

# Information Collection Styles of Wilderness Users: A Market Segmentation Approach

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**Abstract**—Attempts to influence the behavior of wilderness visitors through the use of information are limited by the visitors' reception of that information. This study examined the information gathering behavior of wilderness visitors and the effect of different information collection styles on visitors' knowledge of low-impact behavior and attitudes toward wilderness management. Four distinct information collection styles were identified in a cluster analysis procedure. There were small, but statistically significant differences in knowledge of low-impact behavior between individuals using different information collection styles. There were no significant differences in attitudes toward wilderness management between individuals using different styles.

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One of the primary assumptions of the wilderness experience is that it should be a relatively unregulated experience. Unfortunately, many types of behavior can damage wilderness recreation sites. Wilderness areas are difficult to patrol and many managers are averse to over-regulating the wilderness experience. Because of these factors, most attempts to influence the behavior of wilderness users involve information and education, but these attempts depend on the visitors' information collecting habits. More effective communication with visitors will be possible if managers understand where and how visitors collect information.

Previous research in this area has indicated that visitors may be more or less active in their pursuit of information (Manfredo and Bright 1991), may attend to that information in different ways (Vogt and Stewart 1998) and may adjust their search habits based on previous experience or their personal investment in the trip (Rogers and Ramthun 1998). There is a growing body of evidence that people plan recreational trips by searching for information selectively from a variety of sources using a variety of search strategies (Fodness and Murray 1999). The search strategy and information sources selected by the trip planner have the potential to affect visitor behavior and visitor attitude toward the site. Visitor education programs are designed

to provide information to visitors that may persuade them to make behavioral changes, therefore it is important to measure the extent to which visitor education information is selected and relied on by visitors.

The "Leave No Trace" program (often referred to as LNT), is a joint educational effort by the USDA Forest Service, National Park Service, the National Outdoor Leadership School and other organizations to persuade outdoor travelers to engage in low-impact camping and travel behaviors.

## Hypotheses

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This study tested two hypotheses: (1) that wilderness visitors would display varying styles of information collection, and (2) that the style of information collection used by the visitors would affect their knowledge about appropriate wilderness behavior.

## Methods

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### Survey Location

The Mt. Rogers National Recreation Area is a unit of the George Washington-Jefferson National Forest in southwestern Virginia. It is a 123,000-acre recreation site that contains three federally designated wilderness areas. The Mt. Rogers NRA is very popular with hikers and backpackers seeking scenic views from the "crest zone," which is distinctly different from most southern Appalachian mountains. The Appalachian Trail and the Virginia Highlands Horse Trail traverse the area. The Mt. Rogers wilderness areas are easily accessible, located relatively near roads and a popular state park.

### Sampling Procedure

An on-site survey measuring respondents' knowledge of low-impact behaviors, attitudes toward wilderness and reliance on different information sources was administered to 197 wilderness visitors at Mt. Rogers NRA in Virginia. The surveys were administered between September 1995 and June 1996, at four trailheads providing access to the Mt. Rogers wilderness areas. Surveys were administered at times that were randomly selected by week and month. Surveys were given only to individuals who had passed a trailhead signboard, thereby guaranteeing they had at least one opportunity to see LNT information and local wilderness regulations. Several data collection periods were cancelled and rescheduled due to severe weather.

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## Questionnaire Construction

The survey contained a nine-item “quiz” on Leave No Trace principles and local wilderness regulations. The quiz was developed in conjunction with the Mt. Rogers NRA personnel. Each item on the LNT quiz was given a score of “1” if the respondent provided a correct answer or “0” if the respondent provided an incorrect answer. The complete LNT quiz is included in table 1. In addition to the LNT quiz, there was a series of questions on visitors’ attitudes toward wilderness and motives for visiting wilderness. These attitude and motivation questions were scored on a five-point Likert scale. The questionnaire also contained a 14-item list of potential information sources of information that might be used by individuals planning trips to Mt. Rogers or other wilderness areas. Respondents were asked to rate their use of these potential information sources on a five-point Likert scale, with “5” representing sources that were used often and “1” representing sources that were never used. The information use items are included in table 2. A hierarchical cluster analysis using SPSS, Version 8 was performed to identify discrete styles of information gathering. Relationships between information gathering style and knowledge of low-impact behavior and wilderness regulations were examined.

**Table 1**—The Leave No Trace quiz.

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There are a large number of regulations that apply to people using the Mt. Rogers wilderness areas. There are also a number of actions that the Forest Service recommends in order to improve the quality of the experience for all users. We would like to find out how much you know about these regulations and recommendations. Please give your best answers to the following questions:

1. Your camp should be placed:
    - (a) at least 20 feet from the trail.
    - (b) at least 50 feet from the trail.
    - (c) at least 100 feet from the trail.
    - (d) at least 200 feet from the trail.
  2. True or False—It is better to build fires than to carry a small stove into wilderness areas.
  3. Any litter you create on your trip should be:
    - (a) buried at least 10 inches deep.
    - (b) hidden from obvious view.
    - (c) packed out in a trash bag.
    - (d) burned.
  4. True or False—There are no restrictions on the number of people in your group while in the Mt. Rogers wilderness areas.
  5. True or False—Remaining in the same campsite for more than four days may cause damage to plant life at that site.
  6. If a campfire is built, it should be:
    - (a) built with large branches cut from nearby trees.
    - (b) in a meadow.
    - (c) built in an existing fire circle.
  7. True or False—Catholes or latrines for human waste should be placed about 100 feet from trails, campsites, or water sources.
  8. True or False—Only the U.S. Congress can establish a wilderness area.
  9. True or False—Mountain bikes may not be ridden in wilderness areas.
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The questionnaire also contained a series of questions about respondents’ assessments of crowding and trail use in the area. These questions were included at the request of area managers for later use in their LAC process.

## Results

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### Sample Description

The sample represented 122 males and 75 females. The mean age of the respondents was 34.7 years, with a range from 17 to 63 years. The education level of the sample, consistent with other wilderness research, was quite high; 34% of the sample had completed a bachelor’s degree, while 23% of the sample had attended graduate school. The overall income levels of the respondents were also quite high, with 30% reporting incomes over \$60,000.

The sample represented a variety of activity groups: 46.7% of the respondents were day hiking when surveyed, 32% were backpacking, 10.2% camping and 6.6% hunting. Horseback riding, fishing, running, photography, viewing wildlife and other activities composed the activities of the remaining 5% of sample respondents. (Note: Horseback riding is underrepresented in this sample. Horseback riders consistently declined to participate in the survey, probably due to problems with controlling the animal or because they were members of large groups.)

### Cluster Analysis

Cluster analysis indicated four distinct styles of information collection. Cluster One was composed of “inactive searchers” (Manfredo 1992). Individuals in this cluster reported below-mean reliance on all of the possible information sources, with the exception of *friends or family members*. Previous research has indicated that many backcountry travelers rely on more experienced members of their party as a primary information source (Ramthun 1998). Cluster One represented 32% of the survey respondents.

Cluster Two contained 29% of the sample respondents and was characterized by reliance on a limited range of potential information sources. These respondents reported above-mean reliance on *magazines about hiking and backpacking* and *literature provided by the Forest Service*. Individuals in this cluster were characterized as “selective searchers”.

Cluster Three contained 19.5 % of the sampled respondents. Individuals in this cluster reported above-mean utilization of a wide variety of the potential information sources listed on the questionnaire. These individuals reported above-mean use on all of the written information sources with the exceptions of *Magazines about hunting and fishing* and *Magazines about horses and trailriding*. Individuals in this cluster were characterized as “readers”.

Cluster Four contained 18.9 % of the sampled respondents. Respondents in this cluster reported above-mean reliance on their membership in hiking or riding clubs, scout groups and college outing programs, as well as above-mean reliance on trail signs and bulletin boards provided at the site. This pattern of use was difficult to characterize but it seemed to represent a “personal/on-site” pattern of information collection.

**Table 2**—Information source items.

People use a variety of information sources to learn about outdoor sports and to determine how and where to travel in the outdoors. Please read the following list of information sources and mark the degree to which you have used this source to learn about your sport or about travel in and to the Mt. Rogers wilderness areas.

	Never use	Use occasionally	Use frequently
Learned from friends or family members.	1.....	2.....	3.....4.....5
Magazines about horses and trailriding.	1.....	2.....	3.....4.....5
Magazines about hunting and fishing.	1.....	2.....	3.....4.....5
Magazines about hiking and backpacking.	1.....	2.....	3.....4.....5
Magazines from special groups such as the Sierra Club	1.....	2.....	3.....4.....5
Books written specifically about hiking, horseback riding, hunting or other sports.	1.....	2.....	3.....4.....5
Articles in local newspapers.	1.....	2.....	3.....4.....5
Sports shops or specialized stores.	1.....	2.....	3.....4.....5
Literature provided by the Forest Service.	1.....	2.....	3.....4.....5
Trail signs and bulletin boards provided by the Forest Service.	1.....	2.....	3.....4.....5
Membership in clubs for hiking, horseback riding, hunting, or other sports.	1.....	2.....	3.....4.....5
Membership in organized groups such as the Scouts.	1.....	2.....	3.....4.....5
Participation in college classes or outing groups.	1.....	2.....	3.....4.....5
Other _____.	1.....	2.....	3.....4.....5

## Leave No Trace Knowledge

The respondents in this survey scored quite low in their knowledge of LNT principles and local wilderness regulations. The sample mean was 5.79 on the nine-point LNT quiz (modal score was 6). These findings are consistent with other on-site surveys, which found visitors had an intermediate level of knowledge of LNT practices (Confer and others 1998). Of the 182 surveys from which usable data could be obtained, only two respondents had perfect scores.

## Analysis of Variance

Analysis of variance indicated that there was a statistically significant difference in knowledge of low-impact behavior between visitors who utilize different information collecting styles (table 3). The “readers” cluster mean score was 6.26 on the nine-point LNT quiz. The “inactive searchers” cluster mean score was 5.26 on the LNT quiz. This was the only statistically significant difference between clusters ( $p = 0.0019$ ).

**Table 3**—Leave No Trace mean scores by cluster.

Cluster	LNT mean
Cluster 1—“inactive searchers”	5.26*
Cluster 2—“selective”	5.96
Cluster 3—“readers”	6.26*
Cluster 4—“personal/on-site”	5.93

\*Denotes groups significantly different at the 0.05 level.

Two additional analysis of variance procedures were done to examine the relationship between information collection styles and attitudes toward the wilderness resource and its management. The items in this portion of the questionnaire asked respondents to rate the value of wilderness to their activity, their level of support for more areas to be managed like the Mt. Rogers NRA and their potential willingness to support a permit system if that became necessary to control crowding and overuse. There were no statistically significant relationships between information collection styles and any of these attitudinal measures. The information collection style of visitors does not have any impact on their attitudes about the value of wilderness or attitudes about the implementation of permit systems.

## Conclusions

The results of the study support Hypothesis 1: There are distinct and measurable differences in the patterns of sources that outdoor recreationists use to gather information. The results also support Hypothesis 2: Information collecting style does have an effect on knowledge of low-impact behavior. The additional assumption that information collection style may influence attitudes toward the resource or its management was not supported by the evidence. Most of the respondents placed consistently high value on the Mt. Rogers wilderness areas and were supportive of most management policies. This comparative lack of variance in response was probably responsible for the finding of no statistically significant relationships between information collection style and attitudes.

## Implications

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The visitors to the Mt. Rogers wilderness areas who were sampled in this study had a relatively low knowledge of LNT practices and wilderness area regulations. The sample mean of 5.79 on a nine-point quiz is the equivalent of a "D" on the test. All the information tested by the quiz was located on trailhead signboards that the respondents passed at least once and, in many cases twice or more, indicating that many wilderness area trail users pay little attention to signs. Visitors who rely primarily on written sources of information have a better understanding of low-impact behaviors recommended by the managing agency, but these "readers" only made up 20% of the sample. Many visitors rely heavily on less formal sources on information, such as sport shops, activity clubs or experience with organizations such as the Scouts. By dispersing wilderness information through a wider variety of media, including clubs and organizations, managing agencies can make information available to a wider range of visitors.

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