To the Graduate Council:

I am submitting herewith a thesis written by Janet Loy Hughes entitled "Winter Backcountry Campers in the Great Smoky Mountains National Park: Their Behavior, Use Patterns and Characteristics." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Forestry.

William E. Hammitt

William E. Hammitt, Major Professor

We have read this thesis
and recommend its acceptance:

Edward E. C. Clebsch

Edward R. Buckner

Accepted for the Council:

Lewis Minkel

Vice Provost
and Dean of The Graduate School

WINTER BACKCOUNTRY CAMPERS IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK: THEIR BEHAVIOR, USE PATTERNS AND CHARACTERISTICS

A Thesis

Presented for the

Master of Science

Degree

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Janet Loy Hughes

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ABSTRACT

Studies of backcountry or wilderness use to date have been based on summer or peak season use. Due to the lack of research concerning winter backcountry use, a comparative study was conducted to investigate potential differences in the behavior, use, and user characteristics of winter and summer backcountry campers in the Great Smoky Mountains National Park.

Major questions to be addressed in the study were: (1) are the user characteristics and use patterns of winter backcountry campers significantly different from those of summer campers? (2) are the motives of winter backcountry campers different from those of summer campers? and (3) is area substitution on a seasonal basis a major motive for winter backpacking in the Park?

A sample of Park backcountry overnight use permits from the 1979 winter and summer seasons and a mail questionnaire were used for data collection. Use data were surveyed from 580 permits from each season. A two-page mail questionnaire was sent to 300 winter users to gain further information about use and user characteristics, past backpacking experience, motives for winter use, and the possibility of area and seasonal substitution.

Results indicate: (1) place of origin (state), day hike originated (weekend versus weekday), type of hike (loop versus non-loop), length of stay, and miles hiked were all significantly different ($p \leq .001$) between winter and summer users; (2) the "typical"

winter backpacker in the GSMNP is male (99%), averages 30 years of age (29.5), has been backpacking for 10 years, averages 6.7 trips and 19 days backpacking per year, and participates in winter backpacking significantly more ($p \leq .001$) than he does in spring, summer, or fall camping: (3) the major motives for winter camping were "experiencing the winter environment" and "avoiding crowds"--especially summer crowds; and (4) GSMNP winter backcountry campers definitely substitute other areas for the Park during the heavy use summer season.

Therefore, while previous backcountry research has shown little evidence for use differences between western and eastern users, there is some evidence to suggest such differences between the winter and summer user.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION	1
	Backcountry Use	1
	Purpose and Objectives	3
	Study Approach	4
	Study Hypotheses	4
II.	LITERATURE REVIEW	6
	Western and Eastern Studies	7
	Differences	9
	Similarities	10
	Summary	15
III.	METHODOLOGY	16
	Study Area	16
	Study Locale	16
	Study Site	18
	Winter Environment	19
	Sampling Procedures	21
	Backcountry Overnight Use Permits	21
	The Survey Questionnaire	22
	Questionnaire Sampling Procedure	25
	Data Analysis	26
	Permit Data	26
	Questionnaire Data	26
IV.	COMPARISON OF WINTER AND SUMMER BACKCOUNTRY USERS	28
	Origin of Backcountry Users	29
	Party Characteristics	29
	Party Size	29
	Period of the Week the Hike Originated	32
	Mode of Travel	32

CHAPTER PAGE

Trip Characteristics 34

Length of Hike 34
Type of Hike 36
Length of Stay 36

Use Patterns 38

Area Use 38
Shelter Use 42
Entry and Exit Point Use 42

Summary of Winter and Summer Use Characteristics . . 47
Further Comparison of Winter Backcountry Users . . . 47

V. THE WINTER BACKCOUNTRY USER 50

Demographic Characteristics 50

Gender 50
Age 52
Place of Residence--State and City 52
Distance of Place of Residence from Smokies . . . 54

General Backpacking Experience 54

Years of Backpacking Experience 54
Time Spent Backpacking Each Year 54
Seasonal Distribution of Backpacking Trips 58

Backpacking in the Great Smoky Mountains
National Park 58

First GSMNP Backpacking Trip 58
GSMNP Trip Frequency 62
Seasonal Distribution of Smokies Trips 62
First GSMNP Winter Trip 65
Trip Frequency Over Last Three Years 67
Winter Trip Length 67

Reasons for Winter Backpacking in the Smokies . . . 69
Area and Seasonal Substitution 74

VI. MAJOR FINDINGS 78

Comparison of Winter and Summer Backcountry Users . 78
The Winter Backcountry User 81

CHAPTER PAGE

VII. IMPLICATIONS AND CONCLUSIONS 88

REFERENCES 92

APPENDICES 97

Appendix A. Mandatory Backcountry Overnight Use Permit Required by the Park 98

Appendix B. Mail Questionnaire Sent to Winter Backcountry Campers in GSMNP 99

Appendix C. Cover Letter Included with Mail Questionnaire Sent to Winter Backcountry Campers in GSMNP 101

Appendix D. Post Card Reminding Winter Campers to Return the Mail Questionnaire 102

Appendix E. Tables of Winter Permit Data, by the Individual Months of January and February 103

Appendix F. Other Reasons for Winter Backcountry Camping in GSMNP 109

Appendix G. Backcountry Area Substituted for GSMNP During the Summer Season by Winter Backcountry Campers 111

VITA 116

LIST OF TABLES

TABLE		PAGE
I.	State of Origin of Backcountry Users in the Great Smoky Mountains National Park, 1979	30
II.	Number of Individuals in Backcountry Parties	31
III.	Period of the Week the Hike Originated	33
IV.	Number of Miles Hiked by Winter and Summer Backcountry Users	35
V.	Type of Hike by Winter and Summer Backcountry Users	37
VI.	Length of Stay of Backcountry Users	37
VII.	User Concentration According to Shelters and Nine Use Areas of the Park--Winter vs. Summer	41
VIII.	User Concentration According to Shelters of the Park--Winter vs. Summer	43
IX.	Entry Points of Winter and Summer Backcountry Users	45
X.	Exit Points of Winter and Summer Backcountry Users	46
XI.	Summary of Winter Versus Summer User Variables	48
XII.	Gender and Age of Questionnaire Respondents	51
XIII.	Places of Residence--State and City	53
XIV.	Distance to Place of Residence from Smokies	55
XV.	Years of Backpacking Experience	56
XVI.	Average Number of Backpacking Trips Per Year	57
XVII.	Average Number of Days Spent Backpacking Per Year	59
XVIII.	Winter Backcountry Users' Average Number of Backpacking Trips Per Season	60
XIX.	Year of First Backpacking Trip in the Smokies	61

TABLE PAGE

XX. Winter Backcountry Users' Average Number of Backpacking Trips to the Smokies Per Year (All Seasons Included) 63

XXI. Winter Backcountry Users' Average Number of Backpacking Trips to the Smokies Per Season 64

XXII. Year of First Winter Trip to the Smokies 66

XXIII. Number of Trips Made to the Smokies During the Last Three Years in Winter and Summer 68

XXIV. Length of Winter Hikes in Days and Miles Compared to Hikes in Other Seasons 70

XXV. Reasons for Winter Backpacking in Great Smoky Mountains National Park 71

XXVI. Factor Analysis of Reasons for Winter Backpacking in Great Smoky Mountains National Park 73

XXVII. Smokies Avoidance During Summer by Winter Backcountry Users 75

XXVIII. Winter Backcountry Users' Plans to Increase Winter Backpacking in the Smokies 77

XXIX. Origin of Winter Backcountry Users in Great Smoky Mountains National Park, 1979 103

XXX. Number of Individuals in Backcountry Parties 104

XXXI. Period of the Week the Hike was Started 104

XXXII. Number of Miles Hiked by Winter Backcountry Parties . . 105

XXXIII. Type of Hike by Winter Backcountry Users 105

XXXIV. Length of Stay of Winter Backcountry Users 106

XXXV. Winter User Concentration According to Shelters and Nine Use Areas of the Park 107

XXXVI. Winter User Concentration According to Shelters of the Park 108

CHAPTER I

INTRODUCTION

Backcountry Use

The Great Smoky Mountains National Park (GSMNP), like many other wilderness and backcountry areas, received a tremendous increase in backcountry camping during the late 1960s and 1970s (Bratton et al., 1978). In 1975, there were 105,000 camper nights recorded, a 53% increase over 1972 and a 250% increase over 1963. Use peaked during the period of 1976-1978 with total backcountry camper nights recorded at 117,500 for 1976, 101,700 for 1977, and 105,930 for 1978. Since 1978, backcountry use has stabilized at about 80,000 camper nights per year.

The increase in total backcountry use has included an increase in "off-season" camping. The Great Smoky Mountains National Park is now an all season park with its most intense backcountry use extending from mid March through late October (Figure 1). Unlike other backcountry areas, camper nights usually peak during March and April, instead of July and August. Even during the four winter months of November through February, use averages around 2000 and 3000 camper nights per month, 1976-1982 (personal communication, GSMNP staff).

While there have been numerous use and management studies of summer or peak season backcountry campers (Merriam and Ammons 1968; Hendee and Catton 1968; Hendee et al. 1968; and Stankey 1973; Hendee

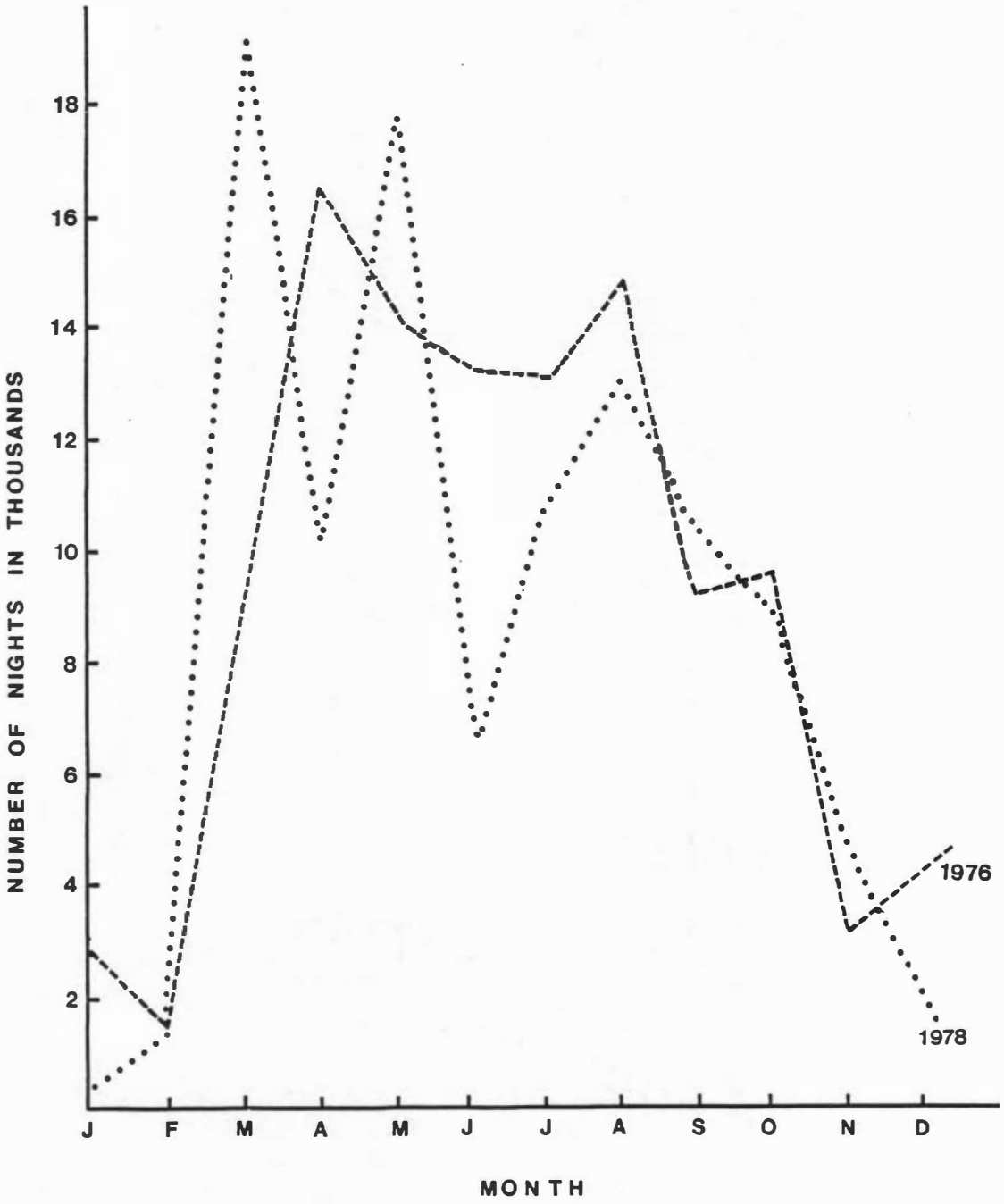


Figure 1. Amount of annual overnight use, by months of the year, for backcountry camping in Great Smoky Mountains National Park, 1976 and 1978. Number of nights in thousands represents the number of individual campers in the backcountry for each month of a year.

1974; Lime and Buchman 1974; Lucas 1974; Murray 1974; Stankey et al. 1974; Lime 1976; Echelberger and Moeller 1977; Bratton et al. 1978; Hendee et al. 1978; Leonard et al. 1978; Canon et al. 1979; Roggenbuck et al. 1979; Boteler 1980; Lucas 1980; Roggenbuck 1980), few, if any, studies have been done that concentrate on winter overnight backcountry use. As a result, resource managers are limited to using peak season use information to manage off-season users. For the resource manager, a critical question becomes: are the use patterns, user characteristics, and preferences of winter backcountry campers similar enough to summer backcountry campers that the two can be managed in the same manner?

Information concerning winter overnight backcountry use will be of increasing importance to resource managers because of (1) the general trend nationwide toward all-season recreation, (2) the increased interest in winter camping, and (3) the potential behàvioral and preferential differences between winter and summer campers.

Purpose and Objectives

Because of the lack of information concerning winter backcountry use and the potential for seasonal differences in use patterns, user characteristics, and user preferences a winter backcountry use study in the Great Smoky Mountains National Park was initiated. The objectives of this study were:

1. To examine major differences between winter and summer overnight backcountry campers; does the GSMNP serve a different "public" in winter than in the summer?

2. To investigate winter and summer overnight backcountry use patterns. Investigated under this objective were: origin of user (state), party size, period of the week the hike was started (weekday versus weekend), number of miles hiked, type of hike (loop or non-loop), length of stay, destination patterns; and use distribution by area concentration, shelters, entry and exit points.
3. To examine the characteristics, past backpacking experience, and reasons for participation of winter users.
4. To investigate the amount of area substitution on a seasonal basis by winter users; do many backcountry campers who use the Park during the winter avoid the Park during the heavy use summer period?

Study Approach

To address Objectives 1 and 2, information was surveyed from backcountry use permits of an equal sample (580) of winter and summer users of the GSMNP in 1979. A two-page mail questionnaire was developed and sent to 300 randomly selected winter users to achieve Objectives 3 and 4. Names and addresses were obtained from the backcountry use permits.

Study Hypotheses

Hypotheses concerning winter users formed during the initial stages of this study were as follows:

1. The backcountry of the GSMNP serves a different "public" (user characteristics) in the winter than in the summer,
2. Winter trips are more group oriented and involve shorter stays,
3. Winter trips are more destination oriented (often shelters) and involve less hiking,
4. A large number of winter backcountry users tend to avoid the Park during the heavy-use summer period,
5. Winter use in the Park will increase considerably in the future.

CHAPTER II

LITERATURE REVIEW

Research on winter, or off-season, wilderness-backcountry[1] overnight use is scarce. Few wilderness use studies have even reported data taken from the winter or off-season (Bratton et al. 1978; Lucas 1980). However, numerous studies have been reported that have used data from summer or peak use season. Such studies have generated valuable information for resource management concerning the behavior, characteristics, motives, attitudes, and management preferences of wilderness users. Most wilderness use studies have been conducted in designated wilderness and primitive areas (Lime 1976). With the exception of the Boundary Waters Canoe Area in Minnesota, past research was concentrated in the western states, since the majority of wilderness areas exist west of the Mississippi (Merriam and Ammons 1968; Hendee and Catton 1968; Hendee et al. 1968; Stankey 1973; Lime and Buchman 1974; Lucas 1974; Stankey et al. 1974; Lucas 1980). Recognizing the inherent differences between eastern and western wilderness areas, e.g., size, terrain and vegetation, proximity to population centers--resulting in heavier use, etc., eastern resource managers constantly questioned whether western studies could be applied to the eastern wilderness areas and

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[1] Designated wilderness and backcountry are used interchangeably in this thesis.

users. Spurred by this need for information, studies which focus on eastern wilderness areas and users have become more numerous over the past ten years (Murray 1974; Echelberger and Moeller 1977; Bratton et al. 1978; Leonard et al. 1978; Canon et al. 1979; Roggenbuck et al. 1979). A comparison of eastern and western studies, based on summer or peak season use, reveals what has been established about wilderness users and their use patterns.

Western and Eastern Studies

Of the 11 million acres (4,451,700 ha.) of designated wilderness areas already in the National Wilderness Preservation System prior to the passage of the 1975 Eastern Wilderness Act (Public Law 93-622), all but approximately 1.1 million acres (445,170 ha.) were located in western states. Most of this acreage was in the Boundary Waters Canoe Area in Minnesota (1,029,690 acres, or 416,716 ha.). The passage of the Eastern Wilderness Act designated 16 national forest areas in the East and Midwest, totaling 207,000 acres (83,773 ha.) as wilderness, and authorized study of an additional 125,000 acres (50,588 ha.) for possible future inclusion in the system. As of 1978, only 17% of the total acreage in the wilderness system was located in the eastern half of the United States, with three-fourths of that acreage contained in just two areas--the Boundary Waters Canoe Area and Everglades National Park (Roggenbuck 1980).

Based on the history of the "wilderness-poor" East and Midwest, it is not surprising that a majority of the past (and earliest)

wilderness use and visitor studies were conducted in western wilderness areas. Without any similar studies on eastern wilderness use to rely on for information, eastern managers were already questioning how much of western based research could be related to eastern use. As more studies focusing on use in eastern wilderness areas began to appear, the question both eastern and western managers began to pose was, "Is there a difference in behavior, characteristics, use patterns, attitudes, and management preferences between western and eastern wilderness users?"

A review of the existing use studies conducted in western or eastern wilderness areas revealed many basic similarities and few differences in use and user characteristics. There have also been several studies that have summarized and compared the existing western and eastern wilderness use research (Lime 1976; Hendee et al. 1978; Boteler 1980; Roggenbuck 1980). Each study found far more similarities than differences between western and eastern wilderness users. The remainder of this section will be a review of the differences and similarities indicated by these studies as pertinent to this thesis. Although many literature sources were consulted as background for this thesis, the sources cited in the References are a selected set of references, not a complete bibliography. Also, since the following review is a consensus of 14 individual wilderness use studies and the 4 comparative studies, specific citations have been omitted.

Differences

Differences between western and eastern wilderness users were few and therefore easier to review. Most significant differences involved the character of the wilderness itself. Eastern wilderness areas tend to be smaller and closer to more population centers, therefore more heavily used and less rugged than their western counterparts. Size alone can be an important consideration in determining management approaches. The definition of congestion in an area can also vary according to size. Western wilderness areas average 160,000 acres (64,752 ha.), while eastern areas average 12,000 acres (4,856 ha.) with several less than 5,000 acres (2,024 ha.) (Boteler 1980; Hendee 1980).

Proximity to more population centers results in heavier use for eastern wildernesses, yet denser vegetation and deciduous leaf cover serve to increase social and ecological carrying capacities in these areas. Wilderness areas in the West are frequently further from population centers and are sometimes so remote that day hikes are nearly eliminated. Because of different terrain and more sensitive ecological conditions (i.e., alpine), some western areas may be more susceptible to social and ecological impacts than eastern areas.

Finally, besides being a major attribute in itself, differing physical geography and terrain can offer opportunities for various activities or the predominance of an activity in an area (i.e., water based activities in Boundary Water Canoe Area and horseback parties in the West.

Similarities

Many similarities have been noted between western and eastern wilderness use and users (Lime 1976; Hendee et al. 1978; Boteler 1980; Roggenbuck 1980). For ease and coherence of review, several categories will be used to discuss the similarities and any exceptions: use characteristics, demographic characteristics, previous experience, and motives and attitudes.

A. Use Characteristics

Seasonal pattern of use: Wilderness use is typically concentrated during certain seasons. In nearly all studies, and all areas, summer is the principal use season. A few exceptions may have spring or fall peaks of use. It should be noted that some western wilderness areas have only one, very limited, use season, sometimes two summer months or less due to inclement weather, i.e., blocking of trails by snow or high water. Limited seasonal use is one of the most important characteristics reviewed as far as this study is concerned, as all existing wilderness studies have been conducted during the summer or peak season, sampling only peak season users.

Weekly pattern of use: Weekend peaks of use are common, especially in western wilderness areas close to population centers. In eastern areas, use tends to be evenly distributed throughout the week during the summer or peak season.

Length of stay and hike: Approximately 50% of wilderness use is day use. For those users who did extend their hikes

past one day, short hikes of short duration were characteristic of most wilderness areas. The average stay in most wilderness areas was from 2 to 4 days (average 2.5 days). Visits tended to be slightly longer for those users traveling by horse. Longer trips of a week or more were rare, except in less accessible areas where the time involved in reaching an area leads to a longer trip. Lucas' study (1980) reflected examples of this in two areas--the Bob Marshall and Great Bear Wildernesses--where more than 10% of the trips were a week or more in length.

Mode of travel: The most common method of travel in all areas was hiking with a few exceptions. Paddled and motor-powered canoes and motorboats are the most common methods of travel in such areas as the Boundary Waters Canoe Area, and horseback travel is more predominant in a few western wilderness areas, e.g., Bob Marshall Wilderness. In general, while horse use is more accepted in western areas, in most eastern wilderness areas horse use is rare or absent altogether. Conflict concerning modes of travel between user groups poses a frequent problem in wilderness management. One user group is usually less tolerant of another user group's mode of travel, feeling it is incompatible with the wilderness environment. Often hikers are less tolerant of horseback parties, feeling that encounters with them are detrimental to the wilderness experience. Canoeists who paddle their

own craft often feel the same way about encounters with users of motorized water craft.

Party size: Parties of wilderness users tend to be small. The average party size in all wilderness studies ranges from 2 to 4 people. Lone individuals are not common, comprising less than 7% of all user groups. Parties of 10 or more account for 5% of all groups.

Geographic distribution of use: Use was found to be unevenly distributed among and within wilderness areas. Some of the most heavily used wilderness areas received over a million visitor days per year, e.g. Boundary Waters Canoe Area in Minnesota, while some received only several hundred visitor days per year, e.g., Galiuro Wilderness in Arizona (Lime 1976; Hendee et al. 1978; Roggenbuck 1980).

Uneven distribution of use among access points, along trails, and among campsites is characteristic of all wilderness areas. In all areas a few principal trailheads, or access points, received a majority of the use. Uneven use of access points leads to uneven use of trails, and use was typically concentrated on a small percentage of available trail mileage. Use was often less concentrated among campsites, but still uneven in that some sites received little or no use at all.

B. Demographic Characteristics

Gender: The wilderness user is typically male. Females represented from 25% to 32% of the visitor population among

the various wilderness use studies. The larger horse-oriented wilderness areas average fewer females, while the smaller hiking areas averaged more.

Age: Young adults under the age of 30 are the most common wilderness users (and a high percentage of these are less than 25 years old), but all age groups are usually fairly well represented.

Visitor residence: Although many wilderness areas draw visitors from all over the nation, many wilderness users are of local origin from within the state where the wilderness area is located, or from adjacent states. Percentages of local origin range from just over 50% up to 90%. Furthermore, most visitors are from the same section of the state in which the wilderness area is located. This seems to indicate that wilderness areas serve a more regional recreation purpose, rather than a national one. Finally, most wilderness users are from urban areas, i.e., large towns or large cities.

C. Previous Experience

A majority of wilderness users surveyed had been on at least one previous hike, whether dayhiking or backpacking, in their hiking careers. Almost half had made previous trips to the wilderness study area and one-half to two-thirds had visited other wilderness areas. Many had considerable experience and averaged 3 to 6 trips and 6 to 10 days hiking per year. Notably, the more experienced the hiker, the stronger the preference was for low density hiking.

D. Motives and Attitudes

Motives for hiking in wilderness areas were fairly uniform across all studies. The most important motive, or reason, for all users was enjoyment of the scenic beauty and wilderness qualities of the area. Another very important motive was to experience solitude (along with peace and quietness). A third major motive was to escape civilization and the day to day routine of urban life. Users sought a more natural environment where evidence of man's intrusion on the environment was minimal. Most, therefore, preferred more primitive undeveloped conditions.

Common concerns and attitudes held by most wilderness users pertained to the quality of their wilderness experience. Most felt the quality of the experience declined as more groups were encountered. Encountering one large party (10 or more) was considered by most more detrimental than encountering several smaller parties. Most wilderness users expected encounters in the periphery of the area but sought to avoid all contacts as they penetrated deeper into the wilderness area and fully expected an isolated campsite. Additionally, most users felt that any noises or signs of civilization, e.g., autos, chain saws (timber harvesting), outboard motors, views of resorts, or industrial developments from the trail detracted from the solitude factor and the whole experience.

Summary

In summary, comparison of western and eastern wilderness use studies have shown many similarities and few differences between the two groups. Yet, to what extent can this research, which has been based on summer or peak season use, be applied to winter or off-season use? Many wilderness areas have the potential for, and are frequently receiving, year-round use. Winter weather factors certainly cause concern for potential differences in management approach in a four season resource area. But are there other factors that might require management differences when dealing with winter use? The question for the resource manager now becomes, "Are there differences between seasonal users and use patterns, especially the seasonal extremes--winter and summer?"

CHAPTER III

METHODOLOGY

Study Area

Study Locale

The Great Smoky Mountains National Park is located in the Great Smokies range. As a portion of the Southern Appalachians, the Great Smokies are one of the taller mountain masses in eastern North America. The Great Smokies range is oriented northeast to southwest between Tennessee and North Carolina, resulting in the Park straddling the common border of the two states (Figure 2).

The wide range of elevation within the Park (e.g. Cooper Road at 1180 feet (360 m.) and Clingman's Dome at 6643 feet (2025 m.)) and the accompanying climatic conditions result in such a diversity of habitats that hiking from the lowlands to the peaks is comparable to taking a trip from Tennessee to Canada. The variation of habitat accounts for the abundance and diversity of flora and fauna encountered in the Park--deciduous and coniferous forests composed of more than 100 species of native trees, 1300 species of flowering plants, 200 species of birds, and 50 species of mammals, to list but a few.

The Park's natural beauty is not its only attraction. It is also an historic park offering a silent testimony to life as it was for the Cherokees and later the pioneers, or "mountain people" as they became known, who settled this mountainous area and lived a



Figure 2. Geographical location of the Great Smoky Mountains National Park, located on the boundary of the states of Tennessee and North Carolina.

primitive, isolated way of life. The split rail fences, open fields, crumbling homesteads, grist mills, churches, abandoned cemeteries, and the other remaining buildings and structures are evidence of a culture that has all but disappeared from this country.

These many attributes make the Smokies an extremely valuable recreation resource, high in national awareness and recognition. Added to this is the Park's proximity to many major eastern population centers, resulting in the Park's status as the most visited National Park in the United States--receiving some nine million visits annually.

Study Site

The Great Smoky Mountains National Park was selected as the study area because it receives as much winter backcountry overnight use as any wilderness backcountry in the United States, excluding perhaps a few warm climate areas. This use is likely to increase at a faster rate in the Smokies than in other areas due to its proximity to large eastern population centers. Because of remoteness and short seasons, many western wilderness areas are not suited for the short destination hikes of eastern winter campers.

The Park contains 800 square miles (1,287 sq. km.) of mountainous terrain, 700 miles (1,127 km.) of streams and waterfalls, and over 850 miles (1,368 km.) of foot and horse trails. The Appalachian Trail enters the Park on its eastern boundary at Davenport Gap, then meanders along a 70 mile (113 km.) diagonal across the Park, leaving the Park at Fontana Dam on the Park's southwestern boundary

(Figure 3). For a more detailed map of the Park, see the map in the back pocket of this thesis. Available to backcountry campers in the Park are approximately 82 designated backcountry campsites and 18 shelters. Thirteen of the 18 shelters are located on the Appalachian Trail.

Winter Environment

The winter use season for this study was defined as the months of January and February. Little snow falls in the Park at the lower elevations before late December and the spring flora blooms as early as late February. U. S. Weather statistics indicate that for Gatlinburg, Tennessee--located at the Park's boundary at an elevation of 1,482 feet (452 m.)--the average monthly temperatures for January and February are 39.3°F (4.1°C) and 41.9°F (5.5°CO, respectively. Although snow remains on the ground for more than a day or two at low elevations in the Park, the snow depth on the ridgetops of 6,200 feet (1,890 m.) may exceed 6 feet (1.8 m.) and remain for weeks. Early climatic records for the higher elevations of the Park are nonexistent; however, Shank's work of 1949 and 1950 indicates that temperatures average 10-12°F (-12.2°C to -11.1°C) lower at elevations above 5,050 feet (1,539 m.) (Shanks 1954).

Winter campers are routinely warned by park rangers of the unpredictability and possible danger of the weather during the winter season. Sudden storms can develop resulting in extreme weather conditions and temperature changes. Hypothermia and frostbite are ever present dangers, and Park personnel try to make winter campers

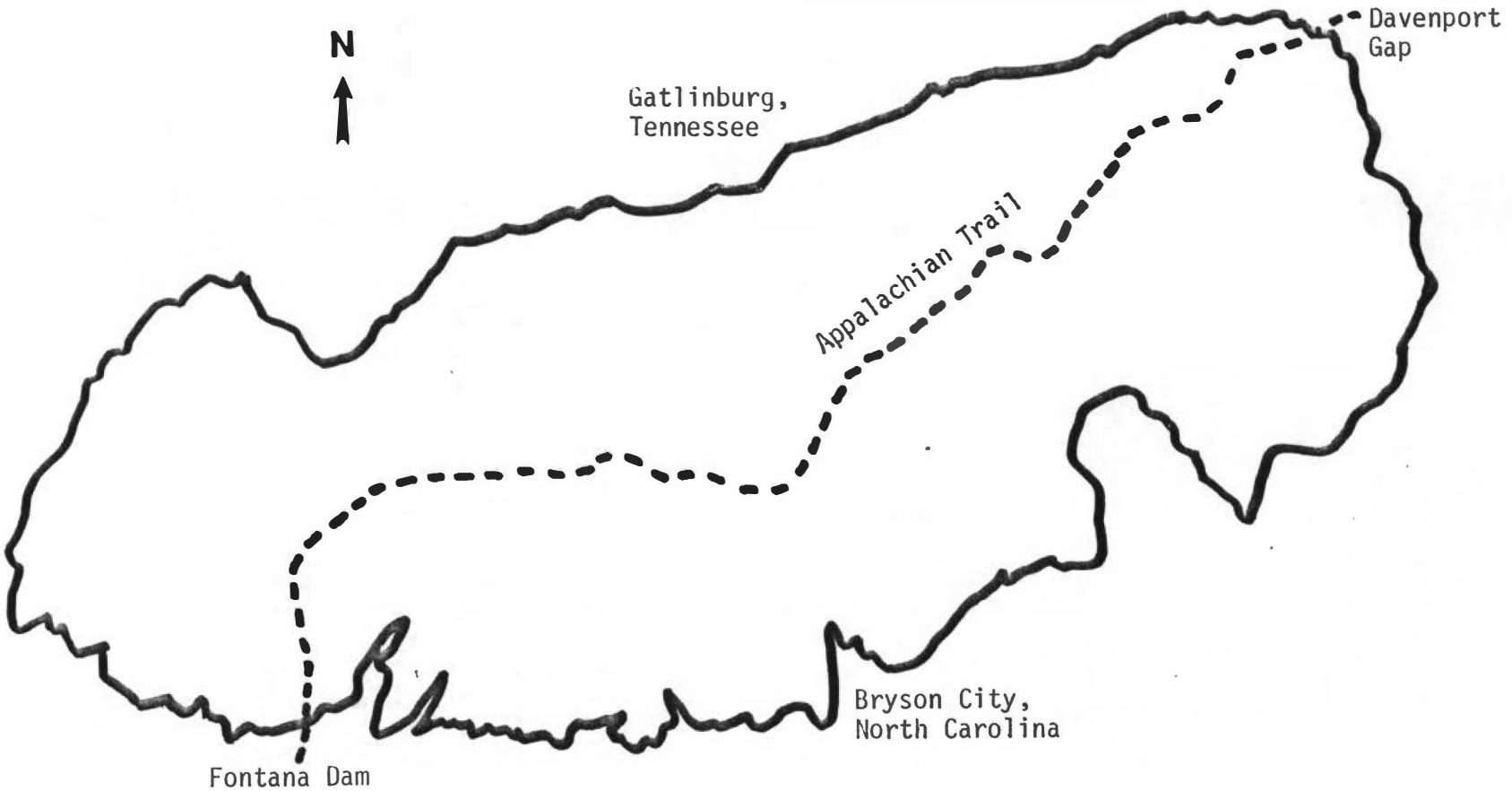


Figure 3. An outline map of the Great Smoky Mountains National Park, showing the location of the 70 miles of Appalachian Trail within the Park.

knowledgeable concerning winter survival. Winter permits are sometimes denied if a camper's clothing or equipment is judged inadequate for potentially severe winter weather.

Sampling Procedures

The following methods of data collection were decided upon to achieve the objectives of the study:

1. Use pattern data were obtained from backcountry overnight use permits required by GSMNP for an equal number of 1979 winter and summer backcountry campers.
2. Additional data concerning the characteristics, backpacking experience, participation reasons, and amount of area substitution on a seasonal basis were obtained by mailing questionnaires to a random 300 of the above mentioned 1979 winter backcountry campers.

Backcountry Overnight Use Permits

Use pattern data were obtained for both winter and summer backcountry overnight users from the permits that the Park requires for all overnight backcountry camping (Appendix A). The permit system was instituted in 1972 and permits are issued only up to the capacity determined for each shelter and backcountry campsite.

Data were recorded from all 580 winter permits issued in January and February 1979, with a breakdown of 350 from January and 230 from February. In order to compare differences between winter and summer use patterns, an equal number (580) of summer backcountry

permits was randomly selected for August 1979. Initial plans were to select permits from both July and August 1979. Because of the abnormally high rainfall in July 1979, it was decided that August, when the rainfall returned to a more normal level, would give the study a more representative sample of summer backcountry users.

Data recorded from the permits included:

1. Origin of users (state and zip code)--the information recorded represents only the origin of the individual who filled out the permit, not the origins of all the members of the hiking party,
2. Period of the week the hike was started (weekend or weekday),
3. Trail entry and exit points,
4. Type of hike (loop or non-loop),
5. Mode of travel (foot or other),
6. Size of party,
7. Length of hike (miles),
8. Length of stay (nights),
9. Areas, campsites, and/or shelters used each night.

The Survey Questionnaire

A mail questionnaire was chosen as the most effective means to generate additional data on winter use in GSMNP for several reasons:

1. With the smaller number of backcountry campers in the winter, a larger sample could be obtained from the use of

names and addresses from 2 full months of permits versus spending 2 to 3 weeks on site.

2. Mail questionnaires do not intrude directly upon the recreation experience as do on-site interviews.
3. No federal funding nor stipends were available for the study; therefore a mail questionnaire was more cost-effective than field interviews.

The questionnaire was developed by the author, in consultation with Dr. William E. Hammitt. A rough draft of the questionnaire was then given to selected GSMNP staff and other research scientists for their evaluation and recommendations concerning clarification, understanding, and pertinence of each question.

The final form of the questionnaire consisted of 2 pages (1 page front and back) that required from 3 to 5 minutes to complete (Appendix B). The questionnaire was divided into five general information sections as follows:

1. Backpacking Experience--which investigated the respondent's total number of years of backpacking experience, the average number of backpacking trips made per year, the seasonal distribution of these trips, and the average number of days spent backpacking per year;
2. Backpacking in Great Smoky Mountains National Park--concentrated on the respondent's backpacking experience specifically in the Smokies, investigating year of first backpacking trip to the Smokies, average number of backpacking trips to the Smokies per year, seasonal

distribution of these trips, year of first winter backpacking trip to the Smokies, the number of winter and number of summer backpacking trips to the Smokies over the last three years, and determination by the respondent as to whether his/her winter trips had been longer or shorter than his/her summer trips in number of days and miles in length.

3. Reasons for Winter Backpacking in the Smokies--investigated the respondent's reasons for winter backpacking in the Smokies. This section employed a five-point Likert scale for recording the user's response to each listed reason as either not important, somewhat not important, somewhat important, important, or very important. This section ended with an open question for the respondent to fill in specifying other reasons not listed.
4. Area Substitution--investigated respondent's tendency to avoid the Smokies during the summer months due to heavy visitor use, and his/her plans to increase winter backpacking in the Smokies.
5. Background Information--investigated the respondent's age, gender, residence, and distance traveled to the Smokies.

Sections 1, 2, and 5 employed "open" questions which required the respondent to reply with numerical values unique to his/her experience. One "closed" question was included in Section 2 which gave the respondent alternate choices to the question "Do your hikes

tend to be shorter or longer in the winter (number of days and miles in length)?" Section 3 employed a five point Likert scale as mentioned before. Section 4 employed two closed questions and one open question. The closed questions offered alternate choices to the questions concerning the tendency to avoid the Smokies in the summer months and plans to increase winter backpacking in the Smokies. The open question requested the names of alternative areas used by the respondent during the summer.

Questionnaire Sampling Procedure

The questionnaire was mailed to 300 randomly selected winter backcountry campers whose names and addresses were obtained from the 1979 winter backcountry permits. In addition to the questionnaire, a cover letter (Appendix C) and self-addressed, postage-paid, return envelope were included with the survey. The cover letter was printed on The University of Tennessee, Knoxville stationary and explained the purpose of the questionnaire and reason the respondent was chosen, while emphasizing the briefness of the survey, short amount of time needed to complete it, and the importance of returning the survey due to the small sample.

Of the 300 questionnaires mailed, 70 were returned as non-deliverables and 173 were completed and returned by the respondents. One post card reminder was used and no further mailings of the questionnaire were made (Appendix D). Subtracting the 70 non-deliverables resulted in a 75% return rate of the questionnaires. The large number of non-deliverables may have been due to many respondents moving since

permit addresses were from 1979 and the mail questionnaire was conducted in 1981.

Data Analysis

Statistical analyses were computed using the Statistical Package for the Social Sciences (Nie et al. 1975). The General Linear Models Procedure was used from the SAS User's Guide (Blair et al. 1979) to determine analysis of variance for two questionnaire experience variables. Univariate statistics (mean, median, mode, minimum and maximum values, variance, standard deviation) were computed for all variables from winter and summer permits and the questionnaire.

Permit Data

Student's t-test procedures were used to test hypotheses ($p \leq .05$) regarding mean differences among party size, number of miles hiked, and length of stay between winter and summer backcountry campers. Chi-Square tests of significance were used to compare dominant states of origin, day hike started, and type of hike, for the two groups of campers.

Questionnaire Data

Student's t-test and analysis of variance were used to test for significant differences ($p \leq 0.05$) between and among levels of seasonal participation in and outside GSMNP by winter campers. Factor analysis was used to determine clusters or themes among the reasons for winter backpacking in the Smokies. Principal factoring

with iteration and orthogonal varimax rotation (Nie et al. 1975) was the factor analysis routine employed. Factoring criteria included: factor loadings had to be $\geq$ 0.40 for reasons to be included in a factor, and only factors with eigen values $\geq$ 1.0 were extracted. To determine the internal consistency reliability among items in a factor, Cronbach's alpha was selected. This measure indicates the degree of reliability of the items within a factor in measuring a given concept.

CHAPTER IV

COMPARISON OF WINTER AND SUMMER BACKCOUNTRY USERS

Backcountry overnight use permits were the source of data used in the comparison of winter and summer users. The permit system was instituted in 1972 as an instrument to regulate the ever-increasing numbers of campers in the Park's backcountry. Thus it embodied an effort to distribute and regulate backcountry use and provide opportunities for solitude. The permit system restricts use to a certain determined capacity for each campsite and shelter. Although backcountry campsites and shelters may be reserved up to 30 days in advance of a trip, the permit itself may only be picked up in person within 24 hours of the beginning of the trip. A permit is required for each camper or party using the Park's backcountry and provides to Park managers a record of party routes and overnight locations along with other use information, contributing both to visitor protection and the establishment of use patterns vital to Park management.

Comparison of winter and summer users will be presented in four major sections:

1. Origin of users, i.e., state of residence,
2. Party characteristics--party size, period of week hike began (weekend versus weekday), mode of travel,
3. Trip characteristics--length of hike in miles, type of hike (loop versus non-loop), length of stay in nights,

4. Use patterns--area use, shelter use, trip entry and exit points.

Origin of Backcountry Users

State of residence differed significantly (Chi-Square, $p \leq .001$) between winter and summer backcountry users. Winter users were likely to be of local origin with 76% of the users coming from Tennessee, Georgia, North Carolina, Alabama, and South Carolina (Table I). Over a third of the winter use (35%) came from Tennessee residents. In contrast, 45% of the summer users came from Tennessee, North Carolina, Georgia, and Kentucky, with Tennessee residents accounting for 20% of the users. There was a greater representation by state among summer users with 36 states represented as opposed to 29 states represented in the winter.

Party Characteristics

Party Size

Party size was the only major use variable that did not differ significantly with winter and summer means of 2.6 and 2.7 respectively (Student's t-test, $p = .857$). Party size ranged from 1 to 8 people (the Park limit is 8 people per party) for both winter and summer users. There was an overall tendency for party sizes to be small, with 80% of the parties consisting of 3 or less persons during both seasons (Table II). The most frequent party size during both winter and summer was 2 people. Somewhat surprising was the number of winter solo trips (14%) compared to summer solo trips (15%), which

Table I. State of Origin of Backcountry Users in the Great Smoky Mountains National Park, 1979.

Winter		Summer	
State	%	State	%
Tennessee	35	Tennessee	20
Georgia	13	North Carolina	15
North Carolina	11	Ohio	8
Alabama	9	Georgia	5
South Carolina	8	Kentucky	5
Other[a]	24	Other[b]	47

$X^2 = 58.60$; $df = 5$; $p \leq .001$.

[a]Twenty-four other states plus a foreign category.

[b]Thirty-one other states plus a foreign category.

Table II. Number of Individuals in Backcountry Parties.

Number of Individuals		Winter %	Summer %
1		14	15
2		48	50
3		18	15
4		11	9
5		4	4
6 or more		5	7
mean	=	2.6	2.7
median	=	2.0	2.0
mode	=	2.0	2.0

t = -0.18; df = 1158; p = .857.

contradicts an earlier hypothesis that winter trips are more group oriented.

Period of the Week the Hike Originated

Two periods of the week were identified for purposes of temporal distribution analysis: weekend, with the hike beginning on Friday, Saturday, or Sunday; and weekday, with the hike beginning on a Monday, Tuesday, Wednesday, or Thursday.

Winter and summer users differed significantly in the period of the week their hikes began (Chi-square, $p \leq .001$). Almost a third more winter users (77%) started their hike on the weekends than summer users (48%), while over half (52%) of the summer hikes began on weekdays (Table III). The higher percentage of hikes begun on the weekend in the winter is due largely to the season, in which winter weather conditions make shorter, weekend-oriented hikes more desirable and practical. In contrast, the higher percentage of hikes begun on weekdays during the summer season corresponds to the greater number of vacations taken in summer, summer breaks for students, and similar factors.

Mode of Travel

Different modes of travel have different impacts on the physical resource, as well as the experiences of the backcountry visitors. The most frequent travel modes used by backcountry campers (this excludes wilderness areas that have waterways that allow for watercraft modes of transportation) are foot and horseback. In western wilderness areas, horses are used quite frequently as a mode

Table III. Period of the Week the Hike Originated.

Period Started	Winter %	Summer %
Weekend[a]	77	48
Weekday[b]	23	52

$X^2 = 102.71$; df = 1; $p \leq .001$.

[a]Weekend = Friday, Saturday, or Sunday.

[b]Weekday = Monday, Tuesday, Wednesday, or Thursday.

of travel on backcountry camping trips; but in eastern wilderness areas, the use of horses is less popular.

Almost 100% of travel by winter users was on foot, with other modes of travel accounting for less than 1% of all travel. During the summer season, other modes of travel (horse) accounted for 3% of the total travel while 97% was done on foot. The mode of travel variable was removed from any further analysis due to the small percentages representing modes of travel other than foot.

Trip Characteristics

Length of Hike

Winter users hiked significantly fewer miles (Student's t-test, $p \leq .001$) than summer users, with mean number of miles of 18.3 (29.4 km.) and 27.8 (44.7 km.) respectively (Table IV). Winter backcountry trip lengths ranged from 1 to 115 miles (1.6 to 185 km.), with the most frequent hike length being 10 miles (16 km.). Hikes of 15 miles (24 km.) or less were taken by 59% of the users, supporting the earlier hypothesis that winter hikes tend to be shorter; yet a surprising 25% of winter users took hikes of 22 miles (35 km.) or more. In contrast, summer hikes ranged from 2 to 154 miles (3.2 to 248 km.) with the most frequent hike length being 12 miles (19 km.). Almost half (48%) of the summer users took hikes of 22 miles (35 km.) or more.

Table IV. Number of Miles Hiked by Winter and Summer Backcountry Users.

Number of Miles		Winter %	Summer %
1-3		1	1
4-6		12	3
7-9		14	8
10-12		20	12
13-15		12	13
16-18		9	8
19-21		7	7
22 or more		25	48
mean	=	18.3	27.8
median	=	13.0	21.0
mode	=	10.0	12.0

$t = -6.84$; $df = 1156$; $p \leq .001$.

Type of Hike

Two types of hikes were identified for this study--loop hikes and non-loop hikes. The trail entry and exit points were the same for loop hikes, often keeping the hike concentrated in one use area. The trail entry and exit points were different for non-loop hikes, and often were located in two or more different use areas of the Park.

Although loop hikes were the most popular type of hike for both winter and summer users, a significantly higher percentage (Chi-Square, $p \leq .001$) of winter hikers chose a loop hike (88%) than did summer hikers (73%) (Table V). Other permit information indicates that loop hikes were typically shorter hikes, both in mileage and length of stay (number of nights), than were non-loop hikes. In addition, loop hikes seemed to be more destination oriented--oriented towards reaching a particular campsite or shelter for the night and returning within a day or two on a loop trail, or retracing the initial trail used, to the point of entry.

Length of Stay

Length of stay was measured in the number of nights spent in the backcountry per trip. Length of stay differed significantly (Student's t-test, $p \leq .001$) between winter and summer users, with mean lengths of 2.1 nights for winter and 3.0 nights for summer (Table VI). The number of nights spent in backcountry campsites and shelters by winter users ranged from 1 to 11 nights compared to 1 to 13 nights for summer users. Short stays were characteristic of

Table V. Type of Hike by Winter and Summer Backcountry Users.

Type of Hike	Winter %	Summer %
Loop	88	73
Non-loop	12	27

$X^2 = 33.71$; df = 1; $p \leq .001$.

Table VI. Length of Stay of Backcountry Users.

Number of Nights	Winter %	Summer %
1	50	27
2	24	23
3	11	18
4	5	12
5	3	8
6 or more	7	12
mean =	2.1	3.0
median =	2.0	3.0
mode =	1.0	1.0

t = -7.89; df = 1158; $p \leq .001$.

winter users with 85% of the parties camping 3 nights or less, and with 50% camping for only 1 night. Almost a third of summer users (32%) spent 4 or more nights in the Park backcountry per trip. Just over a quarter of the summer users (27%) limited their camping to one night.

Use Patterns

Area Use

The Park was divided into 9 researcher designated districts, or use areas, to serve as a basis for recording the distribution of backcountry visitor use. These districts, or use areas, are not Park Service districts but correspond with the areas given on the backcountry map distributed by the Park to backpackers, with 5 to 15 Park designated campsites in each area. All shelters were grouped into a separate district, or use area. Since the distribution of use is a primary problem of Park backcountry management, an absolute carrying capacity has been set for each campsite per night, and shelter use is limited to the number of bunks available (Bratton et al. 1978). Permits are issued for a site(s) or shelter(s) only if the set carrying capacity has not been reached during the time period the hike will occur. When the use capacity has been reached for a particular campsite or shelter, alternative campsites or shelters, if available, are suggested. If the user does not wish to change his plans and accept an alternative site, or if all campsites and shelters are full, the permit is denied.

Use tends to be concentrated in certain areas of the Park and at specific campsites and shelters. Shelters as a group received a major portion of use in both winter and summer. However, nearly

two-thirds of the winter backcountry campers (62%) used shelters as compared to 40% of the summer campers (Table VII).

The Appalachian Trail, which represents about 8% of the maintained trail system in the Park, was recognized as a distinct use area (Figure 4). Thirteen of the Park's 18 shelters are located along the Appalachian Trail[1] with only one campsite, Mt. Chapman (horse camp), located along the Trail. Combining the use percentages of these 13 shelters reveals that the Appalachian Trail received 44% of the backcountry use during the winter period and 33% of the backcountry use during the summer season.

Other areas where winter use was concentrated during the winter include: Greenbrier-Cosby-Big Creek-Cataloochee area (10%), Elkmont-Tremont area (8%), Oconaluftee area (7%), and Cades Cove area (6%). These four areas, plus the shelters, accounted for 93% of the winter use within the Park.

In contrast, summer use tended to be more dispersed among the use areas with a larger percentage of use occurring in those areas accessible only through longer hikes. Yet many of the areas that were the most popular in the winter were as popular, or more so, during the summer. Heavily used areas in the summer include: Greenbrier-Cosby-Big Creek-Cataloochee area (12%), Elkmont-Tremont area (9%), Cades Cove area (9%), Oconaluftee area (7%), Deep Creek area (7%), and Twenty Mile area (7%). These six areas, plus the

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[1]Although located along the Appalachian Trail, the shelters are within one-half mile of the Trail.

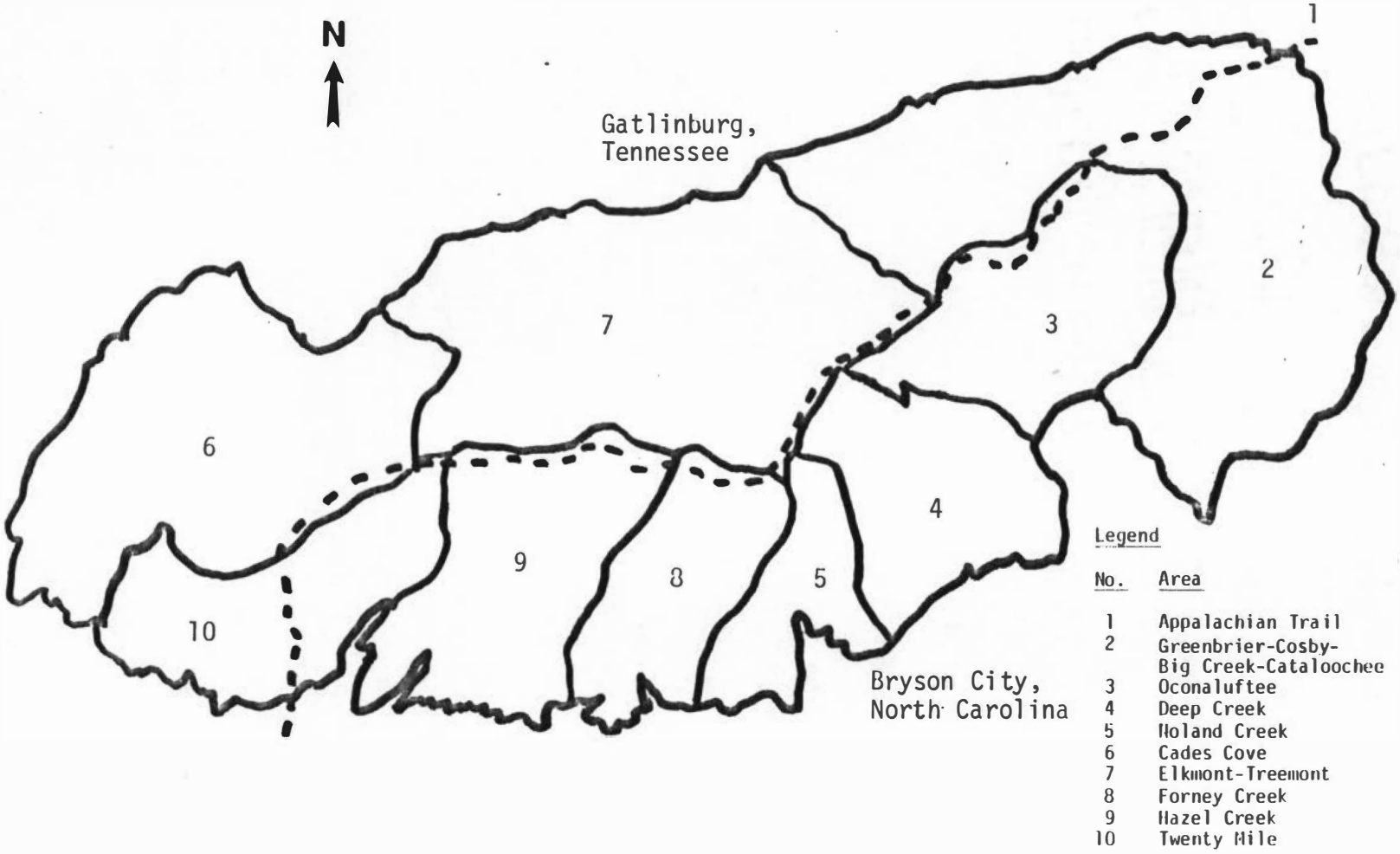


Figure 4. Map of backcountry use areas in the Great Smoky Mountains National Park. These use areas were researcher designated to serve as a basis for recording distribution of backcountry visitor use.

Table VII. User Concentration According to Shelters and Nine Use Areas of the Park--Winter vs. Summer.

Area	Winter %	Summer %
Shelters[a]	62	40
Greenbrier-Cosby-Big Creek-Cataloochee	10	12
Elkmont-Tremont	8	9
Oconaluftee	7	7
Cades Cove	6	9
Deep Creek	3	7
Hazel Creek	1	3
Twenty Mile	1	7
Noland Creek	1	3
Forney Creek	1	3

[a]Thirteen out of 18 shelters are located along the Appalachian Trail.

shelters, accounted for 91% of the summer use in the Park.

Shelter Use

As with the use areas in the Park, certain shelters tended to receive a disproportionate amount of use, particularly in the winter season. Two shelters received almost a third of the winter shelter use--Ice Water Springs (17%) and Mt. LeConte (13%) (Table VIII). Other shelters receiving the next heaviest percentage of use include: Mt. Collins (9%), Kephart (9%), Spence Field (8%), Russell Field (7%), Peck's Corner (5%), and Cosby Knob (5%). These six shelters, plus the Ice Water Springs and Mt. LeConte shelters accounted for almost three-quarters (73%) of the winter shelter use.

Summer shelter use, as with summer use areas, tended to be more dispersed among the 18 shelters. Seven shelters accounted for just over half (53%) of the shelter use in the summer. The two most popular of these were Mt. Collins and Cosby Knob at 9% each. Following these two in percentage of use were Ice Water Springs, Peck's Corner, Tricorner Knob, Derrick Knob, and Double Springs at 7% of use each. Despite the popularity of the Mt. Collins and Cosby Knob shelters, which are located a short distance from trailheads, those shelters accessible only by longer hikes showed increased usage by summer users.

Entry and Exit Point Use

Entry and exit points (trailheads) of hikes are also important components in determining use patterns. Forty-two entry points and 45 exit points were identified for winter users, and 46 entry

Table VIII. User Concentration According to Shelters of the Park--Winter vs. Summer.

Shelter Name	Winter %	Summer %
Ice Water Springs	17	7
Mt. LeConte	13	5
Mt. Collins	9	9
Kephart	9	6
Spence Field	8	6
Russell Field	7	5
Peck's Corner	5	7
Cosby Knob	5	9
Tricorner Knob	4	7
Mollie's Ridge	4	4
Siler's Bald	3	4
Derrick Knob	3	7
Laurel Gap	3	6
Birch Springs	2	4
Rich Mountain	2	1
Davenport Gap	2	5
Double Springs	2	7
Scott Gap	2	1

points and 46 exit points were identified for summer users. In both the winter and summer seasons, a few trailheads received a majority of the visitor use. Since most of the trailheads received only very light use, only the top 12 locations used are identified in the following tables on entry and exit points.

The 12 most frequently used entry points identified by winter users (Table IX) accounted for 88% of the use, with the remaining 12% spread among 30 other entry points. The trailheads at Anthony Creek, Newfound Gap, and Alum Cave combined represent 48% of the total winter use. The top 12 entry points identified by summer users accounted for 77% of the entry point use, with the remaining 23% of the use spread among 34 other entry points. As with summer use areas and shelters, summer entry point use tended to be more dispersed among the trailheads identified.

The most frequently used exit points were generally repeats of the most popular entry points in each season, with only a few variations. This is because a majority of the hikes were loop hikes in both winter (88%) and summer (73%), with the hike beginning and ending at the same trailhead.

The 12 more frequently used exit points accounted for 85% of the winter use and 76% of the summer use (Table X). Again, Anthony Creek, Alum Cave, and Newfound Gap received the most concentrated use from winter users and combined accounted for 45% of the total winter exit point use. As with summer entry points, summer exit points tended to be more dispersed among the trailheads identified by summer users.

Table IX. Entry Points of Winter and Summer Backcountry Users.[a]

Winter		Summer	
Location	Rel. Freq. (%)	Location	Rel. Freq. (%)
Anthony Creek	18	Newfound Gap	10
Newfound Gap	16	Anthony Creek	10
Alum Cave	14	Big Creek	9
Smokemont	8	Elkmont	8
Big Creek	7	Cosby	7
Elkmont	7	Smokemont	6
Cosby	5	Deep Creek	6
Kephart	5	Alum Cave	6
Forge Creek	3	Fontana Dam	4
Abrams Falls Parking	2	Twenty Mile	4
Mt. LeConte	2	Abrams Falls Parking	4
Deep Creek	2	Upper Deep Creek	3
All Others	12	All Others	23

[a]Only top 12 locations are identified.

Table X. Exit Points of Winter and Summer Backcountry Users.[a]

Winter		Summer	
Location	Rel. Freq. (%)	Location	Rel. Freq. (%)
Anthony Creek	18	Anthony Creek	10
Alum Cave	14	Newfound Gap	8
Newfound Gap	13	Elkmont	8
Smokemont	8	Cosby	8
Elkmont	6	Big Creek	7
Big Creek	6	Fontana Dam	7
Cosby	5	Deep Creek	7
Kephart	5	Smokemont	5
Forge Creek	3	Twenty Mile	5
Fontana Dam	3	Alum Cave	4
Mt. LeConte	2	Abrams Falls Parking	4
Davenport Gap	2	Davenport Gap	3
All Others	15	All Others	24

[a]Only top 12 locations are identified.

Summary of Winter and Summer Use Characteristics

A summary of the findings comparing winter and summer backcountry users in GSMNP is presented in Table XI. Significant seasonal differences were found in several of the use variables, and these will be discussed in more depth, along with those variables that displayed little difference, in Chapter VI--Major Findings.

Further Comparison of Winter Backcountry Users

A further breakdown of winter permit data into the two component months of January and February was made to examine possible differences in the use variables between the two months. Data analysis was restricted to univariate statistics (mean, median, mode, minimum and maximum values, variance, standard deviation) computed for the use variables for each month (for tables, see Appendix D).

The breakdown into January versus February winter data revealed notable differences in several of the use variables. Of the winter users, 9% more came from Tennessee in February (41%) than in January (32%), which consequently caused slight differences in the number of users originating from the other dominant states. Seventeen percent of winter backpackers chose to make solo trips in January, as opposed to 10% in February; whereas groups of 3 and 4 were more popular in February (35%) than in January (24%). Almost 20% more winter users began their hikes on the weekend in February (88%) than in January (69%). This substantial difference may be the result of vacations taken in conjunction with the holiday season, extending into January, making it somewhat easier to begin a hike on a weekday.

Table XI. Summary of Winter Versus Summer User Variables.

Variable	Winter	Summer
Dominant State of Origin	35%[a]	20%[a]
Mean Party Size	2.6	2.7
Weekend Originated Hikes	77%	44%
Mean Miles Hiked	18.3	27.8
Loop Hikes	88%	73%
Mean Length of Trip (Nights)	2.1	3.0
Shelter Use	62%	40%
Dominant Shelter Used	17%[b]	9%[c]
Dominant Entry Point	18%[d]	10%[e]
Dominant Exit Point	18%[f]	10%[f]

[a]Tennessee.

[b]Ice Water Springs.

[c]Mt. Collins/Cosby Knob (tie).

[d]Anthony Creek.

[e]Newfound Gap/Anthony Creek (tie).

[f]Anthony Creek.

Almost half of the hikes (48%) taken in February were 7 to 12 miles (11-19 km.) in length, while the same percentage of hikes taken in January were of 16 miles (26 km.) or more, with 31% of January hikes falling into the 22 miles (35 km.) or more category. Of the hikes taken in February, 91% were loop hikes, as opposed to 85% loop hikes in January. Of the trips made in February, 83% were of 1 to 2 nights in length, as opposed to 68% of the same length in January. Use areas and shelters displayed only slight differences in contrasting January and February (Appendix D).

CHAPTER V

THE WINTER BACKCOUNTRY USER

Speculation that the winter backcountry user could be a "specialized" user with unique user characteristics, experience levels, and preferences, therefore requiring a different managerial approach than summer users, spurred further research via a questionnaire sent to 300 randomly selected winter users. A two-page mail questionnaire (Appendix B) generated data from 173 respondents for the development of a winter backcountry user profile. The results of this questionnaire will be presented in five sections.

1. Demographic Characteristics,
2. General Backpacking Experience,
3. Backpacking Experience in Great Smoky Mountains National Park,
4. Reasons for Winter Backpacking in the Smokies,
5. Area and Seasonal Substitution.

Demographic Characteristics

Gender

The winter backcountry user in the Smokies is typically male (99%) with females making up only 1% of the users (Table XII). The high predominance of males may be the result of having surveyed only the group leaders, i.e., the persons who filled out the backcountry permits. However, communication with GSMNP personnel

Table XII. Gender and Age of Questionnaire Respondents.

Gender	%	Age	%
Male	99	17-20	5
Female	1	21-25	33
		26-30	27
		31-35	18
		36-40	7
		41-49	5
		50-59	5
		mean =	29.5
		median =	28.0
		mode =	22.0

verifies that males are more predominant among winter backcountry users than summer backcountry users.

Age

The average age of the winter user was around 30 (29.5), with the most frequently given age being 22. Sixty percent of the respondents were between 21 to 30 years of age, with a third of the respondents (33%) falling into the 21 to 25 year old category (Table XII). Participation in winter backpacking seemed to decline with each age group after the age of 30, yet each age group was represented.

Place of Residence--State and City

Although 25 states were represented in the tabulation of the questionnaire respondents' places of residence, 71% of the respondents were of local origin from Tennessee and the adjacent states of Georgia, North Carolina, Alabama, and South Carolina (Table XIII). This is in accord with the permit data on user origin. Almost a third of the winter users (31%) were Tennessee residents. However, a few respondents did travel considerable distance in order to backpack in the Park during winter, e.g., Wisconsin (3%) and California (3%).

Over 100 cities (109) were named as place of residence by the respondents. Over a quarter of the respondents (26%) came from one of four cities: Knoxville (10%), Atlanta (7%), Birmingham (5%), and Nashville (4%) (Table XIII). Again emphasizing the local origin of winter backcountry users, 16 of the top 20 cities listed as place of

Table XIII. Places of Residence--State and City.

State	%	City	%
Tennessee	31	Knoxville, TN	10
Georgia	17	Atlanta, GA	7
North Carolina	10	Birmingham, AL	5
Alabama	7	Nashville, TN	4
South Carolina	6	Cincinnati, OH	2
Florida	5	Maryville, TN	2
Louisiana	3	Charlotte, NC	2
Ohio	3	Chattanooga, TN	2
Wisconsin	3	Memphis, TN	2
California	2	New Orleans, LA	2
Kentucky	2	Cullowhee, NC	1
Virginia	2	Kenner, LA	1
Maryland	1	Louisville, KY	1
Massachusetts	1	Macon, GA	1
Michigan	1	Marietta, GA	1
Mississippi	1	Morristown, TN	1
Others[a]	5	Oak Ridge, TN	1
		Signal Mountain, TN	1
		Spartanburg, SC	1
		Winston-Salem, NC	1
		Others[b]	52

N = 173.

[a]Only 1 respondent from each of the remaining 9 states.

[b]Only 1 respondent from each of the remaining 89 cities.

residence were in the states of Tennessee (8), North Carolina (3), Georgia (3), South Carolina (1), and Alabama (1).

Distance of Place of Residence from Smokies

Winter backcountry users traveled anywhere from 6 (10 km.) to 3,200 miles (5,150 km.) from their homes to make their winter backpacking trips in the Park. Almost three-quarters of the respondents (74%) lived within 300 miles (483 km.) of the Park, and over half (54%) lived within 200 miles (322 km.) (Table XIV). Two hundred miles (322 km.) was the most frequently given travel distance. A small percentage of users (5%) traveled 1,001-3,200 miles (1,611-5,150 km.) in order to winter backpack in the Park.

General Backpacking Experience

Years of Backpacking Experience

The questionnaire respondents had an average of ten years (10.3) general backpacking experience (any season or area). Only one respondent had no backpacking experience before embarking on his winter trip to the Smokies. All other respondents (99%) had 3 or more years of general backpacking experience (Table XV). Almost half of the respondents (45%) had 6 to 10 years of general backpacking experience.

Time Spent Backpacking Each Year

The respondents averaged 6.7 trips and 19 days backpacking each year. Seventy percent made 4 to 12 trips per year (Table XVI). The maximum number of trips made per year by any respondent was 35.

Table XIV. Distance to Place of Residence from Smokies.

Miles	%
0-100[a]	27
101-200	27
201-300	20
301-500	7
501-700	9
701-1000	5
1001-2000	3
2001-3200	2

mean = 341.8
median = 200.0
mode = 200.0
N = 173

[a]Six miles was the actual least distance traveled.

Table XV. Years of Backpacking Experience.

Years	%
0-2	1[a]
3-5	21
6-10	45
11-15	20
16 or more	13

mean 10.3
median = 9.0
mode = 7.0
N = 173

[a]This respondent had no previous backpacking experience before making this winter trip in the Smokies.

Table XVI. Average Number of Backpacking Trips Per Year.

Number of Trips	Frequency %
1-3	23
4-7	42
8-12	28
13 or more[a]	7
	mean = 6.7
	median = 6.0
	mode = 4.0
	N = 173

[a]Maximum number of trips taken per year was 35.

Sixty-one percent of the respondents spent from 6 to 20 days backpacking each year (Table XVII). Ten percent spent 36 days or more backpacking each year, with 70 days being the maximum number of days spent backpacking each year by any respondent.

Seasonal Distribution of Backpacking Trips

On a seasonal basis, winter backcountry users made significantly more ($F = 4.54$, $p \leq .001$) winter trips (to any area) than summer, fall, or spring trips. The respondents averaged almost twice the number of winter trips (2.3) as summer trips (1.3) (Table XVIII). In contrasting the seasons, 35% of winter users made no summer trips at all, with spring following as the season with the next highest trip abstention rate (23%). Six percent of the respondents replied that they made zero winter trips each year. This probably is an indication of those winter backpackers who make less than one annual winter trip, or first time winter backpackers. Only 12% of the respondents make 3 or more summer backpacking trips per year, while 32% make 3 or more winter trips annually. Summer is clearly the season most avoided by winter backpackers, while fall is slightly more popular than spring.

Backpacking in the Great Smoky Mountains National Park

First GSMNP Backpacking Trip

Almost two-thirds of the respondents (66%) took their first backpacking trip in the Smokies (any season) from 1 to 6 years before their 1979 trip (Table XIX). All but 7% made their first GSMNP

Table XVII. Average Number of Days Spent Backpacking Per Year.

Number of Days	Frequency %
1-5	8
6-10	21
11-15	17
16-20	23
21-25	5
26-30	12
31-35	4
36 or more[a]	10
	mean = 19.2
	median = 18.0
	mode = 20.0
	N = 173

[a]Maximum number of days spent backpacking per year was 70.

Table XVIII. Winter Backcountry Users' Average Number of Backpacking Trips Per Season.

Number of Trips		Summer %	Fall %	Winter %	Spring %
0		35	19	6	23
1		29	30	33	34
2		24	26	29	25
3		6	17	16	12
4		4	4	6	3
5		1	2	4	2
6 - 15		1	2	6	1
mean	=	1.3	1.7	2.3	1.5
median	=	1.0	2.0	2.0	1.0
mode	=	0.0	1.0	1.0	1.0

Table XIX. Year of First Backpacking Trip in the Smokies.

Year	%
1979	2
1978	17
1977	11
1976	10
1975	11
1974	8
1973	9
1972	5
1971	6
1970	4
1969	5
1968	2
1967	1
1966	2
1943-1965[a]	7

mean = 1973.1

median = 1975

mode = 1978

N = 173

[a]One respondent made his first backpacking trip in the Smokies in 1943.

backpacking trip after 1965. This is probably a good example of the tremendous increase in backcountry use experienced nationwide in the late 1960's up until the late 1970's. Only 2% of the respondents were first time users in 1979.

GSMNP Trip Frequency

Respondents averaged 3.7 backpacking trips to the Smokies per year. Most of the respondents (43%) make one or two trips to the Smokies each year (Table XX). However, 9% of the respondents said they average zero trips to the Smokies each year. This again may be the result of backpackers who make less than one trip to the Smokies each year. Fifteen percent of the respondents make 7 or more trips per year with 35 trips per year being the maximum number taken by any respondent.

Seasonal Distribution of Smokies Trips

The respondents take significantly more ($F = 6.92$, $p \leq .001$) of their backpacking trips in GSMNP in the winter than in any other season. Respondents indicated that on a seasonal basis, they use the Park backcountry at least twice as much in the winter (1.6 trips) as in the summer (0.6), spring (0.7), or fall (0.8) (Table XXI). Sixty-five percent of the respondents avoid the Park entirely during the heavy use summer season. Over half avoid it during the spring (53%) and fall (52%) as well. This may be a result of the heavy use the Park receives in these seasons due to spring weather and wildflowers

Table XX. Winter Backcountry Users' Average Number of Backpacking Trips to the Smokies Per Year (All Seasons Included).

Number of Trips	%
0	9
1	20
2	23
3	10
4	13
5	4
6	6
7 or more[a]	15

mean = 3.7
median = 2.0
mode = 2.0
N = 173

[a]One respondent made an average of 35 trips per year.

Table XXI. Winter Backcountry Users' Average Number of Backpacking Trips to the Smokies Per Season.

Number of Trips		Summer %	Fall %	Winter %	Spring %
0		65	52	15	53
1		24	30	49	32
2		8	12	18	9
3		1	4	9	3
4		1	1	5	1
5		0	0	1	1
6 - 15		1	1	3	1
mean	=	0.6	0.8	1.6	0.7
median	=	0.0	0.0	1.0	0.0
mode	=	0.0	0.0	1.0	0.0

and changing colors in the fall. Avoidance of the Park during the summer season, and spring and fall as well, and the strong tendency toward making more winter trips in the GSMNP supports the study hypothesis that the Park serves a different "public" in the winter.

First GSMNP Winter Trip

Just over two-thirds of the respondents (64%) made their first GSMNP winter backpacking trip one to four years before the permit surveyed 1979 trip (Table XXII). For 9%, the 1979 trip was their first winter experience in the Park, and over one-third of the respondents (35%) took their first winter trip only one year prior to the 1979 trip. Therefore, winter backpacking in the GSMNP was a first time or relatively recent experience for 44% of the respondents. All but 7% made their first winter backpacking trip in the Park sometime in the 1970's. This may be a function of the age of the respondents, but it may also be indicative of the beginning of a growing trend in winter backcountry use by experienced backpackers who are displaced by the crowds in the peak use seasons.

The winter backcountry use displayed by the questionnaire respondents may be a product of the tremendous nationwide increase in overall backcountry use that occurred throughout much of the 1970's. Yet, while backcountry use peaked in the Park in 1976 and was becoming stabilized by 1978, this study's data indicates that the number of individuals using the Park for winter backpacking was steadily increasing in the 1970's, with a significantly larger number of

Table XXII. Year of First Winter Trip to the Smokies.

Year	%
1979	9
1978	35
1977	9
1976	9
1975	11
1974	6
1973	6
1972	3
1971	4
1970	1
1949 - 1969[a]	7

mean = 1975.3

median = 1977

mode = 1978

N = 173

[a]One respondent made his first winter backpacking trip in the Smokies in 1949.

backpackers beginning to use the Park for winter trips in 1978 (Table XXII).

Trip Frequency Over Last Three Years

During the three years prior to the 1981 questionnaire, the respondents had taken over twice the number of winter backpacking trips (4.8) as summer trips (2.0) in the Smokies (Table XXIII). Almost half of the respondents (48%) had taken no summer backpacking trips in the GSMNP during those three years. An additional 28% had made only one or two trips in that time period. Almost a third of the respondents (33%) had made three to four winter trips over the past three years compared to 13% making the same number of trips during the past three summer seasons. Only 4% of the respondents made 7 or more backpacking trips during the summer seasons of the past 3 years, while 17% made 7 or more trips during the past 3 winter seasons. Again, the tendency to avoid, or make fewer summer trips in the Park, while making more winter trips, indicates further support for the study hypothesis that the Park serves a different "public" in the winter.

Winter Trip Length

Respondents were asked to rate their winter hikes in terms of length, i.e., were their winter hikes longer, shorter, or about the same, measured in the number of days and miles, than hikes taken in other seasons. Measuring their winter hikes in number of days, 45% said their hikes tend to be shorter, while 55% said their hikes

Table XXIII. Number of Trips Made to the Smokies During the Last Three Years in Winter and Summer.

Number of Trips	Winter %	Summer %
0	2	48
1	23	12
2	12	16
3	17	8
4	16	5
5	5	1
6	8	6
7 or more	17	4
	mean = 4.8	mean = 2.0
	median = 3.0	median = 1.0
	mode = 1.0	mode = 0.0
	N = 173	

were longer (38%) or about the same (17%) in duration (Table XXIV). A majority (65%) indicated that their winter hikes tended to be shorter in miles than hikes made in other seasons (Table XXIV). Just over a third of the respondents (35%) said that their winter hikes were longer or about the same in length when measured in miles.

The responses of the surveyed winter backcountry users correspond with the statistics from the backcountry permit data concerning winter trip length. When comparing winter and summer trips, permit data indicated a much greater difference in winter trip length in terms of miles than in trip length measured in length of stay, even though length of stay was found to differ significantly between winter and summer users. Again, this supports the earlier study hypothesis that winter hikes involve less hiking and shorter stays.

Reasons for Winter Backpacking in the Smokies

Respondents were asked to indicate reasons for participating in winter backpacking in the GSMNP. Eighteen reasons were rated on a 5-point Likert scale for importance by the respondents, i.e., not important, somewhat not important, somewhat important, important, and very important. The most important reasons for winter backcountry use in GSMNP involved enjoying winter scenery in the Smokies, experiencing the winter environment, and avoiding crowds, especially summer crowds (Table XXV). Least important among the reasons were those concerned with less chance of encountering dangerous animals (i.e., snakes, bears), amount of time available, testing new equipment, and "to show that I could do it."

Table XXIV. Length of Winter Hikes in Days and Miles Compared to Hikes in Other Seasons.

Answer	Number of Days %	Miles in Length %
Longer in Winter	38	22
Shorter in Winter	45	65
About the Same	17	13

N = 173.

Table XXV. Reasons for Winter Backpacking in Great Smoky Mountains National Park.

Reasons	Mean[a]	Standard Deviation
To enjoy the winter scenery in the Smokies	4.59	0.61
To get away from the crowds	4.39	0.79
To experience the winter environment	4.36	0.72
Fewer people than during the summer	4.34	1.04
To be close to nature	4.30	0.76
Quieter in winter	3.70	1.18
More challenging in the winter	3.60	1.21
Prefer winter weather	3.54	1.30
To test the survival backpacking skills involved	3.18	1.24
Need to get away from home environment	3.13	1.41
To be with my friends	3.06	1.29
To be alone, by myself	2.57	1.42
More risk involved	2.53	1.31
To test new equipment	2.36	1.25
To show that I could do it	2.25	1.20
Not enough time for a long vacation--Smokies was close	2.16	1.28
More free time in the winter	1.95	1.25
Less chance of running into dangerous animals (i.e., snakes,.bears)	1.49	0.92

[a]Response format was: 1 = not important, 2 = somewhat not important, 3 = somewhat important, 4 = important, 5 = very important. Means are based on the 1 to 5 rating values.

The order of the respondents' reasons further supports the preference of winter over summer backpacking by winter backcountry users. They prefer winter backpacking not only for the escape it offers from peak season crowds but also, and most important, for the very qualities no other season can offer--the winter scenery and environment.

When the 18 reasons were factor analyzed, using a principal components routine, three factors were identified. The most important factor, with a mean of 4.20, involved "experiencing the winter environment" (Table XXVI). Three of the four items grouped in this factor involved winter scenery, winter environment, and winter weather. The fourth item included in this factor was "to be close to nature." Following a close second in importance was a factor dealing with solitude, with a factor mean of 4.15, which was not significantly different from the first factor's mean at the 0.05 level. Escape from the crowds, fewer people, and quietness were the reasons for winter backpacking included in this factor. The least important factor, with a factor mean of 2.79, dealt with skill development and challenge. The mean of this factor was significantly different ($p \leq .05$) from the other two factor means. The five items grouped in this factor involved testing survival backpacking skills and new equipment and the greater risk and challenge offered in the winter. The greater importance of the winter environment and solitude factors (i.e., higher factor means) is in agreement with the tendency of the respondents to engage in more backpacking trips during the winter months than during the other seasons of the year.

Table XXVI. Factor Analysis of Reasons for Winter Backpacking in Great Smoky Mountains National Park.

Factor	Factor Loading	Factor Mean†	Factor Alpha Value††
Experiencing the winter environment			
To enjoy the winter scenery in the Smokies	0.6306		
To experience the winter environment	0.4646	4.20_a	0.51
To be close to nature	0.4385		
Prefer winter weather	0.4240		
Solitude			
To get away from the crowds	0.5897		
Fewer people than during summer	0.8042	4.15_a	0.70
Quieter in the winter	0.5633		
Skill development/challenge			
To show that I could do it	0.4690		
To test new equipment	0.5243		
More risk involved	0.7775	2.79_b	0.80
More challenging in the winter	0.7069		
To test survival backpacking skills involved	0.8144		

†Factor means with the same subscript were not significantly different at the 0.05 level.

††Cronbach's alpha was used as a measure of internal consistence within factors.

Respondents were asked to specify any other reasons not listed for winter backpacking in the Smokies. Forty such reasons were identified (Appendix E). The "other" reasons specified most often by respondents were as follows:

- o no insects (12 respondents)
- o winter photography (6 respondents)
- o meet and exchange information with more knowledgeable backpackers, encounter less tourists (5 respondents)
- o cross country skiing (4 respondents)
- o clearer views due to less haze and foliage (4 respondents)
- o easier to get reservations in better shelters/campsites (4 respondents)
- o new experience being from the deep South (4 respondents).

Area and Seasonal Substitution

Respondents were asked if they tend to avoid the Smokies during the summer due to heavy visitor use. Over three-quarters (78%) indicated that they do avoid the Park during the heavy use summer season (Table XXVII). This data is another indication that avoidance of the peak use summer season is one of the reasons for the prevalence of winter backpacking in the GSMNP, and substantiates the earlier study hypothesis that a large number of winter backcountry users tend to avoid the Park during the summer season.

Respondents were then asked what alternative areas were used during the summer, if they did avoid the Smokies. Ninety-seven different alternative areas were indicated (Appendix F). Areas which

Table XXVII. Smokies Avoidance During Summer by Winter Backcountry Users.

Answer	%
Avoids	78
Does Not Avoid	22

N = 173.

were most frequently substituted for the Park during the summer season were as follows:

- Joyce Kilmer-Slickrock (13 respondents)
- Pisgah National Forest (12 respondents)
- Nantahala National Forest (11 respondents)
- Cherokee National Forest (6 respondents)
- Linville Gorge, Tellico Wildlife Area, and Cohuttas (5 respondents each)
- Shining Rock, North Georgia, Mt. Mitchell area, Colorado, and Western United States (4 respondents each)
- Blue Ridge Parkway, Standing Indian, Cumberland Plateau, Red River Gorge, Appalachian Trail "outside the Park," White Mountains (N.H.), Rockies, and Grand Tetons (3 respondents each).

Therefore, questionnaire data does indicate that seasonal and area substitution for the GSMNP is clearly occurring with winter back-country users during the summer peak use season.

Finally, respondents were asked if they plan to increase winter backpacking in the Smokies. Almost half (48%) indicated that they do plan to increase their winter use of the Park, while 21% cited no such plans (Table XXVIII). The remaining 31% were uncertain as to whether or not they would increase their winter backpacking in the Smokies. Though this may be an indication that winter use of the Park will increase considerably in the future (and therefore support another earlier hypothesis), this cannot be stated as a certainty without further studies being done to support it.

Table XXVIII. Winter Backcountry Users' Plans to Increase Winter Backpacking in the Smokies.

Answer	%
Plans to Increase	48
Does Not Plan to Increase	21
Not Sure	31

N = 173.

CHAPTER VI

MAJOR FINDINGS

Major findings in this study included both significant seasonal differences in many use variables, as well as the lack of expected differences in a few use variables. Evaluation of permit and questionnaire data seems to indicate that the GSMNP does serve a different clientele or "public" in the winter, with different use/user characteristics and motives for participation. Discussion of the major findings will be presented in two parts:

1. Comparison of winter and summer backcountry users,
2. The winter backcountry user.

Comparison of Winter and Summer Backcountry Users

Examination of the winter and summer backcountry use characteristics and use patterns indicated significant seasonal differences for all use variables except one--party size.

Winter backcountry users were more likely to be of local origin, i.e., Tennessee and adjacent states (76%), than summer users (45%). Yet the summer season drew users from more different states (36) than the winter season (29). This is not surprising considering that summer is the peak use season of the Park, a time when many people schedule vacations, or are drawn by warmer or more predictable weather. Inclement winter weather conditions cannot only act as a

deterrent for many people, but also hinder travel into the area for many potential out of state winter users.

Party size was the only use variable that did not differ significantly between winter and summer users. Party size tended to be small in both seasons, averaging 2.6 people in the winter and 2.7 people in the summer. This corresponds with the findings of previous use studies which have shown average party sizes of two to four people. In contrast to the earlier study hypothesis that users would be more group oriented, there was only a 1% difference in the number of backcountry users hiking alone in the winter (14%) compared to the summer (15%). The percentage of people hiking alone in the Smokies is higher in both seasons than has been reported in past studies of other wilderness areas (7% or less). Previous use studies have shown that solitude is one of the most important motives for visiting wilderness areas. While the total solitude of hiking alone is not sought by the majority of wilderness users, the tendency to keep party size small may be a reflection of the search for solitude. This may explain the lack of difference in party size between winter and summer users, particularly since winter users seem to be seeking solitude and escape from peak season crowds.

A majority of the winter hikes (77%) were begun on the weekend, i.e., Friday, Saturday, or Sunday. Summer use was more dispersed throughout the week, with 52% of the summer hikes beginning on a weekday. This relates to the findings of past use studies that have shown more even weekly dispersal of use in eastern wilderness areas

during the peak use season (Bratton et al. 1978; Leonard et al. 1978; Plumley et al. 1978; Boteler 1980). Closely associated with the predominance of weekend hikes in the winter season was the tendency for winter hikes to be shorter, both in miles and number of days, than summer hikes. A greater percentage of the winter hikes were loop hikes, which frequently were shorter hikes, as the use of the same access point for entry and exit often kept the hike concentrated in one area. Thus, winter backcountry overnight trips to GSMNP can be characterized as weekend hikes of short duration and hiking distance.

As has been found in previous use studies, just a few of the many areas, campsites, shelters, and access points available to users received a majority of the use during both seasons. The concentration of use at a few points was even more noticeable in the winter season, possibly influenced by winter weather conditions resulting in shorter hikes to closer destinations, often shelters, and a tendency to avoid the more remote areas of the Park that would require a longer hike in both miles and days.

Certain use areas and shelters tended to receive more use than others, particularly in the winter season. Two shelters were clearly favorite destinations of winter users--Ice Water Springs (17%) and Mt. LeConte (13%). Both of these shelters can be easily reached from trailheads located on U. S. Highway 441, the principal road through the Park. The remaining winter shelter use was unevenly distributed among 16 shelters, with 5 shelters receiving only 2% each of the use. Summer shelter use was far less concentrated and therefore better

distributed, but still uneven with two shelters, Scott Gap and Rich Mountain each receiving only 1% of the use.

The Winter Backcountry User

Previous wilderness use studies have shown a predominance of young adult males in their user population with females comprising from one-fourth to one-third of that population (Murray 1974; Echelberger and Moeller 1977; Hendee et al. 1978; Roggenbuck et al. 1979; Lucas 1980). Similarly, the typical winter backcountry camper in the GSMNP is male (99%) and young, with an average age around 30 (29.5). Approximately a third of the respondents (33%) were in the 21 to 25 year old category, yet all age groups are represented in winter backcountry use. This broad representation of age groups also corresponds to past study findings concerning the age of the users participating in wilderness use. It is interesting to note that winter backpacking in the Smokies seems to be almost an all male activity. This again may be the result of having surveyed only group leaders, but communication with GSMNP staff indicates that males are more predominant among winter backcountry users.

Corresponding with the permit data, most of the respondents (71%) were of local origin--from Tennessee and the adjacent states of Georgia, North Carolina, Alabama, and South Carolina. Most were from urban areas with a majority (74%) living within 300 miles of the Park. Knowledge of backcountry users' place of origin, or residence, can be of benefit to resource managers. Dispersal of information and

media campaigns, e.g., winter backcountry use policies, can be better directed to reach more of the backcountry users of the Park when their home states and cities are known.

The local origin of respondents is in agreement with past use studies which have indicated that a majority of wilderness users are local in origin and from urban areas, i.e., large towns or cities. However, contrary to past study findings that most visitors are from the same section of the state in which the resource area is located, GSMNP draws its winter backcountry users from cities and towns located throughout Tennessee and the adjacent states. This is evident to an even greater extent in the summer. Winter users of the Park may tend to be more local in origin than summer users simply because of the influence of inclement winter weather. Hazardous winter travel conditions nationwide could lessen the appeal of the Park for those who must travel a greater distance to reach it, leaving the Park available to more local users for short weekend trips, minus the crowds of the summer and other high use seasons.

One might assume that the Park would receive much of its winter overnight use from The University of Tennessee, Knoxville students with the Park located only 45 miles (72 km.) from Knoxville, Tennessee, and its proximity to several smaller colleges in the area. However, demographic data from the questionnaire sent to winter backcountry users indicates that this is not true. Only 10% of the respondents were from Knoxville. The most frequently given travel distance was 200 miles and only 27% of the winter users traveled 100 miles or less

to participate in winter backpacking in the Park. The average age of the respondents was around 30 (29.5) which exceeds the age of most college students. The combination of this information seems to indicate that college students may account for only a small portion of the winter backcountry use received by the Park.

Most wilderness use studies have found that the users have considerable hiking experience, averaging 3 to 6 trips and 6 to 10 days hiking per year. In these studies, about half of the users had made at least one previous trip to the study area, and one-half to two-thirds had made trips to other wilderness areas as well. In comparison, the sample of winter backcountry users tended to be even more experienced than the users surveyed in these previous studies. The respondents averaged 10.3 years of general backpacking experience, with 99% having at least 3 years of experience; and they averaged 6.7 trips and 19 days backpacking each year. The surveyed winter users also had considerable backpacking experience in the GSMNP, averaging 3.7 trips per year. Sixty-six percent made their first trip to the Smokies (any season) from 1 to 6 years before the 1979 winter trip, with only 2% making their first trip in 1979. Most (91%) had made winter trips in the Smokies prior to the 1979 surveyed trip. This tendency for winter users to be more experienced than average backpackers, coupled with their different use patterns and their definite preference for winter backpacking over any other season, both within and outside the Park, seems to indicate that winter users may be a subpopulation of backpackers or "specialists." Such specialists are more experienced and may be

looking for a hiking experience different from that available during the summer and other high use seasons.

In previous use studies, nature and solitude have proven to be two of the most important reasons for participating in wilderness use. This study was no exception in that these were the two major motives for winter backpacking. While the enjoyment of nature and scenery is inherent in those motives comprising the most important factor "experiencing the winter environment", it should also be noted that winter users take winter hikes because they enjoy the winter scenery, the winter environment, or prefer winter weather. Winter trips are valued for seasonal qualities that only one season can provide and which these users actively seek.

Solitude has always been one of the major attributes of wilderness recreation that separates it from other forms of outdoor recreation. The degree of solitude encountered by a user is often the very basis for judging the quality of a wilderness experience. Previous wilderness studies have indicated that the more experience a user has, the higher the degree of solitude he is likely to seek, and even expect, in his wilderness experience. This desire for solitude may also be reflected by the small party size common to both seasons, as past studies have indicated that users would rather encounter several small parties than one large party. Therefore, the higher degree of solitude a user seeks, the more he attempts to avoid encounters or contact with other users. This may be a major reason for winter use in the Park. The winter backcountry camper in the GSMNP tends to be a more experienced user, who has probably discovered that solitude,

or perhaps the degree of solitude he desires, is hard to find in the Smokies during the summer or other high use seasons. Therefore, the more experienced backpacker is seasonally displaced and turns to the low use winter season.

Besides hindering the travel of potential users, winter weather can also discourage potential backcountry users simply because many people do not like the more severe and unpredictable weather and environment characteristic of the Park in the winter season. Overnight use statistics for the Park from Bratton's study (1978) and communication with GSMNP staff verify that there is indeed a drastic drop in overnight use during the winter months. With significantly less people in the Park, winter camping offers a greater probability of finding solitude. So, while solitude is an important motive for both winter and summer users, it may be of even greater importance to winter users, with the winter season providing a better opportunity for finding it.

The least important factor analysis grouping for winter users contained motives involving skill development and challenge. Winter camping requires new skills and can put survival skills to the test. The unpredictability of winter weather, particularly in the mountains, and the physical results of that weather, i.e., snow, ice, sleet, and cold temperatures, can certainly add more challenge and risk to a backpacking venture. Yet these were not rated as important motives for participating in winter backpacking.

A majority of the respondents (78%) said that they do avoid the Park during the heavy use summer months. Of these, most indicated

that they do substitute alternate areas for the GSMNP. The most frequently given alternate areas were Joyce Kilmer-Slickrock Wilderness, Pisgah National Forest, and Nantahala National Forest. Thus, while seasonal substitution occurs for use within the Park, winter users must resort to area substitutions in the summer months. This may also imply that local national forests and wilderness areas are more likely to be "spill-over" areas for the displaced GSMNP winter users during the heavy use summer season. While some winter users may take longer vacation-oriented backpacking trips to more distant wilderness areas, this study's findings indicate that the majority tend to substitute resource areas near the Park or close to their homes (Appendix F). This can have important implications for managers of these areas in the future. As more experienced backpackers or "specialists" become displaced by heavy summer or other peak season use, more use may be "spilled-over" into their areas. Preparation to absorb and distribute this additional use may be necessary, as well as increased ranger and visitor services.

Almost half of the respondents (48%) indicated that they do plan to increase their winter backpacking in the Park, while 31% reported that they were unsure. Yet, if even half of the present winter users increase their winter use, that will result in a substantial overall increase in winter use in the Park, with more increases possible from those who were unsure at the time. As the Park becomes more crowded in the future, more experienced backpackers are likely to become displaced and turn to seasonal substitution, i.e., winter, as an answer. This all adds up to the possibility of

a considerable increase in future winter use of the Park. With such a potential, it is essential for Park managers to be aware of seasonal differences in use and user characteristics and motives, and thus evaluate whether different managerial approaches are required.

Perhaps one of the major findings of this study has been the value that winter users place on solitude and the quality of their wilderness experience. At this time, winter use is not enough to warrant strict controls and regulated distribution, yet future increases in winter use could require this. The open vistas of winter, exposed by leaf fall and so often admired by winter users, also serve to decrease the social carrying capacity of an area, as other parties can be viewed just as easily as the vistas. It is imperative that Park managers strive to maintain the degree of solitude and the quality of the experience available for users in the winter season--as this is why they have turned to the winter season. And where can winter users turn in the Park if they are displaced by crowds in the winter season?

CHAPTER VII

IMPLICATIONS AND CONCLUSIONS

Since all other backcountry and wilderness studies have been based on summer, or peak season use, other winter data do not exist to substantiate this study's findings.

Does the Park serve a different "public," or clientele, in the winter? The degree of seasonal differences found between use patterns of winter and summer backcountry campers in GSMNP, and the degree to which winter users engage in winter backpacking in preference to other seasons of the year, suggest that this may be the case. The data indicate that winter backcountry campers in GSMNP are more experienced users or "specialists" who may be seeking an experience different from that found during the heavy use summer season, and may often avoid the relatively popular spring and fall seasons as well. Their avoidance of the Park during the heavier use seasons, and their involvement in more winter than summer backpacking trips, both within and outside the Park, can have important management implications for backcountry managers.

Knowledge of use on a seasonal basis allows for different managerial policies regarding where and when backcountry campers may or may not need to be distributed or regulated. Since winter is the low use season in the Park, distribution of users may not be a major concern. However, most of the winter trips are short, weekend

oriented, destination hikes, often to shelters, with use concentrated at certain areas, shelters, campsites, and access points of the Park.

Knowing the use patterns and use areas of winter hikers is beneficial to managers since problems concerning weather associated safety hazards and emergencies increase during winter. Increased maintenance might also be necessary for high use areas, trails, campsites, and shelters. Knowledge of use patterns and of high use areas in the Park allows for more efficient scheduling and use of backcountry patrol personnel, both for enforcement and safety purposes.

Ecological impacts to the physical resource are related to many factors other than the amount of use an area receives, including season of year and user behavior. Use during winter months, though light in terms of total amount of use, may lead, proportionately, to more impact than summer use for certain resource elements. Firewood consumption per hiking party is likely to be greater in cold weather, particularly if trips are destination oriented and involve less hiking and more time in camp. Winter hikers have also been known to use vegetation and plastic to shield shelters from the cold wind.

Displacement of experienced and solitude-oriented users from heavy use backcountry areas is another concern in backcountry resource management (Hendee et al. 1978). It is often assumed that these users are displaced to less used areas, seldom to return to the original areas. The findings from this study indicate that winter users are not completely displaced from GSMNP, but simply shift seasonal use of the area. Resource managers could provide a service to winter users by letting them know monthly use figures for the Park by geographic

use distribution, i.e., access points, areas, shelters, and campsites. Winter users could then select either a less congested area if they desired or the most appropriate seasonal period to visit the Park.

The answer to the question as to whether the resource manager can use the significant amount of existing summer or peak season wilderness backcountry data to manage winter users is not definite. Unlike the studies that have demonstrated little basis for geographical difference between the characteristics and use patterns of western versus eastern wilderness users (Lime 1976; Hendee et al. 1978; Roggenbuck 1980; Boteler 1980), the degree of seasonal difference between the use patterns of winter and summer backcountry campers and the insights into the user characteristics of the winter user, suggest that further research is needed concerning winter backcountry use. Perhaps future studies could survey several years of permit data in order to verify winter and summer permit differences. A questionnaire, much like the one sent to winter users, could be developed and sent to the summer backcountry user to determine if there is a real variation in user characteristics, i.e., experience levels, motives, etc. Future studies should also survey some of the other members of the backpacking parties, besides the group leaders, to determine if there are major differences in user characteristics and motives among party members.

Winter backcountry users' avoidance of the Park during the heavy use seasons, the practice of area substitution, and overall preference for winter rather than summer backpacking has important management implications for the future. No one can predict with

certainty at this time if winter backcountry use will continue to increase. But, as the Park becomes more crowded in the future, and as more experienced users or "specialists" become displaced from summer backpacking, it is probable that more winter use can be expected. And, user data suggests that it may require some forms of management different from that commonly used for summer use.

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APPENDICES

APPENDIX A

MANDATORY BACKCOUNTRY OVERNIGHT USE PERMIT

REQUIRED BY THE PARK

Form 10-404 Rev. (11-76)
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE





BACKCOUNTRY USE PERMIT

The visitor must have this permit during the visit.

When signed, this single-visit permit authorizes

NAME

ADDRESS

CITY STATE ZIP 1 2 3 4 5

To visit 6 7 8 9

Give best estimate of start and finish dates FROM MO./DAY 10 11 12 13 THROUGH MO./DAY 14 15 16 17

Location of entry 18 19 20

Location of exit 21 22 23

Primary method of travel 24 25

Number of people in group 26 27

Number of pack or saddle stock 28 29

Number of watercraft or other craft 30 31

CAMPSITE NAME

ZONE – SITE 77 78

NIGHTS 79 80

REMARKS

DATE (VISITOR'S SIGNATURE)

DATE (ISSUING OFFICER'S SIGNATURE)

FASTEN THIS TAG TO YOUR PACK, SADDLE, BOAT OR TENT

APPENDIX B

MAIL QUESTIONNAIRE SENT TO WINTER BACKCOUNTRY CAMPERS IN GSMNP

Please answer each question as best you can. If you are uncertain of an answer please give your best approximation.

BACKPACKING EXPERIENCE

---

1. How many years of backpacking experience have you had? _____

2. On the average, how many backpacking trips do you make per year? _____
   How many are in the summer (June-Aug.)? _____
   in the fall (Sept.-Nov.)? _____
   in the winter (Dec.-Feb.)? _____
   in the spring (Mar.-May)? _____

3. On the average, how many days do you spend backpacking per year? _____

BACKPACKING IN GREAT SMOKY MOUNTAINS NATIONAL PARK

---

1. When did you first backpack in the Smokies (year)? _____

2. On the average, how many backpacking trips to the Smokies do you make per year? _____
   How many in the summer (June-Aug.)? _____
   in the fall (Sept.-Nov.)? _____
   in the winter (Dec.-Feb.)? _____
   in the spring (Mar.-May)? _____

3. When was your first winter (Dec.-Feb.) backpacking trip to the Smokies (year)? _____

4. During the last three years how many winter (Dec.-Feb.) backpacking trips have you made to the Smokies? _____ summer (June-Aug.) trips? _____

5. Do your hikes tend to be longer or shorter (number of days and miles in length) in the winter? Number of days: longer ____ shorter ____
   Miles in length: longer ____ shorter ____

REASONS FOR WINTER BACKPACKING IN THE SMOKIES

People have many reasons for going backpacking in the winter. Below are several of these reasons. Please check the box which indicates the importance you place in each of the reasons listed.

	Not Important	Somewhat Not Important	Somewhat Important	Important	Very Important
To enjoy the winter scenery in the Smokies	( )	( )	( )	( )	( )
Not enough time for a long vacation--Smokies was close	( )	( )	( )	( )	( )
To get away from the crowds	( )	( )	( )	( )	( )

	Not Important	Somewhat Not Important	Somewhat Important	Important	Very Important
To show that I could do it	( )	( )	( )	( )	( )
To experience the winter environment	( )	( )	( )	( )	( )
To be alone, by myself	( )	( )	( )	( )	( )
More free time in the winter	( )	( )	( )	( )	( )
To be with my friends	( )	( )	( )	( )	( )
To test new equipment	( )	( )	( )	( )	( )
More risk involved	( )	( )	( )	( )	( )
Fewer people than during the summer	( )	( )	( )	( )	( )
To be close to nature	( )	( )	( )	( )	( )
Less chance of running into dangerous animals	( )	( )	( )	( )	( )
More challenging in the winter	( )	( )	( )	( )	( )
Need to get away from home environment	( )	( )	( )	( )	( )
Quieter in the winter	( )	( )	( )	( )	( )
To test the survival backpacking skills involved	( )	( )	( )	( )	( )
Prefer winter weather	( )	( )	( )	( )	( )

Specify other reasons not listed _____

AREA SUBSTITUTION

1. Do you tend to avoid backpacking in the Smokies in the summer months due to heavy visitor use? Yes _____ No _____
   If so, what alternative areas do you use during the summer? (Specify areas and location) _____

2. Do you plan to increase winter backpacking in the Smokies? Yes ____ No ____
   Not sure ____

BACKGROUND INFORMATION

1. Your present age: _____
2. Sex: Male _____ Female _____
3. Please give your place of residence. City _____, State _____
4. About how far is this from the Smokies? _____ miles

APPENDIX C

COVER LETTER INCLUDED WITH MAIL QUESTIONNAIRE SENT TO WINTER BACKCOUNTRY CAMPERS IN GSMNP

The University of Tennessee
INSTITUTE OF AGRICULTURE

Department of Forestry, Wildlife, and Fisheries
P.O. Box 1071
Knoxville, Tennessee 37901

Dear Backpacker:

During the winter of 1978, you made a backpacking trip to the Great Smoky Mountains National Park. Because of your winter backpacking experience, we would like to ask you to participate in our study. Information concerning the experience level of winter backpackers and their reasons for winter backpacking is being collected to aid backcountry managers. Little management information is known about people who choose to backpack during the winter season. Patterns of use, amount of past hiking experience, and reasons for backpacking during the winter may be quite different between winter and summer users of the Park.

Because we are sampling only a small portion of winter backpackers, it is important that you return our survey. We have deliberately made it brief for your convenience. It consists of only two pages and requires three to five minutes to complete. None of the participants' names will be connected in any way to the compiled results. A self-addressed, stamped envelope has been provided for the return of your survey. Your participation is completely voluntary, but we do encourage you to return the survey at your earliest convenience.

Sincerely,

William E. Hammitt
Assistant Professor of Forest Recreation

Janet L. Loy
Graduate Student

THE UNIVERSITY OF TENNESSEE IS AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX D

POST CARD REMINDING WINTER CAMPERS TO RETURN THE MAIL QUESTIONNAIRE

Dear Backpacker:

About two weeks ago you should have received our mail questionnaire concerning a backpacking trip you made in the winter of 1979.

This is a reminder that as of yet we have not received your completed questionnaire. If you have not yet received the questionnaire, please let us know and we will send you another.

If you have already returned the questionnaire, please accept our thanks. Your views are important and we look forward to receiving them.

Sincerely,

William E. Hammitt

William E. Hammitt
University of Tennessee

APPENDIX E

TABLES OF WINTER PERMIT DATA, BY THE INDIVIDUAL MONTHS OF JANUARY AND FEBRUARY

Table XXIX. Origin of Winter Backcountry Users in Great Smoky Mountains National Park, 1979.

State	Overall Winter %	January %	February %
Tennessee	35	32	41
Georgia	13	15	11
North Carolina	11	11	9
Alabama	9	10	6
South Carolina	8	7	11
Ohio	3	3	3
Others[a]	21	22	19

[a]"Others" represent 23 other states plus a foreign category in the Overall Winter percentage; 21 other states plus a foreign category in January; 14 other states in February.

Table XXX. Number of Individuals in Backcountry Parties.

Number of Individuals		Overall Winter %	January %	February %
1		14	17	10
2		48	50	45
3		18	16	20
4		11	8	15
5		4	4	4
6 or more		5	5	6
mean	=	2.6	2.6	2.8
median	=	2.0	2.0	2.0
mode	=	2.0	2.0	2.0

Table XXXI. Period of the Week the Hike was Started.

Period Started	Overall Winter %	January %	February %
Weekend[a]	77	69	88
Weekday[b]	23	31	12

[a]Weekend = Friday, Saturday, or Sunday.

[b]Weekday = Monday, Tuesday, Wednesday, or Thursday.

Table XXXII. Number of Miles Hiked by Winter Backcountry Parties.

Miles		Overall Winter %	January %	February %
1-3		1	2	-
4-6		12	13	8
7-9		14	12	17
10-12		20	14	31
13-15		12	11	13
16-18		9	9	11
19-21		7	8	8
22 or more		25	31	12
mean	=	18.3	20.5	15.0
median	=	13.0	15.0	11.0
mode	=	10.0	10.0	10.0

Table XXXIII. Type of Hike by Winter Backcountry Users.

Type of Hike	Overall Winter %	January %	February %
Loop	88	85	91
Non-loop	12	15	9

Table XXXIV. Length of Stay of Winter Backcountry Users.

Number of Nights		Overall Winter %	January %	February %
1		50	46	55
2		24	22	28
3		11	11	10
4		5	7	3
5		3	4	1
6 or more		7	10	3
mean	=	2.1	2.4	1.8
median	=	2.0	2.0	1.0
mode	=	1.0	1.0	1.0

Table XXXV. Winter User Concentration According to Shelters and Nine Use Areas of the Park.

Area	Overall Winter %	January %	February %
Shelters[a]	62	61	65
Greenbrier-Cosby-Big Creek-Cataloochee	10	9	11
Elkmont-Tremont	8	8	7
Oconaluftee	7	7	6
Cades Cove	6	7	5
Deep Creek	3	2	4
Hazel Creek	1	2	-
Twenty Mile	1	2	1
Noland Creek	1	1	1
Forney Creek	1	1	-

[a]Thirteen out of 18 shelters are located on the Appalachian Trail.

Table XXXVI. Winter User Concentration According to Shelters of the Park.

Shelter Name	Overall Winter[a] %	January[a] %	February[a] %
Ice Water Springs	11	10	12
Mt. LeConte	8	7	10
Mt. Collins	6	6	6
Kephart	6	4	7
Spence Field	5	5	6
Russell Field	4	3	6
Peck's Corner	3	4	2
Cosby Knob	3	3	4
Tricorner Knob	2	3	2
Mollie's Ridge	2	3	1
Siler's Bald	2	2	1
Derrick Knob	2	2	1
Laurel Gap	2	2	1
Birch Springs	2	2	1
Rich Mountain	1	1	2
Davenport Gap	1	1	1
Double Springs	1	1	1
Scott Gap	1	2	1

[a]Shelters accounted for 62% of backcountry use in winter--61% in January, 65% in February.

APPENDIX F

OTHER REASONS FOR WINTER BACKCOUNTRY CAMPING IN GSMNP

Reason (Number of respondents)

No insects (12)

Winter photography (6)

Meet and exchange information with more knowledgeable backpackers, encounter less tourists (5)

Cross-country skiing (4)

Clearer views due to less haze and foliage (4)

Easier to get reservations in better shelters/campsites (4)

New experience being from the deep South (4)

Snowshoeing (2)

Easier to control body temperature (2)

Train/build confidence in Boy Scout troop (2)

Backpack year-round with no emphasis on season (2)

Fight winter depression (1)

Enjoy ice and snow camping (1)

Train for mountaineering excursions (1)

Safe winter camping for Outward Bound type of high school (1)

Do not like to be like everyone else (1)

Little chance of encountering government patrols--respondent hikes with dogs (1)

Wider food selection, wildlife (1)

Chance to observe animal tracks (1)

No Yankees (1)

Come in closer contact with God and His power as seen through the severe winter conditions and mountains (1)

Cleaner air due to fewer cars (1)

Gain better appreciation of the things left at home (1)

Capture a feeling of self-reliance (1)

Greater need to get away from home in winter (1)

Winter camping is the best substitute for glacier travel and ice climbing (1)

Since moving to Georgia in 1956, GSMNP is a nearby experience of winter in New York (1)

Winter hiking is relaxing; summer hiking is frustrating (1)

Meet new friends (1)

Enjoy solitude of winter (1)

Fun, party, learn, friends, girls, and wilderness (1)

A snowstorm in the Smokies is the closest thing to the environment in the Rockies (1)

Be with my son on his birthday, an annual event (1)

Live life to its fullest (1)

Encounter less road traffic (1)

Complete change of pace from job (1)

Be with my wife and two sons (1)

Study ecology, observe the land in all her moods (1)

Astronomy is better due to winter crispness in the air; stars are clearer (1)

In early backpacking years adventure was important; later learning was more important; then understanding became important; and now peace has become most important (1)

Complete and/or give mountaineering courses to National Ski Patrolmen; to do nordic ski patrolling and cross country skiing; collect weather data, snow depth; help injured persons or persons in trouble (1)

APPENDIX G

BACKCOUNTRY AREA SUBSTITUTED FOR GSMNP DURING THE SUMMER SEASON BY WINTER BACKCOUNTRY CAMPERS

Area (Number of respondents)	Origin of Respondent
Joyce Kilmer-Slickrock(13)	Knoxville, TN(3); Atlanta, GA(2); Smyrna, GA; Nashville, TN; Birmingham, AL; Canton, NC; Barbourville, KY; St. Petersburg, FL; Ringgold, GA; Winston-Salem, NC.
Pisgah Ntl. Forest (12)	Atlanta, GA(2); Knoxville, TN(2); Cedar Mtn., NC; Charlotte, NC; Memphis, TN; College Park, GA; Traveler's Rest, SC; Carson, WA; Inman, SC; Greer, SC.
Nanatahala Ntl. Forest(11)	Atlanta, GA(2); Knoxville, TN; Roswell, GA; San Diego, CA; Birmingham, AL; Gadsden, AL; Cedar Mtn., NC; Sylva, NC; Inman, NC; Durham, NC.
Cherokee Ntl. Forest(6)	Knoxville, TN(3); Memphis, TN; Ventura, CA; Columbia, TN.
Linville Gorge(5)	Charlotte, NC; Chapel Hill, NC; Coats, NC; Marron, NC; Inman, SC.
Tellico Wildlife Area(5)	Chattanooga, TN; Apison, TN; Gadsden, AL; Signal Mtn., TN; Ventura, CA.
Cohuttas(5)	Atlanta, GA; Chattanooga, TN; Thomaston, GA; Powder Springs, GA; College Park, GA.
Shining Rock(4)	Knoxville, TN; Mebane, NC; Marron, NC; Chapel Hill, NC.
North Georgia(4)	Atlanta, GA: Ringgold, GA; Athens, GA; South Springs, GA.

Mt. Mitchell area(4)	Coats, NC; Marron, NC; Tullahoma, TN(2).
Colorado(4)	Atlanta, GA; Cincinnati, OH; Mobile, AL; Kenner, LA.
Western United States(4)	Nashville, TN; St. Petersburg, FL; Oak Ridge, TN; Traveler's Rest, SC
Blue Ridge Parkway(3)	South Springs, GA; Lexington, SC; Labelle, FL.
Standing Indian(3)	Tullahoma, TN; Gadsden, AL; Lexington, SC.
Cumberland Plateau(3)	Knoxville, TN(2); Oak Ridge, TN.
Red River Gorge(3)	Carson, WA; Cincinnati, OH; Indianapolis, IN.
Appalachian Trail "outside Park"(3)	College Park, GA; Louisville, TN; Concord, TN.
White Mountains, NH(3)	Nashville, TN; Cincinnati, OH; Knoxville, TN.
Rockies(3)	Anderson, SC; Kenner, LA; Birmingham, AL.
Grand Tetons(3)	Cincinnati, OH(2); Greer, SC.
Appalachian Trail "in Georgia"(2)	Decatur, GA; Marietta, GA.
Appalachian Trail "in Virginia"(2)	Newport News; VA; Tullahoma, TN.
Chattahoochee Ntl. Forest(2)	Atlanta, GA; Knoxville, TN.
Roan Mountain area(2)	Durham, NC; Tullahoma, TN.
Daniel Boone Ntl. Forest(2)	Barbourville, KY; Cincinnati, OH.
Chattooga River(2)	Athens, GA; Lexington, SC.
Frozen Head State Park(2)	Crossville, TN; Oak Ridge, TN.
Ozarks(2)	Peoria, IL(2).
Wyoming(2)	Atlanta, GA; Kenner, LA.

Glacier Ntl. Park(2)	Montgomery, AL; Charlotte, NC.
Yellowstone(2)	Morristown, TN; Cincinnati, OH.
"National Forests"(2)	Knoxville, TN; Concord, TN.
Appalachian Trail "on Georgia/ North Carolina border"(1)	Nashville, TN.
Appalachian Trail "north of Park"(1)	Knoxville, TN.
Appalachian Trail "south of Park"(1)	Deland, FL.
Loop Trail off Appalachian Trail in Georgia(1)	Labelle, FL.
Big Frog Mtn., Georgia Appalachian Trail(1)	Auburn, AL.
Mt. Rogers Ntl. Recreation Area(1)	Knoxville, TN.
Balsam Mtn., NC(1)	Kodak, TN.
Welch Ridge(1)	Kodak, TN.
Nicolet Ntl. Forest(1)	Neenah, WI.
Wisconsin State Forests(1)	Neenah, WI.
Core Banks, NC(1)	Winston-Salem, NC.
North Alabama(1)	Birmingham, AL.
Montana(1)	Atlanta, GA.
Allagash Wilderness, ME(1)	Kingston, RI.
Sierras(1)	Cincinnati, OH.
East Ohio(1)	Cincinnati, OH.
Central Indiana(1)	Cincinnati, OH.
Gifford Pinchot Wilderness(1)	Carson, WA.
Johnston City area(1)	Maryville, TN.

North Greenville County, SC(1)	Greer, SC.
Shenandoah Ntl. Park(1)	Arnold, MD.
Yosemite Ntl. Park(1)	Mobile, AL.
Grandfather Mountain(1)	Charlotte, NC.
Rainier Ntl. Forest(1)	Charlotte, NC.
Mt. St. Helen area(1)	Charlotte, NC.
Mt. Adams(1)	Charlotte, NC.
Mt. Baker(1)	Charlotte, NC.
Olympic Ntl. Park(1)	Charlotte, NC.
Wild River Range, WY(1)	Greer, SC.
Norris and north to Kentucky(1)	Knoxville, TN.
Northern Appalachians in North Carolina(1)	Harmony, NC.
Chilhowee(1)	Apison, TN.
Cape Hatteras(1)	Winder, GA.
Cumberland Island(1)	Winder, GA.
Daniel Boone Wildlife Refuge(1)	Winston-Salem, NC.
Georgia State Parks(1)	Atlanta, GA.
Alabama Ntl. Forests(1)	Birmingham, AL.
North Carolina or Virginia Federal Wilderness Areas(1)	Hollywood, FL.
Fall Creek Falls(1)	Signal Mtn., TN.
Fullicott, SD(1)	College Park, GA.
Northwest States(1)	Cincinnati, OH.
Private lands(1)	Memphis, TN.

Western Maryland(1)	Westminster, MD.
Virgin Pocket Wilderness(1)	Knoxville, TN.
Coastal Maine(1)	Ann Arbor, MI.
Canada(1)	Cedar Mtn., NC.
Bruce Peninsula, Ontario(1)	Ann Arbor, MI.
Boundary Waters Canoe Area(1)	Peoria, IL.
Ntl. Forests by Great Lakes(1)	Peoria, IL.
Algongon Provincial Park, Ontario(1)	Cincinnati, OH.
Springer Mountain(1)	Knoxville, TN.
Foreign Countries(1)	Traveler's Rest, SC.
Spring Hill Caves by Powell(1)	Powell, TN.
South Mills River area(1)	Asheville, NC.
Looking Glass Rock area(1)	Asheville, NC.
Lake Santeetlah(1)	Asheville, NC.
Bankhead Ntl. Forest, AL(1)	Birmingham, AL.
Tallula Gorge(1)	Athens, GA.
Porcupine Mtns. State Park (1)	Wausua, WI.
Hoosier Ntl. Forest, IN(1)	Indianapolis, IN.
Cumberland Mtn. Park(1)	Nashville, TN.
Jack's River, GA(1)	Woodstock, GA.

VITA

Janet Loy Hughes was born in Knoxville, Tennessee on December 29, 1955. She attended elementary school in Knoxville and graduated from Knoxville Holston High School in May 1973. The following September she entered The University of Tennessee, Knoxville, and in June 1978 she received a Bachelor of Arts degree in Psychology.

In September 1978 the author entered the Graduate Program in Forestry at The University of Tennessee, Knoxville, to begin work toward a Master's degree in Forestry (Recreation Option). During this period, she was inducted into Xi Sigma Pi and Sigma Delta honorary societies and also served as a Student Senator and Graduate Student Council Representative. Mrs. Hughes received a Master of Science degree with a major in Forestry on March 19, 1985.

The author was married to Douglas Edward Hughes of Houston, Texas on June 12, 1982. She is the daughter of Mr. and Mrs. James M. Loy of Knoxville, Tennessee.