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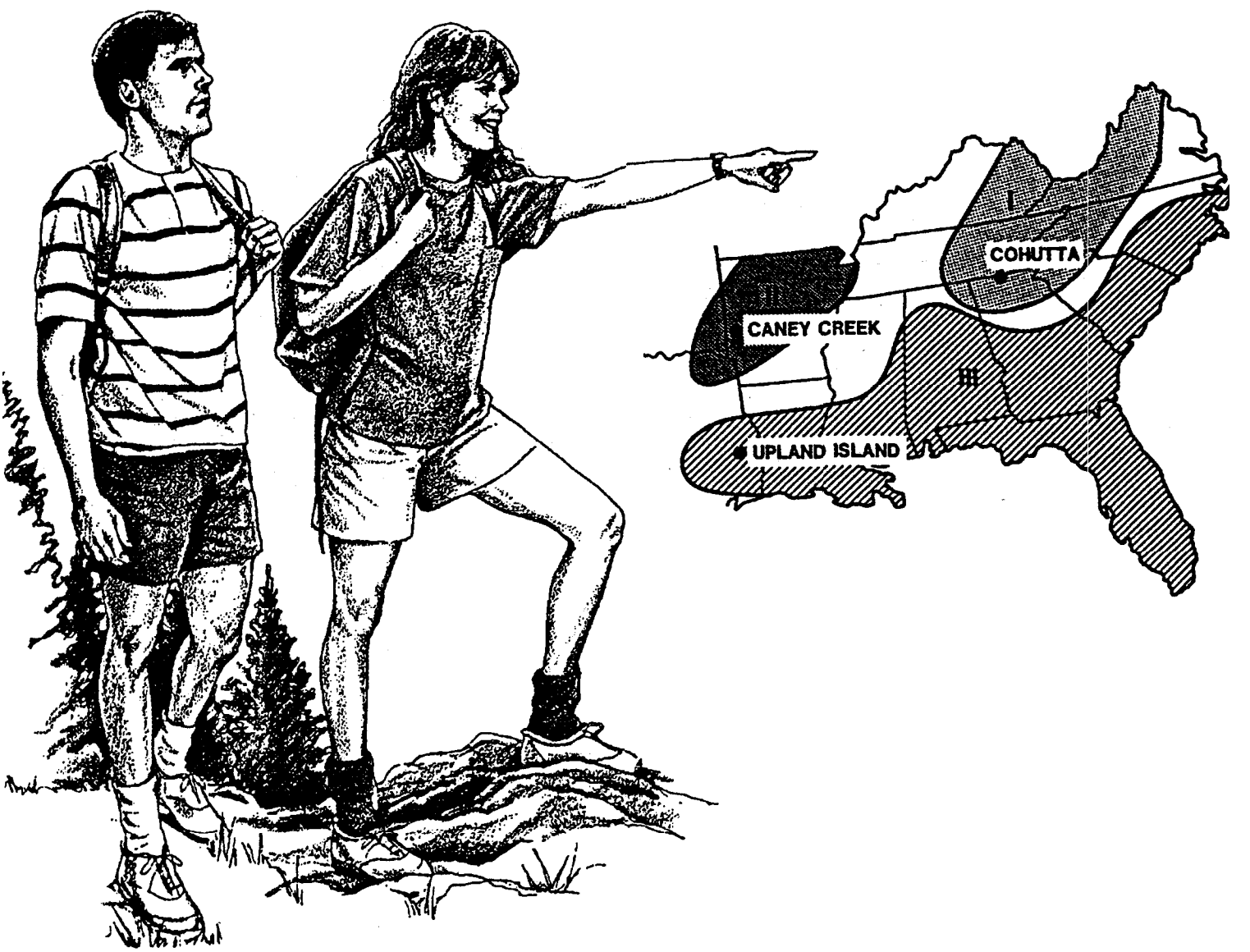
Visitor Characteristics and Preferences for Three National Forest Wildernesses in the South

Alan E. Watson
Daniel R. Williams
Joseph W. Roggenbuck
John J. Daigle



THE AUTHORS

ALAN E. WATSON is research social scientist with the Intermountain Research Station's Wilderness Management research work unit at the Forestry Sciences Laboratory on the University of Montana campus, Missoula. Dr. Watson attended the School of Forestry and Wildlife Resources, Virginia Polytechnic institute and State University, Blacksburg, receiving a bachelor's, a master's, and in 1983, a Ph.D. degree. His research interests are primarily in wilderness experience quality, including the influences of conflict, solitude, and visitor impacts.

DANIEL R. WILLIAMS is assistant professor of forest recreation, Department of Forestry, Virginia Polytechnic institute and State University, Blacksburg. Dr. Williams received his B.S. degree from the University of Nevada, Reno; his M.S. degree from Utah State University, Logan; and his Ph.D. degree in forest recreation from the University of Minnesota, St. Paul, in 1984.. He has written extensively on outdoor recreation behavior, particularly the role of past experience on recreation motivation and choice.

JOSEPH W. ROGGENBUCK is associate professor of forest recreation, Department of Forestry, Virginia Polytechnic institute and State University, Blacksburg. Dr. Roggenbuck received his B.S. and his M.S. degrees from the University of Michigan, Ann Arbor, and his Ph.D. degree in forest recreation from Utah State University, Logan, in 1975. He has written many papers on wilderness management, particularly on use and user characteristics.

JOHN J. DAIGLE was an outdoor recreation planner with the intermountain Research Station's Wilderness Management research work unit at the Forestry Sciences Laboratory, Missoula, MT, when this project was begun. He is now studying rural community development issues at the University of Massachusetts, Amherst, assigned to the Northeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture. He received his B.S. degree in recreation resources management from the University of Maine, Orono, in 1986. He received a master's degree in recreation resources and landscape architecture from Colorado State University, Fort Collins, in 1990. He has written publications on wilderness recreation visitor conflict and management.

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RESEARCH SUMMARY

Greater knowledge is needed about visitors to federally classified wilderness in the South, the reasons they visit wilderness, and the ways wilderness conditions influence their experiences. This information will allow areas within the region to be compared, and it will improve the potential for tracking future changes that may require management changes.

Visitors to the Cohutta Wilderness in Georgia, Caney Creek Wilderness in Arkansas, and Upland island Wilderness in Texas were surveyed to gather baseline data on use and user characteristics. These characteristics included length of visit, group size, activities participated in, social encounter levels, availability of substitute sites, place of residence, sociodemographic information, previous wilderness experience, level of attachment for wilderness, and visitor preferences for wilderness conditions.

Results suggest many differences among visitors to the three wilderness areas studied. The areas differed in some aspects of visit characteristics, visitor characteristics, and visitor preferences. This baseline information also suggests differences among these areas and other wilderness areas studied, most located in the Western United States.

This report provides knowledge about current visitation. It may help in planning future educational programs, selecting wilderness quality indicators for Limits of Acceptable Change applications, and establishing management objectives for experience-related issues.

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Intermountain Research Station
324 25th Street
Ogden, UT 84491

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INTRODUCTION

Since 1964, a series of legislative acts (Browning and others 1989) has built our National Wilderness Preservation System from an original 9 million acres in 55 areas to more than 91 million acres in nearly 500 separate management units. Each unit is managed by the Forest Service, U.S. Department of Agriculture, or the National Park Service, Bureau of Land Management, or Fish and Wildlife Service, all of the U.S. Department of the Interior. Classified wilderness exists in all but six States (Kansas, Rhode Island, Connecticut, Maryland, Delaware, and Iowa).

The growth of the wilderness system can be illustrated by changes in the Forest Service's Southern Region. Extending from Texas, east to Florida and north to include Virginia, Kentucky, and Arkansas, this region had only two wilderness units designated in 1964-both in North Carolina. By 1979, the number of individual areas had grown to 16. Between 1980 and 1984, five additions were made to existing areas and 46 new areas were established. From 1985 until 1988, six more additions were made to existing areas and 15 new areas were established. Every State in the Region now includes classified wilderness. The number of wilderness areas in the Region has increased only slightly since 1988, to a total of 76. Future increases probably will be minimal. Recent growth trends are not likely to be repeated.

While the supply of wilderness is not expected to increase much in the Southern Region, recreation demand on these lands remains high. Wilderness areas in this Region are relatively easily accessed by a large portion of the Nation's population. The importance of wilderness is expected to grow in every region because of other values (Cordell and others 1990). These include contributions to air quality, water quality, wildlife habitat protection, and ecosystem preservation. To maintain these values, managers must remain alert to threats to the wilderness resource. Recreational use is the threat that might be easiest to manage.

The research reported here is intended to help managers in the South:

1. Understand who visits wilderness.
2. Understand why people visit wilderness.
3. Understand how wilderness experiences are influenced by conditions in wilderness.
4. Have a baseline for comparisons of future wilderness conditions and visitor preferences.

Roggenbuck and Lucas (1987) and Watson (1990) have summarized why wilderness managers are interested in information about wilderness visitors and how they use wilderness. This knowledge could increase the effectiveness of visitor management.

Knowledge of visitors and their use of wilderness is considered essential to lighthanded management (Lucas 19801. Such approaches are usually preferred for influencing the behavior of wilderness visitors (Watson 1989). Lighthanded approaches emphasize subtle, unobtrusive management to help maintain the freedom, spontaneity, and sense of escape that visitors expect from wilderness. Knowledge of visitor characteristics could help managers understand who is likely to comply with lighthanded appeals (Swearingen and Johnson 1990). In addition, such knowledge could be helpful when selecting direct management strategies. Visitor education has long been heralded to help persuade visitors to refrain from high-impact behaviors they don't realize are harmful in wilderness. Much of the confidence in visitor education arises from the high formal education of wilderness visitors (Roggenbuck and Lucas 1987).

Previous research in both the social and ecological impacts of visitor use suggests the relationship with increasing use is not linear. It is influenced by use characteristics as much or more than by the amount of use (Cole 1982; Helgath 1975; LaPage 1967). Many

of the threats to wilderness, as well as wilderness benefits, stem from wilderness visitation (Roggenbuck and Lucas 1987). Managers must maintain natural conditions while providing opportunities for wilderness recreation. Visitors' numbers and their style of use can threaten both objectives.

Research on wilderness use and users is less common now than it was a decade or two ago, even though problems have multiplied with expansion of the wilderness system (Roggenbuck and Lucas 1987). The growth in the wilderness system in the South demonstrates the need for better understanding the use of these areas. Three case studies of wildernesses in the South will allow some intraregional comparisons and provide baselines for examining trends in this region. These findings were compared to Roggenbuck and Lucas' summary of previous research findings. Some differences could be caused by changes in wilderness use across time for all areas. Some differences may be caused by variations in sampling methods.

BASELINE SURVEYS

In 1989, the U.S. General Accounting Office released a Congressionally directed evaluation of Forest Service wilderness management (General Accounting Office 1989). The General Accounting Office was critical of the Forest Service's lack of baseline data on wilderness conditions and use for most areas.

The best example of a regional baseline study of wilderness visitors is Lucas (1980). Lucas established baseline information for nine western wilderness areas and roadless areas. Lucas (1985) demonstrated the value of this baseline information when he repeated the 1972 study of visitors to the Bob Marshall Wilderness complex. These studies show how use and users changed during that time. Such information could help wilderness managers respond to these changes.

The data reported here provide insight into three quite different areas in the Forest Service's Southern Region. These data will provide a basis for comparing use and users in the future as well as comparing the different areas in the Region to each other. If the areas have great diversity in users and use activities, the regional approach to wilderness management should reflect this diversity.

Information to be analyzed in this report includes:

1. Visit characteristics-including such factors as length of visit, group size, group type, activities, social encounter levels, availability of substitutes, and points of focus for particular visits.
2. Visitor characteristics-including place of residence, sociodemographic information, previous wilderness experience, and the level and type of attachment felt for wilderness.
3. Visitor preferences for wilderness conditions-including such things as the relative influence of the number and type of social encounters on the quality of wilderness experiences.

STUDY AREAS

Several study areas were selected in the Forest Service's Southern Region to learn about differences within the Region. Areas were stratified based on similarities in use levels and use characteristics. One area was chosen from each stratum.

Stratification of Wilderness Areas

National Forest wilderness areas were subjectively classified into three strata based on agency perceptions of similarities in landform or ecosystem type, geographical location, and the type of use believed to occur there. The three strata (fig. 1) were:

1. Southern Appalachian Mountains wilderness. The Southern Appalachians include at least 37 individual National Forest wilderness units, many along the Appalachian backbone. These wilderness areas extend from northern Virginia through North Carolina, South Carolina, Tennessee, and northern Georgia, They include Appalachian oak forest, northem hardwoods along the backbone of the Appalachians, or oak-hickory-pine forests in some areas (Bailey 1980). Besides some local users, visitors could come from metropolitan areas such as Baltimore, MD; Washington, DC; Richmond, VA, Knoxville, TN; Atlanta, GA, Asheville, Raleigh, and Charlotte, NC; and Columbia, SC. At least six wildernesses in the adjoining Forest Service Region in West Virginia would fit this category.
2. Ozark Highlands wilderness. Twelve National Forest wildernesses in Arkansas and Oklahoma and eight areas in the adjoining Forest Service Region in Missouri are reasonably similar. These lands are mostly oak-hickory-pine forests (Bailey 1980). Besides some local residents, users could come from urban areas in Arkansas, Oklahoma, Louisiana, and Texas.
3. Coastal/swamp/piedmont wilderness. About 29 southern wilderness areas are not within mountain ranges. These areas include the piney woods of eastem Texas, Louisiana, and Mississippi; the Piedmont of Alabama and North Carolina; and swamps of Florida and South Carolina. Bailey (1980) classifies these forests as Southern Mixed Forest. Very little is known about recreational use of these areas. Most were designated as wilderness in recent years to increase ecosystem diversity in the wilderness system. Recreational use is believed to be low at most areas. Most use occurs at relatively small, easily accessible locations within each wilderness.

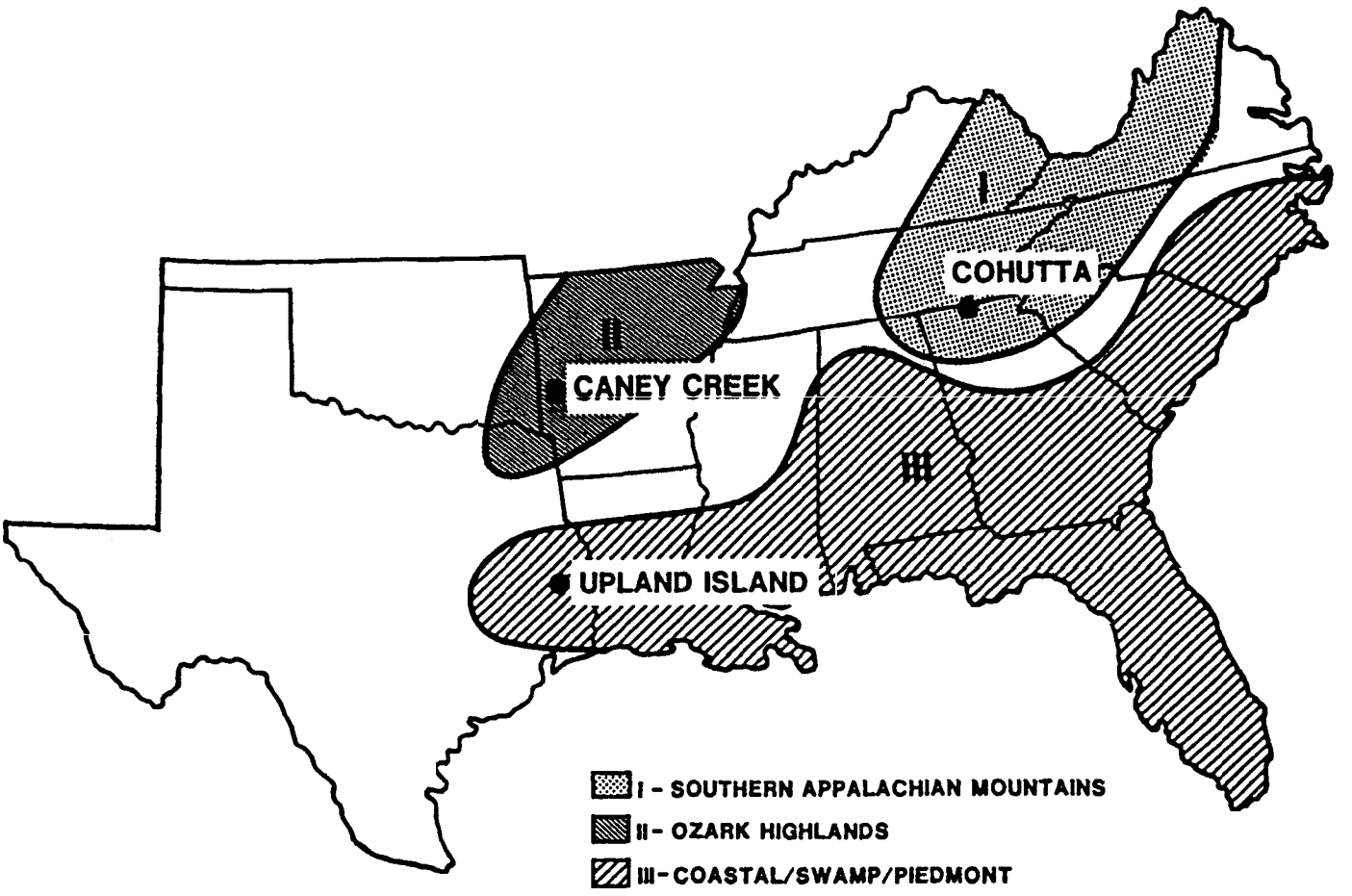

Figure 1-Stratification of wilderness units in the Southern Region and study areas selected.

Selected Areas

The Cohutta Wilderness (fig. 2) in the Chattahoochee National Forest in northern Georgia was selected to represent Southern Appalachian Mountains wilderness. The Cohutta is only about a 2-1/2 hour drive north of Atlanta. About 80 percent of the users are believed to be from Georgia, even though the wilderness extends north into Tennessee. This 37,000-acre area is the South's largest National Forest wilderness. The Cohutta's proximity to Atlanta and surrounding communities contributes to the estimated annual use of 71,680 recreation visitor days (RVD's) in 1989. The area is moderate in size by national standards, is close to a large population center, and receives a lot of use (table 1). Estimated use peaked in 1983 at 152,800 RVD's. Three trailheads are believed to receive 56 percent of the annual use, with most of the remaining use distributed across eight other trailheads.

The Caney Creek Wilderness (fig. 3) in the Ouachita National Forest in Arkansas was selected to represent Ozark Highlands wilderness. Caney Creek Wilderness contains 14,460 acres. Other wilderness areas in this stratum range from just under 5,000 acres to nearly 17,000 acres. Caney Creek receives an estimated 11,400 RVD's per year (table 1). Use estimates

Table1 -Size and recreational use of survey areas

Area	Approximate size	Recreational use (1988 estimation)	Visitor days/acre
	1,000 *acres*	*Visitor days*	
Cohutta (Georgia)	37.0	71,680	1.93
Caney Creek (Arkansas)	14.5	11,400	.79
Upland Island (Texas)	12.5	2,500	.20

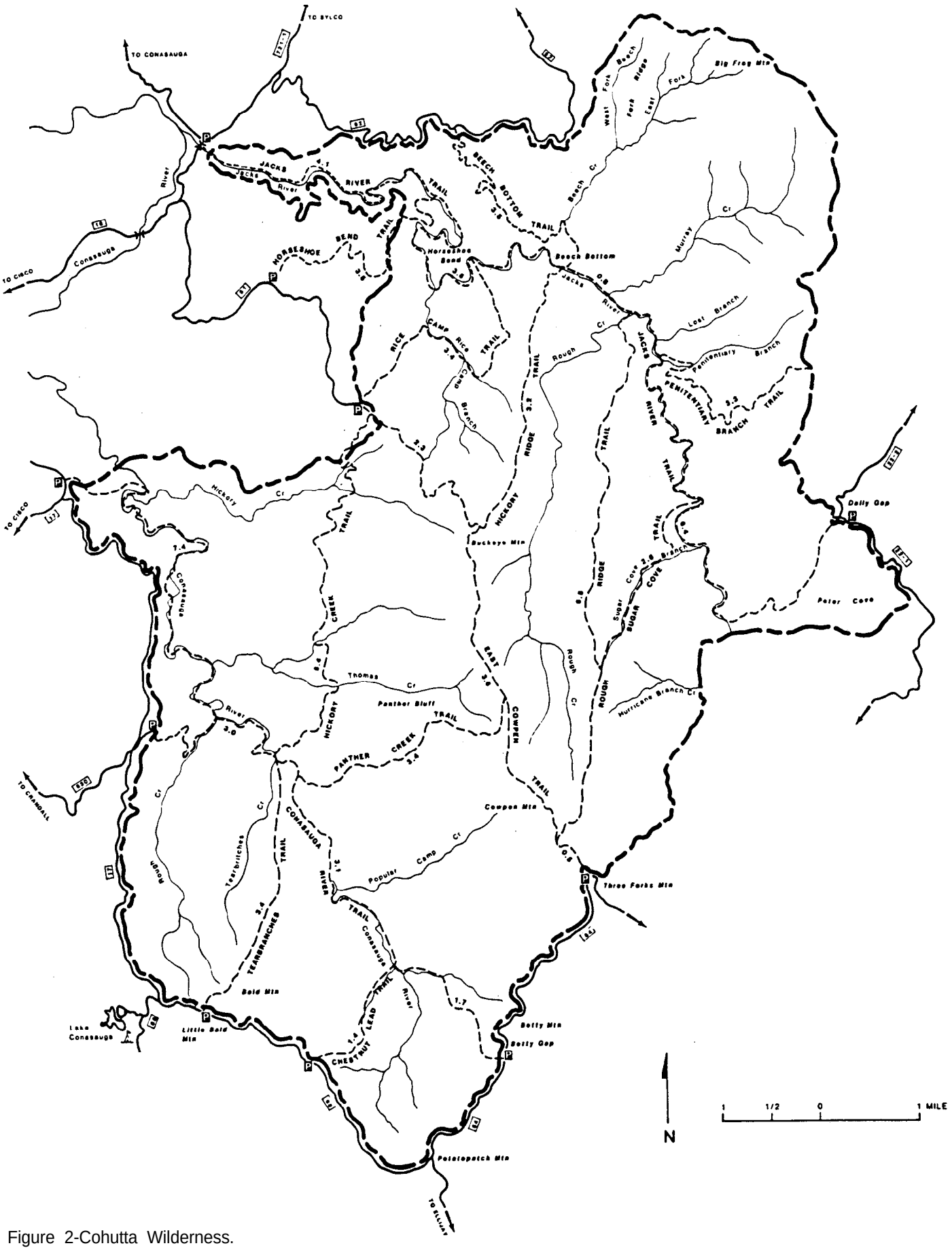

Figure 2-Cohutta Wilderness.

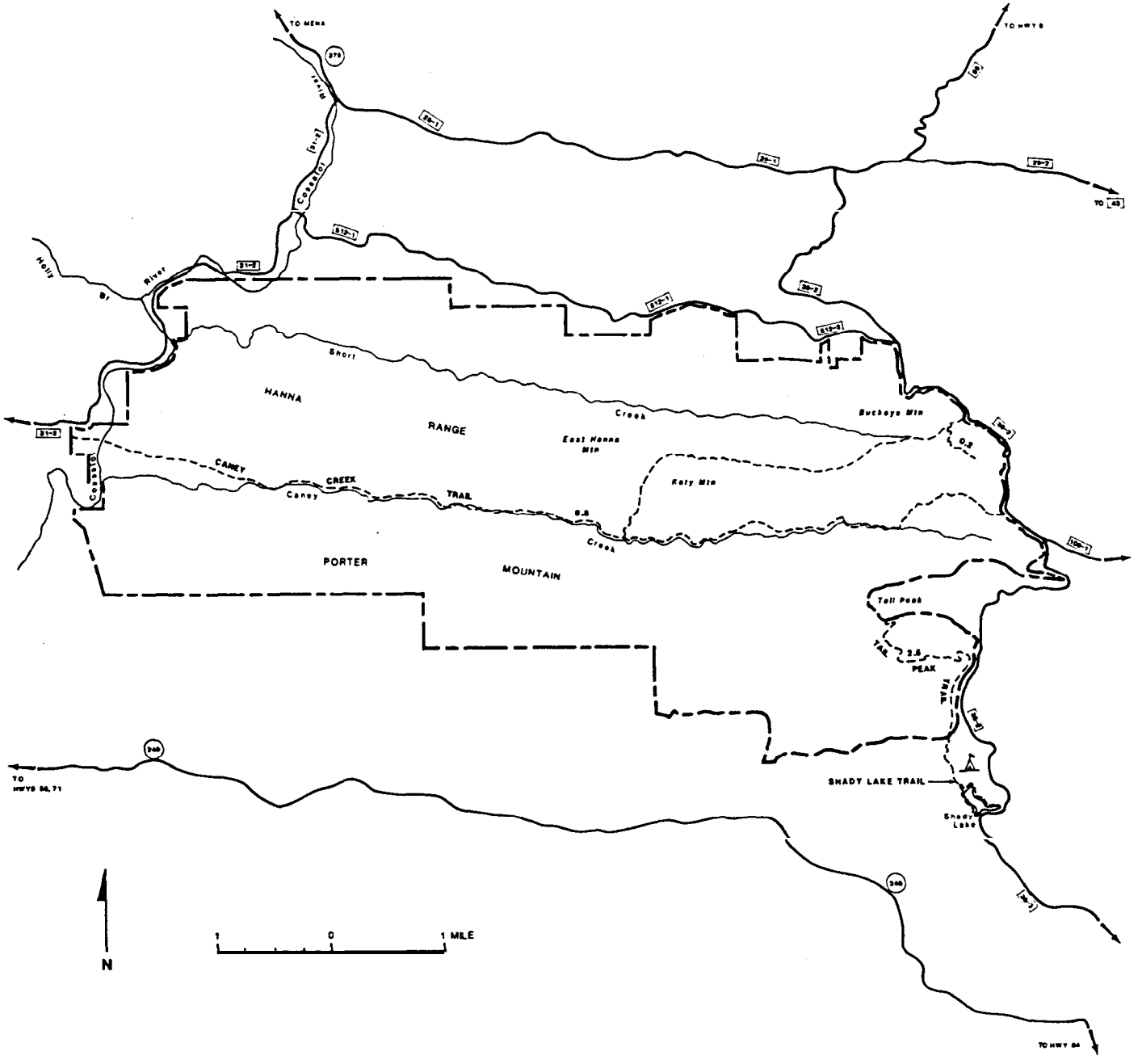

Figure 3-Caney Creek Wilderness.

show a slight annual increase, growing from 10,500 RVD's in 1982. Visits include overnight and day trips. Most use is in the fall and spring, with light use in the summer. Many visitors are believed to come from nearby urban areas, although a substantial number of Texas and Louisiana license plates are commonly seen at trailhead parking areas. The bulk of use occurs along three trails, accessible at four trailheads.

Upland Island (fig. 4, in the Angelina National Forest in Texas, was selected to represent coastal/swamp/piedmont wilderness. In general, use is low for these small, often trailless areas. Upland Island, with about 2,500 RVD's per year on its 12,562 acres, has the highest use (table l), and is the largest of five Texas wildernesses. Some users are believed to come from Stephen F. Austin University in Nacogdoches. Some use comes from Houston to the south. Many other users are from local rural population centers. A new guide service is expected to attract hunters from Houston and the Dallas/Fort Worth metropolitan areas. The primary use-season is reportedly from

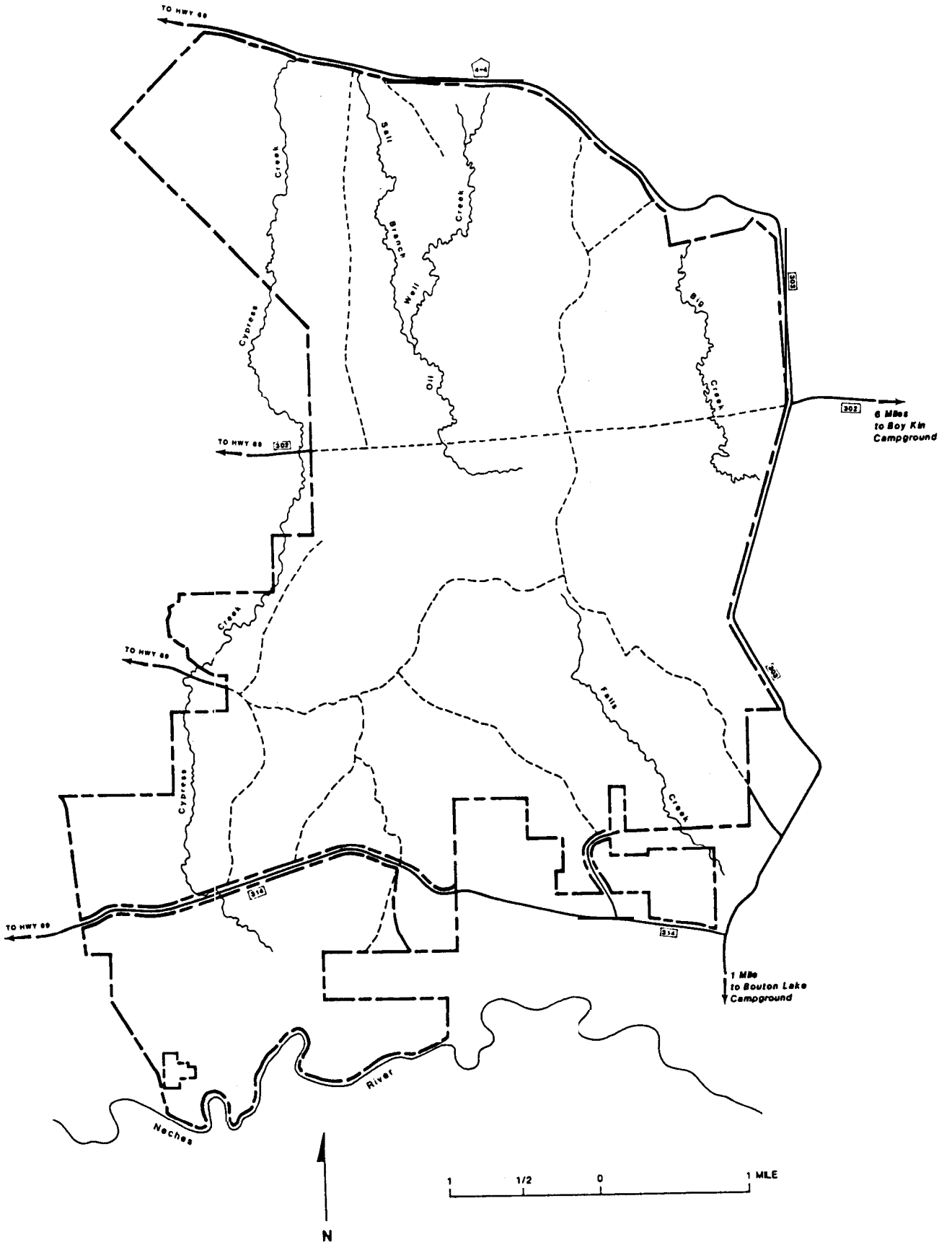

Figure 4- Upland Island Wilderness.

October to February, with a substantial amount of nighttime use by raccoon hunters, posing interesting sampling challenges. Wilderness access is by old roads or cross-country travel; there are no established trails. About half the use is believed to originate from a public road splitting the wilderness. Another 30 to 40 percent of the use comes from two previously used roads that now end along the area's eastern boundary. Two access points to the west account for 10 to 20 percent of use. Another four access roads are believed to contribute only 1 percent of the use.

SURVEY METHODS

Survey methods were similar for each of the three wilderness areas studied. Variation in use patterns was significant. Timing of visitor contacts and methods of contact varied slightly because of these differences.

Season of Use

The Cohutta Wilderness exhibits a use season typical of wilderness areas studied in the past. Very little use is in winter. Fishing and wildflowers attract some spring visitors. Summer use is heavy, particularly on weekends. Many visitors from the Atlanta area, or from elsewhere in the Georgia Piedmont, come to the mountains to escape heat and humidity. Hiking, fishing, and camping use continue well into the autumn. Temperatures are relatively moderate then, and leaves are changing colors. A fall hunting season for deer, turkey, and squirrel extends use until the end of November. Our visitor contacts were from May 15 to November 30, 1989.

The Caney Creek Wilderness, near Mena, AR, attracts many visitors from Louisiana and Texas during the spring and fall. The Ouachita Mountains are much cooler than the Piedmont and Coastal areas at these times. The mountains are not much cooler in midsummer, so use then, and during winter, is mostly by local visitors. Our visitor contacts at the Caney Creek Wilderness began May 1, extending to the end of November 1989.

Upland Island Wilderness is used differently than the two other wildernesses studied. Most use appears to be of local origin, mostly tied to hunting. The primary uses are believed to be squirrel, turkey, deer, and raccoon hunting. Backpacking and hiking are limited. Summer use is essentially nonexistent because of high temperatures, humidity, and insect pests. Our visitor contacts were from October 1, 1989, until the end of February 1990.

Sources of Samples

While sampling consistency is desirable, some variation occurred. Most contacts were by a personal interview by a Forest Service employee stationed at selected trailheads at selected times. The Upland Island Wilderness has no established trailheads. The area is relatively small, with good roads along much of the perimeter. A Forest Service employee drove the perimeter on selected days at selected times, interviewing visitors leaving or approaching their vehicles. After two passes around the perimeter during a selected 4-hour time period, the interviewer placed a postage-paid postcard, with instructions for completion, on the driver's-side window of parked vehicles. This postcard included questions to collect the same basic information collected by interviewers. We obtained the names and addresses of outfitted hunters from the permittee.

Sampling Procedures

For the Cohutta, two weekday (Monday to Thursday) and two weekend (Friday to Sunday) clusters of days were selected for each month of sampling. For each day of a randomly selected cluster, an interviewer was randomly assigned to one of 11 trailheads. The sampled period had 95 sample days. On each sample day, two of three possible 4-hour time blocks were randomly selected for visitor contact. The blocks began no earlier than 8 a.m. and ended no later than 8 p.m. Each entering or exiting visitor was interviewed to learn the length of visit, travel destinations, group size, type of group, visitors' ages and genders, and the number of previous visits to the Cohutta. As in most previous studies, only visitors 16 years or older were asked to complete a mail questionnaire. The names and addresses of up to nine people per group were recorded so they could be sent the questionnaire.

For the Caney Creek Wilderness, the same sampling procedure resulted in 94 sample days. Selected days were randomly assigned to one of the four trailheads. Visitors entering or exiting the selected trailhead were interviewed during two randomly selected 4-hour time blocks (out of a possible three) each day.

The Upland Island Wilderness was sampled differently. Since little weekday use was suspected, only one weekday cluster per month was sampled. Two weekend clusters were sampled each month. This resulted in 65 sampling days. On each sample day, two out of four possible I-hour time blocks were randomly selected. Visitor contact began no earlier than 7 a.m., and ending no later than 10 p.m. The late time block was intended to allow interviews with nighttime hunters. The clientele list of the commercial outfitter operating in the Upland Island Wilderness provided a supplementary sample of hunters.

Mail Questionnaire Procedures

A mail questionnaire was sent to each individual who agreed to receive and complete the survey. Questionnaires were sent to 667 Cohutta visitors, to 185

Caney Creek visitors, and to 163 Upland Island visitors, for a total of 1,015 individuals. We tried to see that each visitor received the questionnaire within 2 weeks of the onsite interview.

The mailout procedure basically followed the approach recommended by Dillman (1978). The initial mailing included a questionnaire with cover letter, postage-paid envelope, and a bookmark incentive. One week after the first mailing, a postcard reminder was sent to everyone. Three weeks after the initial mailing, a followup mailing was sent to those who had not responded. A different cover letter in this mailing emphasized the importance of everyone's response. Another questionnaire and postage-paid return envelope were included. A second followup was sent to those who still had not responded 7 weeks after the initial mailing.

Visitor Response Rates

For the onsite interviews, response was 100 percent. No one refused to answer questions at any of the three wildernesses. We expected a minimum response rate of 60 percent for the mail questionnaires (Dillman 1978). Response rates exceeded this level for two of the three areas.

Of the 667 surveys mailed to Cohutta visitors, 10 were not deliverable. A total of 444 completed questionnaires were returned, providing an overall response rate of 68 percent. Visitors who returned their questionnaires were compared to those who did not on several onsite interview questions to check for nonresponse bias. These questions included length of stay, group size, group type, age, sex, number of previous visits to the Cohutta, and the area traveled or camped in. Field interviewers had predicted that day users who visited any of three heavily used, easy access trails would not have a high response rate on the mail questionnaire. While these visitors cooperated during interviews, even providing names and addresses for questionnaire mailing, many did not appear fully committed to the visitor study. As field interviewers had predicted, the lowest questionnaire response rate (51 percent) was for visitors we classified as "high concentration day users." Overnight users were much more likely to return the questionnaire (more than 81 percent). Day users who visited other less heavily used areas responded at a moderately high rate (64 percent). Other variables tested did not differ between respondents and nonrespondents.

Of the 185 questionnaires mailed to Caney Creek visitors, 152 were completed and returned, for a response rate of 82 percent. Visitors who returned their questionnaires were compared to those who did not. The two groups did not differ significantly on length of stay, group size, group type, age, sex, number of previous visits to Caney Creek, or the area traveled or camped in.

Upland Island visitors were much less likely to respond to the questionnaire. Only 76 of the 163 surveys mailed were completed and returned, for a response rate of 47 percent. Visitors who did not return the questionnaire had a higher average number of previous visits to the area than those who returned the questionnaire. No other significant differences were found between visitors who responded and those who did not.

Implications of Nonresponse Findings for Results

The data from Cohutta and Upland Island underrepresent identifiable user groups. The potential bias at the Cohutta involves an underrepresentation of the casual user. The extent of the bias cannot be determined from the data. The potential bias at Upland Island involves underrepresentation of more frequent visitors. We believe that these nonrespondents represent visitors living nearby, who probably make frequent, short visits while hunting. For both areas, the potential nonresponse bias is only partial. The onsite data are complete. Nonresponse affects just the questionnaire. Although we acknowledge this constraint on the validity of our results, we believe it has relatively minor effects on comparisons among areas.

RESULTS

We compared data for visit characteristics, visitor characteristics, and visitor preferences across the three study areas. In addition, we tried to compare these data to previous studies of wilderness visitors.

Visit Characteristics

Length of Visit-Length of visit varied, but the means were not significantly different (table 2). The Caney Creek Wilderness had more visitors who stayed one night or more (62 percent) than who stayed for a day or less (38 percent). But the Cohutta, had more visitors staying for one day or less (55 percent) than stayed one night or more (45 percent). At Upland Island, where 48 percent stayed one night or more, visitors were more than twice as likely to stay more than one night (34 percent), as to stay one night (14 percent). One-third of the visitors stayed for more than one night-much higher than for the other two areas. Despite these differences, the mean length of visits was similar. The average length of stay ranged from 20.6 hours at Caney Creek to just under 25 hours at Upland Island.

Compared to what we know about other wilderness areas, the average length of stay is short for all three areas. The proportion of overnight visitors to the

Table 2-Total and mean length of visit

	Caney Creek	Cohutta	Upland Island
		Percent	
1 to 4 hours	31	31	33
More than 4 hours, not overnight	7	24	19
1 night	44	21	14
More than 1 night	18	24	34

	Mean length of visit[1]	S.D.
Caney Creek	20.6	1 a.4
Cohutta	22.2	24.7
Upland Island	24.9	25.2

'Differences not significant (ANOVA, $p = 0.05$).

Caney Creek Wilderness is uncommonly high. Summarizing past research, Roggenbuck and Lucas (1987) noted that the most common wilderness visit is for one day or less. The average length of stay for most areas has been about 2 to 3 days. Lucas (1985) found the length of visits to the Bob Marshall decreased from 5.7 days in 1970 to 4.7 days in 1982.

Lucas (1980) concluded that the abundance of short trips to nine western areas implied the need for more hiking opportunities, especially outside of wilderness. The experience provided on such short trips could probably be provided in nonwilderness areas, reducing the social and ecological impacts along trails and at easily reached wilderness destinations. For Cohutta and Upland Island, this seems to be the case. Development of nonwilderness alternatives, if communicated to potential visitors, may reduce wilderness use and related impacts. The success of such a strategy would probably depend on the attractiveness of the nonwilderness alternatives and the strength of attachment visitors have for the wilderness in question. Caney Creek has a high percentage of overnight visitors (62 percent), suggesting a strong need for education in low-impact camping to minimize impacts to this small wilderness.

Group Size-The average group size did not differ across the three areas studied (table 3). A high percentage of lone visitors used these three areas. While earlier studies showed less than 10 percent of visitors to National Forest wilderness are alone, 27 percent of the visitors at Upland Island were alone. At Cohutta, 15 percent of the visitors were alone.

Two-person groups were the most common size at all three areas, ranging from about one-third of the groups at Caney Creek and Upland Island to almost one-half at Cohutta.

The relatively high percentage of visitors coming alone to the wilderness is probably the most interesting finding. Short trips to these relatively small southern areas with moderate climate may not seem quite so risky as trips in western mountain areas where most previous wilderness research has occurred.

From past research, Roggenbuck and Lucas (1987) concluded that wilderness visitor groups were small and getting smaller. For National Forest wildernesses, they reported average group sizes of four to five. For virtually all areas, 50 to 75 percent of all groups are believed to be two- to four-person groups (Roggenbuck and Lucas 1987). Two-person groups have been the most common, with single visitors accounting for less than 10 percent of all visitor groups. Lucas (1985) reported average group size dropping dramatically in the Great Bear and Scapegoat Wildernesses from 1970 (5.2 and 5.6 visitors per group, respectively) to 1982 (3.8 and 4.4).

Small parties of one or two people probably cause the least impact, though many small groups will spread impacts more widely than fewer larger groups. The tendency toward small groups in these areas may help explain the importance visitors attached to avoiding larger groups in southern wilderness areas, noted in previous research (Roggenbuck and others 1982).

Group Type-Caney Creek had an extremely high proportion of family groups (43 percent), more than for any other group type (table 4). For Cohutta, family groups made up only about 29 percent of all groups, exceeded substantially by groups of friends (38 percent). At Upland Island, use was split fairly evenly across family groups, groups of friends, and single-person groups. The percentage of organized groups in Caney Creek and Cohutta was about twice as much as previous research would have led us to expect.

Table 3-Group size

Area	Average group size[1]	S.D.	Percentage of total groups of indicated size							
			1	2	3	4	5-7	8-10	11-15	15+
Caney Creek	3.1	2.4	18	37	13	16	8	3	5	0
Cohutta	3.7	4.9	15	46	13	8	11	2	2	3
Upland Island	2.6	1.1	27	36	12	10	15	0	0	0

'Differences not significant (ANOVA, p = 0.05).

Table 4-Type of group (as a percentage of total groups)[1]

Type of group	Caney Creek	Cohutta	Upland Island
		percent	
Family	43	29	34
Family and friends	9	10	9
Friends	19	38	28
Club or organized group	10	8	2
Alone	18	15	26

[1]Significant differences among the three areas (Chi-square, $p = 0.018$).

Wilderness user trend studies have shown that family groups are the most common type of group visiting wilderness--often comprising about 40 percent of all groups (Roggenbuck and Lucas 1987). Recent studies suggest that the predominance of family groups is growing, spreading more evenly across seasons of the year and travel methods (Lucas 1985). Groups of friends are believed to be the second most common type of group-frequently numbering 30 to 40 percent. For some areas, particularly those with substantial hunting, groups of friends exceed 50 percent of the visitor groups. Use of the wilderness by organized groups or clubs, or by lone visitors, is believed to be low everywhere. Organized groups usually make up less than 5 percent of the groups visiting a wilderness.

The number of organized groups using Caney Creek and Cohutta poses a need for special efforts to monitor and manage group impacts. If organizations that make repeat visits can be identified, a special informational contact could be established. Since organized groups tend to be larger, the potential for site impacts is increased. The contact could suggest organized groups use sites where their size, noise, and activities would not interfere with others, and where site conditions would be more resistant to impacts.

Activities-Activities participated in varied by area (table 5). The most notable difference was the extremely high percentage of Upland Island visitors who were hunting. Also, Upland Island visitors were not as likely to visit for hiking, nature study, photography, talking to others, or picnicking. Many Upland Island visitors were checking out places to hunt. For example, visitors interviewed while squirrel hunting may have been looking for signs of deer, indicating a good place to come back to during deer season.

For Cohutta and Caney Creek, hiking was the most frequent activity. More visitors indicated they hiked off trails in Caney Creek (54 percent) than in Cohutta (33 percent). The limited number of trails in Caney Creek and the fairly easy terrain probably contribute to this difference.

Caney Creek visitors were more likely to participate in nature study and photography. Caney Creek had the highest percentage of visitors who talked to members of other groups during their visits (41 percent). Only 11 percent of Upland Island visitors reported talking to other visitors.

Swimming, picnicking, and hunting-related activities were the most common activities at Cohutta. Visitors tended to participate in these activities more frequently there than at Caney Creek.

Past research has shown that visitors' activities vary by wilderness. Roggenbuck and Watson (1989) concluded that hiking, followed by fishing (when possible), photography, nature study, and swimming (particularly in the Southeast and California) are the most common activities in wilderness. Past studies also suggested that hunting may be prevalent in some areas. However, hunting has generally been found to be less popular than expected. The Bob Marshall and Great Bear Wildernesses are particularly known for hunting opportunities Lucas (1985) found that hunters comprised just over 30 percent and 40 percent, respectively, of visitors to these areas. Lucas (1985) also reported that hunting dropped sharply in percentage of total visitation to the Bob Marshall complex from 1970 to 1982.

The extremely high percentage of visitors hunting in Upland Island suggests a particular emphasis on the area's management. With such a dominant use, and management's desire to provide this opportunity, conditions necessary for other pursuits could suffer.

Table 5-Activities participated in[1]

Activity	Caney Creek	Cohutta	Upland Island
		Percent	
Hiking on trails	97	86	24
Camping	83	62	37
Taking pictures	66	46	11
Hiking off trails	54	33	26
Nature study	53	35	15
Spending time all alone	43	34	25
Talking to others in other groups	41	32	11
Swimming, sunbathing	31	41	0
Bird watching	29	12	12
Picnicking	25	28	3
Rock climbing	19	16	0
Collecting berries, mushrooms, or other	16	3	1
Fishing	10	26	3
Other	10	5	4
Checking out places to hunt in the future	6	16	59
Hunting	4	10	87
Horseback riding	0	1	25
Running	0	1	0

[1]Percentages add to more than 100 because of visitors' participation in multiple items.

Table 6-Number of other groups of hikers and mean number of hiker groups seen along the trail

Area	Number of groups	Day 1	Day 2	Day 3
		Percent[1]		
Caney Creek	0	20	10	19
	1-2	37	38	44
	3-5	35	44	30
	6-10	7	7	7
	11-20	1	1	0
	>20	0	0	0
Cohutta	0	17	17	17
	1-2	30	24	37
	3-5	30	31	24
	6-10	16	20	14
	11-20	7	8	9
	>20	1	1	0
Upland Island	0	49	75	82
	1-2	27	13	9
	3-5	19	13	9
	6-10	3	0	0
	11-20	2	0	0
	>20	0	0	0

	Mean number of hiker groups[2]	S.D.
Caney Creek	1.8	1.6
Cohutta	3.6	4.3
Upland Island	1.5	2.5

[1]Percentages in this and subsequent tables may not equal 100 because of rounding.

[2]Significant differences among areas, with Cohutta higher than Caney Creek and Upland Island (ANOVA, $p < 0.01$).

Continued cooperation with game management specialists seems highly desirable for maintenance of natural wildlife populations in this area.

The high percentage of people spending time talking with visitors in other groups is surprising. We might have thought that wilderness visitors would avoid contact with other groups, as they did in the hunter-dominated Upland Island Wilderness.

The relatively low numbers of horse riders is probably fairly accurate for Cohutta. Horse groups do use Caney Creek for a few specially planned trips each year. We missed these groups. With horse use so rare, any increase would surely be a source of concern for user conflicts and resource impacts. Horse use at Upland Island may be increasing with the new outfitter services there. Horse use, and related impacts, need to be monitored closely in all three areas.

Encounter Levels-Past research indicates the number, type, and frequency of encounters with other groups during a wilderness trip influence feelings of solitude and wilderness experience. We asked visitors to these three areas the numbers of encounters for up to 3 days of their visit. Visitors reported the number of groups of hikers they saw while traveling along the trails, the total number of hikers they saw, and the number of large groups (more than six people) encountered.

Caney Creek and Upland Island visitors saw relatively few groups of visitors along the trails (table 6). Visitors to Caney Creek saw about 1.8 other groups per day. Visitors to Upland Island saw about 1.5 other groups. Both areas have few visitors who see more than five groups per day on any of the first 3 days of a visit. Cohutta visitors encounter a significantly larger number of groups (3.6 per day). The likelihood of seeing more than five groups per day is greater in Cohutta, even on the third day of a trip.

Visitors' reports of the total number of hikers encountered along the trails are similar to the results for groups encountered (table 7). Cohutta visitors report significantly more encounters (11.3 hikers per day). At Cohutta, visitors are more likely to see many people (more than 20) in a single day, even on the third day of extended trips. Caney Creek visitors reported seeing significantly more of hikers along the trail than did Upland Island visitors. This difference may be attributable to the slightly larger group sizes at Caney Creek and differences in total use levels.

Table 7-Total and mean number of hikers seen along the trail

Area	Number of hikers	Day 1	Day 2	Day 3
		Percent		
Caney Creek	0	18	12	15
	1-5	25	29	52
	6-10	25	27	22
	11-20	25	26	11
	>20	8	6	0
Cohutta	0	15	16	13
	1-5	27	21	33
	6-10	19	19	17
	11-20	22	19	22
	>20	17	26	16
Upland island	0	41	55	78
	1-5	30	41	11
	6-10	19	5	11
	11-20	11	0	0
	>20	0	0	0

	Mean number of hikers[1]	S.D.
Caney Creek	6.3	6.2
Cohutta	11.3	13.0
Upland Island	3.2	5.1

[1]Significant differences among areas, with Cohutta highest, Caney Creek second, and Upland Island lowest (ANOVA, $p < 0.01$).

This trend continues when we examine the number of large groups (more than six people) visitors reported seeing (table 8). Cohutta visitors saw significantly more large groups. The number of encounters with large groups is surprisingly stable across the 3 days of inventory data. Going on a longer trip in the Cohutta Wilderness does not mean you will see fewer large groups or fewer hikers.

The number of horse groups encountered (table 9) and the number of horse riders encountered (table 10) were equally low for all three areas. Most people (77 to 86 percent) did not encounter horses along the trails.

Privacy at campsites is believed to be important for feelings of solitude in wilderness. The three areas did not differ significantly in the average number of groups camping within sight or sound of other visitors (table 11). At least half the visitors reported no other groups camping within sight or sound of their campsites. The average number of other groups camped by overnight visitors was just over one. In Caney Creek and Cohutta, visitors taking longer trips had less likelihood of having other groups Camped nearby.

Reports of hiker groups walking past visitors' campsites varied significantly by area (table 12). Visitors

Table 8-Total and mean number of large groups of hikers (more than six) seen along the trail

Area	Number of large groups	Day 1	Day 2	Day 3
		percent		
Caney Creek	0	62	63	83
	1-2	33	36	13
	3-5	5	0	4
	6-12	0	1	0
Cohutta	0	60	57	66
	1-2	32	28	23
	3-5	7	11	8
	6-12	1	4	2
Upland Island	0	94	96	100
	1-2	3	0	0
	3-5	2	5	0
	6-12	2	0	0

	Mean number of large groups[1]	S.D.
Caney Creek	0.4	0.6
Cohutta	.7	1.3
Upland Island	.2	1.1

[1]Significant differences among areas, with Cohutta higher than Caney Creek and Upland Island (ANOVA, $p < 0.01$).

Table 9-Total and mean number of horse groups seen along the trail

Area	Number of horse groups	Day 1	Day 2	Day 3
		mean	Percent	
Caney Creek	0	83	78	87
	1	16	21	13
	2-4	1	1	0
	>4	0	0	0
Cohutta	0	87	89	89
	1	10	8	7
	2-4	2	2	3
	>4	0	1	1
Upland Island	0	77	84	89
	1	20	11	11
	2-4	3	5	0
	>4	0	0	0

	Mean number of horse groups[1]	S.D.
Caney Creek	0.1	0.8
Cohutta	.1	.6
Upland Island,	.2	.4

[1]No significant differences (ANOVA, $p = 0.05$).

Table 10-Total and mean number of horse users seen along the trail

Area	Number of horse users	Day 1	Day 2	Day 3
		percent		
Caney Creek	0	83	79	87
	1-2	11	11	0
	3-5	2	4	13
	>5	4	6	0
Cohutta	0	86	87	89
	1-2	7	7	7
	3-5	4	4	0
	>5	3	2	4
Upland Island	0	77	75	80
	1-2	13	5	10
	3-5	7	15	0
	>5	3	5	10

	Mean number of horse users[1]	SD.
Caney Creek	0.3	0.8
Cohutta	.4	1.8
Upland Island	.5	1.2

[1]No significant differences (ANOVA, $p = 0.05$).

Table 11-Total and mean number of hiker groups camped within sight or sound of visitors' campsites

Area	Number of hiker groups	Day 1	Day 2	Day 3
		Percent		
Caney Creek	0	47	51	75
	1-2	35	29	13
	3-5	12	11	6
	>5	6	9	6
Cohutta	0	46	50	54
	1-2	37	30	22
	3-5	11	12	15
	>5	6	9	9
Upland Island	0	79	77	71
	1-2	4	5	0
	3-5	7	5	14
	>5	11	14	14

	Mean number of hiker groups[1]	SD.
Caney Creek	1.3	1.8
Cohutta	1.6	2.6
Upland Island	1.0	2.2

[1]No significant differences (ANOVA, $p = 0.05$).

Table 1 P-Total and mean number of hiker groups that walked past visitors' campsites

Area	Number of hiker groups	Day 1	Day 2	Day 3
		Percent		
Caney Creek	0	42	26	50
	1-2	29	44	25
	3-5	22	21	19
	>5	8	9	6
Cohutta	0	33	34	43
	1-2	33	23	22
	3-5	21	20	16
	>5	13	23	19
Upland Island	0	74	68	100
	1-2	22	32	0
	3-5	4	0	0
	>5	0	0	0

	Mean number of hiker groups[1]	SD.
Caney Creek	2.0	2.4
Cohutta	3.0	4.0
Upland Island	.3	.6

[1]Significant differences between Upland Island and (Caney Creek and Cohutta) (ANOVA, $p < 0.001$).

were more likely to have other groups walk past their campsites in the Caney Creek and Cohutta Wildernesses. About half to three-fourths of the campers reported others walking past. Fewer than one-third of the campers in the Upper Island Wilderness reported other groups walking past.

Few horse groups camped within sight or sound of visitors in any of the three areas. Few visitors reported seeing horse groups travel past their campsites. Horse encounter information is most useful as a baseline for these areas.

Generally, trail encounters are significantly higher at Cohutta than at other areas. Longer trips do not reduce the encounters. If encounters are an important factor affecting solitude in this wilderness, management has a baseline to begin evaluating change.

Cohutta visitors do not differ from visitors to other areas on the campsite solitude opportunities. It appears to be easy for at least half of the campers to find campsites without others nearby. Opportunities to experience isolated campsites improve on longer trips.

Substitute Sites-During the onsite interviews, each group was asked where they would have visited if they had found out before leaving home that the wilderness they were visiting was not available. About 19 percent of Caney Creek groups, 29 percent of Cohutta groups, and 34 percent of Upland Island groups said they would have stayed home (table 13). These visitors did not perceive an available substitute for the trip they had planned that day. This suggests that up to 80 percent of these visitors perceive an available substitute for the area they visited, or the activities they planned there. Of the groups that would have gone elsewhere, a surprisingly small percentage would have visited a different wilderness (0 to 8 percent). A surprisingly large percentage would have gone to nonwilderness National Forest lands (40 to 66 percent).

Absher and others (1989) identified nearly 166 million acres of land nationwide believed to provide a substitute for wilderness. Of this total, only about 8 percent (13.5 million acres) is within the boundaries

Table 13-Substitute sites listed by wilderness visitor groups

Substitute site	Caney Creek	Cohutta	Upland Island
	Percent		
Stay home-no substitute	19	29	34
Go somewhere else	81	71	66
Don't know where	15	10	0
A different wilderness	3	8	0
A National Forest site (campground, trail, drives)	58	40	66
A National Park	5	4	0
A State Park	10	11	0
Other outdoor recreation areas	9	26	34

of the Forest Service's Southern Region. Many people don't know of the substitutes for wilderness recreation that are available. Absher and others (1989) believed that only about 33 percent of wilderness visitors were aware of alternatives to the area they visited on a particular trip. They based their belief on responses to a question in the Public Area Recreation Visitor Study (PARVS) asked 677 wilderness visitors. Absher and others concluded that visitors' lack of knowledge may make it difficult to substitute physically suitable nonwilderness lands for wilderness.

The high proportion of people indicating an available substitute may reflect a subtle difference in the way substitutability was investigated in this study. We asked the question of the group, rather than individuals as was apparently the case in PARVS. We reasoned that the social group is a basic unit that will stay together for the day.

With so many wilderness visitors suggesting nonwilderness substitutes, we suspect these visitors are not heavily wilderness dependent. If high use was of concern at any of the study areas, nonwilderness substitutes might satisfy some of the users.

Focus of Trip-Modes, or ways of experiencing the wilderness setting (Jacob and Schreyer 1980), may be described for wilderness visitors. For some visitors, the primary purpose for being in wilderness may be to experience the natural environment. For others, the purpose may be to participate in an activity such as hunting that may or may not require wilderness. For still others, the setting may serve only as a backdrop for socializing with friends or spending time with loved ones. In our study, respondents were asked to choose between "I came here because this is a good place to do the outdoor activities I enjoy" (activity mode), "I came here because I enjoy this place itself' (place mode), or "I came here because I wanted to spend more time with my companions" (social mode). Most visitors saw their wilderness visit in terms of an activity (59 percent) with a sizable minority describing their visit in terms of place (29 percent) (table 14). Only 11 percent said their visit was primarily to spend time with companions. Nearly all Upland Island visitors see the area in terms of activity. They do not relate to the area in terms of place. This is consistent with the finding that Upland Island visitors were much more likely to be hunting or checking out places to hunt.

Table 14-Focus of trip (by area)

Area	Activity	Place	Social
		percent	
Caney Creek	55	30	16
Cohutta	55	33	13
Upland Island	90	7	3

Visitor Characteristics

Place of Residence-Instate residents were the predominant visitors for both Cohutta (83 percent) and Upland Island (99 percent) (table 15). The percentage of instate residents visiting Caney Creek is surprisingly low (23 percent). Caney Creek managers said that they believed a high proportion of their spring and summer use came from Texas and Louisiana. These data verify their perceptions.

Summarizing several studies of wilderness visitors, Roggenbuck and Lucas (1987) surmised that visitors to wilderness areas are generally instate residents. Usually, about 66 to 75 percent of the visitors are instate residents. In lesser-known wilderness areas, instate residents may sometimes be more than 84 percent of all visitors. Roggenbuck and Watson (1989) speculated that wilderness areas in the East may have more out-of-State visitors because of the smaller size of eastern states, the relative scarcity of wilderness there, and high demand. About half of the visitors to the Boundary Waters Canoe Area Wilderness in northern Minnesota come from out of State.

Upland Island fits the "lesser known" category described by Roggenbuck and Watson (1989). The Cohutta may not be well known nationally, but it is known regionally as the largest National Forest wilderness in the South. In addition, its location on the border between Georgia and Tennessee would have suggested the proportion of instate visitors would be in the "normal" range of 66 to 75 percent. Yet 83 percent of the Cohutta's visitors are instate residents. Residents of Tennessee and nearby North Carolina may perceive several reasonable substitutes to Cohutta. This may not be true for Georgia residents.

Urban/Rural Residence-The 1980 census indicates that about 62 percent of Georgia residents live in urban areas. Using Bureau of the Census guidelines, we can classify 69 percent of Cohutta visitors as urban dwellers. With the Atlanta urban area nearby, this percentage is not a surprise. For Upland Island, 64 percent of visitors were urban. Texas has

Table 15-Place of residence (by area)

Place of residence[1]	Caney Creek	Cohutta	Upland island
		percent	
Instate	23	83	99
Out-of-state	77	18	1

[1]Significant differences across the three areas (Chi-square. $p < 0.001$).

Table 16-Type of community where visitor lives now

Type of community'	Caney Creek	Cohutta	Upland Island
	percent		
Farm or ranch	6	4	10
Country-not on a farm or ranch	14	20	14
Town: less than 2,500 population	2	7	12
Small city: 2,500-25,000 population	11	20	23
City: 25,000-100,000 population	19	17	19
Large city: 100,000-l million population	26	5	10
Metropolitan area/large city: more than 1 million population	21	28	12

[1]Significant differences across the three areas (Chi-square, $p < 0.001$).

a high percentage of urban residents, nearly 80 percent. Caney Creek visitors were 78 percent urban residents. Arkansas is only about 52 percent urban. However, most Caney Creek visitors came from out of State-mostly from Texas (80 percent urban) and Louisiana (69 percent urban). The percentage of urban visitors using the Caney Creek Wilderness fits the States where most visitors live. Urban residents were underrepresented at Upland Island. They were slightly overrepresented at Cohutta (table 16).

The three areas show no significant differences in the types of communities where visitors grew up (table 17). At all three areas, visitors were likely to be living in a more urban community than where they grew up. About 67 percent of Caney Creek visitors grew up in urban areas and about 78 percent live in urban areas now. For Cohutta visitors, 62 percent grew up in urban areas and 69 percent live in urban areas now. While 64 percent of the Upland Island visitors live in urban areas now, only about 46 percent reported growing up in urban areas.

Past studies found most wilderness visitors came from urban areas (Roggenbuck and Watson 1989). While the percentage of urban visitors is low for the Bob Marshall Wilderness (50 percent), Montana has a population that is only about 51 percent urban. On the other hand, about 90 percent of visitors to the Desolation Wilderness in highly urbanized California came from urban areas (Lucas 19801. While wilderness visitors tend to live in urban areas at the time of their visit, they are much more likely to have grown up in rural areas or small communities than the general population (Roggenbuck and Watson 1989).

The number of urban dwellers seeking wilderness experiences emphasizes the importance of wilderness to American society. Urban dwellers are willing to travel to wilderness, even though wilderness is likely to be less convenient to them than to rural residents living nearby. Information for urban visitors could be disseminated through urban newspapers and radio, or through outdoor equipment suppliers.

Gender-Women are about one-fourth of the visitors at the Caney Creek (29 percent) and Cohutta (25 percent) Wildernesses (table 18). These numbers are comparable with earlier findings from other wilderness areas. However, only about 7 percent of Upland Island visitors are women.

Wilderness visitors generally have been between 70 and 85 percent men (Roggenbuck and Lucas 1987).

Table 17-Type of community where visitor grew up

Type of community[1]	Caney Creek	Cohutta	Upland Island
	percent		
Farm or ranch	14	13	14
Country-not on a farm or ranch	12	16	26
Town: less than 2,500 population	7	9	14
Small city: 2,500-25,000 population	23	25	15
City: 25,000-100,000 population	20	18	14
Large city: 100,000-l million population	12	8	7
Metropolitan area/large city: more than 1 million population	11	11	11

'No significant differences (Chi-square, $p = 0.05$).

Table 18-Gender of wilderness visitors[1]

Gender	Caney Creek	Cohutta	Upland Island
	percent		
Female	29	25	7
Male	71	75	93

[1]Significant differences across areas (Chi-square, $p < 0.001$).

Women typically make up a sizable minority, usually around 25 percent. In Lucas' studies of Bob Marshall Wilderness visitors, he found the proportion of women grew from 20 percent in 1970 to 30 percent in 1982 (Lucas 1985). This finding has led to speculation that the proportion of women visiting wilderness may be increasing elsewhere.

Family Composition-The three family composition variables studied were marital status, the proportion of visitors having children under 5 years of age living with them, and the proportion of visitors having children between 5 and 17 years of age living with them (tables 19,20,21). Caney Creek and Cohutta visitors appear fairly similar in family composition. Visitors to the Caney Creek (60 percent married) and Cohutta (52 percent married) wildernesses were much less likely to be married than Upland Island visitors (77 percent married). Upland Island visitors are also much more likely to have children under 17 living with them. Caney Creek and Cohutta visitors may be typical of the baby boom generation, with relatively low percentages of children under 5 years of age at home. From one-fourth to one-third of those visitors have children age 5 to 17 living with them.

Recent speculation has suggested that although the baby boom generation was an important wilderness user group in the 1960's and 1970's, its members may have used wilderness less during the 1980's, when they were entering their childbearing and rearing years. If these baby boomers now have young children, wilderness trips may be shorter than before. As the children age, longer trips will become more feasible. Children born to baby boomers may be more likely to use wilderness because of their early exposure to wilderness-based activities.

Table 19-Marital status of wilderness visitors[1]

Marital status	Caney Creek	Cohutta	Upland Island
	percent		
Married	60	52	77
Not married	40	48	23

[1]Significant differences across areas (Chi-square, $p < 0.001$).

Table 20-Children under 5 years of age at home[1]

Children under 5	Caney Creek	Cohutta	Upland Island
	percent		
Yes	14	12	23
No	86	88	77

[1]Significant differences across areas (Chi-square, $p = 0.024$).

Table 21-Children between 5 and 17 years of age at home[1]

Children 5 to 17	Caney Creek	Cohutta	Upland Island
	percent		
Yes	24	31	45
No	76	69	55

[1]Significant differences across areas (Chi-square, $p = 0.012$).

Age-Caney Creek visitors were significantly older (mean = 37) than visitors to Upland Island (mean = 32) and Cohutta (mean = 29) (table 22). The three areas had a few less visitors than expected in the 16 to 25 age group. In past studies, this age group comprised 20 to 40 percent of wilderness visitors. However, in these wildernesses, the percentage of visitors age 16 to 25 tended to be in the teens (about the percentage found in the general population). Cohutta was the exception, with 26 percent of its visitors age 16 to 25. About 20 to 30 percent of the visitors were age 26 to 35, comparable to past wilderness studies. This percentage, however, is well above the age group's representation in the United States population. A high number of visitors were in the 36 to 45 age group. Past wilderness studies showed 10 to 20 percent of the visitors were age 36 to 45. In our study areas, 18 to 37 percent of the visitors were age 36 to 45, much higher than the age group's representation in the United States population. Percentages were low for the 46 to 55 age group-below the national average-despite previous studies suggesting this group may be slightly over-represented among wilderness visitors.

Much of the difference in average age across the three areas is due to two extremes. The under 16 age group was overrepresented at Upland Island (33 percent) compared to 0 percent at Caney Creek and 16 percent at Cohutta. This age group makes up 25 percent of the general population. The percentage of wilderness visitors over 55 was about 5 to 10 percent, comparable to past wilderness studies. The high average age of Caney Creek visitors (37) reflects 9 percent of visitors over 55, with none under age 16.

Table 22-Age groups and mean age of wilderness visitors

Age group	Caney Creek	Cohutta	Upland Island	1980 census
	percent			
Under 16	0	16	33	25
16-25	18	26	16	19
26-35	27	30	20	16
36-45	37	18	19	11
46-55	9	7	7	10
Over 55	9	3	5	20
	Mean age[1]	S D .		
Caney Creek	37.1	11.9		
Cohutta	28.7	12.6		
Upland Island	32.2	14.2		

[1]Significant differences across areas (ANOVA $p < 0.001$).

Education-Visitors to Caney Creek and Cohutta had particularly high education levels (table 23). About 54 percent of Caney Creek visitors and 49 percent of Cohutta visitors completed a 4-year college degree. Compared to past wilderness studies, an extremely high proportion of Caney Creek and Cohutta visitors reported some graduate study (37 percent and 27 percent, respectively). On the other hand, only about 26 percent of Upland Island visitors reported completing college. Sixteen percent of those completing the mail questionnaire did not graduate from high school. This compares with just 3 percent of Caney Creek visitors and 8 percent of Cohutta visitors who did not graduate from high school.

In the past, wilderness visitors have been found to have significantly higher education levels than the general population. Participants in other resource-based recreation activities such as nonwilderness camping, hiking, and bird watching also have high education levels (Watson and others 1989). Past studies found that at least 40 percent of wilderness visitors had completed college (Roggenbuck and Watson 1989). In some studies, the number of college graduates exceeded 50 percent. The 1980 Census reported that 18 percent of the United States population had completed college. Many wilderness visitors are young; they had not finished their education when they were surveyed in wilderness studies. General population surveys tend to include only people who have completed their education. This suggests these data may underestimate the difference in education levels between wilderness users and the general population.

Knowing visitors education levels is probably most important for preparing visitor information programs. Wilderness visitors include high percentages of college graduates-higher than the United States population. Most wilderness visitors probably can understand fairly complex justifications for low-impact procedures or regulations. Appeals with information based on logic are likely to produce feelings of satisfaction, encouraging compliance by the visitors.

Table 23-Education level of wilderness visitors

Education level[1]	Caney Creek	Cohutta	Upland Island
	percent		
Less than high school graduate	3	8	16
High school graduate	20	21	35
Some college	24	22	23
College graduate	17	22	12
Graduate school	37	27	14

[1]No significant differences (Chi-square. $p = 0.05$).

Income-Wilderness visitors generally have above-average incomes (Roggenbuck and Lucas 1987). Average incomes can vary greatly for visitors to different wildernesses, however. Visitors to Upland Island have significantly lower incomes than visitors to the other two areas in this study (table 24). Caney Creek and Cohutta visitors have similar incomes.

For all three areas, a higher proportion of wilderness visitors were in the higher income categories ($25,000 to $49,999 and more than $50,000) than for the population of the State where the areas are located.

Table 24-Income of wilderness visitors

Income category[1]	Caney Creek	Arkansas	Cohutta	Georgia	Upland Island	Texas
	percent					
Under $15,000	8	59	9	50	17	45
$15,000 to $24,999	17	24	18	26	26	26
$25,000 to $49,999	44	14	44	21	29	24
$50,000 and over	32	2	30	4	29	5

[1]Income distributions are significantly different (Chi-square, $p < 0.001$).

Table 25-Club memberships for wilderness visitors

Type membership	Caney Creek	Cohutta	Upland Island
	---------*Percent*---------		
No club membership	58	64	77
Wilderness-oriented clubs only	34	14	6
Wilderness and conservation clubs	14	12	0
Nature conservation clubs	19	18	6
Youth organizations	9	17	0
Other resource organizations	17	19	12
Other combinations of clubs	8	20	6

Club Membership- In past wilderness studies, about 20 to 35 percent of wilderness visitors have been members of conservation organizations (Roggenbuck and Lucas 1987). Typically, fewer than half of these memberships involve wilderness-oriented organizations like the Sierra Club or The Wilderness Society. At Caney Creek, about 43 percent of the visitors belonged to conservation organizations, compared to 36 percent of Cohutta visitors and 23 percent of Upland Island visitors (table 25). The Caney Creek visitors have unusually high membership rates for conservation organizations in general (43 percent) and for wilderness-oriented clubs (34 percent).

Past Wilderness Experience- About 94 percent of Caney Creek visitors, 95 percent of Cohutta visitors, and 85 percent of Upland Island visitors may have had some previous wilderness experience (table 26). Cohutta and Caney Creek visitors had significantly longer familiarity with wilderness.

Upland Island visitors were noticeably inexperienced in other wilderness areas (table 27). Nearly half had never been to another area, compared to just 18 percent of Cohutta visitors and 14 percent of Caney Creek visitors. Visitors to the three areas did not differ in the frequency of their wilderness trips, however (table 28).

Table 26-Number of years since first visited a wilderness area

Number of years[1]	Caney Creek	Cohutta	Upland Island
	--------- Percent-------		
Less than 1 year	6	5	15
1 to 2 years	11	12	20
3 to 10 years	28	39	46
11 to 20 years	39	32	12
More than 20 years	16	12	6

[1]Significant differences across areas (Chi-square, $p < 0.001$).

Table 27-Number of other wilderness areas ever visited

Number of areas[1]	Caney Creek	Cohutta	Upland Island
	--------- *Percent*---------		
None	14	18	49
1 to 2 areas	24	30	34
3 to 5 areas	35	32	13
More than 5 areas	28	21	4

[1]Significant differences across areas (Chi-square, $p < 0.001$).

Table 28-Typical number of visits per year to wilderness

Number of visits[1]	Caney Creek	Cohutta	Upland island
	--------- *Percent*--------		
Not more than once	20	13	23
2 to 3 visits	35	31	21
4 to 10 visits	30	36	32
More than 10 visits	14	20	24

[1]No significant differences across areas (Chi-square, $p = 0.05$).

Past wilderness studies have found that 30 to 40 percent of wilderness visitors were making their first visit to that specific area. Caney Creek fell to the high side of the expected range (43 percent), while Upland Island fell to the low side (28 percent). Experience levels for each of the study areas were significantly different (table 29).

The lengths of time visitors had been associated with each area were also significantly different (table 30). Visitors to Upland Island were more likely to have been visiting the area for only a year or two, or were on their first visit. Considerably fewer had been visiting Upland Island for 6 to 10 years.

Caney Creek visitors make significantly fewer visits per year than visitors to Upland Island or Cohutta (table 31). Only about 24 percent visit the area more than twice per year. Nearly a fifth (19 percent) typically do not go to the wilderness during any given year. On the other hand, 57 percent of the Upland Island visitors go at least three times per year and more than 40 percent of Cohutta visitors go three times or more per year.

When Roggenbuck and Lucas (1987) summarized knowledge about wilderness visitor characteristics in 1985, they concluded that 70 to 90 percent of all visitors had made at least one previous trip to a wilderness area. They believed this number would be lower in the East, where wilderness areas are fewer and typically more recently established. Variation in

Table 29-Number of previous trips into this wilderness area

Number of trips[1]	Caney Creek	Cohutta	Upland Island
	---------- Percent----------		
No previous trips	43	38	28
1 to 5 previous trips	28	33	24
More than 5 trips	29	30	48

[1]Significant differences (Chi-square, $p < 0.01$).

Table 30-Number of years since first visit to this wilderness area

Number of years[1]	Caney Creek	Cohutta	Upland Island
	----------Percent----------		
First trip this year	21	15	25
1 to 2 years	19	29	27
3 to 5 years	14	22	25
6 to 10 years	21	17	6
More than 10 years	25	18	17

Significant differences across areas (Chi-square, $p = 0.019$).

Table 31-Number of visits per year to this wilderness

Number of visits[1]	Caney Creek	Cohutta	Upland Island
	---------- Percent---------		
None	19	10	18
Once per year	30	26	18
Twice per year	27	23	8
More than twice per year	24	41	57

[1]Significant differences across areas (Chi-square, $p < 0.001$).

the numbers of times study areas had been previously visited was high. The number of people making their first visit ranged from 30 to 60 percent. On the other hand, between 20 and 30 percent of the visitors at some areas had made six or more previous visits. Visitors in other studies averaged three or four wilderness visits per year (Lucas 1980).

Attachment to Wilderness/Place- A related visitor characteristic is the extent to which visitors are emotionally attached to a place or a wilderness (Williams and others 1992). Wilderness managers in the South need to know the extent to which the public identifies these areas as wilderness. Many areas may have received extensive recreational use before wilderness designation. We developed multiple-item Likert-type scales to measure the extent of place attachment and wilderness attachment. The attachment items were measured on a five-point scale from strongly disagree to strongly agree. Upland Island users were significantly less attached to the place and to wilderness than Caney Creek and Cohutta visitors (table 32). For these three areas there appears to be a connection between how the area is used (activities and mode of experience) and the degree of attachment to place and to wilderness.

Visitor Preferences

Resource managers have sometimes tried to protect the wilderness resource and experience by defining an area's carrying capacity. Appropriate use levels have been estimated for a few areas. Sometimes managers have tried to limit use within the estimated capacity. These actions might alienate wilderness visitors, and have not been proven to protect the wilderness or the wilderness experience. Many variables such as type of use, visitor behavior, and site durability may better predict site impacts than the amount of use.

Recognizing the limitations of the carrying capacity model, Stankey and others (1985) developed the Limits of Acceptable Change (LAC) planning framework, a management planning system now widely adopted. This planning approach focuses on system outputs, defining appropriate wilderness conditions and opportunities. Many resource and experience parameters might be selected to define wilderness quality. Monitoring all these parameters is infeasible and unnecessary. Instead, the I.AC process calls for identifying and monitoring a small set of wilderness quality indicators. The best indicators are those that can be measured in cost-effective ways with acceptable accuracy, are related to amount or type of use,

Table 32-Visitor scores on place and wilderness attachment[1]

Wilderness area	Place attachment				Wilderness attachment				Correlation between place and wilderness
	Mean	Med	SD	Alpha	Mean	Med	SD	Alpha	
Caney Creek	3.3	3.3	0.7	0.93	3.8	4.0	0.7	0.76	0.46
Cohutta	3.4	3.4	.7	.93	3.8	3.8	.7	.78	.48
Upland Island	3.1	3.1	.7	.92	3.4	3.4	.8	.80	.71

'Upland Island visitors were significantly less attached to place and wilderness than Caney Creek or Cohutta visitors (ANOVA, $p < 0.05$).

are related to user concerns, and are potentially responsive to managerial actions (Stankey and others 1985; Watson and Cole in press).

The Wilderness Act defines classes of indicators only in a general sense. For example, the act says wilderness is to provide opportunities for visitor solitude or primitive and unconfined types of recreation. But it does not define solitude or the other key concepts. Being alone on the trail, alone in the campsite, encountering no large groups, and hearing no human-related noise could all be associated with desirable wilderness experiences.

Influences on Experience Quality- Table 33 shows the relative influence of 19 potential indicators on the quality of visitor experiences at the three study wildernesses. These evaluations were to determine which aspects of the wilderness resource concerned visitors-one of the criteria for selecting indicators. There was high agreement across the Cohutta and Caney Creek visitors. Pearson's *r* correlation was 0.97. ANOVA tests across the means for the three areas most often grouped Cohutta and Caney Creek means, with the scores for visitors to these two areas significantly higher on most items than for visitors to Upland Island (table 33). Correlations between Upland Island visitor ratings and the other two areas were substantially lower (0.67 and 0.70).

At Cohutta and Caney Creek, the highest rated potential indicators of wilderness quality were the amount of litter and the number of trees people had damaged around a campsite. The number of wild animals seen was the most important potential indicator of wilderness quality for Upland Island visitors. This probably reflects the large proportion of hunters (85 percent) in the area's sample. Upland Island visitors also gave high ratings to the amount of litter and damaged trees. The amount of noise, coming from inside or outside the wilderness, was the next most important influence at all three areas. Visitors to the Cohutta and Caney Creek Wildernesses also gave high ratings to the number of wild animals seen, the amount of vegetation loss and bare ground around a campsite, and the number of other groups camping within sight or sound of a visitor. Interestingly, the number of trail encounters with hiking groups-an indicator frequently used in wilderness social carrying capacity assessments (Stankey 1973, 1980) and in LAC planning (USDA FS 1987)-was rated among the least important influences in this study. The visibility of lights originating outside the wilderness and

Table 33-Visitor ratings of the relative influence of potential indicators of wilderness experience quality'

Indicator	Caney Creek		Cohutta		Upland Island		ANOVA	
	Mean	Rank	Mean	Rank	Mean	Rank	results	*p*=
	(A)		(B)		(C)			
Amount of litter seen	5.69	1	5.60	1	4.92	2	A,B>C	0.0001
Number of trees damaged by people around campsites	5.32	2	5.22	2	4.61	3	A,B>C	.0001
Amount of human-related noise originating outside wilderness	4.99	3	4.80	4	4.60	5	A,B>C	.0006
Amount of human-related noise originating inside wilderness	4.95	4	4.86	3	4.32	4	A,B>C	.0051
Number of horse groups that camp within sight or sound	4.64	5	4.57	7	3.93	6	A,B>C	.0037
Amount of vegetation loss and bare ground around a campsite	4.62	6	4.64	6	3.78	12	A,B>C	.0001
Number of wild animals seen	4.61	7	4.68	5	5.22	1	C>A,B	.0129
Number of hiker groups camped within sight or sound	4.59	8	4.53	8	3.75	14	A,B>C	.0001
Number of campfire rings people have made	4.42	9	4.27	10	3.84	9	A,B>C	.0138
Number of horse groups that travel past my campsite	4.37	10	4.36	9	3.82	10	A,B>C	.0242
Visibility of lights originating outside wilderness	4.37	11	3.98	15	3.43	18	A>B>C	.0002
Number of horse groups seen along the trail in a day	4.15	12	4.12	13	3.58	16		
Percent of time people are in sight along the trail	4.11	13	4.02	14	3.86	8	A,B>C	.0218
Number of hiker groups that walk past my campsite	3.96	14	4.21	11	3.80	11		
Number of large groups seen along the trail	3.91	15	4.19	12	3.76	13		
Total number of people seen hiking along the trail	3.75	16	3.81	16	3.48	17		
Number of groups of hikers seen along the trail	3.66	17	3.79	17	3.39	19		
Amount of time spent on old roads in the wilderness	3.48	18	3.28	18	3.88	7	C>A,B	.0056
Number of miles of gravel road traveled to the wilderness	2.82	19	2.93	19	3.59	15	C>A,B	.0025

'Possible responses: 1 = Not at all; 2 = Slightly;3 = Somewhat;4 = Moderately;5 = Very much;6 = Extremely.

the presence of old roads in the wilderness were once thought to eliminate an area from consideration for inclusion in the National Wilderness Preservation System (Roth 1984). In this study, visitors generally rated these factors as having little influence on the wilderness experience. Upland Island represents an exception. Old roads there are the only access and are used for hunting. Time spent on old roads and the percentage of time in sight of other people while on these "trails" were rated moderately important at Upland Island.

The LAC planning guidelines call for the selection of indicators that individually or in combination reflect the condition of the wilderness (Stankey and others 1985). Lucas and Stankey (1985) suggested selecting a few important indicators to represent resource and social conditions in wilderness. The Bob Marshall Wilderness complex LAC plan (USDA FS 1987) includes five important indicators. For the Upland Island Wilderness, only five experience quality indicators were rated moderately important or above: amount of litter, number of trees damaged around campsites, noise originating inside the wilderness, noise originating outside the wilderness, and number of wild animals seen (table 33). If these items are examined in light of other indicator criteria, the number of items may be reduced further.

Selecting indicators is more difficult for the Cohutta and Caney Creek Wildernesses. For these areas, visitors rated 13 or 14 potential indicators moderately important or above. Managers might be able to reduce the number of potential indicators by selecting just one of several indicators if they all relate to a single dimension of the visitor experience. For instance, the two or three items receiving the highest ratings may be related to a single aspect of the visitor experience. In such a case, it would be inefficient to establish objectives for and monitor all three indicators.

Factor analysis is a mathematical routine that examines the correlation among items and identifies a reduced number of factors, for unique dimensions, that explain the most overall variance. It then identifies the items that "load highly" on, or best define, each individual dimension. From such an analysis, one or two indicators might be selected that represent each dimension and meet other LAC criteria. This could make LAC management more responsive to users' concerns.

The following unique dimensions were discovered during factor analysis of indicator items for Caney Creek: site impacts, sound and sight intrusions, seeing wild animals, horse encounters, and people encounters (table 34). The factor structure for the Cohutta Wilderness users was similar; the only difference was that the site impact and sound and sight

Table 34--Factor names, items, loadings, and importance of wilderness indicators for Caney Creek Wilderness users. Factor analysis used was principal factoring with iteration and orthogonal varimax rotation

Potential indicators	Factor loading	Mean importance (overall factor) and items
Site impacts		(5.00)
The amount of litter I see	0.454	5.67
The number of trees around a campsite that have been damaged by people	.822	5.29
The amount of vegetation loss and bare ground around a campsite	.664	4.62
The number of campfire rings that people have made	.711	4.43
Sound and sight intrusion		(4.78)
The amount of noise associated with human activities within the area	.735	4.98
The amount of manmade noise originating from outside the area	.722	4.99
The visibility of lights originating from outside the recreation area	.587	4.38
Wild animals		(4.59)
The number of wild animals I see a day		4.59
Horse encounters		(4.46)
Number of horse groups that camp within sight or sound of my campsite	.856	4.73
Number of horse groups that travel past my campsite while I am there	.879	4.45
Number of horse groups that I see along the trails in a day	.834	4.21
People encounters		(3.99)
Number of groups of hikers I see along the trail	.872	3.60
The total number of people I see hiking along the trail	.909	3.72
The number of large groups (more than 6 people) that I see along the trail	.800	3.91
The number of hiker groups that camp within sight or sound of my campsite	.628	4.62
The number of hiker groups that walk past my campsite	.688	3.96
The percent of time other people are in sight while I'm along the trail	.611	4.12

Table 35-Factor names, items, loadings, and importance of wilderness indicators for Cohutta Wilderness users. Factor analysis used was principal factoring with iteration and orthogonal varimax rotation

Potential indicators	Factor loading	Mean importance (overall factor) and Items
Site impact/sound and sight intrusion		(4.77)
The amount of litter I see	0.647	5.61
The number of trees around a campsite that have been damaged by people	.780	5.23
The amount of vegetation loss and bare ground around a campsite	.697	4.66
The number of campfire rings that people have made	.652	4.30
The amount of noise associated with human activities within the area	.564	4.85
The amount of manmade noise originating from outside the area	.584	4.80
The visibility of lights originating from outside the recreation area	.481	3.97
Wild animals		(4.70)
The number of wild animals I see in a day		4.70
Horse encounters		(4.37)
Number of horse groups that camp within sight or sound of my campsite	.859	4.58
Number of horse groups that travel past my campsite while I am there	.817	4.38
Number of horse groups that I see along the trails in a day	.725	4.14
People encounters		(4.11)
Number of groups of hikers I see along the trail	.855	3.83
The total number of people I see hiking along the trail	.865	3.83
The number of large groups (more than 6 people) that I see along the trail	.773	4.20
The number of hiker groups that camp within sight or sound of my campsite	.584	4.55
The number of hiker groups that walk past my campsite	.539	4.21
The percent of time other people are in sight while I'm along the trail	.634	4.04

intrusion factors were combined as one dimension (table 35). In both areas, users had distinctive responses to encounters with people and encounters with horses.

All the items in the site impacts factor (for Caney Creek) appear to meet the LAC criteria of being measurable, related to amount or type of use, and responsive to managerial intervention. The analysis also shows these items have highly correlated influences on visitor experiences. Therefore, inventorying and monitoring all the items may be unnecessary. The item "the number of trees around a campsite that have been damaged by people" is rated very influential on wilderness experiences and has the highest factor loading. It best represents the factor and might be selected as the site impact indicator. However, if a cost-effective method of inventorying and monitoring campsite tree damage doesn't exist, the manager has the option of moving to the remaining factor item that best represents the dimension (the number of campfire rings that people have made), or the item of greatest influence on experiences (the amount of litter seen). Any decision is made with the knowledge that the selected indicator (or indicators) represents an identifiable and important dimension of visitor experiences.

Caney Creek's sound and sight intrusion factor has three highly correlated items (table 34), but the "amount of noise associated with human activities within the wilderness" is the only one that likely can be influenced by management. It also represents the dimension well. This item represents an important dimension of the wilderness experience that is not commonly addressed in LAC standards. However, a method of inventorying and monitoring noise would have to be agreed on.

For Cohutta, the site impact and the sound and sight intrusion factors were combined. The importance of indicators within the factor is similar to Caney Creek. Managers might monitor tree damage in the campsite because of its high factor loadings and litter because of its high importance to the visitors' experience. If the monitoring budget allowed additional indicators, vegetation loss in the campsite represents the factor well and has high visitor importance ratings.

The "number of wild animals I see" is apparently an influential factor in visitors' evaluations of the quality of the wilderness experience at both study areas. However, the density of wildlife in wilderness and the number of wild animals people see are largely beyond the manager's control. Thus, the use of the

number of wild animals people see as an indicator of wilderness quality in the LAC framework is limited. We do, however, recommend that managers continue to protect wilderness wildlife from human impacts originating inside and outside wilderness.

The horse encounter factor at Caney Creek and the Cohutta might best be represented by one of these items: "the number of horse groups that camp within sight or sound of my campsite" and "the number of horse groups traveling past my campsite." Both are probably highly correlated in their occurrence, and both have extremely high factor loadings. These indicators, however, address only overnight horse use. If day use by horses is high, the "number of horse groups seen along the trail in a day" may also be used.

The people encounter factor at Caney Creek and Cohutta, apparently has the least impact on wilderness experience of the factors examined. Nevertheless, mean ratings of items suggest that certain kinds of people encounters are moderately influential. "The number of hiker groups that camp within sight or sound of my campsite" influences experiences the most and has reasonably high factor loadings. Of the trail encounter items, "the number of large groups (more than six people) that I see along the trail" had a high factor loading and moderately high visitor ratings. It represents an important aspect of day use.

Defining Acceptable Standards for Indicators- Once appropriate indicators of wilderness quality have been selected, a planning group must agree on acceptable, conditions for each indicator. The group must decide how much human-caused change will be accepted. The Wilderness Act sets broad guidelines which managers must follow, leaving much to the manager's discretion. Research can help establish standards by identifying thresholds of rapid change in the indicator, interest group opinions, the range in current conditions, and visitor preferences. These standards can then guide management within the LAC framework.

The task is easier if visitors have broad agreement, or consensus, on acceptable conditions. If not, the manager might try to meet different visitors' needs in different zones of the wilderness, work with the clientele group to foster consensus through discussion and compromise, or decide what proportion of the clientele group to satisfy. Table 36 describes the highest level of change from the pristine condition that 50 percent and 75 percent of the Cohutta, Caney Creek, and Upland Island visitors will accept for some important potential indicators. We focused on the 50 and 75 percent levels because it is impractical to expect to please all visitors. Some past carrying capacity research recommended managing for the median or 50 percent standard (Shelby 1981). We believe managers may be able to please more than half of the visitors, so we have included the 75 percent level. The difference between standards at the 50 and 75 percent levels shows the extent of consensus among visitors: the greater the difference, the less the agreement.

Table 36 indicates surprisingly broad agreement across areas on acceptable wilderness conditions (see also Williams and others in press). The only differences of consequence are the more restrictive standards of Upland Island users about encountering large groups on trails and tree damage and vegetation loss in the campsites, and their greater acceptance of litter. In contrast, there is far greater variation in the standards of users within a particular wilderness. For almost all indicators, the manager would have to reduce the acceptable impact by more than half to meet preferences of 75 percent of the visitors, instead of 50 percent. This suggests little shared agreement on appropriate conditions within a wilderness.

Visitor standards may not be as restrictive, or pure, as expected. For example, camping out of sight and sound of other groups has been considered a norm among wilderness users (Lucas 1980). For our study areas, most visitors would accept camping near zero

Table 36-The highest level of change from the pristine that 50 or 75 percent of visitors will accept

Potential Indicators	Caney Creek		Cohutta		Upland Island	
	50%	75%	50%	75%	50%	75%
Number of pieces of litter seen	1	0	0	0	2	0
Percent of trees damaged by people around campsites	4	0	4	0	0	0
Number of horse groups camped within sight or sound	1	0	1	0	2	0
Number of hiker groups camped within sight or sound	5	1	3	1	3	1
Number of large groups (more than six people) that I see along the trail	5	2	5	3	3	1
Percentage of vegetation loss and bare ground around the campsite	20	10	20	10	16	4

to two horse groups and one to three hiking groups. Past research indicates that wilderness users do not like to see groups larger than six people (Roggenbuck and others 1982). Our respondents would accept from two to five such encounters on the trail per day. Tree damage has a great influence on visitor experiences, but our study participants would accept damage to four or five percent of the trees in the campsite. Noises caused by people are highly disruptive in wilderness. But because we do not know whether visitors are upset by the frequency, type, or loudness of the noise, we did not attempt to define a standard.

SUMMARY OF RESULTS

Important findings about wilderness visits, wilderness visitors, and visitors' preferences can be summarized for the three study areas.

Visit Characteristics

The average trip to these areas is relatively short, 24 hours or less. Two-person groups are the most common, with many individuals hiking alone. In the Cohutta, a large proportion of people come with friends. At Caney Creek they are more likely to come with family members. The Cohutta and Caney Creek Wildernesses have more use by organized groups than is typical.

Most Upland Island visitors were hunting or checking out places for future hunting trips. They were much less likely to spend time hiking, studying nature, or talking to members of other groups. Cohutta and Caney Creek visitors were more likely than expected to spend time talking to other groups.

The type of social experience available at the three areas varies in an interesting way. Though the Cohutta is much larger than the other areas, visitors there are likely to encounter more people while traveling and have more people travel past their campsites. Cohutta visitors encountered about twice as many people as visitors encountered at Caney Creek and nearly four times as many as visitors encountered at Upland Island. Longer trips (up to 3 days) in the Cohutta do not offer great reductions in the number of people seen while traveling. Campsite solitude appears to be about equal at all areas. Visitors were able to camp with no other groups within sight or sound about half the time. On average, about one other camping group was nearby. About 75 percent of visitors to all three areas felt one group within sight or sound was acceptable.

A relatively large percentage of visitors to the three areas would have substituted some other place for the wilderness they visited, if the wilderness had been unavailable. Less than 10 percent of those who indicated a substitute listed another wilderness. Most would have visited an alternative National Forest non-wilderness site. A high percentage of visitors to all three areas made the visit primarily to participate in some activity (hunting, fishing, nature study, photography, hiking, etc.), rather than to experience a wilderness setting. Only about 29 percent of all visitors focused on the wilderness setting.

Visitor Characteristics

Wilderness visitors in the Southeastern United States are not homogeneous. About 77 percent of the Caney Creek visitors come from outside Arkansas. While the proportion of Caney Creek visitors who live in urban areas is high for Arkansas, it represents the States where the visitors reside, Louisiana and Texas. Cohutta visitors are highly urban for Georgia, while Upland Island visitors underrepresent Texas' relatively high urban population. Only about half of the Upland Island visitors grew up in urban areas compared to two-thirds living in urban areas now. About two-thirds of Cohutta and Caney Creek visitors grew up in urban areas, although closer to three-fourths live in urban areas now.

Women make up about one-fourth of the visitors in the Cohutta and Caney Creek Wildernesses. Less than 7 percent of Upland Island visitors are women. The predominantly male population at Upland Island is also predominantly married. A high percentage have children under 17 living with them. Only about half of the Cohutta visitors are married. Cohutta visitors are more likely to be visiting with friends than family. Visitors to both the Caney and Cohutta Wildernesses are unlikely to have children under 5 living with them, but about one-fourth to one-half have children age 5 to 17 in their home.

A relatively young population of visitors to the Cohutta (mean = 29 years) contrasts with visitors to Caney Creek (mean = 37 years) and Upland Island (mean = 32 years). Upland Island had an extremely high percentage of visitors under 16 years old. Education levels are high for Caney Creek and Cohutta, but slightly lower for the large, young group at Upland Island. For all three areas, household incomes are quite a bit higher than for the general population, although the income of Upland Island visitors is lower than for visitors to the other two areas.

Visitors to Caney Creek appear slightly more active in conservation organizations, particularly organizations involved with wilderness issues. Caney Creek also had the highest percentage of first-time visitors of the three areas. Visitors to all three areas reported fairly high past wilderness experience. Upland Island visitors had slightly less experience and were much less likely to have visited other areas. Upland Island visitors are also much less attached to wilderness and to Upland Island itself than visitors to the other two areas.

Visitor Preferences

For the Upland Island Wilderness, a relatively small pool of potential wilderness quality indicators could be developed by eliminating items visitors did not rats at least moderately influential. Visitors there were most concerned about tree damage around campsites, litter, noise, and the number of wild animals they saw. Cohutta and Caney Creek visitors were concerned about more things that might influence their wilderness experiences. These areas require a more complex process for selecting indicators.

Factor analysis identified five basic groups of potential indicators. These factors are site impacts, seeing wild animals, sound and sight intrusions, horse encounters, and people encounters. Criteria suggested by Stankey and others (1985) can help select indicators to represent each factor. Factor analysis reveals the similarity in concerns expressed by visitors to the Cohutta and Caney Creek Wildernesses and the differences between visitors there and at Upland Island.

Visitors had surprisingly broad agreement across the areas on acceptable wilderness conditions. Far greater variation existed in user standards within a particular wilderness. For almost all wilderness quality indicators, the manager would have to reduce the amount of impact by more than half to meet the preferences of 75 percent of the visitors, instead of 50 percent. This suggests little shared agreement on appropriate conditions within each wilderness.

MANAGEMENT IMPLICATIONS

Some specific management implications have already been pointed out. Several more general suggestions can be made. This report could be used when studying current visitation, planning future educational programs, selecting indicators for LAC applications, and establishing management objectives. Contrary to some past research, many differences were found among visitors to the three wilderness areas studied. These differences support individual management plans for wilderness areas. Regionwide standards appear to be of questionable value.

The high percentage of one- or two-person groups should be encouraging to managers. Keeping group sizes small in these areas seems important, even though current visitors aren't greatly bothered by meeting large groups (more than six). Seventy-five percent of visitors are willing to accept encounters with one to three large groups each day while traveling.

The differences in encounter levels across the three areas also suggest some differences in management priorities. Social conditions at Upland Island do not seem to concern most visitors. That may be because of the relatively low encounter levels there. At Cohutta, however, encounters are rated as at least moderately important by many visitors-particularly around the campsite. Trends in campsite solitude should be monitored closely at Cohutta.

These visitors showed a surprising lack of dependence on the wilderness setting. This has some implications for any future effort to change visitor use-patterns. If reasonable nonwilderness substitutes are available nearby, they could be relied on in attempts to move some use out of the wilderness. This may become desirable to reduce resource impacts.

Educational efforts should vary by area. Information aimed at Caney Creek visitors should be distributed onsite or through urban newspapers in Texas and Louisiana where most visitors live. Specific urban centers should be identified and targeted. Organizations that use the wilderness should also be targeted for information. Cohutta and Upland Island visitors come from urban areas in Georgia and Texas, where they can be targeted with information through major newspapers or other media. The information should be tailored to the visitors, nearly one-fourth of whom are women. A large number of these visitors are well educated, experienced wilderness users. Since Caney Creek does not have as many repeat visitors, repeat messages are warranted.

The results suggest at least a couple of things about monitoring in southern wilderness areas. Identifying some of the major dimensions of the wilderness experience is more important than identifying individual potential wilderness quality indicators. So LAC planning efforts should develop indicators for the major dimensions of wilderness experience. For instance, many LAC efforts include only one or two experiential indicators, usually related to the number of people encountered along the trail and the number of groups within sight or sound of a campsite. This research suggests that the wilderness experience includes more than just social concerns. Perceptions of naturalness are at least as important. Furthermore, some dimensions are identifiable, such as sound and sight intrusions, site impacts, and seeing wildlife. If we select levels of encounters as indicators, we should at least acknowledge that people react to different types of encounters differently and that these encounters occur at different rates. Horse encounter indicators and hiker encounter indicators do not measure the same thing. They appear to be two different dimensions of the experience, just as encounters while traveling differ from encounters at the campsite.

Some visitors will accept more departure from pristine conditions than others. A range of opportunities within the wilderness appears to be appropriate. The mean acceptability values developed here are probably of limited use in developing standards and objectives for management. But more detailed analysis of similar data could differentiate preference values for overnight and day users, for hunters, for visitors to heavily used places, and for visitors to the more remote portions of the wilderness.

RESEARCH IMPLICATIONS

The major research implication of this study is the value of baseline data for wilderness use and users. These case studies, selected because of anticipated differences, provide insight into similarities and differences within a region. More baseline studies in other regions, and for wildernesses managed by other agencies, are desirable. Followup research to determine trends in the characteristics assessed here would provide information for managers within the Southern Region, Regional planners and administrators, political interests, and others interested in the changing relationship between wilderness and the American people.

Comparing encounter indicators with other experiential aspects of the wilderness visit provides particularly promising information. We hope researchers will explore other potential indicators of other experiential dimensions. For instance, wilderness is supposed to provide opportunities for primitive and unconfined recreational experiences. Some of the perceived naturalness indicators explored here cover primitiveness somewhat, but additional indicators are needed. Unconfined experiences is hardly defined at all. Visitor preferences for varying degrees of challenge, risk, spontaneity, and freedom are yet to be examined.

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