A STUDY OF BLUE RIDGE PARKWAY USE BY AREA RESIDENTS WITH THE DEVELOPMENT OF A DEMAND MODEL

by

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INTRODUCTION

The Blue Ridge Parkway is a scenic mountain roadway which penetrates 470 miles through the heart of the Blue Ridge mountains in Virginia and North Carolina. Administered by the National Park Service since construction began in the late 1930's, the parkway has become a significant national attraction and has been recognized worldwide as an example of wise land-use planning (Liles, 1977). Indeed, in 1976 the Blue Ridge Parkway with approximately 16.2 million visits was the most heavily visited unit within the National Park system. Of this incredible amount of use, however, almost half of the visits were from residents of Virginia and North Carolina (Tingle, 1977). Thus, the importance of the Parkway as a regional park is evident.

Due to regional population growth combined with increasing leisure time and disposable income (Blue Ridge Parkway, 1976), the use of the Blue Ridge Parkway by the local population[1/] seems likely to increase. This once sparsely populated region is experiencing rapid growth in second home developments, particularly in the western North Carolina area. Also, existing communities along the Parkway continue to expand

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[1/] Local or adjacent population, for the purposes of this research, is defined as all people living in a county lying adjacent to the Blue Ridge Parkway or within the city of Lynchburg. The area included a total of 29 counties in Virginia and North Carolina. This definition was deemed appropriate for capturing the population having immediate parkway access and also simplified sampling procedures.

as improved transportation facilities attract additional industry and tourism. Two major urban areas, Roanoke, Virginia and Asheville, North Carolina, border the Parkway itself and influence visitation considerably. These factors combined with the possibility of future gas shortages and thus restricted travel patterns by the public indicate the emerging value of the Blue Ridge Parkway as a regional or even "local" park.

Recognition of the regional value of large federal recreation areas such as the Blue Ridge Parkway is not limited to the Parkway alone. In the past ten years the philosophy of bringing parks to the people has emerged within several federal agencies such as the National Park Service and within large segments of the public sector (Seiberling, 1974). This change in thinking is largely a result of dissatisfaction with past criteria used for park and wilderness selection which emphasized only the national significance or wilderness qualities of the site. The result showed over two thirds of America's recreation areas in the western part of the country where less than one third of the population lives (National Parks and Conservation Magazine, 1974). The new emerging philosophy is evidenced by passage of the Eastern Wilderness Act in 1974 and establishment of the Cuyahoga Valley National Recreation area and the Gateway parks, both of which are located near large urban areas.

Upon establishment of the National Park Service in 1916 several objectives were formulated which included, among others, that the Park Service shall be a "people serving agency" and provide for the highest quality use and enjoyment of the park system (National Park Service, 1972). Thus as a unit of the National Park system, the Blue Ridge

Parkway can hardly ignore area residents who comprise a substantial and increasing proportion of the visiting public. Blue Ridge Parkway managers need to incorporate information regarding the local user into the Parkway management and planning framework in order to achieve the maximum recreational value of this large resource. This need will become especially critical as the volume of local use increases.

In Coordinated Guidelines for Recreation Use in the Great Smokies Region, the planners note that "the key to efficient allocation of recreation resources is knowledge of the amounts and types of demand that will be placed on those resources, both today and in the future" (Great Smokies Regional Planning Team, 1975). Without this demand information, recreation managers and planners will be unable to adequately assess the extent of future resource management problems and recreation needs. Questions concerning what facilities and activities to provide and when and where to provide them will be hard to answer. Substituting management intuition for hard data on user demands and preferences is likely a poor alternative. Many studies (Lucas, 1964; Peterson, 1971, 1974) indicate the real possibility of disparity between management intuition and user preferences.

To date, no clear demand information is available concerning the amount and type of Blue Ridge Parkway use made by the adjacent residents. Specifically, no information is available on the seasonal variation of local use, areas and facilities used, or the actual proportion of the local population using the parkway. Past research on the Blue Ridge Parkway includes only two studies (Tingle, 1977; Wilbur Smith and

Associates, 1974)[2/] which because of their distinct objectives, fail to provide the necessary data. Other resident user studies such as the one conducted for the Great Smokey Mountains National Park (Great Smokies Regional Planning Team, 1975) are not applicable to the Parkway because of the Parkway's unique linear character and its diverse resource offerings.

The value of information on specific user groups such as local users has been recognized for some time (Hendee, 1969; Shafer, 1969). Shafer (1969), in his study of campground use, identified several distinct user groups who had different preferences and camping habits. Thus, there is no such person as the average user and management should not try to focus on this image. Obviously, the Parkway cannot meet all the needs of all the people. However, by understanding the relationships between the Parkway and specific user groups, Parkway managers and planners will be better able to provide the appropriate blend of recreation opportunities which best serve the varied people using this resource.

A major value of the detailed demand information needed on local users is in its application towards the development of mathematical models to both predict and valuate recreation use. Past predictive models which frequently just extended past use trends into the future

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[2/] Tingle's study (1977) concentrated on characteristics and motivations of the general parkway user. Although many of the visitors contacted were area residents, their numbers were still insufficient for proper data analysis and few questions were asked which concerned the many aspects of local use. Wilbur Smith and Associates (1974) conducted an access impact study of only a 10 mile section of the parkway. The study did not focus upon local visitor use and its narrow design make generalizations inappropriate.

were insensitive to the factors affecting demand (Buhyoff and Leuschner, 1978) and could not be used to assess the economic value of that use. However, with the proper combination of variables describing use patterns, user characteristics, and site characteristics, it will be possible to reliably predict both the extent and value of local Parkway use in the years to come. The need to valuate recreation areas becomes critically important as the competition for federal funds and scarce resources increases. In the past it was easy for opponents to discount the value of public recreation since zero or small user fees made it difficult to determine a tangible price for these recreation sites.

Thus, with shifting emphasis towards the regional park concept and the need to allocate recreation resources more efficiently, the specific objectives of this research are to:

1) document the characteristics and intensity of local use on the Blue Ridge Parkway and
2) combine important user and site characteristics affecting local Parkway demand into a mathematical model which can be used to both predict and valuate local use.

LITERATURE REVIEW

Demand Modeling

Outdoor recreation participation has been on the increase for several decades and there are no signs of a change in this general growth pattern. As a result, agencies at all levels of government have been expending much time, money, and effort to satisfy this increasing demand. With this time and effort has come the realization of the importance of recreation demand models (Van Lier, 1977). The vast amount of research literature which has already accumulated on demand models is further evidence of the importance of these models (O'Rourke, 1974; Cesario and Knetsch, 1976).

Various techniques and models have been developed for predicting the levels of use that a recreation site might receive. Some methods include merely extending the past use trends into the future and others may base predictions solely on the characteristics of the population (Buhyoff and Leuschner, 1978). In the past decade or so, however, much research has been devoted towards developing predictive models known generally as gravity potential or gravity models. These models, considered some of the most effective demand models thus far, take into account a whole system of recreation sites and can incorporate many of the important variables affecting recreation demand (Cesario, 1973).

Although gravity models were used to describe human interaction as early as the 1850's and more commonly in the early 1900's (Lukermann

and Porter, 1960), their occurrance in recreation demand studies is relatively recent. The original recreation gravity potential model put forth by Van Doren in 1967 (Van Lier, 1977) was used to predict use of Michigan state parks. The basic model was of the form:

$$V_{ij} = N_i \frac{A_j/D_{ij}^{\alpha}}{\sum_{m=1}^{M} A_m/D_{im}^{\alpha}}$$

where: V_{ij} = number of visits from population i to site j

N_i = number of recreation trips/unit time from population center i

A_j = measure of attractiveness of park j

D_{ij} = distance between population center i and site j

α = elasticity of visits with respect to distance

m = refers to the mth park

M = represents the total number of parks in the recreation system

In simple terms, the above model predicts the distribution of recreation trips among various similar recreation sites. The number of visits "pulled" to each site depends on the attractiveness of that site and its distance from the visitor's origin relative to other sites. Note that the number of visits to a park is inversely related to distance. This relationship with distance is known as a gravity variable, a term borrowed from the realm of physics. The gravity variable has consistently been shown to be the key variable in predicting rec-

reation use in many models (Crevo, 1963; Mansfield, 1969; Cheung, 1972; McAllister and Klett, 1976).

The above "pure" form of the gravity potential model is rarely seen today. Since the initial introduction of this rather simplified gravity potential model, many new versions have been formulated and used (Cheung, 1972; Freund and Wilson, 1974; Cesario and Knetsch, 1976; Knetsch, Brown and Hansen, 1976; McAllister and Klett, 1976). The modern models are frequently presented in regression form and may contain many more variables than Van Doren's Model. The binding factor linking all of these models, though, is their inclusion of the basic gravity variable (D_{ij}) and the population (N_i) variable (Buhyoff and Leuschner, 1978). Deacon, Pigman, and Deen (1972) present a list of the multitude of other variables concerning site characteristics, user characteristics, and locational factors which have been included in these models. New versions have come about largely as an attempt to more adequately measure the basic variables of the gravity potential model.

Problems arise concerning Van Doren's model when each of its variables is analyzed. The original distance variable of the model failed to distinguish between a visitor's travel costs and time costs. Either of these costs can change independently of the other and thus can change the visitation level of the park. Both costs have a negative influence on recreation demand. By lumping these costs together into the distance variable the model might yield severely biased estimates. Most recent gravity models (Cesario and Knetsch, 1976; Knetsch, Brown and Hansen, 1976) separate the distance variable (D_{ij}) into two com-

ponents, the travel cost variable and time cost variable. However, the value of time relative to travel costs is still a subject of debate. Transportation planning literature seems to indicate that a value of one fourth to one half the wage rate is an appropriate value for travel time (Cesario and Knetsch, 1976).

The N_i variable of Van Doren's model is a variable which has been expanded upon greatly over recent years. The original use of this term assumed that a given number of trips occurred at each population center without allowing for changes. Of course, if socioeconomic factors such as income and education change, then it is reasonable to expect a change in the number of trips generated at a population center. Also, an increase in N_i (total number of trips) could be expected if a new recreation site was developed near the population or if the quality of any of the sites were improved. Thus, in order to capture changes in what Cesario (1975) calls emissiveness and Cesario and Knetsch (1976) call trip generation, the N_i component appears as a much more complex variable in more recent models.

Despite this realization that the N_i variable should be sensitive to changing conditions, no clear cut forms have yet been developed to account for these variations. Budget constraints, availability of data, and some subjective feelings frequently determine which factors will be used to explain the number of trips generated from a population center.

To understand how the original gravity potential model has evolved, consider the model used by Cesario and Knetsch (1976) to predict the level of use at Pennsylvania state parks. The form of the model was:

$$v_{ij} = \theta X_i Y_j \exp(B\, c_{ij}) \left(\sum_{k=1}^{m} Y_k \exp(B\, c_{ij})\right)^{\alpha}$$

where: v_{ij} = number of trips/unit time from population i to site j

X_i = characteristics of the population center such as income and population size

Y_j = attractiveness of park j

c_{ij} = the cost of travel from i to j (this includes road milage, travel time, and site fees)

θ, α, B are coefficients

k = refers to the kth park

m = represents the total number of parks in the recreation system

The above model can be mathematically changed to the equivalent form:

$$v_{ij} = \underbrace{\left[\theta X_i \left(\sum_{k=1}^{m} Y_k \exp(Bc_{ik})\right)^{(\alpha+1)}\right]}_{N_i} \underbrace{\left[\frac{Y_j \exp(Bc_{ij})}{\sum_{k=1}^{m} Y_k \exp(Bc_{ik})}\right]}_{K_i}$$

Now the model appears similar to Van Doren's model. The terms within the first brackets represent the N_i variable of Van Doren's model. However, in this case the number of trips generated from a population center is dependent upon site quality and accessibility (the K_i term). Also, the origin characteristics can be included in the X_i term. In their actual application, though, the X_i term represented merely the population size and did not include income or other factors. The terms within the second set of brackets in this model are equivalent to the

last part of Van Doren's model. This is referred to as the trip distribution equation. Here, the probability of visiting park j is established by using a composite value, called accessibility, of the park's attractiveness and trip cost to that park and dividing by the sum of the accessibility of all parks. The trip cost variable (c_{ij}) replaced the D_{ij} of Van Doren's model. This new variable included two terms, one for travel costs and one for time costs.

McAllister and Klett (1975) developed a similar expansion of Van Doren's model in an attempt to predict ski trips in California. However, for the trip generating (N_i variable) portion of the model they included income, age, and level of urbanization as factors. On the other hand, they did not consider time costs and travel costs as separate variables. This model and the Cesario and Knetsch model both fail to consider the effects of crowding on travel patterns. It appears that congestion is a problem that still must be resolved in model construction.

The attractiveness variable of the gravity potential model is included as an attempt to differentiate recreation sites according to their appeal to the potential recreationist. More attractive sites should draw more visits than other sites at equal distances from the population. Unfortunately, "attractiveness" is not something that can be directly measured. Usually some proxy or combination of proxies is used to determine the relative attractiveness of a site.

A common method used to determine the attractiveness of a park has been to measure physical factors objectively. Knetsch, Brown, and Hansen (1976) used size of reservoirs in acres as an index of attrac-

tiveness to predict use of reservoirs in California and McAllister and Klett (1976) used a combination of maximum altitude, minimum altitude, and uphill carry capacity of ski lifts to predict use of ski facilities in California. Others have used physical factors for attractiveness but have qualitatively ranked these factors. For instance, Cesario and Knetsch (1976) used a team of researchers to subjectively rate the quality of facilities of Pennsylvania state parks as part of their index of attractiveness.

Usually the factors used for the index of attractiveness are found by first measuring numerous different characteristics of the recreation sites and then through statistical regression analysis, determine the best predictors of site use. Freund and Wilson (1974) used this procedure to determine which of over 40 attractiveness variables would best predict freshwater fishing trips in Texas. The final equation with 8 attraction variables included growing season, number of campsites, and milage of ocean frontage among others. Van Doren (Cheung, 1972) measured some 55 variables concerning camping attractiveness in Michigan state parks and then factor analyzed these to determine the key factors of importance. This procedure was complex however and no other similar attempts at using factor analysis seem to have been done.

Cesario (1975) has suggested use of the Automatic Interaction Detector Technique (AID) to determine the best explanatory variables of attractiveness. This technique is statistically more powerful[3/] than

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[3/] The specific advantages of the AID method are discussed by Sonquist and Morgan (1964). Basically, the AID technique is free from many of the major and often violated assumptions surrounding regression analysis.

regression analysis and can handle more complicated problems concerning numerous variables where many of these variables interact with each other. Essentially, the AID program identifies those variables which are most important in explaining the variance between use of different recreation sites. The program developes a type of "tree" where each successive branch indicates the next most important explanatory variable. As used by Cesario, a figure of relative attractiveness of any recreation site in a study can be read directly from the AID classification tree. One merely has to measure the relevant variables (i.e., relevant as determined by the AID analysis) of a recreation site and locate where these values fall within the classification tree. Both objective and qualitative physical factors can be analyzed simultaneously. Cesario's own application of the AID program supports the use of quantitative measures such as the size of a park or number of campsites.

In earlier years Cesario (1969) developed an attractiveness index based on distance decay curves which did not depend on any site characteristic measures. He proposed developing curves for each park considered in the model which related visits per capita to distance (Figure 1). The relative attractiveness of a park was found by comparing how many people visited different parks at a given distance. The average distance between the curves determined how attractive one park was relative to another. Aside from Cesario's own discussion of this method in 1969 no other references were found which used this method.

Another procedure for assessing attractiveness was used by Cheung (1972) to predict demand for various parks in the province of

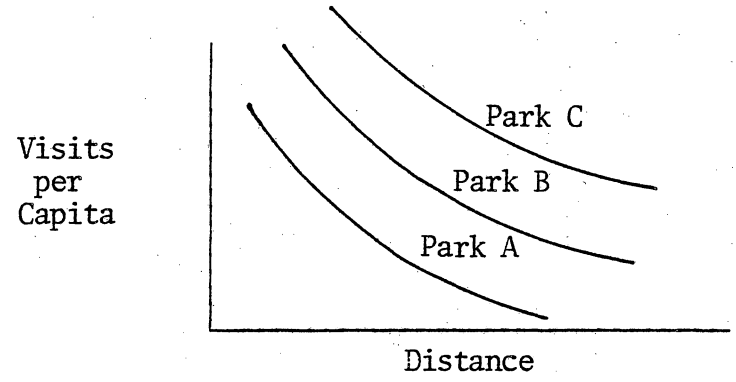

FIGURE 1

Saskatchewan in Canada. The attractiveness factor of a park depended on the popularity of selected day-use activities and the quality and quantity of the facilities associated with these activities. Popularity ratings were derived from a past national survey which assessed the participation rates of 26 outdoor recreation activities. The relative popularity of all activities was established by dividing the percentage of participation of each activity by some common participation rate percentage. For example, the 32 percent participation rate for swimming was divided (as were all other activity participation rates) by the 29 percent participation rate of hiking to obtain a relative value of 1.10. Then, all the popularity ratings for activities at a park were summed to obtain a total popularity value for that park. Also, the facilities associated with each activity were analyzed. The relative importance of facilities was determined by first finding the resultant correlation coefficients when day-use of all parks was correlated with each facility. Each coefficient was then divided by a common coefficient of some facility to obtain a relative value. To differentiate facilities by quality and quantity, numerical rankings were assigned. The rank value

for quality was a subjective assessment. As an example, facilities associated with swimming in the study were bathing beach, water quality, and number of showers. The bathing beach facility correlated .58 with day-use. Its relative importance rating was 1.88 after dividing by the .31 coefficient of boat ramp, the common denominator used. The quality of the bathing beach was ranked as fair or good and then a rank number was assigned. Thus, the final attractiveness value of a park was a combination of the values of all of its activities and their facilities. This attractiveness index is unusual in that physical measurements such as the length of beach played a minor role in its formulation.

The above methods of valuing attractiveness seem to emphasize two approaches: (1) using physical properties of the site and (2) relying on the recreationist's perception of the site. The value of either approach depends on its predictive success. Use of physical factors is criticized because of its lack of face validity. Alternatively, methods dealing with recreationist perception, such as assessing quality, seem to be plagued by subjectivity. Further, in most cases, the quality of a recreation site is relative to the group perceiving it and will vary across users (Van Lier, 1977). Research concerning perception is attempting to identify the components which determine attractiveness but as yet, no clear cut methods of measuring perception have been found which can be broadly applied. As an example, landscape preference research is attempting to determine the elements of a landscape which increase its aesthetic appeal (Daniel and Boster, 1976). Hopefully, this research can yield an objective means of determining a realistic value of attractiveness.

Valuation Procedure

The procedure for using the gravity model to valuate recreation sites is fairly straightforward and has already been described extensively by several authors (Clawson and Knetsch, 1966; Dwyer, Kelly and Bowes, 1977; Buhyoff and Leuschner, 1978). Generally called the travel cost method, the procedure was originally suggested by Hotelling in 1949 (Dwyer, Kelly and Bowes, 1977). The method uses travel costs as a surrogate for price and then estimates a demand function for a site. Since most public recreation areas are free of charge, it is assumed that the major costs of using such a site are the travel costs and users will thus react to a change in travel costs as they would to a change in user fees. By artificially manipulating the travel cost variable (i.e., distance) in a gravity model, a demand curve for the site is determined from which an estimated site value is derived.

Previous criticisms of the travel cost method concerned the validity of equating increased travel cost with user fees (Clawson and Knetsch, 1966). Many of these criticisms as discussed by Dwyer, Kelly, and Bowes (1977) have been overcome in newer models by inclusion of variables discussed previously such as both money and time costs and the effects of substitute or alternative recreation sites.

Conditions for using Gravity Models

The gravity model and its related forms are effective demand models because both use prediction and site valuation can be done simultaneously. But, the success of the models depends on their proper use. Dwyer,

Kelly and Bowes (1977) present a list of conditions which favor use of gravity models. Generally, the system of parks being evaluated in a region should be relatively homogeneous, travel costs (i.e., distance) should vary sufficiently between users to estimate changes in demand, and travel costs should be mainly due to visits to the individual park in question (i.e., the park should be a primary destination). The authors note that the models are particularly useful for rural sites where the visitors come from a local market area. Other researchers (Lukermann and Porter, 1960; Freund and Wilson, 1974) emphasize the importance of distinguishing between trips of different lengths (i.e., day trips vs. weekend trips, etc.). Different prediction models should be formulated for different trip lengths.

A final point to remember in developing recreation demand models is the purpose for their development. In recent years, many complex and sophisticated models have been developed which thoroughly control for all influences on recreation demand. But, as Matthias and Greco (1968) and Wennergren and Nielson (1970) note, too much complexity can make application of the model impractical while being only slightly more accurate than simpler models. Thus, accuracy in most cases must be balanced against reasonable data requirements.

METHODOLOGY

Study Area

The Blue Ridge Parkway is a National Recreation Area and also a unit of the National Park system. From its northern terminus at the south entrance of Shenandoah National Park in Virginia, the Parkway generally runs in a southwesterly direction for 469 miles, ending at the Great Smokey Mountains National Park in North Carolina (Figure 1). The Parkway follows the high ridges of the Blue Ridge mountains which also form the boundaries for 29 counties. Thus, a string of counties of fairly uniform width lines either side of the Parkway through both Virginia and North Carolina.

For the purposes of this study, the residents of the 29 adjacent Parkway counties and adjacent incorporated cities like Roanoke and Asheville plus the city of Lynchburg, Virginia were considered the local population under study. The residents of these 12 Virginia and 17 North Carolina counties are no more than about 50 miles from a Parkway entrance point and, therefore, have immediate access to this substantial recreation area. Lynchburg, Virginia was included because, although it does not border the Parkway it is sandwiched between two counties which are adjacent to the Parkway. Also, because the coverage of the telephone directories (see sampling, p. 20) did not conform exactly to the county boundaries, about one half of the land area of Macon county in North Carolina was included in the study area. This included about two thirds

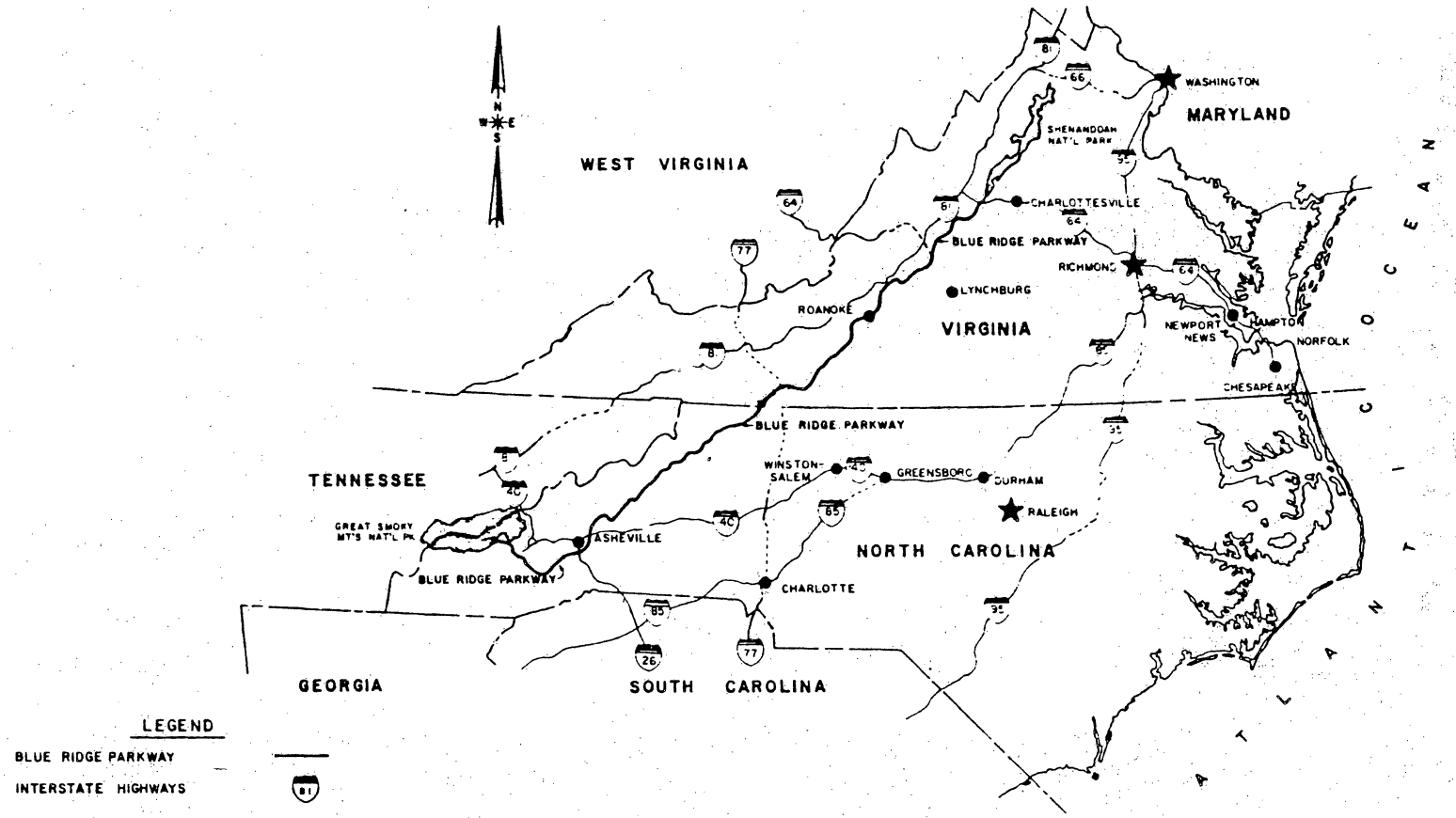

Fig. 1. Blue Ridge Parkway - General Location.

of the Macon county population. Although Macon county is not adjacent to the Parkway, the area included in the study is consistent with the other counties in terms of its general location (i.e., within 50 miles of the Parkway). Table 1 presents a list of the counties included in the study.

Sampling

Because of convenience and cost constraints, the sample population was selected from recent telephone directories which cover the study area. There are certain disadvantages of this method, however. One disadvantage is the possibility of bias since about 8 percent of the U.S. population do not have phones (Survey Research Center, 1975). Therefore, specific groups who tend not to have phones such as the poor, minority groups, and those who live alone may be underrepresented. This disadvantage is not considered a major problem, however, since the research focuses primarily upon present and future use, and those without phones are probably less apt to use the Parkway. Also, the impact of unlisted numbers on the sample is unknown. The assumption was made that a random portion of the population have unlisted numbers. Finally, a segment of the population was missed due to inadequate or outdated addresses (e.g., such as when people move). Any such occurrences were assumed to be random.

A proportional stratified sampling scheme was used to draw the 1200 names and addresses from the telephone directories. Specifically, the procedure was as follows:

TABLE 1

Counties Included Within the Study Area

Counties*	
North Carolina	Virginia
Swain	Grayson
Macon**	Carroll
Jackson	Patrick
Haywood	Floyd
Transylvania	Franklin
Henderson	Botetourt
Buncombe	Bedford
Yancey	Amherst
McDowell	Rockbridge
Mitchell	Nelson
Burke	Augusta
Avery	Roanoke
Caldwell	
Watauga	
Ashe	
Wilkes	
Alleghany	
Surry	

*/ All cites, whether incorporated or not, which were located within the outer boundaries of the above counties, were included in the study area. Also Lynchburg, Virginia which borders both Bedford County and Amherst County was included.

**/ Only the eastern half of Macon County which lies closest to the Parkway was included within the study area.

1) The population was stratified into 28 sections corresponding to the 28 telephone directories.
2) From the estimated total population of 440,000 listings, 1200 samples were drawn using a determined random method. The method involved using random numbers tables to select a random page number, column number, and listing within a column of a given telephone directory.
3) The portion of the 1200 samples coming from each of the 28 directories was based on the percentage which each book forms of the total population.
4) Any commercial numbers chosen were excluded and new listings were selected in place of these. Also, within any directory, if a chosen listing fell outside of the stated study area then that listing was excluded.

After this selection procedure, 200 names were systematically chosen from the 1200 for use in the pretest phase. The remaining 1000 samples constituted the actual sample for the study.

The above sampling scheme resulted in 54.3 percent of the samples being drawn from the relevant counties within North Carolina. Reference to 1970 Census data (Bureau of the Census, 1972) indicated that 54.0 percent of the samples should have come from these North Carolina counties. Thus, it appears that use of the telephone directories provided an accurate reflection of the true population distribution.

Survey Instrument

A self-administered mail-back questionnaire (Appendix F) was the

instrument used to collect the needed data. The questionnaire design included the following variables:

1) Local use patterns - A major part of the questionnaire concerned how much the Blue Ridge Parkway was used by local residents in 1978 and what sections (see modeling procedures, p. 32) were used.
2) Attractiveness variables - A section of questions was developed to indicate the relevant site characteristics influencing Parkway visitation.
3) Non-users - Since a substantial part of the sample consisted of people who did not use the Parkway in 1978, a section was developed to try to understand this lack of use. Also, this section was included as an effort to increase the response rate from non-users.
4) Comparison data - Several questions similar to those used by Tingle in his study (1977) were included.
5) Socio-economic data - Various background information questions were asked since other studies have shown that some -- such as income -- are important predictors of park use. Also, these questions yield a clearer picture of the sample population and lay the groundwork for future studies.

Survey Procedures

Two hundred local residents were mailed a questionnaire during September, 1978 as part of a pretest. The pretest was done to detect any unforeseen problems with the questionnaire such as ambiguous questions

or improper wording. Based on the returned questionnaires, final revisions were made.

Major use of the Blue Ridge Parkway during the year occurs between April 1 and October 31. Thus, the questionnaires, which ask numerous detailed questions concerning the April-October, 1978 season of use, were mailed out at the beginning of November, 1978. Each mailing envelope contained (1) a questionnaire, (2) a Blue Ridge Parkway map divided into sections as described below, (3) a return postage-paid envelope, and (4) a cover letter emphasizing the importance of the study. To reduce mailing costs, all out-going mail was sent by bulk mail and the return envelopes were printed with a business reply permit.

Follow-up techniques were used to increase the response rate (Dillman, et al., 1974). Therefore, all 1000 people were sent a reminder post card one week after the initial mailing. Those not responding two weeks after the post card was sent were then sent a complete new questionnaire packet containing a different and more forceful cover letter. The final mailing to non-respondents was made another two weeks later and contained an even more emphatic letter. All mailings were completed by early January 1979.

Copies of the questionnaire, Parkway map, and all cover letters used are presented in appendices F through I.

Response

For the mail-back questionnaire an estimated response rate of about 47 percent was attained. This figure excludes from the calculations the portion of the sample thought not to have received the questionnaire

even though it was mailed to them. Questionnaires were mailed to 1002 people and of these, 322 responded. However, of the original 1002 people in the sample only an estimated 680 people actually received the questionnaire. Two hundred forty-nine questionnaires were returned by the post office for reasons which included (1) addressee move, (2) unknown address, (3) incomplete address, and (4) addressee deceased. The remaining 73 people thought not to have received the questionnaire was an estimated figure based on the results of the telephone survey (see telephone follow-up procedures, p. 26). The assumption was made that the telephone numbers which were disconnected or out-of-service (17 percent or 9 of 53) represented another portion of the total sample of 1002 which did not receive the questionnaire. The estimated response rate is considered reasonable if not conservative since nine of the people actually interviewed by telephone also indicated that they had never received the questionnaire. A point to note is that because of outdated and incomplete addresses, telephone directories appear to be an extremely inefficient means of sampling the population within the study area in question.

All 322 returned questionnaires had usable information although many, approximately 20 percent, had at least one question which was improperly answered. No particular problems were created, however. Blank or improperly answered questions were simply excluded from the analysis of that question.

The telephone follow-up survey was highly successful with only 2 of 55 possible calls remaining incomplete after three tries. Nine telephone numbers were disconnected or out-of-service, but these were

considered completed calls for the purposes of the survey (i.e., the needed information was obtained). Of 44 people contacted, no one refused to be interviewed.

Telephone Follow-up Procedures

Due to the relatively large non-response to the questionnaire (see response, p. 24), a telephone follow-up survey of a sample of the non-respondents was deemed necessary. The purpose of the follow-up survey was to determine whether significant differences existed between those people responding to the questionnaire and those people who did not respond. The telephone questionnaire presented in appendix J is derived from the original mail-back questionnaire and contains most of the key questions from the original questionnaire so that appropriate comparisons could be made.

From the 431 non-respondents who were assumed to have received the mail-back questionnaire, 55 names were randomly selected for the telephone survey. The resultant sample size was approximately 13 percent of the total non-respondents. Between February 5 and February 14 of 1979, up to 3 telephone calls were made to each of the 55 people in an effort to contact them. All calls were made by the same person between 6:30 p.m. and 8:00 p.m. during weekdays.[4/] During the interview, all questions

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[4/] Telephone calls were all made during weekdays to take advantage of the university's SCATS line (i.e., wide area telephone service) which does not operate on weekends. Also, calls were made in the evenings because it was thought more people would be home then and partly because no phones were available during the busy office hours. As it turned out, alternate calling times were not necessary due to the high calling success achieved.

were asked exactly as written to avoid possible interviewer bias. Each telephone interview took between five and ten minutes to complete.

Telephone Interview Results and Conclusions

Table 2 presents the relevant differences which were found between questionnaire respondents and the sample of non-respondents interviewed by telephone. Responses to all other questions asked during the telephone interview which are not shown were not significantly different from the responses given on the questionnaire. Thus, concerning these other questions, there was no apparent non-response bias involved and therefore, no data adjustments were needed. For example, based on questionnaire data, the average group size during a Parkway visit was 4.06. Whereas, based on telephone interview data, average group size was 4.00. The difference was insignificant ($\alpha = .05$).

The most important non-response bias evident in Table 2 is the large difference in the extent of use made of the Parkway in 1978. Almost 72 percent of the questionnaire respondents said they had used the Parkway in 1978. However, only about 41 percent of the sample of non-respondents indicated that they had visited the Parkway that year. Thus, of the total sample of people who received questionnaires (approximately 680), a substantially larger proportion of the non-respondents had not used the Parkway in 1978. Also, Table 2 indicates that questionnaire non-respondents (i.e., telephone respondents) are less likely to use the Parkway in the next year or five years. However, this finding is most likely a result of the fact that the sample of questionnaire non-respondents contains a larger proportion of 1978 non-users than the

TABLE 2

Comparisons of Telephone Interview Data with Questionnaire Data

	Mail Respondents	Telephone Respondents*	Mail Respondents not Using BRP in 1978
Proportion who visited BRP in 1978	71.7%	41.9%	--
Proportion expecting to visit BRP next year	76.8%	63.6%	42.7%
Proportion expecting to visit BRP within 5 years	89.5%	84.1%	74.2%

	Mean Educational Level**	Mean Age of Respondent in Years
All Mail Respondents	6.1	47.7
Telephone Respondents	5.1	50.6
Mail Respondents not Using BRP in 1978	5.5	51.9

*/ Note that Telephone Respondents represent a sample of questionnaire nonrespondents.

**/ Educational level was based on a scale from 1 to 9 where 1 represented 0-4 years of education and 9 represented an advanced degree. The 9 categories refer to the 9 choices offered on the education question of the questionnaire.

sample of questionnaire respondents. When only the 1978 non-users of the questionnaire respondents were considered, the percentage of people expecting to use the Parkway in the next year or five years was even lower. Thus, in general, the 1978 non-users expect to use the Parkway less in future years than those who did visit the Parkway in 1978.

Because of the apparent non-response bias regarding the extent of use made of the Parkway, certain data adjustments seemed necessary. First, the 72 percent extent of use figure from the questionnaire data was adjusted downward to 55.4 percent after the telephone interview data was incorporated. The following strategy was used to derive this new figure:

1) There were 71.7 percent or 231 people of a total of 322 questionnaire respondents who used the Parkway in 1978.
2) Of the estimated 358 questionnaire non-respondents, 40.9 percent or 146 of these people were assumed to have used the Parkway in 1978.
3) Therefore, of the 680 people who received the questionnaire, an estimated 377 people (231 plus 146) or 55.4 percent used the Parkway in 1978.

The same strategy as above was used to adjust the figures relating to future Parkway use. Thus, a more conservative estimate would be that 69.9 percent of the population intend to use the Parkway next year and 86.7 percent of the population intend to use the Parkway within the next 5 years.

A second adjustment of data undertaken involved the trips/1000 population estimates made for each county or cluster of counties by

using the demand model (see modeling procedures, p. 32). Since the number of trips/1000 population predicted by the demand model for each origin are based on the use figures from the questionnaire data, these estimates would be inflated if the questionnaire results are assumed to be biased as indicated. A correction factor of .769 was calculated which, if multiplied by a given trips/1000 population estimate derived from the demand model, would yield a more conservative and possibly more realistic estimate of the actual trips/1000 population. Fortunately, there was no significant difference ($\alpha = .05$) between questionnaire respondents and non-respondents concerning the average number of trips taken by 1978 Parkway users. Thus, the strategy used to calculate the correction factor was as follows:

1) The 231 people from the questionnaire respondents who said they used the Parkway in 1978 should comprise 55.4 percent of a sample population instead of the calculated 71.9 percent. Thus, 231 people should not be from a sample of 322 people, but from a sample size of 417 people.
2) For each origin, trips/1000 population was found by dividing the total number of one-day trips by the number of respondents and then, multiplying by 1000. To adjust for bias, then, a certain number of non-users must be added to the sample for a given origin since there were more non-users than was indicated by the questionnaire data.
3) The adjusted number of respondents for each origin is equal to the original number of respondents multiplied by 1.3. This figure, 1.3, is found by dividing 417 by 322.

4) Since the number of respondents is the denominator used in the formula used to calculate trips/1000 population, an adjustment of the trips/1000 population estimates can be determined by either dividing all such estimates by 1.3 or, equivalently, by multiplying by .769.

Mean educational level, shown in Table 2, was another item on which questionnaire respondents and non-respondents differed significantly ($\alpha = .05$). In this case, non-respondents tended to have a significantly lower educational level than either the questionnaire respondents or the non-users respondents. This finding indicates that the lower educational level probably was not due only to the presence of more non-users in the non-respondent group. The apparent bias, however, does not affect any of the conclusions stated in this thesis and therefore, no data adjustments were necessary. Mean age levels of questionnaire respondents and non-respondents, although not significantly different, are presented in Table 2 to reveal, again, the apparent effect of the size of the proportion of non-users in the sample. It appears that, as the proportion of non-users in a sample increases, the mean age of the sample also increases.[5/] The relevance of the relationships between the extent of Parkway use, education, and age are discussed further in the following chapter when the results of the demand modeling task are presented.

[5/] Although mean age levels were not significantly different between questionnaire respondents and non-respondents, the difference was significant ($\alpha = .05$) between the 1978 Parkway users from the questionnaire respondents and the 1978 non-users.

Modeling Procedures

Model Form

Because of the Blue Ridge Parkway's large size and linear character, use levels vary considerably along its 470 mile length. Site variations along the Parkway itself may influence use patterns. Also, differences in the regional population from one area of the Parkway to another can affect use levels. Therefore, in order to develop a more meaningful demand model of local use which can account for these variations, the Parkway was divided into smaller units for the purposes of prediction. Specifically, five sections of the Parkway identified by Tingle (1977) as being distinct in terms of use intensity and type of primary use, were the basis of prediction. The five sections identified include:

Area	Area Dimensions	Approximate Mileage
A	Mile 0 to Roanoke	115
B	Roanoke to Fancy Gap	85
C	Fancy Gap to Blowing Rock-Boone	100
D	Blowing Rock-Boone to Asheville	90
E	Asheville to Smokey Mtn. N.P.	80

The demand model developed, then, predicts day-use[6/] for each section. Total predicted day-visitation to all sections by area residents can be determined by merely summing predicted day-use figures for each of the 5 sections.

Note that only the extent of day-use will be predicted by the developed demand model. As was discussed in the literature review

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[6/] Day-use trips are defined to be trips to the Parkway where the visitor returned home on the same day he or she left.

(p. 17) and as is evident from the survey results (see results and conclusions, p. 48), extended visits (e.g., overnight Parkway camping trips) appear to have a different demand function from day-visits. In other words, use patterns differ depending on the length of the visit. Thus, only day-trips were used in the analysis since inclusion of all trips, regardless of length, would likely decrease the predictive ability of the demand model. Day-trips were chosen over other types of trips since they accounted for over 90 percent of the trips made to the Parkway by local residents (see results and conclusions, p. 47).

Construction of the recreation demand model for the five sections was based on the following relationship describing recreation travel behavior:

$$V_{ij} = f(D_{ij}, O_i, S_{ij}, A_j)$$

where: V_{ij} = number of visits from origin i to site j

D_{ij} = a measure of distance between origin i and site j

O_i = origin characteristics (e.g., population size, income)

S_{ij} = availability of alternative recreation sites

A_j = characteristics of site j (i.e., attractiveness factors)

Here, the number of visits from origin i to site j is a function of various origin and site characteristics, available alternative recreation sites, and the distance to site j from origin i. The above four basic variables related to visitation levels summarize the multitude of variables used by past researchers to describe recreation behavior. All variables discussed in the literature review can be expressed by one of the above four variables.

In terms of the Blue Ridge Parkway, the applicable recreation system consisted of counties or clusters of adjacent counties as the origins and the five Parkway sections as the destinations. Originally, each county in the study was to be considered as a separate origin. However, because of the poor response rate from several of the counties, certain adjacent counties were grouped together as one origin for use in the demand model. Table 3 presents the list of counties and clusters of counties which were used as origins in the demand model.

Dependent Variable

The dependent variable to be predicted in the Parkway demand model is the number of day-trips/1000 population for a given time period. Two time periods were used and thus, two demand models were developed. One demand model predicts the number of day-trips/1000 population occurring within a year while the second model predicts the number of day-trips/1000 population occurring within the busy April-October visitor season. The data on the dependent variables used to develop the demand model was derived from the questionnaire data. For each county or cluster of counties, as the case may be, the total number of day-trips to a given Parkway section was divided by the number of questionnaire respondents making those trips and then, multiplied by 1000 to determine the trips/1000 population figures. Thus, since there were 21 possible origins and 5 possible destinations (i.e., Parkway sections), 105 different trips/1000 population estimates were obtained for each demand model. Use of the trips/1000 population variable as the dependent variable implicitly assumes that population size is an important variable

TABLE 3

Origins Used in the Development of the Demand Model

County or County Clusters (i.e. Origin)	1970 Population*	Land Area in Square Miles	Sample Size
North Carolina:			
Jackson-Swain-Transylvania-Macon**	61,113	1,697	11
Haywood	41,710	551	7
Henderson	42,804	378	20
Buncombe	145,056	657	39
Yancey-Mitchell-Avery	38,731	772	8
McDowell	30,648	436	6
Burke	60,364	511	11
Caldwell	56,699	469	12
Watauga	23,404	317	5
Wilkes	49,524	757	9
Ashe-Alleghany	27,705	651	7
Surry	51,415	536	18
Virginia:			
Grayson	21,717	459	8
Carroll-Floyd	32,867	877	7
Patrick	15,282	464	6
Franklin	26,858	716	5
Roanoke	181,436	303	71
Bedford	32,739	734	12
Botetourt-Rockbridge	48,852	1,155	6
Amherst-Nelson***	91,857	966	35
Augusta	85,431	1,002	19
		Total =	322

*/ Figures derived from 1970 Census Data (Bureau of Census, 1972).

**/ Only 2/3 of the Macon County population and 1/2 of its land area were included in the study.

***/ The city of Lynchburg is included as part of this origin.

since total visitation from a given origin will always depend on the population size. Thus, variations in total predicted visitation between origins may be due to population differences rather than due to differences in one of the independent variables included within the final model.

Independent Variables

Independent variables included in the final models were selected after the testing of 21 candidate variables. Table 4 presents a list of all independent variables which were tested, as well as the source from which the data was obtained. Initial selection of the variables shown in Table 4 was based on the findings of past researchers (see literature review, p. 8) and each variable can be classified under one of the four major determinants of recreation behavior (i.e., distance, alternative recreation sites, origin characteristics, and site characteristics).

Distance Quantification

Two different distance measurements were tried in the initial phases of model development. The first distance variable was a measure of actual distance in miles between a given origin and Parkway section. The distance was measured from state road maps and was an estimate of the shortest road distance from the calculated population centroid (i.e., the center of a population mass) of an origin to the nearest Parkway entrance of the section in question. A second distance variable was created by merely placing the previous distance measures into the

TABLE 4

Independent Variables Considered in the Parkway Demand Model

Independent Variable	Data Source
Distance (D_{ij}):	
1. Distance in Miles	State road maps
2. Distance Categories	State road maps
Alternative Recreation Sites (S_{ij})	
3. Number of closer comparable recreation sites (excluding Shenandoah National Park and Great Smokey Mountains National Park	State road maps
4. Number of closer comparable sites (including Shenandoah National Park and Great Smokey Mountains National Park)	State road maps
Origin Characteristics (O_i):	
5. % with children under 5	Questionnaire (question E-12)
6. % with children 5 to 17	Questionnaire (question E-13)
7. average educational level	Questionnaire (question E-15)
8. average age	Questionnaire (question E-9)
9. median age	1970 Census data
10. average income	Questionnaire (question E-14)
11. median income	1970 Census data
12. average type of community (index of urbanization)	Questionnaire (question E-6)
13. density	1970 Census data
Site Characteristics or Attractiveness (A_j):	
14. Site preference index	Tingle's thesis (1977)
15. Index of attractiveness based on 8 physical characteristics	General Parkway visitor map and Questionnaire data (section B)
16. Average altitude of Parkway	Parkway road log
17. # of restaurants	General Parkway visitor map
18. # of visitor centers	General Parkway visitor map
19. # of picnic areas	General Parkway visitor map
20. # of short nature trails	General Parkway visitor map
21. # of historic sites	General Parkway visitor map

following categories:

Distance Category	Category Range in Miles
1	0 - 20
2	21 - 40
3	41 - 60
4	61 - 80
5	81 - 100
6	101 - 150
7	151 - 200
8	more than 200

This second variable proved to be better in terms of its correlation with the dependent variables and thus, was used in place of the original distance measurement for later analysis. The distance categories were initially created under the assumption that they might mask any errors from the road map estimates and also, because visitation was essentially zero for distances greater than 200 miles.

Quantification of Alternative Recreation Sites

As already stated, the developed demand model will predict visitation from a given origin to a given Parkway section. The effect of alternative recreation sites (S_{ij}) on local visitation patterns was quantified by counting the number of comparable recreation areas which were closer to the given origin than the Parkway section in question. Also, comparable recreation areas were included in the count if they were the same distance from the origin as the given Parkway section. Since the Parkway is a relatively unique recreation resource and not comparable to any nearby county or state parks, the alternative recreation sites include only the five sections themselves, and possibly Shenandoah National Park (SNP) and the Great Smokey Mountains National Park (GSMNP). Further, since the comparability of SNP and GSMNP with the Parkway was uncertain, two S_{ij}

variables were devised. One variable included only the five sections themselves as possible alternative sites. The other S_{ij} variable includes both the five Parkway sections plus SNP and the GSMNP for a total of 7 possible recreation sites. As an example, if the number of visits from Augusta county in Virginia to section B of the Parkway were being predicted, S_{ij} could equal either 1 or 2 depending on which variable was being used since both section A of the Parkway and SNP are closer recreation sites than section B.

Origin Characteristics Quantification

As shown in Table 4, numerous origin characteristics were identified as possible candidates for inclusion in the final demand model. Information regarding these variables was collected for each origin identified in Table 3. Note that age, income, and population density are each represented by two different variables. For each of these three characteristics, information was obtained from both questionnaire data and 1970 census data. Use of census data was used partly as a validity check on the results obtained from the questionnaire. A high correlation between questionnaire data and census data on these three characteristics indicates, to some degree, that the questionnaire respondents were representative of the general population. Also, if the correlations were high, then census data which is relatively easy to obtain could possibly be used in place of the questionnaire data in the final model (i.e., assuming one or more of the three variables are included in the final model). The education, income, and type-of-community variables derived from questionnaire data were based on multiple choice questions. Choices

to these questions were ranked from the lowest value through the highest value and then the means for each origin were calculated.

Attractiveness Quantification

Quantifying site attractiveness has always been a difficult task in demand modeling and no methods of clear cut superiority have been developed to date. In the case of the Parkway, three different methodologies were employed in hopes that at least one method or variable would show a significant relationship with local Parkway visitation patterns. The first index of attractiveness was based on the indicated preferences for each Parkway section as found by Tingle (1977). In Tingle's study, Parkway visitors were asked their favorite or most preferred Parkway area and then, a histogram was prepared which indicated the preference levels for the 44 Parkway planning subsections. The preference figures for the five major Parkway sections identified in this study were derived by adding together the preference levels for all planning sections within a major section and finding the average.

Another attractiveness index was based on the sum of various physical characteristics which were weighted according to the strength of the public's preference for those characteristics. The data used to derive this index are presented in Table 5. The eight characteristics forming the index were the eight most important Parkway features as indicated by respondents to the questionnaire (see appendix C, p. 73). Similarly, the preference weights used were the average rating values obtained from the same section of the questionnaire (i.e., section B). The index value for each Parkway section was found by ranking the sections

TABLE 5

Basic Data for Weighted Attractiveness Index

Parkway Characteristic	Parkway Sections and Rankings*					Preference Weight
	A	B	C	D	E	
Average altitude of Parkway	2	1	3	4	5	2.6
# of Restaurants	5	2.5	2.5	2.5	2.5	2.5
# of Visitor Centers	5	3	1.5	4	1.5	2.5
# of Picnic Areas	2	3.5	3.5	5	1	3.0
# of self-guiding or short nature trails	5	2	2	4	2	2.6
# of historic sites	5	4	3	2	1	2.6
Amount of forested land surrounding Parkway	3	1.5	1.5	4	5	2.6
Most isolated from developments	3	1	2	4	5	2.8

Index Results

Section A = 78.4
Section B = 49.2
Section C = 50.8
Section D = 78.9
Section E = 60.8

$$\text{Index Value} = \sum_{i=1}^{8} (\text{Ranking}_i)\ (\text{Preference Weight}_i)$$

*/ Rankings were from 1 to 5 where 5 was the best ranking and 1 was the worst ranking.

from 1 to 5 on each of the eight characteristics and multiplying each ranking by the appropriate preference weight before summing all eight rankings. Five was considered the best ranking for the scheme used and thus, the section with the largest index value was calculated to be the most appealing. All rankings were based on objective information except "amount of forested land surrounding the Parkway" and "most isolated from developments" which were subjective evaluations.

The final type of attractiveness measures considered were individual physical characteristics such as average altitude of the Parkway and the number of short nature trails within each section. The last six variables listed in Table 4 under site characteristics were of this type.

Data Analysis

All statistical analysis procedures for both study objectives were performed using SPSS (Statistical Package for Social Scientists). The first objective, documentation of local use patterns and characteristics, was basically a descriptive task and thus, univariate statistics (i.e., mean, mode, variance, range) was the primary method of analysis used. Below is the list items analyzed using univariate statistics:

a) Local population use of the Parkway in 1978
   - percent of local population using the Parkway in 1978.
   - extent of past Parkway use and expected future use.

b) Information concerning non-Parkway users in 1978
   - major reasons for not using the Parkway
   - extent of past Parkway use

c) Information concerning those who did use the Parkway in 1978
   - average number in party
   - average number of trips per season
   - breakdown on trip lengths
   - month of visits
   - avoidance of crowded times or places
   - percent using Parkway in winter and average number of trips
   - major purpose of visits in summer and winter
   - extent and type of facilities used
   - preferences for Parkway attractions and facilities

d) Commuter Use (i.e., all non-recreational use)
   - extent of commuter use by local population
   - location of most commuter use

e) Local Opinions of the Parkway
   - opinions concerning the scenic beauty of Parkway (i.e., is it worse, better, or the same as in past), also list of specific reasons given for opinion
   - opinions towards additional activities and facilities
   - suggestions for new facilities

Regarding the above outline, bivariate statistics using the student t-test to test hypotheses ($\alpha = .05$) was performed to explore differences which might have existed between those who do and do not use the Parkway for commuting purposes and between those who do and do not avoid crowded Parkway times and places. This additional analysis was necessary to adequately describe these facets of local Parkway use. Also, the student t-test was used to indicate the significant differences ($\alpha = .05$) which

existed between questionnaire respondents and non-respondents.

The second study objective, development of a recreation demand model, was accomplished by use of multiple stepwise regression techniques. Specifically, the forward selection procedure was used which enters the dependent variables one by one according to how much the variable increases the R^2 (coefficient of determination). Those variables increasing the R^2 the most are entered first. Several model forms were tried including a linear model and various non-linear models. The non-linear models considered were transformed into log linear form so that linear regression techniques could be used. Also, since the log of zero is undefined, a small constant (.001) was added to all zero values of any variable which was to be transformed in a log linear model. Final selection of the best prediction model (i.e., the best combination of variables as well as the best model form) depended largely upon the model's R^2 and the relative significance of the included variables.

RESULTS AND DISCUSSION

Two objectives were considered in this study; (1) description of local use patterns and characteristics, and (2) development of a recreation demand model of local use. Thus, the results are presented in two sections. Results of the demand modeling effort are presented in the latter part of the chapter, since much of the information and strategy used in the development of the model was extracted from the findings related to the first objective. Supporting numerical data for the first section can be found at the end of the report in Appendices A through E.

Local Use Patterns and Characteristics

The relative recreational value of the Blue Ridge Parkway to its adjacent residents is indicated by the data presented in Appendix A. As can be seen, even after adjusting the use figures downward to account for any bias, more than half of the sample had used the Parkway in 1978 alone. Further, virtually everyone sampled had used the Parkway at least once in past years and about one half of those respondents had used the Parkway more than 20 times. When asked if they would likely visit the Parkway within the next year or five years, over two thirds of the respondents stated they would visit the Parkway next year and almost 90 percent of the respondents thought they would visit the Parkway within five years. The fact that these percentages concerning expected future

Parkway use were higher than the percentage visitation in 1978 suggests a desire by the local residents to use the Parkway more extensively than it is currently being used.

Lack of time is likely one key reason why the local population makes less use of the Parkway than desired. Appendix B, which presents information concerning those who did not use the Parkway in 1978, reveals that lack of time was far more important than any other reason for not using the Parkway. Based on the questionnaire rating scale, all other reasons rated by 1978 Parkway non-users were of little or no importance. Thus, if available leisure time should increase in future years, Parkway visitation by local people will likely increase also.

As shown by Appendix B, expected future Parkway use as well as past use by the 1978 non-users was generally less than the overall group of respondents. However, visitation by this group still appears to be extensive over the long run with over 90 percent having used the Parkway in past years. Also, over one third of the non-users of 1978 had visited the Parkway more than 20 times.

The results of the multitude of specific questions which were asked to those who did use the Parkway in 1978 are presented in Appendix C. As shown, average group size during a Parkway visit was found to be 4.1. Although this value was higher than the 3.7 figure estimated by Tingle (1977), the difference was not significant ($\alpha = .05$) indicating that no difference exists between the party sizes of local users and all other users as a whole. However, both figures are greater than the 3.3 passengers per vehicle multiplier presently used by the Parkway in conjunction with traffic counters. Whether or not the 3.3 figure under-

estimates actual recreational visitation would depend on the level of non-recreational use (e.g., commuter use) which inflates visitation figures.

Day-trips where the visitor returns home on the same day he or she left were the most common type of visits made to the Parkway. Only about 10 percent of all Parkway visits made by local residents were for extended periods of time (i.e., two or more days in a row). This finding is quite different from Tingle's research (1977) which found that for the general Parkway visitor, 3.5 days was the average amount of time spent on the Parkway during one visit. In Tingle's study, however, about one half of the visitors sampled were from states other than North Carolina and Virginia. The significance of the relative popularity of one-day trips by local residents will become apparent as other characteristics of local use are discussed.

When visitation levels were considered by month during the popular April through October visitor season, some interesting trends were revealed. Generally, the distribution of one-day trips over the various months was fairly consistent with actual Parkway visitation figures. That is, visitation was fairly low during April and May, moderate during June, fairly high during July and August, and highest during the colorful month of October. However, the number of one-day trips by the local population remained relatively high during September when overall Parkway visitation declines substantially. Also, visits of two days and longer were much more common during July, August, and September than during October. It would appear that during September the Parkway is dominated much more by the local population than by visitors from

more distant locations.[7/] Further, the extremely high use of the Parkway during October might be attributed partly to the large amount of one-day trips made by the adjacent residents during this time.

Distribution of visits across the five major Parkway sections (see modeling procedures, p. 32) is also shown in Appendix C. These results should be interpreted with caution, however, since the levels of visitation for each section depend considerably on how the population was sampled. For this study, areas were sampled proportionally to the population size and the response generally followed the original sampling distribution. Thus, the more populus areas like Roanoke and Lynchburg, Virginia comprised a sizable portion of the total sample. The greater day use of the Parkway section north of Roanoke (i.e., section A) is most likely due to the greater concentration of people in that region. Notable, however, is that when two-day and longer trips are considered and distance becomes less of a deterring factor, visitation seems to shift more towards the North Carolina sections of the Parkway. This would indicate that either the North Carolina sections are preferred more for extended visits rather than for one-day visits or most likely, the southern Parkway areas are preferred more overall and given adequate time most people would prefer to visit these areas. Tingle's study (1977) also found that the mountainous North Carolina sections were

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[7/] For the purpose of understanding how visits by the local population might affect overall Parkway visitation patterns it should be noted that probably about one third of all Parkway use is made by the local population studied. The actual use figures will be presented later when the demand model is discussed (p. 58).

preferred over the northern Parkway areas. One might conclude, then, that facilities or activities associated with day use (e.g., picnic areas, short nature trails) would be more needed in the northern Parkway sections of Virginia while facilities and activities associated with extended visits (e.g., campgrounds, lodges) would be in greater demand in North Carolina.

The Blue Ridge Parkway can become quite crowded during certain periods between April and October; especially during the fall color season in October. Thus, an attempt was made to assess how aware local residents are of these crowded conditions. When asked if they ever arranged their Parkway visits to avoid crowded times or places, about 30 percent of the respondents agreed that they had on both parts of the question. However, there was no apparent difference between this sample of 30 percent and the rest of the sample when the distribution of trips by month was examined. Also, both groups had visited the Parkway a statistically equivalent average number of times ($\alpha = .05$). Therefore, if such changes in visitation plans do occur, it would appear that those adjustments are made within a given month or even within a given day.

Concerning Parkway visitation during the winter months (i.e., November through March), Appendix C reveals that over one fourth of the respondents had made such a visit in the winter of 1977-78. Of those who did visit the Parkway during that period, the average number of trips was 2.8. The major purposes for visiting the Parkway in winter were essentially the same as for visiting in the summer months: (1) viewing scenery, (2) participating in outdoor recreation activities and (3) visiting Parkway facilities. A small difference was that, during

winter months, visiting Parkway facilities was somewhat less important. This finding may be related to the fact that many Parkway facilities are not open in winter. Results of this question concerning the local visitor's primary purpose for visiting the Parkway are consistent with responses by all Parkway visitors as found by Tingle (1977).

As one might expect, facilities associated more closely with day-use activities were the most heavily used by the local population. Most used facilities were Parkway picnic areas followed by restaurants and visitor centers. Least used of the five types of facilities presented in Appendix C were lodges, cabins, and campgrounds, i.e., facilities not used on one-day visits. Further, when respondents rated the importance of eighteen different reasons for visiting specific Parkway areas, picnic areas came out on top again. For facilities, the results were consistent with actual use levels with campgrounds and lodges rated least important. The results of the importance ratings shown in Appendix C indicate that for local Parkway visitors, picnic areas which are close to home yet isolated from towns and developments are most desired. Also, the value of such areas might be enhanced if short nature trails and historic sites were available for local users. Likewise, visitor centers and restaurants appear to be of some importance. The relatively high ratings attached to isolated areas and large forested areas emphasizes the importance of protecting the natural and scenic qualities of the Parkway.

Appendix D presents data concerning the local population's use of the Parkway as a commuter route (i.e., non-recreational use). Twenty-three percent of the sample agreed that they sometimes use the Parkway

for commuting purposes. The only statistically significant ($\alpha = .05$) characteristic of Parkway commuter use found was that Parkway commuters seem to live in a narrow corridor along the Parkway, living an average of 11.6 miles from the Parkway. No difference was apparent between the level of commuter use in North Carolina and Virginia. Also, the Pearson product-moment correlation between the population density of a county and the percentage of the county population commuting on the Parkway was only -0.08 and thus, not significantly different from zero ($\alpha = .05$). This indicates that commuting on the Parkway is equally common in both rural and more urban areas. However, more commuters would likely come from urban areas simply because of their greater populations.

The collection of data on local opinions towards the Blue Ridge Parkway is shown in Appendix E. Generally, it appears adjacent Parkway residents are extremely satisfied with the quality of the Parkway. Close to 40 percent of the sample think the scenic beauty of the Parkway has improved over the years while only 9 percent think the scenic beauty is deteriorating. Improved Parkway maintenance was the overwhelming reason mentioned for the increased scenic beauty. For the small number of respondents dissatisfied with the scenic beauty of the Parkway, the most mentioned reasons were (1) obscured views and (2) increasing commercialization of the Parkway. Although a small number of responses were submitted for this free response question concerning Parkway scenic beauty, the results do indicate some of the Parkway characteristics of which the local population is aware. Respondents were also asked for their opinions regarding the amount of Parkway facilities desired. About one half of the respondents were satisfied with the present number Parkway

facilities while another 45 percent of the respondents would like to see more facilities opened. Specific additional facilities and activities desired by the local population were numerous, with over 70 different responses to this free-response question. The question allowed respondents to list up to three different suggestions for additional facilities and activities. Most responses were very specific, e.g., covered picnic tables, more guard rails, or even campgrounds for trailers only. The most common responses given were generally consistent with the results of a similar question asked to all Parkway users by Tingle (1977). However, in the case of local users, campgrounds and campground facilities were mentioned less frequently. Restaurants, comfort stations, and picnic areas were the three most requested facilities. Again, it appears that facilities associated with extended Parkway visitation are less important to local users who make extensive day-use of the Parkway. Note also that a substantial number of respondents stated that no more facilities were desired even though such a response was not requested. Possibly other respondents who left this question blank had similar feelings. Thus, one should be aware that requests for additional facilities and activities do not necessarily represent the majority of local users.

Recreation Demand Model of Local Use

Choice of the optimal demand model presented below was guided by the desire to keep future data requirements minimal without limiting the predictive ability of the equations. While numerous factors certainly influence recreation behavior, usually only a few key variables have been found to account for the bulk of recreation visitation. An

effort was made to identify the key variables related to local Parkway visitation patterns and to include these variables in the final models. Two models were developed. One model predicts the number of one-day trips/1000 population occurring within the April through October visitor season while the second model predicts one-day trips/1000 population occurring within one complete year. As it turned out, the selected model form with its included variables was the same for both developed demand models, although, of course, the coefficients differ. The final chosen model was:

$$V_{ij} = b_o + b_1 \ln(DIS_{ij}) + b_2 \ln(ALT_{ij}) + b_3 \ln(DEN_i)$$

where: V_{ij} = the number of one-day trips/1000 population from origin i to site j (time period is either the April-October season or one year),

DIS_{ij} = distance between origin i and site j expressed as a value from 1 to 8 depending on the distance category,

ALT_{ij} = an alternative opportunity index, the sum of the number of Parkway sections closer to origin i than section j,

DEN_i = the population density of origin i obtained from census data,

ln = the natural logarithm of the variables within parentheses,

b_a = coefficients.

The actual coefficient values, depending on the model, are presented in Table 6. For all models, the coefficients of DIS_{ij} and ALT_{ij} were significantly different from zero at the .005 level. The coefficients for the DEN_i variable were significant at the .09 level. Also, the signs of the coefficients were as expected. That is, the negative signs of the

TABLE 6

Estimated Demand Functions, Blue Ridge Parkway, 1978*/

Dependent Variable	R^2	Intercept	Independent Variable Coefficient		
			DIS_{ij}	ALT_{ij}	DEN_i
April-October Seasonal Models					
1) V_{ij}	0.63	742.3	-665.3 (111.3)	-137.0 (32.6)	157.4 (92.4)
2) V_{ij} (Adjusted for bias)	0.63	570.8	-511.6 (85.6)	-105.3 (25.1)	121.0 (71.1)
Year Round Models					
3) V_{ij}	0.58	924.3	-907.5 (160.3)	-156.6 (46.9)	228.4 (133.1)
4) V_{ij} (Adjusted for bias)	0.58	710.8	-697.9 (123.2)	-120.4 (36.1)	175.7 (102.3)

*/ Figures in parentheses are the standard errors of the coefficients under which they appear.

DIS_{ij} and ALT_{ij} coefficients are consistent with the idea that as distance and the number of alternative recreation opportunities increase, the number of visits to a given site decreases. Further, the positive sign of the DEN_i coefficient implies that people from more urban areas use the Parkway more frequently. Multicollinearity was not considered a problem regarding these three independent variables since none of the correlations between the variables were greater than .8 (Leuschner and Young, 1978). As can be seen, the seasonal-use demand model explains 63 percent of the variation in use while the year-round demand model explains 58 percent. Models 2 and 4 presented in Table 6 are the models which were derived after adjusting the data for the apparent nonresponse bias (see Telephone Interview Results and Conclusions, p. 27).

Examination of the residuals[8/] for the above model form revealed that one of the assumptions upon which the statistical tests used in linear regression are based was violated. It was found that the error variance was not constant over the range of the independent variable. This heteroscedasity problem means that for the larger values of V_{ij} the variation of the actual observations about the estimate was much greater than for smaller V_{ij} values. The problem could have been easily solved by using a model in which the independent variable, V_{ij} was transformed but this new model would have had a much smaller R^2 value. Consultants of the Virginia Polytechnic Institute and State University statistics department also recommended use of the model presented here since, for

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[8/] Residuals are defined to be the differences between the observed value of a dependent variable and the predicted value of that variable.

the purposes of this research, predictive ability was of prime importance. Further, as the consultants stated and as Cohen and Cohen (1975) indicate, in most cases heteroscedasity will not seriously influence the accuracy of the statistical tests. It is also interesting to note that in most of the models tried, both linear and log linear, the variables highly related to local Parkway use were the same.

As is shown, only three variables of the many variables tested were incorporated within the final recommended model. DIS_{ij} and ALT_{ij} were key variables which entered the model first during the forward selection statistical procedure. However, upon selection of the third variable for the model, several choices were available which were very similar in terms of their significance to a three-variable model. The educational level and age variables derived from questionnaire data actually boosted the R^2 slightly more than the density variable while the income variable (from census data) was slightly less important. Further, after entering any one of these variables at the third step, the remaining three variables as well as all other non-entered variables were quite insignificant at the fourth step. Thus, addition of any more than three variables to the model would only render the model more complex without increasing its predictive ability. The DEN_i variable, even though it was slightly less significant than either education or age, was selected because the appropriate data is easily obtainable from census information and therefore, use of this variable is more practical. Because only one of the four variables significant at third step could be used in the final model it was apparent that these variables explained the same portion of the variation in local use. This result is consistent, however, with the

relatively high correlations between all four of these variables. In other words, in the area surrounding the Parkway lower income levels, lower educational levels, more rural areas, and the older age classes of the population were associated with each other and these characteristics, in turn, were associated with decreased use of the Parkway. Results obtained from the analysis of the telephone follow-up survey (see p. 27) also indicated that education and age were significantly related to Parkway visitation.

As is obvious, none of the devised attractiveness variables were incorporated into the final demand model. None of the coefficients of these variables was significantly different from zero even at relatively large alpha levels (i.e., $\alpha = .30$). Coefficients of some variables also had illogical signs (i.e., negative signs). A combination of factors probably rendered these attractiveness variables insignificant. One possible reason is that because of the relatively small number of samples chosen from each county, the error variability in the data masked the effects of site characteristics on visitation. Also, for one-day trips, distance may be an overriding factor controlling use patterns, such that even though certain Parkway areas are preferred, the visitor feels forced to use those areas closest to home. Thus, given more time (e.g., weekend trips), the Parkway visitor would gravitate to the most preferred areas and the importance of certain site characteristics would then become apparent. Another possible reason is that for the purposes of a one-day visit, the Parkway is perceived to be a relatively homogenous site and no one area is preferred much over another. Finally, it may be that inappropriate attractiveness variables were tested and

other, unmeasured variables would have been related to visitation patterns.

Evident in Table 6 is that the R^2 for the seasonal day-use model and the year round day-use model differ. In fact, in all models tested, the R^2 of the year round day-use model was always lower than that of the seasonal model. The apparent poorer predictive ability of the year round model was probably caused by a slight difference in the visitation patterns between the winter trips and the April-October seasonal trips. In other words, the relationship between the independent variables and the dependent variable was different for winter trips than it was for seasonal trips. Defining one demand function for both types of trips together would be less accurate than two separate functions. Because the distance coefficient relative to other coefficients in the year round model was larger than it was in the seasonal model, it would appear that winter visitation is influenced more heavily by the distance variable. This would mean that visitors are less likely to drive as far during the winter months.

Table 7 presents the appropriate estimates derived by using the developed recreation demand models. Since this study was the first attempt to assess the extent of local Parkway visitation, no other data is available to check the estimates exactly. However, in light of other available data, the estimates presented here seem reasonable. The Park Service estimated that the Parkway received about 15.4 million visits in 1978 while Tingle (1977) found that close to one half of all Parkway visitation comes from residents of Virginia and North Carolina. Using the more conservative year round demand model (i.e., the model which was adjusted to account for non-response bias), the number of one-day trips

TABLE 7

Estimates of 1978 Parkway Visitation

	Number of Visits	Percent of All Parkway Visits
One-day visits by Local Population		
April-October 1978		
Model 1: Unadjusted estimate	3,983,068	25.9
Model 2: Adjusted for bias	3,062,979	20.0
Year Round 1978		
Model 3: Unadjusted estimate	5,198,569	33.9
Model 4: Adjusted for bias	3,997,698	26.0
Total Estimated 1978 Parkway Visitation by all visitors (Park Service data)	15,351,632	

taken by the local population in 1978 was estimated to be about 4.0 million. These 4 million visits represent about 26 percent of all Parkway visitation in 1978. Assuming that 10 percent of all visits made by the local population are of more than one day in length and that the average length of these visits is about 3 days (see Appendix C, p. 73), a rough estimate, then, would be that about 32 percent of all Parkway visits are made by the local population studied. Thus, the day-use estimates from the demand models are consistent with what one would expect. That is, if one half of all Parkway visits are from the two states through which the Parkway passes, then, it is likely that a substantial part of this state visitation emanates from those areas immediately surrounding the Parkway.

SUMMARY AND CONCLUSIONS

Summary

Recognizing that a substantial portion of Blue Ridge Parkway visitation is made by the local population, this study was initiated as an effort to collect specific information on the characteristics of local Parkway use and to develop a demand model of local use based on the findings. The results should provide Parkway managers with information needed to more adequately serve the recreation needs of the local population.

Most of the information presented in this study was collected during the fall of 1978 through use of a self-administered mail-back questionnaire which was sent to a random sample of people living in the 29 counties adjacent to the Parkway. Results are based on questionnaires received from 322 local residents. Additional information was also obtained from 44 other local residents interviewed by telephone. Development of the recreation demand model required much of the questionnaire data as well as data obtained from existing Parkway and Census Bureau publications.

Local Use Characteristics

Results of the study indicate that during 1978 alone, about 55 percent of the local population studied had visited the Parkway at least once. Further, most of the population have substantial past experience

with the Parkway, with about 50 percent having visited the Parkway more than 20 times. Much of the use during 1978, over 90 percent, was for trips lasting only one day, however. This extensive day-use of the Parkway by the local population is apparent throughout the research findings.

For those who did visit the Parkway in 1978, the average number of trips from April through October was 5.0. October was the most popular month for making one-day visits to the Parkway. However, most trips of two days and longer were taken during mid to late summer with very few of these extended trips occurring in October. Winter use of the Parkway (i.e., November through March) was somewhat less extensive. Of the 28 percent of the sample who did visit the Parkway during the 1977-78 winter, the average number of trips was 2.8.

Distribution of local visits across the five major Parkway sections (see Modeling Procedures, p. 32) varied depending on the length of the visit. One-day visits were more common on the Parkway section north of Roanoke, i.e., the area where local population levels were highest. However, the southern Parkway sections were used more heavily for trips of two days or longer when time is less of a factor.

The most heavily used Parkway facilities were those most closely related to day-use activities, i.e., picnic areas, visitor centers, and restaurants. Results of the importance ratings collected on eighteen different reasons for visiting specific Parkway areas also revealed that these day-use facilities were valued more than other facilities (e.g., lodges and campgrounds). High importance ratings were also attached to (1) areas close to home, (2) isolated areas, (3) short nature trails,

(4) historic sites, (5) extensively forested areas, and (6) high mountains. In light of these favored characteristics, it was found that driving along the Parkway to view scenery is the basic reason for visiting the Parkway.

Overall, most of the residents living around the Parkway appear satisfied with present Parkway management. Close to 40 percent of the respondents thought the scenic beauty of the Parkway had improved over the years, mainly because of better maintenance practices. One half of the respondents were satisfied with current Parkway offerings. Of those desiring additional Parkway facilities and activities, the most frequently mentioned requests were for: (1) restaurants, (2) comfort stations, (3) picnic areas, (4) campgrounds, and (5) gas stations.

Recreation Demand Model

The extensive use of the Parkway for day-trips by the local population made it desirable to develop day-use demand models only. The two models developed are used to predict the amount of day-visitation occurring within the April-October visitor season and within a complete year. Twenty-one variables which might be related to local use patterns were considered initially, but only 3 variables were needed in the final models to explain 63 percent of the variation in seasonal use and 58 percent of the variation in year-round use. Both models contain the same three variables. The basic form for both models is presented below while the appropriate coefficients for each model are shown in Table 6 (p. 54).

$$V_{ij} = b_o + b_1 \ln(DIS_{ij}) + b_2 \ln(ALT_{ij}) + b_3 \ln(DEN_i)$$

where: V_{ij} = the number of one-day trips/1000 population from origin i to site j (time period is either the April-October season or one year),

DIS_{ij} = distance between origin i and site j expressed as a value from 1 to 8 depending on the distance category,

ALT_{ij} = an alternative opportunity index, the sum of the number of Parkway sections closer to origin i than section j,

DEN_i = the population density of origin i obtained from census data,

ln = the natural logarithm of the variables within parentheses,

b_a = coefficients.

Using the above model, estimates of local Parkway day-use were obtained which appear reasonable in light of previous findings by Tingle (1977) and overall Parkway visitation figures estimated by the Park Service. The figures derived indicate that about one fourth of all Parkway visitation in 1978 was composed of one-day visits made by the local population of this study.

Implications for Planning and Management

A relatively large amount of information was collected and presented for this study concerning the characteristics of local Parkway use. The usefulness of this information will certainly not be limited to the ideas presented in this section. A simple awareness of the data presented in this paper should prove useful in understanding and resolving day to day management and planning problems which arise. Generally, information

on local users, along with previous information concerning all Parkway users, should help Parkway managers judge which facilities and activities are preferred by whom, when and where these facilities are desired, and in what amounts they may be desired.

In keeping with the above basic uses of this study, Parkway personnel should be able to more adequately gauge the level of support they might receive for various management alternatives. Concerning local users, steps which would enhance the value of the Parkway as a day-use area would probably be supported strongly. Based on the findings of this study, appropriate actions might include improvements in existing picnic areas or development of new picnic areas, as well as assuring that adequate recreation opportunities exist near these areas. Highly valued picnic areas would be located in a natural and isolated setting yet be convenient to local population centers. These areas would also have convenient access to short nature trails and historic sites.

Local opinions towards the scenic beauty of the Parkway emphasize some of the important Parkway characteristics which this sector of the public is most likely to notice. Results of this study suggest that proper maintenance, scenic vistas, and a clean environment are important components enhancing the quality of the Parkway experience. The Parkway's current emphasis on maintenance (i.e., in terms of present budget allocations) appears to be a wise decision in light of these findings. It may also be significant to note that because local residents have substantial past experience with the Parkway, they are probably more likely to notice changes in the quality of the Parkway than more distant residents.

Despite the relative popularity of picnic areas, restaurants, and visitor centers, local residents' overriding basic purpose for visiting the Parkway was just to drive along the Parkway to view scenery. In light of this finding and as already stated, isolated and forested areas, and maintenance of scenic vistas are important Parkway qualities. These results all emphasize the importance of maintaining the natural qualities of the Parkway and to some extent, justify Park Service efforts to secure scenic easements, control adjacent housing developments, and limit the extent of Parkway facility development.

The information presented on the distribution of local trips across both the April-October visitor season and the five major Parkway sections (see Modeling Procedures, p. 32) can prove useful in scheduling maintenance and interpretive programs as well as in locating additional facilities. The concentration of one-day trips by the local population[9/] in the northern Parkway areas suggests that there may be a greater need for day-use activities and facilities in these areas rather than in the North Carolina sections. However, campgrounds and related facilities may be in higher demand in North Carolina since extended Parkway visits are concentrated here. People living farther from the Parkway, whose visits are probably limited to those of two days or more, also prefer the North Carolina areas (Tingle, 1977).

Demand estimates are an important component of proper recreation

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[9/] It seems likely that most day-use on the Parkway is made by the local population studied since these poeple live within a reasonable distance of the Parkway where they can easily use the Parkway in that manner.

planning since they indicate possible future recreation needs. The recreation demand models presented in this study should enable Parkway planners to adequately assess future Parkway use by the local population. Further, the estimates will be sensitive to changes in several factors which were determined to influence local Parkway demand. These variables or factors included population size, population density, availability of alternative recreation opportunities, and distance. Thus, the effects which changes in any of these variables have on local visitation can be assessed. Since the demand models are based on a recreation system of M origins and N destinations, appropriate estimates of local demand can also be derived for the proposed Parkway extension.[10/] The procedure would merely involve adding the proposed Parkway section along with the additional adjacent counties to the recreation system. Estimates of local use within this new system could then be obtained for each origin-destination combination by using the appropriate values for the independent variables included in the models.

Although valuation of the five Parkway sections was not specifically considered in this study, the developed demand models can be easily adapted for this purpose. The basic gravity variable (i.e., distance) is included within both demand models and thus, the travel cost method can be applied. Assuming certain travel costs exist for various distances,

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[10/] The National Park Service is currently analyzing the feasibility of a proposed extension of the Blue Ridge Parkway. The probable route of this extension would be from the present southern terminus of the Parkway through mountainous sections of southwestern North Carolina and northeastern Georgia.

the value of the distance variable could be artifically manipulated to derive the appropriate demand functions (see Literature Review, p. 6). Depending on the model used, values could be obtained for a complete year of use or for April through October use. It should be noted, however, that value estimates would only be estimates of the Parkway's value to local residents for one-day visits. In any event, in an age of ever tightening budgets, these value estimates might serve to further justify the significance of the Parkway.

Future Research

This study, in part, was born from an idea suggested by Tingle (1977) following his 1976 research, i.e., to examine the extent to which the Parkway serves as a regional recreation resource. Tingle also presented other research ideas in his paper. It is not my intention here to repeat earlier suggestions by Tingle but to suggest additional studies which might enhance the value of the information revealed both in this study and Tingle's study.

One additional project might consider the effectiveness and value of Parkway interpretive activities. Both interpretation methods and themes should be examined in relation to specific user groups. Information of this sort could then be combined with the information presented in this study and Tingle's study concerning use variations over time and space to ensure that the various interpretive programs are offered when and where they will be most effective.

Attitudes towards various Parkway maintenance practices is another area of research which could yield useful information. Results of this

current study suggest that the Parkway experience can be enhanced through proper maintenance. Studies could explore the value and effect of various specific procedures such as mowing practices or vista clearing. Related to this research is research concerning attitudes towards Park Service regulations which could help determine future management policy as well as improve relations with the public. To some extent, the value of a visitor's recreation experience is influenced by current Parkway regulations, since these regulations are used to control and manipulate the visitor in various ways. Research should discover which combinations of regulations can be implemented to achieve Park Service goals and also, maximize the visitor's experience.

Landscape preference studies would be a valuable research effort, since the Parkway is primarily used as a scenic drive. Identification of the landscape components which both add to and detract from the scenic beauty of the Parkway would be valuable for both management and planning. Information of this sort could be used to identify and protect important Parkway qualities. Such studies would also be useful in planning the proposed Parkway extension.

APPENDIX A

Data Concerning the Extent of Parkway Use by the Local Population*/

Visit Parkway in 1978?	Percent of Sample	Number of Respondents
yes	71.7 (55.4)	231 (377)
no	28.3 (44.6)	91 (303)
Do you think you will visit Parkway next year?	**Percent of Sample**	**Number of Respondents**
yes	76.8 (69.9)	242 (475)
no	23.2 (30.1)	73 (205)
Do you think you will visit Parkway within 5 years?	**Percent of Sample**	**Number of Respondents**
yes	89.5 (86.7)	282 (590)
no	10.5 (13.3)	33 (90)
Have you ever visited the Parkway before 1978?	**Percent of Sample**	**Number of Respondents**
yes	97.7	307
no	2.3	7
How many Parkway visits before 1978?	**Percent of Sample**	**Number of Respondents**
1 - 5	19.5	59
6 - 10	13.9	42
11 - 20	17.2	52
more than 20	49.5	150

*/Values listed in parentheses are adjusted values derived after consideration of the telephone interview results. Derivation of these figures is discussed in the methodology chapter under the Telephone Interview Results and Conclusions section.

APPENDIX B

Information Concerning the Non-Parkway Users of 1978

Reasons for not using Parkway in 1978	Average Rating*
1. Lack of time	2.5
2. Not interested in available Parkway activities	1.7
3. Been to Parkway too many times in the past	1.6
4. Had no information on Parkway activities and facilities	1.6
5. Health reasons	1.6
6. Parkway too crowded	1.5
7. Not enough facilities on the Parkway	1.5
8. Not enough activities on the Parkway	1.5
9. Other members of family do not enjoy the Parkway	1.4
10. Prefer to visit other parks or state and national forests	1.3
11. Have very young children	1.3
12. Too expensive to visit	1.3
13. Too much development on Parkway	1.2
14. Too far to drive	1.2
15. Lack of equipment	1.2
16. Lack of transportation	1.2

*/ Ratings were derived from a scale of 1 to 4 where 1 - not important, 2 = of little importance, 3 = moderately important, and 4 = extremely important. Ninety-one non-users answered this section of questions. Missing answers to any reasons were assumed to mean not important.

Appendix B, Continued.

Do you think you will visit Parkway next year?	Percent of Sample	Number of Respondents
yes	42.7	38
no	57.3	51

Do you think you will visit Parkway within 5 years?	Percent of Sample	Number of Respondents
yes	74.2	66
no	25.8	23

Have you ever visited the Parkway before 1978?	Percent of Sample	Number of Respondents
yes	92.0	80
no	8.0	7

How many Parkway visits before 1978?	Percent of Sample	Number of Respondents
1 - 5	32.5	25
6 - 10	18.2	14
11 - 20	14.3	11
more than 20	35.1	27

APPENDIX C

Information Concerning Those who did use the Parkway in 1978

Size of Party

Mean = 4.1 S.D. = 3.5 Min. = 1 Max. = 35

Trips between April & October 1978*	Total	Percent of All Trips	Mean	S.D.	Range
Number of One-Day Trips	1,010	90.3	4.5	5.8	1-62
Number of Two & Three-Day Trips	89	8.0	0.4	1.0	0-5
Number of Trips Four Days & Longer	20	1.8	0.1	0.5	0-7

Distribution of Trips by Month

	One-Day Trips		Two-Day and Longer Trips	
Month	Number of Trips	Percent of All Trips	Number of Trips	Percent of All Trips
April	38	5.4	5	5.3
May	65	9.2	11	11.6
June	81	11.5	13	13.7
July	124	17.6	16	16.8
August	125	17.7	19	20.0
September	113	16.0	22	23.2
October	160	22.7	9	9.5

*/ All winter trips are excluded since no information was collected on length of winter trips.

Information Concerning Those who Did Use the Parkway in 1978

Distribution of Trips by Parkway Section

Parkway Section	One-Day Trips: Number of Trips	One-Day Trips: Percent of All Trips	Two-Day & Longer Trips: Number of Trips	Two-Day & Longer Trips: Percent of All Trips
A	236	29.9	20	15.6
B	151	19.1	25	19.6
C	118	15.0	27	21.1
D	144	18.3	27	21.1
E	140	17.7	29	22.7

Do you avoid crowded Parkway times?	Percent of Sample	Number of Respondents
yes	32.9	73
no	67.1	149

Do you avoid crowded Parkway places?	Percent of Sample	Number of Respondents
yes	29.0	64
no	71.0	157

Visit Parkway during winter?	Percent of Sample	Number of Respondents
yes	27.6	89
no	72.4	233

Winter Trip Summary

Total = 245 trips mean for 89 winter users = 2.8 trips

S.D. = 2.2 Min. = 1 Max. = 12

Information Concerning Those Who Did Use the Parkway in 1978

Major Purpose of April-October Visits	Percent of Sample	Number of Responses
View scenery	58.2	152
Outdoor recreation activities	28.0	73
Interpretive programs	13.8	36
Major Purpose of Winter Visits		
View scenery	58.3	49
Outdoor recreation activities	34.5	29
Interpretive programs	7.1	6

Facility Use

Facility Type	Number of Visits	Percent of All Facility Use
Picnic Areas	388	30.5
Restaurants	324	25.5
Visitor Centers	281	22.1
Lodges and Cabins	150	11.8
Campgrounds	130	10.2

Information Concerning Those Who Did Use the Parkway in 1978

Reasons for Visiting Specific Parkway Areas	Average Rating*
1. Picnic Areas	3.0
2. Close to home	3.0
3. Isolated from towns and other developments	2.8
4. Short trails with informational signs or brochures in area	2.6
5. Historic sites	2.6
6. Large amount of forested lands surrounding the Parkway	2.6
7. High mountains	2.6
8. Visitor centers	2.5
9. Parkway restaurants	2.5
10. Hiking trails in area	2.3
11. Campgrounds	2.1
12. Interpretive programs and talks by Park rangers	2.1
13. Close to National Forest land and State Parks	2.1
14. Many Parkway facilities in one place	2.0
15. Camp stores	1.9
16. Fishing	1.9
17. Parkway lodges & cabins	1.7
18. Horseback riding	1.3

*/ Ratings were derived from a scale of 1 to 4 where 1 = not important, 2 = of little importance, 3 = moderately important, and 4 = extremely important. Two hundred thirty-one Parkway users answered this section of questions. Missing answers to any reasons were assumed to mean not important.

APPENDIX D

Data on Commuter Use

Do You Use Parkway for Commuting Purposes?	Percent of Sample	Number of Respondents
yes	23.0	70
no	77.0	234

	Mean Distance from Parkway*	S.D.
Commuters	11.6 miles	10.2
Non-Commuters	15.4 miles	9.9

*/ Results of the student t-test showed that Parkway commuters live significantly closer to the Parkway than non-commuters ($\alpha = .01$).

APPENDIX E

Local Opinions of the Parkway

Is Scenic Beauty Getting Better, Worse, or the Same?	Percent of Sample	Number of Respondents
Better	38.5	114
The Same	52.4	155
Worse	9.1	27

Specific Reasons Why Parkway is Better	Percent of Sample	Number of Respondents
Maintained Better	23.1	24
Better Views and Color	11.5	12
Parkway Seems Cleaner	8.7	9
Forest More Mature	8.7	9
Better Facilities, Services, and Recreation Areas	7.7	8
Personal Appreciation of Nature Has Increased	7.7	8
Road Improved	4.8	5
Trails Improved	3.8	4
Other	24.0	25

Specific Reasons Why Parkway is Worse	Percent of Sample	Number of Respondents
Views Obscured by Vegetation	21.4	6
Commercialization (i.e., too much Development on Parkway	14.3	4
Encroachment of Housing Developments	10.7	3
Grass on Shoulders too High	10.7	3
Too Crowded	10.7	3
Ice Damage	10.7	3
Other	21.4	6

Amount of Facilities Desired	Percent of Sample	Number of Respondents
More	45.2	132
Same as Now	51.0	149
Less	3.8	11

Continued.

Appendix E, Continued.

Specific Additional Facilities and Activities Desired	Percent of Sample	Number of Respondents
More Restaurants and Food Stations	12.5	43
None Desired	9.6	33
More Comfort Stations	8.4	29
More Picnic Areas and Tables	7.0	24
More Campgrounds	6.4	22
More Gas Stations	6.1	21
More Hiking Trails	5.2	18
More Lodging Facilities	3.8	13
Electric, Water & Sewer Hookups at Campgrounds	3.2	11
Hot Showers at Campgrounds	2.9	10
More Fishing Opportunities	2.0	7
More Horseback Riding Facilities	2.0	7
More Available Information	2.0	7
More Swimming Areas	1.7	6
Other (60 Different Responses)	27.2	94

APPENDIX F

Self-administered

Mail-back Questionnaire

SECTION A. INFORMATION ON YOUR USE OF THE BLUE RIDGE PARKWAY

To provide adequate facilities at the right times and places, recreation agencies need information on when and how parks are used. These next questions will help supply this information. In answering the questions in this section, please consider only trips to the parkway made for recreational purposes. Do not include trips made for commuting purposes.

1. Did you visit the Blue Ridge Parkway between APRIL 1 and OCTOBER 31 of 1978?

   Yes _____
   No _____ If no, skip to section C (Page 7)

2. What is the usual number of people including yourself who travel with you on a visit to the Blue Ridge Parkway? _____

The next three questions refer only to those visits to the Blue Ridge Parkway between APRIL 1 and OCTOBER 31 of 1978.

Please read directions carefully. These next 3 questions are extremely important.

3. a. How many of your visits during the above period were for one-day only -- that is, you returned home on the same day you left? (Please write in number of one-day visits.) _____

b. Please tell us the month and any sections visited on each of your most recent one-day visits. Use the enclosed map to determine which sections you visited. Begin with your most recent trip and then work down the list through the fifth most recent trip (if applicable).

FOR EXAMPLE, if the last time you visited the Blue Ridge Parkway for a day was in August and you went to the Mabry Mill area and the Peaks of Otter area, then you would circle your answers as indicated below.
(Your most recent trip Ap M J J (A) S Oct (A) (B) C D E)

April-October 1978 Trips	Circle Month of Visit							Circle Any Sections Visited				
Your most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
2nd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
3rd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
4th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
5th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E

4. a. How many of your visits during the APRIL through OCTOBER 1978 period were for either 2 or 3 days in a row (that is, you stayed overnight away from home)? _____

b. Again, using the enclosed map for reference, please indicate below, any of the five sections of the parkway which you visited on each of your following 2 or 3 day trips (if applicable).

April-October 1978 Trips	Circle Month of Visit							Circle Any Sections Visited				
Your most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
2nd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
3rd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
4th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
5th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E

5. a. How many of your visits during the APRIL through OCTOBER 1978 period were for 4 or more days in a row? _____

b. Again, using the enclosed map for reference, please indicate below, any of the five sections of the parkway which you visited on each of your following 4 or more day trips (if applicable).

April-October 1978 Trips	Circle Month of Visit							Circle Any Sections Visited				
Your most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
2nd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
3rd most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
4th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E
5th most recent trip	Ap	M	J	J	A	S	Oct	A	B	C	D	E

6. Did you ever arrange your 1978 visits to the Blue Ridge Parkway to avoid crowded times or places, even though the time or place you chose was not what you really wanted? (Please check one box for each.)

a. avoided crowded times ☐ yes ☐ no

b. avoid crowded places ☐ yes ☐ no

7. To judge how important the Parkway is for winter recreation we need to know about how many recreational trips you made to the Parkway between NOVEMBER 1, 1977 and MARCH 31, 1978. _____ (If none, please mark in zero.)

-- How many of these trips visited: (see map)

Section A _____

Section B _____

Section C _____

Section D _____

Section E _____

8. Overall, if you had to pick the most important purpose for your trips to the Blue Ridge Parkway which one of the following purposes would it be? Please consider your winter trips separately from your April through October 1978 trips. (Please only check one box for April-October trips and one box for winter trips.)

	Major Purpose for April-October Trips	Major Purpose for Winter Trips
a. Drive along the parkway specifically to look at scenery.	___	___
b. To visit parkway facilities such as visitor centers, demonstration areas, etc.	___	___
c. To participate in outdoor recreation activities such as hiking, fishing, camping, etc.	___	___

9. Blue Ridge Parkway facilities have limited capacities. We need to ask this next question to determine which facilities are the most popular and thus, which facilities may need to be managed better or possibly expanded.

For those specific Blue Ridge Parkway facilities you have used between APRIL 1 and OCTOBER 31 of 1978, please circle the appropriate number of times it was used during this time period only.

Lodges and Cabins	Number of Visits							
1. Peaks of Otter (milepost 85.6)	1	2	3	4	5	6-10	11-15	16+
2. Rocky Knob Cabins (milepost 174)	1	2	3	4	5	6-10	11-15	16+
3. Doughton Park (milepost 239)	1	2	3	4	5	6-10	11-15	16+
4. Mt. Pisgah Inn (milepost 408.6)	1	2	3	4	5	6-10	11-15	16+
Restaurants								
5. Whetstone Ridge (milepost 29)	1	2	3	4	5	6-10	11-15	16+
6. Otter Creek (milepost 60.8)	1	2	3	4	5	6-10	11-15	16+
7. Peaks of Otter (milepost 85.6)	1	2	3	4	5	6-10	11-15	16+
8. Mabry Mill (milepost 176.1)	1	2	3	4	5	6-10	11-15	16+
9. Doughton Park (milepost 239)	1	2	3	4	5	6-10	11-15	16+
10. Mt. Pisgah (milepost 408.6)	1	2	3	4	5	6-10	11-15	16+
11. Crabtree Meadows (milepost 339)	1	2	3	4	5	6-10	11-15	16+
Visitor Centers								
12. Humpback Rocks (milepost 5.8)	1	2	3	4	5	6-10	11-15	16+
13. Otter Creek (milepost 63.6)	1	2	3	4	5	6-10	11-15	16+
14. Peaks of Otter (milepost 86)	1	2	3	4	5	6-10	11-15	16+
15. Mabry Mill (milepost 176.1)	1	2	3	4	5	6-10	11-15	16+
16. Museum of N.C. minerals (milepost 331)	1	2	3	4	5	6-10	11-15	16+
17. Craggy Gardens (milepost 364.6)	1	2	3	4	5	6-10	11-15	16+
Picnic Areas								
18. Humpback Rocks (milepost 8.4)	1	2	3	4	5	6-10	11-15	16+
19. Peaks of Otter (milepost 86)	1	2	3	4	5	6-10	11-15	16+
20. Smart View (milepost 154.5)	1	2	3	4	5	6-10	11-15	16+
21. Rocky Knob (milepost 169)	1	2	3	4	5	6-10	11-15	16+
22. Groundhog Mtn. (milepost 188.8)	1	2	3	4	5	6-10	11-15	16+
23. Cumberland Knob (milepost 217.5)	1	2	3	4	5	6-10	11-15	16+
24. Doughton Park (milepost 240)	1	2	3	4	5	6-10	11-15	16+
25. E. B. Jeffress Park (milepost 272)	1	2	3	4	5	6-10	11-15	16+
26. Julian Price Memorial Park (milepost 296.6)	1	2	3	4	5	6-10	11-15	16+
27. Linville Falls (milepost 316.5)	1	2	3	4	5	6-10	11-15	16+
28. Crabtree Meadows (milepost 340.3)	1	2	3	4	5	6-10	11-15	16+
29. Craggy Gardens (milepost 367.6)	1	2	3	4	5	6-10	11-15	16+
30. Mt. Pisgah (milepost 408.6)	1	2	3	4	5	6-10	11-15	16+
Campgrounds								
31. Otter Creek (milepost 60.8)	1	2	3	4	5	6-10	11-15	16+
32. Peaks of Otter (milepost 86)	1	2	3	4	5	6-10	11-15	16+
33. Roanoke Mtn. (milepost 120.4)	1	2	3	4	5	6-10	11-15	16+
34. Rocky Knob (milepost 167)	1	2	3	4	5	6-10	11-15	16+
35. Doughton Park (milepost 240)	1	2	3	4	5	6-10	11-15	16+
36. Julian Price Memorial Park (milepost 297.1)	1	2	3	4	5	6-10	11-15	16+
37. Linville Falls (milepost 316.3)	1	2	3	4	5	6-10	11-15	16+
38. Crabtree Meadows (milepost 339)	1	2	3	4	5	6-10	11-15	16+
39. Mt. Pisgah (milepost 408.6)	1	2	3	4	5	6-10	11-15	16+

SECTION B. YOUR PREFERENCES FOR BLUE RIDGE PARKWAY ATTRACTIONS

Different people enjoy different activities and places. To help planners decide on what services and facilities to provide for different groups of parkway visitors we need to ask about your specific reasons for visiting the parkway.

1. Considering all of your 1978 visits to the Blue Ridge Parkway, check how important the following reasons were when you decided to visit the sections you went to. (Please answer every reason.)

Reasons	Extremely Important	Moderately Important	Of Little Importance	Not Important
1. Hiking trails in area	( )	( )	( )	( )
2. Horseback riding	( )	( )	( )	( )
3. Campgrounds	( )	( )	( )	( )
4. Picnic Areas	( )	( )	( )	( )
5. Visitor Centers	( )	( )	( )	( )
6. Restaurants on Parkway	( )	( )	( )	( )
7. Parkway lodges & cabins	( )	( )	( )	( )
8. Camp stores	( )	( )	( )	( )
9. Short trails with informational signs or brochures in area	( )	( )	( )	( )
10. Historic sites	( )	( )	( )	( )
11. Interpretive programs and talks by park rangers	( )	( )	( )	( )
12. Many Parkway facilities in one place	( )	( )	( )	( )
13. Fishing	( )	( )	( )	( )
14. Close to National Forest land and State Parks	( )	( )	( )	( )
15. Close to home	( )	( )	( )	( )
16. Large amount of forested lands surrounding the Parkway	( )	( )	( )	( )
17. High mountains	( )	( )	( )	( )
18. Isolated from towns and other developments	( )	( )	( )	( )

** PLEASE SKIP TO SECTION D (Page 8) **

SECTION C. ** This section only for those people who did not visit the Blue Ridge Parkway in 1978.

To adequately serve all of the people of the Blue Ridge region, recreation planners need information not just on the people presently using the Blue Ridge Parkway but also on the people who do not use the Parkway. This next question is extremely important towards aiding future planning decisions.

1. Please check how important each of the following was as a reason causing you not to visit the Parkway this last year (April 1 through October 31, 1978). (Please answer every reason even if it is not important to you.)

Reasons	Extremely Important	Moderately Important	Slightly Important	Not Important
1. Lack of time	( )	( )	( )	( )
2. Lack of transportation	( )	( )	( )	( )
3. Parkway too crowded	( )	( )	( )	( )
4. Not interested in available Parkway activities	( )	( )	( )	( )
5. Prefer to visit other parks or state and national forests	( )	( )	( )	( )
6. Have very young children	( )	( )	( )	( )
7. Too expensive to visit	( )	( )	( )	( )
8. Been to Parkway too many times in the past	( )	( )	( )	( )
9. Other members of family do not enjoy the Parkway	( )	( )	( )	( )
10. Not enough facilities on the Parkway	( )	( )	( )	( )
11. Not enough activities on the Parkway	( )	( )	( )	( )
12. Lack of equipment	( )	( )	( )	( )
13. Too far to drive	( )	( )	( )	( )
14. Too much development on Parkway	( )	( )	( )	( )
15. Had no information on Parkway activities & facilities	( )	( )	( )	( )
16. Health reasons	( )	( )	( )	( )
17. Other a._____	( )	( )	( )	( )
b._____	( )	( )	( )	( )

SECTION C. ** This section only for those people who did not visit the Blue Ridge Parkway in 1978.

To adequately serve all of the people of the Blue Ridge region, recreation planners need information not just on the people presently using the Blue Ridge Parkway but also on the people who do not use the Parkway. This next question is extremely important towards aiding future planning decisions.

1. Please check how important each of the following was as a reason causing you not to visit the Parkway this last year (April 1 through October 31, 1978). (Please answer every reason even if it is not important to you.)

Reasons	Extremely Important	Moderately Important	Of little Importance	Not Important
1. Lack of time	( )	( )	( )	( )
2. Lack of transportation	( )	( )	( )	( )
3. Parkway too crowded	( )	( )	( )	( )
4. Not interested in available Parkway activities	( )	( )	( )	( )
5. Prefer to visit other parks or state and national forests	( )	( )	( )	( )
6. Have very young children	( )	( )	( )	( )
7. Too expensive to visit	( )	( )	( )	( )
8. Been to Parkway too many times in the past	( )	( )	( )	( )
9. Other members of family do not enjoy the Parkway	( )	( )	( )	( )
10. Not enough facilities on the Parkway	( )	( )	( )	( )
11. Not enough activities on the Parkway	( )	( )	( )	( )
12. Lack of equipment	( )	( )	( )	( )
13. Too far to drive	( )	( )	( )	( )
14. Too much development on Parkway	( )	( )	( )	( )
15. Had no information on Parkway activities & facilities	( )	( )	( )	( )
16. Health reasons	( )	( )	( )	( )
17. Other a._____	( )	( )	( )	( )
b._____	( )	( )	( )	( )

SECTION E. BACKGROUND INFORMATION

Finally, we would like to ask a few questions about yourself for statistical purposes. All information is confidential and will not be identified with your name.

1. Do you ever use the Blue Ridge Parkway for commuting purposes?

   Yes _____
   No _____

2. What town do you live in or what is the nearest town to you?

   _____
   (town)

3. About how many miles do you live from the nearest entrance point on the Blue Ridge Parkway?

   _____

4. In what state did you live most of the time before your eighteenth birthday?

   _____
   (state)

5. In which of the following kinds of places did you spend the most time while growing up? (Circle one letter.)

   a. on a farm or ranch
   b. in the country but not on a farm or ranch
   c. in a small town (2,500 or fewer people)
   d. in a town or small city (between 2,500 and 25,000 people)
   e. in a city (between 25,000 and 100,000 people)
   f. in a suburb of a large city
   g. in a large city (over 100,000 people)

6. In what type of community do you now live?

   a. on a farm or ranch
   b. in the country but not on a farm or ranch
   c. in a small town (2,500 or fewer people)
   d. in a town or small city (between 2,500 and 25,000 people)
   e. in a city (between 25,000 and 100,000 people)
   f. in a suburb of a large city
   g. in a large city (over 100,000 people)

7. How long have you lived in your present county? _____ (years)

8. How long have you lived in a county which is adjacent to the Blue Ridge Parkway? _____ (years)

9. Your age: _____ (years)

10. Are you:

    a. female _____
    b. male _____

11. Are you currently married?

    a. Yes _____
    b. No _____

12. Do you have children under five years old living with you?

    a. Yes _____
    b. No _____

13. Do you have children between 5 and 17 years old living with you?

    a. Yes _____
    b. No _____

14. Taking into consideration all sources of income, what was your total family income before taxes in 1977?

    a. Less than $3,000 _____
    b. 3,000 to 5,999 _____
    c. 6,000 to 9,999 _____
    d. 10,000 to 14,999 _____
    e. 15,000 to 24,999 _____
    f. 25,000 to 34,999 _____
    g. 35,000 to 49,999 _____
    h. $50,000 or more _____

15. What is the highest year of formal schooling you have completed so far?

    a. 0-4 years _____
    b. 5-8 years _____
    c. some high school _____
    d. technical school instead of high school _____
    e. completed high school (12 years) _____
    f. post high school business school/trade school _____
    g. 1-3 years of college _____
    h. completed college _____
    i. advanced degree _____

Thank you! These are all of the questions. If there are any comments you wish to make, please use the blank pages at the end of the questionnaire for that purpose.

Your contribution to this study is greatly appreciated. If you would like a summary of the results, please print your name and address on the back of the return envelope (NOT ON THIS QUESTIONNAIRE). We will see that you get a copy of the results.

APPENDIX G

Initial Cover Letter

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

SCHOOL OF FORESTRY AND WILDLIFE RESOURCES (703) 961-5481

Dear Blue Ridge Resident:

We need your help!

As you probably know, many federal agencies are responsible for managing large recreation areas such as the Blue Ridge Parkway. Past management of these areas has been largely geared towards the "average" user with little consideration for specific types of visitors. In recent years, however, the National Park Service, Forest Service, and other agencies have expressed increasing interest in the people living close by these recreation lands. The National Park Service in particular wishes to develop and manage their lands in ways which will provide benefits to nearby residents. To achieve this goal, information is needed about how area residents use this land, and about the opinions and preferences of these local users.

To provide some of this information, we are conducting a survey of residents living near the Blue Ridge Parkway in North Carolina and Virginia. We want to learn a little about how and when you use the Blue Ridge Parkway and about your favorite areas and activities. You are one of a small number of people living near the Blue Ridge Parkway who have been scientifically selected to participate in this study.. Because only a small number of Blue Ridge mountain residents were selected, your personal participation is essential towards making this survey representative and useful. We are very interested in the opinions of both those who use the parkway and those who don't.

The questionnaire contains an identification number for mailing purposes only. Your answers will be held in strict confidence. All results will be analyzed in such a way that answers on any single question cannot be identified with you.

Please take time to complete the enclosed questionnaire and return it to us. A stamped, self-addressed envelope is enclosed for your convenience. If you would like a copy of the survey results, please print your name and address on the back of the return envelope.

Your help in this study will be greatly appreciated.

Sincerely,

G. J. Buhyoff
Assistant Professor
Forestry

S. B. Williams
Research Assistant
Forestry

GJB/SBW/ddn

Enclosures

APPENDIX H

First Follow-up

Cover Letter

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

SCHOOL OF FORESTRY AND WILDLIFE RESOURCES (703) 961-5481

November 28, 1978

Dear Blue Ridge Resident:

You should recently have received a survey sent to only a small portion of the many people living in counties which are adjacent to the Blue Ridge Parkway. Because only a small sample of Blue Ridge residents are contacted, your participation in this survey becomes critical in guiding decisions concerning the future of the Blue Ridge Parkway.

As a resident living in the Blue Ridge mountains, you have direct access to a major recreation resource. The value of the Blue Ridge Parkway to you and your neighbors depends, however, on its proper management. This study is an opportunity for you, as an area resident, to express your personal experiences and feelings.

As of today, we have not received your completed questionnaire. We hope it is in the mail or that you will take the time to complete the enclosed copy. If you would like to know the responses of other Blue Ridge residents, please print your name and address on the back of the return envelope.

Sincerely

Gregory J. Buhyoff, Ph.D.
Assistant Professor
Forestry

S. B. Williams
Graduate Research Assistant
Forestry

GJB/JDW/ddn

Encl.

APPENDIX I

Second Follow-up

Cover Letter

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

SCHOOL OF FORESTRY AND WILDLIFE RESOURCES (703) 961-5481

Dear Blue Ridge Resident:

We want to be of help to you. In order to properly manage the Blue Ridge Parkway for the benefit of area residents we need to know your preferences, problems you have experienced, and places you have visited. This information will be important in guiding future decisions concerning budgeting, construction plans, maintenance practices and so forth.

We have already heard from many of the people we have contacted, but we have not heard from you. Please don't assume your answers would not be valid or useful because you may have had little or no experience with the Blue Ridge Parkway. The questionnaire contains questions which apply to any area resident. The goal of the survey is to provide information about the actions and attitudes of all area residents around the Blue Ridge Parkway, including those who have never visited the parkway.

Your participation in this survey is vital. Please complete the questionnaire and send it to us in the enclosed postage-paid envelope.

Sincerely,

Gregory J. Buhyoff
Assistant Professor
Forestry

Stephen B. Williams
Research Assistant
Forestry

GJB/SBW/ddn

Encl.

APPENDIX J

Telephone Interview Questionnaire

Introduction:

"Hi, my name is _____. I'm a research assistant at Virginia Tech in Blacksburg, Virginia. We here are in the process of finishing up some research which will be used to improve the management of the Blue Ridge Parkway. As part of the study, we have been sending you a survey to gain some opinions and information from the public. Have you been receiving these surveys?"

Yes ☐ → I No ☐ → II

I If yes:

"Well, to make sure the information we now have really represents the way people feel and to improve our research methods we need to ask why you did not return the questionnaire?"

_____

_____

_____

"OK, thank you. Would you mind if I asked just a few questions which will improve our present findings a whole lot?"

Do not mind ☐ → (Go to next page) Do mind ☐

II If no:

Oh, then our address must have been wrong or something. Anyway, you should have been getting a small booklet which asked certain questions about your use of the Parkway and other basic information. You see, the Park Service is interested in making the Parkway more enjoyable for people who live close to it. We sent out these surveys to a small sample of people in NC and VA this fall to try and determine how the Parkway might be improved for you. Anyway, at this time we would just like to ask you a few quesitons which will really add a lot to the information we gained from those who did respond and also to make sure our survey sample really does represent the region's people. OK?

Yes ☐ → (next page) No ☐

1. Did you visit the Blue Ridge Parkway between April and October of 1978?

   Yes ☐ No ☐ (If NO skip to next page

---

1. About how many trips did you make during this period? _____

2. Were any of those trips for longer than just 1 day? Yes ☐ _____ (number)

   No ☐

3. Did you make any trips to the Parkway last winter (i.e. November through March)?

   Yes ☐ No ☐

   ↓

   About how many? _____

4. About how many people usually go with you on these trips? _____

5. Did you ever arrange your 1978 visits to the Blue Ridge Parkway to avoid crowded times or places, even though the time or place you chose was not what you really wanted?

   a. avoided crowded <u>times</u> ☐ Yes ☐ No

   b. avoided crowded <u>places</u> ☐ Yes ☐ No

Skip to Page 4

(If you did not visit the Parkway in 1978)

1. What would you say were the major reasons why you did not visit the Blue Ridge Parkway last year?

   1.

   2.

   3.

Go to Page 4

1. Have you ever visited the Blue Ridge Parkway before 1978?

   Yes ☐ No ☐ (Skip to 2)

   ↓

   About how many times? _____

   ↓

   Do you think the scenic beauty of the Parkway is getting better, worse or the same?

   better ☐ same ☐ worse ☐

2. Do you think you will visit the Blue Ridge Parkway for recreational purposes in the next year? 5 years?

   yes ☐ no ☐ yes ☐ no ☐
   (year) (5 years)

3. Do you ever use the Parkway for commuting purposes?

   yes ☐ no ☐

(Justify next questions) -- OK. Now these last few questions are what we call background variables. We need to ask these to ensure that our sample has given all different types of people a chance to respond. In other waords, we don't want our sample, say, to be just all city residents or all country residents. We want a fair mixture, just like it really is.

4. In what type of community do you now live? _____

5. How long have you lived in your county? _____

6. How old are you? _____

7. Are you married? Yes ☐ No ☐

8. Do you have children under 5 years of age living with you? Yes ☐ No ☐

9. Do you have children between 4 & 17 years old living with you?

   Yes ☐ No ☐

10. And finally, what is the highest level of education you have completed?

    _____

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A STUDY OF BLUE RIDGE PARKWAY USE BY AREA RESIDENTS WITH THE DEVELOPMENT OF A DEMAND MODEL

by

Stephen Bruce Williams

(ABSTRACT)

The purpose of this study was to collect specific information on the characteristics and intensity of local Blue Ridge Parkway use and to use the collected information to develop a recreation demand model of local Parkway visitation. Data was obtained through use of a self-administered mail-back questionnaire which was sent to a random sample of people who live in the 29 counties adjacent to the Parkway. Forty-seven percent or 322 of those contacted returned the questionnaire. Additional information was also obtained through telephone interviews with 44 other local residents.

Results of the study indicated that in 1978 alone, over half of the local residents studied had visited the Parkway. Most use, over 90 percent, was for trips lasting only one day, however. Facilities closely related to day-use activities were the most popular. These included picnic areas, restaurants, and visitor centers. The findings also indicated that local visitors were relatively satisfied with Parkway management. Close to 40 percent of the respondents thought the

scenic beauty of the Parkway had improved over the years, mainly because of better maintenance practices.

Two recreation demand models were developed which use three variables (i.e., distance, alternative recreation sites, and population density) to predict visitation from various local visitor origins to different Parkway areas. The derived model estimates indicated that about one-fourth of all Parkway visits in 1978 were one-day visits made by area residents.

blue ridge parkway

north carolina virginia

Blue Ridge Parkway, a unit of the National Park System, extends 469 miles through the southern Appalachians, past vistas of quiet natural beauty and rural landscapes lightly shaped by the activities of man. Designed especially for motor recreation, the parkway provides quiet, leisurely travel, free from commercial development and congestion of high-speed highways. No ordinary road, it follows mountain crests to link Shenandoah National Park in northern Virginia and Great Smoky Mountains National Park in North Carolina and Tennessee.

You travel the Southern Highlands, a land of forested mountains, streams, and the flowering spring, cool in the green summer, colorful in the red autumn. Views are enlivened by highland farms, whose split-rail fences, weathered cabins, and gray barns compose the "hill culture."

Rhododendron, azalea, white pine, and other native plants border the roadsides. Overlooks, campgrounds, picnic areas, trails, and wayside exhibits all contribute to make your visit a memorable motoring adventure.

The Appalachian Mountains, reaching from Maine to Georgia, are a broad ribbon of many parallel ranges connected by cross ranges and tumbled mountains and hills. From Shenandoah National Park for 355 miles, the parkway follows the Blue Ridge Mountains, eastern rampart of the Appalachians. Then skirting the southern end of the massive Black Mountains, it weaves through the Craggies, the Pisgahs, and the Balsams to the Great Smokies. This is a region of ancient, rugged mountains and deep, narrow coves and valleys.

People of the hills. The physiography of the Southern Highlands has directly influenced the history of its inhabitants, dictating where the Indian should live and turning the tides of white immigration between its hills. The first pioneers settled in the valleys and became prosperous. Those arriving later took up progressively more isolated homesteads. They cut the trees, allowing the rich topsoil to wash away. Thus was set in motion a process which gradually impoverished both land and settlers.

Blue Ridge Parkway "tells" the story of these fiercely independent people, a story still being

ARNOLD'S VALLEY, MILE 75.2

written on the face of this land where crops and cabins hang on the hillsides. The mountain people sang their ballads and passed them from parent to child by word of mouth. Their musical instruments were the fiddle, banjo, and guitar, which are still used to accompany songs and folk dances. The crossroad country store is the hub of community life during the week, while the rural church becomes the center on Sunday.

Improved roads, electricity, radio, and television have changed the way of life in the mountains, but centers have been established where the old handicrafts are taught and practiced. Handicraft articles, in great demand, are available at outlets along the parkway.

Wild animals abound along the parkway. When the sun is high, chipmunks and squirrels chitter and chat. At night, striped skunks, bobcats, foxes, opossums, and raccoons forage along roadsides and in forests. White-tailed deer and black bear are easily recognized but seldom seen. Watch for them in early morning or early evening.

The parkway lies along a major bird migration route. In early spring more than 100 species, including many warblers, grace forests and fields. Some migrants join the year-round residents and remain to rear young, while others continue northward.

Wild animals are a delight and a privilege to observe. Treat them with respect; after all, we are the guests.

When to visit. Because of its length and range in elevation, the whole parkway seldom experiences the same weather at the same time. Most visitors come in summer, but spring and autumn are pleasant, too, and the parkway is less crowded then.

Campgrounds, picnic areas, and other visitor accommodations are open May 1 through October. Guided and self-guiding walks, evening nature

SUMMIT OF SHARP TOP, PEAKS OF OTTER

talks, museum and roadside exhibits, and other forms of interpreting the parkway comprise the naturalist program. The full program is in operation June through Labor Day.

A visit in winter can be delightful, but snow or ice may cause temporary closure of the parkway. The entire road may be closed for longer periods in winter when hazardous driving conditions exist.

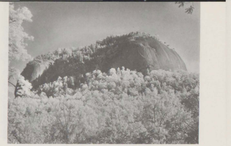
The flowering season. Spring is slow to arrive along Blue Ridge Parkway. The forests are bare when dogwood blooms late in April. Gradually the trees leaf out and by mid-May they are green to 4,000 feet elevation. Fraser magnolia blooms a creamy white. Each day widens the band of green, until suddenly, spring is everywhere.

Azalea, rhododendron, and mountain-laurel abound in the Southern Highlands. Because of the wide range in elevation (649 to 6,053 feet), peak blooming occurs at different times and places along the parkway.

If you visit in mid-May, or a little before, flame azalea will most likely be at its best south of Roanoke to Rocky Knob—the fine display in the high mountains west of Asheville occurs about the middle of June. In mid-May you might also see mountain-laurel in bloom along Otter Creek north of James River—elsewhere in the parkway it blooms during the first 2 weeks in June.

During the first week in June, dense thickets of catawba rhododendron overflow with purple north of Peaks of Otter to Onion Mountain and along the bluffs of Doughton Park. In Craggy Gardens and through the Balsams, however, the bloom comes soon after mid-June. White rhododendron is showy from the end of June to late July.

Wildflowers are colorful throughout spring, summer, and autumn.



LOOKING GLASS ROCK, MILE 417

Autumn brings color in late September when dogwood, sourwood and blackgum turn deep red. But most of the forest remains green until early October. Then, bright patches grow each day as color advances to a mid-month peak.

Early in October, birch, hickeye, poplar, and beech become masses of yellow. Leaves of the tulipтree are blends of brown and yellow; sassafras turns a vivid orange. The bright red berries of mountain ash are conspicuous. No tree adds more brilliance than red maple, "Color King of the Southern Appalachians." On mountaintops and ridges, hickories have a leathery sheen. Late in October, when other trees begin to fade, oaks add the final tones of red.

Visitor-use Areas	Mile	Food	Gas	Lodging	Campground	Picnicking	Hiking	Fishing	Visitor Center	Walks & Talks
Humpback Rocks	5.8					X	X		X	
Whetstone Ridge	29	X	X							
Otter Creek	60.9	X		X		X	X	X	X	X
Peaks of Otter	86	X	X	X	X	X	X	X	X	X
Roanoke Mountain	120.4					X				
Smart View	134.5					X	X	X		
Rocky Knob	169			X	X	X	X	X	X	X
Mabry Mill	176.1	X							X	
Cumberland Knob	217.5						X	X		
Doughton Park	241.1	X	X	X	X	X	X	X	X	X
Cherry Hill	257	X	X							
E. B. Jeffress Park	272						X	X		
Moses H. Cone Mem. Park	294.1						X	X	X	
Julian Price Mem. Park	297.1					X	X	X	X	X
Linville Falls	316.4					X	X	X	X	X
Crabtree Meadows	339.5	X	X			X	X	X		X
Craggy Gardens	364.6						X	X		X
Mount Pisgah	408.6	X	X	X	X	X	X			X

THE FENCES, GROUNDHOG MOUNTAIN, MILE 188.8

Visitor-use areas are marked by this emblem. In them may be located picnic areas and campgrounds, visitor centers, exhibits, trails, food, gas, lodging, and comfort stations. See map narrative for facilities in a particular place.

Restaurants, gas stations, and lodging are available along the parkway May 1 through October, except for Peaks of Otter Lodge which is open all year. Reservations for lodging are advisable.

FACILITY	CONCESSIONER	ADDRESS
Peaks of Otter Lodge	Virginia Peaks of Otter Co.	Box 489, Bedford, VA 24523
Rocky Knob Cabins (June through Labor Day)	National Park Concessions, Inc.	Meadows of Dan, VA 24120
Bluffs Lodge (In Doughton Park)	National Park Concessions, Inc.	Laurel Springs, NC 28644
Pisgah Inn	Pisgah Inn, Inc.	Route 2, Box 375 A Canton, NC 28716

A wide range of accommodations is available in towns and cities near the parkway.

Camping. The nine parkway campgrounds are open May through October only, but limited camping facilities are available in winter at Otter Creek, Roanoke Mountain, Price Park, and Linville Falls.

Drinking water and comfort stations are provided, but no shower or laundry facilities are available. Sites in each campground are designated for trailer use, but none is equipped for utility connections. Sanitary dumping stations for trailers are provided at

HIGHLAND MEADOWS, DOUGHTON PARK

Otter Creek, Peaks of Otter, Roanoke Mountain, Rocky Knob, and Mount Pisgah campgrounds. Each campsite has a table and fireplace.

Limited camping supplies are available at most parkway gas stations. Camping is limited to 14 days and campsites may not be reserved.

Picnic grounds with parking spaces, tables, fireplace, drinking water, trash cans, and comfort stations are provided in most of the visitor-use areas.

Picnic tables are also placed in a number of parking areas north of Roanoke and west of Asheville. Watch for the overlook-ahead symbol; a "Picnic Table" sign under it indicates table locations.

Trails. The word "trail" under an overlook-ahead symbol is your invitation to leave the car for a walk through the woods. Some of the trails are short legstretchers and take only 10 to 20 minutes round trip; others will take the best part of an hour, or longer. The longer trails may be steep in places, but young and old walk them without difficulty. Self-guiding trails begin at some of the overlooks; you will know them by the squirrel-rifle-and-powder-horn symbol on the trail sign. They offer explanatory stations or a booklet or notes keyed to numbered stakes. Trails are described in the mile-post guide of this folder.

Many miles of excellent hiking are available at Peaks of Otter, Rocky Knob, Doughton Park, and Cone Memorial Park. Gully Creek Trail at Cumberland Knob is a favorite during the autumn.

The Appalachian Trail roughly parallels the parkway from Mile 0 at Rockfish Gap to Mile 103, where the trail takes a more westerly route toward the Great Smoky Mountains and Georgia. Shelters, 1 day's hike apart, are available on a first-come, first-served basis all along the Appalachian Trail. Information about the trail may be obtained from the Appalachian Trail Conference, P.O. Box 236, Harpers Ferry, WV 25425.

MILE HIGH OVERLOOK, MILE 458.2

Fishing. Streams and lakes along the parkway are primarily trout waters. State fishing licenses are required and State regulations apply. Temporary licenses can be purchased by parkway visitors.

Six visitor centers are focal points of the naturalist program. Each center features a different part of the region's natural or human history, and has detailed information about that section of parkway and general information about the entire parkway.

Visitor centers are open May through October—daily, mid-June through Labor Day, and part time during the rest of the season. Park rangers are on duty to help you.

Interpretive activities. In summer, guided walks are conducted and special living history programs are presented at points of interest along the Parkway. You are also invited to attend evening talks. Activities are listed in the free visitor activities folder. Obtain a copy at any visitor center.

Craft demonstrations and sales. Mabry Mill (Mile 176.1) is an operating, water-powered gristmill with a blacksmith shop. Apple butter and sorghum molasses are made the oldtime way during autumn weekends. Brinegar Cabin (Mile 238.5), in an authentic setting, offers demonstrations of weaving on an old mountain loom. Textile handicraft articles are for sale.

Northwest Trading Post (Mile 258.6) is a country store, displaying and selling native handicrafts and produce of the surrounding region.

Parkway Craft Center (Mile 294) from time to time presents demonstrations of weaving, rugmaking, gemcutting, and other crafts by members of the Southern Highland Handicraft Guild. In the Pioneer Museum are displayed weaving, basketry, furniture, kitchen utensils, and tools of the cottage crafts. The guild also has handicraft articles for sale.

Facilities for swimming are available in nearby U.S. Forest Service recreation areas, State Parks, and mountain resorts. The lakes, ponds, and streams along the parkway are for fishing and scenic beauty; they are not suitable for swimming.

Boats without motor or sail are permitted on Price Lake, but boats are not permitted on any other parkway waters.

Your safety. Do not allow your visit to be spoiled by an accident. Efforts have been made to provide for your safety, but there are still hazards which require your alertness and vigilance. Exercise common sense and caution.

Help protect the parkway. This is your parkway. Help us in protecting it. Leave shrubs and wild flowers for others to enjoy. Drive carefully; speed limit is 45 miles per hour. Report any accident to a park ranger. Vehicles being used commercially are not allowed on the parkway.

Please do not throw trash from your car. Use the receptacles at parking and picnic areas.

Please, no swimming in parkway lakes and ponds.

Fire is the archenemy of the parkway. Use the fireplaces in campgrounds and picnic areas. Dispose of burning matches and tobacco safely.

Protect wildlife. Watch for animals as you drive and—for your own safety as well as theirs—avoid hitting them. Hunting is prohibited in this wildlife sanctuary.

Pets must be kept on leash or otherwise under physical control. No animals may be turned loose on parkway land at any time.

Administration. Blue Ridge Parkway, established on June 30, 1936, is administered by the National Park Service, U.S. Department of the Interior.

A superintendent, whose address is P.O. Box 7606, Asheville, NC 28807, is in immediate charge of the parkway.

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, park and recreation areas, and for the wise use of all those resources. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

NATIONAL PARK SERVICE
U.S. DEPARTMENT of the INTERIOR

GPO 1978 O-270-442

BLUE RIDGE PARKWAY
A UNIT OF THE NATIONAL PARK SYSTEM

At the southern end of the Blue Ridge Parkway lies Great Smoky Mountains National Park, a rugged, heavily forested wilderness complemented by touches of pastoral beauty. To the north of the Parkway is Shenandoah National Park, a more gentle portion of the Blue Ridge now returning to wilderness following agricultural use.

In these brief descriptions of special features along the Parkway, milleposts are used as reference marks beginning with Mile O on the north end, where the parkway joins Skyline Drive in Shenandoah National Park.

PARKWAY ON RICHLAND BALSAM, MILE 431.4

The parkway skirts pyramidal Mount Pisgah (el. 5,721) and soars a mile high across the Balsams and Plott Balsams. Range upon range, the mountains stretch to the horizon.

Mile	Special Places to Stop
408.6	Mount Pisgah. Campground, picnic area, trails. Inn, restaurant, gas. Mount Pisgah was part of the 100,000-acre estate bought in the late 1800's by George W. Vanderbilt. The first forestry school in America was established on the estate. A large part of the woodland, the first large tract of managed forest in this country, became the nucleus of Pisgah National Forest.
417	Looking Glass Rock, a large granite mountain.
422.4	Devils Courthouse. Trail from parking area to the "courthouse," a rock summit affording a 360° view across the mountains of North Carolina, South Carolina, Georgia, and Tennessee.
431	Self-guiding trail through Canadian-type, spruce-fir forests on Richland Balsam.
469	Terminus of Blue Ridge Parkway.

TWIN TUNNELS, MILE 344.5

The mountains reach their greatest height at Mount Mitchell in the Black Mountains. The once magnificent dark green forest of Fraser fir is dying, victim of the woolly aphid. The trees give the Blacks their name.

Mile	Special Places to Stop
320.7	Chestoa. Short walk to view from cliff of Humpback Mountain. Table Rock is conspicuous.
331	Museum of North Carolina Minerals.
339	Crabtree Meadows. Campgrounds, Crabtree Falls, gas, restaurant (Mile 339.5). Picnic area (Mile 340.3).
342.2	The Black Mountains dominate the horizon. Mount Mitchell (el. 6,684) is highest in the East.
355.4	N.C. 128 to Mount Mitchell State Park. Campgrounds, trails, picnic area, lookout tower.
363.4 to 369.6	Craggy Gardens. Outstanding purple rhododendron mid-June. Trail to Craggy Pinnacle (Mile 364.1). Visitor center, self-guiding trail (Mile 364.6). Road to picnic area, trails (Mile 367.6).

THE FOREST, LINVILLE FALLS, MILE 316.3

The parkway skirts the mountain resort area of North Carolina and skips in and out of Pisgah National Forest from Grandfather Mountain (el. 5,939) to Great Smoky Mountains.

Mile	Special Places to Stop
285.1	Daniel Boone's Wilderness Road crosses here.
292.7 to 295	Moses H. Cone Memorial Park. 25 miles of horse and carriage trails; two lakes. Parkway Craft Center (Mile 294).
295.1 to 298	Julian Price Memorial Park, 2-mile Green Knob loop trail from Sims Pond. Lake and campgrounds (Mile 297.1). Picnic area (Mile 296.6).
308.3	Flat Rock. Trail to superb view of Grandfather Mountain and Linville Valley.
316.3	Linville Falls, in a dramatic and rugged setting, was donated by John D. Rockefeller, Jr. Campgrounds. Trail to overlooks of falls and gorge. Picnic area (Mile 316.5).

RHODODENDRON AT ALLIGATOR BACK, MILE 242.6

Entering North Carolina, you will find the mountain country higher and more sparsely settled. Rolling bluegrass pastures terminate in precipitous bluffs. Rhododendron blooms through Doughton Park in early June.

Mile	Special Places to Stop
218.6	Fox Hunters Paradise. 10-minute trail to Paradise, where old-time hunters listened to the baying of their hounds in the valley below.
238.5 to 244.7	Doughton Park. Weaving demonstrated on old loom at Brinegar Cabin. Campground, picnic area, hiking trails, fishing. Restaurant, gas. Bluffs Lodge. Bluffs Ridge road and trail to shelter on Bluff Mountain. Wildcat Rocks (Mile 241.1).
258.6	Northwest Trading Post, a country store.
260.6	Jumpin-Off Rocks. Short woodland trail to overlook on sheer rock cliffs above a forested valley.
264.4	The Lump. Sweeping view of forested foothills.
272	E. B. Jeffress Park. Self-guiding trail to Cascades. Picnic area.

MABRY MILL, MILE 176.1

Blue Ridge Parkway passes through a region rich in the folk history of the late 1700's, when the Blue Ridge marked the edge of the western frontier. Log cabins, farm buildings, a church, and a gristmill are some the structures preserved as evidences of the pioneer past.

Mile	Special Places to Stop
176.1	Mabry Mill. Visitor center; self-guiding trail features old-time mountain industry; water-powered mill and blacksmith shop in operation; restaurant.
188.8	Groundhog Mountain. Picnic grounds. Examples of rail fences—snake, post and rail, and buck.
189.8	Puckett Cabin. Home of Mrs. Orlean Hawks Puckett from 1865 until her death in 1939 at the age of 102 years. A busy midwife, she is credited with bringing more than a thousand babies into the world. None of her own 24 children lived past infancy.
217.5	Cumberland Knob. Picnic area, trails.

PARKWAY NEAR ADNEY GAP, MILE 136

For 150 miles south of Roanoke, Va., the Blue Ridge is a high rolling plateau which breaks sharply on the east.

Mile	Special Places to Stop
120.4	Roanoke Mountain. Campground 1.3 miles on spur road to Mill Mountain, trails; Mill Mountain, a Roanoke City Park, 3 miles. Roanoke Mountain (Mile 120.3), one-way road around mountain, 3.7 miles long, steep grades, no towed vehicles, impressive views from summit.
129.6	Roanoke Valley. The city you see is Roanoke, largest along the parkway.
154.5	Smart View. Picnic area, trails. The one-room Trail Cabin built in the 1890's faces a "right smart view." Fine dogwood bloom early May.
165	Shading from yellow to deep red, flame azalea blooms mid-May throughout the plateau section.
167 to 174	Rocky Knob. Campgrounds (Mile 167). Nature trail from The Saddle (Mile 168). Picnic area, trails, gas (Mile 169). Housekeeping cabins (Mile 174).

PEAKS OF OTTER LODGE, MILE 85.6

After crossing the James River, the parkway ascends 3,286 feet in 13 miles to its highest elevation in Virginia, 3,950 feet.

Mile	Special Places to Stop
71	Petit Gap. Road to Cave Mountain Lake (7 miles) in Jefferson National Forest. Swimming, picnicking, camping.
74.7	Thunder Ridge. 8-minute trail to superb view of Arnold Valley. The slopes are purple with rhododendron in early June.
79.7	Onion Mountain. Short loop trail through rhododendron and mountain-laurel. Fine bloom in early June.
83.4	Fallingwater. Loop trail along Fallingwater cascades, 1.5 miles.
84 to 87	Peaks of Otter. Lodge, restaurant (Mile 85.6). A forest plant-animal community is the theme of exhibits at the visitor center (Mile 86) and self-guiding trail. Gas, road to campgrounds, picnic area, bus station, hiking trails.
114.9	Twenty-minute walk to overlook above Roanoke River gorge.

WHETSTONE RIDGE FROM PARKWAY, MILE 28

The parkway winds in and out of George Washington National Forest from Mile 0 to James River. South of the river to Roanoke, it is in Jefferson National Forest. It crosses Otter Creek nine times between Mile 56.6 and James River, and at Mile 63.2 drops to its lowest elevation, 649.4 feet.

Mile	Special Places to Stop
16	Va. 814 to Sherando Lake (4.5 miles) in George Washington National Forest. Swimming, picnicking, camping.
29	Whetstone Ridge. Restaurant and gas.
34.4	Yankee Horse. Reconstructed spur of logging railroad. Delightful short walk through woods alongside Wigwam Creek to Wigwam Falls.
58 to 63.6	Otter Creek. Campground, restaurant, gas, (Mile 60.8). Otter Lake (Mile 63.1), fishing, trail. Visitor center (Mile 63.6) tells of James River and Kanawha Canal; footbridge across James River to restored canal lock; self-guiding trail from visitor center along banks of the James.

THE MOUNTAIN FARM CABIN, MILE 5.8

At the northern end of Blue Ridge Parkway is Shenandoah National Park, 75 miles long and from 2 to 13 miles wide. Its most celebrated features are mountain slopes of lush beauty and a succession of panoramas from Skyline Drive, which is 105 miles long and connects with the parkway at Rockfish Gap.

Mile	Special Places to Stop
5	Humpback Rocks. Self-guiding trail through reconstructed mountain farm homestead leads
to 9.2	from visitor center (Mile 5.8). Hiking trail from parking area at Mile 6.1 leads three-quarters of a mile to The Rocks, whose humped appearance gives the area its name. Picnic area (Mile 8.4). Greenstone self-guiding trail (Mile 8.8) offers an interesting walk. Stone fences are remnants of hog-walls built in early 1800's to control wanderings of half-wild hogs.
10.7	Ravens Roost. Torry Mountain and Shenandoah Valley to the west.