

To the Graduate Council:

I am submitting herewith a thesis written by Elizabeth Greer Edwards entitled "Policy Issues and Implications of Whitewater Recreation Use of the Ocoee River: An Institutional and Social-Psychological Approach." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science in Planning.

Walter L. Shouse
Walter L. Shouse
Major Professor

We have read this thesis and
recommend its acceptance:

Pat L. Fisher
W. Locks

Accepted for the Council:

L. Edwards
Vice Chancellor
Graduate Studies and Research

POLICY ISSUES AND IMPLICATIONS OF WHITEWATER RECREATION
USE OF THE OCOEE RIVER: AN INSTITUTIONAL
AND SOCIAL-PSYCHOLOGICAL APPROACH

A Thesis
Presented for the
Master of Science in Planning
Degree
The University of Tennessee, Knoxville

Elizabeth Greer Edwards

March 1982

3057953

ACKNOWLEDGMENTS

Professor Walter Shouse has encouraged me for several years and his guidance has been invaluable. I also thank other members of the faculty in the Graduate School of Planning for their advice.

George Humphrey of TVA's Division of Land and Forest Resources provided me with the opportunity to work on the National River Recreation Study (NRRS) and has been an important source of data and information. Other members of the recreation staff also offered advice and information on data collection.

Richard Knopf of the North Central Forest Experiment Station was very helpful and provided not only the NRRS data but graciously consented to lengthy telephone interviews and along with Vicki Mork was able to offer not only explanations of the raw data but a great deal of support.

I also owe thanks to Don Waller and Phillip Maples of the Local Planning Division of the Tennessee State Planning Office for their encouragement and support, especially through the final months of writing and preparation.

Several people helped with the typing over three years, but Carolyn Oden typed the final draft, and her patience and endurance were essential to my completing the paper. My dear friend Louisa Beach Cooke gave me her support and her

skills as a tactful editor which were also extremely important.

There are many other people who have given me information, advice, and encouragement and although I cannot name each one, I thank them sincerely. The emotional support given by my friends and family was vital to the entire project. Without them I could not have finished. I thank you all.

ABSTRACT

The purpose of this study was to examine the institutional and social-psychological aspects of managing whitewater recreation on the Ocoee River in Polk County Tennessee. Recreational use of the river has increased greatly since the river was first used for recreation in 1976. The study focuses on the years 1977-1979, which are the years that the Ocoee was included in a nation-wide study of attitudes of river users toward crowding and toward management practices on the river.

This study examined the differences between users with different levels of experience, the attitude of all users toward management actions that would limit use on the river, and whether the environmental quality of the river was deteriorating in the opinion of the river users.

The primary source of information about the users' attitudes was the National River Recreation Study. Another aspect of the thesis, the management of the river by TVA, was explored through the use of interviews with personnel from the Land and Forest Resources Division of TVA, as well as with people from other agencies who also have jurisdiction on the Ocoee River. Commercial outfitters, private canoe and kayak clubs, and other river users were also interviewed.

It was found that most of the respondents to the questionnaires enjoyed their river trip. The increased crowding does not yet seem to have created general dissatisfaction, and the river environment was found to be in good condition by most of the users. There were differences between the novice users and those who had more experience on the Ocoee in their responses to certain questions. The more experienced users were slightly more sensitive to the effects of crowding. That is, they had more complaints about seeing too many people and seeing litter than did the first-time visitors. Management actions which would limit use on the river were opposed by the more experienced users, but were generally supported by the people on the river for the first time.

A literature review of the carrying capacity concept as it applies to river recreation was presented, but it was determined that it would be impossible to apply this concept to the Ocoee to produce a range or level of suggested use. The environmental physical and social conditions that the managing agency seeks to maintain must be established, before the carrying capacity concept can be applied. These factors should be set out in the Management Plan as clear and definite objectives.

In order to continue to provide recreation on the Ocoee, TVA, the managing agency, must be able to coordinate

not only the outside agencies and interested recreation users, but TVA must be coordinated from within. The Division of Land and Forest Resources and the Division of Power must agree on scheduling recreational releases and the agency as a whole must devise an overall policy toward the problem of power production versus recreation, and then decide upon commitments for improvements and land acquisition near the river for the future.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
The Ocoee River	2
Geographical Setting	4
Power and Recreation	5
Growth in Whitewater Sports	9
The Problem	13
The Plan	14
Immediate Physical Setting	17
Reaction to Crowding	19
Purpose of the Study	20
Methodology	21
Research Questions	22
Description of Following Chapters	23
II. BACKGROUND AND LITERATURE REVIEW	25
The Environment and History	25
The Environment	25
Historic Significance	31
Review of the Literature	32
Carrying Capacity	32
Carrying capacity for outdoor recreation	41
Attitudes and Perceptions of the Visitors	45
Management Objectives	47
III. METHODOLOGY	50
Interviews	51
National River Recreation Study	51
The Mail Questionnaire	56
Rationale for Questionnaire Items	56
Data Collection, Processing, and Analysis	62
Limitations	63
IV. FINDINGS	67
Institutional Limits to Increased Use	67
What Are the Institutional Limits to Increased Use?	67
Inside TVA	67
The plan	70

CHAPTER	PAGE
Social-Psychological Factors	73
What Are the Social-Psychological Factors Related to Increased Use among Groups in Different Types of Craft?	73
What Are the Social-Psychological Factors Related to Increased Use among Groups with Different Levels of Experience?	84
Do Litter, Water Pollution, and Stream Bank Erosion Affect Perception?	95
What Are User Attitudes Toward Management Practices?	104
Has the Perception of Crowding Changed Over the Three-Year Period from 1977 to 1979?	113
Summary	115
V. CONCLUSIONS	125
LIST OF REFERENCES	136
APPENDIXES	147
A. LIST OF PRIVATE CANOE AND KAYAK ORGANIZATIONS	148
B. OCOEE RIVER MANAGEMENT PLAN	150
C. RULES AND REGULATIONS	161
D. DIFFICULTY RATINGS FOR RIVERS	162
E. INTERVIEW CARDS	163
F. NATIONAL RIVER RECREATION STUDY QUESTIONNAIRES	167
VITA	189

LIST OF TABLES

TABLE	PAGE
1. Six Categories of Information Needs Measured by 1978 and 1979 Questionnaires	58
2. How Crowded Did Commercially versus Privately Outfitted Visitors Feel at Various Locations (1978)?	75
3. How Crowded Did Commercially versus Privately Outfitted Visitors Feel at Various Locations (1979)?	76
4. On Which Management Options Do Visitor Group Opinions Differ (1978)?	78
5. Differences in Degree of Support of Actions Which Would Restrict Use on the River (1979) . . .	79
6. What Problems Were Encountered by Commercially versus Privately Outfitted Visitors During Their Trip (1978)?	80
7. What Problems Were Encountered by Commercially versus Privately Outfitted Visitors During Their Trip (1979)?	81
8. How Many Times Have Commercially Outfitted and Privately Outfitted Visitors Floated the Study River (1978)?	85
9. How Many Times Have the Visitors Floated the Study River (1979)?	86
10. What Problems Were Encountered by New versus Repeat Visitors During Their Trip (1978)?	88
11. What Problems Were Encountered by First-Time versus Repeat Visitors During Their Trip (1979)? .	90
12. How Crowded Did New versus Repeat Visitors Feel at Various Locations (1978)?	91
13. How Crowded Did First-Time versus Repeat Visitors Feel at Various Locations (1979)?	92

TABLE	PAGE
14. On Which Options Do Visitor Group Opinions Differ (1978)?	94
15. Support for Different Management Actions Limiting Use on the Ocoee River between First-Time versus Repeat Visitors (1979)	96
16. Support for Management Options Limiting Use on the Ocoee (1978)	97
17. Do the Visitors Feel That the River and Its Surroundings Are in Good Condition (1978)?	98
18. Do the Visitors Feel That the River and Its Surroundings Are in Good Condition (1979)?	99
19. What Kinds of Environmental Damages Were Reported by the Visitors (1978)?	101
20. For Those Who Feel the River Environment Is Being Damaged by Recreational Use What Kinds of Damage Do They See (1979)?	102
21. Do the Visitors Feel the River Environment Is Being Damaged by Recreational Use (1979)?	103
22. What Problems Were Encountered by Visitors During Their Trip (1978)?	105
23. What Problems Were Encountered by Visitors During Their Trip (1979)?	106
24. Do the Visitors Feel That a Good Job Is Being Done by Managers of the River (1978)?	107
25. Do the Visitors Feel That a Good Job Is Being Done by Managers of the River (1979)?	108
26. What Kinds of Management Options Do the Visitors Support or Oppose (1978)?	110
27. What Kinds of Management Options Do the Visitors Support (1979)?	111
28. How Crowded Did Visitors Feel at Various Locations from 1977-1979?	114

TABLE	PAGE
29. Do Visitors Feel Conflicts Exist between Different Groups of River Users (1979)?	117
30. What Kinds of Experiences Do Visitors Want, Are Neutral Toward, and Do Not Want (1978)? . .	118
31. What Kinds of Experiences Do Visitors Want, Are Neutral Toward, and Do Not Want (1979)? . .	119
32. Overall, Were the Visitors Satisfied with Their River Trip (1978)?	120
33. Overall, Were the Visitors Satisfied with Their River Trip (1979)?	121
34. How Did the Number of People at Various Locations Compare with the Visitors' Expectations Over the Three Year Period (1977-1979)?	122
35. Number of Times Commercially Outfitted and Privately Outfitted Visitors Floated the Study River in 1978	124

LIST OF FIGURES

FIGURE	PAGE
1. Location Map for the Ocoee No. 2 Project, Showing the Area within a 150-Mile Radius	3
2. Use Levels on the Ocoee River, 1977-1981	13
3. TVA Properties in the Area of the Ocoee No. 2 Project	16
4. Population Increase Over Time	34
5. Carrying Capacity and Growth Forms	37

CHAPTER I

INTRODUCTION

Water recreation in the Tennessee Valley is a rapidly evolving phenomena from fishing on tributaries and small mountain streams to lake recreation, to whitewater recreation activities, such as rafting, canoeing, and kayaking, which today have become popular. The rivers of this region have long been an important resource. As in other parts of the country, damming, channellization, and diversions were directed primarily toward protecting people and property from flooding and to improve transportation. These efforts also brought about changes in the ways we use the rivers. Many reservoirs have provided hydroelectric power, as well as constant water supplies, and navigation has been improved by the lakes and channelization projects. Lake recreation and the potential for residential development around the shorelines are also benefits which have resulted from these improvements.

While recreation on lakes and slow-moving streams has been popular for many years, we are now seeing an interest in whitewater recreation. Because of the attitude that rivers were to be used for transportation and rapids were considered dangerous, whitewater streams were avoided until

recently (Nash, 1977, p. 2). But the fear associated with rapids and whitewater streams has become a challenge and a fascination for many people today (Nash, 1977, p. 2).

The Ocoee River

The Ocoee River in southeastern Tennessee is one river that has become an important whitewater recreation resource. Because there are few free-flowing streams left which are suitable for whitewater recreation, streams like the Ocoee, which are dam controlled and thus have a year round flow, are the most popular and most frequently used.

While some whitewater streams are relatively inaccessible and are virtually unused except by a small number of kayakers and canoeists, rivers like the Ocoee receive a great amount of use, are easily accessible by road, and are well known to whitewater enthusiasts of all skill and interest levels. Approximately 8.5 million people live within 150 miles of the Ocoee River and many of the largest cities within this radius are linked to the Ocoee by the Interstate System (see Figure 1) (U.S. Department of Commerce, 1981).

For the reasons mentioned above, accessibility and predictable flow, the Ocoee is receiving increasingly greater use by whitewater enthusiasts. Planning for management of this increasing use is the concern of this

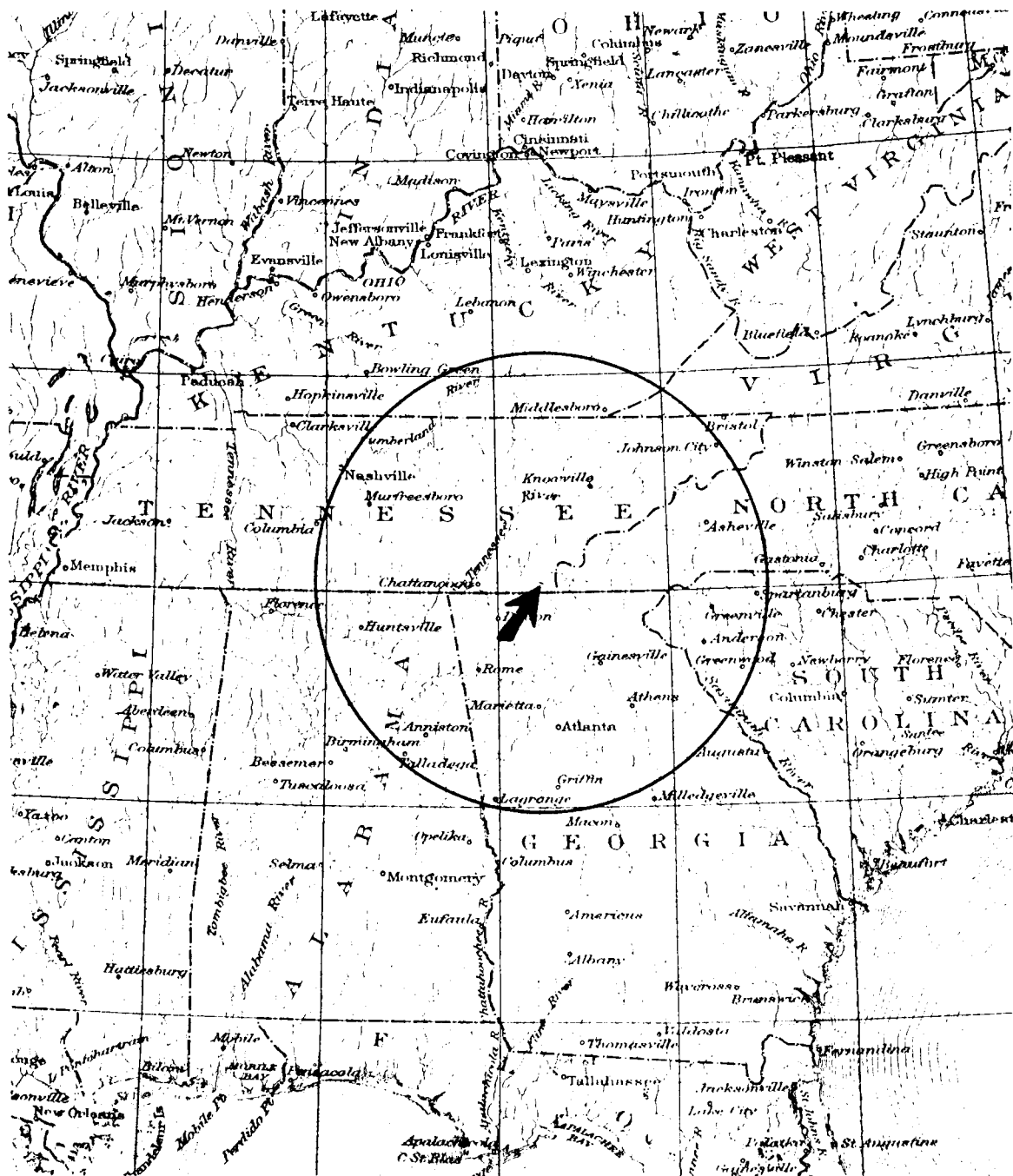


Figure 1. Location Map for the Ocoee No. 2 Project, Showing the Area within a 150-Mile Radius.

Source: Tennessee Valley Authority, Draft Environmental Impact Statement: Rehabilitation of the Ocoee No. 2 Hydro Plant (Chattanooga: Tennessee Valley Authority, 1978).

paper. All the whitewater use occurs on a 4.6 mile segment of the river which is paralleled by U.S. Highway 64. This is the main truck route from Chattanooga, Tennessee, to Asheville, North Carolina. The river and road travel through a steep mountain gorge which limits the space available for access to the river.

Geographical Setting

The Ocoee River supports several power projects which are owned by the Tennessee Valley Authority (TVA), including four dams and three lakes. The special situation for whitewater recreation that the power system creates requires a brief explanation.

The headwaters of the Ocoee River lie in the mountains of northern Georgia, where the river is known as the Toccoa (see Figure 1). The Blue Ridge Dam forms a large lake at river mile 53 (river miles are counted from the mouth or confluence with another stream). Below Blue Ridge Dam, the river flows northwest to the Ducktown and Copperhill area in Polk County, Tennessee (Mile 40-35). Copper smelting here in the early 1900's completely denuded about forty square miles of land. Water quality in streams below this area is poor due to erosion which has caused heavy siltation and a high concentration of heavy metals in the water (TVA, 1978a, p. 12). The Ocoee No. 3 Dam forms a small lake at mile 25.2

and the river continues to flow to the No. 2 Dam where water was diverted, during normal operation, into a wooden flume. This is an artificial chute for water supported on a bench or shelf of land cut into the mountainside or supported by wooden beams. The flume carried water above the riverbed for 4.6 miles. At this point, the water was discharged into pipes, down 250 feet to the No. 2 Powerhouse. While the flume was built with a relatively flat gradient of about one foot of drop in one mile, the riverbed drops more than 250 feet in the 4.6 mile distance.

The river, back in its natural bed, continues north and west to the Parksville Lake. This 1,890 acre lake is created by the largest of the four dams, Ocoee No. 1. Below the dam, the river proceeds to the northeast to its confluence with the Hiawassee River.

The Parksville and Blue Ridge Lakes and the quiet pastoral river section between Parksville Lake and the Hiawassee provide opportunities for those desiring more traditional water recreation. The entire system of Ocoee dams and lakes, except for Blue Ridge Lake, lies in Polk County, Tennessee.

Power and Recreation

The Ocoee No. 1 and No. 2 Dams were built by the East Tennessee Power Company between 1910 and 1913 as two of the

first hydroelectric projects in the Tennessee Valley. TVA purchased them in 1939 and has since added the No. 3 and Blue Ridge projects to the system. The total power generating capacity of the system is 88,000 kilowatt hours during normal operations, which is approximately .003 percent of the entire TVA generating capacity (TVA, 1980).

The whitewater section of the river is that 4.6 mile section between the No. 2 Dam and Powerhouse. In 1976, an inspection of the timber and rock dam and of the wooden flume line revealed that both were in need of repair. This is when TVA shut down operation of the No. 2 project until repairs could be made or until a decision was made concerning the feasibility of repairs (TVA, 1978a, p. 1). [None of the people employed at the No. 2 project lost their jobs when it was shut down but were put to work on other sections of the system. The entire system, Ocoee No. 1, No. 2, No. 3, and Blue Ridge, employs about 45 people (Curbo, 1979)].

As a result of the shutdown, the water, which was normally diverted into the flume, now flows over the dam and down a spillway into the riverbed. The flow is usually about 1,000 cubic feet per second, which is sent from the Blue Ridge and the No. 3 projects which have continued operation. A flow of 1200 cfs is sufficient to allow whitewater rafting, kayaking, and canoeing and the ability

to control the flow from upstream means that whitewater is available on a regular basis throughout the year (TVA, 1978a, p. 1).

There has been a controversy over whether or not to repair the flume and if so, whether or not to allow releases for recreation. If there are recreational releases, when should they occur? These questions have been dealt with in an Environmental Impact Statement, which was published for public comment before reconstruction of the flume (TVA, 1978b, 1979). It has been decided to construct a concrete dam and to construct a new wooden flume, but the issue of recreational use has remained controversial. In 1979, in the Final Environmental Impact Statement, TVA proposed to construct the new dam and flume and allow for forty-six days of recreational flow from the No. 2 Dam. This option allows for recreational releases on all Saturdays, Sundays, and national holidays from May 1 to September 30 (TVA, 1978a, p. 10).

The people who use the river, namely paying customers who take raft trips offered by commercial outfitters, and private boaters who float the river in their own kayaks, canoes or rafts, protested this decision, saying forty-six days was not enough. The TVA Board of Directors voted in October, 1979, to reconstruct the project and allow for eighty-two days of recreational releases. This was another

option that had been presented in the Draft Environmental Impact Statement, which called for recreational releases on Fridays, Saturdays, Sundays, and national holidays from May 1 to September 30, plus one weekend per month from October 1 to April 30 (TVA, 1978a, p. 10).

In November, one month later, the TVA Board of Directors voted to make the eighty-two days of whitewater release contingent upon a five million dollar Congressional appropriation to reimburse the agency for hydroelectric power which would be lost during the next thirty-five years of proposed recreational use of the river.

Since this time, a group called the Ocoee River Council was formed to promote recreation on the Ocoee River and several groups have taken positions both supporting and opposing TVA's request for reimbursement for recreational releases. A lawsuit has been filed in the U.S. District Court in Chattanooga by the Ocoee River Council, a commercial outfitter and a private paddler to try to have the construction project stopped entirely. No decision has yet been made, but the court did instruct the TVA to reconsider its decision in light of the National Environmental Policy Act. The court has held that the decision to rehabilitate the flume must not be based solely upon power considerations, but that TVA must also consider the impact of their actions on the environment and on recreational use of the river.

The issue may never be completely resolved, but construction of the flume is proceeding. When construction is completed, there will always be the option available of providing recreational releases on certain days, whatever they may be, and using the water for power at other times. A compromise may be worked out, but the problems of overcrowding will still have to be dealt with. This paper will deal specifically with the problem of overcrowding on the Ocoee and will undertake to determine a range of acceptable use of the Ocoee by recreationists.

Growth in Whitewater Sports

It is important to explore the general growth in whitewater recreation to understand the reasons that the Ocoee has become so popular. There are several factors which contribute to the expanding interest in whitewater recreation: the desire for adventure, increased leisure time and income, advanced technologies, and public exposure by the media.

The desire for adventure or thrills has widespread appeal and includes several age groups and socioeconomic groups (Schreyer, 1978, p. 37). Increasing numbers of people are enthused by risk recreation or natural challenge activities. These types of activities have been defined as:

Those stress-seeking outdoor pursuits which require the participant to learn a response to a chosen landscaped difficulty increase (Meier, 1978, p. 32).

Included in this category of activities are the whitewater sports kayaking, canoeing, and rafting, as well as land based activities such as mountain climbing, ski mountaineering, and caving. Also, hang gliding is often listed as a natural challenge or risk recreation activity (White, 1978, p. 44).

This definition implies that there are varying degrees of participation which correspond to the level of skill required and the relative degree of financial investment the participant is willing to make. An example of a low level of investment is a casual float in an inner tube down a quiet nearby stream. Investment levels increase when one takes a commercially guided raft trip or buys equipment, and the risk level is increased when one becomes involved in kayaking and canoeing. The more money and time invested indicates a greater degree of specialization and also an increased assumption of risk (Meier, 1978; Schreyer et al., 1978; White, 1978).

Related to the search for adventure is the desire for a personal challenge, the development of self-confidence, and an increased awareness of the environment. Physical fitness, camaraderie, and the hope of finding relief from

the tensions and "unnaturalness" of urban life are other considerations (Meier, 1978, pp. 32-33).

The amount of leisure time and income spent on outdoor recreation by the general public has increased since World War II. Although simple activities (walking for pleasure, sightseeing, picnicking, outdoor swimming) have dominated outdoor recreation in America, sports which demand a higher degree of specialization have attracted more than eight million participants annually (Greenwood and Edwards, 1979, pp. 373-374). Participation in whitewater recreation has also increased due to the development of durable rubber rafts in World War II and the advances in plastics technology such as fiberglass, various resins, and molded plastic for kayaks.

Public exposure to whitewater is another important factor in its gaining popularity. The film Deliverance and television coverage of the whitewater races in the 1972 Olympics at Munich provided widespread exposure for the sport. Private industry has used the whitewater theme for advertising (Schlitz, Coors) and in 1979 the Tennessee Department of Tourism sponsored a television advertisement which featured the Governor and a country music star riding through the rapids of the Ocoee River on a raft.

There are organizations in every major city in Tennessee and most of the surrounding states which exist

primarily to promote whitewater recreation. (See Appendix A.) These private paddling clubs offer instruction programs, organize trips, and most are actively involved in the preservation of stream quality and protection from further inundation or alteration. These clubs provide an opportunity for families or individuals to learn to kayak or canoe. Their participation in river management decisions will be mentioned later.

In response to a growing interest in adventure sports, and whitewater recreation in particular, several commercial rafting services have opened up for business. These provide guided raft trips down the Ocoee, as well as rental services. Since 1970-1971, this has been the case on many rivers in the area including the Nantahala in North Carolina, the Chatooga in Georgia and South Carolina, and the French Broad in North Carolina and Tennessee (Huser, 1977, p. 40).

There were nine commercial raft companies operating on the Ocoee in 1980. It is evident from Figure 2 that total use of the river since 1976 has increased dramatically. In 1980, the use level was approximately 56,000 people for the year. About 70 percent of the people have been in rafts operated by commercial outfitters and 30 percent have been private boaters using kayaks, canoes, or privately owned rafts (TVA, 1978b, p. 1).

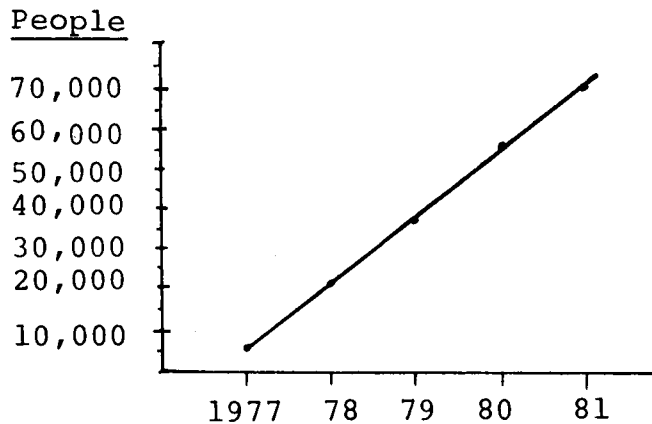


Figure 2. Use Levels on the Ocoee River, 1977-1981.

Source: Tennessee Valley Authority, Division of Land and Forest Resources.

The Problem

It has been mentioned that the use of the Ocoee River is increasing and it has been pointed out that U.S. Highway 64 parallels the river. As with any natural resource, there are limits to the amount of use that can be tolerated before harmful or ill effects occur. TVA has been trying to establish a management plan for the Ocoee River since 1976 (Lewis, 1978). Their studies and further research have indicated that limits to use, or a determination of how many people can use the river, must be based on what is known as carrying capacity. This is defined for recreation as:

The amount and character of use that an area can support over a specified time period without causing unacceptable change to the physical environment or to the experience of the user. (Lime, 1975a, p. 121)

Using this definition the present investigation must consider each of the factors mentioned. What level of development do we want? What level of change is unacceptable based on the natural environment and the perception of the visitor who comes to the Ocoee?

The Plan

Within the Tennessee Valley Authority, its Division of Land and Forest Resources has attempted to establish a management plan for the Ocoee River. Since 1976 when the first draft of the plan was written, it has been continually revised and updated. The plan, which specifically addresses itself to the whitewater section of the river, was formulated by TVA's Division of Land and Forest Resources with the advice of representatives of the commercial raft companies which have established themselves to operate on the Ocoee, and the canoe and kayak clubs of the region. Also involved with plan formulation have been other agencies which have jurisdiction in the area. The U.S. Forest Service, the Tennessee Department of Transportation, the Tennessee Department of Safety, Tennessee Wildlife Resources Agency, and several officials from Polk County are all involved in the planning process on a continuing basis.

The management plan recommends that one agency should assume responsibility for all facets of management. The

arrangement would be contingent upon agreements made among all the agencies presently involved.

Currently, TVA controls the water flow, the hydroelectric facilities, the land areas within the Ocoee No. 2 Dam Reservation, the Ocoee No. 2 Powerhouse Reservation, and the parking areas at the dam and the take-out point (TVA, 1978b, p. 8). (Refer to Figure 3.) The remaining land is controlled by the Forest Service, as it is part of the Cherokee National Forest. The Tennessee Department of Transportation is responsible for highway maintenance and statistics, and the Tennessee Department of Safety is responsible for enforcing traffic laws and investigating accidents on U.S. Route 64. The Tennessee Wildlife Resource Agency has authority to enforce boating regulation and litter control, and the Polk County Sheriff's Department has general law enforcement authority (TVA, 1978b, p. 6). Coordination among the agencies will be required for the future to prevent conflict and to provide for the satisfaction of the greatest number of people. Participation of the private paddling clubs, commercial outfitters, and other interested groups must be sought out and planned for as well. Although TVA has not officially taken this role as managing agency, it has been acting in this role until now and will continue its efforts to manage and plan for use of the river (Lewis, 1978).

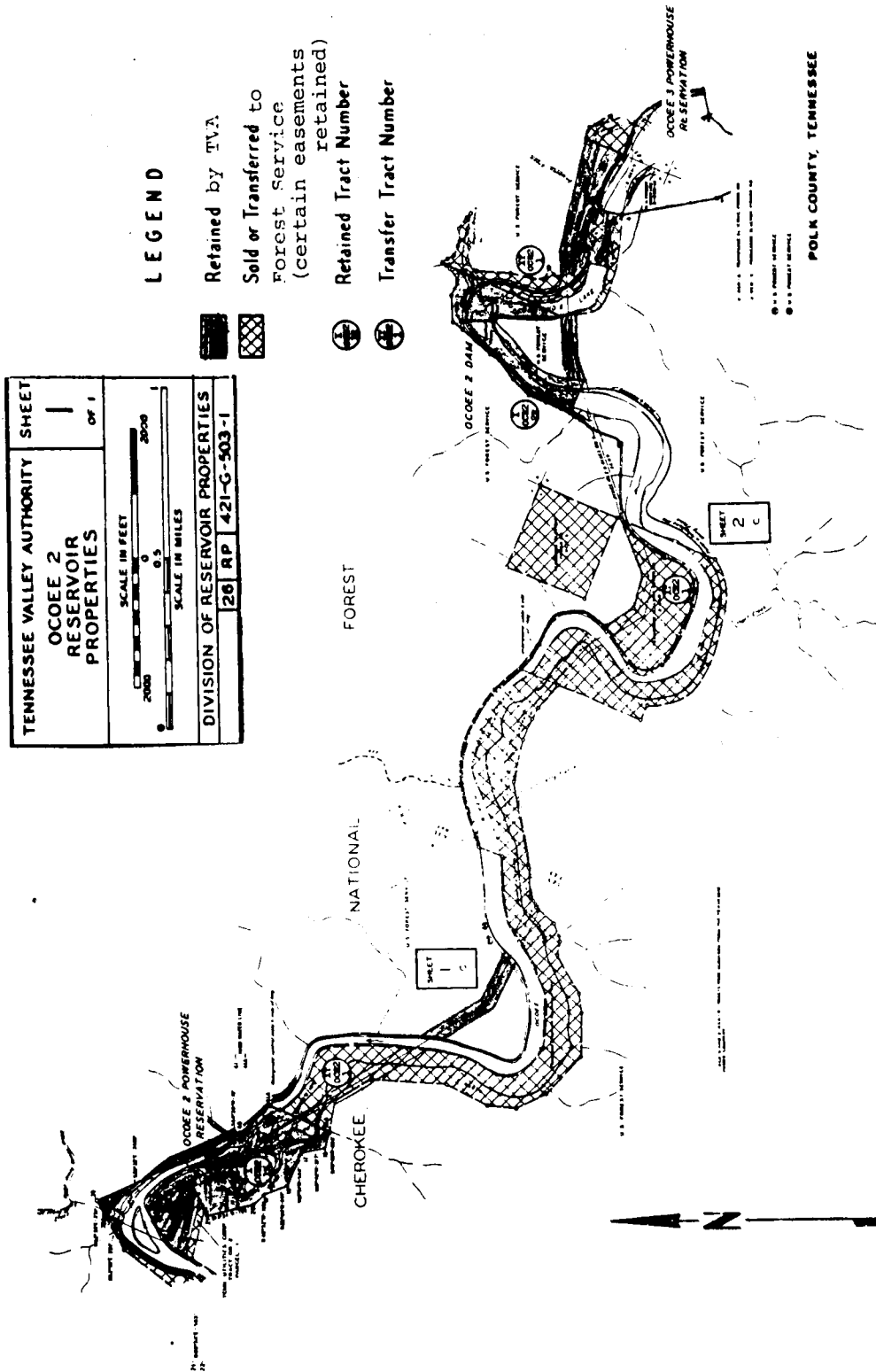


Figure 3. TVA Properties in the Area of the Ocoee No. 2 Project.

Source: Tennessee Valley Authority, Division of Reservoir Properties.

The commercial outfitters had been attempting to regulate themselves regarding scheduling of trips and safety regulations prior to TVA's efforts to coordinate use of the river. Since the fall of 1977 all the participants have continued to meet to discuss the management and possible limitations to use on the river. Some private clubs feel that the role of commercial outfitters has been too large and that they are trying to negate the interests of the private paddlers (Parsons, 1980).

Immediate Physical Setting

U.S. Highway 64 parallels the Ocoee River for the entire 4.6 miles of the whitewater section. The average daily traffic count on Highway 64, or the Old Copper Road, as it is known locally, is 3360 vehicles per day (TDOT, 1978).

This road is a heavily used truck route, as mentioned earlier, and is also quite popular with tourists in automobiles coming to the river and who are just driving through the mountain gorge. The road, especially along the whitewater section, is very narrow and winding with few places to pull over or to pass. On weekends, when the river use is at its peak, other traffic is also heavy: automobiles slow down on the road or attempt to pull over onto the shoulders to watch the boats and rafts on the river or to

look at the scenery. The combination of all this traffic creates a rather dangerous situation. The parking lots above the No. 2 Dam and below the powerhouse were provided by TVA for boaters, and the cars pulling into and out of these parking lots create some highway congestion. This problem is compounded because the "sightseer" traffic uses these parking lots, too.

To attempt to provide for the safety of boaters while unloading and for passing motorists, TVA has provided a traffic officer to make sure that boaters move their cars out of the loading zone near the put-in point as quickly as possible. Highway signs indicating congested areas have been installed along U.S. Highway 64 and "15 Minute Parking" or "No Parking" signs are posted on the shoulder of the road at all access points.

Facilities provided at the end of the whitewater section in the parking lot include two changing rooms and two portable toilets. Toilet facilities are also provided near the point of entry, or put-in point, of the whitewater section and also in the parking lot at the No. 2 Dam.

A metal staircase and slide to assist in getting rafts and private boats to the water were built by local outfitters at the put-in point, and in 1980, TVA provided a larger and more convenient set of wooden steps at the take-out point.

Because safety is an important issue on the river, TVA has provided information on bulletin boards at the two main points of access. An agent was also stationed at the put-in point to inspect the rafts for safety violations. Posted regulations give some safety requirements and establish a minimum age of twelve for persons allowed on the river. There has been no licensing or issuing of permits to show that private boaters (kayakers and canoeists) have the ability or skill to run the river, but minimum standards are set for the commercial outfitters who operate on the river (TVA, 1978b). (See Appendix C.)

Requirements for commercial raft customers include the ability to swim, wearing a life preserver and helmet on the river, and being twelve years old. The reason for such requirements is that the Ocoee is designated as a Class III river with respect to the difficulty of the rapids and the level of skill required to float the river in a kayak or canoe. (See Appendix D.)

Reaction to Crowding

How do people react to increased crowding in a river recreation setting? Use on the Ocoee has been increasing dramatically and it would seem that this would cause problems for those coming to the river for recreation. There are several different kinds of recreation users; those

in rafts, those in kayaks and canoes, and those who come for special events such as races. Many people come just to watch the others. Overcrowding may lead to conflicts between these users, both on the river and on the banks or in the parking lots.

Purpose of the Study

The purpose of this study is to determine whether constraints should be imposed upon additional use on the Ocoee, and which of these factors, based on the ecology of the river environment, is most limiting to increased use: physical, institutional, or social-psychological. A further intent is to offer guidelines to the managing agency concerning the kinds of management actions that would be appropriate for controlling increased use by determining a range of acceptable use, or carrying capacity of the river. This will be important for providing a sound basis for determining the need for restrictions or regulations on use.

These recommendations will be based on several factors. User attitudes as portrayed through three years of responses to questionnaires will be compared to changes in the actual number of users. Data on physical and environmental conditions at the main use sites have been documented by TVA during this same three year period, 1977-1979. The effectiveness of the managing agency and its ability to

carry out coordination of river use will also be discussed in Chapter IV.

The carrying capacity concept will be examined and its application to the problem of dealing with increased use on the Ocoee River will be discussed, based on a review of the relevant literature.

Methodology

Environmental characteristics of the land and water will be profiled as a background to this study. The physical limitations to the river's carrying capacity, such as access, the highway, and available facilities, will also be examined. These factors will form the background for studying institutional capability in the Ocoee situation. This involves considering TVA's administration of the management plan, as well as TVA's coordination with other agencies involved and the users of the river. While these factors do present constraints, the resource is to be managed for people. Information on the institutional factors, such as TVA's ability to coordinate with other agencies and the problems within TVA concerning recreational use of the river will be obtained, in part, through interviews with personnel from TVA and other agencies.

The reactions of people using the river to increased use has been studied by the U.S. Forest Service in the

National River Recreation Study. The results of this three year effort on the Ocoee will be compared to each other to explore possible changes in attitudes of the people using the river and to obtain suggestions for management techniques which may help alleviate some of the problems that are pointed out by this data.

Research Questions

The research questions to be explored are:

1. What are the institutional limits to increased use?
2. What are the social-psychological factors related to increased use? (PERCEPTION)
 - (a) Among groups in different types of craft.
 - (b) Among groups with different levels of experience.
 - (c) Do litter, water pollution, and stream bank erosion affect perception?
 - (d) What are user attitudes toward current management practices?
 - (e) Has perception of crowding changed over 3 years?

While the intent of the National River Recreation Study was to focus on comparing a broad range of rivers, looking at several different kinds of problems, it is assumed that the research questions asked in this thesis will be answered

by the data available from the Forest Service which pertains to the Ocoee.

The Ocoee is unique in its physical setting and in its recent popularity. The following chapter will provide a background and discussion of the environmental and historical facts about the river as well as a review of the literature relating to river recreation on other rivers and research on the carrying capacity concept as it applies to river recreation.

Description of Following Chapters

Chapter III contains a discussion of the methodology used in the National River Recreation Study and Chapter IV contains the findings based on Summary Tables compiled by the North Central Forest Experiment Station. Limitation of using the National Study will be discussed in both Chapter III and IV. Chapter V is a summary and presents some conclusions about the findings of the study as well as some recommendations for future coordination and planning of recreational use of the Ocoee.

This study is important because the data from the Forest Service will be examined for its implications for management of the Ocoee. Having the data available provides an excellent opportunity to learn more about specific management problems and, given the limitations of the study,

more can be learned about the opinions of the people who are using the river.

CHAPTER II

BACKGROUND AND LITERATURE REVIEW

This chapter contains information on the environmental and cultural setting of the Ocoee River as a background to this study and a review of the literature. It has been mentioned that the environment may be an important determinant of carrying capacity, but an actual determination of the environmental carrying capacity for the river is beyond the scope of this study. While this study will focus primarily on the social and institutional carrying capacity, it is important to discuss environmental characteristics of the Ocoee River in order to have an accurate overview of the entire recreation situation.

The literature review in this chapter will focus on three main areas: the carrying capacity generally; the behavior of outdoor recreation users; and resource management.

The Environment and History

The Environment

The following information is taken from the Draft Environmental Impact Statement: Rehabilitation of the Ocoee No. Hydro Plant, dated August 8, 1978 (TVA, 1978a, p. 11).

The EIS, as this document is known, contains information about hydrology, topography, water quality, plant and animal life and cultural, historical and archaeological resources.

The entire land area which is drained by the Ocoee or its small tributaries covers 639 square miles (TVA, 1978a, p. 12). The area is very rugged and mountainous, and lies in the Unaka Mountain range of the Blue Ridge Mountains. The highest peak in the drainage area is 3,531 feet high. Large portions of the drainage area lie in the Chattahoochee National Forest in Georgia and Cherokee National Forest in Tennessee (TVA, 1978a, p. 11).

Rainfall varies here because of the variation in elevation but the average annual rainfall for the thirty year period from 1941 to 1970 was about 61 inches. This compares with an annual average of 46.2 inches for Knoxville, 46.0 inches for Nashville, and 52.0 inches for Chattanooga (National Weather Service, 1980).

The greatest known flood in the area above the Ocoee No. 2 Dam occurred in November, 1906. At that time the estimated stream flow was 61,000 cubic feet per second (cfs). This can be compared to the Grand Canyon of the Colorado River which flows normally now at about 25-30,000 cfs, or to the Tennessee River at Knoxville which has a normal flow of 13,110 cfs (U.S. Department of the Interior, 1981). As was mentioned in Chapter I, the normal flow of the Ocoee is between 1,000 and 1,500 cfs.

The water quality of the Ocoee River has been poor for decades due to discharges from erosion and from point sources of pollution in the Copper Basin. Point sources are those which are easily identifiable, often flowing from a pipe, such as municipal waste. The Copper Basin is the area around Copperhill and Ducktown, Tennessee, known primarily for copper mining and industrial operations (TVA, 1978a, p. 12). Copper smelting, as mentioned in Chapter I, created fumes of sulfur dioxide, which when combined with rain, fell as sulfuric acid on the mountainsides. The result was that more than forty square miles of land were completely denuded or made bare of all trees and plant life. During rainy periods, large amounts of silt enter the Ocoee River from the heavily eroded areas in the Copper Basin.

The silt causes the problems of turbidity, or muddy or cloudy water, and suspended solids. The solids are particles of heavy metals such as copper, zinc, iron, and lead. The water in the Ocoee contains these solids; consequently, they become deposited or trapped behind each of the dams. Because Ocoee No. 3 is nearest to the Copper Basin, the siltation and build up of solids is the worst here. Once each year, an attempt is made to flush out some of this built up silt by sending higher than normal flows of water down from the Blue Ridge Dam.

Identifiable sources of pollution have been from the Cities Services Company mining operation in Copperhill and from domestic waste or sewage from the towns of Copperhill, Tennessee, and McCaysville, Georgia. According to the Tennessee Department of Public Health, these sources of pollution are less significant now than they have been because waste treatment systems have been installed (Holland, 1981).

The water quality problems will persist for many years because of the large deposits of silt already in the river and because the erosion out of the Copperhill area has not been arrested. In fact, it is expected to continue for many years.

A TVA report based on data collected from 1965 to 1975 indicates that the water below the Ocoee No. 2 Dam (the whitewater section)

has high concentrations of sulfates, copper, iron, lead, manganese and dissolved solids. . . . Dissolved oxygen and pH are of a nature that could support biological growth. (TVA, 1978a, p. 13)

Dissolved oxygen refers to the "oxygen freely available in water and necessary for aquatic life and oxidation of organic materials (Izaak Walton League of America, 1973, p. 87). "pH" is a symbol for the measure of acidity or alkalinity on a scale of zero to fourteen, where neutrality, or pure water is seven. In other words, the water quality

is low, but it is not as bad as other sections of the river nearer to Copperhill.

Downstream from the Ocoee No. 2 Dam there is almost no macroscopic aquatic life; as a result, there are very few fish because these macroscopic organisms are necessary to support fish life. It should be pointed out that there are diverse and abundant communities of fish and organisms that fish feed on above Copperhill (TVA, 1978a, pp. 14-15).

The stream bed is composed of bedrock, large boulders, gravel, and small deposits of sand, silt, and clay. The rocks are coated with a thin residue of a mud-like substance, which has been deposited over the years as a result of mining activities at Copperhill (TVA, 1978a, p. 14).

Both banks of the river are rather steep and there is very little flood plain. The left bank supports a forest environment, with low ground cover and primarily hardwood trees. There are rhododendron and mountain laurel growing along this bank and a few species of pine. The right bank is very close to U.S. Highway 64, which parallels the river, and consists mainly of grasses planted following construction of the highway, some bushes, small trees, and stabilizing rock (TVA, 1978a, p. 14).

Although the Ocoee River gorge has never been the subject of a systematic botanical study, several other

similar southern Appalachian river gorges have been studied. There are three rare plant species which are known to exist in the Ocoee gorge. Two plants found there have been proposed to the Federal government as endangered species. One of these, Stonecrop (sedum nevii Gray), is a mossy, creeping evergreen which grows on rocks; and the other, Ruth's golden aster [Heterotheca ruthii (small) Harms], is a flowering plant which grows in rock crevices and among large boulders. The Smithsonian Institute considers the saxifrage (saxifraga careyana Gray) to be threatened by extinction. This plant also grows in rock crevices and grows along wet rocks, on bluffs, and creek banks in the Ocoee River gorge (TVA, 1978a, p. 13).

Documenting the existence of any certain type of fauna or animal in the Ocoee gorge is difficult, but in the Draft Environmental Impact Statement, it is noted that there are over 390 species of terrestrial vertebrates that may be present in the area below the No. 2 Dam. This includes amphibians, reptiles, birds, and mammals. Of these 390 species, forty-six are listed by the Federal or State government as threatened, endangered, or unique (TVA, 1978a, p. 13). However, only one species of these forty-six is known to inhabit the area in question. This is the green anole lizard (Anolie carolinensis) which the State of Tennessee considers to be "in need of management" (TVA, 1978a, p. 13).

Historic Significance

The flume is the longest (4.6 miles) structure of its kind in the United States and is the most visible part of the power operation, but the entire Ocoee No. 2 System is considered a landmark of hydroelectric technology. It represents the beginning of mass electrical production in the region and in the nation (Building Conservation Technology, Inc., 1979, p. 8).

The entire Ocoee No. 2 System, including the flume line, dam, and all related buildings, were placed on the National Register of Historic Places in October, 1979 (Fielding, 1981). The historical significance of the flume was documented by TVA, in the process of nominating the Ocoee No. 2 System to the National Register of Historic Places. The completed nomination form contains a great deal of historical information, as does the Case Report to the Advisory Council on Historic Preservation (Building Conservation Technology, Inc., 1979). For the purpose of this study, it is interesting to note that TVA entered into an agreement with the Tennessee State Historic Preservation officer and the federal Advisory Council on Historic Preservation to make "every feasible effort to replicate the original appearance of the flume line and trestles and to operate and maintain the system in order to best preserve its historical significance (Garvey, 1980).

Reconstruction of the flume line began in 1980. While much of the original materials used in constructing the flume had been replaced throughout the years, the flume is being replaced now with yellow pine beams as specified in the original drawings.

Part of the significance of the Ocoee No. 2 Project is that it remained in operation for so long. Upon completion of the renovations, it will continue to produce power which was the original single purpose of the project. Because the Ocoee can be used both for power and recreation, this dual purpose may enhance the historic significance. The whitewater has brought more people into the area who will be able to appreciate the project for its historic value, while enjoying the recreation it provides.

Review of the Literature

Carrying Capacity

The question that researchers and managers of the recreation resource of the Ocoee River must answer is how much use is too much? We have stated that use is increasing, and as of yet, there are no restrictions on use or plans for establishing such restrictions. In this section, some of the background and assumptions for regulating recreational use will be discussed. The first is the concept of carrying capacity. We will trace the origins

of the carrying capacity concept in ecology to its application in natural resources planning and management. The intention is to focus primarily on river recreation planning and management.

Carrying capacity first became important as a concept in the field of ecology. Ecology is a branch of natural science in which individual organisms are studied, as well as their relationship to their surroundings. This may include the study of an individual type of animal and its immediate habitat or the study of a group of animals living throughout several kinds of environments. It may also include the study of the interrelationships and development of animals which are grouped or associated with one specific habitat or environment, according to Charles Adams (1913).

In ecology, carrying capacity is the term used to describe the limitations imposed on a certain population by the environment. Usually this is the maximum number of a species which can be supported by an environment. The limiting factors of an environment include water, food, shelter, and space. Robert L. Smith explains that this maximum or upper limit concept means that as the population increases, the detrimental effects or environmental resistance of increased density such as overgrazing or lack of water begin to inhibit growth, until it reaches a certain level. This level is continually approached but never met

(Smith, 1972, p. 176). This is the carrying capacity. Eugene Odum provides an explanation of carrying capacity in terms of growth forms and offers an equation which produces an s-shaped curve. This curve represents the result of greater and greater action of the detrimental factors, or environmental resistance, such as lack of food, water, and shelter, as the population density increases (Figure 4).

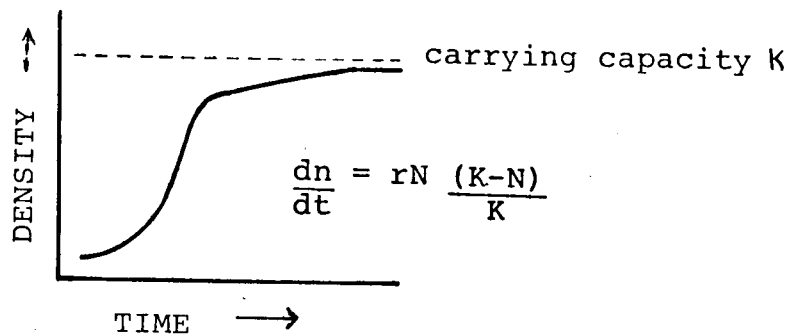


Figure 4. Population Increase Over Time.

Source: Eugene P. Odum, Fundamentals of Ecology, 2nd ed. (Philadelphia: W. B. Sanders Co., 1959), p. 183.

To understand this equation it is helpful to look at the equation for average growth rates: $\Delta n / \Delta t = r$. Δ is a symbol for "a change in," and is used to discuss average rates. N stands for the population or number of organisms; t stands for a time period; and r is the specific growth rate of increase. The curve in Figure 4 is describing an

instantaneous rate, or a rate at a particular moment in time. The derivative, replacing the W , describes the rate of change as Wt approaches zero, and is used in discussing instantaneous rates (shown by the letter d).

So, dn/dt = the rate of change in the number of organisms per time at a particular instant.

The slope of the growth curve at any point is the growth rate of the population (Odum, 1959, p. 168). The completed equation for the S-shaped growth curve is: $dn/dt = rN (K - N)/K$. K stands for

the maximum population size or upper asymptote (carrying capacity), and $K - N/K$ is an expression to indicate the environmental resistance created by the growing population itself, which brings about an increasing reduction in the potential reproduction rate as the population size approaches the carrying capacity. (Odum, 1959, p. 184)

To summarize the complete equation in Odum's words:

Rate of population increase	equals	Maximum possible rate of increase (unlimited specific growth rate times the numbers in the population).	times	The degree of realiza- tion of the maximum rate
dn/dt		rN		$\frac{K - N}{K}$

(Odum, 1959, p. 185)

(Odum) points out that there are other equations which will produce an S-shaped curve.)

Another growth form called exponential growth is shown by a j-shaped curve and differs in that the environmental resistance is delayed until the end of the increase. These curves are shown in Figure 5 (Dasmann, 1964, p. 181). Refer to this figure for some of the other levels of population stabilization to be discussed below.

This concept of an equilibrium level or carrying capacity is rarely found to be exactly the case in nature. Rather, populations of plants and animals tend to show a constant fluctuation in density, between some upper and lower limits. Where the asymptote or upper limit falls depends on how carrying capacity is defined. The asymptote is the line which the curve approaches but never quite reaches, as shown in Figure 4.

Four levels of carrying capacity are described by Dasmann (pp. 183-187). The first is the subsistence density, or upper limit concept, where the population obtains enough food to survive, but not for optimum growth, vigor, or reproduction. This is a disaster level, where even small changes in water or food supply can cause widespread decimation. But the species can survive for a long time until disasters occur. Births must equal deaths for the population to survive. Carrying capacity here

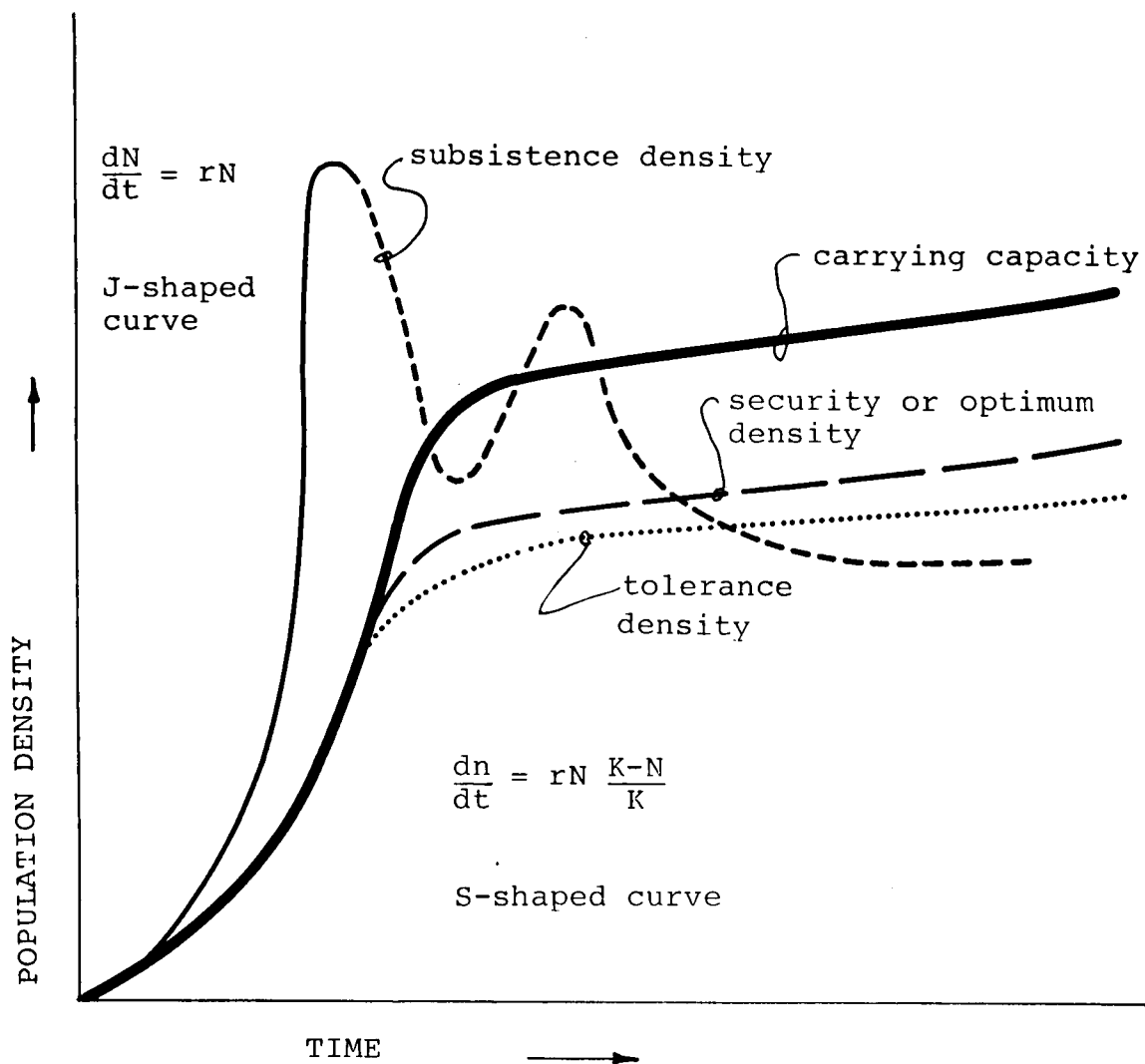


Figure 5. Carrying Capacity and Growth Forms.

Source: Robert L. Smith, ed., The Ecology of Man: An Ecosystem Approach (New York: Harper and Row, 1972), p. 178.

represents the upper symptote or level for any population whose growth is limited by environment.

Optimum density is what is usually meant by carrying capacity in range management. This level means that there is adequate food, water, and shelter to meet the needs of the population. Deaths will not occur as a result of shortages of these elements unless there is a drastic weather change or other catastrophe. Health, growth, body size, and reproduction ability will be near the maximum. Populations rarely remain at this level, unless controlled by hunting or predators or other self limitations.

Security density is a level which is controlled by hunting or predators. At a given level of hunting or predation the security density is determined by the amount and distribution of escape cover. Security and optimum density often correspond.

A fourth level is tolerance density, or saturation density. It is most commonly found in territorial species where crowding is prevented by territorial spacing and where populations are limited through dispersal, brought about by territorial claims and antagonism. Space is the primary limiting factor, but this is influenced by the availability of food and shelter. Tolerance density may be nearly the same level as optimum density for species which demonstrate preference for a certain territory (Smith, 1972, p. 179).

These principles are frequently applied to human population density, in the area of human ecology, and in resource management in trying to secure a balance between human population and natural systems.

In human ecology, these principles are applied in terms of population and birth control. According to Smith, undeveloped countries may be said to be at the subsistence density, where population density is high, but conditions are pushed to the limit. The U.S., Canada, Western Europe, Australia, and New Zealand may be thought of as being at optimum density, with their populations controlled by territoriality and birth control. Generally there is an adequate food supply, and few deaths from starvation occur (Anderson, 1972, p. 122). Distribution of the food supply, however, is such that a portion of the population does go hungry, and Anderson states that 20 million Americans are undernourished in the United States (Smith, 1972, p. 179).

Security density is not as applicable to human populations, according to Smith, except in some primitive hunting societies or newly colonized groups. Man has historically behaved as if under the influence of tolerance density. When the population became too great in ancient settlements, such as Greek city-states, some people were forced out and founded new settlements. The early hunters were spread around the world living at a low, but probably

optimum, density. The hunters then increased their carrying capacity by becoming farmers. Instead of living in small, cooperative groups, they began to live in clusters of varying densities. The limitations were still food and other resources of the surrounding area. This pattern of expansion was continued on a much larger scale when England and other European countries became overpopulated, and began to colonize to the New World as well as to South Africa and Australia (Smith, 1972, p. 179).

Two points should be made to summarize the prevailing concepts of carrying capacity for human ecology. Optimum density is the ideal level for humans and this will vary according to the desires, needs, and lifestyles of the population. So, what is crowded for one person or group may be desirable for another. Carrying capacity then is relative and will be determined by the standards which a particular population demands.

The second point is that resources are becoming more limited. While carrying capacity may be increased by improving the habitat, or increasing food production, or by solving environmental problems, there is a limit to which even the carrying capacity may be increased. As Smith states, when capacity of a habitat is increased, a population has a way of filling it up, so as capacity increases, so does population. The only alternative is to curtail the growth of population (Smith, 1972, p. 179).

Many countries have already exceeded the carrying capacity and others will in the near future. Quoting Ian McHarg, Arthur Boughey writes,

We need to estimate the carrying capacity of a given region in terms of its limited resources and contrast this with what we require in the form of environmental quality. (Boughey, 1971, p. 429)

McHarg and others were instrumental in promoting the idea that there must be a balance between human and natural systems (Belnap et al., 1967). Richardson, in his study of housing in environmentally sensitive areas, noted that the balance between human and natural systems will determine the extent to which the environment will be productive. By placing too much emphasis on the human elements, we run the risk of overstepping the carrying capacity of natural systems (Richardson, 1967, p. 36).

Carrying capacity for outdoor recreation. The concept of carrying capacity has been applied to managing natural systems, in particular those contained within wilderness areas which are also used for recreation. Much of the research in the field of carrying capacity and outdoor recreation has been done by research foresters, and many applications have been for the National Forests or National Parks.

Some of the earliest applications of the carrying capacity concept for outdoor recreation were made by Wilbur

LaPage in 1963 and Alan Wagar in 1964. Carrying capacity literature since then has focused on the question of how much use is too much for wilderness areas, for rivers, and for trails that are not necessarily designated wilderness but that may be receiving large numbers of visitors (Stankey, 1972 and 1978; Wagar, 1964 and 1974; Lime and Stankey, 1971; McCurdy, 1970; Michigan State University, 1962; Lime, 1979; Lime, 1977a; Lime, 1976; Greist, 1975; Stankey, Lucas, and Lime, 1976; Lime and Lucas, 1977; Hobson, 1979; West, 1981; Washburne, 1981; Kuss and Morgan, 1980).

This study is based on the above research and includes research that deals more specifically with river recreation management problems. David Lime has been a major contributor to the literature on wilderness capacity, generally, and more recently, especially in his National River Recreation Study, he and his colleagues have created an important mechanism for the long term study of river recreation management (Lime and Knopf, 1980). There have been other contributions to the literature which have lead to a better understanding of the Ocoee River situation. Some studies deal with specific rivers: the Colorado in Arizona (Nielson and Shelby, 1977), the Snake River in Idaho (Shelby and Danley, 1979), the Rogue River in Oregon (Pfister and Frenkel, 1975 and 1976 and Shelby and Colvin, 1979), the Salmon River in Idaho (Warren, 1977), and the Bois Brule River in Wisconsin (Heberlein, 1977).

These studies of problems on individual rivers are helpful, but it is also important to recognize the studies that deal with a wide range of river management issues. These include summaries from Lime's National River Recreation Study (Lime and Field, 1981) and articles from river recreation conferences (Mak, Jensen, Hartman, 1977; Brown, 1977; Lime, 1977a and 1977b; Peterson, Lime, and Anderson, 1981). The point here is not to offer an exhaustive listing of research but to show areas of concern, upon which research has focused.

Out of these studies, several issues have emerged and will be discussed here because they provide a framework for examining the problem of carrying capacity on the Ocoee River.

Researchers agree that there are several different components to the carrying capacity concept (LaPage, 1963; Wagar, 1964 and 1974; Heberlein, 1977; Bury, 1976; Godschalk et al., 1974; Wilkinson, Paul F., 1978; Lime and Stankey, 1971; Hunt, 1974). While there is disagreement over exact labels, there are three main components which seem to summarize the carrying capacity concept: social-psychological, or the perceptions and attitudes of the visitors toward the resource; physical, which includes the area's natural characteristics that limit use or development as well as man-made facilities; and institutional, or the

ability of the area's managing agencies to provide services or to impose those controls that are necessary to preserve the experience desired and the resource itself (Godschalk et al., 1974, p. 2).

It is generally agreed that carrying capacity is not a static concept or that it is not an absolute or magic number and it is not a space standard (Lime and Stankey, 1971; Godschalk et al., 1974; Heberlein, 1977; Lime, 1977a and 1977b). In this thesis the carrying capacity is defined as:

The amount and character of use an area can sustain over a specified time period without causing unacceptable change to the physical environment or to the experience of the user.
(Lime, 1977a, p. 22)

There are many issues in this definition which require that value judgments be made. One must decide what unacceptable change is and which type of user should be planned for. In addition, it is known that any site used for recreation may be hardened, or altered; to make it able to withstand greater use. Some of these hardening techniques are: paving or parking lots, trail development and maintenance, and building access ramps to certain points of interest. By watering or fertilizing, plant life can be increased and through education visitors' behavior can be changed which may reduce wear and tear on the recreation site (Bury, 1976, p. 57). The complexity of the concept is that it is multifaceted; it is dynamic, or changing, and ultimately human

judgment is required of the resource managers. Carrying capacity is a framework for planning and managing a particular recreation resource (Lime, 1979, p. 37).

Attitudes and Perceptions of the Visitors

The definition given in the previous section, in part, states that the amount or type of use in a recreation area should not cause unacceptable change to the experience of the user. Several researchers have based their work on the assumption that there is a level of crowding or density which reduces the quality of the recreation experience (Lime and Stankey, 1971; Wagar, 1964; Stankey, 1972 and 1978; Bury, 1976; and Hammon et al., 1974). The visitors' attitudes toward crowding, their expectations about the recreation experience, and their perceptions of management issues have been tested in the last few years to attempt to discover this level of unacceptable change (Michigan State University, 1962; Hendee and Harris, 1970; Peterson and Lime, 1979; Heberlein, 1977; Lime, 1977a and 1976; Lime and Lucas, 1977; Hunt, 1974).

Numerous studies have been written on specific problems of survey research as a way of studying outdoor recreation generally, and river recreation specifically (Pfister and Frenkel, 1975 and 1976; Nielson and Shelby, 1977; Heberlein, 1977; Lime, 1979; and Schreyer, 1980). Problems that were

addressed in these studies include the questionnaire itself, distribution, and inconsistency in the results.

There are limits to what user surveys can offer in terms of guidance to management. Partly this is because the public is so diverse. This means that a certain recreation experience may be of great satisfaction to some visitors, and satisfaction may depend upon the level of other experiences these people have had. The manager must choose which public to manage for. Bryan Hobson (1979) suggests that less experienced people, or more generally motivated people, are more easily satisfied than those who visit an area or who have a higher level of expertise in a certain kind of recreation (Hobson, 1979, p. 4). It has been pointed out that managers may have a poor perception of what people want in outdoor recreation (Hendee and Harris, 1970; and Lime and Stankey, 1971). They need to develop several tools for understanding more about the resource they manage and the people they manage the areas for. There are other issues here which will be brought out in considering the results of the survey taken on the Ocoee River, but one important point is that satisfaction as described in visitor surveys is not directly related to levels of crowding. In other words, as crowding increases, satisfaction does not necessarily decrease (Hammon et al., 1974; Lime, 1977a; Heberlein, 1977; Nielson and Shelby, 1977; Shelby, 1979).

This indicates that satisfaction should not be the sole basis for determining social-psychological carrying capacity (Lime and Stankey, 1971; Stankey, 1972 and 1978; Lime, 1977b and 1979). Rather, carrying capacity must be based on clear management objectives. These objectives must define specifically what kind of recreational experience is to be provided (Heberlein, 1977, p. 76). Lime adds that the objectives must also state how and where the recreation will be managed and maintained (Lime, 1979, p. 37).

Management Objectives

A lack of clear management objectives is one of the major shortcomings of most attempts at recreation management (Stankey, 1978, p. 180). Without management objectives the attitudes and perceptions of the visitors stand alone with no reference points with which to be compared (Pfister and Frenkel, 1976, p. 6). Management objectives define the physical, biological, and social conditions which the managing agency seeks to maintain. Thus, an overall goal is established which has several objectives.

Lime has suggested that there are certain general objectives such as those controlled by enabling legislation or general administrative policy such as deciding the kinds of activities that will be provided; whether to consider protecting the natural features of the area; and whether the

area should be developed to serve as many people as possible or should be limited to certain kinds of visitors.

Lime (1979, p. 37) goes on to discuss more explicit objectives which include:

- (a) Type of use desired.
- (b) General intensity of use or level of solitude desired.
- (c) Level of development and accessibility of recreation facilities desired.
- (d) General sense of naturalness desired.

In some cases, looking at the general objectives, agency goals are too general to be of use to the manager. In certain areas there is not a specific mandate to provide or preserve wilderness or a pristine environment. This is the case in land governed by the Wilderness Act or by the National Wild and Scenic Rivers Act of 1968 (Shelby, 1979, p. 41). Some agencies that are managing recreation areas do not have a specific recreation mandate. This is the case with the TVA. According to Robert Olson of the Division of Land and Forest Resources at TVA, they have managed their recreation programs under the general directive of providing for the general welfare of the people of the Tennessee Valley (Olson, 1981). This makes the task of defining management objectives difficult.

The entire question of institutional capacity or the ability of the managing agency to provide services and to impose the necessary restrictions to insure that a certain level of experience is maintained, is dependent on the determination of clear management objectives. While other factors such as budget constraints and levels of technology are important, all of these are tied in to an overall planning program. There must be agreement between managers and users and between managers and bureaucracy as to what the goals and objectives are. Having specific and detailed objectives allows the agency to judge what consequences certain actions will have upon the recreation area and will enable managers to see if their objectives are being met (Stankey, 1970, p. 181).

This chapter has described the environmental and physical setting of the Ocoee River and discussed the development of the term carrying capacity from application in the field of ecology to outdoor recreation. It has been shown that carrying capacity is a framework for establishing management objectives, and that the process of defining carrying capacity is very complex. The components of carrying capacity for this study are social-psychological, physical, environmental, and institutional limitations.

CHAPTER III

METHODOLOGY

This chapter contains a description of the methods used to examine the research questions posed in Chapter I. The research questions were:

1. What are the institutional limits to increased use?
2. What are the social-psychological factors related to increased use? (PERCEPTION)
 - (a) Among groups in different types of craft.
 - (b) Among groups with different levels of experience.
 - (c) Do litter, water pollution, and stream bank erosion affect perception?
 - (d) What are user attitudes toward current management practices?
 - (e) Has perception of crowding changed over 3 years?

The information for the first question was obtained from interviews with people from the agencies interested in managing the Ocoee. The various parts of the second question were explored using information gathered through the National River Recreation Study.

Interviews

The information about institutional limits was obtained from interviews with TVA personnel from the Division of Land and Forest Resources and from the Division of Power. Over the last three years, other interviews have been made with people from other agencies who have jurisdiction on the Ocoee, as well as commercial outfitters, raft guides, individual kayakers and canoeists, members of kayak and canoe organizations, and the Director of the Ocoee River Council.

These interviews have also served to test the reliability of the second source of information, the National River Recreation Study. The Ocoee River was included in this study for three years, from 1977 to 1979. The study provides the basis for the social-psychological research questions, or how the river users perceive the recreation experience of the Ocoee.

National River Recreation Study

Background information concerning the entire study will be presented here to provide a focus on its application to the Ocoee River.

The National River Recreation Study (NRRS) is a nationwide study which was developed and coordinated by the

Backcountry River Recreation Management Research Project of the North Central Forest Experiment Station (NCFES). The U.S. Forest Service operates experiment stations across the nation and for this project the researchers at the NCFES worked in cooperation with several other federal agencies that are managing rivers. The Forest Service researchers' goal is to "describe characteristics and preferences of recreational users for a variety of rivers using standardized measurement instruments" (Lime et al., 1981, p. 1). Because of growing recreational use several environmental and social problems have been created. The NRRS is an attempt to provide administrators and planners of the rivers with information about problems on their rivers and will give insight into the need for river recreation opportunities throughout the country (Lime et al., 1981, p. 2).

The populations studied were people who travel on rivers and streams by canoe, kayak, raft, motorboat, or other means.

The surveys were designed to measure ten different items:

1. Level of satisfaction.
2. Reasons for using the river.
3. Degree and type of problems experienced on the river.

4. Reactions to the number of people on the river.
5. Perceived conflict between users.
6. Perception of environmental degradation from use of river.
7. Degree of support for management practices.
8. Demographic characteristics and experience on the river.
9. Characteristics of the trip, type of craft, party size, type of group, private/commercial, etc.
10. Demand for resource, willingness to pay.

It was also planned to develop a good data processing system for dissemination of the results; to create a data bank for river recreation issues, such as supply, demand, quality, and management problems; and to identify representative rivers to be used in a follow-up study (Lime et al., 1981, p. 2).

The survey instrument was developed through several stages over a four year period, beginning in 1976. The form used in 1979 evolved primarily from a form developed by Northwestern University. That questionnaire was derived from several studies and suggestions by social scientists, especially from research on the Colorado and Green Rivers (Lime et al., 1981, p. 5). The 1977 survey was distributed on eleven rivers, on thirteen rivers in 1978, and on twenty-three rivers in 1979 (Lime et al., 1981, p. 4). The Ocoee

River was one of five rivers studied for more than one season.

Several different kinds of rivers were studied, including urban rivers, backcountry rivers, whitewater, and flatwater. The agencies cooperating with the study were the Bureau of Land Management, the National Park Service, the Tennessee Valley Authority (TVA), and various state agencies dealing with river management (Interviewer Manual, 1979, p. 6).

The study carried out on the Ocoee consisted of two phases as it did on the other rivers. First, the recreationists are interviewed briefly at a specified place on the river. For the Ocoee, the take-out point was used as the primary interview station. The second phase consisted of a mailed questionnaire sent to a representative sample of those interviewed on the river.

A sampling design for 1979 was drawn up by TVA and was randomly selected from weekdays and weekend days over a two month period. This was to avoid oversampling during the week, because it was known that the greatest use occurs on weekends. The sampling design for 1978 was not taken on a random basis, but interviews were made for fourteen days in a row.

For 1978 and 1979, the on-site interviewers were given instructions in the background of the study and the interviewing process.

On sample days, the interviewers were instructed to remain at the access point for eight continuous hours, which were adjusted to reflect the actual distribution of users. For the Ocoee, these hours were from 10:30 a.m. to 6:30 p.m., both during the week and on weekend days (USDA, 1979).

Respondents were given cards (River Recreation Registry) to fill out which requested their name, address, and location of entry and take-out of the river (see Appendix E). The interviewers also were to give a leader of each group a "group log" card which requested information such as the number of people in the group and the type of craft each member traveled in, and whether or not the trip was made through an outfitter. In 1979, the individual cards requested more detailed information about each person.

The interviewer was to contact as many people as possible, but to avoid continually contacting the same type of group. Both large and small, private and commercial groups were contacted. The ratio of commercial users to private users was estimated to be about 70 percent to 30 percent, and given this information, the interviewers were instructed to use their own judgment in efforts to maintain this ratio. Only users over fourteen years old and who had actually been on the river were given interview cards. The respondents were assured that their anonymity would be maintained at all times, and the purpose of the study was explained, if time allowed.

In 1978 a total of 1,586 visitors were contacted and given interview cards. In 1979, 1,815 visitors were interviewed on the river.

The Mail Questionnaire

The goal of the research team was to obtain 200 to 250 useable responses to the mail questionnaire. This was determined to be the best range of responses to provide for thorough analysis. Knopf and other members of the research project assumed they could get at least a 60 percent return rate which meant they would mail 350 questionnaires to a sample of those who had filled out individual cards at the river. The names were chosen by using a systematic sample with a random start in the interview cards, choosing every nth card. For both years, 350 mail questionnaires were mailed and twelve were returned as undeliverable, so that 338 people actually received questionnaires (Knopf, 1982). Both years, two follow-up mailings were sent to nonrespondents, at about three-week intervals. In 1978, the response rate was about 74 percent, or 251, and for 1979, 264 people returned the questionnaires for an approximate 78 percent return rate.

Rationale for Questionnaire Items

The following information is derived from Appendix H of the National River Recreation Study: Interviewer Manual

(1979). The questionnaires used are found here as Appendix F. Table 1 shows the questions used to test six categories of information needs.

Testing the perceived quality of the river trip, or satisfaction of the user was considered to be the prime objective of the questionnaire. The other categories of questions were considered to be predictors or dimensions of this main variable. The other questions provided a way to study several aspects of satisfaction and could be used as independent variables or simply as subgroups for other questions. The analysis of the comparison of results for these questions are found in Chapter IV. The present discussion will concentrate on the questions themselves.

The researchers asked separate questions for each category, based on earlier research and comments from river managers. The question directly testing the visitors' perception of the trip contained a variety of statements about the trip, to which the respondent gave Likert scale responses ranging from strongly disagree to strongly agree. It was found that when people were asked to rate the perceived quality of an experience with reference to specific attributes, greater sensitivity in the measures was found, and from this the managers are given more concrete information about how visitors feel about the resource.

TABLE 1
SIX CATEGORIES OF INFORMATION NEEDS MEASURED BY
1978 AND 1979 QUESTIONNAIRES

Information need	1978 Question number	1979 Question number
Perceived quality of the river	11	13
Reasons for taking the trip	12	14
Problems experienced during the trip	6	6
Reactions to meeting other river users	4,5,7,8,9	4,5,7,8,9,10
Degree of support for specific river management practices	10	12
Demographic and control variables	1,2,3,13 14,15,16 17,18,19	1,2,3,15 16,17,18 19,20,21,22

Source: U.S. Department of Agriculture, Forest Service,
Interviewer Manual: Summer Field Work, National River Recreation Study,
St. Paul, Minn., North Central Forest Experiment Station, May, 1979,
Appendix H.

It has been said that people with different reasons for taking river trips show differences in satisfaction levels, are satisfied by different aspects of the trip, mention different environmental features and show differences in opinion about certain management actions (National River Recreation Study, Interviewer Manual, Appendix H, p. 3, 1979). The statements used in Question 12 (1978) and 14 (1979) were derived from an inventory by B. L. Driver (1976) to identify and scale the desires people wish to obtain from recreation experiences. The Forest Service researchers state that many pretests of this question have been made and that it is very helpful in documenting differences within a group of diverse recreationists.

The third category of measurement dealt with specific problems experienced during the trip. Question 6 itemizes fifty potential problems (fifty-two in 1979) that may be of concern. Respondents were requested to indicate how serious each one was on a Likert scale. The responses to this question will be useful at the descriptive level and in explaining differences in the perceived quality of the trip. Managers may be able to learn from these results which problems seem to be the most serious for recreation users. As this question is used over the years, it may be possible to see if the users find that certain problems are alleviated, or are getting worse.

The reactions to meeting other river users were obtained from five questions (six in 1979), which asked how many people were seen on the river, how this compared with what was expected, and whether the number seen was too many, too few, or about right. It was determined that question 5, "How did the number of people you saw at each of the following places compare with what you had expected to see?", would be important especially for those who reported seeing more than they expected. This group could be examined further in terms of characteristics and other perceptions and attitudes about the trip. This group was considered to be an indicator of displacement or deciding to go somewhere else next time. The theory that those who are uncomfortable with the number of people they have seen may not return, has been discussed by Stankey (1978) and Schreyer et al. (1975) and it seems important to test here.

The other questions in this category, Questions 8 and 9 measured perceived conflicts among river users and general opinions about environmental damages which have resulted from recreational use. These will be compared over time to see if there are changes and will also be used to identify the magnitude of the problems they explore.

The degree of support for specific management practices measured by Question 10 and 12 (1979) will be used primarily by managers to help identify which actions would be accepted

or rejected if implemented on the river. It is believed by the Forest Service researchers and management alike that polling user opinion is important for those actions which will limit or control recreational use of river. The users were asked to note the degree of support for a list of possible actions that could be taken by the management, "Given the conditions on the river when you were there, how would you feel about each of the following management actions?" The actions deal with limiting use, improving facilities and access, and controlling litter. The answers here may give a bit more detailed understanding to the responses to more general questions, such as 8 and 9 discussed above.

The demographic variables considered in the questionnaire were age, occupation, education, physical impairment status, and the control variables were the amount of prior use of this particular river (experience), the time at which the decision was made to take the trip, type of group, and the nature of prior recreation experience on other rivers.

Other descriptive information about the trip was obtained from the interview cards, as discussed earlier. All these variables will be needed to describe the kind of people who are using the river so that changes over time can be analysed.

Data Collection, Processing, and Analysis

As was mentioned, 264 questionnaires were returned in 1978 and 251 were returned in 1979. The responses were punched onto IBM cards and basic frequency distributions were produced displaying the responses to each question. The questions were labeled so that each possible response could be distinguished. The information from the cards is stored on tapes at the North Central Forest Experiment Station in St. Paul, Minnesota.

Interpretation of the yes-no questions and Likert scale (1 - strongly agree to 5 - strongly disagree) were straightforward, but several open ended questions had to be specially coded to reflect the wide array of responses and to show whether the respondent offered a solution, described potential conflicts, or made a nonuseable response (Schoolmaster, 1978, p. 2).

From the computer printouts, fifty tables were produced which provided a simple descriptive analysis of the data. For instance, the frequency distributions for responses were displayed for each possible response under each of the items for each question. Many of these tables have been printed in Chapter IV, and the analysis and findings for each of the research questions used in this study are discussed there.

Most of the data are presented by the actual number of responses and by the percentage of those answering the question that the number represents.

Limitations

Very little has been reported on the 1977 survey, concerning either sampling techniques or the actual instrument itself. The sampling techniques were not sound because the interviewer was traveling among three rivers and the Ocoee was sampled only "as often as possible" (Humphrey, 1981). This means that very little can be inferred from the data that was produced in 1977. In Chapter IV, one of the research questions calls for a comparison of attitudes toward crowding over the three year period. This data is used only for interest and no projections will be made using the 1977 figures.

The data collection methods were a bit more sound in 1978, and the only phase about which little is known is the on site sample, so this data should also be treated with this limitation in mind.

The 1979 sample seems to be good, or as good as can be expected. Much more is known about not only the sampling frame and the research design, but about the entire procedure of instrumentation. The results are also much more refined.

One limitation of using the National River Recreation Study is that it is aimed toward a national view of river recreation. This is the only data available for the Ocoee and the researchers at the North Central Forest Experiment

Station have been extremely helpful in sharing their information. There were problems in not being able to control the parameters of the study and in trying to extract data for a somewhat different set of research questions.

For 1979, the field procedures were well coordinated and the sampling seemed to evenly reflect the types and amounts of use on the Ocoee. The 1979 data and design was the result of suggestions and additions made from the first two years of the study. Richard Knopf stated that both 1978 and 1979 procedures and data are accurate. Some of the other drawbacks found in trying to adopt the National River Recreation Study to this thesis are discussed below.

Several specific problems were found in the interview cards. The interview cards contained questions which were completely irrelevant to the users' experience on the Ocoee. The 1978 group log card (Appendix E) asked the group leader to note the "date group first put on the river" and the "date group will leave the river." The card also asked how many nights were to be spent camping on the river. The Ocoee trip is only 4.6 miles, which takes an average of three hours, and there are no places to camp on the river, nor any reason to. This would seem to confuse the respondent, especially someone who did not know much about the river. Some people do camp nearby the river and float it for two days or more, and some people make several river

trips in one day. The questionnaire also contained other questions regarding camping on the river, which may have been confusing.

The 1979 group log card again asked the number of nights camped and the individual log card offered a list of ten possible types of watercraft and asked the respondent to check the one used on this trip. Three of these boats have never been used on the Ocoee and it is very unlikely that they ever will. These are examples of problems that occur when one instrument is used for sampling several diverse populations, i.e., users of many kinds of rivers.

The questionnaires themselves contained a few choices for certain questions that were not pertinent to the Ocoee, but the respondents seemed to handle this by simply not answering to something that did not relate to their trip. The questionnaires were very neat and easy to understand on the whole. The 70 percent (or better) response rate may possibly be interpreted as an indicator that the questionnaires were generally well written, but there are some other questions about the reliability of the results of the questionnaires. One is that 24 percent of the respondents for 1978 replied that they had floated the river more than five times, and in 1979 17 percent reported this. It would seem that these people may have had trouble in remembering the conditions on the river for the particular

day they were interviewed and filled out cards. There was no way to know how this phenomenon affected the survey results. Another more troubling question is that when asked about management actions, it would be difficult for some of the first-time users to comment; having nothing with which to compare their trip.

These problems may or may not be unique to the Ocoee as compared to the other rivers studied by the Forest Service, but they should be kept in mind when considering the results to the surveys.

CHAPTER IV

FINDINGS

This chapter contains the findings for each research question based upon interviews and results of the National River Recreation Study surveys.

Institutional Limits to Increased Use

What Are the Institutional Limits to Increased Use?

The section on institutional limits for the increased use of the Ocoee is the result of interviews with TVA staff, commercial outfitters, and private kayakers who have had experience on the river.

Institutional carrying capacity was defined in Chapter II as "the ability of the area's governing body and management agencies to provide services and impose the controls necessary to insure that the desired quality of life is maintained" (Godshalk et al., 1974, p. 2).

Inside TVA. There are several agencies involved in managing different aspects of the Ocoee River. TVA and its Division of Power is the primary or lead agency because it controls the power system, the flume, dam, the water flow, and owns the parking lot areas. Recreation management has

been the concern of TVA's Division of Land and Forest Resources. Cooperation between these two branches of TVA has become an issue, because the Division of Power has authority to release or not to release water down the stream bed for recreation. If it is decided to allow recreational releases, it must be further decided how frequently and for what period during the day will the water flow.

TVA may be ordered by the Federal Court to continue certain whitewater releases or, because of the court decision it may be allowed to use the water for power production only. The outcome of the lawsuit, as mentioned in Chapter I, is still not known. Whatever the decision, it is possible that in the future, as the Division of Power is able to assess the demand for electricity, some regular or some sporadic recreational releases may occur. There may also be a compromise between recreation and power needs. If there are any releases at all, it is safe to assume that overcrowding will be a problem, and that this problem must be dealt with by some agency or group that can gain the support of all interested parties.

Because TVA is so decentralized, the Division of Power and the Division of Land and Forest Resources are quite separate and have different patterns of relations with their respective constituencies or client groups (Derthick, 1974, p. 40). This means that the Ocoee case should provide a

good chance to observe how each division will deal with its respective constituencies in the Polk County area since the Ocoee No. 2 project could be a dual purpose power and recreation project.

The TVA Board of Directors has decided that its policy will be to place more emphasis or importance on power production for the Ocoee No. 2 project than on recreation (Humphrey, 1981). This does not seem surprising, as recreation projects have often been considered as secondary to, or spinoffs of, power projects. Personnel in the Division of Land and Forest Resources did what they could to promote "natural resources" or recreation on the Ocoee, but because of the Board's decision, recreation will be provided only at the expense of the recreation users. While their role in managing recreation use on the river is now more limited, the Division of Land and Forest Resources will continue to provide an on-site manager, but it will also be in the position of trying to produce enough revenues from the users to continue the recreational releases (Humphrey, 1981).

With the possibility of federal budget cuts, funds for improving facilities or for doing further research into management problems on the river may be limited or may not be available at all after 1983. A request for funds to purchase additional land for parking areas was turned down

in 1981, and research on crowding and carrying capacity has been curtailed (Humphrey, 1981).

One reason for slowing down efforts on the Ocoee is the lawsuit, mentioned in Chapter I. A decision on the lawsuit may dictate issues such as whether there should be recreation at all on the Ocoee or whether the recreationist should have to pay TVA for using the river.

One important function of the Division of Land and Forest Resources is the regulation of activity on and around the river. While the commercial outfitters have been doing a great deal of self-regulation and were involved in assisting TVA to develop regulations, it cannot be expected that the commercial outfitters will continue to reach agreement on all matters, nor can they be expected to guarantee the rights of the private paddlers on the river. There will have to be some kind of outside regulatory body to ensure fairness for all recreationists.

The plan. The Division of Land and Forest Resources designed the Ocoee River Management Plan to establish a working management program for recreation on the river. As mentioned in Chapter I, this plan was formulated in 1978 by several agencies having jurisdiction in the area as well as private canoe and kayak clubs and the commercial outfitters. It was mentioned that TVA has taken the role of the lead or managing agency.

The Plan was intended to provide the opportunity for a safe and enjoyable recreational experience for all river users (TVA, 1978b, p. 1). As was pointed out in the review of the relevant literature, this is too vague and imprecise to provide any direction to river managers.

In another section of the plan, a more useful statement is found:

As predictable levels of use are established, the managing agency will take whatever steps are deemed necessary to insure appropriate levels of use are not exceeded with consideration given to both providing a safe and enjoyable experience for recreationists and maintaining the integrity of the resource. (TVA, 1978b, p. 6) (Emphasis added.)

This is more useful as a statement of objectives, even though it is somewhat hidden in the text of the Plan, because it does consider some of the complex issues involved in managing the river. These added dimensions include the resource itself and its protection, safety, satisfaction of the user, and carrying capacity or appropriate levels of use.

The Plan itself is included as Appendix B. The contents of the Plan were described in Chapter I and will not be discussed in detail here. It should be pointed out that when the Plan was written in 1978, it dealt with very specific issues and most of the recommendations were fairly simple and inexpensive to carry out. It does not seem that

the Plan anticipated the increases that were to occur in the next three years. In 1978 the total use on the river was approximately 23,000 people. In 1981, estimates are that the highest use on a single day was 2,000 people and approximately 70,000 people are estimated to have used the river in this year (Hunt, 1981).

Long term plans for expansion of parking lots and providing more toilet facilities should have been addressed in the Plan. In the allocation of use, it was decided not to limit the numbers of private paddlers (TVA, 1978b, p. 7), but it seems that private use should be monitored as carefully as commercial use because conflicts are beginning to occur on the river not only between commercial outfitters, but between individual private paddlers as well, especially as crowding occurs at each rapid. For example, a fist fight was observed in 1981 at a popular rapid, because a canoeist failed to wait his turn while a kayaker was playing in the waves (Kenney, 1981). It may be more difficult to schedule private kayakers or groups but the possibility should be at least examined in any plan for managing the river.

A further criticism of the Plan is that it implies that after a carrying capacity is established, then steps will be taken to maintain it (TVA, 1978b, p. 6). Members of the Land and Forest Resources staff have also stated that they

are looking for a maximum number of people that can be on the river at any given time (Lewis, 1978). This seems inconsistent with the kinds of recommendations that are provided in the literature. It is important to have clear goals before setting out to determine if use levels are excessive.

Social-Psychological Factors

The following section on social-psychological factors of increased use was derived from the results of the National River Recreation Study which was described in Chapter III.

All the tables are derived from the Summary Tables for both 1978 and 1979 and the last question includes some data from the 1977 results. None of the remarks about camping or camping facilities in the tables will be considered.

What Are the Social-Psychological Factors Related to Increased Use among Groups in Different Types of Craft?

There are certain perceptual differences about the trip on the river between people who had their own equipment, generally kayaks or canoes, and people who rented or borrowed equipment from an institution or from a commercial outfitter, usually rafts. For the Ocoee, the group using kayaks and canoes corresponds very closely to the group which identified itself as being privately outfitted. Those

traveling in rafts correspond closely to the group identified as commercially outfitted users (Knopf, 1981). Information about the type of craft (raft/kayak) was not requested in the 1978 survey, so in order to compare user groups for 1978 and 1979 the commercial/private delineation will be used. In 1978, privately outfitted visitors tended to respond that they felt less neutral about the number of people they had seen at various places on the river than did commercially outfitted users (Table 2). (The term "neutral" refers to the response "neither too few nor too many" people on the river.) Over 10 percent more private users said they saw "a few too many people" than did the commercial users, but overall more of the private users reported seeing too many and also seeing too few people compared to the commercial users. The conclusion here is that more commercial users were neutral about this question.

Again, in 1979, commercial users were simply less disturbed about their feelings toward the number of people they saw at different locations (Table 3). Slightly more private users said they would like to have seen more people, but at least 10 percent more of the private users reported "a few too many people." At the take-out point, 12 percent of the private users reported seeing "far too many people" compared to 3 percent of the commercial users.

TABLE 2

HOW CROWDED DID COMMERCIALY VERSUS PRIVATELY OUTFITTED VISITORS FEEL AT VARIOUS LOCATIONS (1978)?*

Location	Feelings about the Number of People Seen										Total	
	Would like to have seen a lot more people		Would like to have seen a few more people		Neither too many nor too few		A few too many people		Far too many people			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Commercially outfitted visitors												
At the put-in point	5	2.8	8	4.4	112	62.2	46	25.6	9	5.0	180	100.0
While traveling on the river	3	1.7	15	8.4	116	64.8	38	21.2	7	3.9	179	100.0
At the take-out point	3	1.7	7	3.9	121	67.6	38	21.2	10	5.6	179	100.0
While camping on the river	0	0	0	0	0	0	0	0	0	0	0	0
Privately outfitted visitors												
At the put-in point	3	4.7	4	6.3	35	54.7	18	28.1	4	6.3	64	100.0
While traveling on the river	2	3.1	6	9.4	33	51.6	20	31.3	3	4.7	64	100.0
At the take-out point	2	3.1	3	4.7	39	60.9	15	23.4	5	7.8	64	100.0
While camping on the river	0	0	0	0	0	0	0	0	0	0	0	0

*How do you feel about the number of people you saw at each of the following places?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 28, Mail Questionnaire, Question 7, 1979.

TABLE 3

HOW CROWDED DID COMMERCIALY VERSUS PRIVATELY OUTFITTED VISITORS FEEL AT VARIOUS LOCATIONS (1979)?*

Location	Feelings about the Number of People Seen										Total	
	Would like to have seen a lot more people		Would like to have seen a few more people		Neither too many nor too few		A few too many people		Far too many people		Number	Percent
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Commercially outfitted visitors												
At the put-in point	5	2.5	9	4.5	128	64.0	52	26.0	6	3.0	200	100.0
While traveling on the river	2	1.0	14	7.0	136	68.3	42	21.1	5	2.5	199	100.0
At the take-out point	3	1.5	12	6.0	132	66.0	47	23.5	6	3.0	200	100.0
While camping on the river	0	0	1	4.0	22	88.0	1	4.0	1	4.0	25	100.0
Privately outfitted visitors												
At the put-in point	1	2.0	3	6.1	22	44.9	19	38.8	4	8.2	49	100.0
While traveling on the river	1	2.0	2	4.1	24	49.0	19	38.8	3	6.1	49	100.0
At the take-out point	1	2.0	1	2.0	23	46.9	18	36.7	6	12.2	49	100.0
While camping on the river	0	0	0	0	9	75.0	3	25.0	0	0	12	100.0

*How do you feel about the number of people you saw at each of the following places?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 32, Mail Questionnaire, Question 7, 1979.

In considering levels of support for management actions that limit or control use on the river, large differences in support for these actions are seen between the two groups (Table 4). Commercially outfitted users may have responded more favorably to these things because of the controlled situation in which they experienced the river. They are assigned specified times of launch by the outfitter; they must follow the outfitter's schedule. They also go in an assigned group with only a certain number of other people, and they may meet other commercially outfitted groups. It may be that the privately outfitted users are a bit more sensitive about controls because they were not limited at all in 1979 and because the issue of possible limitations to use remains unclear.

As shown in Table 5, the group means of those who gave opinions about limiting use differed significantly. The commercially outfitted users seemed to be neutral or to agree slightly with these proposed actions, while the privately outfitted users had more problems or complaints, according to the results of Question 6 from both 1978 and 1979 (see Tables 6 and 7). As with all the problems and criticism of the river experience, people generally were very satisfied with their trips, but when asked to consider each item as a problem and to express the degree to which it

TABLE 4
ON WHICH MANAGEMENT OPTIONS DO VISITOR GROUP
OPINIONS DIFFER (1978)?*

Management options	Group means ^{a,b}	
	New visitors (n = 174)	Repeat visitors (n = 90)
Post signs warning of hazards	3.88	3.55
Provide more parking at access points	3.75	4.11
Provide more patrols to assist river users and enforce regulations	3.20	2.97
Develop short hiking trails at points along the river	3.82	3.50
Require every group to have approved first-aid equipment	8.84	3.20
Restrict the numbers of people using the river at any one time	3.45	1.95
Provide more campsites along the river between put-in and take-out points	2.97	2.41
Limit the number of people per group allowed on the river	3.11	1.79
Achieve better spacing among groups by assigning the time of day when each group may begin its trip	3.42	1.89

^a
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

^b Means are listed for those groups whose responses differed significantly (0.05 level).

*"Given the conditions on the river when you were there how would you feel about the following management actions?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables. Ocoee River. Table 39, Mail Questionnaire, Question 10, 1978.

TABLE 5
DIFFERENCES IN DEGREE OF SUPPORT OF ACTIONS WHICH
WOULD RESTRICT USE ON THE RIVER (1979)

Rank Order	Management actions	Number	Percent
<u>Commercially outfitted visitors</u>			
11	Achieve better spacing among groups by assigning time of day	104	51.7
15	Restrict the number of people using the river at any one time	86	43.2
18	Limit the number of people per group on the river	73	36.5
<u>Privately outfitted visitors</u>			
15	Restrict the number of people using the river at any one time	11	22.0
21	Achieve better spacing among groups by assigning time of day	7	14.3
22	Limiting the number of people per group on the river	7	14.0

Note: Actions are ordered by percent of visitors supporting or strongly supporting the action.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 44, Mail Questionnaire, Question 12, 1979.

TABLE 6

WHAT PROBLEMS WERE ENCOUNTERED BY COMMERCIALY VERSUS PRIVATELY OUTFITTED VISITORS
DURING THEIR TRIP (1978)?*

Problems Encountered (Rank Ordered)	Seriousness of Problem										Total	
	Not a problem		Slight problem		Moderate problem		Serious problem		Very serious problem		Number	Percent
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<u>Commercially outfitted visitors</u>												
Inadequate toilet facilities	60	33.5	57	31.8	42	23.5	15	8.4	5	2.8	179	100.0
at put-in and take-out points	87	48.3	37	20.6	43	23.9	10	5.6	3	1.7	180	100.0
Too few drinking water sources	103	57.5	47	26.3	17	9.5	6	3.4	6	3.4	179	100.0
Litter on banks	131	72.8	16	8.9	14	7.8	8	4.4	11	6.1	180	100.0
Water pollution												
Too few toilet facilities	113	63.8	37	20.9	17	9.6	6	3.4	4	2.3	177	100.0
along river between points	123	68.3	31	17.2	17	9.4	3	1.7	6	3.3	180	100.0
Roads within sight of river												
<u>Privately outfitted visitors</u>												
Water pollution	25	39.1	7	10.9	11	17.2	13	20.3	8	12.5	64	100.0
Inadequate toilet facilities	19	29.7	20	31.3	14	21.9	5	7.8	6	9.4	64	100.0
at put-in and take-out points	18	28.1	20	31.3	16	25.0	7	10.9	3	4.7	64	100.0
Litter on banks	29	45.3	10	15.6	12	18.8	8	12.5	5	7.8	64	100.0
Muddy water	29	45.3	13	20.3	15	23.4	5	7.8	2	3.1	64	100.0
Too few drinking water sources	28	43.8	22	34.4	7	10.9	4	6.3	3	4.7	64	100.0
Too few garbage cans	24	37.5	23	35.9	15	23.4	2	3.1	0	0	64	100.0
Too many people on the river	30	46.9	18	28.1	9	14.1	6	9.4	1	1.6	64	100.0
Litter in river												
Navigation problems due to	33	52.4	15	23.8	9	14.3	1	1.6	5	7.9	63	100.0
low water levels												
Too few toilet facilities	42	66.7	7	11.1	8	12.7	3	4.8	3	4.8	63	100.0
along river between points												
Inadequate information	39	60.9	12	18.8	10	15.6	0	0	3	4.7	64	100.0
services at put-in points	40	63.5	14	22.2	3	4.8	5	7.9	1	1.6	63	100.0
Vandalism	42	65.6	12	18.8	8	12.5	0	0	2	3.1	64	100.0
Roads within sight of river												
Inadequate brochures showing	41	64.1	15	23.4	6	9.4	1	1.6	1	1.6	64	100.0
map of river, hazards, etc.												

*Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your river trip?"

Note: Problems are ordered by mean score, from most serious to least serious problem. Only problems with means greater than 1.5 are listed (1 = Not a problem, 2 = Slight problem).

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 18, Mail Questionnaire, Question 6, 1978.

TABLE 7

WHAT PROBLEMS WERE ENCOUNTERED BY COMMERCIALY VERSUS PRIVATELY
OUTFITTER VISITORS DURING THEIR TRIP (1979)?*

Commercially outfitted visitors			Privately outfitted visitors		
Problems encountered (rank ordered)	Number	Percent	Problems encountered (rank ordered)	Number	Percent
Inadequate toilet facilities at put-in and take-out points	73	36.5	Water pollution	25	50.0
Too few drinking water sources	44	22.1	Inadequate toilet facilities at put-in and take-out points	25	50.0
Campsites not clearly identified	6	18.8	Unskilled people using the river	21	42.9
Too few toilet facilities between put-in and take-out point	37	18.6	Too few drinking water sources	21	42.0
Roads within sight of a river	33	16.4	Too many people on the river	18	36.0
Insufficient information about things to do and see	31	15.5	Litter on banks	18	36.0
Litter on banks	31	15.4	Campsites occupied by others	5	35.7
Too many people on the river	27	13.6	Too few garbage cans	16	33.3
Poor quality campsites	4	12.5	Poor quality campsites	4	28.6
Water pollution	24	11.9	Litter in river	14	28.0
Inadequate brochures showing map of river, hazards, etc.	23	11.5	Muddy water	14	28.0
Too few garbage cans	20	10.1	Too few toilet facilities between put-in and take-out point	11	22.4
			Roads within sight of a river	10	20.0
			Too many commercial establishments	6	12.2
			Navigation problems due to low water levels	6	12.2
			People being inconsiderate	6	12.0
			Insufficient information about things to do and see	6	12.0
			Too many rules and regulations	6	12.0
			Inadequate information at put-in points	6	12.0
			Frightening rapids	6	12.0
			Inadequate brochures showing map of river, hazards, etc.	5	10.4
			Damage to or loss of personal property	5	10.4

*Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your trip?"

Note: Responses are ordered by percent of visitors reporting the problem as moderate, serious, or very serious. Only problems encountered by at least 10 percent of the visitors are listed.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 20, Mail Questionnaire, Question 6, 1979.

is a problem, the results can be an indicator of which problems are perceived to be the worst.

For 1978, the commercially outfitted users' most serious problems were "inadequate toilet facilities" and "drinking water sources." Water pollution and litter were the next most serious problems. Only six items in all had mean scores of over 1.5, where 1 equals not a problem and 2 equals slight problem. The privately outfitted users described fourteen items as being problems, with water pollution and inadequate toilets as the most serious problems. Next were "litter on the banks" and "muddy water" followed by "inadequate drinking water sources" as the fifth most serious problem. Other problems noted by the privately outfitted users included "too many people on the river," "navigation problems due to low water," "too few garbage cans," and "litter in the river." It seems that the private paddlers are a bit more sensitive to environmental problems than are the commercially outfitted users. Also they are a bit more sensitive to crowding, but only slightly.

In 1979 the two worst problems for both groups were again inadequate toilets and drinking water for commercial users, and water pollution and inadequate toilets for the privately outfitted users. The results are tabulated a bit differently in the 1979 tables than in the 1978 tables (see

the notes at the end of each table). Campsite identification, toilets, proximity to the road, and lack of information were the next most frequently mentioned problems by commercial users, and they ranked litter, water pollution, and lack of garbage cans seventh, tenth, and twelfth on their list of problem areas. "Too many people" was mentioned and ranked eighth as a problem.

The private users again mentioned more problems: twenty-two compared to twelve for the commercial users. They mentioned "unskilled people using the river" as the third greatest problem and 36 percent saw "too many people on the river" as a problem compared to 14 percent of the commercial users." "Litter on the banks," "too few garbage cans," "litter in the river," and "muddy water" were mentioned by at least 28 percent of the private users. These problems were ranked 6, 8, 10, and 11 respectively. Other items which were mentioned only by the private users were "litter in the river," "muddy water," "too many commercial establishments," "navigation problems due to low water," and "people being inconsiderate."

It is difficult to say if these responses mean that private paddlers are more sensitive to crowding than the commercially outfitted user. Perhaps private paddlers are simply more sensitive to the evidence or results of crowding, such as litter, crowded parking lots, etc.

What Are the Social-Psychological Factors
Related to Increased Use among Groups
with Different Levels of Experience?

This question may overlap with the first one in some ways because many of the people who have more recreational experience on the Ocoee are privately outfitted. Commercially outfitted users are often novices, but it seems worthwhile to separate these questions because it is important to find out if the users seem to return or if new visitors seem to find serious problems. Another reason to look at the differences in new and repeat visitors is to see if the repeating users are more sensitive to crowding and management actions which may ease problems relating to crowding.

Table 8 for 1978 shows that 61 percent of the privately outfitted users had floated the river more than five times; 19 percent were on their first trip. Seventy-two percent of the commercially outfitted users who responded to the survey were taking their first trip, and nearly 11 percent had floated the Ocoee over five times.

Looking at the same table for 1979, 5 percent of the private users were on the Ocoee for the first time, and 74 percent had floated the Ocoee more than five times (see Table 9). The same pattern that was seen in the 1978 data exists here: 3 percent of the commercial users had floated the Ocoee five or more times, and 73 percent were on the

TABLE 8

HOW MANY TIMES HAVE COMMERCIALY OUTFITTED AND PRIVATELY
OUTFITTED VISITORS FLOATED THE STUDY RIVER (1978)?*

Number of times on study river	Commercially outfitted		Privately outfitted	
	Number	Percent	Number	Percent
One time (this trip)	129	71.7	12	18.8
Two times	22	12.2	3	4.7
Three times	7	3.9	5	7.8
Four times	1	.6	1	1.6
Five times	2	1.1	4	6.3
More than five times	19	10.6	39	60.9
Total	180	100.0	64	100.0

*"How many times have you been on this particular stretch of the river?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables. Ocoee River Table 11, Mail Questionnaire, Question 3, 1979.

TABLE 9

HOW MANY TIMES HAVE THE VISITORS FLOATED THE STUDY RIVER (1979)?*

Number of times on study river	Total sample		Commercially outfitted		Privately outfitted	
	Number	Percent	Number	Percent	Number	Percent
One time (this trip)	152	60.6	147	73.1	5	10.0
Twice	34	13.5	31	15.4	3	6.0
Three times	14	5.6	12	6.0	2	4.0
Four times	3	1.2	2	1.0	1	2.0
Five times	5	2.0	3	1.5	2	4.0
Six to ten times	11	4.4	3	1.5	8	16.0
More than ten times	32	12.7	3	1.5	29	58.0
Total	251	100.0	201	100.0	50	100.0

*"How many times have you been on this particular stretch of the river?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 11, Mail Questionnaire, Question 3, 1979.

river for the first time. For both years, approximately 18 percent of the commercial users had been on the Ocoee two to five times. Twenty percent of the private users in 1978 and 16 percent in 1979 reported floating the river two to five times.

In response to the question asking the degree to which the visitor found certain items to be a problem, in 1978 the new visitors noted only five items to be a problem, while repeat visitors reported fifteen problems (Table 10). Most of the visitors had very few problems and for all of these items, most new visitors said these things were "not a problem," so these results must be interpreted carefully.

The repeating visitors not only had more problems but indicated that problems they did have were more serious (Table 10). The new visitors mention "inadequate toilet facilities at the put-in and take-out points" as the most serious problem, followed by other problems with inadequate facilities. Litter was mentioned as the fourth most serious problem. The repeating visitors found "water pollution" the most serious problem followed by "inadequate toilet facilities at the put-in and take-out points." "Litter on banks" and other environmental problems were mentioned by this group as being somewhat serious problems such as too many people, inadequate information, and facilities were also mentioned.

TABLE 10

WHAT PROBLEMS WERE ENCOUNTERED BY NEW VERSUS REPEAT VISITORS DURING THEIR TRIP (1978)?*

Problems Encountered (Rank Ordered)	Seriousness of Problem										Total	
	Not a problem		Slight problem		Moderate problem		Serious problem		Very serious problem			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
New visitors												
Inadequate toilet facilities at put-in and take-out points	62	35.8	56	32.4	36	20.8	11	6.4	8	4.6	173	100.0
Too few drinking water sources	88	50.6	37	21.3	42	24.1	6	3.4	1	.6	174	100.0
Too few toilet facilities along river between points	108	63.2	34	19.9	19	11.1	4	2.3	6	3.5	171	100.0
Litter on banks	105	60.7	45	26.0	19	11.0	1	.6	3	1.7	173	100.0
Roads within sight of river	119	68.4	32	18.4	15	8.6	4	2.3	4	2.3	174	100.0
Repeat visitors												
Water pollution	26	28.9	10	11.1	19	21.1	18	20.0	17	18.9	90	100.0
Inadequate toilet facilities at put-in and take-out points	20	22.2	29	32.2	25	27.8	12	13.3	4	4.4	90	100.0
Litter on banks	21	23.6	31	34.8	19	21.3	12	13.5	6	6.7	89	100.0
Muddy water	35	38.9	14	15.6	19	21.1	14	15.6	8	8.9	90	100.0
Too few drinking water sources	35	38.9	16	17.8	22	24.4	13	14.4	4	4.4	90	100.0
Too few garbage cans	36	40.0	25	27.8	19	21.1	5	5.6	5	5.6	90	100.0
Navigation problems due to low water levels	44	48.9	20	22.2	15	16.7	5	5.6	6	6.7	90	100.0
Litter in river	39	43.3	29	32.2	11	12.2	8	8.9	3	3.3	90	100.0
Too many people on the river	38	42.2	28	31.1	18	20.0	4	4.4	2	2.2	90	100.0
Roads within sight of river	58	64.4	13	14.4	15	16.7	0	0	4	4.4	90	100.0
Inadequate information at put-in points	60	66.7	16	17.8	8	8.9	2	2.2	4	4.4	90	100.0
Erosion of stream banks by river users	54	60.0	24	26.7	8	8.9	4	4.4	0	0	90	100.0
Too few toilet facilities along river between points	62	69.7	13	14.6	7	7.9	5	5.6	2	2.2	89	100.0
Vandalism	58	65.9	18	20.5	6	6.8	5	5.7	1	1.1	89	100.0
Inadequate brochures showing map of river, hazards, etc.	59	66.3	17	19.1	9	10.1	2	2.2	2	2.2	89	100.0

*Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your river trip?"

Note: Problems are ordered by mean score, from most serious to least serious problem. Only problems with means greater than 1.5 are listed (1 - Not a problem, 2 - Slight problem).

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 18, Mail Questionnaire, Question 6, 1979.

In 1979 (see Table 11), while the repeat users still had more problems, the new or first-time users seemed to be more sensitive to problems than they appeared to be in 1978. Both groups mentioned "inadequate toilets at the put-in and take-out points" first, followed by "too few drinking water sources." Still, the only environmental problem identified by new users was "litter on the banks" and the repeating users still cited more problems with "water pollution," "litter in river," "too few garbage cans," and "muddy water." A greater percentage of new visitors mentioned lack of information as a problem than did the repeat group, but it is interesting to note that both groups mention it. Another important difference is that 19 percent of the repeating users mentioned "too many people on the river" and 18 percent reported having a problem with "unskilled people using the river." Neither of these are mentioned by the new visitors, which means that less than 10 percent found these items to be problems. This may be because the repeating group is more sensitive to problems and because the problems have not been alleviated over the last two years. It is the author's opinion that this may reflect a bit of elitism on the part of the repeating visitors in their attitudes toward more people coming to the river.

The responses to the question of how crowded they felt at different locations on the river, Tables 12 and 13 show

TABLE 11

WHAT PROBLEMS WERE ENCOUNTERED BY FIRST-TIME VERSUS REPEAT VISITORS
DURING THEIR TRIP (1979)?*

First-time visitors			Repeat visitors		
Problems encountered (rank ordered)	Number	Percent	Problems encountered (rank ordered)	Number	Percent
Inadequate toilet facilities at put-in and take-out points	54	35.5	Inadequate toilet facilities at put-in and take-out points	29	43.9
Campsites not clearly identified	6	24.0	Too few drinking water sources	19	28.8
Too few drinking water sources	32	21.2	Water pollution	19	28.4
Roads within sight of a river	28	18.4	Too few toilet facilities between put-in and take-out point	16	24.2
Too few toilet facilities between put-in and take-out points	27	17.9	Too many people on the river	13	19.4
Poor quality campsites	4	16.0	Unskilled people using the river	12	18.5
Insufficient information about things to do and see	24	15.9	Too few garbage cans	12	18.2
Litter on banks	24	15.8	Litter on banks	12	17.9
Inadequate brochures showing map of river, hazards, etc.	20	13.2	Litter in river	11	16.4
Too many people on the river	19	12.7	Muddy water	11	16.4
Campsites occupied by others	3	12.0	Poor quality campsites	2	15.4
			Campsites occupied by others	2	15.4
			Insufficient information about things to do and see	10	14.9
			Too many rules and regulations	8	12.1
			Inadequate information at put-in points	7	10.6
			Roads within sight of a river	7	10.4

*Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your trip?"

Note: Responses are ordered by percent of visitors reporting the problem as moderate, serious, or very serious. Only problems encountered by at least 10 percent of the visitors are listed.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 21, Mail Questionnaire, Question 6, 1979.

TABLE 12
HOW CROWDED DID NEW VERSUS REPEAT VISITORS FEEL AT VARIOUS LOCATIONS (1978)?*

Location	Feelings about the Number of People Seen										Total
	Would like to have seen a lot more people		Would like to have seen a few more people		Neither too many nor too few		A few too many people		Far too many people		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
New visitors											
At the put-in point	4	2.3	8	4.6	110	63.2	43	24.7	9	5.2	174 100.0
While traveling on the river	2	1.2	15	8.7	118	68.2	33	19.1	5	2.9	173 100.0
At the take-out point	2	1.2	5	2.9	117	67.6	38	22.0	11	6.4	173 100.0
Repeat visitors											
At the put-in point	4	4.4	4	4.4	44	48.9	29	32.2	9	10.0	90 100.0
While traveling on the river	3	3.3	8	8.9	41	45.6	31	34.4	7	7.8	90 100.0
At the take-out point	3	3.3	5	5.6	52	57.8	23	25.6	7	7.8	90 100.0

*"How do you feel about the number of people you saw at each of the following places?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 29, Mail Questionnaire, Question 7, 1978.

TABLE 13
HOW CROWDED DID FIRST-TIME VERSUS REPEAT VISITORS FEEL AT VARIOUS LOCATIONS (1979)?*

Location	Feelings about the Number of People Seen										Total	
	Would like to have seen a lot more people		Would like to have seen a few more people		Neither too many nor too few		A few too many people		Far too many people			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
First-time visitors												
At the put-in point	5	2.7	11	5.9	119	64.3	45	24.3	5	2.7	185	100.0
While traveling on the river	2	1.1	13	7.0	129	69.7	36	19.5	5	2.7	185	100.0
At the take-out point	3	1.6	12	6.5	120	64.9	45	24.3	5	2.7	185	100.0
While camping on the river	0	0	1	3.7	24	88.9	1	3.7	1	3.7	27	100.0
Repeat visitors												
At the put-in point	1	1.6	1	1.6	31	48.4	26	40.6	5	7.8	64	100.0
While traveling on the river	1	1.6	3	4.8	31	49.2	25	39.7	3	4.8	63	100.0
At the take-out point	1	1.6	1	1.6	35	54.7	20	31.3	7	10.9	64	100.0
While camping on the river	0	0	0	0	7	70.0	3	30.0	0	0	10	100.0

*"How do you feel about the number of people you saw at each of the following places?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 33, Mail Questionnaire, Question 7, 1979.

differences for each group in 1978 and 1979. In 1978 the more experienced visitors were less neutral about the number of people they had expected to see by as much as twenty-two percentage points "while traveling on the river." There was also a difference in those who saw "a few too many people," with the repeating group showing as much as fifteen percentage points more than new visitors who had seen "a few too many people." Only slightly more of the repeating group saw "far too many people," but an interesting note is that a few of the more experienced group stated they would like to have seen more people.

In 1979 most of the repeat visitors reported that they saw "neither too few nor too many," or "a few too many people." Most of the first-time visitors were neutral about the number of people they saw. More repeat visitors said they saw "far too many people" and fewer repeat visitors said they "would like to have seen a few more people." The percentage of people who said they "would like to have seen a lot more people" was about the same for both groups.

In response to the question which measured the degree of support for certain management actions, there were some differences between the new and repeat visitors. Here, actions aimed specifically at limiting or controlling use on the river were examined. Table 14 is derived from the Forest Service data; from it we see that there is much less

TABLE 14

ON WHICH OPTIONS DO VISITOR GROUP OPINIONS DIFFER (1978)?*

	Group Means ^a	
	Commercial n = 180	Private n = 64
Restrict the number of people using the river at any one time	3.36	2.00
Limit the number of people per group allowed on the river	3.05	1.72
Achieve better spacing among groups by assigning time of day	3.46	1.82

- ^a1 = Strongly Disagree
 2 = Disagree
 3 = Neutral
 4 = Agree
 5 = Strongly Agree

*"Given the conditions on the river when you were there how would you feel about the following management actions?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables. Ocoee River. Table 39, Mail Questionnaire, Question 10, 1978.

agreement with these kinds of controls on use among the repeating visitors, and that the new visitors appear to feel only slight agreement with each item.

A different method of data display was used for this question in 1979 (Table 15). The same three management actions are shown in ranked order, from the most strongly supported to those less strongly supported. As in 1978, the repeating visitors are less supportive than new visitors of those management actions which would limit use on the river (Table 16).

Table 15 may be compared to Table 5 on page xx. This comparison shows that both repeating and privately outfitted visitors show less support for actions that control use on the river than do the new, or commercially outfitted groups.

It should be noted that the differences on feelings of crowding were more pronounced between new and repeat visitors than between commercial and private users.

Do Litter, Water Pollution, and Stream Bank Erosion Affect Perception?

First, it should be mentioned that most people for both 1978 and 1979 felt that the river and its surroundings were in good condition (Tables 17 and 18).

A broad measure of perception of environmental degradation was tested by an open-ended question: "Do you feel that more controls are needed to prevent the

TABLE 15

SUPPORT FOR DIFFERENT MANAGEMENT ACTIONS LIMITING USE
ON THE OCOEE RIVER BETWEEN FIRST-TIME VERSUS
REPEAT VISITORS (1979)*

(Rank order)				
New	Repeat	Management actions	New visitors	Repeat visitors
10	14	Achieve better spacing among groups by assigning time of day.	# 81 % 53.3	# 26 % 38.8
13	18	Restrict the number of people using the river at any one time.	# 70 % 46.4	# 21 % 31.8
17	20	Limit the number of people per group on the river	# 56 % 37.1	# 20 % 29.9

*"Given the conditions on the river when you were there, how would you feel about each of the following management actions?"

Note: Actions are ordered by percent of visitors supporting or strongly supporting the action.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 45. Mail Questionnaire, Question 12, 1979.

TABLE 16
SUPPORT FOR MANAGEMENT OPTIONS LIMITING USE
ON THE OCOEE (1978)?*

Management options	Group Means ^a	
	New visitors n = 174	Repeat visitors n = 90
Restrict the number of people using the river at any one time	3.45	1.95
Limit the number of people per group allowed on the river	3.11	1.79
Achieve better spacing among groups by assigning the time of day when each group may begin its trip	3.42	1.89

- ^a
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

*"On which options do visitor group opinions differ?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 39. Mail Questionnaire, Question 10, 1978.

TABLE 17

DO THE VISITORS FEEL THAT THE RIVER AND ITS SURROUNDINGS
ARE IN GOOD CONDITION (1978)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	32	12.2
Agree	154	58.6
Neutral	26	9.9
Disagree	42	16.0
Strongly disagree	9	3.4
Total	263	100.0

*"How well do the following statements describe your feelings about the river trip?" (I thought the river and its surroundings were in good condition.)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 20. Mail Questionnaire, Question 11, Item N, 1978.

TABLE 18

DO THE VISITORS FEEL THAT THE RIVER AND ITS SURROUNDINGS
ARE IN GOOD CONDITION (1979)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	32	12.8
Agree	165	66.0
Neutral	30	12.0
Disagree	19	7.6
Strongly disagree	4	1.6
Total	250	100.0

"How well do the following statements describe your feelings about the river trip? (I thought the river and its surroundings were in good condition.)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 24. Mail Questionnaire, Question 13, Item N, 1979.

environment from being damaged by recreational use of the river?" (Tables 19 and 20). It should be pointed out that in 1979 most of the people responded negatively to this question (Table 21). Only 13 percent said they felt the environment was being damaged. General deterioration of the resource and a loss of recreational experience were mentioned most often by this 13 percent. In 1978, litter on the bank and in the river were the most frequently cited environmental damages. Soil damage was the third most often mentioned problem.

People responding to the questionnaires seem to show concern about these particular forms of environmental degradation of the river. The most strongly supported management action in both 1978 and 1979 surveys was to "require people to carry out their own trash." This was a part of Question 10 in 1978 and Question 12 in 1979. Carrying out trash is not currently required, but it would seem to have a great deal of support by the users if it were enforced.

Question 6 for both 1978 and 1979 deals with problems encountered by the users and gives more clarity to the degree of feelings about environmental problems. These problems are ranked in order from the most serious to the least serious, and it should be pointed out that most respondents do not find any of the items to be much of a

TABLE 19

WHAT KINDS OF ENVIRONMENTAL DAMAGES WERE REPORTED BY THE
VISITORS (1978)?*^a

Kinds of environmental damage	Total responses	
	Number ^b	Percent
Litter	29	45.3
Human waste and garbage	5	7.8
Pollution (general)	3	4.7
Water pollution	2	3.1
Soil damages	16	25.0
Fire scars, cut trees, vegetation damage	1	1.6
Vandalism	5	7.8
General degradation due to recreational use	3	4.7
Other damages	0	0.0
Total	35	100.0

^aEnvironmental damages mentioned by those responding "yes" to Question 9, Item A.

^bResponses, not respondents, because visitors could mention more than one kind of damage.

*"Do you feel that more controls are needed to prevent the environment from being damaged by recreational use of the river? (If yes, what kinds of environmental damages are occurring?)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 22, Mail Questionnaire, Question 9, Item B, 1978.

TABLE 20

FOR THOSE WHO FEEL THE RIVER ENVIRONMENT IS BEING DAMAGED
BY RECREATIONAL USE WHAT KINDS OF DAMAGE
DO THEY SEE (1979)?*

Kinds of environmental damage (Rank ordered)	Responses	
	Number ^b	Percent
<u>General Aesthetics</u>		
General deterioration	20	37.7
Loss of recreation experience	7	13.2
<u>Land-Based</u>		
Destruction of wildlife habitat	4	7.5
Litter	4	7.5
Soil erosion	2	3.8
Vegetation destruction	2	3.8
Wildlife kill	1	1.9
Overuse/people pressures	1	1.9
Human waste	1	1.9
<u>Water-Based</u>		
Pollution	4	7.5
Overuse/people pressures	3	5.7
Litter	2	3.8
<u>Facilities</u>		
General deterioration	1	1.9
Total	53	100.0
Total number of visitors who feel the environment is being damaged	33	

*"Do you feel that more controls are needed to prevent the environment from being damaged by recreational use of the river? (If yes, what kinds of environmental damages are occurring?)"

Note: Respondents can report more than one damage. Therefore, the total number of responses may exceed the total number of visitors who feel the environment is being damaged.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 26, Mail Questionnaire, Question 10, 1979.

TABLE 21

DO THE VISITORS FEEL THE RIVER ENVIRONMENT IS BEING DAMAGED
BY RECREATIONAL USE (1979)?*

Is the environment being damaged?	Total sample	
	Number	Percent
YES	33	13.3
NO	215	86.7
Total	248	100.0

*"Do you feel the river environment is being damaged by recreational use?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 23. Mail Questionnaire, Question 10, 1979.

problem (Tables 22 and 23). In 1978, "water pollution" ranked as the third most serious problem and "muddy water" was fifth. "Litter on the banks" was the fourth most serious problem; "too few garbage cans" was number eight; and "litter in the river" was ranked as eleventh. "Erosion of the stream bank" was thirteenth as a problem for the respondents.

In 1979 "litter on the banks" was the third most serious problem for the respondents and "water pollution" was the fifth most serious problem. "Too few garbage cans," "litter in river," and "muddy water" ranked as the thirteenth, fourteenth, and fifteenth worst problems respectively, and "erosion of stream banks" was eighteenth.

What Are User Attitudes Toward Management Practices?

Generally, people feel positively toward the work done by managers on the Ocoee. For both 1978 and 1979 the users were asked how strongly they agreed or disagreed with the statement: "I was pleased with the job being done by managers of the river" (Question 11, Item C in 1978 and Question 13, Item C in 1979). Tables 24 and 25 show that most of the respondents in both years feel that the managers are doing a good job. In 1978, 65 percent agreed with the statement, and in 1979, 76 percent agreed.

There are other questions that deal with the users' attitudes toward management practices including Question 6,

TABLE 22
WHAT PROBLEMS WERE ENCOUNTERED BY VISITORS DURING THEIR TRIP (1978)?*

Problems Encountered (Rank Ordered)	Seriousness of Problem										Total	
	Not a problem		Slight problem		Moderate problem		Serious problem		Very serious problem		Number	Percent
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Inadequate toilet facilities at put-in and take-out points	62	31.2	85	32.3	61	23.2	23	8.7	12	4.6	263	100.0
Too few drinking water sources	123	46.6	53	20.1	64	24.2	19	7.2	5	1.2	264	100.0
Water pollution	165	62.5	24	9.1	30	11.4	24	9.1	21	8.0	264	100.0
Litter on banks	126	48.1	76	29.0	38	14.5	13	5.0	9	3.4	262	100.0
Muddy water	166	62.9	46	17.4	26	9.8	17	6.4	9	3.4	264	100.0
Too many people on the river	150	57.0	70	26.6	36	13.7	4	1.5	3	1.1	263	100.0
Too few toilet facilities along river between points	170	65.4	47	18.1	26	10.0	9	3.5	8	3.1	260	100.0
Too few garbage cans	169	64.0	51	19.3	31	11.7	8	3.0	5	1.9	264	100.0
Roads within sight of river	177	67.0	45	17.0	30	11.4	4	1.5	8	3.0	264	100.0
Navigation problems due to low water levels	160	68.7	44	16.8	25	9.5	6	2.3	7	2.7	262	100.0
Litter in river	174	66.2	57	21.7	18	6.8	9	3.4	5	1.9	263	100.0
Inadequate information services at put-in points	175	66.5	57	21.7	23	8.7	4	1.5	4	1.5	262	100.0
Erosion of stream banks by river users	181	69.1	54	20.6	19	7.3	6	2.3	2	.8	262	100.0
Inadequate brochures showing map of river, hazards, etc.	183	69.8	55	21.0	15	5.7	7	2.7	2	.8	262	100.0
Insufficient information about things to do in the area	183	69.3	60	22.7	17	6.4	1	.4	3	1.1	264	100.0
Off-road vehicles in river area	219	83.0	25	9.5	12	4.5	6	2.3	2	.8	264	100.0
Someone in your group receiving an injury	215	81.4	33	12.5	14	5.3	1	.4	1	.4	264	100.0
Obstructions in river (logs, limbs, fences)	215	81.4	36	13.6	11	4.2	2	.8	0	0	261	100.0

*"How do you feel about the number of people you saw at each of the following places?"

Note: Problems are ordered by mean score, from most serious to least serious problem. Only problems with means greater than 1.5 are listed (1 - Not a problem, 2 - Slight problem).

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 17, Mail Questionnaire, Question 7, 1978.

TABLE 23

WHAT PROBLEMS WERE ENCOUNTERED BY VISITORS DURING THEIR TRIP (1979)?*

Problems Encountered (Rank Ordered)	Seriousness of Problem										Total	
	Not a problem		Slight problem		Moderate problem		Serious problem		Very serious problem		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Inadequate toilet facilities	86	34.4	66	26.4	61	24.4	20	8.0	17	6.8	250	100.0
at put-in and take-out points	125	50.2	59	23.7	42	16.9	16	6.4	7	2.8	249	100.0
Too few drinking water sources	119	47.4	83	33.1	37	14.7	8	3.2	4	1.6	251	100.0
Litter on banks												
Campsites not clearly identified	25	55.6	13	28.9	3	6.7	0	0	4	8.9	45	100.0
Water pollution	170	67.7	32	12.7	21	8.4	14	5.6	14	5.6	251	100.0
Too few toilet facilities between put-in and take-out points	154	62.1	46	18.5	33	13.3	7	2.8	8	3.2	248	100.0
Campsite occupied by others	31	67.4	7	15.2	4	8.7	1	2.2	3	6.5	46	100.0
Poor quality campsites	32	69.6	6	13.0	4	8.7	1	2.2	3	6.5	46	100.0
Too many people on the river	154	61.8	50	20.1	36	14.5	9	3.6	0	0	249	100.0
Roads within sight of a river	163	64.9	45	17.9	33	13.1	5	2.0	5	2.0	251	100.0
Unskilled people using the river	160	65.0	47	19.1	27	11.0	12	4.9	0	0	246	100.0
Insufficient information about things to do and see	162	64.8	51	20.4	30	12.0	5	2.0	2	.8	250	100.0
Too few garbage cans	173	70.0	38	15.4	25	10.1	5	2.0	6	2.4	247	100.0
Litter in river	181	72.4	40	16.0	21	8.4	5	2.0	3	1.2	250	100.0
Muddy water	180	71.7	42	16.7	26	10.4	2	.8	1	.4	251	100.0
Inadequate information at put-in points	186	74.4	42	16.8	15	6.0	6	2.4	1	.4	250	100.0
Inadequate brochures showing river, hazards, access points, etc.	192	77.4	28	11.3	21	8.5	5	2.0	2	.8	248	100.0
Erosion of stream banks	187	75.4	50	20.2	8	3.2	3	1.2	0	0	248	100.0

*Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your river trip?"

Note: Problems are ordered by mean score, from most serious to least serious problem.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Table 19, Mail Questionnaire, Question 6, 1979.

TABLE 24

DO THE VISITORS FEEL THAT A GOOD JOB IS BEING DONE
BY MANAGERS OF THE RIVER (1978)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	64	24.6
Agree	105	40.4
Neutral	70	26.9
Disagree	20	7.7
Strongly disagree	1	.4
Total	260	100.0

*"How well do the following statements describe your feelings about the river trip? (I was pleased by the job being done by managers of the river.)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 40. Mail Questionnaire, Question 13, Item C, 1978.

TABLE 25

DO THE VISITORS FEEL THAT A GOOD JOB IS BEING DONE
BY MANAGERS OF THE RIVER (1979)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	72	28.7
Agree	120	47.8
Neutral	44	17.5
Disagree	12	4.8
Strongly disagree	3	1.2
Total	251	100.0

*"How well do the following statements describe your feelings about the river trip? (I was pleased by the job being done by managers of the river.)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 47. Mail Questionnaire, Question 13, Item C, 1979.

which has been discussed earlier. As was pointed out, the users generally agreed with most of the management actions. It should be mentioned here that the item ranked most frequently by most users was "inadequate toilet facilities at the put-in and take-out points" (see Tables 22 and 23). This was followed by too few drinking water sources. For 1978 "water pollution" was the third most often mentioned problem and "litter on banks" was fourth. In 1979 "litter on banks" was third and "water pollution" was listed as the fourth worst problem (this does not count the camping questions). Again, in all categories for problems, most respondents found these items to be either "not a problem or a slight problem." Other management issues to be discussed below were not identified as problems in either 1978 or 1979.

Another question asked river users in both 1978 and 1979 about management actions (Question 10 in 1978 and Question 12 in 1979). Users were asked to describe their feelings about twenty-three different actions that managers could take in 1978, and twenty-six actions in 1979. Several of the actions and responses are listed in Tables 26 and 27. The items displayed in this text were chosen because they seemed to be the most applicable to the Ocoee. Two items listed in the 1979 responses were not used in the 1978 tables provided by the Forest Service.

TABLE 26

WHAT KINDS OF MANAGEMENT OPTIONS DO THE VISITORS SUPPORT OR OPPOSE (1978)?*

Management Actions (Rank Ordered)	Level of Support						Total	
	Strongly oppose		Oppose		Neutral		Support	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Action supported								
Provide more parking at access points	9	3.5	23	8.8	59	22.7	110	42.3
Post signs of warning and advising of hazards	14	5.4	25	9.6	55	21.1	118	45.2
Provide more patrols to assist users and enforce regulations	26	10.1	32	12.4	112	43.4	73	28.3
Neutral towards								
Achieve better spacing among groups by assign- ing time of day	49	19.0	46	17.8	64	24.8	73	28.3
Restrict the number of people using the river	49	18.7	50	19.1	63	24.0	74	28.2
Limit the number of people per group on the river	53	20.4	62	23.8	67	25.8	56	21.5
							22	8.5
							260	100.0

*Given the conditions of the river when you were there, how would you feel about each of the following management actions?"

Note: Responses were coded on a five point scale, with a "1" representing "strongly oppose" and a "5" representing "strongly support." "Actions supported" include those items showing a population mean of greater than 3.5. "Neutral towards" includes those with a mean of 2.5 to 3.5.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 38, Mail Questionnaire, Question 10, 1978.

TABLE 27

WHAT KINDS OF MANAGEMENT OPTIONS DO THE VISITORS SUPPORT (1979)?*

Management Actions (Rank Ordered)	Level of Support								Total	
	Strongly oppose		Oppose		Neutral		Support		Strongly support	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<u>Action supported</u>										
Improve the loading areas at put-in and take-out points	5	2.0	15	6.0	73	29.3	104	41.8	52	20.9
Provide more parking at access points	16	6.5	32	13.1	62	25.3	79	32.2	56	22.9
<u>Neutral towards</u>										
Post signs of warning and advising of hazards	17	6.9	32	13.0	61	24.7	91	36.8	46	18.6
Achieve better spacing among groups by assign- ing time of day	37	14.8	36	14.4	66	26.4	93	37.2	18	7.2
Provide more patrols to assist and enforce regulations	16	6.5	51	20.6	99	40.1	70	28.3	11	4.5
Restrict the number of people using the river at any one time	36	14.5	54	21.7	62	24.9	80	32.1	17	6.8
Limit the number of people per group on the river	38	15.2	62	24.8	70	28.0	58	23.2	22	8.8
<u>Actions opposed</u>										
Provide more points of access	73	29.3	73	29.3	53	21.3	43	17.3	7	2.8

*"Given the conditions of the river when you were there, how would you feel about the following management actions?"

Note: Responses were coded on a five point scale, with a "1" representing "strongly oppose" and a "5" representing "strongly support." "Actions supported" include those items showing a population mean of greater than 3.5. "Neutral towards" includes those with a mean of 2.5 to 3.5 and "Actions opposed" includes those with a mean score less than 2.5.

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 43, Mail Questionnaire, Question 12, 1979.

The actions shown on the table are listed in order of decreasing support, and the ranked order for items derived from the original Forest Service tables are given on the tables. Actions supported in 1978 were to "provide more parking at access points" and to "post signs of warning and advise users of hazards." All the other actions received a neutral response from the users. Some strong support was mentioned for the actions dealing with parking and signs, but some strong opposition was noted to the three actions which dealt with limiting use on the river.

The actions generally more supported than others in 1979 were those to "improve the loading areas at the put-in and take-out points" and to "provide more parking at access points." All other actions except the one to "improve more points of access to the river" were regarded neutrally by the respondents. Providing more access points was the most strongly opposed of the eight actions in Table 27.

Support for the three actions to limit use on the river was a bit less emphatic in 1979, but it did not change very much from 1978. There was slightly more opposition to "providing more patrols to assist users and to enforce regulations" in 1979 than in 1978, but again the differences across the column are small. This is the case generally between the data for both years.

Has the Perception of Crowding Changed
Over the Three-Year Period from 1977
to 1979?

The assumption made here was that because actual levels of use increased from 7,000 people in 1977, to 23,000 in 1978, and to 34,000 people in 1979, people would note that the river was more crowded.

As noted, Table 28 depicts results to the question "How do you feel about the number of people you saw in each of the following places?" Respondents were asked to answer on a scale from "would like to have seen a lot more people" to "saw far too many people" for the put-in, while traveling on the river and at the take-out point. This is Question 7 on the 1979 questionnaire.

The results are shown in tables for each year, and the totals were compiled as Table 28. Generally speaking, the impressions or feelings of the respondents to the questionnaires show little change over the three year period. More specifically, the percentage of people who said they saw far too many people was very low for 1977, with only an increase of one to two percentage points for 1978. In 1979 the percentage of people reporting seeing "far too many people" dropped back, not quite to 1977 levels, but below 1978 responses.

The percentage of people reporting a "few too many people" for all three years was higher than those reporting

TABLE 28
HOW CROWDED DID VISITORS FEEL AT VARIOUS LOCATIONS FROM 1977-1979:*

Location	Year	Would like to have seen a lot more people		Would like to have seen a few more people		Neither too many nor too few		A few too many people		Far too many people		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Where you first put in	1977	4	2.4	11	6.6	108	65.1	34	20.5	9	5.4	166	100.0
	1978	8	3.0	12	4.5	154	58.3	72	27.3	18	6.8	264	100.0
	1979	6	2.4	12	4.8	150	60.2	71	28.5	10	4.0	249	100.0
While traveling on the river	1977	4	2.4	18	10.8	114	68.7	25	15.1	5	3.0	166	100.0
	1978	5	1.9	23	8.7	159	60.5	64	24.3	12	4.6	263	100.0
	1979	3	1.2	16	6.5	160	64.5	61	24.6	8	3.2	248	100.0
Where you last took out	1977	4	2.4	11	6.7	121	73.3	24	14.5	5	3.0	165	100.0
	1978	5	1.9	10	3.8	169	64.3	61	23.2	18	6.8	263	100.0
	1979	4	1.6	13	5.2	155	62.2	65	26.1	12	4.8	249	100.0

*The question for all three years was "How do you feel about the number of people you saw at each of the following places?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River; 1977 data compiled from "Cross Tabulation of Outfitted by Question 13," pp. 1, 2, 4; 1978 data from Table 27, Mail Questionnaire, Question 7; 1979 data from Table 31, Mail Questionnaire, Question 7.

"far too many," and changed from 1977 to 1979 by as much as twelve percentage points for the "points where you last took out." The difference here was between responses for 1977 and the other two years, 1978 and 1979. For these two years, response levels for this column were quite similar.

Generally, the percentage of people who would like to have seen more people (the first two columns) declined gradually over the three-year period.

For all three years, most people replied that they saw "neither too few nor too many people." Responses for 1978 and 1979 were quite close, with no more than four percentage points difference.

These figures indicate that over 60 percent of the people who responded to these questions were satisfied with the number of people they saw on the river, which supports the generally satisfied tone of the responses from the other research questions. Since perception of crowding over the last three years does not seem to have changed very much, it cannot necessarily be implied that the river is too crowded.

Summary

In summary it should be pointed out that all the users surveyed were generally pleased with their river experience. Most respondents felt that they neither saw too few nor too

many people on the river and most people agree that there were no real conflicts (Table 29). Most users reported feeling that the river and the surrounding area were in good condition, and that there were no environmental damages. For those who did notice environmental damages, litter and soil damages were mentioned, as well as water pollution and general deterioration.

Most people reported being well pleased with the job the managers were doing, and while there were some differences of opinion between user groups, the new users and commercially outfitted users tended to express fewer problems than did repeat and privately outfitted users.

Even considering the limited usefulness of the 1977 survey, the perception of crowding does not seem to change over the three year period, even though actual use increased from 7,000 to 34,000 over the study period.

It does not seem then that the increased number of people decreased the levels of satisfaction. Comparing the kinds of experiences wanted by the users (Tables 30 and 31) with overall levels of satisfaction (Tables 32 and 33), it seems that generally people got what they came to the river for, namely thrills and action, new skills, and scenery. Most respondents were not unhappy with the number of people they saw. Table 34, a summary of visitor expectations over the three-year period, indicates that most of the

TABLE 29

DO VISITORS FEEL CONFLICTS EXIST BETWEEN DIFFERENT GROUPS
OF RIVER USERS (1979)?*

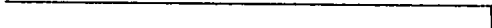
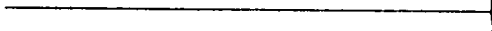
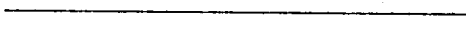
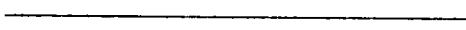
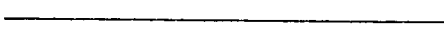
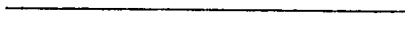
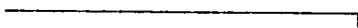
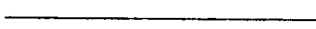
Do conflicts exist?	Total sample	
	Number	Percent
YES	52	21.1
NO	194	78.9
Total	246	100.0

*"Do you feel there are conflicts between different groups of river users? (For example between canoeists and fishermen, motorboaters and swimmers, landowners and canoeists, horseback riders and canoeists, etc.)"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 39. Mail Questionnaire, Question 8, 1979.

TABLE 30

WHAT KINDS OF EXPERIENCES DO VISITORS WANT, ARE NEUTRAL
TOWARD, AND DO NOT WANT (1978)?*

Type of experience (Rank ordered) ^a	Level of agreement				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	1	2	3	4	5
<u>Experiences Desired</u>					
Exercise					
Skill development					
Thrills and action					
Scenery and nature					
Learning					
<u>Neutral Toward</u>					
Friendship					
Meeting new people					
Peace and tranquility					
Family experience					
Status					
Escape crowding					
<u>Experiences Not Wanted</u>					
Solitude					

^aExperiences are rank ordered by mean score from those most desired to those least desired.

*"Some possible reasons why people take river trips are listed below. Think about why you took the river trip and circle the number that best shows how much you agree or disagree with EACH of the following statements?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 15. Mail Questionnaire, Question 12, 1978. Experiences are based on the following items: Peace and Tranquility, Items P and HH; Thrills and Action, Items Q and GG; Friendship, Items X, B, and U; Scenery and Nature, Items A and D; Skill Development, Items I and DD; Status, Item II; Escape Crowding, Items N and EE; Family Experience, Item V; Exercise, Item BB; Meeting New People, Item F; Learning, Items FF, W, and T; Solitude and Privacy, Item AA.

TABLE 31

WHAT KINDS OF EXPERIENCES DO VISITORS WANT, ARE NEUTRAL
TOWARD, AND DO NOT WANT (1979)?*

Type of experience (Rank ordered) ^a	Level of agreement				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	1	2	3	4	5
<u>Experiences Desired</u>					
Thrills and action					
Developing skills					
Viewing scenery					
Learning new things					
Being with friends					
Physical exercise					
<u>Neutral Toward</u>					
Peace and calm					
Meeting new people					
Escaping crowds					
Being with family					
Social recognition					
<u>Experiences Not Wanted</u>					
Being alone					

^aExperiences are rank ordered by mean score from those most desired to those least desired.

*"Some possible reasons why people take river trips are listed below. Think about why you took the river trip and circle the number that best shows how much you agree or disagree with EACH of the following statements?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 15. Mail Questionnaire, Question 12, 1979. Experiences are based on the following items: Peace and Calm, Items P and HH; Thrills and Action, Items Q and GG; Being with Friends, Items X, B, and U; Viewing Scenery, Items A and D; Developing Skills, Items I and DD; Social Recognition, Item II; Escaping Crowds, Items N and EE; Being with Family, Item V; Physical Exercise, Item FF, W, and T; Being Alone, Item AA.

TABLE 32

OVERALL, WERE THE VISITORS SATISFIED
WITH THEIR RIVER TRIP (1978)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	72	27.6
Agree	151	57.9
Neutral	35	13.4
Disagree	2	0.8
Strongly disagree	1	0.4
Total	261	100.0

*"How well do the following statements describe your feelings about the river trip?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 42. Mail Questionnaire, Question 11, Items A, G, I, K, and L (averaged), 1978.

TABLE 33

OVERALL, WERE THE VISITORS SATISFIED
WITH THEIR RIVER TRIP (1979)?*

Level of agreement	Total sample	
	Number	Percent
Strongly agree	69	28.0
Agree	144	58.5
Neutral	33	13.4
Disagree	0	0.0
Strongly disagree	0	0.0
Total	246	100.0

*"How well do the following statements describe your feelings about the river trip?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River, Table 49. Mail Questionnaire, Question 13, Items A, G, I, K, and L (averaged), 1979.

TABLE 34
HOW DID THE NUMBER OF PEOPLE AT VARIOUS LOCATIONS COMPARE WITH THE VISITORS' EXPECTATIONS
OVER THE THREE YEAR PERIOD (1977-1979)?*

Location	Number of People Compared with Expectations												Total
	Far fewer than expected		Fewer than expected		About what expected		More than expected		Far more than expected		Had no expectations		
Location	Year	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Where you first put in	1977	4	2.4	9	5.5	74	44.8	64	38.8	14	8.5	NA	----
	1978	5	1.9	14	5.4	124	47.5	49	18.8	23	8.8	46	17.6
	1979	5	2.0	20	8.0	115	46.0	66	26.4	15	6.0	29	11.6
While traveling on the river	1977	3	1.9	20	12.3	92	56.8	39	24.1	8	4.9	NA	----
	1978	4	1.5	29	11.2	126	48.5	53	20.4	10	3.8	38	14.6
	1979	7	2.8	26	10.4	130	52.0	58	23.2	7	2.8	22	8.8
Where you last took out	1977	2	1.2	21	13.1	94	58.8	38	23.8	5	3.1	NA	----
	1978	6	2.3	16	6.2	112	43.2	64	24.7	21	8.1	40	15.4
	1979	5	2.0	14	6.4	123	49.2	59	23.6	20	8.0	27	10.8

*For all three years the question was "How did the number of people you saw at EACH of the following places compare with what you had expected to see?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables, Ocoee River; 1977 data compiled from "Travel mode by Question 6," pp. 1, 2, 4; 1978 data from Table 30, Mail Questionnaire, Question 5; 1979 data from Table 34, Mail Questionnaire, Question 5.

respondents said that the number of people they saw was "about what they expected," and a bit smaller group reported that they saw "more than they expected." Again looking at Tables 32 and 33, it seems that most of those who saw more than they expected were satisfied with this.

Reasons for the lack of correlation between satisfaction and crowding will be discussed in Chapter V. One of the main reasons seems to be that most of the respondents were on the Ocoee for the first time (Table 35), and because of this, they were not prepared to make a judgment about what was crowded or what was not.

TABLE 35

NUMBER OF TIMES COMMERCIALY OUTFITTED AND PRIVATELY
OUTFITTED VISITORS FLOATED THE STUDY RIVER IN 1978*

Number of times on study river	Commercially outfitted		Privately outfitted	
	Number	Percent	Number	Percent
One time (this trip)	129	71.7	12	18.8
Two times	22	12.2	3	4.7
Three times	7	3.9	5	7.8
Four times	1	.6	1	1.6
Five times	2	1.1	4	6.3
More than five times	19	10.6	39	60.9
Total	180	100.0	64	100.0

*"How many times have you been on this particular stretch of the river?"

Source: USDA Forest Service. National River Recreation Study: Summary Tables. Ocoee River. Table 11, Mail Questionnaire, Question 3, 1979.

CHAPTER V

CONCLUSIONS

The Ocoee River has become a popular whitewater recreation river in the last five years and has provided opportunities for individual or private recreation, as well as for commercial establishments which offer group river recreation. Both private and commercial recreation use has risen tremendously on the river, increasing from about 7,000 people in 1977 to over 65,000 in 1981.

Part of the findings of this thesis were based on the results of interviews with the managing agency, TVA, as well as personnel from other agencies, and river users. The results of the National River Recreation Study were the basis for the remainder of this paper. Two main research questions were asked, the first was related to institutional limits to increased use and the second dealt with five of the social-psychological aspects of increased use.

The first chapter provided a background of the recreation use on the Ocoee and presented the problems that managers of the river are now facing. The area around the river is quite limited, as U.S. Highway 64 parallels the entire 4.6 mile stretch of the river that is used for recreation. With increased use it will be important to have

a management plan to deal with all factors relating not only to recreational use, including coordination with power production on the Ocoee. TVA, along with other interested parties have devised a plan and this is one factor in the first research question: What are the institutional limits to increased use on the Ocoee? The literature suggests that it is important to devise a plan that is based upon clear and definite management objectives. An examination of the Ocoee Management Plan revealed that it is not based upon clear or definite management objectives. The plan also suggests that use levels for the river will be established once a carrying capacity is known. However, most researchers agree that determining the carrying capacity must be based on a definite set of objectives, in order to know when the limit has been reached. Using the carrying capacity concept implies, that the managers are able to define the physical, biological, and social conditions the managing agency seeks to maintain.

It was found that the cooperation between the Division of Power and the Division of Land and Forest Resources within TVA will have to improve if recreation releases are to be continued. Scheduling releases and designating water levels will be two important issues each division will have to agree upon. Long term issues such as acquisition of additional land for parking lots, and other commitments for

improvements will also have to be considered, especially with regard to budget limitations.

TVA's ability to coordinate all the various government agencies and private and commercial users was very good during the formulation of the plan, but there is not much information available upon which to judge TVA's ability to continue this in the future. The above mentioned factors may all affect the way the management of the river recreation is carried out, but because of the unique situation of the Ocoee, it will be difficult to compare or make judgments about the institutional factors in play here.

Research Question 2 had five sections which were based on social-psychological factors relating to increased use. These factors were examined using results from the National River Recreation Study, part of which was conducted on the Ocoee for three years by the U.S. Forest Service. The Forest Service Study was part of a nation-wide survey which was designed to test the attitudes and opinions of river users on about forty rivers. Surveys were made on the Ocoee during the summers of 1977, 1978, and 1979.

The first part of Question 2 considered the differences in attitudes between users in different types of craft, between those who were privately outfitted (kayaks and canoes) and those who were commercially outfitted (rafts). Using selected parts of the questionnaire it was found that

the private users found more problems with their river trip than did the commercial users, especially considering environmental damages. However, judging from the responses to other questions, it can be said that private users were only slightly more sensitive to the increased crowding than were the commercial outfitted users. The privately outfitted users opposed management actions which would limit use on the river, compared to commercial users who supported or were neutral toward these kinds of actions. It should be stated that generally, all river users thought the managers were doing a good job, that the river was in good condition, and that they enjoyed their trips. Several questions were designed to elicit detailed reactions to certain problems, so as to provide the managers using the results with some concrete suggestions.

For the second part of Research Question 2, the differences between the new and repeating visitors were explored. Most of the new users were commercially outfitted, and most of the repeating users were privately outfitted, but the differences of opinion on crowding between the new and repeat users were more pronounced than between the private and commercial users.

Crowding seemed to be less of a problem generally speaking, for the first-time users than for the repeating, or experienced users and the repeating users found more

problems with the entire river experience. The more experienced users were again less supportive of management actions that would limit us than were the new visitors. The results from the survey indicate that while the more experienced private users are slightly more sensitive to crowding, they would oppose overt actions by the management to alleviate crowding.

This indicates that while use on the river had increased between 1977 and 1979, the levels reached in 1979 were not high enough to show dissatisfaction among the river users.

As pointed out, most people found the environmental condition of the Ocoee to be good. The third part of Research Question 2 asked whether litter, water pollution, and stream bank erosion affected perception. Litter was the worst problem overall and requiring people to carry out their own trash was strongly supported as a possible management action. Water pollution and stream bank erosion were mentioned as problems for all groups in both 1977 and 1979.

The environmental issues are generally ranked somewhat lower in 1979 than in 1978, probably because other problems relating to inadequate information about things to do, and campsites were of greater concern to the respondents. While litter, water pollution, and stream bank erosion were not

reduced, nor had environmental conditions improved in 1979, people mentioned these environmental issues generally as being more serious in 1978 than in 1979. The users' attitudes toward management practices was the subject of the fourth part of the second research question. The majority of respondents for both 1978 and 1979 report that they felt the managers were doing a good job, but most frequently mentioned problem was inadequate toilet facilities. Actions to ease the crowded conditions such as, providing more parking at access points and posting signs warning and advising users of hazards were supported in 1978. For 1979, the respondents again supported providing more parking at the access points, also supported improving the loading areas at the put-in and take-out points.

It is hoped that managers on the Ocoee will consider the results of these questions in deciding what management actions to take. The results, while somewhat limited, seem to indicate which management practices would be best received by the public and which of those would be unpopular. While users' attitudes cannot be the only guide, one important function of a user survey is to test potential attitudes to possible actions. The complete list of questions used by the Forest Service provides a scale of attitudes toward various management actions and should be considered in any future planning for the Ocoee.

The last part of the Research Question 2 considered the change in perception of crowding over the three-year period from 1977 to 1979. Even though crowding increased, the respondents do not seem to be less satisfied in 1979 than they were in 1977, or at least their dissatisfaction is not reflected in the surveys. Reasons for this are suggested in the literature of outdoor recreation.

Stankey and others have said that other factors such as the types of group encountered by the visitors, the location of the encounter, and the site of the group encountered influence responses (Stankey, 1978, pp. 175-178). Another important factor would be the behavior of the groups encountered. Loud or rude people seem to have a much greater impact than do large crowds. Littering, another kind of inappropriate behavior, was also of greater concern in the Ocoee Study than seeing too many people. Another reason that the data may not show dissatisfaction is that visitors who were dissatisfied may have simply not returned. This is known as displacement, and it occurs when conditions exceed people's threshold of toleration and these people move on to places where conditions are less crowded or more consistent with their desires (Stankey, 1978, p. 178).

A final explanation for a lack of correlation between crowding and satisfaction is that the visitor's expectations may be poorly defined. As shown in Table 35 (p. xx) most of

the people who responded to the survey were on the river for the first time. Their satisfaction with their experience is difficult to assess, and as has been mentioned, feelings about crowding are individual judgments.

For first-time users, the norms about what is crowded and what is not are unclear (Stankey, 1978, p. 178). In other words, people who have never been on the river may not be affected by crowding because they have no experience on which to base this judgment. It has been observed by the writer that those who have had experience on the Ocoee seem to be more aware of the increasing use, but they do not necessarily object to it.

While the above mentioned factors may explain why increasing use does not seem to be lowering satisfaction, it seems evident that at some point in the future, the effects of crowding will begin to diminish the enjoyment of the river experience.

Several other goals were established for this thesis in Chapter I. One of these was to determine if constraints should be imposed on additional use of the river. Because opinion differs on whether or not the river is crowded, it is difficult to say exactly what kinds of actions managers should take. It seems from the data that limits will be needed in the future, but that the use is not yet great

enough, nor are conflicts among users severe enough to warrant limiting or allocating use now.

In considering which factor (physical, social-psychological, or institutional) is the most restricting to increased use on the river, again the evidence presented here is inconclusive. In the writer's opinion it appears that because the managing agency has the potential to improve the physical facilities and to take actions to reduce the effects or the perception of crowding, the answer is that institutional factors will be the most limiting. The managing agency will probably be looked to provide the coordination and opportunities for cooperation among all the users and the other interested agencies.

As mentioned, the managers now receive broad support from all the users. This will be important as TVA continues its efforts to provide more toilet facilities and to require the users to carry out their own trash. Budget constraints may be a factor when considering expanding parking lots and providing more frequent maintenance of the river bank.

A broad range of other more subtle management actions was suggested by the NRRS survey, and these should be considered with the consultation of the river users. Good working relationships among all river users and TVA are essential, and toward this end, any actions taken concerning allocation of use or requiring fees must be explained to the

users. For instance, it would be important to inform the users what exactly their fee was going to be used for, such as maintenance, etc.

The carrying capacity concept was discussed at great length and it seems that while it is an appropriate framework for studying increased river recreation, it is very difficult to apply. TVA was looking for a concrete number at which to set the carrying capacity. The problem with this is that the kind of river setting that is to be achieved or maintained has not been defined. There is an implication that carrying capacity refers to the site "as is," but the managers can alter the site easily by adding gravel, or by directing traffic to another area, thus altering the carrying capacity (Godin and Leonard, 1977, p. 161). So, the term measures a dynamic concept, and this is part of the difficulty. The ecology of the site is set but the impact of future use is variable.

Several studies imply that one solution is to consider the river as part of a larger recreation system. For the Ocoee, its unique characteristics of predictable flow and difficulty make it hard to categorize with other rivers in the area because during the high use periods, from June through September, there are very few other rivers running at all. The problem of applying carrying capacity and studying use levels will require more research into the

potential of the Ocoee's land base, or river banks and parking lots. More information about the ecology of the site must be obtained, and projections of future use should be made when enough data is available. These pieces of information are required before the carrying capacity concept can be fully applied to the Ocoee River.

LIST OF REFERENCES

LIST OF REFERENCES

A. BOOKS

- Adams, Charles G. Guide to the Study of Animal Ecology. New York: Macmillan Co., 1913.
- Anderson, Dorothy, Leatherberry, Earl C., and Lime, David W. An Annotated Bibliography on River Recreation. General Technical Report NC-41. St. Paul: North Central Forest Experiment Station. USDA Forest Service, 1978.
- Belnap, Raymond K., and Furtado, John G. Three Approaches to Environmental Resource Analysis. Washington, D.C.: The Conservation Foundation, 1967.
- Boughey, Arthur S. Man and the Environment: An Introduction to Human Ecology and Evolution. New York: Macmillan Co., 1971.
- Dasmann, Raymond F. Wildlife Biology. New York: John Wiley and Sons, 1964.
- Derthick, Martha. Between State and Nation: Regional Organizations of the United States. Washington, D.C.: The Brookings Institution, 1974.
- Dice, Lee R. Man's Nature and Nature's Man. Ann Arbor, Michigan: The University of Michigan Press, 1955.
- Godschalk, David R., Parker, Francis, and Knoche, Thomas. Carrying Capacity: A Basis for Coastal Planning. Chapel Hill, North Carolina: Department of City and Regional Planning and the Marine Science Council, The University of North Carolina, 1974.
- Greenwood, Ned H., and Edwards, J. M. B. Human Environments and Natural Systems. North Scituate, Massachusetts: Duxbury Press, 1979.
- Hobson, Bryan. Conflict in the Great Outdoors. Birmingham, Alabama: University of Alabama, Bureau of Public Administration, 1979.
- Mayfield, Michael W. Tennessee Whitewater. Knoxville, Tennessee: Southern Brochure and Book Press, 1979.

- McHarg, Ian. Design with Nature. Philadelphia: National History Press, 1979.
- Odum, Eugene P. Fundamentals of Ecology. Second Edition. Philadelphia: W. B. Sanders Co., 1959.
- Richardson, Dan K. The Cost of Environmental Protection: Regulating Housing Development in the Coastal Zone. New Brunswick, New Jersey: Center for Urban Policy Research, 1976.
- River Conservation Fund, The. Flowing Free: A Citizen's Guide for Protecting Wild and Scenic Rivers. Washington, D.C.: The River Conservation Fund, 1977.
- Smith, Robert L., ed. The Ecology of Man: An Ecosystem Approach. New York: Harper and Row, 1972.
- Stankey, George, and Lime, David W. Recreational Carrying Capacity: An Annotated Bibliography. General Technology Report INT-3. Ogden, Utah: Intermountain Forest and Range Station. USDA, Forest Service, 1973.
- Vesilind, P. Aarne. Environmental Pollution and Control. Ann Arbor, Michigan: Ann Arbor Science Publishers, Inc., 1977.
- Wilkinson, Paul F. Environmental Impact of Outdoor Recreation and Tourism: A Bibliography. #P57. Montecello, Illinois: Vance Bibliographies, August, 1978.

B. ARTICLES AND PAPERS

- Anderson, Gerald B. "The Head Has A Stomach." In The Ecology of Man, pp. 122-126. Edited by Robert L. Smith. New York: Harper and Row, 1972.
- Brown, Perry. "Information Needs for River Recreation Planning." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota. General Technical Report NC-28. St. Paul, Minnesota: USDA Forest Service North Central Experiment Station, 1977.
- Bury, Richard L. "Recreation Carrying Capacity--Hypothesis or Reality?," Parks and Recreation, January, 1976, pp. 22-25.

- Chubb, Michael and Baumann, Eric H. "Assessing the Recreation Potential of Rivers," Journal of Soil and Water Conservation 32 (March-April 1977): 97-102.
- Godin, Victor B., and Leonard, Raymond E. "Design Capacity for Backcountry Recreation Management Planning." Journal of Soil and Water Conservation 32 (July-August 1977), 161-167.
- Greist, David A. "Risk Zoning: A Recreation Area Management System and Method of Measuring Carrying Capacity." Journal of Forestry 73 (November 1975), 711-714.
- Heberlein, Thomas A. "Density Crowding and Satisfaction: Sociological Studies for Determining Carrying Capacity." In Proceedings: River Recreation Management and Research Symposium. January 24-247, 1977. Minneapolis, Minnesota. General Technical Report NC-28 pp. 67-69. St. Paul, Minnesota: USDA Forest Service. North Central Forest Experiment Station, 1977.
- Hendee, John C., and Harris, Robert W. "Foresters' Perceptions of Wilderness Users Attitudes and Preferences." Journal of Forestry 68 (December 1970), 759-762.
- Huser, Verne. "Industry Responds to the Explosion in River Recreation." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota: General Technical Report NC-28, pp. 38-45. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1977.
- Kuss, Fred R., and Morgan, John M. "Estimating the Physical Carrying Capacity of Recreation Areas. A Rationale for the Application of the Universal Soil Loss Equation." Journal of Soil and Water Conservation 35 (March-April 1980), 87-89.
- LaPage, Wilbur. "Some Sociological Aspects of Forest Recreation." Journal of Forestry 61 (January 1963), 32-36.
- Lime, David W. "Wilderness Use and Users: A Summary of Research." In Proceedings: Of the 54th Annual Winter Meeting, Allegheny Section of the Society of American Foresters. Dover, Delaware. February 3-6, 1976.

- Lime, David W. "Alternative Strategies for Visitor Management of Western Whitewater River Recreation." In Managing Colorado River Whitewater: The Carrying Capacity Strategy. Proceedings of a Symposium January 16-18, 1975. Moab, Utah, pp. 146-155. Edited by Lawrence Roger, William Becker, and Richard Schreyer. Logan, Utah: Institute for the Study of Outdoor Recreation and Tourism. Utah State University, 1977a.
- Lime, David W. "Principles of Recreation Carrying Capacity." In Proceedings of the Southern States Recreation Research Applications Workshop. September 16-18, 1975. Asheville, North Carolina. General Technical Report SE-9, pp. 122-134. Asheville, North Carolina: USDA Forest Service, Southeastern Forest Experiment Station, 1977b.
- Lime, David W. "Carrying Capacity." Trends in Rivers and Trails 16 (February 1979): 37-40.
- Lime, David W., and Knopf, Richard C. "Assessing Trends in River Recreation." Landscape Research 5 (Winter 1980): 17-18.
- Lime, David W., Knopf, Richard C., and Peterson, George L. "The National River Recreation Study: Growing New Data Base with Exciting Potential." In Some Recent Products of River Recreation Research, pp. 1-8. Edited by David W. Lime and Donald R. Field. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1981.
- Lime, Davis W., and Lucas, Robert. "Good Information Improves the Wilderness Experience." Naturalist (Winter, 1977): 18-20.
- Lime, David W., and Stankey, George H. "Carrying Capacity: Maintaining an Outdoor Recreation Quality." In Recreation Symposium Proceedings, pp. 174-184. Upper Darby, Pennsylvania: Forest Service, Northeastern Forest Experiment Station, 1971.
- McCurdy, Dwight R. "Recreationists' Attitudes toward User Fees: Management Implications." Journal of Forestry 68 (October 1970): 645-464.

- Mak, Kenneth R., Jensen, Marvin O., and Hartman, Thomas L. "Management Response to Growing Pressures in Western Whitewater Rivers--The Art of the Possible." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota. General Technical Report NC-28, pp. 102-109. St. Paul, Minnesota: USDA Forest Service. North Central Forest Experiment Station, 1977.
- Meier, Joel F. "Is the Risk Worth Taking?" Journal of Physical Education and Recreation 49 (April 1978): 31-33.
- Nash, Roderick. "River Recreation: History and Future." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota. General Technical Report NC-28, pp. 2-7. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1977.
- Neilson, Joyce McCarl, and Shelby, Bo. "River Running in the Grand Canyon: How Much and What Kind of Use." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota. General Technical Report NC-28, pp. 168-177. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1977.
- Peterson, George L., and Lime, David W. "People and Their Behavior: A Challenge for Recreation Management." Journal of Forestry 77 (June 1979): 343-346.
- Peterson, George L., Line, David W., and Anderson, Dorothy H. "Attraction of Recreationists to Rivers: A Nationwide View." In Some Recent Products of River Recreation Research, pp. 18-16. Edited by David W. Lime and Donald R. Field. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1981.
- Schreyer, Richard. "Survey Research in Recreation Management: Pitfalls and Potentials." Journal of Forestry 78 (June 1980): 338-340.
- Schreyer, Richard, White, Richard, and McCool, Stephen. "Common Attributes Uncommonly Exercised." Journal of Physical Education and Recreation 49 (April 1978): 36-38.

- Stankey, George H. "Strategy for the Definition and Management of Wilderness Quality." In Natural Environments: Studies in Theoretical and Applied Analysis, pp. 88-114. Edited by John B. Krutilla. Baltimore: Resources for the Future, Inc. Johns Hopkins University Press, 1972.
- Stankey, George H. "Wilderness Carrying Capacity." In Wilderness Management, pp. 169-188. Washington, D.C.: U.S. Forest Service, P.D. 435, 1978.
- Stankey, George H., Lucas, Robert C., and Lime, David W. "Crowding in the Parks and Wilderness." Design and Environment, Fall 1976 (Reprinted by U.S. Forest Service).
- Wagar, Alan J. "The Carrying Capacity of Wildlands for Recreation." Forest Science Monograph No. 7 (1964).
- Wagar, Alan J. "Recreational Carrying Capacity Reconsidered." Journal of Forestry 72 (May 1974): 274-278.
- Warren, Sam E. "How to Ration River Floating Use: The Middle Fork of the Salmon Experience." In Proceedings: River Recreation Management and Research Symposium. January 24-27, 1977. Minneapolis, Minnesota. General Technical Report-NC-28, pp. 151-154. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1977.
- Washburne, Randal F. "Carrying Capacity Assessment and Recreational Use in the National Wilderness Preservation System." Journal of Soil and Water Conservation 36 (May-June 1981): 162-166.
- West, Patrick C. "On Site Surveys and the Determination of Social Carrying Capacity in Wildland Recreation Management." Research Note NC-264. St. Paul, Minnesota: USDA Forest Service, North Central Forest Experiment Station, 1981.
- White, Brian. "Natural Challenge Activities." Journal of Physical Education and Recreation 49 (April 1978): 44-46.

C. DOCUMENTS AND REPORTS

Building Technology, Inc. Case Report to the Council on Historic Preservation: Rehabilitation of the Ocoee No. 2 Hydro Plant, Cultural Resources Program. Nashville: Tennessee Valley Authority, December 1979.

Christopherson, Kjell A. Report of Attitudes and Opinions of Recreationists toward Wild and Scenic Rivers: A Case Study of the St. Joe River. Report No. 90. Moscow, Idaho: Water Resources Institute, University of Idaho, October 1973.

Michigan State University, Department of Resource Development. The Quality of Outdoor Recreation as Evidenced by User Satisfaction. A Report to the Outdoor Recreation Resources Review Commission, ORRRC Study Report No. 5. Washington, D.C.: Government Printing Office, 1962.

Garvey, Robert R. "Memorandum of Agreement." Addressed to Mr. Thomas H. Ripley, Tennessee Valley Authority. Washington, D.C.: Advisory Council on Historic Preservation, 1980.

Hammon, Gordon A., Cordell, Harold K., Moncrief, Lewis W., Warren, Roger M., Crysdale, Richard A., and Graham, John. Capacity of Water-Based Recreation Systems. Part I: The State of the Art--A Literature Review. Report No. 90. Raleigh, North Carolina: Water Resources Research Institute of the University of North Carolina. North Carolina State University, April 1974.

Hunt, John D. "Some Thoughts on Wild River Recreation Carrying Capacity." Logan, Utah: Institute for the Study of Outdoor Recreation and Tourism. Utah State University, 1974.

Lime, David W., and Field, Donald R., eds. Some Recent Products of River Recreation Research. Papers Presented at the Second Conference on Scientific Research in the National Parks, November, 1979. General Technical Report NC-63. St. Paul, Minnesota: USDA Forest Service. North Central Forest Experiment Station, 1981.

- Pfister, Robert E., and Frenkel, Robert E. The Concept of Carrying Capacity: Its Application for Management of Oregon's Scenic Waterway System. Rogue River Study--Report No. 2. WRRRI-32. Corvallis, Oregon: Water Resources Research Institute, Oregon State University, June 1975.
- Pfister, Robert E., and Frenkel, Robert E. Field Investigations of River Use within the Wild River Area of the Rogue River, Oregon. Rogue River Study--Report No. 1. WRRRI-51. Corvallis, Oregon: Water Resources Research Institute, Oregon State University, December 1976.
- Schneider, Devon M., Godschalk, David R., and Axler, Norman. The Carrying Capacity Concept as a Planning Tool. PAS Report No. 338. Chicago: The American Planning Association, 1978.
- Schoolmaster, Andy. Basic Summary Statistics Guide: Ocoee River. St. Paul, Minnesota: USDA Forest Service, North Central Experiment Station, 1978.
- Shelby, Bo, and Colvin, Richard B. Determining Use Levels for the Rogue River. WRRRI-63. Corvallis, Oregon: Water Resources Research Institute, Oregon State University, July 1979.
- Shelby, Bo, and Danley, Mark. Allocating River Use. Final Report on Private and Commercial Use Allocations for the Snake River in Hell's Canyon. USDA Forest Service. Corvallis: Oregon State University, June 1979.
- Tennessee Valley Authority. "Ocoee River Management Plan." Norris, Tennessee: Division of Land and Forest Resources. November 1978b.
- Tennessee Valley Authority. Rehabilitation of the Ocoee No. 2 Hydro Plant: Draft Environmental Impact Statement. Chattanooga, Tennessee: Tennessee Valley Authority, August 1978a.
- Tennessee Valley Authority. Rehabilitation of the Ocoee No. 2 Hydro Plant: Final Environmental Impact Statement. Chattanooga, Tennessee: Tennessee Valley Authority, July 1979.
- U.S. Department of Agriculture. Forest Service. Crosstabulation Analysis of Selected 1977 Ocoee River Data--National River Recreation Study. St. Paul, Minnesota: North Central Forest Experiment Station, 1978.

- U.S. Department of Agriculture. Forest Service. Interviewer Manual: Summer Field Work, National River Recreation Study. St. Paul, Minnesota: North Central Forest Experiment Station, May 1979.
- U.S. Department of Agriculture. Forest Service. National River Recreation Study: Summary Tables of Visitor Characteristics, Preferences, and Use Patterns. Ocoee River--1978 Season. St. Paul, Minnesota: North Central Forest Experiment Station, December 1979.
- U.S. Department of Agriculture. Forest Service. National River Recreation Study: Summary Tables of Visitor Characteristics, Preferences, and Use Patterns. Ocoee River--1979 Season. St. Paul, Minnesota: North Central Forest Experiment Station, May 1980.
- U.S. Department of Commerce. Bureau of the Census. Population and Households by States and Counties: 1980. PC 80-S1-2. Washington, D.C.: Government Printing Office, May 1981.
- U.S. Department of the Interior. Geological Survey. Water Resources Data for Tennessee--Water Year 1979. Nashville, Tennessee, 1981.

D. INTERVIEWS

- Braly, Lewis. Member Tennessee Valley Canoe Club, Tennessee Scenic Rivers Association. Chattanooga, TN. Interviews on several occasions, 1979.
- Brown, David. Executive Director, Ocoee River Council. Ocoee, TN. Interviews on several occasions, 1981.
- Chipley, William H. Sunburst Wilderness Adventures, Interview, Knoxville, November 1979.
- Curbo, Don. TVA Division of Power. Interviews, Ocoee, TN. August 1979 and telephone interviews throughout 1979.
- Griffith, Russ. U.S. Forest Service, Cherokee National Forest, Cleveland, TN. Interview, May 1979.
- Humphrey, George. Recreation Planner, TVA. Interviews on several occasions Norris, TN and telephone interviews 1978-1982.

- Hunt, Marc, Sunburst Wilderness Adventures, Past Chairman of Ocoee Outfitters Association, Interviews on several occasions, 1978-1981.
- Kenny, Tom. Private Paddler, Nashville. Interview, August 1981.
- Knopf, Richard. Research Forester, USDA Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota. Telephone interviews, November 1981, December 1981, and January 1982.
- Lewis, Harry J. Recreation Planner. Tennessee Valley Authority. Norris, TN. Interviews on several occasions, 1978.
- National Weather Service, Nashville, TN.1 Telephone interview, November 12, 1981.
- Olson, Robert, Recreation Planner. Tennessee Valley Authority, Norris, TN. Telephone interviews, March 1979 and November 1981.
- Parham, Joel Lieutenant. Tennessee State Highway Patrol, Chattanooga, Telephone interview, May 1979.
- Parsons, Betsy. Member, Tennessee Valley Canoe Club, Chattanooga, TN. Interviews on several occasions, 1978-1981.
- Ramsey, Maxwell. Office of Natural Resources, Tennessee Valley Authority. Norris, TN. Telephone interviews, March 1979, and November 1981.
- Slayden, Robert L. Member, Tennessee Scenic Rivers Association, Nashville, TN. Interviews on several occasions, 1978-1981.

APPENDIXES

APPENDIX A

LIST OF PRIVATE CANOE AND KAYAK ORGANIZATIONS

Tennessee

East Tennessee Whitewater Club
Box 3074
Oak Ridge, TN 37830

Tennessee Valley Canoe Club
Box 11125
Chattanooga, TN 37401

Tennessee Scenic Rivers Association
Box 3104
Nashville, TN 37219

Chota Canoe Club
Box 8270 Univ. Sta.
Knoxville, TN 37916

Footsloggers
Box 3865 CRS
222 N. Roane St.
Johnson City, TN 37601

Georgia

Georgia Canoeing Association
2127 Desmond Dr.
Decatur, GA

North Carolina

Carolina Canoe Club
Box 9011
Greensboro, N.C. 27408

Watauga Whitewater Club
State Farm Rd.
Boone, N.C. 28607

Nantahala Outdoor Center (not a club but very active)
Star Route 41-A
Bryson City, N.C. 27813

South Carolina

Carolina Whitewater Canoeing Association
Columbia, South Carolina

Alabama

Birmingham Canoe Club
Birmingham, Alabama

APPENDIX B

OCOEE RIVER MANAGEMENT PLAN

I. Objective

The objective is to construct a recreation management plan for the Ocoee River below Ocoee No. 3 Powerhouse that will, when implemented, provide the opportunity for a safe and enjoyable recreational experience for river users.

II. Discussion

In the summer of 1976, inspection of the wooden flume, which carries water from Ocoee No. 2 Dam to Ocoee No. 2. Powerhouse, revealed that the trestles which support parts of the flume had deteriorated to the point that replacement was necessary. For safety reasons, the project was then shut down in late 1976, and the water that normally was diverted into the flume was spilled over Ocoee No. 2 Dam.

This flow, down the usually "dry" riverbed with a gradient of 60 ft/mi, provides approximately 4-1/2 miles of excellent whitewater. Since hydroelectric facilities on the Ocoee River are generally used for base-load power production, this gives some

predictability to water flow. These facts, combined with the direct access to the area provided by U.S. Route 64 and the Interstate Highway System from the cities of Knoxville, Chattanooga, and Atlanta, have led to increasing numbers of people using the river. Use for 1977 and 1978 was calculated to be 7,000 and 23,000 visits, respectively. Sixty to 70 percent of those using the river rafted with commercial outfitters. Approximately 20 percent of the total were in open and decked boats. Projected annual increases in use over the next few years show a large number of people using the river for recreation. With only limited water and land resource bases, there could be problems associated with overcrowding and possible conflicts between commercial and private use of the river. As the river becomes more widely known, there will be additional requests for special uses such as competitive events and advanced whitewater training. The present physical facilities are very limited. The parking lot above Ocoee No. 2 Dam is adequate to handle the present use; however, the area at Caney Creek is overcrowded on weekends during the summer. In addition, there are no facilities for launching below the dam. With the present level of

use and the expected increase, highway and water safety problems increase in importance.

U.S. Highway 64 is a narrow, twisting road through the Ocoee gorge and high speed traffic mixed with cars parked along narrow berms and pedestrians walking along the road present a dangerous situation. As river use increases, this situation will become worse.

The personal safety of people using the river is already of some concern. Some individuals in the private sector are neither adequately equipped nor prepared to use a river of the difficulty of the Ocoee.

III. Management Considerations

Meeting the stated objective requires management attention be given to the following areas of concern:

- A. Safety--highway and river
- B. Facilities
- C. Use
- D. Administration

Safety--Highway

The anticipated growth of recreation use on the Ocoee will increase the potential for danger to both pedestrians and motorists along the gorge section of U.S. Highway 64. A variety of

informational and regulatory signs will be placed throughout the gorge area to warn motorists of congestion and to reduce speed to appropriate levels. For a listing of recommended signs, see Appendix A.

Encouragement of heavy vegetative screening between U.S. Highway 64 and the river (except in areas selected for designated observation points) will help prevent motorists from observing the river at points unsuitable for parking.

Parking will be permitted in designated areas only. Parking time at the put-in area will be limited and this time limitation will be enforced by appropriate personnel.

There are a limited number of sites along U.S. 64 suitable for use as observation areas by passing motorists. These sites should be developed to minimize traffic congestion. A list and location map of potential sites suitable for development are given in Appendix B.

Safety--River

Due to the danger inherent in floating the Ocoee, a number of measures will be taken to reduce the possibility of injury and ensure an enjoyable,

safe experience. River users will be expected to abide by a set of use regulations which will be posted at the put-in. These are presented in Appendix C.

The managing agency will provide signs at the put-in point to inform the public of river conditions and the potential hazards associated with them.

A map with a description of the river showing major rapids and their difficulty rating will be provided as will information on alternatives which may be better suited to the needs of some individuals such as commercial raging services and other nearby streams.

All commercial outfitters operating on the Ocoee will be licensed by the managing agency and required to operate under the minimum standards outlined in Appendix D.

The managing agency will appoint a river manager to oversee all facets of administration. All safety measures and emergency procedures will be coordinated with the local civil defense organization, rescue squad, Polk County law enforcement authorities, and the State Highway Patrol.

Sufficient personnel will be provided by the managing agency in order to minimize theft, harassment, and vandalism.

Facilities

While some facilities, e.g., parking lots and portable toilets, are currently provided, the anticipated increase in use will require upgrading of some existing facilities and the addition of others.

Parking and toilet facilities will be provided at the put-in and take-out points commensurate with the available land base. A change house for river users will be provided at the take-out point.

At the put-in point a small information center will be developed which will include information on regulations and recommended precautions, a water release schedule, and the location of area support facilities such as campgrounds, restaurants, and motels.

Additional facilities may include a direct access from the Ocoee No. 2 Dam parking area to the river below the dam, a permanent slalom course on the river, and a public telephone at or near the Ocoee No. 2 Powerhouse.

As use levels become established, a determination will be made regarding the adequacy of local camping facilities. In some instances, it may be feasible (and necessary) to expand existing public campgrounds; however, the private sector will be encouraged to develop both camping and indoor lodging facilities adequate to meet the anticipated increase in use.

Due to the limited land base and the need to maintain the scenic and natural conditions currently existing in the gorge section of the Ocoee, the development of commercial facilities along the river between Ocoee No. 3 Powerhouse and Parksville Lake will be prohibited.

Use

As a result of the relatively short length of time the Ocoee has been available for recreational boating, sufficient data on which to base an optimum level of use have not been collected. As predictable levels of use are established, the managing agency will take whatever steps are deemed necessary to ensure appropriate levels of use are not exceeded with consideration given to both providing a safe and enjoyable experience for recreationists and

maintaining the integrity of the resource. Allocation of use, if required, will be contingent on how use of the river develops. The primary reasons for allocating use would be to prevent overuse and protect the resource.

There will be two categories of commercial users including: (a) those who provide service on a regular basis, and (b) those who provide service on an intermittent "special trip" basis.

The latter group must obtain permission for special trips from the managing agency, while both groups will be required to conform to established standards for safety and equipment. For the present, commercial outfitters will be limited to those concerns which have operated on the Ocoee on a regular basis in previous years. Unless private or individual use exceeds anticipated levels, the number of private paddlers using the river will not be limited. For the 1979 use season, the Ocoee Outfitters Association has developed a self-regulating schedule of launches designed to preclude crowded conditions at the put-in point and on the river. This schedule appears as Appendix E.

The allocation of use will be established once total carrying capacity is determined and will be in the interest of maximizing use by spreading the volume of recreationists in accordance with the need to prevent overcrowding during peak days of the week.

Special events must be sanctioned by the managing agency. Requests will be handled on a per-case basis.

Administration

Presently TVA, the U.S. Forest Service, Tennessee Department of Transportation, Tennessee Department of Safety, Tennessee Wildlife Resources Agency, and the Polk County Sheriff's Department have jurisdiction in the area. TVA controls the water and water flow, hydroelectric facilities, the land areas within the Ocoee No. 2 Dam Reservation, Ocoee No. 2 Powerhouse Reservation, and the parking areas at the dam and take-out. The remaining area is administered by the Forest Service. The Tennessee Department of Transportation is responsible for highway maintenance. Traffic control is the responsibility of the Tennessee Department of Safety and the Polk County Sheriff's Department.

Enforcement of boating regulations and litter control are the responsibilities of the Tennessee Wildlife Resources Agency and law enforcement is under the Polk County Sheriff's Department. Inasmuch as a coordinated, multiagency approach to management would be unwieldy, the recommended alternative is for one agency to assume responsibility for all facets of management, based on memoranda of understanding between the managing agency and other concerned government entities.

The administering agency must have full authority to manage the river and the power to actively regulate use. At the same time the managing agency must actively seek participation of both private and commercial river users along with Polk County authorities and State agencies in solving problems that may arise from time to time.

Management strategy will entail both active, onsite administration and the encouragement of private sector development of support facilities. Administration requires seeking to balance the need for a safe and enjoyable experience for present users with the responsibility to preserve

the resources for future times. Onsite management will entail a river manager to set and implement policy and safety officers to enforce use regulations and provide information to recreationists.

APPENDIX C

RULES AND REGULATIONS

- a. A minimum of two craft per party.
- b. Persons using the river should be able to swim and be a minimum of 12 years old.
- c. The use of intoxicants on the river will be prohibited.
- d. No bottles, cans, or styrofoam coolers will be allowed on the river.
- e. All craft must have adequate floatation and all rafts must have a minimum of 1,400 pounds floatation as rated by the Boating Industry Association.
- f. All river users must wear approved lifejackets and helmets.

APPENDIX D

DIFFICULTY RATINGS FOR RIVERS

- Class I - Easy: riffles and small waves. Course easily picked.
- Class II - Medium difficulty: small regular waves, small ledges uncomplicated passage.
- Class III - Difficult: larger often irregular waves, small hydraulics. Course not easily recognizable. Some maneuvering required.
- Class IV - Very difficult: large drops many irregular waves, powerful holes and complex maneuvering required. Rapids are often long.
- Class V - Exceedingly difficult: longer more violent rapids, irregular unavoidable high waves and holes. Rescue difficult.
- Class VI - All difficulties increase: involves serious risk of life even by an expert paddler.

Source: Michael W. Mayfield, Tennessee Whitewater (Knoxville, Tennessee, Southern Brochure and Book Press, 1979).

APPENDIX E

INTERVIEW CARDS

1978

RIVER REGISTRATION REGISTRY GROUP LOG

River: _____

Group #: _____ Time: _____

Date: _____ Location: _____

Point of Contact:

() Put-in () Stopover () Take-out

Put-in point: _____

Take-out point: _____

Date group first put onto river: _____

Date group will leave river: _____

How many nights will (or did) group camp
on the river, including camping at put-in
and take-out points and places in-between?
If "0" nights write "0".

_____ Nights

Number of people in the group, including
you? (Your group consists of all the
people who are traveling together on
water, regardless of the number of water
craft used.) _____ People

Number of watercraft by type:

<u>Type of craft</u>	<u>Commercial</u>	<u>Private</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Outfitter _____

1978

Individual Card

RIVER RECREATION REGISTRY
PLEASE PRINT
=====

Form Approved OMB No.
40-R3856

Name: _____

Permanent Mailing Address: _____

City: _____ State: _____ Zip: _____

Zip code of CURRENT residence if different than
above. Zip _____

Location where you first put onto the river: _____

Location where you last take out of river: _____

How many nights will (or did) the group camp on the river, including camping at
put-in and take-out points and places in-between? If "0" nights write "0".

_____ Nights

Number of people in the group, including you? _____ People.

THANK YOU, AND HAVE A PLEASANT DAY!

1979

Individual Card
RIVER RECREATION REGISTRY

Form Approved OMB No.
40-R3857

Name (Please Print): _____

Permanent Mailing Address: _____

City: _____ State: _____ Zip: _____

Zip code of CURRENT residence if different than above. Zip: _____

Primary type of watercraft you are
using on this trip: (check one)

- ☐ canoe ☐ dory, driftboat
☐ raft ☐ jonboat, flatboat
☐ kayak ☐ jet boat
☐ innertube ☐ motorboat
☐ rowboat ☐ pontoon boat
☐ other: _____

Does this craft have a motor?

- ☐ yes ☐ no

Will you or did you camp along the
river during this trip?

- ☐ yes ☐ no

Before this trip, how many times have
you floated this river stretch?

- ☐ never before ☐ three times
☐ once before ☐ four times
☐ twice before ☐ five or more

Is floating this river: (check one)

- ☐ the primary purpose of your
trip away from home?
☐ one of several important things
you had planned to do on your
trip?
☐ something you decided to do
after being in the area?

THANK YOU, AND HAVE A PLEASANT DAY!

APPENDIX F

NATIONAL RIVER RECREATION STUDY QUESTIONNAIRES

1978

Form Approved
OMB No. 40-R4062

Questionnaire Number:

This survey is voluntary. While you are not required to respond, your cooperation is needed to make the survey results comprehensive, accurate and timely. Thank you.

1. On your river trip, what type of group were you with? (Check all that apply)

- ☐ By myself
☐ Family
☐ Friends or acquaintances
☐ With people I didn't know prior to the trip
☐ Club or organization--please give type _____

2. How long before your river trip did you actually decide to go? (Check one)

- ☐ Less than 24 hours
☐ More than 24 hours, but less than one week
☐ One week to one month
☐ One month to six months
☐ Six months to twelve months
☐ More than one year

3. How many times have you been on this particular stretch of river? (Check one)

<u> </u> once	<u> </u> twice	<u> </u> three	<u> </u> four	<u> </u> five	<u> </u> more than
only		times	times	times	five times
(this trip)					

4. Estimate the number of people you saw at each of the following places: (Do not count members of your own group).

Estimated number of
people seen

Where you first put into the river

While traveling on the river

Where you last took out of the river

While camping on the river

5. How did the number of people you saw at EACH of the following places compare with what you had expected to see?

	<i>Far fewer than expected</i>	<i>Fewer than expected</i>	<i>About what I expected</i>	<i>More than I expected</i>	<i>Far more than expected</i>	<i>Had no expectations</i>
Where you first put into the river	[]	[]	[]	[]	[]	[]
While traveling on the river	[]	[]	[]	[]	[]	[]
Where you last took out of the river	[]	[]	[]	[]	[]	[]
While you were camping on the river	[]	[]	[]	[]	[]	[]

6. Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your river trip? (Check the box that best describes how serious you found EACH to be).

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Too few garbage cans	[]	[]	[]	[]	[]
Erosion of stream banks by river users	[]	[]	[]	[]	[]
Litter in river	[]	[]	[]	[]	[]

Litter on banks	[]	[]	[]	[]	[]
Obstructions in river (logs, limbs, fences)	[]	[]	[]	[]	[]
Vandalism	[]	[]	[]	[]	[]

Too few drinking water sources	[]	[]	[]	[]	[]
Bad weather	[]	[]	[]	[]	[]
Too many homes or cottages along river	[]	[]	[]	[]	[]

Muddy water	[]	[]	[]	[]	[]
Water pollution	[]	[]	[]	[]	[]
Off-road vehicles in river area	[]	[]	[]	[]	[]

People shouting and yelling	[]	[]	[]	[]	[]
People being inconsiderate	[]	[]	[]	[]	[]
People drinking alcoholic beverages	[]	[]	[]	[]	[]

6. (continued)

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Too many people on the river	[]	[]	[]	[]	[]
Insect bites	[]	[]	[]	[]	[]
Frightening rapids	[]	[]	[]	[]	[]
Motorized boats on the river	[]	[]	[]	[]	[]
Airplanes flying overhead	[]	[]	[]	[]	[]
Utility poles and lines	[]	[]	[]	[]	[]
Railroads along banks	[]	[]	[]	[]	[]
Too few rules and regulations	[]	[]	[]	[]	[]
Too many rules and regulations	[]	[]	[]	[]	[]
Trees and branches overhanging the river	[]	[]	[]	[]	[]
People playing loud radios	[]	[]	[]	[]	[]
Insufficient information about things to do and see in the area	[]	[]	[]	[]	[]
Too many commercial establishments	[]	[]	[]	[]	[]
Inadequate toilet facilities at put-in and take-out points	[]	[]	[]	[]	[]
Too few toilet facilities along river between put-in and take-out points	[]	[]	[]	[]	[]
Not enough law enforcement	[]	[]	[]	[]	[]
Too much law enforcement	[]	[]	[]	[]	[]
People fishing	[]	[]	[]	[]	[]
Roads within sight of river	[]	[]	[]	[]	[]
Too many signs along the river	[]	[]	[]	[]	[]
People being rowdy	[]	[]	[]	[]	[]
Inadequate information services (signs, displays) at put-in points	[]	[]	[]	[]	[]
Too many bridges across river	[]	[]	[]	[]	[]
Too much nudity	[]	[]	[]	[]	[]

6. (continued)

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Livestock	[]	[]	[]	[]	[]
Someone in your group receiving an injury	[]	[]	[]	[]	[]
Human body waste	[]	[]	[]	[]	[]

Damage to or loss of personal property	[]	[]	[]	[]	[]
Navigation problems due to low water levels	[]	[]	[]	[]	[]
Navigation problems due to high water levels	[]	[]	[]	[]	[]

Conflicts or tensions within your group	[]	[]	[]	[]	[]
Inadequate brochures showing map of river, hazards, access points, etc.	[]	[]	[]	[]	[]
Poor quality campsites	[]	[]	[]	[]	[]

Campsites occupied by others	[]	[]	[]	[]	[]
Campsite locations not clearly identified	[]	[]	[]	[]	[]
Other things (please specify):					
_____	[]	[]	[]	[]	[]
_____	[]	[]	[]	[]	[]
_____	[]	[]	[]	[]	[]

7. How do you feel about the number of people you saw at each of the following places?

	<i>Would like to have seen a lot more people</i>	<i>Would like to have seen a few more people</i>	<i>Neither too many nor too few</i>	<i>A few too many people</i>	<i>Far too many people</i>
Where you first put into the river	[]	[]	[]	[]	[]
While travelling on the river	[]	[]	[]	[]	[]
Where you last took out of the river	[]	[]	[]	[]	[]
While you were camping on the river	[]	[]	[]	[]	[]

8. Do you feel that more controls are needed on the river to prevent conflicts from occurring among different kinds of river users? (For example, between canoeists and fishermen, motorboaters and swimmers, horseback riders and canoeists, canoeists and kayakers, etc.)

☐ NO

☐ YES If yes, what conflicts exist? _____

9. Do you feel that more controls are needed to prevent the environment from being damaged by recreational use of the river?

☐ NO

☐ YES If yes, what kinds of environmental damages are occurring?

10. Given the conditions on the river when you were there, how would you feel about each of the following management actions? (Check the box that shows how much you support or oppose EACH action.)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support
Provide more points of public access to the river	☐	☐	☐	☐	☐
Require people to carry out their own trash	☐	☐	☐	☐	☐
Prohibit the use of cans, bottles, and other nonburnable disposable containers	☐	☐	☐	☐	☐
Prohibit motorized watercraft on the river	☐	☐	☐	☐	☐
Post signs warning and advising of hazards	☐	☐	☐	☐	☐
Provide more parking at access points	☐	☐	☐	☐	☐

10. (continued)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support
Provide firewood at campsites and picnic areas	[]	[]	[]	[]	[]
Allow wood fires only at designated spots	[]	[]	[]	[]	[]
Prohibit wood fires altogether	[]	[]	[]	[]	[]

Provide more patrols to assist river users and enforce regulations	[]	[]	[]	[]	[]
Develop short hiking trails at points along the river	[]	[]	[]	[]	[]
Prohibit off-road vehicles in the vicinity of the river, except on roads and highways	[]	[]	[]	[]	[]

Improve existing access roads to put-in and take-out points	[]	[]	[]	[]	[]
Be more aggressive in the enforcement of safety rules and regulations	[]	[]	[]	[]	[]
Allow camping only at designated locations	[]	[]	[]	[]	[]

Require every group to have approved first-aid equipment	[]	[]	[]	[]	[]
Prohibit camping along the river	[]	[]	[]	[]	[]
Restrict the numbers of people using the river at any one time	[]	[]	[]	[]	[]

Provide campsites for river users at put-in and take-out points	[]	[]	[]	[]	[]
Provide more campsites along the river between put-in and take-out points	[]	[]	[]	[]	[]
Limit the number of people per group allowed on the river	[]	[]	[]	[]	[]

Achieve better spacing among groups by assigning the time of day when each group may begin its trip	[]	[]	[]	[]	[]
Have each group be assigned where they are to camp	[]	[]	[]	[]	[]

11. How well do the following statements describe your feelings about the river trips?
For EACH statement check the box that best describes how strongly you agree or disagree.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I thoroughly enjoyed the trip	[]	[]	[]	[]	[]
I did not see the types of wildlife I had hoped to see	[]	[]	[]	[]	[]
I was pleased by the job being done by managers of the river	[]	[]	[]	[]	[]

The number of people I saw on the river was about right	[]	[]	[]	[]	[]
The actions of other people on the river bothered me	[]	[]	[]	[]	[]
The river went through some very wild country	[]	[]	[]	[]	[]

I cannot imagine a better river trip	[]	[]	[]	[]	[]
I wish there had been more rapids	[]	[]	[]	[]	[]
The river trip was well worth the money I spent to take it	[]	[]	[]	[]	[]

I was very pleased with the scenery	[]	[]	[]	[]	[]
I do not want to run any more rivers like this one	[]	[]	[]	[]	[]
I was disappointed with some aspects of my trip	[]	[]	[]	[]	[]

The river went through some true wilderness	[]	[]	[]	[]	[]
I thought the river and its surround- ings were in good condition	[]	[]	[]	[]	[]
The people I saw on the river did not bother me	[]	[]	[]	[]	[]

12. Some possible reasons why people take river trips are listed below. Think about why you took your river trip and check the box that best shows how much you agree or disagree with each of the following statements.

I took this river trip because I wanted . . .

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
To view the scenery	[]	[]	[]	[]	[]
To be part of a group	[]	[]	[]	[]	[]
To test and use my equipment	[]	[]	[]	[]	[]

To be close to nature	[]	[]	[]	[]	[]
To run rapids	[]	[]	[]	[]	[]
To talk to new and varied people	[]	[]	[]	[]	[]

To be my own boss	[]	[]	[]	[]	[]
To do some hiking	[]	[]	[]	[]	[]
To develop my skills and abilities	[]	[]	[]	[]	[]

To think about my personal values	[]	[]	[]	[]	[]
To get away from the usual demands of life	[]	[]	[]	[]	[]
To do some fishing	[]	[]	[]	[]	[]

I wanted:

To strengthen my feelings of self-worth	[]	[]	[]	[]	[]
To get away from other people	[]	[]	[]	[]	[]
To see historical sites	[]	[]	[]	[]	[]

To experience peace and calm	[]	[]	[]	[]	[]
To have thrills and excitement	[]	[]	[]	[]	[]
To do some camping	[]	[]	[]	[]	[]

To have a change from the daily routine	[]	[]	[]	[]	[]
To learn more about nature	[]	[]	[]	[]	[]
To be with people having similar values	[]	[]	[]	[]	[]

12. (continued)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
To do something with the family	[]	[]	[]	[]	[]
To learn more about things there	[]	[]	[]	[]	[]
To be with friends	[]	[]	[]	[]	[]

To give my mind a rest	[]	[]	[]	[]	[]
To visit archeological sites (pictographs, ruins, artifacts)	[]	[]	[]	[]	[]
To be alone	[]	[]	[]	[]	[]

To keep physically fit	[]	[]	[]	[]	[]
To release tensions and anxieties	[]	[]	[]	[]	[]
To test my abilities	[]	[]	[]	[]	[]

To be away from crowds of people	[]	[]	[]	[]	[]
To experience new and different things	[]	[]	[]	[]	[]
To take chances in dangerous situations	[]	[]	[]	[]	[]

To be away from the noise back home	[]	[]	[]	[]	[]
To show others I can do it	[]	[]	[]	[]	[]
To share what I have learned with others	[]	[]	[]	[]	[]

13. Before this river trip, had you ever been on a river trip? (A "river trip" refers to traveling on a river or stream by innertube, canoe, kayak, raft, motorboat, etc.)

[] NO If "No," go to Question No. 14.

[] YES If "Yes," continue with "A" below.

- A. On what rivers have you taken river trips? Please list their names below, the number of trips to each river, and name the states or foreign countries where they are located. (If more space is needed, use the last page of this questionnaire.)

<u>River Name</u>	<u>River Stretch</u>	<u>Number of Trips</u>	<u>Year(s)</u>	<u>State or Foreign Country</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

14. What is your educational background? (Circle the number of the highest "grade" completed.)

1 2 3 4 5 6 7 8 9 10 11 12
Elementary through High School

13 14 15 16 16+
Beyond High School

15. Are you a student?

☐ NO

☐ YES

16. Are you retired?

☐ NO

☐ YES

17. What is your occupation? _____

What sort of work do you do? _____

18. What is your age? _____ years.

19. At the time of your river trip, did you have any physical impairment or handicap?

☐ NO

☐ YES Please describe: ☐ Hard of hearing or deaf

☐ Serious difficulty in seeing or blind

☐ Respiratory disorder

☐ Crippled (orthopedic handicap)

☐ Arthritis or rheumatism

☐ Heart trouble

☐ Other--please specify: _____

Thank you for your help!

1979

Form Approved
OMB No. 40-R4062

Questionnaire Number:

This survey is voluntary. While you are not required to respond, your cooperation is needed to make the survey results comprehensive, accurate and timely. Thank you.

1. On your river trip, what type of group were you with? (Check all that apply)

- ☐ By myself
☐ Family
☐ Friends or acquaintances
☐ With people I didn't know prior to the trip
☐ Club or organization--please give type _____

2. How long before your river trip did you actually decide to go? (Check one)

- ☐ Less than 24 hours
☐ More than 24 hours, but less than one week
☐ One week to one month
☐ One month to six months
☐ Six months to twelve months
☐ More than one year

3. How many times have you been on this particular stretch of river? (Check one)

_____	_____	_____	_____	_____	_____
once	twice	three	four	five	more than
only		times	times	times	five times
(this trip)					

4. Estimate the number of people you saw at each of the following places: (Do not count members of your own group).

	Estimated number of people seen
Where you first put into the river	_____
While traveling on the river	_____
Where you last took out of the river	_____
While camping on the river	_____

5. How did the number of people you saw at EACH of the following places compare with what you had expected to see?

Where you first put into the river	[]	[]	[]	[]	[]	[]
While traveling on the river	[]	[]	[]	[]	[]	[]
Where you last took out of the river	[]	[]	[]	[]	[]	[]
While you were camping on the river	[]	[]	[]	[]	[]	[]

6. Information about problems you may have experienced would be helpful to river managers. To what extent did you find each of the following to be a problem during your river trip? (Circle the number that best describes how serious you found EACH to be).

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Too few garbage cans	1	2	3	4	5
Erosion of stream banks	1	2	3	4	5
Litter in river	1	2	3	4	5

Litter on banks	1	2	3	4	5
Obstructions in river (logs, limbs, fences)	1	2	3	4	5
Vandalism	1	2	3	4	5

Too few drinking water sources	1	2	3	4	5
Bad weather	1	2	3	4	5
Too many homes or cottages along river	1	2	3	4	5

Muddy water	1	2	3	4	5
Water pollution	1	2	3	4	5
Off-road vehicles in river area	1	2	3	4	5

People shouting and yelling	1	2	3	4	5
People being inconsiderate	1	2	3	4	5
People drinking alcoholic beverages	1	2	3	4	5

6. (continued)

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Too many people on the river	1	2	3	4	5
Insect bites	1	2	3	4	5
Frightening rapids	1	2	3	4	5
Motorized boats on the river	1	2	3	4	5
Airplanes flying overhead	1	2	3	4	5
Utility poles and lines	1	2	3	4	5
Railroads along banks	1	2	3	4	5
Too few rules and regulations	1	2	3	4	5
Too many rules and regulations	1	2	3	4	5
Trees and branches overhanging the river	1	2	3	4	5
People playing loud radios	1	2	3	4	5
Insufficient information about things to do and see in the area	1	2	3	4	5
Too many commercial establishments	1	2	3	4	5
Inadequate toilet facilities at put-in and take-out points	1	2	3	4	5
Too few toilet facilities along river between put-in and take-out points	1	2	3	4	5
Not enough law enforcement	1	2	3	4	5
Too much law enforcement	1	2	3	4	5
People fishing	1	2	3	4	5
Roads within sight of river	1	2	3	4	5
Too many signs along the river	1	2	3	4	5
People being rowdy	1	2	3	4	5
Inadequate information services (signs, displays) at put-in points	1	2	3	4	5
Too many bridges across river	1	2	3	4	5
Too much nudity	1	2	3	4	5

6. (continued)

	Not a problem	Slight problem	Moderate problem	Serious problem	Very serious problem
Livestock	1	2	3	4	5
Someone in your group receiving an injury	1	2	3	4	5
Human body waste	1	2	3	4	5

Damage to or loss of personal property	1	2	3	4	5
Navigation problems due to low water levels	1	2	3	4	5
Navigation problems due to high water levels	1	2	3	4	5

Conflicts or tensions within your group	1	2	3	4	5
Inadequate brochures showing map of river, hazards, access points, etc.	1	2	3	4	5
Nuisance wildlife	1	2	3	4	5

Unskilled people using the river	1	2	3	4	5
Poor quality campsites	1	2	3	4	5
Campsites occupied by others	1	2	3	4	5

Campsite locations not clearly identified	1	2	3	4	5
Other things (please specify):					

7. How do you feel about the number of people you saw at each of the following places?

Where you first put into the river	[]	[]	[]	[]	[]
While travelling on the river	[]	[]	[]	[]	[]
Where you last took out of the river	[]	[]	[]	[]	[]
While you were camping on the river	[]	[]	[]	[]	[]

8. Do you feel there are conflicts between different groups of river users? (For example, between canoeists and fishermen, motorboaters and swimmers, landowners and canoeists, horseback riders and canoeists, etc.)

[] NO

[] YES If yes, between which groups are the conflicts occurring? _____

What conflicts exist between these groups? _____

9. Do you feel that more controls are needed to keep these conflicts from occurring?

[] NO

[] YES

10. Do you feel the river environment is being damaged by recreational use?

☐ NO

☐ YES If "Yes," what kinds of environmental damages are occurring?

11. Do you feel more controls are needed to prevent the river environment from being damaged by recreational use?

☐ NO

☐ YES

12. Given the conditions on the river when you were there, how would you feel about each of the following management actions? (Circle the number that shows how much you support or oppose EACH action.)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support
Provide more points of public access to the river	1	2	3	4	5
Require people to carry out their own trash	1	2	3	4	5
Provide more campsites along the river between put-in and take-out points	1	2	3	4	5
Prohibit motorized watercraft on the river	1	2	3	4	5
Post signs warning and advising of hazards	1	2	3	4	5
Provide more parking at access points	1	2	3	4	5
Provide firewood at campsites and picnic areas	1	2	3	4	5
Allow wood fires only at designated spots	1	2	3	4	5
Prohibit wood fires altogether	1	2	3	4	5

12. (continued)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support
Provide more patrols to assist river users and enforce regulations	1	2	3	4	5
Develop short hiking trails at points along the river	1	2	3	4	5
Prohibit off-road vehicles in the vicinity of the river, except on roads and highways	1	2	3	4	5

Improve existing access roads to put-in and take-out points	1	2	3	4	5
Be more aggressive in the enforcement of safety rules and regulations	1	2	3	4	5
Allow camping only at designated locations	1	2	3	4	5

Require every group to have approved first-aid equipment	1	2	3	4	5
Prohibit camping along the river	1	2	3	4	5
Restrict the numbers of people using the river at any one time	1	2	3	4	5

Provide campsites for river users at put-in and take-out points	1	2	3	4	5
Prohibit the use of cans, bottles, and other nonburnable disposable containers	1	2	3	4	5
Limit the number of people per group allowed on the river	1	2	3	4	5

Achieve better spacing among groups by assigning the time of day when each group may begin its trip	1	2	3	4	5
Improve the loading areas at put-in and take-out points	1	2	3	4	5
Provide more information along the river identifying facilities and points of interest	1	2	3	4	5

Provide more distance markers along the river	1	2	3	4	5
Have each group be assigned where they are to camp	1	2	3	4	5

13. How well do the following statements describe your feelings about the river trips?
(Circle the number that best describes how strongly you agree or disagree with each statement.)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I thoroughly enjoyed the trip	1	2	3	4	5
I did not see the types of wildlife I had hoped to see	1	2	3	4	5
I was pleased by the job being done by managers of the river	1	2	3	4	5

The number of people I saw on the river was about right	1	2	3	4	5
The actions of other people on the river bothered me	1	2	3	4	5
The river went through some very wild country	1	2	3	4	5

I cannot imagine a better river trip	1	2	3	4	5
I wish there had been more rapids	1	2	3	4	5
The river trip was well worth the money I spent to take it	1	2	3	4	5

I was very pleased with the scenery	1	2	3	4	5
I do not want to run any more rivers like this one	1	2	3	4	5
I was disappointed with some aspects of my trip	1	2	3	4	5

The river went through some true wilderness	1	2	3	4	5
I thought the river and its surround- ings were in good condition	1	2	3	4	5
The people I saw on the river did not bother me	1	2	3	4	5
I want to go back and run that part of the river again	1	2	3	4	5

14. Some possible reasons why people take river trips are listed below. Think about why you took your river trip and circle the number that best shows how much you agree or disagree with EACH of the following statements.

I took this river trip because I wanted . . .

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
To view the scenery	1	2	3	4	5
To be part of a group	1	2	3	4	5
To test and use my equipment	1	2	3	4	5

To be close to nature	1	2	3	4	5
To run rapids	1	2	3	4	5
To talk to new and varied people	1	2	3	4	5

To be my own boss	1	2	3	4	5
To do some hiking	1	2	3	4	5
To develop my skills and abilities	1	2	3	4	5

To think about my personal values	1	2	3	4	5
To get away from the usual demands of life	1	2	3	4	5
To do some fishing	1	2	3	4	5

I wanted:

To strengthen my feelings of self-worth	1	2	3	4	5
To get away from other people	1	2	3	4	5
To see historical sites	1	2	3	4	5

To experience peace and calm	1	2	3	4	5
To have thrills and excitement	1	2	3	4	5
To do some camping	1	2	3	4	5

To have a change from the daily routine	1	2	3	4	5
To learn more about nature	1	2	3	4	5
To be with people having similar values	1	2	3	4	5

14 (continued)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
To do something with the family	1	2	3	4	5
To learn more about things there	1	2	3	4	5
To be with friends	1	2	3	4	5

To give my mind a rest	1	2	3	4	5
To visit archeological sites (pictographs, ruins, artifacts)	1	2	3	4	5
To be alone	1	2	3	4	5

To keep physically fit	1	2	3	4	5
To release tensions and anxieties	1	2	3	4	5
To test my abilities	1	2	3	4	5

To be away from crowds of people	1	2	3	4	5
To experience new and different things	1	2	3	4	5
To take chances in dangerous situations	1	2	3	4	5

To be away from the noise back home	1	2	3	4	5
To show others I can do it	1	2	3	4	5
To share what I have learned with others	1	2	3	4	5

15. Before this river trip, had you ever been on a river trip? (A "river trip" refers to traveling on a river or stream by innertube, canoe, kayak, inflatable raft, motorboat, etc.)

[] NO If "No," go to Question No. 16.

[] YES If "Yes," continue with "A" below.

- A. On what rivers have you taken river trips? Please list their names below, the number of trips to each river, and name the states or foreign countries where they are located. (If more space is needed, use the last page of this questionnaire.)

<u>River Name</u>	<u>Name or Location of River Stretch</u>	<u>Number of Trips</u>	<u>Year(s)</u>	<u>State or Foreign Country</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

16. What is your educational background? (Circle the number of the highest "grade" completed.)

1 2 3 4 5 6 7 8 9 10 11 12
Elementary through High School

13 14 15 16 16+
Beyond High School

17. Are you a student?

☐ NO

☐ YES

18. Are you retired?

☐ NO

☐ YES

19. What is your occupation? _____

What sort of work do you do? _____

20. What is your age? _____ years.

21. At the time of your river trip, did you have any physical impairment or handicap?

☐ NO

☐ YES Please describe:

☐ Hard of hearing or deaf

☐ Serious difficulty in seeing or blind

☐ Respiratory disorder

☐ Orthopedic handicap

☐ Arthritis or rheumatism

☐ Heart trouble

☐ Other--please specify: _____

A brief description of our research program is on the
back of this questionnaire.

Any other comments about your river experience or
suggestions about managing the river are welcomed.
Please use the next page to write your comments.

Thank you for your help!

VITA

Elizabeth Greer Edwards was born in Asheville, North Carolina, on May 8, 1953. She attended elementary schools in Lincoln, Illinois, and graduated from Lincoln Community High School in May, 1971. In the fall of 1971 she entered the University of the South at Sewanee, Tennessee, and received the Bachelor of Arts degree in political science from this institution in 1975.

Prior to entering the Graduate School of Planning at The University of Tennessee, Knoxville, in 1977, she was employed for two years with the Tennessee Comptroller's Office. She received the Master of Science in Planning in March 1982.

The author has been employed with the Tennessee State Planning Office, in the Local Planning Division, since May 1980.

She is married to Warren Davidson Broemel of Nashville, Tennessee.