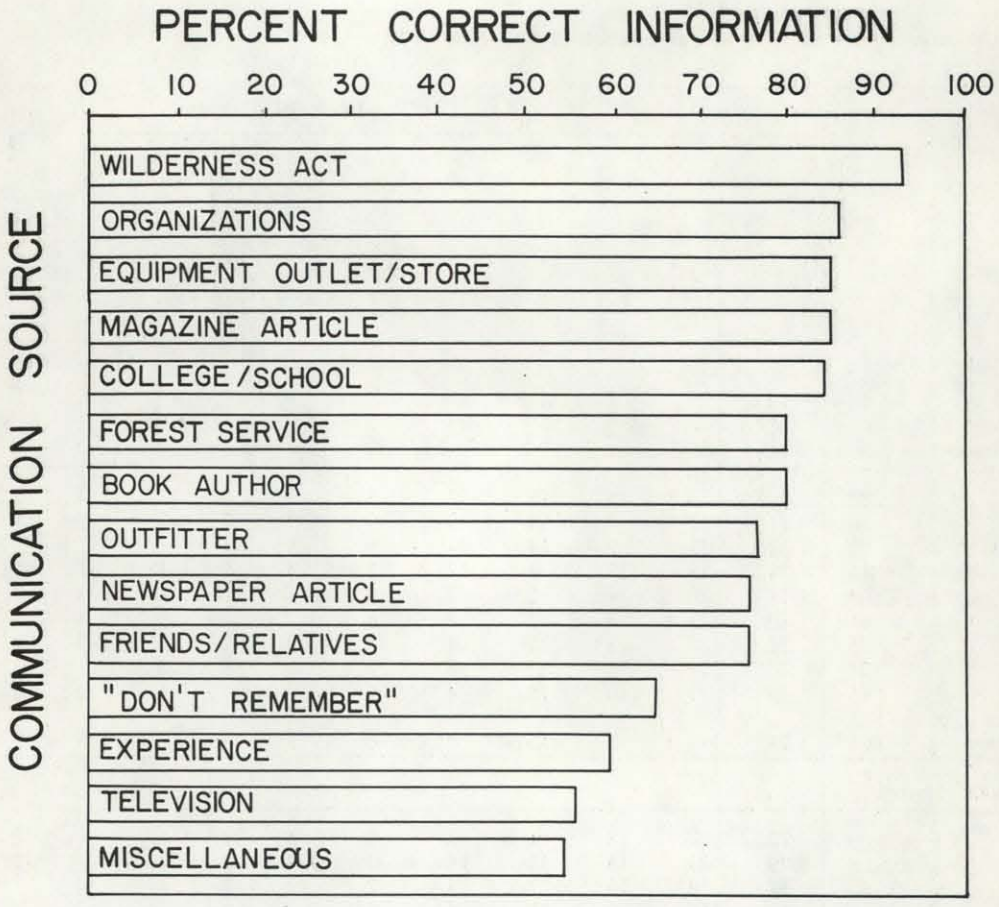


Fig. 3. Correct information attributed to communication sources, Selway-Bitterroot Wilderness, 1976.

cited experience as their source. Based on number of correct answers, experience was poorer than any other recalled source except for television. Learning basic wilderness information through experience is also extremely inefficient and unacceptable from a management standpoint when large numbers of users are involved. Because of the numbers of wilderness recreationists today, physical and social impacts created by misuse through ignorance must be considered significant.

Friends and Relatives

Friends and relatives played their typically important role in providing information, and were found in this study to be the third most commonly used source (13 percent). This finding is in keeping with the traditional emphasis credited to interpersonal communication for "spreading-the-word" (Burch 1969, Lucas 1970, Lime 1971). Information provided by friends and relatives tended to be mostly on the topics of wilderness ethics, biophysical information and safety/equipment, in that order. This is not surprising. Manners and basic skills are traditionally taught by the family or friends. Figure 2 illustrates that family and friends provided correct information 78 percent of the time, which seems reasonably high. Few management implications can be suggested relative to this source.

Educational Institutions

Sources at colleges and other schools supplied the next largest amount of information (9 percent). Biophysical and safety/equipment information provided by this source were the most common. Correct information was cited 84 percent of the time—well above the average, by 11 percent.

About 45 percent of the users sampled in this study attended a college or school at that time. The vast majority of wilderness users had college educations and all had at least some high school education. Apparently the topic of wilderness, and particularly its management and values, is rarely dealt with in educational institutions, to have such a small percentage of respondents citing school sources relative to the number of years spent with them.

For respondents who recalled learning about the wilderness concept from these sources, an impressive 92 percent selected correct answers. The school atmosphere is an excellent environment for students to gain knowledge and increase sensitivity toward wilderness. Interviewers noted that, generally speaking, students were enthusiastic about accepting messages from the agency to aid them in proper wilderness use procedures. Informing people in locations away from the wilderness does not necessarily imply

encouragement to use wilderness; rather, this can provide relevant facts to people who at one time or another will probably engage in wilderness recreation. If users are properly prepared for the experience, incompatible uses and practices will undoubtedly be reduced.

Organizations

A wide range of conservation/outdoor and even service organizations were credited with informing a small percentage (6 percent) of SBW users on the various topics tested in this study.

Stankey (ND) reported that, although one-third of his respondents in two California wilderness areas claimed membership in some conservation or outdoor club, only about 10 percent recalled that their group provided them with any information about the permit rationing program. In the SBW study, we found that for all management topics, only 1 percent of the sources recalled were organizations. Overall, when organizations were cited, they could be associated with correct answers 86 percent of the time (next to best). Answers to knowledge questions in the categories of ethics and safety/equipment received the greatest number of mentions as having been provided by organizational sources. Both organized group leaders and members cited this source most often.

Considering that some 60 percent of the SBW users reported affiliation with at least one organization—although not necessarily outdoor/conservation-oriented—it was surprising to find such a small amount of information originating from these potential sources. Individuals within organizations are predisposed to accept the beliefs and hold the values associated with those of the group. Therefore, information from the organization would likely be accepted quite readily by its members (Rogers 1971). The managing agency would be wise to work closely not only with the popular conservation/outdoor organizations, but also with local horse and gun clubs, 4-H groups, camper clubs, etc. The organizations cited most often as having provided wilderness-related information are listed in Table 5.

In most cases, mean knowledge scores were higher for past and present members of the organizations cited in Table 5 than for respondents not affiliated with those organizations. Three exceptions were Boy Scouts of America, Girl Scouts of America and church groups. In these cases, the mean knowledge scores of non-affiliates were higher than members. This might suggest the need for increased educational work with these groups.

Although not shown in the table, 52 respondents cited the United States Forest Service as an "organization" with which they were affiliated at some time. These were not individuals who were on duty, for our sampling procedure eliminated on-duty officials. Rather, they were past and present employees ranging from clerks and seasonal help to recreation staff officers at the supervisor's level. As might be expected, their mean knowledge scores were high (14.1 with a standard deviation of 3.3). What was not expected was the high proportion of recreational users who were or had been part of the managing agency. In this case it was, at minimum, 9 percent of our sample. This would tend to underscore the need for in-service training in wilderness topics for all levels of agency personnel. In this way, a significant percentage of the users are reached directly, and many others are reached through diffusion of the information to friends, relatives and visitors. Conversely, other studies related to this subject have documented problems resulting from uninformed personnel having contact with wilderness visitors (Fazio 1974, Stankey ND).

Unidentifiable Sources Using Books and Mass Media

As recreational interest in wilderness grows, so do the numbers of books and magazines entering the market to meet the demand for information. The electronic media and newspapers have also been active in disseminating wilderness messages of various kinds. Although these technically are "channels," it is extremely difficult for most people to know or remember the true source of the messages behind the transmissions. For this reasons, when a respondent listed a book, television or similar medium as the source of his or her information, it was listed as such for this part of the study. These media as channels will be discussed in greater depth in following sections.

The majority of SBW users in this study reported reading magazine articles and books to gain some kind of

Table 5. Organization affiliations (past and current) cited as providing wilderness-related information to Selway-Bitterroot Wilderness users, 1976.

Organization	Number of mentions	Mean knowledge score (1-20)	SD
Boy Scouts of America	135	9.9	4.3
Recreational Equipment, Inc.	103	12.3	3.6
Sierra Club	44	13.7	3.1
Church group	42	9.5	4.3
Girl Scouts of America	41	8.6	3.8
Audubon Society	41	12.6	3.5
Alpine/mountaineer Clubs	33	14.1	3.4
The Wilderness Society	22	15.2	2.8

Recreationists entering the study area by plane compared poorly with other users in a test of wilderness knowledge, but are difficult to reach through many available communication channels.

wilderness-related information. Eight percent of the sources providing answers in the knowledge test were reported to have been one of these two media.

Information provided by magazine or book sources had by far its greatest impact on the topic of safety/equipment. Backpackers (including, for the most part, organized group leaders, group members and day users) read more books than other users. They also were high in magazine reading, as were plane users, horse campers and hunters.

Newspapers and television as sources of the information items tested received only nominal mention. When they were the source, these media were linked mainly to the categories of biophysical, concept and management, and all user groups made use of them to some small degree. Television as a source was credited with the least amount of correct information of any source in the study. Radio was mentioned so infrequently as to be considered negligible.

Outdoor Equipment Stores

As may be noted in Table 4, answers to the test items rarely originated from outdoor equipment stores. This is unfortunate, in that most likely more wilderness users visit these stores for equipment and provisions than visit the wilderness agency for information. The low percentage of respondents (only 3 percent) naming equipment outlet stores—especially in the category of safety/equipment—attests to the little impact of this source. It would appear to be one with considerable potential for contributing to the area of wilderness user education.

Commercial Outfitters

Hunters, stock users and day users claimed commercial outfitters and their employees as an information source relatively frequently, in comparison with other user groups. The rapport outfitters have with private stock users and hunters may be quite significant. In fact, the same respondents crediting the outfitter as their source of information commonly made remarks about the Forest Service that gave interviewers the impression that they did not consider the latter a credible source. It should be noted, too, that outfitters also provided hikers with information, particularly day users. This communication relationship is probably a potentially effective way to affect visitor behavior, as was found by McCool (1970). In his study, he reported very effective results on littering behavior occurring after camper-outfitter interaction in the Boundary Waters Canoe Area.

The Wilderness Act

Finally, the Wilderness Act itself received some recognition. Ninety percent of the time, when the act was cited as a source of information, the respondent selected the correct answer on the questionnaire test. These correct responses were usually in the categories of the wilderness concept and wilderness management. Outfitters, organized group leaders, group members and backpackers were most familiar with this source.

Source of Initial Information about the Area

An important question in tourism research centers on where a visitor receives the first information about a specific area. In a commercial sense, this is obviously very important if potential visitors are to be contacted and persuaded to visit. For recreation resource managers, it is important if visitors are expected to arrive with a certain knowledge of rules, expected behavior, potential hazards and similar information.

In a study of campgrounds in northeastern Minnesota, Lime (1971) found that interpersonal communication was most frequently the way users received their initial information about the sites. Lucas (1970) cited similar results on the Huron and Manistee National Forests. For SBW users, friends, relatives and acquaintances accounted for 50 percent of the sources identified. These and other initial sources are shown in Table 6.

The importance of recognizing the impact of interpersonal communication goes beyond its being the way most visitors receive their first information about an area. Equally or more important is that leisure behavior is affected tremendously by informal conversations and interactions with peers (Burch 1969). Other forms of communication may be instrumental in bringing an awareness, but interpersonal communication is most effective in actually modifying human behavior (Rogers 1971).

Other than being aware of its extent and importance, there is little the manager can do to use or improve interpersonal communication among friends and relatives (except as discussed in the section on organizations as sources of wilderness information). Rather, the most controllable situation arises when visitors contact the managing agency seeking information for an initial visit. This will be discussed in greater depth in Part III.

Awareness of "Low Impact Camping"

Within recent years, numerous agencies, clubs, organizations and individuals have been involved in efforts to help promote an awareness of "low impact camping" concepts and skills. The questionnaire items dealing with low impact camping asked first if the respondent was familiar with the term. If answered affirmatively, the next question asked for the initial source from which he learned the term. An examination of the results presented in Table 7 shows that only 37 percent of the respondents had previously even heard of the term.

Some user groups, such as airplane users, hunters, horse campers and organized group members, showed extreme deficiencies in awareness of low impact camping, while backpackers, organized group leaders and outfitters were much more aware of the term.

Table 6. Sources of initial information received by users about the Selway-Bitterroot Wilderness Area, 1976.

	User group										
Source (N)	Backpackers (273)	Group leaders (34)	Group members (34)	Day users (15)	Outfitters (8)	Horse campers (59)	Pilots (33)	Passengers (63)	Hunters (41)	No response (39)	Total (601)
Friends	28	28	–	33	–	20	27	6	17	–	31
Forest Service	24	15	15	13	–	15	12	44	15	–	18
Relative	13	9	3	40	38	29	3	21	29	–	15
No one	6	6	23	7	–	9	6	3	2	–	6
Map	6	6	3	–	–	3	3	2	10	–	5
Acquaintance	4	12	–	7	13	7	12	3	5	–	4
Outfitter	1	6	6	–	38	7	3	2	10	–	3
Organization	3	12	18	–	–	3	–	–	–	–	3
Prof/teacher	1	3	29	–	–	–	–	–	–	–	2
Fish & Game Dept.	2	3	3	–	–	7	–	–	5	–	2
Airport/FAA	–	–	–	–	–	–	17	5	–	–	1
Magazine article	1	–	–	–	–	–	6	5	7	–	2
Book	1	–	–	–	–	–	3	6	–	–	1
Other	9	–	–	–	11	–	8	3	–	–	7

*Figures represent percentages.

Table 7. Percent of users aware of the term "low impact camping," by user group, Selway-Bitterroot Wilderness, 1976.

Aware of the Term (N)	User Group										
	Backpackers (287)	Group leaders (33)	Group members (42)	Day users (16)	Outfitters (8)	Horse campers (59)	Pilots (35)	Passengers (70)	Hunters (45)	No response (16)	Total (601)
Yes	47*	56	26	43	100	23	28	10	22	–	37
No	53	44	74	57	–	77	72	90	78	–	63

*Figures represent percentages.

As may be seen in Table 8, the Forest Service was most often cited as the initial source of information resulting in low impact awareness. Other important sources were conservation/outdoor magazines, universities and schools, friends and relatives. Again noticeable was the relatively small impact of equipment outlets.

Residence had no apparent effect on awareness of low impact camping. On the other hand, age seemed to be somewhat important. The most aware ages ranged from 19 to 34 years. Younger and older persons were less informed.

On some national forests, the term "no trace" camping is being used instead of "low impact." It would seem that consistency would aid the educational efforts of the agency, although most people would probably recognize the concepts as one and the same. In stressing the importance of awareness of the term, we are assuming that this is usually prerequisite to modifying one's wilderness behavior to abide by the various tenets of the concept. With only 37 percent of the visitors having reached this first step, it seems apparent that agency education efforts need to be strengthened in this important knowledge area.

Information Channels

Column B of the questionnaire (Appendix A) was used to determine relative use of various channels in obtaining answers to the 20 test items. Although the information **source** was actually requested, the **channel** was usually evident from the reply. It was at first intended to ask respondents to recall both source and channel. In pre-testing, this led to confusion. In the final instrument, the interviewer used the respondent's statement to determine **how** the message came from the source. If it was not obvious, the respondent was questioned after completing the form. The results are shown in Table 9.

As was done with sources, correct test answers were correlated with channels recalled as having been used to receive the information. These data are displayed in Figure 4.

Word-of-Mouth

Not surprisingly, word-of-mouth was the channel cited most frequently as the way information in the test had been initially received. For all users combined, 58 percent of the tested information was received in this manner, with 35 percent being received through conver-

Table 8. Initial source of awareness of the term "low impact camping," by user groups, Selway-Bitterroot Wilderness, 1976.

Initial Source (N)	User Group									
	Backpackers (135)	Group leaders (19)	Group members (11)	Day users (7)	Outfitters (8)	Horse campers (14)	Pilots (10)	Passengers (7)	Hunters (10)	Total (221)
Forest Service	21*	34	46	14	100	29	10	29	30	26
Magazines	18	16	9	–	–	14	20	43	10	16
University/school	13	21	18	14	–	14	–	–	20	12
Friend/relative	13	5	–	29	–	21	10	14	–	12
Other	13	9	–	29	–	1	40	14	20	12
Organization	6	5	9	–	–	7	10	–	20	9
Book	11	5	17	–	–	14	10	–	–	9
Equipment store	5	5	–	14	–	–	–	–	–	4

*Figures represent percentages.

Table 9. Channels of communication utilized by Selway-Bitterroot Wilderness users, 1976.

Receivers (user groups)	N	Channels: Word-of-mouth (friends, rel., org.)	Not able to determine	Word-of-mouth (Rangers)	Word-of-mouth (Professors/teachers)	Brochure	Word-of-mouth (Club leader)	Book	Magazine	Sign	Catalog	Map	Newspaper	Meeting	Television	Radio	Miscellaneous
Backpackers	289	32*	13	9	9	7	4	7	4	4	2	2	2	–	1	–	6**
Group leaders	34	26	15	10	9	8	7	7	3	2	2	1	1	–	–	–	8
Group members	42	23	12	10	18	4	12	7	1	2	1	–	1	2	1	–	5
Day users	16	38	7	7	16	8	1	3	2	4	2	1	1	–	2	–	7
Outfitters	8	25	2	14	4	3	3	2	–	3	1	1	–	31	–	–	9
Horse campers	61	42	17	7	7	5	5	3	3	4	1	1	3	–	1	1	2
Pilots	35	40	21	9	3	4	4	3	2	2	1	3	1	–	2	1	2
Passengers	71	45	13	10	7	4	4	3	3	3	–	3	1	–	2	–	2
Hunters	45	53	15	7	4	1	4	1	4	4	–	1	2	3	4	–	–
All users combined	601	35	13	9	9	6	5	5	3	3	2	2	2	1	1	–	4
Type of information received																	
Ethics		47	9	10	3	7	7	5	2	1	1	1	2	1	–	–	2
Biophysical		40	12	7	16	3	2	5	1	1	–	1	4	–	2	–	4
Concept		31	14	8	6	10	2	4	3	10	–	5	2	1	1	–	5
Management		25	20	22	5	5	1	1	4	4	–	1	4	2	–	1	7
Safety/Equipment		30	14	–	14	5	9	9	5	–	5	1	1	–	1	–	6

* Figures represent percentages.
** Rows may not sum to equal 100 percent due to rounding.

sation with friends, relatives and acquaintances. Hunters and airplane passengers received proportionally more information this way than others, possibly contributing to their being lowest of all users on the wilderness knowledge test. As may be seen in Figure 4, information received via word-of-mouth from other than teachers, rangers and club leaders correlated with correct test answers only 63 percent of the time.

Informal word-of-mouth is an unreliable channel of information, and can actually be dangerous or detrimental in that it is so vulnerable to inaccurate incursions. It is, essentially, the "grapevine" that has been so often discredited as a transmitter of accurate information (Goldhaber 1974). Perhaps the only control of misinformation transmitted in this way is the planned, constant countertransmission of accurate information (Gilbert 1975). Monitoring the grapevine—just plain listening to people— should be considered an important part of the responsibilities of field personnel such as portal assistants or wilderness rangers. This is part of the "feedback process," a crucial, useful link in the communication process.

Compared with word-of-mouth that came from friends, relatives and acquaintances, when rangers, teachers or club leaders were recalled as having transmitted the information, accuracy rose considerably. This provides another finding relative to contact with wilderness rangers and portal assistants. The Forest Service "portal assistant" program is a relatively new and partly experimental approach to communicating with wilderness users. Portal assistants are employees or volunteers used to supplement the more traditional wilderness ranger by contacting visitors directly at trailheads or air strips. Six of the eight portals used in this study had such personnel assigned there at least part of the time. In addition, every district in the study area supported at least one seasonal "wilderness ranger."

Thirty-nine percent of the sampled population in this study had been contacted by portal assistants and wilderness rangers. Since these personnel attempt to contact all recreationists encountered, there was no self-selecting bias between those who were contacted and those who were not (as probably would be the case if testing groups of people who sought information compared with those who did not). Therefore, when a comparision of knowledge scores was made between users who were contacted and those who were not, it was assumed that the contact caused the difference. It was found that contacted users had a mean knowledge score of 11.4 (SD = 3.8) on a scale of 1-20; those not contacted scored 8.7 (SD = 4.1). Separating the

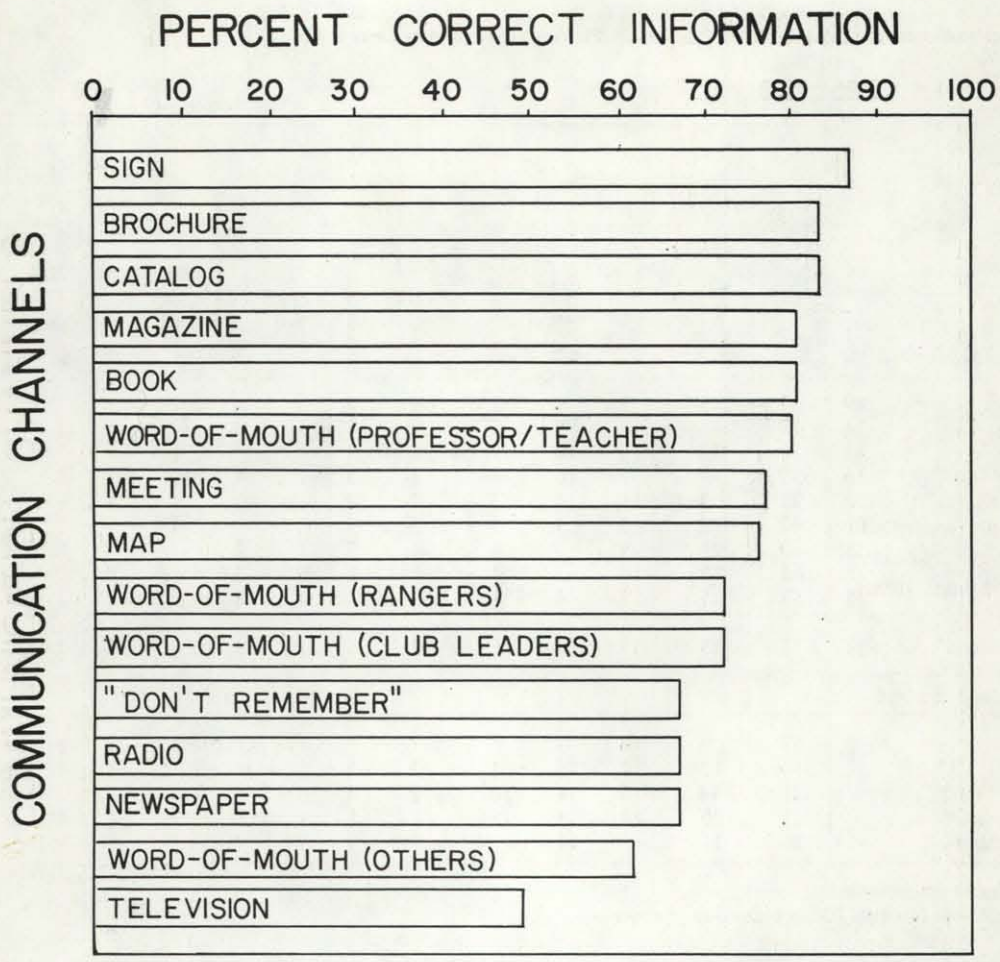


Fig. 4. Correct information attributed to communication channels, Selway-Bitterroot Wilderness, 1976.

scores by the five information categories and then using Student's *t* test, we found that the differences were statistically significant at the .001 level of probability.

Scores in all five information categories were significantly higher for those contacted than for those not contacted. The largest differences were in wilderness ethics, the concept of wilderness and wilderness management. Information within these three categories was also the primary objective of the portal assistants' educational efforts.

Many visitors volunteered supportive comments for the portal assistant program. One airplane passenger added the following to her questionnaire in reference to portal assistants:

> *These are very polite and helpful young people. They have greatly increased my appreciation for this area.*

An outfitter said,

> *I can sure see the difference of people impacts on the area when there is a good portal assistant at work. Last year the portal assistant knew the area well and contacted everyone in sight. He helped to place people to different areas and told them how to keep from making a mess. The area looked fantastic. But this year, with only a part-time, lazy assistant, the place is crowded in certain areas and shows lots of new wear.*

This outfitter was quite in favor of the Forest Service retaining a strong portal assistant program, but was concerned over the quality of seasonal employees occupying the positions.

The portal assistant program may well be the Forest Service's most effective channel for communicating with the wilderness user. Through adequate staffing, a large percentage of visitors can be contacted, with self-selection all but eliminated; the messages can be transmitted with an opportunity for feedback, clarification and persuasion; the messages can be modified according to specific circumstances; and there appears to be high visitor receptivity for the method.

Table 10. Possession of a map, by user group, Selway-Bitterroot Wilderness Area, 1976.

Possession of an area map (N)	User Group										
	Backpackers (286)	Group leaders (34)	Group members (41)	Day users (16)	Outfitters (8)	Horse campers (61)	Pilots (35)	Passengers (71)	Hunters (45)	No response (4)	Total (601)
Yes	87*	94	68	56	75	75	97	75	73	–	82
No	13	6	31	44	25	25	3	25	27	–	18

* Figures represent percentages.

Another potentially important and effective transmitter of information is the teacher or professor. Respondents associated their initial information with teachers/professors 9 percent of the time, and this correlated with correct test responses in 80 percent of the cases. However, teachers were most associated with biophysical information and safety/equipment items. Only 3 percent of the ethics items, 5 percent of the management items and 6 percent of the concept items were attributed to these people, suggesting a need for agency personnel to provide more of this kind of information to the educator.

Brochures and Maps

Divergent opinions exist regarding the benefits of brochures as a wilderness information channel. For example, Schomaker (1975) judged maps and pamphlets or brochures for disseminating information to wilderness users, especially in dispersed areas, to be the best media currently available. Krumpe (pers. comm. 1978) reported success in using information on a map as a tool for dispersing wilderness users in Yellowstone National Park. In addition to this case of proven effectiveness, maps and brochures have the advantages of being accepted by wilderness users (Hendee et al. 1968, Stankey 1971) and of being relatively inexpensive. As discussed in Part II, however, it was found in Rocky Mountain National Park that backcountry visitors exhibited no significant change in knowledge levels resulting from receiving a brochure distributed for testing purposes. That case supported a point stressed by Gilbert (1975), that contact does not necessarily mean communication.

In the SBW study, as may be seen in Table 9, brochures were identified as a channel only 6 percent of the time and maps 2 percent of the time. However, both were associated with relatively high degrees of correct information (Figure 4). Brochures and maps were mentioned by respondents most often as providing answers to questions relating to ethics and the wilderness concept. All user groups appeared to use brochures approximately the same amount, except for hunters, who used them less than did others.

Maps also were mentioned as channels fairly consistently among the various user groups. Importantly, the majority of new information obtained by airplane users from the Forest Service was received via SBW maps given to them by portal assistants at the landing strips. Possession of maps by respondents was further investigated and the results are shown in Table 10. Table 11 shows where the maps were obtained.

In that 58 percent of all users in possession of a map obtained it from the Forest Service, this might be viewed as a promising channel for disseminating wilderness information. Unfortunately, however, only 2 percent of the

Table 11. Source of maps being carried, by user group, Selway-Bitterroot Wilderness Area, 1976.

Source of map (N)	User Group									
	Backpackers (238)	Group leaders (32)	Group members (28)	Day users (10)	Outfitters (6)	Horse campers (44)	Pilots (34)	Passengers (51)	Hunters (30)	Total (475)
Forest Service	59*	63	43	80	100	77	35	51	60	58
University	15	19	39	–	–	–	–	2	–	11
U.S. Geol. Survey	12	19	7	–	–	7	3	2	10	9
Friend/relative	8	3	–	–	–	5	3	8	–	6
Store	4	–	7	–	–	–	3	6	13	4
Idaho Fish & Game	4	3	–	20	–	–	–	2	13	4
FAA/aeronautics	–	–	–	–	–	–	29	6	–	3
Other	–	–	4	–	–	11	27	23	4	5

* Figures represent percentages.

Table 12. Number of wilderness-related books read by users, Selway-Bitterroot Wilderness, 1976.

Number of books read (N)	User Group									
	Backpackers (289)	Group leaders (34)	Group members (42)	Day users (16)	Outfitters (8)	Horse campers (61)	Pilots (35)	Passengers (71)	Hunters (45)	Total (601)
None	45*	41	69	69	75	80	80	82	80	60
1-5	46	41	29	31	25	18	17	17	16	34
6 or more	9	18	2	–	–	2	3	1	4	6

* Figures represent percentages.

respondents recalled tested information having initially come to them from the agency via this channel. Accordingly, it appears that the effectiveness of successfully communicating information by this approach was relatively poor. It is almost certain that all respondents acquiring maps from the Forest Service obtained the colorful, high-quality Selway-Bitterroot Wilderness map. This map actually contained answers to about half the questions used in this study to test knowledge levels. More findings relating to agency use of maps are presented in Part III.

Signs

A specially designed informational sign at the edge of wilderness (i.e., at trailheads) was found to be ineffective in convincing visitors of the necessity of use permits in heavily-used Rocky Mountain National Park (Fazio 1974). In the SBW study area, informational signs were located at trailheads and within the wilderness at both sampled airstrips. These or some other signs apparently provided a wide range of respondents with messages about the wilderness concept and management. Signs were recalled as only 3 percent of the total channels, but were associated with the highest percentage of correct test answers in the study. Further study will be needed to resolve the inconsistency regarding signs as an effective communication channel. However, from a management standpoint, consideration should be given to earlier findings that signs **inside** wilderness have been perceived by users to be inconsistent with the concept of wilderness (Hendee et al. 1968, Stankey 1971).

Books

Books accounted for 5 percent of the cited channels and were mentioned most frequently by hikers. They provided information in all categories, especially safety/equipment.

Despite the infrequency with which books were cited as channels of information for the specific test items, other results indicate they play an important role in the education of wilderness users. One hundred-twenty different books were mentioned in this study as providing respondents with wilderness-related information! Forty percent of the participants read at least one of these books. Organized group leaders and backpackers read books the most. Since no book list was offered to stimulate recall, undoubtedly more than 120 different books were actually read by the 601 respondents, as recalling specific names presented problems for many people.

Table 13. Books cited by users as channels for wilderness information, and readers' knowledge scores, Selway-Bitterroot Wilderness, 1976.

Book and author	N	Mean knowledge score (1-20)	SD
The Complete Walker (Fletcher)	53	13.3	3.1
Backpacking–One Step at a Time (Manning)	36	13.6	3.8
How to Stay Alive in the Woods (Angier)	21	12.4	3.4
Boy Scout Handbook (BSA)	21	10.2	3.8
Mountaineering–Freedom of the Hills (Seattle Mountaineers)	17	14.8	2.9
A Sand County Almanac (Leopold)	12	15.3	3.7
Wilderness and the American Mind (Nash)	10	16.1	2.1
The Wilderness Handbook (Petzoldt)	7	16.1	1.6

Table 12 presents the data collected on book readership by user groups. Using Scheffe's multiple range test, it was determined that statistically significant differences in mean knowledge scores ($p < .05$) occurred among respondents who read none, 1-5 and 6 or more books. The mean knowledge scores associated with these differences were 8.4, 11.2 and 14.9 respectively.

The most frequently recalled books are listed in Table 13. In every case, the mean knowledge scores for readers of these books were greater than for non-readers. Readers of the *Boy Scout Handbook* scored lowest of any listed, and their mean score was only 0.5 point higher than that of non-readers.

There seems little that agency personnel can do to influence the message content of most books. Of course, when writers do seek assistance from an agency, that is the critical time for managers to communicate their concerns and provide appropriate information. Given the long-range effects of a single book, it seems well worth the time and careful preparation to attempt adequate input for its contents. A more readily available opportunity to use this channel is in the promotion of those books that contain information that is likely to favorably influence the behavior of wilderness visitors. This might be accomplished by encouraging equipment stores or concessionaires to carry these items for sale, or by preparing reference lists for public distribution.

Magazines, Newspapers and Catalogs

Magazines, newspapers and catalogs received only 3, 2 and 2 percent, respectively, of the mentions as channels providing answers to the questionnaire test items. No single user group stood out as showing a tendency toward the receipt of information through magazines and all categories of information seemed covered about equally. Numbers of respondents citing this channel were so low that nothing conclusive can be inferred. Similarly, with the same limitation, it was found that catalogs provided mainly safety/equipment and some ethics information, and were utilized mostly by hiking recreationists. Newspapers also provided respondents with only a small degree of information, but over the whole range of topics.

Although few magazines were recalled as having provided the answers to specific items used in the knowledge test, this medium did correlate to high mean knowledge scores for readers vs. non-readers. Magazines would seem to be an important potential channel for wilderness managers. Where the target audience is dispersed in residency and time, magazines can often be used to identify and reach a specific type of user. The message can then be made specific or encompassing, localized or widespread, and be valuable and of interest to those in the particular target group (Gilbert 1975).

Using the list shown in Appendix A, wilderness visitors were asked to check or add any magazines they had actually used in acquiring wilderness-related information. Respondents were then grouped according to the number of magazines cited, with the results shown in Table 14.

Only 19 percent of all the wilderness users did not gain any information from some magazine. Organized group leaders and backpackers were the most frequent magazine readers, while airplane passengers, outfitters and horse campers read the fewest magazines related to wilderness. With results similar to the test of book readers, it was found that statistically significant differences in wilderness knowledge existed among the four categories of readerships shown in Table 14 ($p < .05$ using Scheffe's multiple range test). Essentially, the more wilderness and related magazines a respondent read, the higher his or her score tended to be.

Table 15 contains a list of the magazines cited most frequently and the mean scores of their readers. In most cases, the scores were higher than those of non-readers. The exceptions were *Field and Stream*, the most frequently cited of any magazine in the study, *Outdoor Life*, *Boy's Life* and several magazines grouped together as fliers' magazines.

The ubiquitous magazine *National Geographic* ranked second as the most-read publication believed to provide respondents with wilderness-related information.

Table 14. Number of magazines read, by user groups, Selway-Bitterroot Wilderness, 1976.

Number of magazines read (N)	User Group									
	Backpackers (289)	Group leaders (34)	Group members (42)	Day users (16)	Outfitters (8)	Horse campers (61)	Pilots (35)	Passengers (71)	Hunters (45)	Total (601)
None	18*	15	17	19	25	23	9	27	18	19
1-3	46	41	45	50	50	52	68	52	51	48
4-8	31	24	38	25	25	23	23	20	31	29
9 or more	5	20	–	6	–	2	–	1	–	4

* Figures represent percentages.

Table 15. Magazines cited by users as channels for wilderness information, and knowledge scores of readers, Selway-Bitterroot Wilderness, 1976.

Magazine	N	Mean knowledge score (1-20)	SD
Field and Stream	231	9.1	3.9
National Geographic	212	10.7	4.1
Outdoor Life	179	9.6	4.0
Backpacker	121	12.0	3.9
REI Catalog	102	12.3	3.4
Boy's Life	80	9.1	4.4
Audubon	64	12.6	3.6
Sierra Club Bulletin	61	13.5	3.4
Idaho Wildlife Review (now defunct)	55	12.3	4.0
Natural History	31	13.3	2.9
National Parks and Conservation Magazine	27	12.7	4.0
Living Wilderness	18	15.5	2.9
American Forests	17	12.9	3.7
Flying magazines	16	7.5	3.0

Interestingly, this magazine was also cited by many urban absentee landowners in a study by Dickson (1970) in which he attempted to determine where these people received forestry information that might influence their management practices. The citations in both studies were probably not the result of receiving information germane to the research, but rather a function of familiarity with articles related generally to forests and wilderness.

The next two most popular magazines were *Backpacker Magazine* and *REI Catalog*. Nearly 40 percent of all users were reached by messages channeled through these two magazines. Knowledge scores recorded for readers of these magazines were not as high as for readers of the older, more traditional and less frequently mentioned preservation magazines, i.e. - *Audubon, Sierra Club Bulletin, Natural History, National Parks and Conservation Magazine* and *Living Wilderness.*

Even though no airplane magazines were listed in the checklist, at least 16 different airplane users cited airplane-oriented magazines that contained information concerning wilderness. Judging from knowledge deficiencies found for airplane users and an inverse relationship between the score of flying magazine readers and non-readers, these publications could be used to disseminate information on the wilderness concept, ethics and management topics. Instead, they have been known to publish articles that simply inform pilots of the unusual vacation spot that awaits them in the Selway-Bitterroot and other wilderness areas.

Radio and Television

Despite local agency efforts to use public service announcements (PSA) on radio to disseminate wilderness-related information, this channel was cited by fewer than 1 percent of the SBW respondents—the lowest of any channel mentioned in the study. Public service announcements on radio represent a "shotgun" approach to information dissemination. They are very short, can be aired by the station at any time of the day or night and face formidable competition for listeners' attention. They are likely to reach potential wilderness users only by chance. The only control that agency personnel have in the use of this approach is to be certain that tapes with appropriate messages are sent to stations with listening audiences made up largely of young people, locals or others with socio-economic characteristics indicative of low wilderness knowledge. The chances of PSA use on local stations are good, since most other PSAs are of regional or national origin. Station managers in the vicinity of the SBW have been enthusiastic and cooperative in helping to produce and air wilderness-related messages (Bradley 1977).

Like radio, television is today sometimes looked upon as a panacea for public communication. One reason, of course, is its popularity and the fact that more than nine out of ten American homes support at least one television set (Anonymous 1968). But again, there is little assurance that target audiences will be contacted, at least on a PSA basis which allows the station to determine dates and times of release (as opposed to when paid advertising is used, which is generally out of the question for public agencies).

In Part II, television is shown to have been a poor means for reaching backcountry visitors in Rocky Mountain National Park. Similarly, in the SBW study, very little information about wilderness passed to respondents through the medium of television. It was also associated with the lowest number of correct test answers (50 percent). Hunters, airplane users and horse campers relied most heavily on this channel for their information; overall 82 percent of the respondents watched only 2 hours or less of television per day (Table 16). This may be considered relatively light viewing compared with most individual Americans, who watch on the average of 3 hours of television per day and

Table 16. Television viewing time for users, Selway-Bitterroot Wilderness, 1976.

Amount of time in hours/day (N)	User Group: Backpackers (289)	Group leaders (34)	Group members (42)	Day users (15)	Outfitters (8)	Horse campers (61)	Pilots (35)	Passengers (71)	Hunters (45)	No response (1)	Total (601)
Not at all	33*	18	17	26	38	13	6	5	–	–	21
Less than 2	54	71	54	53	37	67	77	70	69	–	61
2 or more	13	12	29	20	25	20	17	25	31	–	18

* Figures represent percentages.

have sets in their house operating from 5 to 6 hours daily (Rubenstein et al. 1972, Goodhart et al. 1975). A rather large segment of the SBW respondents (21 percent) reported watching no television at all.

Using Scheffe's multiple range test, it was found that wilderness knowledge scores were inversely related to the amount of television viewing time reported ($p < .05$). The mean knowledge score for non-viewers was 11.2; viewers watching 2 hours or less, 9.8; and those watching more than 2 hours, 8.0. Groups of users who watched more television than the others were hunters, airplane passengers and organized group members. Commercial outfitters spend much of their year in remote places; thus some had difficulty answering this question. Other than outfitters, backpackers and day users had the largest percentages of their groups in the non-viewer category. Many individuals in these groups made marginal remarks that "television is basically a waste of time." It is possible, though, that these same individuals would respond favorably to wilderness-related programs if the opportunities existed.

Despite the relatively small amount of time SBW users spend in front of televisions, it was thought that cable TV might be a useful channel for reaching recreationists in the small communities that contribute much of the area's use. Public service commitments to local areas by cable television companies create opportunities for transmitting messages to the viewing public at little or no expense beyond production costs. Unfortunately, in looking into this possibility, we found the results to be rather disappointing. As may be seen in Table 17, at best only 27 percent of all users subscribed to cable television.

Voluntary Contacts with the Forest Service for Information

Wilderness users who voluntarily seek information from the managing agency provide a particularly available and probably receptive target for communication.

In one way or another, 59 percent of the participants in this study contacted the Forest Service for information related to their wilderness visit. As would be expected, local residents made such contacts 10 percent less frequently than semi-local or non-local individuals. As shown in Table 17, group leaders and outfitters had the most information seekers, while group members, airplane passengers, horse campers and hunters had significantly fewer.

Table 18 represents data on how the contact with the Forest Service was made. Personal visits were most common (60%) among all user groups except organized group leaders. Actually, since some respondents contacted the Forest Service by other means as well as in person, the total personal visit tally runs closer to 84 percent (note that the categories are independent; thus a respondent citing "phone and personal visit" was not included in the "personal visit" class). Letters were used by 25 percent of all respondents. Again, some who wrote letters also phoned and/or made personal visits.

Proportionally, non-locals wrote more letters and phoned the managing agency more frequently than did locals. About 40 percent of the non-locals either wrote letters or phoned, compared to 22 percent of the locals. Since non-locals have few opportunities to make personal visits and take advantage of information accruing from

Table 17. Percentages of information seekers within user groups, Selway-Bitterroot Wilderness, 1976.

Contacted the Forest Service for information (N)	User Group: Backpackers (289)	Group leaders (34)	Group members (42)	Day users (16)	Outfitters (8)	Horse campers (61)	Pilots (35)	Passengers (71)	Hunters (44)	No response (1)	Total (601)
Yes	66*	88	36	62	88	46	54	42	48	–	59
No	34	12	64	38	12	54	46	58	52	–	41

* Figures represent percentages.

Table 18. Methods utilized by users to contact the Forest Service for wilderness information, Selway-Bitterroot Wilderness, 1976.

Method (N)	User Group: Backpackers (188)	Group leaders (30)	Group members (15)	Day users (10)	Outfitters (7)	Horse campers (28)	Pilots (20)	Passengers (29)	Hunters (21)	Total (350)
Personal visit	58*	30	73	80	57	57	70	76	75	60
Letter, phone, & personal visit	8	40	13	–	43	4	5	3	–	10
Letter	12	–	7	–	–	11	5	3	10	9
Phone & personal visit	10	10	–	–	–	7	10	3	10	8
Letter & personal visit	5	10	–	10	–	14	–	14	–	6
Phone	5	10	–	–	–	7	10	–	5	5
Other	1	–	6	10	–	–	–	–	–	1

* Figures represent percentages.

them, it becomes imperative for the agency to fully utilize the communication opportunity of answering their letter inquiries. Opportunities to effectively communicate by mail on wilderness subjects are discussed in Part III.

Examination of Table 19 shows that 86 percent of those who contacted the Forest Service believed the information they received to be at least adequate in helping them plan their trip or in answering their questions. Overall, personal visits were most satisfying to visitors; letters did not fare as well. Such a high percentage of respondents reporting satisfaction with the information received from personal visits (88%) is impressive. Although not tested, it was noticed by interviewers that those not satisfied with their contact generally were the more knowledgeable respondents.

Forty-seven complaints about inadequate Forest Service information included: 1) incomplete information given, partly due to lack of knowledge by Forest Service personnel (43%), 2) no topographical maps available (25%), 3) personnel not helpful or cooperative (16%), 4) trails not inventoried (4%), 5) slow reply (2%), and 6) a wide variety of other reasons (10%).

Importantly, visitors who voluntarily contacted the managing agency for information had higher mean wilderness knowledge scores than those who did not make such contacts. This held true in all five categories of information and the differences were significant at the .001 level of probability using Student's *t* test. From these data, it is clear that agency efforts to communicate with wilderness users must not rely solely on visitors' initiating the contacts. Those who appear to have greatest need for information that might reduce user impacts are more likely to be those who do not seek it from managers.

Table 19. Adequacy of information received by users from the Forest Service through various methods, Selway-Bitterroot Wilderness, 1976.

Method	Was information adequate? Yes	No
Phone & personal visit	89*	11
Personal visit	88	12
Phone	83	17
Letter, phone & personal visit	82	18
Letter & personal visit	81	19
Letter	80	20
Total	86	14

* Figures represent percentages.

Part II

ROCKY MOUNTAIN NATIONAL PARK: AN EXPERIMENTAL STUDY OF CHANNEL EFFECTIVENESS

Channel research has received considerable attention by communications investigators. In the recreation and natural resources field, channel research has ranged from effectiveness of signs to the elements of exhibitry that are believed to appeal to visitors. Portions of this work were done by Mahaffey (1970), Washburne and Wagar (1972), Bernardi (1973), Ross and Moeller (1974), Feldman (1975), Folkman (1975), Schomaker (1975), Shiner and Shafer (1975) and Wagar (1976).

The work reported in this section was an experimental approach to test the effectiveness of several common communication channels used in national parks to reach backcountry[1] recreationists.

STUDY AREA AND METHODOLOGY

Rocky Mountain National Park (RMNP) was selected as the study site because of the intense human pressures on the park's backcountry resources. Located in north central Colorado only 65 miles northwest of Denver, the park is one of the first popular backpacking areas west of the Great Plains. Not only is it within a few hours' drive of most of Colorado's expanding population centers, it is also all but connected to the population center of the United States by two interstate highways. Even during the gasoline shortage of 1973, recreational use of the park's backcountry continued its steady rise. In 1973, the year this study was conducted, at least 23,489 recreationists used the park's 256,000-acre backcountry overnight. Most of the 37,180 camper-days occurred during the summer months. In terms of visitation growth, impact on natural resources and deterioration of recreational experiences, the situation at RMNP presents a microcosm of the problems affecting wilderness areas everywhere.

The 1973 study was an evaluation of two management approaches to solving the problems—implementation of a highly restrictive backcountry use permit system and use of communication media to affect visitor behavior and reduce human impacts. The results are detailed in *A Mandatory Permit System and Interpretation for Backcountry User Control in Rocky Mountain National Park: An Evaluative Study* (Fazio 1974). The portion dealing with communication channels is summarized below.

The experiment at RMNP was designed to test the hypothesis that knowledge of low impact camping procedures would be increased to the same degree using different communication channels. Work on this part of the study was conducted during a consecutive 60-day period from 8 July through 8 September 1973.

The method used was the classic "before-and-after control-group design (pre-test, post-test)" described by Kerlinger (1964). Subjects for the experiment were selected from applicants for backcountry use permits at the park's headquarters building on the outskirts of Estes Park, Colorado. These park visitors completed a questionnaire to determine level of knowledge regarding selected low impact camping skills. They were then exposed to one of several interpretive techniques (treatments) commonly used by the National Park Service. A control group received the pre-treatment questionnaire[2] but was exposed to no interpretation—i.e., they received no information from the researcher through the channels being tested.

Post-testing was achieved through a second, similar questionnaire mailed to the subject 5 weeks following completion of the first. In addition to knowledge of the low impact techniques, socio-economic data, wilderness sensitivity scores and opinions on the permit system were also obtained through the two questionnaires.

The Tested Channels

The "treatments" used in this research consisted of exposure to one of several methods commonly used in attempts to interpret backcountry recreation to potential visitors. Essentially, this represented exposure to different communication channels, all containing the same selected test messages. The channels were 1) a brochure, 2) a visitor-

[1] Backcountry and wilderness are used synonymously in this report. In National Park Service terminology, the former is commonly applied to its roadless areas whether or not they are classified or intended for classification in the National Wilderness Preservation System.

[2] This instrument is also referred to in the text as the initial questionnaire, pre-test and pre-visit questionnaire. Likewise, the post-treatment questionnaire is sometimes referred to as the post-test, post-visit or follow-up questionnaire.

activated slide/sound exhibit, 3) a half-hour color television program and 4) a newspaper feature article.

Brochures

An eight-panel pamphlet was developed to test this commonly used interpretive medium. An attempt was made to make the brochure simple yet attractive, with most of the test messages plainly highlighted through the use of bold type headings.

The brochure was distributed in the backcountry office of park headquarters approximately 2 days each week, on different days of the week, throughout the experimental period. On "brochure days," the pamphlets were handed to all members of each party completing questionnaires.

To determine if the brochure would have greater impact if the visitor received it from a ranger while actually camped or hiking in the backcountry, a plan was developed for distribution by this method on an experimental basis. Three days each week were designated as "control days" during which permit applicants completed questionnaires, but then were exposed to none of the experimental treatments. At the beginning of the summer, a memorandum and a supply of brochures were sent to each subdistrict ranger asking his cooperation in distributing the brochures on the specific dates selected as control days. In this way, a sample of backcountry campers would receive the brochure in the backcountry without this treatment being contaminated by any of the others.

Slide Exhibit

Visitor-activated slide exhibits synchronized with sound are another of the common interpretive techniques used in national parks. For testing this medium, exhibit panels and a rear-screen projection unit were assembled in the downstairs lobby of park headquarters. The panels were plain, with a wood-grain finish, except for the National Park Service emblem and white raised letters which read: FOR BACKPACKERS . . . .

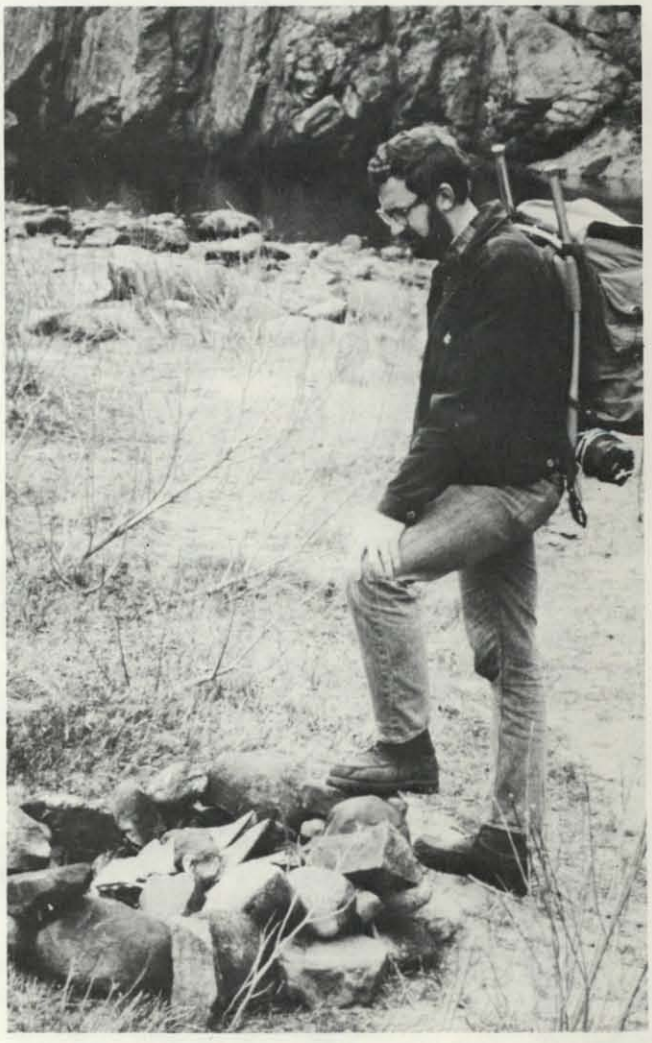
Rear-screen projection equipment consisted of a carousel projector with a 1.4-inch lens, synchronized to a continuous tape playback unit and continuous loop tape cartridge. In response to electronic impulses on the tape, the slide tray would automatically recycle to its starting point after the final slide. The projector would then shut down and be reactivated when a visitor pressed a button next to the 2 x 3-foot panel screen.

The narrated slide program consisted of 51 slides, with background music and a professional broadcaster's voice. Viewing time was 8½ minutes, slightly longer than planned, but of a length necessary to include all the test messages.

As with the brochure treatment and control periods, backcountry permit applicants were exposed to the slide exhibit on alternate days throughout the summer. After completing the questionnaire in the headquarters building, the subjects were told by the researcher, "We are asking that before heading into the backcountry, you stop downstairs for a few minutes and take a look at a slide exhibit that has been set up especially for backpackers." As a reminder, a sign was placed outside the backcountry office door with the wording: "Please view the slide exhibit downstairs before 'heading in' to the backcountry." On those days not designated for slide exhibit treatment, the exhibit was hidden behind panels containing a general park message.

Television

During the spring of 1973 a 30-minute color television tape entitled "Our Crowded Wilderness" was made as part of a Colorado State University public service series, "Environmental Controversy." The program format was a panel discussion with three graduate students presenting



Blackened rock rings at backcountry campsites are a major threat to the high quality of wilderness which rangers are trying to preserve.

pre-planned questions to the "guest expert." The guest was David B. Butts, then serving as resource management specialist at RMNP. In the course of discussion between Butts and the graduate students, using slides to illustrate many of the main points, the various test messages were clearly covered during the program.

The taped series was offered free by the Office of University Communications to television outlets in Colorado and some surrounding states. Stations could then obtain the series or individual tapes and air the films at the discretion of the station manager.

Newspaper Feature Article

For this phase of the test, a 1500-word feature article was prepared. The article was mailed, complete with subheadings and black-and-white photographs to highlight the interpretive messages, to editors of five newspapers published along Colorado's front range closest to RMNP. The newspapers selected were *Fort Collins Coloradoan, The Daily Reporter-Herald* (Loveland), *The Estes Park Trail Gazette, The Boulder Camera* and *The Denver Post.* Upon receipt of rejection from *The Denver Post, Rocky Mountain News* was approached to provide coverage of the metropolitan Denver area.

A letter accompanied each manuscript, briefly explaining the research project to the editor and asking for his cooperation by publishing the article, without alteration or editorial comment, in an early August issue of the newspaper.

Trailhead Signs

A 3 x 4-foot sign was designed to test this communication channel, but due to its limitation on the amount of copy that could be used, only messages pertaining to the permit system were included. This portion of the study is beyond the scope of this report and is mentioned here only because some figures in the following tables reflect visitor numbers exposed to the medium.

The trailhead signs were rotated at 2-week intervals throughout the summer.

The Test Messages

The interpretive messages transmitted through all channels were selected on the basis of two principal criteria: 1) that they were related to actual management problems in RMNP and 2) that they might be expected to run counter to generally established tradition or belief. A good example of the latter was an item promoting the use of subdued colors that blend into the natural surroundings rather than brightly colored equipment that stands out. The final list of items resulted from consultation with resource management specialist David B. Butts, and from principles of wilderness use taught by Paul Petzoldt, founder of the National Outdoor Leadership School, Lander, Wyoming.

Wording of the messages was varied to fit the formats of the various media, but the concepts, as listed below, provided consistent interpretive content:

1. The individual can help to preserve the environmental quality of the wilderness he is using. This can be done by
   a. never using live tree limbs for bough beds, but instead using foam rubber pads or air mattresses.
   b. using only dead and downed wood for fires.
   c. never breaking branches off a tree, even dead branches, because this often destroys what others consider beauty.
   d. using only the amount of firewood needed, to help conserve the natural supply.
   e. never stockpiling wood for the next camper because this is not in keeping with the spirit of independence inherent to wilderness recreation.
   f. using drab colors because brightly colored clothing and equipment tend to shrink the wilderness psychologically. By using browns, greens, and blues, more people can be in an area without knowing of each others' presence, thus preserving solitude.
   g. washing dishes next to the water supply, not in it, thus preventing pollution.
   h. carrying out everything carried in, instead of burying it, because wild animals and frost action often bring buried garbage and trash to the surface.
2. Metal fire rings installed by the National Park Service preserve wilderness quality because
   a. they use firewood most efficiently; since trees at high elevations replace wood supplies slowly, it is important to conserve this fuel, because so many people need to draw from the supply available.
   b. they prevent the proliferation of blackened rocks which have been used as fire rings and give an ugly appearance to an area.

3. Portable backpacking stoves are ideal because

   a. their use helps preserve the natural environment.

   b. they are also convenient and lightweight, and in some areas are the only legal source of fire.

4. Pet dogs must not be taken on wilderness trips because

   a. even if on a leash, they frighten wild animals. Most backpackers hope to view wildlife.

   b. they often disturb other campers.

   c. dog-like tracks in the wilderness should only be those of wolves, coyotes or foxes.

Questionnaire Administration

Content

A self-administered questionnaire was used for both pre- and post-testing in this study. Nine questions were included, based on the low impact messages selected for the experiment. Eight of these were presented in two parts, one part being a multiple choice with one selection considered "correct," and the other part consisting of a semantic differential scale to measure the strength of a respondent's reply. The following illustration will clarify the approach:

A. In areas where wood fires are allowed, which of these practices do you consider most proper and helpful in preserving wilderness (backcountry) quality? (Check *one.*).

   ___ Gather only enough firewood for your own use.
   ___ The Park Service should provide cut firewood at each campsite.
   ___ When you leave a campsite, always stockpile firewood for the next camper.

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference	Slightly in favor	In favor	Strongly in favor

0 1 2 3 4 5 6 7 8 9

A ninth question asked for a preferred color for backpacking equipment. Low impact colors were then rated correct responses, while bright colors and "doesn't matter" were considered incorrect. All nine test items are shown in Appendix B.

The same test questions were asked in both the pre-treatment and the post-treatment questionnaires, but were disguised in different formats. The first questionnaire consisted of seven mimeographed pages of copy, and included Hendee's "wilderness scale" (Hendee et al. 1968) and items pertaining to socio-economic and experience data and opinion questions regarding the permit system. The second questionnaire was an attractively printed mail-back booklet. It was also much shorter. An important feature of the post-visit questionnaire was a series of questions on page one designed to determine into which treatment class the respondent should be placed. These questions are shown below.

1. a. During the summer, did you read, see or hear information regarding backcountry (wilderness) management in Rocky Mountain National Park? This might have included such things as:

   - what the National Park Service is doing to preserve the environmental quality of backcountry areas.
   - what users can do to preserve backcountry quality.
   - the new Backcountry Use Permit system.

   ___ NO *If* no, please skip to page 2.
   ___ YES

   b. *If* yes, in what form did you receive the information?

   (Most people will have been involved with only *one* of the following information media, if any. Please check the one, or more if necessary, that you *definitely remember.*)

   ___ Read a green-colored brochure entitled "Tips on Protecting Your Backcountry."
   ___ Read a sign at trailhead about backpackers and the permit system.
   ___ Read an article about it. Please specify in what newspaper(s) or magazine(s): _____
   Did you see it before ___ or after___ your park visit?
   ___ Saw a narrated slide exhibit at park headquarters.
   ___ Saw a television program. What station (city or call letters)? _____
   Did you see it before ___ or after ___ your park visit?
   ___ Other (please specify): _____

c. *If* you checked "Read a brochure" above, where did you receive the brochure?

___ A ranger gave it to me in the back country.
___ At park headquarters when I applied for my Backcountry Use Permit.
___ At a ranger station
___ In a box at trailhead
___ Other (please specify): _____
___ Don't remember

If a respondent failed to answer the above questionnaire items, the brochure was returned with a letter asking for its completion. In addition, responses were checked against other definite information, and those appearing to be invalid were discarded or corrected. For example, if a person claimed to have read an article prior to the date it was actually published, that person was not classified as being in the newspaper article treatment group. We also knew which individuals were handed brochures. If such a person failed to check "read a brochure," he or she was placed in the brochure treatment class anyway. A reply of "no" in part A would usually result in classification into the control group (which was exposed to no treatment). Again, a check of the date when it was known that the respondent visited the backcountry office would verify if placement into the control group should actually be made.

Both the pre-treatment and the post-treatment questionnaires contained items regarding opinions about certain park management practices, but only those items relative to the nine low impact message questions will be discussed in this report.

Sampling Procedures

In RMNP, most backcountry recreation takes place in the East District, closest to the front range cities and the popular resort town of Estes Park. The East District comprises approximately two-thirds of the park's land area and in 1973 had a total permit quota of 117 for 27 designated areas, compared to the West District's 59 permits for 21 areas. Percentages of all permits issued in the East District during 1973 are also indicative of the difference between the two districts. These ranged from 68 percent of the cross-country camping permits and 74 percent of the permits for camping at designated trailside sites, to 99 percent

Day hikers crowd the shore of The Loch more than 2 miles into the backcountry of Rocky Mountain National Park.

of the technical climbing permits. For these reasons, as well as budgetary limitations, sampling was restricted to the headquarters building which served primarily East District backcountry users.

Sampling took place in the backcountry office at park headquarters approximately 5 days each week during the research period. It was originally planned that the questionnaire would be administered by park personnel issuing permits. However, after the first day it was obvious that obtaining complete and valid returns would require the full attention of the researcher. Thereafter, I personally administered all questionnaires from 8:00 a.m. through 5:00 p.m., except for an hour at or near noon.

When designing the sampling procedure, it was decided to use one randomly selected member of each party. The sole use of party leaders was ruled out primarily on the basis of Jubenville's (1971) findings that these individuals differ significantly from other party members in a number of ways that could have influenced the outcome of this study. Neither did the use of all members of the party seem prudent, simply from the standpoint of volume and waste of time associated with oversampling. Stratified sampling was not possible because there was little previous information on which to base the strata.

The method which was decided upon involved asking each party member to complete a questionnaire, and then later randomly selecting one from the group. Although this produced a waste of questionnaire forms, it was decidedly superior to selecting one party member at random and having only him or her complete the form. This was attempted during the first days of sampling, but resulted in impatience or "assistance" on the part of non-participating party members, and many incomplete or invalid questionnaire returns.

Questionnaire completion time averaged approximately 10 to 15 minutes. This usually presented no inconvenience to the visitor, since most had to wait longer to begin the application process to obtain a permit. In fact, it often seemed to be a pacifying diversion during crowded peak periods. Prior to using a respondent's completed questionnaire, it was ascertained that it was his or her first visit to the park during the research period. This eliminated respondents who could have viewed the slide exhibit previously, and greatly reduced the chances of including visitors who had previously been exposed to the brochure.

No mention was made of a follow-up questionnaire or the objectives of the study. Questions about the necessity of a name and address on the questionnaire were answered non-commitally, saying it was in case the National Park Service wanted to mail literature to backcountry visitors. Actually, this allowed mailing of the post-visit questionnaire, which was sent 5 weeks after completion of the initial questionnaire. Two follow-up letters were sent at 3-week intervals if no reply was received.

Data Analysis

A total of 20 points were possible for 8 of the 9 knowledge items shown in Appendix B. This was based on a scale awarding 11 points for the correct answer plus up to nine additional points depending on the attitudinal strength of the response on the semantic differential scale. For an incorrect response, one point was awarded, plus as many as nine additional points in the reverse order used with correct answers. For example, if a subject indicated "very little preference" toward his incorrect response, his score would be one plus nine, for a total of ten. "Very little preference" toward a correct response would be 11 plus 0, for a total of 11. For the ninth item, 1 point was added if a low impact color was indicated, and more if a bright one was selected. The total point score was based on an average of the number attempted or completed entirely, then converted to a scale of 1 to 100.

An identical code number on both questionnaires completed by a respondent allowed matching and statistical analysis by computer. The primary tool for testing the statistical significance of changes was analysis of variance.

RESULTS AND DISCUSSION

Reaching the Target Audience

The experiment to test the effectiveness of various channels used to deliver low impact messages was designed to obtain somewhat equal numbers in each treatment class. Generally, during the 60-day research period, treatments were conducted for 2-day intervals, then rotated—i.e., brochures were distributed for 2 days, then the slide exhibit was used for 2 days. Three days of control then followed during which neither brochures nor slides would be used. The extra day was allowed to provide greater numbers on control days because it was expected that rangers were cooperating and would intercept some of the users on these days to distribute the brochure in the backcountry.

There was, of course, no way to control the number of visitors exposed to the television or newspaper articles. The best that could be done in that regard was to control the release of messages through these channels, assuring that they would be exposed to the mass media approaches, and perhaps enough in the control group to establish a "pure" group exposed to no other treatment. Similarly, by having the trail signs at two trailheads all summer, it was hoped that enough individuals in each treatment group,

plus the control group, would be exposed to this treatment to enable the identification of separate groups, including a "pure" trailhead sign group.

As a result of these efforts, 648 post-test respondents[3] could be classified into treatment groups based on their responses to item 1 of the second questionnaire. The numbers in each treatment group are shown in Table 20. It is clear that equal groups were not obtained, and in some cases numbers were so small that meaningful analysis was impossible. In addition, several combination groups resulted. In most of the latter cases it became impossible to associate dependent and independent variables, and most of these were screened out from further consideration. In some, however, the combination was considered as a single treatment group and included for testing.

Brochures

Brochures were by far the easiest channel to use. As visitors applied for permits (and after they completed the pre-test), each member of the party was handed a copy of the pamphlet. Rarely did anyone refuse, and it was relatively simple to be certain that contact was made with a definite number of individuals.

Table 20. Numbers of backcountry users in experimental treatment groups, Rocky Mountain National Park, summer 1973.

Treatment	Number of subjects
Pure groups	
Brochure (backcountry office)	132
Brochure (backcountry; ranger-distributed)	3
Control	178
Newspaper test article (after visit)	2
Slide exhibit	98
Television program	0
Trailhead sign	26
Combinations	
Brochure and slide exhibit	34
Brochure and trailhead sign	20
Brochure, slide exhibit and trailhead sign	5
Newspaper test article after visit, and other treatment	2
Slide exhibit and trailhead sign	14
Any above treatment and:	
discussions with friends/relatives	32
discussions with park personnel	24
newspaper test article before pre-test	3
non-test article after visit	8
non-test article before visit	41
other	26

[3] 803 completed the initial survey and were eligible for post-testing. An additional 217 day hikers were queried for purposes not discussed in this report.

Brochures Distributed by Backcountry Rangers

As discussed earlier, more control days were planned than slide exhibit days or brochure treatment days, to allow a proportion of these visitors to receive brochures from rangers in the backcountry. From Table 20, it is apparent that this never materialized. The reason is not clear, but some ranger personnel believed that carrying a supply of leaflets and distributing them once or twice a week to backpackers imposed too great a burden. Littering may have been another reason. One ranger claimed to have distributed ten of the brochures at the Jim's Grove camping area on Longs Peak, only to later find seven of them lying on the ground. Had the backcountry dissemination been carried out as planned, the littering aspect would have been a valuable sidelight regarding the potential technique. As it turned out, nothing further can be said regarding the effect of interpretive literature received in the backcountry from rangers.

Slide Exhibit

Reaching the backcountry audience through the slide exhibit was not without problems. The principal one was getting the permittee to watch the brief showing. Before leaving the backcountry office, those individuals intended for this treatment were asked to stop downstairs "before heading 'in' to the backcountry" to see a special slide for backcountry users. Most would agree to do so, but based on informal observations an estimated one-third would then immediately leave the building—permit in hand and thoughts on the backcountry! It is possible, however, that some percentage of these individuals would return at a more convenient time to view the slides.

A more minor problem was that of secondary or inappropriate audiences gathering around the slide exhibit, possibly discouraging a backpacker who might be in a hurry—especially if he had had enough of crowds from his experience in the backcountry office. By being in the basement lobby, the exhibit at least escaped the notice of the most cursory visitors. However, its location next to the restrooms and outside the park theater brought it to the attention of senior citizens, tourist bus visitors and others for whom it had an attraction based solely on its being one of the few exhibits or "things to do" in the headquarters building. Ideally, the slide exhibit would have been in a part of the building out of the path of cursory visitors, and to which permit-issuing personnel could have directed the backpackers.

Trailhead Signs

From the responses in item 1-B of the post-test questionnaire, it was difficult to ascertain whether or not the respondent had actually read one of the two experimental trailhead signs, or if he or she was referring to the "permit required" notices found at the beginning of all trails. So many respondents marked the trailhead sign

response that it became necessary to run a double check on this category. This was done by referring to the initial questionnaire on which the subject's assigned campsite and camping dates were noted. If these coincided with the locations of the experimental trailhead signs, the response was considered valid. Otherwise, it was deleted. To have been classified in a pure trailhead sign treatment group, the subject would have needed to obtain his permit on a control day, then start or end his hike at a trailhead where one of the two signs was in place. Only 26 respondents fell into this category.

Newspaper Feature Article

The illustrated feature article written for this experiment received wide circulation along the highly populated front range of the Colorado Rockies. Of six newspapers selected to carry the article, the editors of four cooperated fully. Geographically, the areas of circulation of the four newspapers formed a solid corridor to the east of RMNP, *in toto* providing excellent coverage of the area from which most local visitors came to the park. According to circulation statistics in the *Ayer Directory of Publications* (Anonymous 1973), the article reached at least 251,829 readers.

Any information specialist or interpreter would have been pleased not only with the wide coverage obtained through the article, but with the attractive layouts and lavish space provided by the cooperating editors. Yet in spite of all these optimal conditions, only 7 of 665 respondents in the post-visit survey indicated having seen the article.

Television

In this study, television fared even worse than newspapers as a method of reaching backpackers with the experimental interpretive messages. The videotape used on televison, like the newspaper article, was known to have been given wide exposure in Colorado. It was aired far short of prime time; still, the coverage was perhaps as good as any that most park naturalists or managers could hope to achieve on a public service basis. The tape was aired by station KREX-TV, Grand Junction, Colorado, at noon on 29 July. Geographically, this broadcast covered most of western Colorado and reached an estimated viewing audience of 5000 men and women at that time.[4] In the same time slot and on approximately the same date, the tape was broadcast by KRDO-TV, Colorado Springs, Colorado, to an estimated audience of 6000 people 18 years of age and older. Coverage from that station was provided throughout central and southeastern Colorado. The half-hour program was also aired by KOA-TV in Denver and supplied via cable to more than 57,000 subscribers statewide on an undetermined date in June or late May. On KOA-TV, it was broadcast at 1:00 p.m. on a Saturday and 11:30 p.m. the following Sunday.

Despite this seemingly broad Colorado coverage, not a single survey respondent indicated having seen the program either before or after visiting the park.

Channel Effectiveness

Reaching the target is the first step and, as shown above, some channels were very ineffective in performing this basic communication task. For channels that did reach sufficient numbers of subjects, comparative effectiveness in raising knowledge scores was then determined. This measurement was based on the increase of the treatment groups' scores on questions about the test messages transmitted through the different channels. In other words, the difference between a treatment group's mean pre-test knowledge score and its post-test score was the dependent variable and was considered "improvement." To account for pre-test sensitizing and extraneous variance such as learning from sources not related to the experiment, all improved scores should be considered in light of a control group which also showed an increase. The results of this experiment are displayed in Table 21.

Statistical testing showed that pre-test mean scores for the various treatment groups were not significantly different. Following treatment, significant differences did result in some cases. These differences, based on confidence intervals which do not overlap, may be observed in Table 21.

Communicating with backcountry users is an acute problem in national parks.

[4] All audience and geographic coverage data were supplied by the respective stations in the form of advertising promotional material.

Table 21. Mean differences between pre-test and post-test scores related to knowledge of low impact camping and influenced by exposure to different communication channels, Rocky Mountain National Park, summer 1973.

Channel (ranked by resulting score improvements)	N	Mean score difference (improvement)	SD	95 percent confidence interval
Slide exhibit and trailhead sign	14	15.71	12.39	8.56 to 22.87*
Slide exhibit and brochure	34	13.73	14.41	8.69 to 18.78*
Slide exhibit	98	13.70	13.18	11.07 to 16.34*
Brochure and trailhead sign	20	13.40	10.90	8.30 to 18.50
Brochure	132	8.85	14.26	6.39 to 11.31
Control group	178	6.54	11.99	4.76 to 8.32
Trailhead sign	26	3.54	9.88	-0.45 to 7.53

* Difference from control group is significant.

From this, it may be seen that the only treatment groups which resulted in scores improved significantly more than those of the control group were those involving the use of the slide exhibit.

The slide exhibit in combination with brochures having the same material apparently had no additional advantage. For all practical purposes, the mean score improvements for those two treatment groups were identical.

Those people who saw the slides and then passed the interpretive sign at a trailhead may have been influenced the most, even though the sign provided no information about low impact camping per se. Rather, it may have had an attitudinal influence which, in combination with the informational aspects of the slide exhibit, led to a greater acceptance of the test messages. The numbers involved (N = 14) were too small to allow conclusive statements on this point. Even though the mean score improvement was higher than that of the control group, it was not significantly higher than for those exposed only to the slide exhibit.

In this study, audio-visual communication at the point of contact proved far superior to all other methods. It was much easier to hand a brochure to a permittee than to verbally encourage him or her to take time to view a set of slides, but as shown in Table 21, visitors who received the brochure had improved knowledge scores no different from those who received no brochure and saw no slides or other pertinent material. Quite often, an agency or organization will consider its information or education program "effective" based on the amount of literature distributed. But as evidenced in this study, receiving a brochure and reading it (or being influenced by it if it is read) are certainly not synonymous.

Extraneous Influences

To determine what influence socio-economic factors or experience may have had on the change in scores, separate statistical tests were made on each of several variables. Analysis of variance was used to determine whether there was significant difference in score changes regardless of sex, age, level of education, number of visits to the park's backcountry, residency or permit class. The results supported the conclusion that the changes noted in Table 21 were indeed due to the effects of the communication channels rather than to any of the other variables considered in this study.

The only factor having significant within-treatment-group variation was the number of years of experience. Here, the mean score increase for individuals backpacking in their first year was 10.97. This was significantly higher than the mean change for individuals having 10 or more years of experience. The latter had positive score changes of only 4.38. With this exception, the effects of each channel used in the experiment were equal within their treatment groups.

Part III

ANALYSIS OF MAILED AGENCY MESSAGES

Of all communication media or techniques available to wilderness management agencies, mailed responses to pre-visit inquiries are potentially the most effective. There are four reasons why this is believed to be true.

First, the visitor has initiated the communication. This would indicate a positive mode for message reception, through self-recognition of the need for information and the attitude of credibility toward the agency shown by voluntarily asking the agency to meet the need. This, of course, does not offer a solution for communicating with all users, such as offered by the "portal assistant" approach, but it does cover a large segment of potential visitors. Schoenfeld (1971), for example, found that one-third of the campers surveyed in the Nicolet National Forest had written for information about the area, half of those to the Forest Service.

The second reason why mailed responses are potentially effective is that the message will be received prior to the actual visit. Consequently, there is more opportunity to influence some aspects of visitor behavior. For example, if certain equipment is prohibited or discouraged in the area, it allows the visitor time to make substitutions before arrival. Similarly, if there are specific procedures for obtaining permits, or other requirements that visitors must know about, pre-visit information is likely to facilitate compliance.

This is closely related to the third reason why this communication method is important—trip planning. Inadequate information for trip planning appears to be a rather serious problem. Forty percent of Schoenfeld's (1971) respondents reported that a lack of information had hindered them at least partially from "doing something" in the national forest. During 1973, 51 percent of the applicants for backcountry use permits in RMNP believed they did not have adequate information about the permit system when planning their visit. In the less regimented SBW, 20 percent of the study participants who wrote in for information believed what they received was inadequate (Table 19).

Finally, mailed responses and literature may be compared to the commercial advertising technique of direct mail. It is for good reason that this approach to influencing buyers and contributors has made direct mail campaigns the third most used method of advertising. Basically, it is the most personal, intimate form of advertising (Sandage and Fryburger 1971). Through skillful use of mailed communication, the message sender has the opportunity to truly modify the messages to "focus" on the specific receiver. Such precise modified communication can begin with addressing the receiver by name. It can then supply the exact material to meet the receiver's needs, include other information or interpretive materials that will aid in protective management of the area or its resources, and direct the inquirer to additional sources of information or assistance.

In the RMNP study described in Part II, I found evidence that national parks were not using mailed responses as effectively as they could. After compiling literature from 17 parks having mandatory permit systems, I concluded that through dissemination of inadequate information and interpretive material, the National Park Service was contributing to its own problem of having backcountry users arrive unprepared for the permit system, physical conditions of the area or the general experience that awaited them. As a result of that preliminary study in 1973, a more detailed investigation was conducted in 1975 through 1976 and is reported in the following pages.

The general objective of this research was to obtain a basis for describing how the USDA Forest Service (USFS), the National Park Service (NPS) and USDI Fish and Wildlife Service (USFWS) currently use printed material as a means of communicating with potential wilderness visitors who have requested information. More specifically, are the agencies taking full advantage of the opportunities for effective communication outlined above? Also, and perhaps most important, what is the content of these communication efforts? Does the content address the problems of wilderness protection, thereby truly serving as a management tool?

METHODOLOGY

To obtain a broad and complete sample of literature and other communication methods used by the wilderness management agencies, a mailing list was developed to include offices responsible for all national forest and national wildlife refuge lands listed in the contiguous United States by The Wilderness Society (1971) and containing at least 5000 acres. In addition, all national park units, except those in Hawaii and Alaska, listed in a U.S. Department of the Interior (1975) news release as requiring backcountry use permits were included in the sample. This resulted in a mailing list of 74 national forest supervisors' offices, 31

national park headquarters and 37 national wildlife refuge headquarters.

A letter was developed for use in acquiring the literature and other materials used as agency responses. To simulate actual communication conditions as closely as possible, no indication was given to the agencies that the request was part of a research project. Because it would be impractical to pose as a variety of users, all letters were sent as a backpacker's inquiry, since backpacking is the most common recreational use in most wilderness and primitive areas. Each letter and envelope was handwritten, dated, signed by "D.M. Chapman" with no title or other indication of gender and contained a home return address. The letter stated:

Dear Sir or Madame:

I am planning a backpacking trip in (the name of the specific area). I would appreciate any information that might be helpful.

Thank you,

D. M. Chapman

Mailings were made to one-third of the mailing list at each of three seasonal intervals in 1975 and 1976. They were stamped and mailed early Monday mornings on 21 July 1975, 17 November 1975 and 15 March 1976.

Analysis of each packet of information received as a result of the inquiry letters was aided by use of a coding form, followed by tabulations and descriptive statistical procedures.

RESULTS AND DISCUSSION

Sample

Returns from the incognito mailings were 100 percent from the USFS, 97 percent from the NPS and 86 percent from the USFWS. Returns were screened to eliminate those from areas where no backpacking or camping was allowed, and areas that were reported by the agency as not qualified for, being considered for, or presently included in the National Wilderness Preservation System. The numbers of resulting packets used for the analyses in this study were USFS 73, NPS 28, and USFWS 12.

Information on rules or ethics received in advance of a wilderness visit increases the chances that visitors will do their part in protecting a fragile resource.

Response Time

Many visitors to wildland recreation areas spend a relatively short period of time planning their trip. Stankey found that approximately 80 percent of the permit applicants in California's San Gorgonio and San Jacinto Wilderness Areas planned their trips less than one month in advance (Stankey and Baden 1977). Womble et al. (1978) reported almost one-third of the hikers interviewed on Alaska's Chilkoot Trail had made the decision to hike that trail within 1 month before the actual event. When short planning spans are involved, it becomes important for agency personnel to respond quickly to a mail request such as that used in this study. Otherwise, the information arrives too late to be used, or after plans are already solidified. Such complaints were sometimes voiced by survey participants in both the SBW and RMNP studies reported in previous sections of this report. Essentially, delays become barriers to effective communication.

To determine if this is a problem in the dissemination of wilderness-related material by mail, response time was calculated for each letter mailed. Response time was defined as the number of days (or portions of days), excluding weekends and holidays, that the letter was in the agency office before a response (information packet and/or letter) was mailed. This was determined by a date-received stamp on the inquiry letter (which was often returned in the packet) and by postmarks on some response material. If the receipt dates or postmarks were not readable, delivery times were estimated using postmark dates from nearby areas, and/or from U.S. Postal Service estimates.

The results of this study indicate that potential visitors normally receive requested information without undue delay. Response time did vary widely and ranged up to 29 days in one case, but the average was 3 days. Fifty-two percent of the time, only 1 day elapsed between receipt of the letter and mailing of a response. The USFS response time varied the most—in 15 percent of the cases they took more than 1 week to answer, but they also had the highest percentage of 1-day responses (53 percent). The NPS had the best mean response time with 2.1 days, but chi-square tests showed no statistically significant differences among the three agencies tested.

Correspondence and Gender-Related Titles

Edward N. Mayer, a past president of the Direct Mail Advertising Association, explained in part why direct mail can be so effective. He said,

> *You address your customer or prospect individually by the most important word he knows—his name. Basically, you seek to create the impression that you know who he is and what he is like. In most direct mail copy, you talk to him as you would if you were face to face.* (Sandage and Fryburger 1971, p. 503).

What, then, if instead of an individualized reply, the inquirer receives back his or her letter stuffed into the envelope along with maps and literature? Or what if a female correspondent receives a reply addressed "Mr."? The answers to these and similar cause-effect questions were not investigated in this study. However, we did document the type of transmittal letter or correspondence, and the number of times "D.M. Chapman" was addressed by the masculine title. The results are presented in Table 22.

No individualized letters were sent by NPS personnel, whereas 4 percent of the responses from the USFS and 50 percent from the USFWS were personalized. This is probably a function of volume. Repeatedly, the researchers were given the impression that the request to the USFWS was out of the ordinary. National parks, on the other hand, are notoriously besieged for information on camping and wilderness use. Sixty-eight percent of the time national park packets contained only literature, with not even a form letter addressing the inquirer. Forest

Table 22. Characteristics of transmittal correspondence used by agencies in answering requests for wilderness information.

Agency	N	Type of transmittal correspondence					
					Senders' letters returned		
		None	Form letter	Individualized letter	Without notations	With stamp or notations	Masculine title used
United States Forest Service	73	18*	40	4	26	11	18
National Park Service	28	68	14	--	18	--	11
United States Fish and Wildlife Service	12	17	17	50	--	17	50

*Figures represent percentages.

Table 23. Mean number of literature pieces mailed in 1975 and 1976 in response to a request for material to help plan a wilderness backpacking trip.

	Related to wilderness		Partially related to wilderness		Unrelated to wilderness		Total*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
United States Forest Service	2.6	1.8	1.9	1.6	1.2	1.8	5.7	3.8
National Park Service	1.1	0.9	2.3	1.3	2.0	1.9	5.5	2.7
United States Fish and Wildlife Service	0.3	0.6	2.7	1.5	1.3	3.1	4.3	4.6
SD	$P < .001$		--		$P < .01$		--	

*All figures exclude duplicates and cover letter or returned request letter.

Service personnel returned the sender's letter in 37 percent of the packets in this study. This procedure was used only 18 percent of the time by the other two agencies.

Masculine titles on envelopes were used most by the USFWS (50%), followed by the USFS (18%) and the NPS (11%). In a time of increasing sensitivity to sexism, it would seem prudent to respond in some neutral manner to individuals not indicating their gender—e.g., address the letter to "Mr. or Ms. D.M. Chapman" (or simply "D.M. Chapman") and the envelope with no title.

Content Related to Request

Of primary concern in this study was the kind of wilderness-related information being disseminated to wilderness users. This, it is believed, provides data on the emphasis, and perhaps inadequacies, of current educational efforts being used as management tools. In this study, content and format were analyzed several ways. One consideration was the amount of literature received and the degree to which it was related to the request for help in planning a wilderness backpack trip.

Printed material is expensive and has increased in cost and volume to the point where some agencies now find it necessary to charge a fee even for general maps. This alone would suggest the need to economize in literature distribution. It might also be argued that if attempts are made to restrict or tailor communication to a specific receiver's needs, the message transmissions would not be cluttered with subjects immaterial to the communication objective. If the objective is to answer a potential visitor's question about backpacking in the wilderness, it probably does not make sense to also inform him or her of the availability of a hydroelectric dam tour near the area asked about. It can be said, of course, that such information could enhance the overall visit, or help meet certain management objectives. Again using an example, the backpacker is not likely to ask for information on the agency's fire management program, but gaining public support for the program may be an important objective on a particular forest. In this case, literature on fire management would seem appropriate. The point is, these are managerial decisions that should be weighed in light of communication objectives. It is suspected (based on limited experience with the agencies in this study) that actual decisions about what information should be mailed are left to individual employees, usually those in low level positions, including volunteers. Pre-determined guidelines on distribution would seem prudent, and would probably go far toward improving communication as a wilderness management tool.

Table 23 presents the quantity and types of material received in response to the request for "information that might be helpful" in "planning a backpacking trip." Total pieces per packet ranged from 1 (9.7% of all packets) to 10 or more (14.3%), with one national wildlife refuge sending 18 pieces, 11 of which were totally unrelated to wilderness or its use. Still, the USFWS was the most conservative, with 83 percent of their packets containing four or fewer pieces—this compared with 44 percent for the USFS and 36 percent for the NPS. Many times the packets contained duplicates, with five copies of the same piece in one Forest Service packet.

In categorizing the kinds of literature received, consistency was maintained by using only two coders. The following are examples of material placed in each category:

Wilderness-Related Literature

Wilderness maps

Rules, news releases, and description sheets unquestionably and totally related to a wilderness or primitive area or similar candidate area used in the sample

Leaflets and booklets such as

"Backpacking in the National Forest Wilderness"

"Leading a Backcountry Outing"

"Search for Solitude"

Partially Related Literature

National forest or park maps with wilderness or primitive areas included
District maps
General rules and area descriptions that included wilderness or primitive areas but were not totally related
Master plans
Fire prevention with backcountry-type camping included
Topo map order forms
Hunting/fishing regulations
Plant or animal check lists

Unrelated to Wilderness

State highway maps
Nature trail guide booklets
Vehicle campground regulations and/or other information
Local attractions (dams, museums, etc.)
Concessionaire facilities
Schedule of interpretive programs
Fire prevention of a very general nature

According to the data in Table 23, the quantity of wilderness-related literature fared rather poorly in comparison with other material sent. Because of traditional agency roles and emphasis, it is understandable that the USFWS disseminated significantly less wilderness information than the others. However, for the world leader in land preservation and interpretation, the NPS could be expected to place more emphasis on its backcountry education efforts. Twenty-five percent of the packets received from national parks had no literature specifically related to their wildernesses or backcountry. Fifty percent contained only one such piece. Strikingly, the packet from Glacier National Park, an area with important wilderness resources and a variety of impact problems, contained no material specific to its backcountry. This park is known to have such material, but at least in this test it was not made available to a potential backpacker for use in trip planning and mental orientation to the experience.

Examples of commendable attempts at wilderness education included a vest pocket folder from Bridger-Teton National Forest simply titled "Wilderness Rules," which capsulized not only the rules, but the concept behind the rules as well. Yellowstone National Park's three-sheet mimeographed "Yellowstone's Backcountry" would provide a potential visitor with just about every rule or caution needed for a safe and impact-free visit.

Communicating Rules

Closely related to a study of quantity and pertinence of literature is the question, "Does the material give information needed by a visitor to abide by various rules related to reducing impacts on wilderness?" For each packet received, the questions listed in Table 24 were answered either "yes," "no," or "not clear" on a coding form. The same questions were later mailed in a brief questionnaire to the agency that sent the packet so that items not applicable could be determined.

Table 24. Common trip-planning information not provided in mailed agency literature, 1975-76.

Question or information needed	United States Forest Service			National Park Service			United States Fish and Wildlife Service		
	N	Not provided	Not clear	N	Not provided	Not clear	N	Not provided	Not clear
Are there restrictions on camp-site locations (designated sites, distance from water, etc.)?	44	50*	2	26	4*	4	8	38*	--
Is there a limit on length of stay?	37	68	8	25	36	4	8	38	--
Is there a limit on size of parties?	41	44	7	24	50	--	2	--	--
Are there a limited number of camping sites?	10	59	1	21	33	--	3	67	--
Is a system in effect that rations use?	6	0	17	18	56	--	3	67	--
If rationed, are there provisions for advance reservations?	6	17	--	13	7	8	3	33	--
Are fire permits required?	13	23	8	4	100	--	1	--	--

* Figures in these columns represent percentages, which are based on N, the number of areas where the restriction or requirement was reported by the agency to be applicable.

Table 25. Wilderness-related literature mailed by agencies in response to a backpack trip planning request, 1975-1976.

Literature category or title	Usage in 113 packets sent by agencies responding*							
	United States Forest Service		National Park Service		United States Fish and Wildlife Service		All agencies	
	N	%	N	%	N	%	N	%
Wilderness map	40	55	4	14	2	17	46	41
Mixed (misc.) wilderness information	13	18	9	32	--	--	22	19
Rule sheet or booklet	8	11	7	25	2	17	17	15
General description of area	12	16	--	--			12	11
Permit instructions or application forms	7	9	4	14	--	--	11	10
Place or trail description	6	8	2	7	--	--	8	7
Safety tips	4	5	2	7	--	--	6	5
Activity (hiking, etc.) tips	1	1	3	11	--	--	4	3
Press release	1	1	--	--	--	--	1	1
"Backpacking in the National Forest Wilderness" (booklet)	14	19	--	--	--	--	14	12
"Wilderness Sanitation" (card)	14	19	--	--	--	--	14	12
"Obtaining Your Wilderness Permit" (leaflet)	12	16	--	--	--	--	12	11
"Woodsey Owl on Backpacking" (leaflet)	7	10	--	--	--	--	7	6
"Leading a Backcountry Outing" (leaflet)	6	8	--	--	--	--	6	5
"Your Wilderness Trip" (booklet)	6	8	--	--	--	--	6	5
"The Wilderness Traveler" (leaflet)	5	7	--	--	--	--	5	4
"An Outdoor Code" (card)	3	4	--	--	--	--	3	3
"National Forest Wilderness Primitive Areas" (leaflet)	2	3	--	--	--	--	2	2
"Search for Solitude" (booklet)	2	3	--	--	--	--	2	2
"Off on the Right Foot" (leaflet)	1	1	--	--	--	--	1	1
"Stalking the Wilderness Experience" (leaflet)	1	1	--	--	--	--	1	1
"To the Wilderness Traveler" (leaflet)	1	1	--	--	--	--	1	1
"Wilderness Beginnings" (card)	1	1	--	--	--	--	1	1
"Wilderness Digest" (booklet)	1	1	--	--	--	--	1	1

* Excludes duplicates and more than one of a kind in specific categories.

The findings in Table 24 are similar to those in an earlier study of 17 national park responses to the same mailed request (Fazio 1974). From the evidence it may be concluded that managing agencies need to examine their printed material and make efforts to mail literature that answers the listed questions or ones similar to them. For any given wilderness-type unit, it would be a simple matter to establish a checklist of messages important to protective management of the area, then assure that these specific messages are included in all responses to requests for wilderness information.

Content Analysis

Table 25 lists all wilderness-related literature received in this study, some of it by specific titles, and some general categories. For each title or category, the volume of use by each agency is shown. To simplify the table, usage disregards the number of pieces enclosed in a specific packet. Therefore, the percentages shown are actually for packets containing one or more pieces of the literature listed. In some cases, several in the same category were enclosed. For example, three different wilderness maps may have been enclosed, but N would reflect only one.

Narrative information printed on wilderness maps was the literature mailed most frequently by the Forest Service. Fifty-five percent of the agency's packets containing wilderness-related information contained such a map. Of 15 wilderness-related publications of a general nature, used region- or service-wide, "Backpacking in the National Forest Wilderness" (31 pages) and the vestpocket card "Wilderness Sanitation" were mailed most, but were still included in only 19 percent of the packets.

No widely available titled publications were sent by either the NPS or the USFWS. The NPS used mimeographed or printed sheets of miscellaneous wilderness information, including these in 32 percent of all packets containing wilderness-related information. Only four pieces of literature from the USFWS were specifically related to wilderness—two maps and two rule sheets or booklets.

The diversity of materials and low percentage of use for each indicates there is no general plan for disseminating wilderness information to potential visitors. If there were such a plan within an agency, one would expect such a basic and inexpensive piece of information as the card "Wilderness Sanitation" to be contained in more than 12 percent of the packets received. Also, based on titles, there seems to be little sharing of information between agencies.

Although the material listed in Table 25 was obtained solely through mail inquiry, it was a nationwide sample of all agencies currently responsible for wilderness management. Consequently, it can reasonably be assumed that the data represents the decided majority of wilderness-related literature being disseminated to the general public in the years 1975 to 1976. It was, therefore, considered a good sample to use for analysis of topic content in an effort to determine where agency emphasis is currently placed. This, in turn, presented us with a clearer picture of how visitor education is being used as a management tool, and where gaps may exist in the overall educational effort.

The literature in Table 25 was subjected to content analysis, a research technique "for the objective, systematic and quantitative description of the manifest content of communication" (Berelson 1952, p. 18). Unlike other methods of judging content, this method guards against distortion by selective perception.

> *Once the analyst has established his sample and procedures, he must include all relevant material. He exercises selectivity only in choosing his sample and establishing his category system. The traditional critic, on the other hand, is free to emphasize or omit material as best suits his prejudices or monetary assumptions.* (Bowers 1970, p. 292).

Establishing a category system is one of the greatest problems in content analysis. For this study, no precedent was known, so the first step was to devise a reliable system that anyone reasonably familiar with wilderness management could then use without personal instruction. The resulting system included 7 general categories with some subcategories, or a total of 13 units into which any paragraph in the same information category could be placed. The system resulting from this study is presented in Appendix C, along with the few procedural directions believed necessary. In a test of reliability, with no instructions other than the printed category criteria, there was approximately 75 percent agreement among analysts. This was considered satisfactory given the exploratory nature of this work. It is believed that improvement is easily possible through the use of oral instructions and/or refinement of some categories, particularly "wilderness concept" and "historical information."

For each piece of literature, the percentage of wilderness information in the total content was derived, based on the percentage of paragraphs in each category. In turn, summaries by agency were prepared for comparison of message emphasis both within and between the primary agencies responsible for wilderness management. Results of the analysis, as applied to 131 pieces of wilderness-related literature, are shown in Table 26.

The data in Table 26 are presented in two ways. Because of the large number of publications with no paragraphs in a given category, content means based on **all** publications became rather meaningless. Therefore, the number of publications **not** addressing a particular information category were summed and expressed as a percent of all publications. Then a mean number of paragraphs for each information category was calculated based on only those publications actually containing one or more paragraphs in the given category.

For all publications combined, historical information about an area received the least attention. In 84 percent of the publications, no message was presented on this topic. At the other extreme, "how-to" information relative to

The concept of wilderness was not discussed in most literature sent to the potential visitor.

Table 26. Content of 131 pieces of wilderness-related literature based on the number of paragraphs in topic categories.

Category	United States Forest Service			National Park Service			United States Fish and Wildlife Service			Total		
	Zero paragraphs* (%)	Mean paragraphs** (%)	SD	Zero paragraphs (%)	Mean paragraphs (%)	SD	Zero paragraphs (%)	Mean paragraphs (%)	SD	Zero paragraphs (%)	Mean paragraphs (%)	SD
Equipment/safety/comfort	29	25	23	20	31	25	0	60	50	27	28	25
Biophysical	30	37	26	57	26	17	50	33	--	37	35	24
Unclassifiable	39	11	7	40	13	11	50	8	--	40	11	8
Wilderness management-rules	46	20	22	23	34	18	50	17	--	40	24	22
Wilderness ethics	36	19	17	53	11	8	100	--	--	41	17	16
Wilderness management-permits	60	24	29	23	22	23	50	17	--	51	24	26
Other sources	54	8	7	53	9	7	100	--	--	55	8	7
Wilderness concept	64	10	18	97	2	--	50	5	--	71	10	17
Ethics-sanitation	69	6	8	77	6	2	100	--	--	71	6	7
Wilderness management	71	6	5	77	7	5	100	--	--	52	7	5
Fire prevention	69	6	5	97	4	--	100	--	--	76	6	5
Enticing	80	5	4	93	7	4	100	--	--	83	6	4
Historical	80	15	13	97	16	--	100	--	--	84	15	13

* Percent of publications containing no paragraphs classifiable into the given category.
** Mean percentage of paragraphs in publications received, **excluding** publications with no paragraphs classifiable into the given category.

using the wilderness was given the most coverage. Seventy-three percent of the publications devoted some space to equipment and/or personal safety or comfort. In publications containing such material, 28 percent of the paragraphs was the mean allocation of space to topics on this category.

Perhaps the most striking fact shown in Table 26 is the relatively low emphasis given to the very topics that could help managers reduce deterioration of wilderness quality. The subject of general wilderness ethics (or manners), for example, is mentioned in only 59 percent of the wilderness-related publications. The specific topic "sanitation" (human waste disposal) rated space in only 29 percent of the literature. "Ethics" did slightly better in USFS publications than in those of the NPS; the topic of ethics was not mentioned enough by the USFWS to even register in the survey. A few of the Forest Service publications, however, contained what was considered "incorrect" information, or information contrary to the precepts of low impact wilderness use. For example, some illustrations showed rock circles being used for campfires, and one publication recommended burying human excrement "at least a foot deep." Another example related to the topic of low impact camping recommended the use of bright colors in clothing, packs and tents—"to better attract attention in an emergency" and because "they also add contrast and color to your photographs." The magnitude of this problem of misinformation, however, was not considered large.

Discussion of the wilderness concept—the heart of all other considerations—was found in only 29 percent of the material, with a mean of less than 10 percent of the paragraphs in those publications that did touch on it. This topic fared worse with the NPS than with the other two agencies.

The "why" behind wilderness management came out rather poorly, too—not very far above messages classified as "enticing" potential visitors into wilderness, considered by some to be the antithesis of wilderness management. However, when the subcategories of general wilderness management, namely "rules" and "permits," are combined, the management topic moves to the second most frequently mentioned.

Based on these data, and in view of relatively low knowledge reported in Part I for SBW visitors, I suggest that more emphasis is needed on the topics of wilderness ethics, wilderness management and suggestions for other sources of information. The concept of wilderness, too, should receive more attention. Possibly overemphasized by all agencies are the "how-to" specifics of backpacking, personal safety and personal comfort. While these topics should by no means be neglected, they are comparatively well covered by the private trade, outdoor programs and other non-agency interests. Providing visitors with a greater sensitivity to wilderness as a unique social and biological environment falls to the government that created the wilderness system. It is advised that agency personnel use content analysis to review the literature they disseminate and then adjust the content to meet established objectives and to help communicate the kind of messages that will aid in more effectively managing the wilderness resource.

Readability and Human Interest

Whatever the content, if the printed message is to be transmitted successfully to the cognitive realm of the receiver, it must be read. The receipt of a brochure or other publication is not enough.

One way to aid communication via the channel of print is to be certain the publication (or sign, for that

matter) draws the intended reader into the copy and holds his or her attention until the message is absorbed. Graphic quality contributes to the former and is discussed in the next section. Holding attention requires readable and interesting copy.

In this study, readability and human interest were determined using the Flesch formulas. Of the various fog indices and other methods used to quantify these rather subjective qualities, Flesch's (1949) procedure is probably the most commonly used. Williams (1970) referred to the formulas as no more than rules-of-thumb, and it seems a fair assessment. They are, however, useful as guidelines when applied to material for lay audiences. The formulas may be stated as:

Reading ease = 206.835 - 0.846s - 1.015w
where s = average number of syllables per 100 words and
w = average number of words per sentence.

Human interest = 3.635w + 0.314s
where w = average number of "personal words" per 100 words (nouns of gender, personal pronouns, etc.) and
s = average number of "personal sentences" per 100 sentences (direct quotations, exclamations, questions, etc.).

For this study, three sample blocks of 100 words were selected randomly from each publication. The final score for that publication was then based on an average of the samples. For more detailed procedures, see Flesch (1949) or step-by-step directions in an extension publication by Cowing (1961).

In 1971, Hunt and Brown used these methods in examining 18 publications intended for the public and produced by the USFS, NPS and Bureau of Land Management. Based on the formulas given, they reported most of the literature to be both difficult to read and dull. In our study, the results reflected little improvement in agency efforts over the years. Of the 131 wilderness-related publications, 16 were eliminated because the text did not lend itself to use of the formulas (i.e., it was too brief or contained mostly numbered lists, etc.). For the others, the results are shown in Table 27.

Statistically, there were no significant differences among the agencies; on the average, publications from all of them were difficult to read and possessed very little human interest as rated by the Flesch formulas. The methods used, like content analysis, are not definitive. This is especially true for the so-called human interest scores, which are much more applicable to certain kinds of popular magazines than they might be to the analysis of messages from wilderness management agencies. Still, both scores are, as Williams (1970) suggested, rules-of-thumb. As such, agency personnel would do well to apply the tests to all literature as it is developed for the visiting public.

Graphic Quality

Most of Part III has been devoted to message analysis, but in this final section the channels through which the messages passed were evaluated on the basis of their visual qualities. Printed media (in this case, publications) must draw the potential reader into the copy if communication is to have a chance of being successful. Only in this way can contact be transformed into cognizance. For this reason, an attempt was made to determine the attractiveness of the 131 wilderness-related pieces of literature received in this study.

Assessing graphic quality is highly subjective. Therefore, a simple 3-category evaluation scheme was used and is shown in Appendix D. Even so, evaluator opinions on the first and last items (paper/print quality and design) varied. The results, shown in Table 28, must be considered only an approximate indication of overall graphic quality. Literature from the USFWS was included only in the total

Table 27. Readability and human interest scores* in wilderness-related publications as determined by Flesch's formulas.

Test	United States Forest Service (N = 87)		National Park Service (N = 26)		United States Fish and Wildlife Service (N = 2)		Total (N = 115)	
	Score	SD	Score	SD	Score	SD	Score	SD
Readability	2.99	.88	2.69	.68	2.00	1.41	2.90	.86
Human interest	1.79	.85	1.38	.90	1.00	--	1.69	.87

* Scoring:

Readability:		Human interest:	
	5 = Fairly easy		5 = Dramatic
	4 = Standard		4 = Very interesting
	3 = Fairly difficult		3 = Interesting
	2 = Difficult		2 = Mildly interesting
	1 = Very difficult		1 = Dull

Table 28. Mean scores (0-4) for graphic quality of wilderness-related publications.

	United States Forest Service (N = 99)		National Park Service (N = 30)		Total (N = 131)	
	Score	SD	Score	SD	Score	SD
Paper/print quality	1.7	1.5	0.4	0.8	1.4	1.5
Use of color	1.8	1.5	1.3	1.1	1.7	1.4
Illustrated	2.1	1.6	0.6	0.9	1.8	1.6
Design	1.7	1.6	0.1	0.5	1.3	1.6
Total (0-16)	7.3	5.6	2.4	2.4	6.2	5.4

because the small quantity, combined with this subjective evaluation, made comparison meaningless.

The range in graphic quality was quite wide, with mean scores generally depressed by the large amount of mimeographed or similarly processed material used to disseminate wilderness information. The NPS relied more heavily on this method of production than the USFS. For all agencies combined, more than half the publications categorized as "rules," "general descriptions," "permit instructions," "activity tips," and "mixed wilderness information" were given total ratings of 2 or less on the scale of 0 to 16. Wilderness maps (supplied mostly by the USFS), on the other hand, were scored 14 or higher 51 percent of the time. These were generally the most lavish of all publications, using good quality paper, photographs, and full color printing. Although they were mailed to us at no cost, policy now makes it necessary for Forest Service units to sell these maps in most cases. This is probably a case of quality being carried to the extreme, the cost now becoming to some degree a barrier to communication. Some users—particularly those who are young and in low-income categories—will undoubtedly not purchase the maps. These are the very groups who have shown low wilderness knowledge scores and especially need to be reached by educational material. Another barrier created by sales is time. If a visitor writes for information he receives a note stating that he/she must remit 50 cents before it can be sent, there may be little or no time left to write again to the agency. These factors should be considered in future evaluative studies.

Illustrations were rated strictly on whether or not there were any, and if so, whether they were line drawings or photographs. It is recognized, of course, that photos are not always the most effective way to help communicate messages. In most cases, however, they can depict reality to a greater degree. From a budgetary standpoint, they may also provide an indication of agency commitment and a basis for comparing wilderness communication with other topics of interest to managers. An important factor observed in both line drawings and photographs was that some were inappropriate to a wilderness education program. These included scenes such as a large campfire with rock rings, tent ropes tied to trees, and poles cut from saplings for various camp uses. Although not widespread, illustrations of this nature need to be purged from wilderness literature.

Design quality had the lowest ratings of any characteristic. This may be partly an artifact of the rating scale, as it is difficult to establish simple guidelines that can consistently separate publications into "good" and "bad" design categories. However, care in the layout of copy can be used to improve even the simplest of mimeographed pages. Improved design can contribute to appearance and readability with the least monetary investment of any of the criteria used for determining graphic quality.

The effects of graphics on readership were not studied in this project, but would indeed be an interesting area for future research. This is especially true given the low numbers of respondents who recalled maps as a channel of information in the SBW (Table 9), despite the fact that 58 percent of the users had Forest Service maps, the most elaborate of the publications reviewed in this part of the study.

Part IV

RECOMMENDATIONS

The process of communication is extremely complex. Dissection of its parts can never be considered definitive, but can contribute to understanding the whole and improving its function. Communication, the key to education, needs considerable improvement if it is to achieve its potential in wilderness management. The findings presented in this report can contribute to this goal. Although some of the results are tenuous or need cautious interpretation because of the exploratory nature of this work, enough has been documented to aid in deliberate planning to improve communication with wilderness users.

The primary value of this study will be to individual wilderness managers, to help improve the use of communication as a management technique at the local level. Similarly, information and education specialists at regional or national levels should be able to glean information applicable to their work. The following list of recommendations is far from complete, for it would be impossible to suggest application of the findings to every situation where they might be used. Generalizations from the data should be made with the appropriate caution necessitated by the study design and other limitations.

1. Knowledge levels relevant to the low impact use of wilderness are sufficiently deficient to warrant major efforts by agencies to improve user education through deliberate, carefully planned approaches. Additionally, agency personnel must initiate the communication and not rely on users to make the first contacts. Especially in the Northwest and northern Rocky Mountains, priority should be given to more effectively communicating with (in order of urgency)
   a. airplane passengers and pilots
   b. hunters
   c. non-hunter horse campers (particularly on the topics of wilderness ethics, concept, and management)
   d. backpackers (particularly on the topic of wilderness management)

   Day users, where significant, should also be given priority consideration (see Table 3).

2. Table 2 in this report should be disseminated to managers for use as a guide in establishing priorities in educational efforts. Visitor characteristics were essentially the same as those found in many wilderness areas, so applicability is probably quite wide.

3. Emphasis in educational efforts needs to be placed less on "how to" recreate safely and comfortably, and more on
   a. what wilderness management consists of and why it is necessary
   b. biophysical characteristics of the area's resources
   c. wilderness ethics
   d. the concept of wilderness

4. A term such as "low impact camping" should be given more emphasis to increase its recognition factor. Use of alternative terms portraying the same concept (such as "no trace" camping) may tend to confuse or dilute the campaign. Whatever is used, a common term should be agreed upon and used by all units of the agency.

5. Annual in-service training in the above topics should be given to employees at all levels.

6. Specific efforts should be made to communicate with teachers and professors, particularly those within a partial day's drive of wilderness areas. Again, the topics listed above should be emphasized.

7. Agencies should assist, when possible, in the promotion of the books cited in this study as correlating strongly with high knowledge scores (Table 13). This would be most feasible in the sale areas of national parks, but could be achieved by any agency through the use of suggested reading lists made available to wilderness visitors.

8. Copies of the Wilderness Act should be made available as handout literature. A special interpreted edition for young people would be appropriate.

9. Agency personnel should regularly write appropriate articles (or contract authorship) on wilderness for magazines read by potential visitors.

Top priority should be given to magazines for private pilots, scout publications and outdoor magazines aimed at consumptive users—e.g., *Field and Stream* and *Outdoor Life.* Care should be taken to avoid articles with "enticement" content. Topics in item 3 would be especially helpful.

10. Simple interpretive or informational signs that harmonize with the surroundings should be developed on an experimental basis for use at trailheads or parking areas. These should focus on a few points that are particular management problems in that area. This recommendation is particularly important where the use of portal assistants is not feasible.

11. The portal assistant program should be more fully and carefully developed. This method is effective enough that it should be funded rather than being dependent on volunteers, and should be carefully monitored to screen out ineffective personnel. It is extremely important that it be conducted at landing strips as well as trailheads, and it should be extended into periods of hunting use.

12. Exhibits housing short sound/slide, videotape or motion picture presentations should be utilized at on-site points of visitor contact such as ranger stations, permit distribution offices and visitor centers. Messages should be based on the management problems of the specific area.

13. Mailed responses to inquiries from potential visitors should be viewed as an important management tool. As such, careful consideration should be given to what will be sent. Based on the area's management problems, specific guidelines should be developed and given to aides or other personnel responsible for the actual mailing.

    Guidelines should include

    a. a time frame for responding (the ideal, 1 day, seems achievable and is recommended)

    b. response to requests received without gender-related titles in the same manner as received i.e., without reference to Mr. Mrs., etc.

    c. lists of literature that should be included in all mailings, and lists that should be sent in response to specific kinds of requests.

14. Agency units should develop trip-planning information that is needed by visitors to a specific area and assure that this information is included with all literature disseminated by mail or other means. Where applicable, this should include

    a. restrictions on locating wilderness campsites

    b. party size limits (also, dog rules, fires, etc.)

    c. complete information about any permit system in effect, including limitations on numbers due to rationing, and provisions for advance reservations, if any

    d. any other information pertinent to compliance with rules that require advance planning (as opposed to rules that can be adhered to with no advance planning—i.e., not feeding bears).

15. Agencies should subject their literature to content analysis to assure that communication emphasis conforms to management problems and needs. Much currently used literature should be revised or expanded, since it appears weak in the topics of ethics and the wilderness concept—both central to visitor behavior that will affect the quality of wilderness resources and visitor experiences. It should also be reviewed to remove photos or drawings depicting practices that should be discouraged—e.g., building rock fire rings, cutting saplings for tent poles, cooking fires and the like.

16. Readability formulas should be applied to literature being developed for public use to assure reading ease and a reasonable degree of human interest.

17. Graphic quality should be a consideration in all literature used to communicate wilderness information. The actual effects of various characteristics such as the use of color, illustrations and layout need additional research specific to their use in wilderness education. However, such considerations as brevity, visual flow, spacing for clarity and simple illustrations would add little or no cost and would undoubtedly aid readability, even of mimeographed material.

18. Replication of the research in other regions of the country would be valuable for verifying, modifying or expanding the findings and recommendations of this study. User groups not included or having inadequate numbers should also be investigated in the future. These include river users, winter recreationists, and perhaps the most important users to reach through communication, organized group leaders.

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APPENDIX A

QUESTIONNAIRE USED IN 1976 STUDY OF SELWAY-BITTERROOT WILDERNESS USERS

Dear Wilderness Visitor:

The following information will be a great help to us in learning more about recreationists and communication in the Selway-Bitterroot country. Your answers will be held in strictest confidence.

If you would like the results of this study mailed to you, you may give your name and address to the researcher when you have finished.

Thank you for your cooperation and help.

Dr. James R. Fazio
Wilderness Research Center
University of Idaho

FIRST, PLEASE READ THE DIRECTIONS:

Column A

Check the **one** answer that is correct or expresses your opinion.

PLEASE DO NOT GUESS

Column B

Please write in from **whom** you FIRST learned the information in Column A.

The list below may help you remember, but there are many other possible ways you may have learned about this bit of information.

* Parent or other relative
* Friends or neighbors
* Store clerk
* Books, magazines, newspapers
* Teacher (college or other)
* Scout leader or other
* Club leader
* USDA Forest Service
* National Park Service
* Idaho Fish and Game
* Some other agency

or, someone else

or, if you don't remember, please say so.

Please think carefully. If it is impossible to remember, write "Don't know." Do Not Guess.

EXAMPLE Which is the best mosquito repellent in these woods?

___ Bombardie
___ Buzzhard
X Toes up
___ Ozone-gone
___ Don't know

B. Learned from an outdoor equipment store clerk.

---

1. In a wilderness area, which of these fire sources for cooking has the least "impact"?

___ rock circle
___ iron grill put in by Forest Service
* portable gas stove
___ dry rotting stump
___ don't know

B.

---

2. "Left over" firewood should be:

* scattered
___ piled up for the next camper
___ burned up
___ doesn't matter
___ don't know

B.

---

* Denotes response considered by researchers to be correct

PLEASE CHECK ONLY ONE ANSWER – DO NOT GUESS

	Column A	Column B (Whom did you learn this from?)
3. For quickest decomposition, human waste should be buried:	___ less than 4 inches deep * 6 to 8 inches deep ___ as deep as possible ___ at any depth—the rate will be the same ___ don't know	B.
4. Who has the right-of-way on on a trail—horses or hikers?	* horses ___ hikers ___ whichever is going uphill ___ whichever is going downhill ___ don't know	B.
5. Which species of tree most needs forest fires to reproduce itself?	___ Douglas-fir * lodgepole pine ___ ponderosa pine ___ white bark pine ___ don't know	B.
6. Most forest fires in this area are caused by:	___ cigarette smokers * lightning ___ campfires ___ children ___ don't know	B.

PLEASE CHECK ONLY ONE ANSWER – DO NOT GUESS

Column A		Column B (Whom did you learn this from?)
7. Trees grow slowly near treeline because of:	___ short growing season ___ lack of moisture during growing season ___ wind * all of the above ___ don't know	B.
8. Snow usually blocks the passes on the trails in this area until:	___ mid-March ___ late April * late June ___ late August ___ don't know	B.
9. Which is prohibited on all trails in a wilderness area?	___ wheeled hand cart for hauling out game ___ portable am/fm radio * trail bike ___ all of the above ___ don't know	B.
10. Primary purpose for setting aside wilderness is to:	___ provide primitive recreation opportunities ___ provide good hunting and fishing * preserve the natural ecosystem ___ preserve timber for possible use in the future ___ don't know	B.

PLEASE CHECK ONLY ONE ANSWER – DO NOT GUESS

	Column A		Column B (Whom did you learn this from?)
11.	Man's place in a wilderness area can best be described as being:	___ as permanent as the individual is strong and wise in wilderness ways ___ a recreationist * a temporary visitor ___ don't know	B.
12.	The Selway-Bitterroot Wilderness Area is:	___ a "wild area" ___ a "primitive area" * part of the National Wilderness Preservation System ___ awaiting Congressional designation into the National Wilderness Preservation System ___ don't know	B.
13.	The Forest Service often asks you to sign a register at trailhead. This is primarily because it:	* helps monitor the amount of use in the area ___ helps in locating lost parties ___ aids law enforcement efforts ___ wants your address to mail literature ___ don't know	B.

PLEASE CHECK ONLY ONE ANSWER – DO NOT GUESS

	Column A		Column B (Whom did you learn this from?)
14.	Required wilderness use permits are a method to:	___ disperse use ___ inform visitors of rules ___ gather research data * all of the above ___ don't know	B.
15.	Forest Service philosophy toward wildfire in this wilderness is:	___ attempting to put out all fires by 10:00 a.m. the next day * to let wildfire more nearly play its natural role ___ suppressing all fires that might endanger wildlife habitat ___ same as in all national forest lands ___ don't know	B.
16.	To help manage this wilderness, the Forest Service can:	___ use gasoline chainsaws to clear trails ___ build air-strips where needed * do **both** of the above ___ do none of the above ___ don't know	B.
17.	If you were to get wet in freezing weather, which clothing would you prefer to be wearing:	___ cotton flannel * wool ___ canvas ___ nylon ___ don't know	B.

PLEASE CHECK ONLY ONE ANSWER – DO NOT GUESS

Column A		Column B (Whom did you learn this from?)
18. East on most maps would be the:	___ top ___ bottom ___ left * right ___ don't know	B.
19. Hypothermia is a danger whenever:	___ a person with the disease is at high elevations ___ the temperature is below 5° F * wetness, wind and fatigue are combined ___ the temperature is high ___ don't know	B.
20. The warmth of a down sleeping bag depends mostly on its:	___ garn ___ weight * loft ___ shape ___ don't know	B.

Column A

21. On your first visit to this area, from whom did you obtain information about what the area is like?

22. Do you have a map? ___ yes ___ no

If yes, where did you get it?

23. Have you ever read or heard about "low impact camping"? ___ yes ___ no

If yes, how did you first learn of this term?

24. Have you ever contacted the USDA Forest Service for wilderness information? ___ yes ___ no

If yes, how? ___ letter ___ phone ___ personal visit ___ other, please specify: _____

Was the information you received adequate in helping you to plan your trip to your satisfaction? ___ yes ___ no

Why not? _____

25. During your trip, were you contacted by a Forest Service backcountry ranger or portal assistant? ___ yes ___ no

26. Who sets hunting/fishing regulations in this area—Idaho Fish & Game or the Forest Service?

___ Fish & Game
___ USFS
___ don't know

---

27. All air strips in the Selway-Bitterroot Area are open to public use.

___ true
___ false
___ don't know

---

28. How did you first learn of the Moose Creek/Fish Lake landing strip?

---

29. Please think carefully, and then check the magazines you actually **use** to obtain **INFORMATION REGARDING WILDERNESS** (such as "how-to" techniques, wilderness regulations, proposed legislation, etc.).

——*American Forests*
——*American Hiker*
——*Ascent-Sierra* (yearly journal)
——*Audubon Magazine*
——*Backpacker*
——*Better Camping*
——*Bio-Science*
——*Boys Life*
——*Camping Magazine*
——*Colorado*
——*Common Cause*
——*Conservation News*
——*Conservationist*
——*Defenders of Wildlife*
——*Environment and Behavior*
——*Environmental Action*
——*Field and Stream*
——*High Country News*
——*Horizon*
——*Idaho Wildlife Review*
——*Journal of Forestry*
——*Journal of Leisure Research*
——*Journal of Soil and Water Conservation*
——*Living Wilderness*
——*Montana Outdoors*
——*Montana Wildlife*
——*Mountain*
——*Mountain Gazette*
——*National Geographic*
——*National Parks and Conservation Magazine*
——*National Wildlife*
——*Natural History*
——*Natural Resources*
——*Naturalist*
——*Nature Conservancy News*
——*Nature Magazine*
——*Not Man Apart* (Friends of the Earth)
——*Outdoor Life*
——*Pacific Search*
—— Research Publications of Forest Service
——*Sierra Club Bulletin*
——*Sports Afield*
——*Wilderness Camping*
——*Wyoming Wildlife*

Others _____

_____

30. Books on the subject (of wilderness) that you have read:

_____

_____

_____

31. What organizations are you a member of **THAT HAVE CONTRIBUTED TO YOUR KNOWLEDGE OF WILDERNESS?** (They do not necessarily have to be outdoor-oriented.)

—— American Camping Association
—— American Forestry Association
—— American Museum of Natural History
—— Boy Scouts of Ameriaca
—— Church organization
—— Environmental Action
—— Environmental Defense Fund
—— Explorers
—— Federation of Outdoor Clubs (Western)
—— Friends of the Earth
—— Girl Scouts of America
—— Idaho Conservation League
—— Mountain Travel, Inc.
—— National Audubon Society
—— National Parks and Conservation Association
—— National Wildlife Federation
—— Natural Resources Defense Council
—— (The) Nature Conservancy
—— Packers Association
—— Recreational Equipment, Inc. (REI)
—— Sierra Club
—— Society of American Foresters
—— Solo
—— Wilderness Research Foundation
—— Wilderness Society

Others _____

_____

_____

32. How many hours a day do you normally watch television?

___ not at all
___ less than 1 hour
___ 1-2 hours
___ 2-4 hours
___ 4 hours or more

33. Do you subscribe to cable tv service? ___ yes
___ no

SOCIO-ECONOMIC DATA

34. Male ___ Female ___

35. Age ___

36. Are you a student? yes ___ no ___

If **YES**, at what level are you? (11th grade, sophomore, Masters, Ph.D., etc.) _____
If **NO**, what was your highest level of education completed? _____
If **NO**, what is your occupation? Specify _____

37. Please check the income range that best indicates the total yearly income of your family household (that is, everyone related living under the same roof):

(Students: If you derive part of your support from parents, please include their income in the total).

Less than $1,000	___	$12,000 to 14,999	___
$1,000 to 2,999	___	$15,000 to 19,999	___
$3,000 to 4,999	___	$20,000 to 24,999	___
$5,000 to 6,999	___	$25,000 to 29,999	___
$7,000 to 8,999	___	$30,000 to 49,999	___
$9,000 to 11,999	___	$50,000 or more	___

38. How many nights are you camping out on this trip into the Selway-Bitterroot Wilderness Area? _____

39. Your primary objective on this trip is:

____ fishing	____ hiking	other, please specify:
____ hunting	____ camping	_____

40. Residence: City of Post Office _____ State _____

41. How old were you when you made your first overnight wilderness trip? _____ years old.

42. How many overnight trips have you made into the Selway-Bitterroot Wilderness Area?

____ first time	____ 4-6 trips	____ 16-19 trips
____ 2 trips	____ 7-9 trips	____ 20-29 trips
____ 3 trips	____ 10-15 trips	____ 30 trips or more

43. How many total years have you visited wilderness areas on overnight camping trips?

____ First	____ 4-6 years	____ 16-19 years
____ 2 years	____ 7-9 years	____ 20-29 years
____ 3 years	____ 10-15 years	____ 30 years or more

THANK YOU. HAVE A SAFE AND ENJOYABLE TRIP.

APPENDIX B

TEST QUESTIONS USED IN 1973 STUDY OF RELATIVE CHANNEL EFFECTIVENESS, ROCKY MOUNTAIN NATIONAL PARK

The following questions pertain specifically to Rocky Mountain National Park:

9. A. Which of these bedding practices do you consider most proper and helpful in preserving wilderness (backcountry) quality? (check **one**)

____ Making a bough bed
____ Using an air mattress or foam rubber pad
____ Using chalet or lean-to with cots provided

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

10. A. Which of these fire-making practices do you consider most proper and helpful in preserving wilderness (backcountry) quality? (check **one**)

____ Digging a small fire pit, then replacing the sod after use
____ Making a rock circle for cooking fires
____ Using a portable gas or kerosene stove

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

11. A. In areas where wood fires are allowed, which of these practices do you consider most proper and helpful in preserving wilderness (backcountry) quality: (check **one**)

____ Any tree limb should be cut for firewood.
____ Only dead tree limbs lying on the ground should be used for firewood.
____ Only dead tree limbs should be cut for firewood.

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

12. A. In areas where wood fires are allowed, which of these practices do you consider most proper and helpful in preserving wilderness (backcountry) quality? (check **one**)

___ Gather only enough firewood for your own use.
___ The Park Service should provide cut firewood at each campsite.
___ When you leave a campsite, always stockpile firewood for the next camper.

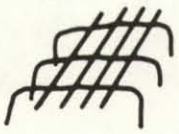
B. On this numerical scale, indicate how strongly you feel toward your selection. (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

---

13. A. In areas where wood fires are allowed, which of these fireplaces do you consider most helpful in preserving wilderness (backcountry) quality? (check **one** letter)

___a. ___ b. ___ c.



B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

---

14. A. Which of these dish-washing practices do you consider most proper and helpful in preserving wilderness (backcountry) quality? (check **one**)

___ Wash dishes away from streams or lakes.
___ Wash dishes only in lakes.
___ Wash dishes only in streams.

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

15. A. Which is the best policy regarding pets in the backcountry? (check **one**)

____ Pets should be allowed.
____ Pets should be allowed only on a leash.
____ Pets should not be allowed.

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

16. A. Which litter-disposal method do you consider most proper and helpful in preserving wilderness (backcountry) quality? (check **one**)

____ Bury all litter.
____ If fires are allowed, burn what you can and carry out all else.
____ Place litter in backcountry receptacles for the Park Service to air-lift out.

B. On this numerical scale, indicate how strongly you feel toward your selection (circle appropriate number):

Very little preference		Slightly in favor			In favor			Strongly in favor	
0	1	2	3	4	5	6	7	8	9

23. Which color do you prefer for to a backpack and/or tent? (check **one**)

____ Orange
____ Green
____ Yellow
____ Red
____ Brown
____ Doesn't matter

APPENDIX C

CATEGORY CRITERIA FOR CONTENT ANALYSIS OF WILDERNESS LITERATURE

10 Biophysical Description

Describes country in general: size, terrain, beauty, trail mileages, wildlife, plants, climate, ecology (including the role of fire, predators, etc.). Includes trail route descriptions and accessibility. (Code Historical Descriptions as 60; Cultural Information as 70.)

Ex.: "There are 3000 miles of trails in and through the wilderness of these national parks."
"Few of the trails are easy, and some are especially difficult. . . ."
"Wildflower blooms may be expected beginning in May."

20 Wilderness Concept, General

States and/or explains the Wilderness Act and/or philosophy behind it; interpretations of the act and the experiences normally associated with recreation in qualifying areas; historical background leading to act, or classification of the area as wilderness.

Ex.: "About 9 million acres is the nucleus of the National Wilderness Preservation System."
"The Wilderness Act assumes that some areas will be left that retain their primeval character."
"The Wilderness Act was passed in 1964."

30 Wilderness Management, General

Mentions various management techniques or strategies designed to help agency personnel meet requirements of the Wilderness Act and other laws or regulations related to wilderness management; also the need for management. (permit-related paragraphs are coded 32.)

Ex.: "Registration boxes at trailheads help monitor use of various trails."
"Natural fire plays an important role in maintaining natural ecological conditions in wilderness."
"Bridges allow access for rangers to control fires."

31 Specific Rules

Regulations of any kind (other than permits) related to management of the wilderness resource. (Code game regulations and other general laws as 70.)

Ex.: "Horses may not be grazed in camp areas."
"Motor vehicles are prohibited."
"Camping is not allowed at Cedar Lake."

32 Permit System

Any information relating to a permit system of any kind (mandatory, voluntary, rationed, actual or proposed, campfire permits, etc.). Includes rules, reasons for them, how to obtain, etc.

Ex.: "Visitors should stop at a ranger station to obtain a free permit."
"A permit system on neighboring park lands is in effect."
"Rationing of use helps disperse visitors."

40 Equipment/Visitor Safety/Comfort

Includes description of equipment, suggestions on safety, cooking, camping, keeping dry or warm, etc. General "how-to" that is for the visitor's safety, comfort, or enjoyment. Includes terrain descriptions that are intended as warnings. (Not specific rules, permits, ethics, fire prevention or other categories that relate more to site and/or respect for fellow visitors.)

Ex.: "Freeze-dried food is easy to carry."
"Wool is a warmer material when wet than cotton or nylon."
"The trail to Rock Lake is a steep climb, unless you begin your hike at the South Mountain trailhead."
"Drinking water is not available."

50 Wilderness Ethics, General

Suggestions that are **not** specific regulations or laws and that are intended to protect the site, wilderness integrity, or the experience of fellow visitors.

Ex.: "Hikers should yield to horses and move downhill off the trail."
"Wearing bright colors shrinks the wilderness psychologically."
"Leave only your footsteps behind."
("Littering is **prohibited**" or "all unburnable trash **must** be packed out" should be coded 31).
"Do not tie tent ropes to trees" (unless it is an enforceable rule, in which case it should be coded 36).
"If you must bathe, use only biodegradable soap."

51 Sanitation

Suggestions (as opposed to **rules,** which are coded 31) related to human body wastes.

Ex.: "Body wastes decompose best within the top 6-8 inches of soil."
"Groups should use one hole rather than each person digging his own."
("In some areas of this wilderness pit toilets are provided." This should be coded 30 because it is a management tool or provision).

60 Historical Information

Any information relating the area's human history or prehistory. (Code Historical Background on the Wilderness Act or Classification of the Area as Wilderness as 20).

Ex.: "There once was considerable homesteading along Big Creek."
"This was the realm of the Shoshones."
"Cabins you encounter are part of the gold-seeking era."

70 Other

Any content that cannot be otherwise categorized. Include dialogue that is not specific to some other category.

Ex.: "This manual for backpacking campers is designed for those who want to do it but don't quite know how. It is a general guide."
"In a short time our adventures in the wilderness will just be a memory, but we are leaving with a strong desire to return again next year."
"The USDA Forest Service is dedicated to the principle of multiple use."

71 Persuasion (Enticement)

Narrative or information obviously intended to persuade or entice the reader to try wilderness recreation, a specific kind of wilderness recreation, or to visit a specific area.

Ex.: "You can hike new trails and fish almost untouched waters."
"The Buzztooth Wilderness offers you sweeping vistas and a chance to revitalize your spirit."
(See page 4 of USFS booklet "Backpacking in the National Forest Wilderness" for other examples.)

72 Fire Prevention

Traditional messages related to preventing wildfire; techniques such as breaking matches, putting out campfires, etc. (The role of natural fire should be coded 10 or 30, depending on context.)

Ex.: "Be careful with all fires."
"Stir in soil and water when putting out your campfire."
"Wildfires kill baby deer, destroy valuable trees."

73 Sources of Information

Suggestions of whom to contact, and/or addresses or names of offices, agencies, organizations, or individuals where additional information (on any subject) may be obtained. Also lists of sales outlets, distributors' publications, films, etc.

Additional Criteria for Analysis

1. A numbered list of short items (most items having less than three complete sentences) should be considered the same as one paragraph.

2. When dealing with a series of lists, consider a different head or subhead as the start of a new "paragraph." For example, addresses of equipment outlets are listed, then under a new heading there is a list of ranger stations. These would be two paragraphs, both coded 73. Similarly, if a list of rules for horsemen is followed by a list of rules for hikers, these two lists would count as two paragraphs, both coded 31.

3. Paragraphs containing more than one distinct category should be broken down sentence by sentence. Classify into the category having the majority of sentences. If evenly split, consider it to be as many paragraphs as there are categories represented equally.

4. Sometimes the **intent** of a paragraph is subtle, and classification becomes more subjective than objective. The category of "Persuasion" (71) is sometimes difficult to ascertain, as are "The Wilderness Concept" (20) and "Ethics" (50). Examples are given below to illustrate this problem:

   Persuasion (Enticement)

   The major portion of the Bison Mountains is suitable for backpacking. This is an economical way to travel. It is strenuous, but it has many advantages. You can be independent and self-sufficient. You can go many places and camp in many spots that you could not reach even with horses. You are carefree when backpacking and return spiritually refreshed.

   Wilderness Concept

   Interest in the area increased through the years. On October 31, 1931, a portion of the area was classified by Chief Forester R.Y. Stuart as a primitive area under Regulation L-20. The classified area was named "Mission Mountains Primitive Area" and encompassed 67,000 acres along the east side of the Mission Divide. An addition of 8500 acres was approved on May 29, 1939. This added the high country from Piper Lake to just north of Fatty Lake.

   Ethics

   Burn fish entrails and garbage. Keep the lakes crystal clear.

   Another example might be the one sentence paragraph, "Poisonous snakes are found in the area." Going strictly by the rules, this would be coded 10, "Biophysical Description." However, it is fairly obvious that the **intent** of this paragraph is to warn visitors for the sake of their personal safety. It should therefore be coded 40.

APPENDIX D

GRAPHIC QUALITY SCALE USED TO EVALUATE WILDERNESS-RELATED PUBLICATIONS

Crisp, sharp printing and quality paper	Dull, uneven quality or low grade paper	Blurred, sloppy, and/or mimeograph	Score:
4	2	0	_____
More than 2 colors (including paper)	Black ink on color stock or 1 color ink on white (2-color appearance)	Black and white only	
4	2	0	_____
Photos included	Line drawings only	Not illustrated	
4	2	0	_____
Planned design, good balance and visual flow	Design neither outstanding nor visually objectionable	Obviously cluttered or sprawling and unrelated, no apparent design planning	
4	2	0	_____
		Total Score:	_____