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William E. Hammitt

William E. Hammitt, Major Professor

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DETERMINANTS OF QUALITY WILDLIFE VIEWING IN CADES COVE, GREAT SMOKY MOUNTAINS NATIONAL PARK

A Thesis

Presented for the

Master of Science

Degree

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Judy N. Dulin

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ABSTRACT

Participation in nonconsumptive wildlife recreation has increased substantially in recent years. Because of increased participation in activities such as birdwatching, wildlife viewing, and wildlife photography, a need for research has developed concerning determinants of quality among these kinds of recreation. This study was designed to determine what factors are important to the quality of a wildlife viewing experiences in Cades Cove in the Great Smoky Mountains National Park, Tennessee.

During June, July, and August 1989, 384 visitors were interviewed in Cades Cove, after completing an 11 mile (18 km) auto tour. During the 5-7 minute interviews participants were asked to answer a few brief questions and were given a list of animals that could be seen in Cades Cove and asked to indicate the number of each kind of animal they had seen. After completing the interview, participants were given a mail-back questionnaire in a return postage-paid envelope. Almost 85% of the questionnaires were returned.

Most respondents were well educated and employed as professionals, managers, or laborers. Although a large percentage of participants were from Tennessee, 27 other states and 3 other countries were reported. More than 60%

of participants reported growing up in rural areas or small towns.

Wildlife associated activities that respondents participated in most frequently were wildlife viewing, nature walks, and wildlife photography. Almost 35% of respondents indicated that they subscribed to wildlife or conservation related publications but fewer belonged to related organizations or clubs.

Eight reasons for visiting Cades Cove were rated for agreement by respondents. Reasons concerned with seeing wildlife were rated highest. Also, when asked their purpose for the specific visit the day of the interview and for their many return visits, seeing wildlife was again most frequently reported.

Sixty items concerning general attitudes about animals were asked of the respondents. Scores of agreement were computed for 11 attitude categories. Respondents scored highest in attitude categories labeled aesthetic, humanistic, and moralistic and lowest in categories concerned with the consumptive use of wildlife.

Animals reported most often seen by visitors included white-tailed deer (Odocoileus virginianus), groundhogs (Marmota monax), and black bears (Ursus americanus). Most participants reported seeing fewer than 40 total animals. Butterflies (various species), crows (Corvus brachyrhynchos), and white-tailed deer were animals most

often seen by the researcher during density estimates (count of the number of animals visible on the Cades Cove auto-tour, loop road). However, the researcher reported seeing more than 60 total animals during most periods of density estimates. Respondents indicated that they saw about the number of kinds, total number of animals, and the number of white-tailed deer and black bears they expected. Respondents also indicated that they felt the number of different kinds, the total number of animals, and the number of white-tailed deer seen were about right. Respondents did indicate, however, that they felt the number of black bears and wild turkeys (Meleagris gallopavo) was too few and that the number of wild turkeys they saw was less than expected. Seeing different kinds of animals, black bears, and white-tailed deer was most important to visitor's viewing experience. Stopping the vehicle, photographing, and getting out of the vehicle to see wildlife were viewing behaviors most frequently reported by respondents.

A quality of wildlife viewing (dependent variable) regression model containing expectations toward wildlife seen, feelings toward wildlife seen, importance of different types of wildlife, density level of wildlife, visual encounters with wildlife, and viewing behavior predictors (independent variables) were examined for first-time and previous visit participants. When examining

reduced multiple regression models, expectations and feelings predicted the most variation (25 to 43%) in quality of wildlife viewing for both first-time and previous visit participants. Seven predictors--expectations about the different kinds and the total number of animals seen, feelings about the number of white-tailed deer and black bears seen, the number of kinds of animals seen by the researcher, stopping the car to observe wildlife, and using binoculars or telescope to view wildlife--were significant for previous visit participants (R^2=.42). Three variables--feelings about the total number of animals seen, photographing of wildlife, and using binoculars or a telescope to view wildlife--accounted for 52% (R^2=.52) of the variance for first-time visitors.

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CHAPTER I

INTRODUCTION

Nonconsumptive wildlife associated recreation has increased rapidly over the last few years in the United States. According to a 1977 nationwide survey (USDI 1978) approximately 85 million people participated in activities such as birdwatching, wildlife photography, and nature observation. In a similar survey (USDI 1988) completed in 1985, participation had increased over 30% since 1977. Of Americans 16 years and older, 134.7 million participated in observing, feeding, and photographing fish and wildlife. Over 29 million persons took trips of at least 1 mile primarily for taking part in those activities.

A number of factors have lead to increased participation in nonconsumptive wildlife recreation. These include increasing urbanization, shrinkage of wildlife habitat, and a decrease in areas available for consumptive wildlife recreation (Lime 1976). Increased interest in seeing, photographing, and studying wild animals could also be the result of the "wildlife conservation" movement in popular American literature that has been building over the last 10 years (McGeachy 1989). Increases in wages and leisure time have also stimulated more interest in

nonconsumptive wildlife recreation as it has done with many other forms of recreation.

Cades Cove in the Great Smoky Mountains National Park, Tennessee-North Carolina, is one of the most popular areas in the southeastern U.S. for viewing wildlife. Over a million people from many different states come to visit the area every year not only to see its wildlife, but to view its scenery, picnic, or simply just to "get back to nature." During the summer of 1989, over 450,000 vehicles toured the Cove's 11-mile (18 km) loop road.

Statement of the Problem

Although sportsmen are the traditional clientele of wildlife management, nonconsumptive recreationists are becoming more influential in management decisions. The interests of wildlife professionals are no longer focused primarily on species for the hunt. Recently, there have been extensive efforts to develop programs for protection and means of funding management for species of animals that are viewed and studied by nonconsumptive recreationists and naturalists. Most of these changes are the result of the dramatic increase in the number of people who participate in nonconsumptive wildlife recreation.

In spite of recent management changes and increases in participation, there has been a surprising lack of research and collection of data concerning nonconsumptive wildlife

associated recreation. Lyons (1982) stated four reasons why this problem exists: (1) the lack of records similar to those provided by hunting and fishing licenses, (2) the general lack of elaborate equipment used making product sales an invalid measure of participation, (3) the product of participation is difficult to define and less easily quantified, and (4) the ability of individuals to engage in these activities in a multitude of settings. The most significant source of participation data exists in the U.S. Fish and Wildlife Service's national surveys on fishing, hunting, and wildlife associated recreation. To date, however, there are few studies that research the quality or satisfaction associated with nonconsumptive wildlife recreation.

Only one study has been completed on wildlife viewing in Cades Cove. Hastings (1986) investigated the knowledge, preferences, and attitudes of visitors in reference to the wildlife found in the Cove. His study became a source of knowledge from which a theoretical model could be developed for determining factors influencing the quality of wildlife viewing experiences.

This study investigates the quality of wildlife viewing model stimulated by Hastings' work. The model evaluates the relationship between density level, visual encounters, expectations, feelings, importance, viewing behavior, and the quality of wildlife viewing. This model

(Figure 1) is an adaptation of a satisfaction model (Figure 2) developed by Heberlein and Shelby (1977) for researching wilderness crowding and carrying capacity. Their model's driving force is an assumed inverse relationship between use density (number of people within a given area) and recreational satisfaction. Although density and satisfaction have been demonstrated to have a weak or nonexistent relationship in many studies (Lucus 1980, Lee 1977, and Shelby 1980), density as the number of animals available for viewing is hypothesized to have a positive relationship with the quality of wildlife viewing in Cades Cove.

Purpose and Objectives

The major purpose of this study was to provide adequate data from which a theoretical model concerning determinants of high quality wildlife viewing experiences could be tested. However, special attention was also given to human viewing behavior of wildlife, Cades Cove visitor characteristics, and general visitor attitudes toward wildlife to provide further information for the formulation of better wildlife-viewing management decisions. The following objectives were specified for fulfilling this study's stated purpose:

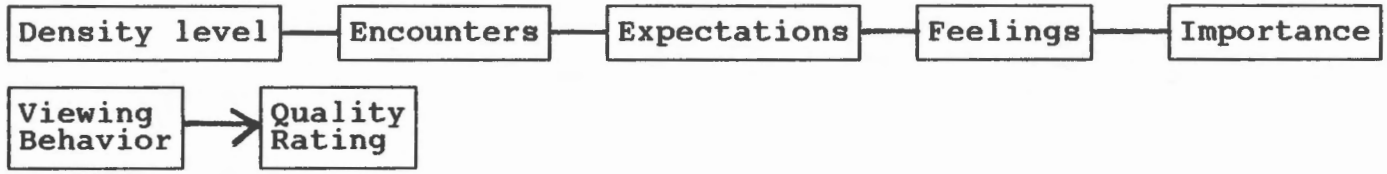


Figure 1. Quality of wildlife viewing model.

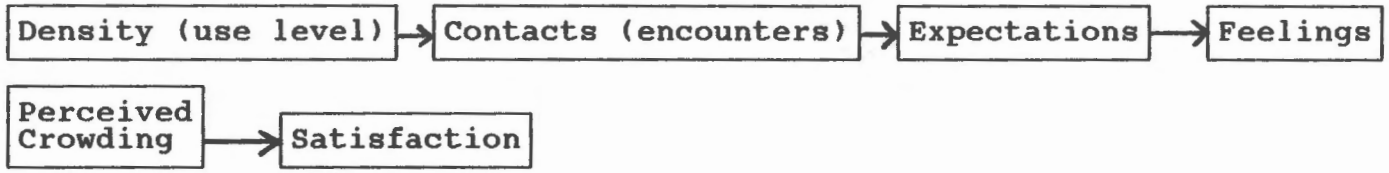


Figure 2. Satisfaction based model (adapted from Shelby and Heberlein 1986).

(1) To document the types and number of wildlife that visitors see, expect to see, and how they feel about the types and numbers of animals they see in Cades Cove.

(2) To determine the reasons why visitors come to Cades Cove.

(3) To determine visitors' general attitudes about animals.

(4) To determine the importance of specific animals in Cades Cove to visitor's wildlife viewing experiences.

(5) To document viewing behavior of visitors in Cades Cove.

(6) To document participation in other wildlife or conservation related activities.

(7) To determine the quality of wildlife viewing in Cades Cove.

(8) To evaluate the relationship and influence of the proposed model variables on the quality ratings for wildlife viewing in Cades Cove.

CHAPTER II

LITERATURE REVIEW

The major goal of all wildlife management agencies is to provide opportunities for high quality recreational experiences. However, public and private agencies have difficulty in defining exactly what "high quality" experiences are and how to produce them (More and Buhyoff 1979). Managers must still make decisions that will ultimately affect the quality of recreational experiences of visitors based, oftentimes, on inadequate information. Consequently, it is desirable to determine what factors most affect quality in specific recreational activities.

Quality in outdoor recreation has most often been defined by visitor satisfaction (Manning 1986). In other words, managers can only be successful if they meet the needs and desires of their customers. Wager (1965) stated three premises that managers should keep in mind to insure quality recreational experiences for visitors: (1) the sole purpose of all land management is to provide benefits for people, (2) recreation is motivated by needs, and (3) the quality of recreation depends on how well it satisfies the needs that motivate it. Therefore, managers can no longer simply concentrate on physical site characteristics

but must also identify the needs, preferences, and expectations of their visitors.

Differences in how nonconsumptive recreationists, as opposed to consumptive participants, rate satisfaction has been demonstrated in several studies. Nonconsumptive participants tend to rate experiences or satisfaction higher than consumptive users (Vaske et al. 1982). There are two reasons for this difference: (1) consumptive activities are more dominated by the attainment of a specific goal and (2) nonconsumptive recreationists are much more likely to achieve their more generic goals or experience. For example: an individual trying to have a picnic in Cades Cove is much more likely to achieve their desired experience than an individual trying to kill a deer on Chuck Swan Wildlife Management area.

Nonconsumptive and consumptive recreational experiences also differ in the kinds of factors that affect them. One explanation that has been given for this difference is the degree of user specialization (Hammitt et al. 1984). Some recreational activities require more elaborate equipment and skill than others. For example: turkey hunting as opposed to picnicking.

Factors that affect the quality of various nonconsumptive recreational experiences vary greatly depending on recreational setting. A survey completed on white water rafting in the southeastern U.S. (McDonald

1981) indicated that the number of other participants was the major determinant of among river rafters. Aesthetic characteristics of the resource were the most important variable in a satisfying experience for northeastern wilderness hikers (Shafer and Meitz 1969). Previous use experience was related to higher quality experiences for campers in an Alberta Provincial Park Campgrounds study (Foster and Jackson 1979).

In recent years, there has been a shift in the kind of factors that affect some types of consumptive recreational experiences. Traditionally, game bagged was the principal source of hunter satisfaction (Heberlein and Laybourne 1978, Vaske et al. 1982). Because of dwindling habitat and decreasing numbers of available game, hunters are beginning to rely more on the other benefits of hunting (Vaske et al. 1986). These benefits include getting to perfect their skills, social companionship, and getting to be outdoors. Evaluating the individual and combined effects of these other benefits on over-all hunter satisfaction has become known as the multiple satisfaction approach to game management.

There also seems to be considerable variation in factors influencing recreational quality among different kinds of hunters in different geographical areas. Vaske et al. (1986) found that factors associated with getting outdoors, skill, and participation in the sport as being

most important to goose hunters. Temporary escape from the home-work environment and social companionship were among the important determinants of a satisfactory hunting experience for deer hunter in Tennessee (Hammitt et al. 1989). Massachusetts deer hunters identified aesthetic benefits, affiliation with people, and the challenge of the hunt as being most important to the quality of their hunting experiences.

The two most commonly found factors associated with the quality of fishing experiences seem to be escapism and catching fish. Cooper (1973) found the opportunity to get away, the natural surroundings, and the presence of wildlife as being important to trout fishermen. Like Cooper, Bryan (1974) found factors associated with escapism as being important to satisfaction in saltwater fishing. However, Buchanan (1983) and several other researchers have found that catching fish is the primary source of satisfaction in fishing.

A model that has been used for determining factors associated with quality in specific recreational experiences is the perceived crowding-satisfaction model. Independent variables in the model include use level, visual encounters, crowding expectations and feelings. The inverse relationship between use density and satisfaction is the major focus of the model. Therefore, as density increases crowding and satisfaction should decrease.

There have been reported, however, dramatic differences in how density affects crowding and satisfaction in different types of recreation. There seems to be a positive relationship between density (up to a point) in some recreational activities such as hunters but a negative relationship for activities such as wilderness hikers (Shelby and Heberlein 1986).

An adapted form of the perceived crowding satisfaction model will be tested in this study. However, instead of numbers of humans being the focus of the theoretical model, numbers of animals will be used. Use level will no longer be the actual number of people available for contact, but will be the number of animals available for potential visual contact. Visual encounters will be in reference to the number of animals visually encountered, not the number of people encountered. The expectations and feelings of visitors examined in the theoretical model will be in reference to the number of animals seen. Two new variables, importance of numbers and types of animals seen and viewer behavior while viewing animals, were additions to the adapted model. Substituted for the measure of satisfaction for this model will be the quality of wildlife viewing. Figure 1 illustrates the theoretical wildlife viewing model.

CHAPTER III

STUDY AREA

Great Smoky Mountains National Park

Located between 35° 26′ and 35° 47′ latitude and 83° 2′ and 84° 0′ longitude (Figure 3) is the Great Smoky Mountains National Park (GSMNP). Its mountains and valleys incorporate two states in the southeastern U.S., namely Tennessee and North Carolina. The park contains over 207,000 ha.

Nearly 8-9 million people visit the GSMNP every year (USDI 1982). In 1989 over 8 million people came to the Smokies to see wildlife, waterfalls, streams, wildflowers, historical structures, and other scenic features. The GSMNP also offers a variety of types of recreation including camping, picnicking, and trout fishing.

Because of the park's diversity in climate and geology, there are numerous species of plants and animals. Over 1,200 species of flowering plants and 130 species of trees inhabit the park (USDI 1981). There are also 59 species of mammals (Linzey and Linzey 1971) including black bear (Ursus americanus) which has become a symbol of the park. Other animals include 200 species of birds, 70 species of fish, 38 species of reptiles, and 39 species of amphibians (USDI 1979).

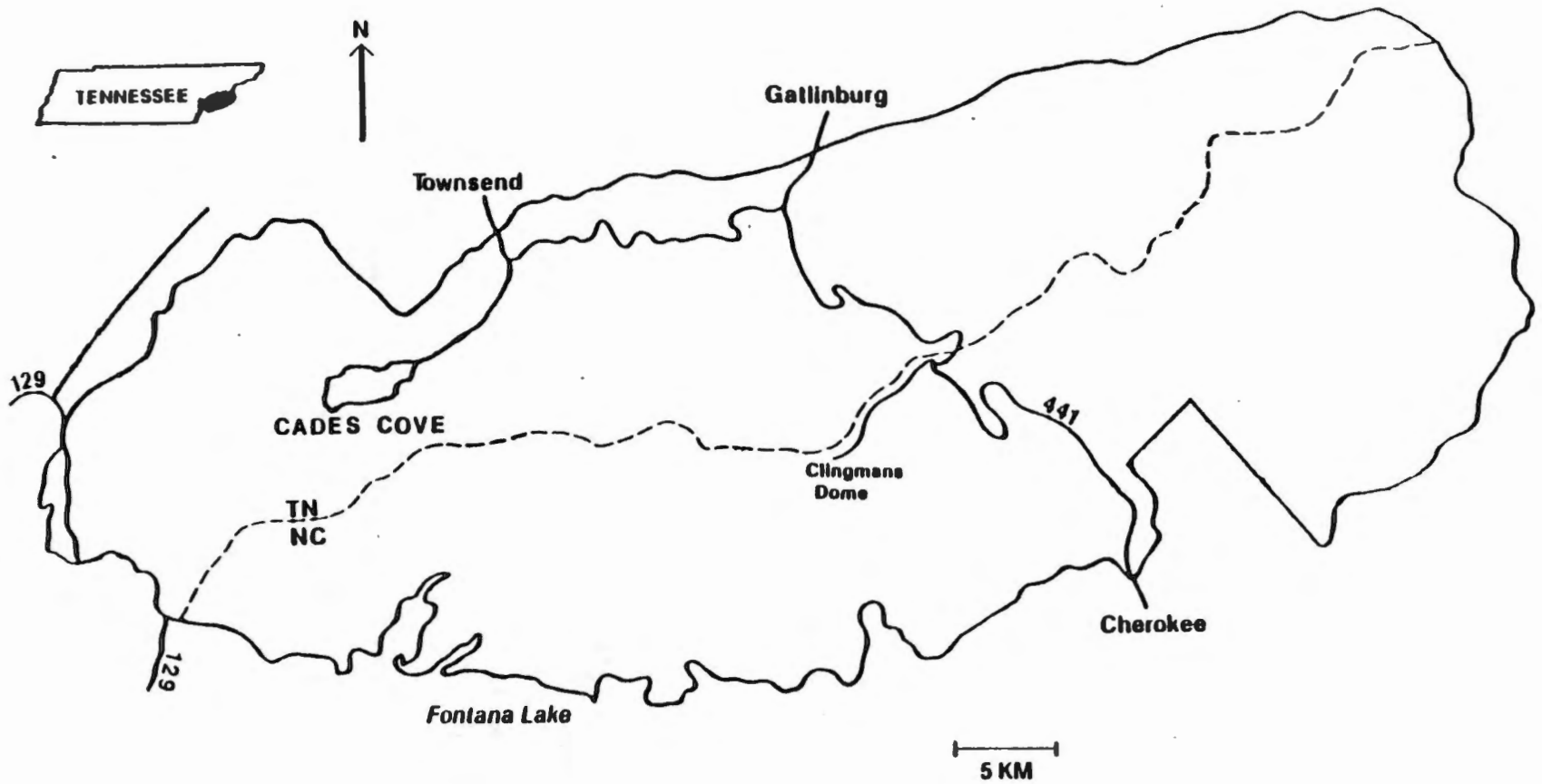


Figure 3. Map of the Great Smoky Mountains National Park, Tennesee and North Carolina (from Hastings 1986).

Cades Cove

Cades Cove (Figure 4), a 1,000 ha historical area, is located in the northwestern section of the GSMNP. Because historical structures and features of the early pioneers of the area are one of the main attractions, it is maintained mostly in hayfields and pastures to simulate landscape in the 1800s. Viewing access to historical features and structures and to wildlife is by an 11-mile (18 km) paved, one-way traffic loop road. The road is further divided by two shorter unpaved roads, Hyatt and Sparks Lane.

Because of the open areas created and maintained by grazing horses and cattle, abundant edge, and the lack of legal hunting many species of animals are attracted to this area. White-tailed deer (Odocoileus virginianus) was one of the most popular species of mammals to be seen and photograph in the Cove (Hastings 1986). However, Cades Cove is home to 28 other species of mammals (Linzey and Linzey 1971) including black bear (Ursus americanus), groundhog (Marmota monax), and striped skunk (Mephitus mephitus). Although the exact number of species of birds that visit or live in the Cove is not known, some of the most exciting to visitors include wild turkey (Meleagris gallopavo), pileated woodpecker (Dryocopus pileatus), and an occasional golden eagle (Aquila chrysaetos). Interesting species of reptiles include the timber rattlesnake (Crotalus horridus), northern fence lizard

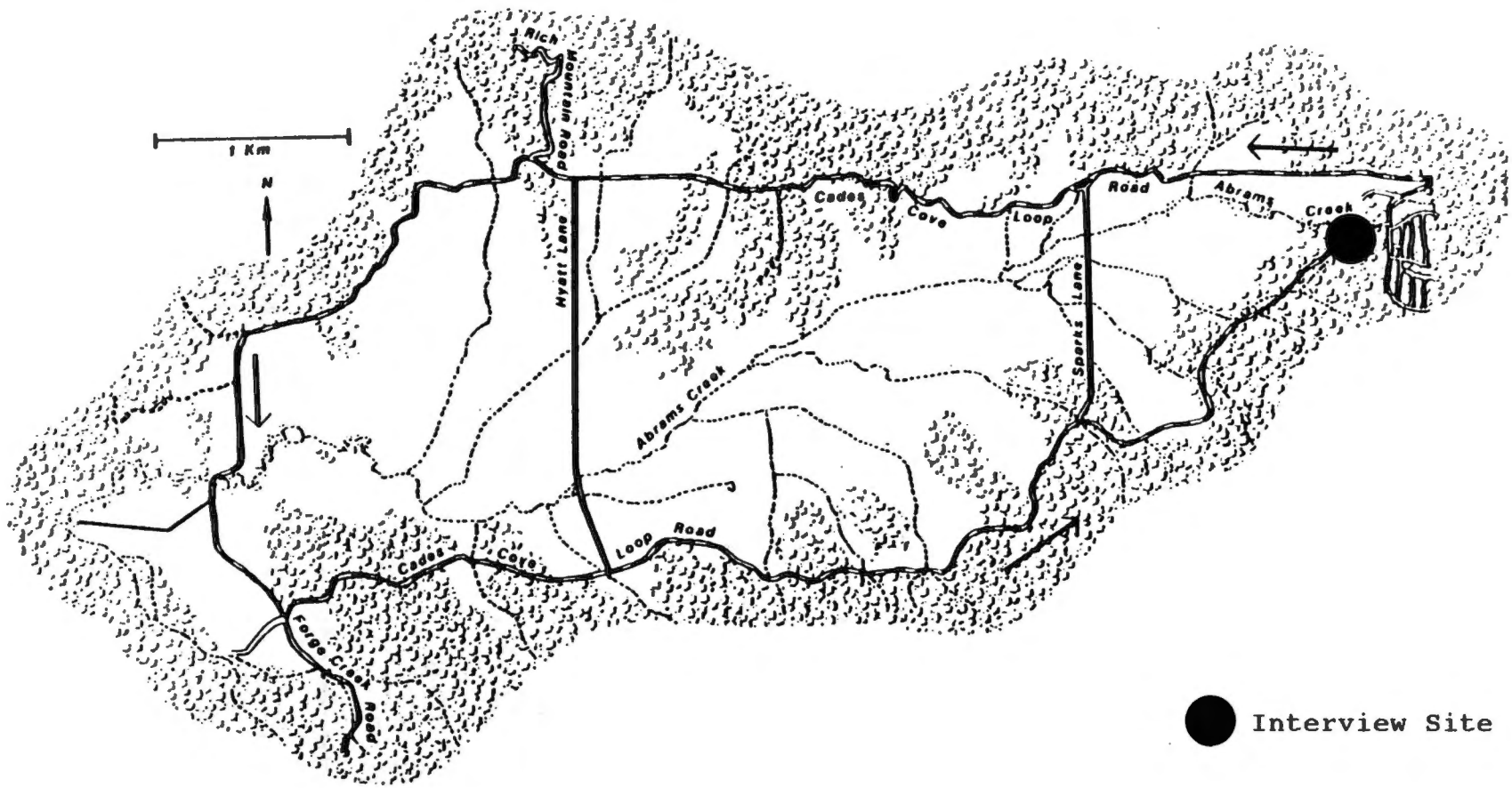


Figure 4. Map of Cades Cove, the location of loop road and survey interview site in Great Smoky Mountains National Park (from Hastings 1986).

(*Sceloporus undulatus*), and eastern box turtle (*Terrapene carolina*). Several species of fish have also been recorded (Mathews 1978).

The one-way traffic, loop road served as the study site within Cades Cove for sampling visitors' reaction to viewing wildlife in the study area. An exit survey at the interview site in Figure 4 was used to sample visitors after they had completed the auto tour through the study area and site.

CHAPTER IV

METHODOLOGY

Development of the Survey

This survey was primarily developed for testing a theoretical model of wildlife viewing quality. However, other human-wildlife relations were also examined such as the types of viewing behavior exhibited by visitors while observing wildlife, the participation of visitors in conservation oriented clubs and organizations, and participation in other nonconsumptive wildlife activities. The establishment of basic attitudes about animals was also investigated. Attitude items developed by Kellert (1989), Yale University were used to generate scores in 11 attitude categories. A written on-site questionnaire was pre-tested on 30 individuals who visited Cades Cove in the spring of 1989. Results of the pre-testing led to the exclusion of poorly developed questions and the addition of several other questions.

Sampling Procedure

The survey population consisted of all visitors who drove cars, vans, trucks, or motor homes around the 11-mile (18 km) loop road in Cades Cove. The sampling goal was to select a representative sample of typical summer visitors.

Sampling was conducted on 16 days during June, July, and August of 1989. If a particular day or time period had to be missed because of weather, then that day and/or time period was replaced. Interviews were conducted on 8 weekdays and 8 weekend days from 17 June to 30 August 1989. Interviews were not conducted on Fridays since Friday can be considered either a weekday or weekend day.

One occupant in each of 24 vehicles was asked to participate on each sample day. Sampling time periods were in the morning at 0800-1000 hrs, in the afternoon from 1300-1500 hrs, and in the evenings from 1800-2000 hrs EDT. At 15 minute intervals, the first vehicle (excluding motorcyclists) to pass a designated landmark was asked to pull over to a pull-off parking area located approximately 300 m from the exit of the Cades Cove loop road. A participant could be any individual within the vehicle, although the driver or a passenger in the front seat was approached first. A total of 384 occupants participated.

Drivers of vehicles were warned during their approach to the interview site by a orange diamond-shaped sign (1.2m x 1.2m) that stated in black letters: "WILDLIFE SURVEY CREW 600 FT. AHEAD." Placed at the interview site was a smaller sign that stated: "PLEASE PULL OVER" on one side and "PLEASE PROCEED" on the other. Vehicles could then be easily directed to move on by flipping the sign to the

other side after the chosen vehicle was directed from the normal flow of traffic.

Data Collection Procedure

Density Estimates of Wildlife Population

A tally of type and number of animals visually seen from the loop road was determined by the researcher on each sampling day. The researcher began counting animals as she approached the parking lot at the entrance of the Cades Cove loop road. All animals sighted (including those not listed) were recorded on a density estimate sheet (Appendix A). While driving a vehicle at typical visitor speeds (not more than 20mph) along the loop road, the researcher scanned the surrounding area from side to side looking for any animals. The researcher also made three stops at designated observation points (Figure 5) which are commonly used viewing areas. Observations for animals were made for 3-5 minutes; then the researcher continued the drive around the loop. The counting of animals ceased after the researcher reached the interview area approximately 300 m from the end of the loop road.

All density estimates were made by the author and from the same vehicle (4-wheel drive pick-up truck). Density estimates were all performed from 1000-1200 hrs EDT on days in which interviews were given. Additional data collected

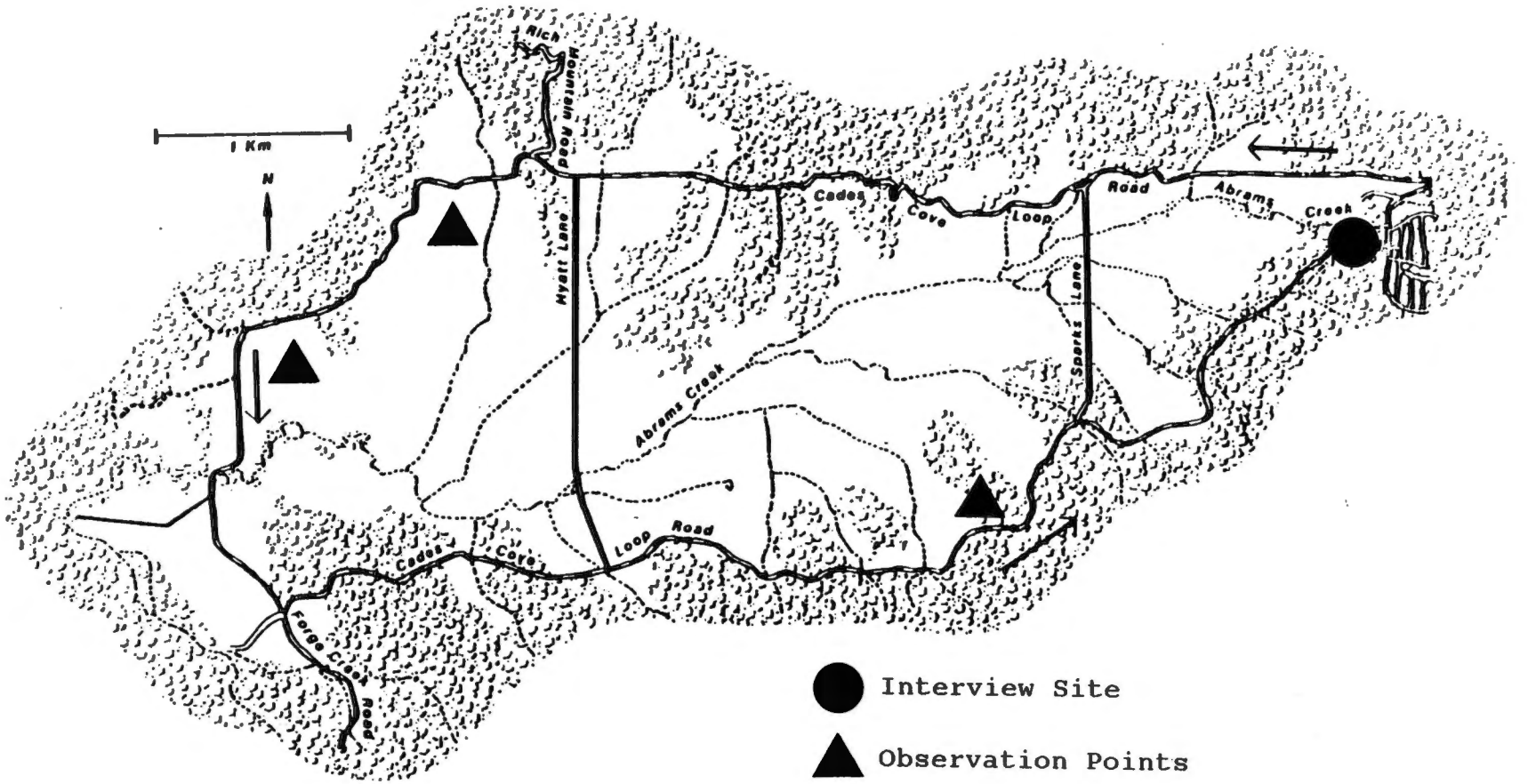


Figure 5. Designated observation points for density estimates of wildlife species visible from Cades Cove loop road in GSMNP, Tennessee and North Carolina (adapted from Hastings 1986).

on each density estimate sheet included the time the count started and ended, the date, the weather, and temperature.

On-site Interview

Interviews were completed only by the author who was always dressed in light colored clothing and wearing a florescent orange vest. When the interviewer approached the selected vehicle, she identified herself, her affiliation with the University of Tennessee, and gave the purpose of the study. Then occupants of the vehicles were asked to answer five questions (Appendix B) and were given a list of 28 different animals (Appendix C) and asked to estimate the number of each listed animal they had seen. Participants were also encouraged to add any animals to the sheet that may not be listed. After completing the list, the occupants were given a mail-back questionnaire and asked to return it within 2 weeks. Participants were also asked if they had any questions about the study and were directed to inquire on the back page of the questionnaire if any questions should arise while completing the questionnaire at home. The interviewer had only three refusals to participate in the survey.

Although most of the writing was completed by only one individual in the vehicle, answers were given by two or more individuals. The entire on-site interview (both questions and list) took approximately 5-7 minutes each. On a few occasions, interviews lasted 2-3 minutes longer if

occupants of the vehicles persisted with questions. The major purpose for asking for the estimation of the number of animals seen before visitors left the Cove loop road was to obtain that information before participants might forget. Other data collected during interviews included date, time, temperature, and name and address of participants.

Mail-back Questionnaire

The 11 page questionnaire (Appendix D) was given to any adult occupant (16 years or older) of the stopped vehicle and was already placed in a self addressed postage-paid envelope. The envelope contained a cover letter (Appendix E) printed on University of Tennessee, Knoxville, stationery that emphasized the importance of completing the questionnaire and thanked the participants for their involvement.

The cover of the questionnaire (25.2 cm x 17.6 cm) was light green and had a photograph of a deer jumping a fence in Cades Cove while visitors watched. The bottom section of the cover had the words, "WILDLIFE STUDY" in large black letters, while the words, "DEPARTMENT OF FORESTRY, WILDLIFE, AND FISHERIES, THE UNIVERSITY OF TENNESSEE 1989" were printed in smaller black letters at the very bottom of the cover.

To satisfy the objectives of the study, the questionnaire was designed to obtain the following

information: (1) visitors' reasons for coming to Cades Cove, (2) visitors' expectations about the number and types of animals seen and the feelings about the number and types of animals they did see, (3) the importance of seeing certain numbers and types of animals, (4) visitors' behavior while engaged in wildlife viewing, and (5) visitor characteristics. The questions were brief and most could be answered with a check mark in the appropriate column or blank.

Two weeks after the participants were given a questionnaire in Cades Cove, persons who had not responded were sent a post card reminder (Appendix F). If participants had not responded by the fourth week, they were sent another survey packet. The packet contained another copy of the questionnaire, self-addressed postage-paid envelope, and cover letter. All reluctant respondents after the sixth week were sent a final postcard reminder (Appendix G). Both post card reminders stressed the importance of returning the completed questionnaire and again thanked visitors for their participation.

Mail Response Rate

The usable questionnaire response rate was 84.6% (Table 1), but seven additional questionnaires had been returned that could not be used because of age (less than 16 years old) or incompleteness. One hundred sixty-two

Table 1. Return rate for the 11-page mail-back questionnaire on wildlife viewing in Cades Cove, GSMNP, 1989.

N Returned Before 1st Reminder	N Returned Before Survey Packet	N Returned Before 2nd Reminder	N Returned After 2nd Reminder
162 (42.2%)	86 (22.4%)	58 (15.1%)	19 (4.9%)

(42.2%) questionnaires were returned before the first postcard reminder. Eighty-six (22.4%) were returned before the survey packets were sent. Fifty-eight (15.1%) were returned before the last postcard reminder and 19 (4.9%) were returned after its mailing.

Data Analysis Procedures

Statistical Packages for the Social Sciences (SPSS) were used in all analyses (Norusis 1988). Pearson's correlation analysis was used for determining relationships between the dependent and independent variables. Stepwise multiple regression analysis was then used to determine the importance of the independent variables in explaining the variance in the quality of wildlife viewing rating. All 35 independent variables were first analyzed by stepwise regression techniques, then later divided into six reduced models.

Tests used for examining statistical differences included Chi-square, Mann-Whitney, and Student's t-test. The significance level was set at $P<0.05$.

Dependent Variable

"On the following scale, please rate the overall quality of your wildlife viewing experience in Cades Cove," was used to investigate visitor satisfaction with their wildlife viewing experience. Participants indicated their

response about the wildlife viewing in Cades Cove along a 9-point scale, where 1= unacceptable to 9=excellent.

Independent Variables

The 35 independent variables were separated into six categories for reduced model analysis. The categories included expectations, feelings, importance, density level, encounters, and kinds of viewing behavior. The expectations category had five variables that dealt with expectations about the number of species seen, the total number of animals seen, and the number of black bears, wild turkeys, and white-tailed deer seen. Visitors were asked if the numbers were less than expected, about what expected, or more than expected. How visitors felt about the appropriateness of the number of species they saw, the total number of animals they saw, and the number of black bears, wild turkeys, and white-tailed deer they saw were variables measured for feelings. Visitors were asked if the number they saw was too few, about right, or too many. Importance variables included how important seeing many different species of wildlife, large numbers of animals, and black bears, white-tailed deer, and wild turkeys were to visitors. Visitors were asked if what they saw were very important, somewhat important, somewhat unimportant, or unimportant to them. Ten variables dealt with numbers of animals including the number of white-tailed deer, black bears, and wild turkeys visitors actually saw. The viewing

behavior variables were measured by asking visitors if they never, seldom, occasionally, or frequently participated in certain activities (i.e., used binoculars) while viewing wildlife in Cades Cove.

CHAPTER V

VISITORS TO CADES COVE

Introduction

In order to make effective management decisions, resource agencies must identify who their clientele are. There have been some participation surveys completed on nonconsumptive wildlife recreationists most of which have data collected on their characteristics. This information could be the key to improving the resource for nonconsumptive use. User characteristics and information that have been identified by this study include various socioeconomic and demographic characteristics, visitors participation in other conservation or wildlife related activities, and reasons for visiting the area.

Also important to human management in wildlife-related environments is an understanding of how humans perceive wildlife in today's society (Norris 1978). Often, attitudes in relation to animals are directly related to some significant event in history. For instance, during World War I, livestock production was the most frequent animal related activity and accounted for most animal citations in literature (Kellert and Westervelt 1982). Utilitarian views were most common. In a similar more recent study (McGeachy 1989), wildlife conservation as an

issue has taken a significant lead in Americans' literature and minds.

In 1974, a quantitative scale for evaluating basic human attitudes toward wildlife was developed (Kellert 1974). A revised system of Kellert's was used in this study which consisted of the following 10 attitude orientations or categories:

Aesthetic: Primary interest in the physical attraction of animals.

Dominionistic: Primary interest in the mastery and control of animals.

Ecologistic: Primary concern for ecological characteristics of wildlife and natural habitats.

Humanistic: Primary interest in strong affection for individual animals.

Moralistic: Primary concern for rights and wrong treatment of animals.

Naturalistic: Primary interest in direct contact with wildlife in nondisturbed, natural settings.

Negativistic: Primary interest in avoiding animals.

Scientistic: Primary interest in biological and physical characteristics of animals.

Utilitarian (consumption): Primary interest in practical value of animals.

Utilitarian (habitat): Primary interest in practical value of animal habitat.

In a study conducted by Kellert and Berry (1980), humanistic, moralistic, utilitarian, and negativistic were the most prevalent attitudes held by Americans.

Methods

Visitor characteristic data were provided by the on-site interview and the 11-page mail-back questionnaire. The on-site interview contained questions concerning the number and ages of persons in the vehicle, the type of group in the vehicle, and the name and address of the person being interviewed. The 11-page questionnaire provided the remaining information. Frequencies were calculated for each category of information. The 11-page mail-back questionnaire also included a section on animal attitudes. Participants were asked to respond to 60 attitude items provided by Kellert. The attitude items were rated on a 5-point scale: 5=strongly agree, 4=moderately agree, 3=no opinion, 2=moderately disagree, and 1=strongly disagree. Some items were rated in the opposite direction due to their negative orientation. Scores were computed by adding all of the values of rated items that represented a specific attitude category for each individual.

Also, Student's t-test, Mann-Whitney, and Chi-square analyses were conducted to determine if there were any differences in some visitor characteristics and wildlife attitude scores for first-time as opposed to respondents who had previously visited the Cove.

Results and Discussion

Socioeconomic/Demographic Characteristics

The sex of questionnaire respondents was slightly skewed toward males (55%). The mean age of respondents was 41.5 years old. Table 2 indicates over half of the respondents were 30-49 years old with only a few individuals (19.7%) being less than 30 years old. Many of the respondents (33.7%) had graduated from high school. However, more respondents (43.2%) had some college. Many respondents were unemployed (housewives, students, and retirees) and many were either professionals or managers (33.5%). The mean annual household incomes reported by respondents was $35,000.

Residential Characteristics

Although most of the participants were from Tennessee (Table 3), 27 other states were also represented. Other countries that participated included Canada, Germany, and Bermuda. Many different home towns (289) were also listed

Table 2. Socioeconomic characteristics of questionnaire respondents in Cades Cove, GSMNP, 1989.

Socioeconomic/Demographic Characteristics	Number of Respondents	Percent of Respondents
AGE		
< 20	4	1.2
20-29	60	18.5
30-39	91	28.1
40-49	85	26.2
50+	84	26.0
TOTAL	324	100.0
SEX		
Male	179	55.2
Female	145	44.8
TOTAL	324	100.0
EDUCATION		
< High school	36	11.2
High school	108	33.7
Technical or vocational school	39	12.1
Some college	68	21.2
Completed college	35	10.9
Graduate work or degree	35	10.9
TOTAL	321	100.0
OCCUPATION		
Professionals	69	21.6
Managers (except farm)	38	11.9
Clerical and sales	24	7.5
Craftsmen	19	6.0
Operatives	19	6.0
Service Workers	27	8.5
Laborers, including farmer	37	11.6
Unemployed (housewives, students, retirees)	79	24.8
Self employed	7	2.1
TOTAL	319	100.0
ANNUAL HOUSEHOLD INCOME		
< 9,999	10	3.5
10,000 to 19,999	49	17.0
20,000 to 29,999	65	22.6
30,000 to 39,999	55	19.1
40,000 to 49,999	43	14.9
50,000 to 69,999	46	16.0
70,000 to 99,999	13	4.5
100,000+	7	2.4
TOTAL	288	100.0

Table 3. Residential characteristics of questionnaire respondents in Cades Cove, GSMNP, 1989.

Residential Characteristics	Number of Respondents	Percent of Respondents
HOME STATE		
Tennessee	139	36.3
North Carolina	37	9.7
Georgia	36	9.4
Alabama	26	6.8
Florida	26	6.8
Ohio	24	6.3
Kentucky	15	3.9
Indiana	13	3.4
Mississippi	9	2.3
Michigan	9	2.3
Other States	46	12.0
Other Countries	3	.8
TOTAL	383	100.0
HOME TOWN		
Knoxville, TN	14	3.7
Maryville, TN	12	3.1
Louisville, KY	6	1.6
Sevierville, TN	5	1.3
Cleveland, OH	4	1.0
Lenoir City, TN	4	1.0
Greenville, NC	4	1.0
Walland, TN	4	1.0
Decatur, AL	4	1.0
Other	326	85.3
TOTAL	383	100.0

on interviews with Knoxville and Maryville, Tennessee being the two most commonly mentioned. Many of the participants (46.1%) indicated that the area where they grew up was rural (Table 4).

Family Characteristics

The average size of family of questionnaire respondents was three. Most of the families had less than five members (Table 5). Ages of family members were relatively evenly distributed. Most of the groups participating in the interviews were families (Table 6). The most common number of occupants in vehicles stopped for interviews was two (Table 7). However, over half of the vehicles (52.9%) had three, four, and five occupants.

Wildlife Associated Activities Participation

Questionnaire respondents indicated that they participated at other times in other wildlife associated recreation and activities (Table 8). Wildlife viewing, nature walks, wildlife photography, and bird feeding were activities most participated in by respondents. However, few of them indicated a conservation club or organization affiliation (Table 9). More respondents (Table 10) said they had subscriptions to conservation or wildlife related publications or literature.

Table 4. Size of residential area where Cades Cove visitors grew up, GSMNP, 1989.

Residential Area Size	Number of Respondents	Percent of Respondents
Large metropolitan area 1,000,000+ people	15	4.7
Metropolitan area 100,000 to 1,000,000 people	28	8.7
City 10,000 to 99,999 people	57	17.8
Small town < 10,000 people	73	22.7
Rural; non-farm	39	12.1
Rural; farm	109	34.0
Total	288	100.0

Table 5. Size of family of visitors in Cades Cove, GSMNP, 1989.

Family Size	n	%
Number In Family (not including respondent)		
1	74	23.3
2	62	19.6
3	90	28.4
4	48	15.1
5	22	6.9
6	12	3.8
7+	9	3.0
TOTAL	317	100.0
AGES OF FAMILY MEMBERS		
< 5	55	6.5
5-10	80	9.4
10-15	115	13.6
15-20	82	9.7
20-29	172	20.4
30-39	129	15.3
40-49	113	13.4
50+	99	11.7
TOTAL	845	100.0

Table 6. Group types of visitors to Cades Cove, GSMNP, 1989.

Group Type	Number of Respondents	Percent of Respondents
Alone	14	3.6
Family	297	77.3
Friends	23	6.0
Both family and friends	49	12.8
Organized group	1	.3
TOTAL	384	100.0

Table 7. Number and ages of persons in vehicles stopped for interviews in Cades Cove, GSMNP, 1989.

Number and Ages	n	%
NUMBER OF PERSONS IN VEHICLE (including driver)		
1	15	3.9
2	119	31.0
3	68	17.7
4	82	21.4
5	53	13.8
6	27	7.0
7+	20	5.2
TOTAL	384	100.0
AGES OF PERSONS IN VEHICLE		
< 5	70	5.1
5-9	137	10.0
10-14	150	10.9
15-19	70	5.1
20-29	174	12.6
30-39	243	17.7
40-49	228	16.5
50+	304	22.1
TOTAL	1376	100.0

Table 8. Participation habits of Cades Cove visitors in other wildlife associated activities, GSMNP, 1989.

			Frequencies			
Activity	N	Mean*	N**	R	S	F
Wildlife viewing	323	3.51	0.3	4.0	40.2	55.4
Nature walks	322	3.11	3.4	11.5	55.9	29.2
Photography	318	3.07	6.9	13.2	46.2	33.6
Bird Feeding	320	3.01	7.8	16.9	42.2	33.1
Fishing	319	2.82	14.4	20.4	34.8	30.4
Birdwatching	321	2.63	17.1	24.0	37.4	21.5
Zoo visits	322	2.57	5.0	40.1	47.5	7.5
Hunting	324	2.22	46.0	10.5	19.1	24.4

* Means based on a 4-point rating scale, where 1=never to 4=frequently participates.

** N=Never, R=Rarely, S=Sometimes, F=Frequently.

Table 9. Conservation organization or club affiliation characteristics of Cades Cove visitors, GSMNP, 1989.

Membership Status	Number of Respondents	Percent of Respondents
Yes	55	17.2
No	264	82.8
Total	319	100.0

Table 10. Subscriptions to wildlife or conservation related publications of Cades Cove visitors, GSMNP, 1989.

Subscribing Status	Number of Respondents	Percent of Respondents
Yes	110	34.8
No	206	65.2
Total	316	100.0

Visitation Patterns

Most of the questionnaire respondents had visited Cades Cove before (Table 11) with (68.9%) who had made at least two previous trips to Cades Cove. Table 12 indicates that the largest percentage of visitors (34.2%) had between 2-5 lifetime visits.

Visitation Reasons

The most common reasons (Table 13) indicated by respondents for visiting Cades Cove were to see big game animals, any wildlife, mountains and trees, and cabins and old structures. When given the opportunity to write their own reasons, the answers were very similar. When asked to give the reason for the specific visit during the interview, the top three answers were to see wildlife and scenery, any wildlife, and black bears and white-tailed deer (Table 14). Although wildlife and scenery combined remained the top reason for many return visits, beauty, tranquility, and peacefulness of the area combined were given as the second most popular answer.

Attitude Categories

When testing the entire sample, respondents basically agreed with questions concerned with aesthetic, humanistic, moralistic, and ecologistic attitudes (Table 15). Higher mean scores were expected in these categories because most of the respondents primarily visit the Cove to view

Table 11. The number of first time visitors to Cades Cove, GSMNP, 1989.

Visiting Status	Number of Respondents	Percent of Respondents
Yes	83	25.7
No	240	74.3
Total	323	100.0

Table 12. Visitation frequency of Cades Cove visitors, GSMNP, 1989.

Visitation Frequency	Number of Respondents	Percent of Respondents
NUMBER OF VISITS LAST YEAR (1988)		
1	61	31.1
2-5	87	44.4
6-10	23	11.7
> 10	25	12.8
TOTAL	196	100.0
NUMBER OF LIFETIME VISITS		
1	3	1.3
2-5	78	34.2
6-9	27	11.8
10-24	54	23.7
25-49	18	7.9
50-100	32	14.1
> 100	16	7.0
TOTAL	228	100.0

Table 13. Visitation reasons of visitors in Cades Cove, GSMNP, 1989.

Reason	N	Mean*	Frequencies				
			SA**	A	U	D	SD
To see big game animals	316	1.54	75.0	20.6	1.3	2.8	0.3
To see any wildlife	318	1.60	60.7	35.8	2.2	1.3	0.0
To see mountains and trees	316	1.78	51.3	44.3	1.3	2.5	0.6
To see cabins and old structures	308	2.42	29.5	51.0	7.8	7.5	4.2
To see specific plants	294	3.22	15.7	40.8	14.6	24.8	4.1
Just for the drive	296	3.41	10.1	44.9	5.1	28.4	11.5
To camp or hike in Cades Cove	287	3.85	16.7	18.8	12.9	31.0	20.6
Just driving, no purpose	279	4.88	2.5	7.5	5.0	37.3	47.7

* Means based on a 5-point scale, where 1=strongly agree to 5=strongly disagree.

** SA=Strongly agree, A=Agree, U=Undecided, D=Disagree, SD=Strongly disagree.

Table 14. Main reasons of respondents for specific visit during interview to Cades Cove, GSMNP, 1989.

Main Reasons	Number of Respondents	Percent of Respondents
REASON FOR THIS VISIT		
Wildlife and scenery	32	21.3
See any wildlife	17	11.3
See bear or deer	16	10.7
See historical structures	10	6.7
Beauty, tranquility, peacefulness	10	6.7
Vacation	9	6.0
Recommended	7	4.7
See mountains and trees	6	4.0
Photography	6	4.0
To take relatives or friends	6	4.0
Other	30	20.0
TOTAL	150	100.0
REASON FOR MANY RETURN VISITS		
See wildlife and scenery	58	33.1
Beauty, tranquility, peacefulness	29	16.5
See any wildlife	26	14.9
See bear or deer	13	7.4
Relaxation or enjoyment	9	5.1
Love for the area	8	4.6
Photography	5	2.9
To take relatives or friends	4	2.3
Other	18	10.3
TOTAL	175	100.0

Table 15. Mean scores for attitude categories.

Categories	Mean*	Standard Deviation
Aesthetic	3.85	.53
Humanistic	3.63	.96
Moralistic	3.57	.75
Ecologistic	3.51	.75
Naturalistic	3.39	.89
Scientistic	3.09	.64
Negativistic	2.71	.81
Dominionistic	2.67	.78
Utilitarian (consumptive)	2.52	.74
Utilitarian (habitat)	2.10	.85

* 5-point scale, where 5=strongly agree, 4=moderately agree, 3=no opinion, 2=moderately disagree, 1=strongly disagree.

wildlife. Visitors are interested in the physical attractiveness of animals, have strong affection for specific animals, and are concerned about the treatment of animals. Respondents were undecisive on items concerned with naturalistic attitudes. Respondents basically had no opinion on questions concerned with dominionistic, scientistic, and negativistic attitudes. Respondents were undecided as to whether they had no opinion or moderately disagreed with items concerning utilitarian (consumptive) attitudes. These results reflect the respondents lack of interest and knowledge of scientific information concerning animals and that many members of this group are not hunters. Respondents generally disagreed with questions related to using wildlife habitat for other purposes. This again reflects an expected attitude that these respondents enjoy seeing wildlife in a natural setting.

Visitor Differences

Significant differences were not observed in sex, family size, education, income, or size of area where respondents grew up for first-time visitors as opposed to persons who had previously visited the Cove. Also, significant differences were not observed for wildlife attitudes scores. The two populations appeared homogeneous except that respondents who had previous visits to the Cove were slightly older (43 as oppose to 38).

Summary

Most respondents (54.3%) were 30-49 years old. However, only persons over the age of 16 were considered valid respondents. There were slightly more males than female respondents. Most of the respondents had education beyond high school and had annual household incomes above $30,000.

The majority of visitors were from Tennessee. The remaining number of visitors was mostly from the southeastern states. The two most frequently reported towns were Knoxville and Maryville, Tennessee. Almost half of the respondents indicated that the area where they grew up was an area with a population of less than 10,000.

Most of the groups that participated were families that contained less than four members of various ages. The majority of the vehicles chosen for participation contained less than five occupants.

Most of the visitors had at least one previous trip to Cades Cove. Many of the visitors had more than five previous visits in the last year. Most of the previous visit participants had at least ten life-time visits.

Visitor had many different reasons for coming to Cades Cove; however, seeing wildlife was the primary reason agreed upon the most. Respondents wrote that wildlife and the scenery were the main reasons for that day's trip and for their many return visits.

Respondents indicated they sometimes participated in other wildlife related activities such as wildlife photography and nature walks. Approximately 17% of participants were members of conservation clubs or organizations and 34.8% subscribed to conservation or wildlife related publications.

Respondents did not express strong attitude orientation for any of the wildlife attitudes categories. Mean response scores were higher in the attitude categories expected: aesthetic, ecologistic, humanistic, moralistic, and naturalistic. Respondents basically disagreed with items concerned with the practical use of wildlife habitat.

Differences were not observed in attitude scores. There were also no significant differences observed in various socioeconomic and demographic characteristics for first-time as opposed to previous visit participants with the exception of age.

CHAPTER VI

DESCRIPTIONS OF MODEL DETERMINANTS OF QUALITY OF WILDLIFE VIEWING

Introduction

In many recreational settings, use level or the number of people entering an area during a specific period of time is relatively easy to measure. Use levels are usually obtained by permit systems, mechanical counts, or some other regulatory management process. For this study, however, use level (the number of animals using the area and available for viewing) was estimated by a different method in which the researcher had to drive the road loop, starting and stopping, and scanning the area from side to side just as visitors actually did.

In past research, encounters have been measured by three different techniques: (1) trained observer accompanying groups, (2) asking visitors to report or estimate the number of people seen after the activity, and (3) diaries completed by visitors (Shelby and Colvin 1982). In this study, to determine the number of animals encountered, visitors were asked to recall at completion of their auto-tour the number of animals they observed while driving the defined area.

Expectations and feelings about the number and types of animals to be viewed are both psychological dimensions that exist in the minds of individual visitors which are usually measured by survey or questionnaire (Shelby and Heberlein 1986). For this study, expectations and feelings were measured by simply asking visitors (in questionnaire form) what they expected and how they felt about what they saw. Two questions were asked. For example, "were the number of deer you saw less than expected, about what expected, or more than expected?" and "did you feel the number of deer you saw were too few, about right, or too many?"

As stated by Hastings (1986), perceptions affect behavior toward animals. For example, certain human perceptions and behaviors toward wildlife can enhance the probability and quality of wildlife viewing opportunities. Stopping the car for a longer view, use of binoculars or spotting scopes for a closer view, and even the use of photography for a lasting view, are all human behaviors that might influence the quality of wildlife viewing as a recreational experience. Visitors were asked how often they engaged in specific behaviors while observing wildlife in Cades Cove.

How important seeing a specific type or number of animals is to visitors is another psychological variable. Therefore, it was also measured by self-report method. How

important a particular species or type of animal is to a visitor is believed to add to or detract from that individuals experience. Consequently, if seeing white-tailed deer is not an important aspect of a visitors tour through Cades Cove, then the number of white-tailed deer available for viewing, the number actually seen, and expectations and feelings concerning white-tailed deer may be poor predictors of the quality of that experience.

Methods

Visitor wildlife encounter data were obtained during the on-site interview in which participants were given a list of animals and asked to estimate the number seen for each type of animal. Density level of animals was provided by density estimate sheets completed by the researcher. Frequencies and means were calculated for each type of animal, the number of different types of animals, and the total number of animals seen by both the researcher and visitors.

Expectations and feelings were categorical variables measured on a 3-point basis as already described. Frequencies for ten specific viewing behaviors engaged in while touring Cades Cove were obtained by a 4-point rating scale. Importance for type and number of animals was determined by means of a 5-point importance rating scale. See the questionnaire in Appendix D for additional details.

Results and Discussion

Encounters

Animals that were reported most often seen by visitors included white-tailed deer, crows, groundhogs, and black bears (Appendix H). Over 370 persons (97.6%) reported seeing at least one white-tailed deer. Crows were reported by 294 persons (77.0%). Over 193 (50.6%) people reported seeing black bears and 212 (55.3%) saw groundhogs. Only one animal presented on the list, otter, was not reported by any visitors. Visitors also reported 16 animals that were not listed. They included six mammals, two fish, seven insects, and spiders. These additional animals included minnows, crawfish, dragonflies, beetles and millipedes as the most frequently reported. The mean number of each type of animal seen by visitors is indicated in Table 16. Most visitors (62.4%) saw less than 40 total animals (Table 17). The majority of visitors (62.2%) also saw five to nine different species or types of animals (Table 18).

Density Level

Animals that were most commonly seen by the researcher during density counts were white-tailed deer, crows, birds, and butterflies (Appendix I). Dragonflies were added to the list during the study, and were seen during 18 of the 23 density estimate counts. Animals on the survey sheet

Table 16. Mean number of animals, by type, most frequently seen by visitors to Cades Cove, GSMNP, 1989.

Animal Type	Mean	Standard Deviation
Deer	22.24	32.69
Crow	7.89	11.21
Butterflies	4.51	10.34
Other Birds	2.81	9.54
Groundhog	2.01	3.88
Squirrel	1.11	2.00
Bear	0.85	1.26
Skunk	0.58	2.05
Trout	0.39	5.23
Frog	0.28	5.10

Table 17. Total number of animals reported seen by visitors in Cades Cove, GSMNP, 1989.

Numerical Categories	Number of Respondents	Percent of Respondents
0	1	.3
1-9	47	12.3
10-19	68	17.8
20-29	71	18.6
30-39	51	13.4
40-49	33	8.6
50-69	39	10.2
70-99	33	8.6
100-200	34	8.9
200+	5	1.3
Total	383	100.0

Table 18. Number of species or types of animals reported by visitors in Cades Cove, GSMNP, 1989.

Number of Types	Number of Respondents	Percent of Respondents
0	1	.3
1-4	130	33.9
5-9	239	62.2
10+	14	3.6
Total	384	100.0

but not seen by the researcher included wild turkeys, trout, rabbits, frogs, otters, poisonous and nonpoisonous snakes, ducks, and salamanders. Animals seen only on one occasion were lizards, chipmunks, hawks, and turtles. The mean number of animal types seen by the researcher is indicated in Table 19. The researcher saw more than 59 total animals during most density estimate counts (Table 20). Six or seven different animal types were observed nearly a third of the time by the researcher (Table 21).

Expectations and Feelings

Tables 22 and 23 indicate the mean responses of visitors to questions concerned with feelings and expectations. Participants reported seeing almost as many different kinds of animals as they expected and seemed indecisive as to whether they felt there were too few or about right. The same was expressed in the mean responses for expectations and feelings concerned with the total number of animals seen. Participants reported seeing as many white-tailed deer as they expected and felt that the number they saw was about right. They also reported seeing the number of black bears they expected but were closer to feeling that the number they saw was too few. Participants expressed that the number of wild turkeys they saw was less than expected and felt that there were too few.

Table 19. Mean number of animals most frequently seen by researcher in Cades Cove, GSMNP, 1989.

Animal Type	Mean	Standard Deviation
Butterflies	27.33	11.81
Crow	13.13	7.05
Deer	7.61	5.87
Other Birds	6.37	5.65
Vulture	2.40	4.15
Groundhog	2.39	1.73
Dragonflies	1.77	1.42
Squirrel	0.33	0.59
Woodpecker	0.23	0.55
Bear	0.21	0.41

Table 20. Total number of animals reported by researcher during density estimates in Cades Cove, GSMNP, 1989.

Number Reported	Number of Times Seen	Percent of Times Seen
20-29	3	13.0
40-59	6	26.2
60-79	11	47.8
80+	3	13.0
Total	23	100.0

Table 21. Number of species or types of animals reported by researcher during density estimates in Cades Cove, GSMNP, 1989.

Number of Species or Types	Number of Times Seen	Percent of Times Seen
5	3	13.0
6	7	30.4
7	7	30.4
8	4	17.5
9	2	8.7
Total	23	100.0

Table 22. Expectations of visitors to Cades Cove toward the type and number of animals seen, GSMNP, 1989.

Expectations About	Mean*
The number of turkey seen	1.24
The total number of animals to be seen	1.90
Seeing different kinds of wildlife	1.91
The number of bear seen	1.97
The number of deer seen	2.04

* 3-Point Scale: 1=less than I expected, 2=about what I expected, 3=more than I expected.

Table 23. Feelings of visitors to Cades Cove toward the type and number of animals seen, GSMNP, 1989.

Feelings About	Mean*
The number of turkey seen	1.09
The number of bear seen	1.46
The different kinds of animals seen	1.54
The total number of animals seen	1.56
The number of deer seen	1.74

* 3-Point Scale: 1=too few, 2=about right, 3=too many.

Importance of Numbers and Types of Animals

The mean responses of participants on questions concerning how important seeing specific types or numbers of animals were to them are found in Table 24. Participants believed that seeing many different kinds of wildlife, large numbers of animals, and white-tailed deer, black bears, and wild turkeys was all at least somewhat important to their viewing experience. However, seeing different kinds of wildlife and bears was most important to visitors.

Wildlife Viewing Behaviors

Mean responses to questions concerned with participation in certain wildlife viewing behaviors are indicated in Table 25. Participants indicated that they almost never feed animals, used field guides to identify animals, sketched or painted wildlife, or attended interpretive wildlife programs. However, they indicated at least sometimes using binoculars or a telescope to view animals. Participants also expressed occasional participation in photographing wildlife, getting out of their vehicles to view wildlife, and reading park service materials on wildlife. Participants indicated that they frequently stopped the car to observe wildlife, a behavior that is encouraged by a written tour guide furnished by the National Park Service.

Table 24. The importance of specific kinds and numbers of animals to visitors in Cades Cove, GSMNP, 1989.

Importance Of	Mean*
Seeing many different kinds of wildlife	1.33
Seeing bear	1.39
Seeing deer	1.43
Seeing turkey	1.75
Seeing a large number of animals	1.76

* 5-Point Scale: 1=very important, 5=unimportant.

Table 25. Behavioral responses to wildlife suggested by visitors in Cades Cove, GSMNP, 1989.

Responses	N	Mean*	N**	S	O	F
Stop vehicle to observe	325	3.72	0.6	2.5	20.9	76.0
Photograph wildlife	323	3.30	9.6	5.6	30.3	54.5
Get out of vehicle	322	3.07	10.2	10.3	41.3	38.2
Read materials on wildlife	321	2.80	19.6	10.0	41.4	29.0
Walk toward wildlife	321	2.37	28.3	26.2	25.2	20.3
Use binoculars or telescope	319	2.36	43.3	7.2	19.7	29.8
Attend any programs	316	1.48	72.4	10.8	12.7	4.1
Use a field guide	320	1.21	86.2	9.1	2.5	2.2
Feed any wildlife	319	1.10	93.4	4.1	1.9	0.6
Sketch or paint wildlife	319	1.03	97.5	1.9	0.6	0.0

* Means based on a 4-point rating scale, where 1=never to 4=frequently.

** N=Never, S=Seldom, O=Occasionally, F=Frequently.

Special Problems

Although there was some agreement between researcher and visitor estimates, some major differences did surface. Both researcher and visitors reported white-tailed deer, crows, and groundhogs as commonly viewed animals, but black bears were reported many more times by visitors as compared to only a few occasions by the researcher. There was also a notable difference between total animals reported by visitors as opposed to the researcher. Many visitors reported seeing less than 30 total animals while the researcher reported at least 60 animals on most density estimate counts.

There are two explanations for these differences noted between viewer and researcher estimates. First, viewers tend to look for specific (preferred) animals such as black bears or white-tailed deer, while ignoring smaller or less important animals such as squirrels or small birds. The researcher had a specific purpose or function of estimating the population potentially available to visitors. On the other hand, a visitor's tour of the loop was multipurpose, less focused on the specific purpose of counting wildlife. Therefore, the researcher estimate of animals observed should be larger than visitors' estimates. An excellent example is the butterfly. The researcher rarely counted less than 20 per density estimate count while over half of viewers did not even report seeing butterflies. This also

explains differences in the total number of reported animals. The second explanation for these differences lies in time of day. Viewers were estimating numbers from all times of the day while the researcher conducted density estimates only between 1000 and 1200 hrs EDT. Animals such as black bears are much more visible during the early morning and late afternoon hours, and less likely to be seen after 0900 hrs EDT in the morning or before 1700 hrs EDT in the afternoon.

Summary

White-tailed deer, crows, and groundhogs were animals mostly commonly sighted by both the researcher and visitors. However, black bears were commonly sighted by visitors and not by researcher and birds and butterflies were commonly reported by the researcher but not by the visitor. Because of the time of the day many animals such as black bears were not reported in high numbers by the researcher and many types of animals were not reported at all.

The researcher and visitor estimates of the type of animals that were seen somewhat agreed while the total number of animals seen did not. The visitors reported seeing between 5-9 species or types of animals. The researcher most commonly reported seeing six or seven species or types of animals. Most visitors reported seeing

less than 40 animals while the researcher rarely reported under 60 total animals.

Participants expressed that the number of different kinds of animals, the total number of animals, and the number of white-tailed deer and black bears they saw were about what they expected. Only the numbers of wild turkeys seen were fewer than expected. When asked how they felt about the number of types, total number of animals, and the number of black bears, white-tailed deer, and wild turkeys seen, respondents indicated that they usually felt the numbers they saw were too few, especially black bears and wild turkeys. Participants also expressed that the number of different kinds of animals seen, the total number of animals seen, and the number of white-tailed deer, black bears, and wild turkeys seen were all at least somewhat important. Only one behavior, stopping the car to view wildlife (which is encouraged by written tour guide), was reported frequently participated in by Cades Cove visitors.

CHAPTER VII

QUALITY OF WILDLIFE VIEWING MODEL

Introduction

Important to the management of any wildland recreation area is the production of high quality recreational experiences. In previous research (Hastings 1986), wildlife has been shown an important attractant for visitors to Cades Cove. Therefore, improving the quality of nonconsumptive wildlife recreation will be important to the managing agency. The problem, however, is determining what constitutes quality in wildlife viewing. What factors best predict and are most important to the quality of wildlife viewing in Cades Cove?

Hammitt (personal communication) has suggested a model, adapted from recreation satisfaction models (Shelby and Heberlein 1986), for determining factors that might be important for predicting quality of wildlife viewing experiences. The proposed model involves both situational variables (i.e., animal density and visual encounters) and psychological variables (i.e., expectations and feelings). Many social carrying capacity studies (Manning 1986) have investigated the relationship between use level (the number of people available for contact in any recreational setting) and satisfying recreational experiences. Although

there have been inconsistencies in how higher densities of recreationists affect the quality of specific kinds of recreation, the theory proposed that higher densities of wildlife will positively affect wildlife viewing experiences.

In addition to actual animal densities as reported by the researcher and animal encounters as reported by the visitor, the quality of wildlife viewing can also be influenced by expectations and feelings about the number of animals viewed by the visitor. How satisfied a visitor is with the experience is directly related to what they expect before their arrival. The quality of a visitor's experience in Cades Cove may be significantly lower for those who expect to see black bears but do not. Likewise, visitors who feel that the number of white-tailed deer they see is too few are inclined to have lower quality experiences. However, the effect that animal density, encounters, expectations, and feelings have on the quality of wildlife viewing may be diminished if seeing large number of animals or specific species is unimportant to the visitor.

Methods

Data used for these analyses comes from three sources: density estimates, on-site interviews, and the mail-back questionnaires. The density estimates provided data

concerning the actual number of animals available for viewing. The on-site interviews recorded the number of animals visitors saw. Information concerning visitors' expectations, feelings, importance of numbers and species, and viewing behavior was recorded on mail-back questionnaires.

Responses to questions were evaluated in different ways. Density level was recorded as the number of animals seen by the researcher. Actual number of animals seen by the visitors was recorded on a list of animals provided during the on-site interview. Expectations about the number of kinds of animals, the total number of animals, and the number of white-tailed deer, black bears, and wild turkeys to be seen were rated as less than expected, about what expected, and more than expected. Feelings about the number of different kinds of animals, the total number of animals, and the number of white-tailed deer, black bears, and wild turkeys seen were rated as too few, about right, or too many. Variables concerning the importance of seeing many different kinds of animals, large numbers of animals, or white-tailed deer, black bears, and wild turkeys were rated on a 5-point scale of very important, somewhat important, undecided, somewhat unimportant, or unimportant. Respondents indicated their participation in various viewing behaviors as being one of the following categories: never, seldom, occasionally, or frequently. The dependent

variable in the model, quality of wildlife viewing, was evaluated by asking the following question: on the following scale, please rate the over all quality of your wildlife viewing experience in Cades Cove. Please restrict your rating to the quality of wildlife viewing in Cades Cove, not to any other aspect of your trip to the Great Smoky Mountains National Park. Quality was then rated on a 9-point scale from 1 (unacceptable) to 9 (excellent).

Pearson's correlation analysis was used to determine the relationship between the wildlife model variables. Further analysis involved multiple regression techniques to determine the amount of variance explained in the quality rating by density estimates, visual encounters, expectations and feelings about the number of animals or types of animals available for viewing, the importance of numbers and types of animals viewed, and viewing behavior. Analysis was performed on first-time visitors and previous visitors separately.

Results and Discussion

First-time Visitors' Model

Table 26 examines the relationship between the quality rating and each of the independent variables for first-time visitors. Pearson's zero-order correlations are presented along with standardized regression coefficients. All of the independent variables were positively correlated with

Table 26. The effects of expectations, feelings, importance of numbers and types, numbers of animals, and viewing behavior on quality of wildlife viewing rating for first-time visitors, GSMNP, 1989.

	Dependent Variable: Quality Rating		
		Standardized Coefficients	
Independent Variables	Zero-Order Correlation	Reduced Model	Entire Model
EXPECTATIONS			
Different kinds	44[a]	ns	ns
Total number seen	.52[a]	.52[a]	ns
Deer	.27	ns	ns
Bear	.43[a]	ns	ns
Turkey	.17	ns	ns
R^2 EXPECTATIONS MODEL		.28	
FEELINGS			
Different kinds	.57[a]	ns	ns
Total number seen	.64[a]	.52[a]	.58[a]
Deer	.23	ns	ns
Bear	.45[a]	.24[b]	ns
Turkey	.32[a]	ns	ns
R^2 FEELINGS MODEL		.43	
IMPORTANCE			
Different kinds	.07	ns	ns
Total number seen	.02	ns	ns
Deer	-.17	ns	ns
Bear	.03	ns	ns
Turkey	.10	ns	ns
R^2 IMPORTANCE MODEL		--[c]	
DENSITY LEVEL			
Number of kinds	.20	.24[b]	ns
Total number seen	.15	ns	ns
Number of bear seen	.15	ns	ns
Number of deer seen	.05	ns	ns
Number of turkey seen	.00	ns	ns
R^2 DENSITY LEVEL MODEL		.06	

Table 26 (continued)

Independent Variables	Dependent Variable: Quality Rating Standardized Coefficients Zero-Order Correlation	Reduced Model	Entire Model
ENCOUNTERS			
Number of kinds	.01	ns	ns
Total number seen	.09	ns	ns
Number of bear seen	.20	ns	ns
Number of deer seen	.19	ns	ns
Number of turkey seen	.20	ns	ns
R^2 ENCOUNTERS MODEL		--	
VIEWING BEHAVIOR			
Stop the car to observe wildlife	.23	ns	ns
Get out of the car for a better view	.20	ns	ns
Walk toward wildlife for a better look	.28	.23[b]	ns
Feed any animals	.18	ns	ns
Photograph any wildlife	.40[a]	ns	.27[a]
Use binoculars or telescope	.18	ns	.25[a]
Use a field guide to identify animals	.15	ns	ns
Sketch or paint any wildlife	.00	ns	ns
Read any materials furnished by NPS	.01	ns	ns
Attend a wildlife program	-.07	ns	ns
R^2 VIEWING BEHAVIOR MODEL		.05	
R^2 ENTIRE MODEL			.52

[a]$p<.01$.

[b]$p<.05$.

[c]--all predictors failed to meet entry requirements (i.e. probability of F-to-enter <0.05), thus the model did not significantly explain variation in the quality of wildlife viewing.

the quality rating except for the importance of seeing white-tailed deer variable and attending wildlife programs variable. These findings suggest that seeing white-tailed deer and attending interpretive programs are not related to the quality of their wildlife viewing experience. However, neither of these correlations was positive nor significant.

There were five items that related to expectations and five items that related to feelings toward wildlife viewing. Expectations and feelings about the number of different species or kinds of animals, total number of animals, and the number of black bears seen were significantly related to quality experiences. Also the feelings variable concerned with the number of wild turkeys seen was significant. Feelings about the total number of animals seen were the most highly correlated with the quality rating (r=.64) indicating that visitors' feelings about the appropriate number of animals seen are strongly correlated with the quality of a wildlife viewing experience.

Variables concerning the actual number of animals seen by visitors (visual encounters) or the researcher (density level) were not significant. This suggests that the actual number of animals, whether a large number or specific species (black bear, white-tailed deer, or wild turkey), is not significantly correlated to the quality of wildlife viewing in Cades Cove. This is not consistent with

previous consumptive wildlife recreation research (Vaske et al. 1986) in which seeing the game within shooting range improved hunting trip satisfaction.

Only one variable concerning visitor behavior, photographing wildlife, was significantly correlated to the quality of wildlife viewing in Cades Cove. Apparently, taking photographs or video tapes of wildlife is related to the quality of viewing experiences for first-time visitors.

Determining the relative importance of these independent variables in explaining the variance in the quality of wildlife viewing in Cades Cove was examined through seven regression analyses. Six separate equations were fitted for each set of expectations, feelings, importance, density level, encounters, and viewing behavior predictors. A final model included all of the independent variables simultaneously. In all cases, the quality rating was the dependent variable.

The model including only expectation predictors revealed only one variable, expectations about the total number of animals seen, had a significant effect on the quality of wildlife viewing. This variable explained 28% of the variance in quality of wildlife viewing. These results indicate that visitors had formed specific expectations about the number of animals they wanted to see.

Visitors' feelings about the total number of animals seen, as well as the number of black bears seen, were both significant influences on the viewing experience. The combined influence of these two variables explained 43% of variation in the quality rating. These results, along with visitors' expectations to numbers of animals seen, indicate that respondents' expectations and feelings about the number of animals and black bears are important to improving nonconsumptive wildlife recreation in Cades Cove.

Only one variable concerned with encounters or density level had influence on the quality rating. This variable, the number of different kinds of animals seen by the researcher, accounted for 6% of the variance in the quality rating. These findings indicate actual numbers of animals seen by recreationists are poor predictors of the quality of wildlife viewing which is consistent with many social carrying capacity studies (Shelby and Heberlein 1986) where use level and encounters have been demonstrated to be poor predictors of satisfaction. However, some consumptive wildlife recreation studies (Vaske et al. 1986) have shown that the number of animals seen can positively influence satisfaction. Hunters who see more game feel that they have a better chance at being successful, possibly because hunters are more goal specific than wildlife viewers.

Another explanation for the lack of predictive value in density levels and encounters for nonconsumptive wildlife recreation may be that once a certain number of animals is seen that meet or exceed visitor expectations, the actual numbers have little or no influence on quality of viewing. In other words, visitors are happy as long as they see "some" of a particular type of animal, but once this threshold is reached, the actual numbers seen are less important than other model variables.

Walking toward wildlife for a better look was the only variable to influence the quality rating for the viewing behavior model. This variable explained 5% of variance in the quality rate.

When all of the variables were considered simultaneously, only three variables significantly influenced the quality of wildlife viewing for first-time visitors. They were feelings about the total number of animals seen (B=.58), photographing wildlife (B=.27), and using binoculars or telescopes to view wildlife (B=.25). Taken together, this set of independent variables explained 52% of the variance in the quality rating. Although viewing behavior variables represented the least complete reduced model (R^2=.05), two of its variables were important to the entire model. Obviously, taking photographs or videos and using equipment such as binoculars can greatly enhance the experience for first-time visitors. The most

important variable to the entire model is feelings about the total number of animals seen. This indicates that how visitors felt about the number of animals they saw is the best predictor of the quality of wildlife viewing for first-time visitors.

Model For Previous Visit Participants

As with the first-time visitors' model, the repeat participants' model examines the relationship between the quality rating (dependent variable) and the same set of independent variables (Table 27). Again, zero-order correlations and standardized regression coefficients are presented.

All variables reflecting the expectations' and feelings' models were significantly and positively correlated with the quality rating. Respondents who saw the total number of animals, the different kinds of wildlife, and the number of white-tailed deer, black bears, and wild turkeys they expected rated the quality of their experiences higher. Likewise, those individuals who felt that the total number of animals, the number of species of animals, and the number of black bears, white-tailed deer, and wild turkeys they saw were about right rated their experiences higher. These results are somewhat stronger than those found in first-time visitors.

Only one importance predictor, the importance of seeing a large number of animals was positively correlated

Table 27. The effects of expectations, feelings, importance of numbers and types, numbers of animals, and viewing behavior on quality of wildlife viewing rating for previous visit participants, GSMNP, 1989.

	Dependent Variable: Quality Rating		
		Standardized Coefficients	
Independent Variables	Zero-Order Correlation	Reduced Model	Entire Model
EXPECTATIONS			
Different kinds	.48[a]	.21[a]	.14[b]
Total number seen	.45[a]	.22[a]	.18[b]
Deer	.28[a]	ns	ns
Bear	.40[a]	.22[a]	ns
Turkey	.19[a]	ns	ns
R^2 EXPECTATIONS MODEL		.28	
FEELINGS			
Different kinds	.32[a]	ns	ns
Total number seen	.39[a]	.21[a]	ns
Deer	.37[a]	.22[a]	.14[b]
Bear	.34[a]	.26[a]	.22[a]
Turkey	.20[a]	ns	ns
R^2 FEELINGS MODEL		.25	
IMPORTANCE			
Different kinds	-.03	ns	ns
Total number seen	.03	ns	ns
Deer	-.02	ns	ns
Bear	-.03	ns	ns
Turkey	-.07	ns	ns
R^2 IMPORTANCE MODEL		--[c]	
DENSITY LEVEL			
Number of kinds	.07	ns	.14[b]
Total number seen	-.01	ns	ns
Number of bear seen	.01	ns	ns
Number of deer seen	.09	ns	ns
Number of turkey seen	.00	ns	ns
R^2 DENSITY LEVEL MODEL		--[c]	

Table 27 (continued)

Independent Variables	Dependent Variable: Quality Rating Standardized Coefficients Zero-Order Correlation	Reduced Model	Entire Model
ENCOUNTERS			
Numbers of kinds	.24[a]	.19[a]	ns
Total number seen	.25[a]	.20[a]	ns
Number of bear seen	.12	ns	ns
Number of deer seen	.20[a]	ns	ns
Number of turkey seen	.01	ns	ns
R^2 ENCOUNTERS MODEL		.10	
VIEWING BEHAVIOR			
Stop the car to observe wildlife	.34[a]	.24[a]	.26[a]
Get out of the car for a better view	.15	ns	ns
Walk toward wildlife for a better look	.18[a]	ns	ns
Feed any animals	.07	ns	ns
Photograph any wildlife	.23[a]	ns	ns
Use binoculars or telescope	.29[a]	.25[a]	.18[a]
Use a field guide to identify animals	.13	ns	ns
Sketch or paint any wildlife	.07	ns	ns
Read any materials furnished by NPS	.16[a]	ns	ns
Attend a wildlife program	.15	ns	ns
R^2 VIEWING BEHAVIOR MODEL		.15	
R^2 ENTIRE MODEL			.42

[a]$p<.01$.

[b]$p<.05$.

[c]--all predictors failed to meet entry requirements (i.e. probability of F-to-enter <0.05), thus the model did not significantly explain variation in the quality of wildlife viewing.

with the quality rating; however, none of the variables were significant. One explanation for the lack of correlation between these variables and the quality rating for both first-time and previous visit participants is that most respondents indicated that seeing different kinds of wildlife, a large number of animals and seeing black bears, white-tailed deer, and wild turkeys were either very or somewhat important to their viewing experience. Very few respondents reported otherwise.

Among the density level and encounters variables only three items were significantly related to quality of viewing. As people saw more species, more total animals, and more white-tailed deer, their viewing experience increased in value.

Five items related to viewing behavior were positively and significantly correlated to the quality rating. They included stopping the car to observe wildlife, walking toward wildlife for a better look, photographing wildlife, using binoculars or telescopes to view wildlife, and reading wildlife materials furnished by the National Park Service.

As with the first-time visitors' data, the importance of these independent variables in explaining the variance in the quality rating was determined through seven regression analyses. A regression analysis was performed

for each category of predictors and one model included all of the independent variables simultaneously.

The model including only expectation predictors suggested that three variables had a significant effect on viewing quality. They were expectations about the different kinds or species seen, the total number of animals to be seen, and the number of black bears seen. The influence of these three variables combined explained 28% of the variation in the quality rating.

When the equation containing only indicators of feelings was examined, three variables accounted for 25% of the variance in the quality rating. They were feelings about the total number of animals seen and the number of black bears and white-tailed deer seen. The feelings variable about the number of black bears seen ($B=.26, p<.01$) was the most important predictor.

Two variables were important in the encounters' equation. The number of types of animals visitors saw and the total number of animals they saw explained 10% of the variation in the quality rating. Previous visit participants show more interest in large numbers of animals and types than seeing specific species than first-time visitors. These results might be explained in that most of the respondents were not "goal specific" wildlife viewers. In other words, most visitors were not looking for specific species or types of animals. Other research (Applegate and

Clark 1987) has demonstrated that in recreationists such as birdwatchers, specific species become much more important to participants, thereby causing less satisfied participants if the species are not located during that trip. Birdwatching is a much more goal specific form of wildlife viewing.

When the equation containing only viewing behavior predictors was examined, two variables accounted for 15% of the variance in the quality rating. Both stopping the car to observe wildlife and the use of binoculars or telescope to view wildlife were significant.

Finally, a model was fitted which included all of the predictors. Seven of the items had a significant influence on the quality rating and explained 42% of the variance. These items were expectations about the total number of animals seen (B=.18) and number of kinds of animals (B=.14) seen, feelings about the number of white-tailed deer seen (B=.14), feelings about the number of black bears seen (B=.22), the actual number of species or kinds of animals reported by the researcher (B=.14), stopping the car to observe wildlife (B=.26), and the use of binoculars or telescope to view wildlife (B=.18). As seen with the first-time visitors, viewing behavior and feeling predictors are the most important when all variables are included simultaneously. More precisely, feelings about the appropriateness of numbers of black bears and white-

tailed deer seen, and the human behavior of stopping the car for observing wildlife, were best as predicting visitor ratings for the quality of wildlife viewing in Cades Cove for previous visit participants.

Summary

All variables concerned with expectations and feelings were positively related to the quality of wildlife viewing rating except for expectations in reference to white-tailed deer and wild turkeys and feelings about white-tailed deer for first-time visitors. None of the variables with respect to importance of seeing specific kinds or numbers of animals were related to the quality rating for either first-time or previous visit participants. The predictors of numbers of kinds of animals seen, total number of animals seen, and number of white-tailed deer seen were related to the quality rating for previous visit participants but not for first-time visitors. Several of the viewing behavior predictors were related to the quality rating for previous visit participants including stopping the car to observe wildlife, walking toward wildlife for a better look, photographing wildlife, using binoculars or telescope to observe animals, and reading any materials furnished by the National Park Service. Only one predictor, wildlife photography, was related to the quality rating for first-time visitors.

In the reduced model containing only expectation predictors, the total number of animals seen, explained 28% of the variance in the quality rating for first-time visitors while seeing different kinds of animals, the total number of animals seen, and the number of black bears seen explained 28% of the variance in the quality rating in previous visit participants. In both first-time and previous visit participants, visitors' feelings about the total number of animals seen and the number of black bears seen were significant predictors. However, another predictor, the number of white-tailed deer seen, was also a significant feelings-predictor for previous visit participants. Importance predictors were insignificant in both first-time and previous visit participants. Models containing only encounter and density level predictors explained only 6% of the variance in the quality rating for first-time visitors and 10% for previous visit participants. When considering only viewing behavior predictors, one variable, walking toward wildlife for a better look, was significant for first-time visitors, explaining 5% of the variance in the quality rating. However, two predictors, stopping the car and using binoculars or a telescope to observe wildlife explained 15% of the variance in the quality rating for previous visit participants.

visit participants. The variables most important to the entire model for first-time visitors were feelings about the total number of animals seen, photographing wildlife, and using binoculars or a telescope to view wildlife. Predictors most important to the entire model for previous visit participants included expectations about seeing different kinds of animals, and the total number of animals viewed, feelings about the number of white-tailed deer and black bears seen, the number of kinds or types of animals seen by the researcher, stopping the car to see wildlife, and using binoculars or a telescope to view wildlife. Repeat visitors tended to be more specialized than first-time visitors in their wildlife viewing by focusing more on specific species of wildlife and stopping the car for a closer look at wildlife.

CHAPTER VIII

CONCLUSION

As indicated on mail-back questionnaires, seeing wildlife is the most important reason why people visit Cades Cove. Therefore, future management of this area should be concentrated on improving access to the wildlife resource for viewing purposes. Although other factors such as historical structures certainly contribute to the attractiveness of Cades Cove, the major objective of the managing agency should be improving the quality of wildlife viewing experiences.

In examining visitor characteristics, attitudes about animals in general, and the factors important to the quality of wildlife viewing, some assumptions and recommendations for improving nonconsumptive wildlife recreation in Cades Cove can be made. First, most visitors were highly educated, middle-incomed, and from Tennessee, giving the managing agency a fairly homogenous group in which reading materials, displays, and programs could focus. Although reading materials and attending interpretive programs did not affect the quality of wildlife viewing in our model, attempts should be made to furnish and make accessible more attractive and appropriate wildlife materials and programs to visitors. An example is

teaching wildlife photography. Photographing wildlife was important to improving the quality of wildlife viewing for both first-time and previous visit participants.

Participants indicated tendencies toward specific attitudes concerning animals. The aesthetic qualities of animals seem to be most important to visitors. Therefore, attempts could be made to make attractive animals such as black bears and white-tailed deer more visually accessible to visitors. This could be done by manipulating the habitat or simply educating visitors as to when and where to see these animals or how to better use viewing equipment. Other attitude categories which visitors rated high were humanistic and moralistic, indicating that visitors place value on individual animals and feel strongly about the welfare of these animals. Visitors scored lowest in categories representing the consumptive use of animals or their habitat, which is expected of supporters and visitors of national parks.

As indicated by respondents through regression analysis factors most important to quality of wildlife viewing for first-time and previous visit participants are those concerned with expectations and feelings toward wildlife. This infers that psychological factors may be manipulated by managers, not just the physical numbers of animals or their habitat. Resource managers can influence what visitors expect and how they feel about what they have

seen in several ways. Again, data have been collected concerning the appearance of specific types and numbers of animals in reference to time of day, temperature, weather, and habitat. This information could be used in materials, displays, and programs furnished to visitors by the managing agency to aid in forming realistic expectations concerning the finding and seeing of wildlife. Game management and fish agencies already provide similar information for consumptive users of wildlife.

Wildlife viewing behaviors were also important predictors in the quality of wildlife viewing. Improving the visitors ability to use their equipment could substantially improve viewing experiences. Photographing wildlife and/or using binoculars or telescope to view wildlife were important predictors for first-time and previous visit participants. Another predictor, stopping the car to observe wildlife was also important for previous visit participants. Perhaps providing periodic strips of space on each side of the paved road or identified wildlife viewing pulloffs in which visitors could stop most anytime would not only improve wildlife viewing opportunities but might also alleviate some traffic problems.

The difference in the number of and importance of specific predictors for first-time as opposed to previous visit participants was probably the result of previous visitors being unable to divorce the present experience

from previous experiences. Special consideration should be made for this situation in future research. Samples should be large enough to test previous visit participants and first-time visitors separately. However, differences in these two groups of visitors may not be found in similar recreational settings.

Visitors must be informed of what present situations exist. For example: white-tailed deer populations may be lower during some years because of low mast production. Visitors must be educated to conditions or situations that may affect the number of or specific animal species, especially those which are most frequently sought by visitors.

Although the results of this study can be used to improve wildlife viewing experiences in Cades Cove, they may not apply to all nonconsumptive wildlife recreation experiences or areas. In areas, such as bird sanctuaries, where visitors come to find specific birds or to add to their life list, seeing a specific species of bird may be more important than seeing a large number of birds. In other words, their form of recreation is more goal specific. Also viewing behaviors may become much more important than for visitors in Cades Cove, because birdwatchers are much more familiar and experienced with their equipment than casual wildlife viewers. Furthermore, this research should be tested under similar conditions

before using in comparable environments for decision making.

To increase their predictive ability, perhaps density level and encounters variables should be measured differently from the methods described in this study. The number of animals available for viewing (density level) should be counted during every sample time period instead of just one period of the day. For example: if people are interviewed from 0800 to 1000 hrs EDT, then a density count should begin around 0830 hrs EDT considering that the average time it takes to complete the 11-mile (18 km) loop road is one hour. This procedure could insure a higher correlation between visitors' (encounters) and researcher (density level) measures.

Although measuring encounters by respondent report is less expensive and more convenient, some possible disadvantages exist. First, reported encounters are not as accurate or as extensive as information collected by trained observers. After the participant sees a certain number of animals, accuracy in self reports decrease. In other words, the more animals visitors see, the more likely they are to underestimate the number they visually encountered. In a study conducted by Shelby and Colvin (1981), when participants were asked to recall the number of other people they encountered, their reports were accurate only at the lowest encounter levels. Therefore,

in future research, attempts should by made to measure encounters by both trained observer and visitor reports.

A strong point with the quality of wildlife viewing model lies in the specificity of its dependent variable. Many studies trying to research questions and objectives similar to this study have failed because the question or item representing their dependent variable was not clear and exact. Future researchers should continue the use and development of explicit questions in the formation of their dependent variable.

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LITERATURE CITED

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APPENDICES

APPENDIX A

DENSITY ESTIMATE SHEET

DENSITY ESTIMATE

Date:_____

Weather:_____

Temperature:_____

Time started:_____

Time ended:_____

Estimate of Number Seen.	Total
Deer	
Crow	
Groundhog	
Bear	
Squirrel	
Turkey	
Trout	
Vulture	
Raccoon	
Lizard	
Chipmunk	
Skunk	
Rabbit	
Hawk	
Frog or Toad	
Opossum	
Fox	
Owl	
Otter	

	Total
Turtle	_____
Non-poisonous snake	_____
Poisonous snake	_____
Woodpecker	_____
Duck	_____
Salamander	_____
Quail	_____
Other birds	_____

Total Number of Animals Seen _____

APPENDIX B

ON-SITE INTERVIEW

Questionnaire No. _____

ON SITE INTERVIEW

Date: _____ Weather: _____ Temperature: _____

Time: _____ Other: _____

No. of persons in the vehicle: _____

Ages of persons in the vehicle: _____

Kind of group:

_____ alone
_____ family
_____ friends
_____ both family and friends
_____ an organized group
_____ other _____

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

APPENDIX C

LIST OF ANIMALS FOR ESTIMATIONS

Questionnaire No. _____

We are interested in how many and what kinds (species) of wildlife you saw today while in Cades Cove. Please give your best estimate for each species.

ANIMAL	ESTIMATE THE NUMBER SEEN
Deer	_____
Crow	_____
Groundhog	_____
Bear	_____
Squirrel	_____
Turkey	_____
Trout	_____
Vulture	_____
Racoon	_____
Lizard	_____
Chipmunk	_____
Skunk	_____
Rabbit	_____
Hawk	_____
Frog or Toad	_____
Opossum	_____
Fox	_____
Owl	_____
Otter	_____
Turtle	_____
Non-poisonous snake	_____
Poisonous snake	_____
Woodpecker	_____
Duck	_____
Salamander	_____
Quail	_____
Other birds	_____
Other (not listed)	_____
please specify.	_____
Butterflies	_____

APPENDIX D

ELEVEN PAGE MAIL-BACK QUESTIONNAIRE

Questionnaire No. _____

Please complete at your earliest convenience. Although some of the questions may not apply to you, please give your best estimate for each question that does. Remember, we are only concerned with your wildlife viewing experience in Cades Cove, not your entire trip to the Great Smokies.

People have many reasons for visiting Cades Cove. We have listed some of these reasons and would like for you to rate the importance of each of them.

The reason I can to Cades Cove today was: (please check an answer for each)	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. To see the mountains and trees.	( )	( )	( )	( )	( )
2. Just for the drive.	( )	( )	( )	( )	( )
3. To see big game animals. (deer, bear, etc....)	( )	( )	( )	( )	( )
4. To camp or hike.	( )	( )	( )	( )	( )
5. Just driving, no purpose	( )	( )	( )	( )	( )
6. To see the cabins and old structures.	( )	( )	( )	( )	( )
7. To see any wildlife. (squirrel, raccoon, etc....)	( )	( )	( )	( )	( )
8. To see specific plants. (ex: wild flowers)	( )	( )	( )	( )	( )

9. Other, please specify. _____

10. Is this your first visit to Cades Cove?

YES ▼

10(a) What was the main reason for your visit?

_____

_____

NO ▼

10(b) How many times did you visit Cades Cove last year? _____

10(c) How many total times have you visited Cades Cove in your life? _____

10(d) If you answered 5 or more on either of the above questions, please state the main reason for your many return visits.

_____

_____

We are interested in what you expected to see while visiting Cades Cove. (Check an answer for each question).

Were the number of animals you saw less than you expected, about what you expected, or more than you expected.....

	Less than I expected	*About what I expected*	*More than I expected*
for the different kinds (species) of wildlife?	( )	( )	( )
for the <u>total</u> number of animals seen?	( )	( )	( )
for the number of deer seen?	( )	( )	( )
for the number of bear seen?	( )	( )	( )
for the number of turkey seen?	( )	( )	( )

We also need to know how you felt about the number of animals you saw.

Did you feel that the number of wildlife you saw were too few, about right, or too many.....

	Too Few	*About Right*	*Too Many*
for the different kinds (species) of animals?	( )	( )	( )
for the total number of animals seen?	( )	( )	( )
for the number of deer seen?	( )	( )	( )
for the number of bear seen?	( )	( )	( )
for the number of turkey seen?	( )	( )	( )

We would like to know what is important to your wildlife viewing experience.

How important is <u>each</u> of the following to the <u>quality</u> of your wildlife viewing experience.

	Very important	Somewhat important	Undecided	Somewhat unimportant	Unimportant
Seeing many different kinds of wildlife.	( )	( )	( )	( )	( )
Seeing a large number of animals.	( )	( )	( )	( )	( )
Seeing deer.	( )	( )	( )	( )	( )
Seeing bear.	( )	( )	( )	( )	( )
Seeing turkey.	( )	( )	( )	( )	( )

We would like to know what you did while viewing wildlife in Cades Cove.

Of the following activities, which do you participate in. Please check the box that indicates how often you did this activity while visiting Cades Cove on the day you were interviewed.

	Never	Seldom	Occasionally	Frequently
Stop the car to observe wildlife.	( )	( )	( )	( )
Get out of the car for a better view.	( )	( )	( )	( )
Walk toward wildlife for a better look.	( )	( )	( )	( )
Feed any animals.	( )	( )	( )	( )
Photograph any wildlife.	( )	( )	( )	( )
Use binoculars or telescope to view wildlife.	( )	( )	( )	( )
Use a field guide to identify animals.	( )	( )	( )	( )
Sketch or paint any wildlife.	( )	( )	( )	( ).

	Never	Seldom	Occasionally	Frequently
Read any materials furnished by the Park Service on wildlife in Cades cove. (displays, brochures, etc.....)	( )	( )	( )	( )
Attend a wildlife program.	( )	( )	( )	( )

On the following scale, please rate the overall quality of your wildlife viewing experience in Cades Cove. Please restrict your rating to the quality of wildlife viewing in Cades Cove, not to any other aspect of your trip to the Great Smoky Mountains National Park. Circle one number that best describes your experience.

1	2	3	4	5	6	7	8	9
Unacceptable		Somewhat Acceptable		Fair		Good		Excellent

Now, I would like to ask you some questions about your feelings and beliefs about animals. There are no right and wrong answers and please do not think your views will be positively or negatively judged in any way. Please state if you strongly agree, moderately agree, moderately disagree, strongly disagree, or have no opinion about the statement.

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
1. When choosing a pet, the animal's physical attraction is generally the most important to me.	( )	( )	( )	( )	( )
2. I admire the skill and courage of a man who can successfully hunt in wild and ruffed country.	( )	( )	( )	( )	( )
3. Creatures like spiders and moles are generally of little value to nature.	( )	( )	( )	( )	( )
4. I think love is an emotion people should feel for other people not for animals.	( )	( )	( )	( )	( )
5. I see little wrong with harvesting seals for their furs so long as the animal is not endangered.	( )	( )	( )	( )	( )

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
6. When walking in the woods, I like to look for strange and unusual insects.	( )	( )	( )	( )	( )
7. I would hate to touch a snake.	( )	( )	( )	( )	( )
8. I like seeing deer and eagles but I have little interest in learning about their physiology.	( )	( )	( )	( )	( )
9. I see little wrong with filling swamps if the land can be used to produce more jobs and income.	( )	( )	( )	( )	( )
10. A dog trained at a task, such as herding sheep or guarding a house, is generally a better animal than one just owned for companionship.	( )	( )	( )	( )	( )
11. When visiting a zoo, I most like to see the unusual and attractive animals.	( )	( )	( )	( )	( )
12. I admire a man very much who can train animals to do skillful animal acts.	( )	( )	( )	( )	( )
13. My interest in animals is less with the individual animal and more with how species behave and interact with other animals.	( )	( )	( )	( )	( )
14. I consider myself a person who likes animals but I would not say I love them.	( )	( )	( )	( )	( )
15. I generally like animals the most that have some practical value.	( )	( )	( )	( )	( )
16. I regard any kind of recreational or sport hunting as cruel to animals.	( )	( )	( )	( )	( )

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
17. When camping, I prefer to stay in a modern campground more than in isolated areas where there might be wild animals nearby.	( )	( )	( )	( )	( )
18. I am afraid of most spiders.	( )	( )	( )	( )	( )
19. I derive a great deal of satisfaction from reading about the biology of animals like molluscs or amphibians.	( )	( )	( )	( )	( )
20. I do not approve of protecting wild animals if it hurts the economic livelihood of people like farmers and foresters.	( )	( )	( )	( )	( )
21. I am generally more interested in seeing exciting animals like eagles or horses than boring ones like sparrows or moles.	( )	( )	( )	( )	( )
22. I believe a person must obtain strict obedience and mastery over dogs.	( )	( )	( )	( )	( )
23. I enjoy seeing ducks but I have little interest in learning about inland or tidal wetlands.	( )	( )	( )	( )	( )
24. My love for animals is among my strongest feelings.	( )	( )	( )	( )	( )
25. I see little wrong with using leg-hold traps to capture wild animals.	( )	( )	( )	( )	( )
26. Animals like grizzly bears or big horn sheep are part of our vanishing wilderness and should be protected even if farmers and ranchers have to make some economic sacrifices.	( )	( )	( )	( )	( )
27. I have little desire to see unusual snakes or lizards in a place like the rain forest of South America.	( )	( )	( )	( )	( )

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
28. Most wild animals are unclean and so I try to stay away from them.	( )	( )	( )	( )	( )
29. I have little interest in learning more about the evolutionary development of animals.	( )	( )	( )	( )	( )
30. If deer populations are carefully regulated, hunting for their annual surplus is little different than harvesting apples each year.	( )	( )	( )	( )	( )
31. I think it is nice to have beautiful animals like the mute swan even if they are not originally native to the United States.	( )	( )	( )	( )	( )
32. I believe a person sometimes has to beat a horse or dog to get it to obey orders properly.	( )	( )	( )	( )	( )
33. I am not interested in learning about the ecological role of insects or worms in moving nutrients through the environment.	( )	( )	( )	( )	( )
34. The idea of loving animals strikes me as a strange emotion.	( )	( )	( )	( )	( )
35. Keeping animals in cages, even in good zoos, seems cruel.	( )	( )	( )	( )	( )
36. I particularly like muskrat furs because of their warmth and durability.	( )	( )	( )	( )	( )
37. I have little desire to hike many miles into wild country where there are no people just to see an animal like a mountain lion.	( )	( )	( )	( )	( )
38. I think rats and cockroaches should be eliminated.	( )	( )	( )	( )	( )
39. I am fascinated by the taxonomic differences of the arthropods.	( )	( )	( )	( )	( )

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
40. We must use pesticides, even ones harmful to wildlife, if needed to maintain the country's good production.	( )	( )	( )	( )	( )
41. If given the choice between seeing a beautiful animal like a wild horse or an unattractive animal like an opposum, I would much prefer to see the wild horse.	( )	( )	( )	( )	( )
42. I would enjoy watching my wits against an animal like a grizzly bear or mountain goat to get a good picture of it.	( )	( )	( )	( )	( )
43. I have little interest in learning about the ecology of animal communities like prairie dog towns or coral reefs.	( )	( )	( )	( )	( )
44. I have owned pets as dear to me as another person.	( )	( )	( )	( )	( )
45. I think animals should have legal rights.	( )	( )	( )	( )	( )
46. Watching birds as a hobby strikes me as a waste of time.	( )	( )	( )	( )	( )
47. I enjoy wildlife activities the most that have some practical value.	( )	( )	( )	( )	( )
48. I prefer to see wild animals on television or in a zoo more than running free near me.	( )	( )	( )	( )	( )
49. We should not help farmers whose sheep are killed by coyotes because this part of the risk of ranching in areas where coyotes live.	( )	( )	( )	( )	( )

	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree	No Opinion
50. Our great national parks should include interesting animals like rainbow trout and deer.	( )	( )	( )	( )	( )
51. Capturing a wild animal strikes me as a very exciting and challenging experience.	( )	( )	( )	( )	( )
52. I generally enjoy reading about animal biology more than actually seeing animals in the wild.	( )	( )	( )	( )	( )
53. I have great affection for individual animals, but I am not especially interested in learning about the ecological characteristics of species.	( )	( )	( )	( )	( )
54. Animals have been among the greatest emotional satisfactions of my life.	( )	( )	( )	( )	( )
55. I think the keeping of wild animals as pets often results in much animal suffering.	( )	( )	( )	( )	( )
56. If populations of wild mink are plentiful enough, I see little reason why they should not be trapped for their fur.	( )	( )	( )	( )	( )
57. I have little desire to see a scorpion or gila monster in a place like the southwestern desert.	( )	( )	( )	( )	( )
58. I dislike most beetles and bugs.	( )	( )	( )	( )	( )
59. I generally get bored by scientific discussions of animals.	( )	( )	( )	( )	( )
60. If given the choice between conserving some rare species or raising our standard of living, I would choose to raise our standard of living.	( )	( )	( )	( )	( )

We would also like to ask you about activities you participate in that are conservation or wildlife related.

About how frequently do you participate in the following activities?

	Never	Rarely	Sometimes	Frequently
Bird Watching	( )	( )	( )	( )
Bird Feeding	( )	( )	( )	( )
Wildlife viewing	( )	( )	( )	( )
Wildlife photography	( )	( )	( )	( )
Nature walks	( )	( )	( )	( )
Zoo visits	( )	( )	( )	( )
Hunting	( )	( )	( )	( )
Fishing	( )	( )	( )	( )

Other, please specify _____

_____

_____

Do you belong to any wildlife or conservation oriented organizations or clubs?

_____no
_____yes, specify. _____

Do you subscribe to any wildlife or conservation related publications?

_____no
_____yes, specify. _____

Background Information

Your age? _____

Your sex? _____

Education---Please check the highest level completed.

_____Less than high school
_____Completed high school
_____Technical or vocational school
_____Some college
_____Completed college
_____Graduate work or degree
_____Other---please specify. _____

What is your occupation? Please be as specific as possible---tell what kind of work you do, not for whom you work. If student, housewife, or retired, please say so. _____

Check the category which includes your 1988 total household income before taxes.

_____Less than $9,999
_____$10,000 up to $19,999
_____$20,000 up to $29,999
_____$30,000 up to $39,999
_____$40,000 up to $49,999
_____$50,000 up to $69,999
_____$70,000 up to $99,999
_____$100,000 or greater

Check the one answer below that best describes the size of the area where you grew up.

_____Large metropolitan area; over 1,000,000 people
_____Metropolitan area; 100,000 to 1,000,000 people
_____City; 10,000 to 199,999 people
_____Small town; under 10,000 people
_____Rural; non-farm
_____Rural; farm

How many persons in your family, not including yourself? _____

What are their ages? _____

APPENDIX E

COVER LETTER GIVEN WITH QUESTIONNAIRE

THE UNIVERSITY OF TENNESSEE
INSTITUTE OF AGRICULTURE

Department of Forestry, Wildlife
and Fisheries
P. O. Box 1071
Knoxville, TN 37901-1071
(615) 974-7126

Dear Cades Cove Visitor:

The University of Tennessee is conducting a wildlife viewing study on Cades Cove. Even though you have enjoyed your entire trip to the Great Smoky Mountains National Park, we are only interested in your wildlife viewing experience in Cades Cove. The cove is one of the most important areas in the Southeastern United States for the viewing of wildlife by the public, and we are interested in determining what factors lead to a quality wildlife viewing experience.

The verbal interview and survey that you participated in at Cades Cove was kept short, since we did not want to take up much of your recreation time. At that time you agreed to complete a longer questionnaire. You are one of a small number of people invited to participate in this study. Therefore, your point of view is very important. Please take a few minutes to fill out the questionnaire.

We want to emphasize that your answers are confidential. The questionnaire number is used only to match your verbal interview form with your written form. Your name will not be included in any report, nor will it be given to any of the agencies involved.

Please return the completed questionnaire in the enclosed self-addressed envelope as soon as possible. Return postage has already been paid.

We shall be happy to answer any questions you might have and also provide information concerning this study. Please call or write. The telephone number is 615/974-7126.

Thank you for your help in making certain that this important study represents the needs and desires of visitors of the Great Smokies and other national parks.

Thanks Again,

W. E. Hammitt Judy Dulin

Dr. William E. Hammitt and Judy Dulin

APPENDIX F

FIRST POSTCARD REMINDER

Dear Cades Cove Visitor:

About two weeks ago we handed you our mail questionnaire concerning your recent trip through Cades Cove in the Great Smoky Mountains National Park.

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

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

Sincerely,

W. E. Hammitt Judy Dulin

William E. Hammitt & Judy Dulin
University of Tennessee
615/974-7126

APPENDIX G

SECOND POSTCARD REMINDER

Dear Cades Cove Visitor:

WE STILL NEED YOUR HELP! As of yet we have not received your questionnaire concerning your trip through Cades Cove and your views on wildlife.

Please return it in its self-addressed stamped envelope as soon as possible. It is important that we include your information in our study. Thank you.

Sincerely,

W. E. Hammitt Judy Dulin

William E. Hammitt & Judy Dulin
University of Tennessee
615/974-7126

APPENDIX H

FREQUENCY OF ANIMAL SIGHTINGS

APPENDIX H

NUMBER OF ANIMALS REPORTED SEEN BY VISITORS IN CADES COVE, GSMNP, 1989.

Number Reported	Number of Respondents	Percent of Respondents
DEER		
0	9	2.4
1-4	94	24.6
5-9	86	22.5
10-14	42	11.0
15-19	24	6.3
20-24	23	6.0
25-49	50	13.1
50-99	33	8.6
100+	21	5.5
TOTAL	382	10.0
CROW		
0	88	23.0
1-4	103	27.0
5-9	72	18.8
10-14	52	13.6
15+	67	17.6
TOTAL	382	100.0
OTHER BIRDS		
0	268	70.5
1-4	49	12.9
5-9	27	7.2
10-14	20	5.2
15+	20	5.2
TOTAL	380	100.0
BUTTERFLY		
0	197	52.2
1-4	87	23.1
5-9	33	8.8
10-14	24	6.4
15+	36	9.5
TOTAL	377	100.0

GROUNDHOG		
0	171	44.7
1-4	166	43.3
5+	46	12.0
TOTAL	383	100.0
SQUIRREL		
0	209	54.4
1-4	154	40.1
5+	21	5.5
TOTAL	384	100.0
BEAR		
0	189	49.4
1+	193	50.6
TOTAL	382	100.0
TURKEY		
0	367	95.6
1+	17	4.4
TOTAL	384	100.0
TROUT		
0	370	96.4
1+	14	3.6
TOTAL	384	100.0
VULTURE		
0	340	88.8
1+	43	11.2
TOTAL	383	100.0
RACCOON		
0	318	82.8
1+	66	17.2
TOTAL	384	100.0
LIZARD		
0	348	90.6
1+	36	9.4
TOTAL	384	100.0

CHIPMUNK		
0	344	89.6
1+	40	10.4
TOTAL	384	100.0
SKUNK		
0	288	75.0
1+	96	25.0
TOTAL	384	100.0
RABBIT		
0	336	87.5
1+	48	12.5
TOTAL	384	100.0
HAWK		
0	341	89.1
1+	42	10.9
TOTAL	383	100.0
FROG		
0	376	97.9
1+	9	2.1
TOTAL	384	100.0
OPOSSUM		
0	378	98.5
1+	6	1.5
TOTAL	384	100.0
FOX		
0	383	99.7
1+	1	.3
TOTAL	384	100.0
NONPOISONOUS SNAKE		
0	364	94.8
1+	20	5.2
TOTAL	384	100.0

POISONOUS SNAKE		
0	381	99.2
1+	3	.8
TOTAL	384	100.0
WOODPECKER		
0	340	88.5
1+	44	11.5
TOTAL	384	100.0
DUCK		
0	375	97.7
1+	9	2.3
TOTAL	384	100.0
SALAMANDER		
0	376	97.9
1+	8	2.1
TOTAL	384	100.0
QUAIL		
0	376	97.9
1+	8	2.1
TOTAL	384	100.0
OWL		
0	374	97.4
1+	10	2.6
TOTAL	384	100.0
TURTLE		
0	373	97.1
1+	11	2.9
TOTAL	384	100.0

APPENDIX I

FREQUENCY OF ANIMAL SIGHTINGS BY RESEARCHER

APPENDIX I

NUMBER OF ANIMALS REPORTED SEEN BY RESEARCHER DURING DENSITY ESTIMATES IN CADES COVE, GSMNP, 1989 (n=23).

Number Reported	Number of Times Seen	Percent of Times Seen
BUTTERFLY		
0	0	.0
1-9	3	13.0
10-19	3	13.0
20-29	5	21.7
30+	12	52.2
CROW		
0	1	4.3
1-4	0	.0
5-9	6	26.2
10-14	7	30.4
15+	9	39.1
DEER		
0	1	4.3
1-4	8	34.8
5-9	8	34.8
10+	6	26.1
OTHER BIRDS		
0	1	4.3
1-4	8	34.8
5-9	11	47.9
10+	3	13.0
GROUNDHOG		
0	4	17.4
1-4	16	69.6
5+	3	13.0
SQUIRREL		
0	16	69.6
1+	7	30.4
BEAR		
0	19	82.6
1+	4	17.4

VULTURE		
0	12	52.2
1-4	7	30.4
5+	4	17.4
WOODPECKER		
0	20	87.0
1+	3	13.0
RACCOON		
0	21	91.3
1+	2	8.7
QUAIL		
0	21	91.3
1+	2	8.7

VITA

Judy N. Dulin was born in Knoxville, Tennessee on August 24, 1962. She attended elementary school in Sevierville, Tennessee and graduated from Sevier County High School in June 1980. The following September, she entered the University of Tennessee, Knoxville, and in December 1984, she received a Bachelor of Science degree in Wildlife and Fisheries Management.

During the summer of 1985, she worked as a seasonal naturalist for the Georgia State Parks. In May 1986, she was employed as a seasonal naturalist with the South Carolina State Parks. After completing her summer duties, she was retained as an assistant park ranger. In February 1987, she was promoted to permanent interpretive naturalist for Myrtle Beach State Park.

She entered The Graduate School of The University of Tennessee, Knoxville, in August 1988. She was awarded a Master's of Science degree from the University of Tennessee, Knoxville, in August 1990.