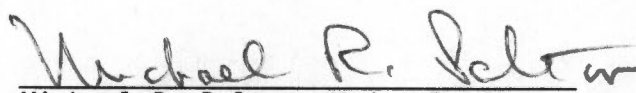
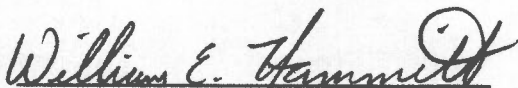


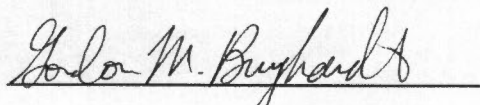
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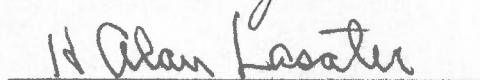
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Michael R. Pelton, Major Professor

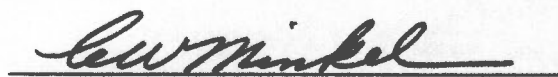
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KNOWLEDGE AND ATTITUDES OF CAMPERS TOWARD BLACK BEARS IN
GREAT SMOKY MOUNTAINS NATIONAL PARK

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Pamela A. Petko-Seus

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ABSTRACT

The purpose of this study was to provide information that would be useful in the management of human-bear interactions in Great Smoky Mountains National Park (GSMNP or Park). One-hundred and fifty backcountry campers and 200 frontcountry campers were interviewed to determine their attitudes, knowledge, camping habits, and experience as related to black bears. In addition, preliminary observations of human-black bear interactions in the backcountry were documented.

Backcountry campers were younger and more educated than frontcountry campers. At least 10% of campers did not realize black bears climb trees or that they are diurnally active. Approximately 25% of campers did not know black bears are capable of inflicting injury. Camper knowledge of bears did not appear strongly related to educational attainment, sex, or experience in backcountry areas. The National Park Service (NPS) reached over 90% of the campers interviewed with information on bears; however, approximately 25% of campers felt the information was not adequate.

Over 50% of backcountry campers hoped to see bears while hiking and 32% hoped to see bears at their campsites. Over 80% of frontcountry campers hoped to see bears along roadsides in the Park; campers should be informed of the potential hazards faced by roadside bears.

Black bears were seen by approximately 29% of backcountry campers and 14% of frontcountry campers during their current trip

to GSMNP. Seven incidents of bear related food loss and/or property damage were experienced by backcountry respondents. Approximately 10% of backcountry campers seeing bears reported their observations to the NPS.

Nearly 11% of backcountry campers were reluctant to hike in the backcountry of the Park because of black bears, while 21% were reluctant to camp in backcountry areas. Significantly more frontcountry campers than backcountry campers were reluctant to hike and camp in backcountry areas.

Approximately 30% of stated reactions of backcountry campers to a black bear on a trail or at a campsite involved yelling, making noise, or throwing non-food objects at the bear; nearly 14% of stated reactions of frontcountry campers involved this type of aggression.

The majority of campers were not disturbed by research markers on bears. Most campers were not in favor of eradicating black bears from the Park, feeding bears, nor receiving reimbursement from the NPS for bear-related incidents.

The results reflect a continuing need to educate campers about bears. Enhanced knowledge about the attributes and capabilities of bears can further reduce the chances of distasteful encounters resulting in property damage or injury. Further research involving food storage devices and camper-bear interactions is needed.

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INTRODUCTION

Annual visitation to Great Smoky Mountains National Park (GSMNP or Park) averages over 8 million with more than 400,000 frontcountry and 70,000 backcountry overnight visits. The Park is not only an important recreational resource, but provides valuable habitat for black bears (Ursus americanus) and other wildlife species. The Park supports a high bear population estimated at 1 bear per 2.7 square kilometers (km) in the northwest section (Eagar 1977). With high densities of bears and visitors, confrontations commonly occur along roadsides and at frontcountry and backcountry campsites.

Keeping bears and Park visitors completely separated within a national park is unlikely (Tate and Pelton 1983), as is eliminating all sources of unnatural food (Beeman and Pelton 1976). The National Park Service must effectively manage confrontations between visitors and black bears. Management programs must be aimed at humans as well as bears (Burghardt et al. 1972, Brown 1982, Martinka 1982, Tate and Pelton 1983). The ultimate solution to human-bear conflicts lies with man and his behavior and attitudes (Herrero 1970a, Burghardt et al. 1972, Pelton et al. 1976).

Three Park visitors were injured by black bears and over \$9,000.00 worth of bear related property damage was reported during 1982, the year this study was conducted. More than 90% of the reported incidents of bear related property damage and food loss during 1982 occurred at backcountry sites.

Why did so many incidents occur in the backcountry? Were frontcountry and backcountry campers unaware of the climbing ability and diurnal activity of black bears? How many campers were interacting with bears? Were all incidents and observations reported to the National Park Service (NPS)? These are some of the many questions this study attempted to answer.

The purpose of this study was to provide management information on the relationship of campers and black bears, particularly relationships in the backcountry of GSMNP. The objectives were: 1) to determine camper attitudes and knowledge of black bears; 2) to determine relations between visitor knowledge of bears and backcountry experience, information provided by the NPS, and various demographic variables; 3) to assess the severity of camper-bear interactions at selected sites within the Park.

Backcountry and frontcountry campers were interviewed to determine their attitudes, knowledge, camping habits, and experience as related to black bears. Bear related attitudes of both frontcountry users (Blakeney 1969, Burghardt et al. 1972) and visitors experiencing bear inflicted injury or property damage (Pelton et al. 1976) have been examined in previous studies. However, a bear related survey directed at backcountry campers in GSMNP had not been conducted prior to initiation of this project.

CHAPTER I

LITERATURE REVIEW

National Park Service Policy

The National Park Service was established in 1916 under the Department of the Interior by a congressional act. This act stated in part:

The service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks . . . which purpose it is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations (Jensen 1977:58).

Preservation of stable wildlife populations was clearly one of the objectives mandated for the NPS, however the use of parks for human recreation and enjoyment influences park management strategies (Schoenfeld and Hendee 1978).

GSMNP has specific management policies for black bears.

The Park management goal is:

To manage visitors, bears, and Park operations in such a manner that the bear's natural existence is not impinged upon, yet provide for safe visitor use that will minimize person bear conflicts.

Bear management objectives are:

- 1) Preserve and perpetuate natural populations of black bear under natural conditions allowing to approximate as nearly as possible that which would exist without the influence by post-Columbian humans.

- 2) Plan development and use of the Park to minimize and prevent person-bear conflicts.
- 3) Provide management that will allow bears to lead natural lives with a minimum of interference by humans (National Park Service 1979:1).

Human-Black Bear Conflicts in National Parks

Black bears are capable of rapid visual discrimination, learning (Bacon 1973, Bacon and Burghardt 1976), and adapting to changes in their environment (Burghardt and Burghardt 1972); they are opportunistic omnivores (Tate and Pelton 1979). Some bears learn to associate man and his equipment with a food reward. Feeding by park visitors strengthens this association (Tate and Pelton 1983). In backcountry areas it is unlikely that people will part with their food by direct feeding because of the effort required to carry it into the backcountry. Incorrect storage of food or the surrender of their camp in fear may result in indirect feeding and reinforcement (Hastings 1982).

Black bears are not as apt as grizzlies (Ursus arctos) to cause serious injuries (Pelton et al. 1976, McCullough 1982); however, they have, on rare occasion, been known to kill humans (Whitlock 1950, Gorsline 1978). Black bears cause the majority of injuries and incidents of property damage in national parks because of their wider distribution and greater numbers (Pelton et al. 1976).

Conflict between humans and bears in national parks is not a new problem. From 1930 to 1946, at least 711 persons were injured

by bears in Yellowstone National Park and 471 bears were destroyed (Cahalane 1948). In Yellowstone during 1938 alone, there were 97 bear-inflicted injuries, 81 incidents of property damage, and 46 bears destroyed (Finley and Finley 1940). The majority of these human injuries were most likely induced by black bears as Herrero (1970b) cited less than 20 grizzly caused injuries in North American national parks from 1930 to 1949.

During the 1930's and 1940's, black bears frequented roadsides in Yellowstone National Park (Finley and Finley 1940), Yosemite National Park (Harms 1976), and GSMNP (Sharritt 1945); problems also existed in Glacier National Park (Cahalane 1948). There was concern that the black bears frequenting roadsides and campgrounds were losing their fear of man (Finley and Finley 1940). In 1945, Sharritt wrote:

. . . once a bear has tasted white man's food he becomes a panhandler. . . . He is spoiled forever . . . so is the borderline bear a menace to those who thoughtlessly extend the feeding hand. The pathetic fact is that bruin, through no fault of his will, suffers the consequences (Sharritt 1945:270).

In the mid 1940's a sign in Great Smoky Mountains National Park read:

The black bears which are so frequently observed along the mountain road are wild animals . . . feeding causes bears to become overbold . . . this may lead to incidents whereby it may become necessary to destroy such animals. Help us preserve these fine creatures . . . (Sharritt 1945:306).

During 1959, 1343 black bear incidents and 3 injuries occurred in GSMNP, largely in frontcountry areas. That year a strict

enforcement program was initiated in frontcountry campgrounds. The Park posted warning signs and handed out information on food storage (Kerr 1959 In LaFollette 1974). Bear proof trash cans were installed in 1966 (LaFollette 1974).

A shift from primarily frontcountry to mainly backcountry incidents followed an increase in backcountry overnight use (Singer and Bratton 1977). This trend continued during 1982; more than 90% of the reported incidents of bear related property damage and food loss occurred at backcountry sites (National Park Service 1982b). Although Park regulations require campers to pack out what they carry into the backcountry, trash and food waste are often left behind at shelters and campsites. Bears are attracted to this source of food (Figure 1). In addition, food is often incorrectly stored and accessible to bears.

Singer and Bratton (1977) found that food storage was the greatest problem faced by backcountry campers in GSMNP. Bears often climbed trees where food was hung and obtained food by chewing through support ropes or by breaking branches. Enforcement of regulations and management of visitors and bears is difficult at remote backcountry sites.

In an attempt to regulate the increasing number of backcountry campers, a permit system was adopted in 1973 (LaFollette 1974). Although the number of incidents has declined in GSMNP, and information provided by the NPS has increased, incidents and injuries still occur (Table 1).



Figure 1. Bear outside of shelter on Mt. LeConte investigating fire ring where food waste was left earlier. Photo by author.

Table 1. Black bear incidents in GSMNP, 1976-1982.

Type of Incident	Year						
	1976	1977	1978	1979	1980	1981	1982
Property Damage:							
Reported Incidents	170	96	205	253	130	89	162
Amount of Damage	\$7,518	\$5,428	\$11,736	\$14,218	\$8,579	\$6,500	\$9,474
Number of Injuries	13	8	16	4	3	2	3
Number of Citations (feeding, harassing)	44	0	66	67	50	0	0

Source: Resource Management, Great Smoky Mountains National Park, 1982.

Management of Human-Black Bear Conflicts

Perhaps conserving bears and assuring visitor safety in national parks are "mutually exclusive park management objectives" (Martinka 1982:9); however, the NPS is legally bound to meet them. The idea of eliminating bears from national parks has been proposed (Moment 1968), but certainly this is not a viable alternative. To many people, bears symbolize wilderness (Herrero 1970a) and help to make a trip to a national park a rewarding experience.

In most years only 5-10% of the black bear population in GSMNP (Beeman and Pelton 1980) and 10% of the population of Shenandoah National Park (Jacobsen 1976 In Baptiste et al. 1979) are thought to be frequenting areas of human use. Thus, only a small percentage of the total population is responsible for the majority of interactions (Tate and Pelton 1979).

"Once corrupted there is little that can be done to restore wildness to wildlife" (Martinka 1982:10). Management of problem bears in frontcountry areas is far easier than in remote backcountry areas (LaFollette 1974). Relocating a problem bear will not necessarily solve the problem. Black bears exhibit a strong homing ability (Beeman and Pelton 1976). Even if the bear does not return, another bear will frequently take its place provided visitor food is available (Tate and Pelton 1983).

Limiting the availability of camper food and trash for bears requires the education of campers and strict enforcement of regulations. Food storage methods must be continually evaluated for

effectiveness. Burghardt et al. (1972) emphasized the importance of observing people responding to bears in varying situations; research by Tate and Pelton (1983) and Hastings (1982) has been in this area.

Management of black bears requires an understanding of bear capabilities and behavior as well as an understanding of the attitudes, knowledge, and behavior of Park visitors. Managers must be aware of the goals of the recreationist as well as his/her attitudes and knowledge of wildlife (Ream 1979). There is a need for more social-wildlife research (Hendee and Potter 1971).

Several surveys have either included questions (Cahn 1968, Bryan and Jansson 1973, Kellert 1979), or been totally directed (Marsh 1970, Baptiste et al. 1979, Sundstrom 1984) at bear management in national parks. Securing information on the needs, desires, attitudes, behavior, and characteristics of Park visitors is consistent with the management objectives of GSMNP (National Park Service 1981).

Three surveys of Park visitors in GSMNP determined attitudes toward black bears. A preliminary survey by Blakeney (1969) was followed by a more intensive survey of attitudes among frontcountry campers, picnickers, and visitors driving through the Park in 1970 (Burghardt et al. 1972). Pelton et al. (1976) evaluated attitudes of visitors who had experienced bear inflicted injury or property damage from 1968 to 1973 within GSMNP. Although the characteristics

and hiking attitudes of backcountry campers in GSMNP have been studied (Marsh 1973), up to this point a survey of backcountry camper attitudes and knowledge regarding black bears has not been conducted in GSMNP.

CHAPTER II

STUDY AREA

Geographical Location

Great Smoky Mountains National Park is located between 35° 26' and 35° 47' N latitude, and 83° 2' and 84° 0' W longitude. The Park covers over 209,000 hectares. The Great Smoky Mountains make up part of the Appalachian chain that runs from New England to Georgia. These mountains are within the Unaka Range and are delineated from this range by two River Gorges--the Pigeon on the northeast and the Little Tennessee on the southwest. The Park is divided geographically by a single ridgeline which runs east-northeast and west-southwest and represents the political boundary between Tennessee and North Carolina. The main divide has an elevation of more than 1520 meters (m) for 58 km of the 114 km it runs within the Park. Sixteen peaks rise above 1829 m (National Park Service 1982a).

Visitor Use Patterns

Scenery, vegetation, wildlife, and historical attributes attract visitors to the Park. GSMNP is within a two-day drive for more than one-half of the population of the United States (National Park Service 1982a). The Park received 8,177,900 visits during 1982 (National Park Service 1982b), the year this study was conducted.

Actual numbers of visitors are somewhat less as some visitors return several times.

Approximately 40% of the traffic in the Park is from the surrounding counties. Approximately 50% of visitation occurs during June, July, and August. The next peak in visitation occurs during leaf change in October. Sight-seeing while driving is likely the most popular activity of visitors in GSMNP; fewer visitors camp or enter backcountry areas (ARMS 1975 In National Park Service 1982a).

The Park averaged more than 400,000 frontcountry and over 70,000 backcountry overnight visits in 1982 (National Park Service 1982b). Backcountry use had dropped from a high of over 100,000 visits in 1977. Backcountry use tends to be concentrated along the Appalachian Trail and at a few highly popular sites (Figure 2). Sites that frequently support high concentrations of campers are more likely to have problems with black bears (Singer and Bratton 1977, Keay and Van Wagtendonk 1983).

Backcountry Study Sites

The Park has more than 1,400 km of maintained hiking trails. There are 84 primitive campsites maintained in the backcountry; site capacity ranges from 6 to 20 campers. Eighteen trail shelters are found mainly along the Appalachian Trail which nearly bisects the Park. Shelters are three-sided stone structures (Figure 3) with a fireplace, 12 wire bunks, and an open area for cooking and

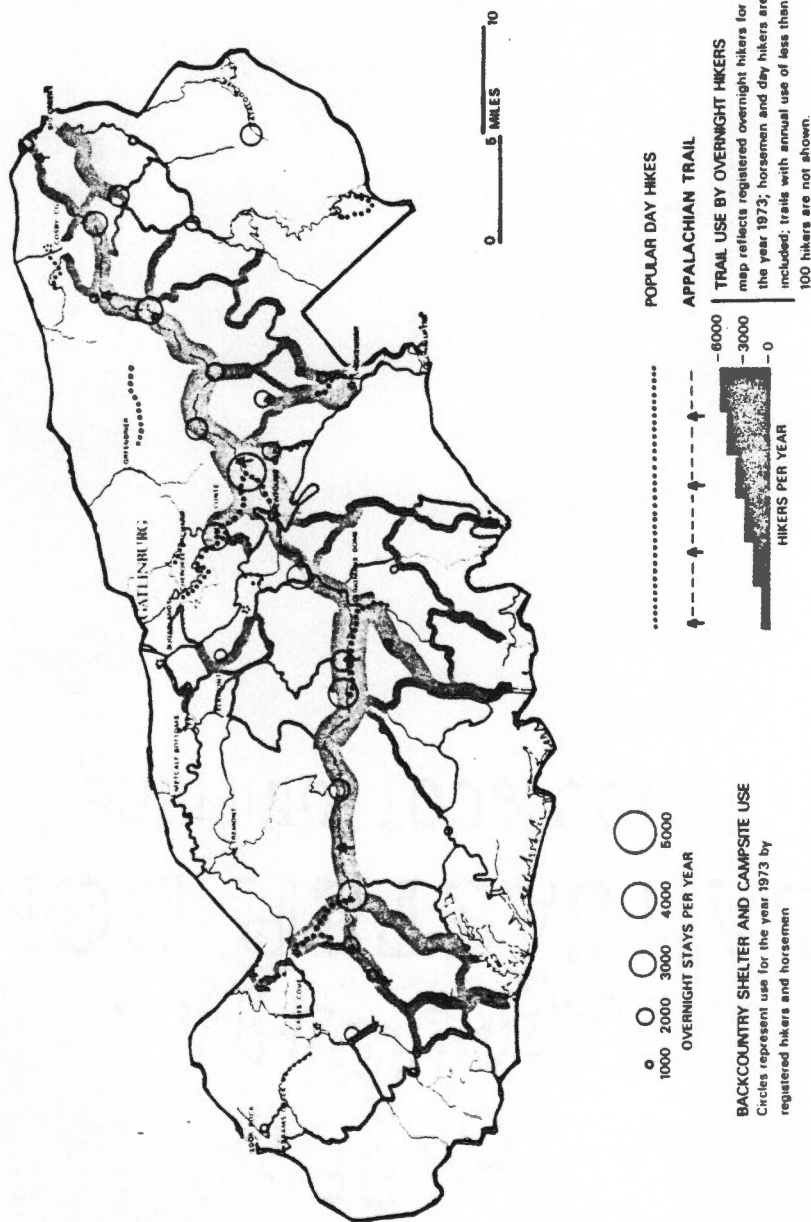


Figure 2. Backcountry use in Great Smoky Mountains National Park. Source: National Park Service, 1982. Final environmental impact statement for the general management plan, Great Smoky Mountains National Park. Denver Service Center, USDI, U.S. Gov. Print. Off. 308 pp.

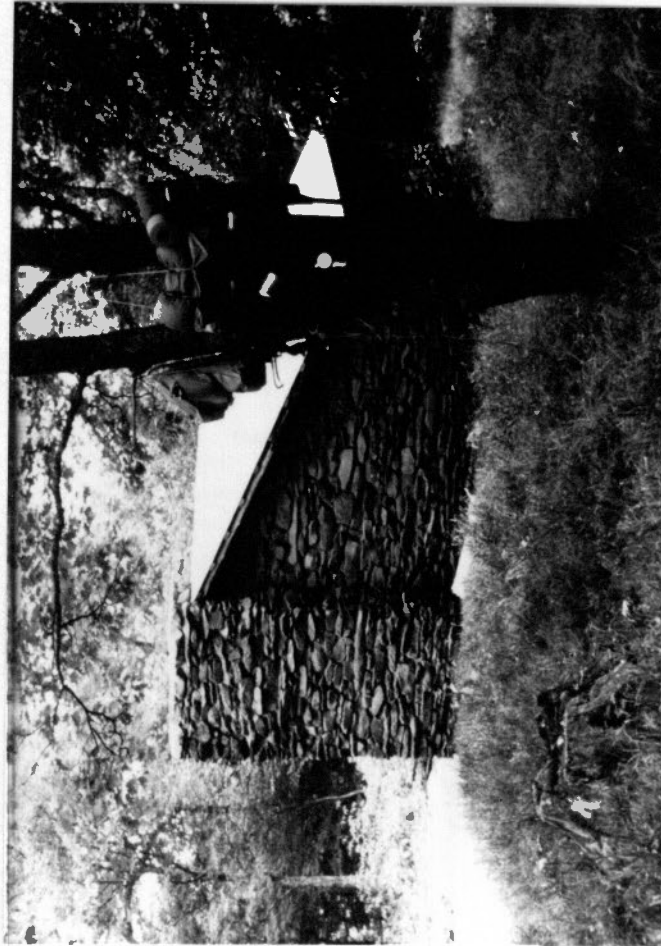


Figure 3. Spence Field Trail shelter, viewed from the side. Backpacks in foreground are incorrectly stored, tied directly to a tree. Photo by Tim Lucas.

storing gear. Chainlink fencing was added across shelter fronts to prevent bears from entering (Figure 4).

Backcountry campers were interviewed at eight backcountry locations (Figure 5). Interview sites were among those sites with the highest number of reported bear incidents and observations during 1979, 1980, 1981. Campers were interviewed at the following trail shelters: Siler's Bald, Spence Field, Tricorner Knob (all along the Appalachian Trail), and Mt. LeConte (8 km from the Trail). Campers were also interviewed at four primitive campsite areas: Walnut Bottoms, Otter Creek, the Deep Creek area, and, jointly Anthony Creek and Ledbetter Ridge.

Frontcountry Study Sites

The NPS maintains seven developed frontcountry campgrounds in GSMNP. Frontcountry interviews were conducted at Cades Cove, Smokemont, Balsam Mountain, and Look Rock campgrounds (Figure 5). Look Rock and Balsam Mountain are smaller sites than Cades Cove and Smokemont (Appendix D, Table 46). Cades Cove and Smokemont campgrounds reach capacity nearly every night during July and August. Balsam Mountain campground occasionally reaches capacity (National Park Service 1982a).

Natural Environment

Geology

Most of the bedrock of the Great Smoky Mountains belongs to the Ocoee Series. These rocks are of sedimentary origin and

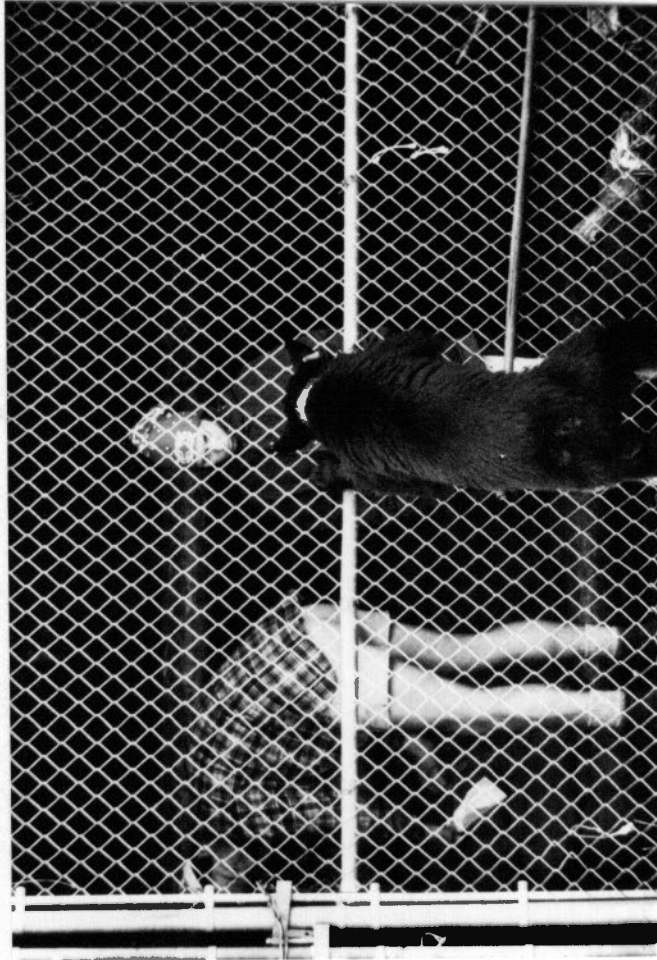


Figure 4. Mt. LeConte shelter showing chainlink fencing extending across the front. Door latch and chain are at far left. Photo by author.

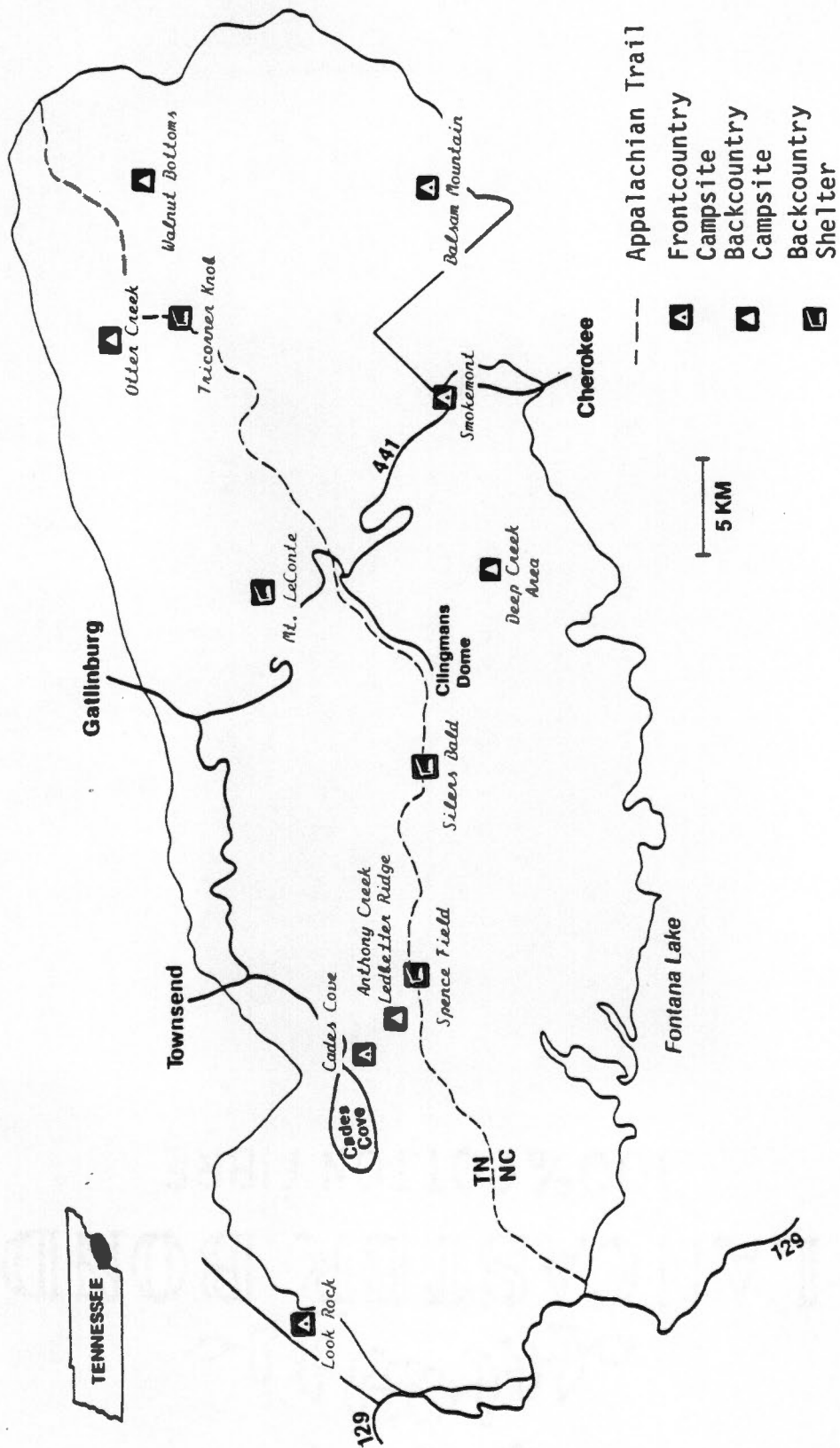


Figure 5. Great Smoky Mountains National Park, showing areas where interviews and observations were conducted.

were formed during the later Precambrian time, 600 million to one billion years ago (King et al. 1968). The Appalachian revolution, an epoch of mountain building, occurred some 200 million years ago. The land surface was lifted and subjected to lateral pressures which caused rock formations to fold and break forming over-thrust faults (Stupka 1962).

The valleys present today were carved from what was a much higher land surface (Stupka 1960). The mountains are a product of prolonged erosion and uplift, and are not themselves a direct product of the deformation which is visible in the rocks that compose them (King et al. 1968).

Climate

The most complete weather records in GSMNP are available for the Gatlinburg station (elevation 443 m); from 1934 to 1972, average annual precipitation there ranged from 106.5 to 174.9 cm (Vaiksnoras 1973). The mountain climates above 610-762 m are extremely humid. Precipitation is 50% greater at 1372-1524 m than in the valleys (Shanks 1954).

Based on Gatlinburg records from 1921 to 1962, the lowest monthly mean temperature (4.1°C) occurred in January and the highest (23.2°C) occurred in August (Vaiksnoras 1973). The average rate of temperature decrease with altitude is 1.2°C per 304.8 m (Shanks 1954).

Flora

The varied climate of the Great Smoky Mountains caused by altitudinal differences in temperature, precipitation, and topography produces a tremendous variety of habitats (Linn 1964). The Smoky Mountains contain more native tree species than any area of comparable size in the United States (Stupka 1962). Between 1200 and 1400 species of flowering plants and 130 species of trees are known to exist within the Park (National Park Service 1982a). One reason for this diversity is that glacial ice moved as far south as the Ohio River Valley during the Pleistocene; many Canadian-zone species moved before it and survived in the southern Appalachians (Stupka 1962).

Almost all of the vegetation in the Smokies is either topographic climax or secondary (Whittaker 1956). Several vegetation types are present in the Smokies including spruce-fir, cove hardwood, hemlock, closed oak, open oak and pine, northern hardwood, and grassy balds (Linn 1964).

Fauna

The Park provides habitat for approximately 200 species of birds, including migratory types. The Park is known to contain 38 different reptiles, 39 species of amphibians and more than 70 species of fish (National Park Service 1982a). There are currently 59 species of mammals within Park boundaries, over one-half of which are rodents. Six species have been extirpated (Linzey and Linzey

1971). The black bear, European wild hog (Sus scrofa), and white-tailed deer (Odocoileus virginianus) are the largest mammals within the Park.

CHAPTER III

METHODOLOGY

Questionnaire

The distribution of questionnaires when backcountry permits were issued was given consideration. The questionnaire would have been completed during or after the camping trip and returned by mail. However, the cost of printing and postage was prohibitive due to budget limitations. Additionally, it was impractical to require respondents to keep a pencil and a questionnaire intact throughout their backcountry trip (weather, loss, use as fire starter). Personal interviews provided insight to attitudes and knowledge while campers were actually in the backcountry and possible encountering black bears. Answers could not be influenced by discussion with others, suggestions from a printed questionnaire, or access to reference materials.

A questionnaire was developed to determine camper attitudes, knowledge, camping habits, and experience as related to black bears (Appendix A). Approximately one-half of the 75 questions required only dichotomous answers while the other half were open-ended. The majority of questions produced nominal data as a result of categorical responses. Seventeen questions were incorporated into Knowledge, Backcountry Experience, and Black Bear Experience

Scores. These scores provided a means of correlating visitor knowledge and experience, and comparing high and low scores with demographic variables.

The questionnaire was revised upon review by graduate committee members, fellow graduate students, and resource management personnel at GSMNP. The questionnaire was pretested on 18 backcountry campers in the Park during the summer of 1981 and revised. In the actual survey, 150 backcountry campers were interviewed from 14 June through 24 October 1982. For comparative purposes, 200 frontcountry campers were interviewed using a modified version of the backcountry questionnaire (Appendix B).

Sampling Periods

Seventy-five backcountry campers were interviewed at shelter sites; an identical number were interviewed at campsites. Sampling dates were based on vehicle and personnel availability, and the number of pre-registered hiking groups at each site (Table 2).

For the frontcountry sample, 50 campers were interviewed at each of four campgrounds (Figure 5). Interview campsites were randomly selected by campsite number. Interviews were conducted simultaneously at Cades Cove and Look Rock on 21, 22, and 24 July 1982 (Wednesday, Thursday, and Saturday) and on 29, 30, and 31 August 1982 (Sunday, Monday, and Tuesday). Thirteen respondents were interviewed on 1 and 2 October 1982 at Look Rock to complete the sample. Sampling occurred at Smokemont and Balsam Mountain

Table 2. Sampling locations and dates for backcountry questionnaire study, GSMNP, 1982.

Backcountry Location	Site Capacity	Distance from Development (Km)	Date, Number of Respondents	Total Number of Respondents	Total Days
Silers Bald	12	6.4	July 29(1), 30(3) August 30(3), 31(1) September 1(3), 2(1), 3(2) October 17(3), 18(3)	20	9
Spence Field	12	7.2	July 7(3), 9(3), 10(3), 14(3) 15(2), 16(3) September 7(2), 8(1) October 3(1), 7(3)	24	10
LeConte	12	8.0	June 28(2), 29(3), 30(1) July 1(4), 2(2), 3(1) October 28(3)	16	7
Tricorner Knob	12	17.7	September 1(1), 2(1), 3(2), 4(2) 5(2), 6(1), 7(1), 14(2), 15(1), 16(2)	15	10
Anthony Creek/ Ledbedder Ridge	6 8	3.2 3.6	October 8(1), 15(3), 16(4), 17(1), 23(4), 24(2)	15	6
Otter Creek	10	9.7	October 9(2), 10(3), 15(4), 16(3), 17(2), 22(6), 23(2), 24(1)	23	8
Walnut Bottoms	20	8.0	June 14(1), 15(1) August 4(5), 5(1), 6(2), 7(1) September 7(2), 8(0), 9(2), 10(1), 11(2)	25	16
Deep Creek Area			October 9(3), 11(2), 12(0), 13(2)		
Site #53	12	6.4		12	6
Site #55	15	8.8	August 13(1), 14(2), 17(2), 18(0)		
Site #57	20	7.0	September 17(2), 18(5)		

on 25, 26, and 27 July 1982 (Sunday, Monday, and Tuesday) and on 25, 26, and 27 August 1982 (Wednesday, Thursday, and Saturday).

The Interview

Two Park volunteers assisted with the interviews. As the interviewer should dress like the average respondent in the sample (Babbie 1973), all interviewers wore clean blue jeans and a khaki shirt. A NPS "Volunteer in Park" patch on the shirt was useful in gaining the trust of respondents. The interviewer would offer her/his name and state that they were involved with bear research in the Park through the University of Tennessee. Potential respondents were asked if they would mind completing a questionnaire. They were informed that the interview would last approximately 15 minutes, that their answers would be completely anonymous, and that they could stop the interview at any point. Only 2 of 202 front-country campers did not wish to participate in the interview. All backcountry campers approached agreed to participate. The completion rate was 99.4%.

Interviews were conducted almost entirely in the late afternoon and evening. Disturbance while respondents were setting up camp or eating was minimized. The interview format allowed respondents to answer questions while they were engaged in simple camp chores. The interviewer read each question from a reusable plastic covered questionnaire. Responses were recorded with a grease pencil and transferred to a code sheet (Appendix C) soon after the interview.

Only one person per camping group was interviewed; this eliminated duplication of bear sighting information and prevented response bias. Often seven or eight people would spend the night at a backcountry site, but only one or two interviews could be obtained since the group consisted of one or two camping groups.

Only persons 16 or over were interviewed. Interviewers carried a list that was referenced when selecting an interviewee. The list read: male (30+), younger male (16-30), female (30+), and younger female (16-30). The interviewer would select an interviewee from a camping group based upon the sex and age category that was next on the list. However, if it was time to interview an older male and a camping group of two younger females arrived, one of the females was interviewed to provide for the largest possible sample. An older male, if present, was interviewed in the next group. If a group consisted of the same sex and age group, the first person seen was chosen for the interview.

For the frontcountry sample, only one person was interviewed at a campsite. The same systematic selection as in the backcountry was used to choose a respondent, and the same introduction was given. In addition, the terms "frontcountry" (areas along roadsides and/or developed areas) and "backcountry" (areas more than one mile from roads and/or developed sites, access only on horseback, by foot, or by air) were defined.

Analysis

It was assumed that the samples of backcountry and frontcountry campers were randomly obtained. The Chi-Square Test (χ^2)

was used to test response differences across samples. The non-parametric Cochran Test (Q) detected changes in response within samples. The Cochran Test is usually used with three or more treatments and the McNemar Test with two treatments. However, if the number of treatments equals two, the Cochran Test is virtually identical to the McNemar Test. Both test statistics are approximated by a chi-square random variable with one degree of freedom (Conover 1971). The Student's t-test (t) revealed differences in sample means; separate variance estimates were used if a significant F-value indicated unequal variances, otherwise a pooled variance estimate was used.

Missing data were not used in analysis. Programs of the Statistical Package for the Social Sciences (SPSS; Nie et al. 1975) were used for the Student's t and Cochran Tests, all other analysis was performed with Statistical Analysis Systems (SAS 1982). For all tests $P < 0.05$ was considered significant. Responses of campers at backcountry shelters and campsites were compared. Next, the two backcountry samples were combined to form a total backcountry sample; this total sample was compared with the frontcountry sample. Black Bear Knowledge, Backcountry Experience, and Black Bear Experience Scores (as described below) were correlated. Kendall Correlation Coefficients (τ) were utilized as they are recommended over Spearman Correlation Coefficients when the data contain a large number of tied ranks (Nie et al. 1975).

Black Bear Knowledge Score. The Knowledge Score was the sum of correct responses to nine questions:

What species of bears are present in this Park?
How often do black bears have cubs?
Can adult black bears climb trees?
Can black bear cubs climb trees?
Are black bears active during daylight hours?
What makes up the diet of a black bear in the Smoky Mountains?
As compared with a human, how fast does a black bear run?
What is the weight of a black bear cub at birth?
What is the weight of an adult male black bear in the Smokies?

Responses to the nine knowledge questions were assumed to be statistically independent of one another. Respondents were divided into three groups of approximately equal size based on their score. Persons with Knowledge Scores of 1 to 4 were classified as "Low," 5 as "Moderate," and 6 to 9 as "High." The three levels of each score were crosstabulated with demographic variables.

Backcountry Experience Score. The number of years since a respondent's first trip to a backcountry area gives an indication of their hiking experience. However, this question alone may be misleading; a thirty-year-old may have hiked as a Scout twenty years ago, but may not have made any trips since. An attempt was made to equalize scores of infrequent hikers that made their first trip several years ago with scores of frequent hikers who began hiking more recently. Utilizing responses from the following four questions provided a good index to backcountry experience:

The number of years since respondent's first trip to a backcountry area.

Frequency of visitation between first trip and present trip.

Number of days spent in the backcountry each year.

Greatest number of consecutive days spent in a backcountry area.

Response categories for each question were weighted and assigned point values (Table 3). The point values for the four questions were summed to provide each respondent with a Backcountry Experience Score.

The respondents were then divided into three groups of approximately equal size. Persons with Backcountry Experience Scores of 1 to 7 were classified as "Low," 8 to 10 as "Moderate," and 11 to 14 as "High." Murray (1972) used a similar technique in forming an experience score for Appalachian Trail users.

Black Bear Experience Score. This score incorporated the following four questions:

Prior to this trip (backcountry questionnaire) have you ever spent time in backcountry sites where black bear activity could have occurred?

Have you ever reported a bear incident or observation to the National Park Service?

Have you ever seen a black bear in a backcountry area?

Have you ever experienced any property damage due to black bears?

The latter two questions were weighted more heavily than the first two as the latter two most likely involved an encounter with a bear. The first two questions may have been answered affirmatively without an encounter. Scores range from 0 to 6 (Table 4).

Table 3. Score points assigned to backcountry experience variables.

Category	Score Points
Number of Years Since First Backcountry Trip	
0-1	0
2-4	1
5-9	2
10-14	3
15+	4
Frequency of Visitation Between First Trip and Present Trip	
First Trip	0
4+	1
2-3	2
1	3
Number of Days Spent in Backcountry Areas Annually	
1-3	1
4-7	2
8-14	3
15+	4
Greatest Number of Consecutive Days Spent in a Backcountry Area	
1	0
2-3	1
4-7	2
8+	3

Table 4. Black bear experience score point values.

<u>Type of Experience with Black Bears</u>	<u>Score Points</u>
Experienced in backcountry sites where black bear activity could occur.	1
Reported a bear incident or observation to the National Park Service.	1
Experienced property damage due to black bears.	2
Observed a black bear in a backcountry area.	2

Observational Techniques

An attempt was made to document interactions between backcountry users and black bears in GSMNP. The researcher remained incognito as not to influence the behavior of campers. A human-bear interaction was defined as an encounter where visitor(s) and/or bear(s) were aware of the presence of the other species. When one species left the visual range of the other, an interaction ended. If more than one person was involved, reactions of the person nearest the bear were recorded.

Sequential changes in behavior of both species were recorded on cassette tape or a note pad and transferred to a data sheet (Appendix C). The time an interaction began and ended was recorded. In addition, the researcher estimated bear approach distance (BAD,

how closely a bear approached a visitor) and human approach distance (HAD, how closely a visitor approached a bear) to the nearest meter. The technique used was patterned after that used by Hastings (1982) in Yosemite National Park. Interactions directly involving the researcher were also recorded. Researchers frequently directed aggression at bears to document their reactions. Analysis was simply descriptive due to small sample size.

CHAPTER IV

RESULTS AND DISCUSSION

Camper Characteristics

Who are the backcountry campers in GSMNP? How do they compare demographically with frontcountry campers in GSMNP? In addition to discussing these general questions, this section will assess the level of backcountry experience possessed by campers, and look specifically at camping habits within GSMNP.

Demographic Characteristics

Age. The mean age of shelter and campsite respondents was 30.8 and 31.4 years, respectively (Table 5); frontcountry respondents, with a mean age of 39.2 years were significantly older. Seventy-five percent of frontcountry respondents were age 51 or under, while 75.3% of backcountry respondents were age 35 or under. Although persons up to age 70 were interviewed in the backcountry, only 3.3% of backcountry campers were age 60 or over compared with 12.5% of frontcountry campers.

Decreasing physical stamina may limit some campers from venturing into the backcountry for an overnight trip. Lucas (1971) found trail use declined with age; he concluded that interests or desires may change with age, but moreover, older people had fewer opportunities to develop interests in many types of outdoor recreation when

Table 5. Mean age of respondents, GSMNP, 1982.

Camper Category	Mean	S.D.	Range
Backcountry Total (N=150)	31.1	11.4	17-70
Backcountry Shelter (N=75)	30.8	11.3	17-66
Backcountry Campsite (N=75)	31.4	11.7	18-70
Frontcountry (N=198)	39.2	14.9	16-75

Student's t-test, backcountry samples: $t=-0.35$, $P=0.728$.
 Student's t-test, backcountry and frontcountry samples: $t=-5.71$,
 $P<0.001$.

they were young. Burch and Wenger (1967) suggested camping style is not simply a function of age and campers may switch camping styles during their lives.

Sex. Approximately twice as many men as women were interviewed in the backcountry (Table 6). This ratio is thought to be representative of the actual ratio of male and female backcountry campers in GSMNP. Records kept by researchers during this study, although incomplete, revealed 157 men and 68 women. Murray (1972) found nearly one-third of the hikers on the Appalachian Trail to be women. An equal number of male and female campers were interviewed in the frontcountry.

Education. The educational level of backcountry campers was higher than that of frontcountry campers; almost 85% of all backcountry campers had attended college (for at least one year), compared with 65.6% of frontcountry campers (Table 7). Educational attainment of the samples will eventually be higher as 20.7% of backcountry and 10.0% of frontcountry campers were students.

Murray (1972) found 79.9% of non-student Appalachian Trail hikers had attended college; a similarly high educational level was found among hikers in GSMNP by Marsh (1973). There is a strong association between education and participation in trail related forms of recreation; wilderness studies reveal high educational levels (Lucas 1980, Hendee et al. 1968). Only 41.6% of GSMNP visitors interviewed by Burghardt et al. (1972) had attended college

Table 6. Percentage of male and female respondents, GSMNP, 1982.

Camper Category	Male	Female
Backcountry Total (N=150)	64.7	35.3
Backcountry Shelter (N=75)	68.0	32.0
Backcountry Campsite (N=75)	61.3	38.7
Frontcountry Total (N=200)	50.0	50.0

Table 7. Highest level of education completed by respondents (%) in GSMNP, 1982.

Camper Category	Under Grade 12	High School Graduate	Some College	4 Years College	Graduate Work
Backcountry Total (N=150)	2.7	13.3	31.3	26.7	26.0
Backcountry Shelter (N=75)	2.7	13.3	36.0	22.7	25.3
Backcountry Campsite (N=75)	2.6	13.3	26.7	30.7	26.7
Frontcountry Total (N=200)	9.5	25.0	33.5	19.5	12.5

Chi-square Test, backcountry samples: $\chi^2=1.968$, $df=4$, $P=0.742$. Chi-square Test, backcountry and frontcountry: $\chi^2=22.541$, $df=4$, $P<0.001$.

and 20.2% had not completed high school. The higher educational level of frontcountry campers in this study may reflect the increasing importance placed on education.

Occupation. Approximately 75% of backcountry campers and 57% of frontcountry campers were professionals, students, skilled workers, or low level white collar workers (Table 8). There were fewer professionals in the frontcountry sample, this result may reflect the lower educational level of the sample. Murray (1972) found 38% of Appalachian Trail hikers to be students compared with 20.7% of backcountry campers in this study. Burghardt et al. (1972) found fewer students (4.2%) and more housewives (28.6%) in their interviews of visitors in GSMNP; perhaps this reflects the fact that more women are employed outside of the home today.

State of residence. The most frequently mentioned home states for shelter respondents were Tennessee (15.1%), Florida (11.0%), North Carolina (8.2%), and Alabama (8.2%), while campsite respondents mentioned Tennessee (25.0%), North Carolina (13.9%), and Alabama (9.7%) most frequently. All other states were mentioned by less than 5 respondents. The home states for 10 or more frontcountry campers were Tennessee (18.5%), Florida (16.0%), Georgia (6.0%), and Ohio (5.0%). Over 50.0% of all campers interviewed were from the Southeast region of the United States and over 90.0% were from the eastern two-thirds of the nation (Table 9; Figure 6).

Table 8. Occupations of campers (%) in GSMNP, 1982.

Camper Category	Occupation						
	Unskilled	Low Level White Collar	Skilled	Housewife	Student	Teacher Sub-College	High Level White Collar
Backcountry Total (N=150)	5.3	14.0	16.0	1.4	20.7	6.7	25.3
Backcountry Shelter (N=75)	4.1	13.3	17.3	-	25.3	6.7	22.7
Backcountry Campsite (N=75)	6.7	14.7	14.7	2.6	16.0	6.7	28.0
Frontcountry Total (N=200)	9.5	18.5	15.5	11.5	10.0	4.0	13.0
							11.5

Table 9. Regional residence of campers (%) in GSMNP, 1982.

Camper Category	Region				Other
	Southeast	Midwest	Mid Atlantic	North Atlantic	
Backcountry Total (N=145)	62.1	15.2	7.6	7.6	4.1
Backcountry Shelter (N=73)	57.5	12.3	5.5	12.3	8.2 ^a
Backcountry Campsite (N=72)	66.7	18.0	9.7	2.8	0.0
Frontcountry Total (N=200)	58.0	20.5	7.5	7.0	1.0 ^b

Chi-square Test, backcountry samples: (Due to sparcity of data "Southwest" was combined with "Other") $\chi^2=10.848$, $df=4$, $P=0.028$. Chi-square Test, backcountry and frontcountry: $\chi^2=6.260$, $df=5$, $P=0.282$.

^aOne respondent from Hawaii, 1 from Washington, 4 foreign visitors.

^bOne respondent from Washington, 1 foreign visitor.

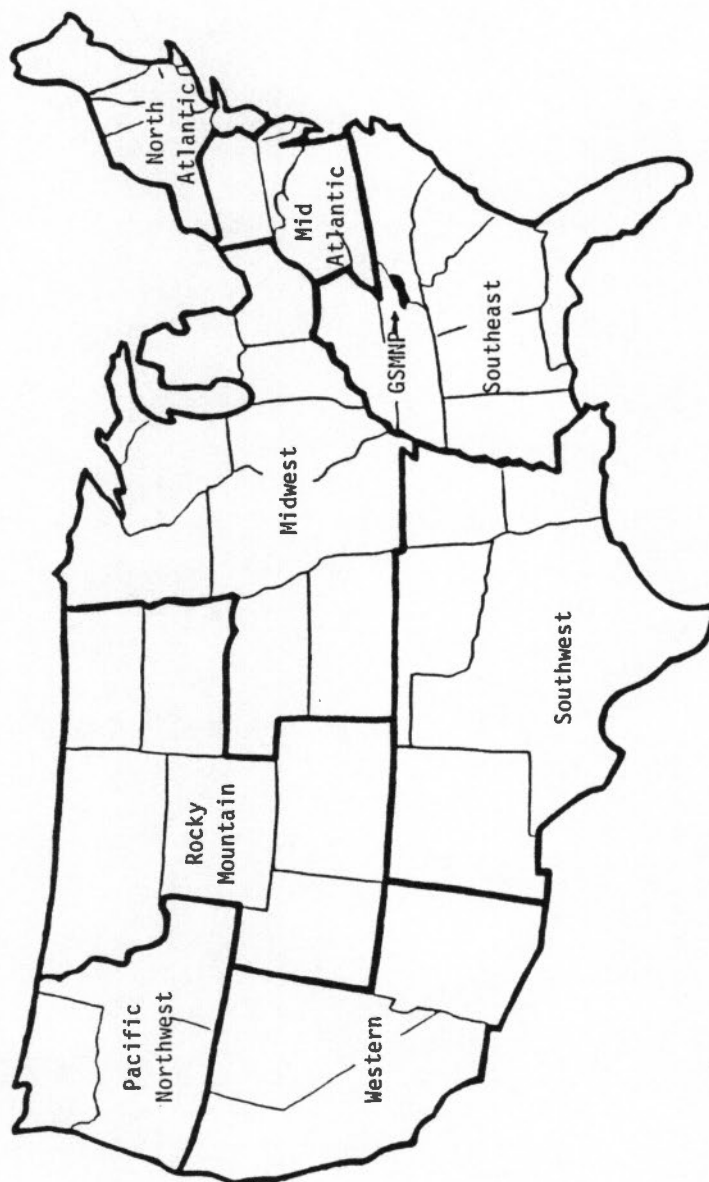


Figure 6. National Park System Regional Divisions of the United States.
Source: National Park Service, 1980, U.S. Dept. of the Interior.

Population of current area of residence. This proved to be a difficult question for many respondents to answer; many guessed at the population of their current residence or gave the population of the nearest city. Rural areas ($\leq 1,000$) and small towns (1,001-20,000) were home for 24.3 to 41.4% of campers, and cities (populations $> 100,000$) were home to 33.4 to 37.9% of respondents (Table 10). These results are similar to those obtained by Burghardt et al. (1972), however a slightly lower percentage (7.6) of Park visitors in 1970 were from cities with populations over 1,000,000.

Area of residence. Respondents were asked if they had spent the majority of their life in a rural, suburban, or city area. Suburban areas represented the largest response category (Table 11) in each sample. Respondents were nearly evenly distributed among the other two areas.

Backcountry Experience

This section presents the results of the four questions that comprise the Backcountry Experience Score. Only frontcountry respondents with backcountry experience are considered below.

Number of years since first backcountry trip. The mean number of years since the first backcountry trip of shelter (8.5 years) and campsite (7.9 years) respondents were not significantly different (Table 12). Frontcountry campers had hiked longer than backcountry campers (14.4 years vs. 8.2 years; $t=-4.16$, $P<0.001$). A larger percentage of backcountry respondents (17.3%) were in their

Table 10. Population size of campers' (%) area of residence as estimated by campers themselves.

Camper Category	≤ 1,000	1,001- 5,000	5,001- 20,000	20,001- 50,000	50,001- 100,000	100,001- 500,000	500,001- 1,000,000	> 1,000,000	Don't Know
Backcountry Total (N=149)	7.4	10.1	15.4	18.1	6.7	14.8	7.4	13.4	6.7
Backcountry Shelter (N=75)	12.0	10.7	18.7	13.3	3.9	14.7	6.7	12.0	8.0
Backcountry Campsite (N=74)	2.7	9.4	12.2	23.0	9.4	14.9	8.1	14.9	5.4
Frontcountry Total (N=195)	6.7	7.2	13.8	22.1	8.2	20.5	4.1	11.8	5.6

Table 11. Type of area where campers (%) spent the majority of their lives, 1982.

Camper Category	Area			
	Rural	Suburban	City	Combination ^a
Backcountry Total (N=150)	26.7	44.0	28.7	0.6
Backcountry Shelter (N=75)	28.0	45.3	25.3	1.4
Backcountry Campsite (N=75)	25.3	46.7	32.0	-
Frontcountry Total (N=200)	31.5	41.5	26.0	1.0

Chi-square Test, backcountry samples: $\chi^2=0.735$, $df=2$, $P=0.692$.
 Chi-square Test, backcountry and frontcountry: $\chi^2=1.029$, $df=2$,
 $P=0.598$.

^aThis category excluded from analysis.

Table 12. Mean number of years since respondents' first trip to a backcountry area.

Camper Category	Mean	S.D.	Range
Backcountry Total (N=150)	8.2	8.0	0.0-50.0
Backcountry Shelter (N=75)	8.5	7.7	0.0-40.0
Backcountry Campsite (N=75)	7.9	8.3	0.0-50.0
Frontcountry with Backcountry Experience (N=92)	14.4	12.8	0.0-60.0

Student's t-test, backcountry samples: $t=0.44$, $P=0.663$.
 Student's t-test, backcountry and frontcountry samples: $t=-4.16$,
 $P<0.001$.

first year of gaining backcountry experience, compared to 5.4% of the frontcountry users (Appendix D, Table 47). Fifteen or more years had passed since 42.4% of frontcountry respondents had first visited a backcountry area while 16.7% of backcountry respondents fell into this category. These results may reflect the greater age of frontcountry campers or a change in preference of camping styles.

Frequency of backcountry visitation. This question involved the frequency of backcountry visitation between respondents' first trip and their present trip. Responses to this question were categorical. Response categories of backcountry samples were not significantly different ($\chi^2=1.775$, $P=0.183$); the majority of campers at both shelters (68.1%) and campsites (77.0%) visited backcountry areas annually (Table 13). There was a difference in the frequency of backcountry visitation between backcountry and frontcountry campers ($\chi^2=13.649$, $P=0.003$); a greater percentage of backcountry campers (72.6%) than frontcountry campers (58.0%) visited backcountry areas yearly. Again, this result may reflect a preference for one camping style over another.

Number of days annually spent in a backcountry area. Shelter respondents spent more time in the backcountry each year than campsite respondents, 17.2 and 8.9 days, respectively (Table 14). A greater percentage of the shelter sample (58.7%) compared to the campsite sample (33.4%) spent over eight days per year in a

Table 13. Frequency of backcountry visitation by campers (%) between first trip and present trip, GSMNP, 1982.

Camper Category	Frequency of Visitation			
	1st Trip, or 1st Trip During 1982	Visit Once a Year	Visit Once Every 2-3 Years	Visit Once Every 4+ Years
Backcountry Total (N=146)	6.8	72.6	15.1	5.5
Backcountry Shelter (N=72)	6.9	68.1	15.3	9.7
Backcountry Campsite (N=74)	6.8	77.0	14.9	1.3
Frontcountry with Backcountry Experience (N=88)	1.1	58.0	29.6	11.4

Chi-square Test, backcountry samples: (Due to sparcity of data in some categories "once a year" was tested against "once every 2+ years") $\chi^2=1.775$, $df=1$, $P=0.183$. Chi-square Test, backcountry and frontcountry: $\chi^2=13.649$, $df=3$, $P=0.003$.

Table 14. Mean number of days campers spent in backcountry areas each year, GSMNP, 1982.

Camper Category	Mean	S.D.	Range
Backcountry Total (N=150)	13.1	21.3	1-200
Backcountry Shelter (N=75)	17.2	27.8	1-200
Backcountry Campsite (N=75)	8.9	10.5	1-60
Frontcountry with Backcountry Experience (N=92)	6.0	7.0	0-35

Student's t-test, backcountry samples: $t=2.44$, $P=0.016$.
 Student's t-test, backcountry and frontcountry samples: $t=3.71$, $P<0.001$.

backcountry area (Appendix D, Table 48). Frontcountry campers spent significantly less time in backcountry areas than backcountry campers. Approximately 50.0% of the frontcountry sample spent only 1 to 3 days annually in backcountry areas compared to 23.3% of the backcountry sample.

Greatest number of consecutive days spent in a backcountry area. The mean number of days spent by shelter respondents on their longest trip was 9.4 days, while campsite respondents averaged 6.8 days (Table 15). Frontcountry campers averaged shorter trips (5.4 days) compared to backcountry campers; 34.8% of frontcountry campers were dayhikers and had never camped in a backcountry area; only 2.0% of backcountry campers were interviewed on the first day of their first backcountry camping trip (Appendix D, Table 49).

Backcountry Camping Habits Within GSMNP

This section describes backcountry camping habits specific to GSMNP, such as how frequently respondents used shelters versus campsites in the backcountry. The type of food carried and food storage methods will be presented. Finally, camper group size and type will be described.

Type of overnight shelter utilized. Respondents were asked how they protected themselves from the elements while sleeping in the backcountry of GSMNP. Approximately two-thirds of shelter campers utilized shelters most frequently; approximately one-third used tents most frequently (Table 16). Campsite respondents in

Table 15. Mean number of consecutive days campers spent in a backcountry area, GSMNP, 1982.

Camper Category	Mean	S.D.	Range
Backcountry Total (N=150)	8.1	8.7	1.0-45.0
Backcountry Shelter (N=75)	9.4	9.0	1.0-45.0
Backcountry Campsite (N=75)	6.8	8.3	1.0-45.0
Frontcountry with Backcountry Experience (N=92)	5.4	6.8	1.0-41.0

Student's t-test, backcountry samples: $t=1.81$, $P=0.073$.
 Student's t-test, backcountry and frontcountry samples: $t=2.75$,
 $P=0.006$.

Table 16. Type of shelter in which backcountry campers most frequently spent the night, GSMNP, 1982.

Type of Shelter	Camper Category	
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)
Trail Shelter	61.3	5.3
Tent	32.0	82.7
Equally Tent and Trail Shelter	4.0	1.3
Sleeping Bag with Tarp	2.7	4.0
Makeshift	--	2.7
Building	--	1.3
No Shelter	--	1.3
Other	--	1.4

this study spent significantly less time in backcountry areas annually (see Backcountry Experience) compared with shelter respondents. Shelter respondents may tend to make more extensive trips along the Appalachian Trail forcing them to utilize shelter sites.

Food carried by backcountry campers. Food odors from a stored backpack or a food sack may aid a bear in locating it. Sealing all food and keeping packs, tents, and clothing free of food odors is a safety recommendation of the NPS. All food carried by the majority of backcountry campers (85.3%, n=64 of shelter and 89.3%, n=67 of campsite respondents) was sealed in some manner; ziplock plastic bags were frequently used. An additional 2.7% (n=2) of shelter and 6.7% (n=5) of campsite respondents sealed all food except fresh fruit. Fresh and dehydrated foods were carried most frequently by backcountry campers (Table 17).

Approximately three-fourths of backcountry campers (69.3%, n=52 of shelter respondents and 76.0%, n=57 of campsite respondents) carried some type of meat into the backcountry. Canned, freeze-dried, and prepared meats were carried most frequently (Table 18). Meat and fish often produce a strong odor during preparation and, depending on the type, grease and bones are left at the campsite or shelter. After finding scraps, bears and other mammals and birds learn to associate the area with food. Campers must understand the importance of packing out or burning all waste food, grease,

Table 17. Percentage of backcountry campers carrying various types of food, GSMNP, 1982.

Type of Food	Camper Category	
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)
Dehydrated	82.7	81.3
Fresh	72.0	78.7
Canned	60.0	64.0
Freeze-dried	61.3	58.1

Table 18. Percentage of backcountry campers carrying various types of meat, GSMNP, 1982.

Type of Meat	Camper Category	
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)
Canned	34.7	38.7
Fried Freeze-dried	30.7	24.0
Prepared (ham, salami, sausage)	14.7	18.7
Fresh (beef, pork, chicken)	6.7	9.3
Bacon, salted, or fat-back	1.3	12.0
Packaged (one time use)	8.0	4.0
Hot dogs, cold cuts	2.7	4.0

or scraps of food left after washing utensils. Burying food scraps is not an acceptable alternative, yet this type of behavior is often observed.

Backcountry food storage techniques. In the backcountry of GSMNP the NPS requires food to be kept within a trail shelter having bear enclosure fencing or suspended at least ten feet above the ground and four feet from any post, tree trunk, or limb. Respondents were asked how or where they usually stored their food while in the backcountry of GSMNP (Table 19). While 61.3% of shelter respondents utilized shelter sites more often than campsites, only 44.0% stored their food most frequently within shelters; some shelter users are storing their food outside. Campsite respondents most frequently stored their food suspended between two trees.

Although many campers attempt to follow NPS regulations, heavy backpacks are difficult to hoist ten feet off the ground. In addition, many backcountry campers do not realize what agile climbers black bears are, or even that black bears climb trees (see Knowledge of Black Bear Characteristics); packs are found close to tree trunks or overhead branches. Bears also learn to chew through support ropes to reach food. Shelters are often found not to be bear proof--chains and latches are missing on doors and fencing does not extend securely to the roof and side walls; bears can climb up the fence or enter between the wall and fence. In addition, shelter doors are frequently left open.

Table 19. Food storage method of backcountry campers (%), GSMNP, 1982.

Food Storage Method	Camper Category	
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)
Inside Shelter	44.0	2.7
Suspended in 1 Tree	24.0	26.7
Suspended Between 2 Trees	18.7	49.3
Suspended in 1 Tree or Between 2 Trees	2.7	8.0
In Shelter or Between 2 Trees	6.7	1.3
Counter Balanced	-	2.7
Bear Pole/Cable	-	2.7
Other	4.0	6.7

Group size and type. The largest percentage of backcountry campers were travelling in groups of two, while approximately 18% were either solitary hikers or in groups of three (Table 20). Groups were as large as 6 at shelters, and 11 at campsites. Parties were smaller in the shelter sample ($t=-2.35$, $P=0.021$), with a mean size of 2.3 ($SD=1.1$, median=2.1) compared to a mean size of 2.9 at campsites ($SD=2.0$, median=2.3). Reservations at shelter sites are often easier to obtain with a smaller party size. Over 50% of the groups of two or more were made up of friends, while approximately 30% were family groups (Table 21).

Knowledge of Black Bear Characteristics

Camper knowledge of bears is necessary for safety and proper food storage. In addition, results of a study by Lime and Cushwa (1969) suggest that the more knowledgeable a recreationist is about wildlife, the more esthetically important that resource becomes.

Users of backcountry shelters and primitive campsites exhibited similar levels of knowledge for 8 of 9 questions regarding black bear characteristics (Table 22). Responses to each question are available in Appendix D, Tables 50-58). Backpackers at trail shelters were significantly more knowledgeable about the diet of black bears compared to backpackers at campsites. The reason for this difference is unknown. Backcountry campers as a whole were more knowledgeable than frontcountry campers regarding the species

Table 20. Size of group that backcountry campers (%) were hiking with, GSMNP, 1982.

Group Size	Camper Category	
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)
1	21.3	16.0
2	52.0	45.3
3	14.7	13.3
4	5.3	14.7
≥ 5	6.7	10.7

Table 21. Type of group backcountry campers (%) were hiking with, GSMNP, 1982.

Type of Group	Camper Category	
	Backcountry Shelter (N=59)	Backcountry Campsite (N=63)
Friends	59.3	50.8
Family	28.8	30.1
Family and Friends	6.8	15.9
Organized Group	5.1	3.2

Table 22. Percentage of correct responses by backcountry and frontcountry campers to 9 questions about bears in GSMNP, 1982.

Camper Category	Question						
	Cub Climbing Ability	Bear Species	Adult Climbing Ability	Daylight Activity	Running Speed	Diet	Mt. of Adult Male Birth Frequency
Backcountry Total	89.3	86.7 ^a	85.3 ^b	83.3	80.7	70.0	31.3 24.7 3.3 ^d
Backcountry Shelter	92.0	92.0	85.3	88.0	86.7	78.7 ^c	32.0 25.3 4.0
Backcountry Campsite	86.7	81.3	85.3	78.7	74.7	61.3 ^c	30.7 24.0 2.7
Frontcountry	89.0	75.5 ^a	74.5 ^b	86.5	77.5	60.0	34.0 28.0 11.5 ^d

Categories of identical superscript are significantly different ($P < .05$).

$a_{\chi^2} = 6.753$, $P = 0.009$.

$b_{\chi^2} = 6.094$, $P = 0.014$.

$c_{\chi^2} = 5.365$, $P = 0.020$.

$d_{\chi^2} = 7.767$, $P = 0.005$.

of bear present in the Park and the climbing ability of adult bears; a possible explanation may be that this information is often disclosed when discussing backcountry food storage. Frontcountry campers were significantly more knowledgeable regarding the weight of cubs at birth; this trivia is often given at naturalist talks held in frontcountry campgrounds.

The percentage of correct responses ranged from 92% regarding the species of bear present in the Park and cub climbing ability, to only 2.7% regarding the weight of newborn cubs. Responses ranged up to 150 lbs. for the birth weight of a cub (Table 23); answers of less than 1 lb. were scored as correct. Weight of adult male bears also proved to be a difficult question with only 31% of backcountry and 34% of frontcountry campers scoring correctly; responses ranged from 35 to 4000 lbs. (Table 24). Responses between 127 and 285 lbs. were scored as correct; this range resulted by averaging the weights of adult (4+ years) male black bears weighed by University of Tennessee researchers in the Smokies. The average weight of research bears was 205.59 ± 78.99 lbs.

A better perception of the relatively light weight of adult bears is needed as Park visitors may approach a 2 to 3 year old bear weighing less than 100 lbs. thinking it is a "harmless" cub. Some may regard running from a black bear as an "escape measure," and visitors thinking they can move faster than a bear may approach a bear closely for photographs or may allow a bear to approach them. Thirteen to 22% of campers felt they could outrun a black bear.

Table 23. Mean response to question regarding the weight of a black bear cub at birth (pounds), 1982.

Camper Category	N*	Mean	SD	Range
Backcountry Shelter	74	21.7	21.8	0.3-100.0
Backcountry Campsite	71	21.4	23.9	0.4-150.0
Frontcountry	192	21.5	24.8	0.1-150.0

*Missing values were responses of "Don't Know."

Table 24. Mean response to question regarding the weight of adult male black bears in the Smoky Mountains (pounds), 1982.

Camper Category	N*	Mean	SD	Range
Backcountry Shelter	74	362.5	175.1	125.0-1200.0
Backcountry Campsite	71	344.3	137.7	35.0-800.0
Frontcountry	192	413.8	413.9	75.0-4000.0

*Missing values were responses of "Don't Know."

The diurnal activities of bears were recognized by a high percentage of campers (78.7-88.0%). Also, it is noteworthy that a high percentage of respondents were knowledgeable regarding the climbing ability of adult black bears (74.5-85.3%). However, over 10% of the backcountry campers interviewed were not aware of bear climbing ability and diurnal activity; backpacks are often seen in the backcountry tied directly to a tree or temporarily left unattended (Appendix E). Projection of survey results to the total number of backcountry overnight visits the Park in 1982 (73,697) reveals that many backpacks were potentially available to black bears.

The level of knowledge of frontcountry and backcountry campers compared favorably with results obtained from 3 similar questions (diet--67.2% correct; running speed--68.2% correct; weight of newborn cubs--9.2% correct) asked by Burghardt et al. (1972) and 2 similar questions (running speed--75% correct; climbing ability--85% correct) asked by Baptiste et al. (1979). The above information indicates that, with one or two exceptions, similar knowledge of these specific characteristics was exhibited through time, at different locations (GSMNP and Shenandoah National Park), and within GSMNP by different users (backcountry and frontcountry).

Knowledge as Related to Experience

Backcountry campers and frontcountry campers (who had backcountry experience) with High Backcountry Experience Scores were

not more knowledgeable in any of the nine areas than campers with Low Scores. Additionally, frontcountry campers with backcountry experience were not significantly more knowledgeable than frontcountry campers without backcountry experience. More frontcountry campers who had prior experience camping in bear habitat had High Knowledge Scores compared to frontcountry campers who were on their first camping trip in black bear habitat ($\chi^2=8.245$, $df=1$, $P=0.004$).

Table 25 presents Kendall correlation coefficients between Black Bear Knowledge, Backcountry Experience, and Black Bear Experience Scores. There was a significant but weak relationship between Backcountry Experience and Black Bear Experience for all samples. This relationship may be explained in part by the fact that the more time spent in the backcountry, the greater the chance of encountering a black bear, even though bears are sometimes seen during a first trip. When Black Bear Experience Scores and Knowledge Scores were considered for the total backcountry sample, a weak but significant relationship was revealed by the larger sample size ($P=0.032$). People may certainly learn about some black bear characteristics through encounters with bears. Correlation coefficients between Backcountry Experience and Knowledge Scores were low, and were significant only for frontcountry respondents who had backcountry experience. This result may indicate that some respondents with more backcountry experience were consistently more knowledgeable than respondents without backcountry experience.

Table 25. Kendall Correlation Coefficients (τ) and probability levels (P) between Black Bear Knowledge Scores, Black Bear Experience Scores, and Backcountry Experience Scores.

Camper Category	Score					
	Bear Experience Hiking Experience		Bear Experience Knowledge		Backcountry Experience Knowledge	
	τ	P	τ	P	τ	P
Backcountry Total (N=146)	0.266	0.000	0.143	0.032	0.103	0.108
Backcountry Shelter (N=72)	0.215	0.019	0.146	0.130	0.088	0.338
Backcountry Campsite (N=74)	0.280	0.002	0.077	0.419	0.030	0.744
Frontcountry with Backcountry Experience (N=88)	0.382	0.000	0.001	0.988	0.196	0.014

Backcountry experience, or the amount thereof, does not appear to greatly influence one's knowledge of black bears. Frontcountry campers on their first trip in bear habitat must be better prepared to deal with black bears. Knowledge of bears is vital to food storage and visitor safety; information should be presented regardless of the experience level of the camper. Managers and rangers must realize that campers who indicate they "have been camping for 20 years" or that they have backcountry experience, may not be more knowledgeable regarding bears than less experienced campers.

Knowledge as Related to Demographic Characteristics

There was no significant difference in the level of formal education possessed by backcountry campers ($\chi^2=0.645$, $df=3$, $P=0.886$) or frontcountry campers ($\chi^2=3.309$, $df=4$, $P=0.508$) with High and Low Knowledge Scores. In addition, the Scores of backcountry ($\chi^2=1.045$, $df=4$, $P=0.903$) and frontcountry ($\chi^2=5.235$, $df=4$, $P=0.264$) campers were not significantly different whether respondents spent the majority of their life in a city, rural, or suburban environment. Knowledge Scores of male and female backcountry campers did not differ significantly ($\chi^2=2.421$, $df=2$, $P=0.298$). In the frontcountry sample, more females had moderate scores and fewer females had high scores compared to males ($\chi^2=6.307$, $df=2$, $P=0.043$); Burghardt et al. (1972) had similar findings among frontcountry Park visitors. The higher knowledge of frontcountry male campers

may reflect traditional male involvement with hunting. Additionally, males may be more likely to register their families at a campsite, thus directly receiving more information.

Sources of Information on Black Bears

Information Provided by the NPS

The majority of respondents at backcountry campsites (90.7%, n=68) and at shelter sites (92.0%, n=69) had received information on black bears in some form from the NPS (Table 26). Of the shelter respondents who received information, 68.1% mentioned the ranger who issued their permit and 65.2% mentioned Park brochures. For backcountry campsite respondents, Park brochures (70.6%) and the ranger who issued their permit (63.2%) were also important sources of information.

Ninety-five percent (n=190) of frontcountry respondents had received information from the NPS on black bears. The sources mentioned by the most people were the list of regulations handed out while registering for a campsite (permit--71.1%), the ranger who issued their permit (66.3%), Park brochures (59.5%), and signs (26.3%).

It is encouraging that over 90% of all campers interviewed had received some type of information from the NPS on bears. However, this information must be read, understood, and heeded to be of use. Clearly, the one-on-one information given by Park employees who issue permits and Park brochures are the best sources of

Table 26. Percentage of campers who received information on black bears from National Park Service sources, GSMNP, 1982.

Source	Camper Category		
	Backcountry Shelter (N=69)	Backcountry Campsite (N=68)	Frontcountry (N=190)
Park Brochures	65.2	70.6	59.5
Ranger Issuing Permit/Registration	68.1	63.2	66.3
Visitor Center	18.8	11.7	12.6
Signs	14.5	13.2	26.3
Ranger	11.6	7.4	13.7
Permit/Campsite Regulations	7.2	10.3	71.1
Other	5.8	10.3	8.9
Trail Map	5.8	8.8	11.1
Naturalist Talks	2.9	4.4	12.1

information on black bears for the backcountry camper. Park personnel who issue permits should be well trained, consistent, and thorough in their presentations regarding bears.

Visits to NPS visitor centers. Seventy-six percent of campsite respondents (n=57) and 85.3% (n=64) of shelter respondents had visited a Park visitor center (Table 27); 90.1% of these respondents had visited within the previous year. Compared with the total backcountry sample, significantly fewer frontcountry campers (68.0%, n=136) visited a center ($\chi^2=7.049$, df=1, P=0.008); 77.2% (n=105) visited within the past year.

The above results reflect the fact that many backcountry users obtain their permits at one of the two visitor centers within the Park--Sugarlands and Oconaluftee. The high visitation rate indicates the visitor centers may be good places to disseminate information on bears; however, only 17.3% (n=13) of shelter respondents, and 10.7% (n=8) of campsite respondents indicated they had obtained information on bears from a visitor center. Some respondents may have only visited the permit desk and not taken time to view exhibits, or respondents may not have thought of the visitor center when asked the question.

The Bear Knowledge Score (High, Moderate, Low) of backcountry respondents who had attended a visitor center in GSMNP was not significantly different from those who had not attended ($\chi^2=0.485$, df=2, P=0.785). There was no difference in the three levels

Table 27. Percentage of campers who visited one or both of the visitor centers in GSMNP, 1982.

Camper Category	Visited Sugarlands Visitor Center	Visited Oconaluftee Visitor Center	Visited Both	Visited Neither
Backcountry Total (N=150)	40.7	10.0	30.0	19.3
Backcountry Shelter (N=75)	36.0	9.3	40.0	14.7
Backcountry Campsite (N=75)	45.3	10.7	20.0	24.0
Frontcountry (N=200)	18.0	14.0	36.0	32.0

of Bear Knowledge Scores based on visitor center visitation ($\chi^2=3.892$, $df=2$, $P=0.143$), nor between High and Low Scores ($\chi^2=3.220$, $df=1$, $P=0.073$) for frontcountry respondents.

Attendance at NPS naturalist talks. Only 18.7% ($n=14$) of backcountry campsite respondents and 32.0% ($n=24$) of shelter respondents had attended a naturalist talk at GSMNP; 60.5% of these campers attended within the past year. Forty-one percent of the frontcountry campers interviewed had attended a naturalist talk; 72.0% attended within the past year.

Backcountry respondents who attended a park naturalist talk did not possess significantly higher Bear Knowledge Scores than those who had not attended ($\chi^2=5.292$, $df=2$, $P=0.071$). However, there were more frontcountry campers with High Bear Knowledge Scores who had attended a talk compared to campers who had not attended a talk ($\chi^2=13.846$, $df=1$, $P<0.001$). Although black bears are the subject of many talks given within the Park, respondents may or may not have attended such presentations. Talks by park naturalists are usually offered in the evenings at frontcountry campgrounds and are therefore more accessible to campers there. Burghardt et al. (1972) found approximately 35% of visitors had attended a naturalist talk in GSMNP, while Pelton et al. (1976) found 37.8% of those who experienced black bear caused property damage or injury had done so.

Adequacy of NPS information on black bears. Respondents who received information on bears in GSMNP were asked if that

information prepared them to deal with black bears; over 22% felt it did not (Table 28). Campers who feel they were not prepared sufficiently to deal with black bears may attempt to hold the NPS responsible for incidents with bears (see Reimbursement of Bear Incidents).

It is difficult for the NPS to make recommendations regarding encounters with black bears; each situation is unique, and individual bears and visitors react differently. There is a need for more research on human-bear interactions in both backcountry and front-country campgrounds.

Much written information is available to campers, however many are eager to begin their trips and not read the material. The one-on-one encounter with a Park employee who issues camping permits is currently providing information to the most campers. Efforts to warn campers of bear activity should continue. Campers should be told not to leave packs unattended unless food is properly stored. All NPS regulations regarding food should be discussed while permits are issued.

Several backcountry campers said the Park employee who issued their permit said nothing about bears. As Park employees are often too busy to cover all information in detail, the NPS may consider exposing all campers to a brief automatic slide and tape show on bears and NPS regulations. Increasing employee interest regarding black bears may be difficult as Peine et al. (1985) found 91.0%

Table 28. Camper response (%) regarding adequacy of NPS provided information on black bears, GSMNP, 1982.

Camper Category	Response			
	Adequate	Not Adequate	Not Adequate for a Bear Encounter	Don't Know, Have Not Read
Backcountry (N=137)	73.0	19.7	5.1	2.2
Shelter (N=69)	73.9	18.8	5.8	1.4
Campsite (N=68)	72.1	20.6	4.4	2.9
Frontcountry (N=188)	75.0	12.8	10.6	1.6

of employees interviewed during the summer of 1982 felt the NPS did an adequate job of telling visitors about bears.

Other Sources of Information

Accuracy of information from sources other than the NPS must be questioned. Books and magazines provided black bear information to approximately 41% of all campers interviewed (Table 29). "Other people" (campers, friends, relatives) provided information to 40% of backcountry campers; correct as well as incorrect information could be passed along.

Television was the most frequently mentioned information source for frontcountry campers. There are many natural history programs which provide accurate information; however, programs such as "Gentle Ben" could dangerously influence one's behavior with wild bears in a national park.

There appears to be an overall increase in the availability and/or utilization of information on bears since 1970; at that time, Burghardt et al. (1972) found only 5.4% of GSMNP visitors and campers mentioned television and 14.0% mentioned books, magazines, and newspapers.

Attitudes and Behavior Regarding Black Bear Encounters

This section begins with a discussion of the desire of survey respondents to interact with black bears. Respondents were also asked what their reaction would be to a black bear on a trail and

Table 29. Percentage of campers receiving information on black bears from sources other than the National Park Service, GSMNP, 1982.

Source	Camper Category		
	Backcountry Shelter (N=75)	Backcountry Campsite (N=75)	Frontcountry (N=200)
Other People	41.3	38.7	23.5
Books and/or Magazines	40.0	46.7	37.0
Personal Experience	20.0	20.0	19.0
Television	17.3	25.3	42.0
Hiking Groups	14.7	14.7	13.5
Environmental Organizations	9.3	10.7	5.5
School/ Envir. Ed.	5.3	4.0	3.0
Zoos or Museums	1.3	4.0	15.0
Newspapers	1.3	2.7	14.0

at their campsite; although difficult questions to answer due to varying situations, responses provided some insight as to whether campers would react passively or aggressively to black bears. How campers plan to react to a bear, may be different from how they actually react. This section concludes with a discussion of observed interactions between backcountry campers and bears; campers did not know they were being observed by a bear researcher.

Desire to Interact with Black Bears

For many Park visitors, thought of the Smokies include the black bear; as one respondent stated, "people come from miles to see black bears." Hastings (pers. commun.) found 98.8% of visitors driving through the Cades Cove portion of the Park wanted to see black bears there. But how did campers feel about seeing black bears at their campsites? Would they like to feed bears? Were they reluctant to hike and camp in backcountry areas because of bears? Additionally, were campers concerned and aware of incidents with bears in GSMNP?

Desire to see black bears. Significantly more shelter respondents (65.3%, n=49) than campsite respondents (49.3%, n=37) hoped to see bears along trails in GSMNP ($\chi^2=3.924$, df=1, P=0.048). More respondents interviewed at shelter sites (38.7%, n=29) than at campsites (25.3%, n=19) hoped to see bears at their camping sites. Although this difference was not significant ($\chi^2=3.064$, df=1, P=0.081), campers may feel that fenced trail shelters offer more security

than nylon tents. Fewer backcountry campers hoped to see bears at campsites than on trails; this result may reflect the concern expressed by the majority of campers regarding bear caused food loss and property damage (see Concern for Food and Equipment), especially when equipment is spread out in camp.

A larger percentage of frontcountry users (42.2%, n=84) than backcountry users (32.0%, n=48) hoped to see bears at their campsites, although this difference was not significant ($\chi^2=3.792$, df=1, $P=0.052$). Experiencing bear caused property damage in the past did not appear to make campers in the backcountry ($\chi^2=0.099$, df=1, $P=0.753$), or campers in general ($\chi^2=0.002$, df=1, $P=0.969$) less hopeful of seeing bears at their campsite.

Frontcountry campers were asked if they hoped to see bears along the roadsides in GSMNP; a surprising 82.4% of frontcountry campers indicated they did. Several campers expressed concern for the bear population in the Park as they recalled previous trips "when there were lots of bears" (along the roadsides). Visitors must be informed of the potential hazards faced by roadside bears (poaching, vehicle collisions) and that GSMNP is not a drive through "safari adventure park" where animals are maintained for entertainment purposes.

Desire to feed bears. Only one person (1.3%) in both the shelter and campsite samples said they hoped to feed bears; this is consistent with actual observations of backcountry campers by

Hastings (1982) in Yosemite National Park. He found only 3 of >5,800 human responses to black bears involved feeding; backpackers were reluctant to part with their food.

The number of people that would feed bears in the frontcountry where food is more easily replaced is likely greater than the 2.5% (n=5) of frontcountry campers responding affirmatively to this question. Tate and Pelton (1979) found visitors commonly feeding bears along roadsides in GSMNP. One problem with direct interviews is that respondents may not express their true feelings when they feel the interviewer would disapprove (Gorden 1980); more likely though, many respondents probably realized it was unlawful to feed bears in GSMNP.

Concern for food and equipment. Eighty percent (n=60) of campsite respondents and 81.3% (n=61) of shelter respondents were concerned about food storage ($\chi^2=0.043$, df=1, P=0.836) because of black bears; a significantly lower percentage of frontcountry campers (67.3%, n=134) expressed concern ($\chi^2=7.723$, df=1, P=0.006). This difference likely reflects the ease of frontcountry food storage in vehicles and the closer proximity to stores.

Sixty percent (n=45) of campsite and 53.3% (n=40) of shelter respondents expressed concern for equipment damage caused by black bears ($\chi^2=0.679$, df=1, P=0.410). A significantly lower percentage of frontcountry campers (22.6%, n=45) expressed concern for bear damage ($\chi^2=42.433$, df=1, P<0.001). Frontcountry campers, the majority utilizing recreational vehicles or campers, likely feel less

vulnerable than backcountry campers who depend on what is carried on his/her back. Fewer respondents who had experienced bear caused property damage were concerned about future damage compared with those who had not, however, this difference was not significant ($\chi^2=1.416$, $P=0.234$).

Awareness of black bear inflicted injuries. Three visitors to GSMNP were injured by black bears during 1982. Black bear caused injuries are usually the result of a bite or a swat with a front paw. Tate and Pelton (1979) found that crowding or attempts at petting black bears precipitated most aggressive acts of bears toward visitors. Additionally, Tate and Pelton found that black bears exhibited restraint in dealing with people; less than 6% of all aggression led to physical contact with visitors.

Approximately one-fourth of all interviewees did not realize black bears injure visitors in GSMNP (Table 30); these campers may tend to be overly bold and approach a bear dangerously close or harass it. The NPS may find that visitors would be less willing to feed and approach bears if they knew that visitors have been injured in the Park.

Campers that knew black bears cause injuries were asked why a black bear might injure a visitor; more than one response was often given. The majority of campers felt injury occurred due to food involvement, and ignorance and carelessness on the part of visitors (Table 31). Seven to 14.3% of respondents felt injuries resulted from bears protecting their cubs; only 1.8 to 7.0% of

Table 30. Camper awareness (%) of black bear inflicted injuries in GSMNP, 1982.

Camper Category	Response			
	Yes, Injuries Occur	Yes, Injuries Occur But Infrequently	No, Injuries Do Not Occur	Don't Know
Backcountry Total (N=150)	51.3	24.0	20.7	4.0
Backcountry Shelter (N=75)	54.7	21.3	21.3	2.7
Backcountry Campsite (N=75)	48.0	26.7	20.0	5.3
Frontcountry Total (N=199)	58.8	14.1	16.6	10.5

Table 31. Reasons why campers (%) felt people are injured by black bears in GSMNP, 1982.^a

Camper Category	Reasons							
	Food Involvement	Ignorance/ Carelessness	People Get Too Close	Defense of Cubs	Annoying Bears	Bear Is Aggressive	People Do Not Follow Rules	Don't Know Other
Backcountry Total (N=113)	73.4	29.2	14.2	10.6	10.6	4.4	1.8	0.9
Backcountry Shelter (N=57)	75.4	31.6	15.8	7.0	3.5	7.0	1.8	-
Backcountry Campsite (N=56)	71.4	26.8	12.5	14.3	17.8	1.8	1.8	1.8
Frontcountry Total (N=145)	64.8	26.9	22.8	13.1	25.5	2.8	7.6	2.8

^aMore than one reason may have been given.

respondents felt black bears were naturally aggressive. Most campers realized people influenced the behavior of bears; these campers may be more likely to support management practices that directly influence campers (e.g., site closure, stricter enforcement).

Safe distance from a black bear. Curiosity or a desire to feed or photograph bears may cause people to approach bears in a national park. Some bears seeking food may approach or follow visitors. The NPS warns visitors in GSMNP to enjoy bears at a distance. A safe distance from a black bear is totally dependent on the situation and the bear. When backcountry campers are behind a shelter fence, a safe distance may be a few inches. Bears in these situations gain familiarity with people, and may attempt to approach people outside of shelters.

At what distance from a black bear did campers feel safe? Responses to this question were at best approximate minimum distances that respondents felt safe from a black bear. As people are poor judges of distance, interviewers would often help campers estimate distances between themselves and objects around their campsite. Table 32 shows each sample mean and minimum and maximum responses. Over 87% of backcountry and 84.7% of frontcountry campers felt safe only at distances over 20 feet, while 55.2% of backcountry and 52.0% of frontcountry campers felt safe only at distances over 50 feet from a black bear. The mean safe distance of respondents who knew black bears may inflict injury ($\bar{x}=157.1$, $n=249$) did not differ from

Table 32. Mean distance (in feet) campers felt safe from a black bear in GSMNP, 1982.

Camper Category	Mean	S.D.	Range
Backcountry Total (N=143)	140.1	224.1	9.0-1500.0
Backcountry Shelter (N=70)	108.9	112.8	9.0-600.0
Backcountry Campsite (N=73)	170.0	291.5	10.0-1500.0
Frontcountry (N=196)	173.5	543.4	6.0-5280.0

Student's t-test, backcountry samples: $t=-1.67$, $P=0.099$.
 Student's t-test, backcountry and frontcountry samples: $t=-0.78$,
 $P=0.439$.

the mean distance of those who did not know ($\bar{x}=165.8$, $n=90$; $t=-0.21$, $P=0.831$).

Reluctance to hike or camp in the backcountry. Respondents were asked if they were reluctant to hike in the backcountry of GSMNP due to black bears; 9.3% ($n=7$) of shelter and 13.3% ($n=10$) of campsite respondents admitted they were ($\chi^2=0.597$, $df=1$, $P=0.440$). However, this reluctance did not prevent these respondents from hiking or camping in the backcountry. A significantly higher percentage of frontcountry campers (19.6%, $n=39$) were reluctant to hike in the backcountry of the Park ($\chi^2=4.337$, $df=1$, $P=0.037$) compared with backcountry campers.

Approximately 20% of shelter (22.7%, $n=17$) and campsite (18.7%, $n=14$) respondents were reluctant to camp in the backcountry because of black bears ($\chi^2=0.366$, $df=1$, $P=0.545$). Significantly more frontcountry campers (34.2%, $n=68$) were hesitant to camp in backcountry areas because of bears ($\chi^2=7.676$, $df=1$, $P=0.006$) compared to backcountry campers; people will naturally camp and hike where they feel most comfortable. In all samples, a higher percentage of campers were reluctant to spend the night in backcountry areas than to just hike there.

Marsh (1970) found 10% of visitors at frontcountry campgrounds and roadside pull-offs in Banff and Glacier National Parks were discouraged from camping because of bears; approximately 20% did not wish to hike because of bears. Some people may avoid national parks because of bears or other wildlife. Bryan and Jansson (1973) found

approximately 30% of persons not visiting national parks in western Canada felt endangered by wildlife.

Stated Reactions to a Black Bear

The initial planned reaction of approximately 45% of all campers to a black bear on a trail was to stand motionless and watch the bear (Table 33). Approximately twice as many backcountry as frontcountry campers planned to make noise, yell, or throw non-food objects at the bear; this result reflects the fact that backcountry campers are dependent on what they carry and are not likely to surrender their food and equipment. Moving away from the bear or avoiding it was a more common planned response of frontcountry campers than backcountry campers. Burghardt et al. (1972) found only 1.8% of Park visitors in 1970 would have attempted to frighten a black bear by shouting or throwing stones.

Several respondents listed two or three reactions to a bear encounter on a trail. Examination of all reactions (including the initial reaction) revealed 3.8 and 6.0% of backcountry shelter and campsite responses, respectively, involved dropping packs or giving food to the bear; 25.1% of the reactions of backcountry campers involved yelling, making noise, or throwing objects at the bear, compared with 12.4% of reactions of frontcountry respondents. Fewer reactions of backcountry campers (33.1%) involved moving away or avoiding the bear, compared with reactions of frontcountry campers (46.6%).

Table 33. Action campers (%) said they would take upon seeing a bear on the trail, GSMNP, 1982.

Camper Category	Stand Motionless/ Watch	Action						
		Yell Make Noise	Walk Slowly Away	Run/ Move Quickly	Move Aside Keep Distance Avoid	Throw Something (Not Food)	Drop Pack/ Give Food	Other
Backcountry Total (N=150)	47.3	17.3	13.3	6.7	4.0	2.0	3.4	6.0
Backcountry Shelter (N=75)	50.7	16.0	13.3	5.3	4.0	4.0	2.7	4.0
Backcountry Campsite (N=75)	44.0	18.7	13.3	8.0	4.0	-	4.0	8.0
Frontcountry Total (N=199)	48.7	6.0	19.1	9.6	14.6	-	0.5	1.5

Respondents were also asked what they would do if a bear entered their campsite. The most frequent initial reaction planned by backcountry respondents was to make noise or yell to scare the bear off (Table 34). Approximately 30% of shelter respondents planned to enter the shelter; this option was not available for campsite respondents who were more likely to initially stand motionless and watch the bear. Approximately one-half as many campers were willing to stand motionless and watch a bear at their campsite as on the trail, probably since their equipment and food were more vulnerable when spread out in camp.

The most common initial reaction of frontcountry campers was to enter their vehicle or a building, only 11.1% planned to yell or make noise. Examination of the initial and sequential planned reactions of respondents revealed 35.5% of backcountry responses involved making noise, yelling or throwing something, compared to 15.1% of frontcountry reactions. Backcountry respondents were more likely to aggressively defend their equipment, especially at a backcountry campsite where a shelter structure was not available.

Mt. LeConte Bear Encounters

Dayhikers, backpackers, and lodge guests often report their encounters with bears to the lodge concession office on Mt. LeConte. A brief one-page questionnaire was available to lodge visitors in August and September of 1982. At the bottom of the sheet was a reminder to respondents that they were not completing a formal report to the National Park Service. Thirteen sheets were completed.

Table 34. Action Campers (%) said they would take if a black bear entered their campsite, GSMNP, 1982.

Camper Category	Action						
	Stand Motionless/ Watch	Go Inside-- Vehicle, Shelter, Tent	Move Aside Keep Distance Leave Area	Make Noise, Talk Yell	Throw Something (Not Food)	Do Nothing	Other
Backcountry Total (N=150)	16.0	15.3	18.7	34.0	2.0	6.0	10.0
Backcountry Shelter (N=75)	8.0	29.3	17.3	30.7	1.4	9.3	5.4
Backcountry Campsite (N=75)	24.0	1.3	20.0	37.3	2.7	2.6	14.7
Frontcountry Total (N=199)	21.6	38.7	18.6	11.1	-	7.0	3.0

There is an obvious bias in the sampling technique and a very small sample to consider. Yet, some useful information was provided and is an indication of the need to study bear problems in developed backcountry areas and day use areas.

Bears reportedly approached eleven respondents; nine were approached within ten feet, and five respondents were approached within five feet. Seven respondents threw food to or near the bear when it approached. This type of behavior obviously provides positive reinforcement for the bear to approach visitors. Visitors may not always admit giving food to bears. When a bear closely approached, throwing food may seem like a good diversion, but later visitors may realize they were illegally feeding bears.

Three visitors reported that the bear ran toward them and then stopped (possible bluff-charge). Five respondents reported a bear vocalized and seven reported being followed by a bear. In eleven cases the bear finally walked away, in one case the bear ran away, and in another case the visitors walked away.

Five incidents occurred between 9:01 a.m. and 1:00 p.m. and eight occurred between 1:01 p.m. and 5:00 p.m.; these were the times respondents would be traveling on trails.

Observed Reactions to Black Bears

A number of interactions between bears and either backcountry campers or researchers were recorded. Interactions between visitors and bears were descriptive; interactions involving researchers were largely "experimental."

Camper-black bear interactions. Twenty-six complete interactions involved backcountry campers with four known bears and at least four unknown bears (Table 35). The researcher, perceived by visitors as just another camper, remained in the background as to minimally influence camper or black bear behavior. Camper-bear interactions which occurred in the presence of a known researcher are not considered due to the probable bias in camper reaction to the presence of the researcher(s). Campers who were aware of the presence of researchers would often imitate the actions of the researchers.

Bears were observed eating natural foods (n=26), walking randomly (n=19), and walking away (n=13) most frequently. Bears were heard huffing six times (Table 36); one of these vocalizations was likely directed at two wild boars. Three huffs were preceded by people approaching bears and one was preceded by a person backing away. Bear #582 was responsible for four of the vocalizations.

In the frontcountry of GSMNP, Tate and Pelton (1983) found the huff (blow vocalization) to be the most frequently exhibited aggressive act of bears toward visitors, while Hastings (1982) found the frequency of the huff vocalization less common in the backcountry of Yosemite National Park. In Yosemite the most frequently observed aggressive behavior of black bears involved running or jumping toward campers.

The most frequently observed human activities during interactions in the backcountry of GSMNP included watching and/or

Table 35. Locations and bears involved in 26 interactions with campers and 17 interactions with researchers in the backcountry of GSMNP, 1982.

Type of Interaction	Location	Bear	Age in 1982	Sex	Number of Interactions
Camper	Mt. LeConte	#582	4	F	11
	Mt. LeConte	#578	3	F	2
	Mt. LeConte	Unknown	-	-	1
	Spence Field	#482	7	F	5
	Spence Field	Unknown	-	-	3
	Siler's Bald	#598	Adult	F	2
	Siler's Bald	Unknown	-	-	1
	Walnut Bottoms	Unknown	-	-	1
	Spence Field	#482	7	F	5
	Spence Field	Unknown	-	-	6
Researcher	Siler's Bald	#598	Adult	F	2
	Walnut Bottoms	Unknown	-	-	2
	Deep Creek	Unknown	-	-	2

Table 36. Responses of backcountry campers to a huff vocalization by a black bear, GSMNP, 1982.

Frequency	Action of Bear	Reaction of Camper
1	huff	watch/listen (inside shelter)
1	huff	walk towards bear
1	huff	back away
1	huff	talking (inside shelter)
1	huff	talk to bear
1	huff (directed at boars)	campers laying down (inside shelter)

listening (n=23) and talking to others and/or pointing at the bear (n=20). Only one camper attempted to feed a bear. Campers approached bears 13 times. People showed aggression by yelling and throwing stones (n=3), jumping toward the bear (n=1), or by making noise in the form of a clap (n=1), yell (n=1), or whistle (n=1); responses of bears to these actions are shown in Table 37.

Interactions averaged 3 minutes and 56 seconds in length, and ranged from 10 seconds to 23 minutes and 48 seconds. During two interactions, campers and bears were within 0.5 m of each other separated by shelter fencing. Excluding these observations, average bear approach distance was 11.0 m.

Researcher-black bear interactions. Seventeen complete interactions directly involving researchers in trail, shelter, and campsite locations were documented (Table 35). Interactions involving bear captures and sedations were not recorded.

Of particular interest was the response of bears to various forms of human aggression. When other campers were not present, the researcher would often yell or make noise to see how bears would respond. Reactions of bears at shelter sites are shown in Table 38, and bears at campsites are shown in Table 39.

The most frequent behavior of researchers was to watch and/or listen (n=57). The most frequent behavior of bears was walking away (n=20), sniffing (n=13), and walking toward a shelter or campsite (n=10). Bears showed aggression in the form of a huff (n=1), jaw pop (n=3), swat and jump (at the shelter fence; n=1), and one bear shook the shelter fence.

Table 37. Responses of black bears to various forms of aggression shown by backcountry campers, GSMNP, 1982.

Frequency	Action of Camper	Reaction of Bear
1	whistle	walk/random movement
1	clap	watch
2	yell/throw stones	eat human food
1	yell/throw stones	walk away with human food
1	yell	walk/random movement
1	whistle	ascend tree

Table 38. Responses of black bears to various forms of aggression shown by researchers at backcountry shelters, GSMNP, 1982.

Frequency	Action of Researcher	Reaction of Bear
1	yell	slap ground
2	yell	jaw pop
2	yell	huff
1	yell	walk toward
2	yell	stand up on fence
1	yell	get down off fence
2	yell	walk toward goal
2	yell	watch
2	yell	stop
2	yell	back up
4	yell	walk away
1	yell	run off
1	yell/throw stones/ whistle	walk toward
1	yell/throw stones	stop
1	pick up stones	walk toward
1	bang objects	dig
1	bang objects	stand (4)
2	bang objects	walk away
1	bang objects	jaw pop
1	bang objects	run off
1	bang on fence	back up
1	other noise	back up
1	walk toward bear	watch

Table 39. Responses of black bears to various forms of aggression shown by researchers at backcountry campsites, GSMNP, 1982.

Frequency	Action of Researcher	Reaction of Bear
2	yell	run off
1	yell	walk away
1	yell	watch
1	yell/throw stones	walk away
2	bang objects	walk away
2	walk toward bear	watch
1	bang stones/take a few running steps toward bear	move back

Duration of interactions ranged from 10 seconds to 38 minutes and 45 seconds, and averaged 5 minutes and 45 seconds in length. Although it is difficult to make any generalizations due to small sample size, bears appear to approach campers more closely at shelter sites, possibly because food is stored close to people within shelters. In addition, campers are likely to be bolder behind shelter fencing and bears that frequent these sites may habituate to people and commonly used aggressive actions such as yelling or making noise.

During 10 of the interactions, bears approached the shelter fence, and during three other interactions bears approached twice within 4 m and once to within 10 m. During the four campsite interactions, BAD was 8, 10, 12, and 15 m. Bears at campsites appeared more cautious of people and reacted with less aggression than shelter bears, but again, these results are only preliminary.

Responses of bears to aggression by campers varies with the situation and the bear, and campers should be advised as such. Although the above data are limited, results suggest behavior of both visitors and bears may be different between shelter and campsite locations. Further study of human-bear interactions in the backcountry of GSMNP should address these differences. Specifically, future research should determine whether bears are indeed more responsive to human aggression at campsites, and what types of aggression are most effective in removing bears from backcountry campsites and shelter sites. In addition, as the NPS currently advocates avoidance of confrontation, reactions of bears to visitor neutrality and avoidance should be documented in GSMNP.

Experience with Black Bears

The following section presents camper experience in black bear habitat, including the occurrence of bear observations and incidents, and the likelihood of campers reporting these events to the NPS.

Experience in Backcountry Bear Habitat

The majority of respondents at shelters (89.3%, n=67) and at campsites (88.0%, n=66) had previous experience in backcountry areas where black bear activity could have occurred ($\chi^2=0.066$, df=1, $P=0.797$). Significantly fewer frontcountry respondents (46.0%, n=92) had experience in backcountry areas inhabited by black bears ($\chi^2=67.963$, df=1, $P<0.001$).

Black Bear Sightings

Backcountry campers. Eighty percent (n=60) of shelter respondents had seen a black bear in a backcountry area at some time; significantly fewer campsite respondents (50.7%, n=38) had ($\chi^2=14.246$, df=1, $P<0.001$). This difference may be partially explained by the fact that more shelter respondents saw bears during their current trip.

A surprising 46.7% (n=35) of shelter respondents had seen at least one bear during their trip to GSMNP prior to the interview; 18 bears were seen by one respondent, however sightings of fewer animals were more common (Table 40). Approximately one-half of

Table 40. Number of black bears (including cubs) seen by backcountry and frontcountry campers (%) during their trip to GSMNP, 1982.

Camper Category	Number of Bears						
	1	2	3	4	5	6-10	> 10
Backcountry Total (N=43)	39.5	23.3	7.0	9.3	4.6	11.6	4.7
Backcountry Shelter (N=34)	32.4	20.6	8.8	11.7	5.9	14.7	5.9
Backcountry Campsite (N=9)	66.7	33.3	-	-	-	-	-
Frontcountry Total (N=28)	25.0	14.3	28.6	7.1	-	25.0	-

shelter respondents who saw bears (n=16) were interviewed during July at Spence Field. An unusual concentration of bears occurred in July in the vicinity of Spence Field; up to 8 bears could be seen at one time feeding on Serviceberries (Amelanchier spp.) within a few acre area. Only 12.0% (n=9) of backcountry campsite respondents had seen bears prior to the interview. Bears at campsites appeared to be less active during daylight hours compared to bears at shelters; campers are less likely to see bears at night.

Forty-four backcountry campers (29.3%) made 103 observations of bears or family groups of bears at the following locations: at shelters or within one-fourth mile of shelters (62.1%, n=64), along trails (33.0%, n=34), at backcountry campsites (2.9%, n=3), and near frontcountry campgrounds (2.0%, n=2).

During 27.2% (n=28) of the observations bears approached people; in five cases respondents yelled at the bear(s). Bears ran off in 9.7% (n=10) of the encounters upon seeing people. Two bears were seen attempting to remove food from a shelter, and three bears were seen inside shelters. During 7.8% (n=8) of the observations, in addition to approaching campers, bears were said to have shown aggression in the form of a charge (n=2), a charge and an attempted swat (n=1), a vocalization (n=2), or by following campers (n=3).

Frontcountry campers. Significantly fewer frontcountry campers who had backcountry experience (n=92) had seen a black bear in a

backcountry area at some time (45.7%, n=42) compared with backcountry campers ($\chi^2=9.059$, df=1, $P=0.003$); this result may be due to the high percentage of shelter respondents who saw bears during their current trip to GSMNP.

Fourteen percent (n=28) of frontcountry campers made observations of bears or groups of bears in GSMNP prior to being interviewed. Bears were seen in Cades Cove (65.0%, n=26), along main roads (17.5%, n=7), in backcountry areas (10.0%, n=4), in frontcountry campgrounds (5.0%, n=2), and in picnic areas (2.5%, n=1).

Three observations involved bears approaching people, two included people feeding bears, and one included a vocalization by a bear.

Bear Related Property Damage and Food Loss

Past incidents. A surprising 21.3% (n=16) of shelter and 13.3% (n=10) of campsite respondents had at some time experienced property damage from black bears ($\chi^2=1.675$, df=1, $P=0.196$). A significantly lower percentage of all frontcountry campers (8.5%, n=17) had experienced property damage ($\chi^2=6.206$, df=1, $P=0.013$); however, if only frontcountry campers who had backcountry experience were compared with backcountry campers, there was no significant difference ($\chi^2=3.523$, df=1, $P=0.060$). The above results reflect the fact that more bear incidents occur in backcountry areas of GSMNP. During 1982, 167 of 181 reported incidents of property damage and food loss occurred in the backcountry of GSMNP (National Park Service, 1982b).

Incidents during current trip. Five backcountry respondents experienced bear related property damage and food loss, and two respondents experienced food loss during their backcountry trip to the Smokies prior to the interview. Two incidents occurred at backcountry campsites, both in the Deep Creek area, and four occurred at or within one-quarter mile of a shelter. One incident occurred at a frequently used spring near a trail. A detailed description of each incident as told by the campers interviewed is presented in Appendix E. No incident of bear related injury was experienced by any campers interviewed. Nor were there any incidents of bear related property damage or food loss experienced by frontcountry campers.

Reports of Observations and Incidents to the NPS

The NPS employs a computer network (BIMS--Bear Information Management System) to file bear related events (Smith 1983). All bear related law enforcement actions and reported incidents of property damage or injury occurring in GSMNP are on file in Park headquarters. In addition, records are kept on any reported significant observations of bears; included are observations involving marked bears, sick or injured bears, family groups, or bears acting aggressively or seen panhandling (National Park Service 1979).

Reporting rates of backcountry bear incidents in GSMNP (Singer and Bratton 1977) and in Yosemite National Park (Hastings 1982) have been low. Campers in this study were questioned regarding

bear observations and incidents that may have occurred during their trip. Park records were checked to determine how many incidents and observations were reported to the NPS.

Past reports of bear observations and incidents. More observations than incidents were reported, likely because more observations occurred. An identical number of respondents at backcountry shelters and campsites had reported a bear incident or observation to the NPS (n=16, 21.3%; Table 41). Frontcountry campers with backcountry experience had similar reporting levels for observations/incidents compared to the backcountry sample ($\chi^2=0.557$, df=1, P=0.455). Significantly fewer reports were made by frontcountry campers if the entire frontcountry sample was compared to the backcountry sample ($\chi^2=7.014$, df=1, P=0.008), perhaps because frontcountry campers experienced fewer incidents.

Reports of observations and incidents experienced during the current trip. Three (6.8%) of backcountry respondents who had seen bears reported their observation(s) to a ranger prior to the interview; 70.0% (n=28) did not plan to report their observations. Campers planned to report only 32.1% (n=9) of the observations in which bears approached them; in addition, respondents experiencing two incidents involving aggression (one charge and one instance of a bear following campers) had no plans to file a report with the NPS.

Only one additional backcountry observation was reported to the NPS. This observation occurred in July at Spence Field -

Table 41. Whether or not campers (%) had ever reported a bear incident or observation to the National Park Service.

Camper Category	Type of Report			
	Observation	Incident	Observation and Incident	No Report
Backcountry Total (N=150)	12.0	5.3	4.0	78.7
Backcountry Shelter (N=75)	13.3	4.0	4.0	78.7
Backcountry Campsite (N=75)	10.7	6.7	4.0	78.7
Frontcountry (N=200)	7.5	3.0	0.5	89.0

(Affirmative responses combined)

Chi-square Test, backcountry samples; $\chi^2=0.000$, $df=1$, $P=1.000$. Chi-square Test, backcountry and frontcountry, $\chi^2=7.014$, $df=1$, $P=0.008$.

(CI# 822045) and involved a bear that charged and attempted to swat a backcountry camper.

Almost 60% of frontcountry campers who had seen bears did not plan on reporting their observation(s) to the NPS, 19.2% had reported their observation(s) prior to the interview, and 23.1% remarked that a NPS employee also saw the bear when they did.

The two backcountry respondents who experienced food loss did not plan on reporting their incident to the NPS. One respondent who experienced property damage had reported the incident to the NPS prior to the interview, and four respondents planned to report their incidents. Of the four incidents campers planned to report, only three incidents were found in NPS records; one of these incidents was reported by someone who talked to the camper involved.

Approximately 10% of backcountry respondents seeing bears reported their observation(s) to the NPS in GSMNP. Singer and Bratton (1977) explained the low reporting rates for backcountry areas were due to a lack of man-power to contact visitors, a lack of emphasis upon reporting, and the numerous unmanned trailheads where campers can leave the Park. The ease of reporting observations in a manned frontcountry campground explains the higher reporting rate among frontcountry campers.

It is difficult to make generalizations regarding reporting rates for incidents of food loss and property damage due to small sample size. However, it appears that many minor incidents of food loss, and some incidents of extensive damage go unreported.

Camper Attitudes Toward Black Bear Management

This final section will discuss how campers feel problem bears should be dealt with in GSMNP. Certainly elimination of bears from GSMNP is not a viable management alternative, yet this section will discuss how campers felt about the idea. In addition, camper opinions of reimbursement for bear related incidents and research markers on bears will be discussed.

Problem Bears

Observations of people in GSMNP reveal there are "problem people" as well as problem bears. Bears learn to associate campers and their equipment with food (Tate and Pelton 1983) and will take advantage of improper food storage. Forty-two percent of persons surveyed who experienced bear-related property damage or injury in GSMNP "fully and openly admitted they were at fault in regard to their incident with a bear" (Pelton et al. 1976).

Respondents in this study were asked how they would resolve a situation involving a black bear that had a history of visiting a particular campsite, taking food when available, and in the process often damaging campers' equipment. The most frequent response given by both backcountry (40.7%) and frontcountry (52.8%) campers was to move the bear within the Park (Table 42). The difficulty and expense of this operation in the backcountry was probably not realized by most respondents. Approximately 40% of backcountry and 22.6% of frontcountry campers advocated solutions that would directly

Table 42. What campers (%) felt should be done with a bear that has a history of visiting a particular campsite, taking food when available, and in the process, often damaging campers' equipment.

Camper Category	Move Bear Within the Park	Adequately Warn Visitors	Close Site Temporarily	Move Bear Within or Outside of Park	Solution					Destroy Bear	Send Bear to Zoo	Do Nothing	Other
					Move Bear Outside of Park	Close or Relocate Site	Close or Relocate Site	Increase Patrols	Educate User,				
Backcountry Total (N=150)	40.7	16.7	16.0	5.3	3.3	4.0	3.3	2.0	2.0	2.0	2.0	-	6.7
Backcountry Shelter (N=75)	48.0	9.3	16.0	5.3	4.0	2.7	4.0	2.7	-	2.7	-	-	8.0
Backcountry Campsite (N=75)	33.3	24.0	16.0	5.3	2.7	5.3	2.7	1.4	4.0	1.4	4.0	-	5.3
Frontcountry Total (N=199)	52.8	13.6	4.0	3.5	16.6	-	5.0	-	0.5	-	0.5	2.5	1.5

involve campers (site closure, warnings, education, and increased patrols); these respondents may realize that their presence has affected bear behavior. Solutions that affect people more than bears were not mentioned during a survey of frontcountry Park visitors in 1969 (Burghardt et al. 1972).

The NPS may consider enclosing a listing of problem sites with information packets requested by campers planning their trip. Campers who are fully aware of the difficulty of keeping food from some bears may choose to re-route their trips to avoid possible problems.

Sixteen percent of backcountry campers suggested closing the site temporarily; this would be a nearly impossible task in frontcountry campgrounds where an extensive reservation system is involved. Some backcountry sites in GSMNP are occasionally closed due to bear problems. The affect of site closure on a bear that frequents it is not known and should be researched; bears may only move to other campgrounds (Hastings 1983).

Respondents who suggested that a bear be relocated were told that black bears often return to the same area from which they have been removed. Campers were then asked what should be done if a bear returns to a campsite; support for moving the bear outside of the Park increased approximately six times, while approximately one-half as many respondents felt the bear should be moved within the Park (Table 43). Percentages advocating destruction of bears increased.

Burghardt et al. (1972) found 51.2% of visitors to GSMNP favored moving troublesome bears to another area of the Park, 19.0% favored confinement, and 15.8% advocated destruction of the bear (mainly as a last resort). Marsh (1970) found 70.0% of respondents in Banff and Glacier approved of removing bears that threaten or attack people; it was generally agreed, however, that the bears should be destroyed if they return.

Elimination of Bears from National Parks

Removal of all bears from national parks has been proposed by some based on the philosophy that parks are for people (Moment 1968). Eradication is certainly not a viable management alternative for the NPS; however, user opinion must be considered and it may influence management decisions. Campers in GSMNP are definitely not in favor of eliminating black bears from GSMNP; over 98.5% of all campers felt black bears should remain in the Park. A small percentage of respondents felt bears that continuously cause problems should be eliminated, but almost all campers agreed that the idea of eliminating the species was "ridiculous." Many respondents felt that black bears had more of a right to be in the Park than visitors did.

It may seem logical to assume persons experiencing bear caused property damage or injury would be more likely to favor eradication; however, this is not the case. Pelton et al. (1976) found only one person out of 119 who had experienced a bear incident favored

eradication. Grizzly bears are more likely to inflict serious or fatal injury to people; this may be the reason why Marsh (1970) found 19.0% of visitors in Banff and Glacier National Parks favored eradication of grizzlies, while only 2.0% favored eradication of black bears.

Reimbursement for Bear Incidents

Respondents were asked if they felt the National Park Service should reimburse visitors who experience bear related food loss, property damage, or injury. Over 94% of respondents felt there should be no reimbursement for food loss; over 86% of campers responded similarly regarding property damage (Table 44).

Significantly more campers (backcountry, $Q=6.400$, $P=0.010$; frontcountry, $Q=7.364$, $P=0.007$) felt reimbursement should occur for injuries than for property damage (responses of undecided were not considered in this analysis). Over 78% of backcountry and 69.4% of frontcountry respondents felt reimbursement should not occur for injuries; the number of respondents expressing indecision nearly doubled over the previous question on property damage. Clearly, personal injury is a more serious offense.

Most responses of indecision reflected uncertainty of the circumstances in which the incident occurred. If the bear was overly aggressive and the NPS made no effort to correct the situation (e.g., warning visitors, moving the bear), the NPS was considered responsible. However, if the camper was at fault by not following

Table 44. Camper responses (%) regarding National Park Service reimbursement for black bear caused food loss, property damage, or injury, GSMNP, 1982.

Camper Category	Food Loss			Property Damage			Injury		
	No	Yes	Undecided	No	Yes	Undecided	No	Yes	Undecided
Backcountry Total (N=150)	96.0	2.0	2.0	92.0	1.3	6.7	79.3	8.0	12.7
Backcountry Shelter (N=75)	96.0	-	4.0	89.3	1.3	9.3	80.0	4.0	16.0
Backcountry Campsite (N=75)	96.0	4.0	-	94.7	1.3	4.0	78.7	12.0	9.3
Frontcountry Total (N=199)	94.5	1.5	4.0	86.9	3.5	9.6	69.4	8.0	22.6

regulations or by harassing the bear, reimbursement should not occur.

The NPS must be ethically and legally concerned about the safety of visitors. Several tort claims have been filed against the NPS as a result of bear incidents in GSMNP; all were dismissed, and never went to court (W. Cook, pers. commun.). Although the majority of campers felt there should be no reimbursement for bear incidents, opinions may change with direct involvement.

Research Markers on Bears in GSMNP

Observing wild animals has become a popular leisure activity (U.S. Dep. Inter. 1973, 1977). Populations visible to the public are often subjects of research requiring telemetry or marking devices. Color-coded ear tags, streamers, and collars may be seen with the naked eye at ≤ 366 m (Knowlton et al. 1964) or farther with a binocular or telephoto lens. Public opinions regarding the use of visible marking devices should be considered since wildlife belongs to the people and public funds are often involved in research. The public may be concerned about the health of marked animals, or marking devices may lessen the satisfaction of seeing these animals in the wild.

Three questions dealt with radio-collars and ear markers on black bears. Respondents were told that markers are often placed on black bears for research identification. They were then shown a red or orange metal ear tag (2.6 cm in diameter) and asked if seeing ear tags on bears in GSMNP was disturbing. Next they were

shown an ear streamer (orange or bright green, vinyl rectangle 5 x 7 cm) and asked to respond to it. Radio-collars were described and explained, and participants were asked if they found collars disturbing.

Responses were recorded as affirmative, negative, or undecided. As only 1.4% of respondents were undecided, these responses were not used in the analysis. The majority of campers at all locations (81.8 to 96.0%) were not offended by markers, although 1.3 to 13.2% of respondents qualified their answers based upon the devices not harming the bear (Table 45).

Responses of backcountry shelter and campsite campers were similar for ear tags ($\chi^2=2.958$, $df=1$, $P=0.086$), streamers ($\chi^2=0.951$, $df=1$, $P=0.330$), and collars ($\chi^2=1.827$, $df=1$, $P=0.176$). When the backcountry sample as a whole was compared to the frontcountry sample, responses were similar for ear tags ($\chi^2=0.267$, $df=1$, $P=0.606$), streamers ($\chi^2=0.000$, $df=1$, $P=0.995$), and collars ($\chi^2=1.785$, $df=1$, $P=0.182$).

When backcountry and frontcountry respondents were grouped, respondents preferred ear tags over streamers ($Q=14.727$, $P<0.001$) and collars ($Q=9.529$, $P=0.002$). Photographers had similar responses to ear tags ($\chi^2=1.076$, $df=1$, $P=0.300$), collars ($\chi^2=0.570$, $df=1$, $P=0.450$), and streamers ($\chi^2=0.843$, $df=1$, $P=0.359$) as other observers.

Craighead (1979) working in Yellowstone National Park with several species marked with collars, ear tags, and streamers found that Park officials believed markers offended visitors especially

Table 45. Response of backcountry and frontcountry campers (%) in GSMNP to seeing ear tags, streamers, and radio-collars on black bears, 1982.

Camper Category	Response			Not Disturbed by Marker Does Not Harm Bear
	Disturbed by Marker	Undecided	Not Disturbed by Marker	
Backcountry Total				
Ear Tag	6.0	1.4	87.3	5.3
Streamer	12.0	0.7	80.0	7.3
Collar	14.7	0.7	76.0	8.7
Backcountry Shelter				
Ear Tag	9.3	1.4	80.0	9.3
Streamer	14.7	-	77.3	8.0
Collar	18.7	-	68.0	13.3
Backcountry Campsite				
Ear Tag	2.7	1.3	94.7	1.3
Streamer	9.3	1.3	82.7	6.7
Collar	10.7	1.3	84.0	4.0
Frontcountry Total				
Ear Tag	7.5	-	87.5	5.0
Streamer	12.0	0.5	82.5	5.0
Collar	10.0	0.5	80.5	9.0

photographers. Photographers in this study were equally tolerant of markers; however, reaction may be different among professional wildlife photographers.

Hastings (pers. commun.) found over 50.0% of visitors to the Cades Cove portion of the Park were not disturbed by collars on deer; acceptance increased when the color of the instrument blended with the animal's coat color or the research purpose of the collar was stipulated.

Results of this study indicate the smaller, less obvious ear tags should be used in GSMNP if the purpose of the study is served. Public opinion about markers may differ depending on the species under study, demography of users, and the type of land use.

CHAPTER V

SUMMARY

1. Backcountry campers tended to be younger and more educated than frontcountry campers. More males than females were found to be camping in the backcountry of GSMNP.

2. Over 50% of campers in GSMNP were from the Southeast, and over 90% were from the eastern two-thirds of the nation.

3. Frontcountry campers (who had backcountry experience) had been hiking significantly longer than backcountry campers. However, backcountry campers tended to visit backcountry areas more frequently and for longer periods of time.

4. Approximately 83% of backcountry campsite respondents utilized campsites more frequently than shelter sites; 61.3% of shelter respondents utilized shelter sites more frequently.

5. Over 85% of backcountry campers sealed all foods carried. The majority of backcountry campers carried some type of meat. The NPS should continue to emphasize the importance of packing out or burning all food waste.

6. Most backcountry campers were hiking and camping in groups of two; friends were the most frequent companions.

7. Backcountry campers were significantly more knowledgeable regarding the species of bear present in the Park and the climbing ability of adult bears; frontcountry campers were significantly

more knowledgeable regarding the weight of cubs at birth. Seventeen percent of the backcountry campers interviewed did not know black bears are active during daylight hours, 15% were not aware of the climbing ability of adult bears, and 13% thought other species of bears were present in GSMNP. There should be continuing efforts to educate campers about black bear characteristics.

8. Camper knowledge regarding black bears did not appear to be greatly influenced by one's educational attainment, sex, experience in backcountry areas, or whether one spent the majority of their life in a rural, suburban, or city area.

9. Over 90% of campers in GSMNP received some type of information from the NPS on bears, although 24.8% of backcountry and 23.4% of frontcountry campers felt the information was not adequate to prepare them to deal with black bears.

10. Visitor center visitation did not appear to influence camper knowledge of bears. Attendance at a Park naturalist talk did not appear to influence the level of bear knowledge possessed by backcountry campers, although there were more frontcountry campers with High Bear Knowledge Scores who attended a talk, compared to those who had not attended.

11. Approximately 57% of backcountry campers hoped to see bears while hiking and 32.0% hoped to see bears at their campsites. A larger percentage of frontcountry campers (42.2%) hoped to see bears at their campsites, while 82.4% of frontcountry campers hoped to see bears along the roadsides in GSMNP. Visitors must be informed of the potential hazards faced by roadside bears.

12. Approximately 11% of backcountry campers were reluctant to hike in the backcountry because of bears compared with 19.6% of frontcountry campers. Approximately 20% of backcountry campers were reluctant to camp in backcountry areas while significantly more (34.2%) frontcountry campers were.

13. Approximately 80% of backcountry campers were concerned about food storage and 56.6% were concerned about bear related equipment damage; significantly fewer frontcountry campers expressed concern.

14. Approximately one-fourth of all campers did not realize visitors to GSMNP are injured by black bears. The majority of campers who knew bears may inflict injury, realized most injuries occur due to food involvement and carelessness on the part of visitors.

15. Approximately 30% of stated reactions of backcountry campers to a black bear on a trail or at a campsite, involved yelling, making noise, or throwing non-food objects at the bear; nearly 14% of frontcountry reactions involved the same aggressive acts.

16. Forty-seven percent of shelter respondents, 12.0% of campsite respondents, and 14.0% of frontcountry respondents saw bears on their current trip, prior to the interview. Seven incidents of bear related food loss and/or property damage were experienced by backcountry campers. Approximately 10% of backcountry campers seeing bears reported their observations to the NPS. Two incidents of food loss and two incidents of food loss and property damage were not reported.

17. Removing bears that are problems at campsites was the most frequently offered management solution. Approximately 40.0% of backcountry and 22.6% of frontcountry campers advocated solutions that directly involve campers (site closure, warnings, education, and increased patrols).

18. Over 98.5% of campers were against eradication of black bears in GSMNP.

19. The majority of campers felt the NPS should not reimburse visitors for bear related incidents, however, most felt the NPS had a responsibility to try and correct the situation.

20. Over 80% of campers were not disturbed by research markers on bears in GSMNP.

CHAPTER VI

MANAGEMENT AND RESEARCH RECOMMENDATIONS

Management Recommendations

1. Recommendation: Shelters should be made bear proof. Gaps between fencing and side walls should be eliminated. Fencing should extend securely to a metal cross support at the roof.

Rationale: Bears have been observed entering a shelter between the top of the fence and the roof.

2. Recommendation: Shelter doors should be equipped with spring closure devices and self-latching locks.

Rationale: Shelter doors are frequently left open when campers move on to the next site; bears may freely enter shelters and are often rewarded with food scraps or trash. In addition, backpackers frequently leave their packs unattended in shelters with open doors.

3. Recommendation: The NPS should inform campers that Park visitors have been injured by black bears in GSMNP. Campers, especially frontcountry campers, should also be informed of the dangers facing roadside bears (e.g., road kill, poaching).

Rationale: Visitors may hesitate to approach or feed bears if they realize bears are capable of inflicting injury. The majority of frontcountry campers hoped to see bears along roadsides and felt the presence of roadside bears indicated a high bear population.

4. Recommendation: The NPS should consider providing explanatory information to visitors regarding research markers and collars on wildlife. The least obvious marking devices should be utilized by researchers; however, the NPS should not be overly concerned if a wildlife research project requires reasonably larger marking devices.

Rationale: The majority of campers interviewed who were told of the research purpose of ear markers and collars on bears were not disturbed by these devices, but smaller devices may be less disturbing than larger ones.

5. Recommendation: The NPS should stress the importance of reporting bear incidents, and make it more convenient for campers to do so. The NPS may consider supplying backcountry campers with fold-up post cards that could be mailed back to GSMNP or dropped in boxes at trailheads.

Rationale: Many observations and backcountry incidents currently are not reported. More reports may be filed if a side trip to a ranger or permit station was not necessary.

6. Recommendation: Employees who issue permits must be thorough and routinely offer information on the climbing ability and the daylight activity of black bears, regardless of the experience level of campers.

Rationale: Many campers are not realizing the above information, tie their packs directly to a tree trunk or leave their packs unattended for long periods of time. Experienced campers are

not necessarily more knowledgeable regarding bears. Some campers interviewed indicated that the ranger who issued their permit was too busy to warn them of bear activity or provide any information on bears.

Research Recommendations

1. Recommendation: The NPS should test food storage devices in the backcountry of GSMNP. Bear poles, cables, metal food lockers, and portable containers should be considered.
Rationale: Methods of food storage currently recommended in GSMNP by the NPS offer little challenge to experienced black bears.
2. Recommendation: The NPS should examine the willingness of backcountry campers to: a) view a brief slide show or film on black bears while permits are issued, b) re-route trips because of bear activity, c) utilize food storage devices if available, and 4) report bear observations and incidents to the NPS. This information could be obtained through a brief one-page questionnaire available to campers when they obtain their permits.
Rationale: If campers were found to be cooperative in these four areas, bear incidents may be reduced.
3. Recommendation: The NPS should conduct research directed at dayhikers in the backcountry and lodge guests on Mt. LeConte, and make information on bears available to these users.

Rationale: These Park users may be very naive regarding black bears, and may enter backcountry areas with little or no information on black bears.

4. Recommendation: Further study of human-bear interactions in the backcountry of GSMNP should be conducted.

Rationale: An intensive study of interactions would provide the NPS a scientific basis for suggesting actions to be taken when a bear enters a campsite or attempts to get food.

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APPENDICES

APPENDIX A

BACKCOUNTRY QUESTIONNAIRE

CASE # _____

DATE _____

- 1-YES 2-NO

1-TRAIL
2-OFF TRAIL
3-SHELTER
4-CAMPGROUND
5-LECONTE LODGE
6-OTHER _____

1-YES 2-NO

1-INJURY
2-PROPERTY DAMAGE
3-FOOD LOSS

4-PROPERTY DAMAGE & FOOD LOSS
5-PROPERTY DAMAGE & INJURY
6-FOOD LOSS & INJURY
7-ALL OF THE ABOVE

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-2-

8) Have you reported this incident to the NPS?

1-YES 2-NO

9) Do you plan to report this incident to the NPS?

1-YES 2-NO

10) Have you ever reported a bear incident or observation to the NPS?

1-YES, OBSERVATION
 2-YES, INCIDENT
 3-YES, OBSERVATION & INCIDENT
 4-NO

The next few questions relate to your knowledge of bears . . .
 but, please do not feel that you are being tested.

11) What species of bears are present in this Park?

1-BLACK	5-BLACK & GRIZZLY
2-BROWN	6-BLACK & BROWN
3-GRIZZLY	7-BLACK & GRIZZLY
4-BLACK & OTHER/ BLACK & DON'T KNOW	8-OTHER _____
	9-DON'T KNOW

12) How often do black bears have cubs?

_____ . _____ years

(0.0 = DON'T KNOW)

13) Can adult black bears climb trees?

1-YES	
2-NO	4-NOT VERY HIGH/ ONLY LARGE TREES
3-DON'T KNOW	

14) Can black bear cubs climb trees?

1-YES	
2-NO	4-NOT VERY HIGH/ ONLY CERTAIN TREES
3-DON'T KNOW	

15) Are black bears active during daylight hours?

1-YES
 2-NO
 3-DON'T KNOW
 4-NO, ONLY DUSK and/or EARLY MORNING

-3-

16) What makes up the diet of a black bear in the Smoky Mountains?

- 1-ALL PLANT MATERIAL
- 2-ALL ANIMAL MATERIAL
- 3-MOSTLY PLANT MATERIAL
- 4-MOSTLY ANIMAL MATERIAL
- 5-EQUALLY PLANT & ANIMAL MATERIAL
- 6-MOSTLY PLANTS, ALSO VISITOR FOOD
- 7-MOSTLY ANIMALS, ALSO VISITOR FOOD
- 8-DON'T KNOW
- 9-OTHER _____

17) As compared with a human, how fast does a black bear run?

- 1-FASTER THAN A HUMAN
- 2-SLOWER THAN A HUMAN
- 3-THE SAME SPEED AS A HUMAN
- 4-DON'T KNOW
- 5-BEARS FASTER UPHILL, SLOWER DOWNHILL

18) What is the weight of a black bear cub at birth?

_____ . _____ pounds

(000.0 = DON'T KNOW)

19) What is the weight of an adult male black bear in the Smokies?

_____ . _____ pounds

(0000. = DON'T KNOW)

20) Markers are often placed on black bears for research identification.
Would it disturb you to see ear tags on bears in this Park?
(Show respondent an ear tag)

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

21) . . . radio collars?

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

22) . . . ear streamers? (Show respondent an ear streamer)

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

-4-

Since black bears are present in this National Park . . .

- | | | |
|--|-------|------|
| 23) Were you reluctant to hike in the backcountry? | 1-YES | 2-NO |
| 24) . . . camp in the backcountry? | 1-YES | 2-NO |
| 25) Were you concerned about food storage | 1-YES | 2-NO |
| 26) . . . about damage to equipment? | 1-YES | 2-NO |
| 27) Did you hope to see bears at your campsite? | 1-YES | 2-NO |
| 28) . . . on the trail? | 1-YES | 2-NO |
| 29) Did you hope to photograph bears? | 1-YES | 2-NO |
| 30) . . . to feed bears? | 1-YES | 2-NO |

- 31) What would you do if you suddenly encountered a black bear standing on the trail in front of you?

1-WALK SLOWLY AWAY
 2-STAND MOTIONLESS, STOP, WATCH
 3-THROW SOMETHING (NOT FOOD)
 4-RUN/MOVE AWAY QUICKLY
 5-DROP PACK/GIVE FOOD
 6-MOVE ASIDE, KEEP DISTANCE, AVOID
 7-YELL
 8-MAKE NOISE
 9-OTHER _____

- 32) What would you do if a black bear entered your campsite?

0-GATHER FOOD
 1-WALK SLOWLY AWAY/LEAVE AREA
 2-STAND MOTIONLESS, WATCH
 3-THROW SOMETHING (NOT FOOD)
 4-DO NOTHING/LEAVE BEAR ALONE
 5-GO INSIDE SHELTER
 6-MOVE ASIDE, KEEP DISTANCE, AVOID
 7-YELL
 8-MAKE NOISE/TALK TO IT
 9-OTHER _____

- 33) What is a safe distance to keep between yourself and a black bear?

_____ feet

(0000. = DON'T KNOW)
 (9999. = THERE IS NO SAFE DISTANCE)

-5-

34) Are people injured by black bears in the Smokies?

- 1-YES
- 2-YES, SELDOM
- 3-NO
- 4-DON'T KNOW

35) (if YES) Why do you think people are injured by black bears?

- 1-ANNOYING, PROVOKING BEAR
- 2-IGNORANCE, CARELESSNESS
- 3-PEOPLE GET TOO CLOSE TO BEAR
- 4-BEAR IS AGGRESSIVE
- 5-DEFENSE OF CUBS
- 6-FOOD INVOLVEMENT
- 7-PEOPLE DO NOT FOLLOW PARK RULES
- 8-SURPRISE, SCARE BEAR
- 9-OTHER _____

36) Do you feel the NPS Should reimburse visitors for black bear caused property damage or loss?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

37) . . . black bear caused food loss?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

38) . . . black bear caused injury?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

39) If a black bear has a history of visiting a particular backcountry campsite, taking food when available, and in the process, often damaging backpackers' equipment, what should the NPS do?

- 0-1 OR 2, WHICH EVER WILL WORK
- 1-MOVE TO ANOTHER AREA OF THIS PARK
- 2-MOVE OUTSIDE OF THIS PARK
- 3-CAGE, OR PLACE IN A ZOO
- 4-DESTROY
- 5-CLOSE CAMPSITE PERMANENTLY, RELOCATE SITE
- 6-CLOSE CAMPSITE OR TRAIL TEMPORARILY
- 7-WARN VISITORS
- 8-EDUCATION OF USER, INCLUDING PATROL, ENFORCEMENT
- 9-OTHER _____

-6-

- 40) (if 1 or 2) Black bears often return to the same area they have been removed from. What should be done if the bear returns to a backcountry campsite?

0-1 OR 2, WHICH EVER WILL WORK
 1-MOVE TO ANOTHER AREA OF THIS PARK
 2-MOVE OUTSIDE OF THIS PARK
 3-CAGE, OR PLACE IN A ZOO
 4-DESTROY
 5-DO NOTHING
 6-CLOSE CAMPSITE/TRAIL TEMPORARILY
 7-WARN VISITORS
 8-EDUCATION OF THE BACKCOUNTRY USER
 9-OTHER _____

- 41) Should black bears be allowed in this Park?

1-YES 2-NO

- 42) What type of shelter do you use most often in the backcountry of this Park?

1-TENT
 2-TRAIL SHELTER
 3-BUILDING
 4-MAKESHIFT
 5-SLEEPING BAG WITH TARP
 6-NONE
 7- $\frac{1}{2}$ TENT, $\frac{1}{2}$ SHELTER
 8-OTHER _____

- 43) How or where do you usually store your food while in the backcountry?

1-#3 AND #4
 2-INSIDE OF A TRAIL SHELTER
 3-SUSPENDED IN ONE TREE
 4-SUSPENDED BETWEEN TREES
 5-COUNTER-BALANCED
 6-BEAR POLE/CABLE
 7-#4 AND #6
 8-#2 AND #4
 9-OTHER _____

- 44) Do you carry freeze-dried food? 1-YES 2-NO

- 45) . . . dehydrated? 1-YES 2-NO

- 46) . . . canned? 1-YES 2-NO

- 47) . . . fresh? 1-YES 2-NO

- 48) Is all of your food sealed in some manner?

1-YES 2-NO 3-YES, EXCEPT FRESH FRUIT

-7-

49) Are you carrying any meats?

1-YES 2-NO

50) (if YES) Type?

1-BACON, SALTED, FAT BACK
2-PREPARED, SALAMI, HAM, SAUSAGE
3-PACKAGED (1 TIME USE)
4-FREEZE-DRIED, DRIED
5-CANNED
6-FRESH FISH
7-FRESH BEEF, CHICKEN, PORK
8-COLD CUTS, HOT DOGS
9-OTHER _____

51) Have you ever visited either Sugarlands or Oconaluftee Visitor Centers?

1-YES, SUGARLANDS
2-YES, OCONALUFTEE
3-YES, BOTH
4-NO

52) (if YES) How long ago?

_____ days (0000 = DON'T KNOW)

53) Have you ever attended any naturalist talks at this Park?

1-YES 2-NO

54) (if YES) How long ago?

_____ days

55) Have you received any information from the NPS on black bears or on food storage in the backcountry?

1-YES 2-NO

56) (if YES) Form?

1-NATURALIST TALKS
2-RANGER
3-RANGER ISSUING PERMITS
4-PERMIT
5-VISITOR CENTER
6-TRAIL MAP
7-PARK BROCHURES
8-SIGNS
9-OTHER _____

-8-

57) Do you feel the information you received from the NPS was adequate to prepare you to deal with black bears?

- 1-YES 3-NO, ENCOUNTER
2-NO 4-DON'T KNOW/HAVE NOT READ

58) From what other sources (beside the NPS) have you received information on black bears?

- 1-TELEVISION
2-ZOOS OR MUSEUMS
3-NEWSPAPERS
4-BOOKS OR MAGAZINES
5-PERSONAL EXPERIENCE
6-OTHER PEOPLE
7-ENVIRONMENTAL ORGANIZATIONS, CONSERVATION- USFS
8-HIKING GROUPS, CLUBS, CAMPS NPS
9-SCHOOL, ENVIRONMENTAL EDUCATION

59) Prior to this trip, have you spent time in backcountry sites where black bear activity could have occurred?

- 1-YES 2-NO

60) Have you ever seen a black bear in a backcountry area?

- 1-YES 2-NO

61) Have you ever experienced any property damage due to black bears?

- 1-YES 2-NO

62) How many years ago did you make your first trip to a backcountry area?

_____ years (00 = FIRST TRIP, OR FIRST TRIP THIS YEAR)

63) Between that first trip and now, would you say that you visited backcountry area at least:

- 0-FIRST TRIP, FIRST TRIP THIS YEAR
1-ONCE A YEAR
2-ONCE EVERY 2 YEARS
3-ONCE EVERY 3 YEARS
4-ONCE EVERY 4 YEARS
5-ONCE EVERY 5 YEARS
6-ONCE EVERY 10 YEARS
7-ONCE EVERY 15 YEARS
8-ONCE EVERY 20 YEARS
9-OTHER _____

64) Approximately how many days do you spend in the backcountry each year?

_____ days

-9-

65) What is the greatest number of consecutive days you have spent in the backcountry?

_____ days

66) How many days ago did you enter the backcountry on this trip?

_____ days

67) How many people, including yourself, are in your party?

_____ people

68) What type of a group is it? (read responses)

1-FAMILY	3-FAMILY AND FRIENDS
2-FRIENDS	4-ORGANIZED GROUP (church, scouts)

69) Your area of residence for most of your life could best be described as (read answers):

1-RURAL	3-CITY
2-SUBURBAN	4-COMBINATION

70) Could you estimate the population of your area of residence?

1-≤1000	6-100,001-500,000
2-1001-5000	7-500,001-1,000,000
3-5001-20,000	8-≥1,000,000
4-20,001-50,000	9-DON'T KNOW
5-50,001-100,000	

71) City and State in which you are now living?

city: _____ state: _____

72) Age, if you don't mind? _____ years (00 = NOT AVAILABLE)

73) Sex (observation) 1-MALE 2-FEMALE

74) What is the highest year of education you have completed?

1-5	5-13-15
2-6-8	6-16
3-9-11	7-17-18
4-12	8-GREATER THAN 18
	9-UNKNOWN

75) Occupation?

0-MILITARY	6-TEACHER (SUB-COLLEGE)
1-UNSKILLED	7-HI LEVEL WT COLLAR,
2-LOW LEVEL WT COLLAR	EXECUTIVE
3-SKILLED	8-PROFESSIONAL
4-HOUSEWIFE	9-RETIRED, UNEMPLOYED
5-STUDENT	

APPENDIX B

FRONTCOUNTRY QUESTIONNAIRE

LOCATION _____

CASE # _____

INTERVIEWER _____

DATE _____

1) Have you seen any bears in the Park on this trip?

1-YES 2-NO

2) (if YES) How many? _____

3) Where were you when you saw it (them)?

1-ROADSIDE PULL-OFF
2-ROADSIDE
3-PICNIC AREA
4-CAMPSITE
5-FRONTCOUNTRY TRAIL
6-BACKCOUNTRY TRAIL
7-BACKCOUNTRY
8-OTHER _____

(cubs? _____)

(location _____)

(time/date _____)

(food? _____)

4) Have you reported this observation to the NPS?

1-YES 2-NO 3-OTHER - RANGER PRESENT
OR ALREADY REPORTED

5) Do you plan to report this observation to the NPS?

1-YES 2-NO 3-OTHER - RANGER PRESENT
OR ALREADY REPORTED

6) Did you or any member of your party experience any injuries,
property damage, or food loss caused by bears on this trip?

1-YES 2-NO

7) (if YES) Type?

1-INJURY 4-PROPERTY DAMAGE & FOOD LOSS
2-PROPERTY DAMAGE 5-PROPERTY DAMAGE & INJURY
3-FOOD LOSS 6-FOOD LOSS & INJURY
7-ALL OF THE ABOVE

(cubs? _____)

(location _____)

(time/date _____)

(food? _____)

-2-

8) Have you reported this incident to the NPS?

1-YES 2-NO

9) Do you plan to report this incident to the NPS?

1-YES 2-NO

10) Have you ever reported a bear incident or observation to the NPS?

1-YES, OBSERVATION
 2-YES, INCIDENT
 3-YES, OBSERVATION & INCIDENT
 4-NO

The next few questions relate to your knowledge of bears . . .
 but, please do not feel that you are being tested.

11) What species of bears are present in this Park?

1-BLACK	5-BLACK & GRIZZLY
2-BROWN	6-BLACK & BROWN
3-GRIZZLY	7-BLACK & GRIZZLY
4-BLACK & OTHER/ BLACK & DON'T KNOW	8-OTHER _____ 9-DON'T KNOW

12) How often do black bears have cubs?

____ . ____ years

(0.0 = DON'T KNOW)

13) Can adult black bears climb trees?

1-YES	
2-NO	4-NOT VERY HIGH/ ONLY LARGE TREES
3-DON'T KNOW	

14) Can black bear cubs climb trees?

1-YES	
2-NO	4-NOT VERY HIGH/ ONLY CERTAIN TREES
3-DON'T KNOW	

15) Are black bears active during daylight hours?

1-YES
 2-NO
 3-DON'T KNOW
 4-NO, ONLY DUSK and/or EARLY MORNING

-3-

16) What makes up the diet of a black bear in the Smoky Mountains?

- 1-ALL PLANT MATERIAL
- 2-ALL ANIMAL MATERIAL
- 3-MOSTLY PLANT MATERIAL
- 4-MOSTLY ANIMAL MATERIAL
- 5-EQUALLY PLANT & ANIMAL MATERIAL
- 6-MOSTLY PLANTS, ALSO VISITOR FOOD
- 7-MOSTLY ANIMALS, ALSO VISITOR FOOD
- 8-DON'T KNOW
- 9-OTHER _____

17) As compared with a human, how fast does a black bear run?

- 1-FASTER THAN A HUMAN
- 2-SLOWER THAN A HUMAN
- 3-THE SAME SPEED AS A HUMAN
- 4-DON'T KNOW
- 5-BEARS FASTER UPHILL, SLOWER DOWNHILL

18) What is the weight of a black bear cub at birth?

_____ . _____ pounds

(000.0 = DON'T KNOW)

19) What is the weight of an adult male black bear in the Smokies?

_____ . pounds

(0000. = DON'T KNOW)

20) Markers are often placed on black bears for research identification.
Would it disturb you to see ear tags on bears in this Park?
(Show respondent an ear tag)

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

21) . . . radio collars?

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

22) . . . ear streamers? (Show respondent an ear streamer)

- 1-YES, WOULD RATHER SEE IN NATURAL STATE
- 2-YES
- 3-NO, AS LONG AS IT DOES NOT DISTURB/HARM BEAR
- 4-NO
- 5-UNDECIDED

-4-

Since black bears are present in this National Park . . .

- | | | |
|--|-------|------|
| 23) Were you reluctant to hike in the backcountry? | 1-YES | 2-NO |
| 24) . . . to camp in the backcountry? | 1-YES | 2-NO |
| 25) Were you concerned about food storage? | 1-YES | 2-NO |
| 26) . . . about damage to equipment? | 1-YES | 2-NO |
| 27) Did you hope to see bears at your campsite? | 1-YES | 2-NO |
| 28) . . . along the roadside? | 1-YES | 2-NO |
| 29) Did you hope to photograph bears? | 1-YES | 2-NO |
| 30) . . . to feed bears? | 1-YES | 2-NO |

- 31) What would you do if you suddenly encountered a black bear standing on the trail in front of you?

1-WALK SLOWLY AWAY
 2-STAND MOTIONLESS, WATCH
 3-THROW SOMETHING
 4-RUN/MOVE QUICKLY AWAY
 5-DROP PACK/GIVE FOOD
 6-MOVE ASIDE, KEEP DISTANCE, AVOID
 7-YELL
 8-MAKE NOISE/TALK
 9-OTHER _____

- 32) What would you do if a black bear entered your campsite?

0-GATHER FOOD
 1-LEAVE AREA
 2-STAND MOTIONLESS, WATCH
 3-THROW SOMETHING (NOT FOOD)
 4-DO NOTHING/LEAVE ALONE
 5-GO INSIDE VEHICLE/BUILDING
 6-MOVE ASIDE, KEEP DISTANCE, AVOID
 7-YELL
 8-MAKE NOISE/ TALK
 9-OTHER _____

- 33) What is a safe distance to keep between yourself and a black bear?

_____ feet

(0000 = DON'T KNOW)

(9999 = THERE IS NO SAFE DISTANCE)

-5-

34) Are people injured by black bears in the Smokies?

- 1-YES
- 2-YES, SELDOM
- 3-NO
- 4-DON'T KNOW

35) (if YES) Why do you think people are injured by black bears?

- 1-ANNOYING, PROVOKING BEAR
- 2-IGNORANCE, CARELESSNESS
- 3-PEOPLE GET TOO CLOSE TO BEAR
- 4-BEAR IS AGGRESSIVE
- 5-DEFENSE OF CUBS
- 6-FOOD INVOLVEMENT
- 7-PEOPLE DO NOT FOLLOW PARK RULES
- 8-SURPRISE, SCARE BEAR
- 9-OTHER _____

36) Do you feel the NPS should reimburse visitors for black bear caused property damage or loss?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

37) . . . black bear caused food loss?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

38) . . . black bear caused injury?

- 1-YES
- 2-NO
- 3-UNDECIDED, DEPENDS ON THE SITUATION

39) If a black bear has a history of visiting a particular campsite, taking food when available, and in the process, often damaging campers' equipment, what should the NPS do?

- 0-1 OR 2, WHICH EVER WILL WORK
- 1-MOVE TO ANOTHER AREA OF THIS PARK
- 2-MOVE OUTSIDE OF THIS PARK
- 3-CAGE, OR PLACE IN A ZOO
- 4-DESTROY
- 5-DO NOTHING
- 6-CLOSE CAMPSITE/TRAIL TEMPORARILY
- 7-WARN VISITORS
- 8-EDUCATION OF USER, INCLUDING PATROL, ENFORCEMENT
- 9-OTHER _____

-6-

- 40) (if 1 or 2) Black bears often return to the same area they have been removed from. What should be done if the bear returns to a campsite?

0-1 OR 2
 1-MOVE TO ANOTHER AREA OF THIS PARK
 2-MOVE OUTSIDE OF THIS PARK
 3-CAGE, OR PLACE IN ZOO
 4-DESTROY
 5-DO NOTHING
 6-CLOSE CAMPSITE/TRAIL TEMPORARILY
 7-WARN VISITORS
 8-EDUCATION OF THE PARK USER
 9-OTHER _____

- 41) Should black bears be allowed in this Park?

1-YES 2-NO 3-CONDITIONAL

Note!

- 51) Have you visited either Sugarlands or Oconaluftee Visitor Center?

1-YES, SUGARLANDS
 2-YES, OCONALUFTEE
 3-YES, BOTH
 4-NO

- 52) (if YES) How long ago?

_____ days

- 53) Have you ever attended any naturalist talks at this Park?

1-YES 2-NO

- 54) (if YES) How long ago?

_____ days

- 55) Have you received any information from the NPS on black bears or on food storage?

1-YES 2-NO

- 56) (if YES) Form?

1-NATURALIST TALKS
 2-RANGER
 3-RANGER ISSUING PERMIT
 4-PERMIT
 5-VISITOR CENTER
 6-TRAIL MAP
 7-PARK BROCHURES
 8-SIGNS
 9-OTHER _____

-7-

57) Do you feel the information you received from the NPS was adequate to prepare you to deal with black bears?

- 1-YES 3-NO, ENCOUNTER
2-NO 4-DON'T KNOW/HAVE NOT READ

58) From what other sources (beside the NPS) have you received information on black bears?

- 1-TELEVISION
2-ZOOS OR MUSEUMS
3-NEWSPAPERS
4-BOOKS OR MAGAZINES
5-PERSONAL EXPERIENCE
6-OTHER PEOPLE USFS
7-ENVIRONMENTAL ORGANIZATIONS, CONSERVATION- NPS
8-HIKING GROUPS, CLUBS, CAMPS
9-SCHOOL, ENVIRONMENTAL EDUCATION

59) Have you ever spent time in backcountry sites where black bear activity could have occurred?

- 1-YES 2-NO 3-YES, DAYHIKE ONLY

60) (if YES) Have you ever seen a black bear in a backcountry area?

- 1-YES 2-NO

62) How many years ago did you make your first trip to a backcountry area?

_____ years (00 = FIRST TRIP)

63) Between that first trip and now, would you say that you visited backcountry areas at least:

- 0-FIRST TRIP, FIRST TRIP THIS YEAR
1-ONCE A YEAR
2-ONCE EVERY 2 YEARS
3-ONCE EVERY 3 YEARS
4-ONCE EVERY 4 YEARS
5-ONCE EVERY 5 YEARS
6-ONCE EVERY 10 YEARS
7-ONCE EVERY 15 YEARS
8-ONCE EVERY 20 YEARS
9-OTHER _____

64) Approximately how many days do you spend in the backcountry each year?

_____ days

-8-

65) What is the greatest number of consecutive days you have spent in the backcountry?

_____ days (01 = DAYHIKES ONLY)

66-67) Approximately how many days do you spend camping each year?

0 _____ days

(0000 = FIRST TRIP/FIRST TRIP THIS YEAR)

(9999 = FIRST TRIP IN 10 OR MORE YEARS)

68) Before this trip, have you ever camped in areas where black bears may be seen?

1-YES 2-NO

Note!

61) Have you ever experienced any property damage due to black bears?

1-YES 2-NO

69) Your area of residence for most of your life could best be described as (read answers):

1-RURAL 3-CITY
2-SUBURBAN 4-COMBINATION

70) Could you estimate the population of your area of residence?

1-≤1000	6-100,001-500,000
2-1001-5000	7-500,001-1,000,000
3-5001-20,000	8->1,000,000
4-20,001-50,000	9-DON'T KNOW
5-50,001-100,000	

71) City and State in which you are now living?

city: _____ state: _____

72) Age, if you don't mind? _____ years (00 = NOT AVAILABLE)

73) Sex (observation)

1-MALE 2-FEMALE

74) What is the highest year of education you have completed?

1-5	5-13-15
2-6-8	6-16
3-9-11	7-17-18
4-12	8-GREATER THAN 18
	9-UNKNOWN

75) Occupation?

0-MILITARY	6-TEACHER (SUB-COLLEGE)
1-UNSKILLED	7-HI LEVEL WT COLLAR,
2-LOW LEVEL WT COLLAR	EXECUTIVE
3-SKILLED	8-PROFESSIONAL
4-HOUSEWIFE	9-RETIRE, UNEMPLOYED
5-STUDENT	

APPENDIX C

DATA SHEETS

CODE SHEET - BACKCOUNTRY PROBLEM% BEAR STUDY

CASE#	CD#	INT	QOD	DAY	NO	YEAR	LOCATION	Q1	Q2	Q3				Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18											
										1	2	3	4																										
1	2	3	4	5	6	7-8	9-10	11-12	13	14	15	16	17-18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33-34	35	36	37	38	39	40	41	42	43		
2	7	5	1	2	2	0	6	0	9	8	2	1	0	3	2	.						2				4	1	1	0	2	1		1	3	1	0	8	0	0

310				Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44								
44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	0	5	0	0	4	2	4	2	1	1	2	1	1	2	1		1				0	3	0	0	1	6	3	2	2	2	4		1	2	2	1

[illegible]

Q53										Q54										Q55										Q56										Q57										Q58										Q59										Q60										Q61										Q62										Q63										Q64										Q65										Q66										Q67										Q68										Q69										Q70										Q71										Q72										Q73										Q74										Q75																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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58 - 9 = Boy Scouts
64 - 2 wks.
71 - Augusta, GA
A2413

- # 26 - reg.
- # 28 - at a distance
- # 32 - get away #31 - back away
- # 33 - 100 yds.
- # 35 - people feed bears
- # 39 - or 3
- # 41 - NPS is not able to get them out
- # 50 - fresh meat = 7

Figure 7. Sample data code sheet (approximately two-thirds original size).

Interaction Data Sheet

Location	Date	Weather	oC Temp	Observer	Recorder	Sheet #

Size B	# cubs	Collar	color Rt. Tag	color Lt. Tag	Bear #	Age B	Sex B	Markings

Int#	Time	PBeh	S	Sequential Behavior	Dur	BAD	HAD	AgeP	SexP

HUMAN		BEAR	
1 Clap hands	21 Back away	1 Huff	21 Walk away w/ pack/food
2 Yell	22 Run away	2 Jaw pop	22 Run away w/ pack/food
3 Ring bells/whistle	23 Watch/listen	3 Run toward	23 Ascend (fear)
4 Bang objects	24 Stop (fear)	4 Jump toward	24 Ascend
5 Grunt/huff at bear	25 Surrender pack/food	5 Make contact	25 Decend
6 Talk to bear	(fear)	6 Slap ground/object	26 Send cubs up tree
7 Other non-verbal noise	26 Flashlight on bear	7 Cub cry	27 Walk away
8 Stamp foot	27 Flashlight off	8 Grunt	28 Run away
9 Arm movements	28 Feed bear	9 Moan	29 Back away
10 Throw stones/sticks	29 Attempt to touch bear	10 Adult gulping	30 Bolt
11 Talk to others/ point at bear	30 Mill about	11 Cub gulping	31 Walk toward an apparent goal
12 Stop (neutral)	31 Go inside	12 Stand (b)	32 Circle
13 Run towards bear	32 Close shelter door	13 Stand (2)	33 Random movement-walking
14 Walk towards bear	33 Chain shelter door	14 Sit down	34 stop (fear)
15 Take photos	34 Pick up equip/food	15 Groom/scratch	35 stop
16 Stand	35 Put down equip/food	16 Sniff	36 attempt to get food
17 Kneel/Squat	36	17 Dig	37 attempt to get in shelter
18 Lie down	37	18 Eat (human food)	38 other _____
19 Sit	38	19 Eat/drink natural	39
20 Walk away	39	20 Watch	40
	40		41
			42

Figure 8. Interaction data sheet (approximately one-half original size).

APPENDIX D

ADDITIONAL DATA

Table 46. Description of frontcountry interview locations.

Campground	Number of ^a Campsites	Location ^b	Elevation ^b
Cades Cove	161 (3 group sites)	16.1 km West of Townsend, TN Park Entrance	1807
Look Rock	92	17.7 km from Walland, TN on NPS Foothills Pkwy.	2500
Smokemont	142 (8 group sites)	11.3 km North of Cherokee, NC	2198
Balsam Mountain	46	16.1 km North of Soco Gap, NC, on Blue Ridge Pkwy. Spur Road	5310

^aNational Park Service (1982a).

^bMurless and Stallings (1973).

Table 47. Number of years passed since campers' (%) first trip to a backcountry area, GSMNP, 1982.

Camper Category	Years				
	0 - 1	2 - 4	5 - 9	10 - 14	15+
Backcountry Total (N=150)	17.3	20.7	25.3	20.0	16.7
Backcountry Shelter (N=75)	16.0	17.3	29.3	18.7	18.7
Backcountry Campsite (N=75)	18.7	24.0	21.3	21.3	14.7
Frontcountry with Backcountry Experience (N=92)	5.4	21.7	18.5	12.0	42.4

Chi-square Test, backcountry samples: $\chi^2=2.401$, $df=4$, $P=0.662$. Chi-square Test, backcountry and frontcountry: $\chi^2=23.959$, $df=4$, $P<0.001$.

Table 48. Approximate number of days that campers (%) spent in backcountry areas each year, GSMNP, 1982.

Camper Category	Days			
	1 - 3	4 - 7	8 - 14	15+
Backcountry Total (N=150)	23.3	30.7	24.7	21.3
Backcountry Shelter (N=75)	21.3	20.0	30.7	28.0
Backcountry Campsite (N=75)	25.3	41.3	18.7	14.7
Frontcountry with Backcountry Experience (N=87)	49.4	26.5	13.8	10.3

Chi-square Test, backcountry samples: $\chi^2=11.137$, $df=3$, $P=0.011$. Chi-square Test, backcountry and frontcountry: $\chi^2=18.721$, $df=3$, $P<0.001$.

Table 49. Greatest number of consecutive days spent by campers (%) in a backcountry area, GSMNP, 1982.

Camper Category	Days			
	1	2 - 3	4 - 7	8+
Backcountry Total (N=150)	2.0	30.0	38.0	30.0
Backcountry Shelter (N=75)	2.7	24.0	33.3	40.0
Backcountry Campsite (N=75)	1.3	36.0	42.7	20.0
Frontcountry with Backcountry Experience (N=92)	34.8	21.7	26.1	17.4

Chi-square Test, backcountry samples: (Due to sparcity of data, "1 day" was combined with "2-3 days") $\chi^2=7.193$, $df=2$, $P=0.027$. Chi-square Test, backcountry and frontcountry: $\chi^2=49.837$, $df=3$, $P<0.001$.

Table 50. Camper response (%) regarding the ability of black bear cubs to climb trees, GSMNP, 1982.

Camper Category	Climbing Ability		
	Yes, Cubs Can Climb Trees	No Cubs Cannot Climb Trees	Don't Know
Backcountry Total (N=150)	89.3	8.0	2.7
Backcountry Shelter (N=75)	92.0	5.3	2.7
Backcountry Campsite (N=75)	86.7	10.7	2.6
Frontcountry (N=200)	89.0	8.0	3.0

Table 51. Camper response (%) regarding the specie of bear present in GSMNP, 1982.

Camper Category	Bear Species					
	Black	Brown	Grizzly	Black-Don't Know Black-Other	Black-Brown	Black-Grizzly Don't Know
Backcountry Total (N=150)	86.7	6.0	1.3	2.0	3.3	1.7
Backcountry Shelter (N=75)	92.0	2.7	1.3	1.3	2.7	-
Backcountry Campsite (N=75)	81.3	9.3	1.3	2.7	4.0	1.4
Frontcountry Total (N=200)	75.5	7.5	-	1.5	5.0	9.0

Table 52. Camper response (%) regarding the ability of adult black bears to climb trees, GSMNP, 1982.

Camper Category	Climbing Ability			
	Yes, Adult Bears Can Climb Trees	No, Adult Bears Can Not Climb Trees	Don't Know	Only Certain Trees/ Not Very High
Backcountry Total (N=150)	85.3	8.7	0.7	5.3
Backcountry Shelter (N=75)	85.3	9.3	1.4	4.0
Backcountry Campsite (N=75)	85.3	8.0	-	6.7
Frontcountry (N=200)	74.5	21.0	3.5	1.0

Table 53. Camper response (%) regarding the daylight activity of black bears, GSMNP, 1982.

Camper Category	Daylight Activity			
	Yes	No	No, Only Dusk and/or Dawn	Don't Know
Backcountry Total (N=150)	83.3	12.0	3.3	1.4
Backcountry Shelter (N=75)	88.0	8.0	2.7	1.3
Backcountry Campsite (N=75)	78.7	16.0	4.0	1.3
Frontcountry (N=200)	86.5	12.5	0.5	0.5

Table 54. Camper response (%) regarding the running speed of a black bear as compared to a human, GSMNP, 1982.

Camper Category	Running Speed				
	Faster	Slower	The Same Speed	Bears Faster Uphill, Slower Downhill	Don't Know
Backcountry Total (N=150)	80.7	6.7	9.3	2.0	1.3
Backcountry Shelter (N=75)	86.6	4.0	6.7	2.7	-
Backcountry Campsite (N=75)	74.7	9.3	12.0	1.3	2.7
Frontcountry (N=200)	77.5	5.5	12.5	1.5	3.0

Table 55. Camper response (%) regarding the diet of a black bear in the Smoky Mountains, GSMNP, 1982.

Camper Category	Diet					
	All Plant Material	All Animal Material	Mostly Plants	Mostly Animals	Equally Plant and Animal	Mostly Plants, Mostly Animals, Also Visitor Food
Backcountry Total (N=150)	11.3	1.3	53.3	3.3	10.7	16.7
Backcountry Shelter (N=75)	6.7	1.3	58.6	2.7	6.7	20.0
Backcountry Campsite (N=75)	16.0	1.3	48.0	4.0	14.7	13.3
Frontcountry (N=200)	14.0	1.0	47.0	3.5	16.5	13.0
						1.4
						2.0
						1.3
						2.7
						1.3
						4.0

Table 56. Camper response (%) regarding the weight of an adult male black bear in the Smoky Mountains, GSMNP, 1982. (Answers of 127-285 lbs. were scored as correct; weight categorized by standard deviation.)

Camper Category	Weight (lbs.)								
	≤ 46	47-126	127-285	286-366	367-440	441-519	520-598	≥ 599	Don't Know
Backcountry Total (N=150)	0.7	1.3	31.3	24.7	17.3	11.3	0.7	10.0	2.7
Backcountry Shelter (N=75)	-	1.3	32.0	25.3	14.7	14.7	-	10.7	1.3
Backcountry Campsite (N=75)	1.3	1.3	30.7	24.0	20.0	8.0	1.4	9.3	4.0
Frontcountry (N=200)	-	1.5	34.0	26.0	8.0	14.0	2.0	13.5	1.0

Table 57. Camper response regarding the frequency of black bear births, GSMNP, 1982.

Camper Category	Birth Frequency				
	More Than Once a Year	Once a Year	At Least Once in 1-2 Years	Every 2 Years	Less Than Once in 2 3, 4, 5 Years
Backcountry Total (N=150)	4.7	56.0	2.0	24.7	9.3
Backcountry Shelter (N=75)	6.7	54.7	4.0	25.3	6.7
Backcountry Campsite (N=75)	2.7	57.3	-	24.0	12.0
Frontcountry (N=200)	3.5	45.5	5.0	28.0	9.5
					8.5

Table 58. Camper response (%) regarding black bear birth weight, GSMNP, 1982. (Answers of <1.0 lb. were scored as correct.)

Camper Category	Weight (lbs.)							
	< 1.0	1.0	1.1-4.9	5.0-9.9	10-24.9	25-49.9	50-99.9	≥ 100
Backcountry Total (N=150)	3.3	5.3	6.7	16.7	33.3	18.0	12.0	1.4
								3.3
Backcountry Shelter (N=75)	4.0	4.0	5.3	20.0	33.3	17.3	13.3	1.4
								1.4
Backcountry Campsite (N=75)	2.7	6.7	8.0	13.3	33.3	18.7	10.7	1.3
								5.3
Frontcountry (N=200)	11.5	0.5	12.5	7.0	34.5	14.5	12.5	3.0
								4.0

APPENDIX E

DESCRIPTIVE INFORMATION

APPENDIX E

DESCRIPTION OF BEAR-RELATED INCIDENTS EXPERIENCED

BY CAMPERS, GSMNP, 1982

July 6 and 7, Deep Creek

Bear appeared at 2130 and took one backpack. Then it went after a food sack which was suspended over a limb. Campers threw rocks and yelled, bear bluff charged. They continued to yell and throw rocks. Bear left, but returned at 2330. It climbed one of two trees where sack was hung, stepped on support rope and food sack slid down to bear. Campers followed bear and drove it off. Campers tied sack to rope with knots to prevent sack from sliding. Bear returned at 0100 on 7 July and took another pack. Bear tried to get food sack but was unsuccessful. Bear reached up and clawed sack from ground, but could not get it.

Result--Food loss and property damage (\$100.00)

Reported incident to NPS prior to interview (CI# 821940)

July 7, Spence Field, 1130

Party was about three feet from their packs, facing away from them. Bear was not detected until it was on the packs. Party moved back and yelled. Bear took pack and ate food. Drove bear away by throwing rocks.

Result--Food loss and property damage

Respondent planned to report incident to NPS--Incident was reported by someone else (CI# 821848)

July 15, Spring on Bote Mountain Road (near Spence Field), 1600

Respondent set his pack down near trail. A bear (#482) ran down the hill and grabbed pack. Respondent yelled and hit bear on head with walking stick, broke walking stick. Bear retreated with backpack. Threw rocks and yelled, eventually retrieved pack after bear ate all food.

Result--Food loss and property damage

Planned to report the incident to the NPS--Not reported

July 15, Siler's Bald

Respondents witnessed three people eating in front of shelter. Bear ran into the midst of them and took a can of lard. While it ate, the people retrieved the remainder of their belongings. Bear had a red tag, and a black collar. Respondents met same bear at

1045 approximately one-half mile from Siler's Bald. Bear ran off the trail about 50 feet in front of campers and stood on a log. It came back on the trail behind the group and ran toward them. The group dropped a food sack for the bear.

Result--Food loss and property damage

Respondent planned to report the incident to the NPS--Reported (CI# 822094).

August 14, Deep Creek #59, 0500

First heard bear at 2300 on August 13, it continued to come around until 0630. Campers saw bear at 0500. Packs were on the ground and hung on trees, food was inside packs. Party threw rocks and yelled when bear started to get into packs. Bear was generally unresponsive to these actions, but would move off until people quieted down.

Result--Lost one package of punch mix.

Campers were not planning to report this incident

September 9, Spence Field 1745

Bear approached man at spring. Bear took one package of pudding man left.

Result--Food loss

Camper did not plan to report this incident

October 3, Spence Field, 1630

Respondent was behind shelter at spring. Backpack was in shelter with door latched and chained. Bear pulled latch around pipe off and took pack into bushes below shelter. Yelling did not scare the bear off.

Result--Food loss and property damage

Camper planned to report this incident--No report filed.

FIELD OBSERVATIONS

11 September 1981

Campers at LeConte Shelter had 2 ribeye steaks, 1 lb. bacon, and pork chops. Fat from meat was dumped outside of shelter.

11 September 1981

Campers at Mt. LeConte Shelter heard to say, "Here are the regulations they gave us; I haven't even read them . . . yeah, don't do this, don't do that."

12 September 1981

Camper at Mt. LeConte said, "These bears don't even know how to eat berries or kill fish anymore. I was in a shelter once and this huge bear pulled open the door and came right in. Everyone was huddled on the top bunks; it ate someone's food."

4 October 1981

Man and his son leave packs outside of Mt. LeConte Shelter standing against a tree and they head to spring. Bear comes by and rips up their packs. They had never been in the backcountry before, and had heard it was alright to set up a tent at a shelter site. They had no permit and did not know that they needed one. They knew nothing about bears.

May 1982

A ranger was heard to say, "I only write up incidents that happen directly to the person I'm talking with, not if they see one happen."

3 July 1982, 1330

Bear approached hikers going to the lodge on Mt. LeConte. They tossed the bear some doughnuts and admitted feeding the bear. At 1400 a bear approached hikers within 4 or 5 feet and took a daypack. The bear ran 25 to 30 feet from the trail. The hikers approached the bear and it growled, hikers retreated.

7 July 1982, 1312, Siler's Bald

Bear #598 flips over the grate on outside fire ring and eats a piece of toaster pastry someone left.

8 July 1982, Siler's Bald

Camper said, "Don't shine a flashlight at a bear at night; it makes them angry."

9 July 1982, Siler's Bald

Bear #598 appears. Camper says, "It's a yearling with a collar; the collar is the second stage; the third stage is when the NPS puts a bell on the collar to warn people."

26, 27 July 1982

No one present to check in campers at Balsam Mountain Campsite. Campground regulations are posted, however, food and coolers are not put away.

VITA

Pamela A. Petko-Seus, daughter of Mary and Michael Petko, was born in Buffalo, New York, on January 12, 1956. She graduated from Williamsville North High School in Williamsville, New York, in 1974. The following September she entered the State University of New York College of Environmental Science and Forestry at Syracuse, and in May 1978, she received a Bachelor of Science degree in Wildlife Biology and Management.

She married Russell F. Seus in August of 1978. In the fall of 1980 she accepted a teaching assistantship with the Department of Forestry, Wildlife and Fisheries, at the University of Tennessee, Knoxville, and began study towards a Master's degree; this degree was awarded in August 1985. Ms. Petko-Seus is employed with Ijams Audubon Nature Center in Knoxville.