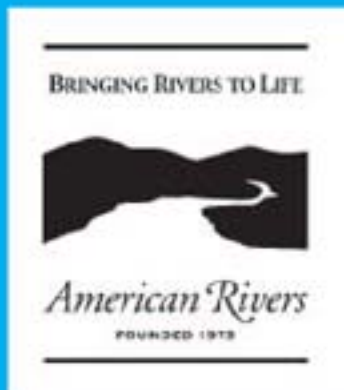


# USE AND ECONOMIC IMPORTANCE OF THE CHATTOOGA RIVER



AMERICAN RIVERS

NATIONAL PARK SERVICE



# **USE AND ECONOMIC IMPORTANCE OF THE WILD AND SCENIC CHATTOOGA RIVER**

*Final Report*

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Principal Investigators:

Roger L. Moore & Christos Siderelis  
Department of Parks, Recreation and Tourism Management  
North Carolina State University  
Raleigh, NC

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## EXECUTIVE SUMMARY

This report presents the results of a comprehensive study of the recreation users, use, economic impacts, and economic benefits of the 57-mile Wild and Scenic segment of the Chattooga River in Georgia, South Carolina, and North Carolina. The study was conducted in 2002 and 2003 and was a cooperative effort involving North Carolina State University, American Rivers, and the National Park Service. Mail questionnaires were used to gather data from a sample of both commercially guided and self-guided boaters, as well as nonboaters using fee-based parking areas near the river. Overall, 841 users (43% of the sample) responded, providing sampling errors of 3.5% or less.

Users were predominantly middle aged men who were well educated, worked in professional careers and had fairly high household incomes. Most users traveled less than 150 miles to get to the river, visited with family or friends, stayed overnight, and had visited there before. Whitewater rafting and kayaking were, by far, the most common activities, with most rafters using the services of one of the 3 river outfitters. Nature-oriented reasons related to the river and its surroundings were the most important motives for users' visits. Most people rated the quality of their experiences very highly, and levels of problems were quite low overall. The issues of greatest concern to those who did report problems were most often related to water quality, pollution, water levels, and trash.

The vast majority of users were aware that the section of the Chattooga they visited was designated as part of the National Wild and Scenic Rivers System and felt that this designation was very important. Most also felt that the river does, in fact, have the characteristics of a wild river area as described in the Wild and Scenic Rivers Act. Overall, users were satisfied with the river and the corridor of land around it, felt it was appropriate that the area be managed through

the USDA Forest Service “forest plan” process, and that efforts to preserve the area had been effective.

Forest Service river use records indicated that approximately 43,000 boating visits were made to the Chattooga in 2001. Using these figures (the most recent available) and spending data provided by the users, it was estimated that visitors from outside the area spent over \$1.8 million in the 6-county area where the river segment is located. After applying the appropriate multipliers, the total economic impact was estimated to be over \$2.608 million for this local area in 2002. Most of this impact was in the form of admissions and fees, retail purchases, and expenditures in restaurants. The total economic benefit to recreation boaters was estimated to be \$5,794,282. This represents the total value of the river segment to boaters and is distinct from the economic impact of river use.

Benefit modeling showed guided and self-guided boaters’ behaviors to be sensitive to changes in water levels. Given that 2001 and 2002 were very dry years in the region, it is therefore likely that the economic impact and benefit estimates in this study are lower than for years with more normal weather and river flows. Self-guided boaters’ behavior was also adversely affected by hypothetical restrictions to the permit system or increased crowding while guided boaters’ behavior was not. Study results indicate that the most important priorities for management and river advocates should be protecting and conserving, and in some cases restoring, the Chattooga’s natural, scenic, and recreational resources.

The final part of this study compared results from the Chattooga River research to the findings from a similar study conducted in 2001 on the Wild and Scenic segment of the West Branch of the Farmington River in Connecticut. Both studies were part of the same line of research, with the two rivers being selected because they were prime examples of a “public land



river” (Chattooga) and a “private land river” (Farmington). The comparisons revealed that there were differences across the two rivers in terms of who was visiting, how far and how often they came, how many were on overnight visits, what river activities they engaged in, numbers using commercial outfitters, and awareness of the river’s wild and scenic designation. More remarkable, however, were the similarities among visitors to these two quite diverse wild and scenic rivers. Both groups shared the same most important reasons for visiting (enjoying the view, experiencing the river, and being close to nature), noted very similar things they liked best about the river and its corridor (related to high quality natural environments), and felt it was very important that the river was designated wild and scenic. These findings are all indications that the National Wild and Scenic Rivers Act of 1968 is indeed providing protection for the “outstandingly remarkable” resource values of free-flowing river segments, as was intended, and that these protections are important to the users of even very different wild and scenic rivers.

## ACKNOWLEDGMENTS

The authors would like to thank a number of key people and organizations for their crucial assistance in bringing this project to a successful completion. We would first like to thank project sponsors American Rivers and the National Park Service for their support, encouragement and hard work. In our experience American Rivers is just what their literature asserts – the nation’s leading river conservation group, which has worked since 1973 to protect wild and scenic rivers, repair damaged rivers, and restore wildlife habitat. Particular recognition is due to Jack Hannon of American Rivers for his contribution as their diligent and professional project liaison. Two outstanding programs of the National Park Service were instrumental in initiating and supporting this research – the Rivers, Trails and Conservation Assistance Program and the National Wild and Scenic Rivers Program. Beth Porter and John Haubert of the Park Service were superb partners representing these programs. This project would have never come about without them.

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Finally, we wish to thank the hundreds of river users who generously shared their time and information to provide the basis for the analyses and results presented here. We hope they will agree that their time and efforts were well spent and benefited the river that they care so much about.

Thank you,

Roger Moore and Chris Siderelis

North Carolina State University

## I. INTRODUCTION

Rivers and river-related recreation experiences are extremely important to people in the United States. According to the National Survey on Recreation and the Environment, 29% of the U.S. population 16 years of age or older participated in boating/floating in 1994-95 and another 29% fished during the same period. This means that approximately 58 million people participated in these types of activities (Cordell et al., 1999, p. 222). Between 1994 and 2001, kayaking participation in the U.S. was the fastest growing of 49 common outdoor recreation activities according to the National Surveys on Recreation and the Environment, with an increase of 186% (Cordell et al., 2003). Canoeing participation increased by 51% and rafting was up 37% during the same period. More importantly, the future demand for river-related activities is predicted to increase nationwide. Forecasts indicate that the number of primary purpose canoeing trips will increase by 29% between 1995 and 2050. Raft/floating trips are expected to increase by 30% and fishing trips by 15% for the same period (Cordell et al., 1999, pp. 329-334).

In order to meet present and future demand for conserved rivers in the nation, Congress passed the National Wild and Scenic Rivers Act in 1968 (Public Law 90-542, 1968). That act requires that rivers designated into the system must be free-flowing and must have at least one “outstandingly remarkable” resource value. Wild and scenic designation affords permanent protection from federally licensed or assisted projects that would adversely affect a river segment’s special resources or free-flowing condition. The National Park Service (NPS) is responsible for implementing the provisions of this act, including identifying rivers that meet the criteria for inclusion in the Wild and Scenic Rivers System. In addition, various NPS programs are responsible for providing comprehensive river planning, consultations and technical

assistance to agencies and organizations involved in planning, developing, and managing rivers in the U.S. However, the protection of wild and scenic rivers depends largely on public support from communities near those rivers.

River advocates have long contended that free flowing and conserved rivers provide a wide variety of benefits to individuals, communities, and society at large. A growing body of research supports and documents this contention. Some of the potential benefits of conserved river corridors and river-related issues that are receiving increased research attention are recreation and tourism experiences, economic impacts, economic benefits, wildlife habitat, effects on adjacent property values, water quality, in-stream flow, and small dam removal (e.g., Porter et al., 2001). Assessing the magnitude and importance of these and other benefits is an important undertaking as public, private and nonprofit organizations at all levels develop policies and programs to effectively plan and manage river corridors and systems.

Any effective planning, management or development effort must be based on accurate and timely information. This is particularly true of rivers because of the many, often conflicting, uses and priorities such corridors face and the dynamic and rapidly changing environments in which they exist. Although various federal, state and local programs attempt to guide river conservation and use, there are still important pieces of information that are lacking if such programs are to meet their mandates. Some of the most poorly documented types of information are the various aspects of the economic importance of conserved river segments. This report documents the results of a comprehensive study undertaken to help address this need. It was conducted on the 57-mile wild and scenic segment of the Chattooga River in Georgia, South

Carolina, and North Carolina, and was a collaborative effort involving North Carolina State University, American Rivers, and the National Park Service.

The research had three primary objectives:

1. Document the recreational use and characteristics of recreation users along the river segment.
2. Estimate the economic importance of river recreation along the river segment.
3. Model the total recreation benefits of the river segment.

The remainder of this report documents the results of the research designed and conducted to address these three objectives.

## II. BACKGROUND

An important part of the Chattooga River was added to the National Wild and Scenic River System in 1974. This 57-mile river segment is located in northwestern South Carolina, northeastern Georgia and southwestern North Carolina (see map in Figure 1). The headwaters of the Chattooga River and the beginning of its wild and scenic segment are near the base of Whitesides Mountain in mountainous southwestern NC. From there it flows south for about 10 miles to where it becomes the border between SC and GA for the remainder of its designated wild and scenic length. When the 57-miles of the Chattooga was designated Wild and Scenic by Congress, it was the first river in the Southeast to be added to the National Wild and Scenic River System. It remains one of the most spectacular and significant free-flowing rivers in the region. Many people recognize this segment because of its use as a location for the movie *Deliverance*. The majority of the segment is located within and surrounded by the Sumter, Chattahoochee, and Nantahala National Forests. The river corridor is primarily primitive and characterized by dense forests with undeveloped shorelines.

The Chattooga is extremely popular for canoeing, whitewater rafting, kayaking, and fishing and the lands that surround it are popular for hiking, backpacking, horseback riding and other forms of nature-based outdoor recreation. No boating is permitted on the northernmost reaches of the wild and scenic river, although fishing and hiking are very popular there. The remainder of the wild and scenic segment is boaters' paradise and is divided into four "sections." Section I is slow and gentle and suitable for novice canoers. Section II includes shelf-like rapids and one Class 3 rapid and is popular with novice whitewater boaters and others. Section III requires considerable whitewater boating expertise with rapids up to Class 5. Numerous boating fatalities

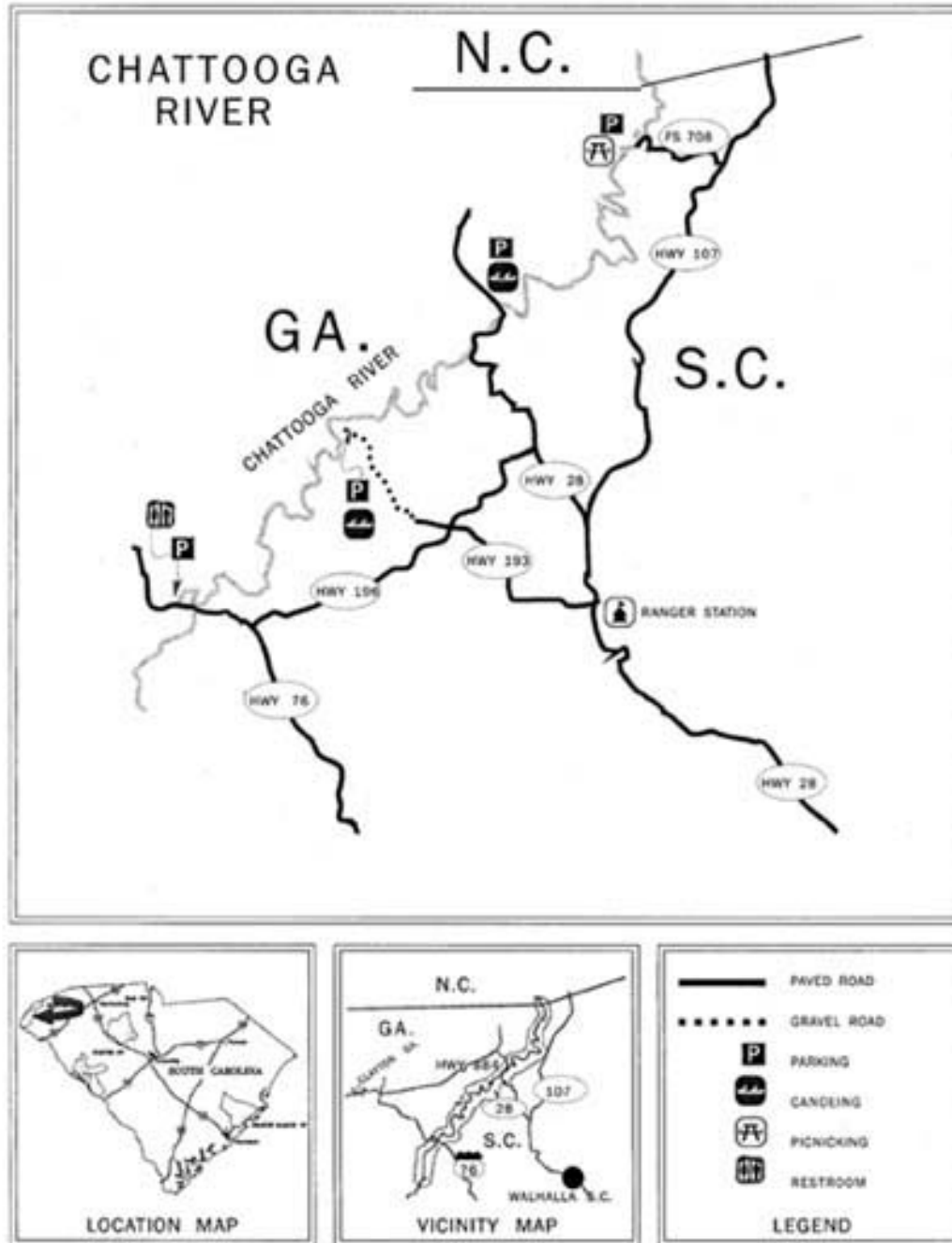
have occurred on this section. Section IV is the most technical and dangerous of the sections with numerous Class 3, 4, and 5 rapids that should be attempted only by expert boaters (USDA Forest Service, 1994). This section ends as the river flows into the calm waters of Lake Tugaloo, which also marks the end of the wild and scenic segment. Water temperatures range from 70 degrees in the summer to the mid-40's in the winter. The minimum water level averages 1.2 feet and reaches a maximum of about 3 feet. Water levels above 2.0 feet are considered dangerous. The USDA Forest Service regulates both guided and self-guided boating on the Chattooga. "Guided boating" is provided by three permitted commercial river outfitters and is managed differently from "self-guided boating" which does not involve commercial guides. The number of trips and customers the outfitters may guide down the river are both capped by the Forest Service and all self-guided boaters are required to obtain a free, self-service permit at registration boxes at their river access points before running the river. The three Chattooga River outfitters are the Nantahala Outdoor Center, Southeastern Expeditions, and Wildwater Ltd.

The wild and scenic segment of the Chattooga flows almost entirely through lands administered by the USDA Forest Service, making it an example of a "public land river" in the National Wild and Scenic Rivers System. This is in contrast to a "private land river," which is a wild and scenic segment that flows through private lands or a patchwork of public and private lands. Whereas, public land wild and scenic rivers are managed by the public land managing agencies responsible for the lands through which they flow, private land rivers are more directly affected by multiple stakeholders such as private landowners, local communities, businesses, land managing agencies, conservation groups, and various governmental bodies. See Moore and Siderelis (2003) for an example of a study conducted on the use of a "private land river."



**Figure 1. Map of the Wild and Scenic Chattooga River**

Source: USDA Forest Service (2002). Chattooga Wild and Scenic River. Columbia, SC: Sumter National Forest. Available at: [//www.fs.fed.us/r8/fms/rec/Chattooga.pdf](http://www.fs.fed.us/r8/fms/rec/Chattooga.pdf)



### III. RESEARCH METHODS

This study required the collection and analysis of primary data from a sample of river users. This section describes the research procedures used.

The initial data collection plan was to sample river users on site, conduct short interviews and obtain permission to send these users a more extensive follow-up questionnaire. Because of the multitude of river access points over the 57 miles of the wild and scenic segment, an alternative was employed that was a more realistic approach to obtaining a representative sample of the many types of users of the various sections of the river. A sample of 2002 users of the river and its immediate “corridor” was generated based on three different existing sources of mailing lists: commercial guided boaters, self-guided boaters, and users of fee-based parking/access points near the river. Mail questionnaires were then sent to each person in the sample.

The first source for the study sample was lists of commercial boating customers from 2002 obtained from the two outfitters that were generous enough to share them. A systematic sample proportional to each outfitter’s share of overall guided boating was pulled from these lists. This subsample will be called “guided boaters.” The second source was a list generated from the on-site permits required of all self-guided boaters from 2002. A systematic sample of these self-guided boaters was then selected and will be referred to as “self-guided” boaters. A third source of users was developed and used as well because not all recreation use of the Chattooga River is for boating. The Chattooga, and its immediate corridor, are also used by people engaged in hiking, fishing, birdwatching, camping, and other recreation uses. National Forest parking areas in the Chattahoochee National Forest require payment of a day use fee. While the self-service forms

completed by users of these sites do not request names and addresses, annual passes for use of these sites do. All 2002 annual pass holders for these sites were included in the study and comprised the third subsample of users. Annual pass holders were instructed to answer the study questionnaire in terms of their use of the river as well as their use of areas within a quarter mile on either side of the river itself. If an annual pass holder had not visited the “Chattooga River corridor” in the last 12 months, they were instructed to write, “have not visited” on the survey and return it to us so they could be removed from the study sample. These three subsamples will be referred to as guided boaters, self-guided boaters, and annual pass holders, respectively, to be consistent with USDA Forest Service terminology.

The sample sizes for the guided and self-guided boater groups were selected to be roughly proportional to each group’s share of overall river use based on the most recent Forest Service use figures available. Because of the relatively small number of annual pass holders, all of them were sent study questionnaires. After the overall study mailing list was generated from these three subsamples, mail questionnaires were sent to each of the subjects in this sample. Up to three mailings were employed with each user, as necessary, to maximize response rates. Overall, the study response rate was 43%. Sample sizes and response rates overall and for the three subsamples are shown in Table 1. Total river use was obtained from Forest Service boating records for 2001, the most recent figures available at the time of the study.

Table 1. Sample Sizes and Response Rates.

	Guided Boaters	Self-Guided Boaters	Annual Pass Holders	Total
Questionnaires Mailed	982	942	180	2,104
Returned Undeliverable	34	80	10	124
Returned “did not visit” in 2002	11	1	32	44
Effective Sample Size	937	861	138	1,936
Returned Usable	360	440	41	841
Response Rate	38.4%	51.1%	29.7%	43.4%

The study questionnaire was designed by faculty from NC State University in collaboration with American Rivers, NPS, USDA Forest Service, and the river outfitters. The questionnaire gathered detailed information on users’ characteristics, their river trips, experiences, expenditures, and attitudes about Chattooga River resources and management. A copy of the survey instrument is included as Appendix B.

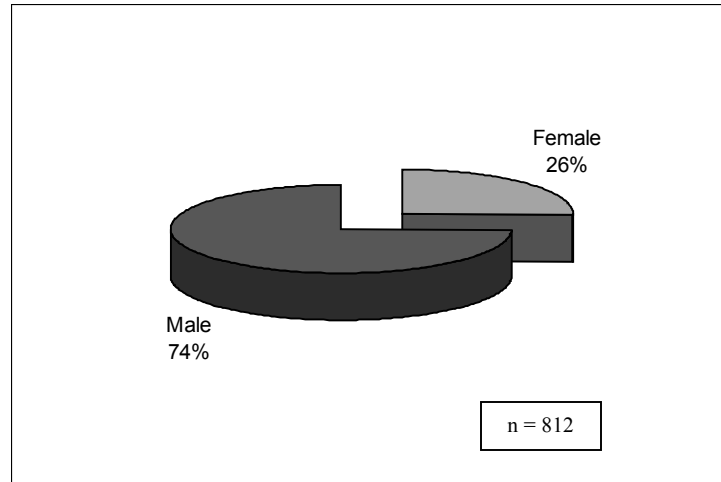
Data were entered, checked for errors and analyzed using the STATA and SPSS statistical software packages. Descriptive statistics were used to summarize the findings regarding the characteristics of the survey respondents, and their river use, attitudes, experiences, and preferences. Various inferential statistics were used to help answer questions related to the study objectives.

## IV. RESULTS

The research results are summarized in this section, which begins with a description of the characteristics of the river users themselves and their river visits. Findings related to the users' river experiences are presented next followed by a description of users' perceptions and attitudes toward river resources and management. This is followed by the estimations of overall economic impacts and benefits of river recreation at the wild and scenic segment of the Chattooga.

### *Users' Characteristics*

Although there are obviously many exceptions, the typical Chattooga River user is a middle-aged male who is well educated with a relatively high household income working in a managerial or professional career. Nearly three quarters of those surveyed were male (Figure 1.) and over three quarters were under 50 years old. Although 7% were 60 years old or over, the largest age group (over a third) was in their 40s. The average age was 41 (Table 2). Nearly three quarters of users had completed college or advanced degrees (Table 3) and the most common occupations (44%) were managerial or professional (Table 4). Not surprisingly considering their education levels and occupations, river users generally had high household incomes. In fact, over a quarter (28%) had annual household incomes of \$100,000 or more (Table 5).



**Figure 2. Respondent's Gender**

**Table 2. Respondent's Age**

<b>Income</b>	<b>Frequency</b>	<b>Percent</b>
Under 20	10	1.2%
20-29	143	17.6
30-39	198	24.3
40-49	281	34.5
50-59	125	15.4
60-69	49	6.0
70 and over	8	1.0
<b>Total</b>	<b>814</b>	<b>100.0%</b>

Mean = 41, Median = 41, Standard Deviation = 12

**Table 3. Respondent's Highest Level of Education**

<b>Education Level</b>	<b>Frequency</b>	<b>Percent</b>
8 <sup>th</sup> grade or less	1	0.1%
Some high school	7	0.9
High school diploma or GED	44	5.5
Business or trade school	32	4.0
Some college	131	16.3
College graduate	276	34.4
Some graduate school	78	9.7
Master's degree	145	18.1
Doctoral or professional degree	89	11.1
<b>Total</b>	<b>803</b>	<b>100.01%</b>

**Table 4. Respondent's Occupation**

<b>Occupation</b>	<b>Frequency</b>	<b>Percent</b>
Managerial or professional specialty	348	43.5%
Technical, sales or administrative support	85	10.6
Retired	55	6.9
Student	54	6.7
Service occupation	53	6.6
Precision production, craft or repair	28	3.5
Farming, forestry or fishing	17	2.1
Homemaker	9	1.1
Unemployed	3	0.4
Operator, fabricator or laborer	3	0.4
Other	146	18.2
<b>Total</b>	<b>801</b>	<b>100.0%</b>

**Table 5. Respondent's Annual Household Income**

<b>Income</b>	<b>Frequency</b>	<b>Percent</b>
Under \$20,000	59	7.6%
\$20,000-\$39,999	96	12.3
\$40,000-\$59,999	148	19.0
\$60,000-\$79,999	138	17.7
\$80,000-\$99,999	120	15.4
\$100,000-\$119,999	69	8.9
\$120,000-\$139,999	40	5.1
\$140,000-\$159,999	34	4.4
\$160,000-\$179,999	12	1.5
\$180,000-\$199,999	13	1.7
\$200,000 or more	50	6.4
<b>Total</b>	<b>779</b>	<b>100.0%</b>

### *Trip Characteristics*

This section describes the characteristics of the users' trips to the Chattooga River. To avoid confusion for users who visit the river regularly, all users were asked to respond to the questions about their visits and experiences based on the *most recent* trip they had made to the river.

Although most visitors traveled moderate distances to access the Chattooga, there was a large minority that traveled a long way to get to the area. Nearly half (49%) traveled 100 miles or less one-way to get to the river. However, nearly a quarter traveled over 300 miles one-way to get there. The average travel distance was 230 miles with a median distance of 110 miles (Table 6).

Users spent an average of about 6 hours at the river. For guided boaters this included the time they spent actually getting from the outfitters' facilities (aboard a bus) to the river itself and then back to the facility after running the river (Table 7).

**Table 6. Miles Traveled to Chattooga River**

<b>Miles</b>	<b>Frequency</b>	<b>Percent</b>
10 or Less	42	5.4%
11-50	160	20.5
51-100	183	23.4
101-150	101	12.9
151-200	50	6.4
201-300	58	7.4
301-400	48	6.1
400 or More	140	17.9
<b>Total</b>	<b>782</b>	<b>100.0%</b>

Mean = 230, Median = 110, Standard Deviation = 281

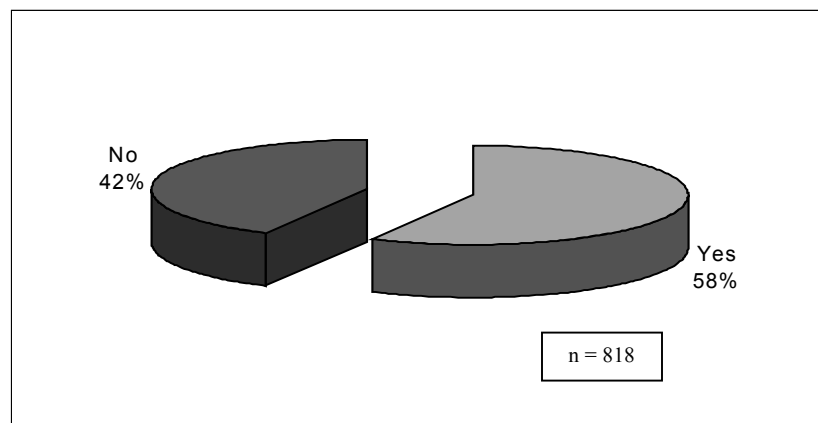


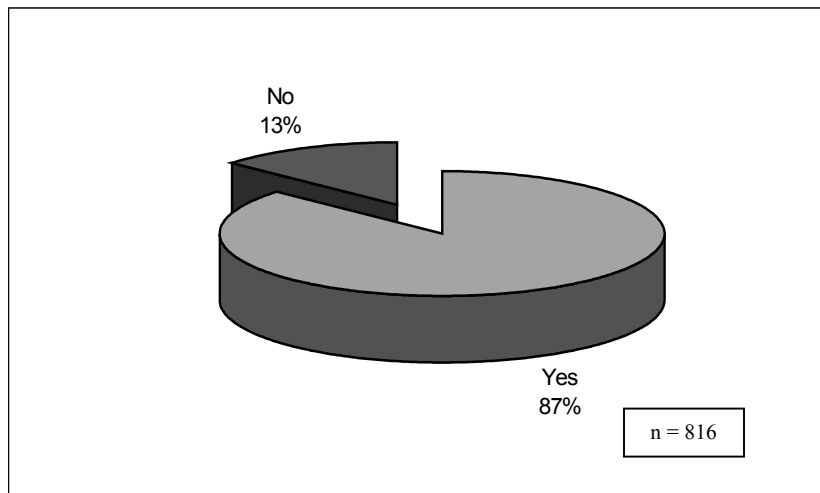
**Table 7. Length of Respondent's Stay at the River**

<b>Time</b>	<b>Frequency</b>	<b>Percent</b>
1 hour or less	6	0.8%
>1 hour through 2 hours	18	2.3
>2 hour through 3 hours	40	5.2
>3 hour through 4 hours	108	14.0
>4 hour through 5 hours	134	17.4
>5 hour through 6 hours	203	26.4
>6 hour through 7 hours	106	13.8
>7 hour through 8 hours	103	13.4
Longer than 8 hours	51	6.6
<b>Total</b>	<b>769</b>	<b>99.9%</b>

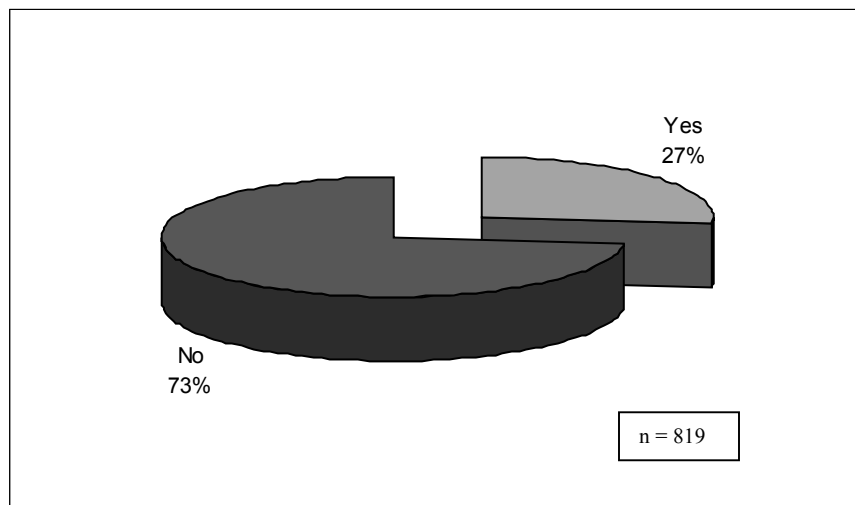
Mean = 6 hrs, Median = 6 hrs, Standard Deviation = 5 hrs

Most Chattooga River users (58%) were on overnight trips away from home when they visited the river (Figure 3) and the vast majority (87%) reported that the Chattooga was their primary destination (Figure 4). Most (74%) had visited the Chattooga before (Figure 5).

**Figure 3. Was Visit Part of an Overnight Trip?**



**Figure 4. Was the Chattooga River the Primary Destination?**



**Figure 5. Was this Respondent's First Visit to the Chattooga River?**

Most Chattooga River users had been associated with the river for a relatively short time. Over half had made their first visit there 5 years or less from the time of the study. But there was also a large group who had visited there for the first time decades earlier. About 14% had made their

first visit to the Chattooga more than 20 years before (Table 8). In fact, 7% of users had made their first trip during or before 1974 when the river was designated Wild and Scenic. Most respondents also reported being infrequent users, but there was also a segment that used the river frequently. When asked how many trips they had taken to the wild and scenic segment in the previous 12 months, 28% reported a single visit. Half of the users had gone there 5 times or less and the median number of visits was 2. However, 8% had visited the river over 20 times in the previous 12 months (Table 9). On average, users planned to take more trips in the next 12 months than they had during the previous year. Again, most expected to take 5 trips or less, but nearly a tenth said they would be visiting more than 20 times in the next 12 months (Table 10). The most common type of group users came with was made up of friends. Nearly a third came with family alone and another 13% visited both with family and friends (Table 11).

**Table 8. Number of Years Since Respondent's First Visit to the River**

<b># of Years</b>	<b>Frequency</b>	<b>Percent</b>
Less than 1	238	30.0%
1 to 5	198	24.9
6-10	113	14.2
11-15	66	8.3
16-20	72	9.1
More than 20	107	13.5
<b>Total</b>	<b>794</b>	<b>100.0%</b>

Mean = 8.1, Median = 4, Standard Deviation = 9.6

**Table 9. Chattooga River Trips Taken in Past 12 Months**

# Trips	Frequency	Percent
0	12	1.5%
1	362	45.4
2-5	206	25.8
6-10	91	11.4
11-20	64	8.0
21-50	52	6.5
51-100	8	1.0
101 or More	3	0.4
Total	798	100.0%

Mean = 7, Median = 2, Standard Deviation = 16

**Table 10. Chattooga River Trips Expected to Take in Next 12 Months**

# Trips	Frequency	Percent
0	123	16.8%
1	202	27.5
2-5	164	22.3
6-10	101	13.8
11-20	76	10.4
21-50	55	7.5
51-100	8	1.1
101 or More	5	0.7
Total	734	100.1%

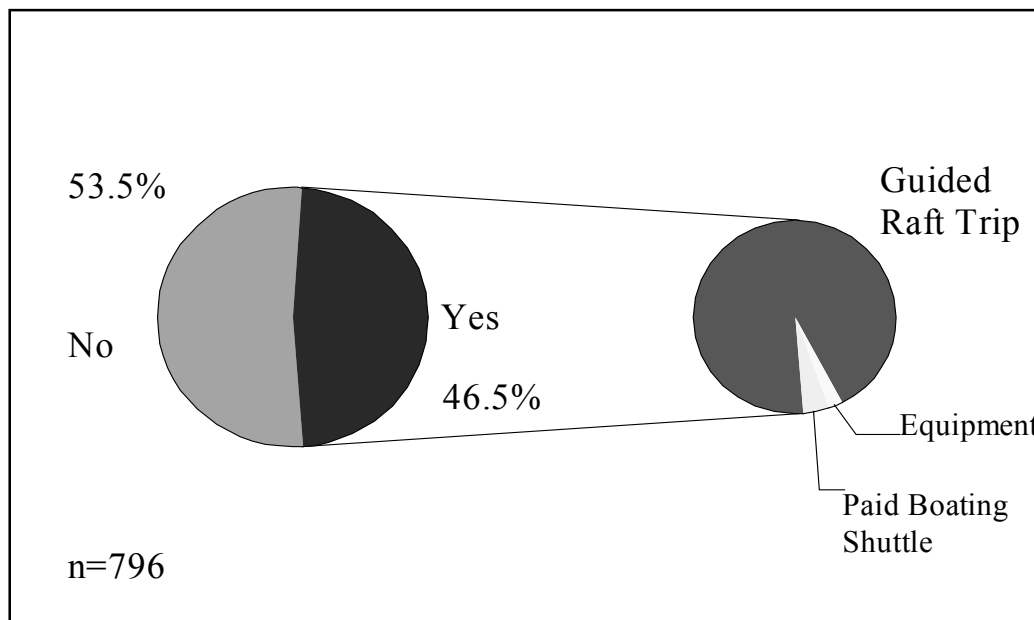
Mean = 10, Median = 2, Standard Deviation = 41

**Table 11. Type of Group**

Group Type	Frequency	Percent
Family	257	31.9%
Friends	361	44.8
Family & Friends	103	12.8
Organized Group	42	5.2
Other	43	5.3
Total	806	100.0%

Just over half of users did not use the services of one of the commercial river outfitters. Of the 47% who did use an outfitter, the vast majority participated in a guided raft trip. A few simply rented equipment from an outfitter or used the paid shuttle services they provide (Figure 6).

**Figure 6. Did Respondent Use a Commercial Outfitter During their Visit?**



Users participated in a wide variety of river activities while at the river. The two most common ones were rafting and kayaking at 24% and 20% of the sample, respectively (Table 12). When asked to specify their one primary activity, rafting, kayaking, canoeing, and fishing were the most common (Table 13). Four questions explored how active and involved users were in their particular activities in order to help put their river trips and the things they did there into their broader context. There were two distinct groups in terms of how often they participated in their primary activities. Over half the users engaged in their activity infrequently (7 or fewer times in the past 12 months). In fact a quarter of the users had only engaged in their activity once in the

past year. On the other hand, 38% of the users engaged in their activity over 30 times in the previous 12 months (Table 14). Skill levels in their activities varied widely for river users as well. Most reported having moderate skill levels or slightly higher, but 6% reported being novices and another 6% considered themselves experts (Table 15). On average, users reported that their activities were quite important to them and that the Chattooga River was very important for their participation in their activities (Tables 16 & 17).

**Table 12. Type of Activities Respondents Engaged in During their Visit**

<b>Activity Type</b>	<b>Frequency<sup>1</sup></b>	<b>Percent</b>
Rafting	372	23.6%
Kayaking	312	19.8
Swimming	185	11.8
Wildlife Observation	175	11.1
Camping	135	8.6
Hiking	132	8.4
Canoeing	124	7.9
Fishing	67	4.3
Inflatable Kayaking	28	1.8
Tubing	15	1.0
Horseback Riding	6	0.4
Other	22	1.4
<b>Total</b>	<b>1,573</b>	<b>100.1%</b>

<sup>1</sup>Respondents could indicate more than one activity for their visit.

**Table 13. Respondent's Primary Activity During their Visit to the Chattooga River**

<b>Activity Type</b>	<b>Frequency</b>	<b>Percent</b>
Rafting	341	44.2%
Kayaking	267	34.6
Canoeing	97	12.6
Fishing	26	3.4
Hiking	12	1.6
Inflatable Kayaking	7	0.9
Tubing	6	0.8
Camping	5	0.6
Swimming	3	0.4
Horseback Riding	1	0.1
Wildlife Observation	1	0.1
Other	5	0.6
<b>Total</b>	<b>771</b>	<b>99.9%</b>

**Table 14. Number of Different Days Respondent Participated in Primary Activity During the Last Twelve Months**

<b># Days</b>	<b>Frequency</b>	<b>Percent</b>
0	29	3.6%
1	198	24.9
2-7	209	26.3
8-14	60	7.5
15-30	150	18.8
31-60	89	11.2
61-90	25	3.1
91 or More	36	4.5
<b>Total</b>	<b>796</b>	<b>99.9%</b>

Mean = 20, Median = 5, Standard Deviation = 32

**Table 15. Respondent's Self-reported Skill Level in their Primary Activity**

Novice		Intermediate			Expert		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)			
5.7	5	6.7	28.2	<b>29.1<sup>1</sup></b>	19.1	6.3	4.5	1.5	808

**Table 16. Importance of Respondent's Primary Activity to Them**

Not at all important		Moderately Important			Very Important		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)			
1	3.8	6.5	21.1	16.6	16	<b>35.1</b>	5.4	1.5	815

**Table 17. Importance of Chattooga River to Respondent's Participation in Primary Activity**

Not at all important		Moderately Important			Very Important		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)			
1.1	2.1	4.5	13.3	14.2	18.7	<b>46.0</b>	5.8	1.5	817

*Users' Experiences*

<sup>1</sup> The most common response for each question is indicated by **bold** type throughout the report.

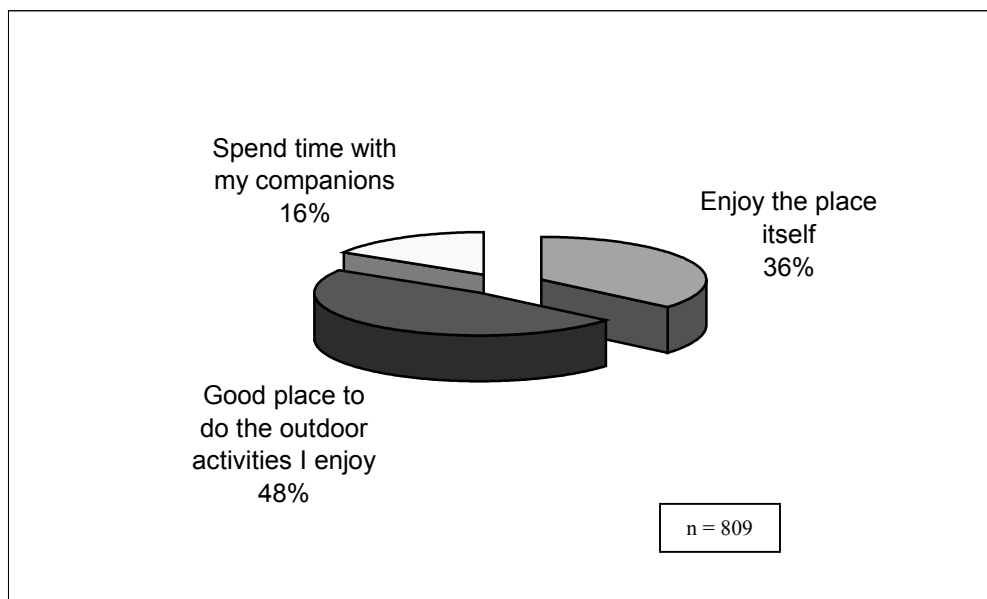


Understanding what visitors do at a recreation site is extremely important for management and planning. However, understanding *why* they come and what they *experience* while there can be even more valuable. This section reports results related to these deeper questions. To begin to explore users' experiences, they were given a list of 22 possible reasons for taking their most recent trip to the Chattooga River and asked to rate the importance of each motive on a 5-point scale where 1 indicated "not at all important" and 5 "extremely important." These results are summarized in Table 18 and are rank ordered from the most to the least important reasons on average. Nine of the 22 reasons were rated as important overall as indicated by each one having a mean of greater than 3 (the mid-point of the 5-point scale). These were all motives related to experiencing nature, being with other people, exercising, relaxing, or experiencing solitude. The top three motives for visiting the Chattooga involved enjoying the natural resources of the river and its setting – to enjoy the view along the river, to experience the Chattooga River, and to be close to nature (Table 18). When forced to choose a single broad reason for their visit (i.e., either their activity, the place itself, or their companions) nearly half said that they went there because it was a good place to do the outdoor activities they enjoy. Enjoying the place itself was the next most common, and spending time with their companions was the least common reason for their visits (Figure 7).

Overall, users were very satisfied with their trips to the river. The average rating on a 10-point scale where 10 indicated "the best possible trip" was 8.3. Less than 6% of the users rated their trips at or below the scale midpoint of 5 (Table 19).

**Table 18. Respondents' Motivations for their Trip to the River**

<b>Motive</b>	<b>Not at all Important</b>		<b>Extremely Important</b>			<b>Mean</b>	<b>Stan. Dev.</b>	<b>N</b>
	<b>1 (%)</b>	<b>2 (%)</b>	<b>3 (%)</b>	<b>4 (%)</b>	<b>5 (%)</b>			
To enjoy the view along the river	0.9	1.1	4.5	25.5	<b>68.1</b>	4.6	0.7	817
To experience the Chattooga River	2.1	1.7	6.7	21.3	<b>68.2</b>	4.5	0.9	820
To be close to nature	2.7	3.1	10.9	26.8	<b>56.5</b>	4.3	1.0	810
To be with members of my group	13.6	4.5	14.7	31.3	<b>36.0</b>	3.7	1.4	804
To get exercise	7.6	7.1	25.7	<b>34.1</b>	25.6	3.6	1.2	818
To relax physically	11.9	7.6	23.6	<b>31.5</b>	25.3	3.5	1.3	813
To help reduce built-up tension	14.9	8.1	18.7	<b>29.2</b>	29.1	3.5	1.4	814
To do something with my family	26.4	8.4	10.9	18.4	<b>36.0</b>	3.3	1.6	789
To experience solitude	21.4	12.9	16.8	21.9	<b>27.0</b>	3.2	1.5	808
To learn about the countryside	18.3	14.8	<b>32.2</b>	22.4	12.4	3.0	1.3	805
To think about my personal values	<b>26.2</b>	16.4	21.6	20.1	15.7	2.8	1.4	801
To bring back pleasant memories of a prior visit	<b>28.8</b>	12.5	23.2	19.7	15.8	2.8	1.4	802
To take risks	<b>25.7</b>	18.1	25.1	22.3	8.9	2.7	1.3	809
To be on my own	<b>36.0</b>	13.1	18.4	15.8	16.8	2.6	1.5	811
To share my skills and knowledge with others	<b>36.4</b>	15.4	21.2	18.0	8.9	2.5	1.4	810
To use my equipment	<b>42.7</b>	11.4	16.3	14.9	14.7	2.5	1.5	798
To test my endurance	<b>42.5</b>	15.4	19.9	14.3	7.9	2.3	1.3	811
To meet new people	<b>44.3</b>	22.6	19.3	9.6	4.2	2.1	1.2	804
To be creative by doing something such as sketching, painting, taking pictures, etc.	<b>54.8</b>	19.9	14.7	6.2	4.4	1.9	1.1	801
To reach a specific destination	<b>57.9</b>	16.4	13.5	6.8	5.4	1.9	1.2	810
To be away from the family for a while	<b>64.7</b>	13.7	12.2	5.5	4.0	1.7	1.1	805
To show others I can do it	<b>64.5</b>	17.0	11.0	5.6	2.0	1.6	1.0	808



**Figure 7. Most Important Reason for this Visit**

**Table 19. Respondent’s Quality Rating for this Visit to the Chattooga River**

<b>1</b> (%)	<b>2</b> (%)	<b>3</b> (%)	<b>4</b> (%)	<b>5</b> (%)	<b>6</b> (%)	<b>7</b> (%)	<b>8</b> (%)	<b>9</b> (%)	<b>10</b> (%)	Mean	Standard Deviation	n
0.2	0.1	0.6	1.5	3.1	4.5	13.2	<b>31.0</b>	19.0	26.8	8.3	1.5	82 4

A number of questions probed how various issues might be affecting users’ experiences for better or worse. The first related to boaters’ interactions with others on the river. Most users saw 5 or fewer people kayaking the river during their visit. The average number of kayakers seen was 7

(table 20). Most users reported that seeing kayakers that day had no effect on their enjoyment. On average seeing kayakers increased user's enjoyment slightly overall. Only 6% of users reported that seeing kayakers had somehow decreased their enjoyment that day (Table 21). When asked in an open-ended format *how* the kayakers had affected their enjoyment, the vast majority of comments were positive. The most common responses were that kayakers were fun and interesting to watch and that it was enjoyable to see their skill (Table 22).

On average, users saw far more people rafting on the day of their visit than they had kayakers. The average number of people seen rafting was 18 and most people saw more than 10 (Table 23). However, 40% reported that they had seen no rafters the day they visited. Like the situation with kayak encounters, most people reported that encountering rafters had not affected their enjoyment. There was a larger percentage that disliked their raft encounters than disliked their kayak encounters. Sixteen percent reported that their encounters with people rafting had decreased their enjoyment somehow that day (Table 24). The ways that rafters affected people's experiences were much more evenly split between positive and negative reasons. The most common ways people rafting increased enjoyment were that they were fun and interesting to watch, were part of the person's group, or that it was fun being with them and making friends with them. The ways that people rafting had decreased others' enjoyment were that they caused congestion and crowding, were loud and noisy, and got in the way and caused waiting to get through rapids (Table 25).

**Table 20. Number of People Respondent Saw *Kayaking* During their Visit**

# People	Frequency	Percent
0	126	16.0%
1-5	323	41.0
6-10	205	26.0
11-20	93	11.8
21 or More	41	5.2
Total	788	100.0%

Mean = 7, Median = 5, Standard Deviation = 10

**Table 21. How Respondent's Encounters with People *Kayaking* Affected their Enjoyment**

People <i>kayaking</i> greatly reduced my enjoyment			People <i>Kayaking</i> had no effect on my enjoyment			People <i>kayaking</i> greatly increased my enjoyment			Mean	Standard Deviation	n
-3 (%)	-2 (%)	-1 (%)	0 (%)	1 (%)	2 (%)	3 (%)					
0.4	1.6	3.8	<b>51.0</b>	12.2	11.2	20.0	0.9	1.3	771		

**Table 22. Why Respondent's Encounters with People *Kayaking* Reduced or Increased their Enjoyment that Day**

	<b>Response</b>	<b>Frequency</b>	<b>Percent</b>	
<b>Positive Responses</b>	Fun, interesting, or enjoyable to watch	48	15.8	
	Enjoyed interaction	42	13.9	
	Pleasure seeing their skill, learning opportunity, or gaining advice	39	12.9	
	Helpful/ Safety	24	7.9	
	Good to see others enjoying the river	21	6.9	
	"I kayak"	20	6.6	
	Kayakers are friendly	14	4.6	
	Kayakers are good, cool, or polite people	11	3.6	
	Made me want to learn	4	1.3	
	Kayakers are respectful	3	1.0	
	Other positive responses	14	4.6	
	<b>Negative Responses</b>	"Caused congestion"	5	1.7
		"Cut in at rapid"	3	1.0
		General negative comments about kayakers	8	2.6
<b>Neutral responses</b>	Not a factor	13	4.3	
	Photographer for outfitter	7	2.3	
	Saw none	3	1.0	
	Other	24	7.9	
	<b>Total</b>	<b>303</b>	<b>99.9 %</b>	

**Table 23. Number of People Respondent Saw Rafting During their Visit**

# People	Frequency	Percent
0	304	39.9%
1-5	39	5.1
6-10	47	6.2
11-20	115	15.1
21 or more	256	33.6
Total	761	99.9%

Mean = 18, Median = 10, Standard Deviation = 25

**Table 24. How Respondent's Encounters with People Rafting Affected their Enjoyment**

People rafting greatly reduced my enjoyment			People rafting had no effect on my enjoyment			People rafting greatly increased my enjoyment			Mean	Standard Deviation	n
-3 (%)	-2 (%)	-1 (%)	0 (%)	1 (%)	2 (%)	3 (%)					
2.7	4.0	9.6	<b>64.1</b>	7.0	6.3	6.3	0.1	1.2	743		

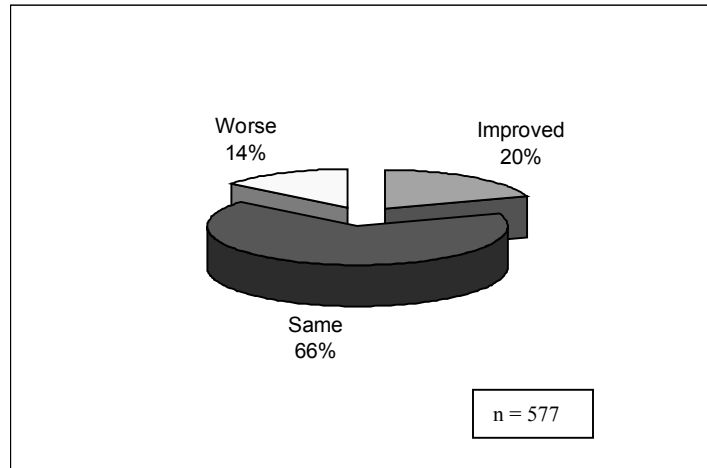
Two questions specifically explored how the quality of visiting the Chattooga River had changed since the user's first visit. Those who were not on their first trip to the Chattooga were asked to report whether the overall quality of visiting there had improved, remained the same, or gotten worse since they had first visited there. Two-thirds reported that the overall quality had not changed and a fifth said that the quality had improved (Figure 8). Those who reported that things had improved or gotten worse were asked to give the main reasons why they felt the quality had changed. These open-ended responses are summarized in Tables 26 and 27. The most common reasons people felt that visiting the Chattooga had improved were related to improvements in facilities and access, and the area itself becoming more pristine and clean. The main reasons

**Table 25. How Respondent's Encounters with People Rafting Reduced or Increased their Enjoyment that Day**

	<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
<b>Positive Responses</b>	Fun and interesting to Watch	34	13.3%
	They were part of our group	22	8.6
	Fun being with others and enjoyed meeting new people	19	7.4
	Having Fun	6	2.3
	Rafter are friendly and nice	4	1.6
	Guides and rafting outfitter was great	4	1.6
	Scheduled not to meet other groups	3	1.2
	Safety	2	0.8
	Other Positive Comments	3	1.2
	<b>Negative Responses</b>	Rafts cause congestion and crowding	18
Rafters are loud and noisy		12	4.7
Rafts get in the way		9	3.5
Rafts cause waiting		7	2.7
Rafters are rude and obnoxious		7	2.7
Rafts are too big		6	2.3
Rafts cause vegetation and riverbank damage		5	2.0
Rafts reduce experience		5	2.0
Rafter monopolize the river		4	1.6
Rafts are unsafe		4	1.6
Worried about getting run over by rafts		4	1.6
Rafters litter		3	1.2
Don't like rafts		3	1.2
Rafts don't care about the river		2	0.8
Do not want rafting		1	0.4
Do not want an increased in rafting		1	0.4
Other negative comments		11	4.3
<b>Neutral Response</b>	Not too many rafters	16	6.2
	Did not see any rafters	11	4.3
	Everyone deserves an equal opportunity	5	2.0
	No Effect	3	1.2
	Other	22	8.6
<b>Total</b>		<b>256</b>	<b>100.3%</b>



people felt things had gotten worse related to increased crowding, decreased water quality and levels, and increased trash and pollution.



**Figure 8. Change in Quality of Visiting Since *First* Visit**

**Table 26. How Respondents Think River Conditions Have Changed For The Better**

Response	Frequency	Percent
Facility Improvements	14	17.5%
More Pristine/Cleaner	11	13.7
Parking/Road Improvements	11	13.7
Better Access	8	10.0
Increased Familiarity With River/Area	8	10.0
Outfitters/Guide Improvements	6	7.5
Wild & Scenic Designation	4	5.0
No Parking Fees	3	3.8
My Skills Have Improved	3	3.8
Trails	1	1.3
Other	11	13.7
<b>Total</b>	<b>80</b>	<b>100.0%</b>

**Table 27. How Respondents Think River Conditions Have Changed For The Worse**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
More People/Crowded	21	22.1%
Worse Water Quality	18	18.9
Water Levels	13	13.7
Trash/Pollution	12	12.6
More Raft/Commercial Use	4	4.2
Development/Commercialization	4	4.2
Parking/Roads	3	3.2
Trails	3	3.2
More Bureaucracy/Regulation/Fees	3	3.2
Problems On Georgia Side	2	2.1
Horses	2	2.1
Other	10	10.5
Total	95	100.0%

When asked directly what they liked best about the Chattooga River and the corridor of land along it, the reasons consistently and overwhelmingly related to the untouched, undeveloped high quality natural resources there and the kinds of experiences these conditions made possible (Table 28). A similar open-ended question asked what people liked least about the river and the corridor of land along it. The most common response was “nothing.” The most common negative responses were related to water quality, pollution and water levels (Table 29).

**Table 28. What Respondents Liked Best About The Chattooga River and its Corridor**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Non-Developed/Untouched	99	12.7%
Beauty/Natural Beauty	96	12.3
Remote/Quiet/Solitude	77	9.9
Scenery/Scenic	68	8.7
Wild/Pristine/Primitive	63	8.1
Nature/Natural	48	6.1
Water/Whitewater	41	5.2
Clean/No Pollution	35	4.5
River/River Access	35	4.5
Wild & Scenic	34	4.3
Rapids/Rocks	23	2.9
Limited Access	18	2.3
Unspoiled	18	2.3
Surroundings	17	2.2
No Houses/Buildings	15	1.9
Preservation	13	1.7
Not Crowded	9	1.2
Rafting	9	1.2
Fishing	8	1.0
Trails	7	0.9
Lack of Roads	7	0.9
Everything	5	0.6
Wildlife	4	0.5
Not Commercial	4	0.5
Swimming	1	0.1
Other	27	3.5
<b>Total</b>	<b>781</b>	<b>100.0%</b>

**Table 29. What Respondents Liked Least About The Chattooga River and its Corridor**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Nothing/No Complaints/ Not Applicable	108	16.5 %
Water Pollution/ Water Quality	66	10.1
Water Level	65	10.0
Trash/Litter	46	7.0
Problems On Georgia Side (vehicles, roads, trash, lack of enforcement)	31	4.7
I Like It All/ Its Naturalness	26	4.0
Lake/Reservoir	24	3.6
Travel Distance/Time	23	3.5
Overuse/Impacts	22	3.2
Rafts/Commercial Groups	18	2.8
Crowded/More People	18	2.7
Lack of Access	17	2.5
Carrying Gear To/From River	14	2.1
Too Many Rules/Regs/Fees	13	2.0
Long Walk In/Out	12	1.8
Too Few/Inadequate Put-Ins/Take-Outs/ Parking	12	1.8
Too Accessible	12	1.8
Horses	11	1.7
Development	10	1.5
Inadequate Restrooms/Trash Cans/ Changing Areas	9	1.3
Campers/Campsites	9	1.3
Locals/Rednecks/Drunks	8	1.2
No Boating Allowed in Upper Sections	7	1.0
Snakes/Animals/Bugs	7	1.1
Water Temperature	4	0.6
Poor/Lack of Fishing	4	0.6
Poor Signage	4	0.6
Inadequate Shuttles	4	0.6
Inadequate Trails	3	0.5
Other	49	7.5
<b>Total</b>	<b>656</b>	<b>99.6%</b>

To further explore issues that might be problems along the Chattooga, users were provided with a list of 28 potential problems that might occur along a wild and scenic river and asked to rate the

severity of each on a 7-point scale where 1 was “not a problem at all” and 7 was a “major problem.” Table 30 presents a summary of the results ordered from the most severe problems on average to the least severe. The most striking thing about these results is that the average levels of all the potential problems were quite low overall, with means no higher than 2.7 on the 7-point scales. The biggest problems, on average, all related to impacts on the natural resources of the river and the corridor of land along it. These were water pollution, litter, evidence of human waste, and erosion at launch areas.

#### *Users’ Perceptions and Attitudes about River Resources and Management*

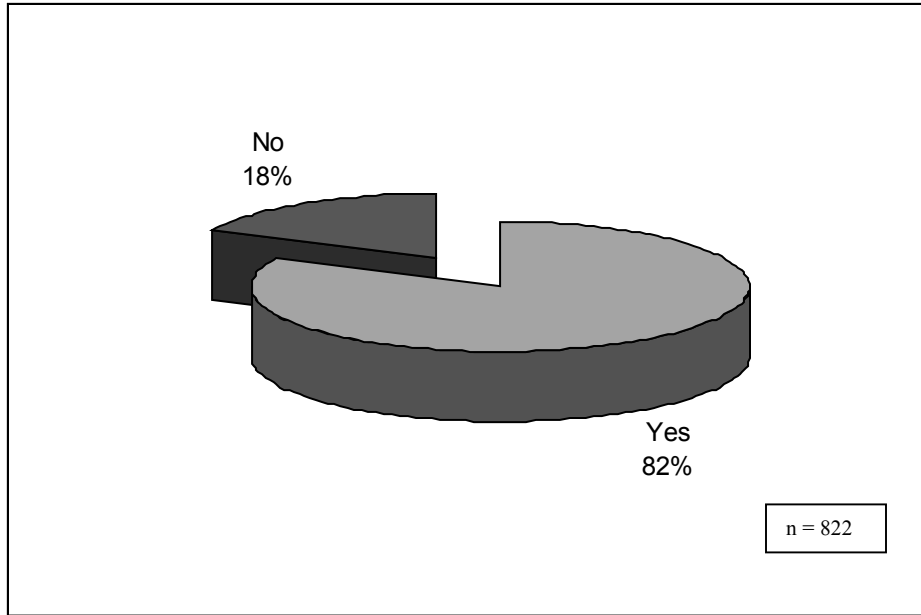
A series of important questions explored how users perceived and felt about river resources and river management. First, users were asked if, before receiving the study questionnaire, they were aware that the Chattooga was designated Wild and Scenic. The vast majority (83%) were aware that the Chattooga was a designated Wild and Scenic River segment (Figure 9). The vast majority also reported that the Chattooga’s Wild and Scenic designation was very important to them (Table 32). All respondents were also asked how important they felt the Chattooga was in terms of providing various benefits. They were given a broad list of 10 potential benefits and asked to rate the importance of the Chattooga in providing each on a 7-point scale from 1 (“not at all important”) to 7 (“extremely important”). Eight of the 10 were rated above the scale midpoint of 4, and 3 of the benefits were quite important, with averages above 6 on the 7-point scales. The most important benefits users felt the Chattooga provides were all related to its protected natural resources – aesthetic beauty, preserving undeveloped open space, and fish and wildlife habitat (Table 33).

**Table 30. Extent to Which Certain Issues were a Problem**

<b>Issues</b>	<b>Not a Problem</b>				<b>Major Problem</b>				<b>Mean</b>	<b>Standard Deviation</b>	<b>n</b>
	<b>1 (%)</b>	<b>2 (%)</b>	<b>3 (%)</b>	<b>4 (%)</b>	<b>5 (%)</b>	<b>6 (%)</b>	<b>7 (%)</b>				
Polluted water	<b>38.5</b>	21.0	12.2	9.5	6.3	5.3	7.3	2.7	1.9	797	
Litter on the river banks	<b>34.8</b>	24.0	14.5	8.6	7.5	5.1	5.5	2.7	1.8	803	
Evidence of human waste	<b>39.7</b>	22.7	14.4	7.9	7.9	4.6	2.7	2.5	1.7	806	
Litter in the river	<b>38.9</b>	23.1	15.8	8.3	6.8	3.0	4.1	2.5	1.7	805	
Erosion at launch areas	<b>38.6</b>	25.4	14.3	9.9	6.2	3.6	2.0	2.4	1.6	796	
Reckless behavior of river users	<b>39.4</b>	24.9	14.5	10.0	6.0	3.0	2.1	2.4	1.5	798	
Muddy water	<b>44.5</b>	23.6	10.8	7.4	6.6	3.4	3.8	2.3	1.7	798	
Conflicts between different types of visitors	<b>41.9</b>	24.8	16.3	8.0	4.9	2.6	1.5	2.2	1.4	802	
Too few rangers or management staff on the river	<b>45.5</b>	23.1	12.5	9.1	5.0	2.8	2.0	2.2	1.5	800	
Noisy or rowdy people	<b>42.8</b>	25.4	14.5	7.9	5.4	2.7	1.4	2.2	1.5	802	
Erosion on river banks	<b>41.7</b>	27.4	16.0	8.2	3.5	1.8	1.4	2.2	1.4	798	
Trampled vegetation along the river banks	<b>43.1</b>	26.8	15.5	6.1	4.6	2.1	1.8	2.2	1.4	802	
Logging of forest visible from river	<b>53.2</b>	23.0	8.8	6.0	3.9	2.4	2.6	2.0	1.5	795	

**Table 30. Extent to Which Certain Issues were a Problem (Continued)**

Issues	Not a Problem							Major Problem	Mean	Standard Deviation	n
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)				
Development visible from the river	<b>54.8</b>	24.8	8.9	4.4	4.0	1.4	1.8	1.9	1.3	801	
Not enough restrooms along the river	<b>60.8</b>	16.2	8.7	6.3	4.7	1.5	1.9	1.9	1.4	805	
Traffic noise from nearby roads	<b>54.0</b>	25.6	11.3	4.9	2.4	1.4	0.5	1.8	1.2	800	
Lack of public transportation between access points	<b>63.1</b>	18.4	6.5	5.5	3.8	1.1	1.8	1.8	1.4	801	
Lack of direction signs	<b>63.5</b>	17.3	7.2	6.2	3.1	1.1	1.5	1.8	1.3	803	
Not enough access points	<b>61.9</b>	17.9	9.1	4.4	3.5	1.6	1.6	1.8	1.4	800	
Not enough parking at access points	<b>59.7</b>	19.2	9.1	6.1	3.6	1.2	1.1	1.8	1.3	804	
Lack of information to plan visits	<b>65.1</b>	17.8	8.9	3.9	2.9	1.3	0.8	1.7	1.2	800	
Lack of drinking water	<b>62.8</b>	20.4	7.1	4.5	3.4	1.1	0.8	1.7	1.2	801	
Feelings of being unsafe or insecure	<b>69.1</b>	19.9	6.9	2.2	1.3	0.4	0.3	1.5	0.9	803	
Lack of services (food, drink, equipment rental, etc.)	<b>72.8</b>	14.5	7.6	3.1	1.0	0.4	0.6	1.5	1.0	787	
Other	<b>42.5</b>	5.9	3.3	4.6	4.6	11.8	27.5	3.7	2.6	153	



**Figure 9. Was Respondent Aware the Chattooga is Designated Wild & Scenic?**

**Table 31. Importance of Chattooga River’s Wild and Scenic Designation**

Not at all Important		Moderately Important					Very Important		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)					
0.5	0.4	1.5	3.2	3.4	10.3	<b>80.7</b>	6.6	0.9	813		



**Table 32. Importance of Chattooga River in Providing Particular Benefits**

Potential Benefits	Not at all Important			Extremely Important				Mean	Standard Deviation	n
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)			
Aesthetic beauty	0.1	0.1	1.0	2.2	6.1	17.1	<b>73.4</b>	6.6	0.8	807
Preserving undeveloped space	0.5	0.1	1.7	3.3	7.7	14.0	<b>72.7</b>	6.5	1.0	808
Fish and wildlife habitat	0.8	1.5	1.0	5.9	9.2	18.4	<b>63.3</b>	6.3	1.2	801
Public education about nature and the environment	1.8	3.1	4.6	14.3	17.2	19.2	<b>39.8</b>	5.6	1.5	802
Public recreation opportunities	3.1	3.3	5.1	12.0	15.5	22.0	<b>38.9</b>	5.6	1.6	799
Community pride	2.3	2.0	5.6	16.7	17.7	14.9	<b>40.9</b>	5.5	1.6	798
Health and fitness	2.1	3.2	8.3	17.6	20.2	19.2	<b>29.4</b>	5.3	1.6	803
Tourism and business development	10.6	5.7	11.4	19.6	17.3	12.8	<b>22.6</b>	4.6	1.9	805
Access for persons with disabilities	14.6	14.1	14.4	<b>23.1</b>	13.7	7.9	12.2	3.8	1.9	787
Traffic reduction and transportation alternatives	<b>23.1</b>	12.8	14.76	18.2	9.5	8.2	13.4	3.6	2.0	779
Other	8.7	2.9	1.5	5.8	4.4	5.8	<b>71.0</b>	6.0	2.0	69

Overall, users were very satisfied with the Chattooga River and the corridor of land along it. On 7-point scales where 1 was “very unsatisfied” and 7 was “very satisfied” the mean scores were 6 or higher regarding the river and its adjacent lands. Nearly 85% rated the river as a 6 or 7 and nearly three quarters rated the adjacent lands that high (Tables 34 & 35).

**Table 33. Respondent’s Overall Satisfaction with the Chattooga River**

Very Unsatisfied							Very Satisfied		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)					
0.4	0.3	0.6	3.3	11.3	34.9	<b>49.2</b>	6.3	0.9	813		

**Table 34. Respondent’s Overall Satisfaction with the Corridor of Land along the Chattooga River**

Very Unsatisfied							Very Satisfied		Mean	Standard Deviation	n
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)					
0.3	0.5	2.3	6.5	16.0	35.6	<b>38.7</b>	6.0	1.1	811		

As one gauge of how important the Chattooga might be to users, they were asked to describe what they would have done if the Chattooga had not been available to them that day for some reason and where they would have gone instead. Table 36 summarizes the substitute activities reported by respondents. The most common responses were that they would have kayaked, rafted, or hiked somewhere else. The actual substitute sites they would have used varied widely and are noted in Table 37. The most common substitute area for the Chattooga was, by far, the Ocoee River. A combination of alternative rivers, various sites in North Carolina, and the Nantahala River were the next most frequently mentioned alternatives. Over 5% of respondents would have simply stayed home if the Chattooga had not been available to them that day for some reason.

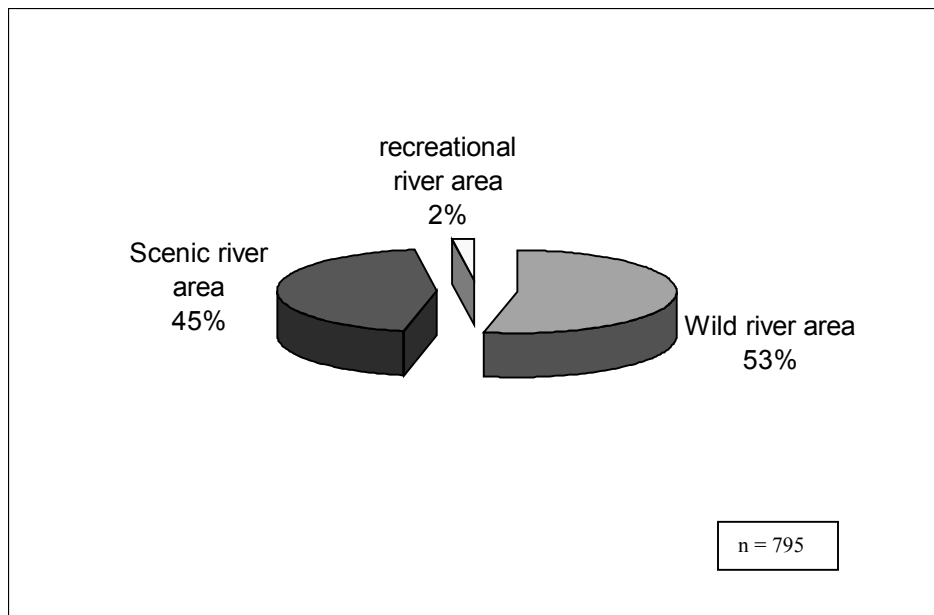
To help assess whether the Chattooga was meeting the purposes for which it was designated, users were asked to indicate whether they felt the Chattooga was wild, scenic, or recreational. These options were described briefly using the language from the national wild and scenic rivers act and users were asked to choose the one that they felt best described the section of the Chattooga they had visited that day. Just over half felt the Chattooga was, in fact, a wild river area, while 45% felt it was actually a scenic river area (Figure 10).

**Table 35. Substitute Activity if Chattooga River Had Not Been Available that Day**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Kayaked	150	19.4%
Rafted	101	13.1
Gone to a different river	92	11.9
Hiked	88	11.4
Combination of recreational activities	47	6.1
Stayed at home	37	4.8
Canoed	31	4.0
Gone somewhere else	30	3.9
Gone home	28	3.6
Fished	23	3.0
Worked	20	2.6
Don't Know / Nothing	16	2.1
Biked	11	1.4
Boated	10	1.3
Other recreational activity	8	1.0
Camped	7	0.9
Visited friends or family	7	0.9
Golf	6	0.8
Same	6	0.8
Climbed	5	0.6
Sightsee	4	0.5
Watched TV	4	0.5
Yard work	4	0.5
Shopping	4	0.5
Gone out drinking or out to eat	4	0.5
Visited an amusement park	3	0.4
Canceled, Postponed, or Rescheduled trip	3	0.4
Horseback riding	2	0.3
Traveled	2	0.3
Other	20	2.6
<b>Total</b>	<b>773</b>	<b>100.1%</b>

**Table 36. Substitute Location if Chattooga River Had Not Been Available that Day**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Ocoee River	153	23.1%
Combination of alternative rivers	65	9.8
North Carolina	52	7.8
Nantahala River	50	7.5
Home	36	5.4
Immediate area	32	4.8
An other state/ combination of states	28	4.2
Georgia	25	3.8
Tennessee	25	3.8
Another River	21	3.2
Not sure	19	2.9
South Carolina	18	2.7
Tallalah	18	2.7
Green River	13	2.0
Depends on the water level	12	1.8
French Broad River	10	1.5
Chattooga River	9	1.4
Chattahoochee National Forest	8	1.2
Chauga River	7	1.1
Great Smoky Mountains National Park	7	1.1
West Virginia	7	1.1
Lake Keowee	6	0.9
Nolichucky	6	0.9
Oconee	6	0.9
Same	5	0.8
Other	25	3.8
<b>Total</b>	<b>663</b>	<b>100.0%</b>



**Figure 10. How Users Perceived the Wild & Scenic Chattooga River**

Most users felt that USDA Forest Service management of the river and its adjacent land through their “Forest Plans” was appropriate. Many users felt this approach was very appropriate. About 9% felt the Forest Plan approach was not appropriate, however (Table 38). Overall, users felt that efforts to maintain the river’s free-flowing character and preserve its outstanding natural, cultural, and recreational features had been effective at the Chattooga. Only a small minority (4%) felt they had not (Table39).

As a final way to gather information from users, they were provided with space at the end of the study questionnaire and told they could comment on the Chattooga River and their experiences there, or offer suggestions for improving the river or its management. These additional comments are summarized in Tables 40 and 41 for positive and negative responses, respectively. Over half of the additional responses were positive ones. The most common ones related to simply loving

the experience and the area and admonishing authorities to preserve and protect the area and keep it clean. The most common negative comments volunteered by respondents were concerns about development and commercialization, self-guided boaters feeling they were being treated unfairly, and complaints about water quality and the current boating permit system.

**Table 37. How Appropriate Respondents Feel the USDA Forest Service “Forest Plans” Are for Managing the Wild and Scenic Chattooga River and the Lands Along It**

<b>Not at all Appropriate</b>							<b>Moderately Appropriate</b>		<b>Very Appropriate</b>	
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	Mean	Standard Deviation	n	
2.5	2.3	3.8	28.6	14.7	22.9	<b>30.2</b>	5.4	1.5	794	

**Table 38. How Effective Respondents Feel the Efforts to Maintain the River’s Free-Flowing Character and Preserve its Natural, Cultural, and Recreational Features Have Been at the Wild & Scenic Chattooga River**

<b>Not at all Effective</b>							<b>Moderately Effective</b>		<b>Very Effective</b>	
1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	Mean	Standard Deviation	n	
0.3	0.4	2.9	11.1	21.5	<b>35.2</b>	28.8	5.7	1.1	805	

**Table 39. Positive Additional Comments**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Love It/Great Experience	39	17.26
Preserve/Protect/Keep River Clean	21	9.29
Don't Change	19	8.41
Beautiful River/Great Place	19	8.41
Open Sections Of The River	17	7.52
Thank You/Keep Up The Good Work	16	7.08
Maintain Wild And Scenic Designation	15	6.64
Personal Feelings/Reflections	14	6.19
Don't Limit Access/Usage	12	5.31
Look Forward To Returning	7	3.10
Fishing	6	2.66
Guided Trip Experience	6	2.66
In Favor Of User Fees	5	2.21
Camping	4	1.77
Improve/Put In More Roads/Parking	4	1.77
In Favor Of A Permit System	3	1.33
Keep The River Natural	2	0.88
Want Mountain Bike Trails	2	0.88
Hiking	2	0.88
Other	13	5.75
<b>Total</b>	<b>226</b>	<b>100.00%</b>



**Table 40. Negative Additional Comments**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Against Development/Commercialization	16	8.84
Self-Guided Boaters Not Treated Fairly	16	8.84
Water Quality	15	8.29
Don't Require Permits	15	8.29
Limit Access/Usage	14	7.73
Water Levels	14	7.73
Better Signage/Information Needed	14	7.73
Object To Fees	9	4.98
Problems On GA Side	7	3.87
Long Survey	7	3.87
Rules/Regs Are Bad For River	7	3.87
Management Needs To Enforce Rules	5	2.76
Put-Ins/Take-Outs	5	2.76
Fishing	4	2.21
Horses	3	1.66
Shuttle Service Needed	3	1.66
Stop Logging	3	1.66
Issues With Commercial Outfitters	3	1.66
Reasons For Not Returning	2	1.10
Guided Trip Experience	2	1.10
Motorized Use	2	1.10
Other	15	8.29
<b>Total</b>	<b>181</b>	<b>100.00%</b>

*Economic Impacts of Chattooga River Recreation*

One of the important objectives of this research was to estimate the economic importance of river recreation along the 57-mile wild and scenic segment of the Chattooga River. This involved two separate types of analyses. The first, as reported in this section, was the economic impacts of river recreation. Economic impact analyses estimate actual visitor expenditures and the effects of these expenditures on local economies. The second broader type of analysis was estimating the demand and economic value of the river. Those estimations will be presented in the next section.

To begin examining the economic impact of Chattooga River recreation, we first asked users a general question to determine their average expenditures per trip during the past 12 months. These average direct expenditures are summarized in Table 41. The figures in this table are per person per trip and include the total amounts spent from the time the person left home until their return home. The majority of users spent an average of more than \$50 per trip and 42% spent more than \$100. Just over a tenth of users spent \$10 or less per trip on average. The overall average expenditure was \$255 per person per trip.

We then estimated the economic impact of Chattooga River recreation by asking users to report their actual trip-related expenditures in a far more detailed manner in the mail questionnaire. This approach has the important advantage of enabling users to report their *actual* expenditures after their trips are completed rather than forcing them to estimate what they *expect* to spend as would occur if data were gathered during their recreation visits. In this study, users reported the amounts they spent in a dozen different categories and, in each case, indicating whether the expenditure was made inside the six counties where the river segment is located (i.e., the “local impact area”) or

somewhere outside this 6-county area. These were the figures then used to estimate total economic impact, not the more general figures shown in Table 41. After these direct expenditures were determined, an economic impact estimation software package was used to estimate the effects of the direct expenditures on the local economy. Such software takes into account the total number of recreation visits, the types of expenditures, the locations of the expenditures, the appropriate economic multipliers for the appropriate economic sectors, and the structures of the particular economies where the expenditures take place. The package used in this study was the Money Generation Model 2 (MGM2) (Stynes, Propst, Chang, & Sun, 2000).

According to the most recent USDA Forest Service records available, there were a total of 42,998 boating visits to the Chattooga River in 2001. This was comprised of 10,894 self-guided boating visits and 32,104 guided boating visits and excludes use by the river guides employed by the commercial outfitters (correspondence from David Hedden, 6 August 2003). We assumed that river use did not change significantly for 2002 and employed these same use figures to estimate the economic impact of river recreation for 2002 (the year of this research). It should be noted that the self-guided boating use figure provided by the Forest Service underestimates actual self-guided use to some extent because some portion of self-guided boaters do not comply with the self-service permit system. The Forest Service speculates that between 10% and 15% of self-guided boaters do not register and are, therefore, not included in the above counts. This underestimate of total use coupled with the fact that 2001 and 2002 were both drought years in the southeast means that the estimates of economic impact and benefits reported in this study are almost certainly conservative.

Using the direct expenditure data gathered from river users, Forest Service river use figures, and the MGM2 software, the direct effects of visitor spending were calculated. The direct effects are the expenditures made in the 6-county impact area by visitors coming from outside that area, in other words, visitors injecting “new money” into the study area. The direct effects of visitor expenditures on sales, jobs, personal incomes and value-added in the 6 Chattooga River counties are presented in Table 42. The sectors that benefit most from Chattooga River visitors are those receiving admissions and fees, providing retail sales, and restaurant meals. Visitors from outside the area spent an estimated \$610,000 on admissions and fees, \$457,000 on retail purchases, and \$373,000 in restaurants in the Chattooga River counties during 2002. Their total direct expenditures in the area were more than \$1.8 million that year.

Total economic impacts were then calculated by applying the appropriate economic multipliers to the direct expenditure figures to estimate the additional indirect and induced effects generated by the direct spending. The total economic impacts for the 6-county area from recreation use of the Chattooga River by people visiting from outside the area are shown in Table 43. Overall, the economic impact by visitors to the Chattooga River in 2002 was estimated to be approximately \$2.608 million with 60 jobs being supported by river recreation.

**Table 41. Respondent's Average Cost per Chattooga River Trip During the Previous 12 Months**

<b>Cost</b>	<b>Frequency</b>	<b>Percent</b>
\$0-10	83	11.1%
\$11-20	71	9.5
\$21-30	68	9.1
\$31-40	49	6.5
\$41-50	77	10.3
\$51-100	85	11.3
\$101 or More	317	42.3
<b>Total</b>	<b>750</b>	<b>100.1%</b>

Mean = \$255, Median = \$100, Standard Deviation = \$392

**Table 42. Economic Impacts of Visitor Spending: Direct Effects**

<b>Sector/Spending category</b>	<b>Direct Effects</b>			
	<b>Direct Sales \$000's</b>	<b>Jobs</b>	<b>Personal Income \$000's</b>	<b>Value Added \$000's</b>
Admissions & fees	613	20	212	347
Retail Trade	457	14	233	364
Restaurants	373	12	127	177
Other vehicle expenses	159	2	49	77
Groceries, take-out food/drinks	96	1	11	22
Wholesale Trade	78	1	32	54
Gas & oil	25	0	1	3
Motel, hotel cabin or B&B	14	0	5	7
Sporting goods	11	0	2	4
Camping fees	10	0	3	5
Souvenirs and other expenses	7	0	2	3
<b>Total</b>	<b>1,844</b>	<b>49</b>	<b>676</b>	<b>1,062</b>

**Table 43. Direct and Total Economic Impacts of Visitor Spending**

<b>Economic measure</b>	<b>DIRECT EFFECTS</b>	<b>Multiplier</b>	<b>TOTAL EFFECTS</b>
Output/Sales (\$ 000's)	\$ 1,844	1.41	\$ 2,608
Personal Income (\$ 000's)	\$ 676	1.41	\$ 952
Value Added (\$ 000's)	\$ 1,062	1.45	\$ 1,535
Jobs	49	1.24	60
Total Visitor Spending (\$ 000's)	\$2,518		
Capture rate		73%	
Effective spending multiplier		1.04	

## V. ECONOMIC BENEFITS TO CHATTOOGA RIVER USERS

This section presents the results of the estimation of the economic benefits to river recreation users of the wild and scenic segment of the Chattooga River. Economic *benefit* analyses are distinct from estimates of economic *impacts*, such as those presented in the previous section. We clarify this distinction below and discuss the methods used to estimate economic benefits for the Chattooga River. We then present the results of the benefit analyses themselves.

Economic impact analyses attempt to determine what visitors *spend* to use a resource. Economic benefit analyses, on the other hand, estimate what that resource is actually *worth* to people. The economic impact analysis of the Chattooga River, discussed earlier, focuses on the spending behaviors of users and not the economic value of the Chattooga River. An economic impact is a change in economic activity generated by users spending money while visiting a particular area. Economic impact is an estimate of users' *expenditures* in a particular geographical area and the effects these expenditures have on the local economy. These economic effects are actual changes in sales revenues, jobs, net incomes, and tax revenues in the local economy caused by visitors' expenditures. This economic impact reflects the gain in the economic base of the area that supplies the primary users with the resource and other goods and services related to the use of that resource. The economic impact of river use does not measure the economic *benefits* of the river to primary users. Economic benefit estimates attempt to determine the total value to users of a particular resource, not what people spend to visit it.

In general there are three methods of estimating the recreation benefits of a particular site or resource. One is the contingent valuation method (CVM). This method generally involves

administering surveys posing hypothetical situations. By analyzing how users say their behavior will change under the situations presented in the surveys, economists can determine what something is worth to a particular group. The second way of estimating economic benefits is hedonic modeling, which examines related behavior to determine what something is worth. This can be accomplished by, for example, modeling how much more real estate is worth near the site or how much less people are willing to accept in salary to live there. The third, and most popular, approach for estimating economic benefits is travel cost analysis. This approach estimates demand curves based on prices that reflect how far and how often people are willing to travel to a site. The resulting analyses lead to different types of economic welfare measures. The most common is “consumer surplus,” or the economic benefit per trip over and above what it might have cost that user to visit the site. Economic benefits are often expressed as a user’s “willingness to pay” (WTP) for access to a site and, of course, the subsequent recreational opportunity there.

Regardless of the benefit estimation method adopted, users obviously do not receive dollar payments or direct adjustments in their annual incomes that are equivalent to the benefit amounts calculated. Rather, the estimated benefits attempt to quantify the dollar value of the site benefits a user receives from having visited there. Sometimes, this is actually the dollar value a user needs to receive to compensate him or her for a hypothetical loss of access to the site. Simply put, economic benefit analysis is an attempt to estimate the *total use value* of a recreation site to users by aggregating all benefits received from all the individuals that visit that site (like the Chattooga River).



For this part of the study, we employed a travel cost analysis technique referred to as random utility model to estimate the benefits that result from visitors' use of the wild and scenic Chattooga River. In the case of the Chattooga, user satisfaction is derived from their demand for the characteristics of what the Forest Service characterizes as guided and self-guided boating opportunities. The random utility model distinguishes between the binary boating choice behaviors and associated implied benefits. To further understand the recreation demand of these two boating segments, we also evaluate the marginal effects of hypothetical modifications to the management and river conditions for each.

### *Boating Choice Model*

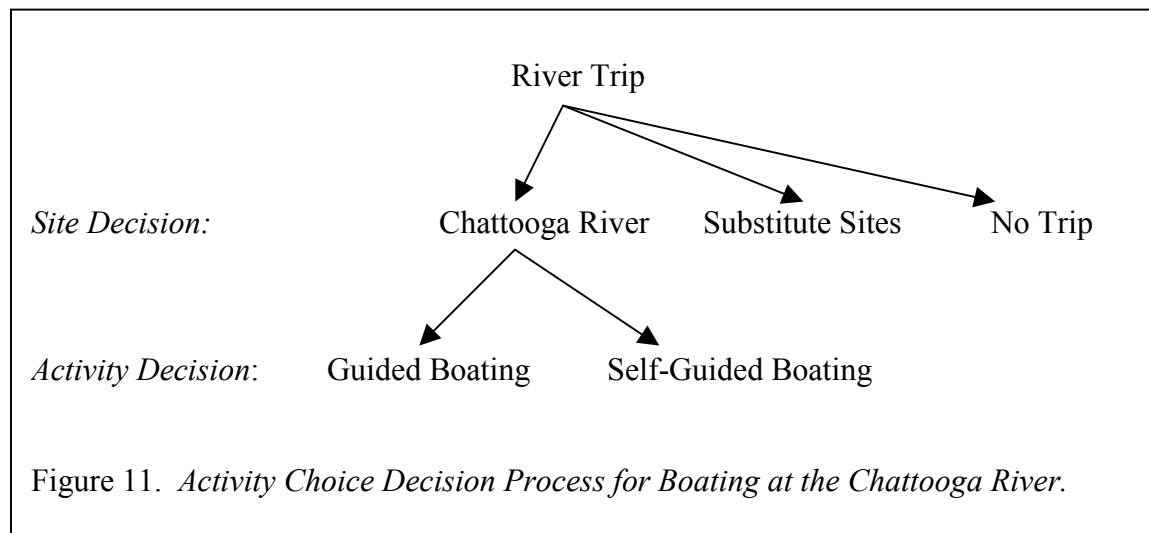
The boating choices examined here consider a person's interest in being guided down the river over a self-guided boating experience (or vice versa) on that occasion (trip) during the 2001 boating season (Parsons, 2002). We acquired this information directly from users with questions in the mail questionnaire relating to how they made their boating choices. It became clear from the preliminary analysis of the data that a typical user's decision process is somewhat complex. Approximately 34% of the respondents choose the Chattooga River because they enjoy the place itself, 48% because they consider the Chattooga to be a good place to do the outdoor activities they enjoy, and 18% because they want to spend time with their companions.<sup>i</sup> Further, the decisions are significantly different statistically for guided and self-guided boating choices ( $\chi^2 (2) = 46.34, p = 0.00$ ). Many guided-boating respondents want to spend time with companions, while the self-guided boaters are more likely to want to enjoy the place. Interestingly, 47% of both the self-guided and outfitter-guided respondents indicate the Chattooga is a good place to do the outdoor activities they enjoy. Additional categorical analysis uncovered significantly different reasons for

respondents' boating choices. Self-guided users are motivated more by wanting to be on their own, to use their equipment, to think about their personal values, to get exercise, and to share their skill and knowledge with others; while the guided users want to take risks, to do something with their families, and to learn about the countryside.

Some analysts may argue, and we agree, that given respondents' multiple motivations for choosing the Chattooga, the site and activity selection decisions should be modeled simultaneously as one decision (i.e., as two separate, single-site travel cost models—one model for guided-boating and another for self-guided-boating trips). We also prefer to model the recreation choices simultaneously by adopting the assumption that the single choice occasion is the appropriate view of a person's time horizon in making a guided-boating choice.<sup>ii</sup> Having no data on respondents' past trips to substitute rivers or survey responses for a "no trip" choice, we cannot assume that the self-guided boating opportunity is the only viable substitute choice for a guided boating opportunity like commercial rafting. Although we do know that not more than 5% of the respondents would have canceled, postponed, stayed at home, or rescheduled their trips, we elected not to remove these observations from the database. Of the remaining respondents, 40% would have substituted an alternative boating activity at the Chattooga, and 12% would have gone to a different river if necessary.

The boating choice framework (displayed in Figure 11) reflects an individual's decision to participate in river recreation, conditional on choosing the Chattooga River. The decision maintains a single trip time horizon, where a boating choice to participate in Chattooga River's guided or self-guided-boating is treated as an independent decision. This implies that the binary

model is applicable for describing guided and self-guided-boating and, in fact, both are monitored by the Forest Service administrators of the Chattooga River. The dependent variable is “binary” in that it assumes a value of one if a person chooses the guided-boating alternative and zero if a person chooses the self-guided one. An analysis of the binary discrete choices reveals how an individual trades off the characteristics of one boating opportunity for another.



The choice model is based on the assumption that users pay “prices” to access the Chattooga River consisting of their round-trip travel expenses from their origins to the Chattooga River, opportunity costs of travel times, and other travel expenses and fees, if any, associated with their visits. We focus on one choice occasion. Further, we maintain that a person’s participation in a particular river activity is conditional on visiting the Chattooga River, and is a rational choice resulting from a comparison of the satisfaction to be realized by participating in either the guided or self-guided boating alternative.

In notational form, a user's satisfaction for a particular on-site boating choice is characterized by a conditional utility ( $v$ ) function,  $v_i(Y - P_i, Z_i, e_i)$ , where  $Y$  is the household's annual income,  $P$  is the price to access the Chattooga,  $Z$  represents other taste or constraint variables, and  $e$  is the error term. Error is viewed as a random variable, or under the systematic control of the analyst. Hence, the model is referred to as a "random utility model." Since we assume that the river recreation trip impacts a user's income, neither income nor price enters the utility function alone. Rather, we enter a variable that is the difference between a user's income and price (i.e.,  $Y - P$ ). This reflects the marginal utility of money, or the rate at which an individual's satisfaction increases (or decreases) as household income increases (or decreases) by one dollar (Pearce, 1992). As Mendelsohn, Matzkin, Peterson, and Rosenthal (1994) note, it cannot be assumed that individuals of different annual incomes will make the same recreation choices.

Assuming the semi-log functional form for the boating choice decisions on single occasions, we incorporate the appropriate prices and incomes into the utility function ( $v$ ):

$$v_i = A_i + B_i \ln(Y - P_i) + C_i \ln Z_i + e_i. \quad (\text{Equation 1})$$

The difference between the conditional utility functions for the discrete boating choices follows from Equation 1 (Mendelsohn et al., 1994). So that,

$$v_i = A_0 - A_1 + B_0 \ln(Y) - B_1 \ln(Y - P) - C_1 \ln Z + u. \quad (\text{Equation 2})$$

The error term  $u$  is now equal to  $e_0 - e_1$ , the  $A$ 's are the guided and self-guided constant terms that reflect the difference between the two choices ( $A_0 - A_1$ ), and the  $B$  and  $C$  terms are the coefficients for the exogenous income and taste variables (i.e.,  $Y - P$ ,  $Z$ 's) (Mendelsohn et al.).

### *Results*

Table 44 displays the binary discrete choice or logit model treating each on-site observation as distinct. The binary dependent variable recorded a value of one if the choice is guided-boating and a zero if not (i.e., the self-guided boating choice). The logit equation uses individual characteristics to explain the choices, but only estimates the parameter vectors for the commercial rafting ( $J - 1$ ) choice. Hence, the parameters on the self-guided boating choice are normalized to zero. The analysis is based on 530 observations containing complete information on boaters' trip decisions, individual characteristics, and an observed river recreation activity (i.e., kayaking, canoeing, or rafting).

Past research has concluded that individuals are able to accurately report recreation expenditures like fees in ex post mail surveys (Champ & Bishop, 1996). The inclusion of average trip expenditures also avoids the common assumption of standard travel cost models that trips of different lengths have the same price (Kerkvliet & Nowell, 1999). Overall, the median group size is four persons. The mean price is \$635 (SD = \$731,  $n = 554$ ) per choice occasion.<sup>iii</sup> For a self-guided boating occasion, the average price is \$208 (SD = \$291,  $n = 283$ ) and is \$1,081 (SD = \$785,  $n = 271$ ) per guided-boating choice occasion. Averages for the remaining explanatory variables are: annual income \$66,335 (SD = \$41,835), percent first-time visitors is 29%, being with a family group is 32%, and visiting the Chattooga being the primary trip purpose is 86%.

Overall, the binary choice estimator did a good job of identifying the determinants of choice as to whether to participate in guided or self-guided boating on the Chattooga River (LR  $\chi^2(4) = 466.66$ ,  $p > \chi^2 = 0.000$ ). As shown in Table 44, a means of assessing the model's fit to the actual

data is by comparing the observed and the predicted choices. In fact, the model was quite accurate, correctly classifying 89% of the on-site boating choices.

The variable  $Y - P$  (income minus price) and the income coefficients are of the same magnitude and opposite signs for the binary choice model. The model is consistent with the Mendelsohn-Matzkin- Peterson-Rosenthal specification of the underlying direct utility function (Equation 2). Respondents belonging to families and making their first visits to the Chattooga River increased the likelihood of the guided-boating choices. The trip purpose, which differentiated single-purpose trips to the Chattooga River from the incidental or multiple-purpose trips, is not statistically significant at the 0.01 decision level (Parsons & Wilson, 1997). The two primary reasons that respondents identified as motivating them to make their most recent trips are “to take risks” by guided boaters and “to be on my own” for self-guided boaters.

**Table 44. Chattooga River Binary Choice Model for the Dependent Variable: Guided-Boating and Self-Guided Choices (n = 530)**

<i>Independent Variables</i>	<i>Coefficient</i>	<i>z-value</i>
Income-Price (Y -P)	-0.0039822	-8.78
Annual Income (Y)	0.0039836	8.80
First Visit (1); else 0	1.903626	5.27
Family (1); else 0	1.536852	4.48
To take risks	0.5538205	4.49
To be on my own	-0.592978	-5.26
Primary destination (1); else 0	0.9948819	2.21
Guided-boating Constant (A)	-3.982296	-5.98
<i>Summary Statistics (see note):</i>		
Observed versus predicted, correctly classified		88.81%
Efron's $R^2$		0.672
McFadden's $R^2$		0.592
Maximum Likelihood $R^2$		0.560
McKelvey & Zavoina's $R^2$		0.827

*Note.* The Efron's  $R^2$  and the McKelvey and Zavoina's  $R^2$  are goodness of fit measures for binary outcomes (Long & Freese, 2001).

### *Recreation Benefits*

Thinking in terms of a person's welfare change, the indifference between recreation choice alternatives is defined by the utility difference (Equation 2) in expected value terms, normalized by the marginal utility of money (coefficient  $B_y$ , Equation 2) (Smith & Kaoru, 1986).<sup>iv</sup> The choice model follows the Mendelsohn- Matzkin- Peterson-Rosenthal specification in Equation 2.<sup>v</sup>

Predictions about guided and self-guided boating choices, given the values of the explanatory variables, are interpreted as the choice probabilities.<sup>vi</sup> The mean sample predicted probabilities for guided boating is 0.82 (SD = .243, n = 271) and 0.18 (SD = .221, n = 283) for self-guided boating.

Haab and McConnell (2002, p. 231) define the willingness to pay (WTP) to avoid the loss of boating access on the Chattooga River per choice occasion. WTP in the discrete choice model depends on the rate of substitution between the two boating choices. We approximate the sample mean for the loss of each of the two boating opportunities as:  $\overline{WTP_j} = -\ln(1 - \text{Pr}(j)) / \beta_y$ , where  $\text{Pr}(j)$  is the probability the user will choose boating choice  $j$ ,  $\ln$  is the natural logarithm, and  $B_y$  is the marginal utility of money.<sup>vii</sup>

The mean WTP is \$937.65 per choice occasion for guided boating (mean boating group-size of 5.4 boaters) and \$71.78 per choice occasion for self-guided boating (mean boating group-size of 3.6 boaters)<sup>viii</sup>. Forest Service records indicate that in 2001 there were 42,998 boating visits to the Chattooga, 32,104 of which were guided (excluding the guides themselves) and 10,894 of which were self-guided (correspondence from David Hedden, 6 August 2003)<sup>ix</sup>. Assuming that use levels were the same in 2002 and using the average party sizes obtained from the questionnaire this equates to 5,945 guided trips (32,104 visits / 5.4 persons per party) and 3,026 self-guided trips (10,894 visits / 3.6 persons per party) to the Chattooga River in 2002. The total economic benefit

or aggregate WTP is, therefore, \$5,794,282 ( $5,945 * \$938 + 3,026 * \$72$ ) for the Chattooga River in 2002. That is, the hypothetical economic value users would need to be compensated if the opportunity to access the Chattooga River for boating were lost to them.

### *Discussion*

Be aware that it is often difficult to compare the estimates of recreation benefits from different estimation techniques. As Smith and Kaoru (1986) note in introducing the binary choice model, simple comparisons of the available models are unlikely to determine the most appropriate view of a person's decision process. There are differences in the information in the modeling approaches and the implicit assumptions of the random utility (e.g., binary choice) framework. In this study, we view the household's decision making trip-taking horizon as one choice occasion (a single point in time) while traditional travel cost modelers assume the longer time horizon of a series of planned trips during a season or year.

The mean WTP for river access to guided-boating occasion is \$938 and for the alternative of self-guided boating is \$72 per choice occasion. Using the consumer price index to adjust to 2002 dollars (U.S. Department of Labor, 2003), our WTP per choice occasion for self-guided boating is somewhat more conservative than the \$112 (\$63 in 1982) consumer surplus per trip that was averaged across 11 quality Colorado Rivers (Sanders, Walsh, & McKean, 1991). Our guided boating WTP is in the \$210 to \$1,474 range adjusted to 2002 dollars (\$127 to \$888 in 1986) for commercial passengers from a dichotomous choice, contingent valuation of whitewater boating on the Colorado River through the Grand Canyon (Boyle, Welsh, and Bishop, 1987). Bowker, English, and Donovan (1996), when valuing guided rafting on the Chattooga and Nantahala Rivers



with a traditional travel cost model (negative binominal), estimate a series of person-trip consumer surplus values. Adjusting the authors' per-person trip consumer surplus for the Chattooga to 2002 dollars and converting our results to person trips, our estimates were in-line with theirs of \$183 to \$375 in 2002 dollars (i.e., \$140 to \$286 per person in 1994).<sup>x</sup>

In a 2002 study of the Wild and Scenic West Branch of the Farmington River in Connecticut, the point estimate (i.e., the actual value of the travel cost parameter) of boating consumer surplus was \$107 (Moore & Siderelis, 2003). The Farmington River value is smaller in comparison to the mean WTP of \$938 per guided trip occasion but larger than the \$72 per self-guided trip occasion on the Chattooga. There are two primary reasons for the difference. One, the annual household incomes of the Farmington River survey respondents did not significantly influence their decisions to take river trips. Two, the mean price that respondents paid to use the Farmington River was similar to that of self-guided boaters on the Chattooga. Overall, the statistical significance of a positive income effect and the higher prices paid per guided boating occasion by Chattooga River users contribute to greater recreation benefits there.

#### *Hypothetical Modifications to River Management and Conditions*

We next examined the marginal effects of alternative modifications to river management and river conditions on the demand for Chattooga River boating. Remember, recreation choice theory proposes that individuals choose recreation sites, outdoor activities, and their number of annual trips, based on their satisfaction relative to each site's quality.<sup>xi</sup> We point to Whitehead, Haab, and Huang (2000) and other analysts who omit quality measures from single-site demand analyses because the existing exogenous measures of site quality (e.g., water quality) do not vary across

visitors (i.e., site quality is assumed the same for all visitors). To remedy this shortcoming, we incorporate boaters' preferences and their reactions to hypothetical changes in site quality directly into the statistical modeling process (Grijalva, Berrens, Bohara, & Shaw, 2002; Siderelis, Moore, & Lee, 2000). As an example of how this information can be obtained, respondents are asked, "How many trips did you take to this site during the past 12-months?" An intended trip question then follows such as, "How many trips do you expect to take to this site in the next 12-months?" By combining the observed (trips taken during the past 12-months) and the intended future data, the site experiences of boaters and site quality can be incorporated in the demand analysis (Englin & Cameron, 1996; Ward & Beal, 2000).

This hybrid approach is referred to as a trip response model in the recreation literature (Loomis & Walsh, 1997) and a "mixed Poisson regression model" in the economic literature. The trip response model infers the willingness by boaters to increase or decrease their participation under different hypothetical circumstances. This is an effective approach, particularly if users are familiar with the site since frequent users are accustomed to making tradeoffs among the site characteristics of different recreation areas such as congestion, the quality of the scenery, the presence of facilities, and travel times (Loomis & Walsh, 1997). In short, respondents are able to react better to hypothetical scenarios that require them to measure changes in their intended trips when considering their past travel behaviors, as opposed to contingent scenarios involving hypothetical increases or decreases in trip prices to sites where there are no access fees. In fact, Loomis (1993) found intended visitation behavior to be a viable approach to estimate changes in recreation use in response to changes in lake quality when investigating the reliability of intended visitation behavior with a test-retest analysis of trip response regarding descriptions of three

different lake levels. In addition, Englin and Cameron (1996) further address panel data and statistical specification issues that accompany the analysis of contingent behavior data. Recently, Grijalva et al. (2002) tested the validity of intended survey data before a proposed change restricting access to rock climbing areas in Texas. They, then, compared the previous intended survey data with surveys after implementing restrictions. The authors concluded that intended trip behavior is a valuable supplement to the actual preference data when policy proposals are outside the range of historical conditions. Cameron, Shaw, Ragland, Callaway, and Keefe (1996) combined intended trip behavior data for each survey respondent at different levels of time aggregation (summer months, rest of year, annual) when studying varying lake levels in the Columbia River Basin. The authors determined that their models accommodated the natural heteroskedasticity resulting for the different time frames, a primary purpose of their study.

Using marginal analysis, we contrast boaters' reactions to six hypothetical scenarios that are modifications to existing visitor policies at the Chattooga River (Table 45). Our rationale for including these scenarios is to focus on those modifications in river management and river conditions critical to the successful protection and operation of the river's corridor in the future.

The first three hypothetical scenarios in Table 45 address changes in the river permitting process. Although none of these changes are actually being considered by river managers, this information could be valuable for Forest Service officials in terms of visitor's compliance with the river permit program and the feasibility of using fees to generate increased revenues to help deal with maintenance backlogs. The primary purposes of permit compliance and fees are to improve the quality of visitor services (Bengston & Fan, 2002, pp. 7-9). At the time of this research, all self-

guided boaters were required to obtain a no-cost, self-registration, river permit, and many self-guided boaters paid a \$3 parking fee (depending on the access area used). The next two scenarios concentrate on hypothetical increases in boating use and are designed to determine how respondents would alter their behaviors given more crowded conditions. These results could help guide Forest Service officials in managing total river use levels and allocating an equitable balance between guided and self-guided river use (Cordell & Tarrant, 2000, p. 271). The last hypothetical scenario examines the impact of a change in the river's water level on the contingent behaviors of respondents (Kakoyannies & Stankey, 2002, pp. 35-36). The daily water flow at the Chattooga averaged 323 cubic feet per second in 2002 with an historical daily mean water flow of 450 (N = 63 years) (Retrieved July 2003 from <http://waterdata.usgs.gov/sc/nwis/discharge?>). The mean gauge height is approximately 1.7 feet. River levels fluctuate normally between a minimum of 1.2 feet and a maximum of 3.0 feet, where only very experienced boaters run the river above 3.0 feet and levels over 2.0 feet are considered dangerous.

**Table 45. Six Intended Behavior Scenario Questions for Hypothetical Changes (As asked in Study Questionnaire)**

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The next six questions are based on current river management policies, but are purely hypothetical. We ask you to think about each scenario, then, answer the question about how the hypothetical change might affect your river use in the next twelve months.

(D1 – PERMIT ALTERNATIVE 1) The current Forest Plan sets daily limits for both self-guided and commercially guided boating on the Wild & Scenic segment of the Chattooga River. Suppose you were required to obtain a free permit that had to be reserved in advance and was available at convenient locations, to float the river. If you and the others in your group were required to obtain a free river use permit in advance, how many trips would you take to the Wild & Scenic Chattooga River during the next twelve months? Please assume that river quality stays at its current level.

(D2 – PERMIT ALTERNATIVE 2) Suppose you were required to obtain a free permit available only to walk-ins on a first-come, first serve basis, to float the Chattooga River. Assume walk-in permits are available the day before or the day of the river trip and are available at convenient locations. If you and the others in your group were required to obtain walk-in permits, how many trips would you take to the Wild & Scenic Chattooga River during the next twelve months? Please assume that river quality stays at its current level.

(D3 – PERMIT ALTERNATIVE 3) Suppose there was non-refundable permit fee of \$5 per person for a day-use permit to float the Chattooga River for both commercially guided and self-guided boaters. Day-use fees would be used to cover the cost of the permit system, existing river programs, and providing better information to river users. If such a fee system was put in place, how many trips would you take to the Wild & Scenic Chattooga River during the next twelve months? Please assume that river quality stays at its current level.

(D4 – INCREASED USE EFFECT) The Forest Service estimates that 32,000 people took commercially guided boating trips and 23,000 people took self-guided trips on the Wild & Scenic Chattooga River in the year 2000. Suppose that during the next twelve months and beyond, you expected to see twice as many boaters on the Chattooga than you saw during your last trip there. How many trips would you take to the Wild & Scenic Chattooga River during the next twelve months?

(D5 – PERMIT ALTERNATIVE 4) Under the more congested boating conditions described in question #7, suppose there was non-refundable permit fee of \$10 per person for a day-use permit to float the Chattooga River for both commercially guided and self-guided trips. How many trips would you take to the Wild & Scenic Chattooga River during the next twelve months?

(D6 – WATER LEVEL EFFECT) A minimum water level of 1.1 feet at the Highway 76 water gauge is considered necessary for boating on the Wild & Scenic Chattooga River. Actual water levels range from below one foot to approximately 3 feet. Suppose the river

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level was impaired by man-made or natural conditions that left the river level below one foot for the next 12 months. How many trips would you take to the Wild & Scenic Chattooga River during the next twelve months?

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Note. The open-ended response format for each of the six questions was, “\_\_\_\_\_ Trips in next 12 months.”

### *Model Specification and Analyses*

On average, the number of trips taken to the Chattooga River during the 12-months prior to this survey by our sample of respondents was 7.26 (SD = 15.87, n = 795), and respondents stated they intended to take 8.43 trips (SD = 18.41, n = 723) to the river during the next 12-months. Overall, annual counts of past and intended trips range from zero to 200 trips with the higher trip counts not removed from analysis.

Hellerstein (1991) describes the statistical analysis and data treatment for non-normal data attributes of trip counts per season (year) as the dependent variable and identifies two attributes that should be addressed. The first attribute is endogenous stratification with on-site sample surveys, where the likelihood of being sampled is related to the number of trips taken annually. In this study, boaters were not intercepted and interviewed on-site. Instead, the sample was drawn from collections of permits over the season and the duplicate names of permit holders were purged from the sampling frame; thereby, avoiding the problem of over-sampling frequent site boaters. The second attribute is truncation, which occurs when non-boaters are not sampled and the number of trips is truncated at one (the lowest number of past trips reported in this study). Englin and Shonkwiler (1995) present a method of subtracting one from the number of past trips to correct the

problems of truncation in the count-data estimator, which we employed in this study to address this issue.

We evaluated the six hypothetical scenarios (Table 45) with the Poisson distribution and a panel-data estimator. Applications of panel estimators have involved both time-series data and/or cross-sectional data, where observations are independent across cases (respondents) but not within the cases (Cameron & Trivedi, 1998, p. 288). A common reason for using a Poisson regression on cross-sectional panel-data is to control for unobserved heterogeneity in the trip taking behaviors of respondents (Cameron & Trivedi). Our panel estimator dealt explicitly with the characteristics of the Chattooga data, that is, zero intended trips, over dispersion of trip counts, the fact that annual trips were entirely nonnegative integers, multiple observations per case (i.e., respondent), and the systematic variations in the demand for trips, which were captured by the independent variables (Stata, 2002).

The dependent variable is the expected quantity of annual trips or  $E[\text{TRIPS}]$ .<sup>xii</sup> We estimate the expected river trips for the next twelve months over the different trip responses for each of the hypothetical modifications as:  $E[\text{TRIPS}] = \exp[A0(Y-P) + B0(D0) + B1(D1) + B2(D2) + B3(D3) + B4(D4) + B5(D5) + B6(D6) + e]$ . The equation includes the slope shift parameters ( $B0, \dots, B6$ ) and their corresponding dummy variables ( $D0, \dots, D6$ , as described in Table 46) to distinguish between the different demands for the six hypothetical scenarios (Table 45) and future trips.<sup>xiii</sup> Future trips ( $D0$ ) is from a response to the question, “About how many trips do you expect to take to the Wild & Scenic segment of the Chattooga River during the next twelve months?” The

independent variable Y-P (income minus price) is already defined as the marginal utility of income.

Englin and Cameron (1996), in applying a trip response model to a cross-section of Nevada anglers, recommend the fixed effects specification, whereas other analysts prefer the random-effects model because it allows the analysts to recover the coefficients on the independent variables (like trip prices) that do not vary within cases (Whitehead, Haab, & Huang, 2000). The principal issue distinguishing the fixed effects estimator from the random effects estimator is that the fixed effects approach does not assume the individual effects to be uncorrelated with the independent variables, as does the random effects model (see Greene, 1993, for a comprehensive discussion on random and fixed effects). We implement a fixed-effect specification (Englin & Cameron). In addition, the panel is unbalanced in design, meaning that the analysis was not restricted to respondents providing a complete set of responses to all the intended trip scenarios. That is, respondents may have provided answers to only two or more of the scenarios, either ignoring the rest of the hypothetical scenarios or leaving them unanswered. From a statistical perspective, an unbalanced panel poses no problems (Cameron & Trivedi, 1998).

Recreation demand results are displayed in Table 46. The Wald chi-squares for guided trips [ $\chi^2(7) = 204$ ;  $\text{Pr} > \chi^2 = 0.00$ ] and self-guided trips [ $\chi^2(7) = 2544$ ;  $\text{Pr} > \chi^2 = 0.00$ ] are statistically significant, indicating that the panel estimators adequately modeled trip responses. We jointly tested the dummy variable coefficients for both the guided and self-guided boating segments to determine if they were equal with respect to the following linear hypotheses: (a) permits,  $B_0 = B_1 = B_2 = B_3 = 0$  (guided trips =  $\chi^2(3) = 23.76$  and self-guided trips =  $\chi^2(3) = 843.99$ ); (b) increased



river use,  $B_0 = B_4 = B_5 = 0$  (guided trips =  $\chi^2(2) = 77.07$  and self-guided trips =  $\chi^2(2) = 1,148.28$ ); and (c) water level decrease,  $B_0 = B_6 = 0$  (guided trips =  $\chi^2(1) = 112.88$  and self-guided trips =  $\chi^2(1) = 1,252.06$ ). In all cases, the results indicate that the responses to the hypothetical modifications are not the same.

**Table 46. Marginal Analysis of Hypothetical Scenarios on the Dependent Variable: Trips**

Independent Variables (Coefficient)	Guided	Self-guided
D0 – Free permit, reserve in advance (B0)	0.8460 (0.0967)	0.1587 (0.0250)
D1 – Free permit, first-come, first-serve (B1)	0.6952 (0.0996)	-0.4439 (0.0302)
D2 – Free permit, first-come, first serve (B2)	0.4988 (0.1040)	-0.4068 (0.0298)
D3 – \$5 permit per person (B3)	0.5106 (0.1030)	-0.5990 (0.0317)
D4 – See twice the number of boaters (B4)	0.5244 (0.1035)	-0.0618 (0.0267)
D5 – Non-refundable permit, \$10 per person (B5)	-0.0386* (0.1178)	-1.105 (0.0379)
D6 – Water level below one foot next year (B6)	-0.3886 (0.1178)	-1.1928 (0.0387)
Log Likelihood	-1,030	-4,697
Wald $\chi^2$	204.45	2,544.86
n <sup>a</sup>	1,302	2,048

Notes. Standard errors are in parentheses. The explanatory variable, marginal utility of income (income minus price), remains constant and does not change with past trips nor with each of the seven trip responses per respondent, so the variable is therefore automatically dropped by the fixed-effects panel estimator.

<sup>a</sup> The panel is unbalance with two to six separate records (D1, ..., D6) per respondent. Hence, the greater number of observations recorded in the table than actual sample of respondents.

\* Not statistically significant at the 0.01 decision level.

### *Conclusions*

Using the results from marginal analysis in Table 46, we project the marginal use effects for each of the hypothetical visitor services on demand and display them in Table 47. We compute the percentage changes from a baseline (the past demand for annual boating trips during the past twelve months), which on average was 1.1 trips for guided boaters and 8.1 trips for self-guided boaters. Our projections for the next 12-months is a 133% increase in guided boater trips (1.4 more trips) and a 17% increase for self-guided boaters (1.3 more trips than the current 8.1 trips). The percentage increase in the number of intended guided trips from the past 1.1 trips to 1.4 more trips may be overstated (hypothetical bias). This may be due to either the enhanced quality of existing river conditions over past trips or simply the optimistic intentions of respondents. Actually, the full extent of boaters' good intentions may not be realized if unexpected time and/or financial constraints materialize. For example, annual incomes may decrease and/or the boater's number of intended trips may simply not materialize during the coming year (Englin & Cameron, 1996).

At the extreme, a hypothetical drop in the water level for the next year would motivate guided boaters to decrease their intended trips by 32% and self-guided boaters to decrease their intended trips by 69%. Another interesting contrast is that guided boaters responded positively to all three permitting options, whereas self-guided boaters responded negatively (Table 47). Evidently, seeing twice the number of boaters on the river would not deter guided boaters from taking more trips since they typically already boat as part of large groups, whereas self-guided boaters would decrease their intended number of trips under the more congested scenario.

**Table 47. Increases and Decreases in Recreation Demand Under Hypothetical Scenarios. (Base comparisons for percentages are the mean sample trips in the past 12-months: Guided = 1.1 trips; Self-guided = 8.1 trips)**

Hypothetical Modifications. (See Table 45.)	Guided <sup>a</sup>	Self-Guided
Future Trips.	133% (+1.4 trips)	17% (+1.3 trips)
D1 – Free permit, reserve in advance.	100% (+1.1 trips)	-35% (-2.8 trips)
D2 – Free permit, first-come, first-serve.	64% (+0.7 trip)	-33% (-2.6 trips)
D3 - \$5 permit per person.	66% (+0.7 trip)	-45% (-3.6 trips)
D4 – See twice the number of boaters.	68% (+0.7 trip)	-6% (-0.4 trip)
D5 – Non-refundable permit, \$10 per person.	ns	-66% (-5.3 trips)
D6 – Water level below one foot for the next year.	-32% (-0.3 trip)	-69% (-5.5 trips)

*Notes.* Marginal use effects equal  $100*[\exp(B)-1]$  and exp is the anti-log of the model's logarithmic coefficient. For example, self-guided respondents are expected to take 17% more trips next year. Negative values indicate that the expected trips are below past trip counts and positive values indicate that the expected trips are above past trip counts.

<sup>a</sup> Approximate increases or decreases in future trip values of the different scenarios are in parentheses.

ns = not significant

On balance, these results indicate that the free river use permit, reserved in advance alternative may be worth considering (Table 45). The difference between the first come, first serve alternative and the reserve in advance alternative is negligible for self-guided, while the reserve in advance feature is clearly preferred by guided boaters. The \$5 per person permit is clearly unpopular with both segments (Table 47). Future increases in the allocations of river use by the two boating

segments would not affect boaters' intended trips significantly. The impact on self-guided boating would be relatively minor (-6%), whereas a non-refundable permit of \$10 per person would clearly impact their future boating behaviors. Obviously, any administrative plans to change daily use levels must adhere to the provisions of the Wild and Scenic River Act and what policy makers and managers envision to be the river's wild and scenic character, and not necessarily to maximize the recreation benefits.

## VII. CONCLUSIONS AND RECOMMENDATIONS

This section summarizes and highlights the most important findings of the study. We then draw conclusions and make recommendations based on the study results.

### *Users, Experiences, Attitudes, and Benefits*

Although there is tremendous diversity among Chattooga users, they are most commonly well educated, middle aged men who work in professional careers and have fairly high household incomes. Most users travel less than 150 miles to get to the river, visit with family or friends, stay overnight, and have visited there before. But there are also many users who come long distances to use the river, with nearly a quarter traveling over 300 miles one-way. Whitewater rafting and kayaking are the most common activities at the river and most people who raft the river use the services of one of the 3 USDA Forest Service permitted river outfitters. Nature-oriented reasons related to the river and its surroundings are the most important motives for users' visits. Most people rated the quality of their experiences very highly, and levels of problems are quite low overall. The issues of greatest concern to the few who did report problems are most often related to water quality, pollution, water levels, and trash. The things people liked best about the river and its corridor related to the area's undeveloped natural beauty, remoteness, and scenery. These findings are all consistent with the Chattooga's reputation of being one of the premier whitewater rivers in the southeast. And, although some users have particular problems, it appears that the river is providing current users with the high quality outdoor recreation settings and experiences they are seeking.

The vast majority of users are aware that the section of the Chattooga they visited is designated as part of the National Wild and Scenic Rivers System and feel that this designation is very important. Most also feel that the river does, in fact, have the characteristics of a wild river area as described in the Wild and Scenic Rivers Act. Overall, users are satisfied with the river and the corridor of land around it, feel it is appropriate that the area be managed through the USDA Forest Service “forest plan” process, and that efforts to preserve the area have been effective. While these results are no reason for complacency, they should be encouraging findings for USDA Forest Service river managers and advocates for the National Wild and Scenic Rivers System.

Forest Service river use records indicated that approximately 43,000 boating visits were made to the Chattooga in 2001. Using these figures (the most recent available) and spending data provided by the users themselves, it was estimated that visitors from outside the area spent over \$1.8 million in the 6-county area where the river segment is located. After applying the appropriate multipliers, this translated into a total economic impact of over \$2.608 million for this local area in 2002. Most of this impact was in the form of admissions and fees, retail purchases, and expenditures in restaurants. The total economic benefit to recreation users was estimated to be \$5,794,282 in 2002. This represents the hypothetical economic value users would need to be compensated if the opportunity to access the Chattooga River for boating were lost to them. Both of these totals are impressively large. The annual infusion of over \$2.6 million into these relatively rural counties is a significant level of economic impact, particularly when protection of the river and its environment generates so many other benefits as well. And total annual use benefits of nearly \$6 million is a strong indication of the value people place on accessing the Chattooga. It is important to note that 2002 was a drought year in the southeast. Visitation, user experiences and total

economic impacts may have been adversely affected as a result. The low water levels in 2002 and the fact that self-guided boating use is underestimated to the extent that some proportion of boaters do not comply with the self-registration system suggest that the estimates of economic impacts and benefits reported here are probably conservative.

Using recreation demand modeling, guided and self-guided boaters' behavior were found to be sensitive to changes in river water levels. Self-guided boaters' behavior is adversely affected by any restrictions to the permit system or increased crowding while guided boaters' behavior is not. These results are consistent with the obvious conclusion that, while there are considerable similarities between guided and self-guided boaters on the Chattooga, there are many important differences as well. Guided boaters on the Chattooga are nearly always engaged in whitewater rafting while self-guided boaters are typically kayaking. But, since both of these groups are *boating* the river, they both require adequate water levels. Likewise, many of their motives for visiting the river were quite similar. In fact the three most important reasons, on average, were identical for kayakers and rafters. But kayakers and rafters did differ in other important ways. When compared to rafters on average, kayakers traveled about half as far to reach the river, were less likely to be on an overnight trip or visiting the Chattooga for the first time, had smaller travel parties, had started visiting the Chattooga over two years earlier than rafters, had visited the river over six times more often during the past 12 months, reported significantly more crowded conditions, were more skilled in their activity, and were younger and more likely to be male.

According to our models kayakers (i.e., most self-guided boaters) tend to be the most sensitive to potential changes in river permitting and to increased crowding. This is probably due to the fact

that river management (particularly permitting) is largely invisible to guided boaters. Their outfitters are the ones who generally need to respond to any changes in river permitting and quotas. The guided boating customer typically makes a reservation with the outfitter, shows up, pays their fee, and then takes their river trip. Self-guided boaters, on the other hand, would be faced with fees and reservation systems for the first time in the hypothetical scenarios we posed. It is not surprising that they would react more negatively than would rafters. This and their greater sensitivity to increased crowding may also be related to what is sometimes referred to as a “floating baseline.” Recreation users tend to evaluate sites and conditions based on what they experience during their first visit there. Since, on average, kayakers had made their first visits years before the rafters had, they tend to judge conditions at the Chattooga against a baseline when the area was less crowded. Rafters also tend to visit in larger groups and join others, typically people they don’t know, at the outfitter’s facility. Therefore, their experiences tend to have a much more social orientation than do kayakers’. This expectation probably helps make rafters less sensitive to crowding than are kayakers.

#### *Comparisons With the West Branch of the Farmington Wild and Scenic River*

This research is actually the second recent study of a wild and scenic river sponsored by American Rivers and the National Park Service. The first examined the West Branch of the Farmington River located west of Hartford, Connecticut. The Farmington and the Chattooga Rivers were selected for study because they are prime examples of two very different types of wild and scenic rivers. The West Branch of the Farmington is a “private land river” while the Chattooga is a “public land river.” This part of the report makes comparisons between the results of the



Farmington study and those of the Chattooga River study, then, attempts to draw some broader conclusions about wild and scenic rivers in general.

The West Branch of the Farmington River was added to the national Wild and Scenic River System in August 1994. This 14-mile segment flows through a mix of rolling wooded hills, farms and small communities that give the river a remarkably rural and undeveloped character in spite of its proximity to numerous large urban centers. A unique aspect of the Farmington is a popular 3-mile “Trout Management Area” (TMA) established there in 1988 by the CT Department of Environmental Conservation (DEC). The TMA is managed very successfully by DEC as a high quality trout fishery. A second interesting aspect of the Farmington is that it is also very popular for tubing. The tubing generally takes place on a different part of the segment than the trout fishing and is supported by a commercial outfitter.

The Farmington flows through a complex patchwork of private and publicly owned lands under numerous jurisdictions. As such it is considered a classic example of a “private land river.” Whereas, public land wild and scenic rivers like the Chattooga are managed by the public agencies responsible for the lands through which they flow, private land rivers are more directly affected by multiple stakeholders. At some private land rivers, like the Farmington, local communities, businesses, land managing agencies, private landowners, conservation groups, and various government bodies can and do become involved in river management through what is referred to as a “partnership model.” The Farmington River partnership model is centered on the locally based Farmington River Coordinating Committee (FRCC), which monitors and guides activities that could affect the river. FRCC is made up of representatives of the five river front towns, the

State of Connecticut, Metropolitan District Commission, Farmington River Watershed Association, the National Park Service and others and relies primarily on local municipal zoning and coordination with existing groups to help assure that the wild and scenic river resources are protected. The Farmington study was conducted in 2001 and 2002 and is described in detail in Moore and Siderelis (2003).

In comparing key findings across the Chattooga and Farmington studies, there are both important differences as well as striking similarities. Table 48 presents a summary of the most important comparisons. In the broadest terms, the Chattooga is a premier whitewater boating destination for a large region of the U.S. while the West Branch of the Farmington is a very popular destination for trout fishing for a much smaller region. Consequently, trips to the Chattooga usually involve longer travel distances and are much more likely to involve overnight stays than those to the Farmington.

Interestingly, while the two rivers are extremely popular for very different river activities (i.e., whitewater boating versus fishing and tubing) the basic reasons people visit each are nearly identical. The most highly rated motives on both rivers were enjoying the views, experiencing the river, and being close to nature. The things people liked best about each river and the corridor of land along it were similar as well. For the Farmington these were it high quality water, beauty, scenery, and good fishing. For the Chattooga they were its undeveloped natural beauty, remoteness, and scenery. In other words, it is the high quality, protected natural resources that are the draw at both rivers, regardless of the actual activities that users end up engaging in while there.

Both rivers receive high levels of use and generate significant economic impacts for the surrounding communities. This is particularly true of the Farmington, in spite of its shorter length. This is partly due to its close proximity to the major population centers in the northeast and the fact that there are very few comparable substitute rivers in the region. The Chattooga and Farmington both generate very high levels of total benefits, indicating that they are both valued highly by the people who use them, even though they use them for different activities. The higher use levels, shorter segment length and the nature of fly fishing are probably also factors in the finding that crowding was a much greater concern at the Farmington than at the Chattooga.

**Table 48. Comparisons of Chattooga River Results With Those From Farmington River**

Variable	Chattooga River	Farmington River
Percent Male	74%	84%
Mean Age	41	48
Median Travel Party	4	3
Median Miles Traveled (one-way) To Reach River	110	30
% On Overnight Trips	58%	10%
% With River as Primary Destination	87%	95%
% On First Visit to River	27%	14%

**Table 48. Comparisons of Chattooga Results With Those From Farmington (Continued)**

Variable	Chattooga River	Farmington River
Mean # of Visits to that River In Past 12 Months	7	26
Mean Hours Spent at River During That Visit	6	4.7
Most Common Activities	Rafting & Kayaking	Fishing & Tubing
% Using Commercial Outfitter	47%	17%
Top 3 Reasons for Visit	Enjoy the View Experience the River Be Close to Nature	Enjoy the View Be Close to Nature Experience the River
Best Liked Aspects	Non-developed/Untouched Beauty/Natural Beauty Remote/Quiet/Solitude	High Quality Water Beauty/Scenery Good Fishing
Biggest Concerns	Pollution & Litter	Crowding
% Aware River was Wild & Scenic	82%	47%
Most Important River Benefit	Aesthetic Beauty	Fish & Wildlife Habitat
Annual Visitation	42,998 (boating only)	77,400
Total Economic Impact	\$2.61 Million	\$3.63 Million
Total Economic Benefit	\$5.79 Million	\$9.45 Million

### *Recommendations*

One of the primary purposes of the National Wild and Scenic Rivers Act is to protect free-flowing rivers with outstandingly remarkable resource values. In the case of the Chattooga Wild and Scenic River, these values revolve around a long, relatively inaccessible whitewater resource of regional significance. Users recognize this and are generally supportive of the job river managers

are doing to keep river resources in this state. Water levels, the quality of surrounding natural resources, and high water quality are all important to the experiences and behavior of users. These issues should remain high priorities for management. Judging by the concerns that some users have about water quality and pollution, these issues in particular need to be diligently monitored and addressed as effectively as possible. In short, the results of this study indicate that the most important priorities for river management and river advocates should be protecting and conserving, and in some cases restoring, the Chattooga's natural, scenic, and recreational resources.

The fact that recreation demand modeling revealed that self-guided boaters, in particular, are sensitive to hypothetical increases in crowding and to greater restrictions in river permitting is important and should be noted. Changes of this nature could have important adverse impacts on a significant portion of river users and should be considered only if there are compelling reasons to do so and only in close collaboration with affected users and publics wherever possible.

The finding that there is a core of frequent visitors who have been visiting for many years, and that most users are highly satisfied with their river experiences, may offer opportunities for river managers and advocates. There is likely a group of very committed users who feel strongly enough about the Chattooga that they would be willing to become active volunteers on behalf of the river. Either directly or through nonprofit partners, river managers and advocates may be able to tap some of this enthusiasm for ongoing volunteer efforts ranging from peer education, resource monitoring, and resource management.

In terms of the National Wild and Scenic Rivers System overall, this study and the previous one on the West Branch of the Farmington River should be encouraging and help provide direction for planners and managers. These two rivers, and by definition all designated river segments in the system, have some “outstandingly remarkable” resource values. The nature of these outstanding features may vary widely from river to river, but based on the results of these studies, those features may all generate high levels of benefits. Whether the river is a “private land” or “public land” river, and whether it is popular for fishing, boating, tubing, hiking, or some mix of these or many other recreation activities, users will come because they value protected free-flowing rivers and their surroundings. And the existence of the protected segment and the recreation use that results will benefit users, their broader communities, and others. The common element in the success of the wild and scenic segments studied is the availability of the high quality natural resources themselves. The protection and conservation of these natural resources should remain the focal point of the wild and scenic rivers protection program and the management of the rivers that comprise the system.

Protecting a diversity of wild and scenic rivers that have different “outstandingly remarkable” resource values is consistent with a basic principle of outdoor recreation resource planning and management that indicates that providing a diversity of opportunities will help to maximize resource benefits in general and user satisfaction in particular. This gives potential users the ability to consider a variety of settings and choose the ones that provide the sort of activities and experience opportunities they are seeking. The National Wild and Scenic River System is protecting a diversity of outstanding free-flowing river segments and should continue to do so.

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**APPENDIX A  
STUDY CONTACT INFORMATION**

**NORTH CAROLINIA STATE UNIVERSITY**

Roger L. Moore, Associate Professor  
Department of Parks, Recreation and Tourism Management  
Box 8004  
North Carolina State University  
Raleigh, NC 27695  
(919) 515-3698  
E-mail: Roger\_Moore@ncsu.edu

Chris Siderelis, Professor  
Department of Parks, Recreation and Tourism Management  
Box 8004  
North Carolina State University  
Raleigh, NC 27695  
(919) 515-3276  
E-mail: Chris\_Siderelis@ncsu.edu

**AMERICA RIVERS**

Jack Hannon  
American Rivers  
1025 Vermont Avenue, NW, Suite 720  
Washington, D.C. 20005  
(202) 347-7550  
E-mail: [www.americanrivers.org](http://www.americanrivers.org)

**NATIONAL PARK SERVICE**

Elizabeth Porter  
National Park Service  
Rivers, Trails and Conservation Assistance Program  
1849 C Street, NW (2220)  
Washington, D.C. 20240  
(202) 354-6913  
E-mail: Beth\_Porter@nps.gov

John Haubert  
National Park Service  
1849 C Street, NW (2510)  
Washington, D.C. 20240  
(202) 354-6973  
E-mail: John\_Haubert@nps.gov

**APPENDIX B**  
**STUDY QUESTIONNAIRE**

(Provided in full; commencing at p. 92)

### *Endnotes*

<sup>i</sup> These responses are typical of the mix of reasons given by respondents for visiting recreation sites as found in our past studies of outdoor recreation behavior.

<sup>ii</sup> The use of choice occasion as opposed to a trip is a minor technical point. Given the decision-making structure that we imposed on the choice problem, as displayed in Figure 1, we would estimate per trip values instead of per choice occasion values when the user chooses between the Chattooga and substitute rivers (e.g., Nantahala) and the choice set excludes the no-trip option from the choice set (Parsons, 2002). We impose the condition that the site choice has been made and the user is perceived as choosing between the two choices—guided and self-guided boating.

<sup>iii</sup> Trip price was computed as:

$$P = [(d * 0.14) + (w * h * 0.33)] * 2 + f$$

where,

d = reported one-way distance from an origin to Chattooga River in miles multiplied by \$0.14 per mile for fuel and upkeep as reported by the American Automobile Association and Runzheimer International for V6 automobiles adjusted from \$1.20 a gallon gas in 1996 to \$1.64 a gallon in 2002 (Autoweek, April 1, 1996, p. 9).

h = reported hours spent traveling to Chattooga River. If missing, one-way distance was divided by the average of 54 mph, which was computed from reported data on miles traveled and time in travel (Hellerstein, Woo, McCollum & Donnelly, 1993).

w = household hourly wage rate as measured by annual household income divided by reported hours worked per week. If missing, household annual income was divided by 2080 work hours in a year and .33 is the fraction of the imputed wage rate to value time.

f = average cost per trip as estimated by respondents (e.g., permit fees, access fees for parking, and guide fees paid, motels, restaurants, etc.). If missing, average reported permit and access expenses per person for guided trips (X = \$73.73 per person) and self-guided (X = \$6.20 per person) were imputed by multiplying the reported number of persons in the travel party estimated average expenses.

Although reported by many respondents, it was our judgment that the reported estimates of the amount of money spent in the various expenditure categories were far too incomplete to impute reliable values.

<sup>iv</sup> Haab and McConnell (2002) apply the concept of weak complementarity. By definition, then, the WTP for a change in a public good is given by Equation 2. Suppose a user rafts the Chattooga River x number of days in a season, then, weak complementarity implies that a user does not care about river use when that individual does not use the Chattooga River. The theoretical support for this argument is provided by Haab and McConnell (2002, pp. 10 – 15).

<sup>v</sup> According to Haab and McConnell (2002, pp. 204 - 206), a common problem of the conditional logit or other discrete choice models is the IIA (Independence of Irrelevant Alternatives) property. (See Haab & McConnell for a comprehensive discussion of the IIA). In short, the problem is present in any distribution where the errors are uncorrelated. Since we are analyzing the choice of guided or not guided (the not guided boating alternative being “self-guided”), we apply a binary logit. The statistical test of the correlation in errors between binary choices in our model yielded a t-value of -12.927,  $p > t = 0.000$ .

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<sup>vi</sup> The survey data were from questionnaires mailed to Chattooga River boaters. Subjects came from two different sources: on-site permits for self-guided users and lists of clients from river outfitters. A chi-square test, -2.14052, confirmed no heteroskedasticity in the data, where the critical value at 95% is 7.82 and at the 99% are 11.34.

<sup>vii</sup> The probability of a guided boating trip is  $Pr(j) = \exp[ A_i + B_i \ln(Y - P) + C_i \ln Z_i + e_i ] / 1 + \exp[ A_i + B_i \ln(Y - P) + C_i \ln Z_i + e_i ]$ . The logit choice model gives the probability that individual *i* chooses alternative *j* as function of individual characteristics and unknown parameters. Accordingly, a portion of the probability of guided boating choice shifts to self-guided boating in the estimation process, so that a probability value, let us say, of .2 for self-guided boating would result from an estimated probability of .80 for guided boating.

<sup>viii</sup> The procedures for computing WTP can be found in Haab and McConnell (2002, p. 229). Benefit estimates are negative. One can think of negative values as the amount of income necessary to compensate a person if hypothetically that person is denied access to the alternative choice occasion.

<sup>ix</sup> We assumed that the 2002 river use was unchanged from 2001 because no more current use figures were available. In fact, both 2001 and 2002 were very dry years in the southeast producing very similar river flows for the two years.

<sup>x</sup> The range of consumer surplus values reflected the different imputed wage rates (0%, 25%, 50%) the authors invoked when computing the opportunity costs of travel times.

<sup>xi</sup> A user's demand function follows,  $Trips = f(Price, Income, Site Quality, Recreation Activities)$ , where annual trips to a site are a function of a trip price, an annual household budget, site quality of the river area, and the recreation activities. This demand function is for a single-site.

<sup>xii</sup> There is a subtle but an important point about expected values (see King, Tomz, & Wittenberg, 2000). Expected trips, when estimated with Poisson regression, are different from predicted trips. Predicted trips contain both fundamental and estimation uncertainty. Expected trips are averaged over the fundamental variability arising from sheer randomness, leaving only the estimation uncertainty caused by not having an infinite number of observations (King, Tomz, & Wittenberg). Predicted and expected trips are the same in linear models, but can differ in nonlinear cases. However, the values are often close, if the nonlinearity is not severe.

<sup>xiii</sup> All Poisson models impose a semi-logarithmic function form for demand. The expected number of trips results by taking the anti-log of the coefficients and independent variables on the right-side of the equation.

